



ARCHITECTURE  
INTERIOR DESIGN  
ENGINEERING  
PLANNING

# Specifications

For:

# TownePlace Suites

**1810 NE Douglas St.  
Lee's Summit, MO 64064**

**Volume 1 of 2**

**Owner:  
Intrinsic Development  
3622 Endeavor Ave. Ste 101  
Columbia, MO 65201**

**Project No.: 23098  
November 1, 2023**



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033000	CAST IN PLACE CONCRETE
034100	PRECAST STRUCTURAL CONCRETE
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10 4416	FIRE EXTINGUISHERS
10 5000	METAL LOCKERS
10 5550	KEY KEEPER ENTRY SPECIALTIES
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12 3600	COUNTERTOPS
12 3640	STONE COUNTERTOPS
12 4813	ENTRANCE FLOOR MATS AND FRAMES

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**SECTION 000005**  
**ARCHITECT CERTIFICATION PAGE**

**ARCHITECT CERTIFICATION**

**I, DAVID E. HENDRIKSE, HEREBY SPECIFY, PURSUANT TO THE STATE OF MISSOURI THAT  
THE DOCUMENTS INTENDED TO BE AUTHORIZED BY MY SEAL ARE LIMITED TO:**

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31 2113 RADON MITIGATION  
31 3116 TERMITE CONTROL  
  
32 3119 DECORATIVE METAL FENCES AND GATES

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**AND DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER PLANS, SPECIFICATIONS,  
REPORTS OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE  
USED FOR ANY PART OR PARTS FOR TOWNPLACE SUITES IN LEES SUMMIT, MISSOURI.**

**SEAL:**



**BY:** \_\_\_\_\_

**DATE:** 11/1/2023

**END OF SECTION 000005**



**SECTION 000007**  
**STRUCTURAL CERTIFICATION PAGE**

**STRUCTURAL CERTIFICATION**

**I, CELESTE SPICKERT, HEREBY SPECIFY, PURSUANT TO THE STATE OF MISSOURI THAT  
THE DOCUMENTS INTENDED TO BE AUTHORIZED BY MY SEAL ARE LIMITED TO:**

**SPECIFICATION SECTIONS**

**014533 – CODE REQUIRED SPECIAL INSPECTIONS**  
**030130 – MAINTENANCE OF CIP CONCRETE**  
**031100 – CONCRETE FORMWORK**  
**031500 – CONCRETE ACCESSORIES**  
**032000 – CONCRETE REINFORCEMENT**  
**033000 – CAST IN PLACE CONCRETE**  
**034100 – PRECAST STRUCTURAL CONCRETE**  
**051200 – STRUCTURAL STEEL**  
**053100 – METAL DECKING**  
**061000 – ROUGH CARPENTRY**  
**061516 – WOOD ROOF DECKING**  
**061600 – SHEATHING**  
**061753 – SHOP FABRICATED WOOD TRUSSES**  
**061800 – GLUED-LAMINATED CONSTRUCTION**

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USED FOR ANY PART OR PARTS FOR TOWNPLACE SUITES.

SEAL:



10/12/2023

BY: CELESTE KAY SPICKERT

DATE: OCTOBER 12, 2023

END OF SECTION 000007



**SECTION 000008**  
**MEP CERTIFICATION PAGE**

**MEP CERTIFICATION**

**I, JP WATSON, HEREBY SPECIFY, PURSUANT TO THE STATE OF MISSOURI THAT THE DOCUMENTS INTENDED TO BE AUTHORIZED BY MY SEAL ARE LIMITED TO:**

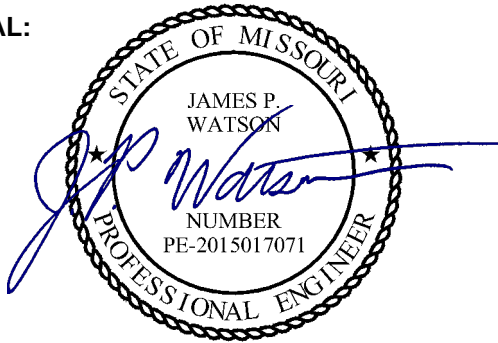
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**EL101 – LIGHTING PLAN – 1<sup>ST</sup> FLOOR – AREA A**  
**EL102 – LIGHTING PLAN – 2<sup>ND</sup> & 3<sup>RD</sup> FLOOR – AREA A**  
**EL103 – LIGHTING PLAN – 4<sup>TH</sup> FLOOR – AREA A**  
**EL111 – LIGHTING PLAN – 1<sup>ST</sup> FLOOR – AREA B**  
**EL112 – LIGHTING PLAN – 2<sup>ND</sup> & 3<sup>RD</sup> FLOORS – AREA B**  
**EL113 – LIGHTING PLAN – 4<sup>TH</sup> FLOOR – AREA B**  
**EL401 – LIGHTING PLAN – GUEST ROOMS**  
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**FS102 – FIRE PROTECTION & SECURITY SYSTEM PLAN – 2<sup>ND</sup>-4<sup>TH</sup> FLOORS – AREA A**  
**FS111 – FIRE PROTECTION & SECURITY SYSTEM PLAN – 1<sup>ST</sup> FLOOR – AREA B**  
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**PW101 – WATER & GAS PLAN – 1<sup>ST</sup> FLOOR – AREA A**  
**PW102 – WATER & GAS PLAN – 2<sup>ND</sup> FLOOR – AREA A**  
**PW111 – WATER & GAS PLAN – 1<sup>ST</sup> FLOOR – AREA B**  
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**SEAL:**



**BY: JP WATSON, PE**

**DATE: 11/01/2023**

**END OF SECTION 000008**



**SECTION 00 3100  
AVAILABLE PROJECT INFORMATION**

**PART 1 GENERAL**

**1.01 EXISTING CONDITIONS**

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:
- B. Geotechnical Report: Entitled GEOTECHNICAL ENGINEERING REPORT DISCOVERY PARK LOT 3, dated August 10, 2023.
  - 1. Original copy is attached to this Specification.
  - 2. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect. A copy of the report follows in Section 00 3110.
  - 3. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.
- C. Basis of Design: Volume 2 of 2

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**



# **GEOTECHNICAL ENGINEERING REPORT**

## **DISCOVERY PARK LOT 3**

**Prepared for:**

Intrinsic Development

Columbia, Missouri

August 10, 2023

Olsson Project No. F21-04643







August 10, 2023

Intrinsic Development  
Attn: Mr. Brian Maenner  
4215 Phillips Farm Road  
Columbia, Missouri 65201

Re: Geotechnical Engineering Report  
Discovery Park Lot 3  
Lee's Summit, Missouri  
Olsson Project No. F1-04643

Dear Mr. Maenner,

Olsson has completed the geotechnical engineering report for the Discovery Park Lot 3 project. The enclosed report summarizes our understanding of the project, presents the findings of the borings and laboratory tests, discusses the observed subsurface conditions, and based on those conditions, provides geotechnical engineering recommendations for the development of Discovery Park Lot 3.

We appreciate the opportunity to provide our geotechnical engineering services for this project. If you have any questions or need further assistance, please contact us at your convenience.

Respectfully submitted,  
**Olsson, Inc.**

A handwritten signature in blue ink, appearing to read "JD Putnam".

**JD Putnam, E.I.**  
*Assistant Engineer*



**James M. Landrum, PE**  
*Vice President*



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# 1. PROJECT INTRODUCTION

## 1.1 Geotechnical Scope

This Geotechnical Engineering Report presents the results of the subsurface exploration performed for Discovery Park Lot 3 in Lee's Summit, Missouri. Olsson, Inc. (**Olsson**) previously completed a preliminary geotechnical report for the development (Olsson Project No. A21-04643 dated March 7, 2023). To supplement the borings completed as part of our preliminary exploration, we drilled seven borings within the proposed footprint and pavement areas at Lot 3. The approximate locations of the borings, including the preliminary boring, are shown on the Boring Location Map in Appendix A. The associated Borehole Reports are presented in Appendix B. Rock Core photographs are located in Appendix C. The purposes of this report are to evaluate the existing subsurface conditions at the site, and based on those conditions, present geotechnical engineering recommendations for general earthwork, foundations for the proposed structures, floor slab and pavement subgrade preparation, and minimum pavement sections thicknesses.

## 1.2 Project Site

The project site is located in the southeast area of the Discovery Park development in Lee's Summit, Missouri (Figures 1 and 2). The proposed lot was previously tree covered, prior to clearing in 2023. A drainage swale is located on the property flowing from the southeast to the northwest across the site. The existing surface elevations at the lot range from 936 feet (within the drainage swale) to 964 feet.





**Figure 1. Project Site Location**



**Figure 2. Drainage Swale Locations**

## 1.3 Project Information

We understand the project consists of a 4-story, slab-on-grade, wood framed hotel structure. The hotel is planned to have a finished floor elevation of 967 feet. In addition to the hotel, we understand that a 4-story concrete parking garage is planned to abut and connect to the hotel



with an integral foundation system. The garage is planned to have a finished slab elevation of 966.66 feet. Within the hotel and garage footprints, we understand that 7 to 15 feet of structural fill is planned to be placed.

Although not finalized, structural loads for the planned hotel are expected to be on the order of 100 kips for isolated column loads and less than 5 kips per lineal foot for exterior wall loads. We understand that column loads for the garage is expected to be on the order of 250 kips. If actual loads are greater than those presented above, **Olsson** should be contacted to provide additional recommendations.

At-grade parking is planned to be located to the north and east of the hotel and garage. We understand that fills in the parking areas will range from 2 feet to 14 feet.

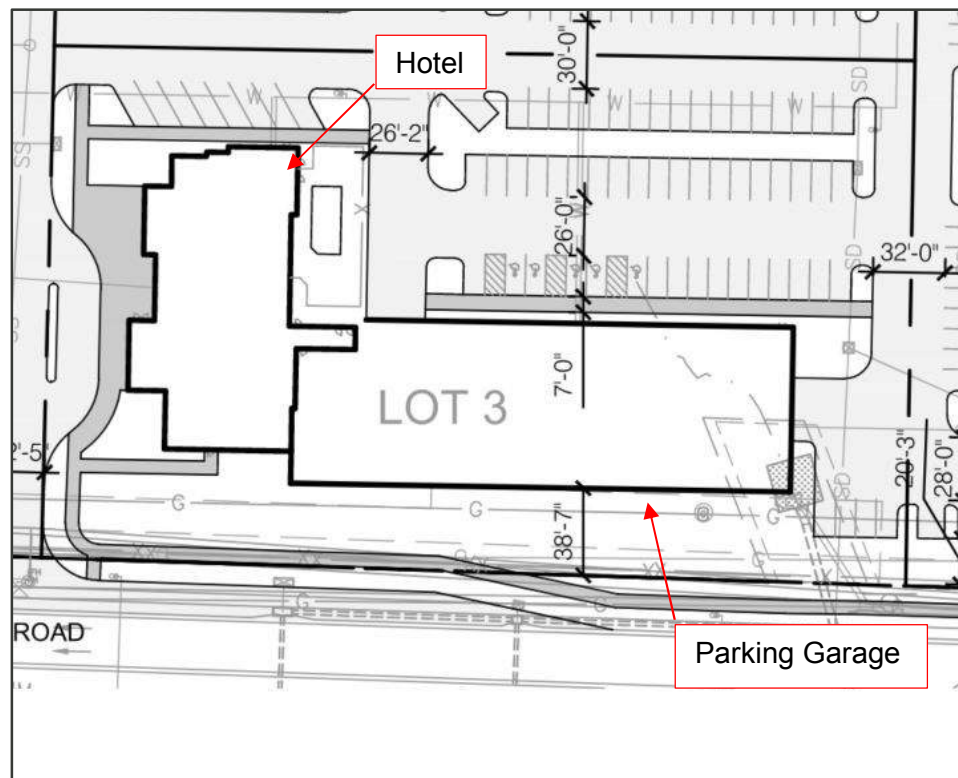


Figure 3. Proposed Site Layout



## 2. FIELD EXPLORATION AND LABORATORY TESTS

### 2.1 Field Exploration

The drill crew used a truck mounted drill rig, equipped with continuous flight augers to advance the seven borings at the site. An **Olsson** survey crew located the borings and provided the ground surface elevations. These elevations are rounded to the nearest tenth of a foot on the appended Borehole Reports.

The drill crew obtained soil samples using thin-walled sampling tubes hydraulically pushed into the soil and split-barreled sampling tubes during the performance of the Standard Penetration Test (SPT). Rock core samples were obtained using an NQ-2 sized diamond bit core barrel. The drill crew sealed and returned the samples to our laboratory for testing and classification. The sampling depths, SPT blow counts (N-values) and rock core run depths are shown on the appended Borehole Reports in Appendix B.

The drill crew prepared a field log for each boring. These field logs include visual classifications of the materials encountered during the drilling process as well as the drillers' interpretation of the subsurface conditions between the samples.

### 2.2 Laboratory Testing

At our laboratory, we classified the soil samples in general accordance with the Unified Soil Classification System (USCS) and tested selected samples. Based on the laboratory test results and our observations of the samples, we modified the field logs that were prepared by the drill crew. Results of the laboratory tests are shown on the appended Borehole Reports.

We visually examined and photographed the rock core samples recovered from the borings. Photographs of the rock cores are provided in Appendix C. Unconfined compressive strength tests were performed on representative bedrock samples. We calculated percent recovery (REC) and Rock Quality Designation (RQD) for each core run. RQD is the percent of total length cored consisting only of sound pieces of at-least 4 inches or more in length and is a measure of the integrity of the rock mass in-situ. Based on RQD, rock quality can be described as "Excellent" (90%-100%), "Good" (75%-90%), "Fair" (50%-75%), "Poor" (25%-50%), and "Very Poor" (<25%).



### 3. SUBSURFACE CONDITIONS

#### 3.1 Subsurface Stratigraphy

The subsurface conditions shown on the borehole reports represent conditions at the specific boring locations at the times they were drilled. Variations may occur between and beyond the borings. The stratification lines shown on the appended Borehole Reports represent the approximate locations of changes in soil and bedrock types. The actual transitions between materials are usually gradual. Based on the borings and laboratory test results, the subsurface conditions at this project site can be generalized as follows.

Below the rootzone layer, the borings encountered moderately to highly plastic clay soils overlaying limestone bedrock. The native clay soils were generally firm to stiff, very dark brown transitioning to pale olive with brown and light brown, silty, and moist, becoming shaley nearing the bedrock interface. The borings encountered and refused on limestone bedrock below the native clay soils at depths of 5 feet to 8 feet below the existing surface.

The bedrock encountered at the borings predominately consisted of limestone with two relatively thin layers of shale. The Missouri Department of Natural Resources identifies the bedrock at this site belonging to the Linn and Bronson Subgroup of the Kansas City Group. A generalized succession layout is provided in Figure 4.

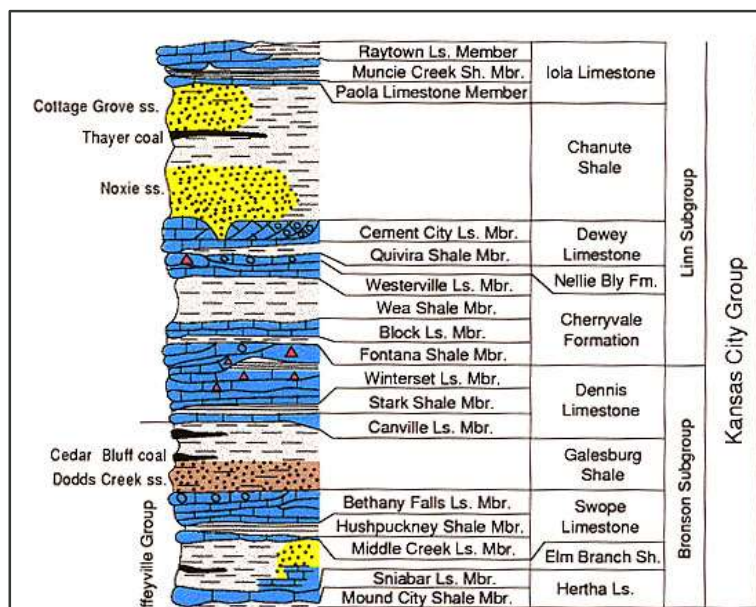


Figure 4. Linn and Bronson Subgroup Succession



## 3.2 Water Level Observations

The drill crew monitored the borings for ground water levels during and immediately after the completion of drilling operations, but prior to rock coring. In borings where rock coring operations took place, ground water levels were not measured after coring as water is introduced into the borehole to cool the bit and flush the cuttings. Water was not observed in any of the boreholes. The lack of groundwater should not be construed to represent a permanent or stable condition. Variations and uncertainties exist with relatively short-term water level observations in boreholes. Water levels can and should be anticipated to vary between boring locations, as well as time within specific borings. Water typically collects near the interface between different materials, such as soil and bedrock. Groundwater levels can fluctuate with variations in precipitation, site grading, drainage, and adjacent land use. Long term monitoring with piezometers generally provides a more representative reflection of the potential range of groundwater conditions.



## 4. GEOTECHNICAL CONSIDERATIONS

Our previous experience with former agricultural sites has shown that it is common practice to push miscellaneous debris/trash directly into old excavations or washouts around the farm or into drainage areas to help control erosion. It is difficult to identify and document the specific location of these areas with soil borings only, but the earthwork contractor should be aware that these areas may be encountered during grading operations. We recommend that a representative of **Olsson** be on-site to monitor the earthwork and excavation operations and to document the presence of suspicious fill, buried debris, or otherwise unsuitable material that may be encountered across the project site. If encountered, these unsuitable materials should be removed and replaced with structural fill.

Trace amounts of organics were encountered in the upper 3 feet of the on-site clay soils. Deeper and varying stripping depths are likely to be required within the project site. It is important to ensure that the subgrade is free of organic content prior to placement of fill.

As previously mentioned, a drainage swale is located in the north half of the lot and flows from the southeast to the northwest. Soft, wet, silty, and other unsuitable soils could be encountered within and around the drainage swale. Where encountered, these soils should be undercut and replaced with approved structural fill as recommended in this report.

Relatively shallow bedrock was encountered across the site. If excavations (e.g. utility lines) encounter limestone, excavation of the limestone could require hard rock removal techniques.



## 5. SITE PREPARATION

### 5.1 General Site Preparation Recommendations

Site preparation should commence with the stripping of any organic topsoil. In addition, any loose, soft, or otherwise unsuitable materials should be stripped from the site. Deeper, softer soils could be present within and adjacent to the drainage swale that crosses the site, and stripping depths are likely to vary across the site. Materials that are stripped from the site should be carefully separated to avoid incorporation of organic materials into new fill sections in the building or pavement areas. Site clearing, grubbing, and stripping should be performed during dry weather conditions. Operation of heavy equipment on the site during wet conditions could result in excessive rutting and mixing of construction debris with the underlying soils.

Upon completion of stripping operations, but prior to any new fill being placed on site, we recommend that the exposed ground surface be proofrolled with a loaded tandem axle dump truck weighing at least 20 tons or similar equipment. Proofrolling operations should be observed by a representative of **Olsson**. Unstable and unsuitable soils revealed by proofrolling should be removed and replaced with structural fill.

Once proofrolling is complete, the upper 8 inches of exposed subgrade should be scarified, moisture conditioned, and recompact to a minimum of 95 percent of the materials Standard Proctor maximum dry density (ASTM D-698) at a moisture content between optimum and 4 percent above optimum.

### 5.2 Structural Fill

All structural fill and backfill should consist of the following approved materials, free of organic matter (organic content less than 5 percent), debris, and particles with sizes larger than 3 inches. Imported fill soils, if needed, should consist of cohesive soils exhibiting a Liquid Limit (LL) less than 55 and a Plasticity Index (PI) less than 35. If imported soils are planned to be used at the site, samples of the fill should be submitted to **Olsson** for laboratory Proctor and classification tests prior to placement on the site. Our observations and laboratory tests, and results from prior explorations within the overall development site, indicate that the on-site soils are suitable for reuse as structural fill. However, the on-site soils do not appear suitable for use as low volume change fill placed directly below the hotel floor and parking garage slabs.

We recommend that all structural fill and backfill be compacted in accordance with the criteria provided in Table 1 below. An **Olsson** representative should observe all fill placement operations at the site and perform field compaction tests, as required.



Table 1. Fill Placement and Compaction Recommendations

Area of Fill Placement	Material	ASTM D-698 Compaction Recommendation	Moisture Content (Percent of Optimum)
<b>Granular Leveling Course</b> 4" Below Base Floor Slab	ASTM C-33 No.57 Aggregate	65% of Relative Density	As Necessary to Obtain Density
<b>Low Volume Change</b> 18" Below Base of <i>Granular Leveling Course</i>	Cohesive Soils w/ LL < 45 PI < 25	95%	0 to +4 Percent
	MoDOT Type 5 Baserock*		As Necessary to Obtain Density
<b>Structural Fill</b> Fill placed within 10 feet of final site grade	Recompacted On- Site Soils	95%	0 to +4 Percent
	Cohesive Soils w/ LL < 55 PI < 35		
<b>Deep Structural Fill</b> Fill Placed 10 feet or more beneath final grade	Recompacted On- Site Soils	98%	0 to +4 Percent
	Cohesive Soils w/ LL < 60 PI < 30		
<b>Pavement Subgrade</b> Granular Base	MoDOT Type 5 Baserock*	95%	As Necessary to Obtain Density
<b>Pavement Subgrade</b>	Cohesive Soils w/ Fly Ash (15%)/ Soil Cement (5%)/ Lime (5%)**	95%	-1 to +3 Percent

\*Or equivalent

\*\*Percentages based on dry unity weights

Suitable fill materials should be placed in thin loose lifts of 9 inches or less. Within small excavations, such as in utility trenches, around manholes, or behind retaining walls, the use of vibrating plat compactors, jumping jack compactors or walk behind sheepsfoot compactors may be used to facilitate compaction in these areas. Loose lifts thicknesses of 4 inches or less are recommended where small compaction equipment is used.

The moisture content of structural fill soils at the time of compaction should generally be maintained between the ranges specified above. More stringent moisture limits may be necessary with certain soils and some adjustments to moistures contents may be necessary to achieve compaction in accordance with project specifications.

If rock fill is planned to be used, **Olsson** should be contacted for additional recommendations.

## 5.3 Drainage and Groundwater Considerations

The area surrounding the site should be sloped to promote surface drainage away from the foundation. Water should not be allowed to collect at the ground surfaces near foundations, floor slabs, or areas of new pavement, either during or after construction. Provisions should be made to quickly remove accumulating seepage water or storm water runoff from excavations.



Undercut or excavated areas should be sloped toward one corner to allow rainwater or surface runoff to be quickly collected and gravity drained or pumped from construction areas. Subgrade soils that are exposed to precipitation or runoff should be evaluated by **Olsson** prior to the placement of new fill, reinforcing steel, or concrete, to determine if corrective action is required.

To minimize concerns related to improper or inadequate drainage away from foundation bearing subgrades or from cohesive backfill materials used in utility or foundation trenches, we recommend the following:

- Site grading should provide for efficient drainage of rainfall or surface runoff away from the new structure and pavements.
- Roof run-off should be collected and transferred directly to the storm sewer system or directed to a location with positive and rapid drainage away from new structure and pavements.
- External hose connections in unpaved areas should incorporate splash blocks to prevent accidental flooding of foundation bearing or backfill soils. External hose connections should have cut-off valves inside the building to prevent accidental or unauthorized use.
- Maintenance personnel should be informed of the potential problems associated with watering near the building.

If water is flowing in the drainage swale that crosses the site, we recommend constructing a granular drainage blanket that follows the existing grade of the swale. The drainage blankets will help collect and remove seepage water to avoid future softening or erosion of new fill. The drainage blanket should be at least 1 foot thick and should lie at the approximate base of the existing swale. The granular drainage blanket should consist of free draining crushed rock (ASTM C 33, Size No. 57 aggregate or similar). The aggregate should be encapsulated in suitable geotextile filter fabric to reduce the potential for intrusion of fines and clogging of the gravel. A perforated drainpipe (minimum 6-inch diameter, wrapped in filter fabric) should be placed at the base of each blanket and should slope to collect and remove accumulated water to a suitable outlet. New controlled structural fill could then be placed above the drainage blanket to develop design grades.

## 5.4 Deep Structural Fills

Up to 15 feet of fill is expected in portions of the site, including within the hotel footprint. Where fill depths are shallow, we anticipate most of this settlement will occur during placement of the structural fill. Where fill depths exceed 10 feet but are less than 15 feet, the settlement will likely continue beyond placement of the fill and construction of settlement sensitive structures, such as utility lines and foundations for the new structure, should be delayed until the settlement is substantially complete. We anticipate a minimum delay period of 45 days following completion



of fill placement. Settlement plates (minimum of three) could be used to monitor the fill and possibly reduce the delay period.



## 6. STRUCTURES

### 6.1 Deep Foundation Recommendations

We understand that the foundations of the hotel and garage will act as a single structure while the upper levels of the two structures will act independently. In order to limit the differential movement between the proposed structures and based on the anticipated loads for the parking garage, in our opinion, the structures should be supported on drilled shafts bearing on competent limestone bedrock. Drilled piers bearing on competent limestone bedrock at this site can be designed and proportioned using an allowable end bearing pressure of 40 kips per square foot (ksf).

Drilled shafts at this site should have a minimum diameter of 30 inches and a length to diameter ratio greater than 2:1. Although groundwater was not encountered in the borings drilled for this report, water and softer soils could be encountered near the soil and bedrock interface during drilled shaft installation, possibly requiring temporary casing and/or dewatering to advance drilled shaft excavations.

The bottom of the shaft excavations should be cleared of water and loose material before placing concrete. Concrete should be placed soon after excavating to minimize bearing surface disturbance. **Olsson** should be retained to observe and test the foundation bearing materials. Any water accumulating in the pier excavation should be pumped from the excavation or the water level should be allowed to stabilize and then concrete should be placed using the tremie method.

Drilled shaft foundations designed and constructed as recommended above would be expected to experience total and differential settlements on the order of ½ inch.

### 6.2 Floor Slab and Garage Slab Subgrade Preparation

We recommend the placement of a 24-inch-thick low volume change (LVC) zone beneath the hotel and parking garage floor slabs.

The upper 6 inches of the zone should consist of a well graded, free draining, granular material (e.g., ASTM C-33 No. 57 aggregate). The free draining material should be compacted to 65 percent of the material's relative density and moisture conditioned to a level that is necessary to obtain the required density. Underlying the granular drainage layer, 18 inches of LVC material should be installed. The LVC material should consist of cohesive soils exhibiting a Liquid Limit less than 45 and a Plasticity Index less than 25, or a well graded granular material such as MoDOT Type 5, or equivalent. The 18 inches of LVC material should be compacted and moisture conditioned to the levels recommended in Table 1 of this report.



Upon completion of grading operations in the building area, care should be taken to maintain the recommended subgrade moisture content and density prior to construction of the new floor slabs. If the floor slab subgrade soils should become saturated, desiccated, frozen, disturbed or altered by construction activity, the subgrade should be restored to the conditions recommended in Table 1.

The procedures recommended above may not eliminate all future subgrade volume change and resultant floor slab movement. However, the procedures outlined should significantly reduce the potential for future subgrade volume change. Leaking utility lines or water allowed to accumulate beneath the slab could lead to significant movements of the slab. Depending on the location of construction joints in the slab, the rigidity of the slab and foundation connection, and the magnitude of actual movement that occurs, some minor cracking within the floor slab could occur and should be anticipated in any case.

## 6.3 Lateral Earth Pressure Parameters

The following soil parameters are provided for use in designing the elevator pit walls that are subject to lateral earth pressures. The parameters are based on the understanding that the retained soils used during construction will be similar in composition to the on-site soils encountered during this exploration. To ensure similarity, we recommend confirmation testing be performed during construction by **Olsson**.

The "at-rest" condition assumes no wall rotation and would be applicable for the elevator pit walls. Table 2 presents recommended values of earth pressure coefficients based on our experience with soils in the area. Equivalent fluid densities are frequently used for the calculation of lateral earth pressures for the "at-rest" and "active" conditions and are therefore provided in Table 2.



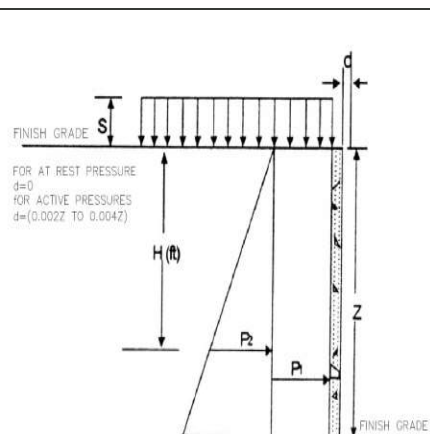
Table 2. Lateral Earth Pressure Parameters

Legend of Symbols		
Z	Wall Height (ft)	
H	Depth Below Surface (ft)	
D	Wall Displacement (ft)	
S	Surcharge Load (psf)	
P <sub>1</sub>	Surcharge Pressure (psf)	
P <sub>2</sub>	Earth Load (psf)	
K	Earth Pressure Coefficient	
G	Equivalent Fluid Density (pcf)	
Pressure Calculations		
Surcharge Pressure	$P_1 \text{ (psf)} = K * S$	
Earth Load	$P_2 \text{ (psf)} = G \text{ (pcf)} * H \text{ (ft)}$	
Earth Pressure Coefficient (K)		
At-Rest (K <sub>o</sub> )	Cohesive	0.59
	Granular*	0.47

The diagram illustrates a retaining wall of height  $H$  (ft) under a surcharge load  $S$  (psf) at the top. The wall is shown with a triangular earth pressure distribution. The resultant force  $P_2$  acts at a height  $Z$  from the base. The diagram also shows the wall displacement  $d$  and the finish grade line. Text labels indicate that  $d=0$  is for at-rest pressure and  $d=(0.0027 \text{ TO } 0.0047)$  is for active pressures.

Equivalent Fluid Density (G)		
	Drained, pcf	Undrained, pcf
At-Rest (K <sub>o</sub> )	70	95
	55	-

\*Granular backfill should be permanently drained.



The following assumptions were made:

- The equivalent fluid densities in Table 2 do not include the effects of surcharge loading.
- The equivalent fluid densities in Table 2 assume a level backslope. If a backslope is included, **Olsson** should be contacted to update the earth pressure coefficient and associated equivalent fluid density.
- Surcharges are uniform, where "S" is surcharge pressure, in psf.
- In-situ backfill has a maximum weight of 120 pcf.
- Horizontal backfill is compacted to 95% of standard Proctor maximum dry density.
- Heavy equipment and other concentrated load components are not included.
- No safety factor is included.

Backfill placed against structures should consist of granular soils or on-site cohesive soils. For the granular values to be valid, the granular backfill must extend out from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively. To calculate the resistance to sliding, an ultimate coefficient of friction value of 0.30 should be used where the footing bears on soil and shale bedrock and 0.65 where the footing bears on limestone bedrock.

To use the drained values, a perimeter drain should be installed at the foundation level. The drain line invert should be below the finished subgrade elevation for the interior floor. The drain line should be sloped to provide positive gravity drainage and should be surrounded by free-draining granular material graded to prevent the intrusion of fines, or an alternative free-draining



granular material encapsulated with suitable filter fabric. A minimum 2-foot-wide section of free-draining granular fill should be used for backfilling above the drain line and adjacent to the wall and should extend to within 2 feet of final grade. The granular backfill should be capped with compacted cohesive fill to minimize infiltration of surface water into the drain system.

## **6.4 Site Seismic Classification**

For this project site, the soil conditions are consistent with the definition of Site Class "C" (Very Dense Soil and Soft Rock profile) as defined in ASCE 07-16.



## 7. PAVEMENTS

### 7.1 Pavement Subgrade Preparation

At a minimum, at-grade parking areas should be supported on 6 inches of granular base with an approved geogrid material, or 6 inches of granular base over 6 inches of stabilized subgrade. The granular base should exhibit the gradation requirements of MoDOT Type 5. The stabilized subgrade could consist of on-site cohesive soils mixed with Class "C" Fly Ash, Soil Cement or Lime. In our experience, 15 percent fly ash, 5 percent cement and 5 percent lime would be necessary for this site. The baserock material and chemically stabilized cohesive soils should be compacted and moisture conditioned to the levels recommended in Table 1 of this report.

We recommend that the prepared subgrade extend a minimum of 2-feet outside the pavements, where feasible. **Olsson** should be present during subgrade preparation to observe, document, and test compaction of the materials at the time of placement. As recommended for all prepared soil subgrades, heavy, repetitive construction traffic should be controlled, especially during periods of wet weather, to minimize disturbance. The final prepared subgrade should be proof rolled with a loaded dump truck or similar rubber-tired equipment with a total weight of at least 20-tons, immediately prior to placement of new pavements. Proofrolling operations should be observed and documented by **Olsson**. Unstable or unsuitable soils revealed by proofrolling should be reworked to provide a stable subgrade or removed and replaced with structural fill.

Construction scheduling often involves grading and paving by separate contractors and can involve a time lapse between the end of grading operations and the commencement of paving operations. Disturbance, desiccation, or wetting of the subgrade soils between grading and paving operations can result in the deterioration of the previously completed subgrade. If soft and/or wet areas are identified during subgrade preparation or if the subgrade soils have been exposed to adverse weather conditions, frost, excessive construction traffic, standing water, or similar conditions, **Olsson** should be consulted to determine if corrective action is necessary.

It is important that the pavement subgrade support be relatively uniform, with no abrupt changes in the degree of support. Non-uniform pavement support can occur as a result of varying soil moisture contents or soil types, or where improperly placed utility backfill has been placed across or through areas to be paved. Improper subgrade preparation such as inadequate vegetation removal, failure to identify soft or unstable areas by proofrolling, and inadequate or improper compaction can also produce non-uniform subgrade support.

### 7.2 Minimum Pavement Sections

At a minimum, the at-grade parking areas should adhere to the *Section 8.620* of the city of Lee's Summit, Missouri – Unified Development Ordinance. The city also allows for alternative designs



that are equal to or greater than city standards. Table 3 summarizes the minimum pavement section thicknesses for Asphaltic Concrete (AC) and Portland Cement Concrete (PCC). Routine maintenance of the pavements will be required, consisting of periodic seal coats, with possibility of one intermediate mill, in addition to regular crack maintenance.

**Table 3. Minimum Pavement Sections**

Vehicle Parking Areas and Drives	Fire Lanes and Truck Access	Heavy Vehicle Areas*
<u>AC Option 1:</u> 1.5" AC Surface 4" AC Base 6" Compacted MoDOT Type 5 Baserock w/ Geogrid  <u>AC Option 2:</u> 1.5" AC Surface 4" AC Base 6" Compacted MoDOT Type 5 Baserock 6" Chemically Stabilized Subgrade*	<u>AC Option 1:</u> 1.5" AC Surface 5" AC Base 6" Compacted MoDOT Type 5 Baserock w/ Geogrid  <u>AC Option 2:</u> 1.5" AC Surface 5" AC Base 6" Compacted MoDOT Type 5 Baserock 6" Chemically Stabilized Subgrade*	<u>Full Depth PCC:</u> 6" PCC 4" Clean Rock Base  *Applies to trash receptacle pads

\*15% Fly Ash, 5% Cement or 5% Lime

PCC pavements are recommended for trash receptacle pads and other areas where heavy wheel loads will be concentrated. Concrete pavements in these areas should have a minimum thickness of 6 inches. It is also recommended that a 4-inch leveling, and drainage course of clean, crushed rock be placed below all PCC pavements. The clean rock base for PCC pavements should be uniform and pavement subgrade should be graded to provide positive drainage of the granular base section. The granular section should be graded to adjacent storm sewer inlets and provisions should be made to provide drainage from the granular section into the storm sewers. Drainage of the granular base is particular important where two different sections of pavements (such as AC and PCC) abut, so that water does not pond beneath the pavements and saturate the subgrade soils. We further recommend that the length of concrete sections be such that no heavy truck wheels are allowed to rest on asphaltic concrete sections during loading/unloading operations.

The performance of the pavements will be dependent upon a number of factors, including subgrade conditions at the time of paving, rainwater runoff, and traffic. Rainwater runoff should not be allowed to seep below pavements from adjacent areas. Pavements should be sloped approximately ¼ inch per foot to provide for rapid surface drainage.

Proper drainage below the pavement section helps prevent softening of the subgrade and has a significant impact on pavement performance and pavement life. Therefore, we recommend that



a granular blanket drain be constructed at all storm sewer inlets within the pavement areas. The blanket drain should consist of clean, crushed rock extending a minimum of 6 inches below pavement subgrade level. The blanket drains should extend radially a minimum of 8 feet from each of the storm sewer inlets. The grade within the blanket drain should be sloped toward the storm sewer inlet, and weep holes should be drilled through the inlet to provide drainage of the granular section into the inlet. Placement of a geotextile filter fabric across the weepholes could be considered to prevent loss of aggregate through the weep holes.

Construction traffic on the pavements has not been considered in the above noted typical sections. If construction scheduling dictates that the pavements will be subjected to traffic by construction equipment, increasing the pavement thickness should be considered to include the effects of additional traffic loading. Construction traffic should not be allowed on partially completed pavements as the pavements will not have adequate structural capacity and could be damaged.



## 8. CONCLUSIONS AND LIMITATIONS

### 8.1 Construction Observation and Testing

We recommend that all earthwork during construction be monitored by a representative of **Olsson**, including site preparation, placement of all structural fill and trench backfill, and pavement subgrades. The purpose of these services would be to provide **Olsson** the opportunity to observe the soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

### 8.2 Limitations

The conclusions and recommendations presented in this report are based on the information available regarding the proposed construction, the results obtained from our borings, laboratory testing program, and our experience with similar projects. The borings represent a very small statistical sampling of subsurface soils and it is possible that conditions may be encountered during construction that are substantially different from those indicated by the borings. In these instances, adjustments to design and construction may be necessary.

This geotechnical report is based on the site plan and our understanding of the project's information as provided to **Olsson**. Changes in the location or design of new structures could significantly affect the conclusions and recommendations presented in this geotechnical report. **Olsson** should be contacted in the event of such changes to determine if the recommendations of this report remain appropriate for the revised site design.

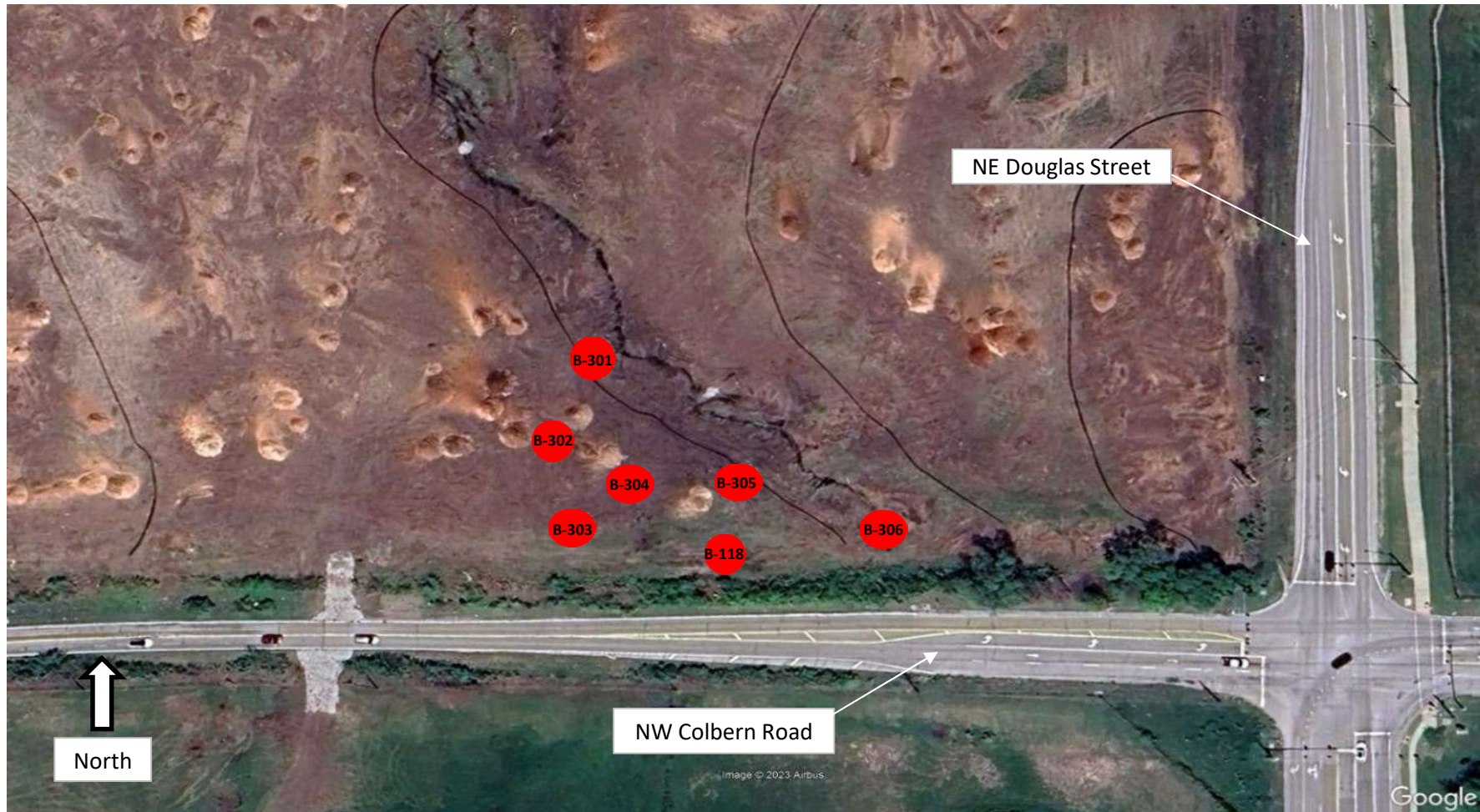
This report was prepared under the direction and supervision of a Professional Engineer registered in the State of Missouri with the firm of **Olsson, Inc.** The conclusions and recommendations contained herein are based on generally accepted, professional, geotechnical engineering practices at the time of this report, within this geographic area. No warranty, express or implied, is intended or made. This report has been prepared for the exclusive use of **Intrinsic Development** and their authorized representatives for the specific application to the proposed project described herein.



## **APPENDIX A**

### **BORING LOCATION MAP**





**olsson**

Scale: n.t.s.
Project No. F21-04643
Approved by: JDP
Date: 8/10/2023

### Boring Location Map

**Discovery Park Lot 3  
Lee's Summit, Missouri**



## **APPENDIX B**

### **BOREHOLE REPORTS, SYMBOLS, AND NOMENCLATURE**



## SYMBOLS AND NOMENCLATURE

### DRILLING NOTES

#### DRILLING AND SAMPLING SYMBOLS

SS: Split-Spoon Sample (1.375" ID, 2.0" OD)	HSA: Hollow Stem Auger	NE: Not Encountered
U: Thin-Walled Tube Sample (3.0" OD)	CFA: Continuous Flight Auger	NP: Not Performed
CS: Continuous Sample	HA: Hand Auger	NA: Not Applicable
BS: Bulk Sample	CPT: Cone Penetration Test	% Rec: Percent of Recovery
MC: Modified California Sampler	WB: Wash Bore	WD: While Drilling
GB: Grab Sample	FT: Fish Tail Bit	IAD: Immediately After Drilling
SPT: Standard Penetration Test Blows per 6.0"	RB: Rock Bit	AD: After Drilling
	PP: Pocket Penetrometer	CI: Cave In

#### DRILLING PROCEDURES

Soil samples designated as "U" samples on the boring logs were obtained in using Thin-Walled Tube Sampling techniques. Soil samples designated as "SS" samples were obtained during Penetration Test using a Split-Spoon Barrel sampler. The standard penetration resistance 'N' value is the number of blows of a 140 pound hammer falling 30 inches to drive the Split-Spoon sampler one foot. Soil samples designated as "MC" were obtained in using Thick-Walled, Ring-Lined, Split-Barrel Drive sampling techniques. Recovered samples were sealed in containers, labeled, and protected for transportation to the laboratory for testing.

#### WATER LEVEL MEASUREMENTS

Water levels indicated on the boring logs are levels measured in the borings at the times indicated. In relatively high permeable materials, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with only short-term observations.

### SOIL PROPERTIES & DESCRIPTIONS

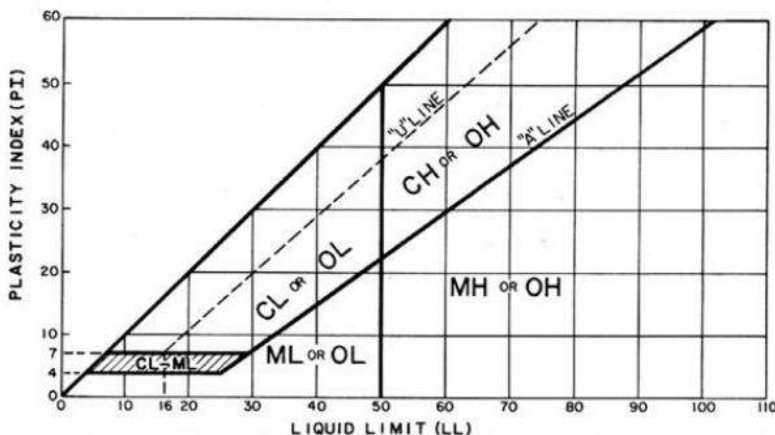
Descriptions of the soils encountered in the soil test borings were prepared using Visual-Manual Procedures for Descriptions and Identification of Soils.

#### PARTICLE SIZE

Boulders	12 in. +	Coarse Sand	4.75mm-2.0mm	Silt	0.075mm-0.005mm
Cobbles	12 in.-3 in.	Medium Sand	2.0mm-0.425mm	Clay	<0.005mm
Gravel	3 in.-4.75mm	Fine Sand	0.425mm-0.075mm		

COHESIVE SOILS		COHESIONLESS SOILS		COMPONENT %	
Consistency	Unconfined Compressive Strength (Qu) (tsf)	Relative Density	'N' Value	Description	Percent (%)
Very Soft	<0.25	Very Loose	0 – 3	Trace	<5
Soft	0.25 – 0.5	Loose	4 – 9	Few	5 - 10
Firm	0.5 – 1.0	Medium Dense	10 – 29	Little	15 - 25
Stiff	1.0 – 2.0	Dense	30 – 49	Some	30 - 45
Very Stiff	2.0 – 4.0	Very Dense	≥ 50	Mostly	50 - 100
Hard	> 4.0				

#### PLASTICITY CHART



#### ROCK QUALITY DESIGNATION (RQD)

Description	RQD (%)
Very Poor	0 – 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 – 100








olsson








## BOREHOLE REPORT NO. B-301

Sheet 1 of 1

PROJECT NAME					CLIENT									
Discovery Park - Lot 3					Intrinsic Development									
PROJECT NUMBER					LOCATION									
F21-04643					Lee's Summit, Missouri									
ELEVATION (ft)	<div> Split Spoon</div> <div> Shelby Tube</div>			GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS	
	MATERIAL DESCRIPTION													
	APPROX. SURFACE ELEV. (ft): 951.0													
	ROOT ZONE				0									
950	LEAN TO FAT CLAY				0.8'		SS 1		4-3-3 N=6		34.8			
	Firm, very dark brown with brown, silty, moist to very moist, trace organics													
	3.0'													
	Firm to stiff, pale olive with brown and light brown, silty, moist, trace gravel						U 2				24.6	100.5		P.P. = 2.0
	4.9'				5									

REFUSAL AT 5.0 FEET

## WATER LEVEL OBSERVATIONS

WD	 Not Encountered
IAD	 Not Encountered
AD	 Not Performed

**OLSSON, INC.**  
**1700 E. 123RD STREET**  
**OLATHE, KANSAS 66061**

STARTED:	7/27/23	FINISHED:	7/27/23
DRILL CO.: SUB-DRILLER		DRILL RIG:	CME 55
DRILLER:	JW	LOGGED BY:	CBM
METHOD: CONTINUOUS FLIGHT AUGER			





## BOREHOLE REPORT NO. B-302

Sheet 1 of 1

PROJECT NAME		CLIENT									
PROJECT NUMBER		LOCATION									
Discovery Park - Lot 3		Intrinsic Development									
F21-04643		Lee's Summit, Missouri									
ELEVATION (ft)	MATERIAL DESCRIPTION	GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS
	APPROX. SURFACE ELEV. (ft): 954.6		0								
	ROOT ZONE		0.8'								
	LEAN TO FAT CLAY <i>Firm, very dark brown with brown, silty, moist to very moist, trace organics</i>		3.0'	SS 1		2-2-3 N=5		32.5			
950	FAT CLAY <i>Firm to stiff, pale olive with brown and light brown, silty, moist</i>		5	U 2	CH			30.6	93.3	69/49	P.P. = 3.0
	LIMESTONE		7.6'								
	REFUSAL AT 7.8 FEET		7.8'								

WATER LEVEL OBSERVATIONS		OLSSON, INC. 1700 E. 123RD STREET OLATHE, KANSAS 66061	STARTED:	7/27/23	FINISHED:	7/27/23
WD	▽ Not Encountered		DRILL CO.: SUB-DRILLER		DRILL RIG:	CME 55
IAD	▽ Not Encountered		DRILLER:	JW	LOGGED BY:	CBM
AD	▽ Not Performed		METHOD: CONTINUOUS FLIGHT AUGER			



PROJECT NAME				CLIENT								
Discovery Park - Lot 3				Intrinsic Development								
PROJECT NUMBER				LOCATION								
F21-04643				Lee's Summit, Missouri								
ELEVATION (ft)	MATERIAL DESCRIPTION		GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS
	APPROX. SURFACE ELEV. (ft): 958.2			0								
	ROOT ZONE											
	LEAN TO FAT CLAY											
	Stiff, very dark brown with brown and redish brown, silty, moist, trace organics				SS 1		3-4-5 N=9		25.8			
955	3.0'											
	Very stiff, pale olive with brown and light brown, silty, moist			5	U 2			2.1	27.8	100.1		
	6.5'											
	WEATHERED LIMESTONE											
	8.0'											
950	LEAN TO FAT CLAY											
	Pale olive with light brown and light gray, silty, shaley (Possible Clay Filled Joint)			10	SS 3		4-5-7 N=12		27.7			
	12.2'											
	WEATHERED LIMESTONE											
	12.5'											
945	LIMESTONE				RC 1							Recovery 100%
	Light gray to blue gray and dark gray											RQD 111.1%
	Unconfined Compressive Strength - 3,137 ksf			15	RC 2							Recovery 98.3%
	17.1'											RQD 93.3%
	Gray with dark gray, interbedded shale											
940	18.6'											
	SHALE											
	18.9'											
	Dark gray to black, fissle			20								
CONTINUED NEXT PAGE												

## WATER LEVEL OBSERVATIONS

WD Not Encountered

IAD Not Performed

AD Not Performed

**OLSSON, INC.**  
**1700 E. 123RD STREET**  
**OLATHE, KANSAS 66061**

STARTED: 7/25/23 FINISHED: 7/25/23

DRILL CO.: SUB-DRILLER DRILL RIG: CME 55


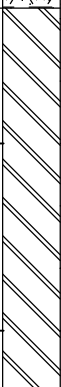
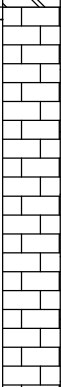
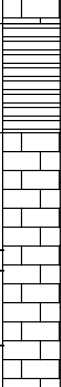


DRILLER: JW LOGGED BY: CBM

METHOD: HOLLOW STEM AUGER / AIR ROTARY










PROJECT NAME					CLIENT									
Discovery Park - Lot 3					Intrinsic Development									
PROJECT NUMBER					LOCATION									
F21-04643					Lee's Summit, Missouri									
ELEVATION (ft)	<div><div><div></div><div>Split Spoon</div></div><div><div></div><div>Shelby Tube</div></div><div><div></div><div>Rock Core</div></div></div> <div>MATERIAL DESCRIPTION</div>			GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS	
	APPROX. SURFACE ELEV. (ft): 955.5													
955	ROOT ZONE				0									
	LEAN TO FAT CLAY					SS 1		4-4-4 N=8		26.0				
	Firm, very dark brown with brown, silty, moist, trace organics													
	Firm to stiff, pale olive with brown, silty, moist													
950	6.0'				5	U 2				25.5	98.7		P.P. = 2.5	
	7.0'					RC 1								Recovery 100.0%
	Pale olive with light brown													
	WEATHERED LIMESTONE													
	7.2'					RC 2								RQD 100.0%
	Gray to blue gray													
	Unconfined Compressive Strength - 2,001 ksf													
945	13.5'				10									Recovery 100.0%
	15.2'					RC 3								Recovery 96.7%
	SHALE													
	Gray to dark gray, interbedded limestone													
940	17.1'													RQD 76.7%
LIMESTONE														
Gray to blue gray														
	17.4'													
	Unconfined Compressive Strength - 2,656 ksf													
	Blue gray, interbedded shale													
	18.6'													
	Blue gray to gray													
	Gray to dark blue gray, sandy				20									
CONTINUED NEXT PAGE														

## WATER LEVEL OBSERVATIONS

WD  Not Encountered

IAD  Not Performed

AD  Not Performed

**OLSSON, INC.**  
1700 E. 123RD STREET  
OLATHE, KANSAS 66061

STARTED: 7/26/23 FINISHED: 7/26/23

DRILL CO.: SUB-DRILLER DRILL RIG: CME 55

DRILLER: JW LOGGED BY: CBM




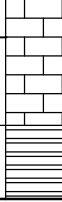
METHOD: HOLLOW STEM AUGER / ROCK CORE








## BOREHOLE REPORT NO. B-304

Sheet 2 of 2

PROJECT NAME <b>Discovery Park - Lot 3</b>				CLIENT <b>Intrinsic Development</b>									
PROJECT NUMBER <b>F21-04643</b>				LOCATION <b>Lee's Summit, Missouri</b>									
ELEVATION (ft)	 Split Spoon	 Shelby Tube	GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS	
	 Rock Core												
	MATERIAL DESCRIPTION												
935				20	RC 4								Recovery 100.0%  RQD 76.7%
	Light gray to light blue gray												
	Unconfined Compressive Strength - 2,802 ksf												
	SHALE												
	Dark gray to black, fissile												
BASE OF BORING AT 23.2 FEET													

## WATER LEVEL OBSERVATIONS

WD  Not EncounteredIAD  Not PerformedAD  Not Performed

**OLSSON, INC.**  
**1700 E. 123RD STREET**  
**OLATHE, KANSAS 66061**

STARTED: 7/26/23 FINISHED: 7/26/23

DRILL CO.: SUB-DRILLER DRILL RIG: CME 55

DRILLER: JW LOGGED BY: CBM

METHOD: HOLLOW STEM AUGER / ROCK CORE





PROJECT NAME						CLIENT												
Discovery Park - Lot 3						Intrinsic Development												
PROJECT NUMBER						LOCATION												
F21-04643						Lee's Summit, Missouri												
ELEVATION (ft)	<div><div><div></div><div>Split Spoon</div></div><div><div></div><div>Shelby Tube</div></div><div><div></div><div>Rock Core</div></div></div> MATERIAL DESCRIPTION					GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS			
	APPROX. SURFACE ELEV. (ft): 954.7						0											
	ROOT ZONE																	
						0.8'												
	LEAN TO FAT CLAY																	
	Firm, very dark brown, silty, moist, trace organics																	
						3.0'												
	Firm to stiff, pale olive with brown and light brown, silty, moist													P.P. = 2.25				
950																		
						8.0'												
	Pale olive with light brown, silty, shaley					8.2'												
	LIMESTONE																	
	Gray to blue gray																	
	Unconfined Compressive Strength - 2,498 ksf																	
945																		
						12.9'												
	SHALE					13.1'												
	Dark gray, clayey																	
	LIMESTONE																	
	Gray to blue gray and dark gray																	
	Unconfined Compressive Strength - 2,196 ksf																	
940																		
						16.6'												
	SHALE					16.9'												
	Dark gray, clayey																	
	LIMESTONE																	
	Gray to blue gray																	
						18.6'												
	Dark gray to blue gray, interbedded shale					19.7'												
935																		
	CONTINUED NEXT PAGE																	
WATER LEVEL OBSERVATIONS						OLSSON, INC. 1700 E. 123RD STREET OLATHE, KANSAS 66061						STARTED:		7/25/23	FINISHED:		7/25/23	
WD	Not Encountered											DRILL CO.:SUB-DRILLER		DRILL RIG:		CME 55		
IAD	Not Performed											DRILLER:		JW	LOGGED BY:		CBM	
AD	Not Performed											METHOD: HOLLOW STEM AUGER / ROCK CORE						




PROJECT NAME					CLIENT											
Discovery Park - Lot 3					Intrinsic Development											
PROJECT NUMBER					LOCATION											
F21-04643					Lee's Summit, Missouri											
ELEVATION (ft)	<div><div><div></div><div></div></div><div>Split Spoon</div></div> <div><div><div></div><div></div></div><div>Rock Core</div></div>			<div><div></div><div></div></div> <div>Shelby Tube</div>			GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS
	MATERIAL DESCRIPTION															
	<div><div></div><div></div></div> <div>Unconfined Compressive Strength - 4,077 ksf</div> <div>Light gray and blue gray (continued)</div> <div>Dark gray with blue gray, interbedded shale</div> <div>Gray to blue gray</div> <div>Unconfined Compressive Strength - 2,778 ksf</div>			<div><div></div><div></div></div>		3								RQD 58.3%		
				<div><div></div><div></div></div>		RC 4									Recovery 100.0%	
				<div><div></div><div></div></div>											RQD 50.0%	

## WATER LEVEL OBSERVATIONS

WD  Not Encountered

IAD  Not Performed

AD  Not Performed

**OLSSON, INC.**  
1700 E. 123RD STREET  
OLATHE, KANSAS 66061

STARTED: 7/25/23 FINISHED: 7/25/23

DRILL CO.: SUB-DRILLER DRILL RIG: CME 55

DRILLER: JW LOGGED BY: CBM

METHOD: HOLLOW STEM AUGER / ROCK CORE



PROJECT NAME					CLIENT									
Discovery Park - Lot 3					Intrinsic Development									
PROJECT NUMBER					LOCATION									
F21-04643					Lee's Summit, Missouri									
ELEVATION (ft)	MATERIAL DESCRIPTION				GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS
955	APPROX. SURFACE ELEV. (ft): 955.0					0								
	ROOT ZONE				0.5'									
	LEAN TO FAT CLAY													
	Firm, very dark brown, silty, sandy, moist, trace organics						SS 1		2-3-4 N=7		27.1			
					3.0'									
	Firm to stiff, pale olive and dark brown, silty, moist						U 2				30.1	95.4		P.P. = 1.5
950					5.6'									
	LIMESTONE													
	Blue gray						RC 1							Recovery 72.9%
					7.4'									RQD 72.9%
	Gray with brown, clayey				7.6'									
	Gray, clayey				9.2'									
945	Gray with blue gray, clayey				9.9'	10		RC 2						Recovery 100.0%
	Gray to dark blue gray													RQD 83.3%
					13.4'									
	Unconfined Compressive Strength - 2,163 ksf				14.0'									
940	Dark gray to gray and blue gray					15		RC 3						Recovery 100.0%
	Gray to blue gray													RQD 85.0%
					18.1'									
	Unconfined Compressive Strength - 1,718 ksf				18.7'									
	SHALE						RC 4							Recovery 96.2%
935	Dark gray and black, fissile					20								RQD
CONTINUED NEXT PAGE														

CONTINUED NEXT PAGE

## WATER LEVEL OBSERVATIONS

WD Not Encountered

IAD Not Performed

AD Not Performed

**OLSSON, INC.**  
1700 E. 123RD STREET  
OLATHE, KANSAS 66061

STARTED: 7/27/23 FINISHED: 7/27/23

DRILL CO.: SUB-DRILLER DRILL RIG: CME 55

DRILLER: JW LOGGED BY: CBM




METHOD: HOLLOW STEM AUGER / ROCK CORE





## BOREHOLE REPORT NO. B-306




Sheet 2 of 2

PROJECT NAME					CLIENT								
Discovery Park - Lot 3					Intrinsic Development								
PROJECT NUMBER					LOCATION								
F21-04643					Lee's Summit, Missouri								
ELEVATION (ft)	<div><div></div><div>Split Spoon</div></div> <div><div></div><div>Rock Core</div></div> <div><div></div><div>Shelby Tube</div></div>			GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS
	MATERIAL DESCRIPTION												
935	LIMESTONE			20.6'	20								44.9%

Blue gray to light gray (continued)

BASE OF BORING AT 20.6 FEET

## WATER LEVEL OBSERVATIONS

WD  Not EncounteredIAD  Not PerformedAD  Not Performed

**OLSSON, INC.**  
**1700 E. 123RD STREET**  
**OLATHE, KANSAS 66061**

STARTED: 7/27/23 FINISHED: 7/27/23

DRILL CO.: SUB-DRILLER DRILL RIG: CME 55

DRILLER: JW LOGGED BY: CBM

METHOD: HOLLOW STEM AUGER / ROCK CORE








## BOREHOLE REPORT NO. B-118

Sheet 1 of 1

PROJECT NAME					CLIENT									
Discovery Park					Intrinsic Development									
PROJECT NUMBER					LOCATION									
A21-04643					Lee's Summit, Missouri									
ELEVATION (ft)	<div><div></div> Split Spoon</div>  MATERIAL DESCRIPTION				GRAPHIC LOG	DEPTH (ft)	SAMPLE TYPE NUMBER	CLASSIFICATION (USCS)	BLOWS/6" N-VALUE	UNC. STR. (tsf)	MOISTURE (%)	DRY DENSITY (pcf)	LL/PI (%)	ADDITIONAL DATA/ REMARKS
	APPROX. SURFACE ELEV. (ft): 957.1					0								
955	ROOT ZONE				<div></div>	5	<div></div> SS 1		2-2-3 N=5		27.5			
	1.0'													
	LEAN TO FAT CLAY													
	Firm, reddish brown and brown, silty, moist													
	3.5'													
Firm, light brown and reddish brown, silty, moist				<div></div>	5	<div></div> SS 2		3-4-4 N=8		28.0				
5.0'														
LIMESTONE														
6.0'														
<div></div>														

REFUSAL AT 6.0 FEET

## WATER LEVEL OBSERVATIONS

WD	 Not Encountered
IAD	 Not Encountered
AD	 Not Performed

**OLSSON, INC.**  
**1700 E. 123RD STREET**  
**OLATHE, KANSAS 66061**

STARTED:	1/11/23	FINISHED:	1/11/23
DRILL CO.:	CFS	DRILL RIG:	CME 45B
DRILLER:	NICK	LOGGED BY:	TREVOR
METHOD: CONTINUOUS FLIGHT AUGER			



## **APPENDIX C**

### **ROCK CORE PHOTOGRAPHS**





**olsson**

**B-303 Box 2 of 2 (20.2'-28.2')**

Project Location  
Lee's Summit, Missouri

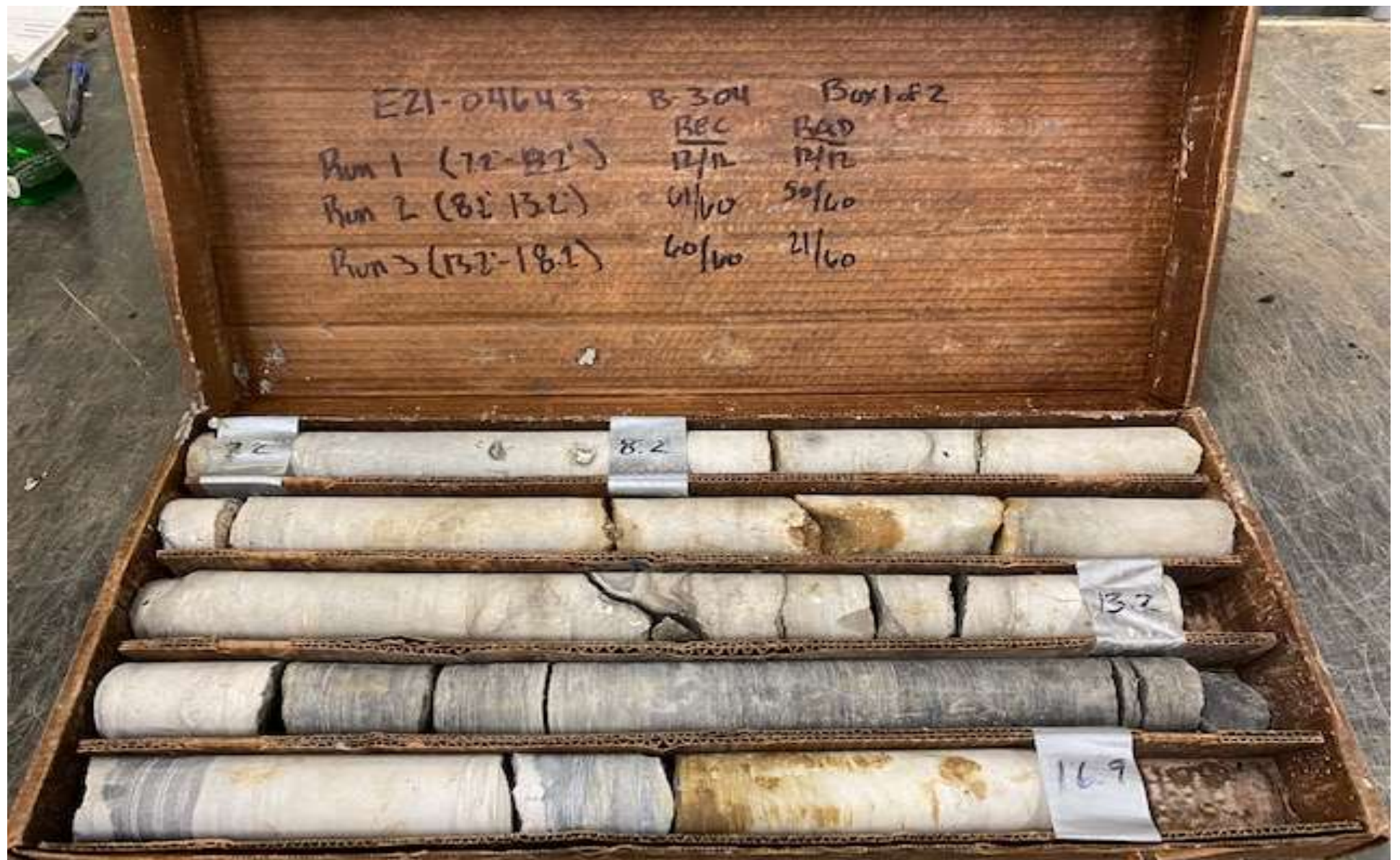
Olsson Project No: F21-04643

Client: Intrinsic Development

Last Revision Date: 8/3/2023

Engineer: JDP





**olsson**

**B-304 Box 1 of 2 (7.2'-16.9')**

Project Location  
Lee's Summit, Missouri

Olsson Project No:	E21-04643
Client:	Intrinsic Development
Last Revision Date:	8/3/2023
Engineer:	JDP





**olsson**

**B-304 Box 2 of 2 (16.9'-23.2')**

Project Location  
Lee's Summit, Missouri

Olsson Project No:	E21-04643
Client:	Intrinsic Development
Last Revision Date:	8/3/2023
Engineer:	JDP





**olsson**

**B-305 Box 1 of 2 (8.3'-17.3')**

Project Location  
Lee's Summit, Missouri

Olsson Project No: F21-04643

Client: Intrinsic Development

Last Revision Date: 8/3/2023

Engineer: JDP





**olsson**

**B-305 Box 2 of 2 (17.3'-23.3')**

Project Location  
Lee's Summit, Missouri

Olsson Project No: F21-04643

Client: Intrinsic Development

Last Revision Date: 8/3/2023

Engineer: JDP





**olsson**

**B-306 Box 1 of 2 (5.6'-16.5')**

Project Location  
Lee's Summit, Missouri

Olsson Project No: F21-04643

Client: Intrinsic Development

Last Revision Date: 8/3/2023

Engineer: JDP





**olsson**

**B-306 Box 2 of 2 (16.5'-20.6')**

Project Location  
Lee's Summit, Missouri

Olsson Project No: F21-04643

Client: Intrinsic Development

Last Revision Date: 8/3/2023

Engineer: JDP





**olsson**

**B-303 Box 1 of 2 (12.6'-20.2')**

Project Location  
Lee's Summit, Missouri

Olsson Project No: E21-04643

Client: Intrinsic Development

Last Revision Date: 8/3/2023

Engineer: JDP



## **APPENDIX D**

### **LABORATORY TEST RESULTS**



OLSSON, INC.  
1700 E. 123RD STREET  
OLATHE, KANSAS 66061



## SUMMARY OF LABORATORY RESULTS

PAGE 1 OF 1

PROJECT NAME: Discovery Park - Lot 3

CLIENT: Intrinsic Development

PROJECT NUMBER: F21-04643

PROJECT LOCATION: Lee's Summit, Missouri

BORING NUMBER	SAMPLE I.D.	SAMPLE DEPTH (ft)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	SATURATION (%)	UNCONFINED STRENGTH (tsf)	STRAIN (%)	ATTERBERG LIMITS			P-200	USCS CLASS.
									LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX		
B-301	SS-1	1.0 - 2.5'	34.8										
B-301	U-2	3.0 - 4.3'	24.6	100.5	0.676	98.4							
B-302	SS-1	1.0 - 2.5'	32.5										
B-302	U-2	3.0 - 5.0'	30.6	93.3	0.806	100.0			69	20	49		CH
B-303	SS-1	1.0 - 2.5'	25.8										
B-303	U-2	3.0 - 5.0'	27.8	100.1	0.683	100.0	2.1	9.2					
B-303	SS-3	8.5 - 10.0'	27.7										
B-304	SS-1	1.0 - 2.5'	26.0										
B-304	U-2	3.0 - 5.0'	25.5	98.7	0.708	97.4							
B-305	SS-1	1.0 - 2.5'	25.6										
B-305	U-2	3.0 - 5.0'	26.1	100.9	0.670	100.0							
B-305	SS-3	8.0 - 8.1'	26.9										
B-306	SS-1	1.0 - 2.5'	27.1										
B-306	U-2	3.0 - 5.0'	30.1	95.4	0.766	100.0							



OLSSON, INC.  
1700 E. 123RD STREET  
OLATHE, KANSAS 66061

## CONSOLIDATION TEST

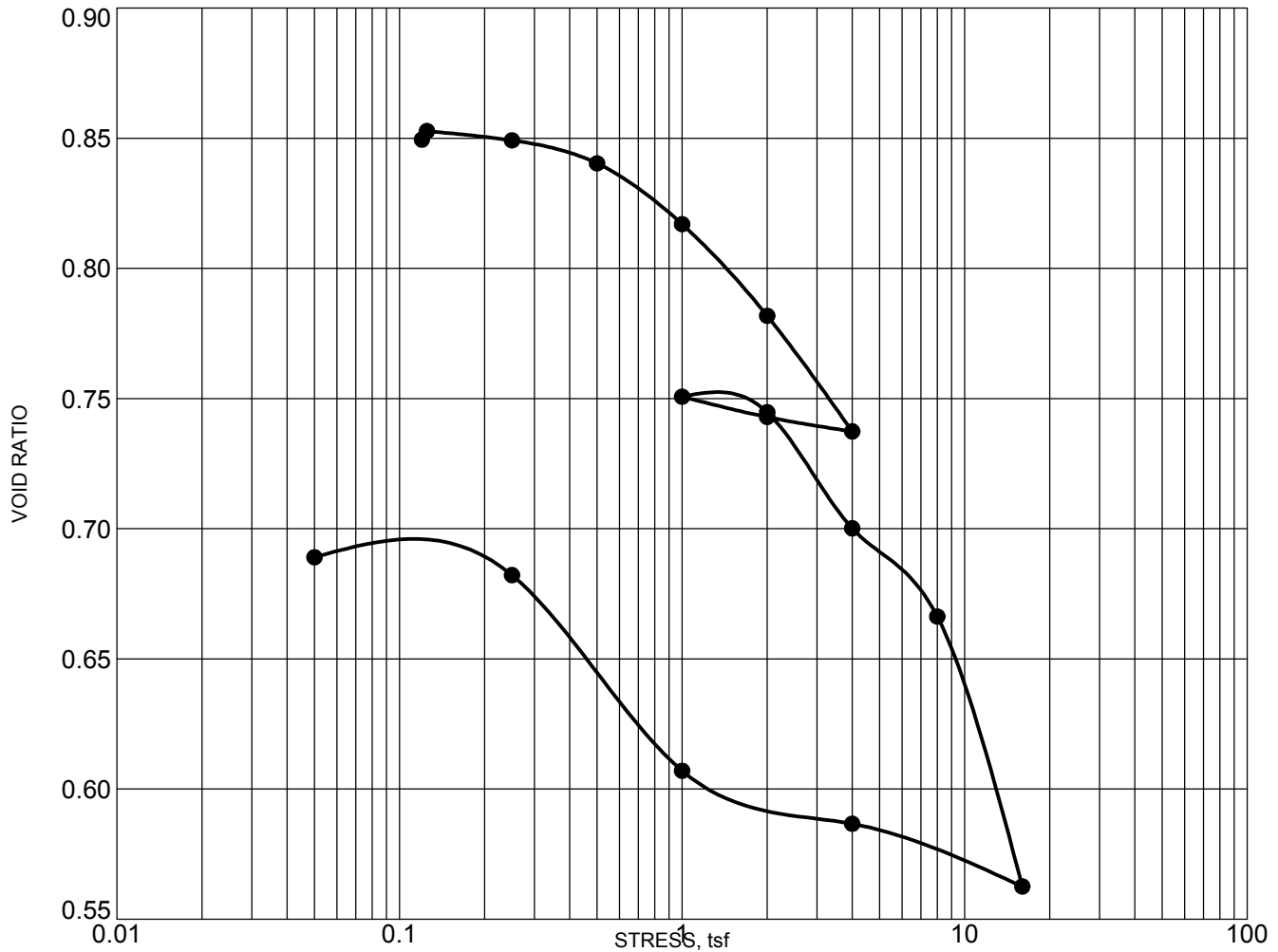


PROJECT NAME: Discovery Park - Lot 3

CLIENT: Intrinsic Development

PROJECT NUMBER: F21-04643

PROJECT LOCATION: Lee's Summit, Missouri



Boring No: B-302 Initial Water Content (%): 31.3 Est. Preconsolidation Stress (tsf): \_\_\_\_\_

Sample ID: U-2 Final Water Content (%): 27.4 Laboratory Water Type: Distilled Water

Sample Depth: 3.0 - 5.0' Initial Dry Density (pcf): 91.0 Test Procedure Method: NA

Start Date: 8/2/2023 Initial Void Ratio: 0.850 Interpretation Procedure: NA

Technician: KK Final Void Ratio: 0.690 Stress at Inundation (psf): 241.0

Apparatus: NA Initial Degree of Saturation (%): 99.3 Specimen Trimming Method: Cutting Shoe

Specific Gravity: 2.7 Final Degree of Saturation (%): 100.0

### ATTERBERG LIMITS

LL	PL	PI	Classification
69	20	49	CH

Sample Description: \_\_\_\_\_ Notes: \_\_\_\_\_



# **DISCOVERY PARK - LOT 3**

Lee's Summit, Missouri - 2023

August 10, 2023

Olsson Project No. F21-04643



**SECTION 00 4000  
CONTRACT FOR CONSTRUCTION**

**FORM OF CONTRACT**

**1.01 AIA DOCUMENT A101, GENERAL CONTRACT FOR CONSTRUCTION. 2017 EDITION, IS  
HEREBY INCORPORATED BY REFERENCE AND MADE A PART OF THE CONTRACT FOR  
CONSTRUCTION.**

**END OF SECTION 004000**



**SECTION 00 5000**  
**CONDITIONS OF THE CONTRACT**

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

- A. The work included under these Specifications consists of furnishing all items, materials, operations, or methods listed, mentioned, indicated, or scheduled on the Drawings and/or in these Specifications, including all labor, materials, equipment transportation temporary facilities, services, and incidentals necessary and required for construction completion of the project named in title page in accordance with Contract Documents.

**1.02 FORM OF SPECIFICATIONS**

- A. Conditions of the Contract, Supplementary General Conditions, and Division 1 apply to every Division of these Specifications.
- B. These Specifications are of abbreviated form and contain incomplete sentences. Omissions of words or phrases such as "the Contractor shall", "shall be", "as noted on the Drawings", "according to the Drawings", "a", "the", and "all" are intentional. Omitted words and phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings.
- C. All Specification instructions are directed to the Contractor, and inclusion of any work by mention, note, or itemization, however brief, implies Contractor shall provide same unless specifically directed otherwise.
- D. In specifying an item by manufacturer's name and/or catalog number, unless specifically stated otherwise, such item shall be provided with all standard devices and accessories indicated in latest edition of manufacturer's catalog or brochure published at date of date of Invitation to Bid: furnished such item complete with component parts necessary for obviously intended use and installation, whether or not description or catalog number contains all supplemental information and/or numbers of such components.

**1.03 UNIFORM FEDERAL ACCESSIBILITY STANDARDS**

- A. General Contractor shall complete all work in accordance with latest printed edition of the Fair Housing Act Guidelines, Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act and/or the Uniform Federal Accessibility Standards as applicable. Where work is required to comply with the standards and conflict exists with the architectural plans and/or specifications, notify Architect immediately of such conflict and request written clarification prior to proceeding with the work.

**1.04 AIA GENERAL CONDITIONS**

- A. AIA Document A201, "General Conditions of the Contract for Construction", 2017 Edition, 15 Articles, hereinafter referred to as "AIA General Conditions", is hereby made a part of this Specification. Contractor shall consult this Document and become intimately familiar with its contents. Refer to Section 00700, General Conditions.

**1.05 NOT USED**

**PART 3 - EXECUTION**

**2.01 SUPPLEMENTS AND AMENDMENTS TO THE AIA GENERAL CONDITIONS**

- A. The AIA General Conditions are hereinafter supplemented and/or amended. All supplementary provisions shall be considered as added thereto. Where any Article is amended, deleted or superseded hereby, unaltered provisions of such Article shall remain in effect.

**2.02 GENERAL PROVISIONS**

- A. Supplement Subparagraph 1.2.1 as follows:
  - 1. Drawings, Specifications and Other Contract Documents are not intended as "Shop Drawings" or extensively detailed documents; they are intended to indicate general design concept of Project in sufficient detail that all work required is reasonable inferable there from and Contractor shall provide all work thus indicated or reasonably inferred as



necessary to produce intended results of complete, structurally sound, aesthetically desirable, durable, properly performing work of quality. Should conflict occur between Drawings and Specifications, Contractor shall obtain written decision of same from Architect prior to submitting Bid, Signing Agreement or proceeding with the work.

- B. Supplement Subparagraph 1.4.1, Interpretation, as follows:
1. When a word, "approval", "approved", "proper", "satisfactory", "equal", and "as directed" is used, it implies such reference as to the Architect's approval or direction.
  2. "Approve", "approval", or "approved" means the Architect will observe or review items or construction referred to him for such approval and that his review represents his opinion that such item or construction is acceptable for the circumstances and conditions of the project, based on his observations and/or information made available to him by Contractor. However, such review shall not represent that Architect checked item or construction in detail, nor that he thereby waives original requirements or assumes any responsibility for its correctness or performance.
  3. "Equal", "equivalent", means the item or constriction possesses similar physical size and characteristics, similar performance qualities and characteristics and fulfills utilitarian functions required by Contract Documents without any decrease in quality, appearance or durability; responsibility for "equal" or equivalent" item of construction to fulfill the Architect's intent of Contract Documents (expressed or implied) rests with the Contractor.
  4. "Extent" means general checklist or outline of work included: not constructed as all inclusive nor limiting and not relieving Contractor from providing all similar or related work elsewhere indicated or inferable in Contract Documents.
  5. "Indicated" means as indicated on Contract Documents.
  6. "Provide" means furnish and install.
- C. ARTICLE 3 CONTRACTOR
1. Supplement Subparagraph 3.7.1 as follows:
  2. Contractor shall give notices to public or private utility companies and others required to make installations, in ample time for them to complete such installations and not delay the project, whether such installations are under contract or reasonable inferable necessary for completion of project. Contractor is responsible for staking or surveying as may be required to complete the installation of utilities either on or off site by any Utility Companies or by private contract.
- D. Supplement Subparagraph 3.12.5 as follows:
1. By submitting Shop Drawings and samples, Contractor thereby represents he has approved them (whether they bear his approval stamp or not) and he has determined and verified all field measurements, quantities, field construction criteria, materials, catalog numbers, and similar data, or will do so, and he has checked and coordinated Shop Drawings and sample with requirements of work and Contract Documents and with work of all other trades and Contractors on project.
- E. Supplement Subparagraph 3.12.8 as follows:
1. When material or equipment is specified by manufacturer's name or names, the intent is to establish quality required. Materials other than those specified will be considered after Contract has been executed provided they are submitted in writing by successful bidder with sufficient data to establish that their quality for the use intended is equivalent to the quality of materials specified.
  2. By making request for substitution, the Contractor represents that he has personally investigated the substitute product and determined that it is equal or superior to that specified, that he will provide the same warranty as for that specified, that eh waives all claims for any additional cost related to the substitution, and that he will coordinate the installation of any accepted substitution making changes as may be required such that the work shall be completed in all respects.
  3. Requests for substitutions shall be submitted in sufficient time to allow for proper consideration and so as to cause no delay in the work. All materials and equipment shall be applied, installed, connected, cleaned and placed in operation in accordance with manufacturer's directions.



4. When material or equipment is required to be installed by manufacturer's approved applicator, it shall be the contractor's responsibility to insure such approval.
- F. ARTICLE 4 ADMINISTRATION OF THE CONTRACT
  1. Delete Second Sentence of Subparagraph 4.1.1 and Insert:
  2. The term Architect means Architect or his authorized representative (including his Consulting Engineer). The term Architect/Engineer means Architect and/or his Consulting Engineer.
- G. ARTICLE 8 TIME
  1. Add the following Subparagraph:
  2. 8.1.5 As between the Owner and the Contractor: as to all acts of failures to act occurring prior to the relevant Date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such Date of Substantial Completion; as to all acts or failures to act occurring subsequent to the relevant Date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate of Payment.
- H. ARTICLE 11 INSURANCE AND BONDS
  1. Supplement Paragraph 11.1 Contractor's liability Insurance, add the following:
  2. 11.1.4 Certificates of Insurance: General Contractor shall, before commencing work under this Contract, submit duplicate copies to Architect and Owner showing evidence that all Certificates of Insurance are in effect, covering Contractor and Owner as their interests may appear, and that these minimum insurance coverage will not be canceled or changed until 30 days after written notice is given to Owner and Architect. Coverage is as follows:
  3. Workmen's Compensation: Statutory for applicable states, except provided \$100,000.00 minimum coverage.
  4. Comprehensive General Liability including Contractor's Liability: Contingent Liability; Contractual Liability; Completed Operations and Products Liability all on occurrences with Bodily Injury Coverage and Broad from Property Damage. Remove the XCU exclusion relating to Explosion, Collapse and Underground Property Damage. Completed Operations Liability shall be kept in force for at least 2 years after date of final completion. Provides \$500,000.00 minimum coverage.
  5. Comprehensive Automobile Liability including no owner or hired care coverage as well as owned vehicles. Provide \$500,000.00 minimum coverage.
  6. Employer's Liability: Provide \$100,000.00 minimum coverage.
  7. Builder's Risk Insurance: Contractor will effect and maintain, Fire Insurance with extended coverage and vandalism and malicious mischief insurance upon the entire structure on which the work to be performed under this Contract is to be done to the extent of 100% of the insurable value thereof. Contractor will be responsible for any and all deductible.
  8. In addition to the above minimum coverage, Contractor shall provide \$1,000,000.00 umbrella coverage.
  9. Supplement Paragraph 11.4 Performance Bond and Payment Bond as follows:
  10. Performance Bond and Labor and Material Payment Bonds shall be furnished to the Owner, by General Contractor, in an amount equal to 100% of the contract sum as security for the faithful performance of the contract and the payment of all persons performing labor and furnishing material in connection with the contract.
  11. Surety: Bonds furnished shall be written by a Surety approved by the U.S. Treasury Department and licensed to do business in the State where project is to be constructed. No work shall be commenced until bonds are in force. Power of Attorney for the Surety Company Agent must accompany each bond issued, and must be certified to include the date of the bonds.
  12. Bid Proposal: Contractor shall include cost of bonds in contract price.

**END OF SECTION 005000**



**SECTION 00 5436**  
**BUILDING INFORMATION MODELING EXHIBIT**

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

- A. The work included under these Specifications consists of furnishing all operations, or methods listed, mentioned, indicated or scheduled on the Drawings and/or in these Specifications concerning the preparation of electronic drawings by Architect and/or Architect's Consultants for the Project. This information is being made available to the Contractor, sub-contractor and material suppliers to set forth the basis of design.
- B. This Section establishes the terms and protocols governing the reliance upon, and the ownership, development, uses, transmission and sharing of Building Information Models (BIM) and other Digital Data for the Project.

**1.02 DEFINITIONS**

- A. Building Information Model or Model: A BIM or Model is a digital representation of the Project or a subset of the Project. A Model is a collection of one or more Model Portions, each of which is an assemblage of Model Elements.
- B. Model Portion: A model Portion, or Portion, is a subset of a Model. The parties may designate a Model Portion by discipline, trade, area, location, phase, or other mutually agreeable distinction.
- C. Model Element: A Model Element is a digital representation of a component, system, object, or assembly within a Model.
- D. Model Version: A Model Version, is a specific edition of a Model or Model Portion that is sufficiently identifiable as unique and unchanged as of the time it is saved by its Author or the Architect
- E. Confidential Digital Data: Unless otherwise stated, Confidential Digital Data is Digital Data containing confidential or business proprietary information that the transmitting party designates as "confidential". For purposes of this Project – all information transmitted by Architect and Architect's Consultants shall be treated as confidential.
- F. Contract Document: The term Contract Document shall have the same meaning as in the Agreement between the Owner and Architect and subsequently to the preparation of Drawings between the Owner and Contractor for the construction of the Project. The Model will not be enumerated as part of the Contract Document and should be considered as such.
- G. Level of Development: The Level of Development (LOD) establishes the minimum dimensional, spatial, quantitative, and qualitative aspects of a Model Element, and the degree to which Project Participants may rely upon the Model Element when developed to that level in the Model. The Levels of Development is described further below in this Section.

**1.03 MODEL USES AND RELIANCE**

- A. Model Uses, Sharing and Reliance: Project Participants may share, use and rely upon a Model or Model Portion only to the extent set forth in Items in this Section. Model sharing includes sharing within Design Team, with Contractor, and within the Construction Team
- B. Model Uses: The Project Participants shall develop Models on the Project for the following uses:
  - 1. Planning: Examples include programming, site analysis, scheduling, and documentation of existing conditions
  - 2. Design: Examples include design authoring, design review, 3D coordination, structural analysis, lighting analysis, and engineering analysis.
  - 3. Any other uses or preparation of supplemental information or drawings utilizing the BIM model may be developed by the Contractor and/or subcontractors at their own discretion, expense, and risk.
- C. Model Reliance: A Project Participant may only rely on Models, Model Portions, and Model Elements as indicated in Paragraph A. The Parties agree that the extent of their reliance on any



Model Version shall be limited to the uses identified in Paragraph B above. Any reliance on a Model Version not in accordance with this Section shall be at the Project Participant's sole risk.

- D. Liability: To the fullest extent permitted by law, the Receiving Party shall indemnify and defend the Architect and Architect's Consultants from and against all claims arising from or related to the Receiving Party's modification to, or unlicensed use of, the Digital Data.
- E. Model Coordination: If Project Participants discover or become aware of any discrepancies, inconsistencies, errors, or omissions in any Model Version, consistent with the LOD scope described below, they shall promptly report the discrepancy, inconsistency, error, or omission in writing to the Architect; prior to commencing any work.

#### **1.04 LEVEL OF DEVELOPMENT**

- A. Level of Development Descriptions: The LOD descriptions below shall be used to identify the minimum required characteristics for each Model Element for the Project. Other Project Participants may only rely on a Model Element consistent with the minimum required characteristics for the designated LOD.
- B. LOD 100. The Model Element designated for the Project by the Architect and Architect's Consultants for the Project is established to be LOD 100. The Model Element may be graphically represented in the Model with a symbol or other generic representation. Information related to the Model Element (e.g., cost per square foot, quantity, etc). Model Elements are not required to be an actual representation of a specific product as enumerated in the Construction Documents.

#### **1.05 DIGITAL DATA LICENSING AGREEMENT**

- A. The purpose of this Agreement will be to grant a license from the Architect or Architect's Consultants (the Transmitting Party) to the Receiving Party for the Receiving Party's use of Digital Data and to set forth the license terms. This Exhibit is anticipated to utilize AIA Document C106-2022 Digital Data Licensing Agreement, and will be required to be executed prior to any data transfer.
- B. Transmission of Digital Data: The Transmitting Party grants to the Receiving Party a nonexclusive limited license to use the Digital Data solely and exclusively for the uses, and in accordance with the terms, set forth in this Section, and in the Digital Data Licensing Agreement.
- C. Access: Only the Receiving Party is permitted to access and use the Digital Data. Unlicensed and unauthorized access or use by third parties is strictly prohibited.
- D. License Conditions: The Receiving Party may use and rely upon the Digital Data to the extent set forth below:
  - 1. The Digital Data is transmitted solely for the Receiving Party's information. Receiving Party acknowledges that any use of the Digital Data shall be at Receiving Party's sole risk. The Receiving Party accepts the Digital Data "as is" without any warranty or representations from the Transmitting Party as to whether the Digital Data is accurate, complete, or fit for use as intended by the Receiving Party. The Receiving Party is solely responsible for verifying whether the Digital Data is accurate, complete, or fit for the Receiving Party's intended use.

#### **PART 2 PRODUCTS (NOT USED)**

#### **PART 3 EXECUTION (NOT USED)**

#### **END OF SECTION**



**SECTION 00 7000  
GENERAL CONDITIONS**

**FORM OF GENERAL CONDITIONS**

- 1.01 AIA DOCUMENT A201, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, 2017 EDITION, ATTACHED, IS HEREBY INCORPORATED HEREIN AND MADE A PART OF THE GENERAL CONDITIONS BETWEEN THE OWNER AND THE CONTRACTOR.**
- 1.02 SUPPLEMENTARY CONDITIONS**
- 1.03 REFER TO SECTION 00 5000 FOR AMENDMENTS AND SUPPLEMENTARY INFORMATION TO THESE GENERAL CONDITIONS**

**END OF SECTION 007000**



# **AIA® Document A201® – 2017**

## **General Conditions of the Contract for Construction**

### **for the following PROJECT:**

*(Name and location or address)*

The Village at Discovery Lot 3 (Townplace Suites)  
Lee's Summit, Missouri

### **THE OWNER:**

*(Name, legal status and address)*

Intrinsic Development, L.L.C.  
3622 Endeavor Ave., Ste 101  
Columbia, Missouri 65201

### **THE ARCHITECT:**

*(Name, legal status and address)*

Rosemann & Associates, P.C., a Missouri professional corporation  
1526 Grand Boulevard  
Kansas City, Missouri 64108-1404

### **TABLE OF ARTICLES**

- 1 GENERAL PROVISIONS**
- 2 OWNER**
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- 13 MISCELLANEOUS PROVISIONS**
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT**

### **ADDITIONS AND DELETIONS:**

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.



## 15 CLAIMS AND DISPUTES



Init.

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**User Notes:**

(3B9ADA43)



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## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 Basic Definitions**

#### **§ 1.1.1 The Contract Documents**

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

#### **§ 1.1.2 The Contract**

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

#### **§ 1.1.3 The Work**

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

#### **§ 1.1.4 The Project**

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

#### **§ 1.1.5 The Drawings**

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

#### **§ 1.1.6 The Specifications**

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

#### **§ 1.1.7 Instruments of Service**

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

#### **§ 1.1.8 Initial Decision Maker**

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

### **§ 1.2 Correlation and Intent of the Contract Documents**

**§ 1.2.1** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent



consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

**§ 1.2.1.1** The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

**§ 1.2.2** Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

**§ 1.2.3** Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

### **§ 1.3 Capitalization**

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

### **§ 1.4 Interpretation**

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

### **§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service**

**§ 1.5.1** The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

**§ 1.5.2** The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

### **§ 1.6 Notice**

**§ 1.6.1** Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

**§ 1.6.2** Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

### **§ 1.7 Digital Data Use and Transmission**

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.



## **§ 1.8 Building Information Models Use and Reliance**

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

## **ARTICLE 2 OWNER**

### **§ 2.1 General**

**§ 2.1.1** The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

**§ 2.1.2** The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

### **§ 2.2 Evidence of the Owner's Financial Arrangements**

**§ 2.2.1** Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

**§ 2.2.2** Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

**§ 2.2.3** After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

**§ 2.2.4** Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

### **§ 2.3 Information and Services Required of the Owner**

**§ 2.3.1** Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements,



assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

**§ 2.3.2** The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

**§ 2.3.3** If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

**§ 2.3.4** The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

**§ 2.3.5** The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

**§ 2.3.6** Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

#### **§ 2.4 Owner's Right to Stop the Work**

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

#### **§ 2.5 Owner's Right to Carry Out the Work**

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

### **ARTICLE 3 CONTRACTOR**

#### **§ 3.1 General**

**§ 3.1.1** The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

**§ 3.1.2** The Contractor shall perform the Work in accordance with the Contract Documents.

**§ 3.1.3** The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.



### **§ 3.2 Review of Contract Documents and Field Conditions by Contractor**

**§ 3.2.1** Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

**§ 3.2.2** Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

**§ 3.2.3** The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

**§ 3.2.4** If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

### **§ 3.3 Supervision and Construction Procedures**

**§ 3.3.1** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

**§ 3.3.2** The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

**§ 3.3.3** The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

### **§ 3.4 Labor and Materials**

**§ 3.4.1** Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.



**§ 3.4.2** Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

**§ 3.4.3** The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

### **§ 3.5 Warranty**

**§ 3.5.1** The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

**§ 3.5.2** All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

### **§ 3.6 Taxes**

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

### **§ 3.7 Permits, Fees, Notices and Compliance with Laws**

**§ 3.7.1** Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

**§ 3.7.2** The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

**§ 3.7.3** If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

### **§ 3.7.4 Concealed or Unknown Conditions**

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.



**§ 3.7.5** If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

### **§ 3.8 Allowances**

**§ 3.8.1** The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

**§ 3.8.2** Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

**§ 3.8.3** Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

### **§ 3.9 Superintendent**

**§ 3.9.1** The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

**§ 3.9.2** The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

**§ 3.9.3** The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

### **§ 3.10 Contractor's Construction and Submittal Schedules**

**§ 3.10.1** The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

**§ 3.10.2** The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the



Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

**§ 3.10.3** The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

**§ 3.11 Documents and Samples at the Site**

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

**§ 3.12 Shop Drawings, Product Data and Samples**

**§ 3.12.1** Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

**§ 3.12.2** Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

**§ 3.12.3** Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

**§ 3.12.4** Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

**§ 3.12.5** The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

**§ 3.12.6** By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

**§ 3.12.7** The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

**§ 3.12.8** The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.



**§ 3.12.9** The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

**§ 3.12.10** The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

**§ 3.12.10.1** If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

**§ 3.12.10.2** If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

### **§ 3.13 Use of Site**

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

### **§ 3.14 Cutting and Patching**

**§ 3.14.1** The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

**§ 3.14.2** The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

### **§ 3.15 Cleaning Up**

**§ 3.15.1** The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

**§ 3.15.2** If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.



### **§ 3.16 Access to Work**

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

### **§ 3.17 Royalties, Patents and Copyrights**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

### **§ 3.18 Indemnification**

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

**§ 3.18.2** In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

## **ARTICLE 4 ARCHITECT**

### **§ 4.1 General**

**§ 4.1.1** The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

**§ 4.1.2** Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

### **§ 4.2 Administration of the Contract**

**§ 4.2.1** The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

**§ 4.2.2** The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

**§ 4.2.3** On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the



Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

#### **§ 4.2.4 Communications**

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

**§ 4.2.5** Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

**§ 4.2.6** The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

**§ 4.2.7** The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

**§ 4.2.8** The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

**§ 4.2.9** The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

**§ 4.2.10** If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

**§ 4.2.11** The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

**§ 4.2.12** Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations



and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

**§ 4.2.13** The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

**§ 4.2.14** The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

## **ARTICLE 5 SUBCONTRACTORS**

### **§ 5.1 Definitions**

**§ 5.1.1** A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

**§ 5.1.2** A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

### **§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work**

**§ 5.2.1** Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

**§ 5.2.2** The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

**§ 5.2.3** If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

**§ 5.2.4** The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

### **§ 5.3 Subcontractual Relations**

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor,



prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

#### **§ 5.4 Contingent Assignment of Subcontracts**

**§ 5.4.1** Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

**§ 5.4.2** Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

**§ 5.4.3** Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

### **ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

#### **§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts**

**§ 6.1.1** The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

**§ 6.1.2** When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

**§ 6.1.3** The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

**§ 6.1.4** Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

#### **§ 6.2 Mutual Responsibility**

**§ 6.2.1** The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

**§ 6.2.2** If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work,



promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

**§ 6.2.3** The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

**§ 6.2.4** The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

**§ 6.2.5** The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

### **§ 6.3 Owner's Right to Clean Up**

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

## **ARTICLE 7 CHANGES IN THE WORK**

### **§ 7.1 General**

**§ 7.1.1** Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

**§ 7.1.2** A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

**§ 7.1.3** Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

### **§ 7.2 Change Orders**

**§ 7.2.1** A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

### **§ 7.3 Construction Change Directives**

**§ 7.3.1** A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

**§ 7.3.2** A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

**§ 7.3.3** If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:



- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

**§ 7.3.4** If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

**§ 7.3.5** If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

**§ 7.3.6** Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

**§ 7.3.7** A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

**§ 7.3.8** The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

**§ 7.3.9** Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

**§ 7.3.10** When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

#### **§ 7.4 Minor Changes in the Work**

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will



affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

## **ARTICLE 8 TIME**

### **§ 8.1 Definitions**

**§ 8.1.1** Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

**§ 8.1.2** The date of commencement of the Work is the date established in the Agreement.

**§ 8.1.3** The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

**§ 8.1.4** The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

### **§ 8.2 Progress and Completion**

**§ 8.2.1** Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

**§ 8.2.2** The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

**§ 8.2.3** The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

### **§ 8.3 Delays and Extensions of Time**

**§ 8.3.1** If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

**§ 8.3.2** Claims relating to time shall be made in accordance with applicable provisions of Article 15.

**§ 8.3.3** This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

## **ARTICLE 9 PAYMENTS AND COMPLETION**

### **§ 9.1 Contract Sum**

**§ 9.1.1** The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

**§ 9.1.2** If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

### **§ 9.2 Schedule of Values**

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and



unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

### **§ 9.3 Applications for Payment**

**§ 9.3.1** At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

**§ 9.3.1.1** As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

**§ 9.3.1.2** Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

**§ 9.3.2** Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

**§ 9.3.3** The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

### **§ 9.4 Certificates for Payment**

**§ 9.4.1** The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

**§ 9.4.2** The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.



## **§ 9.5 Decisions to Withhold Certification**

**§ 9.5.1** The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

**§ 9.5.2** When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

**§ 9.5.3** When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

**§ 9.5.4** If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

## **§ 9.6 Progress Payments**

**§ 9.6.1** After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

**§ 9.6.2** The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

**§ 9.6.3** The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

**§ 9.6.4** The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

**§ 9.6.5** The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.



**§ 9.6.6** A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

**§ 9.6.7** Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

**§ 9.6.8** Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

### **§ 9.7 Failure of Payment**

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

### **§ 9.8 Substantial Completion**

**§ 9.8.1** Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

**§ 9.8.2** When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

**§ 9.8.3** Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

**§ 9.8.4** When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

**§ 9.8.5** The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.



### **§ 9.9 Partial Occupancy or Use**

**§ 9.9.1** The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

**§ 9.9.2** Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

**§ 9.9.3** Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

### **§ 9.10 Final Completion and Final Payment**

**§ 9.10.1** Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

**§ 9.10.2** Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

**§ 9.10.3** If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.



**§ 9.10.4** The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

**§ 9.10.5** Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

## **ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

### **§ 10.1 Safety Precautions and Programs**

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

### **§ 10.2 Safety of Persons and Property**

**§ 10.2.1** The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

**§ 10.2.2** The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

**§ 10.2.3** The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

**§ 10.2.4** When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

**§ 10.2.5** The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

**§ 10.2.6** The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

**§ 10.2.7** The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.



### **§ 10.2.8 Injury or Damage to Person or Property**

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

### **§ 10.3 Hazardous Materials and Substances**

**§ 10.3.1** The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

**§ 10.3.2** Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

**§ 10.3.3** To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

**§ 10.3.4** The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

**§ 10.3.5** The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

**§ 10.3.6** If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

### **§ 10.4 Emergencies**

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.



## **ARTICLE 11 INSURANCE AND BONDS**

### **§ 11.1 Contractor's Insurance and Bonds**

**§ 11.1.1** The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

**§ 11.1.2** The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

**§ 11.1.3** Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

**§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

### **§ 11.2 Owner's Insurance**

**§ 11.2.1** The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

**§ 11.2.2 Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

**§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.



### **§ 11.3 Waivers of Subrogation**

**§ 11.3.1** The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

**§ 11.3.2** If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

### **§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance**

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

### **§ 11.5 Adjustment and Settlement of Insured Loss**

**§ 11.5.1** A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

**§ 11.5.2** Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

## **ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

### **§ 12.1 Uncovering of Work**

**§ 12.1.1** If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

**§ 12.1.2** If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to



the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

## **§ 12.2 Correction of Work**

### **§ 12.2.1 Before Substantial Completion**

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

### **§ 12.2.2 After Substantial Completion**

**§ 12.2.2.1** In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

**§ 12.2.2.2** The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

**§ 12.2.2.3** The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

**§ 12.2.3** The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

**§ 12.2.4** The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

**§ 12.2.5** Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

## **§ 12.3 Acceptance of Nonconforming Work**

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

## **ARTICLE 13 MISCELLANEOUS PROVISIONS**

### **§ 13.1 Governing Law**

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.



## **§ 13.2 Successors and Assigns**

**§ 13.2.1** The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

**§ 13.2.2** The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

## **§ 13.3 Rights and Remedies**

**§ 13.3.1** Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

**§ 13.3.2** No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

## **§ 13.4 Tests and Inspections**

**§ 13.4.1** Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

**§ 13.4.2** If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

**§ 13.4.3** If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

**§ 13.4.4** Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

**§ 13.4.5** If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

**§ 13.4.6** Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

## **§ 13.5 Interest**

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.



## **ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT**

### **§ 14.1 Termination by the Contractor**

**§ 14.1.1** The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

**§ 14.1.2** The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

**§ 14.1.3** If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

**§ 14.1.4** If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

### **§ 14.2 Termination by the Owner for Cause**

**§ 14.2.1** The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

**§ 14.2.2** When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

**§ 14.2.3** When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

**§ 14.2.4** If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance,



the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

#### **§ 14.3 Suspension by the Owner for Convenience**

**§ 14.3.1** The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

**§ 14.3.2** The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

#### **§ 14.4 Termination by the Owner for Convenience**

**§ 14.4.1** The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

**§ 14.4.2** Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

**§ 14.4.3** In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

### **ARTICLE 15 CLAIMS AND DISPUTES**

#### **§ 15.1 Claims**

##### **§ 15.1.1 Definition**

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

##### **§ 15.1.2 Time Limits on Claims**

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

##### **§ 15.1.3 Notice of Claims**

**§ 15.1.3.1** Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.



**§ 15.1.3.2** Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

#### **§ 15.1.4 Continuing Contract Performance**

**§ 15.1.4.1** Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

**§ 15.1.4.2** The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

#### **§ 15.1.5 Claims for Additional Cost**

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

#### **§ 15.1.6 Claims for Additional Time**

**§ 15.1.6.1** If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

**§ 15.1.6.2** If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

#### **§ 15.1.7 Waiver of Claims for Consequential Damages**

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

#### **§ 15.2 Initial Decision**

**§ 15.2.1** Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

**§ 15.2.2** The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the



Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

**§ 15.2.3** In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

**§ 15.2.4** If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

**§ 15.2.5** The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

**§ 15.2.6** Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

**§ 15.2.6.1** Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

**§ 15.2.7** In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

**§ 15.2.8** If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

### **§ 15.3 Mediation**

**§ 15.3.1** Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

**§ 15.3.2** The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

**§ 15.3.3** Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.



**§ 15.3.4** The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

#### **§ 15.4 Arbitration**

**§ 15.4.1** If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

**§ 15.4.1.1** A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

**§ 15.4.2** The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

**§ 15.4.3** The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

#### **§ 15.4.4 Consolidation or Joinder**

**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

**§ 15.4.4.3** The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.



**SECTION 01 1000  
SUMMARY**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Work covered by the Contract Documents.
  - 2. Type of the Contract.
  - 3. Owner's occupancy requirements.
- B. Related Sections include the following:
  - 1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of the Owner's facilities.

**1.03 WORK COVERED BY CONTRACT DOCUMENTS**

- A. Project Identification: TownePlace
  - 1. Project Location: 1810 NE Douglas St. Lee's Summit, Missouri 64064
- B. Owner: Intrinsic Development, L.L.C.
  - 1. Owner's Representative: Brian Maenner
- C. Architect: Rosemann & Associates, P.C.; 1526 Grand Blvd., Kansas City, Missouri 64108
- D. Contractor: Intrinsic Development 3622 Endeavor Ave. Ste. 101 Columbia, MO 65201
- E. The Work consists of the following:
  - 1. The Project consists of the development and construction of a TownePlace Suites by Marriott hotel containing one hundred and twenty-six (126) guest units on floors 2-4. The ground floor is split between an open-air parking garage, guest amenities, and back-of-house support spaces. Guest amenities include public and private gathering spaces, a guest laundry room, public restrooms, a fitness center, a small market for essentials and snacks, a buffet-style breakfast, a vestibule and lobby for guest arrivals and check-in, and an outdoor pool. BOH includes employee break space, a private restroom, laundry service for guest linens, administrative offices, a kitchen for light food prep and warming for guest breakfast, mechanical and electrical rooms, and pool equipment and storage rooms. The Building is connected by 2 elevators and 2 independent stair towers.

**1.04 TYPE OF CONTRACT**

- A. Project will be constructed under a single prime contract. Taxes shall be included in all bids.

**1.05 ACCESS TO SITE**

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

**1.06 WORK RESTRICTIONS**

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
  - 2. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.



#### **1.07 OWNER'S OCCUPANCY REQUIREMENTS**

- A. Owner Occupancy of Completed Areas of Construction: Owner may take possession or occupy floors as they are completed.

#### **1.08 1.5 SPECIFICATION AND DRAWING CONVENTIONS**

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
  - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

#### **1.09 PRODUCTS (NOT USED)**

#### **1.10 EXECUTION (NOT USED)**

**END OF SECTION 011000**



**SECTION 01 2500  
SUBSTITUTION PROCEDURES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
  - 2. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

**1.03 DEFINITIONS**

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

**1.04 ACTION SUBMITTALS**

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. Certificates and qualification data, where applicable or requested.
    - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
    - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    - i. Research reports evidencing compliance with building code in effect for Project, from recognized testing and verification agency
    - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's



- letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

## **1.05 QUALITY ASSURANCE**

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

## **1.06 PROCEDURES**

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

## **PART 2 PRODUCTS**

### **2.01 SUBSTITUTIONS**

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  - b. Requested substitution provides sustainable design characteristics that specified product provided
  - c. Substitution request is fully documented and properly submitted.
  - d. Requested substitution will not adversely affect Contractor's construction schedule.
  - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - f. Requested substitution is compatible with other portions of the Work.
  - g. Requested substitution has been coordinated with other portions of the Work.
  - h. Requested substitution provides specified warranty.
  - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed
- C. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return



requests without action, except to record noncompliance with these requirements:

- a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
- b. Requested substitution does not require revisions to the Contract Documents.
- c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- d. Requested substitution provides sustainable design characteristics that specified product provided
- e. Substitution request is fully documented and properly submitted.
- f. Requested substitution will not adversely affect Contractor's construction schedule.
- g. Requested substitution has received necessary approvals of authorities having jurisdiction.
- h. Requested substitution is compatible with other portions of the Work.
- i. Requested substitution has been coordinated with other portions of the Work.
- j. Requested substitution provides specified warranty.
- k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION 012500**



**SECTION 01 2600  
CONTRACT MODIFICATION PROCEDURES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

**1.03 MINOR CHANGES IN THE WORK**

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

**1.04 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
  - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.



**1.05 ADMINISTRATIVE CHANGE ORDERS**

- A. Allowance Adjustment: See Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

**1.06 CHANGE ORDER PROCEDURES**

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

**1.07 CONSTRUCTION CHANGE DIRECTIVE**

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

**1.08 PRODUCTS (NOT USED)**

**1.09 EXECUTION (NOT USED)**

**END OF SECTION 012600**



**SECTION 01 2900  
PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

**1.03 DEFINITIONS**

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

**1.04 SCHEDULE OF VALUES**

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  - 2. Arrange schedule of values consistent with format of AIA Document G703
  - 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or Division.
    - b. Description of the Work.
    - c. Change Orders (numbers) that affect value.
    - d. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
      - 1) Labor.
      - 2) Materials.
      - 3) Equipment.
  - 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
  - 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
  - 6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.



- a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
10. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

#### **1.05 APPLICATIONS FOR PAYMENT**

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Submit Application for Payment to Architect by the 20th day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
  1. Submit draft copy of Application for Payment five days prior to due date for review by Architect.
- D. Application for Payment Forms: Use AIA forms approved by MHDC as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
  1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
  2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.



3. Provide summary documentation for stored materials indicating the following:
  - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
  - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
  - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- G. Transmittal: Submit review copies of each Application for Payment to Architect Electronically. Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
  1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  1. List of subcontractors.
  2. Schedule of values.
  3. LEED submittal for project materials cost data.
  4. Contractor's construction schedule (preliminary if not final).
  5. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
  6. Products list (preliminary if not final).
  7. Schedule of unit prices.
  8. Submittal schedule (preliminary if not final).
  9. List of Contractor's staff assignments.
  10. List of Contractor's principal consultants.
  11. Copies of building permits.
  12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  13. Initial progress report.
  14. Report of preconstruction conference.
  15. Certificates of insurance and insurance policies.
  16. Performance and payment bonds.
  17. Data needed to acquire Owner's insurance.
- J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
  1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
  1. Evidence of completion of Project closeout requirements.



2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

**1.06 PRODUCTS (NOT USED)**

**1.07 EXECUTION (NOT USED)**

**END OF SECTION 012900**



**SECTION 01 3000  
ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Contractor's daily reports.
- G. Progress photographs.
- H. Coordination drawings.
- I. Submittals for review, information, and project closeout.
- J. Number of copies of submittals.
- K. Requests for Interpretation (RFI) procedures.
- L. Submittal procedures.

**1.02 REFERENCE STANDARDS**

- A. AIA G716 - Request for Information 2004.

**1.03 GENERAL ADMINISTRATIVE REQUIREMENTS**

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
  - 1. Requests for Information (RFI).
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Design data.
  - 6. Manufacturer's instructions and field reports.
  - 7. Applications for payment and change order requests.
  - 8. Progress schedules.
  - 9. Coordination drawings.
  - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
  - 11. Closeout submittals.

**1.04 PROJECT COORDINATOR**

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 1000 - Summary.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:



1. Requests for Information.
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE**

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
  1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
  2. Contractor and Architect are required to use this service.
  3. It is Contractor's responsibility to submit documents in allowable format.
  4. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
  5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, [www.adobe.com](http://www.adobe.com), or Bluebeam PDF Revu, [www.bluebeam.com](http://www.bluebeam.com)), unless such software capability is provided by the service provider.
  6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
  7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.
- C. Submittal Service: The selected service is:
- D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

### **3.02 PRECONSTRUCTION MEETING**

- A. Project Coordinator will schedule a meeting after Notice of Award.
- B. Attendance Required:
  1. Owner.
  2. Architect.
  3. Contractor.
- C. Agenda:



1. Execution of Owner-Contractor Agreement.
  2. Submission of executed bonds and insurance certificates.
  3. Distribution of Contract Documents.
  4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  5. Designation of personnel representing the parties to Contract.
  6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  7. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.03 PROGRESS MEETINGS**

- A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required:
1. Contractor.
  2. Owner.
  3. Architect.
  4. Contractor's superintendent.
  5. Major subcontractors.
- C. Agenda:
1. Review minutes of previous meetings.
  2. Review of work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems that impede, or will impede, planned progress.
  5. Review of submittals schedule and status of submittals.
  6. Review of RFIs log and status of responses.
  7. Maintenance of progress schedule.
  8. Corrective measures to regain projected schedules.
  9. Planned progress during succeeding work period.
  10. Maintenance of quality and work standards.
  11. Effect of proposed changes on progress schedule and coordination.
  12. Other business relating to work.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.04 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 3216**

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. Within 10 days after joint review, submit complete schedule.
- C. Submit updated schedule with each Application for Payment.

### **3.05 PROGRESS PHOTOGRAPHS**

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
1. Completion of site clearing.
  2. Excavations in progress.
  3. Foundations in progress and upon completion.



4. Structural framing in progress and upon completion.
  5. Enclosure of building, upon completion.
  6. Final completion, minimum of ten (10) photos.
- E. Views:
1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
  2. Consult with Architect for instructions on views required.
  3. Provide factual presentation.
  4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
1. Delivery Medium: Via email.
  2. File Naming: Include project identification, date and time of view, and view identification.
  3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
  4. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

### **3.06 COORDINATION DRAWINGS**

### **3.07 REQUESTS FOR INFORMATION (RFI)**

- A. Definition: A request seeking one of the following:
1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
  2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
1. Prepare a separate RFI for each specific item.
  2. Prepare in a format and with content acceptable to Owner.
    - a. Use AIA G716 - Request for Information .
  3. Prepare using software provided by the Electronic Document Submittal Service.

### **3.08 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
1. Product data.
  2. Shop drawings.
  3. Samples for selection.
  4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

### **3.09 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
1. Design data.
  2. Certificates.



3. Test reports.
4. Inspection reports.
5. Manufacturer's instructions.
6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

### **3.10 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
  1. Project record documents.
  2. Operation and maintenance data.
  3. Warranties.
  4. Bonds.
  5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

### **3.11 NUMBER OF COPIES OF SUBMITTALS**

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
  1. After review, produce duplicates.
  2. Retained samples will not be returned to Contractor unless specifically so stated.

### **3.12 SUBMITTAL PROCEDURES**

- A. General Requirements:
  1. Use a single transmittal for related items.
  2. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
  3. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
  4. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
    - a. Deliver submittals to Architect at business address.
  5. Schedule submittals to expedite the Project, and coordinate submission of related items.
    - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
    - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
    - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
  6. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
  7. Provide space for Contractor and Architect review stamps.
  8. When revised for resubmission, identify all changes made since previous submission.
  9. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
  10. Submittals not requested will not be recognized or processed.



- B. Product Data Procedures:
  - 1. Submit only information required by individual specification sections.
  - 2. Collect required information into a single submittal.
  - 3. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
  - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
  - 2. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

### **3.13 SUBMITTAL REVIEW**

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
- D. Architect's and consultants' actions on items submitted for review:
  - 1. Authorizing purchasing, fabrication, delivery, and installation:
    - a. "Approved", or language with same legal meaning.
    - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
    - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
  - 2. Not Authorizing fabrication, delivery, and installation:
    - a. "Revise and Resubmit".
      - 1) Resubmit revised item, with review notations acknowledged and incorporated.
    - b. "Rejected".
      - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
  - 1. Items for which no action was taken:
    - a. "Received" - to notify the Contractor that the submittal has been received for record only.
  - 2. Items for which action was taken:
    - a. "Reviewed" - no further action is required from Contractor.

**END OF SECTION**



**SECTION 01 3100  
PROJECT MANAGEMENT AND COORDINATION**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Coordination Drawings.
  - 2. Administrative and supervisory personnel.
  - 3. Project meetings.
  - 4. Requests for Interpretation (RFIs).
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

**1.03 DEFINITIONS**

- A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

**1.04 COORDINATION**

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
  - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's Construction Schedule.
  - 2. Preparation of the Schedule of Values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Project closeout activities.



8. Startup and adjustment of systems.
9. Project closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
  1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

#### **1.05 SUBMITTALS**

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
  1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
    - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - b. Indicate required installation sequences.
    - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
  2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
  3. Number of Copies: Submit 5 opaque copies of each submittal. Architect will return 2 copies.
    - a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.
  4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
  1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

#### **1.06 ADMINISTRATIVE AND SUPERVISORY PERSONNEL**

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
  1. Include special personnel required for coordination of operations with other contractors.

#### **1.07 PROJECT MEETINGS**

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
  1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.



- B. Preconstruction Conference: Contractor shall schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Procedures for processing field decisions and Change Orders.
    - f. Procedures for RFIs.
    - g. Procedures for testing and inspecting.
    - h. Procedures for processing Applications for Payment.
    - i. Distribution of the Contract Documents.
    - j. Submittal procedures.
    - k. Preparation of Record Documents.
    - l. Use of the premises.
    - m. Work restrictions.
    - n. Owner's occupancy requirements.
    - o. Responsibility for temporary facilities and controls.
    - p. Construction waste management and recycling.
    - q. Parking availability.
    - r. Office, work, and storage areas.
    - s. Equipment deliveries and priorities.
    - t. First aid.
    - u. Security.
    - v. Progress cleaning.
    - w. Working hours.
  3. Minutes: Contractor will record and distribute meeting minutes.
- C. Preinstallation Conferences: Contractor shall conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. The Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility problems.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written recommendations.



- n. Warranty requirements.
- o. Compatibility of materials.
- p. Acceptability of substrates.
- q. Temporary facilities and controls.
- r. Space and access limitations.
- s. Regulations of authorities having jurisdiction.
- t. Testing and inspecting requirements.
- u. Installation procedures.
- v. Coordination with other work.
- w. Required performance results.
- x. Protection of adjacent work.
- y. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
- 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Contractor shall conduct progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.
  - 1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Work hours.
      - 10) Hazards and risks.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Status of correction of deficient items.
      - 14) Field observations.
      - 15) RFIs.
      - 16) Status of proposal requests.
      - 17) Pending changes.



- 18) Status of Change Orders.
- 19) Pending claims and disputes.
- 20) Documentation of information for payment requests.
3. Minutes: Contractor will record and distribute to Contractor the meeting minutes.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
  - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
  1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    - c. Review present and future needs of each contractor present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Work hours.
      - 10) Hazards and risks.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Change Orders.
  3. Reporting: Contractor will record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

#### **1.08 REQUESTS FOR INTERPRETATION (RFIS)**

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
  1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.



- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
1. Project name.
  2. Date.
  3. Name of Contractor.
  4. Name of Architect.
  5. RFI number, numbered sequentially.
  6. Specification Section number and title and related paragraphs, as appropriate.
  7. Drawing number and detail references, as appropriate.
  8. Field dimensions and conditions, as appropriate.
  9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  10. Contractor's signature.
  11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
    - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: CSI Form 13.2A.
1. Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow seven working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for coordination information already indicated in the Contract Documents.
    - d. Requests for adjustments in the Contract Time or the Contract Sum.
    - e. Requests for interpretation of Architect's actions on submittals.
    - f. Incomplete RFIs or RFIs with numerous errors.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use CSI Log Form 13.2B.
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number including RFIs that were dropped and not submitted.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's response was received.



8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

**1.09 P2 PRODUCTS (NOT USED)**

**1.10 P3 EXECUTION (NOT USED)**

**END OF SECTION 013100**



**SECTION 01 3200  
CONSTRUCTION PROGRESS DOCUMENTATION**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Photographic Documentation
  - 2. Contractor's Construction Schedule.
  - 3. Submittals Schedule.
  - 4. Daily construction reports.
  - 5. Field condition reports.
- B. See Division 1 Section "Payment Procedures" for submitting the Schedule of Values.

**1.02 DEFINITIONS**

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Float: The measure of leeway in starting and completing an activity.
- E. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- F. Major Area: A story of construction, a separate building, or a similar significant construction element.

**1.03 SUBMITTALS**

- A. Submittals Schedule: Submit two copies of schedule to the Architect. Arrange the following information in a tabular format:
  - 1. Scheduled date for first submittal.
  - 2. Specification Section number and title.
  - 3. Submittal category (action or informational).
  - 4. Name of subcontractor.
  - 5. Description of the Work covered.
  - 6. Scheduled date for Architect's final release or approval.
- B. Preliminary Network Diagram: Submit two opaque copies, large enough to show entire network for entire construction period. Show logic ties for activities.
- C. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
  - 1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.
- D. CPM Reports: Concurrent with CPM schedule, submit three copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.



1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
  2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  3. Total Float Report: List of all activities sorted in ascending order of total float.
- E. Daily Construction Reports: Submit two copies at weekly intervals.
- F. Field Condition Reports: Submit two copies at time of discovery of differing conditions.

#### **1.04 COORDINATION**

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from parties involved.
  2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

### **PART 2 PRODUCTS**

#### **2.01 SUBMITTALS SCHEDULE**

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
  2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

#### **2.02 PHOTOGRAPHIC DOCUMENTATION**

- A. Extent: Document demolition and construction progress at weekly intervals, include pre-demolition photos for existing building and overall documentation of weekly progress in interval photos. Photo document areas under Green Communities requirements.
- B. Format: Electronic format, saved to disk for Owner's use monthly.

#### **2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL**

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents, and show how the sequence of the Work is affected.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

#### **2.04 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)**

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction.



Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

- C. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized time-scaled CPM network analysis diagram for the Work.
  - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
  - 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 3. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
  - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.
    - f. Utility interruptions.
    - g. Installation.
    - h. Work by Owner that may affect or be affected by Contractor's activities.
    - i. Testing and commissioning.
  - 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  - 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  - 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
  - 1. Contractor or subcontractor and the Work or activity.
  - 2. Description of activity.
  - 3. Principal events of activity.
  - 4. Immediate preceding and succeeding activities.
  - 5. Early and late start dates.
  - 6. Early and late finish dates.
  - 7. Activity duration in workdays.
  - 8. Total float or slack time.
  - 9. Average size of workforce.
- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
  - 1. Identification of activities that have changed.
  - 2. Changes in early and late start dates.
  - 3. Changes in early and late finish dates.



4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

## **2.05 REPORTS**

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  1. List of subcontractors at Project site.
  2. Equipment at Project site.
  3. Material deliveries.
  4. High and low temperatures and general weather conditions.
  5. Accidents.
  6. Stoppages, delays, shortages, and losses.
  7. Meter readings and similar recordings.
  8. Orders and requests of authorities having jurisdiction.
  9. Services connected and disconnected.
  10. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation on CSI Form 13.2A. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## **PART 3 EXECUTION**

### **3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**END OF SECTION 013200**



**SECTION 01 3300  
SUBMITTAL PROCEDURES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
  - 1. Division 1 Section "Construction Waste Management and Disposal" for submitting waste management plan.
  - 2. Division 1 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
  - 3. Division 1 Section "Closeout Procedures" for submitting warranties.
  - 4. Division 1 Section "Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 5. Divisions 2 through 33 Sections for specific requirements for submittals in those Sections.

**1.03 DEFINITIONS**

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

**1.04 SUBMITTAL PROCEDURES**

- A. General: Architect will provide electronic copies of CAD Drawings of the Contract Drawings for Contractor's use in preparing submittals if so requested. CAD files will be provided solely for the convenience of the Contractor and for informational purposes only. Architect's CAD files delivered to the Architect as submittals will not be accepted.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Provide overall schedule of submittals, listing Specification Section, Item, Manufacturer, and subcontractor, to Architect within 30 days of Notice to Proceed.
  - 2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 3. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Resubmittal Review: Allow 15 working days for review of each resubmittal.
  - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 working days for initial review of each submittal.



- D. Identification: Place a permanent label or title block on each submittal for identification.
  - 1. Include the following information on label for processing and recording action taken:
    - a. Revise list below to suit Project.
    - b. Project name.
    - c. Date.
    - d. Name and address of Architect.
    - e. Name and address of Contractor.
    - f. Name and address of subcontractor.
    - g. Name and address of supplier.
    - h. Name of manufacturer.
    - i. Number and title of appropriate Specification Section.
    - j. Drawing number and detail references, as appropriate.
    - k. Location(s) where product is to be installed, as appropriate.
    - l. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- G. Format of submittals -
  - 1. Informational submittals - electronic copies only
  - 2. Shop drawings - electronic copies only
  - 3. Materials submittals - electronic copies plus materials samples where appropriate.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, and authorities having jurisdiction, and others as necessary for performance of construction activities.
- K. Use for Construction: Use only final submittals marked "reviewed" by the Architect.

## **PART 2 PRODUCTS**

### **2.01 ACTION SUBMITTALS**

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. Mark each copy of each submittal to show which products and options are applicable.
  - 2. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Standard color charts.
    - e. Manufacturer's catalog cuts.
    - f. Wiring diagrams showing factory-installed wiring.
    - g. Printed performance curves.
    - h. Operational range diagrams.
    - i. Mill reports.
    - j. Standard product operation and maintenance manuals.



- k. Compliance with specified referenced standards.
- l. Testing by recognized testing agency.
- m. Application of testing agency labels and seals.
- n. Notation of coordination requirements.
- 3. Submit Product Data before or concurrent with Samples.
- 4. Number of Copies: Submit electronically unless material submittals. Architect will return electronic copy for contractor distribution to subcontractor, suppliers and vendors, and the Owner. Submit materials submittals in sample format where appropriate and enough copies so architect can retain a copy and send a copy to the Owner.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
  - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams.
    - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    - f. Shopwork manufacturing instructions.
    - g. Templates and patterns.
    - h. Schedules.
    - i. Design calculations.
    - j. Compliance with specified standards.
    - k. Notation of coordination requirements.
    - l. Notation of dimensions established by field measurement.
    - m. Relationship to adjoining construction clearly indicated.
    - n. Seal and signature of professional engineer if specified.
    - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
  - 2. Number of Copies: Same as for Product Data.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
  - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of appropriate Specification Section.
  - 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will retain sample and return submittal with options selected.



- E. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation" for Construction Manager's action.
- F. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- G. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."
- H. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."

## **2.02 INFORMATIONAL SUBMITTALS**

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
  - 1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Architect will not return copies.
  - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. An officer shall sign certificates and certifications or other individual authorized to sign documents on behalf of that entity.
  - 3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."
- B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- C. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- D. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- E. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- F. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- G. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- H. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- I. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- J. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."
- K. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- L. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a



product or equipment. Include name of product and name, address, and telephone number of manufacturer.

- M. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

### **PART 3 EXECUTION**

#### **3.01 CONTRACTOR'S REVIEW**

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

#### **3.02 ARCHITECT'S ACTION**

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
  - 1. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- B. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- C. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

**END OF SECTION 013300**



**SECTION 01 4000  
QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
  - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
  - 2. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
  - 3. Divisions 02 through 49 Sections for specific test and inspection requirements.

**1.03 DEFINITIONS**

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups will be judged by quality of work and standards of installation and will be retained on-site as quality standard of the project.
- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.



- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of three previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### **1.04 CONFLICTING REQUIREMENTS**

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

#### **1.05 SUBMITTALS**

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Reports: Prepare and submit certified written reports that include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Complete test or inspection data.
  - 8. Test and inspection results and an interpretation of test results.
  - 9. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 10. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 11. Name and signature of laboratory inspector.
  - 12. Recommendations on retesting and reinspect.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

#### **1.06 QUALITY ASSURANCE**

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.



- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
  - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using



materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
  - a. Allow seven days for initial review and each re-review of each mockup.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

#### **1.07 QUALITY CONTROL**

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  2. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.



5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  1. Schedule times for tests, inspections, obtaining samples, and similar activities.

#### **1.08 SPECIAL TESTS AND INSPECTIONS**

- A. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
  1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
  2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
  4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  6. Retesting and reinspecting corrected work.

#### **1.09 P2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION**

#### **2.01 TEST AND INSPECTION LOG**

- A. Prepare a record of tests and inspections. Include the following:
  1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

#### **2.02 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.



2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

**END OF SECTION 014000**



**SECTION 014533**  
**CODE-REQUIRED SPECIAL INSPECTIONS**

**PART 1 – GENERAL**

**1.1 SECTION INCLUDES**

- A. Code-required special inspections.
- B. Testing services incidental to special inspections.
- C. Submittals.
- D. Manufacturers' field services.
- E. Fabricators' field services.

**1.2 DEFINITIONS**

- A. Code or Building Code: ICC (IBC), 2018 Edition of the International Building Code and specifically, Chapter 17 - Special Inspections and Tests.
- B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.
- C. National Institute of Standards and Technology (NIST).
- D. Special Inspection:
  - 1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the AHJ that also require special expertise to ensure compliance with the approved contract documents and the referenced standards.
  - 2. Special inspections are separate from and independent of tests and inspections conducted by Owner or Contractor for the purposes of quality assurance and contract administration.

**1.3 REFERENCE STANDARDS**

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2017)..
- B. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- C. AISC 341 - Seismic Provisions for Structural Steel Buildings; 2016.
- D. AISC 360 - Specification for Structural Steel Buildings; 2016.
- E. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; 2018.
- F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- G. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 2018b.
- H. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete; 2014a.
- I. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.



- J. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2018.
- K. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2015.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- M. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- N. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2018.
- O. ICC (IBC) - International Building Code; 2021.

#### 1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Special Inspection Agency Qualifications: Prior to the start of work, the Special Inspection Agency shall:
  - 1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
  - 3. Submit certification that Special Inspection Agency is acceptable to AHJ.
- C. Testing Agency Qualifications: Prior to the start of work, the Testing Agency shall:
  - 1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
  - 3. Submit certification that Testing Agency is acceptable to AHJ.
- D. Special Inspection Reports: After each special inspection, Special Inspector shall promptly submit two copies of report; one to Architect and one to the AHJ.
  - 1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of Special Inspector.
    - d. Date and time of special inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of special inspection.
    - h. Date of special inspection.
    - i. Results of special inspection.
    - j. Compliance with Contract Documents.
  - 2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.
- E. Test Reports: After each test or inspection, promptly submit two copies of report; one to Architect and one to AHJ.
- F. Certificates: When specified in individual special inspection requirements, Special Inspector shall submit certification by the manufacturer, fabricator, and installation subcontractor to Architect and AHJ, in quantities specified for Product Data.



1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect and AHJ.

1.5 SPECIAL INSPECTION AGENCY

- A. The Special Inspection Agency may employ and pay for services of an independent testing agency to perform testing and sampling associated with special inspections and required by the building code.

1.6 TESTING AND INSPECTION AGENCIES

- A. Owner or Architect may employ services of an independent testing agency to perform additional testing and sampling associated with special inspections but not required by the building code.

1.7 QUALITY ASSURANCE

- A. Special Inspection Agency Qualifications:
  1. Independent firm specializing in performing testing and inspections of the type specified in this section.
- B. Testing Agency Qualifications:
  1. Independent firm specializing in performing testing and inspections of the type specified in this section.
- C. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document.

PART 2 – PRODUCTS

2.1 NOT USED

PART 3 – EXECUTION

3.1 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL

- A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.
  1. Continuous Special Inspection: Special Inspection Agency shall be present in the area where the work is being performed and observe the work at all times the work is in progress.
  2. Periodic Special Inspection: Special Inspection Agency shall be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

3.2 SPECIAL INSPECTIONS FOR STEEL CONSTRUCTION

- A. High-Strength Bolt, Nut and Washer Material:
  1. Verify identification markings comply with ASTM standards specified in the approved contract and to AISC 360, Section A3.3; periodic.
  2. Submit manufacturer's certificates of compliance; periodic.



- B. High-Strength Bolting Installation: Verify items listed below comply with AISC 360, Section M2.5.
  - 1. Snug tight joints; periodic.
  - 2. Pretensioned and slip-critical joints with matchmarking, twist-off bolt or direct tension indicator method of installation; periodic.
  - 3. Pretensioned and slip-critical joints without matchmarking or calibrated wrench method of installation; continuous.
- C. Structural Steel and Cold Formed Steel Deck Material:
  - 1. Structural Steel: Verify identification markings comply with AISC 360, Section M3.5; periodic.
  - 2. Other Steel: Verify identification markings comply with ASTM standards specified in the approved contract documents; periodic.
  - 3. Submit manufacturer's certificates of compliance and test reports; periodic.
- D. Weld Filler Material:
  - 1. Verify identification markings comply with AWS standards specified in the approved contract documents and to AISC 360, Section A3.5; periodic.
  - 2. Submit manufacturer's certificates of compliance; periodic.
- E. Welding:
  - 1. Structural Steel and Cold Formed Steel Deck:
    - a. Complete and Partial Joint Penetration Groove Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
    - b. Multipass Fillet Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
    - c. Single Pass Fillet Welds Less than 5/16 inch Wide: Verify compliance with AWS D1.1/D1.1M; periodic.
    - d. Plug and Slot Welds: Verify compliance with AWS D1.1/D1.1M; continuous.
    - e. Single Pass Fillet Welds 5/16 inch or Greater: Verify compliance with AWS D1.1/D1.1M; continuous.
    - f. Floor and Roof Deck Welds: Verify compliance with AWS D1.3/D1.3M; continuous.
  - 2. Reinforcing Steel: Verify items listed below comply with AWS D1.4/D1.4M and ACI 318, Section 3.5.2.
    - a. Verification of weldability; periodic.
    - b. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames as well as boundary elements of special structural walls of concrete and shear reinforcement; continuous.
    - c. Shear reinforcement; continuous.
    - d. Other reinforcing steel; periodic.
- F. Steel Frame Joint Details: Verify compliance with approved contract documents.
  - 1. Details, bracing and stiffening; periodic.
  - 2. Member locations; periodic.
  - 3. Application of joint details at each connection; periodic.
- G. Cold formed steel trusses spanning 60 feet or more; periodic.



### 3.3 SPECIAL INSPECTIONS FOR CONCRETE CONSTRUCTION

- A. Reinforcing Steel, Including Prestressing of Tendons and Placement: Verify compliance with approved contract documents and ACI 318, Sections 3.5 and 7.1 through 7.7; periodic.
- B. Reinforcing Steel Welding: Verify compliance with AWS D1.4/D1.4M and ACI 318, Section 3.5.2; periodic.
- C. Bolts Installed in Concrete: Where allowable loads have been increased or where strength design is used, verify compliance with approved contract documents and ACI 318, Sections 8.1.3 and 21.2.8 prior to and during placement of concrete; continuous.
- D. Anchors Installed in Hardened Concrete: Verify compliance with ACI 318, Sections 3.8.6, 8.1.3, and 21.2.8; periodic.
- E. Design Mix: Verify plastic concrete complies with the design mix in approved contract documents and with ACI 318, Chapter 4 and 5.2; periodic.
- F. Concrete Sampling Concurrent with Strength Test Sampling: Each time fresh concrete is sampled for strength tests, verify compliance with ASTM C172/C172M, ASTM C31/C31M and ACI 318, Sections 5.6 and 5.8 and record the following, continuous:
  - 1. Slump.
  - 2. Air content.
  - 3. Temperature of concrete.
- G. Concrete and Shotcrete Placement: Verify application techniques comply with approved contract documents and ACI 318, Sections 5.9 and 5.10; continuous.
- H. Specified Curing Temperature and Techniques: Verify compliance with approved contract documents and ACI 318, Sections 5.11 through 5.13; periodic.
- I. Concrete Strength in Situ: Verify concrete strength complies with approved contract documents and ACI 318, Section 6.2, for the following.
- J. Formwork Shape, Location and Dimensions: Verify compliance with approved contract documents and ACI 318, Section 6.1.1; periodic.

### 3.4 SPECIAL INSPECTIONS FOR MASONRY CONSTRUCTION

- A. Masonry Structures Subject to Special Inspection:
  - 1. Empirically designed masonry, glass unit masonry and masonry veneer in structures designated as "essential facilities".
  - 2. Engineered masonry in structures classified as "low hazard..." and "substantial hazard to human life in the event of failure".
- B. Verify each item below complies with approved contract documents and the applicable articles of TMS 402/602.
  - 1. Inspections and Approvals:
    - a. Verify compliance with the required inspection provisions of the approved contract documents; periodic.
    - b. Verify approval of submittals required by contract documents; periodic.
  - 2. Compressive Strength of Masonry: Verify compressive strength of masonry units prior to start of construction unless specifically exempted by code; periodic.
  - 3. Slump Flow and Visual Stability Index (VSI): Verify compliance as self consolidating grout arrives on site; continuous.
  - 4. Joints and Accessories: When masonry construction begins, verify:
    - a. Proportions of site prepared mortar; periodic.
    - b. Construction of mortar joints; periodic.



- c. Location of reinforcement, connectors, prestressing tendons, anchorages, etc; periodic.
  - 5. Structural Elements, Joints, Anchors, Protection: During masonry construction, verify:
    - a. Size and location of structural elements; periodic.
    - b. Type, size and location of anchors, including anchorage of masonry to structural members, frames or other construction; periodic.
    - c. Size, grade and type of reinforcement, anchor bolts and prestressing tendons and anchorages; periodic.
    - d. Welding of reinforcing bars; continuous.
    - e. Preparation, construction and protection of masonry against hot weather above 90 degrees F and cold weather below 40 degrees F; periodic.
  - 6. Grouting Preparation: Prior to grouting, verify:
    - a. Grout space is clean; periodic.
    - b. Correct placement of reinforcing, connectors, prestressing tendons and anchorages; periodic.
    - c. Correctly proportioned site prepared grouts and prestressing grout for bonded tendons; periodic.
    - d. Correctly constructed mortar joints; periodic.
  - 7. Preparation of Grout Specimens, Mortar Specimens and Prisms: Observe preparation of specimens; periodic.
- C. Engineered Masonry in Buildings Designated as "Essential Facilities": Verify compliance of each item below with approved contract documents and the applicable articles of TMS 402/602.
- 1. Inspections and Approvals:
    - a. Verify compliance with the required inspection provisions of the approved contract documents; periodic.
    - b. Verify approval of submittals required by contract documents; periodic.
  - 2. Compressive Strength of Masonry: Verify compressive strength of masonry units prior to start of construction and upon completion of each 5,000 square feet increment of masonry erected during construction; periodic.
  - 3. Preblended Mortar and Grout: Verify proportions of materials upon delivery to site; periodic.
  - 4. Slump Flow and Visual Stability Index (VSI): Verify compliance as self consolidating grout arrives on site; continuous.
  - 5. Engineered Elements, Joints, Anchors, Grouting, Protection: Verify compliance of each item below with approved contract documents and referenced standards.
    - a. Proportions of site prepared mortar; periodic.
    - b. Placement of masonry units and construction of mortar joints; periodic.
    - c. Placement of reinforcement, connectors, prestressing tendons, anchorages, etc.; periodic.
    - d. Grout space prior to grouting; continuous.
    - e. Placement of grout; continuous.
    - f. Placement of prestressing grout; continuous.



- g. Size and location of structural elements; periodic.
  - h. Type, size and location of anchors, including anchorage of masonry to structural members, frames or other construction; continuous.
  - i. Size, grade and type of reinforcement, anchor bolts and prestressing tendons and anchorages; periodic.
  - j. Welding of reinforcing bars; continuous.
  - k. Preparation, construction and protection of masonry against hot weather above 90 degrees F and cold weather below 40 degrees F; periodic.
  - l. Application and measurement of prestressing force; continuous.
6. Preparation of Grout Specimens, Mortar Specimens and Prisms: Observe preparation of specimens; continuous.

### 3.5 SPECIAL INSPECTIONS FOR CAST-IN-PLACE DEEP FOUNDATIONS

- A. Materials, Equipment and Final Placement: Verify each item below complies with approved construction documents and approved geotechnical report.
  - 1. Element length; continuous.
  - 2. Element diameters and bell diameters; continuous.
  - 3. Embedment into bedrock; continuous.
  - 4. End bearing strata capacity; continuous.
  - 5. Placement locations and plumbness; continuous.
  - 6. Type and size of hammer; continuous.
- B. Drilling Operations: Observe and maintain complete and accurate records for each element; continuous.
- C. Material Volume: Record concrete and grout volumes.
- D. Concrete Elements Associated with Cast-in-Place Deep Foundations: Perform additional inspections as required by the Special Inspections for Concrete Construction article of this section.

### 3.6 SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE

- A. Structural Observations for Seismic Resistance: Visually observe structural system for general compliance with the approved contract documents; periodic.

### 3.7 SPECIAL INSPECTIONS FOR WIND RESISTANCE

- A. Wind Resisting Components:
  - 1. Roof cladding; periodic.
  - 2. Wall cladding; periodic.
- B. Structural Observations for Wind Resistance: Visually observe structural system for general compliance with the approved contract documents; periodic.

### 3.8 OTHER SPECIAL INSPECTIONS

- A. Provide for special inspection of work that, in the opinion of the AHJ, is unusual in nature.
- B. For the purposes of this section, work unusual in nature includes, but is not limited to:



1. Materials and systems required to be installed in accordance with the manufacturer's instructions when said instructions prescribe requirements not included in the building code or in standards referenced by the building code.

C. Load Tests:

1. Proposed Construction and Construction in Progress: Where required by code, conduct tests listed below.
  - a. Load test procedures specified in code; periodic.
  - b. Load test procedures not specified in code; periodic.
  - c. Loadbearing Wall and Partition Assemblies: Load test with and without window framing; periodic.
  - d. Exterior Window and Door Assemblies: Wind load design pressure test; periodic.
2. Completed Construction: Where required by code, conduct tests listed below.
  - a. Load test procedures specified in code; periodic.
  - b. Load test procedures not specified in code; periodic.

### 3.9 SPECIAL INSPECTION AGENCY DUTIES AND RESPONSIBILITIES

A. Special Inspection Agency shall:

1. Verify samples submitted by Contractor comply with the referenced standards and the approved contract documents.
2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
3. Perform specified sampling and testing of products in accordance with specified reference standards.
4. Ascertain compliance of materials and products with requirements of Contract Documents.
5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
6. Perform additional tests and inspections required by Architect.
7. Submit reports of all tests or inspections specified.

B. Limits on Special Inspection Agency Authority:

1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the work.

C. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.

D. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

### 3.10 TESTING AGENCY DUTIES AND RESPONSIBILITIES

A. Testing Agency Duties:

1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.



2. Perform specified sampling and testing of products in accordance with specified standards.
  3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
  5. Perform additional tests and inspections required by Architect.
  6. Submit reports of all tests or inspections specified.
- B. Limits on Testing or Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  2. Agency may not approve or accept any portion of the work.
  3. Agency may not assume any duties of Contractor.
  4. Agency has no authority to stop the work.
- C. On instructions by Architect, perform re-testing required because of non-compliance with specified requirements, using the same agency.
- D. Contractor will pay for re-testing required because of non-compliance with specified requirements.

### 3.11 CONTRACTOR DUTIES AND RESPONSIBILITIES

- A. Contractor Responsibilities, General:
1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
  2. Cooperate with agency and laboratory personnel; provide access to the work, to manufacturers' facilities, and to fabricators' facilities.
  3. Provide incidental labor and facilities:
    - a. To provide access to work to be tested or inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
    - c. To facilitate tests or inspections.
    - d. To provide storage and curing of test samples.
  4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing or inspection services.
  5. Arrange with Owner's agency and pay for additional samples, tests, and inspections required beyond specified requirements.
- B. Contractor Responsibilities, Seismic Force-Resisting Systems: Submit written statement of responsibility for each item listed to AHJ and Owner prior to starting work. Statement of responsibility shall acknowledge awareness of special construction requirements and other requirements listed.
- C. Contractor Responsibilities, Wind Force-Resisting Systems: Submit written statement of responsibility for each item listed to AHJ and Owner prior to starting work. Statement of responsibility shall acknowledge awareness of special construction requirements and other requirements listed.



3.12 MANUFACTURERS' AND FABRICATORS' FIELD SERVICES

- A. When specified in individual specification sections, require material suppliers, assembly fabricators, or product manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, to test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

END OF SECTION 014533



**SECTION 01 5000  
TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections include the following:
  - 1. Division 01 Section "Summary" for limitations on utility interruptions and other work restrictions.
  - 2. Division 01 Section "Execution" for progress cleaning requirements.
  - 3. Divisions 02 through 49 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

**1.03 USE CHARGES**

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

**1.04 QUALITY ASSURANCE**

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

**1.05 PROJECT CONDITIONS**

- A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

**PART 2 PRODUCTS**

**2.01 EQUIPMENT**

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.



## **2.02 MATERIALS**

- A. Lumber and Plywood: Comply with requirements in Division 06 Section "Rough Carpentry."
- B. Paint: Comply with requirements in Division 09 painting Sections.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION, GENERAL**

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### **3.02 SUPPORT FACILITIES INSTALLATION**

- A. General: Comply with the following:
  - 1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.
  - 2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted. Provide Preinstallation Meeting with Architect and Owner to discuss signage locations and extent.
  - 1. Provide project sign per MHDC standards. Architect will provide design for site sign with coordination from the Owner.
  - 2. Provide temporary, directional signs for construction personnel and visitors.
  - 3. Maintain and touchup signs so they are legible at all times.

### **3.03 OPERATION, TERMINATION, AND REMOVAL**

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

**END OF SECTION 015000**



**SECTION 01 5850  
PROJECT SIGNS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project identification sign.

**1.02 QUALITY ASSURANCE**

- A. Design sign and structure to withstand 50 miles/hr wind velocity.
- B. Sign Painter: Experienced as a professional sign painter for minimum three years.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

**1.03 SUBMITTALS**

**1.04 SEE DIVISION 1 SECTION - ADMINISTRATIVE REQUIREMENTS FOR SUBMITTAL PROCEDURES.**

**PART 2 PRODUCTS**

**2.01 SIGN MATERIALS**

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum  $\frac{3}{4}$  inch thick, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized.
- D. Paint and Primers: Exterior quality, two coats; sign background of color as selected.
- E. Lettering: Exterior quality paint, colors as needed.

**2.02 PROJECT IDENTIFICATION SIGN**

- A. One painted sign, 32 sq. ft area, and bottom 6 feet above ground.
- B. Content: Project sign content to be verified by the Architect. Sign to include but not limited to the following.
  - 1. Project number, title, logo and name of project.
  - 2. Names and titles of authorities.
  - 3. Names and titles of Rosemann & Associates, P.C. and Consultants.
  - 4. Graphic Design, Colors, Style of Lettering: Designated by Rosemann & Associates, P.C.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install project identification sign within 30 days after date fixed by Notice to Proceed.
- B. Erect at designated location.
- C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- D. Install sign surface plumb and level, with butt joints. Anchor securely.
- E. Paint exposed surfaces of sign, supports, and framing.

**3.02 MAINTENANCE**

- A. Maintain signs and supports clean, repair deterioration and damage.

**3.03 REMOVAL**

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

**END OF SECTION 015850**



**SECTION 01 6000  
PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
  - 1. Division 01 Section "Alternates" for products selected under an alternate.
  - 2. Division 01 Section "Allowances" for administrative and procedural requirements governing allowances for products.
  - 3. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
  - 4. Divisions 02 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

**1.03 DEFINITIONS**

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

**1.04 SUBMITTALS**

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    - b. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - c. Samples, where applicable or requested.



- d. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - e. Cost information, including a proposal of change, if any, in the Contract Sum.
  - f. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen days of receipt of request, or seven days after receipt of additional information or documentation, whichever is later.
- a. Form of Acceptance: Indication of approval in writing from Architect.
  - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within fifteen days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
  - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

#### **1.05 QUALITY ASSURANCE**

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

#### **1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
- 1. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 2. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 3. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
- 1. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  - 2. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

#### **1.07 PRODUCT WARRANTIES**

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.



1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

## **PART 2 PRODUCTS**

### **2.01 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Architect will make selection.
  5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
  6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
  7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.

### **2.02 PRODUCT SUBSTITUTIONS**

- A. Timing: Architect will consider requests for substitution if received within 30 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
  2. Requested substitution is consistent with the Contract Documents and will produce indicated results.



3. Requested substitution has received necessary approvals of authorities having jurisdiction.
4. Requested substitution is compatible with other portions of the Work.

### **2.03 COMPARABLE PRODUCTS**

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
  1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that the product is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  3. Evidence that proposed product provides specified warranty.
  4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  5. Samples, if requested.

### **2.04 EXECUTION (NOT USED)**

**END OF SECTION 016000**



## **SECTION 01 7300 EXECUTION**

### **PART 1 GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.02 SUMMARY**

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. General installation of products.
  - 3. Progress Cleaning and Protection of Residents
  - 4. Protection of installed construction.
  - 5. Correction of the Work.
- B. Related Sections include the following:
  - 1. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
  - 2. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

#### **1.03 P2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION**

#### **2.01 EXAMINATION**

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
  - 1. Before construction, verify the location and points of connection of utility services.
  - 2. As excavation proceeds, verify any portion of the previous building on site that could interfere with new construction. Notify the Architect immediately.
  - 3. As interior demolition proceeds, verify any portion of the work that does not comply with layout for new construction. Notify the Architect immediately.
- B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

#### **2.02 PREPARATION**

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.



- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

### **2.03 CONSTRUCTION LAYOUT**

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 3. Inform installers of lines and levels to which they must comply.
  - 4. Check the location, level and plumb, of every major element as the Work progresses.
  - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Interior Layout: Locate and lay out interior improvements as noted on the drawings.
- F. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

### **2.04 INSTALLATION**

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 7'-6" in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.



- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

## **2.05 PROGRESS CLEANING AND RESIDENT PROTECTIONS**

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
  - 3. Site is an occupied site. Ensure that no materials remain exposed at any time that can be considered hazardous to the residents or staff.
- B. Separation: Separate residents and staff from construction at all times. Provide physical separation in order to prevent residents from entering construction areas. Provide physical separation necessary to protect residents from dusts and other construction chemicals.
- C. Site: Maintain Project site free of waste materials and debris.
- D. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
  - 3. Continuously monitor production of dust and control for resident and staff safety. Provide temporary enclosures or partitions in order to protect residents and staff from the health and comfort effects of dust and debris.
- E. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- F. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- G. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.



- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure to building residents, staff, or construction personnel during the construction period.

#### **2.06 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion. Provide complete protection of all installed finish flooring materials during entire duration of construction.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.
- C. Protect all existing construction, finishes, and materials to remain.

#### **2.07 CORRECTION OF THE WORK**

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
  - 2. Note that flooring that is not adequately protected as specified herein will be replaced in total.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

**END OF SECTION 017300**



**SECTION 01 7700  
CLOSEOUT PROCEDURES**

**PART 1 GENERAL**

**1.01 ACTION SUBMITTALS**

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

**1.02 CLOSEOUT SUBMITTALS**

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

**1.03 MAINTENANCE MATERIAL SUBMITTALS**

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

**1.04 SUBSTANTIAL COMPLETION PROCEDURES**

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by the Owner. Label with manufacturer's name and model number where applicable.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section.
  - 5. Submit test/adjust/balance records.
  - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Owner of pending insurance changeover requirements.
  - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 3. Complete startup and testing of systems and equipment.
  - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."



6. Advise Owner of changeover in heat and other utilities.
  7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  8. Complete final cleaning requirements, including touchup painting.
  9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### **1.05 LIST OF INCOMPLETE ITEMS (PUNCH LIST)**

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Page number.

#### **1.06 SUBMITTAL OF PROJECT WARRANTIES**

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

#### **1.07 1.7 SUBMITTAL OF ATTIC STOCK**

- A. Provide attic stock extra materials equivalent to the following amounts. Provide new materials in original unopened containers. Store all attic stock in one location as directed by Owner.
1. Resilient base equal to one unopened roll.
  2. Vinyl sheet flooring equal to amount required to floor two apartments.
  3. Vinyl plank flooring equal to two unopened cartons.
  4. Tile carpeting equal to one unopened cartons of each type.



5. Sheet carpeting of each type equal to amount for one apartment and equal amount of public area carpet in 12-foot roll.
6. Exterior painting equal to one unopened gallon of each color and finish.
7. Interior painting equal to one unopened gallon of each color and finish.
8. Toilet and bath accessories equal to quantity for two bathrooms.
9. Horizontal louver blinds equal to blinds for four standard windows.
10. Residential casework equal to four cabinet doors in most standard size unopened in cartons.
11. Hardware for two interior doors and one apartment entry door.
12. One unopened carton acoustical ceiling tile.
13. Three additional full height corner guards.
14. Toilet and bath accessories, including grab bars, equal to one apartment bath.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## **PART 3 EXECUTION**

### **3.01 FINAL CLEANING**

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - k. Remove labels that are not permanent.
    - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.



- n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
  - p. Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
  - q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - r. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Disposal."

### **3.02 REPAIR OF THE WORK**

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

### **END OF SECTION 017700**



**SECTION 01 7820  
OPERATION AND MAINTENANCE DATA**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Maintenance manuals for the care and maintenance of products, systems and equipment.
- B. Related Sections include the following:
  - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
  - 2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
  - 3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
  - 4. Divisions 2 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

**1.03 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

**1.04 SUBMITTALS**

- A. Submittal: Submit one copy of each manual 10 working days before final inspection to both the Architect and Owner. Architect and Owner will return copy with comments within 15 working days after final inspection.
  - 1. Correct or modify each manual to comply with Architect's and Owner's comments.

**1.05 COORDINATION**

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

**PART 2 PRODUCTS**

**2.01 MANUALS, GENERAL**

- A. Organization: Organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, a table of contents, followed by the manual contents.
- B. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder. Identify binders as "Operation", "Emergency" or "Maintenance".

**2.02 EMERGENCY MANUALS**

- A. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.



- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.
  - 7. System, subsystem, or equipment failure.
  - 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
  - 1. Instructions on stopping.
  - 2. Shutdown instructions for each type of emergency.
  - 3. Operating instructions for conditions outside normal operating limits.
  - 4. Required sequences for electric or electronic systems.
  - 5. Special operating instructions and procedures.

### **2.03 OPERATION MANUALS**

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions.
  - 2. Performance and design criteria if Contractor is delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.
  - 9. Precautions against improper use.
  - 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Equipment identification with serial number of each component.
  - 4. Equipment function.
  - 5. Operating characteristics.
  - 6. Limiting conditions.
  - 7. Performance curves.
  - 8. Engineering data and tests.
  - 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
  - 1. Startup procedures.
  - 2. Equipment or system break-in procedures.
  - 3. Routine and normal operating instructions.
  - 4. Regulation and control procedures.
  - 5. Instructions on stopping.
  - 6. Normal shutdown instructions.
  - 7. Seasonal and weekend operating instructions.
  - 8. Required sequences for electric or electronic systems.
  - 9. Special operating instructions and procedures.



- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

## **2.04 MAINTENANCE MANUALS**

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard printed maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## **PART 3 EXECUTION**

### **3.01 MANUAL PREPARATION**

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.



- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

**3.02 MANUAL SUBMITTAL**

- A. Submit review set of all manuals to the Owner for review prior to final submittal. Upon Owner's review, complete manuals per comments of review set and provide two final copies of all Operations and Maintenance Manuals to Owner.

**END OF SECTION 017820**



**SECTION 01 7839  
PROJECT RECORD DOCUMENTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.

**1.02 SUBMITTALS**

- A. Record Drawings: Submit one set of marked up prints.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

**PART 2 PRODUCTS**

**2.01 RECORD DRAWINGS**

- A. Record Prints: Maintain one set of prints of the Contract Drawings and Shop Drawings.
  - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity that obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an understandable drawing technique.
    - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  - 3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
  - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.

**2.02 RECORD SPECIFICATIONS**

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.



1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders and Record Drawings where applicable.

### **PART 3 EXECUTION**

#### **3.01 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

**END OF SECTION 017810**



## SECTION 030130

### MAINTENANCE OF CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Removal of deteriorated concrete and subsequent replacement and patching.
  - 2. Floor joint repair.
  - 3. Epoxy crack injection.
  - 4. Corrosion-inhibiting treatment.
  - 5. Polymer overlays.
  - 6. Polymer sealers.
  - 7. Composite structural reinforcement.

##### 1.3 ALLOWANCES

- A. Allowances for maintenance of cast-in-place concrete are specified in Section 012100 "Allowances."
- B. Field quality-control testing is part of testing and inspecting allowance.

##### 1.4 PREINSTALLATION MEETINGS

##### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.
- B. Samples: Cured Samples for each exposed product and for each color and texture specified, in manufacturer's standard size appropriate for each type of work.

##### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturers.
- B. Material Certificates: For each type of portland cement aggregate supplied for mixing or adding to products at Project site.
- C. Product Test Reports: For each manufactured bonding agent cementitious patching mortar joint-filler crack-injection adhesive polymer overlay polymer sealer and composite structural reinforcement , for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Field quality-control reports.



## 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Each manufactured bonding-agent packaged patching-mortar joint-filler crack-injection-adhesive corrosion-inhibiting-treatment polymer-overlay polymer-sealer and composite-structural-reinforcement manufacturer shall employ factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.
- B. Concrete-Maintenance Specialist Qualifications: Engage an experienced concrete-maintenance firm that employs installers and supervisors who are trained and approved by manufacturer to apply packaged patching-mortar crack-injection adhesive corrosion-inhibiting treatments polymer overlays polymer sealers and composite structural reinforcement to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing or patching new concrete is insufficient experience for concrete-maintenance work.
  - 1. Field Supervision: Concrete-maintenance specialist firm shall maintain experienced full-time supervisors on Project site during times that concrete-maintenance work is in progress.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.
- B. Store cementitious materials off the ground, under cover, and in a dry location.
- C. Store aggregates covered and in a dry location; maintain grading and other required characteristics and prevent contamination.

## 1.9 FIELD CONDITIONS

- A. Environmental Limitations for Epoxies: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer. During hot weather, cool epoxy components before mixing, store mixed products in shade, and cool unused mixed products to retard setting. Do not apply to wet substrates unless approved by manufacturer.
  - 1. Use only Class A epoxies when substrate temperatures are below or are expected to go below 40 deg F within eight hours.
  - 2. Use only Class A or B epoxies when substrate temperatures are below or are expected to go below 60 deg F within eight hours.
  - 3. Use only Class C epoxies when substrate temperatures are above and are expected to stay above 60 deg F for eight hours.
- B. Cold-Weather Requirements for Cementitious Materials: Do not apply unless concrete-surface and air temperatures are above 40 deg F and will remain so for at least 48 hours after completion of Work.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: For repair products, obtain each color, grade, finish, type, and variety of product from single source and from single manufacturer with resources to provide products of consistent quality in appearance and physical properties.

### 2.2 BONDING AGENTS

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Manufactured product that consists of water-insensitive epoxy adhesive, portland cement, and water-based solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement.



1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Dayton Superior Corporation.
    - b. Master Builders Solutions; brand of MBCC Group.
    - c. Sika Corporation.
    - d. Sto Corp.
  - B. Epoxy Bonding Agent: ASTM C881/C881M, bonding system Type II Type V and free of VOCs.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. ChemCo Systems, Inc.
      - b. Dayton Superior Corporation.
      - c. Master Builders Solutions; brand of MBCC Group.
      - d. Sika Corporation.
      - e. Sto Corp.
      - f. US SPEC, Division of US MIX Company.
  - C. Latex Bonding Agent, Redispersible: ASTM C1059/C1059M, Type I for use at nonstructural and interior locations unless otherwise indicated.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. Dayton Superior Corporation.
      - b. US SPEC, Division of US MIX Company.
      - c. W. R. Meadows, Inc.
  - D. Latex Bonding Agent, Non-Redispersible: ASTM C1059/C1059M, Type II for use at structural and exterior locations and where indicated.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - a. ChemMasters, Inc.
      - b. Dayton Superior Corporation.
      - c. US SPEC, Division of US MIX Company.
      - d. W. R. Meadows, Inc.
  - E. Mortar Scrub Coat: Mix consisting of 1 part portland cement and 1 part fine aggregate complying with ASTM C144 except 100 percent passing a No. 16 sieve.
- 2.2 PATCHING MORTAR
- A. Patching Mortar Requirements:
    1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal, vertical, or overhead use orientation.
    2. Color and Aggregate Texture: Provide patching mortar and aggregates of colors and sizes necessary to produce patching mortar that matches existing, adjacent, exposed concrete. Blend several aggregates if necessary to achieve suitable matches.
    3. Coarse Aggregate for Patching Mortar: ASTM C33/C33M, washed aggregate, Size No. 8, Class 5S. Add to patching-mortar mix only as permitted by patching-mortar manufacturer.
  - B. Job-Mixed Patching Mortar : 1 part portland cement and 2-1/2 parts fine aggregate complying with ASTM C144, except 100 percent passing a No. 16 sieve.



- C. Cementitious Patching Mortar : Packaged, dry mix for repair of concrete.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CGM, Incorporated.
    - b. ChemMasters, Inc.
    - c. Dayton Superior Corporation.
    - d. KOSTER American Corporation.
    - e. Master Builders Solutions; brand of MBCC Group.
    - f. Sika Corporation.
    - g. Simpson Strong-Tie Co., Inc.
    - h. Sto Corp.
    - i. Themec Company, Inc.
    - j. United Gilsonite Laboratories (UGL).
    - k. US SPEC, Division of US MIX Company.
    - l. W. R. Meadows, Inc.
  2. Compressive Strength: Not less than **5000 psi** at 28 days when tested according to ASTM C109/C109M.
- D. Rapid-Strengthening, Cementitious Patching Mortar : Packaged, dry mix , ASTM C928/C928M for repair of concrete.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CGM, Incorporated.
    - b. ChemMasters, Inc.
    - c. Dayton Superior Corporation.
    - d. Master Builders Solutions; brand of MBCC Group.
    - e. Sika Corporation.
    - f. Simpson Strong-Tie Co., Inc.
    - g. Sto Corp.
    - h. US SPEC, Division of US MIX Company.
    - i. W. R. Meadows, Inc.
  2. Compressive Strength: Not less than **2000 psi** within three hours when tested according to ASTM C109/C109M.
- 2.3 PREPLACED CONCRETE MATERIALS
- A. Preplaced Aggregate: Washed aggregate, ASTM C33/C33M, Class 5S, with 95 to 100 percent passing a **1-1/2-inch** sieve, 40 to 80 percent passing a **1-inch** sieve, 20 to 45 percent passing a **3/4-inch** sieve, zero to 10 percent passing a **1/2-inch** sieve, and zero to 2 percent passing a **3/8-inch** sieve .
  - B. Fine Aggregate for Grout: Fine aggregate according to ASTM C33/C33M, but with 100 percent passing a **No. 8** sieve, 95 to 100 percent passing a **No. 16** sieve, 55 to 80 percent passing a **No. 30** sieve, 30 to 55 percent passing a **No. 50** sieve, 10 to 30 percent passing a **No. 100** sieve, zero to 10 percent passing a **No. 200** sieve, and having a fineness modulus of 1.30 to 2.10.
  - C. Grout Fluidifier for Grout: ASTM C937.



## 2.4 JOINT FILLER

- A. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A Shore durometer hardness of at least 80 according to ASTM D2240.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ChemCo Systems, Inc.
    - b. Dayton Superior Corporation.
    - c. Master Builders Solutions; brand of MBCC Group.
    - d. Sika Corporation.
- B. Polyurea Joint Filler: Two-component, semirigid, 100 percent solids, polyurea resin with a Type A Shore durometer hardness of at least 80 according to ASTM D2240.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ASTC Global, Inc.
    - b. ChemCo Systems, Inc.
    - c. Master Builders Solutions; brand of MBCC Group.
    - d. US SPEC, Division of US MIX Company.
- C. Color: As selected by Architect from full range of industry colors.

## 2.5 EPOXY CRACK-INJECTION MATERIALS

- A. Epoxy Crack-Injection Adhesive: ASTM C881/C881M, bonding system Type IV at structural locations and where indicated, Type I at other locations; free of VOCs.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ChemCo Systems, Inc.
    - b. Dayton Superior Corporation.
    - c. Fyfe Co. LLC.
    - d. Master Builders Solutions; brand of MBCC Group.
    - e. Sika Corporation.
    - f. Sto Corp.
    - g. US SPEC, Division of US MIX Company.
    - h. W. R. Meadows, Inc.
  - 2. Capping Adhesive: Product manufactured for use with crack-injection adhesive by same manufacturer.
  - 3. Color: Provide epoxy crack-injection adhesive and capping adhesive As selected by Architect from full range of industry colors.

## 2.6 CORROSION-INHIBITING MATERIALS

- A. Corrosion-Inhibiting Treatment: Waterborne solution of alkaline corrosion-inhibiting chemicals for concrete-surface application that penetrates concrete by diffusion and forms a protective film on steel reinforcement.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ARDEX Americas.



- b. Cortec Corporation.
- c. Euclid Chemical Company (The); a subsidiary of RPM International, Inc.
- d. Master Builders Solutions; brand of MBCC Group.
- e. Sika Corporation.

## 2.7 POLYMER-OVERLAY MATERIALS

- A. Polymer Overlay: Epoxy adhesive complying with ASTM C881/C881M, bonding system Type III, with surface-applied aggregate for skid resistance; free of VOCs.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ChemCo Systems, Inc.
    - b. Dayton Superior Corporation.
    - c. Master Builders Solutions; brand of MBCC Group.
    - d. Sika Corporation.
    - e. Sto Corp.
    - f. US SPEC, Division of US MIX Company.
  - 2. Aggregate: ACI 503.3, oven-dried, washed silica sand.
  - 3. Color and Texture: As selected by Architect from full range of industry colors.

## 2.8 POLYMER-SEALER MATERIALS

- A. Epoxy Polymer Sealer: Low-viscosity epoxy, penetrating sealer and crack filler recommended by manufacturer for penetrating and sealing cracks in exterior concrete traffic surfaces; VOC content 100 g/L or less .
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ChemCo Systems, Inc.
    - b. Dayton Superior Corporation.
    - c. Master Builders Solutions; brand of MBCC Group.
    - d. Sika Corporation.
  - 2. Color: As selected by Architect from full range of industry colors.

## 2.9 COMPOSITE REINFORCEMENT MATERIALS

- A. Composite Structural Reinforcement: Manufacturer's system consisting of carbon-fiber or glass-fiber reinforcement in the form of tow sheet with field-applied saturant or preimpregnated sheet and epoxy primers, fillers, adhesives, saturants, and topcoats, designed for use as externally bonded structural reinforcement for concrete.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Fyfe Co. LLC.
    - b. Master Builders Solutions; brand of MBCC Group.
    - c. Sika Corporation.



2.10 MISCELLANEOUS MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I, II, or III unless otherwise indicated.
- B. Water: Potable.

2.11 MIXES

- A. General: Mix products, in clean containers, according to manufacturer's written instructions.
  - 1. Do not add water, thinners, or additives unless recommended by manufacturer.
  - 2. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
  - 3. Do not mix more materials than can be used within time limits recommended by manufacturer. Discard materials that have begun to set.
- B. Dry-Pack Mortar: Mix required type(s) of patching-mortar dry ingredients with just enough liquid to form damp cohesive mixture that can be squeezed by hand into a ball but is not plastic.
- C. Concrete: Comply with Section 033000 "Cast-in-Place Concrete."
- D. Grout for Use with Preplaced Aggregate: Proportion according to ASTM C938. Add grout fluidifier to mixing water followed by portland cement, pozzolan, and fine aggregate.

PART 3 – EXECUTION

3.1 CONCRETE-MAINTENANCE SPECIALIST

- A. Concrete-Maintenance Specialist Firms: Subject to compliance with requirements, firms that may perform concrete maintenance include, but are not limited to, the following:

3.2 CONCRETE MAINTENANCE

- A. Have concrete-maintenance work performed only by qualified concrete-maintenance specialist.
- B. Comply with manufacturers' written instructions for surface preparation and product application.

3.3 EXAMINATION

- A. Notify Architect seven days in advance of dates when areas of deteriorated or delaminated concrete and deteriorated reinforcing bars will be located.
- B. Locate areas of deteriorated or delaminated concrete using hammer or chain-drag sounding and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries. At columns and walls make boundaries level and plumb unless otherwise indicated.
- C. Pachometer Testing: Locate at least three reinforcing bars using a pachometer, and drill test holes to determine depth of cover. Calibrate pachometer using depth of cover measurements, and verify depth of cover in removal areas using pachometer.
- D. Perform surveys as the Work progresses to detect hazards resulting from concrete-maintenance work.

3.4 PREPARATION

- A. Ensure that supervisory personnel are on-site and on duty when concrete maintenance work begins and during its progress.



- B. Protect persons, motor vehicles, surrounding surfaces of building being repaired, building site, plants, and surrounding buildings from harm resulting from concrete maintenance work.
  - 1. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
  - 2. Use only proven protection methods appropriate to each area and surface being protected.
  - 3. Provide temporary barricades, barriers, and directional signage to exclude public from areas where concrete maintenance work is being performed.
  - 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of concrete maintenance work.
  - 5. Contain dust and debris generated by concrete maintenance work and prevent it from reaching the public or adjacent surfaces.
  - 6. Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.
  - 7. Protect floors and other surfaces along haul routes from damage, wear, and staining.
  - 8. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.
  - 9. Protect adjacent surfaces and equipment by covering them with heavy polyethylene film and waterproof masking tape or a liquid strippable masking agent. If practical, remove items, store, and reinstall after potentially damaging operations are complete.
  - 10. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
  - 11. Dispose of debris and runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
- C. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.
  - 1. Prevent solids such as aggregate or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from concrete maintenance work.
  - 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.
- D. Preparation for Concrete Removal: Examine construction to be repaired to determine best methods to safely and effectively perform concrete maintenance work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed in the course of repair.
  - 1. Verify that affected utilities have been disconnected and capped.
  - 2. Inventory and record the condition of items to be removed for reinstallation or salvage.
  - 3. Provide and maintain shoring, bracing, and temporary structural supports as required to preserve stability and prevent unexpected or uncontrolled movement, settlement, or collapse of construction being demolished and construction and finishes to remain. Strengthen or add new supports when required during progress of removal work.
- E. Reinforcing-Bar Preparation: Remove loose and flaking rust from exposed reinforcing bars by abrasive blast cleaning needle scaling or wire brushing until only tightly adhered light rust remains.
  - 1. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in two or more adjacent bars, cut bars and remove and replace as indicated on Drawings.



2. Remove additional concrete as necessary to provide at least **3/4-inch** clearance at existing and replacement bars.
  3. Splice replacement bars to existing bars according to **ACI 318** by lapping, welding, or using mechanical couplings.
  - F. Preparation of Floor Joints for Repair: Saw-cut joints full width to edges and depth of spalls, but not less than **3/4 inch** deep. Clean out debris and loose concrete; vacuum or blow clear with compressed air.
  - G. Surface Preparation for Corrosion-Inhibiting Treatment: Clean concrete to remove dirt, oils, films, and other materials detrimental to treatment application.
    1. Use low-pressure water cleaning detergent scrubbing or sand blasting .
    2. Allow surface to dry before applying corrosion-inhibiting treatment.
  - H. Surface Preparation for Overlays:
    1. Remove delaminated material and deteriorated concrete surface material.
    2. Roughen surface of concrete to produce a surface profile matching CSP 3 according to ICRI 310.2.
    3. Use sand blasting shot blasting scarifying needle scaling scabbling or milling .
    4. Sweep and vacuum roughened surface to remove debris followed by low-pressure water cleaning.
  - I. Acidic Surface Preparation for Sealers: Acid etch surface of concrete to produce a surface profile matching CSP 1 according to ICRI 310.2.
    1. Remove excess acid solution, reaction products, and debris by squeegeeing or vacuuming.
    2. Scrub surface with an alkaline detergent, rinse, and squeegee or vacuum.
    3. Check acidity of surface with pH test paper and continue rinsing until pH is acceptable according to sealer manufacturer's written instructions.
    4. When pH is acceptable according to sealer manufacturer's written instructions and surface is clean, vacuum dry.
  - J. Nonacidic Surface Preparation for Sealers: Clean concrete to remove dirt, oils, films, and other materials detrimental to sealer application.
    1. Use shot blasting low-pressure water cleaning or detergent scrubbing .
  - K. Surface Preparation for Composite Structural Reinforcement: Clean concrete where reinforcement and epoxy patching mortar is to be placed by low-pressure water cleaning or detergent scrubbing to remove dirt, oils, films, and other materials detrimental to epoxy patching mortar.
    1. Roughen surface of concrete by sand blasting.
    2. Remove delaminated material and deteriorated concrete surface material.
    3. Sweep and vacuum roughened surface to remove debris followed by low-pressure water cleaning.
- 3.5 REMOVAL OF CONCRETE
- A. Do not overload structural elements with debris.
  - B. Saw-cut perimeter of areas indicated for removal to a depth of at least **1/2 inch** . Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcement.
  - C. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement.
  - D. Remove additional concrete if necessary to provide a depth of removal of at least **1/2 inch** over entire removal area.



- E. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar and to provide at least **3/4-inch** clearance around bar.
- F. Test areas where concrete has been removed by tapping with hammer, and remove additional concrete until unsound and disbonded concrete is completely removed.
- G. Provide surfaces with a fractured profile of at least **1/8 inch** that are approximately perpendicular or parallel to original concrete surfaces. At columns and walls, make top and bottom surfaces level unless otherwise directed.
- H. Thoroughly clean removal areas of loose concrete, dust, and debris.

### 3.6 APPLICATION OF BONDING AGENT

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Apply to reinforcing bars and concrete by stiff brush or hopper spray according to manufacturer's written instructions. Apply to reinforcing bars in two coats, allowing first coat to dry two to three hours before applying second coat. Allow to dry before placing patching mortar or concrete.
- B. Epoxy Bonding Agent: Apply to reinforcing bars and concrete by brush, roller, or spray according to manufacturer's written instructions, leaving no pinholes or other uncoated areas. Place patching mortar or concrete while epoxy is still tacky. If epoxy dries, recoat before placing patching mortar or concrete.
- C. Latex Bonding Agent, Type I: Apply to concrete by brush roller or spray. Allow to dry before placing patching mortar or concrete.
- D. Latex Bonding Agent, Type II: Mix with portland cement and scrub into concrete surface according to manufacturer's written instructions. Place patching mortar or concrete while bonding agent is still wet. If bonding agent dries, recoat before placing patching mortar or concrete.
- E. Mortar Scrub Coat for Job-Mixed Patching Mortar and Concrete: Dampen repair area and surrounding concrete **6 inches** beyond repair area. Remove standing water and apply scrub coat with a brush, scrubbing it into surface and thoroughly coating repair area. If scrub coat dries, recoat before placing patching mortar or concrete.
- F. Slurry Coat for Cementitious Patching Mortar: Wet substrate thoroughly and then remove standing water. Scrub a slurry of neat patching mortar into substrate, filling pores and voids.

### 3.7 INSTALLATION OF PATCHING MORTAR

- A. Place patching mortar as specified in this article unless otherwise recommended in writing by manufacturer.
  - 1. Provide forms where necessary to confine patch to required shape.
  - 2. Wet substrate and forms thoroughly and then remove standing water.
- B. Pretreatment: Apply specified bonding agent .
- C. General Placement: Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
- D. Vertical Patching: Place material in lifts of not more than **1-1/2 inches** or less than **1/4 inch**. Do not feather edge.
- E. Overhead Patching: Place material in lifts of not more than **1-1/2 inches** or less than **1/4 inch**. Do not feather edge.
- F. Consolidation: After each lift is placed, consolidate material and screed surface.
- G. Multiple Lifts: Where multiple lifts are used, score surface of lifts to provide a rough surface for placing subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.



- H. Finishing: Allow surfaces of lifts that are to remain exposed to become firm and then finish to a surface matching adjacent concrete .
- I. Curing: Wet-cure cementitious patching materials, including polymer-modified cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.

### 3.8 INSTALLATION OF DRY-PACK-MORTAR

- A. Use dry-pack mortar for deep cavities. Place as specified in this article unless otherwise recommended in writing by manufacturer.
  - 1. Provide forms where necessary to confine patch to required shape.
  - 2. Wet substrate and forms thoroughly and then remove standing water.
- B. Pretreatment: Apply specified bonding agent .
- C. Place dry-pack mortar into cavity by hand, and compact tightly into place. Do not place more material at a time than can be properly compacted. Continue placing and compacting until patch is approximately level with surrounding surface.
- D. After cavity is filled and patch is compacted, trowel surface to match profile and finish of surrounding concrete. A thin coat of patching mortar may be troweled into the surface of patch to help obtain required finish.
- E. Wet-cure patch for not less than seven days by water-fog spray or water-saturated absorptive cover.

### 3.9 CONCRETE PLACEMENT

- A. Place concrete according to Section 033000 "Cast-in-Place Concrete" and as specified in this article.
- B. Pretreatment: Apply epoxy-modified, cementitious bonding and anticorrosion agent to reinforcement and concrete substrate.
- C. Pretreatment: Apply Type I latex bonding agent to concrete substrate.
- D. Standard Placement: Place concrete by form-and-pump method unless otherwise indicated.
  - 1. Use vibrators to consolidate concrete as it is placed.
  - 2. At unformed surfaces, screed concrete to produce a surface that when finished with patching mortar will match required profile and surrounding concrete.
- E. Form-and-Pump Placement: Place concrete by form-and-pump method where indicated.
  - 1. Design and construct forms to resist pumping pressure in addition to weight of wet concrete. Seal joints and seams in forms and where forms abut existing concrete.
  - 2. Pump concrete into place from bottom to top, releasing air from forms as concrete is introduced. When formed space is full, close air vents and pressurize to 14 psi.
- F. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.
- G. Fill placement cavities with dry-pack mortar and repair voids with patching mortar. Finish to match surrounding concrete.

### 3.10 GROUTING PREPLACED AGGREGATE CONCRETE

- A. Use grouted preplaced aggregate concrete for column and wall repairs . Place as specified in this article.
- B. Design and construct forms to resist pumping pressure in addition to weight of wet grout. Seal joints and seams in forms and where forms abut existing concrete.
- C. Apply epoxy bonding agent to reinforcement and concrete substrate.



- D. Place aggregate in forms, consolidating aggregate in lifts as it is placed. Pack aggregate into upper areas of forms to achieve intimate contact with concrete surfaces.
- E. Fill forms with water to thoroughly dampen aggregate and substrates. Drain water from forms before placing grout.
- F. Pump grout into place at bottom of preplaced aggregate, forcing grout upward. Release air from forms at top as grout is introduced. When formed space is full and grout flows from air vents, close vents and pressurize to **14 psi**.
- G. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.
- H. Repair voids with patching mortar and finish to match surrounding concrete.

### 3.11 FLOOR-JOINT REPAIR

- A. Cut out deteriorated concrete and reconstruct sides of joint with patching mortar as indicated on Drawings. Install joint filler in nonmoving floor joints where indicated and as specified in this article.
- B. Depth: Install joint filler to a depth of at least **3/4 inch**. Use fine silica sand no more than **1/4 inch** deep to close base of joint. Do not use sealant backer rods or compressible fillers below joint filler.
- C. Top Surface: Install joint filler so that when cured, it is flush at top surface of adjacent concrete. If necessary, overfill joint and remove excess when filler has cured.

### 3.12 EPOXY CRACK INJECTION

- A. Clean cracks with oil-free compressed air or low-pressure water to remove loose particles.
- B. Clean areas to receive capping adhesive of oil, dirt, and other substances that would interfere with bond.
- C. Place injection ports as recommended by epoxy manufacturer, spacing no farther apart than thickness of member being injected. Seal injection ports in place with capping adhesive.
- D. Seal cracks at exposed surfaces with a ribbon of capping adhesive at least **1/4 inch** thick by **1 inch** wider than crack.
- E. Inject cracks wider than **0.003 inch** to a depth of **8 inches**.
- F. Inject epoxy adhesive, beginning at widest part of crack and working toward narrower parts. Inject adhesive into ports to refusal, capping adjacent ports when they extrude epoxy. Cap injected ports and inject through adjacent ports until crack is filled.
- G. After epoxy adhesive has set, remove injection ports and grind surfaces smooth.

### 3.13 APPLICATION OF CORROSION-INHIBITING-TREATMENT

- A. Apply corrosion-inhibiting treatment to surfaces indicated on Drawings, from wall-to-wall or curb-to-curb and from joint-to-joint in the perpendicular direction.
- B. Apply by brush, roller, or airless spray in two coats at manufacturer's recommended application rate. Remove film of excess treatment by high-pressure washing before patching treated concrete or applying a sealer or overlay.

### 3.14 APPLICATION OF POLYMER OVERLAY

- A. Apply polymer overlay according to ACI 503.3.
- B. Apply to traffic-bearing surfaces, including parking areas and walks.



3.15 APPLICATION OF POLYMER SEALER

- A. Apply polymer sealer by brush, roller, or airless spray at manufacturer's recommended application rate.
- B. Apply to traffic-bearing surfaces, including parking areas and walks.

3.16 INSTALLATION OF COMPOSITE STRUCTURAL REINFORCEMENT

- A. Fiber Tow Sheet and Saturant: Unless otherwise recommended by manufacturer, install as follows:
  - 1. Apply epoxy primer using brush or short nap roller to prepared concrete surfaces in areas where composite structural reinforcement will be applied.
  - 2. After primer has set, patch surface defects with epoxy filler and allow to set before beginning reinforcement application.
  - 3. Apply epoxy saturant to fiber tow sheet or primed and patched surface using roller. Apply fiber tow sheet to primed and patched surface while saturant is still wet, using pressure roller to remove air pockets. Remove paper backing from fiber tow sheet and apply additional epoxy to fully saturate tow sheet.
  - 4. Apply additional layers using same procedure, fully saturating each layer with epoxy.
  - 5. After saturant has cured, apply protective topcoat by brush roller or spray.
- B. Preimpregnated Fiber Sheet: Unless otherwise recommended by manufacturer, install as follows:
  - 1. Patch surface defects with epoxy mortar and allow to set before beginning reinforcement application.
  - 2. Apply epoxy adhesive to a thickness of 1/16 inch to prepared concrete surfaces.
  - 3. Clean fiber sheet with acetone or other suitable solvent, and apply epoxy adhesive to a thickness of 1/16 inch.
  - 4. Apply adhesive-coated fiber sheet to adhesive-coated concrete and roll with a hard rubber roller until fiber sheet is fully embedded in adhesive, air pockets are removed, and adhesive is forced out from beneath fiber sheet at edges.
  - 5. Apply additional layers using same procedure.

3.17 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Product will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.
- D. Manufacturers Field Service: Engage manufacturers' factory-authorized service representatives for consultation and Project-site inspection and to provide on-site assistance when requested by Architect.
  - 1. Have manufacturers' factory-authorized service representatives perform the following number of Project-site inspections to observe progress and quality of the Work, distributed over the period of product installation, regardless of on-site assistance requested by Architect:
    - a. Bonding-Agent and Packaged Patching-Mortar Installation: Three inspections.
    - b. Joint-Filler Installation: Two inspections.
    - c. Crack-Injection-Adhesive Preparation and Installation: Four inspections.
    - d. Corrosion-Inhibiting Treatment: Two inspections.
    - e. Polymer Overlay: Two inspections.
    - f. Polymer Sealer: Two inspections.
    - g. Composite-Structural-Reinforcement: Three inspections.



3.18 CONCRETE MAINTENANCE SCHEDULE

- A. Garage Level 1 Entrance Ramp: Perform the following as indicated on Drawings:
  - 1. Removal of deteriorated concrete and subsequent replacement and patching.
  - 2. Floor joint repair.
  - 3. Epoxy crack injection.
  - 4. Corrosion-inhibiting treatment.
  - 5. Polymer overlays.
  - 6. Polymer sealers.
  - 7. Composite structural reinforcement on underside of slab.
- B. Elevated Warehouse Floors: Perform the following as indicated on Drawings:
  - 1. Removal of deteriorated concrete and subsequent replacement and patching.
  - 2. Floor joint repair.
  - 3. Epoxy crack injection.
  - 4. Corrosion-inhibiting treatment.
  - 5. Polymer overlays.
  - 6. Polymer sealers.
  - 7. Composite structural reinforcement on underside of slab.
- C. Concrete Walls and Floor in Salt Dome: Perform the following as indicated on Drawings:
  - 1. Removal of deteriorated concrete and subsequent replacement and patching.
  - 2. Floor joint repair.
  - 3. Epoxy crack injection.
  - 4. Corrosion-inhibiting treatment.
  - 5. Polymer overlays.
  - 6. Polymer sealers.
  - 7. Composite structural reinforcement of columns.

END OF SECTION 030130





ARCHITECTURE  
INTERIOR DESIGN  
ENGINEERING  
PLANNING

# Specifications

For:

# TownePlace Suites

**1810 NE Douglas St.  
Lee's Summit, MO 64064**

**Basis of Design  
Volume 2 of 2**

**Owner:  
Intrinsic Development  
3622 Endeavor Ave. Ste 101  
Columbia, MO 65201**

**Project No.: 23098  
October 13, 2023**



**SECTION 031500**  
**CONCRETE ACCESSORIES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS:**

- A. All of the Contract Documents, including General and Supplementary Conditions, and Division 1 General requirements, apply to the work of this section.

**1.2 WORK SUMMARY:**

- A. Furnish and install expanding bentonite-based waterstop as specified herein, illustrated on project drawings, or as required to complete the work to comply with waterproofing warranty requirements in Section 07 14 00.

**1.3 RELATED SECTIONS:**

- A. Other specification Sections which directly relate to the work of this section include, but are not limited to, the following:
  - 1. 03 11 00 – Concrete Formwork
  - 2. 03 30 00 – Cast-In-Place Concrete
  - 3. 07 14 00 - Fluid-Applied Waterproofing

**1.4 QUALITY ASSURANCE:**

- A. Verification of Details: Contractor to notify the Architect immediately of any detail, note, or specification which does not comply with current manufacturer's installation requirements
- B. Adhesion: Waterstop-RX is not a self-adhering product. Volclay WB-Adhesive is required to secure Waterstop-RX. No other adhesive should be used. Mechanical fasteners can be used in conjunction with WB-Adhesive, but should not be used solely to secure the waterstop.
- C. Installation Instructions: Components and installation procedures shall be in accordance with current manufacturer's printed specifications and recommendations. Verify technical data submittals are the most current with manufacturer.
- D. Expansion Joints: WATERSTOP-RX is not designed, nor intended for waterproofing or sealing expansion joints. Responsibility of waterproofing expansion joints is of others.
- E. Concrete: Concrete shall be structural grade quality with a minimum 3000psi tensile strength, See Section 03 30 00. For RX-101 and RX-101T a minimum thickness of 8" with two rows of reinforcing steel is required. For RX-102 a minimum thickness of 5" with a single row of reinforcing steel is required.

**1.5 SUBMITTALS:**

- A. Product Data: Submit manufacturer's product data, with complete general and specific installation instructions, recommendations, and limitations.
- B. Bentonite Content Certificate: Submit certificate signed by manufacturer certifying waterstop consists of 75% sodium bentonite and 25% butyl rubber compound and that the product is manufactured in the U.S.A.



- C. NSF Standard 61 Certification: Submit Official NSF Listing for waterstop confirming that the work conforms to the requirements of NSF Standard 61 – Drinking Water System Components – Health Effects.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials in factory sealed and labeled packaging. Sequence deliveries to avoid delays, while minimizing on-site storage. Handle and store following manufacturer's instructions, recommendations and material safety data sheets. Protect from construction operation related damage, as well as, damage from weather, excessive temperatures and prolonged sunlight. Remove damaged material from site and dispose of in accordance with applicable regulations.

PART 2 – PRODUCTS

2.1 MANUFACTURER:

- A. Provide Waterstop-RX bentonite waterstop and water-based adhesive as manufactured by Colloid Environmental Technologies Company (CETCO), 1500 West Shure Drive, Arlington Heights, Illinois 60004-1440, USA. Phone: (847)392-5800; Fax: (847)506-6195; Web-site: <http://www.cetco.com>.

2.2 MATERIALS:

- A. Waterstop shall consist of 75% sodium bentonite and 25% butyl rubber compound formed into uniform coils.
- B. NSF Certified: Bentonite waterstop shall be certified by NSF International to conform to the requirements of NSF Standard 61 – Drinking Water System Components – Health Effects.
- C. BENTONITE WATERSTOPS:
  - 1. WATERSTOP-RX 101: 1" x 3/4" x 16'8" rolls of a flexible strip of bentonite and butyl rubber compound for use in concrete construction joints - not designed for expansion joints.
- D. ADHESIVE:
  - 1. CETSEAL: A multipurpose UV stable single component polyether moisture cure sealant/adhesive

PART 3 – EXECUTION

3.1 SUBSTRATE INSPECTION AND CONDITIONS:

- A. The installer shall examine conditions of substrates and other conditions under which this section work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected and are acceptable for compliance with manufacturer's warranty requirements.
- B. Installation shall not proceed when work areas are flooded or wet to the extent that would cause bentonite waterstop to hydrate prior to concrete encapsulation.



3.2 SURFACE PREPARATION:

- A. Remove dirt, debris, oil, grease, cement laitance, or other foreign matter, which will impair or negatively affect the installation of the water stop. Protect adjacent material surfaces from damage or contamination from during installation operations.

3.3 GENERAL INSTALLATION GUIDELINES:

- A. Install WATERSTOP-RX in all applicable vertical and horizontal cast-in-place concrete construction joints; and around applicable penetrations and structural members. Place WATERSTOP-RX to allow for minimum 3" concrete coverage on all sides coverage for.
- B. Apply WB-ADHESIVE by brush 1" to 1-1/4" wide, to dry, smooth concrete surface maintaining a minimum 3" depth within the concrete joint. Allow adhesive to dry until the adhesive cures black (5-10 minutes in warm weather; cold weather will extend drying time).
- C. Remove release paper from coil of WATERSTOP-RX. Firmly press the entire length of WATERSTOP-RX against the cured (black) adhesive. Verify 3" minimum concrete coverage will be maintained over entire placement of water stop. Place in maximum practical lengths to minimize coil end joints.
- D. Tightly butt coil ends together to form continuous waterstop. Do not overlap coil ends. Where required, cut coils with sharp knife or utility blade to fit coil ends together without overlapping.
- E. Following Steps A-D, install waterstop around all applicable through wall pipes and mechanical penetrations; and around all applicable structural elements like metal H-Piles through the slab.
- F. Protect installed waterstop from prehydration prior to concrete placement and product encapsulation. Replace any waterstop material that exhibits significant expansion prior to concrete encapsulation.

3.4 CLEAN UP:

- A. Clean areas where adjacent finished surfaces are soiled by work of this Section. Remove all tools, equipment and remaining product on-site. Dispose of section work debris and damaged product following all applicable regulations.

END OF SECTION 031500



**SECTION 032000**  
**CONCRETE REINFORCEMENT**

**PART 1 – GENERAL**

**1.1 SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

**1.2 RELATED SECTIONS**

- A. Section 03 30 00 - Cast-in-Place Concrete.

**1.3 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

**1.4 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301.
  - 1. Maintain one copy of document on project site.
- B. Provide Architect with access to fabrication plant to facilitate inspection of reinforcement.
- C. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.

**PART 2 – PRODUCT**

**2.1 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).
  - 1. Deformed billet-steel bars.
- B. Steel Welded Wire Reinforcement: ASTM A 185, plain type.
  - 1. Flat Sheets
  - 2. Mesh Size and Wire Gage: As indicated on drawings.
- C. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gauge.
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.



## 2.2 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice, ACI SP-66 - ACI Detailing Manual, ACI 318, and ASTM A 184/A 184M.
- B. Welding of reinforcement is not permitted.

## PART 3 – EXECUTION

### 3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing as indicated on the drawings

### 3.2 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01 40 00, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION 032000



**SECTION 033000**

**CAST-IN-PLACE CONCRETE**

**PART 1 – GENERAL**

**1.1 WORK INCLUDES:**

- A. Provide all labor, materials and equipment necessary and required to complete all cast-in-place concrete as shown on the drawings and specified herein:
  - 1. Concrete
  - 2. Admixtures
  - 3. Vapor Barriers
  - 4. Curing Materials
  - 5. Joint Materials
  - 6. Reglets
  - 7. Non-shrink Grout
  - 8. Epoxy Mortar
  - 9. Concrete bases for Mechanical and electrical equipment.
  - 10. Concrete bases for Owner furnished equipment.
  - 11. Concrete bases for utility company equipment.
  - 12. Setting grout plates and anchor bolts.

**1.2 REFERENCES:**

Publications listed below form a part of this specification to extent referenced, Publications are referenced in text by basic designation only.

- A. AMERICAN CONCRETE INSTITUTE (ACI)
  - 1. 117-10 – TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS.
  - 2. 211.1-91(R2009) – SELECTING PROPORTIONS FOR NORMAL, HEAVYWEIGHT, AND MASS CONCRETE.
  - 3. 211.2-98(R2004) – SELECTING PROPORTIONS FOR STRUCTURAL LIGHTWEIGHT CONCRETE.
  - 4. 214R-02 – EVALUATION OF STRENGTH TEST RESULTS OF CONCRETE.
  - 5. 301-10 – STRUCTURAL CONCRETE.
  - 6. 304R-00(R2009) – GUIDE FOR MEASURING, MIXING, TRANSPORTING AND PLACING CONCRETE.
  - 7. 305R-10 – HOT WEATHER CONCRETE.
  - 8. 306R-10 – COLD WEATHER CONCETE.
  - 9. 308R-01(R2008) – STANDARD PRACTICE FOR CURING CONCRETE.
  - 10. 309R-05 – GUIDE FOR CONSOLIDATION OF CONCRETE.
  - 11. 318-08 – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE AND COMMENTARY.
  - 12. 347-04 – GUIDE TO FORMWORK FOR CONCRETE.
  - 13. SP-66-04 – ACI DETAILING MANUAL.



B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

1. C31/C31M-09 – PRACTICE FOR MAKING & CURING CONCRETE TEST SPECIMENTS IN THE FIELD
2. C33-08 – SPECIFICATION FOR CONCRETE AGGREGATES
3. C39/C39M-09–TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIFIMENS
4. C42 – TEST METHOD FOR OBTAINING & TESTING DRILLED CORES & SEWED BEAMS OF CONCRETE
5. C94/C94M-09 – SPECIFICAITON FOR READY MIXED CONCRETE
6. C143/C143M-10 – TEST METHOD FOR SLUMP OF HYDRAULIC CEMENT CONCRETE
7. C150-09 – SPECIFICATION FOR PORTLAND CEMENT
8. C172 -08– PRACTICE FOR SAMPLING FRESHLY MIXED CONCRETE.
9. C173-10 – AIR CONTENT OF FRESHLY MIXED CONCRETE BY THE VOLUMETRIC METHOD.
10. C231-09 – TEST METHOD FOR AIR CONTENT OF FRESHLY MIXED CONCRETE BY THE PRESSURE METHOD.
11. C260-06 – SPECIFICATION FOR AIR ENTARINING ADMIXTURES FOR CONCRETE
12. C309-07 – SPECIFICATION FOR LIQUID MEMBRANE FORMING COMPOUNDS FOR CURING CONCRETE
13. C330-09 – LIGHTWEIGHT AGGREGATES FOR STRUCTURAL CONCRETE
14. C494/C494M-10 - SPECIFICATION FOR CHEMICAL ADMIXTURES FOR CONCRETE
15. C618-08 – SPECIFICATION FOR FLY ASH & RAW OR CALCINED NAATURAL POZZOLAN FOR USE AS A MINERAL ADMIXTURES IN PORTLAND CEMENT CONCRETE
16. C666/C666M-03 – RESISTANCE OF CONCRETE TO RAPID FREEZING AND THAWING.
17. C881/C881M-02 – EPOXY RESIN BASE BONDING SYSTEMS FOR CONCRETE.
18. C1107/C1107M-08 – SPECIFICATION FOR PACKAGED DRY, HYDRAULIC CEMENT GROUT (NON-SHRINK)
19. C1116 – SPECIFICATION FOR FIBER REINFORCED CONCRETE & SHOTCRETE
20. C1315-08 – LIQUID MEMBRANE FORMING COMPOUNDS HAVING SPECIAL PROPERTIES FOR CURING AND SEALING CONCRETE.
21. D994 – SPECIFICATION FOR PREFORMED EXPANSION JOINT FILLER FOR CONCRETE
22. D1751-04(R2008) – SPECIFICATION FOR PREFORMED EXPANSION JOINT FILLER FOR CONCRETE PAVING & STRUCTURAL CONSTRUCTION
23. D1752 – SPECIFICATION FOR PREFORMED SPONGE RUBBER & CORK EXPANSION JOINT FILLERS FOR CONCRETE PAVING AND STRUCTURAL CONSTRUCTION
24. D4397-09 – POLYETHYLENE SHEETING FOR CONSTRUCTION, INDUSTRIAL AND AGRICULTURAL APPLICATIONS.
25. E1155-96(R2008) – DETERMINING Ff FLOOR FLATNESS AND FI FLOOR LEVELNESS NUMBERS.

C. CONCRETE REINFORCING STEEL INSTITUTE (CRSI):

1. HANDBOOK – 2008 EDITION.



D. PS1 US PRODUCT STANDARD FOR CONSTRUCTION & INDUSTRIAL PLYWOOD

1.3 RELATED SECTIONS:

- A. 31 23 16 - Excavating, Backfilling and Compacting.
- B. 32 16 13 - Concrete Curbs.
- C. 32 13 13 - Concrete Paving.
- D. 03 11 00 - Concrete Formwork.
- E. 03 15 00 - Waterstops.
- F. 03 20 00 - Concrete Reinforcement.
- G. 03 86 00 – Post Tensioned Concrete.
- H. 04 21 13 - Brick Masonry.
- I. 05 40 00 - Cold Formed Metal Framing.
- J. 06 10 00 - Rough Carpentry.
- K. 07 92 00 - Joint Sealers.
- L. 09 30 00 - Tile Work.
- M. 09 65 00 - Resilient Flooring.
- N. 09 68 00 - Carpet.
- O. 09 97 23 - Floor Sealer

1.4 SUBMITTALS:

- A. Product Data: Manufacturer's technical literature with installation and storage instructions for each product specified.
- B. Design Data:
  - 1. Design mix proportions shall be prepared by an independent testing laboratory. Proportions shall be in accordance with ACI 211 and ACI 318. Water cement ratio shall be determined by preliminary test made in accordance with ASTM C192. Tests shall be conducted in accordance with ASTM C39. Indicate the locations within the project where the mix design is to be used, types and quantities of material used, fresh unit weight, slump, air content, aggregate analysis, dry weight of aggregates, saturated weight of aggregates, and compressive strength at 28 days. A curve shall be established to represent the relationship between the water cement ratio and the average 28-day compressive strength at which the concrete is to receive its full working load. The range of values on the curve shall include all the compressive strengths as specified herein. The curve shall establish at least four sets of test specimens. Six copies of each design mix results and six copies of each graphed curve shall be furnished to the Architect and his review must be obtained prior to commencing any concrete operations.
  - 2. Warrant by the submission of the design mix that such mix is totally representative of the concrete to be supplied and meets the requirements of the Contract Documents. Deviation from the design mix to delivered concrete shall be sufficient reason for rejection. Submit new design mixes for review when changes are required.
- C. Test Reports:
  - 1. Cement: Submit certified mill test reports to the Architect for each type and run of cement used in the work.
  - 2. Aggregates:



- a. Submit a certified laboratory sieve analysis following ASTM C136 criteria of all coarse and fine aggregates used in the work.
- b. Upon request from the Architect or Building Official, submit certified laboratory chemicals and other analyses as deemed necessary by Architect.

1.5 QUALITY ASSURANCE :

- A. Codes and Standards: Comply with provisions of the following, except as otherwise indicated:
  - 1. ACI301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS
  - 2. ACI302 – GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION
  - 3. ACI304 – GUIDE FOR MEASURING, MIXING, TRANSPORTING & PLACING CONCRETE
  - 4. ACI305 – HOT WEATHER CONCRETING
  - 5. ACI306 – COLD WEATHER CONCRETING
  - 6. ACI308 – STANDARD PRACTICE FOR CURING CONCRETE
  - 7. ACI309 – STANDARD PRACTICE FOR CONSOLIDATION OF CONCRETE
  - 8. ACI315 – DETAILS & DETAILING OF CONCRETE REINFORCEMENT
  - 9. ACI318 – BUILDING CODE REQUIREMENTS FOR REINFORCEMENT CONCRETE
  - 10. ACI347 – RECOMMENDED PRACTICE FOR CONCRETE FORMWORK
  - 11. CRSI – MANUAL OF STANDARD PRACTICE
  - 12. SP66 – ACI DETAILING MANUAL
- B. Quality Control Testing During Construction: Contractor shall engage and independent concrete testing service approved by the Architect for quality control testing during concrete operations.
  - 1. Notify testing service at least two working days in advance of field operations requiring concrete testing, or of resumption of operations after stoppages.
  - 2. Coordinate concrete operations with testing service to facilitate quality control testing.
  - 3. Sample and test concrete during placement of concrete as follows:
    - a. Sampling Fresh Concrete: ASTM C172; except modified for slump to comply with ASTM C94.
    - b. Slump: ASTM C143; One test for each concrete load at point of discharge and one for each set of compressive strength test specimens.
    - c. Air Content: ASTM C231; Pressure method; one for each set of compressive strength specimens.
    - d. Compression Test Specimens: ASTM C31; one set of six standard cylinders for each compressive strength test, unless otherwise directed. Accommodate testing service to store cylinders on site for the first 24-hours after molding.
    - e. Concrete Temperature: Test hourly when air temperature is 40°F and below, and when 80°F and above; and each time that a set of compression test specimens is made.
    - f. Compressive Strength Tests: ASTM C39; one set of each 100cuyds or fractions thereof, of each concrete class placed in any one day or for each 5000 square feet of surface area.
- C. Contractor will have a minimum of 5-years experience in the field of structural concrete work.

1.6 DELIVERY, STORAGE AND HANDLING:

- A. Deliver, handle and store material at the job site in a manner as to prevent damage. Packaged material shall be in original containers with seals unbroken and labels intact until time of use.



Wrapped, or bundled material shall bear the name of the manufacturer and the product. All damaged or otherwise unsuitable material shall be immediately removed from the job site.

- B. Store concrete material in accordance with ASTM C9.

1.7 JOB CONDITIONS:

- A. In cold weather do not mix or place concrete when temperature is, or is predicted to be within the following 48-Hrs, below 40 degrees F, except as directed by the Architect unless proper provisions have been made for heating and protecting concrete; follow ACI306. Do not use salts or other chemicals to prevent freezing.
- B. In hot weather take special precautions to prevent high temperatures in freshly poured concrete; follow ACI305.
- C. Provide all labor and equipment necessary to remove water from excavated areas and maintain 'dry' conditions at all times.
- D. The concrete work shall be coordinated with the other parts of the work and with other Contractors, to allow reasonable time to set sleeves, inserts and other accessories when shall be in position before concrete is placed.
- E. Until this portion of the work is completed, remove all water from any source, in the area of construction that may interfere with the proper performance of the work and provide all sumps, pumps, well points, electric power and attendance for this purpose on a 24-Hr basis, until foundations are backfilled and ground bearing slabs have been placed.

PART 2 – PRODUCTS

2.1 FORMWORK: See Specification Section 031100

2.2 REINFORCING: See Specification Section 032000

2.3 WATERSTOPS: See Specification Section 031500

2.4 CONCRETE:

A. Cement:

- 1. Portland cement shall conform to ASTM "Standard Specifications for Portland Cement," C150 Type 1, 2 or 3 low alkali. Normal Portland Cement, uniform gray color from a single source.
- 2. Use one brand throughout the project.

- B. Aggregates: All fine and coarse aggregate shall conform to ASTM C33 with clean, hard, uncoated particles and shall be as specified below. All aggregates when subjected to 5 cycles of the sodium sulfate soundness test (ASTM C88) shall not lose more than 15 percent by weight. This test may be omitted on material from a source known to produce a sound aggregate when so certified by the testing laboratory.

- 1. Fine aggregate shall be natural sand, or sand prepared from stone or gravel. Grains shall be clean, hard, durable, uncoated and free from silt, loam and clay. Do not use dune, bank run or manufactured sand. Fine aggregate shall comply with ASTM C33, Section 5.1 sieve analysis.
- 2. Coarse aggregate shall be crushed stone, gravel, or other approved inert materials of similar characteristics, or combinations thereof, having hard, strong, durable pieces free from adherent coatings. Maximum size of pieces shall be 3/4" to #4 except for footings,



which may be 1-1/2". The maximum size of aggregate may not be larger than one-fifth of the narrowest dimension between forms, or larger than three-fourths of the minimum clear spacing between reinforcing bars. Comply with ASTM C33, Table 2.

- C. Water: Water is to be clean, potable and free from injurious amounts of oil, acids, salts, organic or other deleterious matter.
- D. Provide Ready-Mix Concrete unless otherwise approved or specified.
1. Ready-mix concrete shall conform to ASTM C94. The mixing agitation shall begin within 30 minutes, and the concrete shall be discharged from the truck within one hour after the water has been added to the concrete mix.
  2. Concrete to be pumped shall be specifically designed for pumping.
- E. Concrete Proportions:
1. Submit mix design to independent testing laboratory for review.
  2. Strength: The compressive strength (f'c) of concrete for each portion of the project shall be as designated on the drawings.
    - a. Average strength shall exceed compressive strength as required in accordance with ACI 318.
  3. The proportions of ingredients shall produce a mixture that will work readily into the corners and angles of the forms and around reinforcement by the method of placing and consolidation employed on the work but without permitting the materials to segregate or excessive free water to collect on the surface. Proportions shall also produce the specified strength, durability and slump.
  4. For concrete of normal weight mix proportions to provide the specific characteristics to be developed using one of the methods as described in ACI301: Method 1 - Laboratory Trial Mixes; Method 2- Field Experience Method; Method 3 - Maximum Permissible Water Cement Ratios.
  5. A water reduction admixture shall comply with ASTM C494 Type A and be used for all concrete. Amounts shall be as recommended by the manufacturer and shall be listed in the design mix.
  6. All concrete exposed to exterior weather shall contain 5 percent to 7 percent air entrainment admixture.
  7. Concrete shall be homogenous, and when hardened, shall have the required strength, resistance to deterioration, durability, water tightness and the properties as specified. normal weight concrete shall have a fresh unit weight of 145 to 152psf.
  8. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
  9. Select water to cement materials ratio required to produce a 28-day strength corresponding to over design mix, which is supported by sufficient experience data to assure that test results will fall within limits established in specification.
  10. Slump due to water content alone (without the addition of super plasticizer) shall be as follows:

<u>ALLOWABLE SLUMP</u>	<u>MIN-MAX (INCH)</u>
REINFORCED FOUNDATION WALLS AND FOOTINGS	1-3
UNREINFORCED FOOTINGS, CAISSONS AND SUBSTRUCTURE WALLS	1-3
REINFORCED SLABS, BEAMS AND WALLS	1-4
BUILDING COLUMNS	2-3



11. Slump may be increased by the use of approved high-range water-reducing admixture (super plasticizer). Tolerances as established by ASTM C94. Concrete containing the high-range-water reducing admixture may have a maximum slump of 9-inches. The concrete shall arrive at the job site at a slump of 2 to 3 inches, and 3 to 4 inches for lightweight concrete. This shall be verified, and then the high-range-water-reducing admixture added to increase the slump to the approved level.

## 2.5 ADMIXTURES:

### A. Air Entrained Concrete:

1. Use air entrained concrete for exterior exposed concrete including walls, walks, paving, etc.
2. Proportion air entrained concrete to attain minimum 28-Day compressive strength specified.
3. Total air-entrainment in concrete shall be not less than 5% and not more than 7% volume of concrete. Air content shall be determined by either ASTM C173 or ASTM C231.
4. Air entraining shall conform to ASTM C260.

### B. Water Reducing Admixture: ASTM C494, Type A and not containing more chloride ions than are present in municipal drinking water.

### C. High Range Water Reducing Admixture: ASTM C494, Type F or G and not containing more chloride ions than are present in municipal drinking water .

### D. Non-Corrosive, Non-Chloride Water Reducing, Accelerating Admixture: ASTM C494, Type E and not containing more chloride ions than are present in municipal drinking water. Admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory of at least one year duration using an acceptable accelerated corrosion test method such as that using electrical potential measures.

### E. Admixtures may be used by the Contractor at no additional expense to the Owner in order to provide workability at low slumps, increased compressive strength, retarding or acceleration of the concrete, if approved in writing by the Architect; however, the cement factor shall not be reduced and changes shall be made in the other mix proportions to insure the minimum strength requirements. Water reducing admixtures shall conform to ASTM C494.

### F. Prohibited Admixtures: Calcium chloride, thiocyanates. Admixtures containing more the 0.05% chloride ions are not permitted.

### G. Use water reducing admixture or high range water reducing admixture (super plasticizer) in all concrete.

### H. Fly Ash: Fly ash shall be used in all concrete mixes. ASTM C618 Class 'F' fly ash shall be proportioned by weight of cement to provide fly ash to Portland cement ratio not less than 20% or greater than 25% of the sum of total weight of fly ash and cement. Fly ash is not permitted in cold weather concreting unless extended protection is provided. Protection and heating shall be maintained until 70 percent of specified design strength is achieved.

## 2.6 MOISTURE RETAINING COVER:

### A. One of the following, complying with ASTM C171:

1. Waterproof paper.
2. Polyethylene film.
3. Polyethylene-coated burlap.

## 2.7 VAPOR RETARDER:



- A. Polyethylene film, 15mil thickness complying with ASTM E154; provide under all concrete slabs on grade and at other locations indicated on drawings and shall have the following properties:
  - 1. Permeance of less than 0.01 Perms per ASTM F1249 or ASTM E96.
  - 2. Maintain permeance of less than 0.01 Perms after mandatory conditioning tests per ASTM E154 Sections 8,11,12 and 13.
  - 3. Comply with ASTM E1745 Class A standards.
- B. Provide the following accessories:
  - 1. Seam Tape with a permeance of less than 0.30 Perms per ASTM F1249 or ASTM E96.
  - 2. Vapor proofing mastic with a permeance less than 0.30 Perms per ASTM F1249 or ASTM E96.
  - 3. Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.
- C. Exercise extreme care not to puncture membrane. No stakes shall be driven through the membrane. It is the Contractor's responsibility to devise means for placing the concrete to comply with these protective requirements.

## 2.8 CURING MATERIALS:

- A. Compounds:
  - 1. Material shall become integral part of concrete surface and leave floor free of residue or film. Meet requirements of ASTM C156 and C309, Type I with fugitive dye.
  - 2. It shall be the contractor's responsibility to verify that compounds are compatible with the scheduled floor treatment such as paint and resilient flooring materials and shall not discolor concrete surface.
  - 3. Manufacturers:
    - a. "Polyseal" Chem-Masters Corp, Chagrin Falls, OH 216 247-4277.
    - b. "Cure-Hard" W.R. Meadows Inc., Elgin, IL, 312 683-4500.
    - c. "Dress & Seal" L&M Construction Chemicals, Inc, Omaha NE 800 362-3331.
    - d. "Kure-N-Seal" Sonneborn Bldg Products Inc, Minneapolis MN 612 835-3434.
- B. Moisture Vapor Emissions & Alkalinity Control Sealers: 100% active colorless aqueous silicate solution concrete surface treatment applied the day of the concrete pour in lieu of other curing methods for all concrete slabs receiving resilient flooring, such as sheet vinyl, vinyl plank, vinyl composite tile, rubber, wood flooring, carpet, epoxy coating and overlays.
  - 1. ASTM C1315 Type 1, Class A, and ASTM C309 Type 1, Class A, penetrating product to have not less than 34% solid content, leaving no sheen, volatile organic compound (VOC) content rating as required to suite regulatory requirements. The product shall have at least a five year documented history in controlling moisture vapor emission from damaging floor covering and compatible with all finish materials.
  - 2. MVE 15-year Warranty:
    - a. When floor covering is installed on a below grade, on grade, or above grade concrete slab treated with moisture vapor emission & alkalinity control sealer according to manufacturer's instructions, sealer manufacturer shall warrant the floor covering system against failure due to moisture vapor migration or moisture-born contaminants for a period of 15-years from the date of substantial completion. The warranty shall cover all labor and materials needed to replace all floor covering that fails due to moisture vapor emission & moisture born contaminants.



- C. Waterproof Sheet: Polyethylene, opaque-white, 0.006" (6 mil) thick, meeting the requirements of ASTM C171.
- D. Sprayed Membrane:
  - 1. Sprayed membrane may be employed upon written approval of Architect. Material used must be guaranteed not to prevent bond between concrete and flooring adhesives and be compatible with proposed flooring material. Manufacturer of approved curing treatment shall be required to bond the application and performance of their product.

## 2.9 JOINT MATERIALS:

- A. Sealed Joints:
  - 1. Filler: Non-bituminous rubber or cork conforming to ASTM D1752.
  - 2. Seal: Neoprene conforming to ASTM D2628-Acme Highway Products, Amherst, NY
  - 3. Seal Adhesive: "Prime-Lube" Acme Highway Products, Amherst, NY, 716.691-3001.
- B. Non-sealed Joints:
  - 1. Filler: Pre-molded bituminous type conforming to ASTM D1751.
  - 2. Products:
    - a. "Flexcel" or "Elastite" Celotex Corporation, Tampa, FL, 813 871-4499.
    - b. "Seal Tight Fiber Expansion Joint" W.R.Meadows, Inc, Elgin, IL 312 683-4500.
- C. Non-compressive Filler:
  - 1. Provide one inch thick or two inch thick sheets as indicated on Drawings.
  - 2. Products:
    - a. "Styrofoam SM" Dow Chemical USA, Midland, MI, (800) 258-2436.
    - b. "Foamular" U.C. Industries, Inc., Parsippany, NJ, (800) 221-7888.
- D. Compressive Filler:
  - 1. Provide 1" thick or two thick sheets as indicated on Drawings.
  - 2. Compression modulus within range of 15 to 25 pounds per square inch.
  - 3. Type 1, Class A, with Class II flame spread rating.
  - 4. Products:
    - a. "Ethafom No. 4101" Dow Chemical USA, Midland, MI, (800) 258-2436.
    - b. "Rodofom No. 423" Electrovert, USA Corp., Elmsford, NY, (914) 592-7322.
- E. Filler Adhesive:
  - 1. General Purpose Mastic No. II Down Chemical USA, Midland, MI, (800) 258-2436.
  - 2. Rodofast - Electrovert USA Corp., Elmsford, NY, (914) 592-7322.

## 2.10 REGLETS:

- A. Dayton Superior Corp., Miamisburg, OH, (800) 252-3680.
- B. Fry Reglet Corporation, Norcross, GA, (404) 441-2337.
- B. Hohmann and Barnard, Inc., Hauppauge, NY, (516) 234-0600.

## 2.11 NON-SHRINK GROUT:

- A. Pre-mixed non-metallic formula having the following characteristics:
  - 1. No shrinkage after placement or expansion after set by ASTM C827.



2. 3-day compressive strength of 3000psi minimum by ASTM C109 and 5000psi at 28 days.
3. Initial set time of not less than 45 minutes by ASTM C191.
4. Grout shall conform to ASTM C1107.
5. Furnish test data from independent laboratory indicating that grout when placed at a fluid consistency shall achieve 95% bearing under a 4 foot by 4 foot base plate.
6. Where high fluidity or increased placing time is required, furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% under an 18 inch by 36 inch base plate.

B. Products:

1. Non-Ferrous, Non-Shrink Burke Company, San Mateo, CA, 415.349-7600.
2. Crystex L&M Construction Chemicals, Inc., Omaha, NE, 800.362-3331.
3. Five Star Grout FiveStar Products Inc, Shelton, CT, 800-243-2206.
4. Multi-Purpose #262 Bostik Const. Prod./Upco, Huntington, PA, 800.221-8726.

C. Curing Compound for Grout:

1. Polyclear Bostik Const. Prod./Upco, Huntington, PA, 800. 221-8726.
2. Spartan Cote/Cure-Seal Burke Company, San Mateo, CA, 415.349-7600.

2.12 EPOXY MORTAR:

A. Primer: Neat epoxy resin.

B. Mortar Patch Material: One part epoxy resin and three parts aggregate by volume.

C. Products:

1. Flexocrete Dural International, Deer Park, NY, 516.586-1655, or as approved by Architect.
2. Euco Poly Patch Euclid Chemical Co., Cleveland, OH, 216.531-9222.
3. Epopatch L&M Construction Chemicals, Inc., Omaha, NE, 402.453-6608.
4. "Sonopatch" Sonneborn Building Products, Minneapolis, MN, 612. 835-3434.

2.13 EVAPORATION CONTROL:

- A. Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

2.14 BONDING AGENT:

- A. For patching and surfacing hardened concrete and where approved in writing by the Architect.

1. Sikadur 32 Hi-Mod (Sika Corp)
2. Epobond (L&M Construction Chemicals)
4. Euco-Epoxy 460 (Euclid)

2.15 PATCHING AND SURFACING COMPOUND:

1. SikaTop 122 (Sika Corp)
2. Duratop (L&M Construction Chemicals)

2.16 NON SLIP ABRASIVE:



1. Grip-It AO (L&M Construction Chemicals)
2. Frictex N.S. (Sonneborn)
5. Non Slip (Euclid)

2.17 SLEEVES:

1. ASTM A120, hot-dipped galvanized.

2.18 FIBER REINFORCING:

- A. Use fiber reinforcing only where indicated on the Construction Documents.
- B. Synthetic Fibers: Monofilament or fibrillated polypropylene fibers for secondary reinforcing of concrete members. Use appropriate length and 1.5 pounds per cubic yard unless indicated otherwise. Product shall have a UL rating.
- C. Steel Fibers: ASTM A820, Type I cold drawn, high tensile steel wire for use as primary reinforcing in slab-on-grade. Minimum dosage rate of 30 pounds per cubic yard unless indicated otherwise.

2.19 MIXING:

- A. The concrete mixing, measuring and delivery equipment shall be certified by the National Ready Mixed Concrete Association. The methods shall be subject to Architect's review and in accordance with ACI614. Chlorides shall not be added to the mix.
- B. Ready mixed concrete shall conform to ASTM C94 except as specified.
- C. Obtain duplicate delivery tickets from the ready mixed concrete producer with each load of concrete delivered to the job site. Retain one copy and submit one to the Architect.
  1. Deliver tickets shall provide the following information:
    - a. DATE
    - b. NAME OF READY MIX CONCRETE PLANT
    - c. CONTRACTOR
    - d. JOB LOCATION
    - e. TYPE (STANDARD OR H.E.S.) AND BRAND OF CEMENT
    - f. CEMENT CONTENT IN BAGS PER CUBIC YARD CONCRETE
    - g. TRUCK NUMBER
    - h. TIME DISPATCHED AND TIME UNLOADED
    - i. AMOUNT OF CONCRETE IN LOAD IN CUBIC YARDS
    - j. ADMIXTURES IN CONCRETE
    - k. TYPE AND MAXIMUM SIZE OF AGGREGATE
    - l. WATER ADDED AT SITE.
- D. Maximum delivery temperature of concrete is 100 degrees F. Minimum delivery temperature shall be as follows:

ATMOSPHERIC TEMPERATURE	MINIMUM CONCRETE TEMPERATURE
30 DEGREES to 40 DEGREES F.	60 DEGREES F.
0 DEGREES to 30 DEGREES F.	70 DEGREES F.



2.20 DELIVERY:

- A. Concrete slabs placed at air temperatures below 50 degrees F shall use non-corrosive, non-chloride Accelerator. Concrete required to be air entrained shall use approved air entraining admixture. Pumped concrete, synthetic fiber concrete, architectural concrete, concrete required to be watertight, And concrete with a water/cement ratio below 0.50 shall use a high-range-water-reducing admixture.

PART 3 – EXECUTION

3.01 EXAMINATION:

- A. Examine areas in which work is to be performed. Report in writing to Architect all prevailing conditions that will adversely affect satisfactory execution of work. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Starting work constitutes acceptance of the existing conditions and this Contractor shall then, at his expense, be responsible for correcting all unsatisfactory and defective work encountered.

3.02. VAPOR BARRIER:

A. INSTALLATION:

1. Install under-slab vapor barrier in accordance with manufacturer's written instructions and ASTM E 1643-98 (2005).
  - a. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete pour.
  - b. Lap vapor barrier over footings and/or seal to foundation walls.
  - c. Overlap joints minimum of 6" and seal with manufacturer's tape.
  - d. Seal all penetrations (including pipes) per manufacturer's instructions.
  - e. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
  - f. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area minimum of 6" and taping all four sides with tape.

3.03MOISTURE VAPOR EMISSIONS & ALKALINITY CONTROL SEALER:

- A. Sealer is applied on the day of the concrete pour or as soon as harsh weather permits, prior to any other chemical treatment for concrete slabs either on grade, below grade or above grade receiving resilient flooring, such as, sheet vinyl, vinyl planking, vinyl composite tile, wood flooring, carpet, epoxy coatings and other overlays.
  1. Apply sealer to concrete slabs as soon as final finishing operations are completed and the concrete has hardened sufficiently to sustain floor traffic without damage.
  2. Spray apply sealer at a rate of 200 square feet per gallon. Lightly broom product evenly over the substrate and product has completely penetrated the surface.
  3. If within 2-hours after initial application areas are subjected to heavy rainfall and puddling occurs, reapply sealer product to these areas as soon as weather conditions permits.



3.03 JOINTS:

A. Expansion Joints:

1. Expansion joints in the superstructure shall be located as shown on the Drawings.
2. Inspect joints, which are to receive work of this section. Notify the Architect of conditions, which may prevent satisfactory installation, or performance of seal. Commencement of work on any joint will be considered acceptance of condition of said joint.
3. Joints to receive seal shall be thoroughly cleaned of mortar or any other foreign materials in an approved manner before any seal is applied. Concrete shall be fully cured, free of release agents, curing compounds, loose aggregate or other surface treatments. Test for adhesion before proceeding with seal installation if any surface treatments are present.
4. Joint spaces and surfaces shall be thoroughly dry before installation of seal adhesive. Unless approved means of drying joint is employed, do not install seal when temperature is below 40°F, or during and after rain and fog.
5. Filler material used for forming the joint under the seal shall be adequately held in place between the adjacent concrete surfaces so that after removal of forms and after subsequent joint movement, filler will remain in place without falling out of joint.

B. Preformed Joints: Where exterior concrete grade slabs abut the building and at other locations as shown on the Drawings, preformed joints shall be formed with filler which shall extend the full thickness of the slab.

C. Compressible and Non-compressible Filler: Filler shall be applied to surfaces as detailed and shown on the Drawings or as specified. Adhesive shall be applied in strict accordance with manufacturer's recommendations. Adequate curing time shall be allowed for the adhesive prior to placing concrete against the filler surface.

D. Construction and Control Joints:

1. Construction joints and/or control joints in walls and floors shall be made as specified or as approved by the Architect. Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect. The Contractor shall submit his proposed joint and casting schedule for walls, beams, columns, and slabs for review by the Architect.
2. Bulkheads, to limit each pour of the pre-determined construction joints, shall be set normal and vertical to the section to be poured, and shall be left in place until concrete has sufficiently set. Care shall be used when removing bulkheads to prevent spalling of the concrete surface. Any concrete passing bulkhead shall be removed before adjacent pour is commenced.
3. Walls between vertical construction joints shall be brought up to full height in one continuous operation.
4. Provide keyways at least 1-1/2" deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
5. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated other wise. Do not continue reinforcement through sides of strip placements.
6. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
7. Vertical construction joints in walls and grade beams shall be placed not over 50' apart to minimize the effect of early shrinkage of the concrete. At least 72 hours shall elapse before continuation of pours.
8. Joints not indicated on the Drawings shall be formed and located so as not to significantly impair the strength of the structure. Where a joint is to be formed, the surface of the concrete shall be thoroughly cleaned and all latency removed. In addition to the foregoing,



vertical joints shall be thoroughly wetted and sloshed with a coat of wet cement grout immediately before placing of new concrete.

9. Vertical construction joints using approved bulkheads may be made at center of beam and slab spans where a stop in concrete work is necessary.
10. No horizontal construction joints are to be made in slabs, beams or walls except as shown on Drawings and sections.

3.04. EMBEDDED ITEMS:

- A. Before placing concrete, all items to be embedded in the concrete by this Contractor, such as sleeves, box outs, inserts, anchors, hangers, metal nosings, bolts, slots, and fastening devices shall be firmly and securely fastened in place to formwork and reinforcing as required.
- B. Embedded items and/or penetrations, except for items normally installed by sub-trades such as plumbers, electricians, fire protection, mechanical, or others, shall be furnished by the respective trades and installed by this Contractor.
- C. All embedded items shall be located so as not to reduce the strength of the construction. They shall be thoroughly clean and free from coating, rust, scale, oil and any other foreign matter. No wood shall be permanently embedded in concrete.
- D. Sufficient time between erection of forms and placing of concrete shall be given to the various trades to permit the proper installation of their work. See Drawings and other sections of the specifications for extent, location and details of items to be embedded or placed in concrete.
- E. Embedments such as plumbing and sprinkler sleeves, chases, mechanical duct openings, electrical sleeves and conduits, inserts, hangers for mechanical, plumbing and electrical trades which are furnished and installed by other trades shall be maintained in position and protected until the concreting is complete.

3.05 PLACING REINFORCEMENT:

- A. See Specification Section 03 20 00 – 'Concrete Reinforcement' for placement information.
- B. Provide minimum cover for reinforcement of cast in place concrete as specified on drawings.

3.06 PREPARATION OF FORM SURFACES:

- A. See Specification Section 03 11 00 - 'Concrete Formwork' for requirements.

3.07 PLACEMENT OF WATERSTOPS:

- A. See Specification Section 03 15 00 - Waterstops.

3.08 PREPARATIONS FOR PLACING CONCRETE:

- A. Remove water from excavations. Before placement of concrete, remove wood chips, shavings, debris and hardened concrete from forms.
  1. Clean all equipment.
  2. Wet forms, except in freezing weather, or oil forms.
- B. Earth shall be uniformly moist when concrete is placed. Sprinkling method shall not be such as to form mud or pools of water. Watering sub-grade immediately prior to placing concrete is not sufficient to make the soil uniformly moist.
- C. Notify other crafts to permit installation of their work. Coordinate installation of joint materials and moisture barriers with placement of forms and reinforcing steel.



- D. Provide runways for wheeling equipment to convey concrete to point of deposit. Keep equipment on runways which are not supported by or bear on reinforcement, Provide similar runways for protection of vapor barrier on coarse fill.

3.09. PLACING CONCRETE:

- A. Before placing concrete, formwork shall have been completed; foreign material shall have been removed, reinforcement shall have been secured in place and the Inspector prior to placing concrete shall have approved the entire preparation. Inspector, testing company and Architect shall be notified at least 24 hours prior to desired time of inspection.
- B. Before pouring footings and foundations, see that bottoms of excavations are undisturbed earth and engineered fill, free from frost, properly leveled off, and tamped. Wet wood forms prior to placing concrete. Footings shall be free of loose cuttings, groundwater, etc., prior to placement of concrete.
- C. General: Comply with ACI 304, 'Guide for Measuring, Mixing Transporting, and Placing Concrete' and as specified.
- D. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete as nearly as practicable to its final location to avoid segregation caused by re-handling or flowing. Avoid splashing of forms or reinforcement with concrete in advance of placing concrete.
- E. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
  - 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
  - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
  - 3. Discharge contents of tremies or flexible spouts in horizontal layers not exceeding 20 inches in thickness and space tremies such as to provide a minimum of lateral movement of concrete.
  - 4. Continuously place concrete until an entire unit between construction joints is placed. Rate and method of placing concrete shall be such that no concrete between construction joints will be deposited upon or against partly set concrete, after it's initial set has taken place, or after 45 minutes of elapsed time during concrete placement.
  - 5. On bottom of members with severe congestion of reinforcement, deposit 1 inch layer of flowing concrete containing the specified high-range-water-reducing admixture. Successive concrete lifts may be a continuation of this concrete or concrete with a conventional slump.
  - 6. Concrete on metal deck shall be minimum thickness shown. Allow for deflection of steel beams and metal deck under the weight of wet concrete in calculating concrete quantities slab. The contractor shall become familiar with deflection characteristics of structural frame to include proper amount of additional concrete due to beam/deck deflection.



- E. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength, which could be caused by frost, freezing actions, or low temperatures; comply with ACI 306 and these specifications.
1. Mix and place concrete only when temperature is at least 40°F and rising, unless permission to pour is obtained from Architect.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen sub-grade or on sub-grade containing frozen materials.
  3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators.
  4. When approval is obtained to place concrete at or below an atmospheric temperature of 40°F, heat water or aggregates, or both. Provide suitable enclosures and heating devices.
  5. Record temperature of concrete for each truck as delivered and after placement in forms.
  6. Provide heating equipment or methods capable of heating water and aggregates uniformly
  7. Heat materials to temperature not greater than 150°F.
  8. After concrete placement, provide suitable measures to maintain concrete surface temperature at 40°F or above for a period not less than 14 days.
- F. Hot Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90°F. Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Cover reinforcing steel with water soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
  3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
  4. Use water reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.
  5. When necessary to prevent excessive moisture loss, provision for windbreaks, shading, sprinkling, ponding, or wet covering with a light colored material shall be made in advance of placement, and such protection measures shall be taken as quickly as concrete hardening and finishing operations will allow.
- H. Pumping Equipment: All oil or other rust inhibitors shall be removed from the pressure pumps. The equipment shall be of adequate size and design to ensure a continuous flow of concrete without any separation of materials. The use of aluminum pipe for conveying concrete is strictly prohibited.
- I. Provide adequate runways, chutes and other means of conveying concrete into place without causing segregation or loss of ingredients. Do not drop concrete freely more than 10-feet for concrete containing high-range-water-reducing admixtures or 5-feet for conventional concrete. Where greater drops are required, use a tremie or flexible spout attached to a suitable hopper.
- J. Place concrete immediately after mixing and in no case more than 90 minutes after water has been added. Minimum mixing shall be revolutions at mixing speed. Deposit in uniform, horizontal layers, not more than 24" deep: work around all reinforcing and in corners of forms. Properly spade and puddle by the use of rods, shovels and hand spades and agitate by means of internal or external vibrators to obtain the densest concrete without over vibrating to the point where separation results. Deposit concrete continuously until the completion of each section or unit.
- K. Size of concrete placement shall not exceed 1,000 SqFt for any slab on grade. Provide keyed construction joints and lap mesh. Roughen and clean construction joints and moisten just prior to



placing additional concrete. Place slabs in a checkerboard pattern with 24-hour intervals between placements.

- L. Isolation Joints in Slabs-On-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  - 1. Joint fillers and sealants are specified in Section 2.08 'Protection'.
- M. Platforms: Where shown, construct platforms at entrances of size indicated, except that subgrade shall be 5" of sand or pit run gravel thoroughly tamped. Saw cut joints.
- N. Foundation Pads: Construct 6" high, unless shown otherwise, pads for all electrical and mechanical equipment of size indicated on Drawings, or as determined by equipment to be located on pad. Verify sizes with appropriate subcontractors.
- O. Grout Plates and Anchor Bolts: Accurately set all grout plates and anchor bolts other than those on masonry walls. Grout plates and anchor bolts are specified in Section 05 12 00. Use nonshrinking cement grout. Anchor bolt and foundation tolerances shall be as follows:
  - 1. Elevation of concrete surfaces - 3/8"
  - 2. Elevator of top of anchor bolts - 1" to -3/8"
  - 3. Out of position anchor bolts - 1/8"
- P. Concrete Topping (Floor Fill): Shall be 2' or 2-1/2" as indicated course slab (deferred placement, not heavy duty). Maximum aggregate size shall be 3/8". Bonding agents other than cement grout shall not be used. Finish and tolerance shall be as specified herein. Care shall be taken to maintain welded wire fabric in center of fill.

### 3.10 CURING AND PROTECTION:

- A. No construction loads exceeding the structural design live loads shall be supported upon any un-shored portion of the structure under construction. No construction load shall be supported upon, nor any shoring removed from any part of the structure under construction until that portion of the structure has attained sufficient strength to support safely its weight and the loads placed thereon without noticeable deflection.
  - 1. The use of salts, chemicals or other foreign materials in the mix to lower the freezing point of concrete is prohibited.
  - 2. Hot and Cold Weather: During hot or cold weather or when directed by the Architect, concrete shall be sprayed, covered protected and otherwise cured according to the ACI recommended best standard practices and local regulations.
- B. Provide moisture curing by the following methods:
  - 1. Keep concrete surface continuously wet by covering with water.
  - 2. Use continuous water-fog spray.
  - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4" lap over adjacent absorptive covers.
- C. Provide moisture retaining cover curing as follows:
  - 1. Cover concrete surfaces with moisture retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- D. Curing:
  - 1. All freshly deposited concrete shall be protected from premature drying, from excessively hot or cold temperature and mechanical injury according to provisions of ACI 301, Chapter 12. During



placing, all concrete flatwork exposed to or subject to rapid evaporation of moisture under drying conditions (including hot weather, low humidity, wind and/or sunlight) shall be protected immediately following screeding with evaporation retarder applied in accordance with the recommendations of manufacturer. Application shall precede and shall be in addition to specified curing.

2. All concrete shall be maintained in a continuously moist condition for at least 7 days after placement. Curing shall begin as soon as possible after concrete has been placed and finished. Materials and methods of curing shall be submitted to Architect for review.
3. Curing and protection for surfaces not in contact with forms and surfaces in contact with forms for less than seven days.
  - a. Curing shall be by water curing, application of liquid membrane curing/sealing compound or by application of curing sheet materials. Curing compounds shall be applied in accordance with manufacturer's recommendations. Liquid membrane curing compound used on floor slabs receiving applied finish flooring shall be guaranteed by the manufacturer, in writing, not to impair bonding of adhesive.
  - b. For slabs use a curing treatment of water curing, curing sheet materials, or by applying and removing curing/sealing compound. The curing compounds must be applied immediately after final finishing. For curing by water curing or curing sheet materials, the concrete must be continually moist-cured for at least 7 days. Curing shall begin immediately after finishing.
  - c. For other surfaces (footings, walls, etc.) curing shall be by one of the accepted treatments listed above.
  - d. Restore curing protection on all freshly cut joint edges and faces when sawing joints or removing forms.
4. Concrete placed under cold weather conditions shall be cured by completely covering exposed surfaces of concrete with curing sheet material with sheeting completely sealed around edges. All concrete shall be cured for a minimum of 14 days with temperatures at or above 40 degrees F or for a minimum of 7 days with temperatures at or above 70°F.
- E. All freshly placed concrete shall be adequately protected from damage or injury due to water, falling objects, persons, or anything that may mar or injure the finish surface of the concrete. Any surfaces that are damaged due to lack of protective measures shall be removed and replaced with fresh concrete at the expense of the Contractor. Fresh concrete placed in the vicinity of public traffic shall be adequately protected with barriers, lights and any other protective measures necessary.

### 3.11 TOLERANCES:

- A. The limits and tolerances in the following table represent a maximum acceptable deviation from perfectly true and accurate concrete work, for individual cases. True and accurate work is expected in every instance, and this table is designed for the purpose of setting forth limits and tolerances governing maximum, rather than an index of acceptability.

#### 1. VARIATIONS FROM THE PLUMB.

- a. IN THE LINES & SURFACES OF PIERS, WALLS AND IN ARISES IN ANY 10' OF LENGTH  
1/4"

MAXIMUM FOR ENTIRE LENGTH

1"

- b. FOR EXPOSED CORNER COLUMNS, CONTROL-JOINT GROOVES AND OTHER CONSPICUOUS LINES IN ANY 20' OF LENGTH  
1/4"



- |   |       |
|---|-------|
| MAXIMUM FOR ENTIRE LENGTH   | 1/2"  |
| 2. <u>VARIATION FROM THE LEVEL OR FROM THE GRADES INDICATED ON THE DRAWINGS.</u>  |       |
| a) IN SLAB SOFFITS, CEILINGS, BEAM SOFFITS AND IN ARISES IN ANY 10' OF LENGTH   | 1/4"  |
| IN ANY BAY OR IN ANY 20' OF LENGTH  | 3/8"  |
| MAXIMUM FOR ENTIRE LENGTH   | 3/4"  |
| 3. <u>FLATNESS OF CONCRET SUPPORTING PREFABRICATED COLD FORMED PANELS</u>   |       |
| a) SPECIFIED OVERALL FLATNESS (SOFF) PER ASTM E1155 AND ACI 302.1   | 35    |
| 4. <u>IN EXPOSED LINTELS, SILLS, PARAPETS, HORIZONTAL GROOVES AND OTHER CONSPICUOUS LINES</u>   |       |
| IN ANY BAY OR IN ANY 20' OF LENGTH  | 1/4"  |
| MAXIMUM FOR ENTIRE LENGTH   | 1/2"  |
| 5. <u>VARIATIONS OF DISTANCE BETWEEN WALLS, COLUMNS, PARTITIONS AND BEAMS.</u>  |       |
| a) 1/4" PER 10' OF DISTANCE BUT NOT MORE THAN 1/2" IN ANY ONE BAY AND NOT MORE THAN 1" TOTAL VARIATION  |       |
| 6. <u>VARIATION OF LINEAR BUILDING LINES FROM ESTABLISHED POSITION IN PLAN</u>  | 1"    |
| 7. <u>VARIATION IN THE SIZES AND LOCATIONS OF SLEEVES FLOOR OPENINGS AND WALL OPENINGS.</u>   |       |
| MINUS   | 1/4"  |
| PLUS  | 1/2"  |
| 8. <u>VARIATION IN CROSS-SECTIONAL DIMENSIONS OF COLUMNS AND BEAMS AND IN THE THICKNESS OF SLABS AND WALLS</u>  |       |
| MINUS   | 1/4"  |
| PLUS  | 1/2"  |
| 9. <u>FOOTINGS VARIATION IN DIMENSIONS IN PLAN</u>  |       |
| MINUS   | 1/2"  |
| PLUS  | 2"    |
| 10. WHEN FORMED OR PLUS 3" WHEN PLACED AGAINST UNFORMED EXCAVATION MISPLACEMENT OR ECCENTRICITY 2% OF THE FOOTING WIDTH IN THE DIRECTION OF MISPLACEMENT BUT NOT MORE THAN 2" REDUCTIONS IN THICKNESS MINUS 5% OF SPECIFIED THICKNESS |       |
| 11. <u>VARIATION IN STEPS</u>   |       |
| a) IN A FLIGHT OF STAIRS  |       |
| RISE:   | 1/8"  |
| TREAD:  | 1/4"  |
| b) IN CONSECUTIVE STEPS   |       |
| RISE:   | 1/16" |
| TREAD:  | 1/8"  |

### 3.12 CONCRETE FINISHING:

- A. Surfaces other than horizontal slabs:



1. Patching: Within 12 hours after forms are removed correct surface defects as follows:
  - a. Fins and loose material, honeycomb, aggregate pockets, voids over 1/4" in diameter and holes left by the rods or bolts shall be cut out to solid concrete thoroughly wetted, brush-coat with neat cement grout and filled with mortar.
  - b. Patch work shall finish flush and in the same plane as adjacent surfaces. Exposed patch work shall be finished to match the adjoining surfaces in texture color.
  - c. Damp cure patches for 72 hours. Protruding portions of bar supports shall be ground flush with concrete surfaces that will be exposed.
  - d. Apply bonding agent where patching occurs.
- B. Unspecified Non-Slab Finish:
  1. Rough Form Finish: For all concrete surfaces not exposed to view.
  2. Smooth Form Finish: For all concrete surfaces exposed to view. Surfaces shall be considered exposed even though coating type finish will be applied.
- C. Surfaces of Horizontal Slabs:
  1. Finished slab surfaces shall be true plane surfaces with no deviation in excess of 1/8" when tested with a 10' straightedge, non-accumulative, and with no coarse aggregate showing.
  2. Particular attention should be paid to concrete work receiving other coatings. Fins and joints shall be ground smooth and holes patched.
  3. Slab Finishes: As per ACI" 301, Para 11.7 and as follows:
    - a. Scratched Finish: On slabs which are to receive a bonded cementitious topping. Do not use curing compounds on these surfaces.
    - b. Float Finish: On walks, unless other finishes have been indicated or specified.
    - c. Machine Float Finish: On slabs, which are to receive fluid membrane waterproofing and rigid insulation. Bevel outside corners of slabs where membrane waterproofing extends down side of slab.
    - d. Trowel Finish: On interior slabs and stairs exposed in the finished work, and where interior floors and stairs are to receive adhesive applied flooring such as resilient tile and carpet.
    - e. Broom or Belt Finish: On stair treads with nosings and on level walks and color-conditioned areas. Broom in direction perpendicular to travel and approved sample panel. Submit joint pattern layout prior to starting work.
- D. Use of Epoxy Binder:
  1. The two components of the binder shall be mixed and cured in accordance with the manufacturer's printed instructions. The Contractor shall estimate the time required to complete a patch or patches and mix the volume of materials needed. Mix only the number of containers of material that can be placed before the expiration of the pot life.
  2. Mixing of the binder shall be done with a special paddle, designed for the purpose and driven by a low-speed electric drill (500 to 600rpm) or other approved mixing equipment. Mixing of the components shall be continued for not less than three minutes and until the mixed material contains no streaks or lumps. Special care shall be taken to scrape the sides and bottom of the containers while mixing.
  3. To the properly prepared and primed surfaces, and while the primer is still wet or tacky, apply the epoxy mortar with a steel dowel. During the application, it may be desirable to wipe down the trowels with a rag and toluene. This will act as a trowel lubricant, making trowelling easier and provide a smoother and more uniform finished surface. Do not add toluene or any other type of solvent to the mixed epoxy.



**3.13. FIELD QUALITY CONTROL:**

A. Ready-Mix Concrete:

1. Delivery tickets are to accompany each concrete truck and shall be kept in the job superintendent's file. Delivery tickets must indicate the following information or be subject to rejection:

NAME OF PROJECT	DATE OF DELIVERY
MIX DESIGN NUMBER	BRAND OF CEMENT
SUPPLIER OF CEMENT	CEMENT CONTENT
TRUCK IDENTITY & TICKET SERIAL NUMBER	STRENGTH CLASSIFICATION
BATCHING TIME	ADMIXTURE CONTENT
POINT OF DEPOSIT	NAME OF CONTRACTOR
TOTAL AMOUNT OF WATER	NAME OF DRIVER
WEIGHT OF AGGREGATE	TIME LOADED & FIRST MIXING, TIME UNLOADED
DAILY TEMPERATURE OF CONCRETE	READING OF REVOLUTION COUNTER
TYPE AND MAXIMUM SIZE OF AGGREGATE	
NUMBER OF CUBIC YARDS IN LOAD	

B. Testing:

1. Samples of concrete and grout will be taken in accordance with ASTM C172 during the progress of the work for determination of slump, air content, compression strength, and fresh unit weight. Samples shall be taken by the Independent Testing Laboratory with assistance furnished by the Contractor. The Contractor may perform his own testing. Indicate on the test reports if water is added to concrete by anyone. Concrete and grout for slump tests and cylinders shall be taken from the end of the hose for pumped concrete.
2. See Specification Section 01 33 19 – 'Inspections and Testing ' for specific testing requirements.
3. The Contractor is responsible for obtaining the specified strength of concrete and for proper placing of concrete and reinforcing steel. Concrete or steel improperly placed or testing below specified strength shall be replaced without additional expense to Owner.
4. The use of testing services shall not relieve the Contractor of his responsibility to furnish materials and construction in full compliance with the contract documents.
5. Contractor shall cooperate with the Testing Laboratory.
6. Testing Laboratory shall provide stable, temperature controlled insulated storage of cylinders in the first 24 hours after molding as required by ASTM C31.

C. Test Evaluation:

1. Concrete cylinder tests will be evaluated by the Structural Engineer in accordance with ACI 318 and ACI 214.
2. In the event that 28-day test results indicate that concrete strength is not as specified, the concrete shall be cored as directed by the Structural Engineer. Core holes shall be plugged solid as specified under "Patching" of these specifications.
3. In the event that such additional coring tests do not show the strength required or as determined by load tests made in accordance with ACI 318, and if such tests indicate the necessity, the defective parts shall be removed and replaced, or shall be reinforced as directed by the Structural Engineer.
4. If core test results fall below the design strength specified, changes shall be made in the design mixture for future batches at no additional cost to the Owner.



5. The expense of any and all re-inspection, retesting, redesign and/or replacement of the work that is required due to failure of concrete to meet all contract document requirements, as determined by the Architect or Structural Engineer, shall be borne by the Contractor.

3.14. REMOVAL OF FORMS:

- A. Remove in a manner to assure complete safety of structure after the following conditions have been met.
  1. Where structure as a whole is supported on shores, forms for beams and girder sides, columns, and similar vertical structural members may be removed after 24 hours, provided concrete has hardened sufficiently to prevent surface damage and curing is continued without any lapse in time as specified for exposed surfaces.
  2. Take particular care in removing forms of architectural exposed concrete to ensure surfaces are not marred or gouged, and that corners and arises are true, sharp and unbroken.
- B. Control Test: Use to determine if the concrete has attained sufficient strength and curing to permit removal of supporting forms. Cylinders required for control tests taken in accordance with ASTM C172, molded in accordance with ASTM C31, and tested in accordance with ASTM C39. Control cylinders cured and protected in the same manner as the structure they represent. Supporting forms or shoring not removed until strength of control test cylinders have attained at least 70 percent of minimum 28-day compressive strength specified. For post-tensioned systems supporting forms and shoring not removed until stressing is completed. Exercise care to assure that newly unsupported portions of structure are not subjected to heavy construction or material loading.
- C. Reshoring: Reshoring is required if superimposed load plus dead load of the floor exceeds the capacity of the floor at the time of loading.

3.15. CONCRETE SURFACE REPAIRS:

- A. Patching Defective Areas: Immediately after form removal, cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by the rods and bolts, down to solid concrete but, in no case to a depth of less than 1".
  1. Cut edges perpendicular to concrete surface.
  2. Thoroughly clean, dampen with water, and brush coat area to be patched with neat cement grout or proprietary bonding agent before placing cement mortar or proprietary patching compound.
- B. Exposed To View Surfaces: Blend white Portland cement and standard Portland cement so that patching mortar will match surrounding color when dry.
  1. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching.
  2. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repair of Formed Surfaces: Remove and replace concrete of defective surfaces if defects cannot be repaired to satisfaction of SDR.
  1. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning.
  2. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
  3. Where possible, repair concealed formed surfaces that contain defects that affect concrete durability. If defects cannot be repaired, remove and replace concrete.



- D. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. For unformed surfaces sloped to drain, use template having required slope to test for trueness.
1. Surface defects include crazing, cracks greater than 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop outs, honeycomb, rock pockets, and other objectionable conditions.
  2. Repair finished unformed surfaces that contain defects, which affect concrete durability.
  3. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14-days.
  4. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish to blend into adjacent concrete. Use only approved proprietary patching compounds.
  5. Repair defective areas, with the exception of random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete.
    - a. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least  $\frac{3}{4}$ " clearance all around.
    - b. Dampen concrete surfaces in contact with patching concrete and brush with neat cement grout, or apply concrete bonding agent.
    - c. Mix patching concrete of same materials to provide concrete of same type of class as original concrete.
    - d. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

3.16. CONCRETE TRUCK DISCHARGE:

- A. Excess Concrete: Discharge excess concrete in mixer trucks that cannot be immediately used to area where it will not create an obstruction or hazard during construction. Remove excess concrete from site in a timely manner.
- B. Wash Water Discharge: Discharge wash water from mixer trucks to ground surface in manner and at location where discharge cannot escape construction site, or be washed away to storm sewers, or sanitary sewers by precipitation or other surface flows.
  1. Prior to project completion, remove wash water residue from the site.
  2. Clean wash water discharge site free of debris.

END OF SECTION 033000



## **SECTION 034100**

### **PRECAST STRUCTURAL CONCRETE**

#### **PART 1 – GENERAL**

##### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### **1.2 SUMMARY**

###### **A. Section Includes:**

- 1. Precast structural concrete.

###### **B. Related Sections:**

- 1. Division 03 3300 Section "Cast-in-Place Concrete" for placing connection anchors in concrete.
- 2. Division 07 6200 Section "Sheet Metal Flashing and Trim" for flashing receivers and reglets.
- 3. Division 07 8443 Section "Joint Firestopping" for joint-filler materials for fire-resistance-rated construction.

##### **1.3 DEFINITION**

- A. Design Reference Sample: Sample of approved precast structural concrete color, finish, and texture, preapproved by Architect.

##### **1.4 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design precast structural concrete, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Provide precast structural concrete units and connections capable of withstanding the design loads indicated on the drawings and under conditions indicated on the structural drawings.
  - 1. Design precast structural concrete framing system and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of primary building structure, and other building movements. Maintain precast structural concrete deflections within limits of ACI 318 (ACI 318M).
    - a. Thermal Movements: Allow for in-plane thermal movements resulting from annual ambient temperature changes of minus 18 to plus 120 °F.
  - 2. Fire-Resistance Rating: Select material and minimum thicknesses to provide indicated fire rating.

##### **1.5 SUBMITTALS**



- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water absorption tests.
- C. Shop Drawings: Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement. Detail fabrication and installation of precast structural concrete units.
  - 1. Indicate welded connections by AWS standard symbols. Show size, length, and type of each weld.
  - 2. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints.
  - 3. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
  - 4. Include and locate openings larger than 10 inches by 10 inches (250 mm).
  - 5. Indicate location of each precast structural concrete unit by same identification mark placed on panel.
  - 6. Indicate relationship of precast structural concrete units to adjacent materials.
- D. Delegated-Design Submittal: Provide analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Qualification Data: For installer, fabricator and testing agency.
- F. Welding certificates.
- G. Material Certificates: For the following, from manufacturer:
  - 1. Cementitious materials.
  - 2. Reinforcing materials and prestressing tendons.
  - 3. Admixtures.
  - 4. Bearing pads.
  - 5. Structural-steel shapes and hollow structural sections.
- H. Material Test Reports: For aggregates.
- I. Source quality-control reports.
- J. Field quality-control and special inspection reports.

#### 1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
  - 1. Participates in PCI's Plant Certification program at time of bidding and is designated a PCI-certified plant for Group C or CA.
- B. Installer Qualifications: A precast concrete erector qualified at time of bidding, as evidenced by PCI's Certificate of Compliance, to erect Category S1- Simple Structural Systems.
  - 1. Alternate to S1 certification: Submit Site Specific Safety Plan (SSSP) (Addendum #4)
- C. Installer Qualifications: An experienced precast concrete erector who, before erection of precast concrete, has retained a "PCI-Certified Field Auditor" to conduct a field audit of a project installed by erector in Category S1 - Simple Structural Systems and who produces



an Erectors' Post Audit Declaration, according to PCI: MNL 127, "PCI Erector's Manual - Standards and Guidelines for the Erection of Precast Concrete Products."

- D. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- E. Design Standards: Comply with ACI 318 (ACI 318M) and design recommendations in PCI MNL 120, "PCI Design Handbook -Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.
- F. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."
- G. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code- Steel."
  - 2. AWS D1.4, "Structural Welding Code- Reinforcing Steel."
- H. Preinstallation Conference: Conduct conference at Project site.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Support units during shipment on nonstaining shock-absorbing material in same position as during storage.
- B. Store units with adequate bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.
  - 1. Store units with dunnage across full width of each bearing point unless otherwise indicated.
  - 2. Place adequate dunnage of even thickness between each unit.
  - 3. Place stored units so identification marks are clearly visible, and units can be inspected.
- C. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses that would cause cracking or damage.
- D. Lift and support units only at designated points shown on Shop Drawings.

#### 1.8 COORDINATION

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

### PART 2 – PRODUCTS

#### 2.1 REINFORCING MATERIALS

- A. Reinforcing Bars: AS1MA 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Plain Steel Welded Wire Reinforcement: AS1M A 185, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.



- D. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

## 2.2 PRESTRESSING TENDONS

- A. Pretensioning Strand: ASTM A 416/A 416M, Grade 250 or Grade 270, uncoated, 7-wire or ASTM A 886/A 886M, Grade 270, indented, 7-wire, low-relaxation strand.

## 2.3 CONCRETE MATERIALS

- A. Portland Cement: AS1M C 150, Type I or Type III, gray, unless otherwise indicated.
- B. Supplementary Cementitious Materials:
  - 1. Fly Ash: AS1M C 618, Class C or F, with maximum loss on ignition of 3 percent.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33, with coarse aggregates complying with Class 5S.
- D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.
- E. Air-Entraining Admixture: AS1M C 260, certified by manufacturer to be compatible with other required admixtures.
- F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride or more than 0.15 percent chloride ions or other salts by weight of admixture.
  - 1. Water-Reducing Admixtures: AS1M C 494/C 494M, Type A.
  - 2. Retarding Admixture: AS1M C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: AS1M C 494/C 494M, Type D.
  - 4. Water-Reducing and Accelerating Admixture: AS1M C 494/C 494M, Type E.
  - 5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 7. Plasticizing and Retarding Admixture: AS1M C 1017/C 1017M.

## 2.4 STEEL CONNECTION MATERIALS

- A. Carbon-Steel Shapes and Plates: ASTM A 572 Grade 50.
- B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCIMNL 116.
- C. Malleable-Iron Castings: ASTM A 47/A 47M.
- D. Carbon-Steel Castings: ASTM A 27/A 27M, Grade 60-30 (Grade 415-205).
- E. High-Strength, Low-Alloy Structural Steel: ASTM A 572/A 572M.
- F. Carbon-Steel Structural Tubing: ASTM A 500, Grade C.
- G. Wrought Carbon-Steel Bars: ASTM A 675/A 675M, Grade 65 (Grade 450).
- H. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706/A 706M.



- I. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563 (ASTM A 563M); and flat, unhardened steel washers, ASTM F 844.
- J. High-Strength Bolts and Nuts: ASTM A 325 (ASTM A 325M) or ASTM A 490 (ASTM A 490M), Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563 (ASTM A 563M); and hardened carbon-steel washers, ASTM F 436 (ASTM F 436M).
  - 1. Do not zinc coat ASTM A 490 (ASTM A 490M) bolts.
- K. Zinc-Coated Finish: For items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123/A 123M or ASTM A 153/A 153M.
  - 1. For steel shapes, plates, and tubing to be galvanized, limit silicon content of steel to less than 0.03 percent or to between 0.15 and 0.25 percent or limit sum of silicon and 2.5 times phosphorous content to 0.09 percent.
  - 2. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035B or SSPC-Paint 20.
- L. Shop-Primed Finish: Prepare surfaces of nongalvanized-steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3, and shop apply lead- and chromate- free, rust-inhibitive primer, complying with performance requirements in MPI 79 according to SSPC- PA 1.
- M. Welding Electrodes: Comply with AWS standards.
- N. Precast Accessories: Provide clips, hangers, plastic or steel shims, and other accessories required to install precast structural concrete units.

## 2.5 BEARING PADS

- A. Provide one of the following bearing pads for precast structural concrete units as recommended by precast fabricator for application:
  - 1. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 50 to 70 Shore, Type A durometer hardness, ASTM D 2240; minimum tensile strength 2250 psi (15.5 MPa), ASTM D 412.
  - 2. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. 70 to 90 Shore, Type A durometer hardness, ASTM D 2240; capable of supporting a compressive stress of 3000 psi (20.7 MPa) with no cracking, splitting, or delaminating in the internal portions of pad. Test 1 specimen for every 200 pads used in Project.
  - 3. Cotton-Duck-Fabric-Reinforced Elastomeric Pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer; 80 to 100 Shore, Type A durometer hardness, ASTM D 2240; complying with AASHTO's "AASHTO Load and Resistance Factor Design (LRFD) Bridge Specifications," Division IT, Section 18.1 0.2; or with MIT.,-C-882E.
  - 4. Frictionless Pads: Tetrafluoroethylene, glass-fiber reinforced, bonded to stainless- or mild-steel plate, of type required for in-service stress.
  - 5. High-Density Plastic: Multimonomer, nonteaching, plastic strip.

## 2.6 GROUT MATERIALS



- A. Sand-Cement Grout: Portland cement, AS1M C 150, Type I, and clean, natural sand, AS1M C 144 or AS1M C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with AS1M C 1107, Grade A for drypack and Grades Band C for flowable grout and of consistency suitable for application within a 30-minute working time.
- C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; AS1M C 881/C 881M, of type, grade, and class to suit requirements.

## 2.7 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of precast concrete required.
  - 1. Limit use of fly ash to 40 percent replacement of Portland cement by weight.
- B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.
- C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI318 (ACI318M).
- D. Normal-Weight Concrete Mixtures: Proportion mixtures by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 5000 psi (34.5 MPa).
  - 2. Maximum Water-Cementitious Materials Ratio: 0.40.
- E. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.
- F. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.
- G. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

## 2.8 FABRICATION

- A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
  - 1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."
- B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast structural concrete units to supporting and adjacent construction.
- C. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.



- D. Cast-in openings larger than 10 inches (250 mm) in any dimension. Do not drill or cut openings or prestressing strand without Architect's approval.
- E. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.
  - 1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
  - 2. Accurately position, support, and secure reinforcement against displacement during concrete- placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
  - 3. Place reinforcement to maintain at least 3/4-inch (19-mm) minimum coverage. Increase cover requirements according to ACI 318 (ACI 318M) when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
  - 4. Place reinforcing steel and prestressing strand to maintain at least 3/4-inch (19-mm) minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches (38 mm) when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
  - 5. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.
- F. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses.
- G. Prestress tendons for precast structural concrete units by either pretensioning or post-tensioning methods. Comply with PCI MNL 116.
  - 1. Delay detensioning or post-tensioning of precast, prestressed structural concrete units until concrete has reached its indicated minimum design release compressive strength as established by test cylinders cured under same conditions as concrete.
  - 2. Detension pretensioned tendons either by gradually releasing tensioning jacks or by heat cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.
  - 3. If concrete has been heat cured, detension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.
  - 4. Protect strand ends and anchorages with bituminous, zinc-rich, or epoxy paint to avoid corrosion and possible rust spots.
  - 5. Protect strand ends and anchorages with a minimum of 1-inch- (25-mm-) thick, nonmetallic, nonshrink, grout mortar and sack rub surface. Coat or spray the inside surfaces of pocket with bonding agent before installing grout.
- H. Comply with requirements in PCI: MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete hatching, no additional water may be added.
- I. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.
  - 1. Place backup concrete mixture to ensure bond with face-mixture concrete.



- J. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI: MNL II6.
  - 1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."
- K. Comply with ACI 306.I procedures for cold-weather concrete placement.
- L. Comply with PCI MNL 116 procedures for hot-weather concrete placement.
- M. Identify pickup points of precast structural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast structural concrete unit on a surface that will not show in finished structure.
- N. Cure concrete, according to requirements in PCI: MNL II6, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
- O. Discard and replace precast structural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 116 and meet Architect's approval.

## 2.9 FABRICATION TOLERANCES

- A. Fabricate precast structural concrete units straight and true to size and shape with exposed edges and comers precise and true so each finished unit complies with PCIMNL 116 product dimension tolerances.

## 2.10 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to evaluate precast structural concrete fabricator's quality-control and testing methods.
  - 1. Allow testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with testing agency and provide samples of materials and concrete mixtures as may be requested for additional testing and evaluation.
- B. Testing: Test and inspect precast structural concrete according to PCIMNL 116 requirements.
  - 1. Test and inspect self-consolidating concrete according to PCI 1R-6.
- C. Strength of precast structural concrete units will be considered deficient if units fail to comply with ACI 318 (ACI 318M) requirements for concrete strength.
- D. If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 (ACI 318M) requirements, employ a qualified testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M.
  - 1. A minimum of three representative cores will be taken from units of suspect strength,



- from locations directed by Architect.
2. Cores will be tested in an air-dry condition or, if units will be wet under service conditions, test cores after immersion in water in a wet condition.
  3. Strength of concrete for each series of 3 cores will be considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.
  4. Test results will be made in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:
    - a. Project identification name and number.
    - b. Date when tests were performed.
    - c. Name of precast concrete fabricator.
    - d. Name of concrete testing agency.
    - e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.
  - E. Patching: If core test results are satisfactory and precast structural concrete units comply with requirements, clean and dampen core holes and solidly fill with same precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.
  - F. Defective Units: Discard and replace precast structural concrete units that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Do not install precast concrete units until supporting, cast-in-place, building structural framing has attained minimum allowable design compressive strength or until supporting steel or other structure is complete.

### 3.2 INSTALLATION

- A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.
- B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, supports, and bracing as required to maintain position, stability, and alignment of units until permanent connection.
  1. Install temporary steel or plastic spacing shims or bearing pads as precast structural



- concrete units are being erected. Tack welds steel shims to each other to prevent shims from separating.
- 2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
- 3. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
- 4. For hollow-core slab voids used as electrical raceways or mechanical ducts, align voids between units and tape butt joint at end of slabs.
- C. Connect precast structural concrete units in position by welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
  - 1. Do not permit connections to disrupt continuity of roof flashing.
- D. Field cutting of precast units is not permitted without approval of the Architect.
- E. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.
  - 1. Protect precast structural concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
  - 2. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and apply a minimum 4.0-mil- (0.1-mm-) thick coat of galvanized repair paint to galvanized surfaces according to ASTM A780.
  - 3. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and reprime damaged painted surfaces.
  - 4. Remove, reweld, or repair incomplete and defective welds.
- F. Grouting: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled.
  - 1. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces.
  - 2. Fill joints completely without seepage to other surfaces.
  - 3. Trowel top of grout joints on roofs smooth and uniform. Finish transitions between different surface levels not steeper than 1 to 12.
  - 4. Place grout end cap or dam in voids at ends of hollow-core slabs.
  - 5. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.
  - 6. Keep grouted joints damp for not less than 24 hours after initial set.

### 3.3 ERECTION TOLERANCES

- A. Erect precast structural concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI: MNL 135.
- B. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Architect.

### 3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform as indicated on the special inspections form.



- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Field welds will be visually inspected and nondestructive tested according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.
- D. Testing agency will report test results promptly and in writing to Contractor and Architect.
- E. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.
- F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- G. Prepare test and inspection reports.

### 3.5 REPAIRS

- A. Repair precast structural concrete units if permitted by Architect.
  - 1. Repairs may be permitted if structural adequacy, serviceability, durability, and appearance of units has not been impaired.
- B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet (6 m).
- C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A780.
- D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.
- E. Remove and replace damaged precast structural concrete units that cannot be repaired or when repairs do not comply with requirements as determined by Architect.

### 3.6 CLEANING

- A. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.
- B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
- C. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
- D. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034100



**SECTION 03 5410  
GYPSUM CEMENTITIOUS UNDERLAYMENT**

**PART 1 – GENERAL**

**1.01 SUMMARY**

- A. Description of Work: Work of this section includes gypsum-based, flat-smooth underlayment for interior finish flooring and is not limited to the following:
  - 1. Formulated Materials Fire Rated Underlayment and sound matt covering normal project conditions and applications.

**1.02 REFERENCES**

- A. Underwriters Laboratory Fire Resistance Volume 1 [www.ul.com](http://www.ul.com)
- B. ASTM C472 Compressive Strength
- C. ASTM C33 Sand Aggregate
- D. ASTM D4263 Standard Test Method for Indicating Moisture in Concrete
- E. ASTM F2419 Standard Test Method for Installation of Thick Poured Gypsum Concrete and Preparation of Surface to Receive Resilient Flooring
- F. ASTM E492 Impact Isolation Class (IIC)
- G. ASTM E90 Sound Transmission Class (STC)
- H. ASTM E84 Standard Test Method of Surface Burning Characteristics of Building Materials

**1.03 RELATED WORK SPECIFIED ELSEWHERE**

- A. See Section 9 for acceptable flooring materials including vinyl, tile, wood, and laminates.

**1.04 PRESITE / PREINSTALLATION MEETINGS**

- A. Pre-construction meetings between General Contractor and Sub-Contractor's recommended

**1.05 SUBMITTALS**

- A. Product Data: Submit manufacturer's specifications and installation instructions with project conditions and materials clearly identified or detailed for each required product or system.
- B. Acoustic Data: Submit sound tests according to IBC code criteria ASTM E492 (IIC) and ASTM E90 (STC).
  - 1. Submit in writing that all sound tests or data provided has been tested according to UL (Underwriters Laboratory) fire resistive design number.
- C. Product Certificates: Signed by manufacturers of underlayment and floor-covering systems certifying that products are compatible.
- D. Sound Transmission Characteristics: Where indicated, provide gypsum-cement underlayment systems identical to those of assemblies tested for STC and IIC ratings per ASTM E 90 and ASTM E 492 by a qualified testing agency

**1.06 QUALITY ASSURANCE**

- A. Installer / Dealer Qualifications: Sub-contractor specializing in performing the work of this section is required to be licensed, technically trained in the field, and authorized by the manufacturer for application of underlayment products.
- B. Product Compatibility: Manufacturer of Underlayment Systems certify in writing that products are compatible.
- C. Coordinate application of underlayment with requirements of floor-covering products and adhesives, to ensure compatibility of products.
  - 1. Fire-Resistance Ratings: Where indicated, provide gypsum-cement underlayment systems identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.



### **1.07 DELIVERY, STORAGE AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Follow manufacturer's storage requirements. Keep dry and protect from direct sunlight exposure, freezing and ambient temperature greater than 105 degrees.

### **1.08 REGULATORY**

- A. Conform to all applicable code for fire resistive and acoustic requirements.

### **1.09 FIELD CONDITIONS**

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
  - 1. Place Fire Rated underlayment only when ambient temperature and temperature of substrate are above 50 degrees F.

## **PART 2 - PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- A. Fire-Resistive Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations for UL's "Fire Resistance Directory" or from the listings of another qualified testing agency
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. IIC-Rated Assemblies: For IIC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 492 and classified according to ASTM E 989 by an independent testing agency
- D. FIRE RATED UNDERLAYMENT
  - 1. Underlayment: Gypsum-cement-based, flat-smooth product that can be applied in minimum uniform thickness of 3/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 2. Basis of Design Product: Formulated Materials; Treadstone FR25
  - 3. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C219.
  - 4. Compressive Strength: Not less than 2000psi at 28 days when tested according to ASTM C 109/C 109M.
  - 5. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- E. Aggregate: Well-graded, washed gravel, 1/8" to 1/4"; or coarse sand as recommended by underlayment manufacturer.
  - 1. Provide aggregate when recommend in writing by underlayment manufacturer for underlayment thickness required.
  - 2. Water: Potable and at a temperature of not more than 70 deg F.
  - 3. Primer: Product of underlayment manufacture recommend in writing for substrate, conditions, and application indicated.
  - 4. Primer shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D.
  - 5. Surface Sealer: Designed to reduce porosity as recommended by manufacturer for type of floor covering to be applied to underlayment.
  - 6. Basis of Design Product: Vinavil 5707.

### **2.02 ACCESSORIES**

- A. Sound Isolation Acoustic Underlayment
- B. Approved equal requirements – must meet or exceed acoustical performance whentested by third party accredited lab, must require no more than 3/4" thickness of fire- rated underlayment,



must meet or exceed deflection properties.

## **2.03 UNDERLAYMENT SITE MIXING AND PLACING**

- A. Mix Fire Rated Underlayment according to manufacturer's recommendations.
  - a. 1. Optional - Required for use – SMART BATCH SYSTEMS - Automated batch mixing/pumping machine that provides batch by batch data to assure required compressive strength is achieved throughout. Require summary of batch reports be provided to General Contractor and Architect for review.

## **PART 3 – EXECUTION**

### **3.01 EXAMINATION**

- 1. Use Manufacturer provided pre-mobilization checklist to confirm all requirements that will affect scope of work are coordinated between General Contractor and Sub Contractor. Examine substrates, with installer present and floor covering installer, for conditions affecting performance.
- 2. Proceed with application only after unsatisfactory conditions have been corrected.
- 3. Gaps / holes larger than 1/8" in diameter.
- 4. Soft spots in the substrate.
- 5. Bellowing or warping of substrate.
- 6. Proceed with application only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Prepare and clean substrate according to manufacturer's written instructions.
  - a. 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through the underlayment.
  - b. 2. Fill substrate voids to prevent underlayment from leaking.
- B. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coating that might inhibit underlayment bond and remove sanding dust.
- C. Provide Temporary pour stops at all floor openings, stairs, elevators and exterior doors prior to pouring underlayment. Remove pour stops after underlayment has cured.
- D. Sound Control Mat: Install sound control materials according to manufacturer's written instructions.

### **3.03 APPLICATION**

- A. Mix and apply underlayment components according to manufacturer's written instructions.
  - a. 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
  - b. 2. Coordinate application of components with other general contractor to optimize performance and site conditions.
  - c. 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through the underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply underlayment to produce uniform, flat surface that will follow contour of substrate.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Apply surface sealer at rate recommended by manufacturer.

### **3.04 PROTECTION**

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

**END OF SECTION**



**SECTION 04 2000  
UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete block.
- B. Clay facing brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 7200 - Cast Stone Masonry - for lintels and sills.
- B. Section 05 5000 - Metal Fabrications: Loose steel lintels.
- C. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.
- D. Section 07 6200 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- E. Section 07 8400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- F. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- C. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile 2023.
- D. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2022.
- E. ASTM C91/C91M - Standard Specification for Masonry Cement 2023.
- F. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units 2023.
- G. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.
- H. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- I. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.
- J. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.
- K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
- L. ASTM C476 - Standard Specification for Grout for Masonry 2023.
- M. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry 2023.
- N. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.
- O. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017 (Reapproved 2023).
- P. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane 2015, with Editorial Revision (2022).
- Q. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2017.
- R. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls 2017.



- S. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2022, with Errata.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
  - 1. Include calculations or selections from the manufacturer's prescriptive design tables that indicate compliance with the applicable building code and project conditions.
- D. Samples: Submit four samples of decorative block and facing brick units to illustrate color, texture, and extremes of color range.

#### **1.05 QUALITY ASSURANCE**

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

#### **1.06 MOCK-UP**

- A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Locate where directed.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

### **PART 2 PRODUCTS**

#### **2.01 CONCRETE MASONRY UNITS**

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8 inches.
  - 2. Load-Bearing Units: ASTM C90, normal weight.
    - a. Solid block, as indicated.
    - b. Exposed Faces: Manufacturer's standard color and texture.
    - c. Manufacturers:
      - 1) Echelon Masonry; Cordova Stone
      - 2) Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 BRICK UNITS**

- A. Manufacturers, see basis of design:
  - 1. Belden Brick; Belcrest: [www.beldenbrick.com/#sle](http://www.beldenbrick.com/#sle).
  - 2. Endicott Clay Products Co: [www.endicott.com/#sle](http://www.endicott.com/#sle).
  - 3. Glen-Gery Brick Co.
  - 4. Substitutions: See section 01 6000 - Product Requirements.
- B. Facing Brick: ASTM C216, Grade SW.
  - 1. Nominal size: King size.
  - 2. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
  - 3. Compressive strength: measured in accordance with ASTM C67/C67M.

#### **2.03 MORTAR AND GROUT MATERIALS**

- A. Masonry Cement: ASTM C91/C91M, Type N.
  - 1. Colored Mortar: Premixed cement as required to match Architect's color sample.



- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
  - 1. Not more than 0.60 percent alkali.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
  - 1. Color(s): As selected by Architect from manufacturer's full range.
  - 2. Manufacturers:
    - a. Davis Colors, a division of Venator Materials PLC: [www.daviscolors.com/#sle](http://www.daviscolors.com/#sle).
    - b. Lambert Corporation: [www.lambertusa.com/#sle](http://www.lambertusa.com/#sle).
    - c. Solomon Colors, Inc: [www.solomoncolors.com/#sle](http://www.solomoncolors.com/#sle).
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- G. Water: Clean and potable.

#### **2.04 REINFORCEMENT AND ANCHORAGE**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.
- B. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- C. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
- D. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
  - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
  - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
  - 3. Vertical adjustment: Not less than 3-1/2 inches.
  - 4. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter.

#### **2.05 ACCESSORIES**

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
  - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
- D. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- E. Weeps:
  - 1. Type: Polyester mesh.
  - 2. Color(s): As selected by Architect from manufacturer's full range.
- F. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

#### **2.06 MORTAR AND GROUT MIXING**

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
  - 1. Masonry below grade and in contact with earth: Type S.
  - 2. Exterior, loadbearing masonry: Type N.



- 3. Interior, loadbearing masonry: Type N.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
- C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### **3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### **3.03 COLD AND HOT WEATHER REQUIREMENTS**

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

### **3.04 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

### **3.05 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners, except for units laid in stack bond.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

### **3.06 WEEPS/CAVITY VENTS**

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

### **3.07 CAVITY MORTAR CONTROL**

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.



**3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.
- E. Lap joint reinforcement ends minimum 6 inches.
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

**3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER**

- A. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.
- B. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

**3.10 MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
- C. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.
- D. Extend plastic, laminated, EPDM, and \_\_\_\_\_ flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.

**3.11 LINTELS**

- A. Install loose steel lintels over openings per structural drawings.

**3.12 GROUTED COMPONENTS**

- A. Reinforce bond beams with 2, No. 4 bars, 1 inch from bottom web.
- B. Reinforce columns with 4, No. 4 bars, placed \_\_\_\_\_.
- C. Lap splices minimum 24 bar diameters.
- D. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- E. Place and consolidate grout fill without displacing reinforcing.

**3.13 CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

**3.14 BUILT-IN WORK**

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.



- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
  - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

### **3.15 TOLERANCES**

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

### **3.16 CUTTING AND FITTING**

- A. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### **3.17 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

### **3.18 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

### **3.19 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**



**SECTION 04 7200  
CAST STONE MASONRY**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Cast stone trim, including the following:
    - a. Window sills.
    - b. Lintels.
    - c. Wall caps.
- B. Related Sections:
  - 1. Section 042000 "Unit Masonry" for installing cast stone unit masonry and cast stone units in unit masonry.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
  - 1. For cast stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
  - 1. Include building elevations showing layout of units and locations of joints and anchors.
- C. Samples for Initial Selection: For type and configuration of cast stone unit masonry and for colored mortar.
- D. Samples for Verification:
  - 1. For each color and texture of cast stone required, 10 inches (250 mm) square in size.
  - 2. For colored mortar. Make Samples using same sand and mortar ingredients to be used on Project.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data:
  - 1. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C 1364.
- B. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C 1364, including test for resistance to freezing and thawing.
  - 1. Provide test reports based on testing within previous two years.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute.
- B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- C. Source Limitations for Cast Stone: Obtain cast stone units through single source from single manufacturer.
- D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- E. Mockups: Furnish cast stone for installation in mockups specified in Section 042000 "Unit Masonry."



- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup of typical wall area as shown on Drawings.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work and to minimize the need for on-site storage.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
  - 1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
  - 2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

#### **1.07 PROJECT CONDITIONS**

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Acceptable Manufacturer: CastleStone, 11668 Lilburn Park Road, St Louis, MO 63146; Tel: 314.997.1600; Email: Tom@CastleStoneProducts.com; Web: www.CastleStoneProducts.com.
- B. Acceptable Manufacturer: Midwest Cast Stone, 1610 State Ave.; Kansas City, KS 66102 ; Tel: 913-371-3300 ; Fax: 888-830-1954; Email:request info (darin@midwestcaststone.com); Web:www.midwestcaststone.com
- C. Acceptable Manufacturer: Caliber Cast Stone, #2 Cool Springs Court, O'Fallon, MO 63366; Tel: 636.978.4000; Email request info mseidel@calibercaststone.com; Web: www.calibercaststone.com.
- D. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

#### **2.02 ARCHITECTURAL CAST STONE**

- A. Unit Sizes and Shapes: Provide Architectural Cast Stone in the sizes and shapes indicated on the Drawing and matching the colors(s) and finish(es) of the Samples on File at the Architects location. Architectural cast stone shall comply with the requirements of ASTM C 1364 and be provided with the following physical properties:
- B. Compressive Strength ASTM C 1194: 6,500 psi minimum at 28 days.
- C. Absorption ASTM C 1195: 6 percent maximum by the cold water method, or 10 percent maximum by the boiling method at 28 days.
- D. Air Content ASTM C 173 or C 231: For wet cast product 4 to 8 percent for units exposed to freeze-thaw environments. Air entrainment is not required for VDT products.
- E. Freeze-thaw ASTM C 1364: CPWL shall be less than 5 percent after 300 freeze/ thaw cycles.



- F. Linear Shrinkage ASTM C 426: Not exceed 0.065 percent.

## **2.03 CAST STONE MATERIALS:**

- A. MATERIALS SHALL MATCH THOSE REQUIRED TO PRODUCT RESULTS MATCHING THE PHYSICAL PROPERTIES SPECIFIED, THE COLORS AND FINISHES OF THE ARCHITECTS FILE SAMPLE AND THE FOLLOWING:
- B. Portland cement: Type I or Type III, white and/or grey, ASTM C 150.
- C. Coarse aggregates: Granite, quartz or limestone, ASTM C 33, except for gradation.
- D. Fine aggregates: Manufactured or natural sands, ASTM C 33, except for gradation.
- E. Colors: Inorganic iron oxide pigments, ASTM C 979 except that carbon black pigments shall not be used.
- F. Admixtures: Comply with the following:
- G. ASTM C 260 for air-entraining admixtures.
- H. ASTM C 494/C 495M Types A - G for water reducing, retarding, accelerating and high range admixtures.
- I. Other admixtures: Integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
- J. STM C 618 mineral admixtures of dark and variable colors shall not be used in surfaces intended to be exposed to view.
- K. ASTM C 989 granulated blast furnace slag may be used to improve physical properties. Tests are required to verify these features
- L. Water: Potable.
- M. Reinforcing Bars: ASTM A 615/A 615M: Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 1.5 inches.
- N. Welded Wire Fabric: ASTM A 185 where applicable for wet cast units.
- O. Fiber reinforcement (optional): ASTM C 1116
- P. Anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, or stainless steel Type 302 or 304

## **2.04 RELATED PRODUCTS:**

- A. Anchors: As scheduled or indicated on Drawings.
- B. Cleaners: Prosoco Enviro Klean Safety Klean.
- C. Mortar: Type N, ASTM C 270 as specified in Section 04 05 13.23 - Surface Bonding Masonry Mortaring Masonry Mortar.
- D. Joint Sealant: As specified in Section 07 91 26 - Joint Fillers.
- E. Water Repellant: Prosoco Sure Klean Weather Seal Siloxane WB.
- F. Water Repellant: Prosoco Sure Klean Weather Seal Siloxane PD.

## **2.05 FABRLCATLON**

- A. Cast Stone Shapes: Unless otherwise indicated on Drawings, provide:
- B. Suitable wash on exterior sills, copings, projecting courses, and units with exposed top surfaces.
- C. Drips on projecting units, wherever possible.

## **2.06 COLOR AND FINISH:**

- A. Match sample(s) on file at the Architect's location.



- B. Surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 inch and the density of such voids shall be less than 3 occurrences per any 1 square inch area and not obvious under direct daylight illumination at a 5 foot distance.
- C. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 10 foot distance.
- D. ASTM D 2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
- E. Total color difference - not greater than 6 units.
- F. Total hue difference - not greater than 2 units.
- G. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a 20-ft distance.
- H. The occurrence of crazing or efflorescence shall not constitute a cause for rejection.
- I. Remove cement film, if required, from exposed surfaces prior to packaging for shipment

## **2.07 REINFORCING:**

- A. Reinforce the units as required by the Drawings and as recommended by the manufacturer for safe handling and structural stress.
- B. Minimum reinforcing shall be 0.25 percent of the cross section area.
- C. Reinforcement shall be noncorrosive where faces exposed to weather are covered with less than 1.5 inches of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars.
- D. Panels, soffits and similar stones greater than 24 inches (600 mm) in one direction shall be reinforced in that direction. Units less than 24 inches (600 mm) in both their length and width dimension shall be non-reinforced unless otherwise specified.
- E. Welded wire fabric reinforcing shall not be used in dry cast products.
- F. Curing:
  - 1. Cure in a warm curing chamber approximately 100 degrees F (37.8 degrees C) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 70 degrees F (21.1 degrees C) for 16 hours after casting.
  - 2. Additional yard curing at 95 percent relative humidity shall be 350 degree days (i.e. 7 days @ 50 degrees F (10 degrees C) or 5 days @ 70 degrees F (21 degrees C)) prior to shipping.
  - 3. Form cured units shall be protected from moisture evaporation with curing blankets or curing compounds after casting.
- G. Production Tolerances:
  - 1. Cross section dimensions shall not deviate by more than +/- 1/8 inch from approved dimensions.
  - 2. Length of units shall not deviate by more than length/ 360 or +/- 1/8 inch, whichever is greater, not to exceed +/- 1/8 inch.
  - 3. Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the Architect.
  - 4. Warp, bow or twist of units shall not exceed length / 360 or +/- 1/8 inch, whichever is greater.
  - 5. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features; on formed sides of unit, 1/8 inch, on unformed sides of unit, 3/8 inch maximum deviation.

## **2.08 SOURCE QUALITY CONTROL**

- A. Test compressive strength and absorption from specimens taken from every 500 cubic feet of product produced.
- B. Perform tests in accordance ASTM C 1194 and C 1195.



- C. Have tests performed by an independent testing laboratory every six months.
- D. New and existing mix designs shall be tested for strength and absorption compliance prior to producing units.
- E. Retain copies of all test reports for a minimum of two years.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 SETTING CAST STONE IN MORTAR**

- A. Install cast stone units to comply with requirements in Section 042000 "Unit Masonry."
- B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
  - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
  - 2. Coordinate installation of cast stone with installation of flashing specified in other Sections.
- C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- D. Set units in full bed of mortar with full head joints unless otherwise indicated.
  - 1. Set units with joints 1/4 to 3/8 inch (6 to 10 mm) wide unless otherwise indicated.
  - 2. Build anchors and ties into mortar joints as units are set.
  - 3. Fill dowel holes and anchor slots with mortar.
  - 4. Fill collar joints solid as units are set.
  - 5. Build concealed flashing into mortar joints as units are set.
  - 6. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.
  - 7. Keep joints at shelf angles open to receive sealant.
- E. Rake out joints for pointing with mortar to depths of not less than 3/4 inch (19 mm). Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
- F. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch (10 mm). Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
- G. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- H. Provide sealant joints at copings and other horizontal surfaces, at expansion, control, and pressure-relieving joints, and at locations indicated.
  - 1. Keep joints free of mortar and other rigid materials.
  - 2. Build in compressible foam-plastic joint fillers where indicated.
  - 3. Form joint of width indicated, but not less than 3/8 inch (10 mm).
  - 4. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
  - 5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

### **3.03 SETTING ANCHORED CAST STONE WITH SEALANT-FILLED JOINTS**

- A. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
  - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
  - 2. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.



- B. Keep cavities open where unfilled space is indicated between back of cast stone units and backup wall; do not fill cavities with mortar or grout.
- C. Fill anchor holes with sealant.
  - 1. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.
- D. Set cast stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths. Hold shims back from face of cast stone a distance at least equal to width of joint.
- E. Keep joints free of mortar and other rigid materials. Remove temporary shims and spacers from joints after anchors and supports are secured in place and cast stone units are anchored. Do not begin sealant installation until temporary shims and spacers are removed.
  - 1. Form open joint of width indicated, but not less than 3/8 inch (10 mm).
- F. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
- G. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

#### **3.04 INSTALLATION TOLERANCES**

- A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
- B. Variation from Level: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches (3 mm in 900 mm) or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch (1.5 mm), except where variation is due to warpage of units within tolerances specified.

#### **3.05 ADJUSTING AND CLEANING**

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
  - 1. Remove mortar fins and smears before tooling joints.
  - 2. Remove excess sealant immediately, including spills, smears, and spatter.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
  - 3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
  - 5. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
  - 6. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

**END OF SECTION 047200**



**SECTION 051200**  
**STRUCTURAL STEEL**

**PART 1 – GENERAL**

**1.1 SECTION INCLUDES**

- A. Structural steel framing members.
- B. Base plates, shear stud connectors
- C. Grouting under base plates.

**1.2 RELATED SECTIONS**

- A. Section 05 2100 - Steel Joists.
- B. Section 05 3100 - Steel Deck: Support framing for small openings in deck.
- C. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.
- D. Section 07 8100 - Sprayed-On Fireproofing: Fireproof protection to framing and metal deck systems.

**1.3 UNIT PRICES - MEASUREMENT AND PAYMENT**

- A. See Section 01270 - Unit Prices, for additional unit price requirements.
- B. Structural Steel Framing:
  - 1. Basis of Measurement: By the ton.
  - 2. Basis of Payment: Includes structural members fabricated, placed and anchored.

**1.4 REFERENCES**

- A. AISC M016 - ASD Manual of Steel Construction; American Institute of Steel Construction, Inc.; 1989, Ninth Edition.
- B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.; 2000.
- C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2000.
- D. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2001.
- E. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2002.
- F. ASTM A 108 - Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality; 1999.
- G. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.
- H. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2002.
- I. ASTM A 242/A 242M - Standard Specification for High-Strength Low-Alloy Structural Steel; 2001.
- J. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 2002.



- K. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2002.
- L. ASTM A 325M - Standard Specification for High-Strength Bolts for Structural Steel Joints (Metric); 2000.
- M. ASTM A 449 - Standard Specification for Quenched and Tempered Steel Bolts and Studs; 2000.
- N. ASTM A 490 - Standard Specification for Structural Bolts, Alloy Steel, Heat-Treated, 150 ksi Minimum Tensile Strength; 2002.
- O. ASTM A 490M - Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric); 2000.
- P. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2001a.
- Q. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2001.
- R. ASTM A 514/A 514M - Standard Specification for High-Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding; 2000a.
- S. ASTM A 529/A 529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2001.
- T. ASTM A 563 - Standard Specification for Carbon and Alloy Steel Nuts; 2000.
- U. ASTM A 563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2001.
- V. ASTM A 572/A 572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2001.
- W. ASTM A 588/A 588M - Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4-in. (100-mm) Thick; 2001.
- X. ASTM A 992/A 992M - Standard Specification for Structural Steel Shapes; 2002.
- Y. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability; 2002.
- Z. ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability; 2002.
- AA. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2002.
- AB. ASTM E 94 - Standard Guide for Radiographic Examination; 2000.
- AC. ASTM E 164 - Standard Practice for Ultrasonic Contact Examination of Weldments; 1997.
- AD. ASTM E 165 - Standard Test Method for Liquid Penetrant Examination; 2002.
- AE. ASTM E 709 - Standard Guide for Magnetic Particle Examination; 2001.
- AF. ASTM F 436 - Standard Specification for Hardened Steel Washers; 2002.
- AG. ASTM F 959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners; 2002.
- AH. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 1998.
- AI. AWS D1.1 - Structural Welding Code - Steel; American Welding Society; 2004.
- AJ. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- AK. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2000).
- AL. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for



Protective Coatings; 2002.

AM. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

## 1.5 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
  - 2. Connections.
  - 3. Indicate cambers and loads.
  - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- D. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

## 1.6 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC "ASD Manual of Steel Construction".
- B. Comply with Section 10 of AISC "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.
- C. Maintain one copy of each document on site.
- D. Fabricator: Company specializing in performing the work of this section with minimum five (5) years of documented experience.
- E. Erector: Company specializing in performing the work of this section with minimum five (5) years of documented experience.
- F. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the state where the project is located.

## PART 2 – PRODUCTS

### 2.1 MATERIALS

- A. Steel Angles and Plates: ASTM A 36/A 36M.
- B. Steel W Shapes and Tees: ASTM A 992/A 992M.
- C. Rolled Steel Structural Shapes: ASTM A 992/A 992M.
- D. Steel Shapes, Plates, and Bars: ASTM A 242/A 242M high-strength, corrosion-resistant structural steel.
- E. Steel Shapes, Plates, and Bars: ASTM A 529/A 529M high-strength, carbon-manganese structural steel, Grade 50.
- F. Steel Plates and Bars: ASTM A 572/A 572M, Grade 50 (345) high-strength, columbium-vanadium steel.
- G. Cold-Formed Structural Tubing: ASTM A 500, Grade B.
- H. Hot-Formed Structural Tubing: ASTM A 501, seamless or welded.



- J. Steel Plate: ASTM A 36.
- K. Steel Sheet: ASTM A 1011/A 1011M, Designation SS, Grade 30 hot-rolled, or ASTM A 1008/A 1008M, Designation SS, Grade 30 cold-rolled.
- L. Pipe: ASTM A 53/A 53M, Grade B, Finish black.
- M. Shear Stud Connectors: Made from ASTM A 108 Grade 1015 bars.
- O. Sag Rods: ASTM A 36/A 36M.
- P. Carbon Steel Bolts and Nuts: ASTM A 307, Grade A galvanized to ASTM A 153/A 153M, Class C.
- Q. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, medium carbon, plain.
- R. High-Strength Structural Bolts: ASTM A 490 (ASTM A 490M), with matching ASTM A 563 (ASTM A 563M) nuts and ASTM F 436 washers; Type 1 alloy steel.
- S. Anchor Bolts: ASTM A 307, Grade C.
- T. High-Strength Anchor Bolts: ASTM A 325, Type 1 medium carbon, plain.
- U. Load Indicator Washers: Provide washers complying with ASTM F 959 at all connections requiring high-strength bolts.
- V. Welding Materials: AWS D1.1; type required for materials being welded.
- W. Sliding Bearing Plates: Teflon coated.
- X. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107 and capable of developing a minimum compressive strength of 7,000 psi at 28 days.
- Y. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- Z. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

## 2.2 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Continuously seal joined members by intermittent welds and plastic filler. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.
- D. Develop required camber for members.

## 2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP.
- B. Shop prime structural steel members. Do not prime surfaces that will be field welded, in contact with concrete, or high strength bolted.
- C. Leave structural steel members un-primed.
- D. Galvanize structural steel members to comply with ASTM A 123/A 123M. All exterior/ exposed to weather steel components to be galvanized.

## 2.4 SOURCE QUALITY CONTROL AND TESTS

- A. Provide shop testing and analysis of structural steel per Contract Documents
- B. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
- C. Welded Connections: Visually inspect all shop-welded connections per Contract Documents



1. Radiographic testing performed in accordance with ASTM E 94.
2. Ultrasonic testing performed in accordance with ASTM E 164.
3. Liquid penetrant inspection performed in accordance with ASTM E 165.
4. Magnetic particle inspection performed in accordance with ASTM E 709.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

### 3.2 ERECTION

- A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".
- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components and shear studs indicated on drawings or shop drawings.
- D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".
- E. Do not field cut or alter structural members without approval of Architect.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

### 3.3 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch.

### 3.4 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01400.
- B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", per Contract Documents
- C. Welded Connections: Visually inspect all field-welded connections per Contract Documents
  1. Radiographic testing performed in accordance with ASTM E 94.
  2. Ultrasonic testing performed in accordance with ASTM E 164.
  3. Liquid penetrant inspection performed in accordance with ASTM E 165.
  4. Magnetic particle inspection performed in accordance with ASTM E 709.



END OF SECTION 051200



## SECTION 053100

### METAL DECKING

#### PART 1 – GENERAL

##### 1.1 SECTION INCLUDES

- A. Roof deck
- B. Composite floor deck
- C. Bearing plates and angles
- D. Stud shear connectors

##### 1.2 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast in place concrete
- B. Section 05 1200 - Structural Steel Framing: Support framing for openings up to 6'-0" and shear stud connectors
- C. Section 05 5000 - Metal Fabrications: Steel angle concrete stops at deck edges.
- D. Section 07 8100 - Applied Fireproofing: Spray applied fireproofing.
- E. Section 26 0544 Sleeves and Sleeve Seals for Electrical Raceways and Cabling.
- F. Section 01 8113 Sustainable Design Requirements. (Addendum #2)

##### 1.3 REFERENCE STANDARDS

- A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel
- B. ASTM A 108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
- C. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- E. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society
- G. AWS D1.3 - Structural Welding Code - Sheet Steel; American Welding Society.
- H. FM P7825 - Approval Guide; Factory Mutual Research Corporation.
- I. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.
- J. SDI (DM) - Publication No.31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute.
- K. SSPC-Paint 15 - Steel Joist Shop Primer; The Society for Protective Coatings.
- L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings
- M. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings
- N. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.

##### 1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Shop Drawings: Indicate deck plan, support locations; projections; openings; cellular



- raceways and outlet box locations; pertinent details; accessories.
- C. Product Data: Provide deck profile characteristics; dimensions; structural properties; Finishes.
- D. Certificates: Certify that products furnished meet or exceed specified requirements.
- E. Submit manufacturer's installation instructions.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Cut plastic wrap to encourage ventilation.
- B. Store deck on dry wood sleepers; slope for positive drainage

### PART 2 – PRODUCTS

#### 2.01 MANUFACTURERS

- A. Steel Deck:
  - 1. New Millennium Building Systems: [www.metaldek.com](http://www.metaldek.com)
  - 2. Nucor-Vulcraft Group: [www.vulcraft.com](http://www.vulcraft.com)
  - 3. Substitutions: See Section 01 6000 - Product Requirements

#### 2.02 STEEL DECK

- A. Roof Deck: Non-composite type, fluted steel sheet:
  - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS) Grade 33 with G60 galvanized coating.
    - a. Grade as required to meet performance criteria.
  - 2. Structural Properties: as given on Structural Drawings
- B. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
  - 1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS) Grade 50 with G60 galvanized coating.
    - a. Grade as required to meet performance criteria.
  - 2. Structural Properties: as given on Structural Drawings

#### 2.03 ACCESSORY MATERIALS

- A. Bearing Angles: ASTM A 36/A 36M steel.
- B. Stud Shear Connectors: ASTM A108, Type B Nelson headed shear stud connectors or approved equivalent.
- C. Welding Materials: AWS D1.1.
- D. Fasteners: Stainless steel, self tapping.
- E. Weld Washers: Mild steel, uncoated, 3/4 outside diameter, 1/8 inch thick.
- F. Shop and Touch-Up Primer: Complying with VOC limitations of authorities having jurisdiction.
- G. Flute Closures: Closed cell; profiled to fit tight to the deck.



## 2.04 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips; 33mil thick sheet steel; of profile and size as required; finished same as deck.
- B. Cant Strips: Formed sheet steel, 33mil thick, 45 degree slope, 3 1/2 inch nominal width and height, flange for attachment.
- C. Roof Drain Pans: 68mil sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.
- D. Floor Drain Pans: 68mil sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below floor deck surface, bearing flange 3 inches wide, sealed watertight.

## PART 3 – EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.

### 3.02 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On all bearing surfaces provide greater of 2 1/2" inch bearing or as indicated on Structural Drawings.
- C. Fasten deck to steel support members at ends and intermediate supports at spacing indicated on Structural Drawings.
  - 1. Welding: Use fusion welds through weld washers.
- D. Weld deck in accordance with AWS D1.3.
- E. At deck openings reinforce as indicated on Structural Drawings.
- F. Where deck changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.
- G. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.
- H. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- I. Close openings above walls and partitions perpendicular to deck flutes with double row of foam cell closures.
- J. Place metal cant strips in position and mechanically attach.
- K. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- L. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- M. Weld stud shear connectors through steel deck to structural members below.
- N. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.



END OF SECTION - 053100



**SECTION 05 5213  
PIPE AND TUBE RAILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall mounted handrails.
- B. Stair railings and guardrails.
- C. Free-standing railings at steps.
- D. Balcony railings and guardrails.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 09 9113 - Exterior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.
- C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- D. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings 2021.
- E. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.
- F. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
  - 1. Include the design engineer's seal and signature on each sheet of shop drawings.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Handrails and Railings:
  - 1. See basis of design.
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 RAILINGS - GENERAL REQUIREMENTS**

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.



### **2.03 STEEL RAILING SYSTEM**

- A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A53/A53M Grade B Schedule 80, black finish.
- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- D. Exposed Fasteners: No exposed bolts or screws.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

### **2.04 FABRICATION**

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
  - 1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
  - 2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
  - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

### **3.03 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**



**SECTION 061000**  
**ROUGH CARPENTRY**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Shear wall panels.
4. Rooftop equipment bases and support curbs.
5. Wood blocking and nailers.
6. Wood furring.
7. Wood sleepers.

**B. Related Requirements:**

1. Section 061300 "Heavy Timber Construction."
2. Section 061533 "Wood Patio Decking" for elevated decks, including support framing.
3. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.
4. Section 061753 "Shop-Fabricated Wood Trusses" for wood trusses made from dimension lumber.
5. Section 064013 "Exterior Architectural Woodwork" for exterior wood stairs and railings.
6. Section 064023 "Interior Architectural Woodwork" for interior wood stairs and railings.
7. Section 313116 "Termite Control" for site application of borate treatment to wood framing.

**1.2 DEFINITIONS**

- A. Boards or Strips:** Lumber of less than **2 inches nominal** size in least dimension.
- B. Dimension Lumber:** Lumber of **2 inches nominal** size or greater but less than **5 inches nominal** size in least dimension.
- C. Exposed Framing:** Framing not concealed by other construction.
- D. OSB:** Oriented strand board.
- E. Timber:** Lumber of **5 inches nominal** size or greater in least dimension.
- F. Lumber grading agencies, and abbreviations used to reference them, include the following:**
1. NeLMA: Northeastern Lumber Manufacturers' Association.
  2. NLGA: National Lumber Grades Authority.
  3. SPIB: The Southern Pine Inspection Bureau.
  4. WCLIB: West Coast Lumber Inspection Bureau.



5. WWSA: Western Wood Products Association.

### 1.3 ACTION SUBMITTALS

### 1.4 INFORMATIONAL SUBMITTALS

#### A. Material Certificates:

1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

#### B. Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Engineered wood products.
4. Shear panels.
5. Power-driven fasteners.
6. Post-installed anchors.
7. Metal framing anchors.
8. Sill sealer gasket/termite barrier.

#### C. Qualification Statements: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

### 1.5 QUALITY ASSURANCE

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

### 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.



4. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber:
  1. Boards: 15 percent.
  2. Dimension Lumber: 19 percent unless otherwise indicated.
  3. Timber: 19 percent.
- C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
  1. Allowable design stresses, as published by manufacturer, are to meet or exceed those indicated. Manufacturer's published values are to be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

## 2.2 PRESERVATIVE TREATMENT

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
  1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
  2. For exposed items indicated to receive a stained or natural finish, chemical formulations are not to require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
  3. After treatment, redry dimension lumber to 19 percent maximum moisture content.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
  1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat items indicated on Drawings, and the following:
  1. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  2. Wood floor plates that are installed over concrete slabs-on-grade.

## 2.3 DIMENSION LUMBER FRAMING

- A. Load-Bearing Partitions by Grade: Construction or No. 2 grade.
  1. Application: Exterior walls and interior load-bearing partitions.
  2. Species:
    - a. Douglas fir-larch; WCLIB or WWP A.
    - b. Spruce-pine-fir; NLGA.



- c. Douglas fir-south; WWPA.
  - d. Douglas fir-larch (north); NLGA.
- B. Ceiling Joists: Construction or No. 2 grade.
  - 1. Species:
    - a. Douglas fir-larch; WCLIB or WWPA.
    - b. Douglas fir-larch (north); NLGA.
    - c. Spruce-pine-fir; NLGA.
    - d. Douglas fir-south; WWPA.
- C. Joists, Rafters, and Other Framing by Grade: No. 1 No. 2 grade.
  - 1. Species:
    - a. Douglas fir-larch; WCLIB or WWPA.
    - b. Spruce-pine-fir; NLGA.
    - c. Douglas fir-south; WWPA.
    - d. Douglas fir-larch (north); NLGA.
    - e. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
- D. Joists, Rafters, and Other Framing by Performance: Any species and grade with a modulus of elasticity of at least **1,500,000 psi** and an extreme fiber stress in bending of at least **1000 psi** for **2-inch nominal** thickness and **12-inch nominal** width for single-member use.
- E. Exposed Framing: Hand-select material for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
  - 1. Species and Grade:
    - a. Redwood; No. 1 grade; RIS.
    - b. Western cedars; No. 1 grade; WCLIB or WWPA.

## 2.4 ENGINEERED WOOD PRODUCTS

- A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.
- B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.
  - 1. [<Click here to find, evaluate, and insert list of manufacturers and products.>](#)
  - 2. Extreme Fiber Stress in Bending, Edgewise: **3100 psi** for **12-inch nominal**- depth members.
  - 3. Modulus of Elasticity, Edgewise: **2,000,000 psi** .
  - 4. Horizontal Shear: **285 psi** .
  - 5. Tension Parallel to Grain: **1950 psi** .
- C. Moisture Protection:
  - 1. For western species (Douglas fir/hemlock), factory end and edge seal laminated veneer lumber with opaque moisture barrier.



2. For southern and eastern species (southern yellow pine, yellow poplar), factory seal laminated veneer lumber on face, edge, and ends.

## 2.5 SHEAR WALL PANELS

- A. [<Click here to find, evaluate, and insert list of manufacturers and products.>](#)
- B. Wood-Framed Shear Wall Panels: Prefabricated assembly consisting of wood perimeter framing, tie downs, and Exposure I, Structural I plywood or OSB sheathing.
- C. Allowable design loads, as published by manufacturer, are to meet or exceed those of basis-of-design products. Manufacturer's published values are to be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

## 2.6 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  1. Blocking.
  2. Nailers.
  3. Rooftop equipment bases and support curbs.
  4. Cants.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:
  1. Hem-fir (north); NLGA.
  2. Mixed southern pine or southern pine; SPIB.
  3. Spruce-pine-fir; NLGA.
  4. Hem-fir; WCLIB or WWPA.
  5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
  6. Western woods; WCLIB or WWPA.
  7. Northern species; NLGA.
  8. Eastern softwoods; NeLMA.
- C. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:
  1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
  2. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
  3. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
  4. Eastern softwoods; No. 2 Common grade; NeLMA.
  5. Northern species; No. 2 Common grade; NLGA.
  6. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.



- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.7 FASTENERS

- A. General: Fasteners are to be of size and type indicated and comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than **1-1/2 inches** into wood substrate.
  - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or ASTM F2329 .
  - 2. For pressure-preservative-treated wood, use stainless steel fasteners.
  - 3. For redwood, use hot-dip galvanized-steel fasteners.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 as appropriate for the substrate.

## 2.8 METAL FRAMING ANCHORS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide MiTek Industries, Inc.; or comparable product by one of the following:
  - 1. Tamlyn.
- B. Allowable design loads, as published by manufacturer, are to meet or exceed those of basis-of-design products. Manufacturer's published values are to be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors are to be punched for fasteners adequate to withstand same loads as framing anchors.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, **G60** coating designation.
  - 1. Use for interior locations unless otherwise indicated.
- D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); **G185** coating designation; and not less than **0.036 inch** thick.
  - 1. Use for wood-preservative-treated lumber and where indicated.
- E. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304 .
  - 1. Use for exterior locations and where indicated.
- F. Joist Hangers: U-shaped joist hangers with **2-inch-** long seat and **1-1/4-inch-** wide nailing flanges at least 85 percent of joist depth.
  - 1. Thickness: **0.062 inch**.



- G. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
  - 1. Strap Width: 2 inches.
  - 2. Thickness: 0.062 inch.
- H. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch above base and with 2-inch- minimum side cover, socket 0.062 inch thick, and standoff and adjustment plates 0.108 inch thick.
- I. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
  - 1. Width: 1-1/4 inches.
  - 2. Thickness: 0.062 inch.
  - 3. Length: As indicated.
- J. Rafter Tie-Downs: Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick. Tie fastens to side of rafter or truss, face of top plates, and side of stud below.
- K. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches wide by 0.050 inch thick by 36 inches long.
- L. Hold-Downs: Brackets for bolting to wall studs and securing to foundation walls with anchor bolts or to other hold-downs with threaded rods and designed with first of two bolts placed seven bolt diameters from reinforced base.
  - 1. Bolt Diameter: 5/8 inch .
  - 2. Width: 3-3/16 inches.
  - 3. Body Thickness: 0.138 inch.
  - 4. Base Reinforcement Thickness: 0.239 inch.

## 2.9 MISCELLANEOUS MATERIALS

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- D. Install shear wall panels to comply with manufacturer's written instructions.
- E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.



- F. Do not splice structural members between supports unless otherwise indicated.
- G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than **16 inches** o.c.
- H. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
  - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than **96 inches** o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
  - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than **96 inches** o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and **2-inch nominal** thickness.
  - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than **100 sq. ft.** and to solidly fill space below partitions.
  - 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than **20 feet** o.c.
- I. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- J. Comply with AWP A M4 for applying field treatment to cut surfaces of preservative-treated lumber.
  - 1. Use inorganic boron for items that are continuously protected from liquid water.
  - 2. Use copper naphthenate for items not continuously protected from liquid water.
- K. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- L. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
  - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
  - 3. ICC-ES evaluation report for fastener.
- M. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- N. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.



1. Comply with indicated fastener patterns where applicable.
2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

### 3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than **1-1/2 inches** wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

### 3.3 INSTALLATION OF WOOD FURRING

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
- B. Furring to Receive Plywood or Hardboard Paneling: Install **1-by-3-inch nominal-** size furring horizontally and vertically at **24 inches** o.c.
- C. Furring to Receive Gypsum Board: Install **1-by-2-inch nominal-** size furring vertically at **16 inches** o.c.

### 3.4 INSTALLATION OF WALL AND PARTITION FRAMING

- A. General: Provide single bottom plate and double top plates using members of **2-inch nominal** thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.
  1. For exterior walls, provide **2-by-6-inch nominal-** size wood studs spaced **16 inches** o.c. unless otherwise indicated.
  2. For interior partitions and walls, provide **2-by-4-inch nominal-** size wood studs spaced **16 inches** o.c. unless otherwise indicated.
  3. Provide continuous horizontal blocking at midheight of partitions more than **96 inches** high, using members of **2-inch nominal** thickness and of same width as wall or partitions.
- B. Construct corners and intersections with three or more studs , except that two studs may be used for interior non-load-bearing partitions.
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
  1. For non-load-bearing partitions, provide double-jamb studs and headers not less than **4-inch nominal** depth for openings **48 inches** and less in width, **6-inch nominal** depth for openings **48 to 72 inches** in width, **8-inch nominal** depth for openings **72 to 120 inches** in width, and not less than **10-inch nominal** depth for openings **10 to 12 feet** in width.
  2. For load-bearing walls, provide double-jamb studs for openings **60 inches** and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.



- D. Provide diagonal bracing in walls, at locations indicated, at 45-degree angle, full-story height unless otherwise indicated. Use **1-by-4-inch nominal**- size boards, let-in flush with faces of studs.

### 3.5 INSTALLATION OF FLOOR JOIST FRAMING

- A. General: Install floor joists with crown edge up and support ends of each member with not less than **1-1/2 inches** of bearing on wood or metal, or **3 inches** on masonry. Attach floor joists as follows:
  - 1. Where supported on wood members, by toe nailing or by using metal framing anchors.
  - 2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.
- B. Fire Cuts: At joists built into masonry, bevel cut ends **3 inches** and do not embed more than **4 inches**.
- C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds **48 inches**.
- D. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than one-third depth of joist; do not locate closer than **2 inches** from top or bottom.
- E. Provide solid blocking of **2-inch nominal** thickness by depth of joist at ends of joists unless nailed to header or band.
- F. Lap members framing from opposite sides of beams, girders, or partitions not less than **4 inches** or securely tie opposing members together. Provide solid blocking of **2-inch nominal** thickness by depth of joist over supports.
- G. Anchor members paralleling masonry with **1/4-by-1-1/4-inch** metal strap anchors spaced not more than **96 inches** o.c., extending over and fastening to three joists. Embed anchors at least **4 inches** into grouted masonry with ends bent at right angles and extending **4 inches** beyond bend.
- H. Provide solid blocking between joists under jamb studs for openings.
- I. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.
  - 1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.
- J. Provide bridging of type indicated below, at intervals of **96 inches** o.c., between joists.
  - 1. Diagonal wood bridging formed from bevel-cut, **1-by-3-inch nominal**- size lumber, double-crossed and nailed at both ends to joists.
  - 2. Steel bridging installed to comply with bridging manufacturer's written instructions.

### 3.6 INSTALLATION OF CEILING JOIST AND RAFTER FRAMING

- A. Ceiling Joists: Install with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.



1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate, and nail to first joist or anchor with framing anchors or metal straps. Provide **1-by-8-inch nominal-** size or **2-by-4-inch nominal-** size stringers spaced **48 inches** o.c. crosswise over main ceiling joists.
  - B. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
    1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and **2 inches** deeper. Bevel ends of jack rafters for full bearing against valley rafters.
    2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and **2 inches** deeper. Bevel ends of jack rafters for full bearing against hip rafter.
  - C. Provide collar beams (ties) as indicated or, if not indicated, provide **1-by-6-inch nominal-** size boards between every third pair of rafters, but not more than **48 inches** o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.
  - D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any.
- 3.7 PROTECTION
- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
  - B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000



**SECTION 061516**  
**WOOD ROOF DECKING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Solid-sawn wood roof decking.
  - 2. Glue-laminated wood roof decking.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for dimension lumber items associated with wood roof decking.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. For glued-laminated wood roof decking, include installation instructions and data on lumber, adhesives, and fabrication.
  - 2. For preservative-treated wood products, include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

**1.3 INFORMATIONAL SUBMITTALS**

**1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Schedule delivery of wood roof decking to avoid extended on-site storage and to avoid delaying the Work.
- B. Store materials under cover and protected from weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings. Stack wood roof decking with surfaces that are to be exposed in the final Work protected from exposure to sunlight.



## PART 2 - PRODUCTS

### 2.1 WOOD ROOF DECKING, GENERAL

- A. General: Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Regional Materials: Manufacture wood products within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- C. Regional Materials: Manufacture wood products within 500 miles of Project site.
- D. Certified Wood: Certify wood products as "FSC Pure" in accordance with FSC STD-01-001 and FSC STD-40-004.

### 2.2 SOLID-SAWN WOOD ROOF DECKING

- A. Standard for Solid-Sawn Wood Roof Decking: Comply with AITC 112.
- B. Roof Decking Species:
  - 1. Douglas fir-larch or Douglas fir-larch (North).
- C. Roof Decking Nominal Size:.
- D. Roof Decking Grade:
  - 1. Select(ed) Decking.
  - 2. Dense Standard Decking.
  - 3. Select(ed) Decking or Select Dex.
- E. Grade Stamps: Factory mark each item with grade stamp of grading agency. Apply grade stamp to surfaces that are not exposed to view.
- F. Moisture Content: Provide wood roof decking with 19 percent maximum moisture content at time of dressing.
- G. Face Surface: Rough sanded or wire brushed.
- H. Edge Pattern: Channel grooved.

### 2.3 GLUED-LAMINATED WOOD ROOF DECKING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Structural Wood Systems; A Division of Harrison Industries.
- B. Face Species: Douglas fir-larch or Douglas fir-larch (North) .
- C. Roof Decking Nominal Size: 4 by 8 .



- D. Roof Decking Configuration: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, provide tongue-and-groove configuration that complies with research/evaluation report.
- E. Face Grade:
  - 1. Service: Face knot holes, stains, end splits, skips, roller splits, planer burns, and other nonstrength-reducing characteristics are allowed. Strength-reducing characteristics are not allowed.
- F. Moisture Content: Provide wood roof decking with 15 percent maximum moisture content at time of dressing.
- G. Face Surface: Rough sanded or wire brushed.
- H. Edge Pattern: Channel grooved.
- I. Laminating Adhesive: Wet-use type complying with ASTM D2559.

## 2.4 ACCESSORY MATERIALS

- A. Fasteners for Solid-Sawn Roof Decking: Provide fastener size and type complying with AITC 112 for thickness of deck used.
- B. Fasteners for Glued-Laminated Roof Decking: Provide fastener size and type complying with requirements in "Installation" Article for installing laminated roof decking.
- C. Nails: Common; complying with ASTM F1667, Type I, Style 10.
- D. Fastener Material: Hot-dip galvanized steel.
- E. Installation Adhesive: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, provide adhesive that complies with research/evaluation report.

## 2.5 FABRICATION

- A. Shop Fabrication: Where preservative-treated roof decking is indicated, complete cutting, trimming, surfacing, and sanding before treating.
- B. Predrill roof decking for lateral spiking to adjacent units to comply with AITC 112.
- C. Seal Coat: After fabricating and surfacing roof decking, apply a saturation coat of penetrating sealer.
- D. Apply indicated finish materials to comply with Section 099300 "Staining and Transparent Finishing" in fabrication shop.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine walls and support framing in areas to receive wood roof decking for compliance with installation tolerances and other conditions affecting performance of wood roof decking.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.



### 3.2 INSTALLATION

- A. Install solid-sawn wood roof decking to comply with AITC 112.
  - 1. Locate end joints for lay-up indicated.
- B. Install laminated wood roof decking to comply with manufacturer's written instructions.
  - 1. Locate end joints for lay-up indicated.
  - 2. Nail each course of glued-laminated wood roof decking at each support with one nail slant nailed above the tongue and one nail straight nailed through the face.
    - a. Use 12d nails for 2-by-6 and 2-by-8 roof decking.
    - b. Use 30d nails for 3-by-6 and 3-by-8 roof decking.
    - c. Use 60d nails for 4-by-6 and 4-by-8 roof decking. Predrill roof decking to prevent splitting.
    - d. Use 30d tongue nails in bottom tongue and **3/8-inch** face spikes for 5-by-6 and 5-by-8 roof decking. Predrill roof decking at spikes to prevent splitting.
  - 3. Slant nail each course of glued-laminated wood roof decking to the tongue of the adjacent course at **30 inches** o.c. and within **12 inches** of the end of each unit. Stagger nailing **15 inches** in adjacent courses.
    - a. Use 6d nails for 2-by-6 and 2-by-8 roof decking.
    - b. Use 8d nails for 3-by-6 and 3-by-8 roof decking.
    - c. Use 10d nails for 4-by-6 and 4-by-8 roof decking.
    - d. Use 16d nails for 5-by-6 and 5-by-8 roof decking.
  - 4. Glue adjoining roof decking courses together by applying a **3/8-inch** bead of adhesive to the top of tongues, according to research/evaluation report.
- C. Anchor wood roof decking, where supported on walls, with bolts as indicated.
- D. Where preservative-treated roof decking must be cut during erection, apply a field-treatment preservative to comply with AWPA M4.
  - 1. For solid-sawn roof decking, use inorganic boron (SBX).
  - 2. For laminated roof decking, use copper naphthenate.
- E. Apply joint sealant to seal roof decking at exterior walls at the following locations:
  - 1. Between roof decking and supports located at exterior walls.
  - 2. Between roof decking and exterior walls that butt against underside of roof decking.
  - 3. Between tongues and grooves of roof decking over exterior walls and supports at exterior walls.

### 3.3 ADJUSTING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged roof decking if repairs are not approved by Architect.

### 3.4 PROTECTION

- A. Provide water-resistive barrier over roof decking as the Work progresses to protect roof decking until roofing is applied.



- B. If, despite protection, roof decking becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061516



## SECTION 061600

### SHEATHING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Parapet sheathing.
4. Subflooring and underlayment.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for plywood backing panels.
2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

##### 1.2 ACTION SUBMITTALS

A. Product Data:

1. Wall sheathing.
2. Roof sheathing.
3. Parapet sheathing.
4. Subflooring and underlayment.

B. Product Data Submittals: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5516.
4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. For air-barrier and water-resistant glass-mat gypsum sheathing, include manufacturer's technical data and tested physical and performance properties of products.



1.3 INFORMATIONAL SUBMITTALS

1.4 QUALITY ASSURANCE

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products are to meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- C. Factory mark panels to indicate compliance with applicable standard.

2.3 WALL SHEATHING

- A. Plywood Sheathing, Walls: Exterior, Structural I sheathing.
  - 1. Span Rating: Not less than 16/0.
  - 2. Nominal Thickness: Not less than 15/32 inch.
- B. Paper-Surfaced Gypsum Sheathing: ASTM C1396/C1396M, gypsum sheathing; with water-resistant-treated core and with water-repellent paper bonded to core's face, back, and long edges.
  - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. American Gypsum.
    - b. CertainTeed; SAINT-GOBAIN.
    - c. Georgia-Pacific Gypsum LLC.
    - d. USG Corporation.
  - 2. Type and Thickness: Type X, **5/8 inch** thick.
  - 3. Edge and End Configuration: V-shaped, tongue-and-groove long edges; square ends.
  - 4. Size: **48 by 96 inches** for vertical installation.

2.4 ROOF SHEATHING

- A. Plywood Sheathing, Roofs: , Exterior, Structural I sheathing.
  - 1. Span Rating: Not less than 16/0.



2. Nominal Thickness: Not less than 3/4 inch.

## 2.5 PARAPET SHEATHING

- A. Plywood Sheathing, Parapets: DOC PS 1, Exposure 1, Structural I sheathing.
  1. Span Rating: Not less than 16/0.
  2. Nominal Thickness: Not less than 15/32 inch.

## 2.6 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Subflooring: , Exposure 1, Structural I single-floor panels or sheathing.
  1. Span Rating: Not less than 16.
  2. Nominal Thickness: Not less than 3/4 inch.
- B. Underlayment: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch over smooth subfloors and not less than 3/8 inch over board or uneven subfloors.

## 2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  1. For roof parapet and wall sheathing, provide fasteners.
- B. Nails, Brads, and Staples: ASTM F1667.

## 2.8 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with ASTM D3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  1. Table 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
  2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
  3. ICC-ES evaluation report for fastener.



- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall parapet and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### 3.2 INSTALLATION OF WOOD STRUCTURAL PANEL

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Combination Subfloor-Underlayment:
    - a. Nail to wood framing.
    - b. Screw to cold-formed metal framing.
    - c. Space panels **1/8 inch** apart at edges and ends.
  - 2. Subflooring:
    - a. Nail to wood framing.
    - b. Screw to cold-formed metal framing.
    - c. Space panels **1/8 inch** apart at edges and ends.
  - 3. Wall and Roof Sheathing:
    - a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
    - b. Screw to cold-formed metal framing.
    - c. Space panels **1/8 inch** apart at edges and ends.
  - 4. Underlayment:
    - a. Nail to subflooring.
    - b. Space panels **1/32 inch** apart at edges and ends.
    - c. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

### 3.3 INSTALLATION OF GYPSUM SHEATHING

- A. Comply with GA-253 and with manufacturer's written instructions.
  - 1. Fasten gypsum sheathing to wood framing with nails or screws.
  - 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 3. Install panels with a **3/8-inch** gap where non-load-bearing construction abuts structural elements.



4. Install panels with a **1/4-inch** gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
  1. Space fasteners approximately **8 inches** o.c. and set back a minimum of **3/8 inch** from edges and ends of panels.
  2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
  1. Space fasteners approximately **8 inches** o.c. and set back a minimum of **3/8 inch** from edges and ends of panels.
  2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- E. Seal sheathing joints in accordance with sheathing manufacturer's written instructions.
  1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
  2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.
- F. Air-Barrier and Water-Resistant Glass-Mat Gypsum Sheathing:
  1. Install accessory materials in accordance with sheathing manufacturer's written instructions and details to form a seal with adjacent construction, to seal fasteners, and ensure continuity of air and water barrier.
    - a. Coordinate the installation of sheathing with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
    - b. Install transition strip on roofing membrane or base flashing, so that a minimum of **3 inches** of coverage is achieved over each substrate.
  2. Connect and seal sheathing material continuously to air barriers specified under other Sections as well as to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
  3. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
  4. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip, so that a minimum of **3 inches** of coverage is achieved over each substrate. Maintain **3 inches** of full contact over firm bearing to perimeter frames, with not less than **1 inch** of full contact.



- a. Transition Strip: Roll firmly to enhance adhesion.
  - b. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.
5. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of sheathing material with foam sealant.
  6. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
  7. Seal top of through-wall flashings to sheathing with an additional **6-inch-** wide, transition strip.
  8. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
  9. Repair punctures, voids, and deficient lapped seams in strips and transition strips extending **6 inches** beyond repaired areas in strip direction.

### 3.4 INSTALLATION OF CEMENTITIOUS BACKER UNITS

- A. Install panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

### 3.5 INSTALLATION OF FIBERBOARD SHEATHING

- A. Comply with ASTM C846 and with manufacturer's written instructions.
- B. Fasten fiberboard sheathing panels to intermediate supports and then at edges and ends. Use galvanized roofing nails; comply with manufacturer's recommended spacing and referenced fastening schedule. Drive fasteners flush with surface of sheathing and locate perimeter fasteners at least **3/8 inch** from edges and ends.
- C. Install sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Allow **1/8-inch** open space between edges and ends of adjacent units. Stagger horizontal joints if any.
- D. Cover sheathing as soon as practical after installation to prevent deterioration from wetting.

### 3.6 INSTALLATION OF FOAM-PLASTIC SHEATHING

- A. Comply with manufacturer's written instructions.
- B. Foam-Plastic Wall Sheathing: Install vapor-relief strips or equivalent for permitting escape of moisture vapor that otherwise would be trapped in stud cavity behind sheathing.
- C. Apply sheathing tape to joints between foam-plastic sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

### 3.7 INSTALLATION OF PARTICLEBOARD UNDERLAYMENT

- A. Comply with CPA's recommendations for type of subfloor indicated. Fill and sand gouges, gaps, and chipped edges. Sand uneven joints flush.
  1. Fastening Method: Nail underlayment to subflooring.



3.8 INSTALLATION OF HARDBOARD UNDERLAYMENT

- A. Comply with CPA's recommendations and hardboard manufacturer's written instructions for preparing and applying hardboard underlayment.
  - 1. Fastening Method: Nail underlayment to subflooring.

END OF SECTION 061600



## SECTION 061753

### SHOP-FABRICATED WOOD TRUSSES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

A. Section Includes:

1. Wood products.
2. Preservative-treated lumber.
3. Fire-retardant-treated lumber.

##### 1.2 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

##### 1.3 ACTION SUBMITTALS

A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification from treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification from treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to truss fabricator.

B. Shop Drawings: Show fabrication and installation details for trusses.

1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
6. Show splice details and bearing details.



- C. Delegated Design Submittals: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.
- B. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.

#### 1.5 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
  - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
  - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
  - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
  - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
  - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.
- B. Structural Performance: Metal-plate-connected wood trusses are to be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
  - 1. Design Loads: As indicated.
  - 2. Maximum Deflection under Design Loads:
    - a. Roof Trusses: Vertical deflection of 1/240 of span.
    - b. Floor Trusses: Vertical deflection of 1/360 of span.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.



- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

## 2.2 WOOD PRODUCTS

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
  - 3. Provide dressed lumber, S4S.
  - 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
- B. Minimum Chord Size for Roof Trusses: **2 by 6 inches nominal** for both top and bottom chords.
- C. Minimum Specific Gravity for Top Chords: 0.50.
- D. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

## 2.3 METAL CONNECTOR PLATES

- A. **Basis-of-Design Product:** Subject to compliance with requirements, provide MiTek Industries, Inc.; or comparable product by one of the following:
  - 1. Alpine, a division of ITW Inc.
  - 2. Cherokee Metal Products, Inc.; Masengill Machinery Company.
  - 3. Eagle Metal Products.
- B. Fabricate connector plates to comply with TPI 1.
- C. Hot-Dip Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); **G60** coating designation; and not less than **0.036 inch** thick.
  - 1. Use for interior locations unless otherwise indicated.
- D. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); **G185** coating designation; and not less than **0.036 inch** thick.
  - 1. Use for wood-preserved-treated lumber and where indicated.

## 2.4 FASTENERS

- A. Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.



2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Nails, Brads, and Staples: ASTM F1667.

## 2.5 METAL FRAMING ANCHORS AND ACCESSORIES

A. [<Click here to find, evaluate, and insert list of manufacturers and products.>](#)

B. Allowable design loads, as published by manufacturer, are to comply with or exceed those indicated. Manufacturer's published values are to be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors are to be punched for fasteners adequate to withstand same loads as framing anchors.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, **G60** coating designation.

1. Use for interior locations unless otherwise indicated.

D. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); **G185** coating designation; and not less than **0.036 inch** thick.

1. Use for wood-preservative-treated lumber and where indicated.

E. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, **1-1/2 inches** wide by **0.050 inch** thick. Tie fastens to one side of truss, top plates, and side of stud below.

F. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, **1-1/4 inches** wide by **0.050 inch** thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

G. Floor Truss Hangers: U-shaped hangers, full depth of floor truss, with **1-3/4-inch-** long seat; formed from metal strap **0.062 inch** thick with tabs bent to extend over and be fastened to supporting member.

H. Roof Truss Bracing/Spacers: U-shaped channels, **1-1/2 inches** wide by **1 inch** deep by **0.040 inch** thick, made to fit between two adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.

I. Drag Strut Connectors: Angle clip with one leg extended for fastening to the side of girder truss.

1. Angle clip is **3 by 3 by 0.179 by 8 inches** with extended leg **8 inches** long. Connector has galvanized finish.
2. Angle clip is **3 by 3 by 0.239 by 10-1/2 inches** with extended leg **10-1/2 inches** long. Connector has painted finish.

## 2.6 MISCELLANEOUS MATERIALS

## 2.7 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.



- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
  - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

## 2.8 SOURCE QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.
  - 1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
  - 2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.
- B. Correct deficiencies in Work that special inspections indicate do not comply with the Contract Documents.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
  - 1. Anchor trusses to girder trusses as indicated.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.



1. Install bracing to comply with Section 061000 "Rough Carpentry."
  2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- J. Install wood trusses within installation tolerances in TPI 1.
- K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- L. Replace wood trusses that are damaged or do not comply with requirements.
1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

### 3.2 REPAIRS AND PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- C. Repair damaged galvanized coatings on exposed surfaces in accordance with ASTM A780/A780M and manufacturer's written instructions.

END OF SECTION 061753



## SECTION 061800

### GLUED-LAMINATED CONSTRUCTION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

A. Section Includes:

1. Structural glued-laminated timber.
2. Timber connectors.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for dimension lumber items associated with structural glued-laminated timber.
2. Section 061300 "Heavy Timber Construction" for framing using timbers.
3. Section 061516 "Wood Roof Decking" for glued-laminated wood roof decking.

##### 1.2 DEFINITIONS

- A. Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives and with the grain of the laminations approximately parallel longitudinally.

##### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data on lumber, adhesives, fabrication, and protection.
2. For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
3. For connectors. Include installation instructions.

B. Shop Drawings:

1. Show layout of structural glued-laminated timber system and full dimensions of each member.
2. Indicate species and laminating combination.
3. Include large-scale details of connections.

##### 1.4 INFORMATIONAL SUBMITTALS

- A. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in ANSI A190.1.
- B. Material Certificates: For preservative-treated wood products, from manufacturer. Indicate type of preservative used and net amount of preservative retained.



1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An AITC- or APA-EWS-licensed firm.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with provisions in AITC 111.
- B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Structural glued-laminated timber and connectors are to withstand the effects of structural loads shown on Drawings without exceeding allowable design working stresses listed in ANSI 117 or determined according to ASTM D3737 and acceptable to authorities having jurisdiction.

2.2 STRUCTURAL GLUED-LAMINATED TIMBER

- A. General: Provide structural glued-laminated timber that complies with ANSI A190.1 and ANSI 117 or research/evaluation reports acceptable to authorities having jurisdiction.
  - 1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that are not exposed in the completed Work.
  - 2. Provide structural glued-laminated timber made from single species.
  - 3. Provide structural glued-laminated timber made from solid lumber laminations; do not use laminated veneer lumber.
  - 4. Provide structural glued-laminated timber made with wet-use adhesive complying with ANSI A190.1.
- B. Species and Grades for Structural Glued-Laminated Timber:
  - 1. Douglas fir-larch that complies with structural properties indicated.
- C. Species and Grades: For beams.
  - 1. Species and Combination Symbol: 1.8E2650.
- D. Species and Grades for Columns:
  - 1. Species and Combination Symbol: Douglas fir-larch, 1 .
- E. Appearance Grade:, complying with AITC 110.
  - 1. For Premium and Architectural appearance grades, fill voids as required by AITC 110. For Premium appearance grade, use clear wood inserts, of matching grain and color, for filling voids and knot holes more than 1/4 inch wide.



## 2.3 FABRICATION

- A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.
  - 1. Dress exposed surfaces as needed to remove planing and surfacing marks.
- B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.
- C. Where preservative-treated members are indicated, fabricate (cut, drill, surface, and sand) before treatment to greatest extent possible. Where fabrication must be done after treatment, apply a field-treatment preservative to comply with AWPAC M4.
  - 1. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
  - 2. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.
- D. End-Cut Sealing: Immediately after end cutting each member to final length, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.

## 2.4 FACTORY FINISHING

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Erect structural glued-laminated timber true and plumb and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
  - 1. Handle and temporarily support glued-laminated timber to prevent surface damage, compression, and other effects that might interfere with indicated finish.
- B. Framing Built into Masonry: Provide **1/2-inch** clearance at tops, sides, and ends of members built into masonry; bevel cut ends **3 inches**; and do not embed more than **4 inches** unless otherwise indicated.
- C. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.
- D. Fit structural glued-laminated timber by cutting and restoring exposed surfaces to match specified surfacing.
  - 1. Predrill for fasteners using timber connectors as templates.



2. Finish exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.
3. Coat cross cuts with end sealer.
4. Where preservative-treated members must be cut during erection, apply a field-treatment preservative to comply with AWPAC M4.
  - a. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
  - b. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.

E. Install timber connectors as indicated.

1. Unless otherwise indicated, install bolts with same orientation within each connection and in similar connections.
2. Install bolts with orientation as indicated or, if not indicated, as directed by Architect.

3.3 ADJUSTING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Architect.

3.4 PROTECTION

- A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose, including protection from weather, sunlight, soiling, and damage from work of other trades.
1. Coordinate wrapping removal with finishing work. Retain wrapping where it can serve as a painting shield.
  2. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

END OF SECTION 061800



**SECTION 06 2000  
FINISH CARPENTRY AND MILLWORK**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Furnish all materials, labor and equipment necessary to complete the standing and running trim, cabinets and countertops where not manufactured cabinets, shelving, cabinet hardware, wood blocking, shims, hanging strips and similar work as shown and detailed on drawings and as specified including:
  - 1. Interior painted wood or hardboard standing and running trim.
  - 2. Interior painted wood or hardboard door trim
    - a. 3-1/2" MDF or pine casing square molding with eased edge at doors, both sides.
  - 3. Interior painted wood or hardboard base boards
    - a. 5-1/2" MDF or pine casing square molding with eased edge at all base board.
- B. Related Sections include the following:
  - 1. Divisions 12 Residential Casework for kitchen and bath casework.
  - 2. Division 12 Cultured Stone Countertops for countertops and cultured marble window sills.

**1.03 SUBMITTALS**

- A. Shop Drawings: Include location of each item, plans and elevations, large-scale details, attachment devices, and other components.

**1.04 QUALITY ASSURANCE**

- A. Except as otherwise shown or specified, comply with specified provisions of the Architectural Woodwork Institute (AWI) for premium quality work.

**1.05 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Job Measurements - Field verify measurements before beginning finished carpentry and millwork to insure perfect fitting

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. See basis of design.
- B. Wood for Opaque Finish: Any closed-grain hardwood.
- C. Hardboard: AHA A135.4.
- D. Medium-Density Fiberboard: ANSI A208.2, Grade MD-Exterior Glue.

**2.02 FABRICATION**

- A. Prime trim prior to installation.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Condition woodwork to average prevailing humidity conditions in installation areas. Remove packing materials and back prime before installation.
- B. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in this Section for type of woodwork involved.



- C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches. Shim as required with concealed shims.
- D. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

**END OF SECTION 062000**



**SECTION 07 1300  
SHEET WATERPROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Air gap sheet membrane.

**1.02 REFERENCE STANDARDS**

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-- Tension 2016 (Reapproved 2021).
- B. ASTM D5084 - Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter 2016a.
- C. ASTM D570 - Standard Test Method for Water Absorption of Plastics 2022.
- D. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers 2000 (Reapproved 2020).
- E. ASTM D638 - Standard Test Method for Tensile Properties of Plastics 2022.
- F. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact 2020.
- G. ASTM D751 - Standard Test Methods for Coated Fabrics 2019.
- H. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.
- I. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds 1998 (Reapproved 2017).
- J. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics 2016 (Reapproved 2023).
- K. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test) 2008 (Reapproved 2023).
- L. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2021.
- M. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015 (Reapproved 2021).
- N. ASTM D4068 - Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane 2017 (Reapproved 2022).
- O. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers 2022.
- P. ASTM D4551 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane 2022.
- Q. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles 2015a (Reapproved 2023).
- R. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane 2015, with Editorial Revision (2022).
- S. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems 2018.
- T. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes 2020.
- U. ASTM D5602/D5602M - Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens 2018 (Reapproved 2022).
- V. ASTM D6134/D6134M - Standard Specification for Vulcanized Rubber Sheets Used in Waterproofing Systems 2007, with Editorial Revision (2019).



- W. ASTM D6506/D6506M - Standard Specification for Asphalt Based Protection Board for Below-Grade Waterproofing 2001, with Editorial Revision (2018).
- X. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a, with Editorial Revision (2023).
- Y. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a (Reapproved 2019).
- Z. ASTM F2130 - Standard Test Method for Measuring Repellency, Retention, and Penetration of Liquid Pesticide Formulation Through Protective Clothing Materials 2011 (Reapproved 2018).
- AA. ICC-ES AC308 - Acceptance Criteria for Termite Physical Barrier Systems 2021, with Editorial Revision (2022).
- BB. NRCA (WM) - The NRCA Waterproofing Manual 2021.

### **1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- C. Manufacturer's Installation Instructions: Indicate special procedures.

### **1.04 MOCK-UPS**

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Construct mock-up consisting of 100 sq ft of horizontal and vertical sheet waterproofing panel; to represent finished work including internal and external corners, seam jointing, and attachment method.
- C. Locate where directed.
- D. Mock-up may remain as part of work.

### **1.05 FIELD CONDITIONS**

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

## **PART 2 PRODUCTS**

### **2.01 SHEET WATERPROOFING MATERIALS**

- A. Air Gap Sheet Membrane: HDPE dampproofing sheet dimpled in regular pattern to provide continuous minimum air gap of nominal 1/4 inch for drainage between substrate and adjacent material, with flat flanges on manufactured edges.
  - 1. Sheet Thickness: 26 mil, .14 inch, minimum.
  - 2. Sheet Width: Maximum available to minimize seams.
  - 3. Compressive Strength: 10,000 psf, minimum, when tested in accordance with ASTM D1621.

### **2.02 ACCESSORIES**

- A. Attachment Materials:
  - 1. Battens: \_\_\_\_\_.
  - 2. Disc Washers and Screws: \_\_\_\_\_.
  - 3. Circular Membrane Discs: \_\_\_\_\_.
  - 4. Reglet Strip Devices: \_\_\_\_\_.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Sealant: As recommended by membrane manufacturer.
- D. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
- E. Swellable Sealant: Elastic, solvent-free, one-component sealant used as penetration waterstop and adhesive for waterstop strips.



- F. Bentonite Composite Waterstop: Bentonite-based waterstop with nonwoven fabric and tear-resistant netting; seals static construction joints.
- G. Temporary Wood Protection Waterproofing Sheet: Self-adhered moisture protection for wood components during construction phase.
  - 1. Composition: Flexible nonwoven polypropylene (PO) with antislip layer and acrylic-based adhesive.
  - 2. Thickness: 20 mil, 0.020 inch thick.
  - 3. Width: As required for application.
  - 4. Water Vapor Permeability: 0.5 perm, measured in accordance with ASTM E96/E96M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions are acceptable prior to starting work.
- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify that items penetrating surfaces to receive waterproofing are securely installed.
- D. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.
- E. Do not proceed with work until unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D. Fill nonmoving joints and cracks with a filler compatible with waterproofing materials.
- E. Seal moving cracks with sealant and nonrigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- F. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

### **3.03 INSTALLATION - MEMBRANE**

- A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
- B. Roll out membrane, and minimize wrinkles and bubbles.
- C. Mechanically Fastened Membrane: Install mechanical fasteners in accordance with manufacturer's instructions, and bond sheet to membrane discs.
- D. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
- E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- F. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.
- G. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
- H. Seal membrane and flashings to adjoining surfaces.
- I. Composite Waterstop: Install composite waterstop according to manufacturer's instructions.

### **3.04 INSTALLATION - DRAINAGE PANEL AND PROTECTION BOARD**

- A. Place protection board directly against drainage panel; butt joints, and scribe and cut boards around projections, penetrations, and interruptions.



**3.05 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. The contractor will provide testing services, and Contractor to provide temporary construction and materials for testing.
- C. Upon completion of horizontal membrane installation, dam installation area in preparation for flood testing.
  - 1. Flood to minimum depth of 1 inch with clean water, and after 48 hours inspect for leaks.
  - 2. If leaking is found, remove water, repair leaking areas with new waterproofing materials as directed by Architect; repeat flood test, and repair damage to building.
  - 3. When area is proven watertight, drain water and remove dam.

**3.06 PROTECTION**

- A. Do not permit traffic over unprotected or uncovered membrane.

**END OF SECTION**



**SECTION 07 1413  
HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING**

**HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING**

**PART 1 GENERAL**

**2.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**2.02 SUMMARY**

- A. Section Includes:
  - 1. Rubberized-asphalt waterproofing membrane, reinforced.

**2.03 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review waterproofing requirements, including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

**2.04 ACTION SUBMITTALS**

- A. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
- B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.
  - 1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

**2.05 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.
- B. Sample Warranties: For special warranties.

**2.06 QUALITY ASSURANCE**

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Mockups: Install waterproofing to [100 sq. ft. (9.3 sq. m)] wall to demonstrate surface preparation, crack and joint treatment, corner treatment, thickness, texture, and execution quality. Retain first subparagraph below if mockups are not only for establishing appearance factors.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**2.07 DELIVERY, STORAGE, AND HANDLING**

- A. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer.
- B. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- C. Protect stored materials from direct sunlight.



## **2.08 FIELD CONDITIONS**

- A. Weather Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
  - 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during application and curing of waterproofing materials.

## **2.09 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace waterproofing and sheet flashings that do not comply with requirements or that fail to remain watertight within specified warranty period.
  - 1. Warranty includes removing and reinstalling protection board, drainage panels.
  - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Special Installer's Warranty: Specified form signed by Installer, covering Work of this Section, for warranty period of two years.
  - 1. Warranty includes removing and reinstalling protection board, drainage panels.

## **PART 1 PRODUCTS**

### **3.01 MANUFACTURERS**

- A. Source Limitations: Obtain waterproofing materials sheet flashings protection course molded-sheet drainage panels from single source from single manufacturer.

### **3.02 WATERPROOFING MEMBRANE**

- A. Hot Fluid-Applied, Rubberized-Asphalt Waterproofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.

### **3.03 AUXILIARY MATERIALS**

- A. General: Auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with waterproofing.
- B. Primer: ASTM D 41/D 41M, asphaltic primer.
- C. Elastomeric Sheet: 120-mil-minimum, uncured sheet neoprene with manufacturer's recommended contact adhesives as follows:
  - 1. Tensile Strength: 1400 psi (9.6 MPa) minimum; ASTM D 412, Die C.
  - 2. Elongation: 300 percent minimum; ASTM D 412.
  - 3. Tear Resistance: 125 psi (860 kPa) minimum; ASTM D 624, Die C.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum termination bars; approximately 1 by 1/8 inch (25 by 3 mm) thick; with stainless-steel anchors.
- E. Sealants and Accessories: Manufacturer's recommended sealants and accessories.
- F. Reinforcing Fabric: Manufacturer's recommended, spun-bonded polyester fabric.
- G. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.
- H. Protection Course: Manufacturer's standard, 80- to 90-mil- (2.0- to 2.3-mm-) thick, fiberglass-reinforced rubberized asphalt or modified bituminous sheet.

### **3.04 MOLDED-SHEET DRAINAGE PANELS**

- A. Woven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a woven-geotextile facing with an apparent opening size not exceeding No. 40 (0.43-mm) sieve, laminated to one side with a polymeric film bonded to the other side of a studded, nonbiodegradable, molded-plastic-sheet drainage core, with a horizontal flow rate not less than 2.8 gpm/ft. (35 L/min. per m).



## **PART 1 EXECUTION**

### **4.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
  - 2. Verify that substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **4.02 PREPARATION**

- A. Clean and prepare substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
- D. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
  - 1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D 4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces according to ASTM D 4258.
- E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, and other voids.

### **4.03 JOINTS, CRACKS, AND TERMINATIONS**

- A. Prepare and treat substrates to receive waterproofing membrane, including joints and cracks, deck drains, corners, and penetrations according to manufacturer's written instructions.
  - 1. Rout and fill joints and cracks in substrate. Before filling, remove dust and dirt according to ASTM D 4258.
  - 2. Adhere strip of elastomeric sheet to substrate in a layer of hot rubberized asphalt. Extend elastomeric sheet a minimum of 6 inches (150 mm) on each side of moving joints and cracks or joints and cracks exceeding 1/8 inch (3 mm) thick, and beyond deck drains and penetrations. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.
  - 3. Embed strip of reinforcing fabric into a layer of hot rubberized asphalt. Extend reinforcing fabric a minimum of 6 inches (150 mm) on each side of nonmoving joints and cracks not exceeding 1/8 inch (3 mm) thick, and beyond roof drains and penetrations.
    - a. Apply second layer of hot fluid-applied, rubberized asphalt over reinforcing fabric.
- B. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge joints with elastomeric sheet extended a minimum of 6 inches (150 mm) on each side of joints and adhere to substrates in a layer of hot rubberized asphalt. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

### **4.04 FLASHING INSTALLATION**

- A. Install elastomeric sheets at terminations of waterproofing membrane according to manufacturer's written instructions.
- B. Prime substrate with asphalt primer.
- C. Install elastomeric sheet and adhere to deck and wall substrates in a layer of hot rubberized asphalt.



- D. Extend elastomeric sheet up walls or parapets a minimum of 8 inches (200 mm) above plaza-deck pavers and 6 inches (150 mm) onto deck to be waterproofed.
- E. Install termination bars and mechanically fasten to top of elastomeric flashing sheet at terminations and perimeter of waterproofing.

#### **4.05 MEMBRANE APPLICATION**

- A. Apply primer, at manufacturer's recommended rate, over prepared substrate and allow it to dry.
- B. Heat and apply rubberized asphalt according to manufacturer's written instructions.
  - 1. Heat rubberized asphalt in an oil- or air-jacketed melter with mechanical agitator specifically designed for heating rubberized asphalt.
- C. Start application with manufacturer's authorized representative present.
- D. Reinforced Membrane: Apply hot rubberized asphalt to substrates and adjoining surfaces indicated. Spread to a thickness of 90 mils (2.3 mm); embed reinforcing fabric, overlapping sheets 2 inches (50 mm); spread another 125-mil- (3.2-mm-) thick layer to provide a uniform, reinforced, seamless membrane 215 mils (5.5 mm) thick.
- E. Apply waterproofing over prepared joints and up wall terminations and vertical surfaces to heights indicated or required by manufacturer.
- F. Cover waterproofing with protection course with overlapped joints before membrane is subject to [backfilling] [construction or vehicular traffic].

#### **4.06 MOLDED-SHEET DRAINAGE PANEL INSTALLATION**

- A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate according to manufacturer's written instructions. Use methods that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

#### **4.07 FIELD QUALITY CONTROL**

- A. Engage a full-time site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions; surface preparation; and application of membrane, flashings, protection, and drainage components; furnish daily reports to Architect.
  - 1. Site representative shall measure membrane thickness with pin tester or other suitable device at least once for every 100 sq. ft. (10 sq. m) and include measurements in reports.
- B. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, waterproofing application, protection, and drainage components, and to furnish reports to Architect.
  - 1. Flood Testing: Flood test each deck area for leaks, according to recommendations in ASTM D 5957, after completing and protecting waterproofing but before overlaying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water. Testing agency shall observe flood testing.
    - a. Flood to an average depth of 2-1/2 inches (65 mm) with a minimum depth of 1 inch (25 mm) and not exceeding a depth of 4 inches (100 mm). Maintain 2 inches (50 mm) of clearance from top of sheet flashings.
    - b. Flood each area for 72 hours.
    - c. After flood testing, repair leaks, repeat flood tests, and make further repairs until waterproofing installation is watertight.
  - 2. Electric Field Vector Mapping (EFVM): Testing agency shall survey entire waterproofing area for potential leaks using EFVM.

#### **4.08 CLEANING AND PROTECTION**

- A. Protect waterproofing from damage and wear during remainder of construction period.
- B. Protect installed drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after



installation.

- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

**END OF SECTION**



**SECTION 07 1813  
PEDESTRIAN TRAFFIC COATING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Traffic coating with supplemental waterproofing layer at parking garage and basis of design.

**1.02 ADMINISTRATIVE REQUIREMENTS**

- A. Submittal Procedures:
  - 1. Action Submittals and Informational Submittals shall be submitted in accordance with Section 01 3300, "Submittal Procedures."
  - 2. Closeout Submittals shall be submitted in accordance with Section 01 7700, "Closeout Procedures" and Section 01 7836, "Warranties."
- B. Pre-installation Meeting: Prior to installation of traffic coating and associated work, Contractor shall conduct a meeting at the Project Site with Contractor, Architect, Owner's waterproofing consultant, manufacturer's representative, installer, and other installers whose work may affect quality of traffic coating and waterproofing shall meet at the Project site to coordinate related requirements and waterproofing work.
  - 1. Contractor shall notify participants at least 48 hours before conducting meeting.
  - 2. Review material selections and procedures to be followed in performing the work.
  - 3. Review in detail job conditions, schedule, construction sequence, surface preparation and substrate condition and pre-treatment, installation requirements, minimum curing period and quality of completed installation.
  - 4. Review in detail the means of protecting completed work during remainder of construction period.
  - 5. Review testing, inspection, and remedial repair procedures.
  - 6. discussions of conference and any conflict, incompatibility, or inadequacy. Furnish a copy of record to each participant.
- C. Coordinate Work to ensure that adjacent areas are not adversely affected with other trades to avoid or minimize work on, or in immediate vicinity of, installation in progress.

**1.03 ACTION SUBMITTALS**

- A. Shop drawings showing layout of details, interaction/intersection with adjacent components, etc. Shop drawings shall include typical section, typical base flashing, typical sill/threshold flashing.
- B. Product Data:
  - 1. recommended installation details and procedures, test certification data and limitations for each component indicated and required.
  - 2. Provide a list of materials; including all fasteners (if applicable) intended for use on the project and location of use.
- C. Samples: 12-inch-square samples on plywood illustrating build-up of traffic coatings, including texture and finish coating.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Statement of applicator qualifications, including certification that applicator is approved and licensed by manufacturer, signed by the material manufacturer.
- B. ICC test report attesting that proposed traffic coating has a Class A Fire Rating and meets all ICC criteria for a traffic deck.
- C. Sample Warranty: Copy of material manufacturer's warranty, stating obligation, remedies, limitations and exclusion.
- D. Manufacturer Certificates: Signed by manufacturer certifying that materials, substrates, etc. specified for the Project comply with requirements.



#### **1.05 CLOSEOUT SUBMITTALS**

- A. Manufacturer's written instructions for recommended maintenance practices and schedules.
- B. Extended warranties.

#### **1.06 QUALITY ASSURANCE**

- A. Applicator Qualifications: Factory trained and approved by traffic coating materials manufacturer.
  - 1. Employ foreman trained by materials manufacturer and with a minimum of five
    - a. (5) years' experience as foreman on similar projects, who is fluent in English, to be on-site at all times during Work.
- B. Mockups:
  - 1. Provide pedestrian traffic coating for building mockup specified in Section 01 4339, "Mockups."
  - 2. In addition, first installed example of each installation condition, if not illustrated by building mockup, shall serve as a mockup for review and approval by Architect and Owner of surface preparation, wet and dry slip resistance, visual effect, installation and application techniques, and interface with adjacent construction.
  - 3. Manufacturer's representative shall verify surface preparation and installation methods.
  - 4. If requested, make modifications to mockups without additional charge to Owner.
  - 5. Do not proceed with remainder of installation until mockups have been approved.
  - 6. Where appropriate and acceptable to Owner, approved mockups may become part of the completed Work.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, lot number, and directions for storing and mixing with other components.
- B. Store materials in original, undamaged containers in clean, dry, protected location on raised platforms with weather-protective coverings, within temperature range recommended by manufacturer.
  - 1. Protect stored materials from sunlight.
  - 2. Manufacturer's standard packaging and covering is not considered adequate weather protection.
  - 3. Store all coating materials at 50 degrees F to 80 degrees F.
  - 4. Provide adequate ventilation in storage areas.
- C. Limit stored materials on structures to safe loading of structure at time materials are stored, and to avoid permanent deck deflection.
- D. Handle materials to avoid damage.
- E. Conspicuously mark damaged, opened containers, or containers with contaminated materials, and remove from site as soon as possible.
- F. Remove and replace materials that cannot be applied within the stated shelf life.
- G. Comply with additional requirements specified in Section 01 6000, "Product Requirements."

#### **1.08 PROJECT CONDITIONS**

- A. Coordinate with other trades to ensure that substrate has a slope to drain as shown on the Drawings and is suitable to receive specified coating.
- B. Ambient Conditions: Apply materials when existing and forecast weather conditions permit the materials to be installed according to the manufacturer's written instructions and warranty requirements.
  - 1. Do not install when ambient or surface temperature is below 550F or rises above 850F twenty four hours prior to installation; or is forecast to be below 550F or rises above 950F within twenty four hours after installation; or is outside of range of ambient and substrate temperatures recommended by the material manufacturer.



2. Do not install materials on damp or wet substrate, or when moisture is forecast during the application or curing period.
  3. Do not install materials in rain, fog, mist or when such weather conditions are imminent during the application and curing period.
- C. Do not install traffic coating until all items that penetrate coating have been installed.
  - D. Comply with Owner's limitations and restrictions for site use and accessibility.
  - E. Install materials in strict accordance with safety requirements of the material manufacturer; Material Safety Data Sheets; and local, state, and federal rules and regulations.
  - F. Verify existing dimensions and details prior to installation of materials. Notify Architect and Owner's Representative of conditions found to be different from those indicated in Contract Documents. Architect and Owner's Representative will review the situation and will inform Contractor and Installer of changes.

#### **1.09 WARRANTY**

- A. Manufacturer: Provide manufacturer's written 10-year warranty against defects in materials and workmanship, agreeing to repair or replace traffic coating that does not remain watertight during the warranty period.
  1. The following problems shall be specifically covered under the warranty:
    - a. Cohesive or adhesive failure of the system.
    - b. Weathering deficiencies resulting in failure of system.
    - c. Abrasion or tear failure of system resulting from normal use.
    - d. Surface crazing, cracking, or chalking.
    - e. Leakage, deterioration, or failure to perform as required as a result of failure of materials or workmanship.
    - f. Intrusion of water, oils, gasoline, grease, salt, deicer chemicals or acids into deck substrate.
  2. By terms of warranty, also agree to remove and replace other work, as required, which has been connected to or superimposed on the substrate material to be replaced.
- B. Contractor: Provide written 10-year warranty, countersigned by applicator, agreeing to repair or replace traffic coating that does not remain watertight during the warranty period.
  1. The following problems shall be specifically covered under the warranty:
    - a. Cohesive or adhesive failure of the system.
    - b. Weathering deficiencies resulting in failure of system.
    - c. Abrasion or tear failure of system resulting from normal use.
    - d. Surface crazing, cracking, or chalking.
    - e. Leakage, deterioration, or failure to perform as required as a result of failure of materials or workmanship.
  2. By terms of warranty, also agree to remove and replace other work, as required, which has been connected to or superimposed on the substrate material to be replaced.
- C. Warranties do not cover deterioration or failure of traffic coating due to failure of substrate prepared as specified, formation of new substrate cracks exceeding 1/16 inch width, fire, vandalism, or abuse.

### **PART 2 - PRODUCTS**

#### **2.01 DESIGN AND PERFORMANCE CRITERIA**

- A. System shall be designed for use on outdoor decks to provide a flexible, seamless, waterproof, durable, fire-retardant, nonporous, skid-resistant surface while protecting substrate from leakage and moisture intrusion due to normal shrinkage cracks.
- B. Pedestrian traffic coating is to comply with ICC-ES Acceptance Criteria for Walking Decks AC39.
- C. Traffic coating shall be classified as a Class A roof coating.
- D. Slip Resistance: Traffic coating, after application of specified finishes, shall maintain a minimum wet DCOF AcuTest value of 0.42 in accordance with ANSI A137.1-2012. Alternative



testing to verify compliance, including wet and dry static coefficient value of 0.60 for level surfaces as defined by ASTM D2047 when determined by testing identical products in accordance with National Floor Safety Institute (NFSI) recommendations, shall be acceptable to governing authorities.

## **2.02 TRAFFIC COATING**

- A. Manufacturer and System:
  - 1. Plywood Decking Substrate: "Pli-Deck-2097" System by Pli-Deck Systems, Inc., Fallbrook, CA, 800-364-0287.
- B. Coating System:
  - 1. Underlayment Layer: Polymer modified cementitious mixture, reinforced with metal lath.
    - a. Metal Lath: 2-1/2 pound per square yard minimum galvanized, expanded metal lath.
  - 2. Base Coat: Polymer modified cementitious mixture.
  - 3. Chopped fiberglass strand woven mat, 0.75 oz/sq. yd., as recommended or provided by system manufacturer.
  - 4. Fiberglass reinforced, polymer modified, cementitious texturing material in texture to be selected by Architect.
  - 5. Top Coat: Colored, acrylic based elastomeric coating.
    - a. Color: To match "Mud Pie" by Pli-Deck Systems, Inc.

## **2.03 ACCESSORIES**

- A. Staples: Minimum No. 16 gage, 1 inch crown by 5/8 inch long corrosion-resistant steel; as shown on the Drawings.
- B. Nails: Hot dipped galvanized, annular ring shank nails.
- C. Sealant: Urethane sealant, compatible with the various components of the coating system and meeting requirements of Section 07 9200, "Joint Sealants," as recommended by coating manufacturer.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Plywood Decking: Inspect previously installed work with Installer, material manufacturer's representative or Owner's waterproofing representative for compliance with requirements, other conditions affecting performance and verify that it is complete to the point where traffic coating may be installed.
  - 1. Decking shall be at least 5/8 inch thick, CDX Plywood or accepted equal.
    - a. Oriented-strand board (OSB) decking is not acceptable.
  - 2. Decking shall be supported and fastened along all edges.
    - a. Joists shall be spaced no more than 16 inches on center.
    - b. Provide blocking as required to support all edges.
    - c. Verify all fasteners are fully driven flush with substrate.
    - d. Joints in decking must be staggered and gapped at least 1/8 inch but no more than 1/4 inch.
    - e. Adjacent edges of plywood sheets shall be no more than 1/32 inch out of plane (above or below each other).
    - f. Transitions from crickets must be smooth.
  - 3. Verify that decking has no gaps, voids, or splinters.
    - a. Gaps and voids shall be no greater than 1/4 inch.
  - 4. Verify that plywood substrate is solid, without damage to surface, soft spots, and that nailing is installed in accordance with code and ICC Evaluation Report for traffic coating system. Verify that plywood joints are tongue and groove or tightly blocked.
  - 5. Plywood shall be protected from moisture prior to coating application, to prevent delamination, warping and other deterioration. A protective coating using the base layer may be applied to protect the plywood, if acceptable to the manufacturer.
- B. General:



1. Verify that work of this Section may be installed in accordance with applicable codes and regulations and reviewed submittals.
2. Verify compatibility with and suitability of substrates.
3. Verify that deck drains will drain properly, without low spots or high fascia edges in accordance with code requirements. Deck shall provide a slope as shown on the Drawings toward exterior, drain, or scupper.
4. Notify Owner's representative in writing of conditions which may adversely affect the system installation or performance. Do not proceed with installation until these conditions have been corrected and reviewed by the Owner's representative.
5. Application of systems indicated acceptance of surfaces and conditions by Installer.

### **3.02 METAL FLASHING**

- A. Install bonderized metal flashing at perimeter (walls, edges, scuppers, etc.) with joints and seams mechanically fastened and soldered at corners and transitions. Coordinate with Section 07 6200, "Sheet Metal Flashing and Trim."
- B. Horizontal leg shall extend 4 inches onto deck and extend vertically as indicated on the Drawings. Fasten vertically along top of flashing at each stud.
- C. Lap adjacent sections of metal flashing at least 4 inches in the direction of water flow, with 2 full beads of compatible sealant in the lap. At corners and transitions, trim metal to provide lapped sections and provide compatible sealant within lap.
- D. Fasten horizontal leg of metal flashing to decking with ring shank fasteners at a maximum spacing of 4 inches OC, staggered. Fasten vertical leg along top of flashing at each stud.

### **3.03 PREPARATION**

- A. Protect previously installed work and materials of other trades which may be affected by installation of traffic coating.

### **3.04 APPLICATION OVER PLYWOOD DECKING**

- A. Install traffic coating in accordance with manufacturer's printed instructions summarized as follows.
- B. Lath:
  1. Install lath over entire surface of plywood decking.
  2. Lap lath as recommended by system manufacturer.
  3. Hold lath back one-half inch from edge or wall.
  4. Attach to plywood substrate with not less than 24 staples per square foot, uniformly spaced.
  5. Staple along all edges at 1 inch on center.
  6. Splice butt joints with staples spaced not more than one inch on center.
  7. Do not locate butt joints in lath closer than 2 inches to a parallel plywood joint.
  8. Provide ring shank nails to secure lath when metal flashing must be penetrated.
- C. Lap metal flashing to base of vertical risers and deck drains.
- D. First Coat: Trowel mixture into metal lath and vertically up the metal flashing. Do not use squeegee or float.
  1. Start at deck perimeter.
  2. Make sure all voids in lath are filled to a minimum thickness of 1/8 inch.
  3. Apply to a continuous plane, matching the slope of the deck.
  4. Allow base coat to dry/cure following the manufacturer's specifications.
  5. Patch minor imperfections.
- E. Second Coat: Mixture of binder and fiberglass strand mat.
  1. Lay fiberglass mat over first coat with joints tightly butted.
    - a. "Fray" ends of fiberglass shall meet for smooth transitions.
    - b. Install 6 inch wide strips of fiberglass mat at metal flashings.
      - 1) Install 4 inches vertically and 2 inches horizontally, unless otherwise noted on Drawings.



2. Trowel-apply binder over fiberglass matt at rate of 50 square feet/gallon and thoroughly saturating fiberglass.
3. Apply in two coats in necessary to achieve specified coverage rate.
4. Apply generous layer of base coating at all flashings and strip-ins. Apply two coats if necessary to achieve specified coverage rate.
  - a. Allow to cure for 4 to 6 hours.
  - b. Apply base coat over entire deck area at a rate of 50 square feet per gallon, or more, as required to fully saturate the fiberglass mat.
  - c. Begin in the center of each section by pouring base coat on top of fiberglass mat. Work with moderate pressure, to thoroughly saturate the fiberglass mat.
  - d. Base coat must penetrate through the fiberglass mat.
  - e. Roll the section smooth of bubbles and/or wrinkles with a metal of fiberglass roller prior to beginning the next section.
  - f. Do not dry roll.
  - g. Cut wrinkles and roll flat as they occur.
  - h. Apply sealant as shown on the Drawings.
- F. Trowel apply mixture ensuring an even coverage over the binder/fiberglass coat.
  1. Spray water on cured base coat to identify low spots in the surface/ponding. If low spots are identified, apply additional base coat to provide a consistent plane/surface. Reference Section 3.4 Pond Test.
- G. Final Coat or Topcoat:
  1. Spray mixture uniformly over wearing coat to achieve surface texture to match accepted submittal. Extend coating up metal flashing at details.
  2. Smooth or decorative finish coat may be substituted for sprayed texture coat if tolerances acceptable to manufacturer are maintained.
  3. Minimum Thickness: 1/16 inch.
  4. Apply sealant as recommended by manufacturer.
- H. Color Coat: Roll-apply two uniform coats over Final Coat to achieve a uniform appearance matching accepted mockup. Do not apply second coat before recommended by manufacturer.
- I. Tolerances: Minimum average thickness of the completed system shall be not less than 3/16 inch.
  1. Final system must slope towards the exterior to match substrate.
- J. Allow completed system to cure at least 24 hours before exposed to foot traffic and 96 hours before heavy objects are placed on the finished surface.

### **3.05 APPLICATION OVER CONCRETE SUBSTRATE**

- A. Mixture of binder and fiberglass stand mat, following the manufacturer's recommendations
  1. Prime concrete with manufacturer approved primer.
  2. Apply fiberglass mat over dried underlayment layer, butting joints of adjacent sections (do not overlap).
    - a. "Fray" ends of fiberglass shall meet for smooth transitions.
    - b. Install 6 inch wide strips of fiberglass mat at metal flashing joints and other 90 degree terminations.
    - c. Install 4 inches vertically and 2 inches horizontally, unless otherwise noted on Drawings.
    - d. Extend fiberglass mat horizontally over flashing and strip-ins.
    - e. Apply generous layer of base coating at all flashing and strip-ins. Apply in two coats if necessary to achieve specified coverage rate.
      - 1) Allow to cure for 4 to 6 hours.
    - f. Apply base coat over entire deck area at a rate of 50 square feet per gallon, or more, as required to fully saturate the fiberglass mat.
    - g. Begin in the center of each section by pouring base coat on top of fiberglass mat and working, with moderate pressure, to thoroughly saturate the fiberglass mat.
    - h. Base coat must penetrate through the fiberglass mat to the substrate.



- i. Roll the section smooth of bubbles and/or wrinkles with a metal or fiberglass roller prior to beginning the next section.
  - j. Do not dry roll.
  - k. Cut wrinkles and roll flat as they occur.
- 3. Apply sealant as indicated on drawings.
- B. Second Coat: Trowel apply mixture ensuring an even coverage over the first coat.
  - 1. Spray water on cured base coat to identify low spots in the surface/ponding. If low spots are identified, apply additional base coat to provide a consistent plane/surface. Reference specified Pond Test.
  - 2. Allow base coat to dry/cure, following the manufacturer's recommendations.
- C. Final Coat:
  - 1. Spray mixture uniformly over wearing coat to achieve surface texture to match accepted submittal.
  - 2. Smooth or decorative finish coat may be substituted for spray texture coat if tolerances acceptable to manufacturer are maintained.
  - 3. Minimum thickness: 1/16 inch.
- D. Color Coat: Roll-apply two uniform coats over Final Coat.
- E. Tolerances: Minimum average thickness of completed system shall be not less than 3/16 inch.
  - 1. Final system must slope towards the exterior to match substrate.
- F. Allow completed system to cure at least 24 hours before exposed to foot traffic and 96 hours before heavy objects are placed on the finished surface.

### **3.06 POND TEST**

- A. Coordinate Pond test with Owner's representative and/or Owner's waterproofing representative after wearing coat installation of coating system.
- B. Pond test each area by applying water upon the surface of the deck in all areas, including base flashing.
- C. Observe the decks for ponding for a period of 48 hours.
- D. If ponding occurs, make repairs as directed by the manufacturer and re-test.

### **3.07 FIELD QUALITY CONTROL**

- A. Upon completion of installation, a representative of coating manufacturer shall inspect in order to verify that coating has been installed in accordance with manufacturer's approved specifications, details, and to achieve specified manufacturer's warranty.
- B. Comply with requirements of Section 01 9115, "Building Envelope Consulting and Testing" and Section 01 9116, "Building Envelope Testing Protocol."
- C. In addition, Owner may hire an inspector and/or testing agency in accordance with Section 01 4500, "Testing Services."
  - 1. Inspector and/or testing agency will interpret tests and state in each report whether tested work complies with or deviates from specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance and replaced or additional work with specified requirements.

### **3.08 PROTECTION**

- A. Protect completed coating system from heavy pedestrian traffic for several hours following application of color coat.
- B. Remove temporary coverings and protection.
- C. Protect the surface of coating system from continuous contact with solvents.

### **END OF SECTION**



**SECTION 07 1816  
VEHICULAR TRAFFIC COATING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Work for this Section includes:
- B. Provide all permits, labor, materials, temporary protection, means to access the work, etc. as required to complete the Work.
- C. All Work shall be performed following applicable local, state, and federal codes and regulations, except where the Specifications are more stringent.

**1.02 ACTION SUBMITTALS**

- A. Shop Drawings: Provide shop drawings showing layout of details, intersection/interaction with adjacent components, etc. Shop drawings shall include section and isometric details as required to completely show the required detailing. Shop drawings provided shall include, but not limited to:
  - 1. Typical section.
  - 2. Typical base flashing.
- B. Product Data: For each material and component indicated and required, including test certification data, installation instructions, limitations, etc.
- C. Samples for Verification: Provide the following samples for review by the Owner and Owner's Representative:
  - 1. Stepped samples on backing to illustrate buildup of traffic coatings, including finish texture and coating.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Materials: Provide a list of materials; including all fasteners (if applicable) intended for use on the project and location of use.
- B. Signed by material manufacturer, certifying that the Installer complies with requirements.
- C. Certificates: Signed by manufacturer certifying that materials, substrates, etc. specified for the Project comply with requirements.
- D. Copy of material manufacturer's warranty, stating obligations, remedies, limitations, and exclusions.

**1.04 CLOSEOUT SUBMITTALS**

- A. Following completion of Work, submit completed material manufacturer's warranty.
- B. Manufacturer's written instructions for recommended maintenance practices and schedule.

**1.05 QUALITY ASSURANCE**

- A. Contractor Qualifications:
  - 1. Qualified firm that is approved, authorized, or licensed by the material manufacturer(s) to install the required system and that is eligible to receive required manufacturer's warranty.
  - 2. Installation experience of the specified materials, with similar complexities of this project, in the local area which have been installed for a minimum of five (5) years.
  - 3. Employ foreman trained by the material manufacturer and with minimum of five
    - a. (5) years experience as foreman on similar projects, who is fluent in English, to be on site at all times during Work.
  - 4. Must use trained workers.
- B. Manufacturer Qualifications:
  - 1. The system manufacturer will be a company with at least ten (10) years documented experience with the manufacturing of the systems specified.
- C. Requirements of Regulatory Agencies:



1. The vehicular deck coating system shall be rated Class "A" by Underwriters Laboratories (ASTM E 108/UL 790). Containers to bear Underwriters Laboratories labels.
  2. Materials used in the vehicular deck coating system shall meet Federal, State and local VOC regulations
- D. Pre-installation Meeting:
1. Conduct meeting at Project site.
  2. Review requirements for the work of this Section, including:
    - a. Construction schedule and availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - b. Site use, access, staging, and set-up location limitations.
    - c. Surface preparation and substrate condition and pretreatment.
    - d. Installation procedures.
    - e. Special details and flashings.
    - f. Minimum curing period.
    - g. Testing and inspection requirements.
    - h. Site protection measures.
    - i. Governing regulations if applicable.
  3. Contractor's site foreman, material manufacturer's technical representative, Owner, waterproofing inspector and Owner's Representative shall attend.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, lot number, and directions for storing and mixing with other components.
- B. Store materials in original, undamaged containers in clean, dry, protected location on raised platforms with weather-protective coverings, within temperature range required by manufacturer. Protect stored materials from direct sunlight. Manufacturer's standard packaging and covering is not considered adequate weather protection.
- C. Limit stored materials on structures to safe loading of structure at time materials are stored, and to avoid permanent deck deflection.
- D. Handle materials to avoid damage.
- E. Conspicuously mark damaged or opened containers or containers with contaminated materials, and remove from site as soon as possible.
- F. Remove and replace materials that cannot be applied within the stated shelf life.

#### **1.07 PROJECT CONDITIONS**

- A. Verify existing dimensions and details prior to installation of materials. Notify Owner's Representative of conditions found to be different than those indicated in Contract Documents. Owner's Representative will review situation and inform Contractor and Installer of changes.
- B. Comply with Owner's limitations and restrictions for site use and accessibility.
- C. Environmental Limitations: Apply materials when existing and forecast weather conditions permit the materials to be installed according to the manufacturer's written instructions and warranty requirements.
  1. Do not install when ambient or surface temperature is below 50°F, or rises above 95°F 24 hours prior to installation; or is forecast to be below 50°F or rises above 95°F within 24 hours after installation; or is outside of range of ambient and substrate temperatures recommended by the material manufacturer.
  2. Do not install materials to damp or wet substrate, or when moisture is forecast during application or curing period.
  3. Do not install materials in rain, fog, or mist, or when such weather conditions are imminent during the application and curing period.
- D. Do not install traffic coating until items that penetrate membrane have been installed.



- E. Install materials in strict accordance with safety requirements required by the material manufacturer, Material Safety Data Sheets, and local, state, and federal rules and regulations.

## **1.08 WARRANTY**

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace traffic coating that fails in materials or workmanship within specified warranty period.
  - 1. The following problems shall be specifically covered under the warranty:
    - a. Adhesive or cohesive failures.
    - b. Weathering deficiencies resulting in failure of the system.
    - c. Abrasion or tearing failures of the system resulting from normal use.
    - d. Surface crazing, cracking, or chalking.
    - e. Intrusion of water, oils, gasoline, grease, salt, deicer chemicals, or acids into deck substrate.
    - f. Leakage, deterioration, or failure to perform as required as a result of failure of materials.
  - 2. By terms of warranty, also agree to remove and replace other work, as required, which has been connected to or superimposed on the substrate material to be replaced.
  - 3. Warranty Period: Ten (10) years from date of Substantial Completion.
- B. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace coating systems that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. The following problems shall be specifically covered under the warranty:
    - a. Adhesive or cohesive failures.
    - b. Weathering deficiencies resulting in failure of the system.
    - c. Abrasion or tearing failures of the system resulting from normal use.
    - d. Surface crazing, cracking, or chalking.
    - e. Intrusion of water, oils, gasoline, grease, salt, deicer chemicals, or acids into deck substrate.
    - f. Leakage, deterioration, or failure to perform as required as a result of failure of materials.
  - 2. Warranty Period: Ten (10) years from date of Substantial Completion.
- C. Warranties do not cover deterioration or failure of traffic coating due to failure of substrate prepared as specified, formation of new substrate cracks exceeding 1/16 inch width, fire, vandalism or abuse.

## **PART 2 - PRODUCTS**

### **2.01 ACCEPTABLE MANUFACTURER SYSTEM**

- A. Auto-Gard by NEOGARD.
- B. CCW-5123 by Carlisle Coatings
- C. Sonoguard by Sonneborn/BASF

### **2.02 COATING SYSTEM**

- A. Primer: Various primers for coating substrate, as recommended by the manufacturer.
- B. Elastomeric Coatings – Base, Wearing, and Top Coats: Polyurethane coatings, per manufacturer.
  - 1. Colors:
    - a. Base and Wearing Coat: Gray.
    - b. Top Coat: As selected by Owner from standard colors.
- C. Aggregate: Silica (quartz) sand and other aggregates, as provided by manufacturer.
- D. Sealant: Polyurethane sealant, as provided/approved by coating manufacturer.
- E. Flashing Tape: Reinforced, self-adhered tape flashing, as provided by the coating manufacturer.



## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions with installer and coating manufacturer's representative for compliance with requirements and other conditions affecting performance of system.
  - 1. The concrete deck surface is free of ridges and sharp projections.
  - 2. The concrete was cured for a minimum of 28 days (Minimum of 3,000 psi compressive strength). Water-cured treatment of concrete is preferred. The use
    - a. of concrete curing agents, if any, shall be of sodium silicate base only; others require written approval by Manufacturers.
  - 3. The concrete was finished by a power or hand steel trowel followed by soft hair broom to obtain light texture or "sidewalk" finish.
  - 4. The concrete does not contain voids or gaps, or "honey-comb" surfaces.
  - 5. Ensure that Work done by other trades is complete and ready for the systems to be installed.
  - 6. Notify Owner's Representative in writing of conditions which may adversely affect the system installation or performance. Do not proceed with installation until these conditions have been corrected and reviewed by the Owner's Representative.
  - 7. Verify compatibility with and suitability of substrates.
  - 8. Application of systems indicates acceptance of surfaces and conditions by Installer.
- B. Verify that substrates will drain properly and are sloped to drain a minimum of 1/4 inch per foot, or as indicated on drawings, whichever is greater.
- C. Protect adjacent surfaces and landscaping against damage or soiling.
- D. Preparation: Follow recommendations of coating materials manufacturer.
- E. Remove paint, oils, rust, and other contaminants from exposed metal; and prime.
  - 1. Cleaning: Surfaces contaminated with oil or grease shall be vigorously scrubbed with a power broom and a strong non-sudsing detergent. Thoroughly wash, clean, and dry. Areas where oil or other contaminants penetrate deep into the concrete may require removal by mechanical methods. Cleaning extent shall include the adjacent areas of the existing coating that will be covered with the new coating system.
- F. Blow substrate clean using compressed air to remove any remaining loose debris.
- G. Pretreat structural cracks and cold joints in substrate.
- H. Cover penetrations to prevent entry of coating material.
- I. Mask off adjoining surfaces not to receive coating.
- J. Apply a test patch of membrane to each type of substrate, to check adhesion and as a final check to determine if substrate has been properly cleaned. Submit results of adhesion test in a report to Architect and Owner.
- K. Prior to starting work, and following periods of rain fall, perform testing to confirm the concrete substrate is suitable for installation, following ASTM D4263 – Standard Testing Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

### **3.02 PREPARATION**

- A. Cracks and Cold Joints:
  - 1. Visible hairline cracks (up to 1/16-inch in width) in concrete and cold joints shall be cleaned, primed as required and treated with liquid flashing a minimum distance of 2-inch on each side of crack to yield a total thickness of 30 dry mils.
  - 2. Large cracks (over 1/16-inch in width) shall be routed and sealed with sealant. Sealant shall be applied to inside area of crack only, not applied to deck surface. Detail sealed cracks with liquid flashing a distance of 2-inch on each side of crack to yield a total thickness of 30 dry mils.
- B. Control Joints: Seal secondary control joints with sealant. Sealant shall be applied to inside area of joint only, not applied to deck surface. Detail sealed joints with liquid flashing a distance



of 2-inch on each side of joint to yield a total thickness of 30 dry mils.

### **3.03 MIXING**

- A. Mix the coating materials according to the manufacturer's recommendations, to a homogenous consistency. Thoroughly disperse any coating solids that may have settled to the bottom of the container.
- B. Do not thin coating materials.
- C. Ensure uniform color of coating materials between batches.

### **3.04 APPLICATION**

- A. Install traffic coating in accordance with manufacturer's printed instructions, except as modified below.
- B. Allow all materials to properly dry / cure between subsequent applications of the various materials, as specified by the manufacturer.
- C. Primer: Apply epoxy primer to all concrete surfaces in strict accordance with procedures outlined by the manufacturer. Within 24 hours of application of primer, base coat must be applied. If base coat cannot be applied within 24 hours, re-prime.
- D. Base Coat: Apply elastomeric coating material to deck surfaces to yield an average 20 dry mils in strict accordance with procedures outlined by the manufacturer. Extend base coat over cracks and control joints which have received treatment.
- E. Wearing Surface Coat: Apply elastomeric coating material to yield an average of 8 dry mils and immediately broadcast aggregate, evenly distributed, into wet material to the point of refusal. When dry, remove excess aggregate.
- F. Double-Texturing: After the coat to receive aggregate (the first wearing surface coat) has dried and loose aggregate has been removed, apply elastomeric coating material to yield an average of 12 dry mils and immediately broadcast additional aggregate into wet material to the point of refusal.
- G. Finish Coat: When dry, remove excess aggregate and recoat surface with elastomeric coating material to yield an average of 12 dry mils. Double-textured areas will yield an average of 52 dry mils, exclusive of aggregate.

### **3.05 POND TEST**

- A. Coordinate Pond test with Owner's Representative after complete installation of coating system.
- B. Pond test each area by applying water upon the surface of the deck in all areas, including base flashing.
- C. Observe the decks for ponding for a period of 48 hours.
- D. If ponding occurs, make repairs as directed by the manufacturer, and re-test.

### **3.06 FIELD QUALITY CONTROL**

- A. The Owner's Representative will perform inspections and prepare test reports to confirm the Work conforms to the project requirements.
- B. Remove and replace system components where the test results or inspections indicate that system(s) does not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

### **3.07 CLEANING AND PROTECTION**

- A. Promptly remove all unused materials from the site, and clean wall systems, roofs, windows, door frames, and other surfaces adjacent to Work area.
- B. Remove temporary coverings and protection.



- C. Provide protection and maintain conditions in manner acceptable to the Installer and material manufacturer to ensure that the systems are not damaged at time of Substantial Completion.

**END OF SECTION**



**SECTION 07 2100.01  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Perimeter insulation at slabs-on-grade.
  - 2. Concealed building insulation.
- B. Related Sections include the following:
  - 1. Division 09 Section Acoustic Insulation for sound attenuation insulation.

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.04 QUALITY ASSURANCE**

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 1. Surface-Burning Characteristics: ASTM E 84.
  - 2. Fire-Resistance Ratings: ASTM E 119.
  - 3. Combustion Characteristics: ASTM E 136.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
  - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
  - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

**PART 2 PRODUCTS**

**2.01 CELLULAR-GLASS INSULATION**

- A. Manufacturer: Johns Manville.
- B. Cellular-Glass Insulation:
  - 1. R-21 kraft faced at exterior walls - install with kraft face to interior of building.

**2.02 FOAM-PLASTIC BOARD INSULATION**

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
  - 1. Type VI, 1.80 lb/cu. ft., R-5 per inch.

**2.03 AUXILIARY INSULATING MATERIALS**

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.



- B. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

#### **3.03 INSTALLATION, GENERAL**

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

#### **3.04 INSTALLATION OF SLAB EDGE INSULATION**

- A. Install vertically inside formwork as indicated in the drawings. Stagger end joints and tightly abut insulation units.
- B. Protect insulation from damage during concrete work.

#### **3.05 INSTALLATION OF CAVITY-WALL INSULATION**

- A. Install units of cellular-glass insulation with closely fitting joints using method indicated by manufacturer.

#### **3.06 PROTECTION**

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

**END OF SECTION 072100**



**SECTION 07 2100  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Board insulation for continuous insulation if shown.
- B. Batt insulation and vapor retarder in exterior wall, ceiling, roof, and floor construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

**1.02 REFERENCE STANDARDS**

- A. ASTM C240 - Standard Test Methods for Testing Cellular Glass Insulation Block 2021.
- B. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation 2022.
- C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications 2013 (Reapproved 2019).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.

**1.03 SUBMITTALS**

- A. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

**1.04 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS**

**2.01 APPLICATIONS**

- A. Insulation in Metal Framed Walls: Batt insulation with integral vapor retarder.
- B. Insulation in Wood Framed Walls: Batt insulation with integral vapor retarder.
- C. Insulation in Wood Framed Ceiling Structure: Batt insulation with no vapor retarder.

**2.02 BATT INSULATION MATERIALS**

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, as indicated on drawings.
- B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
  - 1. Formaldehyde Content: Zero.
- C. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
  - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  - 2. Provide Kraft facing toward inside of the building.

**2.03 ACCESSORIES**

- A. As required by manufacturers for product provided.



## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### **3.02 BATT INSTALLATION**

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Staple or nail facing flanges in place at maximum 6 inches on center.
- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

### **3.03 FIELD QUALITY CONTROL**

### **3.04 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.



**SECTION 07 2110  
ACOUSTIC INSULATION**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Glass fiber acoustical insulation for interior partitions.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.03 QUALITY ASSURANCE**

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

**PART 2 PRODUCTS**

**2.01 SOUND ATTENUATION BATTS**

- A. Type: Unfaced glass fiber acoustical insulation complying with ASTM C 665, Type I.
- B. Size: as indicated on the drawings or largest practical size x width of partition stud.
- C. Surface Burning Characteristics, when tested in accordance with ASTM E 84:
  - 1. Maximum flame spread: 10
  - 2. Maximum smoke developed: 10
- D. Combustion Characteristics - passes ASTM E 136.
- E. Fire Resistance Ratings: passes ASTM E 119 as part of a complete fire tested wall assembly.
- F. Sound Transmission Class: STC 45
- G. Dimensional Stability: Linear Shrinkage less than 0.1%

**2.02 EXECUTION**

**2.03 PREPARATION**

- A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

**2.04 INSTALLATION, GENERAL**

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

**2.05 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION**

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.



- B. Glass-Fiber Blanket Acoustical Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
  - 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

## **2.06 PROTECTION**

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

**END OF SECTION 072100**



**SECTION 07 2126  
BLOWN INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Ceiling and Attic: Blown insulation pneumatically placed into joist spaces through access holes.

**1.02 REFERENCE STANDARDS**

- A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. ASTM C739 - Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation 2021a.
- C. ASTM C764 - Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation 2019.
- D. ASTM C1015 - Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation 2017.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and limitations.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Applications: Provide blown insulation in attic and ceiling as indicated on drawings.

**2.02 ACCESSORIES**

- A. Roof Ventilation Baffles: Prefabricated ventilation channels for placement under roof sheathing with baffles to prevent wind-washing.
  - 1. Material: Polyvinyl chloride (PVC).
  - 2. Roof Joist/Truss Spacing: 16 inch on center, nominal.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that substrate and adjacent materials are dry and ready to receive insulation.
- B. Verify that light fixtures have thermal cut-out device to restrict over-heating in soffit or ceiling spaces.
- C. Verify spaces are unobstructed to allow for proper placement of insulation.

**3.02 INSTALLATION**

- A. Install insulation and ventilation baffle in accordance with ASTM C1015 and manufacturer's instructions.
- B. Completely fill intended spaces leaving no gaps or voids.

**3.03 CLEANING**

- A. Remove loose insulation residue.

**END OF SECTION**



**SECTION 07 2129  
SPRAYED INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cellulosic insulation applied to underside of structure and placed in walls.

**1.02 REFERENCE STANDARDS**

- A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019, with Editorial Revision (2023).
- C. ASTM C739 - Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation 2021a.
- D. ITS (DIR) - Directory of Listed Products Current Edition.
- E. UL (DIR) - Online Certifications Directory Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on materials, describing insulation properties.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Manufacturer's Qualification Statement.

**1.04 QUALITY ASSURANCE**

- A. Products Specified by Flammability Criteria: Listed and classified by ITS (DIR), UL (DIR), or authorities having jurisdiction (AHJ).

**1.05 FIELD CONDITIONS**

- A. Maintain acceptable ambient and substrate surface temperatures prior to, during, and after installation of primer and insulation materials and overcoat.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Cellulosic Fiber Sprayed Insulation:
  - 1. GreenFiber: [www.greenfiber.com/#sle](http://www.greenfiber.com/#sle).
  - 2. International Cellulose Corp: [www.spray-on.com/#sle](http://www.spray-on.com/#sle).
  - 3. ThermoCon, Inc: [www.thermocon.com/#sle](http://www.thermocon.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 MATERIALS**

- A. Cellulosic Fiber Insulation: ASTM C739; treated cellulosic fiber, Color as selected by Architect.
  - 1. Thermal Resistance (R-value): 5.3, at 1 inch thick when tested in accordance with ASTM C177 at 75 degrees F temperature
- B. Provide blown insulation in accordance with requirements of Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- C. Thermal Resistance [R-value]: Provided minimum values in accordance with applicable edition of ASHRAE Std 90.1 I-P for envelope requirements of building location and climate zone.

**2.03 ACCESSORIES**

- A. Primer: As required by insulation manufacturer.
- B. Surface Sealer: Clear, latex based for placement over insulation.



- C. Insulation Stop: Plastic, profiled and sized to suit rafter spacing and wall/sloped roof configuration.
- D. Roof Ventilation Baffles: Prefabricated ventilation channels for placement under roof sheathing with baffles to prevent wind-washing.
  - 1. Material: Polyvinyl chloride (PVC).
  - 2. Roof Joist/Truss Spacing: 16 inch on center, nominal.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that surfaces are clean, dry, and free of matter that may inhibit adhesion.
- B. Verify that ceiling hangers and supporting clips have been installed correctly.
- C. Verify other work on and within spaces to be insulated is complete prior to application.

#### **3.02 PREPARATION**

- A. Mask and protect adjacent surfaces from overspray or damage.
- B. Apply primer in accordance with manufacturer's instructions.

#### **3.03 INSTALLATION**

- A. Install sprayed insulation in accordance with manufacturer's instructions.
- B. Install sprayed insulation to a uniform monolithic density without voids.
- C. Tamp wet sprayed insulation surface to improve adhesion and to achieve a smooth surface.

#### **3.04 FIELD QUALITY CONTROL**

- A. Independent agency field inspection will be provided under provisions of Section 01 4000 - Quality Requirements.
- B. Inspection will include verification of sprayed insulation and surface sealer thickness and density.

#### **3.05 PROTECTION**

- A. Do not permit subsequent construction work to disturb applied sprayed insulation.

**END OF SECTION**



**SECTION 07 2400**  
**EXTERIOR INSULATION AND FINISH SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Drainage and water-resistive barriers behind insulation board.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Sheathing on wood framing.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Perimeter flashings.
- C. Section 07 9200 - Joint Sealants: Sealing joints between EIFS and adjacent construction and penetrations through EIFS.

**1.03 REFERENCE STANDARDS**

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.
- B. ASTM C1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage 2013 (Reapproved 2019).
- C. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive 2022.
- D. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity 2015 (Reapproved 2020).
- E. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2021.
- F. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2023).
- G. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies 2018.
- H. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials 2013 (Reapproved 2021).
- I. ASTM G155 - Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials 2021.
- J. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems 2009, with Editorial Revision (2022).
- K. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies 2015, with Editorial Revision (2022).
- L. NFPA 259 - Standard Test Method for Potential Heat of Building Materials 2023, with Errata.
- M. NFPA 268 - Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source 2022.
- N. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components 2023.

**1.04 SUBMITTALS**

- A. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.
- B. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.
- C. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.



### **1.05 MOCK-UP**

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.
- B. Storage: Store materials as directed by manufacturer's written instructions.

### **1.07 FIELD CONDITIONS**

- A. Do not prepare materials or apply EIFS under conditions other than those described in the manufacturer's written instructions.
- B. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.
- C. Do not install coatings or sealants when ambient temperature is below 40 degrees F.
- D. Do not leave installed insulation board exposed to sunlight for extended periods of time.

### **1.08 WARRANTY**

- A. Provide manufacturer's standard material warranty, covering a period of not less than 5 years.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis of Design:
  - 1. Sto Corp; StoTherm ci: [www.stocorp.com/#sle](http://www.stocorp.com/#sle).
- B. Other Acceptable Exterior Insulation and Finish Systems Manufacturers:
  - 1. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 EXTERIOR INSULATION AND FINISH SYSTEM**

- A. Exterior Insulation and Finish System: DRAINAGE type; reinforced finish coating on mechanically-fastened insulation board over sheet-type drainage layer or spacers and separate sheet-type water-resistive barrier over substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate(s) in tested samples.
- B. Fire Characteristics:
  - 1. Flammability: Pass, when tested in accordance with NFPA 285.
  - 2. Ignitibility: No sustained flaming when tested in accordance with NFPA 268.
  - 3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot.
- C. Water Penetration Resistance: No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E331 at 6.24 psf differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.
- D. Drainage Efficiency: Average minimum efficiency of 90 percent, when tested in accordance with ASTM E2273 for 75 minutes.
- E. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM B117, using at least three samples matching intended assembly, at least 4 by 6 inches in size.
- F. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with ICC-ES AC219 or ICC-ES AC235.
- G. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000



hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycles 1, 5, or 9.

- H. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.
- I. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.
- J. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 113.5 gallons of sand.

## **2.03 MATERIALS**

- A. Water-Resistive Barrier Coating: Fluid-applied air and water barrier membrane; applied to sheathing; furnished or approved by EIFS manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate is sound and free of oil, dirt, other surface contaminants, efflorescence, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.
- B. Verify that substrate surface is flat, with no deviation greater than 1/4 in when tested with a 10 ft straightedge.

### **3.02 INSTALLATION - GENERAL**

- A. Install in accordance with EIFS manufacturer's instructions and ASTM C1397.
  - 1. Where different requirements appear in either document, comply with the most stringent.
  - 2. Neither of these documents supercedes provisions of Contract Documents that defines contractual relationships between parties or scope of this work.

### **3.03 INSTALLATION - WATER-RESISTIVE BARRIER**

- A. Apply barrier coating as recommended by coating manufacturer; prime substrate as required before application.
- B. Seal substrate transitions and intersections with other materials to form continuous water-resistive barrier on exterior of sheathing, using method recommended by manufacturer.
- C. At door and window rough openings and other wall penetrations, seal water-resistive barrier and flexible flashings to rough opening before installation of metal flashings, sills, or frames, using method recommended by manufacturer.
- D. Lap flexible flashing or flashing tape at least 2 inches on each side of joint or transition.

### **3.04 INSTALLATION - INSULATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.
- C. On wall surfaces, install boards horizontally. On horizontal surfaces, install boards \_\_\_\_\_.
- D. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch.
- E. Fill gaps greater than 1/16 inch with strips or shims cut from the same insulation material.
- F. Rasp irregularities off surface of installed insulation board.

### **3.05 INSTALLATION - CLASS PB FINISH**

- A. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free, including back-wrap at terminations of EIFS. Install reinforcing fabric as recommended by EIFS



manufacturer.

1. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches.
  2. Allow base coat to dry a minimum of 24 hours before next coating application.
- B. Apply finish coat after base coat has dried not less than 24 hours, embed finish aggregate, and finish to a uniform texture and color.
- C. Seal control and expansion joints within the field of exterior finish and insulation system, using procedures recommended by sealant and finish system manufacturers.

### **3.06 CLEANING**

- A. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

### **3.07 PROTECTION**

- A. Protect completed work from damage and soiling by subsequent work.

**END OF SECTION**



**SECTION 07 2500  
WEATHER BARRIERS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Drainable building wrap as water-resistive barrier, and air barrier over OSB sheathing.
  - 2. Rainscreen system under fiber cement panels,
  - 3. Flexible flashing.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for wall sheathing.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Evaluation Reports: For water-resistive barrier, from ICC-ES.

**PART 2 PRODUCTS**

**2.01 MISCELLANEOUS MATERIALS WATER-RESISTIVE BARRIER**

- A. Drainable building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. DuPont (E. I. du Pont de Nemours and Company); Tyvek DrainVent Rainscreen.
  - 2. Water-Vapor Permeance: Not less than 20 perms (1150 ng/Pa x s x sq. m) per ASTM E 96/E 96M, Desiccant Method (Procedure A).
  - 3. Air Permeance: Not more than 0.0072 cfm/sq. ft. infiltration and 0.0023 cfm/ sq. ft. exfiltration at a pressure differential of 1.57 psf when tested according to ASTM E 2178.
  - 4. Allowable UV Exposure Time: Not less than three months.
- B. Rainscreen System - Dupont Rainscreen Batten System, polypropylene corrugated batten product with flow through ventilation channels installed between the control layer and the siding/stucco system. The battens are 3/8" thick, 1-5/8" wide and 8' long.
- C. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

**2.02 ACCESSORIES**

- A. Per manufacturer's recommendation for substrate.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. DuPont (E. I. du Pont de Nemours and Company); DuPont Flashing Tape.
    - b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Vycor Butyl Self Adhered Flashing.
    - c. Protecto Wrap Company; BT-25 XL.



- d. Raven Industries Inc.; Fortress Flashshield.
  - e. Advanced Building Products Inc.; Wind-o-wrap.
  - f. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
  - g. Fiberweb, Clark Hammerbeam Corp.; Aquaflash 500.
  - h. MFM Building Products Corp.; Window Wrap.
  - i. Polyguard Products, Inc.;
  - j. Sandell Manufacturing Co., Inc.; Presto-Seal.
- C. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.
- D. Nails and Staples: ASTM F 1667.

### **PART 3 EXECUTION**

#### **3.01 WATER-RESISTIVE BARRIER INSTALLATION**

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- B. Cover sheathing with water-resistive barrier as follows:
- 1. Cut back barrier 1/2 inch (13 mm) on each side of the break in supporting members at expansion- or control-joint locations.
  - 2. Apply barrier to cover vertical flashing with a minimum 4-inch (100-mm) overlap unless otherwise indicated.
- C. Building Wrap: Comply with manufacturer's written instructions.
- 1. Seal seams, edges, fasteners, and penetrations with tape.
  - 2. Extend into jambs of openings and seal corners with tape.
- D. Rainscreen system - install per manufacturer's instructions.

#### **3.02 FLEXIBLE FLASHING INSTALLATION**

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
- 1. Prime substrates as recommended by flashing manufacturer.
  - 2. Lap seams and junctures with other materials at least 4 inches (100 mm) except that at flashing flanges of other construction, laps need not exceed flange width.
  - 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
  - 4. Lap water-resistive barrier over flashing at heads of openings.
  - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

**END OF SECTION 072500**



**SECTION 07 2600**  
**SLAB ON-GRADE VAPOR RETARDER**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes: At storage rooms and at rooms to receive moisture sensitive flooring, provide vapor retarder system for slab-on-grade concrete, including sealing joints and protrusions through vapor retarder.

**1.02 SUBMITTALS**

- A. Project data: Submit manufacturer's literature.
- B. Summary of Test Results per paragraph 9.3 of ASTM E1745.
- C. Manufacturer's samples.
- D. Manufacturer's installation instructions for placement, seaming, penetration repair, and perimeter seal per ASTM E1643.
- E. All mandatory ASTM E1745 testing must be performed on a single production roll per SATM E1745 Section 8.1.

**1.03 PROJECT CONDITIONS**

- A. Does not apply vapor retarder during inclement weather or when air temperature is below 40 degrees F.

**1.04 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM E1745-11 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
  - 2. ASTM E1643-11 Selection Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- B. Technical Reference – American Concrete Institute (ACI):
  - 1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. Forifiber Corp./Ultra 15.
- B. Stego Industries, Inc./Stego Wrap (15 mil).
- C. Raven Industries, Inc./Vapor Block # VB15(15 mil Blue).
- D. Substitutions: Refer to Section 01250.

**2.02 MATERIALS**

- A. Vapor Retarder: ASTM/E1745, Class A vapor retarder consisting of 15 mil polyolefin film.
  - 1. Permeance: Maximum 0.025 perms, ASTM F1249 and E154 tests.
  - 2. Resistance to Puncture: Minimum 2200 grams, ASTM D1709, Method B.
  - 3. Tear Resistance: Minimum 8.74 lbs., ASTM D1004
  - 4. Tensile Strength: Minimum 35 lbs/in., ASTM E154, Section 9, Method D-882, in both directions.
- B. Joint Sealer: Pressure sensitive adhesive tape providing permanent bond strength and quick-stick properties as recommended by vapor retarder manufacturer and providing comparable permeance to vapor retarder.
- C. Mastic: Medium viscosity, water based, polymer-modified anionic bituminous/asphalt emulsion exhibiting bonding, elongation, and waterproofing characteristics as recommended by vapor retarder manufacturer.



## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Ensure sleeves, curbs and projections that pass through vapor retarder are properly and rigidly installed.
- B. Ensure substrate is free of projections and irregularities that may be detrimental to proper installation of vapor retarder.
- C. Ensure subsoil is approved by Architect or Geotechnical Engineer.

### **3.02 INSTALLATION**

- A. Spread and roll gravel to provide smooth, even bed for vapor retarder.
- B. Apply vapor retarder in accordance with manufacturer's recommendations and installation instructions and in accordance with ASTM E1643; comply with most restrictive where conflicts occur.
  - 1. Seal items projecting through vapor retarder with manufacturer's approved pressure sensitive tape.
- C. Seams: Minimum 6" overlap, sealed with pressure sensitive tape for vapor tight seal. Vapor retarder must be clean and dry.
- D. Penetrations: All penetrations are to be sealed per manufacturer installation instructions.
- E. Lay vapor retarder membrane smooth with no fishmouths or bunches of material.
- F. Inspect and repair vapor retarder prior to application of concrete slab; tape tears and repair damage.
  - 1. Damaged areas must be repaired with material with permeance no less than the material that was damaged with minimum overlaps of 6 inches.

**END OF SECTION**



**SECTION 07 2726  
FLUID APPLIED MEMBRANE AIR BARRIERS – VAPOR PERMEABLE**

**PART 2 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section includes materials and installation of fluid applied air and moisture barrier membrane over vertical above grade concrete walls, concrete masonry walls, and wall sheathing.

**1.03 DEFINITIONS**

- A. Air Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air Barrier Auxiliary Material: A transitional component that provides air barrier continuity furnished by a source other than the primary air barrier manufacturer.
- D. Air Barrier Assembly: The collection of air barrier materials, accessory and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall

**1.04 PRE-INSTALLATION MEETINGS**

- A. Pre-installation Conference
  - 1. Review air barrier installation requirements and installation details, mock-ups, testing requirements, protection, and sequencing of work.

**1.05 REFERENCES**

- A. Building Code and Material Evaluation Service Standards
  - 1. ICC ES AC 212 March, 2015, ICC Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing
  - 2. 2012, 2015 IBC International Building Code
  - 3. 2012, 2015 IRC International Residential Code
  - 4. 2012, 2015 IECC International Energy Conservation Code
- B. ASTM Standards
  - 1. C 297-94 Test Method for Tensile Strength of Flat Sandwich Constructions in Flatwise Plane
  - 2. C 1177-08 Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  - 3. D 522-93a Test Methods for Mandrel Bend Test of Attached Organic Coatings
  - 4. D 1970-00 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
  - 5. D 3273-00 Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
  - 6. D 4541-09 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
  - 7. E 84-98 Test Method for Surface Burning Characteristics of Building Materials
  - 8. E 96-00 Test Method for Water Vapor Transmission of Materials
  - 9. E 119-98, Standard Test Methods for Fire Tests of Building Construction and Materials
  - 10. E 779-10 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
  - 11. E 783-02 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
  - 12. E 1186-03 (2009) Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems



13. 1E 1827-96 (2007) Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
14. 1E 2178-03 Test Method for Air Permeance of Building Materials
15. 15. E 2357-05 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- C. APA – The Engineered Wood Association
  1. E30U-2007 Engineered Wood Construction Guide
- D. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)
  1. 2005 ASHRAE Handbook Fundamentals
  2. ASHRAE 90.1 2016 Energy Standard for Buildings Except Low-Rise Residential Buildings
  3. ASHRAE 189.1 2009 Standard for the Design of High Performance Green Buildings Except Low-Rise Residential Buildings
- E. National Fire Protection Association (NFPA)
  1. NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
- F. South Coast Air Quality Management District (SCAQMD)
  1. Rule 1113 (2007) Architectural Coatings

#### **1.06 COORDINATION/SCHEDULING**

- A. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier.
- B. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall.
- C. Provide sill flashing to direct water to the exterior before windows and doors are installed.
- D. Install window and door head flashing immediately after windows and doors are installed.
- E. Install diverter flashings wherever water can enter the assembly to direct water to the exterior.
- F. Install parapet cap flashing and similar flashing at copings and sills to prevent water entry into the wall assembly.
- G. Install cladding within 180 days of air and moisture barrier installation (except in the case of StoTherm ci, install insulation board with adhesive within 30 days of Sto Gold Coat installation).

#### **1.07 SUBMITTALS**

- A. Manufacturer's specifications, details and product data.
- B. Manufacturer's standard warranty.
- C. Manufacturer's ICC evaluation report confirming compliance with the IBC, IRC, and IECC as an air barrier and water-resistive barrier.
- D. Samples for approval as directed by architect or owner.
- E. Shop drawings: substrate joints, cracks, flashing transitions, penetrations, corners, terminations, and tie-ins with adjoining construction, and interfaces with separate materials that form part of the air barrier assembly.

#### **1.08 QUALITY ASSURANCE**

- A. Manufacturer requirements
  1. Manufacturer of exterior wall air and moisture barrier materials for a minimum of 30 years in North America.
  2. ISO 9001:2008 Certified Quality System and ISO 14001:2004 Certified Environmental Management System
- B. Contractor requirements
  1. Knowledgeable in the proper use and handling of Sto materials.



2. Employ skilled mechanics who are experienced and knowledgeable in waterproofing and air barrier application, and familiar with the requirements of the specified work.
  3. Provide the proper equipment, manpower and supervision on the job-site to install the air barrier assembly in compliance with the project plans & specifications, shop drawings, and Sto's published specifications and details.
- C. Regulatory Compliance
1. Primary air barrier and joint treatment reinforcement materials:
    - a. Listed by IBC and recognized for use on all types of construction. Refer to ICC ESR 1233 for limitations.
    - b. Comply with VOC requirements of SCAQMD Rule 1113.
    - c. Comply with air barrier material requirements of ASHRAE 90.1 – 2010, 2013
    - d. Comply with air barrier material requirements of ASHRAE 189.1 – 2009
    - e. Comply with 2012 and 2015 IRC requirements for a continuous air barrier
    - f. Comply with air barrier material requirements of 2012 and 2015 IBC and IECC.
    - g. Evaluated and Listed by ABAA as an air barrier material.
- D. Mock-ups
1. Build stand-alone site mock up or sample wall area on as-built construction to incorporate back-up wall construction, typical details covering substrate joints, cracks, flashing transitions, penetrations, corners, terminations, tie-ins with adjoining construction, and interfaces with separate materials that form part of the air barrier assembly.

#### **1.09 PRE-CONSTRUCTION TESTING**

- A. Conduct testing by qualified test agency or building envelope consultant
1. Conduct assembly air leakage testing in accordance with ASTM E 783.
  2. Conduct adhesion testing to substrates in accordance with ASTM D 4541.
  3. Conduct wet sealant compatibility testing in accordance with sealant manufacturer's field quality control test procedure.
  4. Notify design professional minimum 7 days prior to testing.

#### **1.10 DELIVERY, STORAGE AND HANDLING**

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product.
- B. Protect coatings (pail products) from freezing temperatures and temperatures in excess of 90 degrees F (32 degrees C). Store away from direct sunlight.
- C. Protect Portland cement-based materials (bag products) from moisture and humidity. Store under cover off the ground in a dry location.
- D. Protect and store accessory and auxiliary products in accordance with manufacturer's written instructions.

#### **1.11 PROJECT/SITE CONDITIONS**

- A. Maintain ambient and surface temperatures above 40 degrees F (4 degrees C) during application and drying period, minimum 24 hours after application of air and moisture barrier materials.
- B. Provide supplementary heat for installation in temperatures less than 40 degrees F (4 degrees C) or if surface temperature is likely to fall below 40 degrees F (4 degrees C).
- C. Provide protection of surrounding areas and adjacent surfaces from application of materials.

#### **1.12 WARRANTY**

- A. Provide manufacturer's standard warranty.

### **PART 3 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Sto Corp.
- B. Substitutions: See Section 01 6000-Product Requirements.



- C. Obtain primary air barrier and accessory air barrier and Exterior Insulation and Finishing System materials and from single source.

## 2.02 MATERIALS

- A. Primary Air Barrier Material: StoGuard with Sto Gold Coat – ready-mixed flexible spray or roller applied air and moisture barrier material.
- B. Accessory Materials
- C. (Select one of the following joint treatments)
  - 1. Sheathing Joint Treatments
    - a. Sto Gold Coat® with StoGuard Fabric: flexible air and moisture barrier membrane material for embedding non-woven integrally reinforced cloth reinforcement.
    - b. Rough Opening Treatments
      - 1) StoGuard Tape: self-adhered rubberized asphalt tape for frame walls with polyester fabric facing.
    - c. Transition Detail Components
      - 1) StoGuard Transition Membrane: flexible air and moisture barrier membrane for continuity at static transitions: sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling, and shingle lap transitions to flashing. Also used for dynamic joints: floor line deflection joints, masonry control joints, and through wall joints in masonry or frame construction.
    - d. Primers
      - 1) StoGuard Primer: rubber resin emulsion primer for use with StoGuard Tape to enhance adhesion.
- D. Auxiliary Materials furnished by others.
  - 1. Wet sealant: Dow Corning 758, 790, 791, and 795 sealants
  - 2. Pre-cured sealant tape: Dow 123
  - 3. Spray adhesive: 3M Super 77 Spray Adhesive
  - 4. Spray foam: Dow Great Stuff for Gaps and Cracks
- E. Patching and Leveling Material for Concrete and Masonry
  - 1. Sto Leveler: polymer modified cementitious patch and leveling material for prepared concrete and masonry surfaces up to 1/4 inch (6 mm).
  - 2. Sto BTS Xtra: polymer modified lightweight cementitious patch and leveling material for prepared concrete and masonry surfaces up to 1/8 inch (3 mm).

## 2.03 PERFORMANCE REQUIREMENTS

- A. Durability, resistance to aging, water and water penetration resistance, structural loading: joint treatment and primary air barrier material, comply with ICC ES AC 212
- B. Flexibility: ASTM D 522, primary air barrier material, no cracking or delamination before and after aging using 1/8 inch (3 mm) mandrel at 14° F (10° C)
- C. Nail sealability: ASTM D 1970, 7.9.1, primary air barrier passes
- D. Resistance to mold: ASTM D 3273, no mold growth after 28 day exposure
- E. Adhesion: joint treatment and primary air barrier material, ASTM C 297 or D 4541, > 30 psi (207 kPa), or exceeds strength of glass mat facing on glass mat gypsum substrates
- F. Surface burning: ASTM E 84, joint treatment and primary air barrier material flame spread < 25, smoke developed < 450, Class A building material
- G. Water vapor permeance: ASTM E 96 Method B, > 10 perms (570 ng/Pa·s·m<sup>2</sup>)
- H. Field adhesion testing: ASTM D 4541, > 30 psi (207 kPa) or exceeds strength of glass mat facing on glass mat gypsum substrates
- I. Fire resistance: ASTM E 119, permitted for use in exterior walls of fire-resistance-rated construction assemblies. Refer to ICC-ESR 1233.
- J. Building envelope air leakage: ASTM E 779 or 1827, < 0.4 cfm/ft<sup>2</sup> (2 L/s·m<sup>2</sup>)



- K. Material air leakage: ASTM E 2178, primary air barrier and joint treatment < 0.004 cfm/ft<sup>2</sup> at 1.57 psf (0.02 L/s•m<sup>2</sup> at 75 Pa)
- L. Assembly air leakage: ASTM E 2357, < 0.04 cfm/ft<sup>2</sup> (0.2 L/s•m<sup>2</sup>) air leakage after conditioning protocol
- M. Fire propagation: NFPA 285, meets requirements for use on all Types of construction. Refer to ICC-ESR 1233.
- N. Volatile Organic Compounds: SCAQMD Rule 1113, joint treatment and primary air barrier material < 100 g/L
- O. Water-resistive barrier: ICC ES 212, joint treatment and primary air barrier material comply and are listed in a valid ICC ESR.

## **2.04 DESIGN CRITERIA**

- A. Structural (Wind and Axial Loads)
  - 1. Design for maximum allowable deflection normal to the plane of the wall: L/240. Where cladding dictates stiffer deflection criteria use cladding design criteria for maximum allowable deflection.
  - 2. Design for wind load in conformance with code requirements.
- B. Moisture Control
  - 1. Prevent the accumulation of water in the wall assembly and behind the exterior wall cladding:
    - a. Minimize condensation within the assembly.
    - b. Drain water directly to the exterior where it is likely to penetrate components in the wall assembly (windows and doors, for example).
    - c. Provide corrosion resistant flashing to direct water to the exterior in accordance with code requirements, including: above window and door heads, beneath window and door sills, at roof/wall intersections, floor lines, decks, intersections of lower walls with higher walls, and at the base of the wall.
- C. Air Barrier Continuity: provide continuous air barrier assembly of compatible air barrier components.
- D. Substrates
  - 1. Concrete Masonry Units: provide CMU surfaces in conformance with the applicable building code, and such that a void and pinhole free air barrier is achieved. Provide normal weight units with flush joints (struck flush with the surface) and allow for a minimum of 2 coats of the primary air barrier material, applied by spray or roller. Alternatively, for “rough” CMU wall surfaces allow for a cementitious parge coat to fill and level irregular surfaces, prior to 1 coat of the primary air barrier material.
  - 2. Concrete: provide concrete in conformance with the applicable building code.
  - 3. Sheathing: provide gypsum sheathing in compliance with ASTM C 1177, provide APA Exterior or Exposure 1 wood-based sheathing, and provide sheathing that meets required design wind pressures.
  - 4. Mechanical Ventilation: maintain pressurization and indoor humidity levels in accordance with recommendations of ASHRAE (see 2005 ASHRAE Handbook—Fundamentals).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Inspect concrete and concrete masonry surfaces for:
  - 1. Contamination – algae, dirt, dust, efflorescence, form oil, fungus, grease, mildew or other foreign substances.
  - 2. Surface deficiencies – weak, friable, chalkiness, laitance, bugholes, and spalls.
  - 3. Cracks – measure crack width and record location of cracks.
  - 4. Damage or deterioration.
  - 5. Moisture content and moisture damage – use a moisture meter to determine if the surface is dry enough to receive the waterproof air barrier and record any areas of moisture



- damage or excess moisture.
- 6. Flush masonry mortar joints completely filled with mortar.
- B. Inspect sheathing application for compliance with applicable requirement:
  - 1. Exterior Grade and Exposure I wood based sheathing: E30U-2007, Engineered Wood Construction Guide, and the requirements of the applicable building code.
  - 2. Glass mat faced gypsum sheathing in compliance with ASTM C 1177: consult manufacturer's published recommendations and ICC ES Report. Conform with project requirements for wind load resistance.
  - 3. Cementitious sheathing – Consult manufacturer's published recommendations and ICC ES Report. Conform with project requirements for wind load resistance.
- C. Report deviations from the requirements of project specifications or other conditions that might adversely affect the air and moisture barrier installation. Do not start work until deviations are corrected.

### 3.02 SURFACE PREPARATION

- A. Concrete Masonry
  - 1. Surface must be structurally sound and free of weak or damaged surface conditions such as laitance or spalls. Surface must be clean, dry, frost-free, and free of any bond-inhibiting materials such as dust, dirt, oil, algae, mildew, salts, efflorescence, or any other surface contamination. Mortar joints must be struck flush with the surface.
  - 2. Remove excess mortar from masonry ties, lintels and shelf angles.
  - 3. Remove loose or damaged material by water-blasting, sandblasting or mechanical wire brushing. Remove surface contamination such as dirt or efflorescence by chemical or mechanical means. Repair surface defects such as spalls, voids and holes with Sto BTS Xtra (up to 1/8 inch [3 mm] thick) or Sto Leveler (up to 1/4 inch [6 mm] thick).
  - 4. Repair non-structural cracks up to 1/8 inch (3 mm) wide by raking with a sharp tool to remove loose, friable material and blow clean with oil-free compressed air. Apply joint treatment material over crack, embed reinforcement (where applicable), and smooth joint treatment material with a trowel, drywall or putty knife to cover the reinforcement.
  - 5. Important: For "rough" CMU wall surfaces skim coat the entire wall surface with the leveling material to fill and level the surface prior to applying the air and moisture barrier membrane and transition materials. When a skim coat of the leveling material is installed only one coat of the air and moisture barrier coating is typically required. Use the mock-up and site tests as the basis for the work.
- B. Concrete
  - 1. Surface must be structurally sound and free of weak or damaged surface conditions such as laitance, bugholes, or spalls. Surface must be clean, dry, frost-free, and free of any bond-inhibiting materials such as dust, dirt, oil, form release, algae, mildew, salts, efflorescence, or any other surface contamination.
  - 2. Remove projecting fins, ridges, form ties, and high spots by mechanical means.
  - 3. Remove loose or damaged material by water-blasting, sandblasting or mechanical wire brushing. Remove form release by chemical or mechanical means. Repair surface defects such as honeycombs, pitting, spalls, voids or holes with Sto BTS Xtra (up to 1/8 inch [3 mm] thick) or Sto Leveler (up to 1/4 inch [6 mm] thick).
  - 4. Repair non-structural cracks up to 1/8 inch (3 mm) wide by raking with a sharp tool to remove loose, friable material and blow clean with oil-free compressed air. Apply joint treatment material over crack, embed reinforcement (where applicable), and smooth joint treatment material with a trowel, drywall or putty knife to cover the reinforcement.
- C. Sheathing
  - 1. Remove and replace damaged sheathing.
  - 2. Spot surface defects such as over-driven fasteners, knot holes, or other voids in sheathing with knife grade joint treatment material.
  - 3. Spot fasteners with knife grade or coating joint treatment material.



### 3.03 INSTALLATION

- A. Air/Moisture Barrier Installation over Exterior or Exposure I Wood-Based Sheathing (Plywood and OSB), Glass Mat Faced Gypsum Sheathing in compliance with ASTM C 1177, concrete, and concrete masonry (CMU) wall construction
  - 1. Coordinate work with other trades to ensure air barrier continuity with connections at foundation, floor lines, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as decks and balconies, and roof line.
  - 2. Transition Detailing: detail transition areas with Sto RapidGuard or StoGuard Transition Membrane to achieve air barrier continuity. For illustrations of installation, refer to Sto Guide Details and Sto RapidGuard Installation Guide or StoGuard Transition Membrane Installation Guide ([www.stocorp.com](http://www.stocorp.com)).
- B. Rough opening protection
  - 1. Install rough opening protection. Refer to Sto details and applicable Sto product bulletins.
- C. Sheathing joints
  - 1. Install joint treatment material over sheathing joints. Refer to Sto details and applicable Sto product bulletins.
- D. Air and moisture barrier coating
  - 1. Concrete – install one coat of Sto Gold Coat by spray or roller in a uniform, continuous film of 10 wet mils to the prepared concrete substrate. Do not install over working or moving joint sealants.
  - 2. Concrete Masonry – install one liberal coat of Sto Gold Coat by spray or roller in a uniform, continuous film to the prepared concrete masonry substrate. Backroll spray applications. Allow to dry. Install a second liberal coat in a uniform, continuous film, and backroll spray applications, to achieve a void and pinhole free surface. Depending on the condition of the surface a minimum of 10 wet mils up to a maximum of 30 wet mils per coat is required. Apply additional coats if needed to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.
  - 3. Important: The number of coats and thickness is highly dependent on CMU composition, unit weight (lightweight or normal weight), porosity, joint profile, and other variables that may exist. For “rough” CMU wall surfaces skim coat the entire wall surface with the leveling material to fill and level the surface prior to applying the air and moisture barrier coating and transition materials. When a skim coat of the leveling material is installed only one coat of the air and moisture barrier coating is typically required. Use the mock-up and site tests as the basis for the work.
- E. Sheathing
  - 1. Glass mat faced gypsum sheathing: install one coat of Sto Gold Coat by spray or roller in a uniform, continuous film of 10 wet mils to the prepared glass mat gypsum substrate to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.
  - 2. Plywood sheathing: install one coat of Sto Gold Coat by spray or roller in a uniform, continuous film of 10 wet mils to the prepared substrate to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.
  - 3. OSB sheathing: install one coat of Sto Gold Coat by spray or roller in a uniform, continuous film of 10 wet mils to the prepared substrate and allow to dry. Install a second coat in a uniform, continuous film of 10 wet mils to achieve a void and pinhole free surface. Do not install over working or moving joint sealants.
- F. FIELD QUALITY CONTROL
  - 1. Owner’s qualified testing agency or building envelope consultant shall perform inspections and tests.
  - 2. Inspections: air barrier materials are subject to inspection to verify compliance with requirements.
  - 3. Condition of substrates and substrate preparation.



4. Installation of primary air barrier material, accessory materials, and compatible auxiliary materials over structurally sound substrates and in conformance with architectural design details, contractor's shop drawings, project mock-up, and manufacturer's written installation instructions.
  5. Air barrier continuity and connections without gaps and holes at foundation, floor lines, flashings, lintels and shelf angles, openings and penetrations such as pipes, vents, windows and doors, masonry anchors, rafters or beams, joints in construction, projections such as decks and balconies, and roof line.
- G. Tests: air barrier materials and assembly are subject to tests to verify compliance with performance requirements:
1. Qualitative air leakage test: ASTM E 1186
  2. Quantitative air leakage test: ASTM E 779, E 783, and E 1827
  3. Adhesion test: ASTM D 4541
  4. Qualitative adhesion and compatibility testing: wet sealant manufacturer's field quality control adhesion test
  5. Repair non-conforming substrates and air barrier material installation to conform with project requirements.
  6. Take corrective action to repair and replace, reinstall, seal openings, gaps, or other sources of air leakage to conform with project performance requirements.
- H. PROTECTION AND CLEANING
1. Protect air barrier materials from damage during construction caused by wind, rain, freezing, continuous high humidity, or prolonged exposure to sun light.
  2. Protect air barrier materials from damage from trades, vandals, and water infiltration during construction.
  3. Repair damaged materials to meet project specification requirements.
  4. Clean spills, stains, soiling from finishes or other construction materials that will be exposed in the completed work with compatible cleaners.
  5. Remove all masking materials after work is completed.

**END OF SECTION**



**SECTION 07 5423  
THERMOPLASTIC POLYOLEFIN (TPO) ROOFING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Adhered TPO membrane roofing system, see basis of design.
  - 2. Roof insulation.
  - 3. Cover board

**1.02 PERFORMANCE REQUIREMENTS**

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Base flashings and membrane terminations.
  - 2. Tapered insulation, including slopes.
- C. Samples for Verification: For the following products:
  - 1. Sheet roofing, of color specified, including T-shaped side and end lap seam.
  - 2. Roof insulation.

**1.04 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For roofing system to include in maintenance manuals.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- C. Source Limitations: Obtain components including roof insulation for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.
- D. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- E. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored



liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

## **1.07 PROJECT CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

## **PART 2 PRODUCTS**

### **2.01 TPO MEMBRANE ROOFING**

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.
  1. Thickness: 45 mils (1.1 mm), nominal.
  2. Exposed Face Color: Tan.

### **2.02 AUXILIARY MEMBRANE ROOFING MATERIALS**

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
  1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
  2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Plastic Foam Adhesives: 50 g/L.
    - b. Gypsum Board and Panel Adhesives: 50 g/L.
    - c. Multipurpose Construction Adhesives: 70 g/L.
    - d. Fiberglass Adhesives: 80 g/L.
    - e. Single-Ply Roof Membrane Adhesives: 250 g/L.
    - f. Other Adhesives: 250 g/L.
    - g. Single-Ply Roof Membrane Sealants: 450 g/L.
    - h. Nonmembrane Roof Sealants: 300 g/L.
    - i. Sealant Primers for Nonporous Substrates: 250 g/L.
    - j. Sealant Primers for Porous Substrates: 775 g/L.
- B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as sheet membrane.
- C. Bonding Adhesive: Manufacturer's standard.
- D. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, bird spikes and other accessories.

### **2.03 ROOF INSULATION**

- A. General: Preformed roof insulation boards manufactured or approved by TPO membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Molded-Polystyrene Board Insulation: ASTM C 578, Type II, 1.35-lb/cu. ft. (22-kg/cu. m) minimum density.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.



- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

#### **2.04 INSULATION ACCESSORIES**

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
- B. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

#### **2.05 WALKWAYS**

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch (5 mm) thick, and acceptable to membrane roofing system manufacturer.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
  - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

#### **3.03 SUBSTRATE BOARD**

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
  - 1. Fasten substrate board to top flanges of steel deck according to recommendations in FM Approvals' "RoofNav" and FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.
  - 2. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.

#### **3.04 INSULATION INSTALLATION**

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in



each direction.

1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
  1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
  1. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

### **3.05 ADHERED MEMBRANE ROOFING INSTALLATION**

- A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
  1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
  2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
  3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

### **3.06 BASE FLASHING INSTALLATION**

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

### **3.07 WALKWAY INSTALLATION**

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.



**3.08 PROTECTING AND CLEANING**

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

**END OF SECTION**



**SECTION 07 6200**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Formed roof-drainage sheet metal fabrications.
  - 2. Formed steep-slope roof sheet metal fabrications.

**1.02 COORDINATION**

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: For sheet metal flashing and trim.
  - 1. Include plans, elevations, sections, and attachment details.
- C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

**1.04 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.



## 2.02 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
  - 1. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 2. Color: As selected by Architect from manufacturer's full range.
  - 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

## 2.03 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
  - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

## 2.04 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.



1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  2. Obtain field measurements for accurate fit before shop fabrication.
  3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
  2. Use lapped expansion joints only where indicated on Drawings.
- E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- G. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- H. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.
- I. Do not use graphite pencils to mark metal surfaces.

## **2.05 ROOF-DRAINAGE SHEET METAL FABRICATIONS**

- A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
1. Gutter Profile: Style J according to cited sheet metal standard.
  2. Expansion Joints: Butt type with cover plate.
  3. Gutters with Girth up to 15 Inches (380 mm): Fabricate from the following materials:
    - a. Aluminum: 0.032 inch (0.81 mm) thick.
- B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
1. Fabricated Hanger Style: Fig 1-35A according to SMACNA's "Architectural Sheet Metal Manual."
  2. Fabricate from the following materials:
    - a. Aluminum: 0.024 inch (0.61 mm) thick.

## **2.06 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS**

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
1. Aluminum: 0.032 inch (0.81 mm) thick.
- B. Valley Flashing: Fabricate from the following materials:
1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.
- C. Drip Edges: Fabricate from the following materials:



1. Aluminum: 0.032 inch (0.81 mm) thick.
- D. Eave, Rake, and Hip Flashing: Fabricate from the following materials:
  1. Aluminum: 0.032 inch (0.81 mm) thick.
- E. Counterflashing: Fabricate from the following materials:
  1. Aluminum: 0.032 inch (0.81 mm) thick.
- F. Roof-Penetration Flashing: Fabricate from the following materials:
  1. Aluminum: 0.032 inch (0.81 mm) thick.

## **2.07 WALL SHEET METAL FABRICATIONS**

- A. Opening Flashings in Frame Construction: Fabricate head, sill, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:
  1. Aluminum: 0.032 inch (0.81 mm) thick.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
  1. Verify compliance with requirements for installation tolerances of substrates.
  2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION, GENERAL**

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
  4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
  5. Torch cutting of sheet metal flashing and trim is not permitted.
  6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
  1. Coat concealed side of uncoated-aluminum sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
  2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.



1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
  2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).

### **3.03 ROOF-DRAINAGE SYSTEM INSTALLATION**

- A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Hanging Gutters: Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.
1. Fasten gutter spacers to front and back of gutter.
  2. Anchor gutter with gutter brackets spaced not more than 24 inches (600 mm) apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.
  3. Install gutter with expansion joints not exceeding, 50 feet (15.24 m) apart. Install expansion-joint caps.
- C. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints.
1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.
  2. Provide elbows at base of downspout to direct water away from building.
  3. Connect downspouts to underground drainage system.

### **3.04 ROOF FLASHING INSTALLATION**

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm).
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to



pipes that penetrate roof.

### **3.05 WALL FLASHING INSTALLATION**

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

### **3.06 ERECTION TOLERANCES**

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

### **3.07 CLEANING AND PROTECTION**

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION**



**SECTION 07 6500**  
**FLEXIBLE FLASHING AND UNDERLAYMENT**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Sheet underlayment at Portland cement plaster.
  - 2. Self-adhering sheet underlayment where shown on Drawings.
  - 3. Self-adhering sheet flashing at perimeter of window, door, and vent openings, and other locations where shown on Drawings.

**1.02 ADMINISTRATIVE REQUIREMENTS**

- A. Submittal Procedures:
  - 1. Action Submittals shall be submitted in accordance with Section 01 33 00, "Submittal Procedures."
  - 2. Closeout Submittals shall be submitted in accordance with Section 01 77 00, "Closeout Procedures" and Section 01 78 36, "Warranties."
- B. Coordination:
  - 1. Coordinate with other applicable Sections for continuity of water resistance at interface of flexible flashing and underlayment with other materials.
  - 2. Coordinate with installers of anchorage for wall panels, sheet metal, windows, and other work anchored to substrate or otherwise penetrating self-adhering membranes, to ensure that penetrations are sealed with a compatible sealant.
  - 3. Coordinate with shop drawing, mockup, and warranty requirements of other Sections installed in conjunction with work of this Section.
- C. Pre-installation Meetings: Attendance is required at pre-installation meetings specified in related Sections.

**1.03 ACTION SUBMITTALS**

- A. Shop Drawings: Provide plans, sections, elevations, and details showing locations of each specified product and methods of installation.
  - 1. Provide details drawn for this specific installation, not manufacturer's standard details.
  - 2. Include details for all penetrations and terminations.
  - 3. Coordinate with shop drawing requirements specified in related Sections.
- B. Product Data:
  - 1. Provide a list of materials, including fasteners if applicable, to be used on the Project. Indicate location of use for each product.
  - 2. If other than products of listed manufacturers are proposed for use, submit:
    - a. Manufacturer's descriptive data for proposed product, test data, use limitations of materials, and recommended installation procedures.
    - b. Statement from manufacturer that all products submitted are compatible with one another and with other specified materials with which they will come in contact.
- C. Samples: 12 inches x 12 inches for sheet products if other than specified products are proposed.

**1.04 CLOSEOUT SUBMITTALS**

- A. Manufacturer's written instructions for recommended maintenance practices and schedules.
- B. Specified warranty.

**1.05 DELIVERY, HANDLING, AND STORAGE**

- A. Store materials away from sparks, flames, and other heat sources, protected from rain and physical damage, and within temperature range recommended by manufacturer.
- B. Comply with additional requirements specified in Section 01 6000, "Product Requirements."



## **1.06 QUALITY ASSURANCE**

- A. Mockups:
  - 1. Provide flexible flashing and underlayment for building mockup specified in Section 01 4339, "Mockups."
  - 2. In addition, first installed example of each installation condition, if not illustrated by building mockup, shall serve as a mockup for review and approval by Architect and Owner of workmanship, fit, and interface with adjacent construction.
  - 3. If requested, make modifications to mockups without additional charge to Owner.
  - 4. Do not proceed with remainder of installation until mockups have been approved.
  - 5. Where appropriate and acceptable to Owner, approved mockups may become part of the completed Work.

## **1.07 AMBIENT CONDITIONS**

- A. Temperature of air and surfaces to receive underlayment shall be within the range recommended by system manufacturer.
- B. Substrate surfaces shall be dry at application.

## **1.08 WARRANTY**

- A. Special Installer's Joint Warranty: Manufacturer's standard form in which installer agrees to repair or replace products that do not comply with Performance and other specified requirements within specified warranty period.
  - 1. Warranty Period: Five (5) years from Date of Substantial Completion.
- B. Special Manufacturer's Joint Warranty: Manufacturer's standard form in which product manufacturer agrees to furnish product to repair or replace those that do not comply with Performance and other specified requirements within specified warranty period.
  - 1. Warranty Period: Ten (10) years from Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 MEMBRANE MATERIALS; PRODUCT FAMILIES**

- A. The following Product Families are presented as complete systems. Contractor shall select and utilize a complete Product Family. Inter-changing components of different Product Families is not acceptable.
- B. Product Family Components: Definition of use:
  - 1. Nail-on Flashing: Flush window jambs, wood doors, and window sill "bibs" only.
  - 2. Self-Adhered Membrane Flashing: Recessed windows (unless otherwise noted on Drawings), window rough opening sills, door rough openings, backing for wall penetrations, and as required to separate concrete from sheet metal. Note: Release paper shall be removed and membrane fully adhered with J-roller for all self-adhered membrane.
    - a. 25 mil at the following locations unless otherwise indicated on Drawings:
      - 1) Window sills, jambs, and head.
      - 2) Corridor and deck edges.
      - 3) Expansion and control joints.
      - 4) Inside/outside building corners.
      - 5) Over drip edges, head flashings, weep screed, roof metal, and other areas indicated on the Drawings.
    - b. 40 mil at the following locations unless otherwise indicated on Drawings:
      - 1) Door jambs and head.
      - 2) Deep recessed window sills.
      - 3) Door sills.
      - 4) Railing and stair connections.
      - 5) Roof to wall transitions.
      - 6) Transition metal.
      - 7) Scaffolding attachments.



- 8) Parapets.
  - 9) Door jambs and head.
  - 10) Storefront sill, jambs, and head.
  - 11) Valley metal.
  - 12) All roof jacks stripped in.
  - 13) Pot shelves (if applicable).
  - 14) Sheet metal penetrations.
3. Primer: Masonry/concrete, OSB; anywhere self-adhered membrane is not fully adhered or where primer is recommended by manufacturer.
  4. Sealant (on facer):
    - a. Repair of installation at doors, windows, and penetrations.
    - b. Lath sealant repair.
  5. Sealant (contact adhesive backside): Window heads, lag bolt and anchor bolt penetrations.
  6. High Temp Membrane: Horizontal surfaces under metal coping flashing.
  7. Building Paper/Underlayment: Fortifiber "Hydrotex" or equivalent.
- C. Product Family 1: Products by International Building Components, Inc., except as otherwise specified.
1. Nail-on Flashing: "WaterBlock 25-mil" or "Nail-on Flashing."
  2. Self-Adhered Membrane Flashing: "WaterBlock," 25-mil and/or 40-mil.
  3. Primer: "Elastocol Stick H2O."
  4. Window Corner Piece: "WaterBlock Corner Guard" or TLS Labs Corner Pieces.
  5. Sealant (On Facer): WaterBlock Premium Polyurethane.
  6. Sealant (Adhesive Side): "WaterBlock Sopramastic."
  7. High Temp Membrane: "WaterBlock Waterproof Flashing Membrane HT," 40-mil.
  8. Building Paper/Underlayment: Fortifiber "Hydrotex" or equivalent.
- D. Product Family 2: Products by Fortifiber Building Systems Group, except as otherwise specified.
1. Nail-on Flashing: "Moistop Next Window Flashing."
  2. Self-Adhered Membrane Flashing: "FortiFlash" window flashing, 25-mil and/or 40-mil.
  3. Primer: "Aquatac" by the Henry Company, or other approved primer by manufacturer.
  4. Window Corner Piece: TLS Labs Corner Pieces.
  5. Sealant ("FortiFlash" – On Facer): "Moistop Sealant."
  6. Sealant ("FortiFlash" – Adhesive): "Moistop Sealant," knock down.
  7. Sealant – "Moistop Next": No restrictions.
  8. High Temp Membrane: "Grace Ultra" by Grace Construction Products.
  9. Building Paper/Underlayment: Fortifiber "Hydrotex" or equivalent.
- E. Product Family 3: Products by Top Industrial, Inc., except as otherwise specified.
1. Nail-on Flashing: "RainBuster 420."
  2. Self-Adhered Membrane Flashing: "RainBuster 415," 25-mil and/or 40-mil.
  3. Primer: "Aquatac" by the Henry Company, or other approved primer by manufacturer.
  4. Window Corner Piece: "RainBuster 425."
  5. Sealant (on facer): "RainBuster 450."
  6. Sealant (adhesive site): "RainBuster 450."
  7. High Temp Membrane: "RainBuster 415" up to 180 degrees F, "Vycor Ultra" by Grace Construction Products for added protection up to 230 degrees F. If anticipated temperature cannot be determined, use Grace.
  8. Building Paper/Underlayment: Fortifiber "Hydrotex" or equivalent.

## 2.02 ACCESSORIES

- A. Mechanical Fasteners: Washer-type, as recommended by membrane manufacturer for attachment to substrate.



- B. Liquid Membrane: Two-component, 100 percent solids modified urethane, cold-applied; "Bituthene Liquid Membrane," or equal compatible with membrane and acceptable to membrane manufacturer.
- C. Penetration Flashing: Quickflash Weatherproofing Products, Inc., or accepted equal.
  - 1. Electrical panels.
  - 2. Box penetrations.
  - 3. Vent penetrations.
  - 4. Pipe penetrations.
  - 5. Conduit penetrations.
  - 6. Air conditioning lines.
  - 7. Door bells.
  - 8. Miscellaneous penetrations, and where indicated on the Drawings.
- D. Accessories: Provide primers, mastics, and materials recommended by manufacturer for joints and protrusions.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Check to ascertain whether surfaces to receive sheet membrane flashing or underlayment are free of dirt, debris, sharp protrusions, and irregularities at joints.
- B. Verify that entire flashing membrane is installed over solid backing.
- C. Contractor shall promptly bring any problems or discrepancies to the attention of Owner and Architect, in writing.
- D. Application of materials indicates acceptance by installer of surfaces and conditions.
- E. Verify that all penetrations are properly flashed with Quickflash or equal, sheet metal, and/or self-adhered membrane unless otherwise noted on the Drawings. Correct deficiencies.

#### **3.02 PREPARATION**

- A. Where priming is required, prime substrates with primer suitable for each substrate and recommended for this use by membrane manufacturer.
- B. Prime concrete if bottom of membrane overlaps and is adhered to concrete foundation or slab. Prime only areas that can be covered with membrane on the same day. Re-prime areas not covered with membrane within 24 hours.
- C. Prime other substrates as recommended by manufacturer for installation of sheet membrane.
- D. At external corners or gaps in sheathing, install liquid membrane to smooth and ease gaps, and to round corners.

#### **3.03 APPLICATION OF SELF ADHERING FLASHING AND UNDERLAYMENT**

- A. Install at locations specified and as shown on Drawings.
- B. Prime substrates where recommended by membrane manufacturer, or as required to provide appropriate bond.
- C. Cut membrane from roll to required lengths, and apply in continuous strips over solid backing.
  - 1. Remove release paper, and adhere membrane fully to substrate or as indicated on Drawings; no exceptions. Use J-rollers to apply all self-adhered membrane.
    - a. Due to sequencing of multiple trades; peel back, fold/remove release paper, and adhere membrane for work completed at that time. Leave the remaining portion of release paper to be removed at next step of installation.
    - b. Install self-adhering membrane wrinkle free.
    - c. Fishmouths are not allowed.
  - 2. Press membrane into corners where shown, and firmly set with J-roller. Self adhering membrane is not required at building corners except as shown.
  - 3. Comply with manufacturer's recommendations for overlapping or side and end seams.
- D. Saddle membrane over top of walls. Weather-lap ends 6 inches minimum.



- E. Openings: Install as shown on the Drawings, in accordance with details and recommendations of manufacturer, ASTM E2112, and AAMA 2400.
  - 1. Fold and lap flashing to prevent water from migrating behind underlayment.
  - 2. Provide sealant at any "pinholes."
- F. Lap self-adhering membrane in the direction of water flow.
- G. Press membrane into place using heavy hand pressure, or roll with a wall or countertop roller. Roll seams. Fishmouths are not allowed.
- H. Provide mechanical fasteners where recommended by membrane manufacturer. Fastener heads shall be sealed with liquid membrane.
- I. Seal joints caused by pipes, conduits, electrical boxes, anchors, and similar items penetrating membrane with liquid membrane to create an airtight seal between penetrating objects and membrane. Apply liquid membrane to seal termination edges.
- J. Inspect membrane for continuity. Patch tears, fishmouths, damage, and inadequately lapped seams, overlapping in accordance with manufacturer's instructions.
- K. Apply overlying materials within allowable exposure time limits stated in manufacturer's instructions.
- L. Protect membranes from exposure to UV or direct sunlight beyond manufacturer's written exposure limits. If exposure limit expires, remove affected membranes, and replace with new, including subsequent materials.

### **3.04 APPLICATION OF BUILDING PAPER/UNDERLAYMENT AT WALLS**

- A. Apply one layer of specified underlayment over substrate.
  - 1. Install in one layer to provide a continuous drainage plane between inner and outer layers of underlayment, including around penetrations.
  - 2. Securely staple to substrate.
  - 3. Apply horizontally over entire surface in shingle fashion, lapping courses minimum 3 inches.
  - 4. Stagger vertical joints.
  - 5. Lap vertical joints a minimum of 6 inches.
  - 6. Stagger joints between layers.
  - 7. Begin roll a minimum of 6 inches away from corner, including termination of roll.
  - 8. Apply sealant around all penetrations and underlayment, all four sides and hand tool smooth.
    - a. Apply sealant to outer face of all penetrations prior to metal lath, around all sides, hand tool smooth.
- B. Underlayment shall be continuous under control joints in plaster; do not cut.
- C. Flashing material is not considered a "layer."
- D. Repair tears and holes:
  - 1. Under 1/2 Inch: Repair with sealant.
  - 2. 1/2 Inch and Over: Remove defective paper. Apply new paper, properly shingled and overlapped into existing.

### **3.05 FIELD QUALITY CONTROL**

- A. Comply with requirements of Section 01 91 15, "Building Envelope Consulting and Testing" and Section 01 9116, "Building Envelope Testing Protocol."
- B. Owner may retain a waterproofing consultant to monitor membrane installation daily.
- C. In addition, Owner may hire an inspector and/or testing agency in accordance with Section 01 45 00, "Testing Services."
  - 1. Testing may include water testing of flexible flashing and underlayment in accordance with AAMA 501.1 and ASTM E1105.
  - 2. Inspector and/or testing agency will interpret tests and state in each report whether tested work complies with or deviates from specified requirements.



- D. Patch, or remove and replace, system components where inspection or test results indicate that work does not comply with specified requirements.

**END OF SECTION**



**SECTION 07 7200  
ROOF ACCESSORIES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Roof curbs.
  - 2. Equipment supports.
  - 3. Pipe supports.
  - 4. Preformed flashing sleeves.
- B. Related Sections:
  - 1. Section 076200 "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, roof-drainage systems, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.
  - 2. Section 07 5423 "TPO Roofing" for roofing and roof walkways.

**1.03 PERFORMANCE REQUIREMENTS**

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof accessories. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
- C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
  - 1. Size and location of roof accessories specified in this Section.
  - 2. Method of attaching roof accessories to roof or building structure.
  - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
  - 4. Required clearances.
- B. Warranty: Sample of special warranty.

**1.06 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

**1.07 COORDINATION**

- A. Coordinate layout and installation of roof accessories with roofing system to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.



## 1.08 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 10 years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 METAL MATERIALS

- A. Zinc-Coated Galvanized Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation and mill phosphatized for field painting where indicated.
  - 1. Mill-Phosphatized Finish: Manufacturer's standard for field painting.
  - 2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).
  - 3. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A 755/A 755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
  - 4. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
  - 5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 (AZM150) coated.
  - 1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).
  - 2. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A 755/A 755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
  - 3. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil (0.025 mm) for topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).
  - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- C. Aluminum Sheet: ASTM B 209 (ASTM B 209M), manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
  - 1. Mill Finish: As manufactured.
  - 2. Exposed Coil-Coated Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.



- a. Two-Coat Fluoropolymer Finish: AAMA 620. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
- 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- D. Aluminum Extrusions and Tubes: ASTM B 221 (ASTM B 221M), manufacturer's standard alloy and temper for type of use, finished to match assembly where used, otherwise mill finished.
- E. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.
- F. Steel Tube: ASTM A 500, round tube.
- G. Galvanized-Steel Tube: ASTM A 500, round tube, hot-dip galvanized according to ASTM A 123/A 123M.
- H. Steel Pipe: ASTM A 53/A 53M, galvanized.

## **2.02 MISCELLANEOUS MATERIALS**

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWWPA C2; not less than 1-1/2 inches (38 mm) thick.
- C. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- D. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
  - 1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
  - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  - 3. Fasteners for Copper Sheet: Copper, hardware bronze, or passivated Series 300 stainless steel.
  - 4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- F. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant as recommended by roof accessory manufacturer for installation indicated; of type, grade, class, and use classifications required to seal joints and remain watertight.
- G. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

## **2.03 ROOF CURBS**

- A. Roof Curbs: Internally reinforced roof-curb units with integral spring-type vibration isolators and capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. AES Industries, Inc.
    - b. Curbs Plus, Inc.
    - c. Custom Solution Roof and Metal Products.
    - d. Greenheck Fan Corporation.



- e. LM Curbs.
  - f. Metallic Products Corp.
  - g. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
  - h. Pate Company (The).
  - i. Roof Products, Inc.
  - j. Safe Air of Illinois.
  - k. Thybar Corporation.
  - l. Vent Products Co., Inc.
- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
- C. Loads: See mechanical drawings for loads.
- D. Material: Zinc-coated (galvanized) steel sheet, [0.052 inch (1.32 mm)] [0.079 inch (2.01 mm)] [Insert dimension] thick.
- 1. Finish: Mill phosphatized.
- E. Construction:
- 1. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.
  - 2. Liner: Same material as curb, of manufacturer's standard thickness and finish.
  - 3. Factory-installed wood nailer at top of curb, continuous around curb perimeter.
  - 4. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
  - 5. Fabricate curbs to minimum height of 9 inches (300 mm) unless otherwise indicated.
  - 6. Top Surface: Level around perimeter with roof slope accommodated by sloping the deck-mounting flange.
  - 7. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.

#### **2.04 EQUIPMENT SUPPORTS**

- A. Equipment Supports: Internally reinforced metal equipment supports capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. AES Industries, Inc.
    - b. Curbs Plus, Inc.
    - c. Custom Solution Roof and Metal Products.
    - d. Greenheck Fan Corporation.
    - e. LM Curbs.
    - f. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
    - g. Pate Company (The).
    - h. Roof Products, Inc.
    - i. Thybar Corporation.
    - j. Vent Products Co., Inc.
- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
- C. Material: Zinc-coated (galvanized) steel sheet, 0.052 inch (1.32 mm) thick.
- 1. Finish: Mill phosphatized.
- D. Construction:
- 1. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.



2. Liner: Same material as equipment support, of manufacturer's standard thickness and finish.
3. Factory-installed continuous wood nailers 3-1/2 inches (90 mm) wide at tops of equipment supports.
4. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.
5. Fabricate equipment supports to minimum height of 8 inches (300 mm) unless otherwise indicated.
6. Sloping Roofs: Where roof slope exceeds 1:48, fabricate each support with height to accommodate roof slope so that tops of supports are level with each other. Equip supports with water diverters or crickets on sides that obstruct water flow.

## **2.05 GRAVITY VENTILATORS**

- A. Low-Profile, Cylindrical-Style Gravity Ventilators: Manufacturer's standard, fabricated as indicated, with manufacturer's standard welded or sealed mechanical joints.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Greenheck Fan Corporation.
  2. Construction: Integral base flange, vent cylinder, cylinder bird screen, and hood.
  3. Dimensions: As indicated on Drawings.
  4. Configuration: As indicated on Drawings.
  5. Bird Screens: Manufacturer's standard mesh with rewireable frame.
  6. Insect Screens: Manufacturer's standard mesh with rewireable frame.
  7. Vent Cylinder, Base Flange, and Hood Material: Aluminum sheet, of manufacturer's standard thickness.
  8. Finish: As selected by Architect from manufacturer's full range.

## **2.06 PIPE SUPPORTS**

- A. Light-Duty Pipe Supports: Extruded-aluminum base assembly and Type 304 stainless-steel roller assembly for pipe sizes indicated, including manufacturer's recommended load-distributing baseplate.
  1. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
    - a. Thaler Metal USA Inc.
  2. Finish: Manufacturer's standard.

## **2.07 PREFORMED FLASHING SLEEVES**

- A. Exhaust Vent Flashing: Double-walled metal flashing sleeve or boot, insulation filled, with integral deck flange, 12 inches (300 mm) [Insert dimension] high, with removable metal hood and [slotted] [perforated] metal collar.
  1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
  2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] [Insert manufacturer's name; product name or designation] or comparable product by one of the following:
    - a. Custom Solution Roof and Metal Products.
    - b. Thaler Metal USA Inc.
    - c. [Insert manufacturer's name].
  3. Metal: [Aluminum sheet, 0.063 inch (1.60 mm) thick] [Copper sheet, 16 oz. (0.55 mm) thick] [Insert material and thickness].
  4. Diameter: [As indicated] [3 inches (76 mm)] [4 inches (100 mm)] [5 inches (125 mm)] [6 inches (150 mm)] [7 inches (175 mm)] [8 inches (200 mm)] [9 inches (225 mm)] [10 inches (250 mm)] [Insert dimension].
  5. Finish: [Manufacturer's standard] [Insert finish].



- B. Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Custom Solution Roof and Metal Products.
    - b. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
    - c. Thaler Metal USA Inc.
  - 2. Metal: Aluminum sheet, 0.063 inch (1.60 mm) thick.
  - 3. Height: 7 inches (175 mm).
  - 4. Diameter: As indicated by vent size.
  - 5. Finish: Manufacturer's standard.

## **2.08 GENERAL FINISH REQUIREMENTS**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. General: Install roof accessories according to manufacturer's written instructions.
  - 1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
  - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
  - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
  - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  - 1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  - 2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.
  - 3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.
- C. Roof Curb Installation: Install each roof curb so top surface is level.
- D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.
- E. Gravity Ventilator Installation: Verify that gravity ventilators operate properly and have unrestricted airflow. Clean, lubricate, and adjust operating mechanisms.
- F. Pipe Support Installation: Install pipe supports so top surfaces are in contact with and provide equally distributed support along length of supported item.



- G. Preformed Flashing-Sleeve Installation: Secure flashing sleeve to roof membrane according to flashing-sleeve manufacturer's written instructions.
- H. Seal joints with elastomeric sealant as required by roof accessory manufacturer.

**3.03 REPAIR AND CLEANING**

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

**END OF SECTION 077200**



**SECTION 07 7233  
ROOF HATCHES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Work Included: Provide factory-fabricated thermally broken roof hatch for ladder access.

**1.02 SUBMITTALS**

- A. Product Data: Submit manufacturer's product data.
- B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer: A minimum of 5 years experience manufacturing similar products.
- B. Installer: A minimum of 2 years experience installing similar products.
- C. Manufacturer's Quality System: Registered to ISO 9001:2008 Quality Standards including in-house engineering for product design activities.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

**1.05 WARRANTY**

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

**PART 2 PRODUCTS**

**2.01 ROOF HATCH**

- A. Furnish and install where indicated on plans aluminum roof hatch.
- B. Performance characteristics:
  - 1. Cover and curb shall be thermally broken to prevent heat transfer between interior and exterior surfaces.
  - 2. Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m<sup>2</sup>) with a maximum deflection of 1/150th of the span or 20 psf (97kg/m<sup>2</sup>) wind uplift.
  - 3. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
  - 4. Operation of the cover shall not be affected by temperature.
  - 5. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.
- C. Cover: Shall be 11 gauge (2.3mm) aluminum with a 5" (127mm) beaded flange with formed reinforcing members. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
- D. Cover insulation: Shall be 3" (75mm) thick polyisocyanurate with an R-value = 18 (U=0.315 W/m<sup>2</sup>K), fully covered and protected by an 18 gauge (1mm) aluminum liner.
- E. Curb: Shall be 12" (305mm) in height and of 11 gauge (2.3mm) aluminum. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. The curb shall be formed with a 5-1/2" (140mm) flange with 7/16" (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip®



flashing system, including stamped tabs, 6" (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place.

- F. Curb insulation: Shall be 3" (75mm) thick polyisocyanurate with an R-value = 18 (U=0.315 W/m2K).
- G. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.
- H. Hardware
  - 1. Heavy stainless steel pintle hinges shall be provided
  - 2. Cover shall be equipped with a spring latch with interior and exterior turn handles
  - 3. Roof hatch shall be equipped with interior and exterior padlock hasps.
  - 4. The latch strike shall be a stamped component bolted to the curb assembly.
  - 5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
  - 6. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed. [For installation in highly corrosive environments or when prolonged exposure to hot water or steam is anticipated, specify Type 316 stainless steel hardware].
  - 7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
- I. Accessories
  - 1. Provide wall mounted ladder to access roof hatch.
  - 2. Provide 42" high folding safety guard around hatch which allows hatch to meet codes adjacent to edge of roof dropoff.
- J. Finishes: Factory finish shall be mill finish aluminum.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
  - 1. Test units for proper function and adjust until proper operation is achieved.
  - 2. Repair finishes damaged during installation.
  - 3. Restore finishes so no evidence remains of corrective work.

### **3.03 ADJUSTING AND CLEANING**

- A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

**END OF SECTION**



**SECTION 07 8100  
APPLIED FIRE PROTECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Applied fire protection of interior structural steel not exposed to damage or moisture.
- B. Applied fire protection of structural steel exposed to damage or moisture.
- C. Preparation of applied fire protection for application of exposed overcoat finish specified elsewhere.

**1.02 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
- B. ASTM E605/E605M - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members 2019 (Reapproved 2023).
- C. ASTM E736/E736M - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members 2019 (Reapproved 2023).
- D. ASTM E759/E759M - Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members 1992 (Reapproved 2023).
- E. ASTM E760/E760M - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members 1992 (Reapproved 2023).
- F. ASTM E761/E761M - Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members 1992 (Reapproved 2023).
- G. ASTM E859/E859M - Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members 2023.
- H. ASTM E937/E937M - Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members 1993 (Reapproved 2023).
- I. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- J. UL (FRD) - Fire Resistance Directory Current Edition.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data indicating product characteristics.
- C. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, as follows:
  - 1. Bond strength.
  - 2. Bond impact.
  - 3. Compressive strength.
  - 4. Fire tests using substrate materials similar those on project.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Field Quality Control Submittals: Submit field test report.

**1.05 MOCK-UP**

- A. Construct mock-up, 100 square feet in size.
- B. Comply with project requirements for fire ratings.
- C. Locate where directed.



- D. Examine installation within one hour of application to determine variances from specified requirements due to shrinkage, temperature, and humidity.
- E. Where shrinkage and cracking are evident, adjust mixture and method of application as necessary; remove materials and re-construct mock-up.
- F. Mock-up may remain as part of the Work.

#### **1.06 FIELD CONDITIONS**

- A. Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F or when temperature is predicted to be below said temperature for 24 hours after application.
- B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.
- C. Provide temporary enclosure to prevent spray from contaminating air.

#### **1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.
  - 1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
  - 2. Reinstall or repair failures that occur within warranty period.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Applied Fire Protection:
  - 1. GCP Applied Technologies: [www.gcpat.com/#sle](http://www.gcpat.com/#sle).
  - 2. Isolatek International Corp: [www.isolatek.com/#sle](http://www.isolatek.com/#sle).
  - 3. Southwest Fireproofing Products Company: [www.sfrm.com/#sle](http://www.sfrm.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 APPLIED FIRE PROTECTION ASSEMBLIES**

- A. Provide fire resistance ratings for following building elements as required by local building code:
  - 1. Primary structural frame, including columns, girders, and trusses, .
  - 2. Bearing walls, exterior, .
  - 3. Bearing walls, interior, .
  - 4. Nonbearing walls and partitions, exterior, .
  - 5. Nonbearing walls and partitions, interior, .
  - 6. Floor construction, including supporting beams and joists, .
  - 7. Roof construction, including supporting beams and joists, .

#### **2.03 MATERIALS**

- A. Applied Fire Protection Material for Interior Applications, Concealed: Manufacturer's standard factory mixed material, which when combined with water is capable of providing indicated fire resistance, and complying with following requirements:
  - 1. Bond Strength: 150 pounds per square foot, minimum, when tested in accordance with ASTM E736/E736M when set and dry.
  - 2. Compressive Strength: 8.33 pounds per square inch, minimum.
  - 3. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
  - 4. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
  - 5. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.
- B. Applied Fire Protection Material Exposed to Damage or Moisture: Manufacturer's standard factory mixed material, which when combined with water is capable of providing indicated fire



resistance, and complying with following requirements:

1. Bond Strength: 1,000 psf, minimum, when tested in accordance with ASTM E736/E736M when set and dry.
2. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
3. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
4. Air Erosion Resistance: Weight loss of 0.025 g/sq ft, maximum, when tested in accordance with ASTM E859/E859M after 24 hours.
5. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.

## **2.04 ACCESSORIES**

- A. Primer Adhesive: Of type recommended by applied fire protection manufacturer.
- B. Overcoat: As recommended by manufacturer of applied fire protection material.
- C. Water: Clean, potable.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive fireproofing.
- B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- D. Verify that voids and cracks in substrate have been filled.
- E. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

### **3.02 PREPARATION**

- A. Perform tests as recommended by fireproofing manufacturer in applications where adhesion of fireproofing to substrate is in question.
- B. Remove incompatible materials that could effect bond by scraping, brushing, scrubbing, or sandblasting.
- C. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- D. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- E. Close off and seal duct work in areas where fireproofing is being applied.

### **3.03 APPLICATION**

- A. Apply primer adhesive in accordance with manufacturer's instructions.
- B. Apply fireproofing in uniform thickness and density as necessary to achieve required ratings.
- C. Apply overcoat to a thickness of \_\_\_\_ inches.

### **3.04 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing in accordance with Section 01 4000 - Quality Requirements.
- B. Inspect installed fireproofing after application and curing for integrity, prior to its concealment.
- C. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of authorities having jurisdiction (AHJ).
- D. Re-inspect installed fireproofing for integrity of fire protection, after installation of subsequent Work.



**3.05 CLEANING**

- A. Remove excess material, overspray, droppings, and debris.
- B. Remove fireproofing from materials and surfaces not required to be fireproofed.

**END OF SECTION**



**SECTION 07 8123  
INTUMESCENT FIRE PROTECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Thin-film intumescent fire protection.
- B. Compressible-rod intumescent fire protection.

**1.02 REFERENCE STANDARDS**

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2022.
- B. SSPC-PA 2 - Procedure for Determining Conformance to Dry Coating Thickness Requirements 2022.
- C. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Performance characteristics and test results.
  - 2. Preparation instructions and recommendations.
  - 3. Storage and handling requirements and recommendations.
  - 4. Installation methods.
- C. Selection Samples: For decorative top coat, color chips representing manufacturer's full range of available colors and sheens.
- D. Test Reports: Published fire resistive designs for structural elements of the types required for the project, indicating hourly ratings of each assembly.
- E. Field Quality Control Submittals: Submit field test report.

**1.04 MOCK-UP**

- A. Provide a mock-up for evaluation of surface preparation techniques and application workmanship; approved mock-up will serve as a standard of comparison for subsequent work of this section.
- B. Finish at least 100 sq ft of surface in areas as designated by Architect.
- C. Evaluate mock-up for compliance with specified requirements, including thickness and finish texture.
- D. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
- E. Refinish mock-up area as required to produce acceptable work.
- F. Approved mock-up may remain as part of the project.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's original, unopened containers with identification labels and testing agency markings intact and legible.
- B. Store products in manufacturer's unopened packaging until ready for installation.
  - 1. Store at temperatures not less than 50 degrees F in dry, protected area.
  - 2. Protect from freezing, and do not store in direct sunlight.
  - 3. Dispose of any materials that have come into contact with contaminants of any kind prior to application.
- C. Dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.



## **1.06 FIELD CONDITIONS**

- A. Protect areas of application from windblown dust and rain.
- B. Maintain ambient field conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under ambient conditions outside manufacturer's absolute limits.
  - 1. Provide temporary enclosures as required to control ambient conditions.
  - 2. Do not apply intumescent fireproofing when ambient temperatures are below 50 degrees F without specific approval from manufacturer.
  - 3. Maintain relative humidity between 40 and 60 percent in areas of application.
  - 4. Maintain ventilation in enclosed spaces during application and for not less than 72 hours afterward.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Intumescent Thin-Film Fire Protection:
  - 1. Albi Manufacturing Division of StanChem Inc: [www.albi.com/#sle](http://www.albi.com/#sle).
  - 2. Contego International, Inc; High Solids Reactive Fire Barrier (HS RFB): [www.contegointernational.com/#sle](http://www.contegointernational.com/#sle).
  - 3. Hilti, Inc; Fire Finish Steel Protection Spray CFP-SP WB: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
  - 4. Isolatek International Corp: [www.isolatek.com/#sle](http://www.isolatek.com/#sle).
  - 5. Quantum Chemical; SafeCoat Steel: [www.quantumchemical.com/#sle](http://www.quantumchemical.com/#sle).
  - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Intumescent Compressible-Rod Fire Protection:
  - 1. CEMCO; HOTROD Type-X Compressible Firestopping: [www.cemcosteel.com/#sle](http://www.cemcosteel.com/#sle).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 SYSTEM REQUIREMENTS**

- A. Fireproofing: Provide intumescent fire protection systems tested by an independent testing agency in accordance with ASTM E119 and acceptable to authorities having jurisdiction (AHJ).
  - 1. Provide assemblies listed by UL or FM and bearing listing agency label or mark.

### **2.03 MATERIALS**

- A. Fire Resistive Coating System: Thin-film intumescent fire protection system for structural steel, gypsum board, wood, oriented strand board (OSB), concrete, and concrete masonry units (CMU).
- B. Fire Resistive Compressible-Rod System: Compressible intumescent fire protection system for structural steel, gypsum board, wood, oriented strand board (OSB), concrete, and concrete masonry units (CMU).
- C. Sealers and Primer: As required by tested and listed assemblies, and recommended by fireproofing manufacturer to suit specific substrate conditions.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates to determine if they are in satisfactory condition to receive intumescent fire protection; verify that substrates are clean and free of oil, grease, incompatible primers, or other foreign substances capable of impairing bond to fireproofing system.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Thoroughly clean surfaces to receive fireproofing.
- B. Repair substrates to remove surface imperfections that could effect uniformity of texture and thickness of fireproofing system, and remove minor projections and fill voids that could



telegraph through finished work.

- C. Cover or otherwise protect other work that might be damaged by fallout or overspray of fireproofing system, and provide temporary enclosures as necessary to confine operations and maintain required ambient field conditions.

### **3.03 APPLICATION**

- A. Comply with manufacturer's instructions for each particular intumescent fire protection system installation application as indicated.
- B. Apply manufacturer's recommended primer to required coating thickness.
- C. Apply fireproofing to full thickness over entire area of each substrate to be protected.
- D. Apply coats at manufacturer's recommended rate to achieve dry film thickness (DFT) as required for fire resistance ratings designated for each condition.
- E. Apply intumescent fire protection by spraying to maximum extent possible, and as necessary complete coverage by roller application or other method acceptable to manufacturer.

### **3.04 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing in accordance with Section 01 4000 - Quality Requirements.
  - 1. Arrange for testing of installed intumescent fire protection by an independent testing laboratory using magnetic pull-off dry film thickness gauge in accordance with SSPC-PA 2, and ensure it meets requirements of authorities having jurisdiction (AHJ).
  - 2. Submit field test reports promptly to Contractor and Architect.
- B. Repair or replace intumescent fire protection at locations where test results indicate fireproofing does not meet specified requirements.

### **3.05 CLEANING**

- A. Immediately after installation of fireproofing in each area, remove overspray and fallout from other surfaces and clean soiled areas.

### **3.06 PROTECTION**

- A. Protect installed intumescent fire protection from damage due to subsequent construction activities, so fireproofing is without damage or deterioration before Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

### **END OF SECTION**



**SECTION 07 8400  
FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not, and other openings indicated.

**1.02 REFERENCE STANDARDS**

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2022.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2023a.
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems 2015 (Reapproved 2019).
- D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems 2020a.
- E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers 2020a.
- F. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus 2023a.
- G. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies 2023.
- H. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- I. ITS (DIR) - Directory of Listed Products Current Edition.
- J. FM 4991 - Approval Standard of Firestop Contractors 2013.
- K. FM (AG) - FM Approval Guide Current Edition.
- L. SCAQMD 1168 - Adhesive and Sealant Applications 1989, with Amendment (2022).
- M. UL 1479 - Standard for Fire Tests of Penetration Firestops Current Edition, Including All Revisions.
- N. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.
- O. UL (DIR) - Online Certifications Directory Current Edition.
- P. UL (FRD) - Fire Resistance Directory Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

**1.04 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the fire ratings when tested in accordance with methods indicated.
  - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
  - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at [www.icc-es.org](http://www.icc-es.org) will be considered as constituting an acceptable test report.
  - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.



## **1.05 FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Firestopping Manufacturers:
  - 1. 3M Fire Protection Products: [www.3m.com/firestop/#sle](http://www.3m.com/firestop/#sle).
  - 2. A/D Fire Protection Systems Inc: [www.adfire.com/#sle](http://www.adfire.com/#sle).
  - 3. Everkem Diversified Products, Inc; Intumescent Fire-Rated Putty Pads: [www.everkemproducts.com/#sle](http://www.everkemproducts.com/#sle).
  - 4. Grabber Construction Products, Inc; GrabberGard EFC: [www.grabberman.com/#sle](http://www.grabberman.com/#sle).
  - 5. Hilti, Inc: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
  - 6. HoldRite, a Brand of Reliance Worldwide Corporation; HydroFlame 100 Firestop Sealant: [www.holdrite.com/#sle](http://www.holdrite.com/#sle).
  - 7. Nelson FireStop Products: [www.nelsonfirestop.com/#sle](http://www.nelsonfirestop.com/#sle).
  - 8. Passive Fire Protection Partners; Firestop 3600EX: [www.firestop.com/#sle](http://www.firestop.com/#sle).
  - 9. Specified Technologies Inc: [www.stifirestop.com/#sle](http://www.stifirestop.com/#sle).
  - 10. Tremco Commercial Sealants & Waterproofing; TREMstop Acrylic: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
  - 11. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 MATERIALS**

- A. Firestopping Materials: Any materials meeting requirements.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

### **2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS**

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
  - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
- B. Head-of-Wall Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
- C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
- D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

### **2.04 FIRESTOPPING SYSTEMS**

- A. Firestopping: Any material meeting requirements.
  - 1. Fire Ratings: See drawings for required systems and ratings.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.



- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

**3.03 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.

**3.04 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

**3.05 PROTECTION**

- A. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**



**SECTION 07 8413  
PENETRATION FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Penetrations in fire-resistance-rated walls.
  - 2. Penetrations in horizontal assemblies.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.03 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

**1.04 COORDINATION**

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

**PART 2 PRODUCTS**

**2.01 PENETRATION FIRESTOPPING**

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
- D. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
  - 1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-wool-fiber or rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Fillers for sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.



## **2.02 FILL MATERIALS**

- A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- B. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- C. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- D. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- E. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

## **2.03 MIXING**

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

### **3.03 INSTALLATION**

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.



- C. Install fill materials for firestopping by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

#### **3.04 CLEANING AND PROTECTION**

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

**END OF SECTION 078413**



**SECTION 07 9200  
JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Silicone joint sealants.
  - 2. Urethane joint sealants.
  - 3. Polysulfide joint sealants.
  - 4. Latex joint sealants.
  - 5. Solvent-release-curing joint sealants.
  - 6. Acoustical joint sealants.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

**1.03 QUALITY ASSURANCE**

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.
- C. Product Testing: Test joint sealants using a qualified testing agency.
  - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
  - 2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

**1.04 PROJECT CONDITIONS**

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

**PART 2 PRODUCTS**

**2.01 MATERIALS, GENERAL**

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.



## **2.02 SILICONE JOINT SEALANTS**

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
- B. Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.
- C. Mildew-Resistant, Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

## **2.03 LATEX JOINT SEALANTS**

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

## **2.04 ACOUSTICAL JOINT SEALANTS**

- A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

## **2.05 JOINT SEALANT BACKING**

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## **2.06 MISCELLANEOUS MATERIALS**

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

# **PART 3 EXECUTION**

## **3.01 EXAMINATION**

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## **3.02 PREPARATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing



optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

- a. Concrete.
  - b. Masonry.
3. Remove laitance and form-release agents from concrete.
  4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### **3.03 INSTALLATION OF JOINT SEALANTS**

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses in each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  1. Remove excess sealant from surfaces adjacent to joints.
  2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
  4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
  5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
    - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:



1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
  2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.
  3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
  4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- H. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.
- I. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

### **3.04 CLEANING**

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### **3.05 PROTECTION**

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### **3.06 JOINT-SEALANT SCHEDULE**

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
1. Joint Locations:
    - a. Control and expansion joints in brick pavers.
    - b. Isolation and contraction joints in cast-in-place concrete slabs.
    - c. Joints between different materials listed above.
  2. Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.
    - b. Control and expansion joints in unit masonry.
    - c. Joints between different materials listed above.
    - d. Perimeter joints between materials listed above and frames of doors, windows and louvers.
  2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 100/50.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Perimeter joints of exterior openings where indicated.
    - b. Vertical joints on exposed surfaces of walls and partitions.



- c. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
- 2. Joint Sealant: Latex.
- 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Sealant Location:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
  - 2. Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, Silicone.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Location:
    - a. Acoustical joints where indicated.
    - b. Other joints as indicated.
  - 2. Joint Sealant: Acoustical.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

**END OF SECTION**



**SECTION 07 9513  
EXPANSION JOINT COVER ASSEMBLIES**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles 2020.
- D. ITS (DIR) - Directory of Listed Products Current Edition.
- E. UL (DIR) - Online Certifications Directory Current Edition.

**1.02 SUBMITTALS**

- A. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- B. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.
- C. Samples: Submit two samples 12 \_\_\_\_ inch long, illustrating profile, dimension, color, and finish selected.
- D. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Expansion Joint Cover Assemblies:
  - 1. Construction Specialties, Inc; \_\_\_\_: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle), Basis of Design.
  - 2. Inpro; \_\_\_\_: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
  - 3. MM Systems Corp; \_\_\_\_: [www.mmsystemscorp.com/#sle](http://www.mmsystemscorp.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS**

- A. Interior Floor Joints Subject to Thermal Movement:
  - 1. Basis of Design:
    - a. Construction Specialties, Inc: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Interior Wall/Ceiling Joints Subject to Thermal Movement:
  - 1. Manufacturers:
    - a. Construction Specialties, Inc: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.
- C. Interior Fire-Rated Wall/Ceiling/Floor Joints Subject to Thermal Movement:
  - 1. Manufacturers:
    - a. Construction Specialties, Inc; Fire Barriers: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Exterior Wall Joints Subject to Thermal Movement:
  - 1. Manufacturers:
    - a. Construction Specialties, Inc: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.
- E. Parking/Bridge Deck Joints:
  - 1. Manufacturers:



- a. Construction Specialties, Inc; Parking Garage and Stadium Covers: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
- b. Substitutions: See Section 01 6000 - Product Requirements.

## **2.03 EXPANSION JOINT COVER ASSEMBLIES**

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
  - 1. Joint Dimensions and Configurations: As indicated on drawings.
  - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
  - 3. Joint Cover Styles: As indicated herein.
  - 4. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
  - 5. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Floor Joint Covers: Coordinate with indicated floor coverings.
  - 1. If floor covering is not indicated, obtain instructions from Architect before proceeding.
  - 2. If style is not indicated, provide extruded aluminum frame both sides, resilient seals, and minimize exposed metal.
- C. Fire Barriers In Fire Rated Assemblies: Provide cover assembly having fire rating equivalent to that of assembly into which it is installed.
  - 1. Acceptable Evaluation Agencies: UL (DIR) and ITS (DIR).

## **2.04 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
  - 1. Exposed Finish Outdoors: Natural anodized.
  - 2. Exposed Finish at Floors: Selected from manufacturers full color range.
  - 3. Exposed Finish at Walls and Ceilings: Natural anodized.
- B. Resilient Seals:
  - 1. For Ceilings: Any resilient material, flush, pleated, or hollow gasket.
  - 2. For Pedestrian Traffic Applications: EPDM rubber, Neoprene, or Santoprene; no PVC; Shore A hardness of 40 to 50 Durometer.
  - 3. For Vehicular Traffic Applications: EPDM rubber, Neoprene, or Santoprene; no PVC; Shore A hardness of 40 to 50 Durometer.
  - 4. Color: as selected by Architect from full range of manufacturer's selection.
- C. Anchors and Fasteners: As recommended by cover manufacturer.
- D. Threaded Fasteners: Aluminum.
- E. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.
- B. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

### **3.02 INSTALLATION**

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Rigidly anchor to substrate to prevent misalignment.



**3.03 PROTECTION**

- A. Do not permit traffic over unprotected floor joint surfaces.
- B. Provide strippable coating to protect finish surface.

**END OF SECTION**



**SECTION 08 1113  
HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Thermally insulated hollow metal doors with frames.

**1.02 ABBREVIATIONS AND ACRONYMS**

- A. ANSI: American National Standards Institute.
- B. ASCE: American Society of Civil Engineers.
- C. HMMA: Hollow Metal Manufacturers Association.
- D. NAAMM: National Association of Architectural Metal Manufacturers.
- E. NFPA: National Fire Protection Association.
- F. SCIF: Sensitive Compartmented Information Facility.
- G. SDI: Steel Door Institute.
- H. UL: Underwriters Laboratories.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2023.
- C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2020.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2023.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.
- F. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2023.
- G. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- H. ITS (DIR) - Directory of Listed Products Current Edition.
- I. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2017.
- J. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- K. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2022.
- L. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.
- M. UL (DIR) - Online Certifications Directory Current Edition.
- N. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- O. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.



- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

## **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Hollow Metal Doors and Frames; see basis of design:
  - 1. Ceco Door, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### **2.03 HOLLOW METAL DOORS**

- A. Exterior Doors: Thermally insulated.
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Door Face Metal Thickness: 20 gage, 0.032 inch, minimum.
  - 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
    - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
  - 3. Door Thickness: 1-3/4 inch, nominal.
- B. Interior Doors, Non-Fire-Rated:
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
  - 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
- C. Fire-Rated Doors:
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
  - 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
  - 3. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
  - 4. Provide units listed and labeled by UL (DIR) or ITS (DIR).



- a. Attach fire rating label to each fire rated unit.
5. Smoke and Draft Control Doors (Indicated with letter "S" on Drawings and/or Door Schedule): Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;
  - a. Maximum Air Leakage: 3.0 cfm/sq ft of door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
  - b. Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
  - c. Label: Include the "S" label on fire-rating label of door.

#### **2.04 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Exterior Door Frames: \_\_\_\_\_.
  1. Frame Metal Thickness: 18 gage, 0.042 inch, minimum.
  2. Weatherstripping: Separate, see Section 08 7100.
- D. Interior Door Frames, Non-Fire Rated: \_\_\_\_\_.
  1. Frame Metal Thickness: 18 gage, 0.042 inch, minimum.
- E. Door Frames, Fire-Rated: \_\_\_\_\_.
  1. Fire Rating: Same as door, labeled.
- F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- G. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

#### **2.05 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

#### **2.06 ACCESSORIES**

- A. Door Window Frames: Door window frames with glazing securely fastened within door opening.
  1. Size: As indicated on drawings.
  2. Metal Finish: Color as selected by Architect polyester powder coating.
  3. Glazing: 1/4 inch thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
- B. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

#### **3.02 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

#### **3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.



- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Install door hardware as specified in Section 08 7100.

**3.04 TOLERANCES**

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

**3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

**END OF SECTION**



**SECTION 08 1416**  
**MOLDED PANEL WOOD DOORS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Solid-core doors with wood veneer hardboard or MDF faces.
  - 2. Hollow-core pre-hung doors with wood-veneer hardboard or MDF faces.
  - 3. Shop priming flush wood doors.
  - 4. Factory fitting wood doors to frames and factory machining for hardware.
- B. Related Sections:
  - 1. Division 06 "Finish Carpentry" for door trim.
  - 2. 09 Sections "Painting" for field finishing doors.
  - 3. Division 08 Section "Hardware" for preparation for hardware.

**1.03 SUBMITTALS**

- A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
  - 1. Indicate dimensions and locations of mortises and holes for hardware.
  - 2. Indicate dimensions and locations of cutouts.
  - 3. Indicate requirements for veneer matching.
  - 4. Indicate doors to be factory finished and finish requirements.
  - 5. Indicate fire-protection ratings for fire-rated doors.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Warranty: Sample of special warranty.
- E. Sustainable Submittals:
  - 1. Product Data for Recycled Materials: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
  - 2. Laboratory Test Reports: For adhesives, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  - 3. Product Data for Adhesives: For adhesives and composite wood products, documentation indicating that product contains no urea formaldehyde.
  - 4. Laboratory Test Reports for VOC: For composite wood and agrifiber products, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

**1.04 QUALITY ASSURANCE**

- A. Source Limitations: Obtain wood doors and frames from single manufacturer.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with requirements of referenced standard and manufacturer's written instructions.



- B. Package doors individually in plastic bags or cardboard cartons cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

#### **1.06 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

#### **1.07 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Hollow-Core Interior Doors: One year(s) from date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. SEE BASIS OF DESIGN
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Architectural Concepts

#### **2.02 DOOR CONSTRUCTION, GENERAL**

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- B. Wood Doors for Opaque Finish:
  - 1. Grade: Premium
  - 2. Faces: Any closed-grain hardwood or MDF option.
- C. Interior Hardboard-Faced SC Doors
  - 1. Core: Institutional Solid Core
  - 2. Construction: Hardboard faces glued directly to core
  - 3. Blocking: Provide wood blocking with minimum dimensions as follows:
    - a. 10-inch bottom-rail blocking
    - b. 5-by-18-inch lock blocks
    - c. 2-1/2-inch midrail blocking
- D. Solid-Core Doors:
  - 1. Construction: Standard solid core.
  - 2. Core: Wood based Particleboard (meets ANSI A208.1)
  - 3. Provide doors pre-hung in wood frames. Manufacturer to provide door butts.
  - 4. Provide fire rating up to 45 minutes as noted on the drawings. Doors above 20 minute fire rating submit as door only to be field hung in HM frame.
- E. Interior Hardboard-Faced HC Doors
  - 1. Core: Institutional Hollow Core
  - 2. Construction: Hardboard faces glued directly to core
  - 3. Blocking: Provide wood blocking with minimum dimensions as follows:
    - a. 10-inch bottom-rail blocking



- b. 5-by-18-inch lock blocks
  - c. 2-1/2-inch midrail blocking
- F. Hollow-Core Doors:
- 1. Construction: Standard hollow core..
  - 2. Provide doors pre-hung in wood frames. Manufacturer to provide door butts.

### **2.03 FABRICATION**

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
- 1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
- 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  - 2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Cut and trim openings through doors in factory.
- 1. Louvers: Factory install louvers in prepared openings.

### **2.04 SHOP PRIMING**

- A. Doors for Opaque Finish: Shop prime doors with one coat of wood primer specified in Division 09 Section "Painting". Seal all four edges, edges of cutouts, and mortises with primer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine doors and installed door frames before hanging doors.
- 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
- 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
- 1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors.  
Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
    - a. Comply with NFPA 80 for fire-rated doors.
  - 2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
  - 3. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

### **3.03 ADJUSTING**

- A. Operation: Rehang or replace doors that do not swing or operate freely.



- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

**END OF SECTION 081416**



**SECTION 08 3113  
ACCESS DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Fire Rated Access doors and frames for ceilings.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Detail fabrication and installation of access doors and frames for each type of substrate.
- C. Samples: For each door face material, at least 3 by 5 inches in size, in specified finish.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
  - 2. NFPA 288 for fire-rated access door assemblies installed horizontally.

**2.02 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS**

- A. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.
- B. Basis of Design: Karp Associates, Inc., KRP-150FR 1-hour fire rated insulated ceiling access door, 20 gauge steel with 2" thick insulation and opening to 175 degrees, self-latching and auto closing with interior latch release. Baked on powder coat finish with exposed trim.
- C. Size: 30" x 24".
- D. Hardware:
  - 1. Latch: Cam latch operated flush key with paddle latch and with interior release.
  - 2. Lock: Cylinder. Key to match master key on the project.

**2.03 MATERIALS**

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.
- D. Frame Anchors: Same type as door face.
- E. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

**2.04 FABRICATION**

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.



- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
  - 1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
  - 2. Provide mounting holes in frames for attachment of units to metal or wood framing.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
  - 1. For cylinder locks, furnish two keys per lock and key all locks alike.

## **2.05 FINISHES**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
  - 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

### **3.03 ADJUSTING**

- A. Adjust doors and hardware, after installation, for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

**END OF SECTION 083113**



**SECTION 08 3300  
ROLLING STEEL DOOR**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Overhead coiling service doors.

**1.02 REFERENCES**

- A. NFRC 102 - Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.
- B. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element.
- C. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- D. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- F. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- G. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- H. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- I. NEMA MG 1 - Motors and Generators.

**1.03 DESIGN / PERFORMANCE REQUIREMENTS**

- A. Overhead coiling service doors:
  - 1. Wind Loads: Design door assembly to withstand wind/suction load of 20 psf (958 Pa) without damage to door or assembly components.
  - 2. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.
- B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

**1.04 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Details of construction and fabrication.
  - 4. Installation instructions.
- C. Shop Drawings: Include detailed plans, elevations, details of framing members, anchoring methods, required clearances, hardware, and accessories. Include relationship with adjacent construction.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.



- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years experience in the fabrication and installation of security closures.
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish areas designated by Architect.
  - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
  - 3. Refinish mock-up area as required to produce acceptable work.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
- C. Store materials in a dry, warm, ventilated weathertight location.

#### **1.07 PROJECT CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

#### **1.08 COORDINATION**

- A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

#### **1.09 WARRANTY**

- A. Warranty: Manufacturer's limited door and operator system, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 3 years or 20,000 cycles, whichever occurs first.
- B. Warranty: Manufacturer's limited door warranty for 2 years for all parts and components.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS; SEE BASIS OF DESIGN**

- A. (972) 906-1499. Web Site: [www.overheaddoor.com](http://www.overheaddoor.com). E-mail: [info@overheaddoor.com](mailto:info@overheaddoor.com).
- B. Substitutions: See Section 01 6000-Product Requirements.

#### **2.02 OVERHEAD COILING SERVICE DOORS**

- A. Industrial Doors: Overhead Door Corporation, Model 610 Service Doors.
  - 1. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
    - a. Flat profile type F-265 for doors between 18 feet 4 inches (5.59 m) and 25 feet 4 inches (7.72 m) wide, fabricated of:
  - 2. Finish:
    - a. Galvanized Steel: Slats and hood galvanized in accordance with ASTM A 653 and receive rust-inhibitive, roll coating process, including 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on polyester top coat.
      - 1) Polyester Top Coat: As selected by Architect
        - (a) Gray polyester.
        - (b) Tan polyester.



- (c) White polyester.
    - (d) Brown polyester.
  - 2) Powder coat: PowderGuard
    - (a) PowderGuard Weathered Finish: Industrial textured powder coat provides a thicker, more scratch resistant coat. Applied to entire door system including slats, guides, bottom bar and head plate. Color as selected by Architect.
  - 3) Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.
- b. Stainless Steel: Slat and hood shall be stainless steel finished as follows.
  - 1) Finish: No. 4 satin finish.
- c. Aluminum: Slat and hood shall be aluminum finished as follows.
  - 1) Finish: Powder coat, PowderGuard.
    - (a) PowderGuard Premium: Weather resistant polyester powder coat color as selected by the Architect.
    - (b) PowderGuard Weathered Finish: Industrial textured powder coat provides a thicker, more scratch resistant coat. Applied to entire door system including slats, guides, bottom bar and head plate. Color as selected by Architect.
- 3. Weatherseals:
  - a. Vinyl bottom seal.
  - b. Guide weatherseal.
- 4. Bottom Bar:
  - a. Two galvanized steel angles.
- 5. Guides: Three structural steel angles.
  - a. Finish: PowderGuard Zinc Finish for guides, bottom bar and head plate.
- 6. Brackets:
  - a. Galvanized steel to support counterbalance, curtain and hood.
- 7. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
- 8. Hood:
  - a. Aluminum hood with intermediate supports as required.
- 9. Manual Operation:
  - a. Crank operation.
- 10. Electric Motor Operation: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.
  - a. Sensing Edge Protection:
    - 1) Electric sensing edge.
  - b. Operator Controls:
    - 1) Push-button and key operated control stations with open, close, and stop buttons.
    - 2) Controls for interior location.
    - 3) Controls surface mounted.
  - c. Special Operation:
    - 1) Vehicle detector operation.
    - 2) Radio control operation.
    - 3) Card reader control.
    - 4) Door timer operation.
    - 5) Commercial light package.
  - d. Motor Voltage: 115/230 single phase, 60 Hz.
- 11. Windload Design:
  - a. Standard windload shall be 20 PSF.
- 12. Locking:



- a. Interior slide bolt lock for electric operation with interlock switch.
- 13. Wall Mounting Condition:
  - a. Face-of-wall mounting.
- 14. Vision Lites: Provide with 3 inch by 5/8 inch (76 mm by 16 mm) uniformly spaced openings.
  - a. Provide with Plexiglas covers over openings.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify opening sizes, tolerances and conditions are acceptable.
- B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Section 16150. Complete wiring from disconnect to unit components.
- F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.
- G. Install perimeter trim and closures.
- H. Instruct Owner's personnel in proper operating procedures and maintenance schedule.

#### **3.04 ADJUSTING**

- A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.
- B. Adjust hardware and operating assemblies for smooth and noiseless operation.

#### **3.05 CLEANING**

- A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.
- B. Remove labels and visible markings.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

#### **3.06 PROTECTION**

- A. Protect installed products until completion of project.

**END OF SECTION**



**SECTION 08 4113  
ALUMINUM-FRAMED ENTRANCES AND STOREFRONT**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Exterior and interior storefront framing.
  - 2. Exterior and interior manual-swing entrance doors.
- B. Related Requirements:
  - 1. Section 087100 Door Hardware for hardware not specified here for aluminum entrances.
  - 2. Section 088000 "Glazing" for storefront glazing.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
  - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
  - 2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
    - a. Joinery, including concealed welds.
    - b. Anchorage.
    - c. Expansion provisions.
    - d. Glazing.
    - e. Flashing and drainage.
  - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Sustainable Submittals: Furnish submittals that are required to comply with requirements for sustainability goals of recycled and regional materials and low VOC adhesives.
- D. Samples for Initial Selection: For units with factory-applied color finishes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
  - 1. Joinery, including concealed welds.
  - 2. Anchorage.
  - 3. Expansion provisions.
  - 4. Glazing.
  - 5. Flashing and drainage.
- F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

**1.03 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.
- B. Maintenance Data for Structural Sealant: For structural-sealant-glazed storefront to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.



#### 1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
  - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.
- C. Structural-Sealant Glazing: Comply with ASTM C 1401 for design and installation of storefront systems.

#### 1.05 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Noise or vibration created by wind and thermal and structural movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Water penetration through fixed glazing and framing areas.
    - e. Failure of operating components.
  - 2. Warranty Period: Ten years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Warranty Period: 20 years from date of Substantial Completion.

### PART 2 PRODUCTS

#### 2.01 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
  - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  - 2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening of fasteners, attachments, and other components.
    - e. Failure of operating units.
- B. Deflection of Framing Members: At design wind pressure, as follows:
  - 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is

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- less.
2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller or amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch].
    - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
  3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
    - a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans less than 11 feet 8-1/4 inches.
- C. Structural: Test according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- D. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
    - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft..
  2. Entrance Doors:
    - a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
    - b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
- E. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- F. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
  2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- G. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.38 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  2. Thermal Transmittance (U-factor): Entrance doors areas shall have U-factor of not more than 0.77 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  3. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.40 as determined according to NFRC 200.
  4. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 15 as determined according to NFRC 500.
- H. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.



2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
  - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
  - b. Low Exterior Ambient-Air Temperature: 0 deg F.
  - c. Interior Ambient-Air Temperature: 75 deg F.

## 2.02 MANUFACTURERS

- A. Manufacturers, see basis of design:
  1. EFCO Corporation.
- B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

## 2.03 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  1. Construction: Thermally broken.
  2. Glazing System: Retained mechanically with gaskets on four sides.
  3. Glazing Plane: Front.
  4. Finish: Selected by Architect from manufacturer's full Kynar finish range, including metallic coatings.
  5. Fabrication Method: Field-fabricated stick system.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
  1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
    - a. Sheet and Plate: ASTM B 209.
    - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
    - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
    - d. Structural Profiles: ASTM B 308/B 308M.
  2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
    - a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
    - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
    - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

## 2.04 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
  1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
    - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
  2. Door Design: Narrow stile; 3-1/2-inch nominal width.
  3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
    - a. Provide nonremovable glazing stops on outside of door.



## 2.05 ENTRANCE DOOR HARDWARE

- A. General: Provide entrance door hardware for each entrance door to comply with requirements in this Section.
  - 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.
  - 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
  - 3. Opening-Force Requirements:
    - a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbft to set the door in motion and not more than 15 lbf to open the door to its minimum required width.
    - b. Accessible Interior Doors: Not more than 5 lbf to fully open door.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
  - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
  - 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- C. Butt Hinges: BHMA A156.1, Grade 1, radius corner.
  - 1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while entrance door is closed.
  - 2. Exterior Hinges: Stainless steel, with stainless-steel pin.
  - 3. Quantities:
    - a. For doors up to 87 inches high, provide three hinges per leaf.
    - b. For doors more than 87 and up to 120 inches high, provide four hinges per leaf.
- D. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- E. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- F. Cylinders: As specified in Section 087100 "Door Hardware."
- G. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- H. Operating Trim: BHMA A156.6.
- I. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.
- J. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- K. Weather Stripping: Manufacturer's standard replaceable components.
  - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
- L. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- M. Silencers: BHMA A156.16, Grade 1.
- N. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.



## **2.06 GLAZING**

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

## **2.07 ACCESSORIES**

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

## **2.08 FABRICATION**

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Physical and thermal isolation of glazing from framing members.
  - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 5. Provisions for field replacement of glazing from interior.
  - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Storefront Framing: Fabricate components for assembly using shear-block system.
- F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
  - 1. At exterior doors, provide compression weather stripping at fixed stops.
  - 2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
  - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
  - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying



finishes.

- I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## **2.09 ALUMINUM FINISHES**

- A. Selected by Architect from manufacturer's full finish range, including metallic coatings.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

### **3.03 INSTALLATION**

- A. General:
  1. Comply with manufacturer's written instructions.
  2. Do not install damaged components.
  3. Fit joints to produce hairline joints free of burrs and distortion.
  4. Rigidly secure nonmovement joints.
  5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
  6. Seal perimeter and other joints watertight unless otherwise indicated.
- B. Metal Protection:
  1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
- C. Set continuous sill members and flashing in full sealant bed to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- F. Install weatherseal sealant according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
  1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
  2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

### **3.04 ERECTION TOLERANCES**

- A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
  1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
  2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
  3. Alignment:
    - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
    - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.



- c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
- 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

### **3.05 MAINTENANCE SERVICE**

- A. Entrance Door Hardware:
  - 1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

**END OF SECTION 084113**



**SECTION 08 4229  
AUTOMATIC ENTRANCES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Packaged power-operated door assemblies of following types:
  - 1. Sliding type.
  - 2. Automatic ICU/CCU type.
- B. Maintenance.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes 2023.
- C. BHMA A156.10 - Power Operated Pedestrian Doors 2017.
- D. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
  - 2. Identify installation tolerances required, assembly conditions, routing of service lines and conduit, and locations of operating components and boxes.
- C. Product Data: Provide data on system components, sizes, features, and finishes.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.04 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Sliding Automatic Entrance Door Assemblies, see basis of design:
  - 1. Besam; ASSA ABLOY Entrance Solutions: [www.besam-usa.com/#sle](http://www.besam-usa.com/#sle).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Power Operated ICU/CCU Entrance Door Assemblies:
  - 1. Besam ; ASSA ABLOY Entrance Solutions: [www.besam-usa.com/#sle](http://www.besam-usa.com/#sle).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 POWER OPERATED DOORS**

- A. Power Operated Doors: Provide products that comply with NFPA 101 and requirements of authorities having jurisdiction; provide equipment selected for actual door weight and for light pedestrian traffic, unless otherwise indicated.
  - 1. Sliding and Folding Door Operators: In the event of power failure, provide for manual open, close, and break-away operation of door leaves.
  - 2. Packaged Door Assemblies: Provide components by single manufacturer, factory-assembled, including doors, frames, operators, actuators, and safeties.
  - 3. Wind-Borne-Debris Resistance: Where indicated, provide identical full-size glazed assembly without auxiliary protection tested by independent agency in accordance with ASTM E1996 for Wind Zone 4 - Additional Protection for Large and Small Missile impact and pressure cycling at design wind pressure.



- B. Sliding and Folding Doors with Full Power Operators: Comply with BHMA A156.10; safeties required; provide break-away operation unless otherwise indicated; in the event of break-away operation, interrupt power operation.

## **2.03 AUTOMATIC ENTRANCE DOOR ASSEMBLIES**

- A. Comply with ADA Standards for egress requirements.
- B. Framing and Transom Members: Provide manufacturer's standard extruded aluminum framing, reinforced as required to support imposed loads.
  - 1. Nominal Sizes:
  - 2. Transoms: Provide flush glazed transom with framing that is integral with automatic entrance framing system.
- C. Sliding Automatic Door: Bi-parting double leaf track-mounted, electric operation, extruded aluminum glazed door, with frame, and operator concealed overhead.
  - 1. Operation: Power open, power boost operation.
  - 2. Provide products tested for wind-borne-debris resistance as indicated.
  - 3. Hold Open: Toggle switch at inside head of doors; this is not a fire-rated door.
  - 4. Door and Frame Finish: Same as adjacent framing system.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available and is of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install equipment in accordance with manufacturer's instructions.

### **3.03 ADJUSTING**

- A. Adjust door equipment for correct function and smooth operation.

### **3.04 CLEANING**

- A. Remove temporary protection, clean exposed surfaces.

### **3.05 CLOSEOUT ACTIVITIES**

- A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

### **3.06 MAINTENANCE**

- A. Provide service and maintenance of operating equipment for one year from Date of Substantial Completion, at no extra charge to Owner.

**END OF SECTION**



**SECTION 08 5113  
ALUMINUM WINDOWS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes aluminum windows for exterior locations.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.
- B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
  - 1. Include similar Samples of hardware and accessories involving color selection.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports, and calculations.
- B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.
- B. Manufacturer: SealCraft by Contour Windows, see basis of design.

**2.02 WINDOW PERFORMANCE REQUIREMENTS**

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
  - 1. Window Certification: AMMA certified with label attached to each window.
- B. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30 Btu/sq. ft. x h x deg F (1.71 W/sq. m x K).
- C. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.
- D. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) material surfaces.

**2.03 ALUMINUM WINDOWS**

- A. Operating Types: Provide the following operating types in locations indicated on Drawings:
- B. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.
- C. Glass: Clear annealed glass, ASTM C 1036, Type 1, Class 1, q3.
  - 1. Kind: Fully tempered where indicated on Drawings.
- D. Insulating-Glass Units: ASTM E 2190.



1. Glass: ASTM C 1036, Type 1, Class 1, q3.
    - a. Tint: Clear.
    - b. Kind: Fully tempered where indicated on Drawings.
  2. Filling: Fill space between glass lites with air.
  3. Low-E Coating: Pyrolytic on second surface.
- E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- G. Hung Window Hardware:
1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
  2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
  3. Tilt Latch: Releasing latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.
- H. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.
- I. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

#### **2.04 ACCESSORIES**

- A. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.
- B. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- C. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- D. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

#### **2.05 FABRICATION**

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Glaze aluminum windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.
- F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

#### **2.06 GENERAL FINISH REQUIREMENTS**

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.



- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## **2.07 ALUMINUM FINISHES**

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611.
  - 1. Color: As selected by Architect from full range of industry colors and color densities.
- C. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
  - 1. Organic Coating: Thermosetting, modified-acrylic or polyester enamel primer/topcoat system complying with AAMA 2603, medium gloss.
  - 2. Color: As selected by Architect from full range of industry colors and color densities.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.
- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

### **3.03 ADJUSTING, CLEANING, AND PROTECTION**

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
  - 1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.



- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

**END OF SECTION**



## SECTION 08 71 10

### DOOR HARDWARE

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes:
  - 1. All the finish hardware including all screws, bolts, and other devices required to complete the work.
  - 2. Lock cylinders for locks specified in other Sections.
  - 3. Miscellaneous hardware.
  - 4. Hardware furnished for shop or factory installation on doors and frames.
  - 5. Keys and Keying.
- B. Related Sections:
  - 1. Section 08110 - Steel Doors and Frames
  - 2. Section 08200 - Wood and Plastic Doors
  - 3. Section 08410 - Aluminum-Framed Entrances and Storefronts
  - 4. Division 16 Sections - Coordination with items requiring electrical connections.

##### 1.02 REFERENCES

- A. Perform all work in accordance with the following:
  - 1. American National Standards Institute (ANSI) Publications:
    - a. ICC A117.1-2009 "Accessible and Useable Buildings and Facilities"
    - b. ANSI/BHMA A 156.1 "Butts & Hinges"
    - c. ANSI/BHMA A 156.2 "Bored and Preassembled Locks and Latches"
    - d. ANSI/BHMA A 156.3 "Exit Devices"
    - e. ANSI/BHMA A 156.4 "Door Controls - Closers"
    - f. ANSI/BHMA A 156.5 "Auxiliary Locks and Associated Products"
    - g. ANSI/BHMA A 156.6 "Architectural Door Trim"
    - h. ANSI/BHMA A 156.13 "Mortise Locks & Latches"
    - i. ANSI/BHMA A 156.17 "Self-Closing Hinges & Pivots"
    - j. ANSI/BHMA A 156.18 "Materials & Finishes"
    - k. ANSI/BHMA A 156.21 "Thresholds"
    - l. ANSI/BHMA A 156.22 "Gasketing and Edge Seal Systems"
    - m. ANSI/BHMA A 156.28 "Keying Systems"
  - 2. ANSI/DHI Publications:
    - a. ANSI/DHI A115.1G "Installation Guide for Doors and Hardware"
  - 3. Builders Hardware Manufacturers Association (BHMA)
  - 4. Door and Hardware Institute (DHI) Publications:
    - a. DHI-WDHS-3 "Recommended Hardware Locations for Wood Flush Doors"
    - b. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames"
  - 5. National Fire Protection Association (NFPA) Publications:
    - a. 80 "Standard for Fire Doors, Fire Windows"
    - b. 101 "Life Safety Code"
    - c. 252 "Standard Methods of Fire Tests of Door Assemblies"
  - 6. Underwriter's Laboratories, Inc. (UL) Standards
    - a. 10C "Positive Pressure Fire Tests of Door Assemblies"
    - b. 305 "Panic Hardware"
  - 7. Window and Door Manufacturers Association (WDMA)



- B. Regulatory Requirements:
1. Conform to NFPA 80, and other applicable codes for requirements applicable to fire rated doors and frames.
  2. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., and acceptable to the public authority as suitable for the purpose specified and indicated.
  3. Conform to requirements of ADA (Americans with Disabilities Act)
  4. Accessibility: Hardware for doors used by the disabled shall comply with all state and local codes which shall supersede this Section. Notify the Owner's Representative of conflicts between regulations and this specification prior to providing hardware.
    - a. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
    - b. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

### 1.03 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
1. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
  2. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
    - a. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
      - 1) Type, style, function, size, and finish of each hardware item.
      - 2) Name and manufacturer of each item.
      - 3) Fastenings and other pertinent information.
      - 4) Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule. Submittals shall use the same designations for door and hardware numbers as shown on the Drawings.
      - 5) Explanation of all abbreviations, symbols, and codes contained in schedule.
      - 6) Mounting locations for hardware.
      - 7) Door and frame sizes and materials.
      - 8) Keying information.
  3. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
  4. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
  5. Templates for doors, frames, and other work specified to be factory-prepared for the installation of door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.



#### 1.04 QUALITY ASSURANCE

- A. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced Architectural Hardware Consultant (AHC) who is available at reasonable times during the course of the work, for consultation about Project's hardware requirements.
  - 1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
  - 2. The Guest Room security system shall be installed by a Contractor certified by the manufacturer of the system.
  - 3. Hardware supplier for Guest Room security system shall provide supervision during installation as well as training for Courtyard personnel prior to opening of facility.
- B. Fire-rated Openings: Provide door hardware for fire-rated openings that complies with NFPA 80, based on testing per NFPA 252, and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwriter's Laboratories, Inc. (UL), Warnock Hersey, ETL SEMKO division of Intertek (WHI), FM Global (FMG), or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.
  - 1. Comply with the requirements of the International Building Code with testing in accordance with UL 10C for positive pressure door test.
    - a. Test Pressure: After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.
    - b. Doors shall be labeled to certify compliance.
    - c. Provide installation instructions attached to each door in a manner that assures availability to the installer and building official.
- C. Inspection: General Contractor shall provide in writing to Owner's Representative an inspection of all doors and frames for conformance to specifications. Inspection shall include checking for fit tolerance plumb and level as well as proper hardware and operation.

#### 1.05 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

#### 1.06 CERTIFICATIONS

- A. Conform to governing Building Codes for requirements applicable to the work specified herein.
- B. Conform to NFPA 101 with regard to requirements for fire-rated doors and frames.
- C. Hardware for doors in accessible locations as defined by the Americans with Disability Act (ADA) shall comply with all state and local codes which shall supersede this section. The Owner's Representative shall be notified of any conflicts between regulations and the specifications prior to the purchase and installation of any hardware.



#### 1.07 SCHEDULING

- A. Reinforcement for all hardware for metal doors and frames shall be installed at the factory and be made to template and furnished with machine screws. The face of locks shall be beveled to match the bevel edge of metal doors. All hardware for the metal doors shall be ordered as soon as possible after the Contract is awarded.

#### 1.08 DELIVERY, STORAGE AND HANDLING

- A. Legibly mark and label each package, indicating item and location for which it is intended. Each marking shall correspond to the number shown on the approved hardware schedule. Each package shall contain all the required screws, bolts and fasteners necessary for installation of each hardware item.
  - 1. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
  - 2. Include basic installation instructions with each item or package.
- B. Construction keys: Tagged and plainly marked on face of envelope with the key change number, door designation and all other required information and mailed directly to the Owner.
- C. Permanent keys: Identified by lock manufacturer and opening to which they apply. Lock manufacturer shall place each set of keys into an envelope and label same with door numbers for rooms or areas. Mark boxes of keys with project name and location and ship Change Keys, Master Keys, and Grandmaster Keys via prepaid registered mail to Owner.

#### 1.09 SPARE MATERIALS

- A. Refer to Section 01790.

#### 1.10 WARRANTY

- A. Furnish a written guarantee which shall cover the periods stated below from and after the completion of the building and its acceptance by the Owner.
- B. For a period of one (1) year after final acceptance by the Owner. Hardware failing to comply with warranty shall be removed and replaced with new material including labor at no cost to Owner.
- C. Provide the following special warranties starting from the date of substantial completion:
  - 1. Door Locksets: Two (2) years.
  - 2. Computer Systems: One (1) year.
  - 3. Card Readers and other electrical equipment: Two (2) years.



## PART 2 PRODUCTS

### 2.02 MANUFACTURERS

- A. Hardware manufacturers are specified for each hardware item to establish a standard of quality and minimum functional requirements. In the hardware schedule at the end of this Section, product model numbers are used as part of this description to assist in identifying individual items.
- B. Items of a particular hardware category, i.e., locksets, closers, hinges shall be of the same manufacturer.
- C. Approved Manufacturers and Abbreviations:
- |     |     |                                      |                 |
|-----|-----|--------------------------------------|-----------------|
| 1.  | AIP | Aiphone Corporation                  | (800) 692-0200  |
| 2.  | FAL | Falcon, an Allegion Company          | (877) 671-7011  |
| 3.  | VON | Von Duprin, an Allegion Company      | (877) 671-7011  |
| 4.  | JOH | Johnson Hardware                     | (800) 837-5664. |
| 5.  | MCK | McKinney, an ASSA Abloy Company      | (800) 346-7707  |
| 6.  | NAT | National Guard Products, Inc. (PEM)  | (800) 647-7874  |
| 7.  | PEM | Pemko, an ASSA Abloy Company         | (800) 824-3018  |
| 8.  | ROC | Rockwood, an ASSA Abloy Company      | (800) 458-2424  |
| 10. | SCH | Schlage, an Allegion Company         | (800) 671-7011  |
| 11. | YAL | Yale Security, an ASSA Abloy Company | (800) 438-1951  |
| 12. | NOR | Norton, an ASSA Abloy Company        | (800) 438-1951  |
| 13. | GLY | Glynn Johnson, an Allegion Company   | (800) 671-7011  |

### 2.03 GENERAL REQUIREMENTS

- A. Electronic Security Lock System Description
1. Hotel lock system (Salto) to be provided by owner. Reference hardware schedule for components and door/frame prep requirements.
- B. Intercom System:
1. Products:
    - a. Subject to compliance with requirements, provide "LEM-1 DLS System" by Aiphone Corporation.
      - 1) No Substitutions
  2. Complete intercom system including, but not limited to, master unit, door station, power supply and substations, if applicable.
    - a. Master Unit LEM-1
    - b. Door Station Transmitter L-ED
    - c. Power Supply PT120NS
- C. Butt Hinges: Unless otherwise scheduled, shall be five-knuckle, full mortise template, ball bearing type with non-rising loose pin, flat button tip. Exterior hinges, and certain others as scheduled, shall have non-removable pins by use of set screw in the barrel. These are identified in the schedule as "NRP".
1. Sizes:
    - a. Size of hinges to be 3-1/2" x 3-1/2" for 1-3/8" doors
    - b. Size of hinges to be 4-1/2" x 4-1/2" for 1-3/4" doors up to 36" wide; 37" to 48 hinges to be 5" x 4-1/2" unless listed otherwise in hardware sets.
- D. Standard Locks and Latches: Locks shall utilize standard cutouts to facilitate interchange without further mortising. Strikes for locks and latches shall have only the minimum lip projection required to protect trim. Lock and trim shall conform to ANSI/BHMA A156.2. Levers shall match Electronic Lock Levers.



- E. Exit Devices: Shall be listed under "Panic Hardware" in accident equipment lists of Underwriters Laboratories. Where labeled fire doors are used as exits, they shall be equipped with labeled "Fire Exit Hardware". Exit devices shall conform to ANSI/BHMA A156.3
- F. Door Closers (Except for Concealed): Except where other device for automatically closing and controlling the action of swing doors is noted, shall be hydraulic type of rack and pinion design with working parts enclosed in a cast iron or aluminum case. For doors subject to positive or negative HVAC pressures, closer size shall be adjusted accordingly. All Closers shall **NOT** be fastened with Through Bolts through doors. All Wood Doors with closers to be provided with 5" wood top block.
1. Materials and Features:
    - a. ANSI/BHMA A156.4, Grade 1
    - b. ICC/ANSI A117.1-2003
    - c. UL listed. Provide closers for fire rated openings in compliance with NFPA 80, NFPA 101, and local building codes.
    - d. Provide closers with full molded plastic covers.
    - e. Extreme temperature fluid (temperature range from -30 degrees F to 120 degrees F.)
    - f. Provide delayed action closers where required by code
    - g. Provide sex nuts and bolts (SNB) or thru bolts (TB) on all labeled mineral core doors.
    - h. Finish: Provide factory painted or powder finish on exposed metal to match hardware, unless indicated otherwise.
    - i. Mounting: Hinge face mounting, unless otherwise indicated. Do not mount closers on exterior of building.
    - j. Size and mount units indicated or, if not indicated, to comply with manufacturer's recommendations for exposure conditions. Reinforce substrate as recommended.
    - k. Closers to be installed to allow direction of door swing as shown on Drawings and as required to meet field conditions.
    - l. Door pull force:
      - 1) Exterior Doors: Maximum 8.5 lbs.
      - 2) Interior Doors: Maximum 5.0 lbs.
    - m. Provide mounting or drop plates as required by job conditions.
- G. Door Stops: Wall type door bumpers shall be in accordance with ANSI/BHMA A156.16 and provided for all openings where conditions permit. In the event a wall type bumper cannot be used, a floor stop shall be provided.
1. Door Stop Mounting: Methods to suit substrates encountered (plastic anchor, drywall anchor, expansion shield, etc.)
  2. Provide gray rubber exposed resilient parts
  3. Do not furnish aluminum floor stops
  4. Adjust height of floor stops to suit undercut of adjacent door.
- H. Manual Flush Bolts:
1. Manual Flush Bolts: ANSI/BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.
  2. Manual-Extension Flush Bolts: Grade 1, fabricated from extruded brass or aluminum, with 12-inch rod actuated by flat lever; listed and labeled for fire-rated doors, where required. Provide with dustproof strike.
  3. Slide Flush Bolts: Grade 1, cast brass, with rod actuated by slide. Provide with dustproof strike.
  4. Dustproof Strikes: Grade 1, polished wrought brass, with 3/4-inch- diameter, spring-tension plunger.



- I. Automatic And Self-Latching Flush Bolts:
  - 1. Automatic Flush Bolts: Grade 1, fabricated from steel and brass components, with spring-activated bolts that automatically retract when active leaf is opened and that automatically engage when active door depresses bolt trigger; listed and labeled for fire-rated doors where required. Provide brass or stainless-steel cover plate, top and bottom dustproof strikes, guides, guide supports, wear plates, and shims.
  - 2. Self-Latching Flush Bolts: Grade 1, fabricated from steel and brass components, with spring-activated bolts that automatically engage when active door depresses trigger; listed and labeled for fire-rated doors where required. Bolts are manually retracted by a slide in the bolt face. Provide brass or stainless-steel cover plate, dustproof top and bottom strikes, guides, guide supports, wear plates, and shims.
  - 3. Dustproof Strikes: Grade 1, polished wrought brass, with 3/4-inch- diameter, spring-tension plunger.
- J. Door Viewers:
  - 1. 190 degree angle of view. Provide rotating metal cover to match viewer at guestrooms.
- K. Door Guards: Provide all guest room entry door guards with edge guards.
- L. Thresholds:
  - 1. Thresholds at all doors usable by the handicapped shall not exceed 1/2" in height above finished floor with a maximum slope of 1:2 in accordance with ADA and shall be in accordance with ANSI/BHMA 156.21.
- M. Weatherstrip, Sound Seals, Door Sweeps and Astragals.
- N. Protective Plates and Trim: Materials: Protection plates conforming to ANSI/BHMA 156.6, .050 minimum thickness, beveled edges (B4E) four sides. Mount centered, flush with bottom of door. Screws: Phillips head sheet metal screws plated to match plate.
- O. Silencers for Metal Door Frames: ANSI/BHMA 156.16 Grade 1; neoprene or rubber, minimum diameter 1/2-inch; fabricated for drilled application to frame.
- P. Key Control Box:
  - 1. Wall mounted lockable key cabinet complying with ANSI/BHMA A156.5.
  - 2. Size: Sized for actual quantities of keys, plus 25%, plus additional capacity for 12 housekeeper pouches.
  - 3. One wall mounted lockable key cabinet for four (4) key rings.
  - 4. One key control log book.
  - 5. Provide two (2) sets of color coded and numbered tags for key ring identification.



## 2.04 CYLINDERS AND KEYING

### A. Hotel System-Permanent Keying:

1. All locksets shall be construction master keyed.
2. Owner will provide keying requirements for hotel system.
3. Locksets and cylinders shall contain 6-pin tumblers.
4. Furnish the following quantities of keys:

a. Grandmaster Keys (GMK)	10 each
b. Master Keys (each MK set)	5 each
c. Change Keys per lock	3 each
d. Keyed alike sets (each set)	4 each
e. Removable core control keys	4 each
5. Hotel System-Master Keying: Coordinate with Owner based upon the following general requirements.
  - a. Administrative Master Key "AA" - Operates all locks in the administrative and office areas of the hotel.
  - b. Engineering Master Key "AB" - Operates all locks in the engineering and maintenance areas, (i.e., engineer's office, entire maintenance section, mechanical and electrical rooms, utility closets, janitors closets, and all exterior doors, including the roof).
  - c. Food and Beverage Master Key "AC" - Operates all locks under the direct supervision of the steward, (i.e. kitchen, banquet rooms, food storage rooms, dining rooms and kitchen offices).
  - d. Housekeeping Master Key "AD" - Operates all locks under the direct supervision of the housekeeper, (i.e., housekeeper's office, pantries, linen rooms and linen chutes on guest floors and laundry room area).
  - e. Health and Exercise Master Key "AE" - Operates all locks in the health/exercise areas, (i.e., swimming pool, exercise room, pool lockers and game room).
  - f. Grand Master Key "A" – Operates locks as noted in paragraphs a through e above. Upon authorization of the Owner, keyblanks shall be sold only by direct main from the door lock manufacturer.
  - g. Keyed alike in sets, each set different.
    - 1) Electrical and telephone closets.
    - 2) Two or more doors to or from the same room area or space.
    - 3) Public meeting room doors in accordance with areas subdivided by operable partitions.
    - 4) Linen rooms and chute area doors.

### B. Hotel System - Temporary Construction Keying:

1. Furnish temporary construction keying for use during construction. Prior to Owner occupancy of the building, the General Contractor with the Owner's Representative shall void out the construction keys.
2. Furnish 25 Construction Master Keys.

## 2.05 MISCELLANEOUS REQUIREMENTS

- ### A.
- The hardware shall be the proper kind for its required use and shall fit its intended location. Should any hardware, as specified, fail to meet the intended requirements or require modification to suit the intended location, this matter, or any other necessary advance information, shall be brought to the attention of the Architect for correction or decision in ample time to avoid delay in the manufacture and delivery of hardware.



- B. The finish hardware listed herein shall not be construed as necessarily being a complete hardware schedule but shall be considered as an indication of the hardware requirements desired by the Architect. It shall be the Contractor's responsibility to examine the Drawings and door schedules and provide all necessary or additional hardware as required but not scheduled herein. Such items of hardware shall be of the same type, quality, and quantity as that scheduled for similar doors or similar purposes.
- C. In the accompanying hardware list, catalog numbers used are those of specific manufacturers, used to establish a minimum standard of quality and requirements as to type, weight, mechanical construction and operation to which hardware shall conform. That list indicates manufacturers on which catalog numbers are based, as well as acceptable equivalent manufacturers.
- D. Proposals shall be based on specified (base or acceptable equivalent) brands. If the Contractor wishes to submit other brands as equivalent to those specified, they shall enter such proposed substitutions separately from their basic proposal. For each item proposed, they shall enter the amount to be added to or deducted from his base bid in the event the proposed substitution is accepted by the Owner's representative. Substitute items shall not be used without the approval of Marriott International.
- E. Finish:
1. All hardware items not otherwise scheduled shall have the following finish:
    - a. Refer to Hardware Sets in Hardware Schedule
  2. Finish and Base Material Designations: Numbers indicate ANSI/BHMA A156.18 Finish Standards, or nearest traditional U.S. Commercial Finish Standards, or manufacturer's finish designation.

## 2.06 HARDWARE MANUFACTURERS

<u>Hardware Item</u>	<u>Base Manufacturer</u>	<u>Acceptable Equivalents</u>
Hinges	Ive	McKinney
Lockset (Standard)	Sargent	Falcon, Yale
Electronic Lockset System	Saflok	Onity, Ving
Exit Devices	Von Duprin	Falcon, Sargent
Closers	Yale	LCN, Falcon
Electromagnetic Hold-Open	Rixson	Ives
Door Stops	Trimco	Ives
Door Viewers	Rockwood	Ives
Door Guard	Pemko	Ives
Kick Plates	Trimco	Ives, Rockwood
Door Sensor	Pulnix	NONE
Weatherstrip, Door		
Sweeps, Thresholds, Astragals	NGP	Zero, Pemco
Push/Pulls	Ives	Rockwood
Overhead Stops	Glynn Johnson	Rixson
Intercom System	Aiphone	NONE
Key Box	Telkee	NONE

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Verify that doors and frames are ready to receive work and dimensions, are as indicated on Shop Drawings, and as instructed by the manufacturer.
- B. Beginning of installation means acceptance of existing conditions.



### 3.02 INSTALLATION

- A. Install each hardware item in compliance with manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finished, reinstall each item. Do not install surface-mounted items until finishes have been completed on the substrate.
- B. Conform to ADA Standards and ANSI ICC A117.1 for positioning requirements for the Disabled.
- C. All door closers shall be installed out of public sight wherever possible.

### 3.03 FASTENINGS

- A. Suitable size, quantity, and material with finish to match the hardware.
- B. Machine screws for attaching hardware to metal.
- C. Self-tapping screws for attaching kickplate to hollow metal or wood mineral core doors.
- D. Full thread type screws for attaching butt hinges to wood or mineral core doors.
- E. Sex bolts and sleeves for attaching surface closers or arm to mineral core doors.
- F. Non-ferrous or corrosion resistant steel fasteners for items exposed to weather.

### 3.04 HARDWARE LOCATIONS

- A. Hardware mounting heights shall conform to the following unless otherwise indicated on the drawings.

Hinges:	Top - 5" from head to top of hinge leaf. Bottom - 10" from bottom of hinge to finished floor. Intermediates. Intermediates - Equal distance between top and bottom hinges (Maximum 3'-0")
Card Readers:	40" from finish floor to centerline
Locks/Latches (Other than Card Readers):	38" from finish floor to center of lock/latch.
	For Panel Doors: If lock escutcheon plate aligns with or overlaps the door stile, then mount escutcheon plate to minimize overlap occurring above door rail (align top of escutcheon plate 1/2" higher than top of rail). Center line of lever typically 45-1/2" from top of door. If escutcheon doesn't align with or overlap stile, then mount lock on stile so height of lever is at center of rail. Custom strike locations on door frames may be required.
Deadlocks/Deadbolts:	48" from finished floor to center of cylinder.
Door Guards:	60" from finished floor to center line. At Accessible Guest Rooms maximum 48" from finished floor to center line.
Door Viewer:	57" from finished floor to center line.



	At Accessible Guest Rooms, provide two door viewers with mounting heights at 45" and 57" from finish floor to centerline.
Door pulls, Push plates	45" from finish floor to centerline.
Pushbars:	
Exit Device Crossbars:	38" from finish floor to center of crossbar.
Electromagnetic Hold-Open:	Set wall mounted type 72" from finish floor to centerline.
	Wall mounted templates shall be issued by hardware supplier.

### 3.05 HARDWARE INSTALLATION

- A. Coordination:
  - 1. Fit and adjust hardware in accordance with manufacturer's packaged instructions.
  - 2. Coordinate installation with all trades, millwork, finish hardware, door frames and electrical.
- B. Sound and Smoke Seals:
  - 1. Install adhesive seals per manufacturer's instructions. Pre-cut pieces to fit before installing. Do not install as one continuous piece. Install jamb pieces first and header piece last. Position jamb pieces on the door frame rabbet 1/16" from the header rabbet to allow for header piece clearance. Install header piece on the header rabbet with ends overlapping and fitting above jamb piece.
  - 2. Install adhesive seals on astragal of double doors.
- C. Door Viewers: 190 degree viewers at Guest Room doors. 190 degree extra wide angle view at ballroom and meeting room doors.
- D. Door Guards: Guest Room entry door guards shall have strike plate furnished standard with door guard.

### 3.06 ADJUSTING

- A. Adjustments:
  - 1. Weather-stripping and sound/smoke seals shall not interfere with operation of doors and shall be adjusted accordingly.
  - 2. Secure door bottom in strict accordance with manufacturer's printed instructions and as required to seal door to threshold.
  - 3. Door seals to provide intended functions. Replace seals which do not perform.
  - 4. Adjust door so that lockset can be easily opened with a key/card key without binding between the latchbolt and strike. Doors too tight (or too loose) will not be accepted.
  - 5. Clearances between door and frame, at jambs and head: No greater than 1/8" +/- 1/16".
  - 6. Prior to Owner's "soft opening" replace Guest Room battery power supply units with new alkaline batteries.

### 3.07 PROTECTION

- A. Reinstall wrappings furnished by manufacturer for protecting items such as levers, handles and pulls.
- B. Do not remove manufacturer's protective covering of flat items such as kickplates and push plates until just prior to final acceptance of the building.



### 3.08 CLEANING

- A. After installation, clean metal surfaces on both interior and exterior of all mortar, plaster, paint and other contaminants. After cleaning, protect work against damage.

### 3.09 FINAL ADJUSTMENT

- A. Whenever hardware is installed more than one month prior to acceptance or occupancy of a space or area, return during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area.
- B. At the completion of the project, manufacturers' suppliers or representatives shall inspect their hardware and make any corrections required due to errors or improper installation.

### Hardware Schedule

#### Hardware Group No. 01

For use on Door #(s):

1000A

**Provide each SL door(s) with the following:**

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
NOTE: BALANCE OF HARDWARE BY DOOR SUPPLIER.				

#### Hardware Group No. 02

For use on Door #(s):

000 000A

**Provide each SGL door(s) with the following:**

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA HINGE	FBB179	652	STA
1	EA RFID LOCKSET	QUANTUM RFID X BLE X ADB X GALA	626	SAF
1	EA CLOSER	2700 SERIES	689	YAL
1	EA KICK PLATE	K0050 8" X 2" LDW B4E	630	TRM
1	EA WALL STOP	1270WV	626	TRM
1	EA DOOR VIEWER	619	626	ROC
1	SET SEALS	5050B	BRN	NGP
1	EA GASKETING	S773D	DBZ	PEM
1	EA DOOR BOTTOM	PDB411AE		PEM
1	EA DOOR GUARD	PDL	626	PEM

2 VIEWERS SHALL BE PROVIDED AT ACCESSIBLE ROOMS



**Hardware Group No. 03**

For use on Door #(s):

1011A      1020      C1-1A      C1-1B

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONTINUOUS HINGE	FURNISHED BY DOOR SUPPLIER		689	UNK
1	EA	PANIC HARDWARE	35A-NL-OP-388		626	VON
1	EA	ELECTRIC STRIKE	6300 FSE 12/24 VAC/VDC	⚡	630	VON
1	EA	DOOR PULL	FURNISHED BY DOOR SUPPLIER		630	UNK
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	CLOSER ACCESSORIES	BRACKETS/PLATES/SPACERS AS REQ'D		689	YAL
	EA	WEATHERSTRIPPING	BY DOOR AND FRAME MANUFACTURER			
1	EA	DOOR SWEEP	200SSS			NGP
1	EA	THRESHOLD	425HD		AL	NGP
1	EA	DOOR CONTACT	679-05HM	⚡	BLK	SCE
1	EA	POWER SUPPLY	PS SERIES	⚡	GRY	DRM
1	EA	CARD READER	QUANTUM RFID RCU		626	SAF

OPERATION: PRESENTING HOTEL CREDENTIAL TO READER UNIT MOMENTARILY RETRACTS DEVICE LATCH. INSIDE PUSH PAD ALWAYS FREE EGRESS.

**Hardware Group No. 04**

For use on Door #(s):

DDDD

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONTINUOUS HINGE	FURNISHED BY DOOR SUPPLIER		689	UNK
1	EA	PANIC HARDWARE	35A-NL-OP-388		626	VON
1	EA	ELECTRIC STRIKE	6300 FSE 12/24 VAC/VDC	⚡	630	VON
1	EA	DOOR PULL	FURNISHED BY DOOR SUPPLIER		630	UNK
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	CLOSER ACCESSORIES	BRACKETS/PLATES/SPACERS AS REQ'D		689	YAL
1	EA	FLOOR STOP	FS18L		BLK	IVE
	EA	WEATHERSTRIPPING	BY DOOR AND FRAME MANUFACTURER			
1	EA	DOOR SWEEP	200SSS			NGP
1	EA	THRESHOLD	425HD		AL	NGP
1	EA	DOOR CONTACT	679-05HM	⚡	BLK	SCE
1	EA	POWER SUPPLY	PS SERIES	⚡	GRY	DRM
1	EA	CARD READER	QUANTUM RFID RCU		626	SAF

OPERATION: PRESENTING HOTEL CREDENTIAL TO READER UNIT MOMENTARILY RETRACTS DEVICE LATCH. INSIDE PUSH PAD ALWAYS FREE EGRESS.










**Hardware Group No. 05**

For use on Door #(s):

1017B          1018B          S2-1

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.5" X 4.5"		630	MCK
1	EA	POWER TRANSFER	EPT10	 ⚡	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-35A-NL 24 VDC	 ⚡	626	VON
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E		630	TRM
1	EA	FLOOR STOP	FS18L		BLK	IVE
		(@1018B ONLY)				
1	EA	DRIP CAP	16SS		630	NGP
1	SET	SEALS	107SA		CL	NGP
1	EA	DOOR SWEEP	200SSS			NGP
1	EA	THRESHOLD	425HD		AL	NGP
1	EA	DOOR CONTACT	679-05HM	 ⚡	BLK	SCE
1	EA	POWER SUPPLY	PS SERIES	⚡	GRY	DRM
1	EA	CARD READER	QUANTUM RFID RCU		626	SAF






OPERATION: PRESENTING HOTEL CREDENTIAL TO READER UNIT MOMENTARILY RETRACTS  
 DEVICE LATCH. INSIDE PUSH PAD ALWAYS FREE EGRESS.

**Hardware Group No. 06**

For use on Door #(s):

S1-1B

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.5" X 4.5"		630	MCK
1	EA	PANIC HARDWARE	98-EO		626	VON
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E		630	TRM
1	EA	DRIP CAP	16SS		630	NGP
1	SET	SEALS	107SA		CL	NGP
1	EA	DOOR SWEEP	101VA		AL	NGP
1	EA	THRESHOLD	896V		AL	NGP

NOTE: INSTALL WEATHERSTRIP AT FRAME HEAD FIRST, THEN INSTALL CLOSER PA BRACKET.







**Hardware Group No. 07**

For use on Door #(s):

1016B

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.5" X 4.5"		630	MCK
1	EA	STOREROOM LOCK	10G04 GP		626	SAR
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E		630	TRM
1	EA	DRIP CAP	16SS		630	NGP
1	SET	SEALS	107SA		CL	NGP
1	EA	DOOR SWEEP	101VA		AL	NGP
1	EA	THRESHOLD	896V		AL	NGP



INSTALL WEATHERSTRIP AT FRAME HEAD FIRST, THEN INSTALL CLOSER PA BRACKET.

**Hardware Group No. 08**

For use on Door #(s):

1019

**Provide each PR door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONTINUOUS HINGE W/EPT PREP	FURNISHED BY DOOR SUPPLIER		689	UNK
2	EA	POWER TRANSFER	EPT10	 ✂	689	VON
1	EA	ELEC PANIC HARDWARE	RX-3547A-EO	 ✂	626	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-3547A-NL-OP-388 24 VDC	 ✂	626	VON
2	EA	DOOR PULL	FURNISHED BY DOOR SUPPLIER		630	UNK
2	EA	CLOSER	2700 SERIES		689	YAL
2	EA	CLOSER ACCESSORIES	BRACKETS/PLATES/SPACERS AS REQ'D		689	YAL
1	EA	WEATHERSTRIPPING	BY DOOR AND FRAME MANUFACTURER			
2	EA	DOOR SWEEP	200SSS			NGP
1	EA	THRESHOLD	896V		AL	NGP
2	EA	DOOR CONTACT	679-05HM	 ✂	BLK	SCE
1	EA	POWER SUPPLY	PS SERIES	✂	GRY	DRM
1	EA	CARD READER	QUANTUM RFID RCU		626	SAF







**Hardware Group No. 09**

For use on Door #(s):

1012B                      1012C

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.5" X 4.5"		630	MCK
1	EA	STOREROOM LOCK	10G04 GP		626	SAR
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	WALL STOP	1270WV		626	TRM
1	EA	DRIP CAP	16SS		630	NGP
1	SET	SEALS	107SA		CL	NGP
1	EA	DOOR SWEEP	101VA		AL	NGP
1	EA	THRESHOLD	425HD		AL	NGP





INSTALL WEATHERSTRIP AT FRAME HEAD FIRST, THEN INSTALL CLOSER PA BRACKET.

**Hardware Group No. 10**

For use on Door #(s):

1012A

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.5" X 4.5"		630	MCK
1	EA	PRIVACY LOCK	10U65 GP		626	SAR
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	WALL STOP	1270WV		626	TRM
1	EA	DRIP CAP	16SS		630	NGP
1	SET	SEALS	107SA		CL	NGP
1	EA	DOOR SWEEP	101VA		AL	NGP
1	EA	THRESHOLD	425HD		AL	NGP



INSTALL WEATHERSTRIP AT FRAME HEAD FIRST, THEN INSTALL CLOSER PA BRACKET.

**Hardware Group No. 11**

For use on Door #(s):

1000B

**Provide each SL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	KEY SWITCH	MKA			SEC
1	EA	AIPHONE INTERCOM SYSTEM	LEM-1 DLS			AIP
1	EA	CARD READER	QUANTUM RFID RCU		626	SAF

NOTE: BALANCE OF HARDWARE BY DOOR SUPPLIER.




**Hardware Group No. 12**

For use on Door #(s):

S1-1A                      S1-2                      S1-3                      S1-4                      S2-2                      S2-3  
S2-4

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	FBB179		652	STA
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-17		626	VON
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E		630	TRM
1	EA	MAG HOLDER	998M	✈	689	RIX
1	EA	GASKETING	S773D		DBZ	PEM

**Hardware Group No. 13**

For use on Door #(s):

1008D

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	FBB179		652	STA
1	EA	STOREROOM LOCK	10G04 GP		626	SAR
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	WALL STOP	1270WV		626	TRM
1	EA	GASKETING	S773D		DBZ	PEM
3	EA	SILENCER	1229A		GRY	TRM

**Hardware Group No. 14**

For use on Door #(s):

1003E

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	FBB179		652	STA
1	EA	STOREROOM LOCK	10G04 GP		626	SAR
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E		630	TRM
3	EA	SILENCER	1229A		GRY	TRM



**Hardware Group No. 15**

For use on Door #(s):

1002A	1003	1004	1008	1017A	1018A
2000	2001	2002A	3000	3001	3002A
4000	4001	4002A			

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	HOTEL LOCK	QUANTUM RFID X BLE X GALA X LESS DB	626	SAF
1	EA	CLOSER	2700 SERIES	689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E	630	TRM
1	EA	WALL STOP	1270WV	626	TRM
1	EA	GASKETING	S773D	DBZ	PEM
3	EA	SILENCER	1229A	GRY	TRM

**Hardware Group No. 16**

For use on Door #(s):

1003A	1008A
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**Provide each PR door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	FBB179	652	STA
1	EA	FLUSH BOLT	3917	626	TRM
1	EA	CLASSROOM LOCK	10G37 GP	626	SAR
1	EA	OH STOP	90S	630	GLY
1	EA	WALL STOP	1270WV	626	TRM
2	EA	SILENCER	1229A	GRY	TRM

**Hardware Group No. 17**

For use on Door #(s):

1002B	1003B
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**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	ENTRANCE/OFFICE LOCK	10G05 GP	626	SAR
1	EA	WALL STOP	1270WV	626	TRM
3	EA	SILENCER	1229A	GRY	TRM

**Hardware Group No. 18**

For use on Door #(s):

1008C	2002B	3002B	4002B
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**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	PASSAGE SET	10U15 GP	626	SAR
1	EA	CLOSER	2700 SERIES	689	YAL
3	EA	SILENCER	1229A	GRY	TRM



**Hardware Group No. 19**

For use on Door #(s):

1008B

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	PASSAGE SET	10U15 GP	626	SAR
1	EA	OH STOP	90S	630	GLY
3	EA	SILENCER	1229A	GRY	TRM

**Hardware Group No. 20**

For use on Door #(s):

2003      2004      3003      3004      4003      4004

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	TA2714	652	MCK
1	EA	PASSAGE SET	10U15 GP	626	SAR
1	EA	CLOSER	2700 SERIES	689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E	630	TRM
1	EA	MAG HOLDER	998M	689	RIX
1	EA	GASKETING	S773D	DBZ	PEM

NOTE: WALL MAGNET TO RELEASE UPON FIRE ALARM ACTIVATION

**Hardware Group No. 21**

For use on Door #(s):

1005

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	PASSAGE SET	10U15 GP	626	SAR
1	EA	CLOSER	2700 SERIES	689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E	630	TRM
1	EA	WALL STOP	1270WV	626	TRM
1	EA	GASKETING	S773D	DBZ	PEM

**Hardware Group No. 22**

For use on Door #(s):

1007      1009      1010

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	PRIVACY LOCK	10U65 GP	626	SAR
1	EA	CLOSER	2700 SERIES	689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E	630	TRM
1	EA	WALL STOP	1270WV	626	TRM
3	EA	SILENCER	1229A	GRY	TRM



**Hardware Group No. 23**

For use on Door #(s):

1015

**Provide each PD door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	POCKET DOOR KIT	1500SC/1560SC AS REQ'D	AL	JOH
1	EA	POCKET DOOR LOCK	C-90L-CT (LESS CYL)	626	KNC

**Hardware Group No. 24**

For use on Door #(s):

001 003

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	PRIVACY LOCK	28-65U65 KP	626	SAR
3	EA	SILENCER	1229A	GRY	TRM

**Hardware Group No. 25**

For use on Door #(s):

1012D 1012E 1012F

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	SELF CLOSING HINGES	BY GATE MFG		
1	EA	ELECTRIC STRIKE GATE BOX	EN400-GATEBOX	BLK	TRN
1	EA	PANIC HARDWARE	LD-WR9852-L-06	626	VON
1	EA	ELECTRIC STRIKE	EN400RP	✓	TRN
1	EA	DOOR CONTACT	679-05HM	✓	BLK SCE
1	EA	POWER SUPPLY	PS SERIES	✓	GRY DRM
1	EA	CARD READER	QUANTUM RFID RCU	626	SAF

**Hardware Group No. 26**

For use on Door #(s):

004

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	TA2714 4.5" X 4.5"	630	MCK
1	EA	PASSAGE SET	28-65U15 KP	626	SAR
1	EA	SGL CYL X TURN DB	D141P	626	FAL
1	EA	CLOSER	2700 SERIES	689	YAL
1	EA	GASKETING	S773D	DBZ	PEM
1	EA	DOOR SWEEP	OV634A	CL	NGP
1	EA	THRESHOLD	896V	AL	NGP



**Hardware Group No. 27**

For use on Door #(s):

002                      003                      1003C                      1003D.1                      1003D

**Provide each PR door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	FBB179	652	STA
2	EA	DUMMY TRIM	28-65U93 KP	626	SAR
2	EA	ROLLER CATCH	336	626	IVE
2	EA	SILENCER	1229A	GRY	TRM

**Hardware Group No. 28**

For use on Door #(s):

002

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	PASSAGE SET	28-65U15 KP	626	SAR
3	EA	SILENCER	1229A	GRY	TRM

**Hardware Group No. 29**

For use on Door #(s):

1003.1                      1014A

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	CLASSROOM LOCK	10G37 GP	626	SAR
1	EA	CLOSER	2700 SERIES	689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E	630	TRM
1	EA	WALL STOP	1270WV	626	TRM
1	EA	GASKETING	S773D	DBZ	PEM

**Hardware Group No. 30**

For use on Door #(s):

1016A

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	FBB179	652	STA
1	EA	CLASSROOM LOCK	10G37 GP	626	SAR
1	EA	OH STOP	90S	630	GLY
1	EA	CLOSER	2700 SERIES	689	YAL
1	EA	KICK PLATE	K0050 8" X 2" LDW B4E	630	TRM
1	EA	GASKETING	S773D	DBZ	PEM






**Hardware Group No. 31**

For use on Door #(s):

1014

**Provide each SGL door(s) with the following:**

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	FBB179		652	STA
1	EA	POWER TRANSFER	EPT10	 ⚡	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-L-NL-LAT 24 VDC	 ⚡	626	VON
1	EA	CLOSER	2700 SERIES		689	YAL
1	EA	WALL STOP	1270WV		626	TRM
1	EA	GASKETING	S773D		DBZ	PEM
1	EA	DOOR CONTACT	679-05HM	 ⚡	BLK	SCE
1	EA	DOOR MANAGEMENT ALARM	BY ACCESS CONTROL PROVIDER	⚡		
1	EA	POWER SUPPLY	PS SERIES	⚡	GRY	DRM
2	EA	CARD READER	QUANTUM RFID RCU		626	SAF

**END OF SECTION**



**SECTION 08 8000  
GLAZING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
  - 1. Aluminum storefront systems
  - 2. Interior doors.
  - 3. Interior borrowed lites.
- B. Related Sections:
  - 1. Section 088300 "Mirrors."
  - 2. Section 081113 "Steel Doors and Frames"

**1.03 PERFORMANCE REQUIREMENTS**

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:
  - 1. Design Wind Pressures: As required by local code requirements.
  - 2. Glass Type Factors for Wired, Patterned, and Sandblasted Glass:
    - a. Short-Duration Glass Type Factor for Wired Glass: 0.5.
    - b. Long-Duration Glass Type Factor for Wired Glass: 0.3.
    - c. Short-Duration Glass Type Factor for Patterned Glass: 1.0.
    - d. Long-Duration Glass Type Factor for Patterned Glass: 0.6.
    - e. Short-Duration Glass Type Factor for Sandblasted Glass: 0.5.
  - 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
  - 4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each glass product and glazing material indicated.
- B. Sustainable Submittals:
  - 1. Product Data for Credit IEQ 4.1: For glazing sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
  - 2. Laboratory Test Reports for Credit IEQ 4: For glazing sealants used inside the weatherproofing system, documentation indicating that they comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.



### **1.05 INFORMATIONAL SUBMITTALS**

- A. Product Certificates: For glass and glazing products, from manufacturer.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulating glass.
  - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- C. Preconstruction adhesion and compatibility test report.
- D. Warranties: Sample of special warranties.

### **1.06 QUALITY ASSURANCE**

- A. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- B. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of a certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

### **1.08 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).

### **1.09 WARRANTY**

- A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 GLASS PRODUCTS, GENERAL**

- A. Manufacturer: AGC Glass Company North America. see basis of design.
- B. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
  - 1. Minimum Glass Thickness for Exterior Lites: As required by Code.
- C. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is required, provide Kind FT heat-treated float glass.



- D. Windborne-Debris-Impact Resistance: Provide exterior glazing that passes basic-protection testing requirements in ASTM E 1996 for local wind zone when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on the Project and shall be installed in same manner as glazing indicated for use on the Project.
  - 1. Large-Missile Test: For glazing located within 30 feet (9.1 m) of grade.
  - 2. Small-Missile Test: For glazing located more than 30 feet (9.1 m) above grade.
  - 3. Large-Missile Test: For all glazing, regardless of height above grade.
- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
  - 1. For monolithic-glass lites, properties are based on units with lites.
  - 2. For laminated-glass lites, properties are based on products of construction indicated.
  - 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  - 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
  - 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  - 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## **2.02 GLASS PRODUCTS**

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Ultraclear Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I, complying with other requirements specified and with visible light transmission not less than 91 percent[ and solar heat gain coefficient to meet Energy Star].
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. AFG Industries, Inc.; Krystal Klear.
    - b. Guardian Industries Corp.; Ultrawhite.
    - c. Pilkington North America; Optiwhite.
    - d. PPG Industries, Inc.; Starphire.

## **2.03 INSULATING GLASS**

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
  - 1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
  - 2. Spacer: Manufacturer's standard spacer material and construction.
  - 3. Desiccant: Molecular sieve or silica gel, or blend of both.
- B. Glass: Comply with applicable requirements in "Glass Products" Article. Provide Low E coating with SHG coefficient to meet Energy Star.

## **2.04 GLAZING GASKETS**

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from[ one of] the following:
  - 1. Neoprene complying with ASTM C 864.
  - 2. EPDM complying with ASTM C 864.
  - 3. Silicone complying with ASTM C 1115.
  - 4. Thermoplastic polyolefin rubber complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
  - 1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.



- C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

## **2.05 GLAZING SEALANTS**

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
5. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
6. Provide manufacturer's recommended glazing sealant for each application.

## **2.06 GLAZING TAPES**

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
  2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## **2.07 MISCELLANEOUS GLAZING MATERIALS**

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.



## **2.08 FABRICATION OF GLAZING UNITS**

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

### **3.03 GLAZING, GENERAL**

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.



- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

#### **3.04 TAPE GLAZING**

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

#### **3.05 GASKET GLAZING (DRY)**

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

#### **3.06 CLEANING AND PROTECTION**

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with



glass, remove substances immediately as recommended in writing by glass manufacturer.

- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

**END OF SECTION 088000**



**SECTION 08 8813  
FIRE-RESISTANT GLAZING**

**FIRE-RESISTANT GLAZING**

**PART 1 GENERAL**

**2.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**2.02 SUMMARY**

- A. Section Includes:
  - 1. Fire-protection-rated glazing.
  - 2. Fire-resistance-rated glazing.

**2.03 DEFINITIONS**

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

**2.04 COORDINATION**

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

**2.05 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product; 12 inches (300 mm) square.

**2.06 INFORMATIONAL SUBMITTALS**

- A. Product Certificates: For each type of glass and glazing product, from manufacturer.
- B. Sample Warranties: For special warranties.

**2.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

**2.08 FIELD CONDITIONS**

- A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during the remainder of the construction period.

**PART 1 PRODUCTS**

**3.01 MANUFACTURERS**

- A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
- B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

**3.02 PERFORMANCE REQUIREMENTS**

- A. General: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.



### **3.03 GLASS PRODUCTS, GENERAL**

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- B. Safety Glazing Labeling: Permanently mark glazing with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

### **3.04 GLASS PRODUCTS**

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Ultraclear Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear), with visible light transmission not less than 91 percent.
- C. Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
  - 1. Construction: Laminated glass with polyvinyl butyral interlayer unless fire-protection or fire-resistance rating is based on another product.
  - 2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
  - 3. Interlayer Color: Clear unless otherwise indicated.

### **3.05 FIRE-PROTECTION-RATED GLAZING**

- A. Fire-Protection-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on positive-pressure testing according to NFPA 257 or UL 9, including the hose-stream test, and shall comply with NFPA 80.
  - 1. Fire-protection-rated glazing required to have a fire-protection rating of 20 minutes shall be exempt from the hose-stream test.
- B. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether or not glazing has passed the hose-stream test; whether or not glazing meets 450 deg F (250 deg C) temperature-rise limitation; and the fire-resistance rating in minutes.
- C. Fire-Protection-Rated Tempered Glass: fire-protection-rated tempered glass; and complying with 16 CFR 1201, Category II.

### **3.06 FIRE-RESISTANCE-RATED GLAZING**

- A. Fire-Resistance-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing according to ASTM E 119 or UL 263.
- B. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that the glazing is approved for use in walls, and the fire-resistance rating in minutes.

### **3.07 GLAZING ACCESSORIES**

- A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.



- B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
  - 1. Colors of Exposed Glazing Sealants: As indicated by manufacturer's designations Match Architect's samples.
- C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
- D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

### **3.08 MISCELLANEOUS GLAZING MATERIALS**

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- C. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

### **3.09 FABRICATION OF GLAZING UNITS**

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

## **PART 1 EXECUTION**

### **4.01 EXAMINATION**

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **4.02 PREPARATION**

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed work.

### **4.03 GLAZING, GENERAL**

- A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.
- B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.



- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

#### **4.04 CLEANING AND PROTECTION**

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

#### **END OF SECTION**



**SECTION 09 2116  
GYPSUM BOARD SHAFT WALL ASSEMBLIES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes: Gypsum board shaft wall assemblies.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each component of gypsum board shaft wall assembly.
- B. Sustainable Submittals:
  - 1. Product Data for Recycled Materials: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
  - 2. Product Certificates for Regional Materials:
    - a. For products and materials required to comply with requirements for regional materials, certificates indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating distance to Project, cost for each regional material, and fraction by weight that is considered regional.
    - b. For products and materials required to comply with requirements for regionally manufactured[ and regionally extracted and manufactured] materials. Include statement indicating cost for each regionally manufactured material.
    - c. Include statement indicating location of manufacturer and distance to Project for each regionally manufactured material.
    - d. Include statement indicating location of manufacturer and point of extraction, harvest, or recovery for each raw material used in regionally extracted and manufactured materials. Indicate distance to Project and fraction by weight of each regionally manufactured material that is regionally extracted.
  - 3. Product Data for VOC: For adhesives used to laminate gypsum board panels to substrates, documentation including printed statement of VOC content.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Evaluation Reports: For shaft wall assemblies from ICC-ES.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

**1.06 FIELD CONDITIONS**

- A. Environmental Limitations: Comply with ASTM C 840 requirements or with gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, or mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.



## **PART 2 PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. Low-Emitting Materials: Gypsum shaft wall assemblies shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

### **2.02 GYPSUM BOARD SHAFT WALL ASSEMBLIES - SEE DRAWINGS.**

- A. Fire-Resistance Rating: As indicated.
- B. Studs: Manufacturer's standard profile for repetitive members, corner and end members, and fire-resistance-rated assembly indicated.
  - 1. Depth: 2-1/2 inches (64 mm).
  - 2. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
- C. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches (51 mm) long and matching studs in depth.
  - 1. Minimum Base-Metal Thickness: Matching steel studs
- D. Firestop Tracks: Provide firestop track at head of shaft wall on each floor level.
- E. Room-Side Finish: Gypsum board.
- F. Shaft-Side Finish: Gypsum shaftliner board, Type X.
- G. Insulation: Sound attenuation blankets.

### **2.03 PANEL PRODUCTS**

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. Gypsum Shaftliner Board, Moisture- and Mold-Resistant Type X: ASTM C 1396/C 1396M; manufacturer's proprietary fire-resistive liner panels with moisture- and mold-resistant core and surfaces.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; ProRoc Moisture and Mold Resistant Shaftliner.
    - b. Georgia-Pacific Gypsum LLC, Subsidiary of Georgia Pacific; Dens-Glass Ultra Shaftliner.
    - c. Lafarge North America, Inc.; Firecheck Moldcheck Type X Shaftliner.
    - d. National Gypsum Company; Gold Bond Brand Fire-Shield Shaftliner XP.
    - e. PABCO Gypsum; Pabcore Mold Curb Shaftliner Type X.
    - f. Temple-Inland Inc.; Fire-Rated SilentGuard TS Mold-Resistant Gypsum Shaftliner System.
    - g. USG Corporation; Sheetrock Brand Mold Tough Gypsum Liner Panel.
  - 2. Long Edges: Double bevel.
  - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- C. Gypsum Board: As specified in Section 092900 "Gypsum Board."

### **2.04 NON-LOAD-BEARING STEEL FRAMING**

- A. Recycled Content of Steel: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Steel Framing Members: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  - 1. Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120)] [ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.



- C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Fire Trak Corp.; Fire Trak System attached to studs with Fire Trak Posi Klip.
    - b. Grace Construction Products; FlameSafe FlowTrak System.
    - c. Metal-Lite, Inc.; The System.
    - d. Steel Network Inc. (The); VertiClip SLD or VertiTrack VTD Series.

## **2.05 AUXILIARY MATERIALS**

- A. General: Provide auxiliary materials that comply with manufacturer's written recommendations.
- B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 092900 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written recommendations for application indicated.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
- D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
  - 1. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing according to ASTM E 488 conducted by a qualified testing agency.
  - 2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing according to ASTM E 1190 conducted by a qualified testing agency.
- E. Sound Attenuation Blankets: As specified in Section 092900 "Gypsum Board."
- F. Acoustical Sealant: As specified in Section 092900 "Gypsum Board."

## **2.06 EXECUTION**

### **2.07 EXAMINATION**

- A. Examine substrates to which gypsum board shaft wall assemblies attach or abut, with Installer present, including hollow-metal frames, elevator hoistway door frames, cast-in anchors, and structural framing. Examine for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **2.08 PREPARATION**

- A. Sprayed Fire-Resistive Materials: Coordinate with gypsum board shaft wall assemblies so both elements of Work remain complete and undamaged. Patch or replace sprayed fire-resistive materials removed or damaged during installation of shaft wall assemblies to comply with requirements specified in Section 078100 "Applied Fireproofing."
- B. After sprayed fire-resistive materials are applied, remove only to extent necessary for installation of gypsum board shaft wall assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

### **2.09 INSTALLATION**

- A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and ASTM C 754 other than stud-spacing requirements.



- B. Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.
- C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.
  - 1. Elevator Hoistway: At elevator hoistway-entrance door frames, provide jamb struts on each side of door frame.
  - 2. Reinforcing: Where handrails directly attach to gypsum board shaft wall assemblies, provide galvanized steel reinforcing strip with 0.033-inch (0.84-mm) minimum thickness of base metal (uncoated), accurately positioned and secured behind at least one layer of face panel.
- D. Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.
- E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels, while maintaining continuity of fire-rated construction.
- F. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
- G. Control Joints: Install control joints [at locations indicated on Drawings] [according to ASTM C 840 and in specific locations approved by Architect] while maintaining fire-resistance rating of gypsum board shaft wall assemblies.
- H. Sound-Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.
- I. Cant Panels: At projections into shaft exceeding 4 inches (102 mm), install 1/2- or 5/8-inch- (13- or 16-mm-) thick gypsum board cants covering tops of projections.
  - 1. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in adhesive and secure top edges to shaft walls at 24 inches (610 mm) o.c. with screws fastened to shaft wall framing.
  - 2. Where steel framing is required to support gypsum board cants, install framing at 24 inches (610 mm) o.c. and extend studs from the projection to shaft wall framing.
- J. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

## **2.10 PROTECTION**

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, or mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**END OF SECTION 092116.23**



**SECTION 09 2900  
GYPSUM BOARD**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Interior gypsum board.
  - 2. Tile and bath/shower backing panels
  - 3. Moisture resistant gypsum board
- B. Related Requirements:
  - 1. Division 7 section for sound attenuation blankets.
  - 2. Division 9 section for metal support for gypsum board.

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Sustainable Submittals:
  - 1. Product Data for Recycled Materials: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
  - 2. Product Data for VOC: For adhesives used to laminate gypsum board panels to substrates, documentation including printed statement of VOC content.

**1.03 QUALITY ASSURANCE**

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Owner will review gypsum board finish quality prior to installation of paint finishes and reserves right to require reworking of areas that do not meet quality standards.

**1.04**

**STORAGE AND HANDLING**

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

**1.05 PROJECT CONDITIONS**

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an



independent testing agency.

- B. **STC-Rated Assemblies:** For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. **Low-Emitting Materials:** For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## **2.02 INTERIOR GYPSUM BOARD**

- A. **General:** Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
- B. **Size:** Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- C. **Fire Resistant Type C:**
- D. **Fire Resistant Type X:**
  - 1. Thickness: 5/8 inch (15.9 mm) and 1/2 inch (12.7 mm).
  - 2. Long Edges: Tapered.
- E. **Moisture- and Mold-Resistant Type:** With moisture- and mold-resistant core and surfaces.
  - 1. Core: 5/8 inch (15.9 mm), Type X.
  - 2. Long Edges: Tapered.
  - 3. Use in all damp locations like bath rooms.
  - 4. Do not use behind shower or tub surrounds. Use shower and tub backing panels.

## **2.03 EXTERIOR SOFFIT GYPSUM BOARD**

- A. *General: complying with ASTM C1396 and ASTM C931 and GA216 for IBC code.*
- B. *Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.*
- C. *Provide Type X and Type C rating x thickness, depending upon assembly requirements.*
- D. *Seal exposed areas with exterior primer and one or more coats of exterior paint.*

## **2.04 TRIM ACCESSORIES**

- A. **Trim:** ASTM C 1047, galvanized or aluminum-coated steel sheet or rolled zinc at interior applications and hot dip galvanized steel sheet or rolled zinc at exterior locations. Provide the following shapes, unless otherwise indicated:
  - 1. Cornerbead: Use at outside corners.
  - 2. LC-Bead: Use at exposed panel edges.
  - 3. Expansion (Control) Joint: Use where indicated.

## **2.05 JOINT TREATMENT MATERIALS**

- A. **General:** Comply with ASTM C 475.
- B. **Joint Tape:**
  - 1. Interior Gypsum Wallboard: Paper.
  - 2. Water Resistant Gypsum Board: As recommended by panel manufacturer.
  - 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. **Joint Compound for Interior Gypsum Wallboard:** For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. **Prefilling:** At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. **Embedding and First Coat:** For embedding tape and first coat on joints, flanges of trim accessories, and fasteners, use setting-type taping compound.
  - 3. **Fill Coat:** For second coat, use setting-type, sandable topping compound.
  - 4. **Finish Coat:** For third coat, use setting-type, sandable topping compound.



5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
- D. Joint Compound for Tile Backing Panels:
  1. Cementitious Backer Units: As recommended by backer unit manufacturer.

## **2.06 AUXILIARY MATERIALS**

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

## **2.07 TRIM ACCESSORIES**

- A. Interior Trim: ASTM C 1047.
  1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
  2. Shapes:
    - a. Cornerbead.
    - b. Bullnose bead.
    - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - d. L-Bead: L-shaped; exposed long flange receives joint compound.
    - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    - f. Expansion (control) joint.
    - g. Curved-Edge Cornerbead: With notched or flexible flanges.
    - h. 5/8" steel furring channels or hat channels.

## **2.08 TILE AND SHOWER/TUB BACKING PANELS**

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges. Use behind all shower and tub/shower surrounds.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. C-Cure; C-Cure Board 990.
    - b. CertainTeed Corp.; FiberCement BackerBoard.
    - c. Custom Building Products; Wonderboard or EasyBoard.
    - d. FinPan, Inc.; [Util-A-Crete Concrete Backer Board] [EZ Backer] [ProTEC].
    - e. James Hardie Building Products, Inc.; Hardiebacker.
    - f. National Gypsum Company, Permabase Cement Board.
    - g. USG Corporation; DUROCK Cement Board.
  2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
  3. DO NOT USE IN RATED ASSEMBLIES - Use Dens Glass Gold gypsum sheathing in place of gypsum board in rated assemblies.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.



### **3.02 PANEL PRODUCT INSTALLATION**

- A. Gypsum Board: Comply with ASTM C 840 and GA-216.
  - 1. Space screws a maximum of 12 inches o.c. for vertical applications, unless closer spacing required by Code.
  - 2. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
  - 3. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
    - b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
  - 4. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
  - 5. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.

### **3.03 FINISHING**

- A. Installing Trim Accessories: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Coordinate location of push-in concealed spaces vent with the architect.
- C. Finishing Gypsum Board and cementitious panels: Treat panel joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare board surfaces for decoration.
  - 1. Prefill open joints and damaged surface areas.
  - 2. Apply joint tape over board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
  - 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
  - 2. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view.

**END OF SECTION 092900**



**SECTION 09 3000  
TILING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Ceramic trim.

**1.02 REFERENCE STANDARDS**

- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium) 2019.
- B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar 2017 (Reaffirmed 2022).
- C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 2017.
- D. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 1999 (Reaffirmed 2021).
- E. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship 2019.
- F. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive 2019.
- G. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 2021.
- H. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy 1999 (Reaffirmed 2019).
- I. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout 1999 (Reaffirmed 2019).
- J. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout 1999 (Reaffirmed 2019).
- K. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework 2017 (Reaffirmed 2022).
- L. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- M. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2019).
- N. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2005 (Reaffirmed 2021).
- O. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar 2020.
- P. ANSI A118.1 - American National Standard Specifications for Dry-Set Cement Mortar 2019.
- Q. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive 2021.
- R. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2019.



- S. ANSI A118.5 - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation 1999 (Reaffirmed 2021).
- T. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation 2019.
- U. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation 2019.
- V. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 2019.
- W. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2014 (Reaffirmed 2019).
- X. ANSI A118.11 - American National Standard Specifications for EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 2017.
- Y. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation 2014 (Reaffirmed 2019).
- Z. ANSI A118.13 - American National Standard Specification for Bonded Sound Reduction Membranes for Thin-Set Ceramic Tile Installation 2014 (Reaffirmed 2019).
- AA. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar 2019.
- BB. ANSI A136.1 - American National Standard Specifications for Organic Adhesives for Installation of Ceramic Tile 2020.
- CC. ANSI A137.1 - American National Standard Specifications for Ceramic Tile 2022.
- DD. ANSI A137.2 - American National Standard Specifications for Glass Tile 2022.
- EE. ANSI A137.3 - American National Standard Specifications for Gauged Porcelain Tile and Gauged Porcelain Tile Panels/Slabs 2021.
- FF. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2023.
- GG. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- HH. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products 2018 (Reapproved 2023).
- II. ASTM C847 - Standard Specification for Metal Lath 2018.
- JJ. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.
- KK. ASTM D4068 - Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane 2017 (Reapproved 2022).
- LL. ASTM E492 - Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine 2022.
- MM. ASTM E2179 - Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors 2021.
- NN. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2022.
- OO. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2023.
- PP. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- QQ. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2023.



### **1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

### **1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

### **1.05 FIELD CONDITIONS**

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

## **PART 2 PRODUCTS**

### **2.01 TILE**

- A. Manufacturers: See basis of design.
  - 1. Dal-Tile Corporation: [www.daltile.com/#sle](http://www.daltile.com/#sle).
  - 2. Ceramic Technics.
  - 3. Designer Tile and Stone.
  - 4. Transceramica
  - 5. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 TRIM AND ACCESSORIES**

- A. Ceramic Trim: Matching bullnose, double bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
  - 1. Applications:
    - a. Open Edges: Bullnose.
    - b. Inside Corners: Jointed.
    - c. Floor to Wall Joints: Cove base.
  - 2. Manufacturers: Same as for tile.

### **2.03 SETTING MATERIALS**

- A. Provide setting and grout materials from same manufacturer.

### **2.04 GROUTS**

- A. Provide setting and grout materials from same manufacturer.

### **2.05 MAINTENANCE MATERIALS**

- A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
  - 1. Applications: Between tile and plumbing fixtures.
  - 2. Color(s): As selected by Architect from manufacturer's full line.
  - 3. Products:
    - a. ARDEX Engineered Cements; ARDEX SX: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Custom Building Products; Commercial 100% Silicone Caulk: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - c. LATICRETE International, Inc; LATICRETE LATASIL: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - d. Merkrete, by Parex USA, Inc; Merkrete Colored Caulking: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).



- e. Rust-Oleum Corporation; Merkrete Colored Caulking: [www.rustoleum.com/#sle](http://www.rustoleum.com/#sle).
  - f. Substitutions: See Section 01 6000 - Product Requirements.
- B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
- 1. Composition: Water-based colorless silicone.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
  - 1. Test in accordance with Section 09 0561.
  - 2. Test as Follows:
    - a. Alkalinity (pH): ASTM F710.
    - b. Internal Relative Humidity: ASTM F2170.
    - c. Moisture Vapor Emission: ASTM F1869.
  - 3. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.

#### **3.02 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

#### **3.03 INSTALLATION - GENERAL**

- A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Sound tile after setting. Replace hollow sounding units.
- G. Keep control and expansion joints free of mortar, grout, and adhesive.
- H. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- I. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- J. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

#### **3.04 CLEANING**

- A. Clean tile and grout surfaces.



**3.05 PROTECTION**

- A. Do not permit traffic over finished floor surface for 4 days after installation.

**END OF SECTION**



**SECTION 09 5113  
ACOUSTICAL PANEL CEILINGS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes acoustical panels and exposed suspension systems for ceilings.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
  - 1. Acoustical Panel: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern, and texture.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

**1.04 FIELD CONDITIONS**

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

**PART 1 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
  - 2. Smoke-Developed Index: 50 or less.
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

**2.02 ACOUSTICAL PANELS, GENERAL**

- A. Source Limitations:
  - 1. Acoustical Ceiling Panel: Obtain each type from single source from single manufacturer.
  - 2. Suspension System: Obtain each type from single source from single manufacturer.
- B. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- C. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
  - 1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E 795.
- D. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
  - 1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product



designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

### **2.03 ACOUSTICAL PANELS**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Fine Fissured High NRC, HHF-454 HNRC by CertainTeed or comparable product.
- B. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:
  - 1. As scheduled in the drawings.
- C. Color: White.
- D. LR: Not less than 0.80.
- E. NRC: Not less than 0.70.
- F. CAC: Not less than 35 .
- G. Edge/Joint Detail: Reveal sized to fit flange of exposed suspension-system members.
- H. Thickness: 3/4 inch (19 mm).
- I. Modular Size: 24 by 24 inches (610 by 610 mm).

### **2.04 METAL SUSPENSION SYSTEMS, GENERAL**

- A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
- B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
  - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.
- D. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

### **2.05 METAL SUSPENSION SYSTEM**

- A. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.
  - 1. Structural Classification: Intermediate-duty system.
  - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
  - 3. Face Design: Flat, flush.
  - 4. Cap Material: Steel or aluminum cold-rolled sheet.
  - 5. Cap Finish: Painted white.

### **2.06 METAL EDGE MOLDINGS AND TRIM**

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
  - 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.



2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

## **PART 1 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

### **3.02 PREPARATION**

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

### **3.03 INSTALLATION**

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
  1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  6. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
  7. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
  1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
  3. Do not use exposed fasteners, including pop rivets, on moldings and trim.



- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
  - 1. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  - 2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
  - 3. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

#### **3.04 CLEANING**

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

**END OF SECTION**



**SECTION 09 6500  
RESILIENT FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient tile flooring.
- B. Resilient base.
- C. Resilient stair accessories.
- D. Installation accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile 2020.

**1.03 SUBMITTALS**

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- B. Verification Samples: Submit two samples, \_\_\_\_ by \_\_\_\_ inch in size illustrating color and pattern for each resilient flooring product specified.

**1.04 FIELD CONDITIONS**

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

**PART 2 PRODUCTS**

**2.01 TILE FLOORING**

- A. Luxury Vinyl Plank: \_\_\_\_\_. See basis of design.
  - 1. Manufacturers:
    - a. Interface Americas, Inc.
    - b. Substitutions: See Section 01 6000 - Product Requirements.
  - 2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
  - 3. Color: To be selected by Architect from manufacturer's full range.
- B. Rubber Tile: Recycled SBR (styrene butadiene rubber) and colored EPDM (ethylene propylene diene monomer) granules with urethane binder. See basis of design.
  - 1. Color: To be selected by Architect from manufacturer's full range.
- C. Woven Vinyl Flooring, see basis of design.
  - 1. Manufacturers:
    - a. Bolon
    - b. Substitutions: See Section 01 6000-Product Requirements.

**2.02 STAIR COVERING**

- A. Stair Treads: See basis of design.
- B. Stair Risers: See basis of design.
- C. Stair Stringers: See basis of design.
- D. Stair Nosings: See basis of design.

**2.03 ACCESSORIES**

- A. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- B. Adhesive for Vinyl Flooring:
- C. Moldings, Transition and Edge Strips: See basis of design.
- D. Sealer and Wax: Types recommended by flooring manufacturer.



- E. Sound Control Underlayment: Core of fused entangled mesh filaments, attached to a water resistant, non-woven fabric.
  - 1. Manufacturers:
    - a. Maxxon; Acousti-mat.
    - b. Substitutions: See Section 01 6000 - Product Requirements.
  - 2. Thickness: 3/8 inch, nominal.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
  - 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

### **3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

### **3.03 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's written instructions.

### **3.04 INSTALLATION - SOUND CONTROL UNDERLAYMENT**

- A. Install in accordance with underlayment manufacturer's instructions.

### **3.05 INSTALLATION - TILE FLOORING**

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Install plank tile with a random offset of at least 6 inches from adjacent rows.

### **3.06 INSTALLATION - STAIR COVERINGS**

- A. Install stringers configured tightly to stair profile.
- B. Adhere over entire surface. Fit accurately and securely.

### **3.07 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

### **3.08 PROTECTION**

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

**END OF SECTION**



**SECTION 09 6513  
RESILIENT WALL BASE AND ACCESSORIES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Resilient base.
  - 2. Resilient molding accessories.

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Environmental Submittals:
  - 1. For adhesives, including printed statement of VOC content.
- C. Samples: For each type of product indicated, in manufacturer's standard-size samples, but not less than 12 inches long, of each resilient product color, texture, and pattern required.

**1.03 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

**1.04 PROJECT CONDITIONS**

- A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive resilient products.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.
- C. Install resilient products after other finishing operations, including painting, have been completed.

**PART 2 PRODUCTS**

**2.01 RESILIENT BASE**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide listed product or comparable product by one of the following:

**2.02 RESILIENT MOLDING ACCESSORY**

- A. Resilient Molding Accessory:
  - 1. Manufacturers: Subject to compliance with requirements, provide products that coordinate with the base and stair materials provided.
- B. Description: Carpet edge for glue-down applications, Reducer strip for resilient floor covering, Joiner for tile and carpet, transition strips.
- C. Material: Vinyl.
- D. Profile and Dimensions: As indicated.
- E. Colors and Patterns: As selected by Architect from full range of industry colors.

**2.03 INSTALLATION MATERIALS**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
  - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Cove Base Adhesives: Not more than 50 g/L.



## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
  - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

### **3.02 RESILIENT BASE INSTALLATION**

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.

### **3.03 RESILIENT ACCESSORY INSTALLATION**

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet, or resilient floor covering that would otherwise be exposed.

### **3.04 CLEANING AND PROTECTION**

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Cover resilient products until Substantial Completion.

**END OF SECTION 096513**



**SECTION 09 6813  
TILE CARPETING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Carpet tile, fully adhered.

**1.02 SUBMITTALS**

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- B. Samples: Submit two carpet tiles illustrating color for each carpet color selected.

**1.03 FIELD CONDITIONS**

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Tile Carpeting
  - 1. SHAW INDUSTRIES INC
  - 2. See basis of design
  - 3. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 ACCESSORIES**

- A. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

**3.02 INSTALLATION**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in brick ashlar pattern pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Fully adhere carpet tile to substrate.
- G. Trim carpet tile neatly at walls and around interruptions.
- H. Complete installation of edge strips, concealing exposed edges.

**3.03 CLEANING**

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

**END OF SECTION**



**SECTION 09 6816  
SHEET CARPETING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes carpet for building, see basis of design.

**1.02 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Show the following:
  - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
  - 2. Carpet type, color, and dye lot.
  - 3. Seam locations, types, and methods.
  - 4. Pile direction.
- C. Samples: For each exposed product and for each color and texture specified.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Product test reports.
- B. Warrant: Sample of special warranty.

**1.05 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

**1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced Installer who is certified by the International Certified Floorcovering Installers.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet identical to those of assemblies tested for fire response per NFPA 253 by a qualified testing agency.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with CRI 104.

**1.08 FIELD CONDITIONS**

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

**PART 2 PRODUCTS**

**2.01 CARPET**

- A. Basis-of-Design for product.
- B. Color: As selected by Architect from full manufacturer's color range.
- C. Primary Backing: Manufacturer's standard material
- D. Width: 12 feet
- E. Installation: Install over fiber pad in all guest rooms NOTE: Direct glue product in all accessible guest rooms.
- F. Applied Soil-Resistance Treatment: Manufacturer's standard material.
- G. Antimicrobial Treatment: Manufacturer's standard material.

**2.02 INSTALLATION ACCESSORIES**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.



- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
  - 1. Use adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Use adhesives that comply with the product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and that comply with CRI 104, Section 12.2.
- D. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Preparation: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.
- E. Installation: Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:
  - 1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
  - 2. Preapplied Adhesive Installation: Comply with CRI 104, Section 11.4, "Pre-Applied Adhesive Systems (Peel and Stick)."
  - 3. Hook-and-Loop Installation: Comply with CRI 104, Section 11.5, "Hook and Loop Technology."
  - 4. Stretch-in Installation: Comply with CRI 104, Section 12, "Stretch-in Installations."
- F. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- G. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- H. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- I. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- J. Install pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.
- K. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.



- L. Protect installed carpet to comply with CRI 104, Section 16, "Protecting Indoor Installations."

**END OF SECTION 096816**



**SECTION 09 9113  
EXTERIOR PAINTING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes surface preparation and the application of paint systems on exterior substrates. See basis of design.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
  - 2. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

**1.04 FIELD CONDITIONS**

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material, finish and color applied.

**PART 2 PRODUCTS**

**2.01 PAINT, GENERAL**

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Colors: As selected by Architect from manufacturer's full range

**2.02 METAL PRIMERS**

- A. Primer, Alkyd, Anti-Corrosive for Metal
- B. Primer, Galvanized, Water Based

**2.03 SOLVENT-BASED PAINTS**

- A. Alkyd, Exterior, Semi-Gloss (Gloss Level 5)
- B. Alkyd, Exterior Gloss (Gloss Level 6)



## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### **3.02 PREPARATION**

- A. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- C. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer
- D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

### **3.03 APPLICATION**

- A. Apply paints according to manufacturer's written instructions and recommendations.
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
  - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  - 4. Paint entire exposed surface of window frames and sashes.
  - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

### **3.04 CLEANING AND PROTECTION**

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.



- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

**END OF SECTION 099113**



**SECTION 09 9123  
INTERIOR PAINTING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes surface preparation and the application of paint systems on interior substrates. See basis of design.

**1.02 RELATED REQUIREMENTS:**

- A. Section 051200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 8 inches square.
  - 2. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F .
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

**1.05 FIELD CONDITIONS**

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

**1.06 EXTRA MATERIALS**

- A. See Division 1 section "Project Closeout".

**PART 2 PRODUCTS**

**2.01 PAINT, GENERAL**

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the VOC limits shall be, exclusive of colorants added to a tint base, calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Colors: As selected by Architect from manufacturer's full range.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.



- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Wood: 15 percent.
  - 2. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### **3.02 PREPARATION**

- A. Comply with manufacturer's written instructions and recommendations.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- G. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

### **3.03 APPLICATION**

- A. Apply paints according to manufacturer's written instructions and recommendations.
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.



- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

### **3.04 CLEANING AND PROTECTION**

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces, fixtures or equipment.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### **3.05 INTERIOR PAINTING SCHEDULE**

- A. Steel Substrates:
  - 1. Alkyd System:
    - a. Prime Coat: Primer, alkyd, quick dry, for metal.
    - b. Intermediate Coat: Alkyd, interior, matching topcoat.
    - c. Topcoat: Alkyd, interior.
- B. Galvanized-Metal Substrates:
  - 1. Latex over Waterborne Primer System:
    - a. Prime Coat: Primer, galvanized, water based.
    - b. Intermediate Coat: Alkyd, interior, matching topcoat.
    - c. Topcoat: Alkyd, interior.
- C. Opaque Finish Wood Substrates: Including wood trim, architectural woodwork, and wood-based panel products
  - 1. Latex System:
    - a. Prime Coat: Primer sealer, latex, interior.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior.
- D. Transparent Finish Wood Substrates:
  - 1. Semitransparent Stain System:
    - a. Prime Coat: Stain, semi-transparent, matching topcoat.
    - b. Topcoat: Stain, semi-transparent, for interior wood.
- E. Gypsum Board Substrates:
  - 1. Latex System:
    - a. Prime Coat: Primer sealer, latex, interior.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior

**END OF SECTION 099123**



**SECTION 09 9500  
WALLCOVERING**

**PART 1 - GENERAL**

**1.01 TYPES OF WALLCOVERING REQUIRED INCLUDE THE FOLLOWING:**

- A. Per basis of design.

**PART 2 - PRODUCTS**

**2.01 WALL COVERING:**

- A. Per basis of design.

**2.02 ACCESSORY ITEMS:**

- A. Adhesives: Provide manufacturer's recommended strippable adhesive, produced expressly for use with selected wallcovering on substrate as shown on drawings. Provide materials which are mildew-resistant and non-staining to wallcovering.

**2.03 EXECUTION**

- A. Examine substrates for compliance with requirements. Make certain surfaces are free from defects and imperfections that could show through the finished surface.
  - 1. Do not install over oil-based wood stains or felt-tip pen markings.
  - 2. Check painted surfaces for possibility of pigment bleed-through.
  - 3. Do not proceed until unsatisfactory conditions have been corrected.
- B. ACCLIMATIZE wallcovering materials by removing from packaging in the installation area not less than 24 hours before application.
- C. REMOVE switchplates, wall plates, and surface-mounted fixtures where wallcovering is applied. On completion of installation, reinstall items using workmen skilled in trades involved.
- D. TEST SUBSTRATE with electronic moisture meter to verify that surfaces do not exceed moisture content permitted.
- E. VERIFY that colors and patterns are those specified before beginning installation.
- F. VINYL WALLCOVERING: Place panels consecutively in order cut from rolls, including filling spaces above or below openings. Hang by reversing alternative strips, except on match patterns.
- G. Wallboard is to be sized or use strippable adhesive before vinyl fabric is installed. Contractor to submit on selected method.
- H. Apply adhesive to back of wallcovering and place in accordance with manufacturer's instructions. Install seams plumb, at least 6" away from corners. Horizontal seams will not be permitted. Overlap seams and double-cut to assure tight closure. Roll, brush, or use a broad knife to remove bubbles, wrinkles, blisters, and other defects. Cut evenly to edges of wall penetrations. Trim salvages to assure color uniformity and pattern match.
- I. Trim salvages as required to assure color uniformity and pattern match.
- J. Remove excess adhesive along finished seams while it is still wet using warm water and clean sponge, and wipe dry.
- K. Install wallcovering to cleanout plates that are located on walls scheduled for wallcovering.

**2.04 ADJUST AND CLEAN:**

- A. Replace removed plates and fixtures; verify cut edges of wall coverings are completely concealed.
- B. Remove surplus materials, rubbish, and debris resulting from wall covering installation upon completion of work, and leave areas of installation in neat, clean condition.
- C. Provide protection needed to ensure that wallcoverings will be without deterioration or damage at time of substantial completion.



D. Pattern match at no additional charge.

**END OF SECTION**



**SECTION 10 1423**  
**SIGNAGE - INTERIOR/EXTERIOR**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Room-identification signs for building and identification numbers. See basis of design.
  - 2. Exterior Signage - see basis of design.

**1.02 COORDINATION**

- A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.
- B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
  - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
  - 4. Show locations of electrical service connections.
  - 5. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
  - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finishes, in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Room-Identification Signs: Full-size Sample.
  - 2. Variable Component Materials: Full-size Sample of each base material, character (letter, number, and graphic element) in each exposed color and finish not included in Samples above.
  - 3. Exposed Accessories: Full-size Sample of each accessory type.
- E. Sign Schedule: Use same designations indicated in a sign schedule.

**1.04 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For signs to include in maintenance manuals.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Manufacturer of products.

**1.06 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image.
    - c. Separation or delamination of sheet materials and components.
  - 2. Warranty Period: Five years from date of Substantial Completion.



## **PART 2 PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

### **2.02 ACCESSORIES**

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
  - 1. Use concealed fasteners and anchors unless indicated to be exposed.
- B. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.
- D. Hook-and-Loop Tape: Manufacturer's standard two-part tape consisting of hooked part on sign back and looped side on mounting surface.
- E. Magnetic Tape: Manufacturer's standard magnetic tape with adhesive on one side.

### **2.03 FABRICATION**

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
  - 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
  - 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
  - 4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
  - 5. Internally brace signs for stability and for securing fasteners.
  - 6. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

### **2.04 GENERAL FINISH REQUIREMENTS**

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.



- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
  - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
  - 4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Room-Identification Sign and Other Accessible Signage: Install in locations on walls according to accessibility standard.
- C. Mounting Methods:
  - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
    - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
    - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
  - 2. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
    - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.
    - b. Thin or Hollow Surfaces: Place spacers on studs, place sign in position with spacers pinched between sign and substrate, and install washers and nuts on stud ends projecting through opposite side of surface, and tighten.
  - 3. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
  - 4. Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position so that signage is correctly located and aligned.
  - 5. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
  - 6. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
  - 7. Hook-and-Loop Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply sign component of two-part tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage; push to engage tape adhesive. Keep tape strips 0.250 inch (6.35 mm) away from edges to prevent visibility at sign edges when sign is initially installed or reinstalled. Apply substrate component of tape to substrate in locations aligning with tape on back of sign; push and rub well to fully engage tape adhesive to substrate.



8. Magnetic Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position.

### **3.03 ADJUSTING AND CLEANING**

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

**END OF SECTION 101423**



**SECTION 10 2600  
WALL AND DOOR PROTECTION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Corner guards.

**1.02 REFERENCE STANDARDS**

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics 2023, with Editorial Revision.
- B. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies 2023.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Include plans, elevation, sections, and attachment details. Show design and spacing of supports for protective corridor handrails, required to withstand structural loads.
- C. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.

**1.05 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE CRITERIA**

- A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.

**2.02 PRODUCT TYPES**

- A. Corner Guards - Flush Mounted:
  - 1. Width of Wings: 2 inches.
  - 2. Corner: Square.
  - 3. Color: As selected from manufacturer's standard colors.
  - 4. Length: One piece.

**2.03 FABRICATION**

- A. Fabricate components with tight joints, corners and seams.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Position corner guard 4 inches above finished floor to 48 inches high.

**3.02 TOLERANCES**

- A. Maximum Variation From Required Height: 1/4 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

**3.03 CLEANING**

- A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

**END OF SECTION**



**SECTION 10 2800  
TOILET AND BATH ACCESSORIES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Guest room bathroom.
  - 2. Public-use bathroom.
  - 3. Under lavatory guards.

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include the following:
  - 1. Construction details and dimensions.
  - 2. Anchoring and mounting requirements, including requirements for cut-outs in other work and substrate preparation.
  - 3. Material and finish descriptions.
  - 4. Features that will be included for Project.
  - 5. Manufacturer's warranty.

**1.04 COORDINATION**

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

**1.05 WARRANTY**

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 15 years from date of Substantial Completion.

**1.06 EXTRA MATERIALS**

- A. See Division 1 section "Project Closeout".

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.



## **2.02 GUEST ROOM BATHROOM ACCESSORIES**

- A. Toilet Tissue Dispenser: Preferred Bath Accessories; 2008-BN-MV-E; see basis of design.
- B. Shower Panel: Belstone; TPSFP88/44; see basis of design.
- C. Shower Rod:
  - 1. Standard Tub and Accessible Tub: Preferred Bath Accessories; 113-5BN; see basis of design.
  - 2. Accessible Roll-in Shower: Preferred Bath Accessories; 113-5BN-SR; see basis of design.
- D. Shower Accessories:
  - 1. Shower Curtain: P KAUFMANN INC; MTPS MERINO SC 72" X 72" WHITE
  - 2. Hooks: KARTRI SALES CO INC; KA412R - SHOWER HOOKS
  - 3. Shower Curtain Liner: KARTRI SALES CO INC; P-FREE VINYL LINER-72 X 72-PF7272-24
  - 4. See basis of design.
- E. Towel Bar
  - 1. Towel Ladder: WINGIT INNOVATIONS LLC; X-702
  - 2. BATH ACCESSORY: WINGIT INNOVATIONS LLC; X-703L or X-703R
  - 3. See basis of design.
- F. Robe Hook: Preferred Bath Accessories; 2000-BN; see basis of design.
- G. Grab Bars:
  - 1. Standard Shower: Preferred Bath Accessories; 7012-SS, see basis of design.
  - 2. Standard Tub and Accessible Tub or Roll-in Shower: Preferred Bath Accessories; 7024-SS; see basis of design.
  - 3. Accessible Bathroom Roll-in shower: Preferred Bath Accessories, LLC; 7036-SS; see basis of design.
  - 4. Accessible Roll-in Shower or Tub; Preferred Bath Accessories; 7018-SS; see basis of design.
  - 5. Accessible Tub: Preferred Bath Accessories; 7016-SS; see basis of design
- H. Grab Bar with Handheld Shower Holder; Preferred Bath Accessories; 7024-HSH-SS; see basis of design.
- I. Foot Rest: International Marble Industries, Inc; FR-M-NS15; see basis of design.
- J. Accessory Ledge: International Marble Industries, Inc; ACC-AL-C15; see basis of design.
- K. Soap Dish: Preferred Bath Accessories; 313-BP; see basis of design.
- L. Seats:
  - 1. Shower Seat for Accessible Roll-in Shower: Preferred Bath Accessories; 1800-LS-CRH-W (Right Hand), 1800-LS-CLH-W (Left Hand); see basis of design.
  - 2. Tub Seat for Accessible Bathroom: Preferred Bath Accessories; 1800-FDTS-28-W; see basis of design.
- M. Mirror:
  - 1. Standard: PROJECT LIGHT INC; 191325-G
  - 2. Accessible: PROJECT LIGHT INC; 197040-G
  - 3. See basis of design
- N. Substitutions allowed, see basis of design.

## **2.03 PUBLIC-USE BATHROOM ACCESSORIES**

- A. Toilet Tissue (Roll) Dispenser:
  - 1. Employee and Public: American Specialties, Inc; Double: AS 7305-2S
  - 2. Provide one in each toilet room.
  - 3. See basis of design
- B. Soap Dispenser:
  - 1. Employee and Public: American Specialties, Inc.; AS 0332D



2. Provide one in each toilet room.
3. See basis of design.
- C. Paper Towel Dispenser and Waste dispenser:
  1. Employee and Public: American Specialties, Inc; AS 0469
  2. Provide one in each toilet room.
  3. See basis of design
- D. Grab Bar:
  1. Public Restrooms: Preferred Bath Accessories, Inc.; 8018-BP
  2. Public Restroom: Preferred Bath Accessories, Inc.; 8036-BP
  3. Public Restroom: Preferred Bath Accessories, Inc.; 8042-SS, Squared Series
  4. Employee Restrooms: Preferred Bath Accessories, LLC; 7042-SS
  5. Employee Restrooms: Preferred Bath Accessories, LLC; 7036-SS
  6. Employee Restrooms: Preferred Bath Accessories, LLC; 7018-SS
  7. See basis of design
- E. Sanitary Napkin Disposal:
  1. Manufacturer: American Specialties, Inc; 0473
  2. Provide one in each toilet room.
  3. See basis of design
- F. Coat/Purse Hook:
  1. Robe Hook (Basis of Design: Moen, YB2803BN, Eva Series single robe hook, brushed nickel. Provide one at each toilet room.
- G. Mirror:
  1. Employee: American Specialties, Inc; 0620
  2. See basis of design.
- H. Seat Cover Dispenser
  1. Employee and Public: American Specialties, Inc; 6477
  2. Provide one in each toilet room
  3. See basis of design.
- I. Feminine Napkin Vendor
  1. Employee and Public: American Specialties, Inc.; AS 04684
  2. See basis of design.
- J. Substitutions allowed, see basis of design.

#### **2.04 UNDERLAVATORY GUARDS**

- A. Under lavatory Guard:
  1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping, and allow service access without removing coverings.
  2. Material and Finish: Antimicrobial, molded-plastic, white.

#### **2.05 FABRICATION**

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated in drawings.



- B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

**3.02 ADJUSTING AND CLEANING**

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

**END OF SECTION 102800**



**SECTION 10 2819  
TUB AND SHOWER ENCLOSURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Framed tub and shower doors; enclosures.
- B. Semi-frameless tub and shower doors; enclosures.
- C. Frameless tub and shower doors; enclosures.
- D. Tub and shower surrounds.

**1.02 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- C. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- D. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- E. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
- F. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2023.
- G. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip 2023a.
- H. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing 2021.
- I. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2023.
- J. ASTM B138/B138M - Standard Specification for Manganese Bronze Rod, Bar, and Shapes 2011 (Reapproved 2017).
- K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- L. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- M. ASTM B455/B455M - Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes 2020.
- N. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- O. ASTM C1036 - Standard Specification for Flat Glass 2021.
- P. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- Q. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
- R. ISFA 2-01 - Classification and Standards for Solid Surfacing Material 2013.
- S. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate layout, dimensions, identification of components, and interface with adjacent construction.



## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Tub and Shower Enclosures: see basis of design.
- B. Cast Polymer Tub and Shower Surrounds: see basis of design.

### **2.02 MATERIALS**

- A. Tempered Glass: Annealed clear flat glass meeting requirements of ASTM C1036, Type I, Quality Q3, fully tempered in accordance with ASTM C1048, Kind FT, and as follows:
  - 1. Comply with 16 CFR 1201, Category 2 and ANSI Z97.1.

### **2.03 ACCESSORIES**

- A. Protective Glass Coatings: Transparent coatings designed to seal and protect surface of glass subject to wear, soiling, and degradation from environmental exposure.
  - 1. Hydrophobic Coatings: Coatings that repel water causing it to bead up and have a very large contact angle on surface being protected.
    - a. Oleophobic action.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until supports and adjacent substrates are complete.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Clean substrates thoroughly prior to installation.
- B. Prepare substrates as recommended by the manufacturer.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and approved shop drawings.
- B. Fit and align tub and shower enclosure level and plumb.

### **3.04 FIELD QUALITY CONTROL**

- A. Verify enclosure does not leak while shower is running and door is fully closed and catch is engaged.

### **3.05 ADJUSTING**

- A. Adjust tub and shower enclosure doors to operate smoothly.

### **3.06 CLEANING**

- A. Remove protective film and temporary stickers from exposed metal and glass surfaces.
- B. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents or other substances that may damage the material or finish.
- C. Glass and Glazing: Clean glazing surfaces; remove excess glazing sealant compounds, dirt, and other substances; do not use abrasive materials or chemicals, detergents or other substances that may damage the material or finish.

### **3.07 CLOSEOUT ACTIVITIES**

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

### **3.08 PROTECTION**

- A. Protect installed products until Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

## **END OF SECTION**



**SECTION 10 4413  
FIRE EXTINGUISHER CABINETS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

**1.02 DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.**

**1.03 SUMMARY**

- A. Section Includes:
  - 1. Fire protection cabinets for the following:
    - a. Portable fire extinguishers located at public spaces.

**1.04 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
  - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

**1.05 QUALITY ASSURANCE**

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

**1.06 COORDINATION**

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

**2.02 FIRE PROTECTION CABINET**

- A. Manufacturers:
  - 1. Amera Products
  - 2. Larsen's Manufacturing Company
  - 3. Potter Roemer
  - 4. J.L. Industries
- B. Cabinet Type: Suitable for fire extinguisher.
- C. Cabinet Construction: 1-hour fire rated at all locations.
  - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material. Provide factory-drilled mounting holes.
- D. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.



1. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- E. Cabinet Trim Material: Stainless-steel sheet.
- F. Door Material: Stainless-steel sheet.
- G. Door Style: Full glass.
- H. Door Glazing: Clear tempered glass.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
  1. Provide manufacturer's standard hinge permitting door to open 180 degrees.
- J. Accessories:
  1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
    - a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet door.
      - 2) Application Process: Decals.
      - 3) Lettering Color: Black.
- K. Finishes:
  1. Manufacturer's standard baked enamel paint for the following:
    - a. Exterior of cabinet trim except for those surfaces indicated to receive another finish.
    - b. Interior of cabinet.
  2. As selected by Architect from the full range of manufacturer's standard colors.

## **2.03 FABRICATION**

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  1. Weld joints and grind smooth.
  2. Provide factory-drilled mounting holes.
  3. Prepare doors and frames to receive locks.
  4. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
  1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
  2. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

## **2.04 GENERAL FINISH REQUIREMENTS**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.



## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

### **3.03 INSTALLATION**

- A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
  - 1. Unless otherwise indicated, provide semi-recessed fire protection cabinets.
  - 2. Provide inside latch and lock for break-glass panels.
  - 3. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.

### **3.04 ADJUSTING AND CLEANING**

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION 104413**



**SECTION 10 4416  
FIRE EXTINGUISHERS**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguishers.
- B. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

**1.02 QUALITY ASSURANCE**

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
  - 1. Provide fire extinguishers approved, listed, and labeled by FMG.

**1.03 COORDINATION**

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

**PART 2 PRODUCTS**

**2.01 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS**

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet indicated.
  - 1. Valves: Manufacturer's standard.
  - 2. Handles and Levers: Manufacturer's standard.
  - 3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type: UL-rated nominal capacity, with mono-ammonium phosphate-based dry chemical in manufacturer's standard enameled container.
- C. Provide 3 lb multi-purpose extinguisher mounted with a bracket under each kitchen sink.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

- A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

**END OF SECTION 104416**



**SECTION 10 5000  
METAL LOCKERS**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary conditions and Division 1 General Requirements, apply to work of this section.

**1.02 SUBMITTALS: IN ADDITION TO PRODUCT DATA AND INSTALLATION INSTRUCTIONS, PROVIDE SAMPLES OF EACH COLOR AND FINISH REQUIRED.**

- A. Submit shop drawings for metal lockers, verifying dimensions affecting locker installation; include installation details, bases, trim, and accessories.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURER: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:**

- A. Hadrian Inc; Emperor Corridor Lockers
- B. Substitutions: See Section 01 6000-Product Requirements.

**2.02 FABRICATION, GENERAL:**

- A. Construction: Square, rigid, without warp, exposed edges safe to touch. Frames welded together; other joints welded, riveted, or bolted as standard with manufacturer with no bolts or rivets, exposed on front of doors and frames. Welds ground flush.
- B. Frames: Steel 16-gauge channels, with continuous stops/strike formed on vertical members. Corners to be electrically welded. Frame width to equal clear door width.
- C. Hinges: Steel, full loop, 5 knuckle, tight pin, 2" high, welded to frame, screwed to door. Provide 2 hinges for doors.
- D. Finish: Manufacturer's standard baked enamel colors. Color to be equivalent to ASI Storage Solutions, Inc. – Black No. 11.

**2.03 LOCKERS:**

- A. Size: 12" wide x 15" deep x 36" high
- B. Body: Fabricate back, sides, and top of 24-gauge sheet steel, and bottom with 20-gauge steel with double-flanged connections extending full height at back and sides, flanged edges at top and bottom.
- C. Doors: Provide 180° opening, one-piece doors formed of 16-gauge sheet steel, flanged at all edges, constructed to prevent springing when opening or closing.
  - 1. Ventilation: Provide stamped, louvered vents in door face, as follows:
    - a. Minimum 3 louver openings, top and bottom.
- D. Recessed Handle and Latch: Pry-resistant latch, housing forming recess for latch lifter and locking devices, and non-protruding latch lifter with eye and strike for padlock. Provide minimum 2-point latching.
- E. Provide sloped top on top tier.
- F. See basis of design.

**2.04 LOCKER ACCESSORIES:**

- A. Equipment: One double-prong ceiling hook and not less than 2 single prong wall hooks, per locker.
- B. Trim: Manufacturer's standard for surface mounted with sloped top panel.
- C. Filler Panels: 24-gauge steel sheet minimum, factory fabricated and finished to match locker units.
- D. Cushion Silencers: Doors must rest against rubber bumpers on frame latch hooks. Bumpers shall be 2" long by 3/16" thick, and offset to provide a cushion for door impact and shall be



riveted to the hook with no less than two rivets.

**PART 3 - EXECUTION**

**3.01 INSTALLATION:**

- A. Install plumb, level, rigid in compliance with manufacturer's instruction.
- B. Provide trim and filler panels as required using concealed fasteners.
- C. Fasten lockers to a 6" raised wood curb/platform constructed by General Contractor with 6" high straight base applied to front face.

**END OF SECTION**



**SECTION 10 5550  
KEY KEEPER ENTRY SPECIALTIES**

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. Provide Knox box in location shown on the drawings.
  - 1. Fire Department-approved key keeper entry box.
- B. Related Sections:
  - 1. Division 04 Masonry.

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of postal specialty.
- B. Shop Drawings: For entry specialties. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Include setting drawings, templates, and installation instructions for anchor bolts and other anchorages installed as part of the work of other Sections.
- C. Samples for Initial Selection: For units with factory-applied color finishes.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Coordinate installation of lock with Fire Department.

**1.04 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of postal specialties which fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures.
    - b. Faulty operation of hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: Five years from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 KEY KEEPER RAPID ENTRY SYSTEM (KNOX BOX ON DRAWINGS): CONSISTING OF SINGLE COMPARTMENT WITH DOOR; INTERIOR COMPARTMENT SIZE NOT LESS THAN 4 INCHES HIGH BY 5 INCHES WIDE X 3 INCHES DEEP OR AS APPROVED BY LOCAL FIRE DEPARTMENT.**

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
  - 1. Knox Company.
  - 2. Mounting: Recessed.
  - 3. Style: Compartment door with recessed Knox Vault and recessed mounting kit, no exposed frame.
  - 4. Type of Operation: Per local Fire Department.
  - 5. Door Lock: Door prepared to receive lock furnished by local Fire Department.
  - 6. UL Tamper Switch: not required.
  - 7. Exposed Materials: Fabricated from extruded or sheet steel.
    - a. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. All mailboxes in accordance with local Fire Department regulations and manufacturer's instructions. Verify said regulations prior to ordering mailboxes.



**3.02 FIELD QUALITY CONTROL**

- A. Arrange for local Fire Department personnel to examine and test entry specialties after they have been installed according to their regulations.
- B. Obtain written final approval of entry specialties to be served by local Fire Department.

**3.03 ADJUSTING, CLEANING, AND PROTECTION**

- A. Remove temporary protective coverings and strippable films, if any, as entry specialties are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust doors, hardware, and moving parts to function smoothly, and lubricate as recommended by manufacturer. Verify that integral locking devices operate properly.
- C. Touch-up marred finishes or replace entry specialties that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by entry specialty manufacturer.
- D. Replace entry specialties that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- E. On completion of entry specialty installation, clean interior and exterior surfaces as recommended by manufacturer.

**3.04 DEMONSTRATION**

- A. Engage local Fire Department representative to train Owner's maintenance personnel to adjust, operate, and maintain entry specialties.

**END OF SECTION 105500.13**



**SECTION 10 5723**  
**WIRE CLOSET AND UTILITY SHELVING**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. Product Data: For each type of ventilated wire storage shelving specified. Include details of construction and connections relative to materials, dimensions of individual components, and accessories. Include manufacturer's fabrication and assembly instructions of shelving connections, bracing and hardware attachments to other work.
- B. Samples: Of each ventilated wire storage shelving required, not less than 12 inches long in size.

**1.02 QUALITY ASSURANCE**

- A. Single Source Responsibility: Obtain ventilated wire storage shelving from a single manufacturer.

**1.03 DELIVERY, STORAGE AND HANDLING**

- A. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.
- B. Store Shelving in a manner to avoid significant or permanent deflection of shelves.

**1.04 COORDINATION**

- A. Coordinate layout and installation of ventilated wire storage shelving with other construction to which it is attached including floor, partitions and wall assemblies.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Basis of Specification:
  - 1. Container Store; Elfa

**2.02 MATERIALS**

- A. All ventilated wire storage shelving shall be constructed of Grade C-1008 bright, basic, cold-drawn steel wire with average tensile strength of 100,000 psi.
- B. All steel wire shall be resistance welded at intersections of cross deck wires spaced at 1" increments and trimmed smooth.
- C. Tight mesh steel wire spacing shall be on 1/2" increments and trimmed smooth.

**2.03 FINISHES**

- A. Material shall be cleaned and covered with an iron phosphate coating to ensure proper bond with finish coat.
- B. Finish all ventilated wire shelving with baked-on non-toxic and environmentally friendly epoxy coating.
- C. Finish coat shall consist of a continuous 3-5 mil epoxy-polyester hybrid powder coating to provide a hard, smooth, durable finish.

**2.04 MOUNTING HARDWARE**

- A. Mounting hardware components shall provide shelving installation to drywall partitions, walls without requiring mounting to concealed structural members.
- B. Support braces are required for 36" to 42" span.
- C. Back clips shall be mounted on 12" increments beginning 1-1/2" to 2" from side wall.

**2.05 SHELVING ACCESSORIES**

- A. Shelving installation aids available to assist in the installation of shelving components.
  - 1. 12" and 16" installation templates
  - 2. 9" and 20" installation templates



3. Pneumatic cutter
4. Cutter replacement jaws
5. White epoxy touch-up paint
- B. Fast Set preloaded installation system developed to secure shelving system to adjacent walls.
  1. 1/2" and 5/8" back clips
  2. 1/2" and 5/8" flapless back clips
  3. Wall bracket
  4. Free slide wall bracket
  5. Shoe shelf support
  6. Wall anchor
- C. Support braces used to support front edge of shelving system.
  1. 9", 10", 12", and 16" support brace-Fast Set
  2. 12" joiner support brace
  3. 9", 12" and 16" universal support brace
- D. Miscellaneous hardware for complete installation of shelving system.
  1. Small, large and tight mesh end caps
  2. Metal corner bracket
  3. Phillips screws
  4. 1/4" anchors
  5. Rod spacer clips
  6. Free slide rod spacer cap
  7. Joiner plate set
  8. Free slide joiner plate
  9. Free slide joiner plate and rod spanner
  10. All purpose clamp
  11. Wall bracket
  12. Free slide wall bracket
  13. Angle wall bracket
  14. Anchorless back clips
  15. Shoe shelf support
  16. Shelf edge trim
  17. F channel, 8 ft. lengths

## **2.06 FABRICATION**

- A. Fabricate ventilated wire storage shelving square, rigid, flat, and free of dents or distortion. Fabricate connections to form a rigid structure, free of buckling and warping.

## **PART 3 EXECUTION**

### **3.01 INSPECTION**

- A. Examine areas and conditions for compliance with requirements for installation tolerances, clearances, and other conditions affecting installation.
- B. Examine walls to which ventilated wire storage shelving will be attached for proper selection of appropriate fastening hardware.
- C. Installation hardware shall be included which does not require attachment to concealed structural framing.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install shelving system and accessories after finishing operations, including painting have been completed. Install system to comply with final layout drawings, in strict compliance with manufacturers printed instructions. Position units level, plumb; at proper location relative to adjoining units and related work. Adjust accessories to provide visually acceptable installation.



**3.03 FIELD QUALITY CONTROL**

- A. Remove and replace shelving components that are chipped, scratched, or otherwise damaged and which do not match adjoining work. Provide new matching units, installed as specified and in manner to eliminate evidence of replacement.

**3.04 ADJUST**

- A. Adjust components and accessories to provide visually acceptable installation.

**3.05 CLEANING**

- A. Remove surplus materials, rubbish and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition.

**END OF SECTION 105723.13**



**SECTION 10 7313  
AWNINGS**

**PART 1 - GENERAL**

**SUMMARY**

**2.01 SECTION INCLUDES:**

- A. Building supported metal awnings including framing, enclosure, and attachment hardware.
  - 1. Related Sections:
    - a. Division 01: Administrative, procedural, and temporary work requirements.
- B. REFERENCES
  - 1. American Society of Civil Engineers (ASCE) 7 - Minimum Design Loads for Buildings and Other Structures.
  - 2. ASTM International (ASTM)
    - a. B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
    - b. B429 - Standard Specification for Aluminum-Alloy Extruded Pipe and Tube.
- C. SYSTEM DESCRIPTION
  - 1. Design Requirements: Design awning system to withstand:
    - a. Standards for wind pressure, snow load, and drifting snow load in accordance with current adopted form of the Uniform Construction code or accepted requirements of local municipality.
- D. SUBMITTALS
  - 1. Submittals for Review:
    - a. Shop Drawings: Indicate system components, dimensions, attachments, and accessories.
    - b. Samples:
      - 1) 3 x 3 inch coating samples in specified color.
      - 2) 6 inch decking/ siding samples showing profile and finish.
- E. QUALITY ASSURANCE
  - 1. Installer Qualifications: Minimum 5 years experience in installation of MASA products.

**PART 2 - PRODUCTS**

**MANUFACTURER**

**4.01 CONTRACT DOCUMENTS ARE BASED ON: EXTRUDECK**

- A. MASA Architectural Canopies 21 Randolph Ave.
  - 1. Avenel, NJ 07001
  - 2. 800-761-7446
  - 3. [www.architecturalcanopies.com](http://www.architecturalcanopies.com).
  - 4. Acceptable alternates: per requirements of Division 1.
- B. MATERIALS
  - 1. Aluminum Extrusions:
    - a. ASTM B221& ASTM B429 6061-T6 alloy and temper.
  - 2. Hardware:
    - a. All fasteners shall be stainless steel or hot dip galvanized for corrosion resistance.
- C. ACCESSORIES
  - 1. Anchors and Fasteners: Stainless steel or hot dip galvanized and corrosion resistant
- D. FABRICATION
  - 1. Fabricate canopy system in accordance with approved Shop Drawings.
- E. FINISHES
  - 1. Aluminum Framing:
    - a. Color: (color) to be selected by architect from EXTRUDECK color range



**PART 3 - EXECUTION**

**FIELD DIMENSIONS**

**6.01 FIELD VERIFY DIMENSIONS OF SUPPORTING STRUCTURE AND ANY OPENINGS AT SITE OF INSTALLATION PRIOR TO FABRICATION.**

**A. INSTALLATION**

1. Install in accordance with manufacturer's instructions and approved Shop Drawings.
2. Install components plumb and level, in proper plane, free from warp and twist.
3. Anchor system to building components; provide adequate clearance for movement caused by thermal expansion and contraction and wind loads.

**B. ADJUSTING**

1. Touch up minor scratches and abrasions on finished surfaces to match original finish.

**END OF SECTION**



**SECTION 10 7500  
FLAGPOLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum ground-set flagpoles.

**1.02 REFERENCE STANDARDS**

- A. AASHTO M 36 - Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains 2016 (Reapproved 2020).
- B. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube 2022.
- C. NAAMM FP 1001 - Guide Specifications for Design Loads of Metal Flagpoles 2007.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on pole, accessories, and configurations.
- C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads. Include section and details of foundation system.
- D. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.

**1.04 QUALITY ASSURANCE**

- A. Designer Qualifications: Design flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed the State in which the Project is located.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.
- B. Protect flagpole and accessories from damage or moisture.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Flagpoles:
  - 1. American Flagpole: [www.americanflagpole.com/#sle](http://www.americanflagpole.com/#sle).
  - 2. Concord Industries, Inc: [www.concordindustries.com/#sle](http://www.concordindustries.com/#sle).
  - 3. Pole-Tech Co, Inc: [www.poletech.com/#sle](http://www.poletech.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 FLAGPOLES**

- A. Flagpoles: Designed in accordance with NAAMM FP 1001
  - 1. Material: Aluminum.
  - 2. Design: Cone tapered.
  - 3. Mounting: Ground mounted type.
  - 4. Nominal Height: 25' ft; measured from nominal ground elevation.
  - 5. Halyard: Internal type, cam cleat.
- B. Performance Requirements:
  - 1. Wind Pressure Loading on Flagpole with Flag: Resistant without permanent deformation to 95 miles/hr wind speed, in accordance with NAAMM FP 1001; the factor of safety used is 2.5. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole.

**2.03 POLE MATERIALS**

- A. Aluminum: ASTM B241/B241M , 6063 alloy , T6 temper.



## **2.04 ACCESSORIES**

- A. Finial Ball: Aluminum, 6 inch diameter.
- B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.
- C. Cleats: 9 inch size, aluminum with galvanized steel fastenings, one per halyard.
- D. Cleat Box: Aluminum, with built-in hinge and hasp assembly, attached to pole with tamper proof screws inside box.
- E. Halyard: 5/16 inch diameter polypropylene, braided, white. Plastic
- F. Plastic Halyard Flag Clips: Made from injection-molded, UV-stabilized, acetal resin. Clips attach to flag and have two eyes for inserting both runs of halyards. Furnish two per Halyard.

- 1. Product: Subject to compliance with requirements, provide "Quiet Halyard" flag clasp by Acme/Lingo Flagpoles

## **2.05 MOUNTING COMPONENTS**

- A. Foundation Tube Sleeve: AASHTO M 36, corrugated 16 gauge, 0.0598 inch steel, galvanized, depth as designed.
- B. Pole Base Attachment: Flush; steel base with base cover.

## **2.06 FINISHING**

- A. Metal Surfaces in Contact With Concrete: Asphaltic paint.
- B. Aluminum: Mill finish.
- C. Finial: Mill finish.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

### **3.02 PREPARATION**

- A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

### **3.03 INSTALLATION**

- A. Install flagpole, base assembly, and fittings in accordance with manufacturer's instructions.
- B. Install foundation plate and centering wedges for flagpoles base set in concrete base and fasten.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1 inch.

### **3.05 ADJUSTING**

- A. Adjust operating devices so that halyard and flag function smoothly.

**END OF SECTION**



**SECTION 10 8213**  
**EXTERIOR GRILLES AND SCREENS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Exterior aluminum grilles and screens attached to structure.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 1200 - Structural Steel Framing: Mounting substrates.

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum 2020, with Errata (2022).
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- E. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2023.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- G. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2022.
- H. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- K. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2022.
- L. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal 1997 (Reapproved 2018).
- M. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics 2023.
- N. ASTM D2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics 2022.
- O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
- P. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs 2022.
- Q. NFPA 268 - Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source 2022.
- R. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components 2023.
- S. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2023, with Errata.



#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Submit detailed shop drawings, indicating component profiles, sections, finishes, fastening details, special details, and manufacturer's technical and descriptive data.
- C. Samples: Submit samples for color verification, 10 inches by 10 inches minimum.
- D. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to project site in manufacturer's original, unopened packaging, with labels clearly identifying manufacturer and material.
- B. Store materials indoors, protected from moisture, humidity, and extreme temperature fluctuations.

#### **1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a one year period after Date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Exterior Aluminum Grilles and Screens:
  - 1. Architectural Grilles & Sunshades, Inc: [www.agsshade.com/#sle](http://www.agsshade.com/#sle).
  - 2. Construction Specialties, Inc: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  - 3. DAMS Incorporated: [www.damsinc.com/#sle](http://www.damsinc.com/#sle).
  - 4. Industrial Louvers, Inc: [www.industriallouvers.com/#sle](http://www.industriallouvers.com/#sle).
  - 5. Metalwerks: [www.metalwerksusa.com/#sle](http://www.metalwerksusa.com/#sle).
  - 6. Nelson Industrial, Inc: [www.nelsonii.com/arch/#sle](http://www.nelsonii.com/arch/#sle).
  - 7. Patriot Custom Metals DBA PalmSHIELD: [www.palmshieldlouvers.com/#sle](http://www.palmshieldlouvers.com/#sle).
  - 8. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  - 9. \_\_\_\_\_.
  - 10. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 SCREENS**

- A. Aluminum Screens: Provide shop fabricated, shop finished screens assembled into panels.
  - 1. Panel Size and Configuration: As indicated on drawings.
  - 2. Frame/Support: Extruded aluminum tube or flat aluminum bar.

#### **2.03 FABRICATION**

- A. Shop fabricate grilles and screens to the greatest extent possible.
- B. Disassemble as necessary for shipping and handling, clearly mark units for proper reassembly.
- C. Provide supports, anchorages, and accessories as required for complete assembled system.
- D. Provide inserts as required for installation into concrete or masonry based support materials.

#### **2.04 FINISHES**

- A. Finish Color: As selected by Architect from manufacturer's standard color range.

#### **2.05 ACCESSORIES**

- A. Fasteners: ASTM F593 stainless steel or ASTM A307 carbon steel, sizes to suit installation conditions.
- B. Anchors and Inserts: Corrosion resistant; type, size, and material required for loading and installation as indicated.



## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that painting, roofing, masonry work, and other adjacent work that might damage grille finish have been completed prior to start of installation.
- C. Verify that anchorage devices have been properly installed and located.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's written installation instructions.
- B. Set grilles level, plumb, with uniform joints, and in alignment with adjacent work as indicated.
- C. Mechanically secure grilles to supporting structure.
- D. Do not cut or trim aluminum members without approval of manufacturer; do not install damaged members.

### **3.03 CLEANING**

- A. Clean finished surfaces as recommended by manufacturer and maintain clean condition until Date of Substantial Completion.
- B. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

### **3.04 PROTECTION**

- A. Protect installed grilles to ensure grilles are without damage until Date of Substantial Completion.

**END OF SECTION**



## **SECTION 11 3100 APPLIANCES**

### **PART 1 GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Cooking equipment:
    - a. Electric ranges.
    - b. Recirculating microhoods
    - c. Recirculating range hoods
    - d. Freestanding microwave oven
  - 2. Garbage Disposals.
  - 3. Refrigerator/freezers.
  - 4. Dishwashers.
  - 5. Washers and Dryers
  - 6. All Common Areas
- B. Related Sections include the following:
  - 1. Division 12 Section "Residential Casework" for standard cabinets and countertops that receive residential appliances.

#### **1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include operating characteristics, dimensions of individual appliances, and finishes for each appliance.
- B. Maintenance Data: For each product to include in maintenance manuals.
- C. Warranties: Special warranties specified in this Section.

#### **1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain residential appliances through one source from a single manufacturer.
  - 1. Provide products from same manufacturer for each type of appliance required.
  - 2. To the greatest extent possible, provide appliances by a single manufacturer for entire Project.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for product's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- D. Regulatory Requirements: Comply with provisions of the following product certifications:
  - 1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - 2. UL and NEMA: Provide electrical components required as part of residential appliances that are listed and labeled by UL and that comply with applicable NEMA standards.
  - 3. NAECA: Provide residential appliances that comply with NAECA standards.
- E. Regulatory Requirements, Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for



Buildings and Facilities (ADAAG)." ANSI A117.1. FED-STD-795, "Uniform Federal Accessibility Standards."

1. Operable Parts: Provide controls with forward reach no higher than 48 inches (1219 mm) above the floor, horizontal front reach no more than 25 inches (635 mm), horizontal side reach no more than 24 inches (610 mm), and that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
  2. Range or Cooktop: Per ANSI 117.1-2003, 1003.12.6.4 accessible units in this project have been designed for parallel approach. Kneespace is not required for parallel approach, but front controls must be provided.
  3. Refrigerator/Freezer: Provide 50 percent of freezer space within 54 inches (1370 mm) of the floor.
- F. AHAM Standards: Provide appliances that comply with the following AHAM standards:
1. Electric Ranges: AHAM ER-1.
  2. Household Refrigerators: AHAM HRF-1.
  3. Household Freezers: AHAM HRF-1.
- G. Energy Ratings: Provide residential appliances that carry labels indicating energy-cost analysis (estimated annual operating costs) and efficiency information as required by the FTC Appliance Labeling Rule.
1. Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

#### **1.05 WARRANTY**

- A. Special Warranties: Manufacturer's standard form in which manufacturer of each appliance specified agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
1. Electric Range: Five-year limited warranty for in-home service on surface-burner elements.
  2. Refrigerator/Freezer: Five-year limited warranty for in-home service on the sealed refrigeration system.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL - MANUFACTURERS OF OTHER PRODUCTS MEETING THESE SPECIFICATIONS CAN BE SUBMITTED AS EQUALS.**

#### **2.02 COOKING APPLIANCES**

- A. Cooktop
1. Kenyon Appliances, see basis of design.
- B. Accessible range
1. Avanti Products, see basis of design.
- C. Microhood
1. GE, see basis of design.
- D. Accessible Exhaust Hood
1. Broan-NuTone LLC, see basis of design.
    - a. Energy Star Qualified

#### **2.03 DISPOSALS**

- A. Disposal - GE Appliances, see basis of design.

#### **2.04 REFRIGERATION APPLIANCES**

- A. Refrigerator and accessible refrigerator
1. Absocold, see basis of design.
  2. Energy Star rated.
  3. ADA compliant.

#### **2.05 DISHWASHING APPLIANCES**

- A. Dishwasher



1. GE Appliances Sales, See basis of design
  2. ENERGY STAR® qualified
  3. 62 dBA sound level with light on the door
  4. 5 cycles with three options, hard food disposer
- B. Accessible Dishwasher
1. Whirlpool, See basis of design
  2. ENERGY STAR® qualified
  3. Optimizes water temperature, hard food disposer
  4. ADA Compliant

## **2.06 MICROWAVE**

- A. Microwave for countertop
1. GE Appliance Sales, see basis of design.

## **2.07 ALL COMMON AREA APPLIANCES**

- A. Reference Basis of Design.

## **2.08 WASHING APPLIANCES**

- A. Guest - Washer
1. Speed Queen; SWNNC2SP116TW01
  2. Speed Queen; LFNESBSP115TW01
  3. See basis of design.
- B. Guest - Dryer
1. Speed Queen; SDESXRG173TW01
  2. Speed Queen; SDGSXRG113TW01
  3. Speed Queen; SDEBCASG171TW01
  4. See basis of design.
- C. Stacked Dryer
1. Electric-Speed Queen; SSEBCAGS171TW01
  2. Gas - Speed Queen; SSGBCASGS111TW01
  3. See basis of design

## **2.09 FINISHES, GENERAL**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Color-Coated Finish: Provide appliances with manufacturer's standard finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, color, gloss, and minimum dry film thickness for painted finishes

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION, GENERAL**

- A. General: Comply with manufacturer's written instructions.
- B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.



- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- D. Utilities: Refer to Divisions 22 and 26 for plumbing and electrical requirements.

**3.03 CLEANING AND PROTECTION**

- A. Test each item of residential appliances to verify proper operation. Make necessary adjustments.
- B. Verify that accessories required have been furnished and installed.
- C. Remove packing material from residential appliances and leave units in clean condition, ready for operation.

**3.04 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances. Refer to Division 01 Section "Demonstration and Training."

**END OF SECTION 113100**



**SECTION 12 2413  
ROLLER WINDOW SHADES / DRAPERY**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Manually/Motorized operated roller shades with single rollers.
  - 2. Blackout shades
  - 3. Draperies

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
- C. Samples: For each exposed product and for each color and texture specified, 10 inches (250 mm) long.
- D. Samples for Initial Selection: For each type and color of shade band material.
  - 1. Include Samples of accessories involving color selection.
- E. Samples for Verification: For each type of roller shade.
  - 1. Shade band Material: Not less than 10 inches (250 mm) square. Mark interior face of material if applicable.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shade band material indicated, but no fewer than two units.

**1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: Fabricator of products.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

**1.08 FIELD CONDITIONS**

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.



- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

### **2.02 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS**

- A. Manufacturers: Per Basis of Design:
  - 1. BBD Inc, Sonoran Roller Shade
  - 2. Draper Inc.
  - 3. Hunter Douglas Contract
  - 4. SWF Contract.
  - 5. MechoShade Systems, Inc.
- B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
  - 1. Bead Chains: Manufacturer's standard.
    - a. Loop Length: Full length of roller shade.
    - b. Limit Stops: Provide upper and lower ball stops.
    - c. Chain-Retainer Type: Chain tensioner, jamb mounted. Chain-guards at Memory Care Residential Units.
- C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
  - 1. Roller Drive-End Location: Right side of interior face of shade.
  - 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
  - 3. Shade band-to-Roller Attachment: Manufacturer's standard method.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Shadebands:
  - 1. Shadeband Bottom (Hem) Bar: Steel.
    - a. Color and Finish: As selected by Architect from manufacturer's full range.
- F. Installation Accessories:
  - 1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
    - a. Shape: L-shaped.
    - b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 3 inches (76 mm).
  - 2. Endcap Covers: To cover exposed endcaps.

### **2.03 MOTOR-OPERATED, SINGLE-ROLLER SHADES**

- A. Manufacturers: Per Basis of Design:
- B. Motorized Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch,



enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system. Note: Refer to drawings for top-down motor-operated and bottom-up operated units. Bottom-up units shall be two tubes at bottom-pulley at top style with appropriate mfr snap-loc fascia.

- C. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 1. Electric Motor: Manufacturer's standard tubular, enclosed in roller.
    - a. Electrical Characteristics: 110-V ac.
    - b. Maximum Total Shade Width: As required to operate roller shades indicated.
    - c. Maximum Shade Drop: As required to operate roller shades indicated.
    - d. Maximum Weight Capacity: As required to operate roller shades indicated.
  - 2. Remote Control: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following for remote-control activation of shades:
    - a. Keyed Control Station: Keyed, [maintained] [momentary]-contact, three-position, switch-operated control station with open, close, and off functions. Provide two keys per station.
- D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- E. Installation Accessories:
  - 1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
    - a. Shape: L-shaped.
    - b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 4 inches (102 mm).
  - 2. Endcap Covers: To cover exposed endcaps.

## **2.04 SHADEBAND MATERIALS**

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
  - 1. Source: Roller shade manufacturer.
  - 2. Type: Woven polyester and PVC-coated polyester.
  - 3. Weave: Mesh.
  - 4. Roll Width: as determined by window width.
  - 5. Orientation on Shadeband: Up the bolt.
  - 6. Color: As selected by Architect from manufacturer's full range.
  - 7. Features: Washable.

## **2.05 ROLLER SHADE FABRICATION**

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):
  - 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible.

## **2.06 DRAPERY**

- A. Per basis of design - Fabricator list.



## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 ROLLER SHADE INSTALLATION**

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
- B. Roller Shade Locations: Per Basis of Design

### **3.03 ADJUSTING**

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

### **3.04 CLEANING AND PROTECTION**

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

### **3.05 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades.

**END OF SECTION 122413**



**SECTION 12 3530  
RESIDENTIAL AND OUTDOOR KITCHEN CASEWORK**

**RESIDENTIAL CASEWORK AND OUTDOOR KITCHEN**

**1.01 PART 1 - GENERAL**

- A. SECTION INCLUDES
  - 1. Wood Cabinetry:
  - 2. Outdoor Kitchen Cabinetry
- B. REFERENCES
  - 1. American National Standards Institute (ANSI).
  - 2. National Kitchen Cabinet Association (NKCA).
- C. SUBMITTALS
  - 1. Product Data: Manufacturer's data sheets on each product to be used, including:
    - a. Preparation instructions and recommendations.
    - b. Storage and handling requirements and recommendations.
    - c. Installation methods.
  - 2. Shop Drawings: Indicate type, location, size, and hand of each component. Include requirements for blocking and relationship with adjacent construction.
  - 3. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square representing actual product, color, and patterns.
- D. QUALITY ASSURANCE
  - 1. Manufacturer Qualifications: Minimum ten years experience manufacturing similar products.
  - 2. Installer Qualifications: Minimum two years experience installing similar products.
- E. DELIVERY, STORAGE, AND HANDLING
  - 1. Store products in manufacturer's unopened packaging until ready for installation.
  - 2. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- F. PROJECT CONDITIONS
  - 1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

**1.02 PART 1 - PRODUCTS**

- A. MANUFACTURERS
  - 1. MGroup; J Suss Industries, Inc.; MillRock Casework
  - 2. Outdoor Kitchen: Summit Built-In NG Gas Grill
  - 3. See Basis of Design.

**1.03 PART 1 - EXECUTION**

- A. EXAMINATION
  - 1. Do not begin installation until substrates have been properly prepared.
  - 2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. PREPARATION
  - 1. Clean surfaces thoroughly prior to installation.
  - 2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. INSTALLATION
  - 1. Install in accordance with manufacturer's instructions.
- D. PROTECTION
  - 1. Protect installed products until completion of project.



2. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**



**SECTION 12 3600  
COUNTERTOPS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Countertops for manufactured casework.
- B. Wall-hung counters and vanity tops.

**1.02 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- C. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material 2013.
- D. MIA (DSDM) - Dimensional Stone Design Manual, Version VIII 2016.
- E. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

**1.03 SUBMITTALS**

- A. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.
- B. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- C. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**1.05 FIELD CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

**PART 2 PRODUCTS**

**2.01 COUNTERTOPS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
  - 1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness. See basis of design.
    - a. Manufacturers:
      - 1) Wilsonart: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
      - 2) Substitutions: See Section 01 6000 - Product Requirements.
    - b. Surface Color and Pattern: As selected by Architect from the manufacturer's full line.
  - 2. Exposed Edge Treatment: Postformed laminate; front edge substrate built up to minimum 1-1/4 inch thick with raised radiused edge, integral coved backsplash with radiused top edge.
  - 3. Back and End Splashes: Same material, same construction.
- C. Plastic Laminate Countertops: Self-supporting high-pressure decorative laminate (HPDL) panel with decorative surface over structural members.
  - 1. Panels: Phenolic resin impregnated Kraft paper core with melamine impregnated decorative surface papers; NEMA LD 3 Grade CGS.



- a. Panel Thickness: 1 inch.
  - b. Finish: Matte or suede, gloss rating of 5 to 20.
  - c. Surface Color and Pattern: As selected by Architect from manufacturer's full line.
2. Exposed Edge Treatment: Square natural cut sanded and polished to semi-gloss sheen.
3. Back and End Splashes: Same material, same construction; minimum 4 inches high.
- D. Natural Quartz and Resin Composite Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.
  1. Flat Sheet Thickness: 1-1/4 inch, minimum.
  2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
    - a. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with the MIA Dimension Stone Design Manual.
    - b. Finish on Exposed Surfaces: Polished.
    - c. Color and Pattern: As selected by Architect from manufacturer's full line.
  3. Other Components Thickness: 3/4 inch, minimum.
  4. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

## **2.02 MATERIALS**

- A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- B. Joint Sealant: Mildew-resistant silicone sealant, clear.

## **2.03 FABRICATION**

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
  1. Join lengths of tops using best method recommended by manufacturer.
  2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
  3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
  1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
  2. Height: 4 inches, unless otherwise indicated.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **3.03 INSTALLATION**

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.



- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
- C. Seal joint between back/end splashes and vertical surfaces.

**3.04 TOLERANCES**

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

**3.05 CLEANING**

- A. Clean countertops surfaces thoroughly.

**3.06 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**



**SECTION 12 3640  
STONE COUNTERTOPS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes stone countertops.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each variety of stone, stone accessory, and manufactured product.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.
  - 1. Show locations and details of joints.
  - 2. Show direction of veining, grain, or other directional pattern.
- C. Samples for Verification:
  - 1. For each stone type indicated, in sets of Samples not less than 12 inches (300 mm) square. Include three or more Samples in each set and show the full range of variations in appearance characteristics expected in completed Work.

**1.03 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For stone countertops to include in maintenance manuals. Include product data for stone-care products used or recommended by Installer, and names, addresses, and telephone numbers of local sources for products.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Store and handle stone and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, and other causes.
  - 1. Lift stone with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone, if required, using dollies with cushioned wood supports.
  - 2. Store stone on wood A-frames or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to stone. Ventilate under covers to prevent condensation.

**1.05 FIELD CONDITIONS**

- A. Field Measurements: Verify dimensions of construction to receive stone countertops by field measurements before fabrication.

**PART 1 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Source Limitations for Stone: Obtain stone, from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.
  - 1. For stone types that include same list of varieties and sources, provide same variety from same source for each.

**2.02 ENGINEERED QUARTZ**

- A. Material Standard: Comply with ASTM C 615.
- B. Products: As indicated in the Basis of Design. No substitutions.

**2.03 ADHESIVES, GROUT, SEALANTS, AND STONE ACCESSORIES**

- A. General: Use only adhesives formulated for stone and ceramic tile and that are recommended by their manufacturer for the application indicated.
- B. Water-Cleanable Epoxy Adhesive: ANSI A118.3, with a VOC content of 65 g/L or less.
- C. Water-Cleanable Epoxy Grout: ANSI A118.3, chemical-resistant, water-cleanable, tile-setting and -grouting epoxy.
- D. Stone Adhesive: Two-part epoxy or polyester adhesive, formulated specifically for bonding stone to stone, with an initial set time of not more than two hours at 70 deg F (21 deg C), and with a VOC content of 65 g/L or less.



1. Color: Match stone.
- E. Sealant for Countertops: Manufacturer's standard sealant of characteristics indicated below that complies with applicable requirements in Section 079200 "Joint Sealants" and will not stain the stone it is applied to.
  1. Mildew-Resistant Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, silicone.
  2. Color: As selected by Architect from manufacturer's full range.
  3. Sealants shall have a VOC content of 250 g/L or less.
- F. Stone Cleaner: Specifically formulated for stone types, finishes, and applications indicated, as recommended by stone producer and, if a sealer is specified, by sealer manufacturer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.
- G. Stone Sealer: Colorless, stain-resistant sealer that does not affect color or physical properties of stone surfaces, as recommended by stone producer for application indicated.

#### **2.04 STONE FABRICATION, GENERAL**

- A. Select stone for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.
  1. Repairs that are characteristic of the varieties specified are acceptable provided they do not impair structural integrity or function and are not aesthetically displeasing, as judged by Architect.
- B. Grade and mark stone for final locations to produce assembled countertop units with an overall uniform appearance.
- C. Fabricate stone countertops in sizes and shapes required to comply with requirements indicated.
  1. Clean sawed backs of stones to remove rust stains and iron particles.
  2. Dress joints straight and at right angle to face unless otherwise indicated.
  3. Cut and drill sinkages and holes in stone for anchors, supports, and attachments.
  4. Provide openings, reveals, and similar features as needed to accommodate adjacent work.
  5. Fabricate molded edges with machines having abrasive shaping wheels made to reverse contour of edge profile to produce uniform shape throughout entire length of edge and with precisely formed arris slightly eased to prevent snapping, and matched at joints between units. Form corners of molded edges as indicated with outside corners slightly eased unless otherwise indicated.
  6. Finish exposed faces of stone to comply with requirements indicated for finish of each stone type required and to match approved Samples and mockups. Provide matching finish on exposed edges of countertops, splashes, and cutouts.
- D. Carefully inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.

#### **2.05 STONE COUNTERTOPS**

- A. General: Comply with recommendations in MIA's "Dimension Stone - Design Manual VI."
- B. Nominal Thickness: Provide thickness indicated, but not less than 3/4 inch (20 mm). Gage backs to provide units of identical thickness.
- C. Edge Detail: As indicated.
- D. Splashes: Provide 3/4-inch- (20-mm-) thick backsplashes and end splashes unless otherwise indicated.
  1. Height: 4 inches (100 mm).
  2. Top-Edge Detail: Straight, slightly eased at corner.
- E. Joints: Fabricate countertops without joints.
- F. Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated and as follows:
  1. Bonded Joints: 1/32 inch (0.8 mm) or less in width.



G. Cutouts and Holes:

1. Undercounter Fixtures: Make cutouts for undercounter fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
  - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch (5 mm) into fixture opening.
  - b. Provide vertical edges, rounded to 3/8-inch (10-mm) radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch (5 mm) into fixture opening.
  - c. Provide 3/4-inch (20-mm) full bullnose edges projecting 3/8 inch (10 mm) into fixture opening.
2. Counter-Mounted Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

**PART 1 EXECUTION**

**3.01 EXAMINATION**

- A. Examine substrates to receive stone countertops and conditions under which stone countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone countertops.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of stone countertops.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 PREPARATION**

- A. Advise installers of other work about specific requirements for placement of inserts and similar items to be used by stone countertop Installer for anchoring stone countertops. Furnish installers of other work with Drawings or templates showing locations of these items.
- B. Before installing stone countertops, clean dirty or stained stone surfaces by removing soil, stains, and foreign materials. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives. Allow stone to dry before installing.

**3.03 CONSTRUCTION TOLERANCES**

- A. Variation from Level: Do not exceed 1/8 inch in 96 inches (3 mm in 2400 mm), 1/4 inch (6 mm) maximum.
- B. Variation in Joint Width: Do not vary joint thickness more than one-fourth of nominal joint width.
- C. Variation in Plane at Joints (Lipping): Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.
- D. Variation in Line of Edge at Joints (Lipping): Do not exceed 1/64-inch (0.4-mm) difference between edges of adjacent units, where edge line continues across joint.

**3.04 INSTALLATION OF COUNTERTOPS**

- A. General: Install countertops over plywood subtops with full spread of water-cleanable epoxy adhesive.
- B. General: Install countertops by adhering to supports with water-cleanable epoxy adhesive.
- C. Do not cut stone in field unless otherwise indicated. If stone countertops or splashes require additional fabrication not specified to be performed at Project site, return to fabrication shop for adjustment.
- D. Do necessary field cutting as stone is set. Use power saws with diamond blades to cut stone. Cut lines straight, true, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.



- E. Set stone to comply with requirements indicated. Shim and adjust stone to locations indicated, with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances.
- F. Bond joints with stone adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
  - 1. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- G. Space joints with 1/16-inch (1.5-mm) gap for filling with sealant. Use temporary shims to ensure uniform spacing.
- H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Use power saws with diamond blades to cut stone. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- I. Install backsplashes and end splashes by adhering to wall with water-cleanable epoxy adhesive and to countertops with stone adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- J. Apply sealant to joints and gaps specified for filling with sealant; Remove temporary shims before applying sealant.

### **3.05 ADJUSTING AND CLEANING**

- A. In-Progress Cleaning: Clean countertops as work progresses. Remove adhesive, grout, mortar, and sealant smears immediately.
- B. Remove and replace stone countertops of the following description:
  - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
  - 2. Defective countertops.
  - 3. Defective joints, including misaligned joints.
  - 4. Interior stone countertops and joints not matching approved Samples and mockups.
  - 5. Interior stone countertops not complying with other requirements indicated.
- C. Replace in a manner that results in stone countertops matching approved Samples and mockups, complying with other requirements, and showing no evidence of replacement.
- D. Clean stone countertops no fewer than six days after completion of sealant installation, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage stone.
- E. Sealer Application: Apply stone sealer to comply with stone producer's and sealer manufacturer's written instructions.

### **END OF SECTION**



**SECTION 12 4813**  
**ENTRANCE FLOOR MATS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Carpet mat.
- B. Recessed mat frames.

**1.02 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating properties of walk-off surface, component dimensions and recessed frame characteristics.
- C. Shop Drawings: Indicate dimensions and details for recessed frame.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Floor Mats:
  - 1. Activar Construction Products Group - JL Industries; \_\_\_\_\_: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  - 2. American Floor Products Company, Inc; \_\_\_\_\_: [www.afco-usa.com/#sle](http://www.afco-usa.com/#sle).
  - 3. Babcock-Davis; \_\_\_\_\_: [www.babcockdavis.com/#sle](http://www.babcockdavis.com/#sle).
  - 4. Construction Specialties, Inc; Entrance Mats: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  - 5. Nystrom, Inc; MATrac: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
  - 6. R.C. Musson Rubber Co; \_\_\_\_\_: [www.mussonrubber.com/#sle](http://www.mussonrubber.com/#sle).
  - 7. Pawling Corporation; \_\_\_\_\_: [www.pawling.com/#sle](http://www.pawling.com/#sle).
  - 8. Reese Enterprises, Inc; \_\_\_\_\_: [www.reeseusa.com/#sle](http://www.reeseusa.com/#sle).

**2.02 MATS**

- A. Carpet Mat: Cut nylon pile permanently bonded to rubber backing:
  - 1. Color: As selected by Architect.
  - 2. Size and locations as shown on drawings.
    - a. Recessed Frame: 1/4 inch thick zinc exposed top strip, zinc coated steel concealed bottom strip, Coordinate with recess in slab and mat. inch deep, with anchoring features.

**2.03 FABRICATION**

- A. Construct recessed mat frames square, tight joints at corners, rigid. Coat surfaces with protective coating where in contact with cementitious materials.
- B. Fabricate mats in single unit sizes; fabricate multiple mats where indicated on drawings.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that floor opening for mats are ready to receive work.

**3.02 PREPARATION**

- A. Mats: Verify size of floor recess before fabricating mats.
- B. Vacuum clean floor recess.

**3.03 INSTALLATION**

- A. Install frames to achieve flush plane with finished floor surface.
- B. Install walk-off surface in floor recess flush with finish floor after cleaning of finish flooring.

**3.04 TOLERANCES**

- A. Maximum Gap Formed at Recessed Frame From Mat Size: 1/4 inch.

**END OF SECTION**



**SECTION 14 2123  
ELECTRIC TRACTION PASSENGER ELEVATORS**

**GENERAL**

**1.01 SECTION INCLUDES**

- A. Electric traction passenger elevators.

**1.02 RELATED SECTIONS**

- A. Section 015000 – Temporary Facilities and Controls: Protection of floor openings and personnel barriers; temporary power and lighting.
- B. Section 033000 – Cast-in-Place Concrete: Elevator pits.
- C. Section 036000 – Grouts (Grouting): Grouting door frames and sills.
- D. Section 042000 – Masonry Units (Unit Masonry): Setting sleeves, inserts, and anchoring devices in masonry for guide-rail brackets.
- E. Section 051200 – Metal Stairs Structural Steel (Structural Steel Framing): Support steel, divider beams, and hoist beams.
- F. Section 055000 – Gypsum Metal Fabrications: Pit ladders, supports for entrances in drywall hoistways.
- G. Section 061053 – Miscellaneous Rough Carpentry: Temporary platform assembly.
- H. Section 071600 – Cementitious Waterproofing: Waterproofing of elevator pit.
- I. Section 092900 – Gypsum Board: Hoistway walls.
- J. Section 099000 – Paints and Coatings (Painting and Coating): Field painting of elevator entrances over primer.
- K. Section 283100 – Detection and Alarm (Fire Detection and Alarm): Heat, smoke, and products of combustion sensing devices, fire alarm signal lines to contacts in machine space.
- L. Section 23000 – Heating, Ventilating, and Air Conditioning Equipment (Heating, Ventilating, and Air-Conditioning (HVAC)): Heating, cooling, and ventilation of control and machinery space.
- M. Section 260500 – Wiring Methods (Common Work Results for Electrical): Light outlets, convenience outlets, light switches, and conduits.
- N. Section 262400 – Switchboards, Panelboards, and Control Centers (Switchboards and Panelboards): Disconnect switches.
- O. Section 265000 – Lighting: Light fixtures.
- P. Section 221429 – Sump Pumps: For sump pumps, sumps, and sump covers in elevator pits.
- Q. Section 271500 – Communications Horizontal Cabling: For Telephone service for elevators and for Internet connection to elevator controllers for remote monitoring.
- R. Section 273000 – Telephone and Intercommunication Equipment (Voice Communications): Telephone outlets and elevator telephones.
- S. Section 31000 – Earthwork: Excavation of elevator pit.

**1.03 REFERENCES**

- A. ANSI/ASME A17.1/CAN/CSA B44 – Safety Code for Elevators and Escalators.
- B. ADAAG – Americans with Disabilities Act Accessibility Guidelines.
- C. ANSI/NFPA 70 – National Electrical Code.
- D. ANSI/NFPA 80 – Fire Doors and Windows.
- E. ANSI/UL 10B – Fire Tests of Door Assemblies.
- F. CAN/CSA C22.1 – Canadian Electrical Code.



- G. Model and Local Building Codes  
H. ISO 9001: 2000 - Quality Management Systems - Requirements.

#### **1.04 DESIGN REQUIREMENTS**

- A. Arrange elevator components in control closet or machinery space so equipment can be removed for repairs or replaced with minimal disturbance to other equipment and components.  
B. Where permitted by code, provide all elevator equipment including controls, drives, transformers, and rescue features within the elevator hoistway.

#### **1.05 SUBMITTALS**

- A. Comply with Section 013300 (01 33 00) – Submittal Procedures.  
B. Product Data: Submit manufacturer/installer's product data, including,  
1. Descriptive brochures or detail drawings of car and hall fixtures, cab ceilings, and product features.  
2. Power Information: Horsepower, starting current, running current, machine and control heat release, and electrical requirements.  
C. Shop Drawings: Submit manufacturer/installer's shop drawings, including plans, elevations, sections, and details, indicating location of equipment, loads, dimensions, tolerances, materials, components, fabrication, fasteners, hardware, finish, options, accessories, and other information to render totally functional elevators.  
D. Samples: Submit manufacturer/installer's samples of standard colors and finishes of finish materials.  
E. Operation and Maintenance Manual: Submit manufacturer/installer's operation and maintenance manual; including operation, maintenance, adjustment, and cleaning instructions; trouble shooting guide; renewal parts catalogs; and electrical wiring diagrams.  
F. Warranty: Submit manufacturer/installer's standard warranty.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer/Installer's Qualifications: Specialize in manufacturing and installing elevator equipment, with a minimum of 10 years successful experience.  
B. Regulatory Requirements:  
1. Elevator design, clearances, construction, workmanship, materials, and installation, unless specified otherwise, shall be in accordance with ANSI/ASME A17.1, handicap accessibility, Americans with Disabilities Act, and other codes having legal jurisdiction.  
2. ANSI/ASME A17.1 shall govern, except where codes having legal jurisdiction include more rigid requirements or conflict with ANSI/ASME A17.1.  
3. Elevator shall follow design and manufacturing procedures certified in accordance with ISO 9001-2000 to meet product and service requirements for quality assurance for new products.  
4. Where product is in variance to the published ANSI/ASME A17.1 model code, provide a 3rd party AECO certification demonstrating equivalent function, safety, and performance.  
C. Pre-installation Meeting:  
1. Convene pre-installation meeting before start of installation of elevators.  
2. Require attendance of parties directly affecting work of this section, including Contractor, Architect, and elevator manufacturer/installer.  
3. Review examination, installation, field quality control, adjusting, cleaning, protection, and coordination with other work.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery: Deliver materials to site in manufacturer/installer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer/installer.  
B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer/installer's instructions.



- C. Handling: Protect materials during handling and installation to prevent damage.

#### **1.08 PROJECT CONDITIONS**

- A. Temporary Electrical Power:
1. Owner will arrange for temporary 220 VAC, single-phase, 60 Hz., GFCI-protected electricity to be available for installation of elevator components.
  2. Comply with Section 015100 – Temporary Utilities.
- B. Installation of the Elevator:
1. General Contractor will provide permanent three-phase power prior to installation start.
  2. General Contractor will provide clear, rollable access to a 20' x 10' secure and dry storage area prior to delivery.
  3. General Contractor will provide a clean, dry, and complete hoistway along with temporary installation platform and all required OSHA-compliant barricades prior to delivery.
- C. Temporary Use of Elevator:
1. Owner will negotiate with manufacturer/installer for temporary use of elevator, if required.
  2. Temporary use of elevator shall be in accordance with terms and conditions of manufacturer/installer's temporary acceptance form.

#### **1.09 SCHEDULING**

- A. Coordinate elevator work with work of other trades, for proper time and sequence to avoid construction delays.

#### **1.10 WARRANTY**

- A. Manufacturer/installer shall guarantee materials and workmanship of equipment installed under these specifications and make good, defects not due to ordinary wear or to improper use, which may develop within 1 year after completion of installation or acceptance thereof by beneficial use, whichever is earlier.

#### **1.11 MAINTENANCE SERVICE**

- A. Elevator maintenance service shall be performed by elevator manufacturer/installer.
- B. Elevators shall receive regular maintenance on each unit for period of 12 months after completion of work specified herein or acceptance thereof by beneficial use, whichever is earlier.
- C. Trained employees shall make periodic examinations and perform work including necessary adjusting, greasing, oiling, and replacing parts to keep elevators in operation, except parts that require replacement because of accidents, vandalism, misuse, or negligence by parties other than manufacturer/installer.
- D. Manufacturer/installer shall perform all Work, except emergency minor adjustment call-back service, during regular working hours. Manufacturer/installer shall provide emergency minor adjustment call-back service, during regular working hours.
- E. Should Owner request that examinations, cleaning, lubrication, adjustments, repairs, replacements, or emergency minor adjustment call-back service, unless specified herein, be performed on other than manufacturer/installer's regular working hours of regular working days, manufacturer/installer shall absorb straight-time labor charges and Owner will compensate manufacturer/installer for overtime premium, travel time, and expense at normal billing rates.
- F. Elevator Control System:
1. Include built-in remote diagnostic module to relay constant status of elevators and control system to a 24-hour, 7-days-a-week central-monitoring facility.
  2. Remote Monitoring Device: Transmit information on current status of elevators, including malfunctions, system errors, and shutdown.

#### **1.12 PRODUCTS**

#### **1.13 BASIS OF DESIGN**

- A. ThyssenKrupp; Synergy, see basis of design.



- B. Equal products by other manufacturers may be submitted.

#### **1.14 ELEVATOR SYSTEM AND COMPONENTS**

- A. Elevator Equipment Summary:
1. Application: Machine Room Less (MRL)
  2. Counterweight Location: Side
  3. Service: General Purpose Passenger
  4. Quantity: 2 Units
  5. Capacity: 3500 lbs
  6. Speed: 350 fpm
  7. Front Openings: 4
  8. Rear Openings: 0
  9. Operation: Microprocessor Group Automatic Operation
  10. Guide Rails: Equivalent to 12 lb. per foot
  11. Entrance Type and Width: Two Speed Side Opening 3' 6" Wide X 7' 0" High doors
  12. Entrance Height: 7'-0"
  13. Power Supply: 208 Volts 3 Phase 60 Hz
  14. Meets local codes for gurney and wheelchair access
- B. Performance:
1. Car Speed: -10% to +5% of contract speed under any loading condition or direction of travel.
  2. Car Capacity: Safely lower, stop and hold up to 125% of rated load per code.
- C. Ride Quality:
1. Vertical Vibration (maximum): 25 mg
  2. Horizontal Vibration (maximum): 15 mg
  3. Vertical Jerk (maximum): 2 ft/sec<sup>3</sup>
  4. Acceleration (maximum): 1.6 ft/sec<sup>2</sup>
  5. In Car Noise: 53-60 dB(A)
  6. Stopping Accuracy: ±5mm
  7. Starts per hour (maximum): 180
- D. Elevator Operation:
1. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. When all calls have been answered, the car shall park at the last landing served.
  2. Group Automatic Operation with Demand-Based Dispatching: Provide reprogrammable group automatic system that assigns cars to hall calls based on a dispatching algorithm designed to minimize passenger waiting time.
- E. Operating Features - Standard:
1. Door Light Curtain Protection
  2. Static AC Drive
  3. Phase Monitor Relay
  4. Cab Overload with Indicator
  5. Load-weighing
  6. Central Alarm
  7. Remote Monitoring
  8. Firefighter's Operation
  9. Automatic Evacuation
  10. When the main line power is lost for longer than 5 seconds the emergency battery power supply provides power automatically to the elevator controller. If the car is at a floor when the power fails, it remains at that floor, opens its doors, and shuts down. If the car is between floors, it is raised or lowered to the first available landing, opens its doors, and shuts down.
  11. Independent Service



F. Operating Features - Optional:

**1.15 EQUIPMENT: CONTROL COMPONENTS AND CONTROL SPACE**

- A. Controller: Provide microprocessor-based control system to perform all of the functions of safe elevator operation, as well as perform car and group operational control.
  - 1. All high voltage (110v or above) contact points inside the inspection and test panel shall be protected from accidental contact in a situation where the access panels are open.
  - 2. The controller shall be distributed throughout the elevator system located in the overhead, cab and inspection and test panel. The inverter will be mounted in the overhead adjacent to the hoist machine and an inspection and test panel will be located in the door jamb at the top floor or one floor below the top floor. No elevator equipment mechanical rooms or closets are required.
  - 3. Provide multi-bus control architecture to reduce cabling, material and waste.
- B. Drive: Provide a Variable Voltage Variable Frequency AC Closed Loop drive system. Provide stable start without high peak current, quickly reaching a low energy consumption level.
- C. Inspection and Test Panel: Integrated control equipment, main inspection and test panel in door frame at top level served or at one floor below the top level served.

**1.16 EQUIPMENT: HOISTWAY COMPONENTS**

- A. Machine:
  - 1. Gearless asynchronous AC motor with integral drive sheave, service and emergency brakes.
  - 2. Design machine to enable direct power transfer, thereby avoiding loss of power.
  - 3. Design machine to be compact, lightweight and durable to optimize material usage and save space.
  - 4. Mount to structural support channels on top of guide rail system as applicable in hoistway overhead.
- B. Governor:
  - 1. Tension type over-speed governor with remote manual reset.
  - 2. Mount to structural support channels as applicable in hoistway overhead.
- C. Buffers, Car and Counterweight: Compression spring type buffers to meet code.
- D. Hoistway Operating Devices:
  - 1. Emergency Stop switch in the pit.
  - 2. Terminal stopping switches.
  - 3. Emergency stop switch on the machine.
- E. Positioning System: System consisting of proximity sensors and door zone vanes.
- F. Guide Rails and Attachments: Provide Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.
- G. Suspension System: Non circular Elastomeric coated suspension media with high tensile grade steel cords.
- H. Governor rope: Steel wire rope with 6 mm diameter.

**1.17 EQUIPMENT: HOISTWAY ENTRANCES**

- A. Hoistway Doors and Frames:
  - 1. UL rated with required fire rating.
  - 2. Doors: Rigid flush panel construction with reinforcement ribs.
  - 3. Frames: Securely fasten at corners to form unit frame. Frames shall be bolted.
- B. Entrance Markings and Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings.
- C. Smoke control curtains as required by building code.



#### 1.18 EQUIPMENT: CAR COMPONENTS

- A. Car Frame and Safety: Provide car frame with adequate bracing to support the platform and car enclosure. The safety shall be integral to the car frame and shall be flexible guide clamp type.
- B. Platform: Provide platform of steel construction with plywood subfloor and aluminum threshold.
- C. Car Guides: Provide sliding guide shoes mounted to top and bottom of both car and counterweight frame. Arrange each guide shoe assembly to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.
- D. Provide central guiding system to reduce mechanical friction and energy consumption.
- E. Steel Cab:
  - 1. Fire rating: Provide Class B fire rating for cab, or Class A fire rating where required by local Code.
  - 2. Design cab to comply with LEED Indoor Environmental Quality requirements through use of Low-Emitting Materials on walls, ceiling and subflooring.
  - 3. Car wall finish: As selected by Architect from all standard finishes.
  - 4. Base and frieze: Aluminum.
  - 5. Car front finish: Brushed stainless steel.
  - 6. Car door finish: Brushed stainless steel.
  - 7. Ceiling: Canopy ceiling, finished in #4 Stainless Steel With Down Lit Led Lighting. Provide lighting consisting of four compact fluorescent energy saving lights located in two semi-oval lateral cutouts located on the center-sides of the cab ceiling, Lexan lens cover.
  - 8. Handrail: 1 3/8" Round And Curved Painted Aluminum. Locate on Rear Wall.
  - 9. Flooring: By others. Not to exceed 3/8" finished depth.
  - 10. Ventilation: Provide one-speed fan in canopy.
  - 11. Emergency Car Lighting: Provide an emergency power unit employing a 12 volt sealed rechargeable battery and static circuits to illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
  - 12. Emergency Siren: Provide siren mounted on top of the car that is activated when the Alarm button in the car operating panel is engaged.
  - 13. Emergency Exit Switch: Provide an electrical contact to open the safety circuit when the emergency car top exit is opened. When the exit door is opened, the top exit switch shall signal the control and the car will be unable to move.
  - 14. Emergency Exit Lock: Provide an emergency exit lock where required by local code.
  - 15. Emergency Exit Guard: Provide emergency exit guard on top of car when required for hoistway wall to platform clearance exceeds 12" or for multiple cars in hoistway.

#### 1.19 DOOR OPERATOR AND REOPENING DEVICES

- A. Door Operator: Provide a closed loop VVVF high performance door operator with frequency-controlled drive for fast and reliable operation to open and close the car and hoistway doors simultaneously.
- B. In case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Provide emergency devices and keys for opening doors from the landing as required by local code.
- C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. Provide door open button in the car operating panel. Momentary pressing of this button shall reopen the doors and reset the time interval.
- D. Provide door hangers and tracks for each car and hoistway door. Contour tracks to match the hanger sheaves. Design hangers for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed for life bearings.
- E. Electronic Door Safety Device: Equip car doors with concealed transmitter and receiver infrared beam devices to detect presence of object in process of passing through hoistway



entrance and car doorway (light curtain device).

1. Use multi-beam scanning without moving parts to detect obstructions in door opening.
2. Detector Device: Prevent doors from closing, or if they have already started closing, cause doors to reopen and remain open while object is within detection zone.
3. Horizontal Beams: Minimum of 33 infra red beams to fill doorway from ground level to a height of 6 feet.

#### **1.20 EQUIPMENT: SIGNAL DEVICES AND FIXTURES**

- A. Car Operating Panel: Provide a car operating panel with all push buttons, key switches and message indicators for elevator operation.
  1. Full height car operating panel shall be surface mounted on front return.
  2. Comply with handicap requirements.
  3. Push Buttons: Mechanical, illuminating using long-lasting LEDs for each floor served.
  4. Emergency Buttons: Provide in accordance with code. Emergency alarm button, door open and door close buttons.
- B. Features of the Car Operating Panel Shall Include:
  1. Audible chime to signal that the car is either stopping at or passing a floor served by the elevator.
  2. Raised markings and Braille provided to the left-hand side of each push button.
  3. Car Lantern: Provide LED illuminated car lantern with direction arrows to comply with local code when hall lanterns are not provided.
  4. Door open and close push buttons.
  5. Firefighter's hat and Phase 2 Key-switch
  6. Inspection key-switch.
  7. Key-switch for optional Independent Service Operation
  8. Illuminated alarm button with raised marking.
  9. Elevator Data Plate marked with elevator capacity and car number.
  10. Help Button: Activation of help button will initiate two-way communication between car and a location inside the building, switching over to alternate location if call is unanswered, where personnel are available to take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
- C. Hall Fixtures: Provide hall fixtures with necessary push buttons and key switches for elevator operation.
  1. Push buttons: Metallic tactile push buttons, up button and down button at intermediate floors, single button at each terminal floor.
  2. Height: Comply with handicap requirements.
  3. Illumination: Illuminating using long-lasting low power LEDs.
- D. Hall Lanterns and Position Indicators.
  1. LED illuminated direction arrows with audible and visible call acknowledgement.
- E. Hoistway access switches: Provide key-switch at top and/or bottom floor in entrance jamb as required by local code.
- F. Firefighter's Phase 1 Service: Key switch in brushed stainless steel cover plate.
- G. Fixture Cover Plates: For push buttons, hall lanterns and position indicators, resistant white back-printed glass, no screws required for mounting. Provide stainless steel cover plates for Firefighter's Phase I switch and hoistway access switches, with tamper resistant screws in same finish.
- H. Mounting: Mount hall fixtures in entrance frames.

#### **1.21 EXECUTION**

#### **1.22 EXAMINATION**

- A. Examine hoistways, hoistway openings, and pits before starting elevator installation.
- B. Verify hoistway, pit, overhead, and openings are of correct size, within tolerances, and are ready for work of this section.



- C. Verify walls are plumb where openings occur and ready for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.
- D. Verify hoistway is clear and plumb, with variations not to exceed -0 to +1 inch at any point. Verify projections greater than 4" must be beveled not less than 75 degrees from horizontal. No negative tolerance is permitted for minimum hoistway dimensions.
- E. Verify minimum 2-hour fire-resistance rating of hatch walls.
- F. Notify Architect in writing of dimensional discrepancies or other conditions detrimental to proper installation or performance of elevators.
- G. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to manufacturer/installer.

#### **1.23 INSTALLATION**

- A. Install elevators in accordance with manufacturer/installer's instructions and ANSI/ASME A17.1.
- B. Set entrances in vertical alignment with car openings, and aligned with plumb hoistway lines.

#### **1.24 FIELD QUALITY CONTROL**

- A. Perform tests of elevator as required by ANSI/ASME A17.1 and governing codes.

#### **1.25 ADJUSTING**

- A. Adjust elevators for proper operation in accordance with manufacturer/installer's instructions.
- B. Adjust elevators for smooth acceleration and deceleration of car so not to cause passenger discomfort.
- C. Adjust doors to prevent opening of doors at landing on corridor side, unless car is at rest at that landing, or is in leveling zone and stopping at that landing.
- D. Adjust automatic floor leveling feature at each floor to within 1/4 inch of landing.
- E. Repair minor damages to finish in accordance with manufacturer/installer's instructions and as approved by Architect.
- F. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

#### **1.26 CLEANING**

- A. Clean elevators promptly after installation in accordance with manufacturer/installer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage finish.

#### **1.27 PROTECTION**

- A. Protect installed elevators from damage during construction in accordance with the negotiated temporary use agreement between Owner and manufacturer's installer.

#### **END OF SECTION**



**SECTION 14 5600  
LAUNDRY CHUTES AND DOORS**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 General Requirements, apply to work of this section.

**1.02 DESCRIPTION OF WORK:**

- A. Extent and location of each chute door is indicated on the drawings and by provisions of this Section.
- B. Types of chute required include the following:

**LAUNDRY CHUTE.**

**2.01 REFERENCE STANDARDS:**

- A. NFPA 82: "Standard on Incinerators and Waste and Linen Handling Systems and Equipment" has not been adopted by the municipality where the building is located. However, the local authority having jurisdiction may require linen chute to be vented to exterior at top. A 2-hour horizontal assembly at top of shaft (below roof deck) is shown on drawings. If required, provide termination cap, flashing, etc. (but only if deemed necessary by authority having jurisdiction)

**2.02 SUBMITTALS:**

- A. Product Data: Submit manufacturer's product specifications, standard details, installation instructions and general recommendations for total pre-engineered chute system. Mark-up data sheets to indicate actual selections for sizes and other details of installation.

**PART 2 - PRODUCTS**

**3.01 ACCEPTABLE MANUFACTURERS:**

- A. Manufacturer: Subject to compliance with listed requirements (including intake door handle style), provide products of the following:
  - 1. Chutes International, see basis of design.
  - 2. Substitutions: See Section 01 6000-Product Requirements.

**3.02 MATERIALS AND FABRICATION:**

- A. Chute Metal: 16 GA aluminized steel.
- B. Chute Intake Door/Frame Units:
  - 1. Chute Intake Door/Frame Units: Provide self-closing units at each landing and at heights above floor as indicated. Use manufacturer's recommended heights if not otherwise shown. Provide manufacturer standard 21 inch x 21 inch door size. Equip doors with fixed handle with latch release. T-Handle type is not allowed. Door must have a low profile pull with thumb turn latch. Style of door latch must meet the style on the attached drawing in order to be considered meeting the specifications. Provide a cut sheet of the door and door handle assembly for approval. Provide manufacturer's standard stainless steel door units, AISI Type 302/304 with standard satin finish or No. 3 directional polish. Doors to be side hinged.
  - 2. UL Labeled Door Units: Provide UL "B" labeled door units (1.5 hour with 30-min temp. rise of 250 deg.F, 139 deg.C), complete with closers; comply with NFPA 82 for rubbish chute doors.
- C. Chute Accessories:
  - 1. General: Provide Manufacturer's/Fabricator's standard chute accessories as indicated and as required for a complete chute assembly and installation.
- D. Fire Sprinklers (FrSpk): Equip chute with sprinkler heads in accordance with NFPA Standard No. 13, ready for piping connection (as work of another specification section). Provide access for maintenance of heads. Except as otherwise indicated or required by governing regulations, provide ½" I.P.S. heads, one located in chute above highest intake door, and one located at



intake door on alternate floors.

### **PART 3 - EXECUTION**

#### **4.01 INSTALLATION:**

- A. General: Comply with chute Manufacturer's/Fabricator's instructions and recommendations; and comply with applicable recommendations and details of "Architectural Sheet Metal Manual" by SMACNA. Assemble components with tight, nonleaking joints; and securely to supporting structure with sufficient anchorages to withstand impacts from uses, and wind loading stresses on vent units. Provide for thermal expansion movement of chute sections. Except as otherwise indicated, install chutes plumb, without offsets or obstructions, for free fall of materials within chutes. Install chute systems complete with doors, and with safety, sanitizing and fire-resistive components and accessories.
- B. Intake and Discharge Doors: Install doors at heights and locations indicated. Provide anchorages, wall/chute interfaces, self-closing operation, self-latching and similar features of installation to comply with labeling and fire-resistive requirements for fire-resistive door construction. Interface door units with thread sections of chutes in a manner which will ensure safe, snag-proof, sanitary depositing of materials in chutes by users.

#### **4.02 TESTING, ADJUSTING, CLEANING:**

- A. Test operate components of chute system upon completion of installation; demonstrate use and safety features to Owner's personnel. Operate doors, locks and interlock system to demonstrate that hardware is adjusted. Where possible, complete test operations prior to installation of shaft enclosure walls and ceilings (if any).
- B. Cleaning: Following completion of enclosure walls and ceilings, clean exposed surfaces of finished metal components of chute system. Remove foreign substances and repair imperfections in finishes, but do not remove UL labels.

**END OF SECTION**



**SECTION 31 2113  
RADON MITIGATION**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Provide all work necessary to reduce and maintain radon concentration levels below 4.0 PicoCuries per liter (pCi/L) in various buildings specified herein. Perform pre-mitigation diagnostic testing and analysis, provide mitigation system design and installation, and perform post-mitigation testing and monitoring for radon.

**1.02 REFERENCES**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
  - 1. ACI INTERNATIONAL (ACI)
    - a. ACI 301(2005; Errata 2008) Specifications for Structural Concrete
  - 2. AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL (AMCA)
    - a. AMCA 210(2007) Laboratory Methods of Testing Fans for Aerodynamic Performance Rating
  - 3. ASTM INTERNATIONAL (ASTM)
    - a. ASTM B 209(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
    - b. ASTM B 209M(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
    - c. ASTM C 1002(2007) Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
    - d. ASTM C 1047(2010) Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
    - e. ASTM C 36/C 36M(2003e1) Gypsum Wallboard
    - f. ASTM C 475/C 475M(2002; R 2007) Joint Compound and Joint Tape for Finishing Gypsum Board
    - g. ASTM C 514(2004; R 2009e1) Standard Specification for Nails for the Application of Gypsum Board
    - h. ASTM C 645(2009a) Nonstructural Steel Framing Members
    - i. ASTM C 834(2010) Latex Sealants
    - j. ASTM C 840(2008) Application and Finishing of Gypsum Board
    - k. ASTM C 920(2010) Standard Specification for Elastomeric Joint Sealants
    - l. ASTM D 2665(2009) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
  - 4. GYPSUM ASSOCIATION (GA)
    - a. GA 216(2010) Application and Finishing of Gypsum Panel Products
  - 5. INTERNATIONAL CODE COUNCIL (ICC)
    - a. ICC IMC(2009) International Mechanical Code
    - b. ICC UMC(1997; Errata 2 & 3 1997) Uniform Mechanical Code
  - 6. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
    - a. NEMA MG 1(2009) Motors and Generators
  - 7. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
    - a. NFPA 70(2011) National Electrical Code
  - 8. NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION (NELMA)
    - a. NELMA Grading Rules(2006) Standard Grading Rules for Northeastern Lumber
  - 9. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
    - a. SMACNA 1378(1995) Thermoplastic Duct (PVC) Construction Manual, 2nd Edition
  - 10. SOUTHERN PINE INSPECTION BUREAU (SPIB)
    - a. SPIB 1003(2002) Standard Grading Rules for Southern Pine Lumber



11. U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
  - a. EPA 402-R-92-004(1992) Indoor Radon and Radon Decay Product Measurement Device Protocols
  - b. EPA 402-R-92-014(1993) Radon Measurement in Schools
  - c. EPA 402-R-93-003(1993) Protocols for Radon and Radon Decay Product Measurements in Homes
  - d. EPA 402-R-93-078(1993; R 1994) Radon Mitigation Standards
  - e. EPA 625-R-92-016(1993; Am 1994) Radon Prevention in Design and Construction of Schools and Other Large Buildings
  - f. EPA 625-R-93-011(1993) Radon Reduction Technique for Existing Detached Houses: Technical Guidance for Active Soil Depressurization Systems
12. U.S. GENERAL SERVICES ADMINISTRATION (GSA)
  - a. CID A-A-2246(Rev B) paint, Latex
  - b. FS TT-P-650(Rev D) Primer Coating, Latex Base, Interior, White (for Gypsum Wallboard, or Plaster)
13. WEST COAST LUMBER INSPECTION BUREAU (WCLIB)
  - a. WCLIB 17(2000) Standard Grading Rules
14. WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)
  - a. WWPA G-5(1998) Western Lumber Grading Rules

### 1.03 DEFINITIONS

- A. Design
- B. Design Drawings
  1. Documentation showing in graphic and quantitative form the extent, design, arrangement, location, relationships, and dimensions of the construction to be provided by the Contractor.
- C. Designer
  1. USEPA RCP listed mitigation contractor associated with the Contractor who is responsible for the design and has the qualifications and experience specified.
- D. Contract Documents
  1. Documents furnished to prospective bidders/proposers containing information and specifying criteria and project requirements for diagnostic testing, design, construction and monitoring of multiple radon mitigation systems. The documents include this specification and the drawings listed in and accompanying this specification.
- E. Long Term Radon Detectors
  1. Alpha track, electretion chamber, or approved equivalent. Devices capable of sensing and recording the presences of radon during a time period of 91 days to 12 months which when analyzed provide a numeric value, measured in pCi/L, for radon concentrations during the time exposed.
- F. Short Term Radon Detectors
  1. Charcoal, electretion chamber, or approved equivalent. Devices capable of sensing and recording the presences of radon during a time period of 48 hours to 90 days which when analyzed provide a numeric value, measured in pCi/L, for radon concentrations during the time exposed.
- G. Suction Hole
  1. Location at which vacuum is created for sub-slab communication testing.
- H. Suction Point
  1. Vertical standpipe penetrating into the soil gas environment containing radon and serving as the conduit to exhaust radon gas to the atmosphere.
- I. Test Hole
  1. Location at which pressure readings are taken during sub-slab communication testing. Readings are used to evaluate potential effectiveness of a sub-slab depressurization system.



#### **1.04 SYSTEM DESCRIPTION AND REQUIREMENTS**

- A. Performance Requirements
  - 1. Radon mitigation systems shall reduce and maintain radon concentration levels below 4.0 pCi/L in various buildings specified herein. Test, design and construct radon mitigation systems in accordance with EPA 402-R-93-078, EPA 402-R-93-003, and EPA 402-R-92-004 and as specified herein. Additional guidance for testing, designing and constructing radon mitigation systems is contained in EPA 625-R-92-016 and EPA 625-R-93-011.
- B. Criteria for Diagnostic Testing and Suction Points
  - 1. Test locations, suction point locations, pipe sizes, number of fans and discharge points to the building exterior, routing of the radon mitigation systems piping, provision of associated enclosures, and all other work necessary to achieve the desired results specified are the Contractor's responsibility and shall be based on the requirements and restrictions, if any, specified herein.

#### **1.05 SUBMITTALS**

- A. Shop Drawings
  - 1. Radon mitigation
  - 2. Radon mitigation systems enclosures
- B. Product Data
  - 1. Radon mitigation systems components
  - 2. Radon mitigation systems enclosure components
  - 3. Radon diagnostic testing devices
- C. Design Data
  - 1. Radon mitigation systems design narrative
- D. Test Reports
  - 1. Pre-mitigation testing
  - 2. Post mitigation testing
- E. Certificates
  - 1. Contractor qualifications
  - 2. Contractor experience
  - 3. Worker protection plan
- F. Manufacturer's Instructions
  - 1. Radon mitigation systems components
  - 2. Radon mitigation systems enclosure components
- G. Operation and Maintenance Data
  - 1. Radon Mitigation Systems, Data Package 2
- H. Closeout Submittals
  - 1. Radon Detector Location Log
  - 2. Testing laboratory certification
  - 3. Proof of current calibration for testing devices

#### **1.06 DESIGN REQUIREMENTS**

- A. Prepare designs in accordance with the requirements of EPA 402-R-93-078 except that when the contract specification requirements are more stringent, the contract specification shall take precedence. The Contractor shall:
  - 1. Prepare design drawings and assemble and provide product data for construction of multiple radon mitigation systems;
  - 2. Prepare design narrative supporting the design shown;
  - 3. Coordinate all elements of the design to ensure there are no conflicts;
  - 4. For each building, present information 100 percent complete in a single submission and in sufficient detail to permit a complete review by the Architect. The Architect's review is to check the design for conformance with the requirements contained in the contract



documents. Design review shall not be construed as a waiver from performing requirements contained in the contract which may have been omitted from the Contractor prepared design documents.

5. Provide three copies of the complete design documents.

B. Design Drawing Requirements

1. Prepare, organize, and present drawings in the format considered standard industry practice for radon mitigation work and as described herein. Provide drawings complete, accurate and explicit enough to show compliance with the contract requirements and to permit construction. Drawings illustrating systems proposed to meet the requirements of the contract specification shall reflect proper detailing for each system to assure appropriate use, proper fit, compatibility of components and coordination with the design narrative and the contract specification. Coordinate drawings to ensure there are no conflicts between design disciplines and between drawings and the contract specification. Each Contractor prepared drawing shall bear the certification number and signature of the RCP listed individual responsible for the work portrayed on that drawing and proposed to meet the contract requirements.
  - a. Radon Mitigation Systems(Format and Content)
    - 1) On copies of the building floor plans, locate and identify each diagnostic test performed using alpha numeric designations. Prepare a separate drawing for each type of diagnostic test performed in each building. Provide grab sample (GS) data. Provide sub-slab communication (SSC) test data on. Provide short term detector (STD) data on copies of the "Device Placement Log" contained in EPA 402-R-92-014.
    - 2) On copies of the building floor plans, show suction point(s) and routing of the radon mitigation system(s) piping to the building exterior. Indicate pipe size, length of piping in the network, number and nature of flow obstructions, such as fittings, and fan characteristics for each system. Supplement the floor plan information with additional drawings keyed to each floor plan location showing riser diagrams, utility connections and routing, component installations, elevations, sections and details of the radon mitigation system(s). Also, provide construction and installation details such as supporting systems, attachment methods and surface penetration and sealing methods.
    - 3) Drawings shall not be smaller than A4 - 8 1/2 by 11 inch.
  - b. Radon Mitigation Systems Enclosures(Format and Content)
    - 1) Prepare drawings not smaller than A4 - 8 1/2 by 11 inch portraying the proposed method for enclosing each radon mitigation system in occupied spaces. All spaces shall be considered to be occupied spaces except for mechanical and electrical rooms, warehouses, storerooms, janitor closets, crawl spaces, and attic spaces. Enclosures are not required for portions of systems installed above suspended acoustical ceilings.
    - 2) Drawings shall indicate methods and materials to be used in constructing the enclosures and accesses for all operating components. Drawings showing typical enclosures and installations are acceptable (i.e. corner installation, mid-wall installation, etc.).

C. Design Narrative

1. Format
  - a. The design narrative shall include a cover page indicating the project title, location, construction contract number and preparer, a table of contents and tabbed or colored page separations for quick reference. Submit design narrative prepared on A4 - 8 1/2 by 11 inch white paper. The design narrative shall be bound in one volume.
2. Content
  - a. The design narrative shall include a basis of design and calculations. Specific requirements relative to the technical content to be provided are specified in this specification section. The design narrative shall be a presentation of facts to demonstrate that the project requirements are fully understood and that the design is based on sound engineering. The design narrative shall include and address the



following:

- 1) Executive summary.
- 2) Scope of work.
- 3) Building description.
- 4) Diagnostic testing performed and results of the testing (include Attachments C and D and the Device Placement Logs for the short-term detectors).
- 5) Diagnostic test devices and equipment used.
- 6) Locations where readings were recorded (include floor plans).
- 7) Suspected or confirmed entry points of radon into the buildings (narrative or show on floor plans).
- 8) Potential problems which may be caused by active (fan-powered) radon mitigation systems, if any.
- 9) Conclusions and recommendations.
- 10) Radon mitigation method chosen to reduce radon concentrations levels below 4.0 pCi/L and reasons for choosing the method.
- 11) Data and calculations to verify negative pressure exists throughout the soil gas environment containing radon sufficient to exhaust the soil gas to the atmosphere under all weather and building operating conditions.
- 12) Statement of compliance with applicable laws, ordinances, criteria, rules, and regulations of Federal, State, regional and local authorities regarding radon mitigation.
- 13) Appendices (to include design drawings, forms and logs, laboratory analysis sheets, etc.).

D. Design Review and Approval

1. The design will be reviewed by the Architect prior to start of construction. The Architect's review is to check the design for conformance with the contract requirements. Design review does not relieve the Contractor of the responsibility of meeting the requirements of the contract and providing radon mitigation systems which, while active, reduce and maintain radon concentration levels below 4.0 pCi/L. The design of the radon mitigation systems and enclosures shall be approved prior to submission of construction submittals for the materials to be used in the construction of the systems and enclosures.

**1.07 RADON DETECTOR LOCATION LOG**

- A. Prepare and provide to the Owner a Radon Detector Location Log for each building detailing the identity and location of each short-term radon detector. Prepare the log using copies of the "Device Placement Log" contained in EPA 402-R-92-014 and provide the appropriate information as line items. In addition to the log, on a copy of the building floor plans, locate and identify each short-term detector.

**1.08 WORKER HEALTH AND SAFETY**

- A. Provide in accordance with EPA 402-R-93-078. Prepare a worker protection plan in accordance with EPA 402-R-93-078.

**1.09 QUALITY ASSURANCE**

- A. Contractor Qualifications and Experience
  1. Within 15 days after award, submit written evidence or data demonstrating that the Contractor and/or one or more subcontractors employed by the Contractor possess the qualifications and experience specified below.
- B. Contractor Qualifications
  1. The person responsible for diagnostic testing, design, construction and on-site supervision, as required by the specifications, shall have successfully completed the requirements of and shall be maintaining a current listing in the USEPA RCP Program. Alternatively, in a State with legislation requiring mandatory credentialing for this work, compliance with the State legislation is acceptable. Evidence showing successful completion of the requirements of the USEPA National RCP Program shall include copy of current, valid USEPA RCP photo identification card or equivalent documentation issued by



- the State.
2. Contractor Experience
    - a. Submit written evidence demonstrating that the Contractor has successfully designed and installed at least two radon mitigation systems of the same or similar to the type required herein. Experience proof shall include but not be limited to:
      - 1) The contract name and number, completion dates of the project and the total cost of the project;
      - 2) The names, telephone numbers and fax number of the facility or installation for whom the radon mitigation system design, construction and/or testing were performed;
      - 3) The name, telephone number and fax number of a supervisory level point of contact at each facility or installation who has knowledge of the Contractor's performance.
  - C. Testing Laboratory
    1. Submit testing laboratory certification as proof that the testing laboratory performing radon detector analysis has successfully completed the requirements of the USEPA Radon Measurement Proficiency (RMP) Program and is qualified and authorized to perform such analysis. Alternatively, in a State with legislation requiring mandatory credentialing for this work, compliance with the State legislation is acceptable.
  - D. Diagnostic Testing Equipment
    1. Submit proof of current calibration for testing devices used in performing diagnostic testing.
  - E. On-Site Supervision
    1. No work at the site will be permitted without the presence of a person possessing the qualifications specified elsewhere in this section, namely USEPA RCP listing or the State equivalent, where applicable.

#### **1.10 DELIVERY, STORAGE AND HANDLING**

- A. Delivery of Products
  1. Deliver materials to the site in an undamaged condition. Deliver proprietary items in manufacture's original unopened and undamaged containers of packages with manufacture's name and brand and other pertinent data such as specification number, type, and class, date of manufacture. Schedule deliveries of materials to coincide with scheduled installation.
- B. Storage and Handling
  1. Carefully store materials off the ground to provide proper ventilation, drainage and protection against weather and dampness. Protect materials from marring, staining, rust, damage and overload and from contaminants such as grease, oil and dirt. Store materials at temperatures recommended by the manufacturer. Handle material to avoid damage such as chipping and breaking. Replace damaged material.

### **PART 2 PRODUCTS**

#### **2.01 RADON MITIGATION SYSTEMS**

- A. System Performance
  1. Radon mitigation systems shall reduce and maintain radon concentration levels below 4.0 pCi/L after activation of the mitigation systems.
    - a. System Piping
      - 1) Route radon mitigation systems piping so as not to interfere with the daily operations and functions of the building occupants. Keep visibility of the systems to a minimum. Enclose each radon mitigation system in occupied spaces, however, all operating components shall be accessible for maintenance and repair. All spaces shall be considered to be occupied spaces except for mechanical and electrical rooms, warehouses, storerooms, janitor closets, crawl spaces, and attic spaces. Enclosures are not required for portions of systems installed above suspended acoustical ceilings.



- b. System Outlet Location
    - 1) Mitigation system discharge points shall be as specified in EPA 402-R-93-078. Prevent foreign objects from entering the outlet. Maintain water tight seal through all penetrations to the building exterior.
  - c. System Failure Warning Monitor
    - 1) Provide a means to detect and announce each radon mitigation system failure. System failure is defined as:
      - (a) System blockage: foreign debris.
      - (b) Mechanical failure: fan or other mechanical failure.
      - (c) System leakage: pipe breakage or crack.
    - 2) Provide an audio or visual annunciator device to indicate system failure and locate the annunciator device in an occupied space. Conform to the requirements of EPA 402-R-93-078.
  - d. Air Cleaners
    - 1) Air cleaners shall NOT be used as a radon reduction method.
  - e. Ventilation Devices
    - 1) Devices which reduce radon solely by increasing ventilation to the occupied space shall NOT be used.
  - f. Back Drafting
    - 1) Radon mitigation system shall NOT cause back drafting of building chimneys.
- B. Radon Mitigation Systems Components
- 1. Mechanical and electrical materials, fabrication, construction and installation shall conform to the following industry standards:
    - a. Poly(vinyl chloride) (PVC) Piping: ASTM D 2665, Schedule 40.
    - b. In-line Tubular Centrifugal Fans: AMCA 210 and UL listed.
    - c. Electrical Work: NFPA 70, NEMA MG 1 and EPA 402-R-93-078, No. 12 AWG minimum wire size, solid copper installed in EMT or surface metal raceway.
    - d. Mechanical Work: ICC IMC, ICC UMC, SMACNA 1378 and EPA 402-R-93-078.
    - e. Sealants: ASTM C 920, polyurethane, Type S, Grade P for horizontal application, Grade NS for vertical application, Class 25, Use T.
    - f. Crawl space soil-gas retarder membrane shall be minimum 40 mils thick.

## **2.02 RADON MITIGATION SYSTEMS ENCLOSURES**

- A. Radon mitigation systems enclosure components, materials, fabrication, construction and installation for concrete, wood studs and furring, metal studs and furring, gypsum wallboard, sealants and painting shall conform to the requirements specified in the respective specification sections addressing this work contained in the project specification.

## **PART 3 EXECUTION**

### **3.01 RADON TESTING**

- A. Perform radon testing in accordance with EPA 402-R-93-003 and EPA 402-R-92-004. The Contractor shall arrange that all laboratory test results are sent from the testing laboratory directly to the Owner with one copy to the Contractor.
- B. Site investigation data and results obtained from diagnostic testing shall be used to design the radon mitigation systems.
- C. Each sub-slab communication test shall include a suction hole and at least four test holes. Use non-shrink grout to repair all holes resulting from diagnostic testing and restore floor and wall finishes to match existing adjacent surfaces.

### **3.02 DESIGN RADON MITIGATION SYSTEMS AND SYSTEMS ENCLOSURES**

- A. Design radon mitigation systems as required to achieve radon detection test results below 4.0 pCi/L based on radon diagnostic test results, EPA 402-R-93-078 and the information provided herein. Design the systems enclosures to accommodate the radon mitigation systems configurations and the adjacent or surrounding walls, partitions, ceilings and roof construction.



### **3.03 RADON MITIGATION SYSTEMS INSTALLATION**

- A. Installation
  - 1. Provide radon mitigation systems as indicated in the approved design drawings, as specified in EPA 402-R-93-078 and as required by the specifications and standards referenced herein for the respective materials using workmen skilled in the trades involved. Install piping plumb and parallel to existing walls, partitions and ceilings as appropriate, slope horizontal runs to drain, and secure in place in a rigid and substantial manner.
  - 2. Seal new and existing floor slab penetrations in accordance with EPA 402-R-93-078 and as specified herein. Prevent entry of soil gas into the building and exhausting of conditioned air via the radon mitigation system. Seal cracks and openings around floor slab penetrations with polyurethane sealant. Provide backer rod or comparable filler material as required. Insure that all penetrations to the building exterior are weathertight.
  - 3. Lay work out in advance. Exercise care where cutting, channeling, chasing or drilling floors, walls, partitions, ceilings or other surfaces as necessary for proper installation, support or anchorage. Patch and repair damage to buildings, piping and equipment using workmen skilled in the trades involved.
  - 4. As part of the site investigation, the Contractor shall identify furniture, carpeting or other portable materials and equipment which must be relocated to provide for the installation of the radon mitigation systems, if any. The Owner will work with the Contractor to coordinate relocations.
  - 5. Coordinate all work with the Owner.
- B. Supervision
  - 1. Installation of the radon mitigation systems shall be supervised by the RCP listed individual responsible for the design of the systems.
- C. Electrical Work
  - 1. NFPA 70 and EPA 402-R-93-078, No. 12 AWG minimum wire size, solid copper installed in EMT or surface metal raceway. A source of electric power should be available within 50 feet of each fan installation.
- D. Mechanical Work
  - 1. ICC IMC, ICC UMC, SMACNA 1378 and EPA 402-R-93-078.
- E. System Identification
  - 1. Label all components of the radon mitigation systems including, but not limited to, piping (every ten feet), enclosures, fans, electrical conduit (every ten feet) and circuit breakers. Labels shall read:
    - a. Radon Reduction System. Do Not Turn Off.

### **3.04 RADON MITIGATION SYSTEM ENCLOSURES INSTALLATION**

- A. Provide enclosures as indicated in the approved design drawings and as required by the specifications and standards referenced herein for the respective materials using workmen skilled in the trades involved. Install enclosures plumb, level and parallel to existing walls, partitions and ceilings as appropriate, and secure in place in a rigid and substantial manner.

### **3.05 FIELD QUALITY CONTROL**

- A. Radon Mitigation System Inspection
  - 1. Each system shall be inspected and approved in writing by the RCP listed individual responsible for the design of the system. Verify the presence of fire stops. Deficiencies shall be corrected by the Contractor at no additional cost to the Owner.
- B. Post Mitigation Testing and Monitoring
  - 1. Perform post mitigation radon testing in the buildings as specified in EPA 402-R-93-078 and herein.
    - a. Short Term
      - 1) Test each radon mitigation system for effectiveness no sooner than 24 hours nor later than 15 days after activation of the radon mitigation system. Provide short



term radon detectors (charcoal, electret ion chamber or approved equivalent) at the rate of one detector per 2,000 square feet but not less than one detector per enclosed space, except for closets. On copies of the building floor plans, locate and identify each short-term detector and provide short term detector data on copies of the "Device Placement Log" contained in EPA 402-R-92-014.

- 2) At the end of the testing period, the Contractor shall collect the detectors and send the detectors to the testing laboratory for analysis. Provide radon test results of the effectiveness of the mitigation systems not later than 30 days after collecting the detectors. Radon test results shall be sent from the testing laboratory directly to the Owner with one copy to the Contractor. Complete the line item information on the "Device Placement Log."
- 3) Radon test results above 4.0 pCi/L shall require system redesign and installation modifications as necessary to achieve radon test results below 4.0 pCi/L. Submit design modifications to the Government for review and approval. After approval of the design modifications, provide installation modifications to the radon mitigation system and retest for effectiveness. Repeat this short-term test procedure until test results below 4.0 pCi/L are achieved.
- 4) System modifications (as-built systems installations) shall be reflected in the Contractor's design documents (drawings and design narrative).

**END OF SECTION 312113**



**SECTION 31 3116  
TERMITE CONTROL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Chemical soil treatment.
- B. Site-applied termiticide for wood, steel, and concrete.

**1.02 SUBMITTALS**

- A. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements.
- B. Manufacturer's Instructions: Indicate caution requirement.
- C. Warranty: Submit warranty and ensure that forms have been completed in Owner's name.

**1.03 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing this type of work and:
  - 1. Licensed in the State in which the Project is located.

**PART 2 PRODUCTS**

**2.01 CHEMICAL SOIL TREATMENT**

- A. Toxicant Chemical: EPA Title 7, United States Code, 136 through 136y approved; synthetically color dyed to permit visual identification of treated soil.
- B. Diluent: Recommended by toxicant manufacturer.
- C. Mixes: Mix toxicant to manufacturer's instructions.

**2.02 SITE-APPLIED TERMITICIDE**

- A. Site Applied Termiticide for Wood, Steel and Concrete: Borate mineral salt based, spray applied termiticide formulated for use on wood, steel, concrete and other building materials.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.
- B. Verify final grading is complete.

**3.02 APPLICATION - CHEMICAL TREATMENT**

- A. Comply with requirements of U.S. EPA and applicable state and local codes.
- B. Spray apply toxicant in accordance with manufacturer's instructions.
- C. Apply toxicant at following locations:
  - 1. Under Slabs-on-Grade.
  - 2. At Both Sides of Foundation Surface.
- D. Under slabs, apply toxicant immediately prior to installation of vapor barrier.
- E. At foundation walls, apply toxicant immediately prior to finish grading work outside foundations.
- F. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.
- G. Re-treat disturbed treated soil with same toxicant as original treatment.
- H. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

**3.03 INSTALLATION - SITE-APPLIED TERMITICIDE**

- A. Comply with manufacturer's written instructions.

**3.04 PROTECTION**

- A. Do not permit soil grading over treated work.



- B. Protect sheet materials from damage after completed installation. Repair damage with manufacturer's recommended products and according to the manufacturer's written instructions.

**END OF SECTION**



**SECTION 32 3119  
DECORATIVE METAL FENCES AND GATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Decorative aluminum fences.

**1.02 REFERENCE STANDARDS**

- A. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2023.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- C. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact) 1993 (Reapproved 2019).
- D. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test 2023.
- E. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets 2016 (Reapproved 2023).

**1.03 SUBMITTALS**

- A. Product Data: Submit manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- B. Shop Drawings:
  - 1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

**PART 2 PRODUCTS**

**2.01 FENCES**

- A. Fences: Complete factory-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with electrodeposition coating, and having the following performance characteristics:
- B. Electro-Deposition Coating: Multistage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
  - 1. Total Coating Thickness: 2 mils, minimum.
  - 2. Color: As selected by Architect from manufacturer's standard range.
  - 3. Coating Performance: Comply with general requirements of ASTM F2408.
    - a. Adhesion: ASTM D3359 (Method B); Class 3B with 90 percent or more of coating remaining in tested area.
    - b. Impact Resistance: ASTM D2794; 60 inch pounds.
- C. Aluminum: ASTM B221.
  - 1. Tubular Pickets, Rails and Posts: 6005-T5 alloy.
  - 2. Extrusions for Posts and Rails (Outer Channel): 6005-T5 alloy.
  - 3. Extrusions for Pickets and Rail (Inner Slide Channels): 6063-T5 alloy.
- D. Fasteners: ASTM A276/A276M, Type 302 stainless steel; finished to match fence components.

**2.02 ALUMINUM FENCE**

- A. Decorative Aluminum Fence System: Provide fence meeting the Test Load and Coating Performance requirements of ASTM F2408 for Industrial class.
  - 1. Fence Panels: 6 feet high by 6 feet long.



- a. Panel Strength: Capable of supporting 270 pounds minimum load applied at midspan without deflection.
- b. Attach panels to posts with manufacturer's standard panel brackets and recommended fasteners.
- c. Posts: Aluminum extrusions; 2-1/2 inches square.
- d. Rails: Extruded aluminum channels.
  - 1) Double-walled aluminum U-channel; outside cross-section dimensions of 1-3/4 inch square; interior guide channel forms lower limit of raceway for retaining rod.
  - 2) Enclosed Retaining Rod: 1/8 inch diameter galvanized steel with variable pitch connection system for high angle racking and elimination of external fasteners.
  - 3) Picket-to-Rail Intersection Seals: PVC grommets.
  - 4) Picket Spacing, Standard: 4.715 inch on center.
- e. Pickets: Extruded aluminum tubes.
  - 1) Size: 1-1/4 inch square.
  - 2) Style: Flush top rail.
- f. Fasteners: Manufacturer's standard stainless steel bolts, screws, and washers; factory finish fasteners to match fence.
- g. Flexibility: Capable of following variable slope of up to 1:4.
- h. Color: As selected by Architect from manufacturer's standard range.

### **2.03 SPECIALITY HARDWARE**

- A. Hinges: Finished to match fence components.
- B. Latches: Finished to match fence components.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Set fence posts in accordance with the manufacturer recommended spacing.
- C. When cutting rails immediately seal the exposed surfaces by:
  - 1. Removing metal shavings from cut area.
  - 2. Apply zinc-rich primer to thoroughly cover cut edge and drilled hole; allow to dry.
  - 3. Apply two coats of custom finish spray paint matching fence color.
  - 4. Failure to seal exposed surfaces in accordance with manufacturer's instructions will negate manufacturer's warranty.
- D. Space gate posts according to the manufacturers' drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected.
  - 1. Base type and quantity of gate hinges on the application, weight, height, and number of gate cycles.
  - 2. Identify the necessary hardware required for the application on the manufacturer's gate drawings.
  - 3. Provide gate hardware by the manufacturer of the gate and install in compliance with manufacturer's recommendations.

### **3.03 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From Indicated Position: 1 inch.
- C. Minimum Distance from Property Line: 6 inches.

### **3.04 FIELD QUALITY CONTROL**

- A. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.



- B. Gates: Inspect for level, plumb, and alignment.
- C. Workmanship: Verify neat installation free of defects.

**3.05 CLEANING**

- A. Leave immediate work area neat at end of work day.
- B. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.
- C. Clean fence with mild household detergent and clean water rinse well.
- D. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

**3.06 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

**END OF SECTION**