RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

Joe Frogge
Digitally signed by Joe Frogge
DN: CN=Joe Frogge, OU=Development, OU=LS Users, DC=COLS, DC=LOC
Reason: release for construction
Date: 2021.09.07 14:50:58-05'00'

ISSUE DATE:
JULY 22, 2021

PROJECT NUMBER
21-202

REVISIONS:

No.	Date	Description
2	9/03/2021	Fire and Building Comments

CRUMBL COOKIES - LEE'S SUMMIT

1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

DRAWING INDEX

DESIGN CRITERIA

APPLICABLE CODE:
- 2018 INTERNATIONAL BUILDING CODE (I.B.C.)
- 2018 INTERNATIONAL MECHANICAL CODE
- 2018 INTERNATIONAL PLUMBING CODE
- 2018 INTERNATIONAL FIRE CODE
- 2009 INTERNATIONAL ENERGY CONSERVATION CODE
- 2017 NATIONAL ELECTRIC CODE

ACCESSIBILITY
I.C.C. A.N.S.I. 117.1 - 2009

2

SCOPE OF WORK

CONSTRUCTION OF INTERIOR PARTITION WALLS, TRANSACTION COUNTERS AND NEW FINISHES, INSTALLATION OF KITCHEN EQUIPMENT AND MECHANICAL, ELECTRICAL AND PLUMBING SYSTEMS AS REQUIRED BY RETAIL BAKERY FUNCTIONS AND APPLICABLE CODES. SCOPE OF WORK TO INCLUDE THE REUSE OF ELECTRICAL SERVICE PANEL AND EXISTING ROOF TOP UNIT.

PROJECT DIRECTORY

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DEFERRED SUBMITTALS

FIRE ALARM SYSTEM
FIRE SPRINKLER SYSTEM

PROJECT INFORMATION

THESE DRAWINGS ARE PART OF A SET OF CONSTRUCTION DOCUMENTS. THE CONSTRUCTION DOCUMENTS CONSIST OF ONE OR MORE OF THE FOLLOWING ELEMENTS:

- CONSTRUCTION DRAWINGS
- SPECIFICATIONS
- STRUCTURAL CALCULATIONS
- CONTRACT FORMS AND CONDITIONS
- ADDENDA
- MODIFICATIONS AND REVISIONS

CONTRACTORS, SUBCONTRACTORS, AND OTHERS WHO PROVIDE LABOR AND/OR MATERIALS REFERENCING THESE DRAWINGS ARE RESPONSIBLE FOR OBTAINING AND REVIEWING ALL CURRENT CONSTRUCTION DOCUMENTS.

CONTRACTORS, SUBCONTRACTORS, AND OTHERS ARE TO REPORT ANY DISCREPANCIES OR ERRORS TO JZW ARCHITECTURE, INC. IMMEDIATELY. ANY CHANGES TO THE PROJECT WILL BE VERIFIED WITH THE OWNER BY THE ARCHITECT AND REVISIONS WILL BE ISSUED BY ARCHITECT. CONTRACTORS ARE NOT TO MAKE ALTERATIONS OF ANY KIND WITHOUT THE PRIOR WRITTEN CONSENT OF ARCHITECT. DISCREPANCIES NOT REPORTED IMMEDIATELY ARE RESPONSIBILITY OF CONTRACTOR.

CONTRACTORS SHALL NOT SCALE FROM DRAWINGS. DIMENSIONS ARE PROVIDED TO ALLOW FOR ACCURATE CONSTRUCTION OF BUILDING. QUESTIONS ARISING FROM DIMENSIONS SHOULD BE RESOLVED BY CONTACTING ARCHITECT.

GENERAL PROJECT NOTES

GENERAL PROJECT NOTES

1. ALL DIMENSIONS TO NEW WALLS ARE TO FACE OF STUD UNLESS NOTED OTHERWISE. ALL DIMENSIONS TO EXISTING WALLS ARE TO FACE OF FINISH. EXISTING DIMENSIONS WERE PROVIDED BY OWNER. CONTRACTOR TO VERIFY PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO VERIFY EXISTING CONDITIONS. DISCREPANCIES BETWEEN ACTUAL CONDITIONS AND PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. CONTRACTOR SHALL SUBMIT SPECIFIC DISCREPANCIES FOR ARCHITECT REVIEW.
3. IN ALL AREAS OF CONSTRUCTION. PROTECT ALL EXISTING WALLS, CEILINGS, FLOORING FINISHES, EQUIPMENT, FURNITURE, ACCESSORIES, AND ALL EXISTING BUILDING ELEMENTS TO REMAIN FROM DAMAGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING, REPAIR, AND/OR REPLACEMENTS OF ALL SUCH ITEMS AT NO EXPENSE TO OWNER IF DAMAGE OCCURS.

GENERAL FRAMING NOTES

1. ALL DIMENSIONS AND CONDITIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO ANY WORK.
2. ALL INTERIOR WALLS TO BE 3 5/8" METAL STUDS AT 16" O.C. UNLESS NOTED OTHERWISE. PROVIDE ALL BACKING FOR EQUIPMENT AS REQUIRED.
3. ALL WORK SHALL BE IN STRICT ACCORDANCE WITH THE NOTED EDITION OF THE INTERNATIONAL BUILDING CODE (I.B.C.), AND LOCAL ORDINANCES.
4. ALL STRUCTURAL PLYWOOD SHALL BE STRUCTURAL GRADE I OR STRUCTURAL GRADE II.

GENERAL THERMAL, MOISTURE, AND ACOUSTICAL PROTECTION NOTES

1. AIRTIGHT DRYWALL SYSTEMS SHALL BE USED (USE VAPOR BARRIERS AT ALL EXTERIOR WALLS AND CEILINGS).
2. SEAL AROUND ALL ELECTRICAL, PLUMBING, OR MECHANICAL PENETRATIONS AT EXTERIOR WALL AND IN CEILING/FLOOR OR CEILING ROOF ASSEMBLIES.
3. ALL EXTERIOR WALL INSULATION TO MATCH EXISTING.

GENERAL DOOR NOTES

1. COORDINATE WITH OWNER FOR DOOR MANUFACTURER.
2. DOORS TO BE SOLID CORE, PAINT GRADE, COLOR TO BE SELECTED BY OWNER.
3. DOOR HARDWARE TO BE SELECTED BY OWNER.

GENERAL FINISH NOTES

1. ALL INTERIOR WALLS TO BE WRAPPED WITH 5/8" GYPSUM WALL BOARD, TAPED, FILLED, AND FINISHED AS PER ROOM FINISH SCHEDULE AND OWNER.
2. SEE FLOOR PLANS AND/OR FINISH SCHEDULE FOR FINISH FLOOR MATERIALS.
3. OWNER TO SELECT ALL HARDWARE, FIXTURES, APPLIANCES, ETC. CONTRACTOR TO INSTALL AS PER OWNER.
4. ALL SPECIAL ACCESSIBILITY FACILITIES SHALL BE IDENTIFIED WITH APPROPRIATE SIGNAGE.
5. IN ALL AREAS SCHEDULED TO RECEIVE NEW WALL FINISH, CLEAN, PATCH, AND REPAIR ALL WALLS IN PREPARATION FOR NEW PAINT OR FINISH. COORDINATE REMOVAL OF EXISTING WALL ITEMS AND ACCESSORIES WITH OWNER.
6. AT WALL TRANSITIONS FROM NEW TO EXISTING WALLS, PATCH REPAIR AND/OR REPLACE GYP. BOARD AS REQUIRED TO PROVIDE FLUSH TRANSITION BETWEEN NEW AND EXISTING WALL SURFACES.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE AND LOCATE ELECTRICAL, DATA, AND PHONE RECEPTACLES, SWITCHES, ETC. TO AVOID CASEWORK, DOORS ETC.

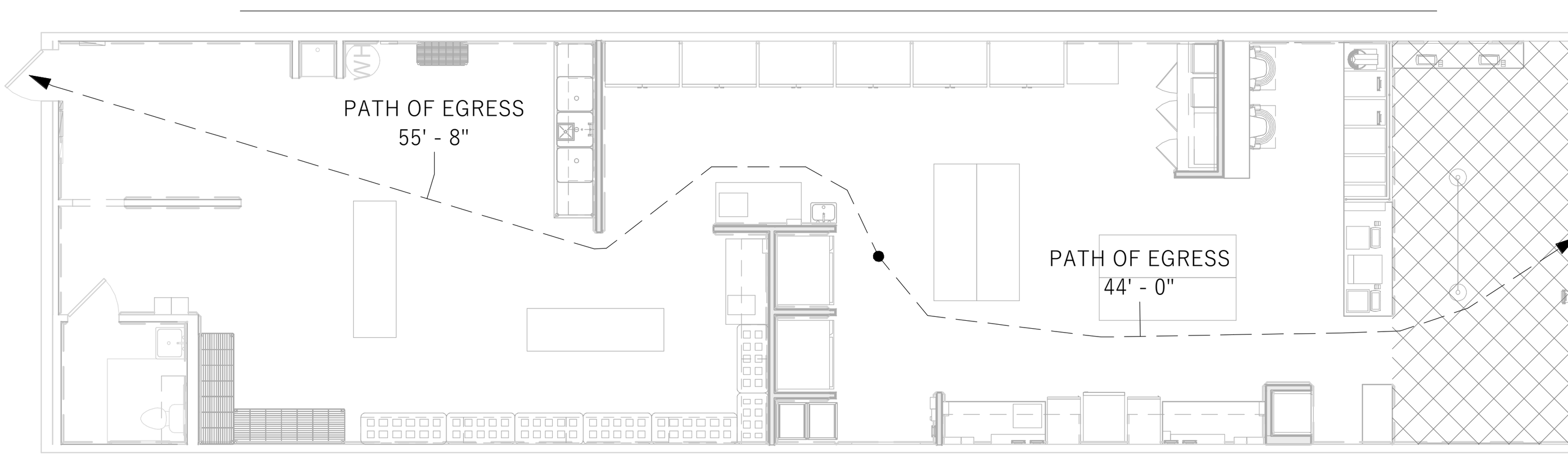
GENERAL PLUMBING, ELECTRICAL, EQUIPMENT NOTES

1. EXISTING CONDITIONS FOR ALL BUILDING SYSTEMS: PLUMBING, MECHANICAL, ELECTRICAL, SEWER, FIRE PROTECTION, STRUCTURAL, ETC. WERE PROVIDED BY OWNER. CONTRACTOR TO VERIFY EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
2. ALL ELECTRICAL FINISH HARDWARE TO BE SELECTED BY OWNER.
3. PROVIDE (2) SEISMIC STRAPS (MIN.) FOR EVERY WATER HEATER.
4. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO ASSURE REQUIRED PLUMBING AND ELECTRICAL SERVICE TO ALL FIXTURES AS INDICATED ON PLANS AND AS REQUIRED BY BUILDING CODE AND OWNER.
5. THE GENERAL CONTRACTOR SHALL VERIFY AND COORDINATE WITH ALL TRADES, SIZES, AND LOCATIONS OF ALL OPENINGS FOR MECHANICAL, PLUMBING, AND ELECTRICAL EQUIPMENT, EQUIPMENT PADS FOR BASES. AS WELL AS ELECTRIC POWER, WATER AND DRAIN INSTALLATIONS, BEFORE PROCEEDING WITH WORK. CONTRACTOR SHALL PROVIDE COORDINATION DRAWINGS FOR PROPER PLACEMENT OF ALL TRADES WORK, ANY CONCERNS, SPACE LIMITATIONS OR STRUCTURAL CONFLICTS, SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT, A REASONABLE RESPONSE TIME SHALL BE ALLOWED.

PROJECT LOCATION

NOT TO SCALE
N

EGRESS PLAN



CODE ANALYSIS

CHAPTER 3: USE AND OCCUPANCY CLASSIFICATION
302 CLASSIFICATION. BUSINESS: GROUP B
304 BUSINESS GROUP B
FOOD PROCESSING ESTABLISHMENTS AND COMMERCIAL KITCHENS NOT ASSOCIATED WITH RESTAURANTS, CAFETERIAS AND SIMILAR DINING FACILITIES NOT MORE THAN 2,500 SF IN AREA

CHAPTER 6: TYPES OF CONSTRUCTION
TYPE II-B
2

CHAPTER 9: FIRE PROTECTION SYSTEMS
903 AUTOMATIC SPRINKLER SYSTEM
EXISTING: EQUIPPED WITH AUTOMATIC SPRINKLER
NFPA 13 FIRE SPRINKLER SYSTEM PROVIDED IN BUILDING

CHAPTER 10: MEANS OF EGRESS
1004 OCCUPANT LOAD
1004.1 DESIGN OCCUPANT LOAD - TABLE 1004.1.2

FUNCTION OF SPACE	LOAD FACTOR	AREA	# OCC.
MERCANTILE:	60 GROSS	257 SF	5
KITCHENS, COMMERCIAL:	200 GROSS	1784 SF	9
OCCUPIED SPACE		2041 SF	14
EMPLOYEE RESTROOM	NA	65 SF	NA
TOTAL AREA		2106 SF	14

1005 MEANS OF EGRESS SIZING
1005.2 MINIMUM WIDTH BASED ON COMPONENT
MIN 36" PROVIDED
1006 NUMBER OF EXITS AND EXIT ACCESS DOORWAYS
TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY
OCCUPANCY:B
OCCUPANT LOAD OF SPACE: <30
COMMON PATH OF EGRESS TRAVEL DISTANCE W/ FS: <100FT
ONE EXIT REQUIRED FROM EACH SPACE
ONE EXIT PROVIDED FROM EACH SPACE

CHAPTER 29: PLUMBING SYSTEMS
2902 MINIMUM PLUMBING FACILITIES
2902.1 MINIMUM NUMBER OF FIXTURES.
MINIMUM NUMBER IN TABLE 2902.1
BUSINESS = 1 PER 25 FOR FIRST 50
2902.2 SEPARATE FACILITIES.
EXCEPTION 2: SEPARATE FACILITIES SHALL NOT BE REQUIRED IN STRUCTURES OR TENANT SPACES WITH A TOTAL OCCUPANT LOAD, INCLUDING BOTH EMPLOYEES AND CUSTOMERS, OF 15 OR FEWER.
2902.3 EMPLOYEE AND PUBLIC TOILET FACILITIES
EXCEPTION 2: PUBLIC TOILET FACILITIES SHALL NOT BE REQUIRED FOR STRUCTURES AND TENANT SPACES INTENDED FOR QUICK TRANSACTIONS, INCLUDING TAKEOUT, PICKUP AND DROP-OFF, HAVING A PUBLIC ACCESS AREA LESS THAN OR EQUAL TO 300 SF.

STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT
9/3/2021

CRUMBL COOKIES - LEE'S SUMMIT

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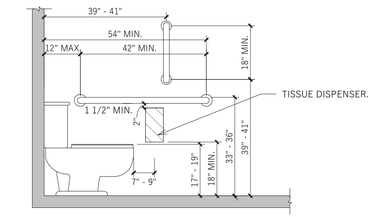
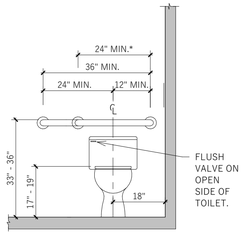


NOTE: SOLID BLOCKING REQUIRED FOR GRAB BARS AND TISSUE DISPENSER.

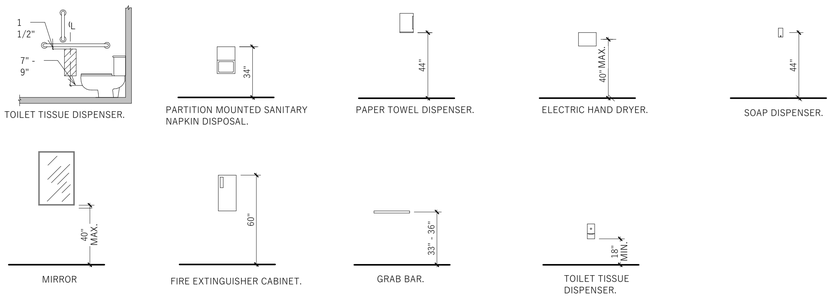
1 G1.1 TYPICAL WATER CLOSET - SIDE VIEW 1/2" = 1'-0"



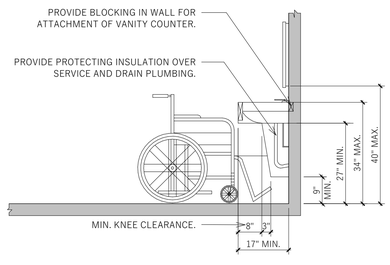
*24" MIN. WHERE WALL SPACE DOES NOT PERMIT A 36" GRAB BAR AS PER ANSI 117.1-2003 SECTION 604.5.2.

NOTE: SOLID BLOCKING REQUIRED FOR GRAB BARS. GRAB BARS TO SUPPORT 250# FORCE

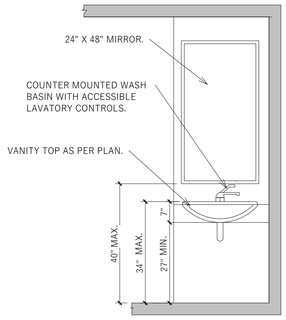
2 G1.1 TYPICAL WATER CLOSET - FRONT VIEW 1/2" = 1'-0"



3 G1.1 MOUNTING HEIGHTS AND TOILET ROOM ACCESSORIES 1/4" = 1'-0"

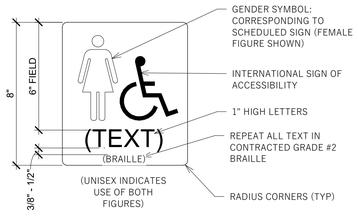


4 G1.1 TYPICAL VANITY DETAIL 1/2" = 1'-0"

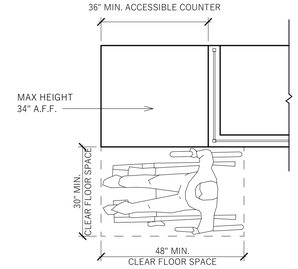


5 G1.1 TYPICAL VANITY ELEVATION 1/2" = 1'-0"

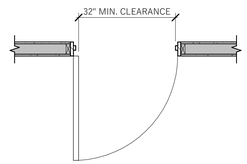
NOTES
1. SIGN IS ENGRAVED LAMINATED ACRYLIC
2. TEXT PER SIGNAGE SCHEDULE
3. MOUNT ON WALL AT LATCH SIDE OF DOOR WITHIN 18" OF OPENING AND AT +5'-0" A.F.F TO CENTER LINE OF SIGN (TYPICAL, U.O.N.)



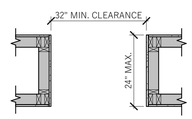
6 G1.1 RESTROOM SIGNAGE 3" = 1'-0"



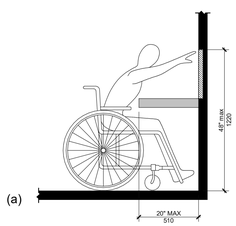
7 G1.1 SALES AND SERVICE COUNTER DETAIL 1/2" = 1'-0"



8 G1.1 CLEAR DOORWAY WIDTH - HINGED 1/2" = 1'-0"



9 G1.1 CLEAR PASSAGEWAY WIDTH - MAX. DEPTH 1/2" = 1'-0"



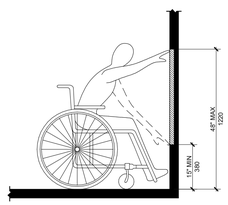


FIG. 308.2.1
UNOBSTRUCTED
FORWARD REACH

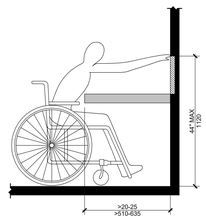


FIG. 308.2.2
OBSTRUCTED HIGH
FORWARD REACH

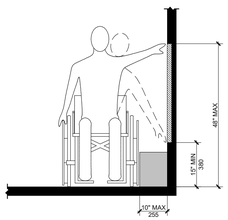


FIG. 308.3.1
UNOBSTRUCTED
SIDE REACH

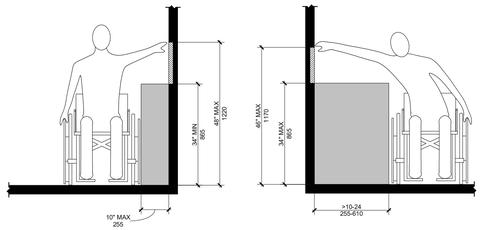


FIG. 308.3.2
OBSTRUCTED HIGH
SIDE REACH

10 G1.1 TYPICAL REACH RANGES 1/2" = 1'-0"

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER:
21-202

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JULY 22, 2021

REVISIONS:

No.	Date	Description

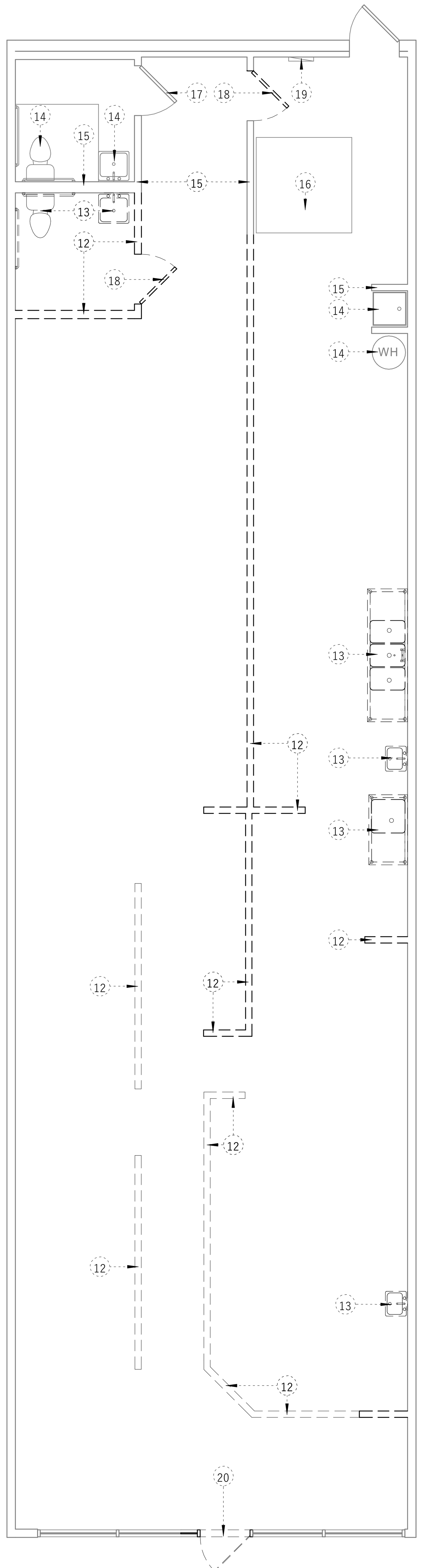
CONSULTANT

CRUMBL COOKIES - LEE'S SUMMIT
1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

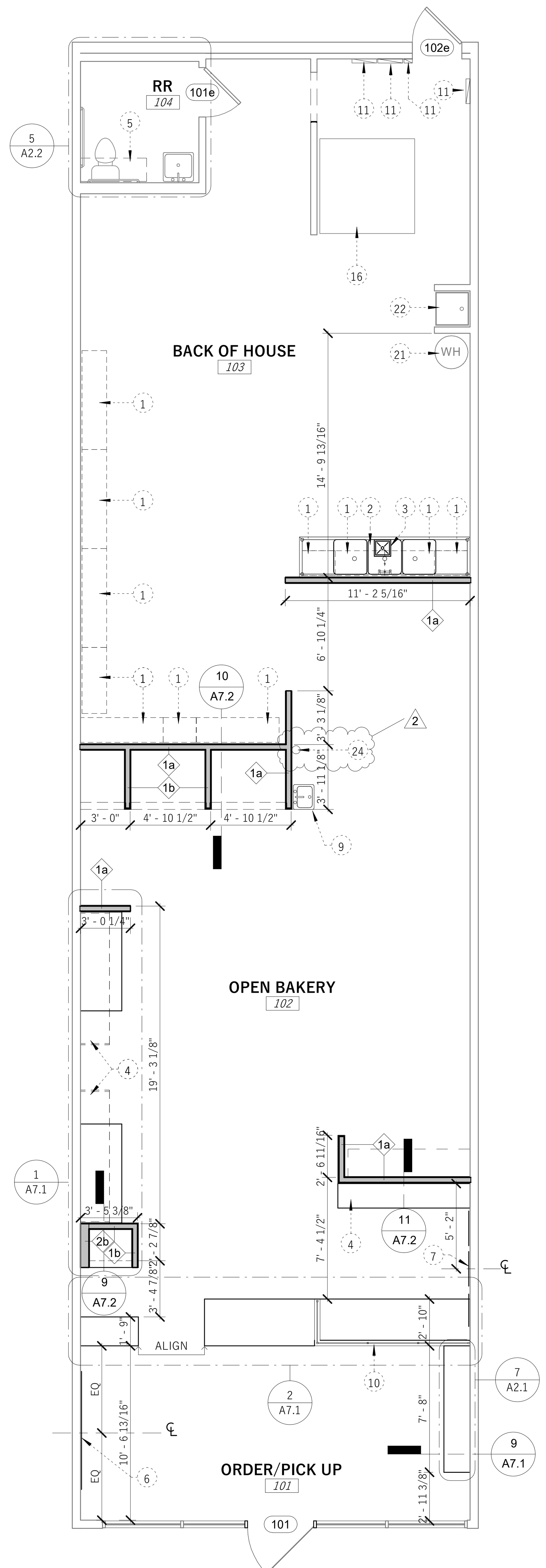
STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT
9/3/2021

ACCESSIBILITY DETAILS

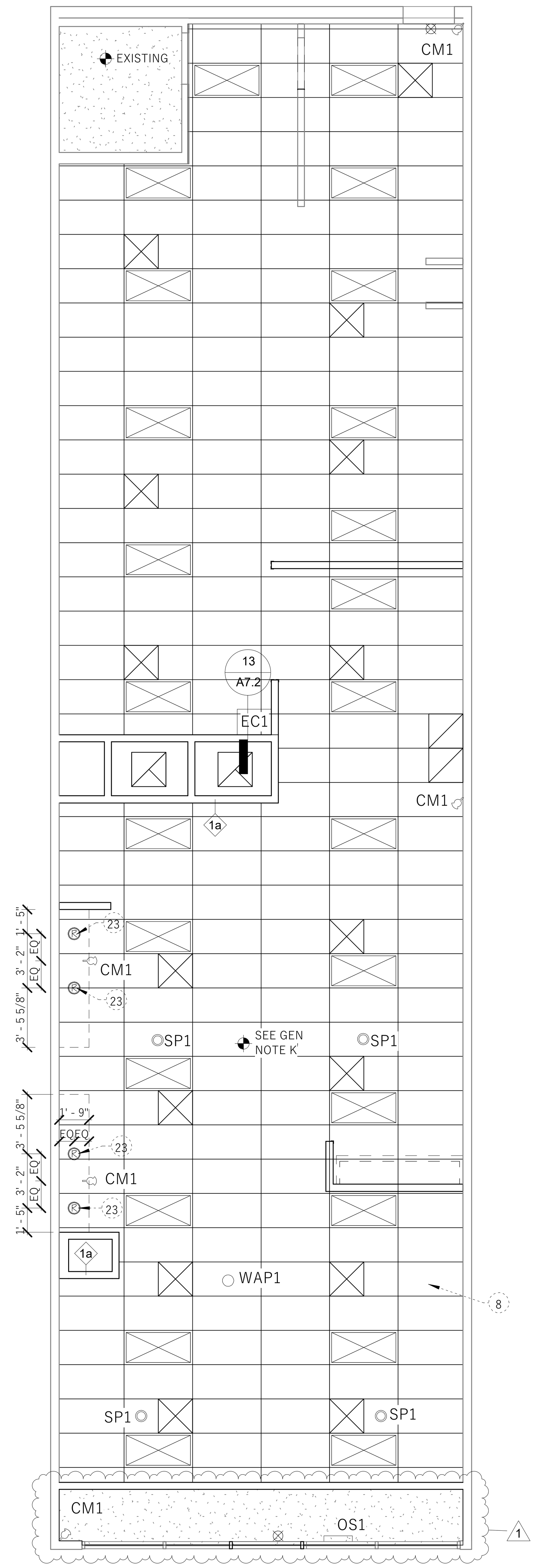
G1.1



1 A1.1 DEMOLITION PLAN
3/16" = 1'-0"



2 A1.1 MAIN FLOOR PLAN
3/16" = 1'-0"



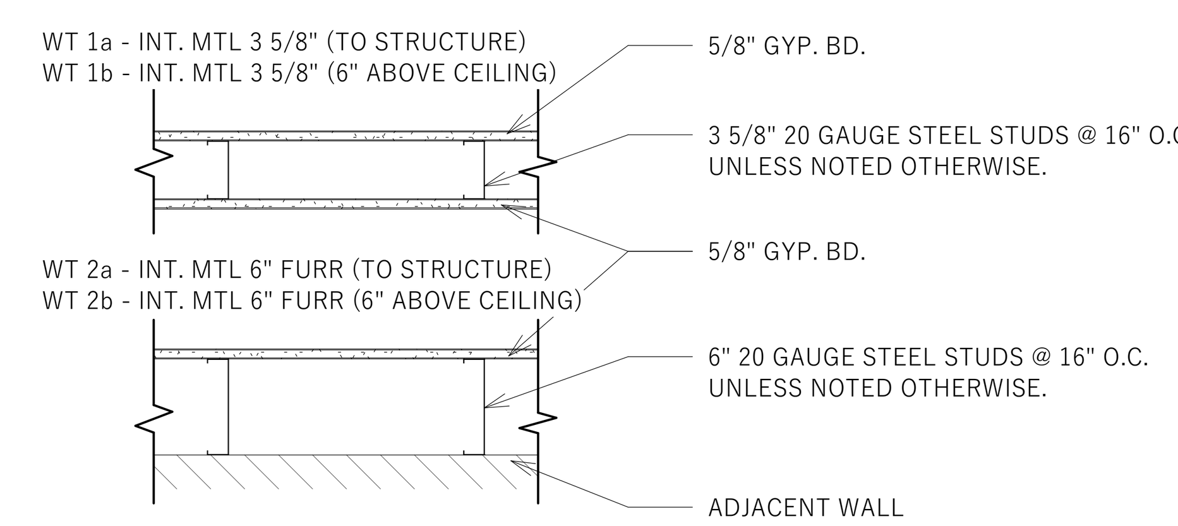
3 A1.1 REFLECTED CEILING PLAN
3/16" = 1'-0"

SYMBOL LEGEND

- RECESSED CAN LIGHT FIXTURE
- 2 X 4 LED LAY- IN LIGHT
- VENTILATION FAN
- EXIT SIGN
- RETURN AIR
- SUPPLY AIR
- VENTILATION FAN
- 2 X 4 LAY-IN CEILING
- GYP. BOARD CEILING
- SPEAKER (SEE EQUIPMENT SCHEDULE A6.1)
- SECURITY CAMERA (SEE EQUIPMENT SCHEDULE A6.1)

WALL TYPES

SEE DETAIL 3/A7.3 FOR WALLS TO STRUCTURE
SEE DETAIL 4/A7.3 FOR WALLS 6" ABOVE CEILING



GENERAL NOTES - PLAN

A	COORDINATE ALL MECHANICAL, PLUMBING, & ELEC. DEMOLITION AND/OR REUSE W/OWNER.
B	CONTRACTOR TO DISPOSE ALL DEMOLITION ITEMS AS PER LOCAL CODES & REGULATIONS.
C	UNKNOWN CONDITIONS MAY EXIST. DEMOLITION SHALL BE DONE W/ CARE TO ENSURE THAT THERE IS NO DAMAGE TO UNSEEN COMPONENTS OR MATERIALS THAT MAY NEED TO REMAIN OR BE RELOCATED.
D	ANY PENETRATIONS THROUGH CONCRETE FLOOR SLABS, CONCRETE WALLS, OR CONCRETE COLUMNS WILL NEED TO BE APPROVED BY THE STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING, PRIOR TO COMMENCING WORK.
E	PROVIDE BLOCKING, WHERE APPLIES, IN NEW AND EXISTING WALLS AS NEEDED FOR NEW MILLWORK (COORDINATE WITH MILLWORK CONTRACTORS).
F	FIELD VERIFY ALL DIMENSIONS AND NOTIFY ARCHITECT OF ANY DISCREPENCIES.
G	ALL DIMENSIONS FROM EXISTING WALLS ARE FROM EDGE OF EXISTING WALL FINISH.
H	ALL DIMENSIONS FROM NEW WALLS ARE MEASURED TO EDGE OF STUD.
I	SEE SHEET A 6.1 FOR EQUIPMENT AND A6.4 FOR FINISH INFORMATION.
J	ALL EXISTING WALL, FLOOR, AND CEILING FINISHES TO BE REMOVED DURING DEMOLITION UNLESS NOTED OTHERWISE.
K	DESIRED CEILING HEIGHT TO BE AS HIGH AS POSSIBLE IF NOT ABLE TO BE PLACED AT 12'-0" AFF AS REQUIRED. GENERAL CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS.

KEYED NOTES

1	18" WIRE WALL MOUNTED STORAGE SHELVING. CONTINUOUS PLYWOOD BACKING BEHIND SHEETROCK. SEE DETAILS.
2	NEW 3-COMPARTMENT SINK
3	FLOOR SINK, COORDINATE WITH PLUMBING
4	SOLID SURFACE FLOATING SHELF, SEE DETAILS
5	18" WIRE MOUNTED STORAGE SHELVING ABOVE TOILET WITH 6' - 8" CLEAR BELOW. PROVIDE CONTINUOUS PLYWOOD BACKING BEHIND SHEETROCK. SEE DETAILS.
6	BAKERHEAD LOGO SIGN, DIMENSIONED TO CENTER LINE. SEE DETAILS FOR SIGNAGE INSTALLATION.
7	COOKIE SIGNAGE DIMENSIONED FROM FINISHED WALL FACE TO CENTER LINE. SEE DETAILS FOR SIGNAGE INSTALLATION.
8	SEE DETAIL 2/A7.3 FOR SUSPENDED CEILING GRID
9	ALIGN SIDE SPLASH OF HAND SINK WITH END OF WALL
10	FRAMED WALL AT REAR OF CABINETRY; SEE DETAILS ON SHEET A7.1
11	SEE ELECTRICAL PLANS FOR EQUIPMENT INFORMATION.
12	EXISTING WALL TO BE REMOVED
13	EXISTING PLUMBING FIXTURE TO BE REMOVED
14	EXISTING PLUMBING FIXTURES TO REMAIN
15	EXISTING WALL TO REMAIN
16	EXISTING FREEZER/COOLER TO REMAIN
17	EXISTING DOOR TO REMAIN
18	EXISTING DOOR TO BE REMOVED
19	EXISTING ELECTRICAL PANEL TO REMAIN
20	EXISTING STOREFRONT TO BE REMOVED. PREPARE FOR ADDITION OF NEW STOREFRONT SYSTEM
21	EXISTING WATER HEATER TO REMAIN
22	EXISTING MOP SINK TO REMAIN
23	UNDERSHELF LIGHTING, SEE DETAILS
24	FIRE EXTINGUISHER.

PROJECT NUMBER
21-202

ISSUE DATE:
JULY 22, 2021

REVISIONS:

No.	Date	Description
1	8/10/2021	Landlord Change
2	9/03/2021	Fire and Building Comments

CONSULTANT

CRUMBL COOKIES - LEE'S SUMMIT

1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

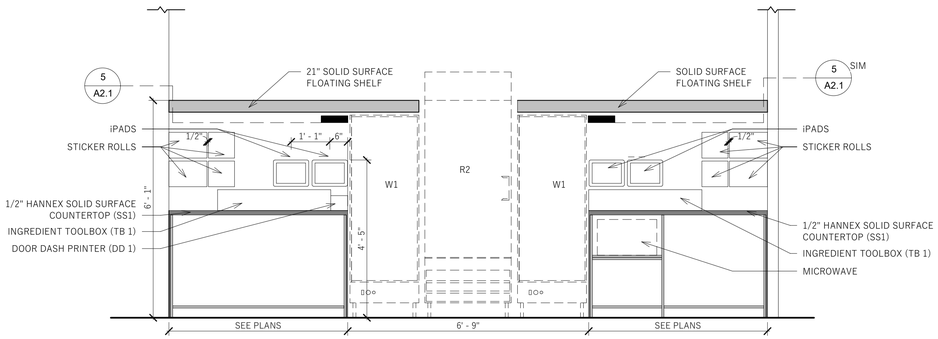
STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT

9/3/2021

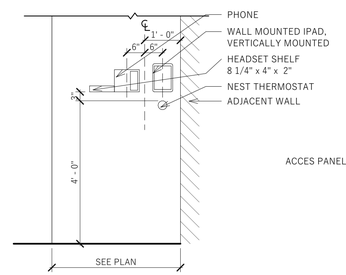
DEMOLITION PLAN, REMODEL FLOOR PLAN & RCP

A1.1

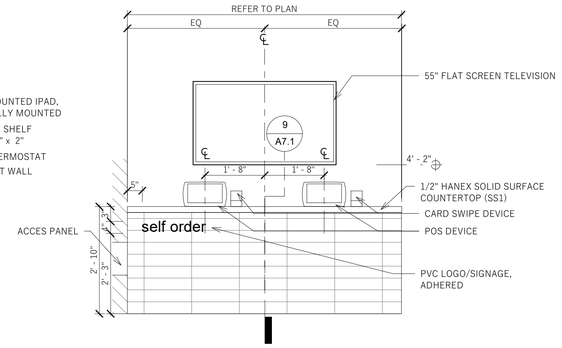
JZW ARCHITECTS



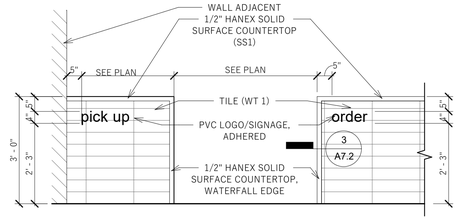
1 A2.1 — DRESSING STATIONS — 1/2" = 1'-0"



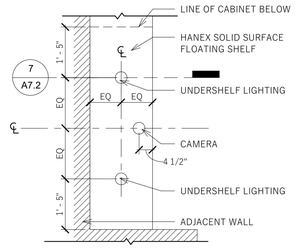
2 A2.1 — NEST/PHONE/iPAD @ PICK UP — 1/2" = 1'-0"



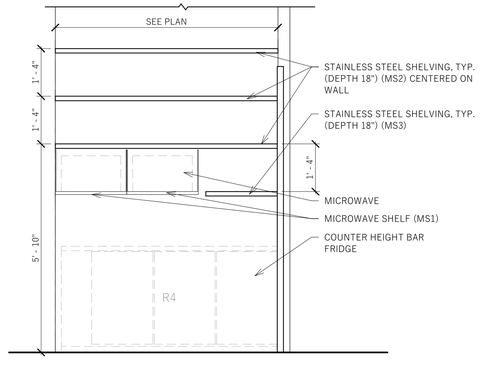
3 A2.1 — SELF ORDERING STATION — 1/2" = 1'-0"



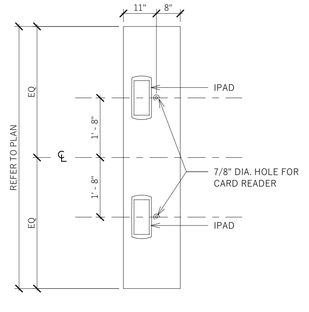
4 A2.1 — PICK UP COUNTER — 1/2" = 1'-0"



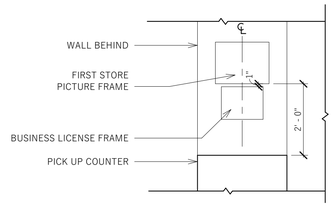
5 A2.1 — CAMERA LOCATION @ FLOATING SHELF @ BOXING STATION — 1/2" = 1'-0"



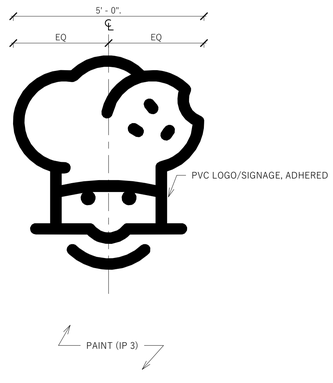
6 A2.1 — FRIDGE @ MIXER WALL — 1/2" = 1'-0"



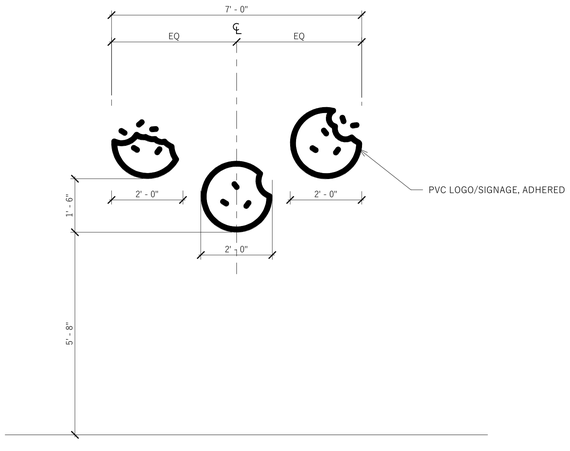
7 A2.1 — ORDERING STATION GROMMET LOCATION DETAIL — 1/2" = 1'-0"



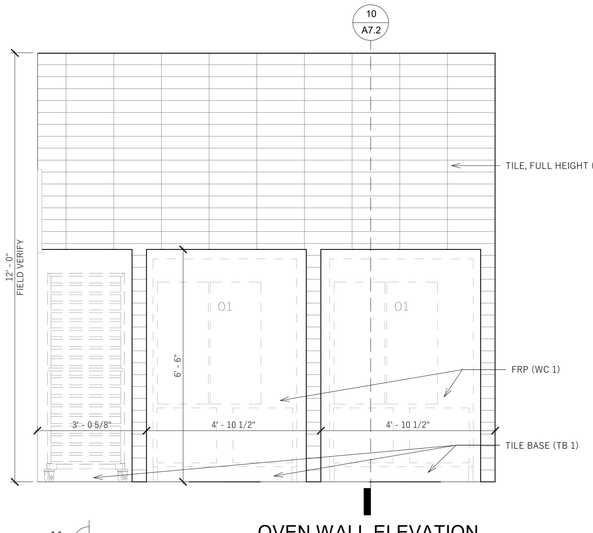
8 A2.1 — FIRST STORE/BUSINESS LICENSE FRAMES @ PICK UP — 1/2" = 1'-0"



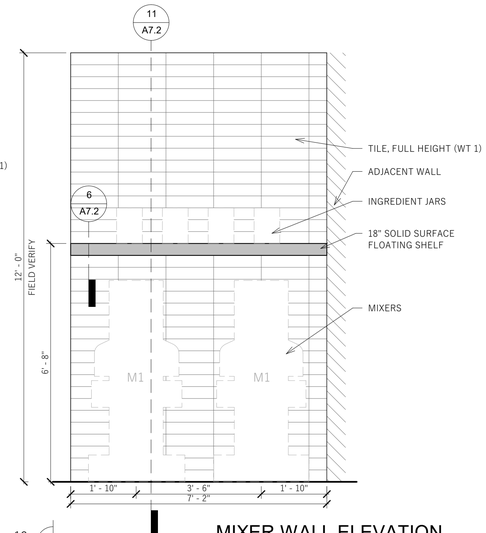
9 A2.1 — BAKER HEAD LOGO — 1/2" = 1'-0"



10 A2.1 — COOKIES LOGO — 1/2" = 1'-0"



11 A2.1 — OVEN WALL ELEVATION — 1/2" = 1'-0"



12 A2.1 — MIXER WALL ELEVATION — 1/2" = 1'-0"

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
TEN WORKING DAYS
09/07/2021

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REVISIONS:

No.	Date	Description

CONSULTANT

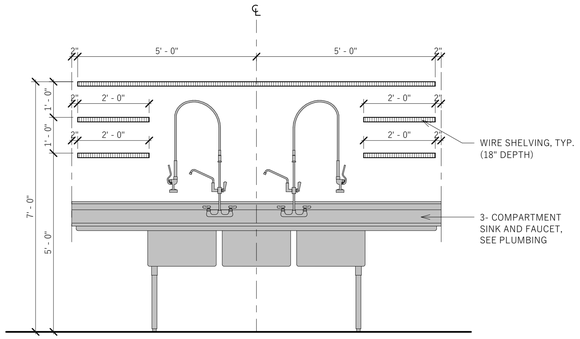
CRUMBL COOKIES - LEE'S SUMMIT

1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT
9/3/2021

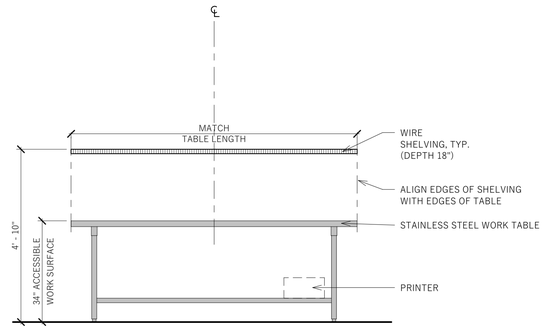
INTERIOR ELEVATIONS

A2.1



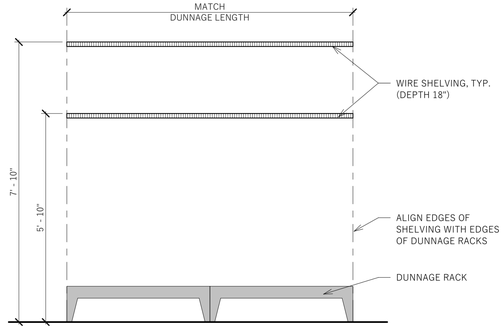
1 A2.2 — 3 COMPARTMENT SINK AND SHELVING

1/2" = 1'-0"



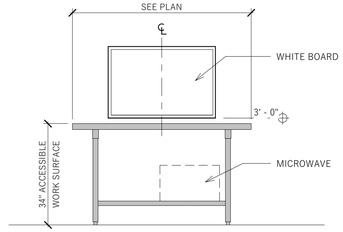
2 A2.2 — BOXING SHELVING @ BACK OF HOUSE

1/2" = 1'-0"



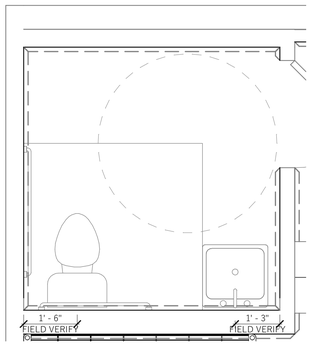
3 A2.2 — DUNNAGE SHELVING

1/2" = 1'-0"



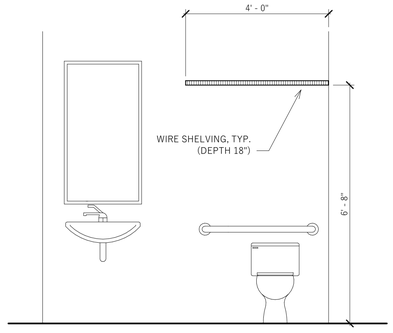
4 A2.2 — WHITE BOARD @ BACK OF HOUSE

1/2" = 1'-0"



5 A2.2 — ENLARGED BATHROOM

1/2" = 1'-0"



6 A2.2 — BATHROOM SHELVING

1/2" = 1'-0"

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
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TEN SUMMIT COURT
09/07/2021

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CRUMBL COOKIES - LEE'S SUMMIT

1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT

9/3/2021

INTERIOR ELEVATIONS

A2.2

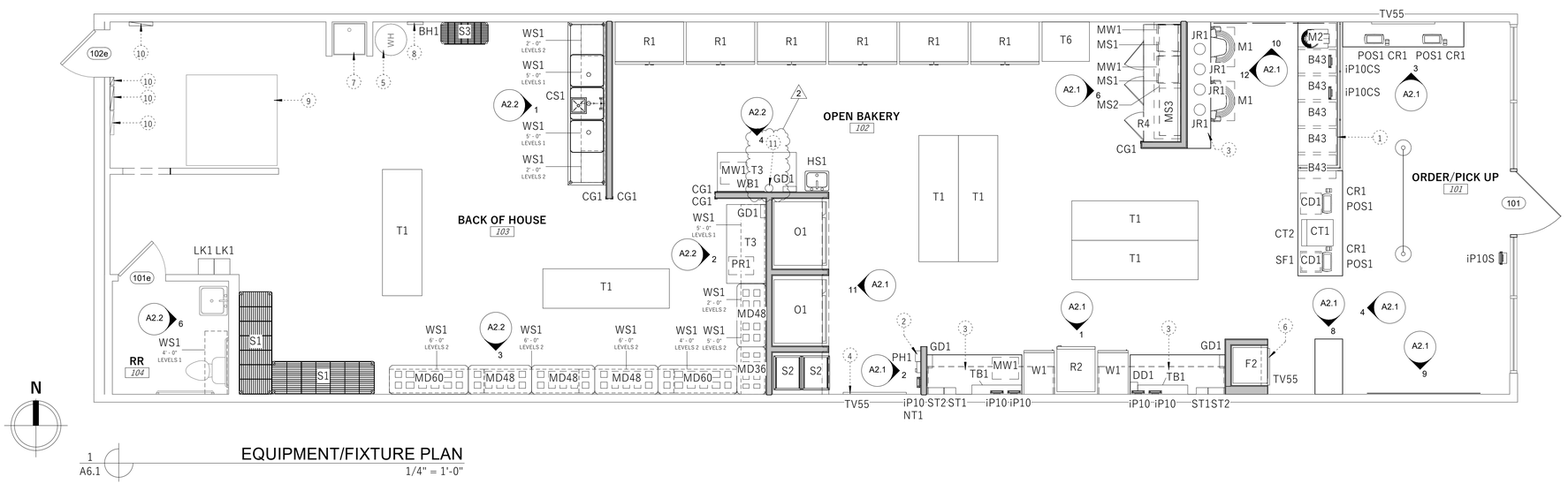
WIRE SHELVING SCHEDULE

ITEM NUMBER	LINEAR FEET	DESCRIPTION	DIMENSIONS	PROVIDER	INSTALLER	ADDITIONAL NOTES
WS1	85' - 0"	STAINLESS STEEL WIRE SHELVING	18" D	GC	GC	CONTACT LENNY AT LDOUGLAS@BARGREEN.COM

EQUIPMENT/FIXTURE SCHEDULE

ITEM NUMBER	QTY	DESCRIPTION	DIMENSIONS	PROVIDER	INSTALLER	ADDITIONAL NOTES
B43	6	43 GALLON INGREDIENT BIN	SEE BUILD OUT GUIDE	OWNER	OWNER	
BH1	1	BROOM HANGER	SEE EQUIPMENT GUIDE	OWNER	GC	
CD1	2	CASH DRAWER	SEE EQUIPMENT GUIDE	OWNER	OWNER	
CM1	5	SECURITY CAMERA	SEE EQUIPMENT GUIDE	OWNER	GC	POWER OVER ETHERNET 802.3af
CR1	4	CARD READER	8 3/4" L X 5" D X 8 5/8" H	OWNER	GC	
CS1	1	STAINLESS STEEL THREE COMPARTMENT SINK	SEE PLUMBING FIXTURE SCHEDULE	GC	GC	SEE PLUMBING FIXTURE SCHEDULE
CT1	1	COOKIE TRAY	SEE DETAILS	OWNER	OWNER	
CT2	1	SMALL COOKIE TRAY	SEE DETAILS	OWNER	OWNER	
DD1	1	DOOR DASH LABEL PRINTER	5.7" L X 9.2" D X 5" H	OWNER	OWNER	
EC1	1	EQUIPMENT CABINET	SEE BUILD OUT GUIDE	OWNER	GC	MUSIC RECEIVER, INTERNET MODEM, CLOUD COVER MUSIC BOX, CAMERA CONTROLLER
F2	1	GLASS DOOR FREEZER	27 1/8" L X 26 1/4" D X 85 3/8" H	OWNER	GC	
GD1	4	GLOVE DISPENSER	9" L X 3" D X 18" H	OWNER	GC	
HS1	1	STAINLESS STEEL HAND SINK	SEE PLUMBING FIXTURE SCHEDULE	GC	GC	SEE PLUMBING FIXTURE SCHEDULE
iP10	5	10.2 INCH WALL MOUNTED IPAD	SEE BUILD OUT GUIDE	OWNER	GC	
iP10CS	2	10.2 INCH COUNTER STAND	SEE BUILD OUT GUIDE	OWNER	GC	
iP10S	1	10.2 INCH IPAD ON INDEPENDENT STAND	SEE BUILD OUT GUIDE	OWNER	GC	
JR1	4	INGREDIENT JAR	SEE BUILD OUT GUIDE	OWNER	OWNER	
LK1	2	EMPLOYEE LOCKERS	SEE BUILD OUT GUIDE	OWNER	OWNER	
M1	2	HOBART LEGACY HL600-1 MIXER	31" L X 47" D X 61" H	OWNER	GC	
M2	1	AVANTCO PLANETARY STAND MIXER (20 QT)	17 1/8" W X 21" D X 30 1/2" H	OWNER	GC	
MD36	1	DUNNAGE RACK	36" L X 22" D X 12" H	OWNER	GC	
MD48	4	DUNNAGE RACK	48" L X 22" D X 12" H	OWNER	GC	
MD60	2	DUNNAGE RACK	60" (W) x 22" (D) x 12" (H)	OWNER	GC	
MS1	2	REGENCY STAINLESS STEEL MICROWAVE SHELF	24" L X 18" D	GC	GC	LOCATE ON WEBSAURANTSTORE.COM, MODEL #600MS1824
MS2	3	STAINLESS STEEL SHELF	84" L x 16" D	GC	GC	CONTACT LENNY AT LDOUGLAS@BARGREEN.COM
MS3	1	STAINLESS STEEL SHELF	36" L x 16" D	GC	GC	CONTACT LENNY AT LDOUGLAS@BARGREEN.COM
MW1	4	1000W COMMERCIAL MICROWAVE	20" L X 18.5" D X 12" H	OWNER	GC	
NT1	1	NEST THERMOSTAT	SEE BUILD OUT GUIDE	OWNER	GC	MOUNT @ 48" A.F.F. MAX
O1	2	BLODGETT XR8-E	48 1/4" L X 45" D X 75" H	OWNER	GC	
OS1	1	OPEN SIGN	SEE EQUIPMENT GUIDE	OWNER	GC	
PH1	1	PHONE	SEE EQUIPMENT GUIDE	OWNER	GC	POWER OVER ETHERNET 802.3af
POS1	4	STRIPE REGISTER KIT	SEE BUILD OUT GUIDE	OWNER	GC	
PR1	1	PRINTER	SEE EQUIPMENT GUIDE	OWNER	OWNER	
R1	6	REACH-IN REFRIGERATOR	54" L X 33 1/4" D X 82 1/2" H	OWNER	GC	
R2	1	REACH-IN REFRIGERATOR	29" L X 32 1/4" D X 82 1/2" H	OWNER	GC	
R4	1	Counter Height Solid Door Back Bar Refrigerator	89" L X 28" D X 40" H	OWNER	GC	
S1	2	STAINLESS STEEL 4-LEVEL STEEL STORAGE RACK	SEE EQUIPMENT GUIDE	OWNER	OWNER	
S2	2	BUN PAN/SHEET PAN RACKS	26" L X 20" D X 70" H	OWNER	OWNER	
S3	1	5 SHELF STORAGE UNIT	SEE EQUIPMENT GUIDE	OWNER	OWNER	
SF1	1	SAFE	SEE EQUIPMENT GUIDE	OWNER	GC	
SP1	4	SPEAKER	SEE BUILD OUT GUIDE	GC	GC	AMAZON BASICS 16 GAUGE AUDIO STEREO SPEAKER WIRE
ST1	4	SMALL STICKER ROLL	8 3/4" L X 5" D X 8 5/8" H	OWNER	GC	
ST2	4	LARGE STICKER ROLL	12 3/4" L X 5" D X 8 5/8" H	OWNER	GC	
T1	6	STAINLESS STEEL WORK TABLE	96" L X 30" D X 34" H	OWNER	OWNER	
T3	2	STAINLESS STEEL WORK TABLE	60" L X 30" D X 34" H	OWNER	OWNER	
T6	1	STAINLESS STEEL WORK TABLE	36" L X 30" D X 34" H	OWNER	OWNER	
TB1	2	BOXING STATION TOOL BOX	38" L X 7" D X 7" H	OWNER	OWNER	
TV55	3	55 INCH FLAT SCREEN TELEVISION	<varies>	OWNER	GC	
W1	2	WARMING CABINET	23 1/8" L X 33 3/16" D X 66 1/2" H	OWNER	GC	
WAP1	1	WIFI ACCESS POINT	SEE EQUIPMENT GUIDE	OWNER	GC	POWER OVER ETHERNET 802.3af
WB1	1	WHITE BOARD	SEE EQUIPMENT GUIDE	OWNER	GC	

NOTE: SEE PLANS FOR PLACEMENT OF ALL EQUIPMENT AND FIXTURES. NOTE: SEE CORPORATE BUILD OUT GUIDE



1 A6.1 EQUIPMENT/FIXTURE PLAN 1/4" = 1'-0"

N

KEYED NOTES

1	SNEEZE GUARD
2	HEADSET SHELF. SEE DETAIL ON A2.1
3	SOLID SURFACE FLOATING SHELF, SEE DETAILS
4	55" WALL MOUNTED TELEVISION, BOTTOM OF TV AT 6'-6
5	EXISTING WATER HEATER TO REMAIN
6	TV MOUNTED VERTICALLY B.O. TV @ 7'-6" AFF
7	EXISTING MOP SINK TO REMAIN
8	WALL MOUNTED MOP HANGER.
9	EXISTING FREEZER/COOLER TO REMAIN
10	SEE ELECTRICAL PLANS FOR EQUIPMENT INFORMATION.
11	FIRE EXTINGUISHER.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
TEN WORKING DAYS
09/07/2021

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21-202

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No.	Date	Description
2	9/03/2021	Fire and Building Comments

CONSULTANT

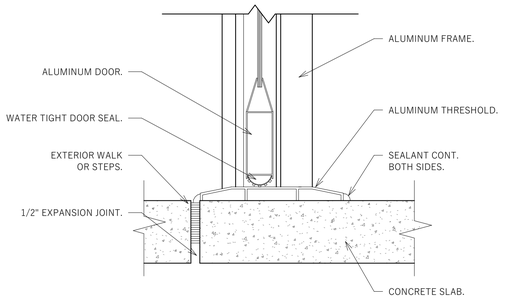
CRUMBL COOKIES - LEE'S SUMMIT

1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT
9/3/2021

EQUIPMENT PLAN AND SCHEDULES

A6.1



3
A6.2

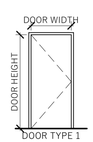
ALUMINUM THRESHOLD

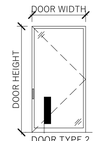
1 1/2" = 1'-0"

DOOR SCHEDULE

DOOR #	WIDTH	HEIGHT	DOOR		FRAME		DOOR TYPE	HARDWARE GROUP	REMARKS
			MATERIAL	FINISH	MATERIAL	FINISH			
101	4' - 0"	7' - 11"	METAL	MANUF	METAL	MANUF	2	1	
101e	3' - 0"	7' - 0"	WOOD	PAINT	METAL	PAINT	1	--	EXISTING, ENSURE COMPLIANCE TO ANSI 117.1 2009
102e	3' - 0"	7' - 0"	METAL	PAINT	METAL	PAINT	1	--	EXISTING, ENSURE COMPLIANCE TO ANSI 117.1 2009

NOTE: OWNER TO SELECT DOOR MANUFACTURER.





3
A6.2

DOOR HARDWARE:

1. CONTINUOUS HINGE
   DOOR PULL
   SURFACE CLOSER
   THRESHOLD
   PERIMETER SEALS
   THUMB TURN

NOTE: ALL DOOR HARDWARE TO BE LEVER TYPE HARDWARE AS PER ANSI A117.1. HARDWARE TO BE SELECTED BY OWNER.

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LEE'S SUMMIT, MISSOURI
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CRUMBL COOKIES - LEE'S SUMMIT
1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT

9/3/2021

DOOR SCHEDULE

A6.2

HUSKY®

Item Number: 458-424
Model Number: ERZ782478W4B

4-LEVEL WELDED STEEL STORAGE RACK
77"W x 24"D x 78"H

Warranty

GUARANTEED FOREVER. If your Husky tool or storage unit ever fails bring it back and we will replace it for free. This full warranty gives you specific rights which vary from state to state. If this product is defective contact the manufacturer for repair or replacement parts.

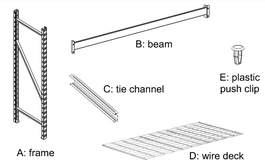
Items you might find helpful

Rubber Mallet, Gloves

Contents

Description	Quantity	Part Number
A: frame	2	ERF7824BLK
B: beam	8	ERB72BLKN
C: tie channel	12	ER-V4-TB
D: wire deck	4	RWD2472SF
E: plastic push clip	16	BBC.118B

Components



General Instructions

Assembly of this unit is done by fitting the brackets of the beams into the slots of the post frames.

A rubber mallet should be used on the ledge of the beams to properly seat the beam brackets. If a hammer is used care should be taken to protect the beam surface to avoid damage by using a protective cloth or block of wood.

The stepped surface of the beam ledge is the top, and should face upwards. This is the surface that the wire deck will rest on.

A bracket should engage and fit firmly into the tapered slot of the post frame. This engagement is a tight swaged fit and will apply resistance as it fully engages. A visual inspection should be made to show that the bracket is properly engaged in the slot.

After assembly re-check each beam for proper engagement.

Safety Instructions

This unit should be placed on a level surface. Failure to do so can result in poor product performance or create a possible safety hazard.

This unit should be securely anchored to a wall or floor with suitable fasteners, which are not included.

Do not use this unit for anything other than the manufacture's intended purpose.

DO NOT STAND ON ANY PART OF THE UNIT, OR USE IT AS A LADDER.

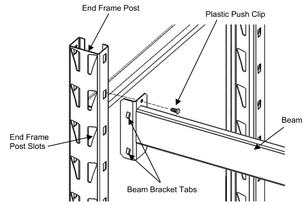
Use care when working with metal parts. Wear gloves for protection.

Evenly distribute the weight on each level and always keep the heavier loads on the bottom.

Assembly Instructions

- Attach the beams to the welded end frame posts (see figure 1) starting at the bottom level by using both end frames to establish the left and the right sides of the units.
- After a beam has been placed in both end frame post slots, tap the beam down at both ends with a rubber mallet to help drive the beam bracket tabs into the slots to secure the beam. Continue assembling each level from bottom to top level (front and back).
- If the beam bracket tabs become bent due to mishandling, it may be necessary to adjust the tabs back to their proper form.
- Place a plastic push clip into the hole of the beam end bracket, then tap the plastic clip with a mallet to drive it into the square hole of the end frame post to secure the beam to the end frame (see figure 1).

Figure 1



- The completed unit should have four (4) levels evenly spaced for maximum stability.
- Although the beams are adjustable in height, it's recommended to evenly space them so that the stability of the unit is not compromised.
- Install (3) tie channels in each level by inserting the tab located on both ends of the tie channel into the slot holes located along the inside bottom edge of the beams (see figure 2).
- Insert wire deck on each level (figure 3).
- Assembly is now complete

Figure 2

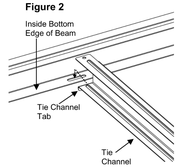


Figure 3

- Husky Welded Storage Rack is engineered to offer maximum flexibility as well as ease and quickness of assembly. The rack units can stand individually, or for greater stability, be joined together using the common post.
- Individual beams can be adjusted without disturbing the beams in adjoining units.
- These instructions should be followed exactly. All parts supplied must be used as shown. Any alteration or deviation from this instruction sheet can result in unit failure.
- After the unit is assembled, it must be placed on a level surface for safety, and optimal product performance.

Questions, problems, damage or missing part? Contact Husky's partnered manufacturer for assistance:

Chat: www.edsal.com/chat or www.edsal.com/contact

Email: support@edsal.com

Phone: 773-475-3131

To obtain replacement parts please provide:
Model Number, Part Number & Description, Location Purchased, and Date Purchased

Edsal Manufacturing
Chicago, IL 60609

US Patents & Patents Pending

Assembled in USA
using global components

Rev: C050918_V3-4

HDX™

SKU # 1001 298 075
Model # 21656CPS

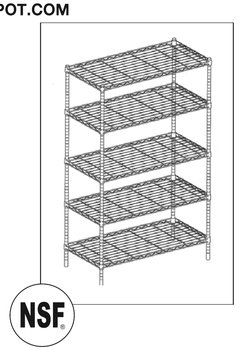
USE AND CARE GUIDE

5 Shelf Storage Unit
Unité de rangement à cinq tablettes
Unidad para Almacenamiento de 5 Estantes

Questions, problems, missing parts?
Before returning to the store, call
Customer Service
8 a.m – 6 p.m., EST, Monday-Thursday
8 a.m – 5 p.m., EST, Friday

888-449-5520

WWW.HOMEDEPOT.COM



NSF

THANK YOU

We appreciate the trust and confidence you have placed in HDX through the purchase of this Storage Unit. We strive to continually create quality products designed to enhance your home. Visit us online to see our full line of products available for your home improvement needs. Thank you for choosing HDX!

Table of Contents

Note

Please dispose of loose, round plastic pieces. These are used to separate the shelves for shipping purposes.

Caution Warnings

1. Two adults are recommended for ease of assembly. Use care when handling.
2. Do not allow children to climb or play in or around the shelves.
3. Assembly recommended on a soft surface, such as carpet, to avoid scratching flooring finish.
4. Each shelf holds up to 350 lbs. evenly distributed.

Specifications

Product weight	36.63 lbs.
Product width	36 in.
Product depth	16 in.
Product height	72 in.

Helpful Hints

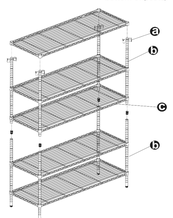
1. Carefully read all instructions and caution warnings before beginning assembly.
2. Determine shelving heights prior to assembly to avoid dismantling for adjustment.
3. When placing the plastic tapered sleeves onto the posts (step 2-ii), slide tapered sleeves up or down on the post until you feel it "snap" into the lines or grooves of the post.

Accessory Parts List

a) (40) plastic tapered sleeves (2) replacements

b) (8) posts (with 4 threaded post jointers pre-installed in posts, 4 foot levelers pre- installed in bottom of posts)

c) (5) shelves



Assembly

Step 1: Post Assembly

i. The top post section has a plastic endcap on one end and the bottom post has a foot leveler attached. Threaded post jointers are pre-installed for your convenience. Screw the posts (1 long & short) tightly together. (See Diagram #1)

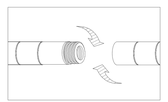


Diagram #1

Step 2: Bottom Shelf Assembly

i. Locate the desired position of the bottom shelf.
ii. Insert four plastic tapered sleeves into the appropriate post groove, one in each post. Ensure tapered end is up. See arrow on lock. (See Diagram #2)
iii. Place shelf on its side and slide each post with tapered sleeves through the bottom of the shelf until snug. (See Diagram #3)
iv. After all posts are in place, position the unit in the upright position.
v. Push down on each corner of the shelf, ensuring that the shelf is in the fully locked position.

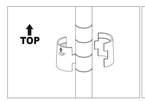


Diagram #2

Diagram #3

Step 3: Additional Shelves Assembly (See Diagram #4)

i. Locate the desired position of the next lowest shelf and insert the tapered sleeves into the posts.
ii. Slide the shelf down from the top of the posts and onto the tapered sleeves. Push down on each shelf corner, ensuring that the shelf is in the fully locked position.
iii. Repeat for the remaining shelves.

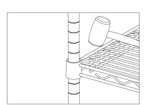
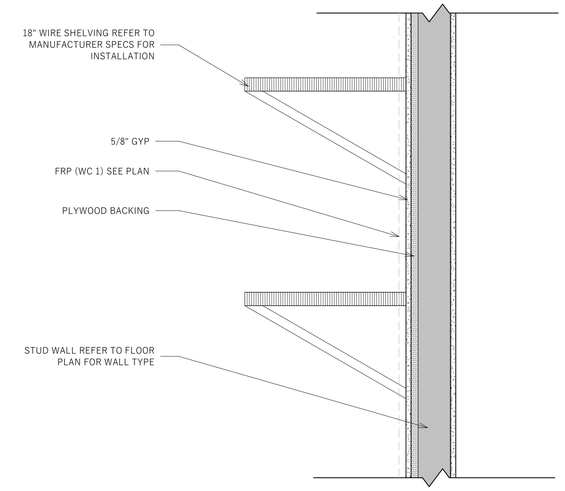


Diagram #4

Step 4: Adjust the foot levelers in or out at the bottom of the posts to attain proper leveling. (See Diagram #5)

Diagram #5

Please contact 888-449-5520 for further assistance.



1 / A6.3 PLYWOOD BACKING DETAIL
1 1/2" = 1'-0"

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
TENANT NUMBER FOUR
09/07/2021

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CONSULTANT

CRUMBL COOKIES - LEE'S SUMMIT
1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT

9/3/2021

WIRE SHELVING DETAILS

A6.3

JZW ARCHITECTS

INTERIOR MATERIAL SCHEDULE

CODE	DESCRIPTION	MFR.	NAME/NUMBER	COLOR/FINISH	COMMENTS
FLOORS					
FS 1	FLOOR SETTING	LATICRETE	ZLC0279-0030-21	TRI-LITE GREY	PURCHASE WITH TILE PACKAGE FROM EMSER. REQUIRED FOR WARRANTY.
FT 1	FLOOR TILE	EMSER TILE	A40NETWGR1223	NETWORK GREY	12"x23", STACK BOND, THROUGHOUT, crumbl@emser.com
GT 2	FLOOR GROUT	LATICRETE	ZLC3122-0001-2	SPECTRALOCK 1 DUSTY GREY	AT FLOOR TILE. PURCHASE WITH TILE PACKAGE FROM EMSER. REQUIRED FOR WARRANTY.
WALLS					
CG1	CORNER GUARD	KSC	#A673	BRIGHT WHITE	3/4" X 3/4" X 8' - 0"
GT 1	WALL GROUT	LATICRETE	ZLC1644-0025-2	1600 UNSAND BRIGHT WHITE	AT WALL TILE. PURCHASE WITH TILE PACKAGE FROM EMSER. REQUIRED FOR WARRANTY.
IP 1	LATEX BASE PAINT	SHERWIN WILLIAMS	HIGH REFLECTIVE WHITE SW7757	SEMI-GLOSS	ON ALL WALLS U.N.O., LEVEL 5 FINISH
IP 3	LATEX BASE PAINT	BEHR	FUNNY FACE M140-2	SEMI-GLOSS	AS NOTED ON PLAN, LEVEL 5 FINISH
TT 1	EDGE PROTECTOR	EMSER TILE	ZBL300-450-10025	WHITE/POWDER COATED	3/8", ALUMINUM
WC 1	FRP	--	--	SMOOTH, BRIGHT WHITE	UP TO 4'-6", 2'-0" AWAY FROM ALL PLUMBING FIXTURES UNLESS SHOWN OTHERWISE
WS 1	WALL SETTING	LATICRETE	ZLC0279-0030-22	TRI-LITE WHITE	PURCHASE WITH TILE PACKAGE FROM EMSER. REQUIRED FOR WARRANTY.
WT 1	FIELD TILE	EMSER TILE	CATCH ICE F14CATCIC0416P	WHITE GLOSS	4"x16" FIELD TILE, STACK BOND W/ EMSER TRIM @ EXPOSED EDGES, crumbl@emser.com, WHITE TILE FROM FLOOR TO CEILING WHERE APPLIED.
BASE					
GT 3	BASE GROUT	LATICRETE	ZLC3122-0001-2	SPECTRALOCK 1 MIDNIGHT BLACK	AT COVE BASE. PURCHASE WITH TILE PACKAGE FROM EMSER. REQUIRED FOR WARRANTY.
TB 1	TILE BASE	EMSER TILE	D99SHADBL0612CBM	SATIN BLACK COVE BASE	6"X12 w/ 3/8" COVE, THROUGHOUT, crumbl@emser.com
CEILINGS					
C1	GRID CEILING	--	VINYL TILE	WHITE	WHITE VINYL TILE WITH WHITE GRID
IP 2	LATEX BASE PAINT	SHERWIN WILLIAMS	TRICORN BLACK SW6258	EGGSHELL	EXPOSED CEILING COLOR/WALLS ABOVE 12' -0"
MILLWORK					
SS 1	SOLID SURFACE	HANEX	HL-003	N-WHITE	WATERFALL EDGE WHERE OCCURING, BUILT UP EDGE
DOORS					
DP	LATEX BASED PAINT	SHERWIN WILLIAMS	HIGH REFLECTIVE WHITE SW7757	SEMI-GLOSS	

NOTE: COORDINATE WITH OWNER FOR FINAL SELECTION AND APPLICATION OF ALL FINISHES.

ROOM FINISH SCHEDULE

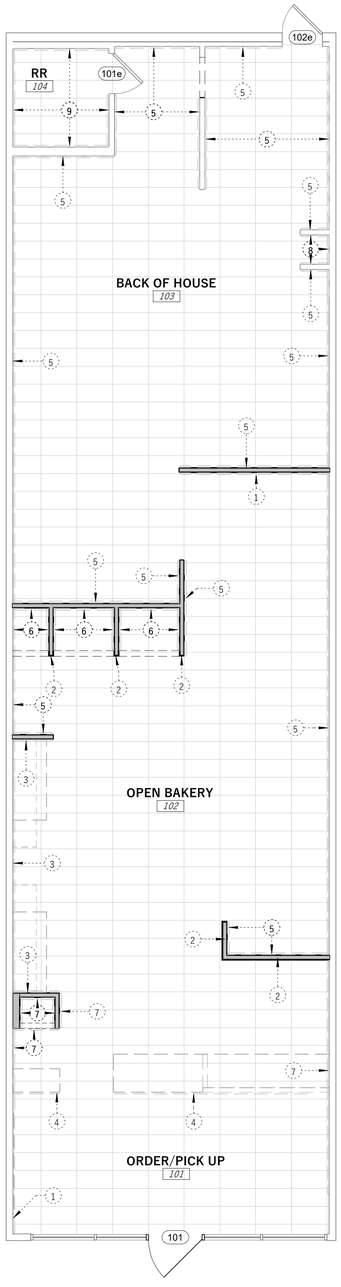
ROOM NUMBER	ROOM NAME	FLOOR	WALLS	BASE FINISH	CEILING FINISH	NOTES
101	ORDER/PICK UP	FT 1	IP 1 / IP 3 / WT 1	TB1	C1	SEE KEYED NOTES.
102	OPEN BAKERY	FT 1	WC 1 / WT 1	TB1	C1	IP 1 ABOVE WC 1 TO CEILING, SEE KEYED NOTES.
103	BACK OF HOUSE	FT 1	WC 1	TB1	C1	IP 1 ABOVE WC 1 TO CEILING, SEE KEYED NOTES.
104	RR	FT 1	WC 1	TB1	C1	IP 1 ABOVE WC 1 TO CEILING, SEE KEYED NOTES.

KEYED NOTES

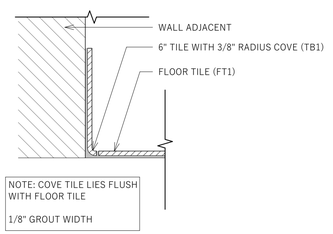
1. WALL FINISH IP 3
2. WALL FINISH WT 1, TO TERMINATE AT T.O. WALL.
3. WALL FINISH WC 1 UP TO BOTTOM OF FLOATING SHELF
4. WALL FINISH WT 1 ON BACK OF CABINETRY WALL
5. WALL FINISH WC 1, UP TO 8'-0" AFF.
6. WALL FINISH WC 1 UP TO 7'-0" A.F.F.
7. WALL FINISH IP 1
8. WALL FINISH WC 1 UP TO B.O. CEILING ADJACENT TO WATER HEATER.
9. WALL FINISH WC 1 IN BATHROOM, UP TO 4'-6" A.F.F.

FLOOR FINISH LEGEND

FT 1



1 A6.4 MAIN FLOOR FINISH PLAN 3/16" = 1'-0"



2 A6.4 COVE TILE DETAIL 3" = 1'-0"

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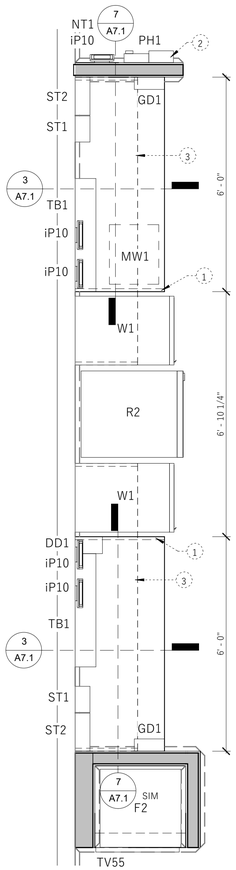
LEE'S SUMMIT, MO 64081

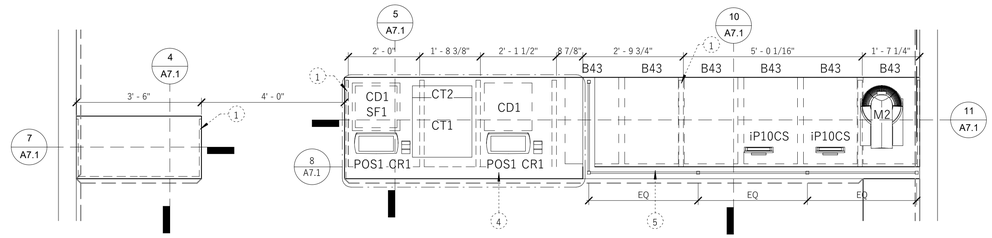
STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT
9/3/2021

FINISH PLAN AND DETAILS

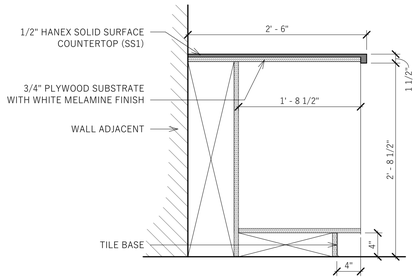
A6.4



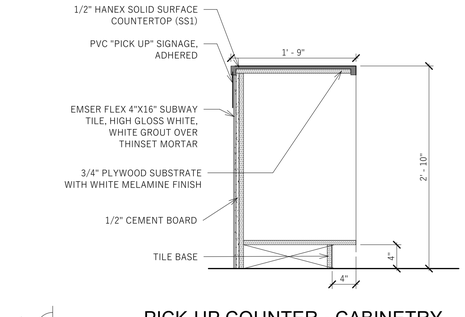
1 A7.1 ENLARGED PLAN @ DRESSING STATION
1/2" = 1'-0"



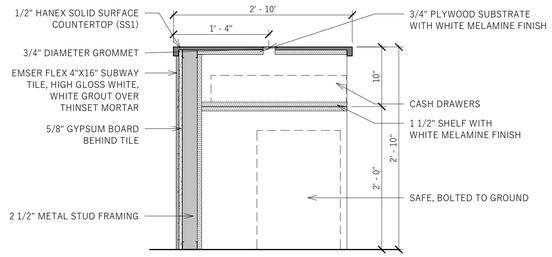
2 A7.1 ENLARGED PLAN @ PREP COUNTER
1/2" = 1'-0"



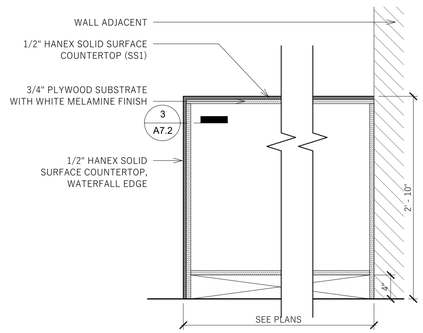
3 A7.1 BOXING COUNTER @ BOX STORAGE - CABINETRY
1" = 1'-0"



4 A7.1 PICK-UP COUNTER - CABINETRY
1" = 1'-0"

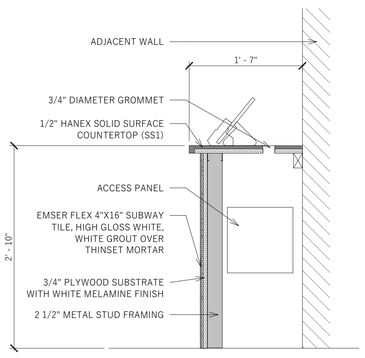


5 A7.1 POS @ BOX STORAGE SAFE - CABINETRY
1" = 1'-0"

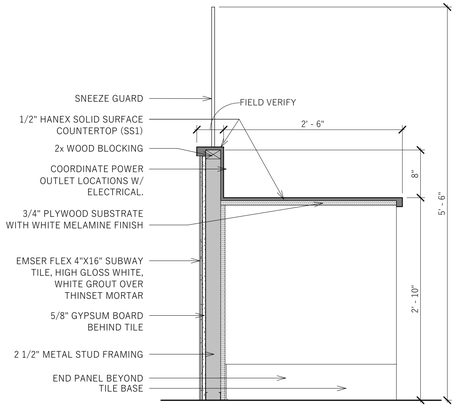


7 A7.1 WATERFALL EDGE @ CABINETRY
1" = 1'-0"

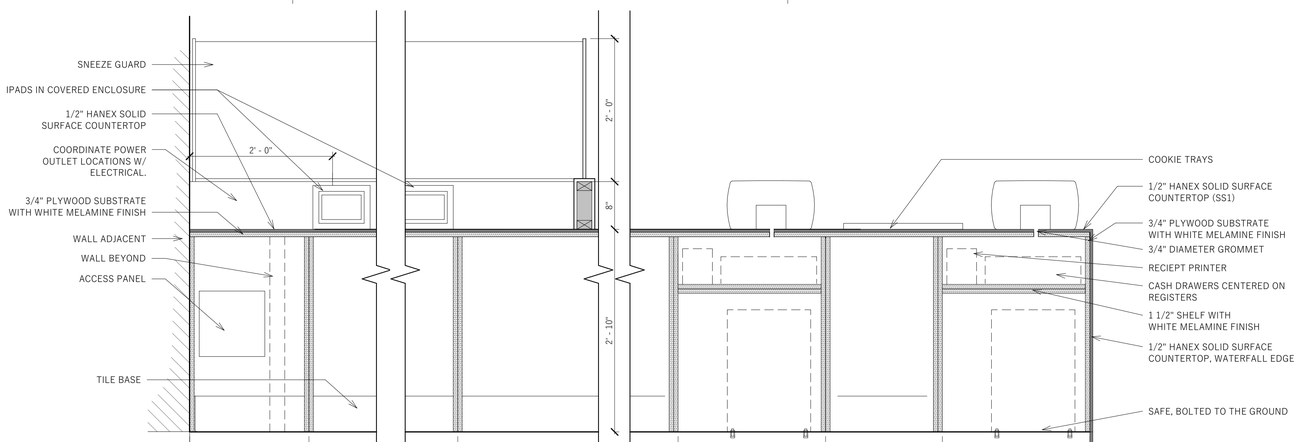
8 A7.1 SALES COUNTER GROMMET LOCATION DETAIL
3/4" = 1'-0"



9 A7.1 ORDERING STATION
1" = 1'-0"



10 A7.1 PREP COUNTER @ BINS - CABINETRY
1" = 1'-0"



11 A7.1 PREP COUNTER - CABINETRY
1" = 1'-0"

KEYED NOTES

1	CABINETRY FRAMING BELOW. SEE DETAILS.
2	HEADSET SHELF. SEE DETAIL ON A2.1
3	SOLID SURFACE FLOATING SHELF, SEE DETAILS
4	WALL FINISH WT 1 ON BACK OF CABINETRY WALL
5	SNEEZE GUARD

RELEASE FOR CONSTRUCTION
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DEVELOPMENT SERVICES
TEN WORKING DAYS
09/07/2021

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CONSULTANT

CRUMBL COOKIES - LEE'S SUMMIT

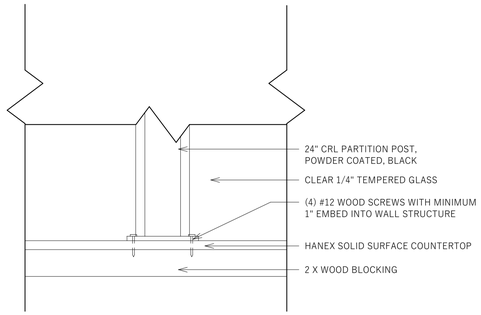
1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

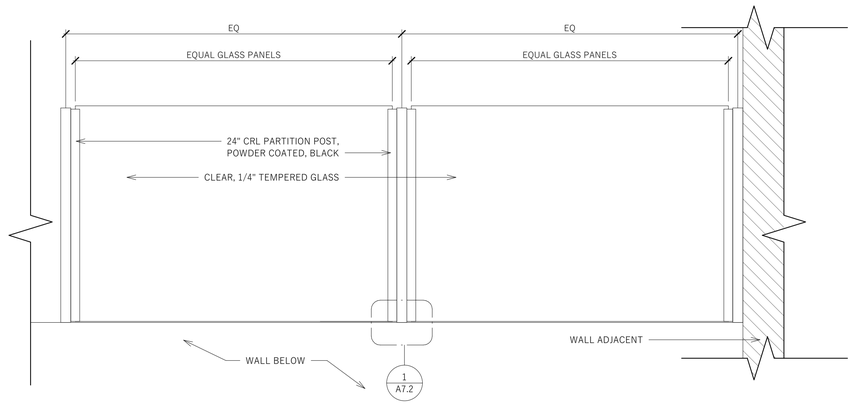
PAUL R. WARNOCK
STATE OF MISSOURI
A-2020000958
ARCHITECT
9/3/2021

CABINETRY PLAN AND SECTIONS

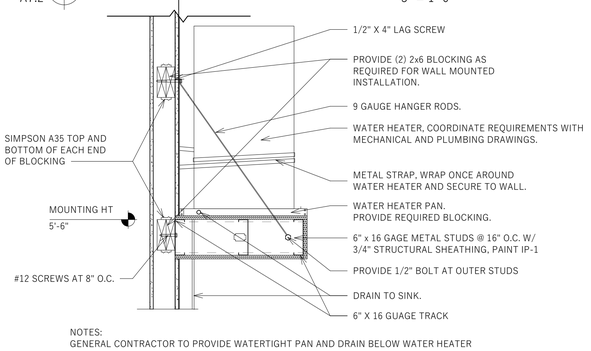
A7.1

JZW ARCHITECTS



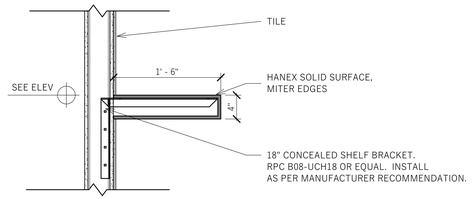


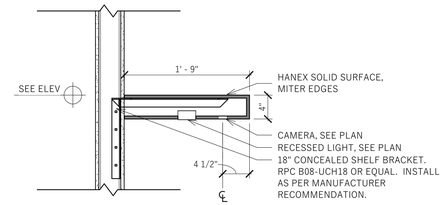
1 A7.2 **SNEEZE GUARD ATTACHMENT DETAIL** 3" = 1'-0"

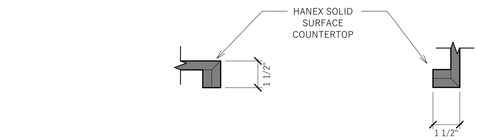


NOTES:
GENERAL CONTRACTOR TO PROVIDE WATERTIGHT PAN AND DRAIN BELOW WATER HEATER

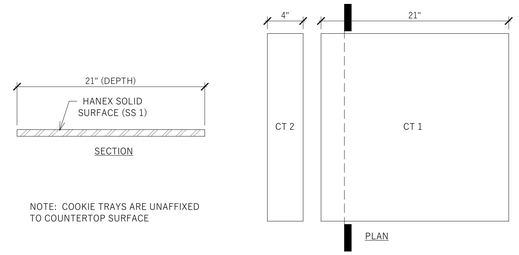
2 A7.2 **SNEEZE GUARD** 1 1/2" = 1'-0"





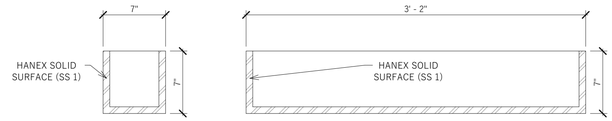


3 A7.2 **TYPICAL EDGE PROFILE** 3" = 1'-0"



NOTE: COOKIE TRAYS ARE UNAFFIXED
TO COUNTERTOP SURFACE

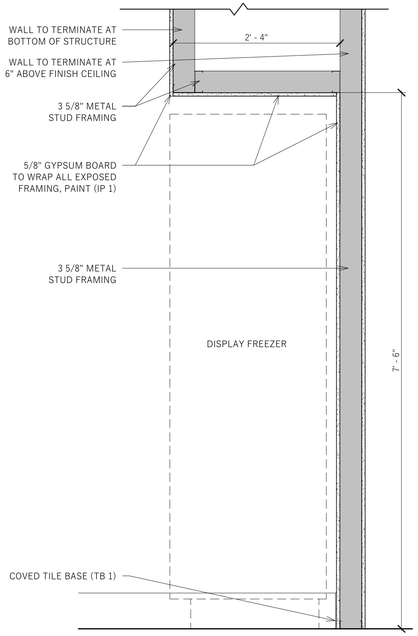
4 A7.2 **COOKIE TRAY DETAILS** 1 1/2" = 1'-0"



SECTIONS

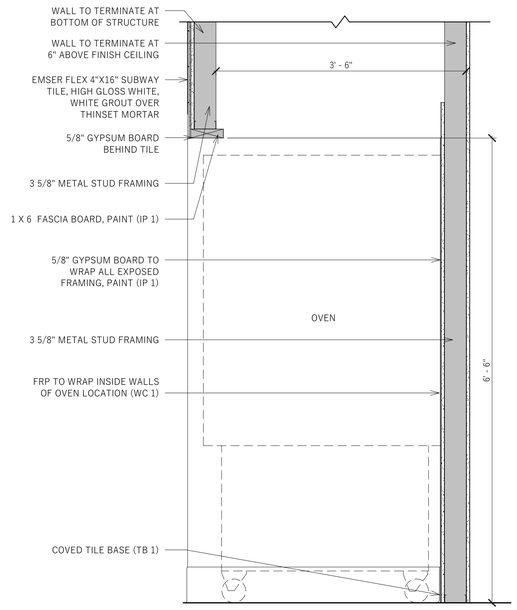
8 A7.2 **INGREDIENT TOOLBOX (TB 1)** 1 1/2" = 1'-0"

5 A7.2 **WATER HEATER** 1" = 1'-0"



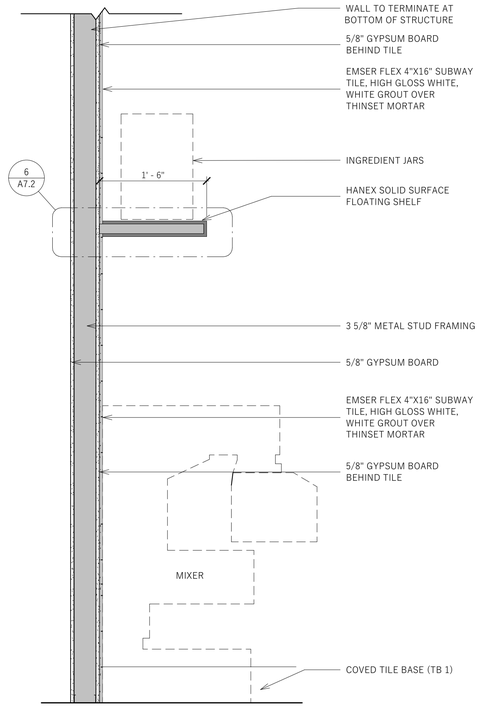
9 A7.2 **DISPLAY FREEZER WALL** 1" = 1'-0"

6 A7.2 **18" INGREDIENT SHELF** 1" = 1'-0"

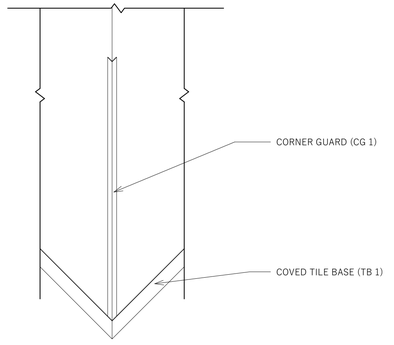


10 A7.2 **OVEN WALL** 1" = 1'-0"

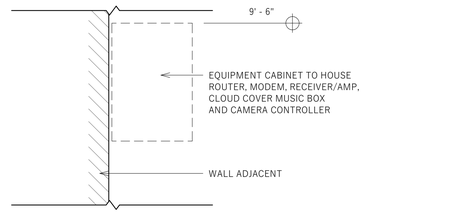
7 A7.2 **21" BOX SHELF** 1" = 1'-0"



11 A7.2 **MIXER WALL** 1" = 1'-0"



12 A7.2 **CORNER GUARD DETAIL** 3/4" = 1'-0"



NOTE: VERIFY EXISTING CEILING CONDITIONS
BEFORE MOUNTING EQUIPMENT CABINET.

13 A7.2 **EQUIPMENT CABINET DETAIL** 3/4" = 1'-0"

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1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT
9/3/2021

SECTIONS AND DETAILS

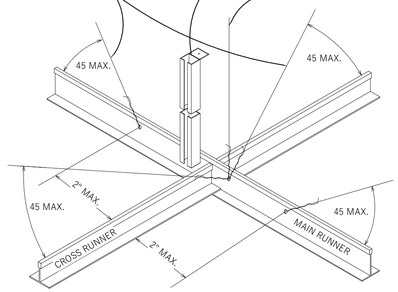
A7.2

FASTEN WIRES TO BOTTOM OF TRUST CORD WITH HILTI EYE LAG CEILING HANGER - 1/4" EL WS. OR APPROVED EQUAL.

PROVIDE VERTICAL STRUT OF CONTINUOUS LENGTH OF CEILING GRID MATERIAL OR OTHER APPROVED LIGHT METAL FRAMING MATERIAL ATTACHED TO MAIN RUNNER AND TO STRUCTURE ABOVE TO COUNTERACT UPLIFTING FORCES OF SPLAYED WIRES.

SPLAY WIRES - 12 G.A. @ 12'-0" O.C. IN PLANE OF EACH RUNNER. TIE BOTH ENDS W/ MIN. 3 TURNS IN 1" OF RUN TYPICAL.

VERTICAL WIRES 12 GA. @ 4'-0" O.C.



ALL CEILING MOUNTED LIGHT FIXTURES SHALL BE ATTACHED TO SUSPENDED CEILING GRID, IN ADDITION 12 GA. HANGER WIRES SHALL BE ATTACHED TO THE GRID WITHIN 3" OF EACH CORNER OF THE FIXTURE. TWO ADDITIONAL WIRES SHALL BE CONNECTED TO THE LIGHT HOUSING AND TO THE STRUCTURE ABOVE (THESE WIRES MAY BE SLACK).

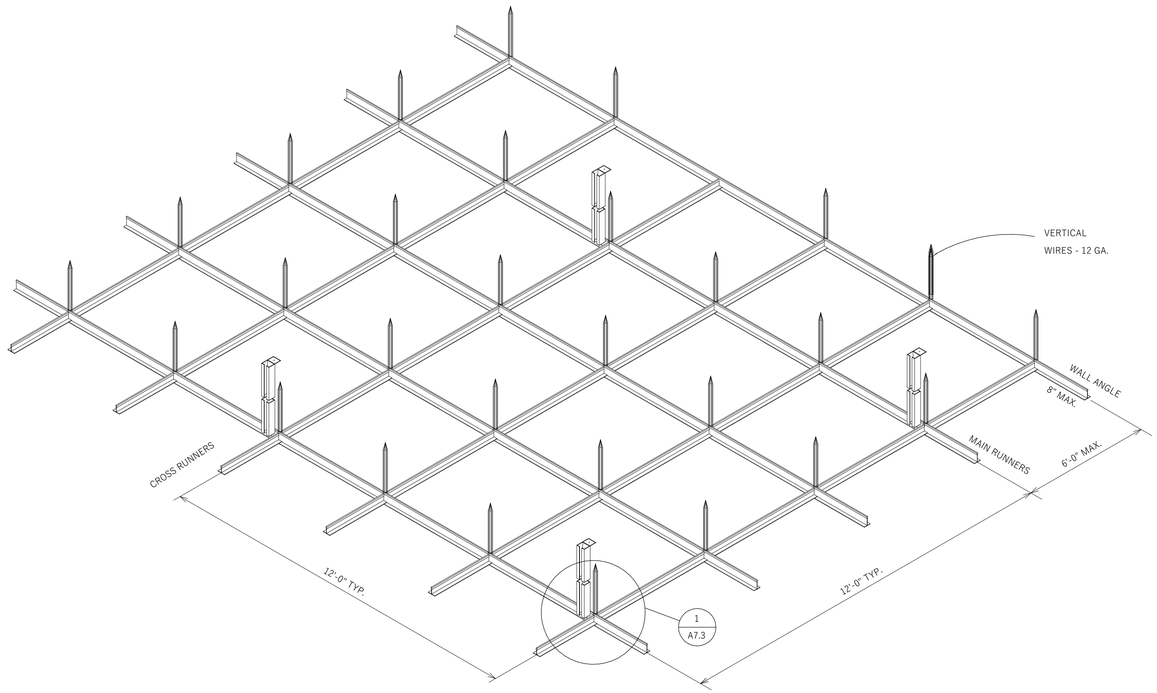
WIRES SHALL NOT ATTACH TO OR BEND AROUND INTERFERING MATERIAL OR EQUIPMENT, NOR SHALL THEY BE CLOSER THAN 5" FROM ANY UN-BRACED HORIZONTAL PIPING OR DUCTWORK. A TRAPEZE OR SIMILAR DEVICE SHALL BE USED WHERE OBSTRUCTIONS OCCUR.

CEILING AREAS OF 144 SQ. FT. OR LESS SURROUNDED BY WALLS WHICH CONNECT DIRECTLY TO THE STRUCTURE ABOVE SHALL NOT REQUIRE THE DIAGONAL BRACING WIRES.
EACH VERTICAL WIRE SHALL BE ATTACHED EACH END WITH MIN. 3 TURNS.
CEILING GRID SHALL BE INSTALLED LEVEL TO WITHIN 1/8" IN 12'.
ALL WIRE LOOPS SHALL BE TIGHTLY WRAPPED AND SHARPLY BENT.
FOR CEILING AREAS EXCEEDING 1,000 S.F. HORIZONTAL RESTRAINT OF THE CEILING TO THE STRUCTURE SHALL BE PROVIDED.

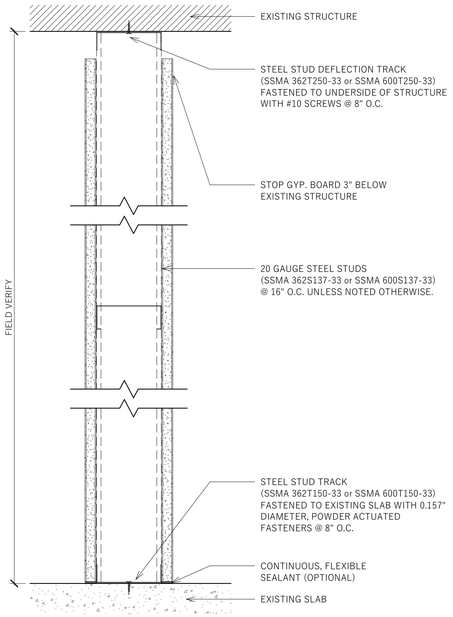
CABLE TRAYS AND ELECTRICAL CONDUITS SHALL BE INDEPENDENTLY SUPPORTED AND BRACED INDEPENDENTLY OF THE CEILING.
SUSPENDED CEILING SHALL BE SUBJECT TO THE SPECIAL INSPECTION REQUIREMENTS OF SECTION 1704.
SUSPENDED CEILING SHALL BE SUBJECT TO THE SPECIAL INSPECTION REQUIREMENTS OF SECTION 1704.
CEILING AREAS OF 1000 SQ. FT. OR LESS SURROUNDED BY WALLS WHICH CONNECT DIRECTLY TO THE STRUCTURE ABOVE SHALL NOT REQUIRE THE DIAGONAL BRACING WIRES.
EACH VERTICAL WIRE SHALL BE ATTACHED EACH END WITH MIN. 3 TURNS.

CEILING GRID SHALL BE INSTALLED LEVEL TO WITHIN 1/8" IN 12'.
LOCAL KINKS OR BENDS SHALL NOT BE MADE IN HANGER WIRES AS A MEANS OF LEVELING MAIN RUNNERS.
ALL WIRE LOOPS SHALL BE TIGHTLY WRAPPED AND SHARPLY BENT.
A HEAVY DUTY T-BAR SYSTEM SHALL BE USED.
THE WIDTH OF THE PERIMETER SUPPORTING CLOSURE ANGLE SHALL NOT BE LESS THAN 2 INCHES. IN EACH ORTHOGONAL HORIZONTAL DIRECTION, ONE END OF THE CEILING GRID SHALL BE ATTACHED TO THE CLOSURE ANGLE. THE OTHER END IN EACH HORIZONTAL DIRECTION SHALL HAVE A 0.75 INCH CLEARANCE FROM THE WALL AND SHALL REST UPON AND BE FREE TO SLIDE ON THE CLOSURE ANGLE.

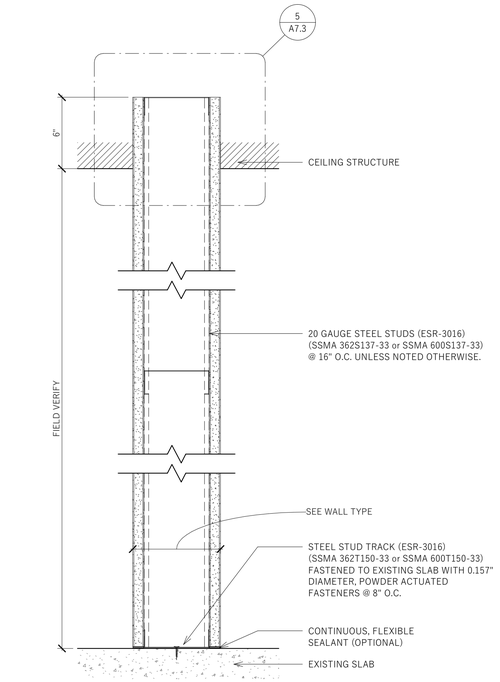
1 A7.3 — SEISMIC BRACING DETAIL — 3/8" = 1'-0"



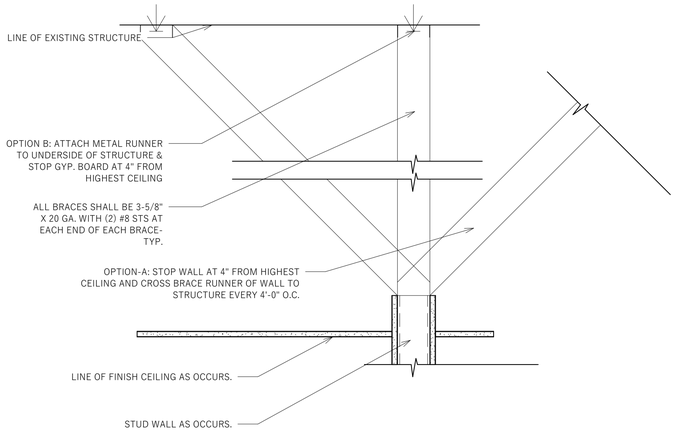
2 A7.3 — SUSPENDED CEILING BRACING — 1/8" = 1'-0"



3 A7.3 — INTERIOR WALLS DETAIL - TO STRUCTURE — 3" = 1'-0"



4 A7.3 — INTERIOR WALLS DETAIL - 6" ABOVE CEILING — 3" = 1'-0"



5 A7.3 — WALL BRACING DETAIL - 6" ABOVE CEILING — 1 1/2" = 1'-0"

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
TEN WORKING DAYS
09/07/2021

PROJECT NUMBER:
21-202

ISSUE DATE:
JULY 22, 2021

REVISIONS:

No.	Date	Description

CONSULTANT

CRUMBL COOKIES - LEE'S SUMMIT
1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PAUL R. WARNOCK
A-2020000958
ARCHITECT
9/3/2021

WALL & CEILING DETAILS

A7.3

PIPING LEGEND

GATE VALVE		CHILLED WATER SUPPLY	CWS
OS & Y PATTERN GATE VALVE		CHILLED WATER RETURN	CWR
BALL VALVE		CONDENSER WATER SUPPLY	CS
BUTTERFLY VALVE		CONDENSER WATER RETURN	CR
MOTORIZED BUTTERFLY VALVE	M	HEATING WATER SUPPLY	HWS
HEAT TRACING		HEATING WATER RETURN	HWR
DEIONIZED WATER	DI	WATER TREATMENT	WT
CHECK VALVE (SWING OR LIFT AS REQ'D)		FIRE DEPT. HORN & LIGHT	
SOLENOID VALVE		HOT GAS	HG
AUTOMATIC CONTROL VALVE (2-WAY)		FLEXIBLE PIPE CONNECTION	
AUTOMATIC CONTROL VALVE (3-WAY)		REDUCED PRESSURE BACKFLOW PREVENTER	RPBP
PRESSURE REDUCING VALVE		DIRECTION OF FLOW	
PRESSURE INDEPENDENT VALVE	P	ELBOW DOWN	
P & T RELIEF VALVE		ELBOW UP	
AIR VENT (AUTOMATIC)		PIPE CAP	
REFRIGERANT LIQUID	RL	TEE DOWN	
REFRIGERANT SUCTION	RS	UNION	
THERMAL EXPANSION VALVE		DOMESTIC COLD WATER	
STRAINER		DOMESTIC HOT WATER	
CIRCUIT SETTER		HOT WATER CIRC.	
FLOW METER		TEMPERED WATER	T
PET COCK OR GAUGE COCK		SANITARY (PLBG) VENT	
PRESSURE GAUGE W/GAUGE COCK		SANITARY SEWER ABOVE GRADE	
THERMOMETER		SANITARY SEWER BELOW GRADE	
TEMPERATURE & PRESSURE TEST PLUG		DRAIN	D
IN-LINE PUMP		ROOF DRAIN PIPING	RD
FLOW SWITCH	F	OVERFLOW DRAIN PIPING	OD
AQUASTAT	A	STORM DRAIN PIPING ABOVE GRADE	SD
HOSE BIBB OR SILLCOCK		STORM DRAIN PIPING BELOW GRADE	SD
VACUUM	V	FIRE SERVICE	F
FLOOR DRAIN		NATURAL GAS	G
FLOOR SINK		COMPRESSED AIR	CA
HOT GAS BYPASS	HGBP	VENT THROUGH ROOF	
WALL CLEANOUT		STEAM	S
FLOOR OR GRADE CLEANOUT		CONDENSATE	C
GRADE CLEANOUT W/ CONCRETE PAD		GREASE WASTE	GW
		SNOWMELT PIPING @ 8" O.C.	
		ROOF DRAIN WITH SNOWMELT PIPING INSTALLED INSIDE PIPE	

MECHANICAL LEGEND

RETURN OR EXHAUST DUCT DOWN	
RETURN OR EXHAUST DUCT UP	
SUPPLY AIR DUCT DOWN	
SUPPLY AIR DUCT UP	
SPIN-IN FITTING W/MVD	
FLEXIBLE DUCT CONNECTION	
CEILING SLOT DIFFUSER	
CEILING DIFFUSER	
CEILING EXHAUST GRILLE	
CEILING GRILLE	
ACCESS PANEL	
MANUAL VOLUME DAMPER	
MOTORIZED DAMPER	M
FIRE DAMPER	
THERMOSTAT OR TEMP SENSOR	T
POINT OF CONNECTION TO EXISTING	
DETAIL TAG	DETAIL NO. / DRAWING NO.
KEYED NOTE	NOTE NO.
SECTION CUT LINE	SECTION NO. / DRAWING NO.
CONTROL TRANSFORMER	TRX
FIRE DAMPER (FUSIBLE LINK)	F, 1 HR
WALL RATING (SEE PLANS)	
COMBINATION FIRE/SMOKE DAMPER MOTORIZED 120V POWER	F/S, 2 HR
WALL RATING (SEE PLANS)	
SMOKE DAMPER MOTORIZED 120V POWER	S, 1 HR
WALL RATING (SEE PLANS)	
MOTORIZED CONTROL DAMPER TYP. 24V POWER (SEE PLANS)	M
OPPOSED BLADE DAMPER (NO MOTOR) W/ INTERLOCKING SEALS AND BLADES	OBD
IRIS DAMPER (NO MOTOR) FOR USE ON ROUND DUCTS	I
BACK DRAFT DAMPER (NO MOTOR) W/ INTERLOCKING SEALS AND BLADES	B
COUNTERWEIGHTED DAMPER (NO MOTOR) W/ INTERLOCKING SEALS AND BLADES	C/W

GENERAL NOTES:

1. ⊕ INDICATES POINT OF CONNECTION OF NEW TO EXISTING MECHANICAL, EQUIPMENT, PIPING OR DUCTWORK.
2. COORDINATE ALL FIRE SPRINKLER HEADS AND AIR DEVICE LOCATIONS WITH REFLECTED CEILING PLANS AND ELECTRICAL DRAWINGS.
3. ALL RIGID ROUND DUCTWORK SHALL RECEIVE 2" - Ø.75 LBS/CU.FT. FIBERGLASS DUCT WRAP - MIN. R-5. ALL LOW PRESSURE RECTANGULAR DUCT SHALL RECEIVE 1" - 1.5 LBS/CU.FT. DUCT LINER. ATTACH TO DUCT WITH MECHANICAL FASTENERS AND TRIM AND SEAL JOINTS. LOW PRESSURE ROUND FLEXIBLE DUCT TO BE 1-½" THICK INSULATED AND A MAXIMUM OF 5 FT. LONG. ALL INSULATION TO MEET NFPA 90 PER UL 181-CLASS 1. NO DUCT BOARD ALLOWED. ALL DUCT IS TO BE WRAPPED UP TO THE VAV'S. DUCTWORK DOWNSTREAM OF THE VAV'S IS TO BE LINED OR WRAPPED IF ROUND.
4. DUCTWORK AND PIPE ROUTING AS SHOWN ON DRAWINGS IS DIAGRAMMATIC AND IS NOT TO BE SCALED. WHERE ALTERNATE ROUTING, OFFSETS AND TRANSITIONS ARE REQUIRED FOR COORDINATION OF WORK, THIS CONTRACTOR SHALL MAKE CHANGES WITHOUT ADDITIONAL COSTS.
5. THIS CONTRACTOR SHALL CLOSELY COORDINATE NEW MECHANICAL WITH NEW AND EXISTING MECHANICAL, ELECTRICAL, ARCHITECTURAL AND BUILDING STRUCTURE.
6. THIS CONTRACTOR SHALL FIELD VERIFY ALL MECHANICAL ITEMS PRIOR TO STARTING NEW WORK. ADDITIONAL COST WILL NOT BE ALLOWED FOR CONTRACTOR'S FAILURE TO BECOME FAMILIAR WITH EXISTING SITE CONDITIONS.
7. THIS CONTRACTOR SHALL USE SMACNA DUCT CONSTRUCTION STANDARDS FOR SHEET METAL DUCTS. ALL HIGH PRESSURE DUCTWORK UPSTREAM OF VAV TERMINAL BOXES SHALL BE CONSTRUCTED FOR 2" W.C. STATIC PRESSURE SEAL CLASS "A". ALL OTHER DUCTWORK (UNLESS OTHERWISE NOTED ON FLOOR PLANS) SHALL BE CONSTRUCTED OF 1" W.C. SEAL CLASS "B".
8. ALL MECHANICAL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE CURRENT ADOPTED EDITION OF THE BUILDING CODES, FIRE CODES, MECHANICAL CODES AND PLUMBING CODES.
9. THIS CONTRACTOR SHALL PROVIDE SUBMITTALS ON ITEMS LISTED IN MECHANICAL EQUIPMENT LIST TO THE ENGINEER FOR REVIEW PRIOR TO THE ORDER, PURCHASE OR INSTALLATION.
10. ALL VAV BOXES, RTU's, WATER FLOW RATES AND DIFFUSERS MUST BE BALANCED TO THE VALUES INDICATED ON THE FLOOR PLANS. PROVIDE BALANCE REPORT TO ENGINEER PRIOR TO PROJECT CLOSEOUT.
11. DUCT DIMENSIONS SHOWN ARE INSIDE CLEAR DIMENSIONS.
12. FIRE SPRINKLER CONTRACTOR SHALL ADD AND/OR RELOCATE SPRINKLER HEADS PER REFLECTED CEILING PLAN AND THE CURRENT ADOPTED EDITION OF NFPA AND BUILDING CODE.
13. PIPING MATERIAL REQUIREMENTS:
    DOMESTIC COLD WATER PIPING - TYPE 'L' COPPER OR PEX
    DOMESTIC HOT WATER PIPING - TYPE 'L' COPPER OR PEX
    WASTE AND VENT PIPING - CAST IRON OR SCH. 40 PVC
    ROOF AND OVERFLOW DRAIN PIPING - CAST IRON OR SCH. 40 PVC
    STEAM PIPING - SCH. 40 (80) STEEL PIPING OR COPPER - THREADED OR WELDED.
    REFRIGERANT PIPING - TYPE 'K' COPPER - 100% BRAZED, NOT SOLDERING ALLOWED.
    NATURAL GAS PIPING - SCH. 40 BLACK IRON - 2" AND BELOW THREADED, 2.5" AND ABOVE WELDED.
    # NO PLASTIC PIPING IS ALLOWED IN RETURN AIR PLENUMS #
14. VENT THE HIGH POINTS OF NEW MECHANICAL PIPING.
15. PROVIDE INSULATION FOR THE FOLLOWING:
    a. DOMESTIC HOT WATER PIPING:
       1" THICK FOR ALL PIPE SIZES.
    b. DOMESTIC COLD WATER PIPING:
       ½" THICK FOR PIPE SIZES ½" TO 6".
       (PROVIDE CONTINUOUS VAPOR BARRIER.)
    c. ROOF AND OVERFLOW DRAINS:
       1" THICK FOR ALL PIPE SIZES
       INSULATION ONLY REQUIRED ON HORIZONTAL PRIMARY DRAINS AND ALL DRAIN BOWLS
    f. REFRIGERANT SUCTION LINE PIPING
       1-1/2" THICK FOR ALL PIPE SIZES.
16. INSULATE PIPING WITH FIBERGLASS PIPE COVERING WITH ALL SERVICE JACKET AND SELF-CAP SEAL. FITTINGS SHALL BE MITERED PIPING COVERING OF GLASS FIBER MOLDED FITTINGS FOR USE IN A RETURN AIR PLENUM. THERMAL CONDUCTIVITY SHALL BE A MAXIMUM OF .25/INCH THICKNESS AT 75°F.
17. _____ INDICATES EXISTING OR FUTURE. _____ INDICATES NEW MATERIAL. IF THERE ARE ANY DISCREPANCIES AS TO WHAT IS NEW AND WHAT IS EXISTING, CONTRACTOR IS TO CONTACT THE ARCHITECT AND/OR MECHANICAL ENGINEER. THE EXISTING SHELL DOCUMENTS ARE AVAILABLE THROUGH THE ARCHITECT. ADDITIONAL COSTS WILL NOT BE TOLERATED FOR THE CONTRACTORS FAILURE TO BECOME FAMILIAR WITH EXISTING SHELL AND SITE CONDITIONS.
18. MECHANICAL CONTRACTOR IS TO COORDINATE WITH ELECTRICAL ON SIZE/QUANTITY OF MOTORIZED DAMPERS. I. E. FIRE/SMOKE DAMPERS, FIRE DAMPERS, MOTORIZED DAMPERS, ETC.
19. EACH TRADE IS RESPONSIBLE THEIR OWN FIRE CAULKING. ALL PENETRATIONS THROUGH ALL RATED WALLS MUST BE PROPERLY SEALED AND CAULKED FOR THE APPROPRIATE WALL RATING AND UL SYSTEM.
20. DIVISION 15 MUST PROVIDE AND INSTALL ALL ACCESS DOORS FOR FCU's, VALVES, FLOW METERS, ETC. COORDINATE LOCATION WITH GENERAL CONTRACTOR.
21. HOUSEKEEPING PADS FOR ALL EQUIPMENT IS PROVIDED AND INSTALLED BY GENERAL CONTRACTOR. COORDINATE LOCATION WITH MECHANICAL CONTRACTOR.
22. ALL TAKE-OFF'S THROUGHOUT THE ENTIRE BUILDING SHALL BE HIGH EFFICIENCY TAKE-OFF'S (HET's). NO EXCEPTIONS TAKEN.
23. DIVISION 15 TO SUBMIT TO ENGINEER ALL AS-BUILDS OF BUILDINGS MECHANICAL AND PLUMBING SYSTEMS PRIOR TO JOB COMPLETION AND FINAL PAYMENT.
24. ALL VFD'S ARE TO BE PROVIDED BY MECHANICAL AND WIRED UP BY ELECTRICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
25. ALL EXPOSED PIPING IS TO BE INSULATED AND WEATHERPROOFED. SEE SPEC SECTION 15080.
26. ALL INVERT ELEVATIONS SHOWN ON PLANS ARE BASED OFF OF FINISHED FLOOR ELEVATION AT 100.0'. CONTRACTOR TO COORDINATE WITH ARCHITECTURAL AND CIVIL DRAWINGS FOR EXACT INVERT ELEVATIONS OF ALL LEVELS.
27. ALL FLOOR DRAINS / FLOOR SINKS THROUGH-OUT THE ENTIRE BUILDING ARE TO HAVE TRAP SEAL PRIMER VALVES PROVIDED / INSTALL BY PLUMBING CONTRACTOR. TRAP GUARDS MAY ALSO BE USED WHERE ALLOWED BY THE LOCAL JURISDICTION.
28. ALL GAS METER REGULATORS ARE TO BE VENTED TO THE OUTSIDE OF THE BUILDING BY THE MECHANICAL CONTRACTOR OR PROVIDE / INSTALL VENTLESS REGULATORS IF ALLOWED BY THE LOCAL JURISDICTION. NONE OF THE VENT PIPING OFF THE REGULATORS ARE SHOWN ON THE PLANS FOR CLARITY.
29. ALL FIRE DAMPERS SHOWN ON PLANS SHALL COMPLY WITH THE REQUIREMENTS OF UL 555. ALL SMOKE DAMPERS SHOWN ON PLANS SHALL COMPLY WITH UL 555S. ALL COMBINATION FIRE / SMOKE DAMPERS SHOWN ON PLANS ARE TO COMPLY WITH BOTH UL 555 AND UL 555S. FOR ALL FIRE DAMPERS CONTRACTOR IS TO PROVIDE / INSTALL "NCA MODEL FD" (OR EQUAL,) TO MEET STANDARD UL 555 RATING. FOR ALL SMOKE DAMPERS AND COMBINATION FIRE SMOKE DAMPERS CONTRACTOR IS TO PROVIDE / INSTALL "NCA MODEL FSD-3V-211" (OR EQUAL,) TO MEET STANDARD UL 555 AND UL 555S RATINGS.
30. THE MECHANICAL CONTRACTOR IS TO HAVE THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR EACH TYPE OF FIRE DAMPER, SMOKE DAMPER, AND COMBO FIRE / SMOKE DAMPERS ON THE JOB SITE AT TIME OF INSPECTIONS.
31. ALL DUCTWORK THAT IS LOCATED IN UNCONDITIONED SPACES (MEANING EXPOSED TO THE OUTSIDE OR IN ATTICS) IS TO HAVE MIN. OF R-8 INSULATION INSTALLED.
32. ALL T-STATS MUST BE MOUNTED AT 48" A.F.F. TO THE TOP OF THE STAT AND TO HAVE FULL DIGITAL DISPLAY READOUT OF CURRENT TEMPERATURE AND TEMPERATURE SET POINTS.
33. ALL DUCT ELBOWS ARE TO BE PROVIDED / INSTALLED WITH RADIUS ELBOWS. ANY ALTERATIONS OR CHANGES IN DUCTWORK FROM WHAT IS SHOWN ON THE PLANS MUST BE PRE-APPROVED BY THE ENGINEER IN WRITING PRIOR TO ORDERING, FABRICATION, OR INSTALLATION.
34. ALL EXTERIOR WALL VENTS, GRILLES, OR PIPING IS TO BE PAINTED BY THE GENERAL CONTRACTOR TO MATCH THE ADJACENT SURFACE.
35. ALL DUCTWORK IS TO BE COMPLETELY SEALED USING DESIGN POLYMERS DP1010 DUCT SEALER OR APPROVED EQUAL.
36. CONTRACTORS TO COMPLY WITH MANUFACTURER'S INSTRUCTIONS, INCLUDING EACH STEP IN SEQUENCE. WHEN MANUFACTURERS' INSTRUCTIONS CONFLICT WITH CONTRACT DOCUMENTS, REQUEST CLARIFICATION FORM ARCHITECT/ENGINEER BEFORE PROCEEDING WITH ANY WORK. IF THIS IS NOT DONE, ITS THE CONTRACTOR'S FULL RESPONSIBILITY TO COVER ALL COSTS.
37. INDICATES POINT OF CONNECTION OF NEW TO EXISTING MECHANICAL, EQUIPMENT, PIPING OR DUCTWORK.

DRAWING INDEX

CODES AND STANDARDS (MISSOURI)

PLUMBING: 2018 IPC
MECHANICAL: 2018 IMC
ENERGY: 2018 IECC

ELEVATION: 1000'

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER:
21-202

ISSUE DATE:
August 2, 2021

REVISIONS:

No.	Date	Description

CONSULTANT
PVE
1040 N 2200 WEST
SALT LAKE CITY UTAH
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CRUMBL COOKIES - LEE'S SUMMIT
1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PATRICK T. CANTRELL
NUMBER PE-2009012191
PROFESSIONAL ENGINEER
08-02-2021

MECHANICAL & PLUMBING SCHEDULES

MP0.1

PLUMBING FIXTURE CONNECTION SCHEDULE

PLAN CODE	DESCRIPTION	CONNECTION SIZE				SPECIFICATIONS
		COLD WATER	HOT WATER	WASTE	VENT	
L-1	LAVATORY, HAND WASH WALL MOUNT, MANUAL FAUCET	1/2"	1/2"	3"	1½"	SINK: AMERICAN STANDARD-LUCERINE, WALL HUNG, VITREOUS CHINA. FAUCET: MOEN 8413 FAUCET AND COVERS FOR ALL EXPOSED PIPING. PROVIDE W/THERMOSTATIC MIXING VALVE
S-1	HAND SINK	1/2"	1/2"	3"	1½"	SINK: REGENCY 600HS1215P SINGLE BOWL, STAINLESS STEEL. FAUCET: REGENCY 600FA12 FAUCET AND SAFETY COVERS FOR ALL EXPOSED PIPING. PROVIDE W/THERMOSTATIC MIXING VALVE
S-2	3 - COMPARTMENT SINK	1/2"	1/2"	3"	1½"	SINK: REGENCY 3 COMPARTMENT, STAINLESS STEEL SINK FAUCET: REGENCY 600FPRSB FAUCET AND SAFETY COVERS FOR ALL EXPOSED PIPING. PROVIDE W/THERMOSTATIC MIXING VALVE.
FD-1	FLOOR DRAIN	N/A	N/A	SEE PLANS	N/A	J. R. SMITH 2005 w/ A05NB NICKEL/BRONZE STRAINER # PROVIDE WITH MIFAB TRAP PRIMER.
FS-1	FLOOR SINK SQUARE 12.5" x 12.5" x 10"	N/A	N/A	SEE PLANS	SEE PLANS	J. R. SMITH 3161Y-12 W/ NICKEL/BRONZE TOP/ ½ GRATE # PROVIDE WITH MIFAB TRAP PRIMER.
SS-1	SERVICE SINK SQUARE 12.5" x 12.5" x 10"	¾"	¾"	3"	1½"	SINK: FIAT MODEL MSB-2424 FAUCET: MODEL FAUCET: CHICAGO FAUCET - 814VBCP PROVIDE WITH THERMOSTATIC MIXING VALVE.
WC-1	WATER CLOSET (ADA ACCESSIBLE)	½"	N/A	4"	2"	TOTO DRAKE MODEL CST744SL 1.6 GPF, ADA ACCESSIBLE, WHITE W/ SEAT

NOTE: ALL PLUMBING FIXTURES ARE TO HAVE ¼ TURN STOPS INSTALLED (NO EXCEPTIONS TAKEN). ALL PLUMBING FIXTURES THAT HAVE EXPOSED SUPPLY LINES I.E., WATER CLOSETS, WALL HUNG LAVS, ETC., CONTRACTOR IS TO PROVIDE / INSTALL STAINLESS STEEL BRAIDED HOSES. IF THE SUPPLY LINES ARE NOT EXPOSED (HIDDEN BELOW CASEWORK ETC.), THEY CAN BE PLASTIC, RIGID, OR STAINLESS STEEL BRAIDED.

COORDINATE ALL FIXTURE FINISHES WITH ARCHITECT AND INTERIOR DESIGNER PRIOR TO ORDERING

NOTE: NOT ALL FIXTURES MAY BE USED. SEE DRAWINGS FOR ALL PLUMBING FIXTURES AND CALLOUTS.

DIFFUSERS & GRILLE SCHEDULE

GRILLE NUMBER — GRILLE CFM

PLAN CODE	TYPE & DUTY	NECK SIZE	CEILING TYPE	N.C. LEVEL MAX	MAX. CFM	MANUFACTURER & MODEL NO.	REMARKS
1	12" x 12" PERF. EXHAUST	SEE PLANS	See Plans	20	244	PRICE PDR SERIES 8"/12"x12"/APDDR/1/B12	PROVIDE ROUND DUCT CONNECTION AND OBD WHERE APPLICABLE PROVIDE OFF WHITE FINISH UNLESS OTHERWISE SPECIFIED BY OWNER
2	24" x 24" PERF. EXHAUST	SEE PLANS	See Plans	19	785	PRICE PDR SERIES 12"/24"x24"/APDDR/1/B12	PROVIDE ROUND DUCT CONNECTION AND OBD WHERE APPLICABLE PROVIDE OFF WHITE FINISH UNLESS OTHERWISE SPECIFIED BY OWNER
3	24" x 24" PERF. RETURN	22" x 22"	See Plans	26	2353	PRICE PDR SERIES 10" x 22"/12"x24"/PDR/1/B12	PROVIDE ROUND DUCT CONNECTION AND OBD WHERE APPLICABLE PROVIDE OFF WHITE FINISH UNLESS OTHERWISE SPECIFIED BY OWNER
4	12" x 12" SQ. SUPPLY	6" x 6" 6'0 or 8'0	See Plans	31	200	PRICE SMD SERIES 6"x6"/12"x12"/SMD/3P/4A/B12	PROVIDE W/ SQUARE TO ROUND ADAPTER AND OBD WHERE APPLICABLE PROVIDE OFF WHITE FINISH UNLESS OTHERWISE SPECIFIED BY OWNER
5	24" x 24" SQ. SUPPLY 3 SLOT	9" x 9" 8'0	See Plans	29	279	PRICE SMD SERIES 8"/24"x24"/SMD/3P/4A/B12	PROVIDE W/ SQUARE TO ROUND ADAPTER AND OBD WHERE APPLICABLE PROVIDE OFF WHITE FINISH UNLESS OTHERWISE SPECIFIED BY OWNER
6	24" x 24" SQ. SUPPLY 3 SLOT	12" x 12" 10'0	See Plans	28	382	PRICE SMD SERIES 10"/24"x24"/SMD/3P/4A/B12	PROVIDE W/ SQUARE TO ROUND ADAPTER AND OBD WHERE APPLICABLE PROVIDE OFF WHITE FINISH UNLESS OTHERWISE SPECIFIED BY OWNER

NOTE: NOT ALL GRILLES MAY BE USED

EXHAUST FAN SCHEDULE (EF)

PLAN CODE	AREA SERVED	TYPE	CFM @ ELEV.	ESP, @ ELEV. (in. W.G.)	FAN RPM	MOTOR				DAMPER	METHOD OF CONTROL	WHEEL DIA. / ROOF OPENING (IN.)	MAX. SONES	OPER. WEIGHT (lbs)	MANUFACTURER & MODEL NO	REMARKS
						BHP Oper.	BHP Standard	H.P.	VOLTAGE & PHASE							
EF-1	EXHAUST RELIEF	IN-LINE CENTRIFUGAL	700	0.2"	957	0.08	0.08	1/8	115/1	BACKDRAFT DAMPER	INTERLOCKED WITH LIGHTS BY ELECTRICAL CONTRACTOR	WHEEL DIA. 12.25"	7.5	106#	TWIN CITY DSI 100A	# PROVIDE W/ BIRDSCREEN AND SPEED CONTROLLER

NOTE: ALL VALUES ARE RATED AT 150 ft. ELEVATION.
NOTE: ALL STARTERS PROVIDED AND INSTALLED BY ELECTRICAL.

OUTSIDE AIR BALANCING SCHEDULE

PLAN CODE	AREA SERVED	BALANCE CFM	COMMENTS
RTU-2	DICKEYS BBQ	700	OA TO BE PROVIDED THROUGH RTU VIA ECONOMIZER

EXISTING PACKAGED ROOF TOP UNIT RTU-

PLAN CODE	MODEL/SIZE	SUPPLY CFM	ESP	EER	CAPACITY	ELECTRICAL		COOLING CAPACITY			HEATING CAPACITY		
					TONNAGE	VOLTS/PHASE	MCA	TOTAL	EAT	LAT	TOTAL	EAT	LAT
RTU-2	LGH120HRMM LENNOX - 8.5 TON	3400	0.75" WC	14.0	8.5	208/3	44	101.2 MBH	77.3	56.7	144 MBH	69	105

FULL SERVICE AND A COMPONENT CHECK SHALL BE PERFORMED FOR EACH EXISTING ROOF TOP UNIT. IT SHALL BE PERFORMED FOR A MINIMUM OF TWO HOURS (ON SITE) PER UNIT. THIS SHALL INCLUDE BUT IS NOT LIMITED TO:

- REFRIGERANT LEAK TEST
- VERIFICATION OF REFRIGERANT CHARGE
- A VISUAL INSPECTION OF COILS
- REPLACEMENT OF ALL BELTS (LEAVE ONE SPARE OF EACH SIZE)
- REPLACEMENT OF FILTERS
- CHECKING ALL MOTORS AND FANS (INCLUDING THE CONDENSER FAN MOTOR)
- CHECKING ALL CAPACITORS AND CONTACTORS
- CHECKING THE FUNCTIONALITY OF ECONOMIZER (IF APPLICABLE)
- CHECKING THERMOSTAT OPERATION AND CONTROL
- VERIFICATION THAT ENTERING AND LEAVING AIR TEMPERATURE OF ALL STAGES OF COOLING AND HEATING ARE WITHIN SPECIFICATIONS
- CLEANING OF EVAPORATOR COILS BY MANUFACTURER RECOMMENDED PROCEDURE
- CHECKING THE CONTROLS
- CLEANING THE CONDENSATE PANS/DRAINS
- CHECKING ACCESS AND MAINTENANCE DOOR HINGES AND LATCHES
- VERIFY THAT THE UNIT IS CAPABLE OF BRINGING IN THE OUTSIDE AIR INDICATED IN OUTSIDE AIR BALANCING SCHEDULE

TESTS SHOULD ONLY BE PERFORMED WHEN OUTSIDE AIR TEMPERATURE IS WITHIN RECOMMENDED RANGE. IT MAY BE NECESSARY TO PERFORM HEATING AND/OR COOLING TESTS ON A DIFFERENT DAY WHEN THE TEMPERATURE IS WITHIN THE ACCEPTABLE RANGE.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
August 2, 2021

REVISIONS:

No.	Date	Description

CONSULTANT

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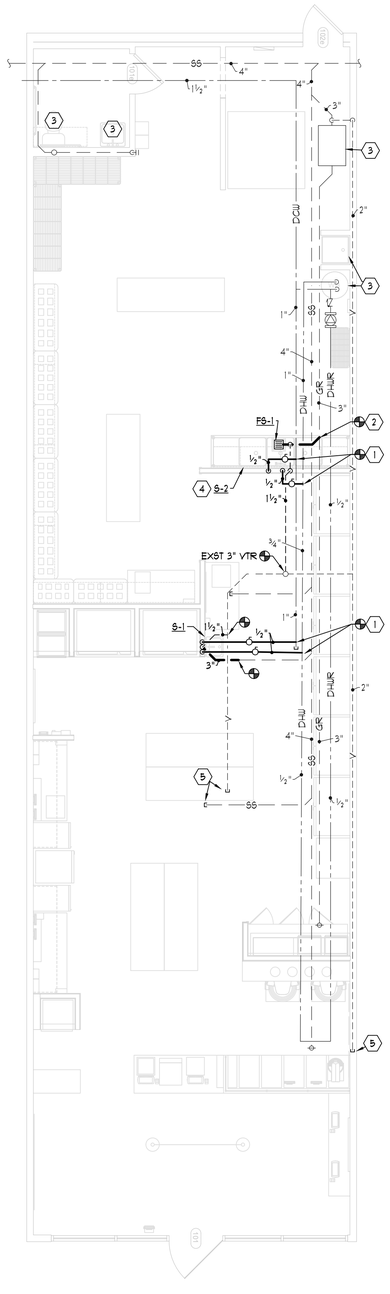
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PATRICK T. CANTRELL
NUMBER PE-2009012191
PROFESSIONAL ENGINEER
08-02-2021

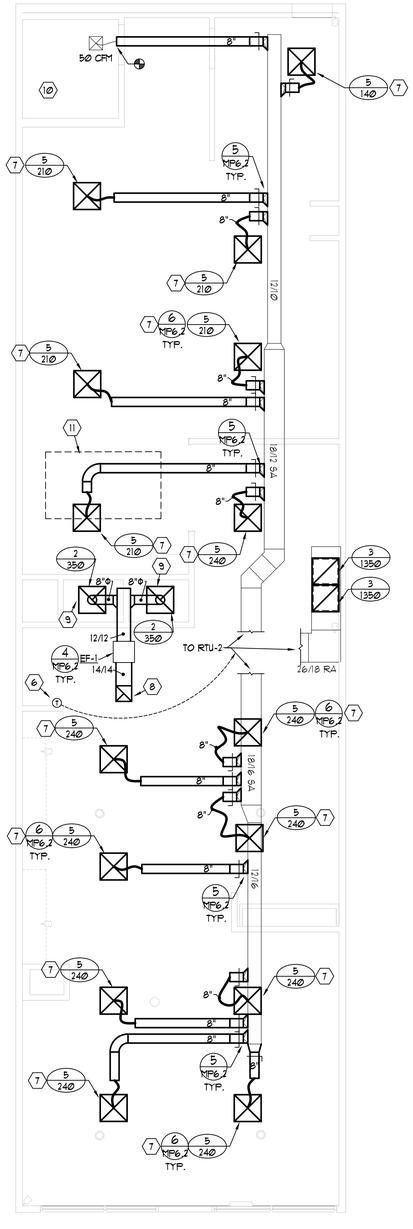
MECHANICAL & PLUMBING SCHEDULES

MP0.2



1 MP1.1 **PLUMBING FLOOR PLAN**

SCALE: 1/4" = 1' - Ø"



2 MP1.1 **MECHANICAL CEILING PLAN**

SCALE: 1/4" = 1' - Ø"

MECHANICAL/PLUMBING KEYED NOTES:

1. CONNECT INTO CLOSEST EXISTING DOMESTIC COLD OR HOT WATER LINE AS LABELED. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND SIZE BEFORE CONNECTING.
2. CONNECT NEW SANITARY SEWER/GREASE LINE INTO CLOSEST EXISTING SANITARY SEWER OR GREASE AS SHOWN. FIELD VERIFY EXACT LOCATION, SIZE, AND DIRECTION OF FLOW BEFORE CONNECTING.
3. EXISTING PLUMBING FIXTURE TO REMAIN. RECONNECT ALL NECESSARY PIPING TO THEIR CORRECT LINES.
4. ROUTE WASTE LINE FROM 3-COMPARTMENT SINK TO FLOOR SINK AND TERMINATE WITH 1" AIR GAP.
5. CAP ALL UNECESSARY/ABANDONDED PLUMBING LINES.
6. PROVIDE/INSTALL NEST 7-DAY PROGRAMMABLE THERMOSTAT AT 48" AFF. CONFIRM FINAL LOCATION WITH OWNER'S REPRESENTATIVE.
7. INSPECT EXISTING MECHANICAL SYSTEM/DUCTWORK. IF ACCEPTABLE KEEP, AND REPLACE DIFFUSERS WITH THOSE SPECIFIED. BALANCE ACCORDINGLY AND CONNECT TO EXISTING SUPPLY/RETURN DUCTWORK WHERE NECESSARY USING HIGH EFFICIENCY TAKEOFFS FOR ALL CONNECTIONS.
8. RISE EXHAUST DUCT UP THROUGH ROOF AND TERMINATE WITH BACKDRAFT DAMPER AND OWNER APPROVED TERMINATION. KEEP EXHAUST TERMINATION 3' AWAY FROM ANY OPERABLE BUILDING OPENING AND 10' AWAY FROM MECHANICAL FRESH AIR INTAKES.
9. THE OVENS IN THIS PROJECT ARE LIGHT DUTY ELECTRIC COOKING APPLIANCES AND DON'T PRODUCE GREASE OR SMOKE AS A RESULT OF THE COOKING PROCESS, THEREFORE THE OVENS DO NOT REQUIRE A TYPE I HOOD. PER 2015 IMC 508.1 TYPE II IS NOT REQUIRED BECAUSE THE HEAT AND MOISTURE LOADS HAVE BEEN INCORPORATED INTO THE HVAC DESIGN. THE KITCHEN AREA HAS AN EXHAUST FAN THAT HAS BEEN SIZED TO Ø.7 CFM/SF AND THE MAKE UP AIR IS VIA OUTSIDE AIR INTAKE ON RTU.
10. CONTRACTOR IS TO VERIFY THAT RESTROOM HAS EXISTING EXHAUST FAN FOR VENTILATION. IF RESTROOM DOES NOT HAVE EXISTING EXHAUST CONTRACTOR IS TO PROVIDE/INSTALL A PANASONIC FV-Ø5-11VKSI EXHAUST FAN, BALANCE TO 80 CFM AND PROVIDE 8" ROUND DUCT VENTED TO ROOF WITH BACKDRAFT DAMPER AND OWNER APPROVED TERMINATION.
11. RTU-1 (12.5 TON LENNOX GCSI5-150-270-1Y) IS TO BE ABANDONED. KEEP DUCT DROPS IN CASE OF FUTURE NEEDS.

GENERAL NOTES:

1. ALL EXHAUST DUCTWORK IS TO BE WRAPPED WITH INSULATION MIN. 10' FROM THE EXHAUST FANS FOR SOUND ATTENUATION.
2. CONTRACTOR TO PROVIDE / INSTALL ALL DUCTWORK AS HIGH UP AS POSSIBLE. COORDINATE ALL DUCTWORK WITH ARCHITECTURAL CEILING HEIGHTS. CONTRACTOR TO OFFSET DUCTWORK AS REQUIRED AND ROUTE THROUGH JOISTS AS REQUIRED. ALL OFFSETS SHOULD NOT EXCEED A 45° ANGLE.
3. CONTRACTOR IS TO PROVIDE / INSTALL ALL DUCTWORK WITH RADIUS ELBOWS WHERE EVER POSSIBLE. IF A 90° ELBOW MUST BE USED, CONTRACTOR IS TO INSTALL LONG RADIUS TURNING VANES IN ELBOWS.
4. CONTRACTOR IS TO FIELD COORDINATE ALL DUCTWORK AND HEIGHTS WITH ARCHITECTURAL CEILING PLANS.
5. All RTU's, MAU's, and CRU's ARE TO HAVE A FACTORY INSTALLED & WIRED WATER-LEVEL DETECTION & MONITORING DEVICE INSIDE THE PRIMARY DRAIN THAT WILL SHUT OFF THE EQUIPMENT IN THE EVENT THE PRIMARY DRAIN LINE IS BLOCKED.
6. WATER, SEWER, AND VENT LINES SHALL NOT BE ROUTED IN DEMISING WALLS. A PLUMBING WALL SHALL BE REQUIRED WHERE THESE LINES ARE SHOWN IN DEMISING WALLS.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
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LEE'S SUMMIT, MISSOURI
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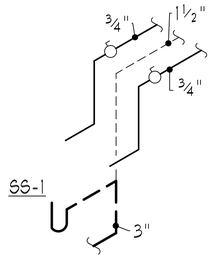
08-02-2021

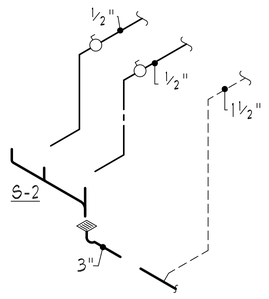
MECHANICAL & PLUMBING PLANS

MP1.1



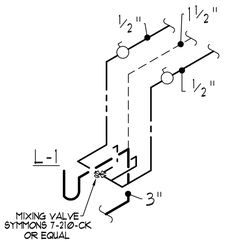
4 MP1.2 **SERVICE SINK ISOMETRIC**

SCALE: NOT TO SCALE



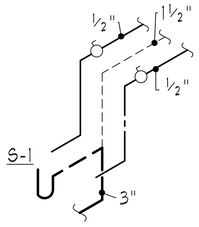
5 MP1.2 **3 COMPARTMENT SINK ISOMETRIC**

SCALE: NOT TO SCALE



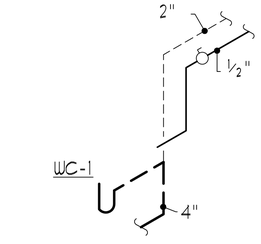
1 MP1.2 **LAVATORY ISOMETRIC**

SCALE: NOT TO SCALE



2 MP1.2 **HAND SINK ISOMETRIC**

SCALE: NOT TO SCALE



3 MP1.2 **WATER CLOSET ISOMETRIC**

SCALE: NOT TO SCALE

WATER SUPPLY FIXTURE UNIT COUNT			
FIXTURE	QTY.	WSFU PER FIXTURE	TOTAL WSFU
3-COMPARTMENT SINK	1	4	4
HAND WASH SINK	1	2	2
LAVATORY	1	1	1
MOP SINK	1	3	3
WATER CLOSET	1	2.5	2.5
BOTTLE STATION	Ø	Ø.5	Ø
PER 2018 IPC TABLE E1Ø3.3(2)		TOTAL	12.5

DRAINAGE FIXTURE UNIT COUNT			
FIXTURE	QTY.	DFU PER FIXTURE	TOTAL DFU
3-COMPARTMENT SINK	1	4	4
HAND WASH SINK	1	2	2
LAVATORY	1	1	1
MOP SINK	1	2	2
WATER CLOSET	1	4	4
FLOOR DRAIN	Ø	2	Ø
BOTTLE STATION	Ø	Ø.5	Ø
PER 2018 IPC TABLE T7Ø9.1		TOTAL	13

KITCHEN EXHAUST

KITCHEN = 91Ø SF
VENTILATION = Ø.7 CFM/SF
91Ø SF * Ø.7 CFM/SF = 64Ø CFM

CALCULATED USING
INTERNATIONAL MECHANICAL CODE TABLE 4Ø3.3.1.1

OUTSIDE AIR CALCULATIONS

KITCHEN = 91Ø SF
FPL = 1 PEOPLE / 1ØØØ SF * 91Ø = 19
PER PERSON = 7.5 CFM/PERSON
PER/SF = Ø.12 CFM/SF
91Ø SF * Ø.12 CFM/SF + 19 PEOPLE * 7.5 CFM/PERSON = 252 CFM

PICKUP = 255 SF
FPL = 1 PEOPLE / 1ØØØ SF * 255 = 3
PER PERSON = 5 CFM/PERSON
PER/SF = Ø.Ø6 CFM/SF
255 SF * Ø.Ø6 CFM/SF + 3 PEOPLE * 5 CFM/PERSON = 31 CFM

BACK OF HOUSE = 925 SF
FPL = 1 PEOPLE / 1ØØØ SF * 925 = 1Ø
PER PERSON = 5 CFM/PERSON
PER/SF = Ø.18 CFM/SF
925 SF * Ø.18 CFM/SF + 1Ø PEOPLE * 5 CFM/PERSON = 217 CFM

TOTAL OUTSIDE AIR = 5ØØ CFM

CALCULATED USING
INTERNATIONAL MECHANICAL CODE TABLE 4Ø3.3.1.1

APPLIANCE LOAD CALCS

APPLIANCE/OBJECT	LOAD PER	QTY.	TOTAL
PEOPLE	25Ø BTU/H	32	8,ØØØ BTU/H
REFRIGERATOR	266Ø BTU/H	7	18,62Ø BTU/H
FREEZER	457Ø BTU/H	2	9,14Ø BTU/H
FOOD WARMER 93%(E)	7ØØ BTU/H	2	1,4ØØ BTU/H
MIXER	2915 BTU/H	2	5,83Ø BTU/H
OVEN 93%(E)	43ØØ BTU/H	2	8,6ØØ BTU/H
TOTAL			51,59Ø BTU/H 4.3 TONS

AREA LOAD CALCS
(DELTA T = 35°F)

DIRECTION	SQUARE FOOTAGE	U-VALUE	LOAD
EAST WALL	14Ø	Ø.Ø64	314 BTU/H
EAST GLASS	22Ø	1.2	9,24Ø BTU/H
WEST WALL	36Ø	Ø.Ø64	8Ø6 BTU/H
ROOF	2Ø8Ø	Ø.Ø35	2,561 BTU/H
TOTAL			12,921 BTU/H 1.Ø8 TONS

TOTAL LOAD = 4.3 + 1.Ø8 = 5.38 TONS

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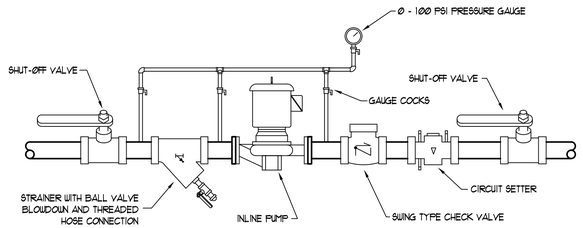
PROFESSIONAL ENGINEER
08-02-2021

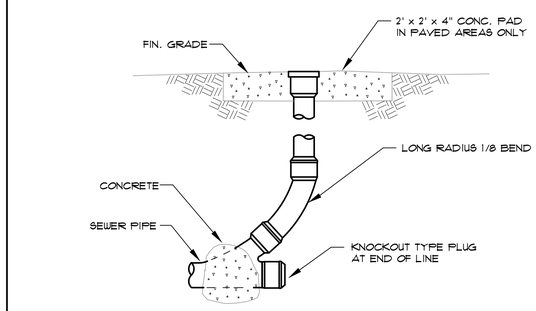
MECANICAL ISO & CALCULATION PLANS

MP1.2



7 MP6.1 TYPICAL IN-LINE PUMP PIPING DETAIL

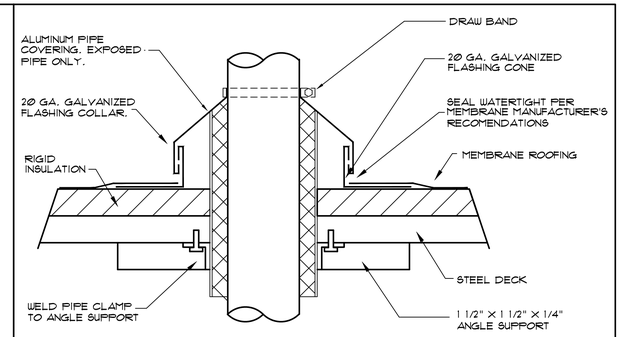
PVED-PUMP-1



4 MP6.1 SURFACE CLEANOUT DETAIL

NOT TO SCALE

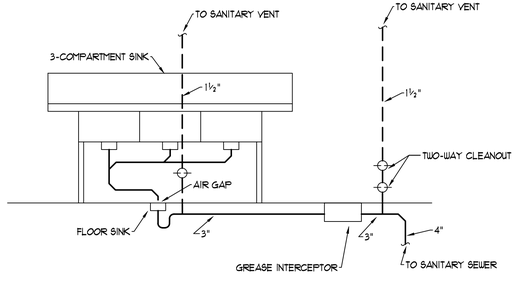
PVED-SURFCO



1 MP6.1 PIPE PENETRATION THRU ROOF DETAIL

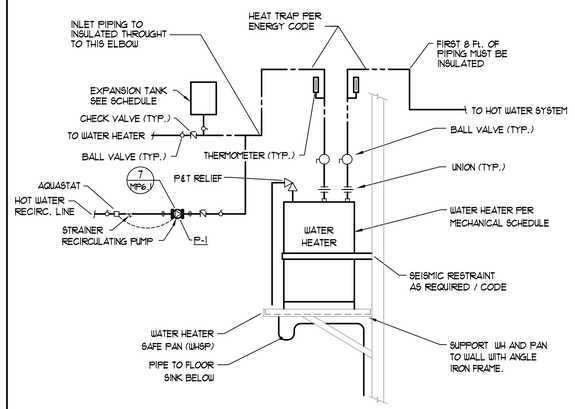
NOT TO SCALE

PVED-CABUNIT

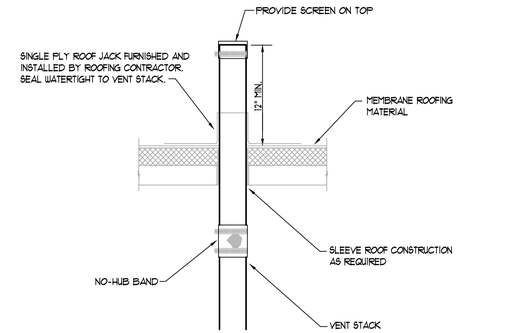


8 MP6.1 3 COMPARTMENT SINK DETAIL

NOT TO SCALE



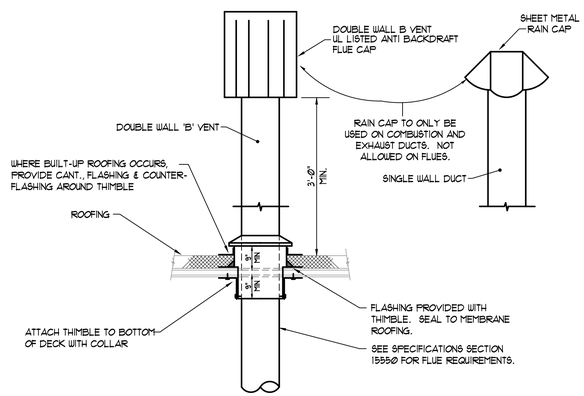
5 MP6.1 WATER HEATER PIPING DETAIL (WALL HUNG)



2 MP6.1 VENT THROUGH ROOF DETAIL

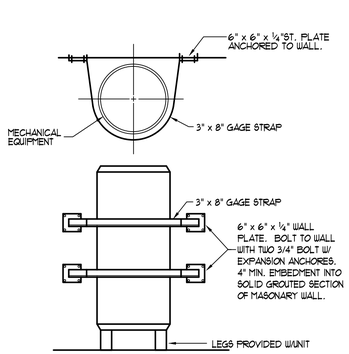
SCALE: NTS

PVED-VENT

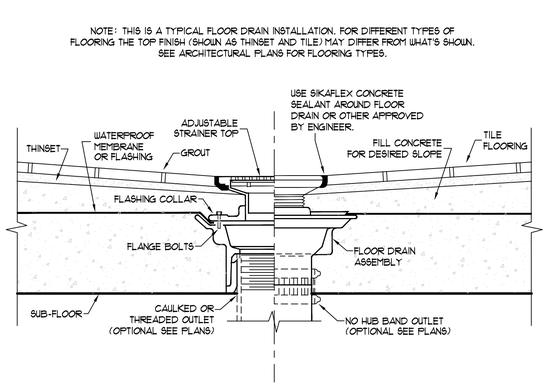


9 MP6.1 VENT / FLUE ROOF PENETRATION DETAIL

NOT TO SCALE



6 MP6.1 SEISMIC RESTRAINT FOR WATER HEATER



3 MP6.1 TYPICAL FLOOR DRAIN / SINK DETAIL

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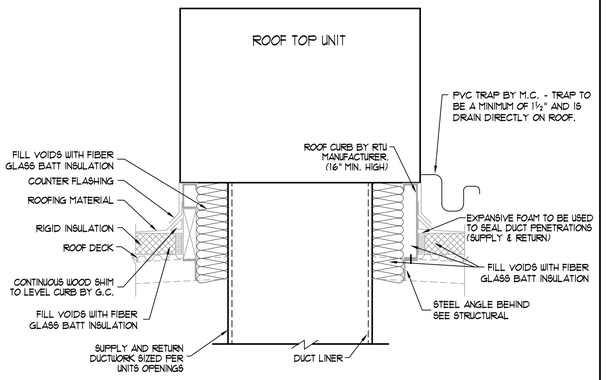
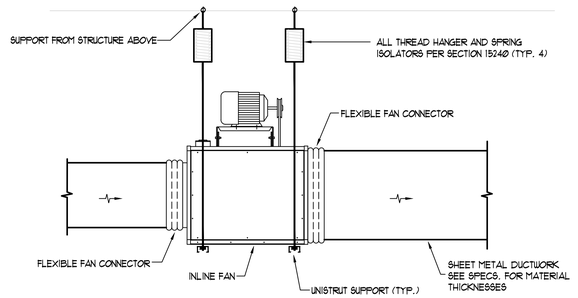
MECHANICAL & PLUMBING DETAILS

MP6.1



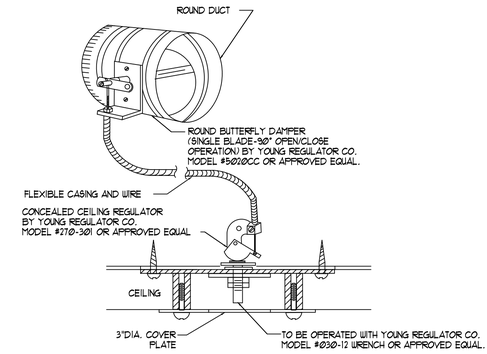
7 MP6.2 **ROOF TOP UNIT CURB DETAIL**

PVED-RTUCURB

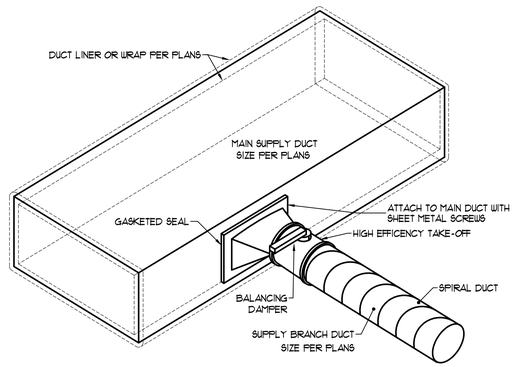


4 MP6.2 **INLINE EXHAUST FAN DETAIL**

PVED-CABUNIT

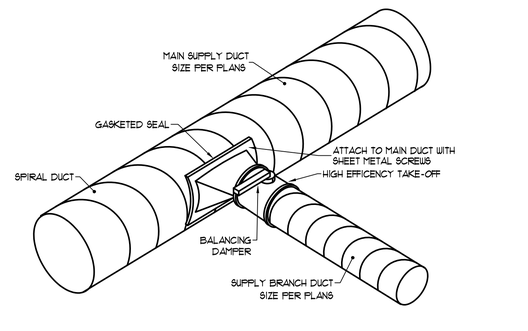


1 MP6.2 **DAMPER AND REGULATOR DETAIL**



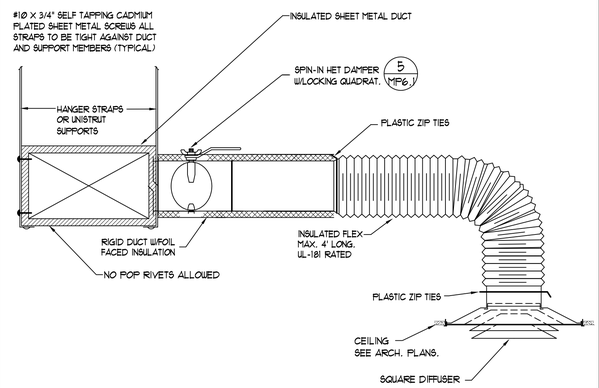
5 MP6.2 **HIGH EFFICIENCY DUCT TAKEOFF DETAIL SQAURE**

SCALE: NTS



2 MP6.2 **HIGH EFFICIENCY DUCT TAKEOFF DETAIL ROUND**

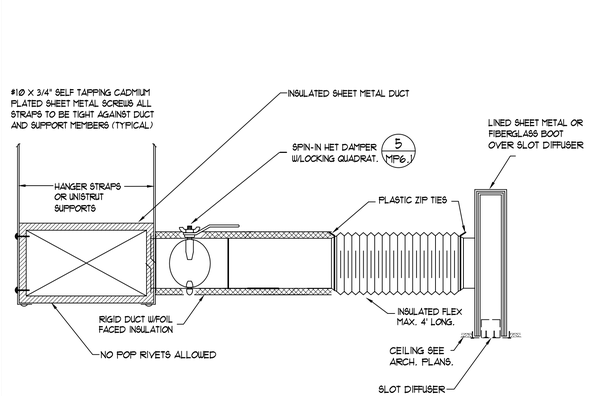
NOT TO SCALE



6 MP6.2 **DIFFUSER MOUNTING DETAIL (SQUARE)**

SCALE: NTS

15850-12



3 MP6.2 **DIFFUSER MOUNTING DETAIL (SLOT)**

15850-10

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LEAWOOD, KANSAS
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MECHANICAL & PLUMBING DETAILS

MP6.2

DIVISION 15 - MECHANICAL

SECTION 15000
MECHANICAL GENERAL PROVISIONS

A. GENERAL CONDITIONS

1. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND ALL OTHER SPECIFICATION SECTIONS ARE A PART OF THIS CONTRACT AND APPLY TO THIS AND THE OTHER SECTIONS OF DIVISION 15.

2. THE CONTRACTOR FOR THIS WORK IS REQUIRED TO READ THE ENTIRE SPECIFICATIONS AND REVIEW DRAWINGS FOR ALL OTHER TRADES.

3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING HIS SUBCONTRACTORS WITH A FULL SET OF BID SET DOCUMENTS (INCLUDING SPECIFICATIONS) AND THE COORDINATION OF HIS WORK AND INSPECTIONS AND THE WORK AND INSPECTIONS OF HIS SUBCONTRACTORS WITH ALL OTHER TRADES ON SITE CONFORMING TO THE GENERAL CONTRACTOR'S TIME SCHEDULE.

4. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING HIS BID TO DETERMINE CONDITIONS AFFECTING THE WORK. BIDS SHALL SERVE AS EVIDENCE REQUIRED TO MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY IN PERFORMANCE OF WORK.

5. WHEN USED, THE TERM "PROVIDED BY CONTRACTOR" SHALL BE INTERPRETED AS MEANING "FURNISHED AND INSTALLED" WITH THE EXCEPTION WHERE ITEMS ARE "PROVIDED BY TENANT" WHICH MEANS "FURNISHED ONLY" (INSTALLED BY CONTRACTOR), EXCEPT AS SPECIFICALLY NOTED OTHERWISE.

B. GENERAL REQUIREMENTS

1. THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, SERVICES, TOOLS, TRANSPORTATION, INCIDENTALS AND DETAILS NECESSARY TO PROVIDE A COMPLETE AND FULLY FUNCTIONAL MECHANICAL SYSTEM AS SHOWN ON THE DRAWINGS, CALLED FOR THE SPECIFICATIONS, AND AS REQUIRED BY JOB CONDITIONS. ALL WORK NOT SPECIFICALLY NOTED AS BEING BY THE LANDLORD SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR. CLOSELY COORDINATE THE ENTIRE INSTALLATION WITH THE LANDLORD, AS REQUIRED. FIELD VERIFY THE EXACT TYPE, SIZE AND LOCATION, ETC. OF EXISTING PIPE AND DUCTS IN THE TENANT SPACE PRIOR TO BID.

2. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO SUPPLEMENT EACH OTHER AND ANY MATERIAL OR LABOR CALLED FOR IN ONE SHALL BE PROVIDED EVEN THOUGH NOT SPECIFICALLY MENTIONED IN BOTH. ANY MATERIAL OR LABOR WHICH IS NEITHER SHOWN ON THE DRAWINGS NOR CALLED FOR IN THE SPECIFICATIONS, BUT WHICH IS OBVIOUSLY NECESSARY TO COMPLETE THE WORK, AND WHICH IS USUALLY INCLUDED IN WORK OF SIMILAR CHARACTER, SHALL BE PROVIDED AS PART OF CONTRACT.

3. WHERE THE DRAWINGS OR SPECIFICATIONS CALL FOR ITEMS WHICH EXCEED CODES OR THE LANDLORD'S TENANT CRITERIA, THE CONTRACTOR IS STILL RESPONSIBLE FOR PROVIDING THE SYSTEM AS DESIGNED AND DESCRIBED ON THESE DRAWINGS, UNLESS SPECIFICALLY NOTED OTHERWISE.

4. ALL MECHANICAL WORK SHALL BE INSTALLED SO AS TO BE READILY ACCESSIBLE FOR OPERATING, SERVICING, MAINTAINING, AND REPAIRING. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SUFFICIENT ACCESS TO ALL EQUIPMENT FOR SERVICE.

5. THE CONTRACTOR SHALL DO ALL CUTTING, CORE DRILLING, CHASING OR CHANNELING AND PATCHING REQUIRED FOR ANY WORK UNDER THIS DIVISION. CUTTING SHALL HAVE PRIOR APPROVAL BY THE TENANT'S CONSTRUCTION MANAGER AND THE LANDLORD. PATCHING SHALL MATCH , FINISH OF SURROUNDING AREA.

C. CODES

1. ALL WORK SHALL BE PERFORMED IN A NEAT PROFESSIONAL MANNER USING GOOD ENGINEERING PRACTICES. ALL WORK SHALL CONFORM TO THE LANDLORD'S ORDINANCES. SAFETY AND HEALTH CODES, NFPA CODES, ENERGY CODES, AND ALL OTHER APPLICABLE CODES AND REQUIREMENTS. THE CONTRACTOR SHALL INQUIRE INTO AND COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS. AFTER CONTRACT IS ISSUED, NO ADDITIONAL COST DUE TO CODE ISSUES SHALL BE REIMBURSED BY THE TENANT TO THE CONTRACTOR.

D. LICENSES, PERMITS, INSPECTIONS & FEES

1. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL LICENSES, PERMITS, INSPECTIONS, AND FEES REQUIRED OR RELATED TO HIS WORK.

2. FURNISH TO THE TENANT'S CONSTRUCTION MANAGER ALL CERTIFICATES OF INSPECTION AND FINAL INSPECTION APPROVAL AT SUBSTANTIAL COMPLETION DATE OF PROJECT.

E. DRAWINGS

1. DRAWINGS (PLANS, SPECIFICATIONS, AND DETAILS) ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION AND INTENT OF THE MECHANICAL SYSTEMS. BECAUSE OF THE SMALL SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL DUCT AND PIPING OFFSETS, FITTINGS AND ACCESSORIES THAT MAY BE REQUIRED.

2. THE LAYOUT SHOWN ON THE DRAWINGS IS BASED ON A PARTICULAR MAKE OF EQUIPMENT. IF ANOTHER MAKE OF EQUIPMENT IS USED WHICH REQUIRES MODIFICATION OR CHANGE OF ANY DESCRIPTION FROM THE DRAWINGS OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE AS PART OF THIS WORK FOR MAKING ALL SUCH MODIFICATIONS AND CHANGES, INCLUDING THOSE INVOLVING OTHER TRADES WITH THE COST THEREOF INCLUDED IN HIS BID. IN SUCH CASE, CONTRACTOR SHALL SUBMIT DRAWINGS AND SPECIFICATIONS PRIOR TO STARTING WORK SHOWING ALL SUCH MODIFICATIONS AND CHANGES. HIS PROPOSAL SHALL BE SUBJECT TO THE APPROVAL OF THE TENANT'S CONSTRUCTION MANAGER.

F. EXISTING SHELL SPACE CONDITIONS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF THE DEMOLITION OF EXISTING MECHANICAL WORK SHOWN ON THE MECHANICAL DRAWINGS AND THE MECHANICAL DEMOLITION SHOWN ON THE ARCHITECTURAL DRAWINGS.

2. THE CONTRACTOR SHALL INCLUDE, AND WILL BE HELD RESPONSIBLE FOR, THE REMOVAL OF ALL EXISTING FIRE PROTECTION, PLUMBING FIXTURES, PIPING, HVAC UNITS, REFRIGERANT RECAPTURE, EXHAUST FAN, ETC. AND ASSOCIATED ROOF CURBS NOT TO BE REUSED ON THIS PROJECT, UNLESS SPECIFICALLY NOTED OTHERWISE. CONTRACTOR MUST VERIFY WITH THE LANDLORD ALL PRESUMED ABANDONED EQUIPMENT, PIPES, DUCTWORK, AND EQUIPMENT PRIOR TO REMOVAL. ROOF CURBS SHALL BE REMOVED AND THE ROOF PATCHED UNLESS NOTED FOR REUSE OR RECONFIGURATION ON PLANS. ROOF PATCHING SHALL BE PERFORMED AT THE CONTRACTOR'S EXPENSE BY A ROOFING CONTRACTOR APPROVED BY THE LANDLORD. ALL EXTRANEOUS ITEMS IN THE SPACE OR ON THE ROOF (ABOVE THIS SPACE) NOT APPLICABLE TO THE NEW WORK OR PART OF THE LANDLORD'S OR ANOTHER TENANT'S ACTIVE SYSTEM MUST BE REMOVED AND ROOF/WALL/FLOOR/PATCHED/REPAIRED TO MATCH EXISTING STRUCTURE. EXISTING ABANDONED PIPES, DUCTS, OR EQUIPMENT IN THE FLOOR, EMBEDDED IN CONCRETE, OR OTHERWISE INACCESSIBLE ARE TO BE CUT OFF AND SEALED BELOW OR WITHIN FLOOR OR WALL LEVEL WHEN THEY ARE NOT TO BE REUSED IN THIS PROJECT. IF REQUIRED BY LANDLORD OR CODES, ABANDONED PIPING AND/OR DUCTWORK MUST BE REMOVED TO POINT OF ORIGIN. CONFIRM THE EXTENT OF DEMOLITION PRIOR TO BID AND INCLUDE IN BID PROPOSAL.

3. ACTIVE LANDLORD OR OTHER TENANT SERVICES ENCOUNTERED IN WORK SHALL BE PROTECTED AND SUPPORTED. IF EXISTING SERVICES NOT ANTICIPATED REQUIRE RELOCATION, CONTACT THE TENANT'S CONSTRUCTION MANAGER IMMEDIATELY. ALL COSTS FOR REPAIR OF DAMAGES TO ACTIVE LANDLORD OR OTHER TENANT SERVICES DURING CONSTRUCTION SHALL BE PAID FOR BY THE CONTRACTOR CAUSING THE DAMAGE.

4. TIE-INS AND MODIFICATIONS TO EXISTING LANDLORD SERVICES MUST BE DONE WITH MINIMUM INTERRUPTION OF LANDLORD OPERATION AND DURING HOURS SPECIFIED BY THE LANDLORD. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING EXACT WORKING HOURS OF THIS WORK WITH THE LANDLORD PRIOR TO SUBMITTING HIS BID. THE CONTRACTOR SHALL INCLUDE IN HIS BID, ALL PREMIUM TIME REQUIRED TO PERFORM MODIFICATIONS DURING OTHER THAN NORMAL WORKING HOURS. ALL SUCH WORK MUST BE COORDINATED WITH THE LANDLORD.

G. DISCREPANCIES IN DOCUMENTS

1. DRAWINGS (PLANS, SPECIFICATIONS, AND DETAILS) ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION AND INTENT OF THE MECHANICAL SYSTEMS. WHERE DRAWINGS, EXISTING SITE CONDITIONS, SPECIFICATIONS OR OTHER TRADES CONFLICT OR ARE UNCLEAR, ADVISE THE GENERAL CONTRACTOR IN WRITING, PRIOR TO SUBMITTAL OF BID. THE GENERAL CONTRACTOR IS RESPONSIBLE TO ADVISE THE TENANT'S CONSTRUCTION MANAGER, IN WRITING, OTHERWISE, TENANT'S CONSTRUCTION MANAGER'S INTERPRETATION OF CONTRACT DOCUMENTS OR CONDITIONS SHALL BE FINAL WITH NO ADDITIONAL COMPENSATION PERMITTED.

H. TRADE NAMES AND MANUFACTURERS

1. WHERE TRADE NAMES AND MANUFACTURERS ARE USED ON THE DRAWINGS OR IN THE SPECIFICATIONS, THE EXACT EQUIPMENT SHALL BE USED AS A MINIMUM STANDARD FOR THE BASE BID. MANUFACTURERS CONSIDERED AS AN EQUAL OR BETTER IN ALL ASPECTS TO THAT SPECIFIED WILL BE SUBJECT TO APPROVAL IN WRITING BY THE TENANT'S CONSTRUCTION MANAGER PRIOR TO ACCEPTANCE. THE USE OF ANY UNAUTHORIZED EQUIPMENT SHALL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.

I. SHOP DRAWINGS

1. SUBMIT COPIES OF MATERIAL LISTS AND SHOP DRAWINGS FOR ALL EQUIPMENT AND DUCT FABRICATION DRAWINGS TO THE TENANT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO ORDERING EQUIPMENT. SUBMISSIONS MUST BE EARLY ENOUGH TO ALLOW THE TENANT'S CONSTRUCTION MANAGER EIGHT WORKING DAYS FOR REVIEW WITHOUT CAUSING DELAYS OR CONFLICTS TO THE JOB'S PROGRESS. SUBMITTALS SHALL BE IN ACCORDANCE WITH THE GENERAL CONDITIONS USING THE MANUFACTURER'S LISTED ON THE DRAWINGS. SHOP DRAWINGS SHALL INCLUDE ALL DATA THAT PERTAINS TO THE REQUIREMENTS SET FORTH ON THE DRAWINGS AND IN THE SPECIFICATIONS. THE SUBMITTAL SHALL INCLUDE BUT NOT LIMITED TO CUTS OR CATALOGS INCLUDING DESCRIPTIVE LITERATURE AND CHARACTERISTICS OF EQUIPMENT SHALL SHOW MAJOR DIMENSIONS, ROUGHING-IN DATA, CAPACITY, CURVES, PRESSURE DROP, CODE COMPLIANCE, MOTOR AND DRIVE DATA AND ELECTRICAL DATA. OBSERVE SPECIAL INSTRUCTIONS WHEN REQUIRED. SUBMITTALS SHALL BEAR THE STAMP OF THE GENERAL AND SUB-CONTRACTOR SHOWING THAT HE HAS REVIEWED AND CONFIRMED THAT THEY ARE IN CONFORMANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS OR INDICATE WHERE EXCEPTIONS TAKE PLACE. LACK OF SUCH CONTRACTOR'S REVIEW AND APPROVAL WILL BE CAUSE FOR REJECTION WITHOUT REVIEW BY TENANT'S CONSTRUCTION MANAGER. ALL SHOP DRAWINGS MUST APPEAR IN THE OPERATION AND MAINTENANCE MANUALS LEFT ON SITE AT JOB COMPLETION.

2. TENANT'S CONSTRUCTION MANAGER'S REVIEW OF SHOP DRAWINGS OR SCHEDULES SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS. OMISSIONS OR OTHER DEFICIENCIES OR DEVIATIONS IN THE SHOP DRAWING FROM THE CONTRACT DRAWINGS AND SPECIFICATIONS.

J. RECORD DRAWINGS

1. THE CONTRACTOR SHALL MAINTAIN ONE COPY OF DRAWINGS AND SPECIFICATIONS ON THE JOB SITE TO RECORD DEVIATIONS FROM CONTRACT DRAWINGS, SUCH AS:

A. LOCATION OF CONCEALED PIPING VALVES AND DUCTS.
B. REVISIONS, ADDENDUM'S, AND CHANGE ORDERS.
C. SIGNIFICANT DEVIATIONS MADE NECESSARY BY FIELD CONDITIONS, APPROVED EQUIPMENT SUBSTITUTIONS, AND CONTRACTOR'S COORDINATION WITH OTHER TRADES.
D. EXACT ROUTING OF ALL SANITARY AND DOMESTIC WATER PIPING UNDER FLOOR.

2. AT COMPLETION OF THE PROJECT AND BEFORE FINAL APPROVAL, THE CONTRACTOR SHALL MAKE ANY FINAL CORRECTIONS TO DRAWINGS AND CERTIFY THE ACCURACY OF EACH PRINT BY SIGNATURE THEREON. THE DRAWINGS ARE TO BE TURNED OVER TO THE TENANT.

K. GUARANTEE

1. THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORK UNDER HIS CONTRACT AND SHALL MAKE GOOD, REPAIR OR REPLACE AT HIS OWN EXPENSE, ANY DEFECTIVE WORK, MATERIAL, OR EQUIPMENT WHICH MAY BE DISCOVERED WITHIN A PERIOD OF 12 MONTHS FROM THE DATE OF ACCEPTANCE (IN WRITING) OF THE INSTALLATION BY THE TENANT'S CONSTRUCTION MANAGER. PROVIDE EXTENDED WARRANTIES AS SPECIFIED WITH INDIVIDUAL EQUIPMENT. IN CASE OF REPLACEMENT OR REPAIR OR EQUIPMENT DUE TO FAILURE WITHIN GUARANTEE PERIOD, GUARANTEE ON THAT PORTION OF WORK SHALL BE EXTENDED FOR A PERIOD OF ONE (1) YEAR FROM DATE OF SUCH REPLACEMENT OR REPAIR.

L. OPERATIONS MANUALS

1. ONE COPY OF EACH OPERATION AND MAINTENANCE MANUAL FOR ALL EQUIPMENT FURNISHED ON JOB SHALL BE COLLECTED AND INSERTED IN A 3" THREE RING BINDER AND TURNED OVER TO THE TENANT. EACH NOTEBOOK SHALL INCLUDE BUT NOT BE LIMITED TO INSTALLATION, MAINTENANCE AND OPERATING INSTRUCTIONS, PAMPHLETS OR BROCHURES APPROVED SHOP DRAWINGS AND WARRANTIES OBTAINED FROM EACH MANUFACTURER OF PRINCIPAL ITEMS OF EQUIPMENT.R

M. SLEEVES

1. THE CONTRACTOR SHALL PROVIDE SLEEVES TO PROTECT EQUIPMENT OR FACILITIES IN THE INSTALLATION. EACH SLEEVE SHALL EXTEND THROUGH IT'S RESPECTIVE FLOOR, WALL OR PARTITION AND SHALL BE CUT FLUSH WITH EACH SURFACE EXCEPT SLEEVES THAT PENETRATE THE FLOOR, WHICH SHALL EXTEND 2" ABOVE THE FLOOR.

2. ALL SLEEVES AND OPENINGS THROUGH FIRE RATED WALLS AND/OR FLOORS SHALL BE FIRE SEALED WITH CALCIUM SILICATE, SILICONE "RTV" FOAM, "3M" FIRE RATED SEALANTS OR EQUAL SO AS TO RETAIN THE FIRE RATING OF THE FLOOR OR WALL. CONFORM TO U.L. ASSEMBLY RATING OF FLOOR OR WALL.

3. SLEEVES IN BEARING AND MASONRY WALLS, FLOORS, AND PARTITIONS SHALL BE STANDARD WEIGHT STEEL PIPE FINISHED WITH SMOOTH EDGES. FOR OTHER THAN MASONRY PARTITIONS, THROUGH SUSPENDED CEILINGS, OR FOR CONCEALED VERTICAL PIPING, SLEEVES SHALL BE NO. 22 U.S.G. GALVANIZED STEEL MINIMUM.

4. DUCT SLEEVES TO BE MINIMUM 14 GAUGE STEEL.

N. HANGERS

1. HANGERS SHALL INCLUDE ALL MISCELLANEOUS STEEL SUCH AS ANGLE IRON, BANDS, C-CLAMPS WITH RETAINING CLIPS, CHANNELS, HANGER RODS, ETC., NECESSARY FOR THE INSTALLATION OF WORK.

2. HANGER SHALL BE FASTENED TO BUILDING STEEL, CONCRETE, OR MASONRY, BUT NOT TO PIPING OR DUCTWORK. HANGING FROM METAL DECK IS NOT PERMITTED. HANGERS MUST BE ATTACHED TO UPPER CHORD OF BAR JOIST. WHERE INTERFERENCE'S OCCUR, IN ORDER TO SUPPORT DUCTWORK OR PIPING. THE CONTRACTOR MUST INSTALL TRAPEZE TYPE HANGERS OR SUPPORTS WHICH SHALL BE LOCATED WHERE THEY DO NOT INTERFERE WITH ACCESS TO FIRE DAMPERS, VALVES, ACCESS DOORS AND OTHER EQUIPMENT SERVICE REQUIREMENTS AND/OR OTHER TRADES. HANGER TYPES AND INSTALLATION METHODS ARE SUBJECT TO LANDLORD CRITERIA.

3. HANGERS FOR ALL INSULATED PIPING SHALL BE SIZED AND INSTALLED FOR THE OUTER DIAMETER OF INSULATION. INSTALL 6" LONG SPLIT CIRCLE GALVANIZED SADDLE BETWEEN THE HANGER AND THE PIPE INSULATION.

4. HANGERS AND PIPING OF DISSIMILAR METALS SHALL BE DI-ELECTRICALLY SEPARATED FROM ONE ANOTHER.

O. ACCESS DOORS

1. FURNISH STEEL ACCESS DOORS AND FRAMES, MIN 16" X 20" OR AS SHOWN ON DRAWINGS, TO GENERAL CONTRACTOR FOR ALL LOCATIONS WHERE NECESSARY TO PROVIDE ACCESS TO CONCEALED VALVES, AND OTHER EQUIPMENT REQUIRING SERVICE OR INSPECTION. LOCATION, TYPE, SIZE AND NUMBER AS DETERMINED BY CONTRACTOR AND APPROVED BY TENANT CONSTRUCTION MANAGER TO SUIT EQUIPMENT REQUIREMENTS. GENERAL CONTRACTOR WILL INSTALL ACCESS DOORS AND FRAMES.

2. ACCESS DOORS LOCATED IN FIRE-RATED WALL, FLOOR, CEILING-FLOOR OR CEILING-ROOF ASSEMBLIES SHALL BE FIRE RATED, UNDERWRITER'S LABORATORIES, INC., LISTED AND LABELED.

3. ACCESS DOORS SHALL BE FLUSH TYPE, MANUFACTURED FROM NO. 14 GAUGE STEEL, COMPLETE WITH FLUSH FLANGE TYPE FRAMES MANUFACTURED FROM NO. 16 GAUGE STEEL, PROVIDED WITH ANCHORS. ACCESS DOORS SHALL BE SUITABLE FOR INSTALLATION IN WALL OR CEILING MATERIALS SHOWN IN ROOM FINISH SCHEDULES.

P. ELECTRICAL MOTORS

1. FURNISH, INSTALL AND ALIGN ALL MOTORS REQUIRED FOR THE EQUIPMENT. UNLESS THEY ARE FACTORY INSTALLED ON THE UNIT, ALL STARTERS AND ASSOCIATED WIRING AND SAFETY SWITCHES FOR SUCH MOTORS SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. STARTERS SHALL MEET ALL REQUIREMENTS AS DEFINED IN THE ELECTRICAL DIVISION OF THE SPECIFICATIONS.

2. DESIGN, CONSTRUCTION AND PERFORMANCE CHARACTERISTICS OF MOTORS SHALL CONFORM TO ALL APPLICABLE PROVISIONS OF LATEST NEMA, ANSI, ISEE STANDARDS FOR ELECTRICAL EQUIPMENT. ALL MOTORS SHALL BE SUITABLE FOR OPERATION ON VOLTAGE, VARIATION OF PLUS OR MINUS 10%, 40 DEGREES C AMBIENT TEMPERATURE± HAVE A SERVICE FACTOR OF NOT LESS THAN 1.15.

Q.

1. LOW VOLTAGE (24 VOLT) WIRING
THE MECH CONTRACTOR IS TO INSTALL ALL LOW VOLTAGE WIRING REQUIRED FOR HIS EQUIPMENT. THIS WORK INCLUDES ALL TRANSFORMERS AND DEVICES TO MAKE THIS A COMPLETE FUNCTIONAL SYSTEM.

2. ALL WORK IS TO CONFORM TO THE LATEST ADDITION N.E.C. AND TO DIVISION 16 ELECTRICAL SPECIFICATIONS.

3. ANY CONDUIT REQUIRED BY CODE OR THE LANDLORD WILL BE INSTALLED BY THE ELECTRICAL SUBCONTRACTOR.

DIVISION 15 - MECHANICAL

SECTION 15300
FIRE PROTECTION

A. SCOPE OF WORK

1. THE F.P. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, TOOLS, TRANSPORTATION AND FACILITIES NECESSARY FOR, REASONABLY IMPLIED AND INCIDENTAL TO, THE FURNISHING, INSTALLATION, COMPLETION AND TESTING OF ALL THE WORK FOR THE SPRINKLER SYSTEMS AS SHOWN ON THE DRAWINGS, CALLED FOR IN THE SPECIFICATIONS, AND AS REQUIRED BY JOB CONDITIONS, TO INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING: (REFER TO RESPONSIBILITY SCHEDULE FOR EXACT RESPONSIBILITIES)
A. INSTALLATION OF NEW WET SPRINKLER SYSTEM AS REQUIRED TO PROVIDE COVERAGE IN ACCORDANCE WITH NFPA-13, LOCAL CODES, LANDLORD'S CRITERIA, AND INSURANCE CARRIERS FOR THE BUILDING AND TENANT.
B. TAPS, RISER, LATERALS, BRANCHES, VALVES, ALARMS, SPRINKLER HEADS AND ALL COMPONENTS REQUIRED FOR A COMPLETE SYSTEM.
C. DESIGN DRAWINGS, CALCULATIONS, SUBMITTALS AND APPROVALS.
D. PERMITS, FEES, AND CHARGES.
E. TESTS AND TEST CERTIFICATES.
F. COST FOR SHUT DOWN FEES.

2. THE CONTRACTOR THAT DOES THE ACTUAL SPRINKLER WORK IS REQUIRED TO BE A LANDLORD APPROVED SPRINKLER CONTRACTOR.

3. BEFORE STARTING WORK, THE CONTRACTOR SHALL EXAMINE THE ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL PLANS AND SPECIFICATIONS TO SEQUENCE, COORDINATE, AND INTEGRATE THE VARIOUS ELEMENTS OF THE FIRE PROTECTION SYSTEM, MATERIALS, AND EQUIPMENT WITH OTHER CONTRACTORS TO AVOID INTERFERENCES AND CONFRONTATIONS.

4. RELOCATION OF EXISTING MAINS, LATERALS, BRANCHES AND RISER TO FACILITATE STORE DESIGN CRITERIA MUST BE INCLUDED IN BID PROPOSAL.

B. SHOP DRAWINGS

1. THE FIRE PROTECTION CONTRACTOR SHALL PREPARE DETAILED SHOP DRAWINGS AND CALCULATIONS FOR HIS WORK. SUBMIT SIX (6) COPIES TO GENERAL CONTRACTOR FOR APPROVAL. NO WORK SHALL BEGIN UNTIL TENANT'S CONSTRUCTION MANAGER APPROVES HEAD AND PIPING LOCATIONS.

2. THE FIRE PROTECTION CONTRACTOR IS RESPONSIBLE FOR SUBMITTING COORDINATED DRAWINGS, CALCULATIONS, HEAD TYPES AND COLORS TO ALL AUTHORITIES HAVING JURISDICTION FOR APPROVAL. NO WORK SHALL BEGIN UNIT ALL APPROVALS HAVE BEEN RECEIVED.

3. A COPY OF THE LETTER OF APPROVAL FROM THE LANDLORD'S INSURANCE RATING BUREAU SHALL BE FORWARDED TO THE LANDLORD'S AGENT AND TO THE TENANT'S CONSTRUCTION MANAGER.

C. EQUIPMENT

1. SPRINKLER HEADS:
A. ALL SPRINKLER HEADS SHALL BE NEW (EXISTING HEADS IN EXISTING STORES TO BE REPLACED), U.L., F.M. LISTED AND APPROVED AUTOMATIC SPRAY TYPE AS MANUFACTURED BY CENTRAL SPRINKLER CO., GLOBE, GRINNELL, RELIABLE, STAR, OR VIKING.
B. ALL SPRINKLER HEADS SHALL BE RATED FOR 165°F UNLESS INDICATED OTHERWISE ON DRAWINGS OR REQUIRED BY LOCAL CODES.
C. ALL SALES FLOORS HEADS ARE TO HAVE BE FACTORY APPLIED COLOR FINISH TO MATCH ARCHITECTURAL CEILING FINISH. VERIFY HEAD TYPES AND COLORS WITH TENANT'S CONSTRUCTION MANAGER AND SUBMIT WITH SPRINKLER DRAWING FOR PERMIT.
D. SPRINKLER HEAD TYPES SHALL BE AS FOLLOWS:
1. FINISHED CEILING - FULLY RECESSED TYPE.
2. NO-CEILING - BRASS UPRIGHT TYPE - DON'T NEED TO BE FINISHED.
3. NON-SALES: - BRASS PENDANT
COVERS SHOULD MATCH ADJACENT CEILING COLORS.

D. GENERAL PIPING

1. A FIRE PROTECTION SYSTEM STUB IN SHALL BE FURNISHED BY THE LANDLORD. SPRINKLER SPACING SHALL NOT EXCEED 150 SQ. FT. IN "OFFICE" AREAS, 130 SQ. FT. IN "SALES" AREAS AND 100 SQ. FT. IN "STOCK" AREAS. COMPLY WITH LANDLORD'S DESIGN CRITERIA. PIPE SIZING SHALL B BASED ON NFPA ORDINARY HAZARD.

2. ALL SPRINKLER LINES SHALL BE INSTALLED CONCEALED, AVOIDING INTERFERENCE WITH LIGHTS, DUCTS, PIPES, STORAGE DECK, ETC. FIRE PROTECTION CONTRACTOR SHALL PREPARE COORDINATED SHOP DRAWINGS INDICATING THE LOCATIONS OF ALL SPRINKLER HEADS, SPRINKLER LINES, LIGHTS, DIFFUSERS, GRILLES AND REGISTERS PRIOR TO INSTALLATION. HORIZONTAL SPRINKLER RUNS AT SOFFITS SHALL BE PLACED INSIDE SOFFIT STRUCTURE. VERTICAL DROPS FROM CEILING TO SOFFIT SHALL BE LOCATED FLUSH AGAINST DEMISING WALLS.

3. WHERE POSSIBLE, REWORK THE EXISTING SPRINKLER SYSTEM TO MEET THE NEW REQUIREMENTS OF THIS DESIGN. RELOCATE ALL MAINS AND BRANCHES INTERFERING WITH CEILING HEIGHTS, EQUIPMENT, AND MAJOR COMPONENTS INCLUSIVE OF ADJACENT TENANTS AND COMMON AREAS. REMOVE ALL UNUSED PIPING.

4. LOCATIONS OF ALL HEADS SHOULD BE APPROVED BY THE LOCAL FIRE PROTECTION OFFICIAL AND THE TENANT'S CONSTRUCTION MANAGER BEFORE INSTALLATION. HEADS MUST BE LOCATED IN THE CENTER OF CEILING TILES AND IN A SYMMETRICAL PATTERN WITH OTHER CEILING FIXTURES. ADDITIONAL MONIES WILL NOT BE ALLOCATED FOR ADDITIONAL HEADS REQUIRED BY FIELD FIRE INSPECTOR AFTER BIDS ARE ACCEPTED. HEADS IN BAYS SHALL BE CENTERED SIDE TO SIDE AND FRONT TO BACK.

5. PROVIDE AND INSTALL A VALVED TEST CONNECTION FOR THE SPRINKLER SYSTEM AS REQUIRED OR REQUESTED BY THE LOCAL INSPECTOR, OR INSURANCE CARRIER. COORDINATE LOCATION WITH TENANT'S CONSTRUCTION MANAGER AND LOCAL FIRE PROTECTION OFFICIAL PRIOR TO ROUGH-IN.

6. SPRINKLER HEADS LOCATED IN STOCK, CORRIDOR ON TOILET ROOM CEILINGS OR WALLS BELOW 8'-0" ABOVE THE FINISHED FLOOR ARE TO BE PROTECTED WITH APPROVED GUARDS.

E. PIPING

1. SCHEDULE 40, BLACK STEEL PIPE, ASTM A-53 FOR FERROUS PIPING, WELDED AND SEAMLESS, ANSI B-36-10-70 FOR WROUGHT STEEL PIPE.
2. CAST IRON OR MALLEABLE IRON SCREWED FITTINGS FOR PIPES 2 INCHES AND SMALLER. SCREWED OR CAST IRON FLANGED JOINTS FOR PIPES LARGER THAN 2 INCHES.
3. GALVANIZED OR BLACK MALLEABLE IRON WITH BRASS SEAT SCREWED UNIONS FOR PIPES 2 INCHES AND SMALLER.
4. VICTAULIC TYPE COUPLINGS ARE ACCEPTABLE, WHERE APPROVED BY CODE AND THE LANDLORD.

F. TESTS

1. WHEN COMPLETED, THE ENTIRE FIRE PROTECTION PIPING SYSTEM SHALL BE HYDROSTATIC ALLY TESTED AS REQUIRED BY THE RULES AND REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION. SYSTEM SHALL SHOW NO SIGNS OF LEAKAGE OR OTHER DEFECTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO THE WORK OF THE OTHER CONTRACTORS OR TO THE BUILDING, OR TO ITS CONTENTS, PEOPLE, ETC., CAUSED BY LEAKS IN ANY OF THE EQUIPMENT INSTALLED BY HIM. ALL REPAIRS OR REPLACEMENT OF DAMAGES SHALL BE AT THIS CONTRACTOR'S EXPENSE.

2. PROPERLY COMPLETED AND SIGNED "SPRINKLER CONTRACTOR'S MATERIAL AND TEST CERTIFICATES" SHALL BE FURNISHED TO THE LANDLORD. AUTHORITIES HAVING JURISDICTION, AND TENANT'S CONSTRUCTION MANAGER.

DIVISON 15 - MECHANICAL

SECTION 15500
HEATING, VENTILATION, AND AIR CONDITIONING

A. SCOPE OF WORK

1. THE HVAC CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, TOOLS, TRANSPORTATION AND FACILITIES NECESSARY FOR, REASONABLY IMPLIED AND INCIDENTAL TO, THE FURNISHING, INSTALLATION, COMPLETIONS AND TESTING OF ALL THE WORK FOR THE MECHANICAL SYSTEMS AS SHOWN ON THE DRAWINGS, CALLED FOR IN THE SPECIFICATIONS, AND AS REQUIRED BY JOB CONDITIONS, TO INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING: (REFER TO RESPONSIBILITY SCHEDULE FOR EXACT RESPONSIBILITES)
A. HVAC UNITS, EQUIPMENT, AND APPURTENANCES.
B. DUCTWORK, FITTINGS, DAMPERS, AND INSULATION.
C. HYDRONIC PIPING AND INSULATION (AS APPLICABLE, REFER TO PLANS).
D. REFRIGERANT PIPING (AS APPLICABLE, REFER TO PLANS).
E. DIFFUSERS, GRILLS, AND REGISTERS.
F. CURBS AND STEEL FRAMING FOR SUPPORT (AS APPLICABLE, REFER TO PALNS).
G. TESTING, ADJUSTING, AND BALANCING.
H. OPERATIONS MANUALS.
I. TEMPERATURE CONTROLS AND RELATED DIAGRAMS.
J. SEQUENCE OF OPERATION.
K. CONNECTION TO ANY LANDLORD ENERGY MANAGMENT SYSTEM.

2. BEFORE STARTING WORK, THIS CONTRACTOR SHALL EXAMINE THE ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL PLANS AND SPECIFICATIONS TO SEQUENCE, COORDINATE, AND ITEGRATE THE VARIOUS ELEMENTS OF THE HVAC SYSTEM, MATERIALS, AND EQUIPMENT WITH OTHER CONTRACTORS TO AVOID INTERFERENCES AND CONFRONTATIONS.

B. HVAC EQUIPMENT

1. PRIMARY HEATING, VENTILATION AND AIR CONDITIONING UNITS.

A. PRIMARY HEATING, VENTILATION AND AIR CONDITIONING UNITS ARE TO BE AS SCHEDULED. ALL COMPRESSORS ARE TO INCLUDE A 5-YEAR EXTENDED WARRANTY.
B. EQUAL EQUIPMENT FROM OTHER MANUFACTURES ARE ACCEPTABLE.
C. ALL EQUIPMENT SHALL BE COMPLETE IN EVERY RESPECT WITH ALL DEVICES, APPURTENANCES, AND ACCESSORIES PROVIDED TO MEET THE DESIGN INTENT AND OPERATION OF THE SYSTEMS SHOWN ON THE DRAWINGS AND SPECIFIED HERIN.
D. EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL AIR CONDITIONING EQUIPMENT MUST HAVE A CONDENSATE DRAIN AND BE TRAPPED IN ACCORDANCE WITH MANUFACTURERS DATA. SEE DRAWINGS FOR ADDITIONAL DETAILS.
E. SECONDARY DRAIN PANS ARE REQUIRED TO BE INSTALLED BENEATH ALL INDOOR AIR CONDITIONING EQUIPMENT WITH THE EXCEPTION OF VAV BOXES. SEOCONDARY PANS ARE TO PROTECT ENTIRE UNIT. PROVIDE CONDENSATE PUMPS, AS REQUIRED. CONDENSATE SHALL BE DIRECTED TO MOP SINK OR AS SPECIFIED ON PLANS.

2. VARIABLE AIR VOLUME BOXES (VAV) - IF APPLICABLE

A. WHERE SHOWN ON DRAWINGS, PROVIDE VAV BOXES COMPLETE WITH CONTROLS, HEATING COILS (FANS AS REQUIRED). ALL DUCT CONNECTIONS FLEXIBLE DUCT / PIPE CONNECTIONS SHALL BE PROVIDED BY THE CONTRACTOR.

3. TOILET EXHAUST FANS

A. WHERE SHOWN ON DRAWINGS, PROVIDE A TOILET EXHAUST FAN UNIT COMPLETE WITH GRAVITY BACK DRAFT DAMPERS. ALL DUCTWORK, ROOF OPENINGS AND CAPS NECESSARY TO PROVIDE A COMPLETE EXHAUST SYSTEM SHALL BE PROVIDED BY THE CONTRACTOR. REFER TO PLANS FOR APPLICABILITY.

4. BASEBOARDS, CABINET, AND UNIT HEATERS

A. WHERE SHOWN ON DRAWINGS, PROVIDE ELECTRIC HEATERS COMPLETE WITH ELECTRIC HEATING COIL, CONTROLS, AND INTEGRAL THERMOSTAT.

5. INLINE PUMPS

A. WHERE SHOWN ON DRAWINGS PROVIDE AN INLINE CLOSE COUPLED PUMP(S). BRONZE FITTED, PUMPS SHALL BE FURNISHED WITH BRONZE CASE WEARING RINGS, BRONZE SHAFT SLEEVE AND MECHANICAL SHAFT SEAL RATED FOR. PUMPS TO BE SO CONSTRUCTED THAT THEY MAY BE MOUNTED IN A HORIZONTAL OR VERTICAL PIPE LINE. MOTOR TO BE 1750 RPM UNLESS NOTED OTHERWISE.

6. VIBRATION ISOLATION DEVICES

A. VIBRATION ISOLATION DEVICES SHALL BE PROVIDED IN ALL SUPPORTS BETWEEN VIBRATING EQUIPMENT (FANS, ROOFTOP UNITS, AIR HANDLERS, FAN POWERED VAV BOXES, ETC.) AND STRUCTURE.
B. VIBRATING EQUIPMENT HUNG FROM STRUCTURE SHALL BE ISOLATED WITH RUBBER AND SPRING DEVICES. VIBRATING EQUIPMENT SUPPORTED FROM FLOOR OR DECK SHALL BE ISOLATED WITH HOUSED SPRING MOUNT DEVICES.
C. EXAMINE DEAD LOAD AND OPERATING LOAD CONDITIONS WHEN SELECTING DEVICES. ADJUST FOR PROPER ALIGNMENT AND LOADING. AVOID "GROUNDING" THE ISOLATOR.
D. CHECK HANGER ROD SIZE FOR ALLOWABLE LOADS AT THE ISOLATING DEVICE AND AT THE UPPER AND LOWER ATTACHMENTS TO STRUCTURES, DUCTS, EQUIPMENT, ETC.
E. CONSULT MANUFACTURER FOR APPLICATION DATA.

7. CURBS AND STEEL FRAMING FOR SUPPORT

A. THIS CONTRACTOR WILL PROVIDE ALL NECESSARY CURBS AND STEEL FRAMING REQUIRED TO INSTALL ALL HVAC EQUIPMENT AS DESCRIBED OR IMPLIED ON THE DRAWINGS. CURBS SHALL BE A MINIMUM OF 14" HIGH, OF THE SAME MANUFACTURER OF THE EQUIPMENT SUPPORTED. INSULATE UNDER THE COMPRESSOR SECTION TO PREVENT CONDENSATION. ALL CURBS MUST BE INSTALLED SO THAT TOP OF CURBS ARE "DEAD" LEVEL. ALL PENETRATIONS OF EXISTING STRUCTURE SHALL BE DONE IN ACCORDANCE TO THE LANDLORD'S GUIDLINES AT THIS CONTRACTOR'S EXPENSE.

C. METAL DUCTWORK - NO FIBERGLASS DUCT ALLOWED

1. NO DUCTWORK SHALL BE FABRICATED PRIOR TO APPROVAL BY THE TENANT'S CONSTRUCTION MANAGER. SIGNIFICANT DEVIATIONS FROM DESIGN MUST BE APPROVED BY TENANT'S CONTRUCTION MANAGER PRIOR TO FABRICATION OR INSTALLATION. ALL DUCT MAINS ARE TO BE RECTANGULAR UNLESS NOTES OTHERWISE. ALL DUCT BRANCHES TO DIFFUSERS ARE TO BE ROUND RIGID DUCT. (FLEXIBLE DUCT CONNECTIONS TO THE DIFFUSER ARE NOT TO EXCEED 5' - 0").

2. EXCEPT AS OTHERWISE INDICATED, FABRICATE AND INSTALL RECTANGULAR DUCTS WITH GALVANIZED SHEET STEEL, IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" OF THIS LATEST EDITION. CONFORM TO THE REQUIREMENTS IN THE REFERENCED STANDARD FOR METAL THICKNESS. REINFORCING TYPES AND INTERVALS, THE ROD APPLICATIONS, AND JOINT TYPES AND INTERVALS.

3. EXCEPT WHERE OTHERWISE INDICATED, CONSTRUCT DUCT SYSTEMS TO THE FOLLOWING PRESSURE CLASSIFICATIONS: (VERIFY WHETHER RETURN OR EXHAUST DUCT IS POSITIVE OR NEGATIVE PRESSURE).
A. SUPPLY DUCTS: 2 INCHES WATER GAUGE, POSITIVE PRESSURE.
B. RETURN AND EXHAUST DUCTS: 2 INCHES WATER GAUGE, NEGATIVE PRESSURE.

C. PRESSURE TEST DUCTS FOR LEAKAGE. REMAKE LEAKING JOINTS AND APPLY SEALANTS AS REQUIRED TO FABRICATE A SYSTEM THAT DOES NOT EXCEED 5% LEAKAGE OR LESS AS STATED BY PRESSURE CLASS RATINGS IN SMACNA STANDARDS.

4. AS A MINIMUM, CROSSBREAK ALL FLAT SURFACES OR REINFORCE WITH A BEAD APPROXIMATELY DEEP ON 12" CENTERS TO PREVENT VIBRATIONS.

5. INSTALL DOUBLE THICKNESS TURNING VANES IN ALL RIGHT ANGLE ELBOWS.

6. INSTALL RIGID ROUND AND RECTANGULAR METAL DUCT WITH SUPPORT SYSTEMS INDICATED IN SMACNA STANDARDS. SUPPORT HORIZONTAL DUCTS WITH 2 FEET OF EACH ELBOW AND WITHIN 4 FEET OF EACH BRANCH INTERSECTION USING DOUBLE STRAP HANGERS ON EACH SIDE OF FITTING. SUPPORT VERTICAL DUCTS AT A MAXIMUM INTERVAL OF 16 FEET AND AT EACH FLOOR. NO WOOD SHALL BE USED TO SUPPORT OF BRACE DUCTS. PROVIDE SWAY AND SEISMIC BRACING AS REQUIRED BY STATE AND LOCAL CODES OR BY LANDLORD.

7. WHERE DUCTS PASS THROUGH ROOFS AND FLOORS, PROVIDE AS MINIMUM 1½ " x 1½" x ⅛" STEEL ANGLE FRAMES AT EACH SIDE OF OPENING. THE ANNULAR SPACE BETWEEN DUCT AND ANGLE FRAMES SHALL BE CAULKED WITH SILICONE SEALANT OR FIREPROOFED AS REQUIRED BY ASSEMBLY FIRE RATING. REFER TO SHELL DWGS.

8. ALL TRAVERSE JOINTS AND SEAMS IN SUPPLY AIR DUCT SHALL BE SEALED AIR TIGHT WITH DAP CMC DUCT SEALER. JOINTS ALSO SHALL BE RIVETED OR CONNECTED WITH SHEET METAL SCREWS.

9. SOFT ELASTOMER BUTYL GASKET WITH ADHESIVE BACKING SHALL BE USED TO SEAL FLANGED JOINTS.

10. DUCT TRANSITIONS SHALL NOT EXCEED 30 DEGREES SLOPE EXCEPT AS SPECIFICALLY NOTED OTHERWISE.

11. PROVIDE ACCESS TO ALL MOTORIZED DAMPERS, FIRE DAMPERS, CONTROLS, AND OTHER ITEMS IN DUCTWORK THAT REQUIRE SERVICE OR INSPECTION. IF THE ACCESS PANEL LOCATION IS EXPOSED TO THE SALES AREA, IT MUST BE APPROVED BY THE TENANT'S CONSTRUCTION MANAGER PRIOR TO INSTALLATION. LAY-IN SUPPLY AND RETURN AIR DIFFUSERS, GRILLES AND REGISTERS WITH PLASTER FRAMES MAY BE USED AS ACCESS LOCATIONS.

12. FLEXIBLE CONNECTIONS

A. FLEXIBLE COLLARS SHALL BE PROVIDED IN ALL CONNECTIONS BETWEEN VIBRATING EQUIPMENT (FANS, ROOFTOP UNITS, AIR HANDLERS, FAN POWERED VAV BOXES, ETC.) AND DUCTS OR CASINGS. ALSO PROVIDE
B. FLEXIBLE CONNECTIONS WHERE DUCTS CROSS BUILDING EXPANSION JOINTS.
FLEXIBLE CONNECTIONS SHALL CONSTRUCTED OF NEOPRENE-COATED FLAMPROOF FABRIC. PROVIDE ADEQUATE JOINT FLEXIBILITY TO ALLOW FOR MOVEMENT AND PREVENT THE TRANSMISSION OF VIBRATION.
C. FLEXIBLE CONNECTION IS TO BE RATED FOR THE OPERATING PRESSURE OF THE SYSTEM.

14. FLEXIBLE AIR DUCT

A. FLEXIBLE AIR DUCT SHALL BE 1.25" INSULATED CLASS 1 AND RATED FOR THE OPERATING PRESSURE OF THE SYSTEM. DUCT CONSTRUCTION MATERIAL (PLASTIC, CLOTH, ALUMINUM) MUST ASHERE TO LOCAL CODES AND LANDLORD'S REQUIREMENTS AND BE INCLUDED AS SUCH IN THE BID.
B. FLEXIBLE AIR DUCT MAY ONLY BE USED IN VERTICAL APPLICATIONS WITH PRIOR APPROVAL FROM TENANT'S CONSTRUCTION MANAGER.
C. FLEXIBLE DUCT SHALL NOT EXTEND OVER 5'-0" IN LENGTH AT ANY ONE LOCATION.

15. SUPPLY AIR TAKE-OFF FITTINGS

A. PROVIDE HET, CONICAL OR "BELL-MOUTH" TAKE-OFFS FROM MAIN DUCTWORK TO ROUND BRANCHES. INSTALL PE MANUFACTURER'S INSTRUCTIONS.
B. PROVIDE HET or 45" RECTANGULAR TAKE-OFFS FROM MAIN DUCTWORK TO RECTANGULAR BRANCHES.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
August 2, 2021

REVISIONS:

No.	Date	Description

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MECHANICAL
& PLUMBING
SPECIFICATIONS

MP7.1

JZW
ARCHITECTS

16. DAMPERS

A. PROVIDE MANUAL LOCKING QUADRANT VOLUME CONTROL DAMPERS WITH HANDLE OPERATORS IN EACH BRANCH DUCT AND AS SHOWN ON PLANS TO FACILITATE AIR BALANCING.
B. WHERE ACCESS TO BALANCING DAMPER IS RESTRICTED, YOUNG'S REGULATORS SHALL BE USED.
C. ALL RECTANGULAR DAMPERS IN OUTSIDE AIR, RELIEF AIR, OR RETURN AIR DUCTS ARE TO BE OF OPPOSED BLADE TYPE. ALL OUTSIDE AIR DUCT DAMPERS MUST ALSO BE OF THE LOW LEAKAGE TYPE.
D. ALL MOTORIZED DAMPERS NOT FURNISHED WITH EQUIPMENT ARE TO BE HONEYWELL DAMPERS.

17. DIFFUSERS, GRILLES, AND REGISTERS

A. PROVIDE DIFFUSERS, GRILLES AND REGISTERS AS SCHEDULED. DEVICES TO BE COMPLETE WITH DAMPERS FRAMES AND ALL ACCESSORIES. FINISH AS INDICATED.
B. INSTALL ALL AIR DEVICES AS LOCATED ON TEH ARCHITECTURAL REFLECTED CEILING PLAN.
C. APPROVED MANUFACTURERS: TITUS IS SPECIFIED, EQUALS BY METALAIRE OR KRUEGER IS ACCEPTABLE.

18. MEDIUM PRESSURE DUCT

A. WHERE DUCTWORK IS SPECIFICALLY NOTED AS MEDIUM PRESSURE, IT SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA STANDARDS FOR A PRESSURE RATING OF 3 INCHES WATER COLUMN MINIMUM OR LARGER AS REQUIRED BY LANDLORD.
B. ALL GAUGES AND REINFORCEMENT MUST MEET WITH THE LATEST EDITION OF SMACNA STANDARDS FOR MEDIUM PRESSURE DUCT AND WITH THE LANDLORD'S CRITERIA.
C. ALL OTHER ITEMS FROM METAL DUCTWORK SPECIFICATION SECTION APPLY TO THIS SECTION.

19. DUCTWORK INSULATION

A. INSTALL INSULATION PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, AND IN ACCORDANCE WITH RECONGNIZED INDUSTRY PRACTICES. INSULATION MUST COMPLY WITH NFPA 90A.
B. DUCT SIZES SHOWN ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS. INSULATE SUPPLY AND RETURN AIR RECTANGULAR DUCTWORK WHERE SHOWN ON PLAN. DUCTWORK SHALL BE INTERNALLY INSULATED WITH 1" THICK, 1-$\frac{1}{2}$ LB. DENSITY LINER (C=0.28 @ 75°F). LINER IS TO HAVE A COATED SURFACE EXPOSED TO AIRSTREAM TO PREVENT EROSION. APPLY ADHESIVES AND MECHANICAL FASTENERS AS RECOMMENED BY SMACNA AND THE MANUFACTURER TO PREVENT LINER SEPARATION FROM THE DUCT. ALL TRANSVERSE EDGES TO BE COATED WITH ADHESIVE.
C. ALL ROUND AND OUTSIDE AIR DUCTWORK ABOVE THE CEILING SHALL BE EXTERNALLY INSULATED WITH 2" 0.75 lbs/cu. ft. WITH A R-6 DUCT WRAP WITH VAPOR BARRIER. VAPOR BARRIER IS TO BE MAINTAINED THROUGHOUT DUCT SYSTEM. ALL JOINTS MUST BE TAPED SO THAT NO INSULATION FIBER IS VISIBLE. EXTEND DUCTWORK INSULATION WITHOUT INTERRUPTION THROUGH WALLS, FLOORS, AND SIMILAR PENETRATIONS.
D. ALL INSULATION SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING OF NO HIGHER THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM C411, OR AS REQUIRED BY LOCAL CODES.

20. SYSTEM CLEANOUT

A. DUCTWORK AND AIR HANDLING EQUIPMENT IS TO BE CLEANED OUT AND BLOWN OUT BEFORE PAINTING IS STARTED BY THE GENERAL CONTRACTOR.
FILTERS MUST BE IN UNITS AT ANY TIME FANS ARE OPERATED.

D. HYDRONIC PIPING

1. PROVIDE A COMPLETE HYDRONIC PIPING SYSTEM IF APPLICABLE. REFER TO PLANS TO DETERMINE IF A HYDRONIC SYSTEM IS REQUIRED.
2. PIPING
A. HYDRONIC PIPING FOR CHILLED WATER AND / OR HEATING WATER AND/OR CONDENSER WATER SHALL BE ASTM A-120, SCHEDULE 40, ERW, BLACK STEEL PIPE WITH PLAIN ENDS. INSTALL STEEL PIPE WITH WELDED JOINTS WHERE PIPE IS 2- INCH AND LARGER. INSTALL STEEL PIPE WITH THREADED JOINTS AND FITTINGS OR INSTALL TYPE "K" ANNEALED TEMPERED COPPER TUBE WITH SILFOS JOINTS FOR 2 INCH AND SMALLER PIPE. PROVIDE DIELECTRIC UNIONS BETWEEN DISSIMILAR METALS. ALL PIPING SHALL BE IN STRICT CONFORMANCE WITH ASTM, ASA, AND LANDLORD'S REQUIREMENTS, WHICHEVER IS MOST STRINGENT. UNIONS OR FLANGES MUST BE USED AT EQUIPEMENT CONNECTIONS WHERE SERVICE OR REMOVAL MAY BE REQUIRED.
B. ALL PIPING AND EQUIPMENT SHALL BE PRESSURE TESTED WITHOUT LEAKAGE AT A MINIMUM PRESSURE OF 125 PSI.
C. ALL HYDRONIC PIPING AND EQUIPMENT CONNECTED TO THE HAVAC PIPING SYSTEM SHALL BE CLEANED AND FLUSHED. REMOVE, CLEAN, AND REPLACE STRAINER SCREENS. FILL TENANT'S SYSTEM WITH DOMESTIC WATER AND VENT ALL PIPING AND EQUIPMENT PRIOR TO CONNECTION TO THE LANDLORD'S SYSTEM. CONTRACTOR SHALL NOT FILL TENANT'S SYSTEM WITH WATER FROM THE LANDLORD'S SYSTEM UNLESS SPECIFICALLY INSTRUCTED TO DO SO FROM THE LANDLORD'S FIELD REPRESENTATIVE.
D. PRIOR TO CONNECTION TO THE LANDLORD'S SYSTEM , CONTRACTOR SHALL OBTAIN WRITTEN CONFIRMATION FROM THE LANDLORD'S FIELD REPRESENTATIVE, THAT ALL TESTING, FLUSHING, AND PROPER FILLING OF THE TENANT'S SYSTEM HAS BEEN COMPLETED IN ACCORDANCE TO THE LANDLORD'S FIELD REPRESENTATIVE, THAT ALL TESTING, FLUSHING, AND PROPER FILLING OF THE TENANT'S SYSTEM HAS BEEN COMPLETED IN ACCORDANCE TO THE LANDLORD'S REQUIREMENTS AND THAT THE TENANT'S SYSTEM IS READY TO BE CONNECTED TO THE LANDLORD'S SYSTEM.

3. VALVES

A. GATE VALVES, 2-INCH AND SMALLER: CLASS 150, BODY AND UNION BONNET OF ASTM B 62 CAST BRONZE WITH THREADED OR SOLDER ENDS, INTEGRAL SEAT, RENEWABLE SOLID BRONZE WEDGE DISC, RISING STEM, SCREWED BONNET AND RE-PACKABLE UNDER PRESSURE. BALL VALVES ARE ACCEPTED AS AN EQUAL SUBSTITUTION.
B. GATE VALVES, 2- INCH AND LARGER: CLASS 125 CAST IRON BODY, RENEWABLE BRONZE SEATS AND SOLID WEDGE DISC, RISING STEM, PLANGED ENDS, AND RE-PACKABLE UNDER PRESSURE.
C. SWING CHECK VALVES, 2-INCH AND SMALLER: CLASS 150, CAST BRONZE BODY AND CAP CONFORMING TO ASTM B 62 WITH HORIZONTAL SWING, Y-PATTERN, RENEWABLE BRONZE DISC, AND HAVING THREADED OR SOLDERED ENDS.
D. SWING CHECK VALVE, 2- INCH AND LARGER: CLASS 125 CAST IRON BODY AND BOLTED CAP, HORIZONTAL SWING, RENEWABLE BRONZE DISC, FLANGED ENDS AND CAPABLE OF BEING REFITTED WHILE THE VALVE REMAINS IN THE LINE.
E. COMBINATION BALANCING AND SHUT-OFF VALVES: BELL & GOSSETT CIRCUIT SETTER WITH LOCKING SETPOINT. A CIRCUIT SETTER BALANCE WHEEL MUST BE INCLUDED WITH O & M MANUAL.
F. FLOW METER: SUBMETER SOLUTIONS 1" M&E MJ25 MULTI-JET BRONZE METER.

4. PIPING SPECIALTIES

A. PRESSURE / TEMPERATURE TEST PLUGS (PETE'S PLUG) - $\frac{1}{4}$ INCH NPT FITTINGS TO RECEIVE EITHER A TEMPERATURE OR PRESSURE PROBE, $\frac{1}{8}$ INCH O.D. FITTING AND CAPS SHALL BE BRASS WITH VALVE CORE OF NORDEL, RATED AT 400 PSIG, OF TO 200°F.
B. STRAINERS-"Y" PATTERN STRAINERS, 125 PSIG, CAST IRON BODY WITH PERFORATED STAINLESS STEEL SCREENS, THREADED FOR 2 INCHES AND SMALLER, FLANGED FOR 2-$\frac{1}{2}$ INCHES AND LARGER. SCREEN OPENING SIZE AT 0.033 INCH FOR HEATING AND $\frac{1}{8}$ INCH FOR CHILLED OR CONDENSER WATER. PROVIDE WITH BLOWDOWN VALVE WITH HOSE END FITTING.
C. THERMOMETERS-DIE CAST ALUMINUM, 9" INDUSTRIAL MERCURY THERMOMETER, FULLY ADJUSTABLE WITH CLEAR ACRYLIC WINDOW AND BRASS SEPARABLE SOCKET.
D. PROVIDE AUTO AIR VENTS WHERE NEEDED. PROVIDE AN AIR CHAMBER CONSISTING OF A $\frac{3}{4}$ INCH NIPPLE AND BUSHINGS.

5. GENERAL INSTALLATION

A. INSTALL WATER MAINS WITHOUT PITCH. USE ECCENTRIC REDUCING COUPLINGS AT CHANGES IN SIZE WITH THE TOP OF PIPES AT SAME ELEVATION. MAKE CHANGES IN DIRECTION WITH FITTINGS.
B. BRANCHES TO UNITS BELOW MAINS TO BE TAKEN FROM BOTTOM OF MAINS AT A 45 DEGREE ANGLE, PITCH DOWNWARD TOWARD UNITS. BRANCHES TO UNITS ABOVE MAINS TO BE TAKEN FROM TOP OF MAINS AT A 45 DEGREE ANGLE PITCHED UPWARD TOWARDS UNTS. PITCH NOT LESS THAN 1 INCH TO 10 FEET.
C. HANGERS SHALL BE SIZED AND INSTALLED FOR THE OUTSIDE DIAMETER OF THE INSULATED PIPE. INSTALL 6 INCHES LONG SPLIT CIRCLE GALVANIZED SADDLE BETWEEN THE HANGER AND PIPE INSULATION.
D. HANGERS AND PIPING OF DISSIMILAR METALS SHALL BE DIELECTRICALLY SEPARATED FROM ONE ANOTEHR.
E. SEE PLANS FOR APPLICABLE DETAILS.
F. ALL PRESSURE PIPING SYSTEMS INSTALLED SHALL CONFORM TO THE REQUIREMENTS OF THE STATE PIPING AND WELDING CODES.
G. INSTALL VALVES AT LOW POINTS FOR DRAINING EACH SYSTEM AND INSTAL MANUAL VENTS TO ALL HIGH POINTS OF EQUIPMENT AND PIPING IN THE SYSTEM TO PROPERLY REMOVE ENTRAPPED AIR.

6. INSULATION
A. ALL HYDRONIC PIPING FOR CHILLED WATER AND/OR HEATING WATER, VALVES, FITTINGS, AND ACCESSORIES SHALL BE INSULATED. FOR PIPE SIZES UP TO 2 INCHES, INSULATE WITH 1.5 INCH THICK FIBERGLASS INSULATION WITH ALL SERVICE JACKET AND VAPOR BARRIER. FOR PIPE SIZES 2-$\frac{1}{2}$ INCHES AND LARGER, INSULATE WITH 2" INCH THICK FIBERGLASS INSULATION WITH ALL SERVICE JACKET AND VAPOR BARRIER.
DOM COLD: 0.5" THICK, DOM HOT: 1" THICK

B. INSULATION AT ALL HANGERS FOR PIPING 2-$\frac{1}{2}$ INCHES AND LARGER SHALL BE HARD AND NON-COMPRESSIBLE.
C. ALL INSULATION SHALL HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING OF NO HIGHER THAN 50 TO CONFORM WITH THE REQUIREMENTS OF THE NFPA.

E. 2. REFRIGERANT PIPING

1. PRVIDE A COMPLETE REFRIGERANT PIPING SYSTEM BETWEEN INDOOR FAN UNITS AND OUTDOOR CONDENSING UNITS, IF APPLICABLE. PROVIDE OIL, REFRIGERANT CHARGE AND TEST SYSTEM. REFER TO PLANS TO DETERMINE IF A REFRIGERANT PIPING SYSTEM IS REQUIRED.

2. MATERIALS

A. REFRIGERANT PIPING SHALL BE TYPE "L" DRAWIN COPPER TUBING (ASTM B88), WROUGHT COPPER OR CAST BRONZE FITTINGS (ANSI B16.22), WITH SILFOS-5 SOLDERED JOINTS.
B. SERVICE VALVES, CHARGING PORTS, FILTER-DRIER, SIGHT GLASS, AND A THERMOSTATIC EXPANSION VALVE (TXV) SHALL BE INSTALLED FOR EACH SYSTEM AS A MINIMUM.

3. INSTALLATION

A. SIZE LINES WITH ADEQUATE LIFT TRAPS AND DOUBLE SUCTION RISERS AS NECESSARY TO MEET THE NEEDS OF EQUIPMENT SPECIFIED, FIELD CONDITIONS, AND EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
B. PRESSURE TEST FOR LEAKS WITH AN INERT GAS AT 250 PSIG. REDO LEAKING JOINTS AND RETEST UNTIL SYSTEM IS TIGHT. EVACUATE GAS AND CHARGE SYSTEM. RE-TEST SYSTEM AND CHECK FOR LEAKS WITH HALIDE LEAK DETECTOR. ALL LEAKING JOINTS MUST BE COMPLETELY RE-DONE UNTIL NO LEAKS EXIST.
C. UPON COMPLETION OF TESTING, BUT BEFORE INSULATION IS APPLIED, PIPING MUST BE INSPECTED BY A REPRESENTATIVE OF THE LOCAL GOVERNING AUTHORITY AS NECESSARY.
D. REFRIGERANT LINES SHALL BE INSULATED WITH 1 INCH THICK RUBATEX OR ARMSTRONG REFRIGERANT PIPE INSULATION IN ACCORDANCE WITH INDUSTRY STANDARDS.

F. 2. SYSTEM TESTING, ADJUSTING, AND BALANCING

1. TESTING, ADJUSTING AND BALANCING OF ALL WORK SHALL BE MADE BY AN INDEPENDENT CONTRACTOR WHO IS CURRENTLY LICENSED ASSOCIATED AIR BALANCING COUNCIL (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) BALANCING CONTRACTOR. NO OTHER BALANCE REPORTS WILL BE REVIEWED OR ACCEPTED. ALL BALANCING WORK MUST BE COMPLETE AND DONE IN ACCORDANCE WITH THE MOST RECENT STANDARDS OF THEIR SOCIETY. PAYMENT OF ALL COSTS FOR TESTING SHALL BE MADE BY THE HVAC CONTRACTOR.

2. THE HVAC CONTRACTOR SHALL INSTALL NEW FILTERS IN ALL UNITS PRIOR TO THE AIR BALANCE. THE COMPLETE AIR BALANCE SHALL TAKE PLACE WITH OUTSIDE AIR DAMPERS IN MINIMUM POSITION.

3. BALANCE AIR AND WATER QUANTITIES TO WITHIN + 5% OF THAT INDICATED ON THE DRAWINGS. ANY REQUIRED CHANGES IN SHEAVES, BELTS, PULLEYS, OR THE ADDITION OF DAMPERS REQUIRED TO ACHIEVE SPECIFIED FLOW RATES SHALL BE PERFORMED BY THE HVAC CONTRACTOR WITH NO ADDITIONAL COST TO THE TENANT.

4. THE BALANCE REPORT SHALL INCLUDE AS A MINIMUM THE FOLLOWING INFORMATION:
A. AABC OR NEBB CERTIFICATION NUMBER AND SIGNATURE OF BALANCING CONTRACTOR.
B. INSTRUMENTATION LIST WITH LAST CALIBRATION DATES.
C. MAKE AND MODEL NUMBERS OF ALL HVAC EQUIPMENT TESTED.
D. AIR CFM AND STATIC PRESSURE READINGS (DISCHARGED AND SUCTION) AS MEASURED BY PITOT TUBE DUCT TRAVERSE AT THE UNIT.
E. MOTOR NAMEPLATE DATA WITH ACTUAL FIELD VOLTAGE AND AMPERAGE READINGS FOR EACH LEG.
F. MOTOR AND FAN RPMS, SHEAVE SIZES AND BELT SIZES.
G. OUTSIDE RETURN, MIXED AND SUPPLY AIR TEMPERATURES AT FULL COOLING.
H. WATER BALANCE DATA INCLUDING GPM WITH INLET AND OUTLET TEMPERATURE AND PRESSURE READINGS (WHERE APPLICABLE).
I. MAKE AND MODEL NUMBERS OF ALL AIR DISTRIBUTION EQUIPMENT.
J. FINAL BALANCED AIR VOLUMES AT ALL OUTLETS (INCLUDING RETURNS WHERE DUCTED).
K. INDEXED PLAN WITH DIFFUSER AND RETURN LOCATIONS.

5. ALL CONTROL SEQUENCES SHALL BE TESTED (INTERLOCKED EQUIPMENT, SMOKE DETECTORS, SMOKE EVACUATION, ECONOMIZER, ETC.) AND OPERATING STATUS RECORDED IN THE REPORT.

6. THREE COPIES OF THE BALANCE REPORT SHALL BE SUBMITTED THROUGH THE GENERAL CONTRACTOR TO THE TENANT'S CONSTRUCTION MANAGER FOR APPROVAL.

7. THE BALANCING CONTRACTOR SHALL PERFORM ALL APPLICABLE TESTING AND BALANCING FUNCTIONS REQUIRED FOR THE SYSTEM DESIGNED IN THESE DRAWINGS. THE BALANCING CONTRACTOR SHALL RECHECK ANY ITEMS THAT THE TENANT DEEMS NECESSARY AT NO ADDITIONAL COST TO THE TENANT.

8. FINAL BALANCE REPORT SHALL BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUALS.

G. FINAL HVAC INSPECTIONS

1. ASIDE FROM NORMAL INTERIM INSPECTIONS OF WORK IN PLACE, THE TENANT SHALL HAVE THE RIGHT TO AN INDEPENDENT HVAC CONTRACTOR INSPECT THE FINISHED HVAC INSTALLATION UPON COMPLETION FOR COMPLIANCE WITH THE PLANS, SPECIFICATIONS, AND CODES. THE INSTALLING CONTRACTOR WILL BE RESPONSIBLE TO BRING ALL ITEMS REPORTED BY THE INDEPENDENT HVAC CONTRACTOR UP TO PLANS AND SPECIFICATION REQUIREMENTS AT NO COST TO TENANT.

DIVISION 15 - MECHANICAL

SECTION 15010 - GENERAL REQUIREMENTS

PART 1 - GENERAL

RELATED DOCUMENTS:

THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL CONDITIONS AND GENERAL REQUIREMENTS APPLY TO THE WORK SPECIFIED IN THIS SECTION.

THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF CONSTRUCTION SHOP DRAWINGS FOR SUBMITTALS TO THE OWNER PRIOR TO START OF CONSTRUCTION. THESE DRAWINGS SHALL INCLUDE SINGLE LINE DUCT DRAWINGS, SINGLE LINE PIPING DRAWINGS, ALL PIPE AND DUCT SIZES, EQUIPMENT CAPACITY AND EXISTING CONDITIONS. NO WORK SHALL BEGIN UNTIL THESE DRAWINGS HAVE BEEN REVIEWED.

CODES, RULES AND REGULATIONS:

ALL WORK AND MATERIALS SHALL CONFORM TO ALL APPLICABLE LOCAL AND STATE CODES, LAWS AND REGULATIONS AND ALL UTILITY COMPANY REGULATIONS.

WHENEVER INDICATED MATERIAL, WORKMANSHIP, ARRANGEMENT OR CONSTRUCTION IS OF HIGHER QUALITY OR CAPACITY THAN THAT REQUIRED BY THE ABOVE CODES, THE DRAWINGS AND/OR SPECIFICATION SHALL GOVERN.

SHOULD THERE BE ANY DIRECT CONFLICT BETWEEN THE STATE OF LOCAL CODES, LAWS OR REGULATIONS AND THE DRAWINGS AND/OR SPECIFICATIONS, THE CODES, LAWS OR REGULATIONS SHALL GOVERN.

STANDARDS:

HEREINAFTER ARE LISTED STANDARDS WITH WHICH THE CONTRACTOR OR HIS SUBCONTRACTOR SHOULD BE FAMILIAR WITH, IN ORDER TO PERFORM THE NECESSARY WORK.

1. BUILDING CODE, CURRENT ADOPTED EDITION.
2. MECHANICAL CODE, CURRENT ADOPTED EDITION.
3. PLUMBING CODE, CURRENT ADOPTED EDITION.
4. SMACNA DUCT CONSTRUCTION STANDARD, METAL AND FLEXIBLE.
5. SMACNA FIRE DAMPER GUIDE FOR AIR HANDLING SYSTEMS.
6. SMACNA MANUAL FOR BALANCING AND ADJUSTING OF AIR DISTRIBUTION SYSTEMS.
7. LIFE SAFETY CODES.
8. NFPA 90A INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS.
9. NFPA 90B INSTALLATION OF WARM AIR HEATING SYSTEMS.
10. NFPA #91 INSTALLATION OF BLOWER AND EXHAUST SYSTEMS.

EXAMINATION OF SITE AND EXISTING BUILDING:

ALL BIDDERS SHALL EXAMINE THE SITE AND THE EXISTING BUILDING AND COMPARE THEM WITH THE DRAWINGS AND SPECIFICATIONS AND FAMILIARIZE THEMSELVES WITH ALL EXISTING CONDITIONS BEFORE SUBMITTING ANY PROPOSAL.

NO EXTRA CHARGES WILL BE ALLOWED FOR WORK PERFORMED BY THE CONTRACTOR DUE TO HIS FAILURE TO BECOME FAMILIAR WITH ALL OF THE EXISTING CONDITIONS PERTAINING TO THIS PROJECT.

WORKING DRAWINGS AND MEASUREMENTS:

THE WORKING DRAWINGS ARE GENERALLY DIAGRAMMATIC. THEY DO NOT SHOW EVERY OFFSET, BEND, OR ELBOW REQUIRED FOR INSTALLATION IN THE SPACE PROVIDED. ALL LOCATIONS FOR MECHANICAL WORK SHALL BE CHECKED AND COORDINATED WITH EXISTING BUILDING CONDITIONS AND THE ELECTRICAL DRAWINGS.

THE DRAWINGS SHALL NOT BE SCALED FOR ROUGHING-IN MEASUREMENTS NOR BE USED AS SHOP DRAWINGS. WHERE DRAWINGS ARE REQUIRED FOR THESE PURPOSES OR HAVE TO BE MADE FROM FIELD MEASUREMENTS, THE CONTRACTOR SHALL TAKE THE NECESSARY MEASUREMENTS AND PREPARE THE DRAWINGS. SHOP DRAWINGS OF VARIOUS SUBCONTRACTORS SHALL BE COORDINATED TO ELIMINATE ALL INTERFERENCE'S AND TO PROVIDE SUFFICIENT SPACE FOR THE INSTALLATION OF ALL EQUIPMENT, PIPING, DUCTWORK, ETC.

THE DRAWINGS AND SPECIFICATIONS HAVE BEEN PREPARED TO SUPPLEMENT EACH OTHER AND THEY SHALL BE INTERPRETED AS AN INTEGRAL UNIT WITH ITEMS SHOWN ON ONE AND NOT THE OTHER BEING FURNISHED AND INSTALLED AS THOUGH SHOWN AND CALLED OUT IN BOTH.

APPROVALS FOR SUBSTITUTION OF EQUIPMENT & MATERIALS:

ACCEPTABLE EQUIPMENT AND MATERIAL MANUFACTURERS ARE SHOWN ON THE DRAWINGS AND/OR LISTED BY NAME IN THESE SPECIFICATIONS. IF NOT SHOWN OR LISTED, WRITTEN ACCEPTANCE FOR THE MANUFACTURER IS REQUIRED BY THE ARCHITECT AND/OR THE ENGINEER BEFORE USING SUCH MANUFACTURERS EQUIPMENT AND/OR MATERIALS FOR BIDDING. ACCEPTANCE WILL NORMALLY BE GIVEN IN DULY ISSUED ADDENDA TO THIS PROJECT.

EQUIPMENT SUBMITTALS, PRODUCT DATA AND SAMPLES:

UNLESS OTHERWISE APPROVED, ALL MECHANICAL SUBMITTALS SHALL BE PROVIDED AT ONE TIME. PARTIAL SUBMITTALS WILL NOT BE ACCEPTED. SUBMIT SIX (6) COPIES IN 3-RING BINDERS.

EACH ITEM SUBMITTED SHALL BE CLEARLY REFERENCED BY SECTION, PAGE AND PARAGRAPH TO THE APPLICABLE PORTION OF THIS SPECIFICATION. WHERE EQUIPMENT IS DESIGNATED BY NUMBER OR SYMBOL ON THE DRAWINGS, THE SUBMITTALS SHALL ALSO SHOW THIS NUMBER OR SYMBOL. MARKINGS USING YELLOW HIGHLIGHTING ARE NOT ACCEPTABLE.

ALL SPECIFIED FEATURES AND PERFORMANCE DATA MUST BE SPECIFICALLY NOTED ON THE SUBMITTAL.

THE CONTRACTOR SHALL CHECK SHOP DRAWINGS FOR SPACE REQUIREMENTS AND CONFORMANCE WITH THE SPECIFICATIONS AND SHALL MARK HIS CORRECTIONS AND APPROVAL ON ALL SHOP DRAWINGS PRIOR TO SUBMITTAL TO THE ENGINEERS.

IN THE SUBMITTAL OR SHOP DRAWING REVIEW, WHEN SOME ERRORS ARE DETECTED BUT OTHERS OVERLOOKED, THIS DOES NOT GRANT THE CONTRACTOR PERMISSION TO PROCEED IN ERROR. REGARDLESS OF ANY INFORMATION OUTLINED IN THE SUBMITTALS OR SHOP DRAWINGS, THE REQUIREMENTS OF THE SPECIFICATIONS MUST BE FOLLOWED AND ARE NOT WAVED OR SUPERSEDED IN ANY WAY BY THE SUBMITTALS OR SHOP DRAWING REVIEW.

ACCESS AND CAPACITY:

THE ACCESS TO EQUIPMENT SHOWN ON THE DRAWINGS IS THE MINIMUM ACCEPTABLE SPACE REQUIREMENTS. NO EQUIPMENT WILL BE CONSIDERED WHICH REDUCES OR RESTRICTS ACCESSIBILITY.

ACCESS FOR REMOVAL OF AIR FILTERS SHALL BE PROVIDED. ANY PIPES OR AIR DUCTS WHICH IMPAIR ACCESS TO AND REMOVAL OF THE AIR FILTERS SHALL BE REMOVED AND REINSTALLED IN A SATISFACTORY LOCATION WITHOUT ANY CHARGE TO THE OWNER.

ALL EQUIPMENT SHALL GIVE THE SPECIFIED CAPACITY AND PERFORMANCE AT THE JOB SITE ELEVATION OF 4500 FT. ABOVE SEA LEVEL. MANUFACTURER'S STANDARD RATINGS SHALL BE ADJUSTED ACCORDINGLY. ALL CAPACITIES AND PERFORMANCES ARE FOR JOB SITE CONDITIONS.

CAPACITIES SHOWN FOR EQUIPMENT IN THE SPECIFICATIONS AND ON THE DRAWING ARE THE MINIMAL ACCEPTABLE. NO EQUIPMENT WILL BE CONSIDERED AS AN ALTERNATIVE WHICH HAS CAPACITIES OR PERFORMANCE LESS THAN THAT OF DESIGN EQUIPMENT.

PERMITS AND FEES:

ARRANGE AND PAY FOR PERMITS, FEES, SERVICE CHARGES AND INSPECTIONS BY GOVERNING AUTHORITIES AND BY UTILITIES.

DUCT OPENINGS AND EQUIPMENT RECESSES:

DUCT CHASES, OPENINGS AND EQUIPMENT RECESSES SHALL BE PROVIDED BY OTHERS ONLY IF SHOWN ON ARCHITECTURAL OR STRUCTURAL DRAWINGS.

ALL OPENINGS FOR THE MECHANICAL WORK, EXCEPT WHERE DRAWINGS AND SPECIFICATIONS INDICATE OTHERWISE, SHALL BE PROVIDED AS WORK OF THIS SECTION.

WHETHER CHASES, RECESSES, AND OPENINGS ARE PROVIDED AS WORK OF THIS SECTION OR BY OTHERS, THIS SUBCONTRACTOR SHALL SUPERVISE THEIR CONSTRUCTION AND BE RESPONSIBLE FOR THE CORRECT SIZE AND LOCATION, EVEN THOUGH DETAILED AND DIMENSIONED ON THE DRAWINGS. THIS SUBCONTRACTOR SHALL PAY FOR ALL NECESSARY CUTTING, REPAIRING AND FINISHING, IF ANY ARE LEFT OUT OR INCORRECTLY MADE.

SEALING:

SPACES BETWEEN CONDUIT, OR DUCT AND SLEEVE THROUGH WALL OR FLOOR SHALL BE COMPLETELY STUFFED WITH 1 LB. PER CUBIC FOOT FIBERGLASS INSULATION TO CLOSE ALL INTERSTICES. SPACES TOO SMALL TO BE STUFFED SHALL BE CAULKED WITH OIL BASED CAULKING COMPOUND. AFTER STUFFING, ALL OPENINGS TO BE THOROUGHLY TAPED WITH HEAVY PLASTIC OR BUTYL DUCT TAPE TO PREVENT SOUND PASSAGE.

ALL SPACES BETWEEN PIPES AND/OR DUCTS AND SLEEVES THROUGH FIRE WALLS, FIRE PARTITIONS, FLOORS, AND CEILINGS SHALL BE CAULKED WITH ONE INCH FILL OF 3M "FIRE BARRIER". CAULKING MUST BE ON BOTH SIDES OF FIRE RATED UNIT.

CLAIMS FOR EXTRA COST:

IF CONTRACTOR CLAIMS ANY INSTRUCTIONS GIVEN HIM INVOLVE EXTRA COST, HE SHALL SO NOTIFY ARCHITECT WITHIN A REASONABLE TIME OF RECEIPT OF SUCH INSTRUCTIONS AND BEFORE PROCEEDING WITH THE WORK CALLED FOR THEREIN. NO SUCH WORK SHALL BE DONE AND NO PAYMENT MADE THEREFOR WITHOUT A WRITTEN CHANGE ORDER COVERING SUCH WORK FROM ARCHITECT AND OWNER.

THE CONTRACTOR'S PROPOSAL FOR CHANGES IN THE WORK SHALL INCLUDE A COMPLETE ITEMIZATION OF THE PROPOSED WORK, INDICATING SEPARATELY:
(A) QUANTITIES OF MATERIALS, (B) UNIT COSTS, (C) LABOR CHARGES, AND (D) CONTRACTOR'S PROFIT AND OVERHEAD, (E) EXTENSION OF TIME IF REQUIRED. A COMPLETE BREAKDOWN OF COSTS IS MANDATORY.

CONTRACTOR'S PROFIT AND OVERHEAD SHALL NOT EXCEED 15% OF THE TOTAL DIRECT COSTS.

PART 2 - PRODUCTS

MATERIALS AND EQUIPMENT:

ALL MATERIALS AND PRODUCTS USED FOR CONSTRUCTION SHALL BE NEW, AND OF THE BEST GRADE AND THE LATEST PRODUCTS AS LISTED IN PRINTED CATALOG DATA. ALL ARTICLES OF A KIND SHALL BE THE STANDARD PRODUCT OF SINGLE MANUFACTURER.

PRODUCTS OR EQUIPMENT OF ANY OF THE MANUFACTURERS CITED HEREIN MAY BE USED OR ANY OF THE PRODUCTS APPROVED BY ADDENDA. HOWEVER, WHERE LISTS OF PRODUCTS ARE CITED HEREIN, THE ONE FIRST LISTED IS THE DESIGN EQUIPMENT USED IN DRAWINGS AND SCHEDULES TO ESTABLISH SIZE, QUALITY, FUNCTION AND CAPACITY STANDARDS.

IF OTHER THAN FIRST NAMED EQUIPMENT IS USED, IT SHALL BE CAREFULLY CHECKED FOR ACCESS, ELECTRICAL REQUIREMENTS, VALVING, PIPING AND CONTROL REQUIREMENTS OF THE ALTERNATE EQUIPMENT. SHOULD CHANGES OR ADDITIONS OCCUR IN PIPING, VALVING, ELECTRICAL WORK, ETC., OR THE WORK OF OTHER CONTRACTORS BE REVISED BY THE ALTERNATE EQUIPMENT, THE COST OF ALL CHANGES SHALL BE BORNE AS WORK OF THIS DIVISION.

PART 3 - EXECUTION

OBSERVATION:

ALL WORK AND MATERIALS SUBJECT TO REVIEW AT ANY AND ALL TIMES BY ARCHITECT AND/OR OWNERS REPRESENTATIVE. CONTRACTOR SHALL NOTIFY THE ARCHITECT A MINIMUM OF TWO DAYS PRIOR TO TESTING ANY PIPING SYSTEM WHICH MUST BE WITNESSED AND APPROVED BEFORE IT IS COVERED UP OR ENCLOSED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE SURE THAT THE WORK WILL STAND THE TEST PRESCRIBED BEFORE GIVING THE NOTIFICATION. IF AN AUTHORIZED OBSERVER FINDS ANY MATERIAL OR WORK NOT CONFORMING TO THESE SPECIFICATIONS, WITHIN THREE DAYS AFTER BEING NOTIFIED, REMOVE FROM PREMISES. IF MATERIAL HAS BEEN INSTALLED, ENTIRE EXPENSE OF REMOVING AND REPLACING SHALL BE BORNE BY CONTRACTOR.

SUPERVISION AND WORKMANSHIP:

FURNISH THE SERVICES OF AN EXPERIENCED FOREMAN WHO SHALL BE IN CHARGE OF THE ERECTION OF THE MECHANICAL SYSTEMS, TOGETHER WITH ALL NECESSARY MECHANICS AND LABORERS REQUIRED TO PROPERLY UNLOAD, TRANSFER, ERECT, CONNECT UP, ADJUST, START, OPERATE AND TEST THE SYSTEM. HE SHALL GIVE FULL INSTRUCTIONS TO THE OWNER'S REPRESENTATIVES AS TO THE OPERATION AND MAINTENANCE OF ALL FIXTURES, APPARATUS AND WORK INSTALLED UNDER HIS SUPERVISION. HE SHALL VERIFY ALL CONDITIONS ON THE JOB SITE AND LAYOUT ALL WORK ACCORDINGLY.

ALL WORKMANSHIP SHALL BE OF FIRST QUALITY. NONE BUT COMPETENT MECHANICS SHALL BE EMPLOYED IN THE WORK. SHODDY WORKMANSHIP WILL BE CAUSE FOR REJECTION AND REPLACEMENT OF INSTALLED WORK WITHOUT ADDITIONAL COST TO THE OWNER.

EXCAVATION AND BACK FILL:

THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL EXCAVATION, TRENCHING, AND BACK FILLING FOR HIS UNDERGROUND PIPING. BOTTOMS OF TRENCHES SHALL BE TAMPER HARD AND FOR SOIL AND WASTE PIPING SHALL BE GRADED TO SECURE UNIFORM FALL OF 1/4" PER FOOT, UNLESS OTHERWISE NOTED. STONES OF ONE (1) INCH OR GREATER IN ANY DIMENSIONS SHALL BE REMOVED TO AVOID POINT OF BEARING. BELL HOLES FOR SEWER PIPE SHALL BE EXCAVATED SO THAT PIPE WILL REST ON SOLID GROUND FOR ITS ENTIRE LENGTH. GRADING SHALL BE DONE ON SOLID GROUND FOR ITS ENTIRE LENGTH. GRADING SHALL BE DONE AS MAY BE NECESSARY TO PREVENT SURFACE WATER FROM FLOWING INTO THE TRENCH, AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED SO THAT THE STABILITY OF THE BOTTOM AND SIDES OF THE TRENCH IS MAINTAINED.

AFTER PIPELINES HAVE BEEN TESTED, INSPECTED AND APPROVED BY THE OWNER'S REPRESENTATIVE, AND PRIOR TO BACK FILLING, THE EXCAVATION SHALL BE CLEANED OF ALL KINDS OF RUBBISH AND BACK FILL MATERIALS CLEANED FREE OF TRASH. BACK FILL SHALL BE PLACED IN 6" LAYERS (LOOSE THICKNESS) FOR COMPACTION BY HAND OPERATED MACHINE COMPACTORS, AND 8" LAYERS FOR OTHER THAN HAND OPERATED MACHINES. EACH LAYER SHALL BE COMPACTED, BY SUITABLE EQUIPMENT TO A DENSITY OF NOT LESS THAN 95% AS DETERMINED BY THE MODIFIED AASHO TEST T-180. BACK FILL MATERIAL TO 12" ABOVE THE PIPE SHALL NOT HAVE STONES LARGER THAN 3/4" IN ANY DIRECTION AND OF A MOISTURE CONTENT THAT WILL FACILITATE COMPACTION.

BEDDING OF ALL UNDERGROUND PIPE SHALL BE FOUR INCHES OF CLEAN SAND.

SEWER AND CULINARY WATER PIPES SHALL BE LAID IN SEPARATE TRENCHES, EXCEPT WHERE OTHERWISE NOTED.

THE MECHANICAL CONTRACTOR SHALL PROVIDE ADEQUATE SHORING TO SAFEGUARD WORKERS FROM CAVE-INS, FOR ALL EXCAVATIONS IN ACCORDANCE WITH OSHA REQUIREMENTS.

PROTECTION AGAINST WEATHER AND STORING OF MATERIALS:

WORK WILL NOT BE PERMITTED UNDER ANY CONDITIONS UNSUITED TO PROPER EXECUTION, SAFETY, AND PERFORMANCE.

ALL EQUIPMENT AND MATERIALS SHALL BE PROPERLY STORED AND PROTECTED AGAINST MOISTURE, DUST, OR WIND. USE COVERINGS OR OTHER PROTECTION ON ALL ITEMS WHICH MAY BE DAMAGED, RUSTED OR HAVE THEIR PERFORMANCE IMPAIRED BY ADVERSE WEATHER OR MOISTURE AND DUST CONDITIONS.

COOPERATION WITH OTHER TRADES:

REFER TO OTHER DRAWINGS AND PARTS OF THIS SPECIFICATION COVERING WORK OF OTHER TRADES WHICH IS CARRIED ON IN CONJUNCTION WITH THE MECHANICAL WORK SUCH THAT ALL WORK CAN PROCEED WITHOUT INTERFERENCE RESULTING FROM LACK OF COORDINATION.

PROPERLY SIZE AND LOCATE ALL CHASES, SLEEVES, EQUIPMENT BASES, AND ACCESSES. PROVIDE ACCURATE WIRING DIAGRAMS TO THE ELECTRICAL CONTRACTOR FOR ALL EQUIPMENT FURNISHED UNDER THIS DIVISION.

MANUFACTURER'S INSTRUCTIONS:

THE CONTRACTOR SHALL FOLLOW THE MANUFACTURER'S INSTALLATION INSTRUCTIONS EXPLICITLY IN THE INSTALLATION OF ALL ITEMS OF MECHANICAL EQUIPMENT.

IN THE EVENT THE MANUFACTURER'S INSTRUCTIONS CONFLICT WITH THE DRAWINGS AND SPECIFICATIONS, THE ENGINEER SHALL BE SO NOTIFIED IN WRITING AND A RESOLUTION WILL BE MADE.

CUTTING AND PATCHING:

NO CUTTING OR DRILLING IN STRUCTURAL MEMBERS SHALL BE DONE WITHOUT WRITTEN APPROVAL OF THE ENGINEER.

THE WORK SHALL BE CAREFULLY LAID OUT IN ADVANCE, AND WHEN CUTTING, CHANNELING, CHASING OR DRILLING OF FLOORS, WALLS, PARTITIONS, DEALINGS, OR OTHER SURFACES IS NECESSARY FOR THE PROPER INSTALLATION, SUPPORT OR ANCHORAGE OF THE PIPING, DUCT OR OTHER MECHANICAL WORK, THIS WORK SHALL BE CAREFULLY DONE, AND ANY DAMAGE TO BUILDING, PIPING, OR EQUIPMENT SHALL BE REPAIRED BY PROFESSIONAL GYPSUM BOARD FINISHERS, MASONS, CONCRETE WORKERS, ETC., AND ALL SUCH WORK BEING PAID FOR AS WORK OF THIS DIVISION.

ALL CUTTING OF MASONRY AND OR CONCRETE SHALL BE DONE BY CORE DRILLING AND MASONRY SAWING.

ALL REQUIRED CUTTING AND PATCHING OF STREETS, SIDEWALKS, AND CURBS AND GUTTERS FOR THE INSTALLATION OF THE UTILITY SERVICE PIPES SHALL BE DONE BY THIS CONTRACTOR. ALL STREETS, SIDEWALKS, AND CURBS AND GUTTERS SHALL BE PATCHED BY THIS CONTRACTOR IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL AUTHORITIES.

ELECTRICAL WIRING:

MOTOR STARTERS AND DISCONNECT SWITCHES, UNLESS SPECIFIED TO BE PART OF THIS MECHANICAL PACKAGED EQUIPMENT, SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

ALL POWER WIRING TO MOTORS AND PACKAGED MECHANICAL EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

ALL AUTOMATIC TEMPERATURE CONTROL WIRING (LINE VOLTAGE OR LOW VOLTAGE) REQUIRED TO COMPLETE THE TEMPERATURE CONTROL SYSTEM (BY INTERCONNECTION OF TIME CLOCKS, LOW TEMPERATURE PROTECTION THERMOSTATS, E.P. SWITCHES, P.E. SWITCHES, STARTING SWITCHES, PACKAGED MECHANICAL EQUIPMENT AND LIKE DEVICES AND EQUIPMENT) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR. INSTALLATION SHALL CONFORM TO ALL LOCAL CODES AND NATIONAL ELECTRICAL CODE. ALL WIRING LOCATED IN RETURN AIR DUCTS OR IN RETURN AIR PLENUMS SHALL BE RUN IN CONDUIT.

BEFORE ORDERING ANY EQUIPMENT, THE MECHANICAL CONTRACTOR SHALL VERIFY WITH ELECTRICAL CONTRACTORS ALL MOTOR CHARACTERISTICS, PHASE AND VOLTAGE.

ANY ELECTRICAL CHANGES OR ADDITIONS REQUIRED BY SUBSTITUTION OF MECHANICAL EQUIPMENT SHALL BE THE COMPLETE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
August 2, 2021

REVISIONS:

No.	Date	Description

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08-02-2021

MECHANICAL
& PLUMBING
SPECIFICATIONS

MP7.2

JZW
ARCHITECTS

COMPLETION REQUIREMENTS:

UPON COMPLETION OF THE WORK AND ADJUSTMENT OF ALL EQUIPMENT, ALL SYSTEMS SHALL BE TESTED BY THE CONTRACTOR TO DEMONSTRATE TO THE ENGINEER'S AND OWNER'S REPRESENTATIVES THAT ALL EQUIPMENT FURNISHED AND INSTALLED, OR CONNECTED UNDER THE PROVISIONS OF THESE SPECIFICATIONS, FUNCTION MECHANICALLY IN THE MANNER REQUIRED.

ADJUSTMENTS, OPERATION, ETC.:

ADJUST ALL CONTROLS FOR PROPER OPERATION. ADJUST ALL REGULATORS, FAUCETS, ETC. OPEN AND CLOSE ALL SHUTOFF AND CONTROL VALVES SEVERAL TIMES TO INSURE TIGHT GLANDS. FURNISH THE SERVICES OF A QUALIFIED MAN FOR A PERIOD OF NOT LESS THAN THREE DAYS AT A TIME, APPROVED BY THE OWNER, TO INSTRUCT THE MAINTENANCE PERSONNEL, CORRECT ANY DEFECTS OR DEFICIENCIES, AND DEMONSTRATE TO THE SATISFACTION OF THE ENGINEER AND OWNER, THAT THE ENTIRE SYSTEM IS OPERATING IN A SATISFACTORY MANNER AND COMPLIES WITH ALL REQUIREMENTS OF ANY OTHER TRADES OR CONTRACTORS THAT MAY BE REQUIRED TO COMPLETE THE WORK. COMPLETE THIS OPERATION TEST PRIOR TO REQUEST FOR FINAL INSPECTION. SUBMIT WRITTEN VERIFICATION OF COMPLIANCE FROM THE OWNER'S REPRESENTATIVE.

CLEANING:

AFTER ALL TESTS AND ADJUSTMENTS HAVE BEEN MADE AND ALL SYSTEMS PRONOUNCED SATISFACTORY FOR PERMANENT OPERATION, THIS CONTRACTOR SHALL CLEAN ALL EXPOSED DUCTWORK, INSULATED MEMBERS, FIXTURES AND EQUIPMENT INSTALLED UNDER THIS SECTION AND LEAVE READY FOR PAINTING. HE SHALL REFINISH ANY DAMAGED FINISH, AND LEAVE EVERYTHING IN PROPER WORKING ORDER.

RECORD DRAWINGS:

RECORD DRAWINGS FOR ALL SYSTEMS AND SECTIONS OF THIS DIVISION SHALL BE FURNISHED AS WORK OF THIS SECTION. SEPIA TRANSPARENCIES OF FLOOR PLANS WILL BE FURNISHED BY THE ARCHITECT'S OFFICE WHICH SHALL BE ACCURATELY AND NEATLY MARKED, SHOWING ALL CHANGED FROM SCHEMATICS.

RECORD DRAWINGS SHALL BE REVIEWED WITH THE ARCHITECT AT LEAST ONCE A MONTH AND SHALL BE SUBMITTED AT TIME OF FINAL INSPECTION AND BE CHECKED FOR ACCURACY. FAILURE TO KEEP RECORD DRAWINGS UP-TO-DATE SHALL BE CAUSE FOR WITHHOLDING MONTHLY PAYMENTS.

GUARANTEE:

BY THE ACCEPTANCE OF ANY CONTRACT AWARD FOR THE WORK HEREIN DESCRIBED OR SHOWN ON THE DRAWINGS, THE CONTRACTOR ASSUMES THE FULL RESPONSIBILITY IMPOSED BY THE GUARANTEE AS SET FORTH HEREIN, AND SHALL PROTECT HIMSELF THROUGH PROPER GUARANTEES FROM EQUIPMENT VENDORS AND FROM SUBCONTRACTORS AS THEIR INTERESTS MAY APPEAR.

THE GUARANTEE SO ASSUMED BY THE CONTRACTOR AND AS WORK OF THIS SECTION IS AS FOLLOWS:

1. THAT THE ENTIRE MECHANICAL SYSTEM, INCLUDING PLUMBING, AIR CONDITIONING, HEATING AND VENTILATION SYSTEMS SHALL BE QUIET IN OPERATION.

2. THAT THE CIRCULATION OF WATER AND AIR SHALL BE COMPLETE AND EVEN.

3. THAT HE SHALL MAKE, PROMPTLY UPON NOTICE FROM THE OWNER AND FREE OF CHARGE, ANY REPAIRS NECESSARY DUE TO DEFECTIVE MATERIALS OR WORKMANSHIP THAT MAY OCCUR DURING A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION. AIR CONDITIONING COMPRESSORS SHALL BE GUARANTEED FOR FIVE YEARS.

4. THAT ALL SPECIALTIES, MECHANICAL AND PATENT DEVICES INCORPORATED IN THESE SYSTEMS, SHALL BE ADJUSTED IN A MANNER THAT EACH SHALL DEVELOP ITS MAXIMUM EFFICIENCY IN THE OPERATION OF THE SYSTEMS.

SECTION 15050 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

RELATED DOCUMENTS:

THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND GENERAL REQUIREMENTS (IF ANY), APPLY TO THE WORK SPECIFIED IN THIS SECTION.

REQUIREMENTS OF SECTION 15010 APPLY TO THIS SECTION.

DESCRIPTION OF WORK:

THE WORK UNDER THIS SECTION INCLUDES THE FURNISHING OF ALL LABOR, MATERIALS, EQUIPMENT, TRANSPORTATION, AND SERVICES INCLUDED IN THE FOLLOWING BASIC MATERIALS AND METHODS CLASSIFICATION:

PIPING MATERIALS
PIPING FITTINGS
VALVES
STRAINERS
UNIONS
PIPE SLEEVES
CONCRETE INSERTS
FLOOR, WALL AND CEILING PLATES
PIPE HANGERS AND SUPPORTS
V-BELT DRIVES
MOTORS
JOINTS AND CONNECTIONS
PIPE INSTALLATION
GRADING OF PIPE

PART 2 - PRODUCTS

PIPING MATERIALS:

FOREIGN MADE MATERIALS: ALL PIPE, PIPE FITTINGS AND ACCESSORIES USED ON THIS PROJECT SHALL BE MANUFACTURED IN THE UNITED STATES. THE USE OF FOREIGN MADE MATERIALS WILL NOT BE ALLOWED.

STEEL PIPE: SIZE 4" AND SMALLER, SCHEDULE 40 OR SCHEDULE 80, BLACK OR GALVANIZED, CONFORMING TO A53 GRADE A.

SIZE 5" AND LARGER, SCHEDULE 40 OR SCHEDULE 80, BLACK OR GALVANIZED, CONFORMING TO ASTM-A53 GRADE F.

CAST IRON PIPE: SERVICE WEIGHT CAST IRON COATED HUB LESS SOIL PIPE CONFORMING TO ANSI A-112.5.1.

COPPER WATER TUBE: HARD DRAWN COPPER, TYPES "K" AND "L" CONFORMING TO ANSI H23.1.

COPPER REFRIGERANT TUBE: TYPE "L" HARD DRAWN, DEGREASED, SCALED-AT-THE-MILL, CLEANED AND SEALED AT THE MILL.

PIPE FITTINGS:

IN STEEL PIPE: 2" AND SMALLER, SCREWED MALLEABLE IRON, CLASS 150 LB., CONFORMING TO ANSI-B26.3, EITHER BLACK OR GALVANIZED.

2-1/2" AND LARGER, SCHEDULE 40 WROUGHT STEEL WELDING FITTINGS CONFORMING TO ANSI-B16.28.

2-1/2" AND SMALLER, SCREWED, COATED CAST IRON DRAINAGE TYPE CONFORMING TO ANSI-B16.12.

IN CAST IRON PIPE: SERVICE WEIGHT, COATED CAST IRON, HUB LESS TYPE CONFORMING TO ANSI-112.5.1.

IN COPPER TUBE: WROUGHT COPPER SWEAT TYPE CONFORMING TO ANSI-26.22. ALL ELBOWS SHALL BE LONG RADIUS.

VALVES:

GENERAL: VALVES MANUFACTURED BY JENKINS, KENNEDY, POWELL, WALWORTH, CRANE, NIBCO, STOCKHAM, HAMMOND, OR LUNKENHEIMER ARE APPROVED. ALL VALVES SHALL BE BY THE SAME MANUFACTURER.

BALL VALVES: IN COPPER TUBE: BRONZE BODY, SOLDERED ENDS, 150 PSI W.P., LEVER HANDLE WITH STOPS, BRONZE STEM AND BALL, TEFLON SEAT. VALVE SEAT REPLACEABLE WITHOUT DISTURBING PIPING, NIBCO S-590.

IN STEEL PIPES: BRONZE BODY, SCREWED ENDS, 150 PSI. W.P., LEVER HANDLE WITH STOPS, BRONZE STEM AND BALL, TEFLON SEAT. VALVE SEAT REPLACEABLE WITHOUT DISTURBING PIPING, NIBCO T- 590.

GAS COCKS: ONE INCH SMALLER WALWORTH #597, 1-1/4" SIZE AND LARGER WALWORTH 655. PROVIDE WRENCHES.

CHECK VALVES: IN COPPER TUBE: SWEAT TYPE BRONZE BODY, WITH RENEWABLE DISCS, 125 PSI W.P. NIBCO S-413-B.

IN STEEL PIPE: SCREWED BRONZE BODY, WITH RENEWABLE DISCS, 125 PSI W.P. NIBCO T-413-B.

BALANCING VALVES: 3" AND SMALLER, SCREWED CAST BRONZE BODY WITH BRONZE DISC, METER CONNECTIONS WITH BUILT-IN CHECK VALVES AND INTERNAL SEALS. BELL AND GOSSETT MODEL "CB", OR ARMSTRONG.

4" SAME AS ABOVE EXCEPT FLANGED.

BALANCING VALVES SHALL BE PROVIDED WITH HANSON QUICK CONNECTS AND SHUTOFF VALVES.

WATER SELF-FILL (P.R.) VALVE: HEATING WATER SELF-FILL, 3/4" BRASS BODY, ALL WORKING PARTS BRASS, DIAPHRAGM OPERATED, WITH ANTI-SYPHON CHECK VALVE AND INLET STRAINER, SET AT 12 PSI. MODEL B-7 BELL AND GOSSETT, OR EQUIVALENT BY TACO OR THRUSH.

TEMPERATURE AND PRESSURE RELIEF VALVE: FOR WATER HEATER: A.S.M.E. RATED AND AUTOMATIC RESEATING, 3/4" BRONZE BODY, WITH TEST LEVER, SET AT 200 DEGREES F. AND 100 PSI, IN CONFORMANCE WITH USA STANDARD Z21.22. WATTS MODEL 40L OR EQUIVALENT BY MC DONNELL-MILLER OR CASH.

GAUGE COCKS: CRANE #712 BRONZE COCK.

MANUAL AIR VENTS: CRANE #88 NEEDLE VALVE, 3/8" SIZE, ON ALL HIGH POINTS OF PIPING SYSTEMS.

ANTI-SYPHON OR BACK PRESSURE VALVE: VALVE SHALL BE REDUCED PRESSURE BACK-FLOW PREVENTOR TYPE WITH MAXIMUM WORKING PRESSURE OF 125 PSI. BRONZE BODY, BRONZE FITTINGS, STAINLESS STEEL SPRINGS, DOUBLE NEOPRENE COATED COTTON DUCT DIAPHRAGM AND NEOPRENE VALVE DISCS. VALVE CONSISTS OF TWO CHECK VALVES BETWEEN WHICH IS MOUNTED A DOUBLE PORTED BALANCED RELIEF VALVE OPERATING INDEPENDENTLY OF LINE PRESSURE, GATE VALVES UP AND DOWNSTREAM OF BASIC UNIT, PIPE UNIONS, AND TEST COCKS. BEECO MODEL "FRP", FEBCO OR WATTS.

WATER PRESSURE REDUCING VALVES: SCREWED ALL BRONZE BODY, RENEWABLE STAINLESS STEEL SEAT, SINGLE SEAT, RUBBER DISC, HIGH TEMPERATURE RESISTING DIAPHRAGM, GOOD FOR 300 PSI INLET PRESSURE, WITH SCREWED STRAINER. WATTS 2" MODEL 223S.

SET REGULATOR FOR 60 PSI REDUCED PRESSURE.

OTHER ACCEPTABLE MANUFACTURERS: MUELLER AND CASH-ACME.

STRAINERS:

Y-PATTERN: 125 PSI WORKING PRESSURE. BODY MATERIAL TO MATCH PIPE MATERIAL. MONEL OR BRASS STRAINER WITH MINIMUM SCREENING AREA 500% GREATER THAN PIPE.

SIZES 2" AND SMALLER: SCREWED CONNECTION.

SIZES 2-1/2" AND LARGER: FLANGED CONNECTION.

CRANE, SARCO, DUNHAM-BUSH, MCALEAR, ARMSTRONG, STRONG STOCKHAM, HOFFMAN.

UNIONS:

IN STEEL PIPE: SCREWED 150 LBS. MALLEABLE IRON, BRASS TO IRON SEAT, GROUND JOINT. BLACK OR GALVANIZED TO MATCH PIPE.

IN COPPER TUBE: 150 LBS. WROUGHT COPPER, BRASS TO COPPER SEAT, GROUND JOINT, SWEAT TYPE, NIBCO MODEL 633.

INSULATING UNIONS: 250 PSI WORKING PRESSURE, PIPE ENDS AND MATERIAL TO MATCH PIPE, ELECTRIC CURRENT BELOW 1% OF GALVANIC CURRENT, GASKDT MATERIAL RECOMMENDED BY MANUFACTURER, EPCO OR WALTER VALLET.

PIPE SLEEVES:

MINIMUM 20 GAUGE GALVANIZED STEEL IN CONCRETE, 18 GAUGE IN ALL OTHER CONSTRUCTION. 1/2" CLEARANCE AROUND PIPE OR INSULATION.

FLOOR, WALL AND CEILING PLATES:

BRASS MATERIAL, CHROME PLATED FINISH. SIZE SUFFICIENT TO COVER ALL PIPE OPENINGS THROUGH WALL, FLOOR OR CEILING. SET SCREW SPRING TO SECURE PIPE.

PIPE HANGERS AND SUPPORTS:

PIPE HANGER SIZE 2" AND SMALLER: ADJUSTABLE MALLEABLE IRON, SPLIT RING HANGER, BLACK, U.L. LISTED. FEE AND MASON NO. 199 OR FIGURE 239.

PIPE HANGER LARGER THAN SIZE 2-1/2": ADJUSTABLE STEEL CLEVIS TYPE HANGER, BLACK, U.L. LISTED. FEE AND MASON NO. 239 OR 103.

PIPE HANGERS IN CONTACT WITH COPPER TUBE SHALL BE COPPER PLATED.

INSULATION PROTECTION SHIELD: GALVANIZED STEEL, 18 GAUGE MINIMUM LENGTH 12". FEE AND MASON #81 OR SIMILAR PRODUCT FABRICATED BY CONTRACTOR.

ELECTRIC MOTORS:

GENERAL: PROVIDE MOTORS CONFORMING TO NEMA MG 1 AND AS FOLLOWS:

EACH MOTOR SHALL HAVE SUFFICIENT CAPACITY TO START AND OPERATE THE MACHINE IT DRIVES WITHOUT EXCEEDING THE MOTOR NAMEPLATE RATING AT THE SPEED SPECIFIED OR AT ANY SPEED AND LOAD WHICH MAY BE OBTAINED BY THE DRIVE ACTUALLY FURNISHED.

EACH MOTOR PROVIDED WITH AUTOMATIC CONTROL SHALL BE CAPABLE OF MAKING AS FREQUENT STARTS AS THE CONTROL DEVICE MAY DEMAND. MOTORS NOT PROVIDED WITH AUTOMATIC CONTROL SHALL BE CAPABLE OF MAKING NOT LESS THAN 4 STARTS PER HOUR.

ALL BELT-CONNECTED MOTORS, REGARDLESS OF SIZE, SHALL BE EQUIPPED WITH SHAFTS AND BEARINGS THAT WILL WITHSTAND BOTH THE NORMAL BELT PULL OF THE DRIVE FURNISHED AND THE MOMENTARY OR CONTINUOUS OVERLOADS DUE TO ACCELERATION OF INCORRECT BELT TENSION.

MOTORS SHALL BE RATED FOR CONTINUOUS DUTY AT 100 PERCENT OF RATED CAPACITY AND TEMPERATURE RISE SHALL BE BASED ON AN AMBIENT TEMPERATURE OF 40° CELCIUS.

ONE-HALF HP AND LARGER MOTORS GENERALLY SHALL BE POLYPHASE MOTORS. MOTORS SMALLER THAN ONE-HALF HP GENERALLY SHALL BE SINGLE-PHASE MOTORS.

POLYPHASE MOTORS SHALL BE SQUIRREL CAGE, INDUCTION TYPE OPEN DRIP-PROOF IN ACCORDANCE WITH NEMA MG 1. POLYPHASE MOTORS SHALL BE WOUND ACCORDING TO THE ELECTRICAL DATA ON THE SCHEDULES. EACH TWO-SPEED MOTOR SHALL HAVE TWO SEPARATE WINDINGS.

UNLESS OTHERWISE SPECIFIED, SINGLE-PHASE MOTORS SHALL BE OF THE OPEN, CAPACITOR-START TYPE, AND SHALL BE IN ACCORDANCE WITH NEMA MG 1. SINGLE-PHASE MOTORS SHALL BE WOUND ACCORDING TO THE ELECTRICAL DATA ON THE SCHEDULES. IN LIEU OF CAPACITOR-START TYPE, 1/6 HP AND SMALLER MOTORS MAY BE OF THE SPLIT-PHASE TYPE OR OTHER TYPES AS SPECIFIED.

MOTORS SHALL MEET NFPA STANDARDS, AND SHALL BE SUITABLE FOR THE SERVICE AND LOCATION, WITH BALL BEARINGS UNLESS OTHERWISE SPECIFIED AND SHALL BE SUITABLE FOR VOLTAGE VARIATIONS OF PLUS OR MINUS 10% OF RATED VOLTAGE.

PROTECTION: MOTORS WITHOUT BUILT-IN PROTECTION SHALL HAVE SEPARATE THERMAL OVERLOAD DEVICES WITH LOW-VOLTAGE RELEASE OR LOCKOUT AS REQUIRED. HERMETICALLY SEALED MOTORS SHALL HAVE QUICK TRIP DEVICES. PROVIDE BUILT-IN THERMAL OVERLOAD PROTECTION IN MOTORS NOT OTHERWISE PROTECTED BY EXTERNAL DEVICES.

RATING: RATE MOTORS FOR CONTINUOUS DUTY WITH 40°C RISE UNDER FULL LOAD. HORSEPOWER RATING SHALL BE WITHOUT SERVICE FACTOR FOR THE SPECIFIED LOAD. VOLTAGE RATING SHALL BE AS SHOWN ON THE DRAWINGS.

MANUFACTURER: MOTORS SHALL BE WAGNER, RELIANCE, WESTINGHOUSE, GENERAL ELECTRIC, OR CENTURY. EACH MOTOR SHALL HAVE THE MANUFACTURER'S IDENTIFYING NAMEPLATE PERMANENTLY ATTACHED.

ALL MOTORS SHALL BE MANUFACTURED IN THE UNITED STATES.

V-BELT DRIVES:

FOR FAN AND MOTOR COMBINATION SHALL CONSIST OF ADJUSTABLE PITCH MOTOR SHEAVE, FIXED PITCH FAN SHEAVE, AND V-BELTS OF SUFFICIENT SIZE AND NUMBER TO GIVE A DRIVE HORSEPOWER RATING EQUAL TO 1-1/2 TIMES THE MOTOR NAMEPLATE HP IN EACH CASE. DRIVE SHALL PROVIDE SUFFICIENT ADJUSTMENT TO VARY THE DESIGN RPM PLUS OR MINUS 20%.

ENCLOSE FAN AND MOTOR SHEAVES AND V-BELTS IN A REMOVABLE BELT GUARD, WITH OPENINGS TO TAKE SPEED READINGS ON BOTH FAN AND MOTOR.

PART 3 - EXECUTION:

PIPE AND PIPE FITTINGS:

GENERAL: RUN ALL PIPING PARALLEL OR PERPENDICULAR TO THE BUILDING STRUCTURE AND SUPPORT IT SUFFICIENTLY TO PREVENT SAGGING. INSTALL ALL PIPING WHERE POSSIBLE SO AS TO VENT AND DRAIN. SUPPORT ALL PIPING INDEPENDENTLY SO THAT ITS WEIGHT IS NOT CARRIED BY THE EQUIPMENT. INSTALL UNIONS IN ALL NON-FLANGED PIPE CONNECTIONS TO APPARATUS AND APPURTENANCES REQUIRING REMOVAL FOR SERVICING, SO LOCATED THAT PIPING MAY BE DISCONNECTED WITHOUT DISTURBING THE GENERAL SYSTEM. PROVIDE DIELECTRIC COUPLINGS, UNIONS OR FLANGES BETWEEN STEEL AND COPPER PIPE OR TUBING.

SCREWED JOINTS: SHALL BEVE THE PIPE ENDS REAMED, DOPE OR TAPE APPLIED TO MALE THREADS ONLY, WITH THE EXCEPTION OF BRASS TO BRASS JOINTS WHICH SHALL BE MADE WITH TEFLON TAPE ONLY. AFTER JOINTING, NO MORE THAN 2 THREADS SHALL REMAIN EXPOSED.

WELDED JOINTS: BY THE "AARC-WELDING" PROCESS: PORT OPENINGS OF FITTINGS MUST MATCH THE INSIDE DIAMETER OF THE PIPE TO WHICH THEY ARE WELDED. MAKE ALL TURNS WITH FULL RADIUS WELDING ELBOWS AND TEES WITH WELDING TEES. REDUCING FITTINGS MUST BE USED FOR SIZE REDUCTION.

SOLDER TYPE JOINTS: WITH 95/5 TIN/ANTIMONY OR "STAY SAFE" LEAD-FREE SOLDER ON WROUGHT COPPER FITTINGS, APPLIED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. JOINTS IN COPPER TUBE 2-1/2" AND LARGER SHALL BE MADE WITH HEAT APPLIED UNIFORMLY AROUND THE ENTIRE CIRCUMFERENCE OF THE TUBE AND FITTINGS BY A MULTIFLAME TORCH. UNDERGROUND JOINTS SHALL BE BRAZED.

NO-HUB CAST IRON PIPE: CONFORM WITH UNIFORM STATE PLUMBING CODE AND CAST IRON SOIL PIPE INSTITUTE RECOMMENDATIONS.

VALVES:

INSTALL VALVES ON EACH SIDE OF ALL EQUIPMENT AND WHERE SHOWN ON DRAWINGS. FULL SIZE OF PIPE UNLESS OTHERWISE INDICATED. PROVIDE NEAT APPEARANCE AND EASY GROUPING WITH ALL PARTS EASILY ACCESSIBLE. VALVE STEMS SHALL BE INSTALLED IN HORIZONTAL OR UPRIGHT POSITION.

FLOOR, WALL AND CEILING PLATES:

INSTALL ON ALL EXPOSED PIPES PASSING THROUGH FLOORS, WALLS OR CEILINGS.

PIPE SLEEVES:

LAYOUT WORK IN ADVANCE OF POURING CONCRETE AND FURNISH AND SET SLEEVES NECESSARY TO COMPLETE THE WORK.

FLOOR SLEEVES: PROVIDE SLEEVE ON PIPES PASSING THROUGH CONCRETE FLOORS. EXTEND SLEEVE ONE INCH ABOVE FINISHED FLOOR.

CAULK ALL PIPES PASSING THROUGH FLOOR WITH OAKUM AND MORTAR.

PIPE HANGERS AND SUPPORTS:

GENERAL: PROVIDE ADJUSTABLE HANGERS ON ALL PIPES, COMPLETE WITH ADJUSTERS, SWIVELS, RODS, ETC. SIZE HANGERS TO CLEAR INSULATION AND GUIDES. ON HOT LINES WHERE EXPANSION AND CONTRACTION OCCURS, PROVIDE SWIVEL JOINT AT TOP OR BOTTOM OF HANGER ROD. PROVIDE HANGER WITHIN THREE FEET OF ALL CHANGES IN DIRECTION. BRANCHES FIVE (5) FEET OR LONGER SHALL HAVE SEPARATE HANGERS.

PLUMBERS' TAPE: NOT PERMITTED AS PIPE HANGERS.

INSULATED PIPE: SUPPORTED BY RING HANGERS, THE RINGS SHALL PASS FREELY AROUND THE INSULATION. PROTECT THE INSULATION AT POINT OF CONTACT WITH THE RING HANGER OR TRAPEZE BAR BY MEANS OF PIPE SADDLES.

HANGER SPACING:

PIPE SPACING:

COPPER TUBING 1-1/4" AND SMALLER	5 FEET
COPPER TUBING 1-1/2" AND LARGER	10 FEET
STEEL PIPE 1" AND SMALLER	7 FEET
STEEL PIPE 1-1/4" AND LARGER	10 FEET

SOIL PIPE (SOLID CORE PVC OR CAST IRON) - AT EACH JOINT AND AT INTERVALS NOT TO EXCEED FIVE (5) FEET.

HANGER RODS:
EE

PIPE SIZES	ROD SIZES
1/2" TO 2"	3/8"
2-1/2" TO 3"	1/2"
4" AND LARGER	5/8"

ALL HANGER RODS SHALL BE PROVIDED WITH DOUBLE NUTS AND THE NUTS SHALL BE LOCKED.

VERTICAL RISERS:

SUPPORT VERTICAL PIPES AT FLOOR WITH RISER CLAMP. ON ALL WATER PIPES, REST PIPE CLAMP ON 1/4" THICK NEOPRENE PAD TO PREVENT TRANSMISSION OF NOISE TO THE STRUCTURE.

GRADING OF PIPE:

DOMESTIC HOT AND COLD WATER PIPING SHALL BE GRADED TO DRAIN COMPLETELY. INSTALL DRAIN AT ALL LOW POINTS.

WASTE AND SOIL PIPING SHALL GRADE DOWNWARD IN THE DIRECTION OF FLOW AT THE RATE OF 1/4" PER FOOT.

PIPE AND EQUIPMENT IDENTIFICATION:

PIPE IDENTIFICATION: IN ALL ACCESSIBLE AREAS, INCLUDING ABOVE REMOVABLE CEILINGS IN EQUIPMENT ROOMS. IN EQUIPMENT ROOMS A DIRECTIONAL FLOW ARROW AND A STENCILED NAME IDENTIFYING THE PIPE CONTENTS SHALL BE PAINTED ON THE PIPE ADJACENT TO EACH VALVE. EACH BRANCH OR TAKEOFF, EACH POINT AT WHICH PIPES LEAVE OR ENTER A WALL, EVERY MAJOR CHANGE OF DIRECTION OF A PIPE, AND AT 50 FT. INTERVALS ON LONG CONTINUOUS RUNS.

STENCIL LETTERS AND FLOW ARROWS SHALL BE 1/2, 7/8 OR 1-3/4 INCH IN HEIGHT, DEPENDING ON THE SIZE OF THE PIPE OR EQUIPMENT. IN ALL CASES, THE LARGEST SIZE PRACTICAL SHALL BE USED. STAPLE LABELS TO INSULATION WHERE APPLICABLE. COVER ALL LABELS WITH CLEAR LACQUER OR CLEAR TAPE TO PREVENT PEELING.

ABBREVIATIONS FOR IDENTIFICATION SHALL COMPLY WITH, BUT NOT BE LIMITED TO, THE FOLLOWING:

DOMESTIC COLD WATER - CW
DOMESTIC HOT WATER - HW
DOMESTIC HOT WATER CIRCULATING - DHWC
REFRIGERANT LIQUID - RL
REFRIGERANT SUCTION - RS
COMPRESSED AIR - CA
DRAIN - D
NATURAL GAS - G

VALVE IDENTIFICATION: ALL VALVES, REGARDLESS OF SIZE, SHALL BE IDENTIFIED WITH BRASS TAGS OF 0.51" THICKNESS, 1" BY 3" OR LARGER WITH 1/8" HIGH STAMPED LETTERS. THE TAG SHALL BE ATTACHED TO VALVES WITH RUSTPROOF KEY CHAINS. INFORMATION ON TAG SHALL INCLUDE FUNCTION OF VALVE AND ANY OTHER PERTINENT DATA. ABBREVIATIONS AS SHOWN SHALL BE USED, AS APPLICABLE.

EQUIPMENT IDENTIFICATION: ALL EQUIPMENT INCLUDING, BUT NOT LIMITED TO, FAN-COIL UNITS, AIR HANDLING UNITS, EXHAUST FANS, PUMPS, HEAT EXCHANGER, EXPANSION TANK AND AIR SEPARATION TANK SHALL BE IDENTIFIED WITH SIGNS MADE OF LAMINATED PLASTIC WITH 1/8" OR LARGER ENGRAVED LETTERS. SIGNS SHALL BE SECURELY ATTACHED BY RUSTPROOF SCREWS OR SOME OTHER PERMANENT MEANS. INFORMATION ON SIGN SHALL INCLUDE NAME OF EQUIPMENT, RATING, MAINTENANCE INSTRUCTIONS, AND OTHER IMPORTANT DATA. THE MECHANICAL AND ELECTRICAL SCHEDULE SYMBOLS SHALL ALSO APPEAR ON IDENTIFICATION TAGS.

SECTION 15250 - INSULATION

PART 1 - GENERAL

RELATED DOCUMENTS:

THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND GENERAL REQUIREMENTS (IF ANY) APPLY TO THE WORK SPECIFIED IN THIS SECTION.

REQUIREMENTS OF SECTION 15010 APPLY TO THIS SECTION.

REQUIREMENTS OF SECTION 15050 APPLY TO THIS SECTION.

DESCRIPTION OF WORK:

THE WORK UNDER THIS SECTION INCLUDES THE FURNISHING OF ALL LABOR, MATERIALS, EQUIPMENT, TRANSPORTATION AND SERVICES INCLUDED IN THE FOLLOWING INSULATION CLASSIFICATIONS:

DOMESTIC HOT WATER PIPING
DOMESTIC COLD WATER PIPING
ABOVE GRADE RAIN WATER PIPING
THERMAL DUCT WRAPPING

QUALIFICATION OF WORKMEN:

USE SUFFICIENT JOURNEYMEN INSULATORS AND SUPERVISORS IN THE EXECUTION OF THIS PORTION OF THE WORK TO INSURE PROPER AND ADEQUATE INSTALLATION OF INSULATION THROUGHOUT.

COMPLIANCE WITH SPECIFICATION:

WHENEVER REQUIRED DURING PROGRESS OF THE WORK, FURNISH PROOF ACCEPTABLE TO THE OWNER THAT ITEMS INSTALLED EQUAL OR EXCEED ALL REQUIREMENTS SPECIFIED FOR THIS WORK.

PRODUCT HANDLING:

PROTECTION: USE ALL MEANS NECESSARY TO PROTECT INSULATION MATERIALS BEFORE, DURING AND AFTER INSTALLATION.

REPLACEMENT: IN THE EVENT OF DAMAGE, IMMEDIATELY MAKE ALL REPAIRS AND REPLACEMENTS NECESSARY.

FIRE HAZARD CLASSIFICATION FOR ALL INSULATION:

ALL INSULATION SHALL HAVE SURFACE BURNING CHARACTERISTICS RATINGS AS TESTED BY ASTM E84, UL723 OR NFPA 255 NOT EXCEEDING: FLAME SPREAD 25 AND SMOKE DEVELOPED 50.

COMPOSITE SHALL INCLUDE INSULATION, JACKETING AND ADHESIVES USED TO SECURE JACKETING OR FACING. ALL ACCESSORY ITEMS, SUCH AS PVC JACKETING AND FITTINGS, ADHESIVES, MASTIC, CEMENT, TAPE AND CLOTH, SHALL HAVE THE SAME COMPONENT RATINGS AS SPECIFIED ABOVE.

PIPING INSULATION SHALL BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF U.L. "PIPE AND EQUIPMENT COVERING R5583 400 8.15".

ACCEPTABLE MANUFACTURERS:

OWENS-CORNING, JOHNS MANVILLE, PPG, KNAUF, OR CERTAIN-TEED.

PART 2 - PRODUCTS

PIPE INSULATION:

FIBERGLASS SECTIONAL PIPE INSULATION: THERMAL CONDUCTIVITY OF 0.25 BTU - IN. PER SQ. FT. PER HOUR AT 75°F MEAN TEMPERATURE. MINIMUM DENSITY OF 2 LBS. PER CUBIC FOOT. JACKETED WITH WHITE VAPOR BARRIER LAMINATED OF ALUMINUM FOIL AND WHITE KRAFT REINFORCED WITH GLASS FIBER STRANDS. JACKET SHALL HAVE FACTORY APPLIED SELF-SEALING LAP.

THERMAL AIR DUCT WRAP:

FIBERGLASS BLANKET INSULATION: THERMAL CONDUCTIVITY OF 0.24 BTU - IN. PER SQ. FT. PER HOUR AT 75°F MEAN TEMPERATURE. MINIMUM DENSITY OF ONE POUND PER CUBIC FOOT. JACKETED WITH ALUMINUM FOIL REINFORCED WITH FIBERGLASS SKRIM LAMINATED KRAFT FACING HAVING A MIN. R VALUE OF R-6.

PART 3 - EXECUTION

PIPE INSULATION THICKNESS:

INSULATION THICKNESS IN INCHES FOR PIPE SIZES:

PIPING SYSTEMS	RUN OUTS 2"*	1" & LESS	1-1/4" TO 2"	2-1/2" TO 4"	5" TO 6"	8" AND OVER
DOMESTIC HOT WATER	1/2	1	1	1-1/2	1-1/2	1-1/2
DOMESTIC COLD WATER	1/2	1/2	1/2	1/2	1/2	1/2
RAIN WATER ABOVE GRADE	1/2	1/2	1/2	1/2	1/2	1/2

* RUN OUTS NOT EXCEEDING 12 FT. IN LENGTH TO INDIVIDUAL TERMINAL UNITS.

THERMAL DUCT WRAPPING: 1-1/2" THICK FIBERGLASS BLANKET.

INSTALLATION OF PIPE INSULATION.

INSTALLATION SHALL BE CONTINUOUS THROUGH WALLS, FLOORS, PARTITIONS, SLEEVES, AND PIPE HANGERS, EXCEPT WHERE NOTED OTHERWISE.

FIBERGLASS SECTION PIPE INSULATION: APPLY INSULATION TO PIPE AND SEAL WITH SELF-SEALING LAP. USE SELF-SEALING BUTT STRIPS TO SEAL BUTT JOINTS. EXCEPTION: INSULATION NOT REQUIRED OVER UNIONS, AND VALVE BODIES ON DOMESTIC HOT WATER.

FITTINGS FOR PIPE SIZES SMALLER THAN 2-1/2" SHALL BE INSULATED AND FINISHED WITH HYDRAULIC SETTING INSULATING CEMENT TO A THICKNESS EQUAL TO THE ADJOINING PIPE INSULATION. FITTINGS FOR PIPE SIZES 2-1/2" AND LARGER SHALL BE INSULATED WITH SEGMENTS OF THE MOLDED INSULATION SECURELY WIRED IN PLACE AND FINISHED WITH A COST OF HYDRAULIC SETTING INSULATING CEMENT. ALL FITTINGS, REGARDLESS OF PIPE SIZE, SHALL BE FINISHED WITH 4 OUNCE CANVAS AND COATED WITH CHILDREN'S WHITE CP-50A "CHIL-SEAL". THIS SEALANT SHALL CONFORM TO NFPA STANDARD 90A, NFPA FIRE CODE 220 (B) AND SHALL MEET FIRE HAZARD REQUIREMENTS OF GSA AND MIL-A-3316B, CLASS 1, GRADE A/B.

INSTALLATION OF THERMAL AIR DUCT WRAP:

WRAP ALL SUPPLY AIR DUCTS AND ALL RETURN AIR DUCTS. DUCTS THAT ARE INTERNALLY INSULATED NEED NOT BE WRAPPED.

APPLICATION, RECTANGULAR DUCT: APPLY OVER CLEAN, DRY SHEET METAL DUCT. INSTALL TO ALLOW MAXIMUM FULLNESS AT CORNERS, 1" MINIMUM THICKNESS AT CORNERS. BUTT INSULATION TIGHTLY AT JOINTS AND OVERLAP VAPOR BARRIER FACING 2" MINIMUM. REMOVE INSULATION FROM LAPS PRIOR TO STAPLING. STAPLE ALL SEAMS 6" ON CENTERS OUTWARD CLINCHING STAPLES, THEN SEAL WITH FOIL VAPOR BARRIER TAPE. WHERE DUCTS ARE OVER 24" IN WIDTH, SECURE DUCT WRAP TO THE BOTTOM OF DUCT WITH MECHANICAL FASTENERS ON 16" CENTERS TO PREVENT SAGGING. SEAL PENETRATIONS TO PROVIDE A VAPOR-TIGHT SYSTEM.

ALL VERTICAL SECTIONS OF DUCTS SHALL BE MECHANICALLY PINNED ON 16" CENTERS, AT LEAST ONE PIN PER SIDE. SEAL PENETRATIONS OF VAPOR BARRIER TO PROVIDE A VAPOR-TIGHT SYSTEM.

APPLICATION, ROUND DUCT: APPLY OVER CLEAN, DRY SHEET METAL DUCT. INSTALL INSULATION TO ALLOW FULL THICKNESS. BUTT INSULATION TIGHTLY AT JOINTS, AND OVERLAP VAPOR BARRIER FACING 2" MINIMUM. REMOVE INSULATION FROM LAPS PRIOR TO STAPLING. STAPLE ALL SEAMS 6" ON CENTERS WITH OUTWARD CLINCHING STAPLES, THEN SEAL WITH FOIL VAPOR BARRIER TAPE.

ALL VERTICAL SECTIONS OF DUCTS 8" DIAMETER AND LARGER SHALL BE MECHANICALLY PINNED ON 16" CENTERS, A MINIMUM OF FOUR PINS AROUND THE CIRCUMFERENCE. SEAL PENETRATION OF VAPOR BARRIER TO PROVIDE A VAPOR-TIGHT SYSTEM.

CLEANING:

CLEAN UP ALL DEBRIS CAUSED BY THIS WORK AND REMOVE FROM SITE. ALL DROPPING FROM INSULATING THE PIPE FITTINGS SHALL BE CLEANED UP AND WASHED CLEAN.

SECTION 15400 PLUMBING:

PART 1 - GENERAL:

RELATED DOCUMENTS:

THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND GENERAL REQUIREMENTS (IF ANY) APPLY TO THE WORK SPECIFIED IN THIS SECTION.

REQUIREMENTS OF SECTION 15010 APPLY TO THIS SECTION.

REQUIREMENTS OF SECTION 15050 APPLY TO THIS SECTION.

DESCRIPTION OF WORK:

THE WORK UNDER THIS SECTION INCLUDES THE FURNISHING OF ALL LABOR. MATERIALS, EQUIPMENT, TRANSPORTATION, AND SERVICES INCLUDED IN THE FOLLOWING PLUMBING CLASSIFICATIONS:

SOIL AND WASTE PIPING
RAIN WATER PIPING
VENT PIPING
NATURAL GAS PIPING SYSTEM
DOMESTIC HOT AND COLD WATER SYSTEM
FLASHINGS
PLUMBING CLEAN OUTS
FLOOR DRAINS
ROOF DRAINS
GAS FIRED WATER HEATER
PLUMBING FIXTURES
PLUMBING TRIM
HOT WATER RECALCULATING PUMP
INSTALLATION
PIPING INSTALLATION
CONNECTION TO CITY SEWER MAIN
CONNECTION OT CITY WATER MAIN
CONNECTION TO NATURAL GAS SERVICE
CAULKING
PIPING TESTS
FIXTURE INSTALLATION AND PROTECTION
INSTALLATION OF WATER HEATER
WATER PIPE STERILIZATION
CLEANING

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
August 2, 2021

REVISIONS:

No.	Date	Description

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08-02-2021

MECHANICAL & PLUMBING SPECIFICATIONS

MP7.3

JZW ARCHITECTS

QUALITY ASSURANCE:

QUALIFICATIONS OF WORKMEN: USE SUFFICIENT JOURNEYMEN PLUMBERS AND COMPETENT SUPERVISORS IN THE EXECUTION OF THIS PORTION OF THE WORK TO ENSURE PROPER AND ADEQUATE INSTALLATION OF PLUMBING THROUGHOUT. IN THE ACCEPTANCE OR REJECTION OF INSTALLED PLUMBING, NO ALLOWANCE WILL BE MADE FOR LACK OF SKILL ON THE PART OF WORKMEN.

COMPLIANCE WITH SPECIFICATION: WHENEVER REQUIRED DURING PROGRESS OF THE WORK FURNISH PROOF ACCEPTABLE TO THE OWNER THAT ITEMS INSTALLED EQUAL OR EXCEED ALL REQUIREMENTS SPECIFIED FOR THIS WORK.

IN THE EVENT SUCH PROOF IS NOT AVAILABLE, OR IS NOT ACCEPTABLE TO THE ARCHITECT AND/OR OWNER, THE ARCHITECT AND/OR OWNER MAY REQUIRE THE CONTRACTOR TO REMOVE THE ITEM OR ITEMS AND REPLACE WITH MATERIAL MEETING THE SPECIFIED REQUIREMENTS AND TO REPAIR ALL DAMAGES CAUSED IN THE REMOVAL AND REPLACEMENT, ALL AT NO ADDITIONAL COST TO THE OWNER.

CODES:

COMPLY WITH THE CURRENT ADOPTED INTERNATIONAL PLUMBING CODE AND ALL LOCAL CODES AND REGULATIONS.

IN THE EVENT THERE IS A CONFLICT BETWEEN THE CODES OR REGULATIONS AND THESE SPECIFICATIONS AND DRAWINGS THE MOST STRINGENT REQUIREMENT SHALL GOVERN.

SUBMITTALS:

PRODUCT DATA: BEFORE PLUMBING MATERIALS ARE DELIVERED TO THE JOB SITE, SUBMIT COMPLETE DATA SHOWING ALL PLUMBING MATERIALS PROPOSED TO BE FURNISHED AND INSTALLED. REFER TO SECTION 15010.

PRODUCT HANDLING:

PROTECTION: USE ALL MEANS NECESSARY TO PROTECT PLUMBING MATERIALS BEFORE, DURING, AND AFTER INSTALLATION.

REPLACEMENT: IN THE EVENT OF DAMAGE, IMMEDIATELY MAKE ALL REPAIRS AND REPLACEMENTS NECESSARY.

PIPE OPENINGS: KEEP CLOSED BY MEANS OF PLUG OR CAPS TO PREVENT THE ENTRANCE OF FOREIGN MATTER.

PART 2 - PRODUCTS:

PIPING:

SOIL AND WASTE PIPING: UNDERGROUND PIPING TO 5-FEET OUTSIDE BUILDING LINE: SOLID CORE PVC or SERVICE WEIGHT NO-HUB CAST IRON SOIL PIPE WITH STAINLESS STEEL COUPLINGS AND NEOPRENE GASKETS.

UNDERGROUND PIPING FROM 5-FEET OUTSIDE BUILDING TO THE SEWER MAIN IN THE STREET: P.V.C. HEAVY DUTY WALL WITH RUBBER SEALING RINGS, CONFORMING TO PRODUCT STANDARD ASTM-D3034, SDR-35.

ABOVE GROUND PIPING: SOLID CORE PVC pr SCHEDULE 40 GALVANIZED STEEL PIPE WITH CAST IRON DRAINAGE FITTINGS OR NO-HUB CAST IRON FOR 2-1/2 INCHES AND SMALLER AND SERVICE WEIGHT CAST IRON SOIL PIPE AND NO-HUB FITTINGS FOR 3 INCHES AND LARGER. USE CAST IRON IN RETURN AIR PLENUMS.

RAIN WATER PIPING: AVOVE AND UNDERGROUND PIPING TO FIVE-FEET OUTSIDE BUILDING LINE: SERVICE WEIGHT NO-HUB CAST IRON SOIL PIPE WITH STAINLESS STEEL COUPLINGS AND NEOPRENE GASKETS. SCHEDULE 40 P.V.C.

UNDERGROUND PIPING FORM FIVE FEET OUTSIDE THE BUILDING TO THE STORM MAIN DRAIN IN THE STREET: P.V.C. HEAVY DUTY WALL WITH RUBBER SEALING RINGS, CONFORMING TO PRODUCT STANDARD ASTM-D3034, SDR-35.

VENT PIPING: UNDERGROUND: SERVICE WEIGHT NO-HUB CAST IRON WITH STAINLESS STEEL COUPLINGS AND NEOPRENE GASKETS.

ABOVE GROUND: SCHEDULE 40 GALVANIZED STEEL PIPE WITH CAST IRON FITTINGS OR NO-HUB CAST IRON FOR 2-1/2" AND SMALLER AND SERVICE WEIGHT CAST IRON SOIL PIPE AND FITTINGS FOR 3 INCH AND LARGER.

NATURAL GAS PIPING: ABOVE GROUND: 2" SIZE AND SMALLER: SCHEDULED 40 BLACK STEEL PIPE WITH SCREWED BLACK MALLEABLE IRON FITTINGS.

ABOVE GROUND: 2-1/2" SIZE AND LARGER: SCHEDULE 40 BLACK STEEL PIPE AND SCHEDULE 40 WELDING TYPE FITTINGS.

UNDERGROUND: SCHEDULE 40 BLACK STEEL PIPE WITH WELDING TYPE FITTINGS AND WRAPPED PER REQUIREMENTS OF LOCAL FUEL SUPPLY CO.

DOMESTIC COLD WATER PIPING:

UNDERGROUND PIPING TO FIVE FEET OUTSIDE BUILDING LINE: TYPE "K" HARD DRAWN COPPER TUBE WITH BRAZED TYPE WROUGHT COPPER FITTINGS.

UNDERGROUND PIPING FORM FIVE FEET OUTSIDE BUILDING TO THE WATER MAIN IN THE STREET: P.V.C. PIPE, SCHEDULE 40, CONFORMING TO ASTM-D1785-82; WITH P.V.C. FITTINGS, SCHEDULE 40 CONFORMING TO ASTM-D2466-78. SOLVENT CEMENT SHALL CONFORM TO ASTM-D2564-80.

ABOVE GROUND INSIDE THE BUILDING: TYPE "L" HARD DRAWN COPPER TUBE WITH SWEAT TYPE WROUGHT COPPER FITTINGS.

EXPOSED PIPE TO FIXTURES: RED BRASS PIPE CHROME PLATED.

COMPRESSED AIR PIPING: SCHEDULE 40 BLACK STEEL WITH SCREWED, CLASS 150 LB. MALLEABLE IRON FITTINGS.

FLASHINGS:

FLASH OPENINGS IN ROOF WITH 3 LB. SHEET LEAD IN ONE PIECE. EXTEND 18" FROM DRAINS OR PIPES UNDER ROOFING IN ALL DIRECTIONS.

EXTEND UPPER EDGE OF LEAD AT LEAST 12" ABOVE ROOF, CAULK THE OPENING BETWEEN LEAD FLASHING AND PIPE WITH BLACK ROOFING MASTIC, INSTALL NO-HUB STAINLESS STEEL CINCH BAND AROUND FLASHING AND CINCH UP TIGHT.

FLASHINGS SHALL BE COMPATIBLE WITH THE TYPE OF ROOFING BEING INSTALLED. COORDINATE WITH THE ROOFING CONTRACTOR.

ALL OPENINGS IN THE ROOF SHALL BE FLASHED.

PLUMBING CLEAN OUTS:

GENERAL: INSTALL AT THE BASE OF ALL VERTICAL STACKS, AT ALL HORIZONTAL CHANGES IN DIRECTION EXCEEDING 45 DEGREES, STRAIGHT RUNS NOT TO EXCEED 50 FT. APART. J.R. SMITH, ZURN, WADE, OR JOSAM.

IN FINISHED FLOORS: SMITH 4023-PB WITH ROUND ADJUSTABLE HEAVY DUTY POLISHED NICKEL BRONZE TOP, GASKET SEAL, IRON PLUG.

IN RESILENT FLOORING: SMITH 4140-PB WITH ROUND ADJUSTABLE POLISHED NICKEL BRONZE TOP, GASKET SEAL, IRON PLUG.

IN FINISHED WALL: SMITH 4530 WITH COUNTERSINK IRON PLUGH WITH GASKET SEAL, WITH STAINLESS STEEL ACCESS COVER.

IN EXPOSED DRAIN LINES: SMITH 4510 WITH COUNTERSINK IRON PLUG WITH GASKET SEAL.

EXTERIOR CLEAN OUT TO GRADE: SMITH 4253 SPIGOT WITH DOUBLE EXTRA HEAVY CAST IRON TOP: INSTALL IN 16" X 16" X 6" DEEP CONCRETE PAD FLUSH WITH GRADE.

FLOOR DRAINS:

SMITH #2010-A WITH 5" DIAMETER NICKEL BRONZE STRAINER, WITH #7221 CAST IRON "P" TRAP. SIZES AS SHOWN ON THE DRAWINGS.

ROOF DRAINS:

ZURN #A-1010 WITH UNDER DECK CLAMP AND VANDAL PROOF DOME. J.R. SMITH, WADE OR JOSAM ARE ACCEPTABLE. SIZES AS SHOWN ON DRAWINGS.

GAS FIRED WATER HEATER:

GLASS LINED STORAGE TANK, PRESSURE TESTED AND RATED FOR 150 PSI WORKING PRESSURE REGULATOR, 100% SAFETY SHUTOFF, DRAFT DIVERTER, AND INSULATED STEEL JACKET. A.G.A. APPROVED. ASME CODE STAMPED.

CAPACITY AND SIZE AS SCHEDULED ON THE DRAWINGS.

STATE STOVE, RUDD, RHEEM, OR A.O. SMITH ACCEPTABLE.

RELIEF VALVE 3/4" #40 L WATTS.

PLUMBING FIXTURES:

THESE SHALL BE, IN GENERAL, KOHLER, AMERICAN STANDARD, CRANE OR ELJER. FURNISH AND INSTALL ALL FIXTURES SHOWN OR SPECIFIED HEREINAFTER AND MAKE ALL PARTS COMPLETE AND LEAVE THE ENTIRE SYSTEM IN PERFECT WORKING ORDER. ALL FIXTURES SHALL BE WHITE. ALL FIXTURES SHALL BEAR THE U.P.C. SEAL.

THE EXACT LOCATION OF ALL PLUMBING FIXTURES SHALL BE AS SHOWN ON THE ARCHITECTURAL DRAWINGS.

THE FIXTURES SHALL BE ALL NEW AND COMPLETE UNLESS SPECIFICALLY NOTED OTHERWISE OR AS SHOWN OR DESCRIBED IN CATALOG OR REQUIRED FOR THE WORK.

FLUSH VALVES SHALL BE SLOAN, DELANEY OR ZURN.

HOSE BIBBS SHALL BE WOODFORD, CHICAGO, ZURN, OR J.R. SMITH, ALL WITH VACUUM BREAKERS.

SPECIALTIES SHALL BE ZURN, J.R. SMITH, WADE OR JOSAM.

INSTALL A WATER HAMMER ARRESTOR AT ENDS OF WATER SUPPLY LINES FOR EACH SINGLE, DOUBLE, OR LIE OF FLUSHING VALVES. SIZE ACCORDING TO J.R. SMITH SIZING TABLES. ALL ARESTORS NOT IN AN ACCESSIBLE AREA SHALL BE PROVIDED WITH 12" SQUARE ACCESS OPENING, WITH CHROME BRONZE FRAME AND SECURED STAINLESS STEEL COVER: SMITH #4730 WITH TAMPER PROOF SCREWS. JOSAM, ZURN, WADE AND SIOUX CHIEF ARE ACCEPTABLE.

PLUMBING FIXTURES SHALL BE AS SCHEDULED ON THE DRAWINGS.

PLUMBING TRIM:

ALL PLUMBING TRIM SHALL BEAR THE U.P.C. SEAL.

TRAPS: PROVIDE TRAPS ON ALL FIXTURES EXCEPT FIXTURES WITH INTEGRAL TRAPS. EXPOSED TRAPS CHROMIUM PLATED CAST BRASS OR 17 GAUGE CHROMIUM PLATED BRASS TUBING. DEARBORN, BRASS-CRAFT, OR FROST.

SUPPLY PIPES WITH STOPS: FIRST QUALITY, CHROME PLATED, STOPS SHALL HAVE FEMALE I.P.S. INLETS. KOHLER, ELJER, CHICAGO, BRASS-CRAFT OR EASTMAN.

CLOSET SEATS: SOLID WHITE REINFORCED PLASTIC, OPEN FRONT, HINGE WITH INSERT MOLDED INTEGRALLY IN SEAT, CONCEALED CHECK. OLSONITE, CHURCH, OR BENEKE.

HOT WATER RECIRCULATING PUMPS:

HORIZONTAL, OIL LUBRICATED, ALL BRONZE TYPE, SPECIFICALLY DESIGNATED AND GUARANTEED FOR QUIET OPERATION, SUITABLE FOR 125 PSI, WORKING PRESSURE, SHAFT GROUND AND POLISHED STEEL WITH INTEGRAL THRUST COLLAR, SUPPORTED BY TWO OIL CIRCULATING SLEEVE BEARINGS. PROVIDE MECHANICAL SEAL WITH CARBON ON CAST IRON OR CERAMIC SEAL FACES. OPEN, DRIP-PROOF, SLEEVE-BEARING, RUBBER-MOUNTED MOTOR WITH BUILT-IN THERMAL OVERLOAD PROTECTION. THE MOTOR SHALL BE NON-OVER-LOADING AT ANY POINT ON THE PUMP CURVE.

ACCEPTABLE MANUFACTURERS: BELL AND GOSSET, ARMSTRONG, THRUSH, OR TACO.

ALL OTHER MATERIALS:

NOT SPECIFICALLY DESCRIBED BUT REQUIRED FOR COMPLETE AND OPERATING FACILITY, SHALL BE NEW, FIRST QUALITY OF THEIR RESPECTIVE KINDS AND SUBJECT TO THE APPROVAL OF THE ENGINEER.

PART 3 - EXECUTION:

INSTALLATION:

GENERAL: DO NOT COVER-UP OR ENCLOSE WORK UNTIL IT HAS BEEN PROPERLY AND COMPLETELY INSPECTED AND APPROVED.

VALVES: PROVIDE VALVES AT EQUIPMENT AND ON BRANCH PIPE CONNECTIONS TO MAINS AND WHERE SHOWN ON THE DRAWINGS. INSTALL VALVES IN ACCESSIBLE LOCATIONS. PROVIDE VALVES FOR DRAINING ENTIRE DOMESTIC WATER SYSTEM.

PIPING INSTALLATION:

GENERAL: REFER TO SECTION 15050, BASIC MATERIALS AND METHODS.

SANITARY WASTE PIPING: SLOPE AT UNIFORM GRADE OF 1/4 INCH PER FOOT UNLESS NOTED OTHERWISE. MAKE CHANGES IN SIZE WITH REDUCING AND WYE FITTINGS. RUN EXPOSED PIPING PARALLEL OR PERPENDICULAR TO BUILDING STRUCTURE.

VENT PIPING: HORIZONTAL RUNS FREE OF DROPS AND SLOPED TO DRAIN TO DRAINAGE SYSTEM. PROVIDE LEAD FLASHING AT VENT PENETRATIONS THROUGH ROOF.

CONNECTION TO SITE WATER MAIN:

OTHERS WILL INSTALL THE SITE WATER MAIN AND LEAVE A STUB APPROXIMATELY FIVE FEET OUTSIDE THE BUILDING. THE CONTRACTOR SHALL MAKE THE FINAL CONNECTION BETWEEN THE SITE WATER MAIN AND THE BUILDING WATER SERVICE LINE. PROVIDE METER BOX, WATER METER, AND VALVING AS REQUIRED BY THE AUTHORITIES. ANY FEES CHARGED BY THE GOVERNING AUTHORITY SHALL BE PAID BY THIS CONTRACTOR.

CONNECTION TO SITE SEWER MAIN:

OTHERS WILL INSTALL THE SITE SEWER MAIN AN LEAVE A STUB APPROXIMATELY FIVE FEET FROM THE BUILDING. THIS CONTRACTOR SHALL MAKE THE FINAL CONNECTION BETWEEN THE SITE SEWER MAIN THE BUILDING SEWER MAIN.

CONNECTION TO NATURAL GAS SERVICE:

ARRANGE WITH THE LOCAL FUEL SUPPLY CO. TO RUN THE GAS YARD LINES AND PROVIDE AND SET THE METER SETS. PROVIDE CONCRETE PAD AS REQUIRED BY THE GAS COMPANY. ANY AND ALL FEES OR CHARGES ASSESSED BY THE GAS COMPANY SHALL BE PAID BY THIS CONTRACTOR.

CAULKING:

CAULK AROUND ALL PLUMBING FIXTURES AT FLOORS AND WALLS WITH WHITE FLEXIBLE CAULKING COMPOUND.

PIPING TESTS:

NOTIFY ARCHITECT AND LOCAL PLUMBING INSPECTOR 2 DAYS BEFORE TEST. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE SURE THE WORK WILL STAND THE TEST PRESCRIBED BEFORE GIVING THE NOTIFICATION.

DRAINAGE, WASTE AND VENT PIPING: TEST IN ACCORDANCE WITH UNIFORM STATE PLUMBING CODE, SECTION 318.

WATER PIPING: ELIMINATE AIR FROM SYSTEM. FILL AND TEST AT 100 PSIG FOR A PERIOD OF TWO HOURS WITH NO LOSS IN PRESSURE.

NATURAL GAS PIPING: TEST IN ACCORDANCE WITH CURRENT ADOPTED PLUMBING CODE.

ANCHOR ALL WATER PIPES SERVING FIXTURES AND OR FLUSH VALVES SOLIDLY IN THE WALL OR PARTITION. IF AT ANY JOB REVIEW IT IS POSSIBLE TO MOVE THESE PIPES, THE CONTRACTOR WILL BE HELD RESPONSIBLE TO BREAK INTO THE WALL, ANCHOR THE PIPE, AND REPAIR AND PAINT THE WALL AS REQUIRED.

AFTER FIXTURES HAVE BEEN SET, THIS CONTRACTOR SHALL CAREFULLY PROTECT THEM FROM DAMAGE UNTIL THE BUILDING IS OCCUPIED BY THE OWNER. ANY DAMAGE TO FIXTURES AND/OR PIPING PRIOR TO OCCUPANCY BY THE OWNER OR FINAL ACCEPTANCE SHALL BE REPAIRED AT NO COST TO THE OWNER.

FIXTURES SHALL NOT BE USED BY CONSTRUCTION PERSONNEL UNLESS APPROVED IN WRITING BY THE ARCHITECT.

INSTALLATION OF GAS FIRED WATER HEATER:

INSTALL GAS FIRED WATER HEATER AS SHOWN ON THE DRAWINGS. CONNECT TO WATER LINES AND L.P. GAS LINE.

RUN A DRAIN LINE FROM THE RELIEF VALVE TO THE FLOOR DRAIN. DRAIN LINE SHALL BE FULL SIZE OF THE RELIEF VALVE.

WATER PIPE STERILIZATION:

UPON COMPLETION OF ALL TEST AND REPAIRS, ALL DOMESTIC WATER PIPING SHALL BE DISINFECTED IN ACCORDANCE WITH THE REQUIREMENTS OF CURRENT CODE AND STATE BOARD OF HEALTH. CERTIFICATION OF COMPLETION OF TEST SHALL BE PRESENTED TO THE ARCHITECT.

INSTALLATION OF SAND AND GREASE INTERCEPTOR:

DO ALL REQUIRED EXCAVATION AND BACKFILL REQUIRED. SET THE INTERCEPTOR ON SOLID UNDISTURBED EARTH AT THE PROPER ELEVATION.
DO ALL REQUIRED PIPING.

CLEANING:

REMOVE ALL DEBRIS FROM JOB SITE CAUSED BY THIS CONTRACTOR.

JUST PRIOR TO THE ACCEPTANCE OF JOB BY OWNER, CLEAN ALL PLUMBING FIXTURES AND REMOVE ALL LABELS.

SECTION 15800 - HEATING, VENTILATING AND COOLING:

PART 1 GENERAL

RELATED DOCUMENTS:

THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND GENERAL REQUIREMENTS (IF ANY) APPLY TO THE WORK SPECIFIED IN THIS SECTION.

REQUIREMENTS OF SECTION 15010 APPLY TO THIS SECTION.

REQUIREMENTS OF SECTION 15050 APPLY TO THIS SECTION.

DESCRIPTION OF WORK:

THE WORK UNDER THIS SECTION INCLUDES THE FURNISHING OF ALL LABOR, MATERIALS, EQUIPMENT, TRANSPORTATION, AND SERVICES INCLUDED IN THE FOLLOWING H.V. & A.C. CLASSIFICATIONS:

DUCTWORK
DUCT SPECIALTIES
DUCT ACOUSTICAL LINING
ROUND FLEXIBLE ACOUSTICAL DUCT
DIFFUSER AND GRILLE BOXES
MANUAL BALANCING DAMPERS
FIRE DAMPERS
WEATHER LOUVERS
GAS FLUES
ROOF TYPE EXHAUST FANS
CEILING TYPE EXHAUST FANS
AIR DIFFUSERS
AIR GRILLES
ROOFTOP HEATING AND COOLING UNITS
EVAPORATIVE COOLING UNITS
SURFACE CONDITIONS
INSTALLATION OF DUCTS
INSTALLATION OF ACOUSTICAL DUCT LINER
INSTALLATION OF DIFFUSER AND GRILLE BOXES
INSTALLATION OF WEATHER LOUVERS
INSTALLATION OF ROOFTOP HOODS
INSTALLATION OF DAMPERS
INSTALLATION OF GAS FIRED UNIT HEATERS
INSTALLATION OF ROOFTOP EXHAUST FANS
INSTALLATION OF CEILING TYPE EXHAUST FANS
INSTALLATION OF ROOFTOP HEATING AND COOLING UNITS
TEMPERATURE CONTROL
CLEANING
AIR SYSTEM BALANCING

QUALIFICATION OF WORKMEN:

USE SUFFICIENT JOURNEYMAN MECHANICS AND SUPERVISORS IN THE EXECUTION OF THIS PORTION OF THE WORK TO INSURE PROPER AND ADEQUATE INSTALLATION OF THE WORK THROUGHOUT.

PRODUCT HANDLING:

PROTECTION: USE ALL MEANS NECESSARY TO PROTECT MATERIALS BEFORE, DURING, AND AFTER INSTALLATION.

REPLACEMENT: IN THE EVENT OF DAMAGE, IMMEDIATELY MAKE ALL REPAIRS AND REPLACEMENTS NECESSARY.

PART 2 - PRODUCTS

DUCT WORK: ABOVEGROUND:

ALL DUCTWORK SHOWN SHALL BE CONSTRUCTED FROM GALVANIZED SHEET AND SHALL BE CONSTRUCTED TO CONFORM WITH SMACNA "DUCT CONSTRUCTION STANDARDS" FOR 2" W.C. STATIC PRESSURE RATING.

FABRICATE FROM ZINC-COATED LOCK FORMING QUALITY STEEL SHEETS CONFORMING TO ASTM-A527-80, "SHEET STEEL ZINC-COATED (GALVANIZED) BY THE HOT-DIP PROCESS, LOCK FORMING QUALITY", WITH TYPE "G" COATING.

JOINTS: DUCTS WITH SIDES UP TO 24" SHALL CONFORM WITH SMACNA "DUCT CONSTRUCTION STANDARDS" FOR 2" STATIC PRESSURE RATING.

DUCTS WITH SIDES 24" TO 48" TRANSVERSE DUCT JOINT SYSTEM BY DUCTMATE/25 OR NEXUS (SMACNA "E" TYPE CONNECTION).

LONGITUDINAL JOINTS AND JOINTS BETWEEN ROUND AND/OR FLAT OVAL DUCTS AND RECTANGULAR DUCTS SHALL BE SEALED BY THE USE OF TWO LAYERS OF "HARDCAST" TAPE INSTALLED WITH "HARDCAST HC-20" ADHESIVE ACCORDING TO THE MANUFACTURER INSTRUCTIONS.

ROUND AND/OR FLAT OVAL DUCTS: SHALL BE GALVANIZED, LIGHT GAUGE, SPIRAL PIPE CONFORMING TO SMACNA "DUCT CONSTRUCTION STANDARDS" FOR 2" STATIC PRESSURE RATING. ALL FITTINGS, TEES, ELBOWS, ETC., SHALL BE FACTORY FABRICATED. THE MAKING OF FITTINGS ON THE JOB AND BY THE USE OF DOVETAIL JOINTS WILL NOT BE ALLOWED.

ALL CONNECTIONS BETWEEN ROUND DUCTS AND RECTANGULAR DUCTS SHALL BE MADE BY USING SPIN-IN FITTINGS.

ROUND FLEXIBLE ACOUSTICAL DUCT:

SHALL BE FOR MINIMUM 2" W.C. WORKING PRESSURE. DUCT SHALL HAVE A FULL INTERIOR LINER TO PREVENT DIRECT EXPOSURE OF FIBERGLASS TO THE AIR STREAM. THE LINER SHALL BE BONDED TO A CORROSIVE RESISTANT GALVANIZED STEEL HELIX. THE OUTSIDE JACKET, VAPOR BARRIER, SHALL BE A SEAMLESS COPOLYMER SLEEVE ENCLOSING A NOMINAL ONE INCH THICK BY ONE POUND PER CUBIC FOOT DENSITY FIBERGLASS INSULATION. EACH SECTION SHALL HAVE FACTORY INSTALLED COLLARS WITH INTEGRAL CLAMPING DEVICES. ENTIRE ASSEMBLY SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL-181 CLASS 1 AIR DUCT MATERIAL.

DUCT INSERTION LOSS OF UNIT SHALL NOT BE POORER THAN THAT CATALOGED FOR GENFLEX-IL.

OTHER ACCEPTABLE MANUFACTURERS ARE FLEXIBLE TUBING CORP. AND WIREMOLD.

DUCT SPECIALTIES:

STANDARD TURN VANES: NON-ADJUSTABLE 90 DEGREE AIR TURN, 26 GAUGE GALVANIZED STEEL BLADE, 24 GAUGE GALVANIZED STEEL SIDE RAIL. VANES 2-1/2:" ON CENTER. H-E-P HIGH EFFICIENCY PROFILE AS MANUFACTURED BY AERO-DYNE CO. OR EQUAL BY CONTRACTOR.

ACCESS DOORS IN METAL WORK: PROVIDE 12" X 12" ACCESS DOORS FOR ACCESS TO EVERY PART OF FIRE DAMPERS COILS AND OTHER ITEMS REQUIRING MAINTENANCE OR INSPECTION AND WHERE SHOWN ON THE DRAWINGS.

DUCT ACOUSTICAL LINING:

INSULATION SHALL BE 1" THICK FIBERGLASS DUCT LINING MEETING THE REQUIREMENTS OF ASTM C 1071, TYPE I. THE LINER MATERIAL SHALL HAVE A MINIMUM NRC OF 0.65 AS TESTED PER ASTM C 423 USING AN "A" MOUNTING OR A MINIMUM OF 0.75 USING AND "E" MOUNTING ALONG WITH A MINIMUM "K" FACTOR OF 0.25 OR AN "R" VALUE OF 6.0. THE LINER SHALL MEET THE LIFE SAFETY STANDARDS AS ESTABLISHED BY NFPA 90A AND 90B.

ACCEPTABLE PRODUCTS: MANVILLE "LINACOUSTIC, C.S.G. "ULTRALITE", O.C.F. "AEROFLEX" AND MANVILLE "SPIRACOUSTIC."

DIFFUSER AND GRILLE BOXES:

PROVIDE SHEET METAL BOXES FOR ALL CEILING DIFFUSERS AND CEILING GRILLES AS DETAILED ON THE DRAWINGS. LINE BOXES WITH 1" THICK ACOUSTICAL DUCT LINER USING 100% ADHESIVE AND MECHANICALLY PINNED ON 12" CENTERS.

MANUAL BALANCING DAMPERS:

SHALL BE OF THE SINGLE-BLADE TYPE, 16 GAUGE GALVANIZED STEEL BLADES, 3/8" SQUARE CONTINUOUS SHAFTS "U" BOLTED TO THE BLADES, YOUNG 3/8" CLOSED AND BEARING, YOUNG 3/8" OPEN END, BEARING OR QUADRANT TYPE DAMPER REGULATOR, BODY CONSTRUCTED OF GALVANIZED STEEL, 22 GAUGE UP TO 15" DIAMETER, 20 GAUGE 15" TO 20" DIAMETER, 16 GAUGE ABOVE 20" DIAMETER. PROVIDE SAMPLE DAMPER TO ENGINEER.

1. MANUAL BALANCING DAMPERS LOCATED ABOVE GYPSUM BOARD CEILINGS SHALL BE PROVIDED WITH FLUSH MOUNTED YOUNG ADJUSTABLE CEILING REGULATORS. PROVIDE RIGHT ANGLE GEAR OPERATORS IF REQUIRED. REGULATOR PLATES SHALL BE FURNISHED IN OFF-WHITE FINISH TO MATCH THE CEILING.
2. MANUAL BALANCING DAMPERS LOCATED ABOVE LAY-IN CEILINGS OR IN ACCESSIBLE SPACES SHALL BE PROVIDED WITH LOCKING QUADRANTS. DURO-DYNE MODEL K-5.

WEATHER LOUVERS:

GENERAL: FURNISH AND INSTALL OF SIZES AND WHERE SHOWN ON THE DRAWING STATIONARY EXTRUDED ALUMINUM WEATHER LOUVERS, AMERICAN WARMING MODEL LF-31 OR APPROVED EQUAL. FASTEN SECURELY INTO THE OPENINGS.

LOUVERS: SHALL BE 6' DEEP WITH EXTRUDED BLADES AND GRAMES OF NOT LIGHTER THAN 0.081" THICK 6063-T5 ALLOY.

BLADES SHALL BE ON 3-1/2" CENTERS WITH TWO (2) REINFORCING V'S AND INTEGRAL DOWN SPOUTS TO DRAIN THE WATER FROM THE BLADES.

PERFORMANCE: LOUVERS SHALL PASS 100 FPM FREE AREA VELOCITY WITH LESS THAN 0.2" OF W.G. PRESSURE DROP AND SHALL CARRY LESS THAN 0.03 OZ. OF WATER PER SQ. FT. DURING A 15 MINUTE PERIOD WHEN TESTED IN ACCORDANCE WITH AMCA CERTIFIED RATING SEAL FOR BOTH AIR PERFORMANCE AND WATER PENETRATION.

SCREENS: SCREENS SHALL BE INSTALLED ON THE INTERIOR SIDE AND HAVE EXTRUDED ALUMINUM "U" FRAMES WITH ½ MESH 0.063" DIAMETER ALUMINUM WIRE.

FINISH: LOUVERS SHALL HAVE A 204-R1 ETCH AND ANODIZED FINISH WITH ONE (1) COAT OF METHACRYLATE LACQUER.

GAS FUELS: FOR ATMOSPHERIC GAS BURNERS

METALBESTOS MODEL "RV" OR "GC", TYPE "B" COMPLETE WITH ROOF FLASHING, STORM COLLAR, CLEAN-OUT, INSPECTION CAP, AND BREIDART TYPE "L" WEATHER CAP. COORDINATE WITH THE ROOFING CONTRACTOR TO INSURE THAT THE PROPER UNIT IS FURNISHED TO INTERFACE WITH THE ROOFING BEING FURNISHED. FLUES SHALL BE U.L. APPROVED. DURA-VENT OR AMERI-VENT ACCEPTABLE.

CEILING TYPE EXHAUST FANS:

SHALL BE DIRECT DRIVE, CENTRIFUGAL CABINET FAN UNIT, COMPLETE WITH SLOW-SPEED CUSHION-BASE MOTORS, COIL SPRING MOUNTING OF ALL ROTATING COMPONENTS, INTERNAL ACOUSTICAL INSULATION, SOUND TRAP, AND GRILLE AND ACCESS PANEL. UNITS SHALL BEAR AMCA AND UL SEALS.

MOTORS SHALL BE FOR OPERATION AND 1 PHASE, 60 CYCLE, 115 VOLT CURRENT, SHALL HAVE SLEEVE BEARINGS WITH WOOL PACKED OIL RESERVOIRS, AND SHALL HAVE CUSHION BASES.

INTAKE GRILLES SHALL HAVE PERFORATED FACE, EXTRUDED ALUMINUM FRAME, IN OFF-WHITE BAKED ENAMEL FINISH.

PROVIDE WALL CAPS AND/OR ROOF CAPS AS SHOWN ON THE DRAWINGS. UNITS SHALL HAVE THE CAPACITIES AS SHOWN ON THE DRAWINGS, AND SHALL BE PENN XEPHYR, COOK OR JENN-AIR.

AIR DIFFUSERS:

GENERAL: DIFFUSER SIZING BASED ON AIR BEING INTRODUCED AT 25 DEGREES F. TEMPERATURE DIFFERENTIAL, AND AIR BEING DIFFUSED AT THE FIVE FOOT LEVEL TO A VELOCITY NOT GREATER THAN 50 FPM. DIFFUSERS SELECTED SO AS NOT TO EXCEED THE NC-35 CURVE. MANUFACTURER SHALL GUARANTEE TO MEET THE ABOVE PERFORMANCE FACTORS AND REPLACE ALL DIFFUSERS WHERE REQUIRED.

ACCEPTED MANUFACTURERS: ANEMOSTAT, J&J REGISTER, CRANES TUTTLE & BAILEY, KRUEGER AND TITUS.

CEILING DIFFUSERS MARKED "CD": SHALL BE OF LOUVER FACE TYPE WITH THE REQUIRED AIR DIFFUSION PATTERN, SHALL HAVE FACTORY APPLIED PANEL PAINTED OT MATCH LOUVERED FACE, ARRANGED TO MOUNT IN 2' X2' LAY-IN "T" BAR CEILING. IN OFF-WHITE BAKED ENAMEL FINISH. SIZES AND DIFFUSION PATTERN AS SHOWN ON THE DRAWINGS. ANEMOSTAT MODEL "DL".

FIRE DAMPERS AND FIRE RESISTANT BLANKETS: ALL DIFFUSERS INSTALLED IN FIRE RATED CEILINGS SHALL BE PROVIDED WITH FIRE DAMPERS AND FIRE RESISTANT MINERAL WOOL BLANKETS. SEE DETAIL ON THE DRAWINGS.

AIR GRILLES:

GENERAL: GRILLES SELECTED SO AS NOT TO EXCEED THE NC-35 CURVE. MANUFACTURER SHALL GUARANTEE TO MEET THE ABOVE PERFORMANCE OR REPLACE ALL GRILLES WHERE REQUIRED.

ACCEPTABLE MANUFACTURER: ANEMOSTAT, J&J REGISTER, CRANES, TUTTLE & BAILEY, TITUS, AND KRUEGER.

CEILING RETURN AIR GRILLES MARKED "RG": SHALL BE OF THE LOUVERED FACE TYPE, FULL 23-1/2" X 23-1/2" FACE SHALL BE LOUVERED, ARRANGED TO MOUNT IN 2' X 2' LAY-IN "T BAR" CEILINGS. FURNISH IN OFF-WHITE BAKED ENAMEL FINISH. ANEMOSTAT MODEL "DF-FULL".

CEILING RETURN AIR GRILLES MARKED "RG-1": SHALL BE OF THE LOUVERED FACE TYPE, FOUR WAY PATTERN, WITH FLANGE FRAME ARRANGED TO SURFACE MOUNT IN GYPSUM BOARD CEILINGS. FURNISH IN OFF-WHITE BAKED ENAMEL FINISH. SIZES AS SHOWN ON THE DRAWINGS. ANEMOSTAT MODEL "DF".

CEILING EXHAUST AIR GRILLE MARKED "EG-1": SHALL BE OF THE EGG CRATE TYPE, 1/2" X1/2" X 1/2" EXTENDED ALUMINUM CORE 0.025" THICK. FRAME 0.055" THICK EXTENDED ALUMINUM, FLANGED FOR SURFACE MOUNTING I GYPSUM BOARD CEILINGS. ANEMOSTAT MODEL "GC5".

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
August 2, 2021

REVISIONS:

No.	Date	Description

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PATRICK T. CANTRELL
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PROFESSIONAL ENGINEER
08-02-2021

MECHANICAL & PLUMBING SPECIFICATIONS

MP7.4

JZW ARCHITECTS

FIRE DAMPERS AND FIRE BLANKETS: ALL GRILLES INSTALLED IN FIRE RATED CEILINGS, WALLS, AND PARTITION SHALL BE PROVIDED WITH FIRE DAMPERS AND FIRE RESISTANT MINERAL WALL BLANKETS. SEE DETAILS ON THE DRAWINGS.

SINGLE ZONE ROOFTOP AIR CONDITIONING UNIT:

GENERAL: FURNISH AND INSTALL WHERE SHOWN ON THE DRAWINGS A ROOFTOP A.C. UNIT. UNIT SHALL BE COMPLETELY FACTORY ASSEMBLED, PIPED, WIRED, TESTED AND SHIPPED IN ONE PIECE WITH A SINGLE POINT POWER CONNECTION. OUTSIDE AIR SYSTEM, RETURN AIR SYSTEM, FILTERS, SWITCHES, SUPPLY AIR FAN SYSTEM AND ALL STANDARD OPERATING SAFETY CONTROLS SHALL BE FURNISHED AND FACTORY INSTALLED. UNITS SHALL BE SPECIFICALLY DESIGNED FOR OUTDOOR ROOFTOP APPLICATION AND INCLUDE A WEATHERPROOF CABINET.

UNIT SHALL BE FOR DIRECT EXPANSION COOLING WITH NATURAL GAS HEAT. ALL UNITS SHALL BE SHIPPED FULLY CHARGED WITH REFRIGERANT 22.

UNIT SHALL HAVE DECALS AND TAGS TO INDICATE CAUTION AREAS AND AID UNIT SERVICE. AN ELECTRICAL WIRING DIAGRAM SHALL BE ATTACHED TO CONTROL PANELS. INSTALLATION AND MAINTENANCE BULLETINS SHALL BE SUPPLIED WITH EACH UNIT. UNITS SHALL BE APPROVED BY U.L. OR A.G.A.

CABINET CASING AND FRAME: THE CABINET SHALL BE CONSTRUCTED FROM HEAVY GAUGE GALVANIZED STEEL, TREATED WITH A FOUR STEP METAL PREPARATION INCLUDING PHOSPHATE AND CHROMIC WASHED AND FINISHED WITH A BAKED ACRYLIC ENAMEL. UNIT SHALL BE EQUIPPED WITH INDIVIDUALLY REMOVABLE EXTERIOR PANELS AND AN ELECTRIC COMPARTMENT HINGED ACCESS PANEL WITH QUICK RELEASE FASTENERS TO PROVIDE A POSITIVE WEATHER TIGHT SEAL. UNIT SHALL BE DESIGNED FOR BOTTOM SUPPLY AND RETURN. HEAVY DENSITY FIBERGLASS INSULATION SHALL BE PERMANENTLY FASTENED TO THE CABINET INTERIOR AND COATED WITH NEOPRENE.

REFRIGERATION SYSTEM: UNIT SHALL BE FURNISHED WITH A DIRECT EXPANSION SYSTEM INCLUDING A FACTORY CHARGE OF R-22, COILS FABRICATED OF ALUMINUM FINS BONDED TO SEAMLESS COOPER TUBES, REFRIGERANT METERING DEVICE AND LIQUID LINE FILTER-DRIER. COMPRESSOR SHALL BE HEAVY DUTY RECIPROCATING, FULL OR SEMI-HERMETIC TYPE WITH INTERNAL OVERLOAD PROTECTION, CRANKCASE HEATERS, OIL FAILURE PROTECTION AND HIGH AND LOW PRESSURE CUTOUTS.

UNIT SHALL BE PROTECTED FROM SHORT CYCLING BY A FACTORY INSTALLED TIMING CIRCUIT THAT PREVENTS COMPRESSOR RESTART FOR A PERIOD OF FIVE MINUTES. LOW AMBIENT OPERATION TO 0 DEGREES F. SHALL BE PROVIDED.

UNIT SHALL BE PROVIDED WITH PROPERLY SIZED SUCTION LINE FILTER-DRIERES AND REFRIGERATION CONTROLS TO PROVIDE RECYCLING PUMP DOWN.

HEATING SECTION: HEATER SHALL BE AN INDIRECT FIRED, MULTIPLE MODULE GAS FURNACE WITH AUTOMATIC SPARK IGNITION, SUITABLE FOR NATURAL GAS OPERATION. FURNACE SHALL HAVE A POWER FORCED DRAFT COMBUSTION SYSTEM, WITH VENT OR FAN ON INLET TO HEAT EXCHANGER, OUT OF THE HOT GAS AIRSTREAM.

CONTROLS SHALL INCLUDE A PILOT VALVE, AUTOMATIC COMBINATION MAIN GAS VALVE AND PRESSURE REGULATOR, COMBINATION FAN CYCLE CONTROL THERMOSTAT, VENT OR MOTOR PROTECTION BY CENTRIFUGAL SWITCHES, HIGH LIMIT THERMOSTAT FLAME SENSOR AND AUTOMATIC RELIGHT SYSTEM.

GAS HEATING UNIT SHALL BE AGA APPROVED.

SUPPLY FAN SECTION: SUPPLY FAN SHALL BE FORWARD CURVED, DOUBLE INLET CENTRIFUGAL TYPE. UNIT SHALL BE BELT DRIVEN BY A PERMANENTLY LUBRICATED MOTOR WITH INHERENT OVERLOAD PROTECTION. THE MOTOR SHALL HAVE A VARIABLE PITCH SHEAVE AND ADJUSTABLE BASE FOR PROPER ALIGNMENT AND BELT TENSION ADJUSTMENT.

FILTER SECTION: THE FILTER SECTION SHALL BE SUPPLIED COMPLETE WITH GALVANIZED STEEL FILTER RACKS AS AN INTEGRAL PART OF THE UNIT. PANEL FILTERS SHALL BE 2" THICK THROWAWAY GLASS FIBER, 35% EFFICIENT PLEATED, MOUNTED IN A GALVANIZED STEEL FILTER FRAME.

OUTSIDE AIR SECTION: SHALL BE ARRANGED WITH ECONOMIZER CONTROL. 0 TO 100% OUTSIDE AIR ECONOMIZER CONTROL SHALL CONSIST OF LOW LEAK OUTSIDE, RETURN AIR ADN EXHAUST AIR DAMPERS, ADJUSTABLE POTENTIOMETER, DAMPER MOTOR AND AN ADJUSTABLE ENTHALPY CONTROLLER MOUNTED IN THE OUTSIDE AIRSTREAM. THE ADJUSTABLE POTENTIOMETER SHALL CONTROL THE MINIMUM OUTSIDE AIR DAMPER POSITION FOR FRESH AIR REQUIREMENTS. AN ENTHALPY CONTROLLER SHALL BE PROVIDED TO SENSE THE DRY BULB TEMPERATURE AND RELATIVE HUMIDITY OF THE OUTSIDE AIR FOR USE IN COOLING. THE ENTHALPY CONTROLLER SHALL PREVENT COMPRESSOR OPERATION WHEN THE OUTSIDE AIR TEMPERATURE AND HUMIDITY CAN SATISFY THE COOLING LOAD. THE DAMPER MOTOR SHALL BE OF THE MODULATING SPRING RETURN TYPE TO CLOSE THE OUTSIDE AIR DAMPER WHEN THE UNIT IS NOT OPERATING.

A SINGLE SPEED CENT. REFLIEF FAN SHALL BE PROVIDED FOR THE ECONOMIZER SYSTEMS AND SHALL BE LOCATED IN THE RETURN AIR SECTION TO EXHAUST RETURN AIR OUT THE BACK OF THE UNIT. EXHAUST LOUVERS AND BIRD SCREEN SHALL BE PROVIDED TO PREVENT INFILTRATION. EXHAUST DAMPERS SHALL BE ALIGNED WITH URETHANE GASKETING ON THE CONTACT EDGES.

ELECTRICAL: UNIT SHALL BE WIRED AND TESTED AT THE FACTORY BEFORE SHIPMENT. WIRING SHALL COMPLY WITH NEC REQUIREMENTS AND SHALL CONFORM TO ALL APPLICABLE U.L. STANDARDS. ALL WIRING SHALL BE NUMBER CODED PER THE ELECTRICAL WIRING DIAGRAMS. ALL ELECTORAL COMPONENTS SHALL BE LABELED ACCORDING TO THE ELECTORAL DIAGRAM AND BE U.L. RECOGNIZED WHERE APPLICABLE. EACH UNIT SHALL HAVE A 24 VOLT CONTROL CIRCUIT TRANSFORMER AND CONTROL CIRCUIT FUSE.

THE SUPPLY AIR FAN, COMPRESSOR AND CONDENSER FAN MOTOR BRANCH CIRCUITS SHALL BE FURNISHED FOR EACH COMPRESSOR AND CONDENSER FAN MOTOR. THE SUPPLY AIR FAN MOTORS SHALL HAVE CONTRACTOR AND OVERLOAD PROTECTION. MAIN CONTROL PANELS SHALL BE OF WEATHERPROOF CONSTRUCTION WITH HINGED ACCESS PANEL AND QUICK-RELEASE LATCHES.

A TERMINAL BOARD SHALL BE PROVIDED FOR THE LOW VOLTAGE CONTROL WIRING. KNOCKOUTS SHALL BE PROVIDED IN THE BOTTOM OF THE MAIN CONTROL PANEL FOR FIELD WIRING ENTRANCE.

A DISCONNECT SWITCH SHALL BE PROVIDED TO CUT POWER TO THE ENTIRE UNIT FOR SERVICING.

TEMPERATURE CONTROLS: UNITS SHALL BE PROVIDED WITH ELECTROMECHANICAL TEMPERATURE CONTROL SYSTEMS. ALL TEMPERATURE CONTROL SYSTEM COMPONENTS SHALL BE COMPLETELY FACTORY WIRED AND TESTED WITH WALL THERMOSTAT.

ROOM THERMOSTAT SHALL BE PROGRAMMABLE TYPE, ONE STAGE HEATING AND ONE STAGE COOLING.

ROOF CURB: PREFABRICATED 14 GAUGE GALVANIZED STEEL ROOF CURB DESIGNED AND MANUFACTURED BY THE UNIT MANUFACTURER SHALL BE PROVIDED FOR FIELD INSTALLED ON THE CURB, TO FORM A POSITIVE WEATHER TIGHT SEAL BETWEEN THE CURB AND UNIT. DESIGN SHALL COMPLY WITH ALL REQUIREMENTS WITH THE NATIONAL ROOF CURB CONTRACTORS ASSOCIATION. CURB SHALL BE OF THE FULL PERIMETER TYPE.

ACCEPTABLE MANUFACTURERS: MCQUAY, TRANE, CARRIER, YORK, AND LENNOX.

EVAPORATIVE COOLING UNIT (IF APPLICABLE):

FURNISH AND INSTALL ON THE ROOF AS SHOWN ON THE DRAWINGS AN EVAPORATIVE COOLING UNIT. CAPACITY AS SCHEDULED ON THE DRAWINGS.

CABINETS SHALL BE CONSTRUCTED OF HOT DIP GALVANIZED STEEL. WATER RESERVOIR SHALL BE OF 18 GAUGE STEEL WITH WELDED SEAMS. THE INTERIOR OF THE WATER RESERVOIR SHALL BE TREATED WITH A RUST INHIBITING UNDERCOATING.

THE EVAPORATIVE MEDIA SHALL BE EIGHT INSULAR THICK CROSS-CORRUGATED CELLULOSE PADS.

WATER SHALL BE DISTRIBUTED TO PADS VIA LARGE DIAMETER BUTYRATE PLASTIC CONDUIT AND TWO TIERS OF WATER TROUGHS. PUMPS SHALL BE EVAPORATIVE COOLER PUMPS IWHT CENTRIFUGAL IMPELLER. PUMP SHALL BE UL LISTED. MAKE-UP WATER SHALL BE THROUGH A METERING FLOAT VALVE.

PROVIDE FACTORY SET WATER BLEED KIT OT PURGE WATER TO REDUCE SOLIDS.

FAN SHALL BE FORWARD CURVED, DOUBLE INLET CENTRIFUGAL TYPE WITH HEAVY DUTY 18 GAUGE STEEL BLADES, WITH WELDED AND RIVETED JOINT OF BLADE TO OUTER RIM. WHEEL SHALL BE KEYED TO THE SHAFT.

V-BELT DRIVE SHALL BE OF THE HEAVY DUTY TYPE WITH TWO GROOVE SHEAVES AND TOW V-BELTS.

MOTOR SHALL BE 3 PHASE, 60 HERTZ, 460 VOLT, 1750 RPM DESIGNED FOR USE IN EVAPORATIVE COOLERS. CONFIRM WITH PLANS IF 208/3.

CAPACITY SHALL BE AS SCHEDULED ON THE DRAWINGS.

ACCEPTABLE MANUFACTURERS: CHAMPION, MCGRAW EDISON, ARCTIC CIRCLE, ALPINE.

ROOFTOP RELIEF AIR HOOD RH-1.

GENERAL: PROVIDE ROOF LOUVERS HOUSES AS SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED. SIZES SHALL BE AS SHOWN ON THE DRAWINGS.

FRAMES: 6" DEEP CHANNEL, 0.081" THICK 6063-T5 EXTRUDED ALUMINUM ALLOY.

BLADES: 0.081" THICK 6063-T5 EXTRUDED ALUMINUM ALLOY 6-¾" SPACING BETWEEN BLADES.

BIRD SCREEN: 1/2" BASKET WEAVE 0.063" DIAMETER ALUMINUM WIRE IN AN EXTRUDED ALUMINUM FRAME, SECURE TO INTERIOR SIDE OF LOUVERS WITH STAINLESS STEEL SHEET METAL SCREWS.

ROOF: 0.081" THICK 3003-H 14 ALUMINUM WITH ASBESTOS MEMBRANE UNDERCOATING; 12 GAUGE ALUMINUM ROOF CORNER POSTS. PROVIDE ADDITIONAL ROOF SUPPORTS AS REQUIRED.

FINISH: STANDARD MILL.

ROOF CURBS: PROVIDE SELF-FLASHING ROOF CURBS TO ACCEPT THE LOUVER HOUSES CONSTRUCTED OF 0.064" THICK ALUMINUM, WITH 6" WIDE FLASHING FLANGE, WITH 1-3/4" WIDE TOP "U" TYPE FLANGE, WITH 1/4" THICK GASKET ON TOP, WITH BOTTOM FLANGE TO FIT THE SLOPE OF THE ROOF; ALL WELDED CONSTRUCTION. CURBS MAY BE FACTORY OR FIELD FABRICATED. COORDINATE WITH THE ROOFING CONTRACTOR.

ACCEPTABLE MANUFACTURERS: COOK, AMERICAN WARMING, PENN, AIROLITE AND JENN-AIR.

ALL OTHER MATERIALS:

NOT SPECIFICALLY DESCRIBED BUT REQUIRED FOR COMPLETE AND OPERATING FACILITY, SHALL BE NEW FIRST QUALITY OF THEIR RESPECTIVE KINDS AND SUBJECT OT THE APPROVAL OF THE ARCHITECT AND/OR ENGINEER.

PART 3 - EXECUTION

SURFACE CONDITION:

INSPECTION: PRIOR TO WORK OF THIS SECTION, CAREFULLY INSPECT THE INSTALLED WORK OF OTHER TRADES AND VERIFY THAT SUCH WORK IS COMPLETE TO THE POINT WHERE THIS INSTALLATION MAY PROPERLY COMMENCE. VERIFY THAT THE WORK OF THIS SECTION MAY BE INSTALLED IN ACCORDANCE WITH PERTINENT CODES AND REGULATIONS AN THE REVIEWED SHOP DRAWINGS.

DISCREPANCIES: DO NOT PROCEED WITH INSTALLATION IN AREAS OF DISCREPANCY UNTIL SUCH DISCREPANCIES HAVE BEEN FULLY RESOLVED.

COVERING: DO NOT COVER UP OR ENCLOSE WORK UNTIL IT HAS BEEN PROPERLY AND COMPLETELY TESTED, INSPECTED AND APPROVED.

INSTALLATION OF DUCTS:

FABRICATION: INSTALL DUCTS IN ACCORDANCE WITH THE DRAWINGS AND THE REFERENCED STANDARDS. ON SHEET METAL DUCTS, CROSS-BREAK OR KINK FLAT SURFACES TO PREVENT VIBRATION AND PULSATION.

DUCT LAYOUT: DUCT SIZES SHOWN ON THE DRAWINGS ARE NET DIMENSIONS INSIDE THE INSULATION; WHEREVER OBSTRUCTION REQUIRE A CHANGE IN DUCT SHAPE, MAINTAIN EQUIVALENT AREAS.

MAKE DUCT ELBOWS RIGHT ANGLE TYPE WITH AIR FOIL ELBOW TURNS OR MAKE ELBOWS WITH A RADIUS OF 1-1/2 TIMES THE DUCT WIDTH. FURNISH AND INSTALL SHEET METAL DOORS IN DUCTS WHERE SHOWN ON THE DRAWINGS AND AT EACH OTHER POINT WHERE REQUIRED FOR ACCESS.

SEALING: SEAL ALL JOINTS AND CONNECTIONS IN LOW PRESSURE SHEET METAL DUCT BY THE USE OF TWO LAYERS OF "HARDCAST" TAPE INSTALLED WITH "HARDCAST HC-20" ADHESIVE ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

DUCT HANGERS AND SUPPORTS: HANG DUCTS WITH STRIPS OF 18 GAUGE GALVANIZED STEEL ONE INCH WIDE. ANCHOR DUCTS SECURELY TO STRUCTURE IN SUCH A MANNER AS TO PREVENT TRANSMISSION OF VIBRATION.

FLEXIBLE CONNECTIONS: PROVIDE FLEXIBLE CONNECTIONS IN THE SUPPLY AND RETURN AIR DUCTS TO ALL FAN UNITS.

MATERIAL 20 OZ. CLOSELY WOVEN GLASS FABRIC, DOUBLE COATED WITH NEOPRENE AND UL APPROVED, DURO DYNE "MFN" OR VENTGLASS.

PAINT: APPLY FLAT BLACK PAINT TO ALL INTERIOR AREAS OF DUCTS VISIBLE THROUGH REGISTERS, GRILLES AND DIFFUSERS.

ACCESS DOORS: DUCTWORK SHALL BE LOCATED AS REQUIRED FOR SERVICE OF FIRE DAMPERS, AUTOMATIC DAMPERS AND OTHER ITEMS REQUIRING MAINTENANCE OR INSPECTION. PROVIDE VENTLOCK NO 100 LATCH WITH NO 150 HINGES AND FELT GASKETS.

INSTALLATION OF ROUND FLEXIBLE ACOUSTICAL DUCT:

INSTALL THESE DUCTS STRICTLY IN ACCORDANCE WITH GENEFLEX INSTRUCTIONS, THEIR BULLETING 1978-A-101-049. COPY OF THIS BULLETIN IS ON FILE IN THE ENGINEER'S OFFICE. INSTALLATION OF ACOUSTICAL DUCT LINER:

LINE ALL RECTANGULAR SUPPLY AIR, RETURN AIR DUCTS AND OUTSIDE AIR DUCTS. LINE ALL RECTANGULAR SUPPLY AIR AND RETURN AIR PLENUMS. INSULATION SHALL BE SECURED TO CLEANED SHEET METAL DUCT WITH A CONTINUOUS 100% COAT OF MIRACLE PF96 OR 3M 1A4320 FIREPROOF ADHESIVE AND FURTHER SECURED WITH MECHANICAL FASTENERS ON 12" CENTERS. ALL DUCT LINER SHALL BE PINNED.

(A) MECHANICAL FASTENERS SHALL CONFORM TO MECHANICAL FASTENER STANDARD MF-1971.
(B) FASTENERS SHALL BE OMARK DISHED HEAD "INSUL-PINS" OR DURO DYNE. GRIP NAILS MAY BE USED PROVIDING EACH NAIL IS INSTALLED BY "GRIP NAIL AIR HAMMER" OR BY "AUTOMATIC FASTENER EQUIPMENT" IN COMPLETE ACCORDANCE WITH MANUFACTURE'S RECOMMENDATION.

LINER SHALL BE ACCURATELY CUT AND ENDS THOROUGHLY COATED WITH ADHESIVE. JOINTS SHALL BE BUTTED TO FORM TIGHTLY FITTED JOINTS. TOP AND BOTTOM SECTIONS OF INSULATION SHALL OVERLAP THE SIDES.

DUCT LINER SHALL BE KEPT CLEAN AND FREE FROM DUST. AT THE COMPLETION OF THE PROJECT, IF DUCT LINER IS FOUND WITH DUST OR DIRT THEREON, IT SHALL BE VACUUM CLEANED.

DUCT DIMENSIONS SHOWN ON THE DRAWINGS ARE FOR FREE AREA INSIDE INSULATION.

IF INSULATION IS INSTALLED WITHOUT ALL HORIZONTAL, LONGITUDINAL AND END JOINTS BUTTED TOGETHER, THE INSULATION WILL BE REJECTED AND THE WORK SHALL BE REMOVED AND REPLACED WITH NEW WORK THAT CONFORMS TO THIS SPECIFICATION.

INSTALLATION OF DIFFUSERS AND GRILLE BOXES:

PROVIDE SHEET METAL BOXES FOR ALL CEILING DIFFUSERS AND CEILING GRILLES AS DETAILED ON THE DRAWINGS. LINE BOXES WITH 1" THICK ACOUSTICAL DUCT LINER USING 100% ADHESIVE AND MECHANICALLY PINNED ON 12" CENTERS.

FASTEN DIFFUSERS AND GRILLES SECURELY TO THE ADJACENT SURFACES. PROVIDE FIRE DAMPERS AND FIRE BLANKET AS DETAILED ON THE DRAWINGS.

INSTALLATION OF WEATHER LOUVERS:

PAINT ALL SURFACES OF THE LOUVERS COMING INTO CONTACT WITH CONCRETE OF BRICKWORK A HEAVY COAT OF ASPHALTUM PAINT. FASTEN LOUVERS SECURELY INTO THE WALL OPENINGS.

INSTALLATION OF ROOFTOP HOODS:

SET PREFABRICATED CURB ON THE ROOF AND ANCHOR SECURELY, COORDINATED WITH OTHER TRADES. SET HOODS ON CURBS, ANCHOR TO CURB SECURELY AND CONNECT TO DUCTWORK.

INSTALLATION OF DAMPERS:

INSTALL DAMPERS IN DUCTS WHERE SHOWN. FASTEN SECURELY WITH BOLTS OR SHEET METAL SCREWS. DO NOT RACK. DAMPER BLADES MUST OPERATE FREELY. CAULK AROUND DAMPERS OT PREVENT AIR LEAKAGE.

INSTALLATION OF GAS FIRED UNIT HEATERS:

SUSPEND UNIT FROM ROOF CONSTRUCTION ABOVE BY MEANS OF STEEL RODS. VENT THROUGH THE ROOF. MOUNT AND WIRE THE THERMOSTAT. CONNECT TO GAS LINE.

INSTALLATION OF ROOF TYPE EXHAUST FANS:

SET PREFABRICATED CURB ON THE ROOF AND ANCHOR SECURELY, COORDINATED WITH OTHER TRADES. SET FANS ON CURB, ANCHOR TO CURB SECURELY AND CONNECT TO DUCTWORK AND ELECTRICAL CONTROLS.

INSTALLATION OF CEILING TYPE EXHAUST FANS:

SUSPEND AT THE PROPER ELEVATION IN THE CEILING CONSTRUCTION. CONNECT TO DUCT AND WALL OR ROOF CAP AS SHOWN ON THE DRAWINGS.

INSTALLATION OF ROOFTOP HEATING AND COOLING UNITS:

SET THE ROOF MOUNTING FRAME ON ROOF AT PROPER LOCATION, ANCHOR TO THE ROOF. THE ROOFING CONTRACTOR WILL ROOF-IN THE FRAME. SET UNIT ON MOUNTING FRAME AND ANCHOR SOLIDLY. CONNECT TO NATURAL GAS LINE AN TO AIR DUCTS AS REQUIRED.

CLEANING:

DUCTWORK: REMOVE DEBRIS AND TRASH FROM DUCTWORK AND VACUUM CLEAN DUCTS WHERE ACCESSIBLE. PAINT INSIDE OF ALL DUCTS VISIBLE THROUGH GRILLES AND REGISTERS WITH FLAT BLACK ENAMEL. RUN SUPPLY AND EXHAUST FANS BEFORE DIFFUSERS, GRILLES AND REGISTERS ARE INSTALLED AND BEFORE CEILINGS AND WALLS ARE PAINTED. ROOM SURFACES SOILED FROM CONSTRUCTION DUST IN DUCTWORK SHALL BE CLEANED OR REPAINTED AT NO ADDITIONAL COST TO OWNER. REMOVE SHIPPING LABELS AND OTHER TAGS AND WIPE ALL EQUIPMENT CLEAN.

AIR SYSTEM BALANCING:

GENERAL: AT THE COMPLETION OF THE JOB THE CONTRACTOR SHALL PERFORM THE TESTING AND BALANCING OF THE AIR DISTRIBUTION AND AIR EXHAUST SYSTEMS. THE CONTRACTOR HAS THE OPTION OF EMPLOYING A BALANCING FIRM TO DO THIS WORK.

TOOLS, EQUIPMENT, INSTRUMENTS: PROVIDE ALL TOOLS, EQUIPMENT AND INSTRUMENTS REQUIRED FOR HE TEST AND BALANCING PROCEDURES.

REPORTS AND RECORDS: SUBMIT THREE COPIES OF COMPLETE TEST AND BALANCING ON FORMS WHICH HAVE BEEN APPROVED BY THE ENGINEER. PROVIDE WITH THE REPORT TWO COMPLETE SETS OF MARKED BALANCING DRAWINGS SHOWING AIR OPENING NUMBERS AND FLOW STATION NUMBERS THAT CORRESPOND TO THE NUMBERING SYSTEM IN THE BALANCING LOGS.

VERIFICATION OF REPORTS: CONTRACTOR SHALL PROVIDE HIS BALANCING PEOPLE FOR A TOTAL PERIOD OF SIX (6) HOURS TO THE ENGINEER FOR SPOT VERIFICATION OF THE RESULTS SHOWN IN THE TEST AND BALANCING REPORT.

TESTING AND BALANCING SYSTEM: IDENTIFY AND LIST SIZE, TYPE AND MANUFACTURER OF ALL AIR DISTRIBUTION DEVICES. USE MANUFACTURERS PUBLISHED RATING ON ALL EQUIPMENT TO MAKE REQUIRED CALCULATIONS. MAKE ALL CHANGES IN DAMPERS AND DRIVES AS REQUIRED TO OBTAIN THE DESIGN AIR QUANTITIES. AIR QUANTITIES SHALL BE WITHIN PLUS OR MINUS 5% OF DESIGN.

1. RECORD NAMEPLATE DATA, VOLTAGE, AND ACTUAL RUNNING AMPERES FOR EACH MOTOR.
2. ALL SUPPLY AIR FANS: RECORD CFM, STATIC PRESSURE AND RPM.
3. ALL RETURN AIR GRILLES: RECORD CFM, STATIC PRESSURE AND RPM.
4. ALL EXHAUST AIR FANS: RECORD CFM, STATIC PRESSURE AND RPM.
5. ALL EXHAUST AIR GRILLES: RECORD CFM.
6. ALL RETURN AIR GRILLES: RECORD CFM.
7. ALL SUPPLY AIR DIFFUSERS: RECORD CFM.

TEMPERATURE CONTROL:

THE CONTROLS ARE SPECIFIED ABOVE WITH THE FURNACES. THIS CONTRACTOR SHALL COMPLETELY INSTALL ALL CONTROLS INCLUDING CONDUIT, CONDUCTORS, ETC.

FURNISH AND INSTALL FOR EACH ROOM THERMOSTAT A GYMNASIUM TYPE GUAR WITH KEYED LOCK. FASTEN SOLIDLY TO THE WALLS.

THE CEILING TYPE EXHAUST FANS SHALL BE TIED INTO THE LIGHT SWITCHES.

ALL WIRING SHALL CONFORM WITH ALL LOCAL CODES AND THE N.E.C.

SECTION 15300
FIRE PROTECTION

SCOPE OF WORK

THE F.P. CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT, SERVICES, TOOLS, TRANSPORTATION AND FACILITIES NECESSARY FOR, REASONABLY IMPLIED AND INCIDENTAL TO, THE FURNISHING, INSTALLATION, COMPLETION AND TESTING OF ALL THE WORK FOR THE SPRINKLER SYSTEMS AS SHOWN ON THE DRAWINGS, CALLED FOR IN THE SPECIFICATIONS, AND AS REQUIRED BY JOB CONDITIONS, TO INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING: (REFER TO RESPONSIBILITY SCHEDULE FOR EXACT RESPONSIBILITIES)
INSTALLATION OF NEW WET SPRINKLER SYSTEM AS REQUIRED TO PROVIDE COVERAGE IN ACCORDANCE WITH NFPA-13, LOCAL CODES, LANLORD'S CRITERIA, AND INSURANCE CARRIERS FOR THE BUILING AND TENANT.
TAPS, RISER, LATERALS, BRANCHES, VALVES, ALARMS, SPRINKLER HEADS AND ALL COMPONENTS REQUIRED FOR A COMPLETE SYSTEM.
DESIGN DRAWINGS, CALCULATIONS, SUBMITTALS AND APPROVALS.
PERMITS, FEES, AND CHARGES.
TESTS AND TEST CERTIFICATES.
COST FOR SHUT DOWN FEES.

THE CONTRACTOR THAT DOES THE ACTUAL SPRINKLER WORK IS REQUIRED TO BE A LANDLORD APPROVED SPRINKLER CONTRACTOR.

BEFORE STARTING WORK, THE CONTRACTOR SHALL EXAMINE THE ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL PLANS AND SPECIFICATIONS TO SEQUENCE, COORDINATE, AND INTEGRATE THE VARIOUS ELEMENTS OF THE FIRE PROTECTION SYSTEM, MATERIALS, AND EQUIPMENT WITH OTHER CONTRACTORS TO AVOID INTERFERENCES AND CONFRONTATIONS.

RELOCATION OF EXISTING MAINS, LATERALS, BRANCHES AND RISER TO FACILITATE STORE DESIGN CRITERIA MUST BE INCLUDED IN BID PROPOSAL.

SHOP DRAWINGS

THE FIRE PROTECTION CONTRACTOR SHALL PREPARE DETAILED SHOP DRAWINGS AND CALCULATIONS FOR HIS WORK. SUBMIT SIX (6) COPIES TO GENERAL CONTRACTOR FOR APPROVAL. NO WORK SHALL BEGIN UNTIL TENANT'S CONSTRUCTION MANAGER APPROVES HEAD AND PIPING LOCATIONS.

THE FIRE PROTECTION CONTRACTOR IS RESPONSIBLE FOR SUBMITTING COORDINATED DRAWINGS, CALCULATIONS, HEAD TYPES AND COLORS TO ALL AUTHORITIES HAVING JURISDICTION FOR APPROVAL. NO WORK SHALL BEGIN UNIT ALL APPROVALS HAVE BEEN RECEIVED.

A COPY OF THE LETTER OF APPROVAL FROM THE LANDLORD'S INSURANCE RATING BUREAU SHALL BE FORWARDED TO THE LANDLORD'S AGENT AND TO THE TENANT'S CONSTRUCTION MANAGER.

EQUIPMENT

SPRINKLER HEADS:
ALL SPRINKLER HEADS SHALL BE NEW (EXISTING HEADS IN EXISTING STORES TO BE REPLACED), U.L., F.M. LISTED AND APPROVED AUTOMATIC SPRAY TYPE AS MANUFACTURED BY CENTRAL SPRINKLER CO., GLOBE, GRINNELL, RELIABLE, STAR, OR VIKING.
ALL SPRINKLER HEADS SHALL BE RATED FOR 165°F UNLESS INDICATED OTHERWISE ON DRAWINGS OR REQUIRED BY LOCAL CODES.
ALL SALES FLOORS HEADS ARE TO HAVE BE FACTORY APPLIED COLOR FINISH TO MATCH ARCHITECTURAL CEILING FINISH. VERIFY HEAD TYPES AND COLORS WITH TENANT'S CONSTRUCTION MANAGER AND SUBMIT WITH SPRINKLER DRAWING FOR PERMIT.
SPRINKLER HEAD TYPES SHALL BE AS FOLLOWS:
FINISHED CEILING - FULLY RECESSED TYPE.
NO-CEILING - BRASS UPRIGHT TYPE - DON'T NEED TO BE FINISHED.
NON-SALES: - BRASS PENDANT
COVERS SHOULD MATCH ADJACENT CEILING COLORS.

GENERAL PIPING

A FIRE PROTECTION SYSTEM STUB IN SHALL BE FURNISHED BY THE LANDLORD. SPRINKLER SPACING SHALL NOT EXCEED 150 SQ. FT. IN "OFFICE" AREAS, 130 SQ. FT. IN "SALES" AREAS AND 100 SQ. FT. IN "STOCK" AREAS. COMPLY WITH LANDLORD'S DESIGN CRITERIA. PIPE SIZING SHALL B BASED ON NFPA ORDINARY HAZARD.

ALL SPINKLER LINES SHALL BE INSTALLED CONCEALED, AVOIDING INTERFERENCE WITH LIGHTS, DUCTS, PIPES, STORAGE DECK, ETC. FIRE PROTECTION CONTRACTOR SHALL PREPARE COORDINATED SHOP DRAWINGS INDICATING THE LOCATIONS OF ALL SPRINKLER HEADS, SPRINKLER LINES, LIGHTS, DIFFUSERS, GRILLES AND REGISTERS PRIOR TO INSTALLATION. HORIZONTAL SPRINKLER RUNS AT SOFFITS SHALL BE PLACED INSIDE SOFFIT STRUCTURE. VERTICAL DROPS FROM CEILING TO SOFFIT SHALL BE LOCATED FLUSH AGAINST DEMISING WALLS.

WHERE POSSIBLE, REWORK THE EXISTING SPRINKLER SYSTEM TO MEET THE NEW REQUIREMENTS OF THIS DESIGN. RELOCATE ALL MAINS AND BRANCHES INTERFERING WITH CEILING HEIGHTS, EQUIPEMNT, AND MAJOR COMPONENTS INCLUSIVE OF ADJACENT TENANTS AND COMMON AREAS. REMOVE ALL UNUSED PIPING.

LOCATIONS OF ALL HEADS SHOULD BE APPROVED BY THE LOCAL FIRE PROTECTION OFFICIAL AND THE TENANT'S CONSTRUCTION MANAGER BEFORE INSTALLATION. HEADS MUST BE LOCATED IN THE CENTER OF CEILING TILES AND IN A SYMMETRICAL PATTERN WITH OTHER CEILING FIXTURES. ADDITIONAL MONIES WILL NOT BE ALLOCATED FOR ADDITIONAL HEADS REQUIRED BY FIELD FIRE INSPECTOR AFTER BIDS ARE ACCEPTED. HEADS IN BAYS SHALL BE CENTERED SIDE TO SIDE AND FRONT TO BACK.

PROVIDE AND ISNTALL A VALVED TEST CONNECTION FOR THE SPRINKLER SYSTEM AS REQUIRED OR REQUESTED BY THE LOCAL INSPECTOR, OR INSURANCE CARRIER. COORDINATE LOCATION WITH TENANT'S CONSTRUCTION MANAGER AND LOCAL FIRE PROTECTION OFFICIAL PRIOR TO ROUGH-IN.

SPRINKLER HEADS LOCATED IN STOCK, CORRIDOR ON TOILET ROOM CEILINGS OR WALLS BELOW 8'-0" ABOVE THE FINISHED FLOOR ARE TO BE PROTECTED WITH APPROVED GUARDS.

PIPING

SCHEDULE 40, BLACK STEEL PIPE, ASTM A-53 FOR FERROUS PIPING, WELDED AND SEAMLESS, ANSI B-36-10-70 FOR WROUGHT STEEL PIPE.
CAST IRON OR MALLEABLE IRON SCREWED FITTINGS FOR PIPES 2 INCHES AND SMALLER. SCREWED OR CAST IRON FLANGED JOINTS FOR PIPES LARGER THAN 2 INCHES.
GALVANIZED OR BLACK MALLEABLE IRON WITH BRASS SEAT SCREWED UNIONS FOR PIPES 2 INCHES AND SMALLER.
VICTAULIC TYPE COUPLINGS ARE ACCEPTABLE, WHERE APPROVED BY CODE AND THE LANDLORD.

TESTS

WHEN COMPLETED, THE ENTIRE FIRE PROTECTION PIPING SYSTEM SHALL BE HYDROSTATICALLY TESTED AS REQUIRED BY THE RULES AND REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION. SYSTEM SHALL SHOW NO SIGNS OF LEAKAGE OR OTHER DEFECTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO THE WORK OF THE OTHER CONTRACTORS OR TO THE BUILDING, OR TO ITS CONTENTS, PEOPLE, ETC., CAUSED BY LEAKS IN ANY OF THE EQUIPMENT INSTALLED BY HIM. ALL REPAIRS OR REPLACEMENT OF DAMAGES SHALL BE AT THIS CONTRACTOR'S EXPENSE.

PROPERLY COMPLETED AND SIGNED "SPRINKLER CONTRACTOR'S MATERIAL AND TEST CERTIFICATES" SHALL BE FURNISHED TO THE LANDLORD. AUTHORITIES HAVING JURSIDICTION, AND TENANT'S CONSTRUCTION MANAGER.

CONTROLS

CONTROLS SHALL BE LONMARK COMPLIANT AND CERTIFIED. CONTROLLERS SHALL BE INSTALLED AND WIRED WITH APPROPRIATE CONTROL APPLICATION COMMISSIONED AND OPERATING. CONTROLS SHALL FURNISH XIF FILES FOR EACH TYPE OF BACNET DEVICE BEING PROVIDED. ROOM SENSORS SHALL BE MOUNTED AT 57" AND SHALL INCLUDE COMMUNICATIONS JACK, SETPOINT ADJUST AND LOCAL OVERRIDE. THE LON BASED CONTROLS SHALL BE CONNECTED TO THE EXISTING LON NETWORK TRUNK IN THE BUILDING BY A 1/PR 22AWG BLUE UTP CAT4 TYPE CMP/MPP COMMUNICATION TRUNK (LONMARK DAISY CHAIN SPECIFICATIONS TO THE JACE CONTROLLER (FURNISHED BY THE SYSTEMS INTEGRATOR)) AND SHALL DEMONSTRATE THAT EACH LON NODE COMMUNICATES BEFORE CONNECTION. THE SYSTEMS INTEGRATION SHALL INCLUDE JACE CONTROLLERS AS REQUIRED AS WELL AS THE COST ASSOCIATED WITH INTEGRATING THE CONTROL HARDWARE INTO THE BUILDING. A GRAPHICAL INTERFACE SHALL BE PROVIDED INCLUDING THE PROGRAMMING AND IMPLEMENTATION OF WEB PAGES TIED INTO THE EXISTING BUILDING MANAGEMENT SYSTEM. THE GRAPHICAL INTERFACE SHALL INCLUDE THE FOLLOWING:
1. SOFTWARE, INCLUDING WEB PAGES GRAPHICS, FOR EACH TERMINAL DEVICE.
2. INTEGRATION OF BACNET NODES.
3. ETHERNET CONNECTION TO BACKBONE.
4. MONITORING OF CONTROLLER.
5. SCHEDULING OF OCCUPIED AND UNOCCUPIED HOURS.
6. AFTER HOURS TENANT BILLING PACKAGE.
7. ALARMING AND ALARM ACKNOWLEDGMENT.
8. GRAPHICAL FLOOR PLAN LAYOUTS.
9. ANIMATED GRAPHICAL EQUIPMENT REPRESENTATION.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
August 2, 2021

REVISIONS:

No.	Date	Description

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PATRICK T. CANTRELL
NUMBER PE-2009012191
08-02-2021

MECHANICAL
& PLUMBING
SPECIFICATIONS

MP7.5

JZW
ARCHITECTS

BLODGETT
A Middlebry Company

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Burlington, VT 05401
Telephone: (802) 860-3700
Engineering Fax: (802) 860-3785

Burlington, December 06 2016

Ventilation of XR8-E electric oven,

To Whom It May Concern:

Blodgett's electric convection ovens must be installed in accordance with NFPA 96. This standard states that cooking equipment used in processes producing smoke or grease laden vapors shall be equipped with an exhaust system complying with hood, duct system, grease removal, and fire extinguishing requirements in various chapters of the standard.

Blodgett Oven Company does not require the use of fire suppression Type I or a Type II exhaust hood for electric convection oven installations that do not produce smoke or grease laden vapors.

Thousands of installations throughout North America of Blodgett electric convection ovens exist without fire suppression. However, we cannot make judgments as to types of cooking that produce smoke or grease laden vapors. Blodgett and the NFPA committee therefore depend on the judgment of the local authority having jurisdiction to determine which cooking operations require protection features addressed in NFPA 96.
A certain model oven used for baking bread products such as cakes, sweet breads, and cookies might be judged by the local authority having jurisdiction as not producing grease laden vapors. The very same model oven used in a different location for broiling meats might be deemed as producing grease laden vapors. Since the Standard cannot address specific installations, the judgment must be made by the authority having jurisdiction.

I hope this correspondence helps you in your situation. If you require further assistance regarding this matter, do not hesitate to contact me

Sincerely,

Stanley Sienko
Compliance Engineer
(802) 860-3738
ssienko@blodgett.com

BLODGETT

BLODGETT COMBI

2019-11-20

Stanley Sienko
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Reference: Project : 4789167924

EPA 202 TEST METHOD: USING STACKED BLODGETT CONVECTION OVEN MODELS Zephaire-200-E COOKING THE BELOW FOOD PRODUCTS AS MEDIA. THIS EVALUATION REPRESENTS THE FOLLOWING OVENS:

Product:

- Zeph100E single 11kW, capacity 5 full size pans
- Zeph100E double 22kW, capacity 10 full size pans
- Zeph200E single 11kW, capacity 5 full size pans
- Zeph200E double 22kW, capacity 10 full size pans
- MarkV100 single 11kW, capacity 5 full size pans
- MarkV100 double 22kW, capacity 10 full size pans
- MarkV200 single 11kW, capacity 5 full size pans
- MarkV200 double 22kW, capacity 10 full size pans
- XR8E (always single) 15kW, capacity 8 full size pans
- XR8E (always single) 18kW, capacity 8 full size pans
- CTB/R single 5.6kW, capacity 5 half size pans
- CTB/R double 11.2kW, capacity 10 half size pans
- CTB/R single 6.8kW, capacity 5 half size pans
- CTB/R double 13.6kW, capacity 10 half size pans
- CTB/R single 8.0kW, capacity 5 half size pans
- CTB/R double 16kW, capacity 10 half size pans

Dear Stanley,

Per your request, project 4789167924 was opened for the evaluation of grease-laden vapors produced from baking chocolate chip cookies in the stacked model Zephaire-200-E ovens.

The scope of this project was to determine the total grease emissions from baking chocolate chip cookies as the specified food load as noted in Appendix A. Testing is conducted in accordance with EPA Method 202 test guidelines to determine ultimate results. Results are used to determine compliance with Section 59 of UL710B, the Standard for Recirculating Systems, formerly Section 14 of UL 197, Eighth Edition, Supplement SB, and paragraph 4.1.1.2 of NFPA96, the Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations. The test was conducted at our facility in Northbrook, IL on November 6, 2019. This letter will report the results of the EPA202 test.

For the record, the test was conducted using stacked Blodgett, models Zephaire-200-E oven, rated 240 V, 11 kW, 3 phase to represent the ovens listed under Product at the front of this letter. The test media as shown in Appendix A was specified by Blodgett. Although the cookie recipe was not given to UL, Blodgett determined that the chocolate chip cookie recipe has the highest butter/oil content of any of the cookies they wanted to represent and was considered to be worst case for grease producing. Two ovens, stacked were tested. Each oven cavity was filled to the maximum capacity of 5 full size sheet pans, 12 cookies per pan for a total of 60 cookies per oven (120 cookies total of the two ovens per load). Total loads cooked was 29. Ovens were set at 300°F with 100% fan. Cook time was 0 hrs. 15 minutes each load. The test was conducted for a total of 8 hours. The results are considered to comply with UL710B, Section 59, formerly Section 14 of UL 197, Eighth Edition, Supplement SB, and NFPA96, paragraph 4.1.1.2 when tested with your specified food load and requested cook times since the total amount of grease-laden effluents collected was 0.69 mg/m³, which is less than 5 mg/m³ limit. No evaluation was conducted in regards to fire protection. In addition, no evaluation of the Blodgett stacked models Zephaire-200-E cooking appliance itself was conducted in respects to safety and sanitation.

UL LLC did not select the samples, determine whether the samples were representative of production samples or witness the production of the test samples, nor were we provided with information relative to the formulation or identification of component materials used in the test samples. The test results apply only to the actual samples tested.

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This letter will serve to report that all tests on the subject product have been completed. All information generated will be retained for future use. This concludes all work associated with Project 4789167924 and we are therefore closing this project. Our Accounting Department has been instructed to bill you for all charges incurred.

Thank you for the opportunity to provide your company with these services. Please do not hesitate to contact us if you should have any questions or comments.

Very truly yours,

Reviewed by:

Fred Zaplatosch
Sr. Staff Engineer

William Morler
Engineer Lead

APPENDIX A

CLIENT INFORMATION	
Company Name	BLODGETT OVEN CO, DIV OF G S BLODGETT CORP
Address	44 Lakeside Ave Burlington, VT 05401-5242

AUDIT INFORMATION:					
Description of Tests		Per Standard No.	UL 197	Edition/Revision Date	10th 2018-01-26
			CSA C22.2 No. 109		2nd 4:1989 (R2013)
			UL 710B		2nd 8/14/2014
[x] Tests Conducted by[1]		KRZYSZTOF SROKA			
[ ] UL Staff supervising UL Staff in training					

TESTS TO BE CONDUCTED:			
Test No.	Done	Test Name	[ ] Comments/Parameters [ ] Tests Conducted by[1] [ ] Link to separate data files[4]
1	2019-10-31	POWER INPUT TEST (THREE PHASE): RATING (CSA 22.2 109-M1981):	Oven(s) with hood
9	2019-11-20	CAPTURE TEST:	
10	2019-11-20	EMISSION TEST:	

Instructions -
1 - When all tests are conducted by one person, name can be inserted here instead of including name on each page containing data.
2 - When test conducted by more than one person, name of person conducting the test can be inserted next to the test name instead of including name on each page containing data. Test dates may be recorded here instead of entering test dates on the individual datasheet pages.
3 - Use of this field is optional and may be employed differently. If used to include a date instead of entering the testing date on the individual datasheet pages, the date shall be the date the test was conducted.
4 – Link to separate data files for a test can be inserted here. The link must be to a server that is accessible to UL staff, that provides for backup, required retention periods and a path, including file name, that does not change and result in a broken link. Not applicable to DAP.

Special Instructions -

[ ] Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be recorded at the time the test is conducted.

Ambient Temperature, C ____ ± ____ Relative Humidity, % ____ ± ____ Barometric Pressure, mBar ____ ± ____

[X] No general environmental conditions are specified in the Standard(s) or have been identified that could affect the test results or measurements.

RISK ANALYSIS RELATED TO TESTING PERFORMANCE:

The following types of risks have been identified. Take necessary precautions. This list is not all inclusive.

[X] Electric shock	[ ] Radiation
[X] Energy related hazards	[ ] Chemical hazards
[X] Fire	[ ] Noise
[X] Heat related hazards	[ ] Vibration
[ ] Mechanical	[ ] Other (Specify)_____

GENERAL TEST CONSIDERATIONS – ALL TESTS:

[Power Supply Connections]
Unless otherwise specified in the individual test methods, the appliance was connected to a 240 volt source of supply at 60 Hz.

This supply connection was based on
[X] The marked voltage rating

TEST LOCATION: (To be completed by Staff Conducting the Testing)				
[x]UL or Affiliate	[]WTDP	[]CTDP	[]TPTDP	[]TCP	[]PPP
Company Name: UL LLC				
Address: 333 PFINGSTEN RD, NORTHBROOK IL 60062				

TEST EQUIPMENT INFORMATION

[X] UL test equipment information is recorded on Meter Use.

TEST SAMPLE IDENTIFICATION:

The table below is provided to establish correlation of sample numbers to specific product related information. Refer to this table when a test identifies a test sample by "Sample No." only.

Sample Card No.	Date Received	[] Test No.+	Sample No.	Manufacturer, Product Identification and Ratings
2552394	2019-09-25	All	1	Two models Zephaire-200-E, each rated 240 V, 11 KW, 3 Ph, 60 hz.

+ - If Test Number is used, the Test Number or Numbers the sample was used in must be identified on the data sheet pages or on the Data Sheet Package cover page.

[ ] Sampling Procedure -

[ ] This document contains data or information using color and if printed, should be printed in color to retain legibility and the information represented by the color.

POWER INPUT TEST (THREE PHASE): UL 197 Sec. 47 (6.2)
RATING (CSA 22.2 109-M1981):

METHOD (OVENS(S) ONLY)

[X] The supply voltage was adjusted to voltage and frequency as noted in "General Test Considerations", [240 V], [60 Hz].

The power input was measured with the appliance at the intended operating temperature under full-load conditions.

[X] (c-UL) - To determine the proper test voltage for the Temperature (Normal) and Temperature (Abnormal) tests, the supply voltage was adjusted to the increased test voltage as noted below. Following the test at increased test voltage, the supply voltage was adjusted to the value necessary to cause the appliance to draw the increased test [current] [and] [power], calculated as specified below.

Increased Test Voltage (V_I): 216V for appliances rated 208V.
250V for appliances rated between 220V-250V.

Increased Test Current (I_I): $I_I(V_I/V_r)$ = _____ A

Increased Test Power (W_I): $W_I(V_I/V_r)^2$ = _____ (W)(kW)

Where V_r, I_r, and W_r, are the rated voltage, current, and power of the appliance, respectively. Note: when the appliance is rated for a range of voltages, the mean of the range is to be used as V_r.

PARAMETERS

Appliance Ratings:

Volts: _240 V__; Current: __26.5___ A; Power: ___11___ kW

The top and bottom ovens (stacked) are merely a heat source for testing the hood. Therefore, we need only conduct the power input test at 240 and 250 V as indicated on the power supply data sheet.

POWER INPUT TEST (THREE PHASE): (CONT'D) UL 197 Sec. 47 (6.2)
RATING (CSA 22.2 109-M1981):

RESULTS (OVEN(S) ONLY)

Operating Conditions	Specified Volts	Specified Amps L1	Specified Amps L2	Specified Amps L3	Specified Power, (kW)	Measured Volts L1-L2	Measured Volts L2-L3	Measured Volts L1-L3	Measured Amps L1	Measured Amps L2	Measured Amps L3	Measured Power, (W)(kW)
Full power operation, rated voltage, top oven	240	---	---	---	---	240	240	240	25.1	25.2	23.3	10,210
Full power operation, rated power, top oven	---	---	---	---	11	251	251	251	25.9	25.9	24.1	11,007
Full power operation, rated voltage, bottom oven	240	---	---	---	---	240	240	240	24.7	24.8	23.0	10,043
Full power operation, rated power, bottom oven	---	---	---	---	11	253	253	252	25.8	25.8	24.0	11,001
Full power operation, rated power, top and bottom oven plus hood	240	---	---	---	---	240	241	241	50.0	50.0	46.8	20,363
C-UL Operating Conditions												
Full power operation, increased test voltage, top oven	250	---	---	---	---	250	250	250	26.0	26.0	24.1	10,987
Full power operation, increased test voltage, bottom oven	250	---	---	---	---	250	250	250	25.6	25.6	23.7	10,811
Full power operation, rated power, top and bottom oven plus hood	250	---	---	---	---	250	250	251	51.5	51.3	48.2	21,819

[X] The input current [was] [was not] between 90% and 105% of the rated input current when the appliance was energized at rated voltage.

[X] The input power [was] [was not] between 90% and 105% of the rated input power when the appliance was energized at rated voltage.

CAPTURE TEST: UL 710B Sec. 58
UL 710 Sec. 31

METHOD

The stacked models Zephaire-200-E ovens with hood cooking appliance was placed under a hood operating at 500 CFM. Food product as specified below was then used for testing, see Emission Testing for specific details. The cooking area is to be observed for the presence of visible smoke and grease-laden air, and the hood assembly shall completely capture all of the emission as determined by observation.

COOKING PRODUCT

[X] Other -

COOKING METHOD

[Other]
Oven set to maximum heat on both ovens with both ovens set to convection mode

RESULTS

Their [was] [was not] the presence of visible smoke and grease-laden air from the appliance during testing.

The sample [did] [did not] capture all of the emissions from the cooking appliance.

EMISSION TEST: UL 710B Sec. 59

METHOD (without hood)

TEST FOR EVOLUTION OF SMOKE OR GREASE-LADEN AIR (300°F):

The model stacked models Zephaire-200-E ovens with hood cooking appliance was placed under a hood operating at 500 CFM, and was tested using a method derived from EPA Method 202. The Manufacturer also provided cookies for the test.

A 12 in. by 6 in. rectangular, 108 in. tall sheet metal stack was constructed on top of the hood. A sampling port was located approximately 80 in. downstream from the hood exhaust, at which point it was determined there was laminar flow. The sampler was assembled and an out of stack filter was used. A pre-leak check was conducted and determined to be < 0.02 ft³/min. Sampling was determined to be done at 8 traverse points.

The oven was operated normally by cooking the following foods:

[Other]
X Chocolate Chip Cookies

Two ovens, Stacked. Each oven cavity was filled to the maximum capacity of 5 full size sheet pans, 12 cookies per pan for a total of 60 cookies per oven (120 cookies total of the two ovens per load). Total loads cooked 29. Ovens were set at 300°F with 100% fan. Cook time was 0 hrs. 15 minutes.

The cooking cycle was repeated for 8 hours of continuous cooking.

During the cooking operation, it was noted whether or not visible effluents evolved from the air exhaust of the hood. Gauge, meter and temperature readings were taken and recorded every 10 min. After cooking, the condition of the duct was noted and a post-leak check was conducted and determined to be < 0.02 ft³/min.

EMISSION TEST (CONT'D): UL 710B Sec. 59

After being allowed to cool, the sampling equipment was disassembled. The glass-filter is to be removed using a pair of forceps and placed in a clean petri dish. The dish is to be sealed and labeled "SAMPLE 1".

A sample of the acetone of the same volume that will be used to rinse-out the nozzle and probe is to be placed into a clean sample bottle, sealed, and labeled "SAMPLE 2". The level of the liquid in the sample bottle is to be recorded.

The inside of the nozzle and probe is to be rinsed with acetone taking care to collect all the rinse material in a clean sample bottle. The sample bottle is to be sealed, labeled "SAMPLE 3", and the level of the liquid in the bottle is to be recorded.

The liquid in the first three impingers is to be measured and the total volume is to be recorded which will be compared to the original volume. The liquid is to be quantitatively transferred to a clean sample bottle. Each impinger and the connecting glassware including the probe extension are to be rinsed twice with water. The rinse water is to be collected and added to the same sample bottle. The sample bottle is to be sealed, labeled "SAMPLE 4" and the level of the liquid in the bottle is to be recorded.

This rinse process is to be repeated with two rinses of methylene chloride ($MeCl_2$). The rinses are to be recovered in a clean sample bottle. The sample bottle is to be sealed, labeled "SAMPLE 5" and the level of the liquid in the bottle is to be recorded.

A volume of water approximately equivalent to the volume of water used to rinse and a volume of $MeCl_2$ approximately equivalent to the volume of $MeCl_2$ used to rinse is to be placed in two clean sample bottles. The sample bottles are to be sealed, labeled "SAMPLE 6" and "SAMPLE 7" respectively, and the level of the liquid in the bottles is to be recorded.

The weight of the fourth impinger containing the silica gel is to be recorded and then the silica gel can be discarded.

The analysis phase was done in accordance with EPA Method 202, using the out of stack filter.

RESULTS (WITHOUT HOOD)

The results [are] [are not] considered acceptable because there [was] [was not] visible smoke emitted from the exhaust of the hood during the normal cooking operation. There [was] [was not] noticeable amounts of smoke accumulated in the test room after 8 hours of continuous cooking.

The total amount of grease-laden effluents collected by the sampling equipment was found to be 0.69 mg/m³, which is [less] [more] than 5 mg/m³.

The total grease emissions (per clause 78.2 of 710B) in pounds per hour per linear food of hood was 0.000385 lb/hr/ft.

Note: Stack avg humidity and temperature;
Stack temperature; 84.1°F
HUMIDITY INSIDE STACK; 11%

EMISSION TEST (CONT'D): UL 710B Sec. 59

CONDENSIBLE MATTER
(Lab Analysis)

Sample Bottle No.	Description	Volume, ml	Final Wt, mg
2	Acetone (Blank)	100.0	0.7
3	Acetone (Wash)	95.0	0.7
4&5	Solvent Phase(Wash)	250.0	1.0
4&5	Water Phase (Wash)	210.0+225.0=435.0	3.0
6&7	Solvent Phase (Blank)	240.0	0.2
6&7	Water Phase (Blank)	240.0	0.7

Filter paper weight before test- 642.3 mg
Filter paper weight after test- 644.8 mg

Analysis (without hood)

1. The liquid level of all the sample bottles is to be measured.
2. The filter from sample ONE is to be removed and dried to constant weight by means of a desiccator or an oven. The weight of the filter is to be recorded.
3. The volume of sample TWO is to be determined. The liquid is then to be transferred to a beaker and evaporated to dryness. The volume of the liquid and the final weight of the condensable matter are to be recorded.
4. The volume of sample THREE is to be determined. The liquid is then to be transferred to a beaker and evaporated to dryness. The volume of the liquid and the final weight of the condensable matter are to be recorded.
5. The volumes of sample FOUR and FIVE are to be measured.
6. Samples FOUR and FIVE are to be combined. The solvent phase is to be mixed, separated, and then repeated with two $MeCl_2$ washes.
7. The solvent extracts obtained from the procedure in 6 are to be placed in a beaker and evaporated to a constant weight. The final weight is to be recorded.
8. The water phase is to be placed in a beaker and evaporated to dryness. The final weight is to be recorded.
9. The volumes of samples SIX and SEVEN are to be determined. Sample bottles SIX and SEVEN are to be analyzed according to procedures 8 and 7 respectively.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
August 2, 2021

REVISIONS:

No.	Date	Description

CONSULTANT

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LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
PATRICK T. CANTRELL
NUMBER PE-2009012191
PROFESSIONAL ENGINEER
08-02-2021

OVEN SPECIFICATION & UL710B TEST

MP7.6

JZW ARCHITECTS

ABBREVIATIONS INDEX

ABBREV.	DESCRIPTION	ABBREV.	DESCRIPTION
#	NUMBER	MH	MANHOLE
AC	ALTERNATING CURRENT	MIC	MICROPHONE
A.F.F.	ABOVE FINISH FLOOR	MIN	MINIMUM
AIC	AMPS INTERRUPTING CAPACITY	MTG	MOUNTING
AM	AMPS METER	MTR	MOTOR
AMP	AMPERE	N/A	NOT APPLICABLE
ANN	ANNUNCIATOR	NC	NORMALLY CLOSED
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE
AUX	AUXILIARY	NEMA	NATIONAL ELECT. MANUFAC. ASSOC.
AWG	AMERICAN WIRE GAUGE	NFC	NATIONAL FIRE CODE
BC	BARE COPPER	NFPA	NATIONAL FIRE PROTECTION ASSOC.
BFG	BELOW FINISH GRADE	N.I.C.	NOT IN CONTRACT
C	CONDUIT	NO	NORMALLY OPENED
CAB	CABINET	NTS	NOT TO SCALE
CATB	COMMUNITY ANTENNA TELEVISION	OS & Y	OUTSIDE SCREW & YOKE
CATV	CABLE TELEVISION	PB	PUSHBUTTON
CKT	CIRCUIT	PF	POWER FACTOR
CLG	CEILING	PFR	PHASE FAILURE RELAY
CNTR	CONTRACTOR	PNL	PANEL
C.O.	CONDUIT ONLY	PT	POTENTIAL TRANSFORMER
CRT	COMPUTER TERMINAL	PVC	POLYVINYL CHLORIDE CONDUIT
CT	CURRENT TRANSFORMER	(R)	RELOCATE
CU	COPPER	RECEP	RECEPTACLE
C/W	COMPLETE WITH	RCSD	RECESSED
DB	DECIBEL	REQ	REQUIREMENT
DC	DIRECT CURRENT	RLA	RATED LOAD AMPS
DWG	DRAWING	RMS	ROOT MEAN SQUARE
(E)	EXISTING	SE	SERVICE ENTRANCE
EC	EMPTY CONDUIT	SPEC	SPECIFICATIONS
EG	EMERGENCY GENERATOR	SPKR	SPEAKER
EMT	ELECTRICAL METALLIC TUBING	SS	SELECTOR SWITCH
EX	EXPLOSION PROOF	SW	SWITCH
FACP	FIRE ALARM CONTROL PANEL	SWBD	SWITCHBOARD
FC	FOOT CANDLE	SWGR	SWITCHGEAR
FT	FOOT	TTB	TELEPHONE TERMINAL BOARD
GFI	GROUND FAULT INTERRUPTER	TTC	TELEPHONE TERMINAL CABINET
GND	GROUND	TV	TELEVISION
GRC	GALVANIZED RIGID CONDUIT	TYP	TYPICAL
HP	HORSE POWER	UG	UNDERGROUND
HZ	HERTZ	UPS	UNINTERRUPTED POWER SUPPLY
IFC	INTERNATIONAL FIRE CADE	V	VOLT (KV–KILOVOLT)
IG	ISOLATED GROUND	VA/R	VOLT–AMPS/REACTIVE
IMC	INTERMEDIATE METALLIC CONDUIT	VM	VOLT METER
IN	INCH	W	WATTS
J–BOX	JUNCTION BOX	W/	WITH
KV	KILOVOLT	WH	WATTHOUR METER
KVA	KILOVOLT AMPERES	W/O	WITHOUT
KVAR	KILOVARS	WP	WEATHERPROOF
KW	KILOWATT	XFMR	TRANSFORMER
LRA	LOCKED ROTOR AMPS	XFMR SW	TRANSFER SWITCH
LTG	LIGHTING	XP	EXPLOSION PROOF
MNF	MANUFACTURER	1P	SINGLE–PHASE
MAX	MAXIMUM	2P	TWO–POLE
MB	MAIN BUS	3P	THREE–POLE
MCC	MOTOR CONTROL CENTER	4P	FOUR–POLE
MCM	1000 CIRCULAR MILLS	ø	PHASE

GENERAL NOTES

1. CONSULT ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF ALL LIGHTING FIXTURES.
2. VERIFY ALL EQUIPMENT DIMENSIONS AND LOCATIONS BEFORE BEGINNING ROUGH IN. CONSULT ALL APPLICABLE CONTRACT DRAWINGS AND SHOP DRAWINGS TO INSURE NEC CODE CLEARANCES REQUIRED AROUND ALL ELECTRICAL EQUIPMENT.
3. CONTRACTOR SHALL VERIFY ALL ELECTRICAL LOADS (VOLTAGE, PHASE, CONNECTION REQUIREMENTS, ETC.) OF ALL EQUIPMENT FURNISHED UNDER ALL DIVISIONS, INCLUDING ALL EXISTING EQUIPMENT TO BE RE-USED. REVIEW ALL SHOP DRAWINGS AND EXISTING EQUIPMENT BEFORE BEGINNING ROUGH IN.
4. SEE SECTION 265100 (16510) OF THE SPECIFICATION REQUIRED COORDINATION MEETINGS WITH MECHANICAL AND CEILING CONTRACTORS.
5. SEE APPLICABLE SHOP DRAWINGS FOR ROUGH IN LOCATION OF ALL EQUIPMENT. WIRING DEVICES, ETC. WHERE APPLICABLE MOUNT ALL WIRING DEVICES ABOVE BACK SPLASH EXCEPT THOSE SERVING UNDER COUNTER EQUIPMENT.
6. SEE SPECIFICATION FOR ENERGY SAVING LAMP AND BALLAST REQUIREMENTS.
7. FINISHES OF ALL LIGHT FIXTURES SHALL BE AS SELECTED BY ARCHITECT.
8. THE ELECTRICAL CONTRACTOR SHALL NOTIFY AND COOPERATE WITH THE MECHANICAL CONTRACTOR SUCH THAT NO PIPING, DUCTS, OR EQUIPMENT FOREIGN TO THE OPERATION OF THE ELECTRICAL EQUIPMENT SHALL BE PERMITTED TO BE INSTALLED IN, ENTER OR PASS THRU ELECTRICAL ROOMS OR SPACES, OR ABOVE OR BELOW ELECTRICAL EQUIPMENT IN OTHER AREAS.
9. ELECTRICAL BOXES SHALL NOT BE LOCATED IN MASONRY COLUMNS IN BRICK WALLS OR IN GROUTED CELLS ADJACENT TO OPENINGS. COORDINATE LOCATION OF BOXES WITH MASONRY CONTRACTOR.
10. ALL PENETRATIONS OF FIRE RATED FLOORS, WALLS, AND CEILINGS SHALL BE SEALED WITH APPROVED MATERIAL TO MAINTAIN FIRE RATING OF SURFACE PENETRATED.
11. CONTRACTOR SHALL VERIFY FURNITURE LAYOUT PRIOR TO ANY FLOORBOX OR POKE-THRU INSTALLATION. COORDINATE EXACT LOCATION OF FLOOR BOX OR POKE-THRU WITH OWNER AND FURNITURE PROVIDER PRIOR TO ROUGH-IN.
12. CIRCUITS EXTENDING OVER 70' FOR 120 VOLT AND 115' FOR 277 VOLT 20 AMP CIRCUITS SHALL BE RUN WITH CONDUCTORS PER TABLE BELOW.

20 AMP MINIMUM BRANCH CIRCUIT CONDUCTOR SIZING		
MAXIMUM LENGTH	BRANCH CIRCUIT VOLTAGE	
CONDUCTOR LENGTH (FT)	120 VOLT	277 VOLT
<70	MIN. #12 AWG	MIN. #12 AWG
70 - 115	MIN. #10 AWG	MIN. #12 AWG
115 - 170	MIN. #8 AWG	MIN. #10 AWG
170 - 270	MIN. #6 AWG	MIN. #8 AWG
271 - 380	NOTE B	MIN. #8 AWG
>380	NOTE B	NOTE B

A. THESE ARE BASED ON MAXIMUM LENGTH OF CIRCUIT.

B. PERFORM VOLTAGE DROP CALCULATIONS AND PROVIDE CONDUCTOR SIZE TO KEEP BRANCH CIRCUIT VOLTAGE DROP LESS THAN 3% WITH A 15 AMP LOAD.

C. CONTRACTOR SHALL ENSURE THAT THE INSTALLATION OF EACH BRANCH CIRCUIT STAYS WITHIN 3% VOLTAGE DROP FOR A 15 AMP LOAD. IF NECESSARY, CONTRACTOR SHALL INCREASE WIRE AND CONDUIT SIZE TO MEET THE STANDARD AT NO ADDITIONAL COST TO OWNER.

DEMOLITION NOTES

1. COORDINATE ALL NEW ELECTRICAL EQUIPMENT REQUIREMENTS AND MAKE CONNECTION TO EXISTING SYSTEMS. THIS INCLUDES LIGHTING, POWER, SIGNAL, RACEWAY AND OTHER SYSTEMS INCLUDED UNDER DIVISION 26 (16).
2. RELOCATE, REWIRE AND/OR RECONNECT EXISTING ELECTRICAL DEVICES AND/OR EQUIPMENT THAT FOR ANY REASON OBSTRUCTS CONSTRUCTION.
3. CONCEAL ALL RACEWAY AND WIRING IN EXISTING WALLS, CEILINGS, FLOORS, ETC. EXCEPT WHERE THE USE OF SURFACE METAL RACEWAYS (E.G. WIRE MOLD) IS INDICATED ON DRAWINGS OR IN SPEC.
4. LEAVE ALL EXISTING EQUIPMENT, IN PORTIONS OF THE BUILDING NOT BEING REMODELED, IN WORKING CONDITION. RESTORE ALL INTERRUPTED BRANCH CIRCUITS, FEEDERS, ETC. TO WORKING CONDITION.
5. EXISTING RACEWAYS MAY BE REUSED (IN PLACE) WHERE POSSIBLE, AND WHERE IN COMPLIANCE WITH THE SPECIFICATIONS AND THE INTENT OF THE CONTRACT DOCUMENTS. INSURE INTEGRITY OF EXISTING RACEWAY BEFORE REUSE.
6. REMOVE ALL RACEWAYS, CONDUCTORS, BOXES, DEVICES, EQUIPMENT, ETC. THAT ARE NOT TO BE REUSED.
7. REMOVE EXISTING LIGHT FIXTURES WHICH ARE NOT TO BE REUSED, PLACE IN CARTON, LABEL APPROPRIATELY, AND RETURN TO OWNER, OR PROPERLY DISPOSE OF FIXTURES THAT THE OWNER CHOOSES NOT TO KEEP.
8. DO NOT PENETRATE STRUCTURAL ELEMENTS OF FLOORS, WALLS, CEILINGS, ROOFS, ETC.
9. DISCONNECT AND RECONNECT ANY/ALL FIXTURES, DEVICES, EQUIPMENT, ETC. REQUIRED FOR PROPER COMPLETION OF THE WORK.

INDEX OF ELECTRICAL DRAWINGS

ELECTRICAL SYMBOL SCHEDULE

1. SEE FIXTURE SCHEDULE FOR TYPE, MOUNTING AND WATTAGE.
2. HEIGHT MEASURED TO CENTER LINE OF THE BOX FROM THE FINISH FLOOR.
3. REFER TO DRAWINGS FOR DIRECTIONAL ARROWS.
4. SUBSCRIPT KEY'S SWITCH TO FIXTURES CONTROLLED.
5. NEMA TYPE 'ND' NON–FUSED UNLESS NOTED 'F' (FUSED). USE 'HD' 480V.
6. HEIGHT MEASURED TO TOP OF THE BOX FROM FINISHED FLOOR.
7. PROVIDE H.O.A. AND S.S. PUSHBUTTONS AS REQUIRED.
8. DOUBLE ARROWS DENOTE A DOUBLE FACE UNIT.
9. COORDINATE WITH MILLWORK SHOP DRAWINGS AND ELEVATIONS FOR HEIGHT.
10. SUBSCRIPT DENOTES NEMA CONFIGURATION.
11. HEIGHT MEASURED TO BOTTOM OF THE BOX FROM FINISH FLOOR.
12. COORDINATE WITH DOOR HARDWARE SUPPLIER.
13. FOR WATER COOLER LOCATION, SEE DIAGRAM R002. FOR ALL OTHER LOCATIONS MOUNT AT +16" TO BOTTOM OF THE BOX FROM FINISH FLOOR, OR AS NOTED.

* TYPICAL SYMBOL SCHEDULE. SOME SYMBOLS MAY NOT BE USED IN THIS SET OF DRAWINGS.

STANDARD MOUNTING HEIGHT UNLESS OTHERWISE NOTED ON PLANS

SYMBOL	DESCRIPTION	MOUNTING HEIGHT	NOTES
	ONE CIRCUIT, HOME RUN TO PANEL		
	TWO CIRCUIT, HOME RUN TO PANEL		
	THREE CIRCUIT, HOME RUN TO PANEL		
	CONDUIT RUN CONCEALED IN WALL OR CEILING		
	CONDUIT RUN CONCEALED IN FLOOR OR GROUND		
	CONDUIT UP		
	CONDUIT DOWN		
	CONDUIT STUB LOCATION	CAP CONDUIT	
	CONDUIT/CIRCUIT CONTINUATION		
	CABLE TRAY	AS NOTED	
	CEILING LIGHT FIXTURE	CEILING	1.
	WALL LIGHT FIXTURE	AS NOTED	1.
	RECESSED DOWNLIGHT FIXTURE	CEILING	1.
	RECESSED WALL–WASH FIXTURE	CEILING	1.
	LIGHT FIXTURE	AS NOTED	1
	EGRESS LIGHT FIXTURE	AS NOTED	UNSWITCHED
	AREA LIGHT POLE AND FIXTURE	CONCRETE BASE	SEE DIAGRAM
	FLOOD OR TRACK FIXTURE	AS NOTED	
	CEILING/WALL MOUNTED EXIT LIGHT	CEILING/ AS NOTED	1. 3. 8.
$x	SINGLE POLE SWITCH	+4'–0"	4. 6.
$3	THREE–WAY SWITCH	+4'–0"	6.
$4	FOUR–WAY SWITCH	+4'–0"	6.
$K	KEY OPERATED SWITCH	+4'–0"	6.
$P	SWITCH WITH PILOT LIGHT	+4'–0"	6.
$D	VARIABLE INTENSITY DIMMER SWITCH	+4'–0"	6.
$TM	TIMER SWITCH	+4'–0"	6.
$	MOMENTARY CONTACT SWITCH, CENTER POSITION OFF	+4'–0"	6.
$X	LOW VOLTAGE WALL STATION (SUBSCRIPT INDICATES CONFIGURATION & CONTROL SEQUENCE) SEE DIAGRAM	+4'–0"	6.
	DUAL TECHNOLOGY CEILING MOUNTED OCCUPANCY SENSOR (PROVIDE WITH ALL ROOM CONTROLLERS)	CEILING	SEE DIAGRAM, SPEC.
OS	DUAL TECHNOLOGY WALL MOUNTED OCCUPANCY SENSOR (SUBSCIPT D=DIMMING AND DAY–LIGHT CONTROL)	+4'–0"	SEE DIAGRAM, SPEC.
PP	POWER PACK	ABOVE CEILING	SEE DIAGRAM, SPEC.
RCX	DIGITAL ROOM CONTROLLER (SUBSCRIPT INDICATES NUMBER OF RELAYS, #E INDICATES EM ENABLED RC)	ABOVE CEILING	SEE DIAGRAM. SPEC.
EP	EMERGENCY LIGHTING CONTROL UNIT	ABOVE CEILING	SEE DIAGRAM, SPEC.
R	RECEPTACLE SWITCH PACK	ABOVE CEILING	SPEC.
A	AUTOMATIC RELAY PACK	ABOVE CEILING	SEE DIAGRAM. SPEC.
T	LOW VOLTAGE TRANSFORMER		
P	PHOTO–ELECTRIC CONTROL	AS NOTED	TORK 2000A
	DIGITAL DAYLIGHT SENSOR	CEILING	SEE DIAGRAM SPECIFICATION
TC	TIME CLOCK	+5'–0"	2.
	DUPLEX RECEPTACLE UPPER OUTLET SWITCH CONTROLLED	+16" OR AS NOTED	9. 11.
	SIMPLEX RECEPTACLE	+16" OR AS NOTED	9. 11.
U	SIMPLEX RECEPTACLE WITH USB OUTLET	+16" OR AS NOTED	9. 11.
	DUPLEX RECEPTACLE	+16" OR AS NOTED	9. 11.
U	DUPLEX RECEPTACLE WITH USB OUTLET	+16" OR AS NOTED	9. 11.
G	DUPLEX RECEPTACLE WITH CONTROL	+16" OR AS NOTED	9. 11.
A	DUPLEX RECEPTACLE		9.
G	5mA GFCI CIRCUIT BREAKER PROTECTED RECEPTACLE		13.
WP	WEATHERPROOF RECEPTACLE	+24" OR AS NOTED	2. 9.
IG	ISOLATED GROUND RECEPTACLE	+16" OR AS NOTED	9. 11.
	GROUND FAULT INTERRUPTER DUPLEX RECEPTACLE	+16" OR AS NOTED	9. 11.
	DUPLEX RECEPTACLE EMERGENCY POWER (RED)	+16" OR AS NOTED	9. 11.
	FOURPLEX RECEPTACLE	+16" OR AS NOTED	9. 11.
	GROUND FAULT INTERRUPTER FOURPLEX RECEPTACLE	+16" OR AS NOTED	9. 11.
	FOURPLEX RECEPTACLE EMERGENCY POWER (RED)	+16" OR AS NOTED	9. 11.
	TVSS PROTECTED RECEPTACLE	+16" OR AS NOTED	9. 11.
	SPECIAL PURPOSE OUTLET	+16" OR AS NOTED	10. WITH CAP. 11.
	CORD DROP		SEE DIAGRAM
	CORD REEL		SEE DIAGRAM
	TOMBSTONE RECEPTACLE		
	PLUGMOLD	+46" OR AS NOTED	
	TELEVISION OUTLET	+16" OR AS NOTED	11.
	POWER POLE		
DP	FLAT PANEL DISPLAY WALL BOX, TVSS RECEPT., DATA AND OTHER DEVICES, REFER TO DIAGRAMS	AS NOTED	SEE DIAGRAM & SPEC. 26 2726
CP	CEILING PROJECTION SYSTEM CEILING BOX	ABOVE CEILING	SEE DIAGRAM AND SPEC.
	DATA OUTLET W/(1) CABLE (SEE SPECIFICATION)	+16" OR AS NOTED	9. 11.
	DATA OUTLET W/(2) CABLES (SEE SPECIFICATION)	+16" OR AS NOTED	9. 11.
	DATA OUTLET W/(3) CABLES (SEE SPECIFICATION)	+16" OR AS NOTED	9. 11.
X	DATA OUTLET W/MORE THAN (3) CABLES (SEE SPEC)	+16" OR AS NOTED	9. 11.
	AV DATA OUTLET (SEE SPECIFICATION)	+16" OR AS NOTED	9. 11. 13.
WAP	WIRELESS ACCESS POINT, W/(2) CABLES (SEE SPEC)	CEILING	
	CALL SWITCH	+4'–0"	6.

SYMBOL	DESCRIPTION	MOUNTING HEIGHT	NOTES
C	CLOCK OUTLET	+7'–6"	8.
FB	FLOOR BOX – SEE SCHEDULE	FLOOR	SEE DIAGRAM, SPEC.
PT	POKE THRU – SEE SCHEDULE	FLOOR	SEE DIAGRAM, SPEC.
FT	FLIP–TOP BOX		9.
J	JUNCTION BOX ('F' IN FLOOR)	AS NOTED	
	MOTOR OUTLET	TO SUIT EQUIP.	
	PUSHBUTTON	+4'–0"	6.
	NON–FUSED DISCONNECT SWITCH	+5'–0"	5.
F	FUSED DISCONNECT SWITCH	+5'–0"	5.
$T	MANUAL STARTER THERMAL OVERLOAD SWITCH WITH PILOT LIGHT	+4'–0"	6.
	MAGNETIC STARTER	+5'–0"	7.
F	MAGNETIC STARTER / DISCONNECT COMBINATION	+5'–0"	
VFD	VARIABLE FREQUENCY DRIVE	+6'–6"	
	PANEL BOARD	TOP AT +6'–0"	
	MAIN DISTRIBUTION PANEL		
	TELEPHONE TERMINAL BOARD		
	GROUND BUS BAR		
	EQUIPMENT CABINET/RACK		CIRCUIT TO 120V
	BELL	+7'–6"	
	CHIME	+7'–6"	
F	FIRE ALARM MANUAL STATION	+4'–0"	6.
H	FIRE ALARM SIGNAL HORN/STROBE	+8'–0"	6.
HCLG	CONCEALED FIRE ALARM SIGNAL HORN/STROBE	CEILING	
H	CONCEALED FIRE ALARM SIGNAL HORN/STROBE WALL	+8'–0"	6.
E	FIRE ALARM SIGNAL SPEAKER/STROBE	+8'–0"	6.
ECLG	CONCEALED FIRE ALARM SIGNAL SPEAKER/STROBE	CEILING	
E	CONCEALED FIRE ALARM SIGNAL SPEAKER/STROBE WALL	+8'–0"	6.
S	FIRE ALARM STROBE	+8'–0"	6.
SCLG	CONCEALED FIRE ALARM SIGNAL STROBE	CEILING	
S	CONCEALED FIRE ALARM SIGNAL STROBE WALL	+8'–0"	6.
K	FIRE ALARM SPEAKER ONLY	+8'–0"	6.
B	FIRE ALARM SIGNAL STROBE WITH BLUE COLORED LENS (CO VISUAL ALARM)	+8'–0"/ CEILING	MOUNT AS PER. MAN
V	ASPIRATING SMOKE DETECTION SYSTEM	CEILING	MOUNT AS PER. MAN
S	SMOKE DETECTOR	CEILING	
SC	SMOKE/CARBON MONOXIDE DETECTOR	CEILING	
C	CARBON MONOXIDE DETECTOR	CEILING	
H	HEAT DETECTOR	CEILING	
D	DUCT SMOKE DETECTOR		MTD. IN DUCT
D	FIRE/SMOKE DAMPER		
	DOOR HOLDER	AS NOTED	
FS	FLOW SWITCH		
TS	TAMPER SWITCH		
WF	WATER FLOOD INDICATOR		
	O.S. & Y. VALVE		SEE DIAGRAM
R	FIRE ALARM RELAY OR SECURITY RELAY		
CM	FIRE ALARM CONTROL MODULE		
MM	FIRE ALARM MONITOR MODULE		
TWZ	TWO–WAY COMMUNICATION SYSTEM ANNUNCIATOR PANEL	+4'–0"	6.
TW	TWO–WAY COMMUNICATION CALL STATION	+4'–0"	6.
D	DURESS PUSHBUTTON	+4'–0"	6.
D1	SECURITY SYSTEM DOOR SWITCH	DOOR JAMB	
D2	SECURITY SYSTEM OVERHEAD DOOR SWITCH	CEILING	MOUNT AS PER. MAN
ML	MAGNETIC SHEAR LOCK		
A	SECURITY SYSTEM KEYED ACCESS SWITCH	+4'–0"	6.
K	SECURITY SYSTEM KEYED PAD	+4'–0"	6.
I	INFRARED SENSOR	AS NOTED	
M	SECURITY MOTION DETECTOR		MOUNT AS PER. MAN
P	SECURITY SYSTEM POP–IT		MOUNT AS PER. MAN
G	GLASS BREAK DETECTOR	CEILING	
ES	ELECTRIC DOOR STRIKE		12.
EL	ELECTRIC DOOR LOCK		12.
R	ACCESS CONTROL SYSTEM, REQUEST TO EXIT		
CR	ACCESS CONTROL CARD READER	+4'–0"	6.
BR	ACCESS CONTROL BIOMETRIC READER	+4'–0"	6.
	CAMERA – SEE SCHEDULE	AS NOTED	SEE DIAGRAM, SPEC.
	DOOR POSITION INDICATING SWITCH		
A	LIGHT FIXTURE (LETTER DESIGNATES TYPE)		
E0 / 842	EQUIPMENT NUMBER		
842	ARCHITECTURAL ROOM NUMBER		
X	DEVICE/EQUIPMENT (TEXT DESIGNATES TYPE) SEE SCHEDULE		

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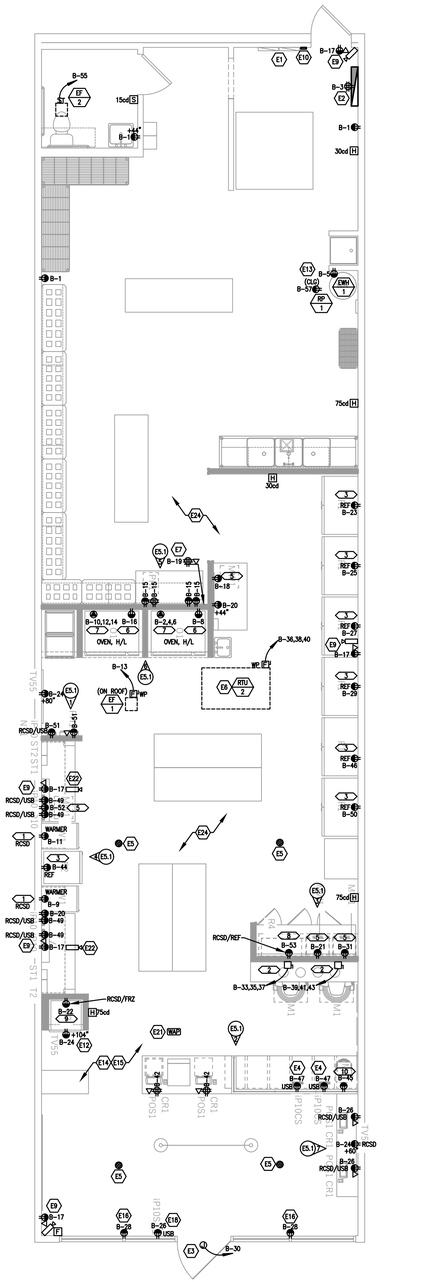
STATE OF MISSOURI
BRIAN DENVER MICKS
NUMBER 2012023178
PROFESSIONAL ENGINEER

SYMBOLS, SCHEDULES AND NOTES

E0.1

JZW ARCHITECTS



PLAN
NORTH

POWER PLAN

1/4" = 1'-0"

0 2' 4' 8'

PLAN
NORTH

LIGHTING PLAN

1/4" = 1'-0"

0 2' 4' 8'

SHEET KEYNOTES

E1	EXISTING 400A 120/208V 2-SECTION PANELBOARD, RENAMED PANEL 'B'. SEE PANEL SCHEDULE FOR ADDITIONAL INFORMATION.
E2	COMMUNICATION BOARD. CONNECT TO EXISTING TELEPHONE CONDUIT IN SPACE. REFER TO COMMUNICATIONS RISER DIAGRAM.
E3	SIGN POWER JUNCTION BOX. UTILIZE FOR SIGN AND CONTROL VIA TIME CLOCK.
E4	OUTLET TO BE PLACED HORIZONTALLY AND HEIGHT TO BE DETERMINED PRIOR TO ROUGH–IN.
E5	SPEAKER POLK AUDIO MC60. PROVIDE AND INSTALL WESTPENN CABLE AS SHOWN IN SOUND RISER DIAGRAM #1 ON E5.2. OWNER TO PROVIDE ALL EQUIPMENT EXCEPT CABLING. CONTRACTOR TO INSTALL ALL SOUND EQUIPMENT INCLUDING RECEIVER, SPEAKERS AND REMOTE POWER SUPPLY AND MAKE ALL POWER AND SPEAKER WIRED CONNECTIONS FOR AN OPERATIONAL SYSTEM. FOR RECEIVER LOCATION SEE KEYED NOTE #7.
E6	EXISTING RTU. PROVIDE NEW ELECTRICAL CIRCUIT AS SHOWN TO EXISTING DISCONNECT. VERIFY EXACT LOCATION ON ROOF. VERIFY ELECTRICAL INFO WITH SHOP DRAWINGS AND/OR EQUIPMENT NAME PLATE INFORMATION. IF THERE IS A DISCREPANCY IN THE ELECTRICAL LOAD OF THE UNIT, NOTIFY THE ELECTRICAL AND MECHANICAL ENGINEERS BEFORE PROCEEDING.
E7	RECEPTACLE FOR SONY MULTI CHANNEL AV RECEIVER STR–DH590. VERIFY MOUNTING HEIGHT WITH OWNER.
E9	CAMERA SYSTEM PROVIDED BY OWNER INSTALLED BY CONTRACTOR. SYSTEM SHALL BE A UNIFI VIDEO BOARD SYSTEM WITH P.O.E. CAMERAS AND A CLOUD BASED STORAGE. PROVIDE POWER AND DATA RECEPTACLES, MOUNTING OF CAMERAS AND CONNECTION TO POWER AND DATA RECEPTACLES. OUTLETS TO BE INSTALLED 4" BELOW CEILING GRID AND 4" FROM CORNER.
E10	TIME CLOCK AND CONTACTORS FOR EXTERIOR SIGNAGE AND FOR DISPLAY WINDOW RECEPTACLES. REFER TO E5.2/LIGHTING CONTROL DETAIL.
E11	RECESSED CAN LIGHT IN SHELF ABOVE BOXING STATION. CONTROL WITH SEPARATE DIMMER SWITCH.
E12	POWER FOR DISPLAY ABOVE FREEZER. COORDINATE EXACT MOUNTING HEIGHT WITH ARCHITECT AND ARCHITECTURAL DRAWINGS.
E13	RECEPTACLE FOR GAS–FIRED WATER HEATER AND RECEPTACLE FOR CIRCULATION PUMP. COORDINATE LOCATIONS FOR BOTH WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH–IN.
E14	ALL USB RECEPTACLES SHALL BE 20 AMP DUAL CHARGING PORTS TYPE A AND C. PROVIDE MANUFACTURER LEVITON CATALOG NUMBER T5833 OR LEGRAND PTTR20ACUSBW NO SUBSTITUTION ALLOWED. REFER TO ELECTRICAL ELEVATION DRAWINGS FOR EXACT IPAD AND RECEPTACLES HEIGHT PRIOR TO ROUGH–IN. ALL RECESSED BOXES (RCSD) SHALL BE OF THE LEGRAND TYPE TVIWMLVKITWCC2. REFER TO E5.3 FOR RECEPTACLE AND BOX CUT SHEETS.
E15	REFER ELECTRICAL ELEVATION DRAWINGS FOR EXACT IPAD HEIGHT OF RECEPTACLES PRIOR TO ROUGH–IN.
E16	RECEPTACLE TO BE MOUNTED 4" BELOW GRID CEILING.
E18	LOCATION AND HEIGHT OF RECEPTACLE TO BE DETERMINED AND VERIFIED BY OWNER PRIOR TO ROUGH–IN.
E19	POWER IN–LINE EXHAUST FAN THROUGH LIGHTING CIRCUIT TO ACTIVATE WHEN LIGHTS COME ON.
E20	RECEPTACLE TO BE MOUNTED ABOVE HEADSET SHELF.
E21	WIRELESS ACCESS POINT (WAP). PROVIDE DATA CABLE AND INSTALLATION OF WAP IN CEILING. REFER TO COMMUNICATIONS RISER DIAGRAM.
E22	CAMERA TO BE INSTALLED UNDER BOXING STATION. REFER TO ELECTRICAL ELEVATIONS SHEET E5.1 DETAIL CALLOUT E5.1–9.
E24	ALL KITCHEN RECEPTACLES ARE TO HAVE GFCI PROTECTION AS PER NEC 210.8. REFER TO PANEL SCHEDULE FOR GFCI BREAKERS AS SHOWN.

PERFORMANCE NOTES

1. CONTRACTOR TO INCORPORATE ALL PAGES OF THIS DOCUMENT IN THE CONSTRUCTION OF THE CRUMBL SPACE TO INCLUDE BUT NOT LIMITED TO GENERAL NOTES SHEET E1.1, POWER AND LIGHTING PLANS WITH KEYED NOTES SHEET E1.1, ELECTRICAL ELEVATIONS SHEET E5.1, ELECTRICAL DETAILS SHEETS E5.2 AND 5.3, ELECTRICAL SCHEDULES E6.1 AND ELECTRICAL SPECIFICATIONS SHEET E7.1. E.C. BID SHALL PROVIDE FOR A COMPLETE AND WORKING SYSTEM.
2. PROVIDE ALL CIRCUITING AS SHOWN ON PLANS. DEVIATION WILL CAUSE FAILURE IN EQUIPMENT TO CHARGE PROPERLY OR TO MAINTAIN PROGRAMMING.
3. ALL EQUIPMENT PROVIDED BY THE OWNER AND SEND TO THE JOBSITE WILL BE INSTALLED BY THE E.C.. E.C. TO PROVIDE A FULLY OPERATIONAL AND TESTED SYSTEM WITH REGARDS TO THE DATA/TELE, SPEAKER/AV RECEIVER, AND CAMERA SYSTEMS. E.C. SHALL PROVIDE ONSITE PERSONNEL TO VERIFY STARTUP WITH OWNER AND CORRECT ANY PROBLEMS IN WIRING OR POWER.
4. FIRE/SMOKE DAMPERS ARE NOT SHOWN ON THE ELECTRICAL DRAWINGS. COORDINATE ANY AND ALL FIRE/SMOKE DAMPERS AND REQUIREMENTS WITH THE MECHANICAL DRAWINGS AND CONTRACTOR. PROVIDE 120V POWER FOR ALL DAMPERS.
5. ALL NEW FIRE ALARM DEVICES SHOWN ARE TO BE TIED INTO EXISTING BUILDING FIRE ALARM DETECTION SYSTEM. COORDINATE WITH THE LANDLORD FOR SYSTEM HEAD–END LOCATION.
6. CONTRACTOR SHALL INSTALL OCCUPANCY SENSORS TO PROVIDE COVERAGE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. CONSULT WITH LIGHTING CONTROL MANUFACTURER AND DISTRIBUTOR FOR ADDITIONAL REQUIREMENTS AND RECOMMENDATIONS: crumbl@cednationalaccounts.com; 562–926–7202.
7. LIGHTING TO BE 0–10V DIMMING. PROVIDE ALL WIRING, COMPONENTS AND LABOR FOR A COMPLETE AND WORKING SYSTEM. SEE SHEET E5.3 FOR DIMMING SWITCHES AND OTHER DIMMING REQUIREMENTS.
8. PROVIDE CAT6 DATA CABLING FOR ALL DATA LOCATIONS.

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LEE'S SUMMIT, MO 64081

BRIAN DENVER HICKS
NUMBER PE-2019023176

REMODEL FLOOR
PLAN & RCP

E1.1

JZW
ARCHITECTS

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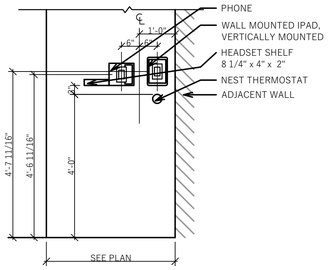
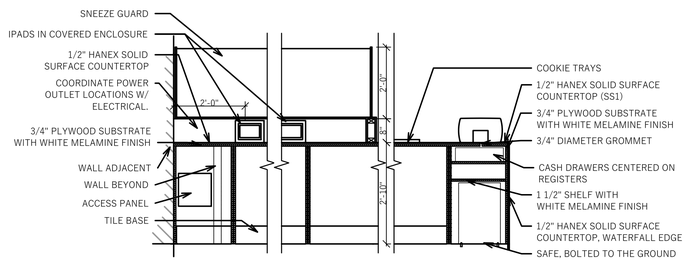
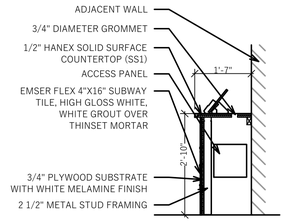
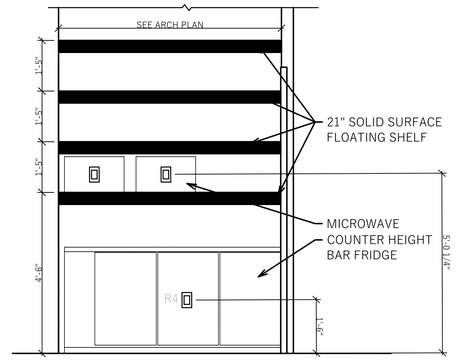


1 E5.1 NEST/PHONE/IPAD @ PICK UP
1/2" = 1'-0"

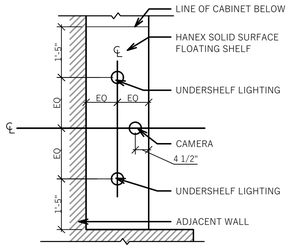


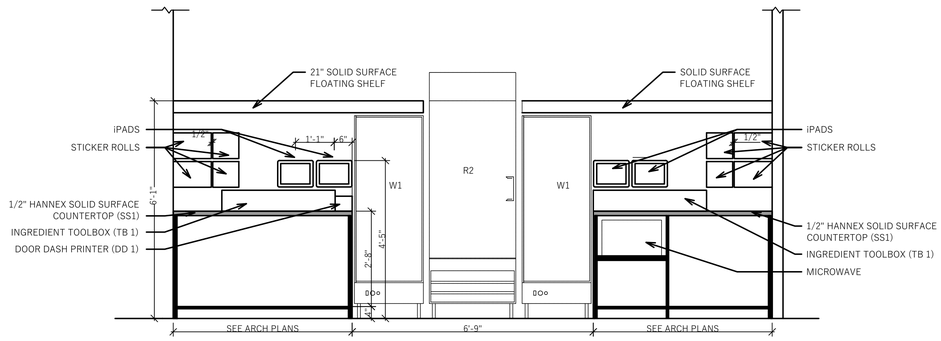
2 E5.1 PREP COUNTER – CABINETRY
1/2" = 1'-0"

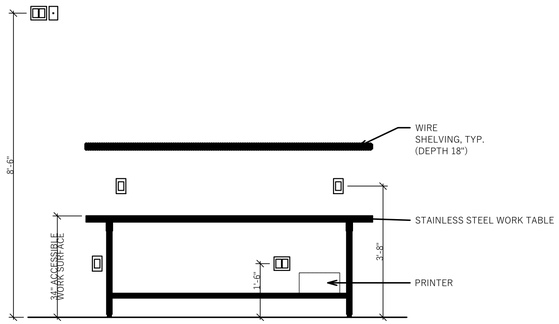




3 E5.1 FRIDGE AT MIXER WALL
1/2" = 1'-0"

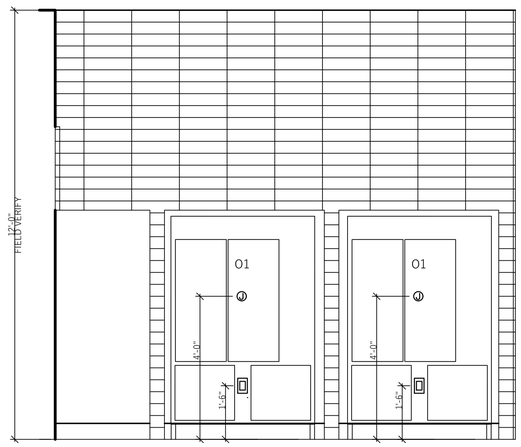




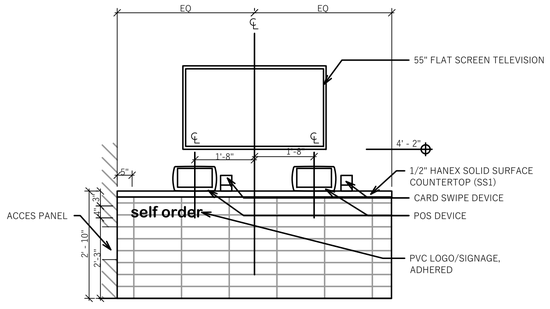


4 E5.1 DRESSING STATIONS
1/2" = 1'-0"

5 E5.1 BOXING SHELVING @ BACK OF HOUSE
1/2" = 1'-0"



6 E5.1 OVEN WALL ELEVATION
1/2" = 1'-0"



7 E5.1 SELF ORDERING STATION
1/2" = 1'-0"

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STATE OF MISSOURI
BRIAN DENVER NICKS
NUMBER
2019023172
PROFESSIONAL ENGINEER

ELECTRICAL ELEVATIONS

E5.1

JZW ARCHITECTS

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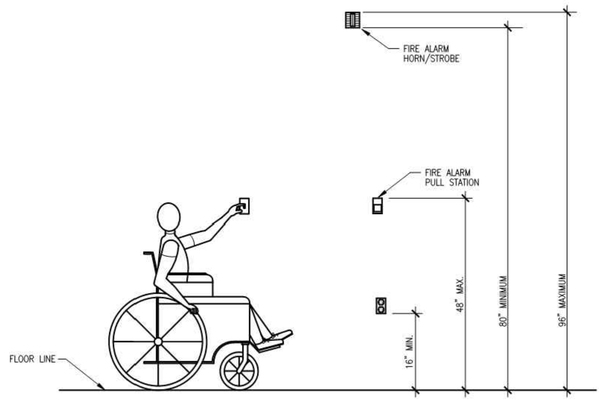


7 DEVICE MOUNTING HEIGHTS INSTALLATION DETAIL

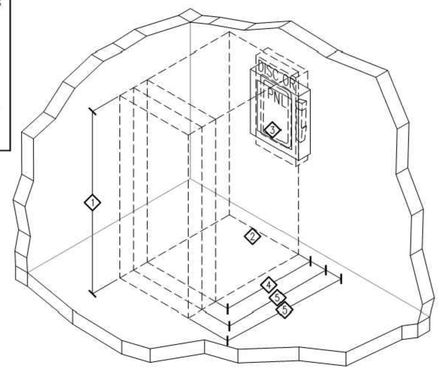
SCALE: NTS

KEYED NOTES:

1. THE MINIMUM HEADROOM OF WORKING SPACE SHALL BE 6½ FT.
2. THE WIDTH OF THE WORKING SPACE SHALL BE THE WIDTH OF THE EQUIPMENT OR 30 IN., WHICHEVER IS GREATER. THE PANEL DOOR SHALL OPEN AT LEAST 90 DEGREES.
3. ALL CIRCUIT BREAKERS OR DISCONNECT HANDLES SHALL BE NOT MORE THAN 6 FT 7 IN. ABOVE THE FLOOR WHEN IN THEIR HIGHEST POSITION.
4. 3 FT CLEARANCE IF 0–150V TO GROUND
5. 3.5FT CLEARANCE IF 151–600V TO GROUND. 4FT IF EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORKING SPACE.

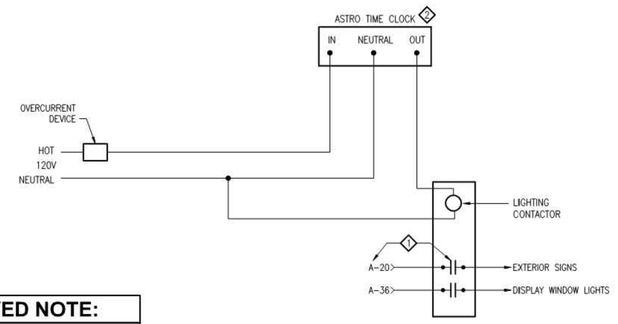
GENERAL NOTE:

1. ALL WORKING SPACE CLEARANCE FROM FACE OF PANEL.



4 ELECTRICAL EQUIPMENT WORK SPACE CLEARANCES

SCALE: NTS

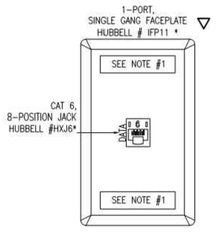


KEYED NOTE:

1. CONTRACTOR AMPERAGE SHALL BE COMPATIBLE WITH CIRCUIT AMPERAGE
2. TIME CLOCK SHALL BE CAPABLE OF RETAINING PROGRAMMING AND TIME SETTING DURING LOSS OF POWER FOR A PERIOD OF AT LEAST 10 HOURS.

5 LIGHTING CONTROL WIRING DIAGRAM

SCALE: NTS



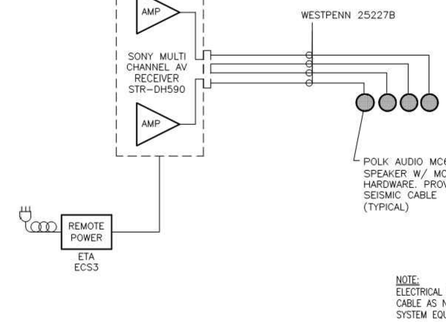
ELECTRICAL GENERAL NOTES:

1. COORDINATE STATION AND PORT LABELING WITH OWNER.
2. ALL PATCH CABLES AND STATION CABLES SHALL BE PROVIDED AND INSTALLED BY EC.
3. ALL PATCHING AND/OR CROSS CONNECTION SHALL BE PERFORMED BY THE EC.

* MATCH FACEPLATE COLOR TO RECEPTACLES.

6 DATA/VOICE JACK INSTALLATION DETAIL

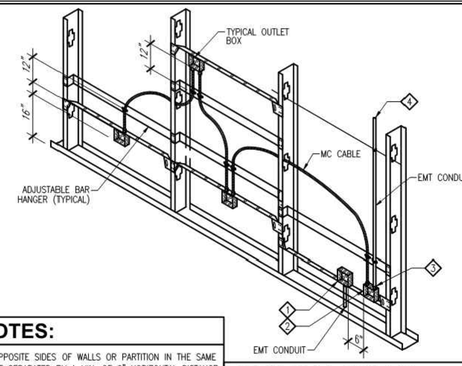
SCALE: NTS



NOTE:
ELECTRICAL CONTRACTOR TO PROVIDE AND INSTALL CABLE AS NOTED. OWNER TO PROVIDE SOUND SYSTEM EQUIPMENT.

1 SOUND SYSTEM RISER DIAGRAM

SCALE: NTS



KEYED NOTES:

1. OUTLET BOXES ON OPPOSITE SIDES OF WALLS OR PARTITION IN THE SAME STUD SPACE MUST BE SEPARATED BY A MIN. OF 6" HORIZONTAL DISTANCE.
2. ELECTRICAL BOXES INSTALLED IN FIRE RESISTANT WALLS OR PARTITIONS SHALL COMPLY WITH IBC 714.3.2 (24" SEPARATION ON OPPOSITE SIDES.)
3. INSULATED THROAT EMT CONNECTOR.
4. HOME RUN TO PANEL MUST BE IN RACEWAY.

GENERAL NOTES:

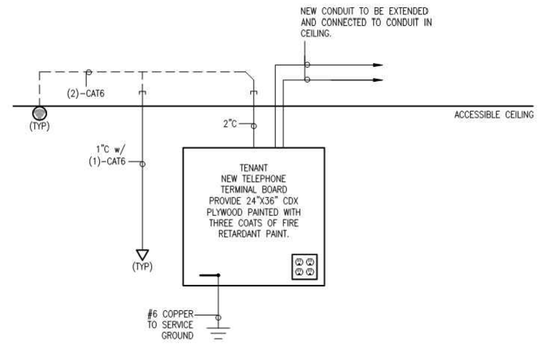
1. TYPICAL FOR WOOD AND METAL STUD ROUGH IN.
2. PLASTER RINGS NOT SHOWN. COORDINATE RING DEPTH TO BE FLUSH WITH FINAL FINISH SURFACE.
3. LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL AND MECHANICAL DRAWINGS, AND WITH ALL APPLICABLE SHOP DRAWINGS.

2 ROUGH-IN DETAIL FOR MC CABLE

SCALE: NTS

NOTES:

1. CONNECT FROM NEW PHONE BOARD TO EXISTING TELEPHONE BOX WEST SIDE OF BUILDING 1–1/2" FOR TELEPHONE AND 1" FOR CATV. PROVIDE A PULL STRING BACK TO MAIN BUILDING TELEPHONE TERMINAL BOARD.



3 COMMUNICATIONS RISER DIAGRAM

SCALE: NTS

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LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
BRIAN DENVER HICKS
NUMBER 2019021717
PROFESSIONAL ENGINEER

ELECTRICAL DETAILS

E5.2

JZW ARCHITECTS

By: troyc Aug 10, 2021 – 12:54pm
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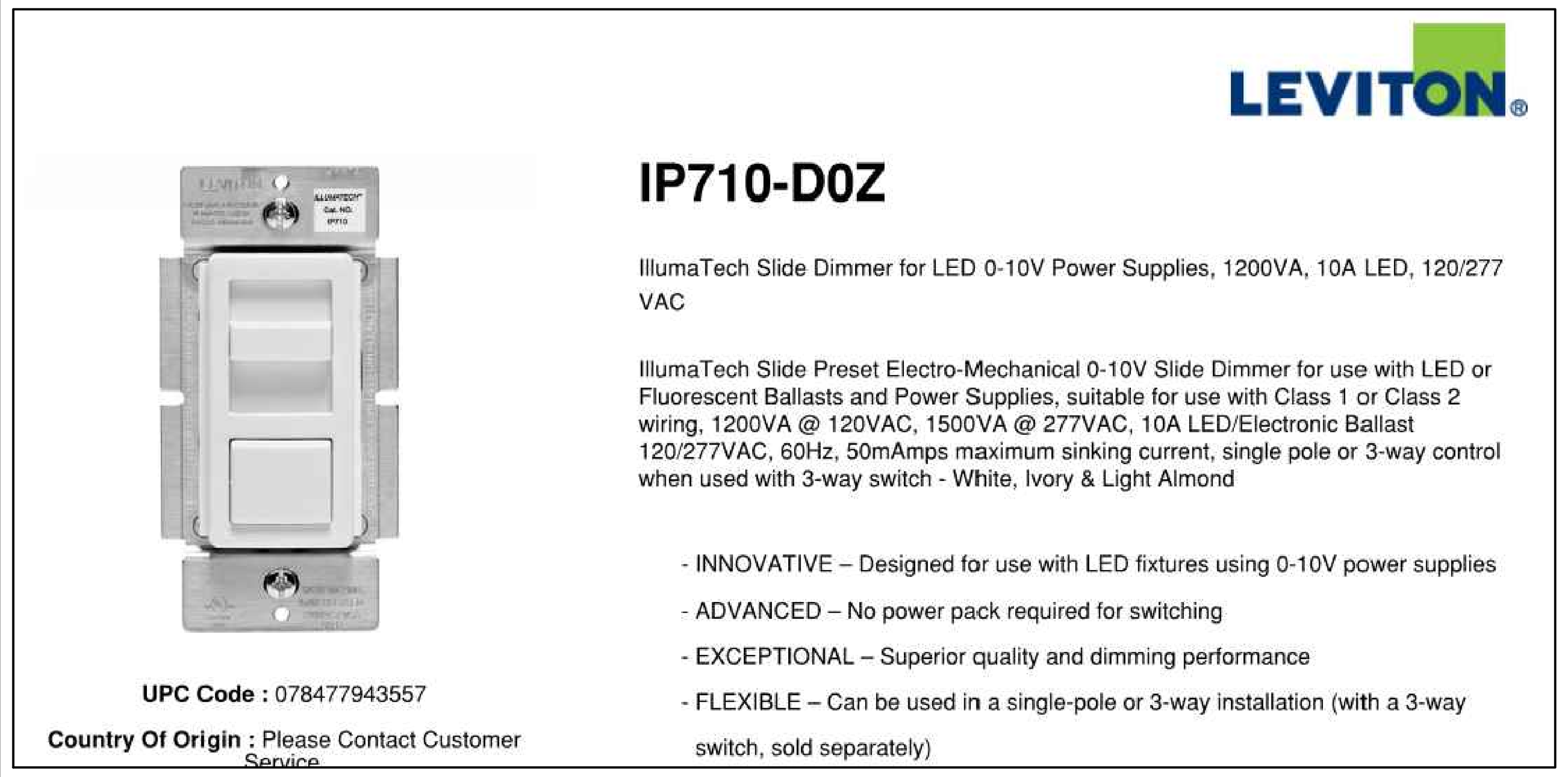
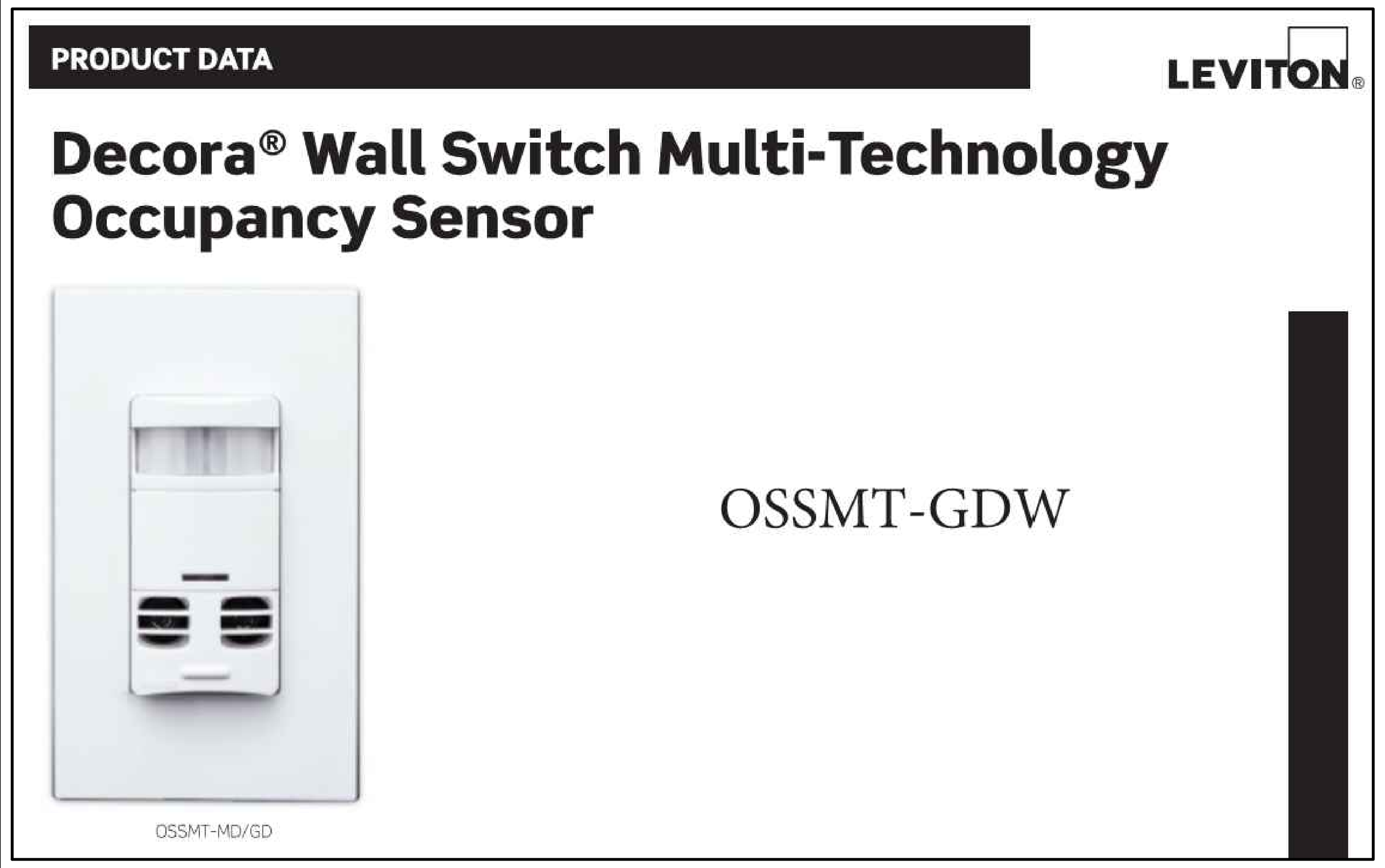
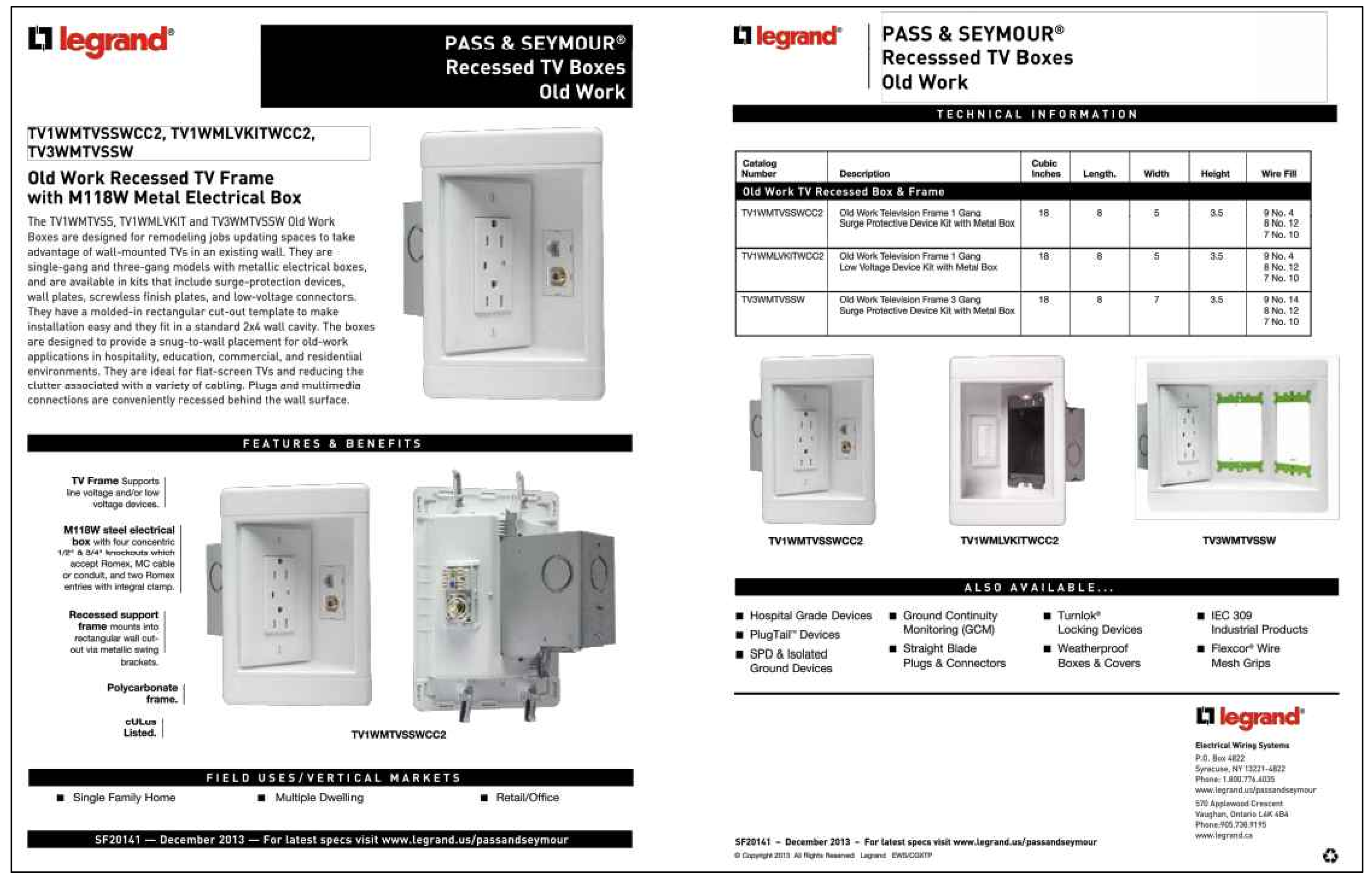
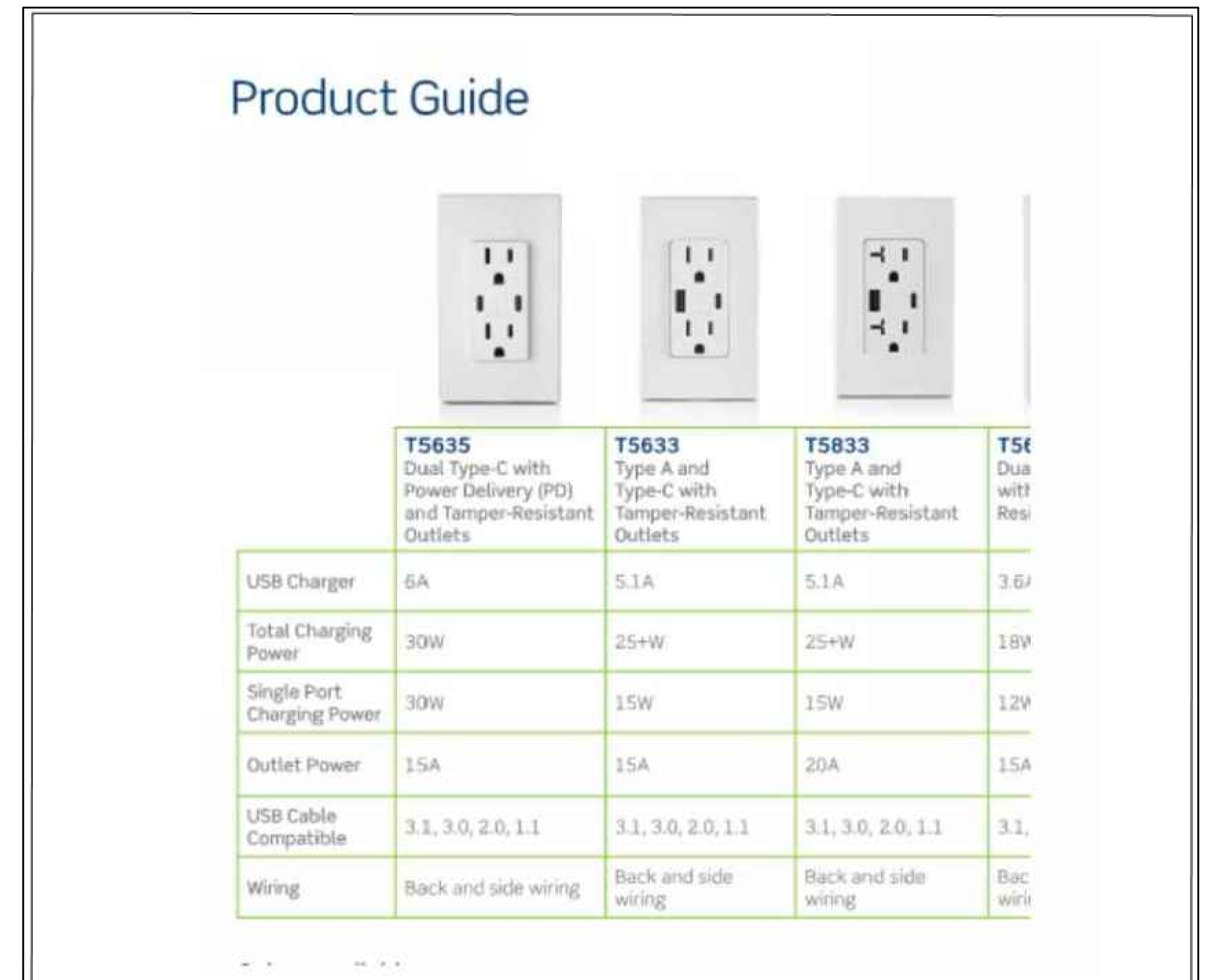
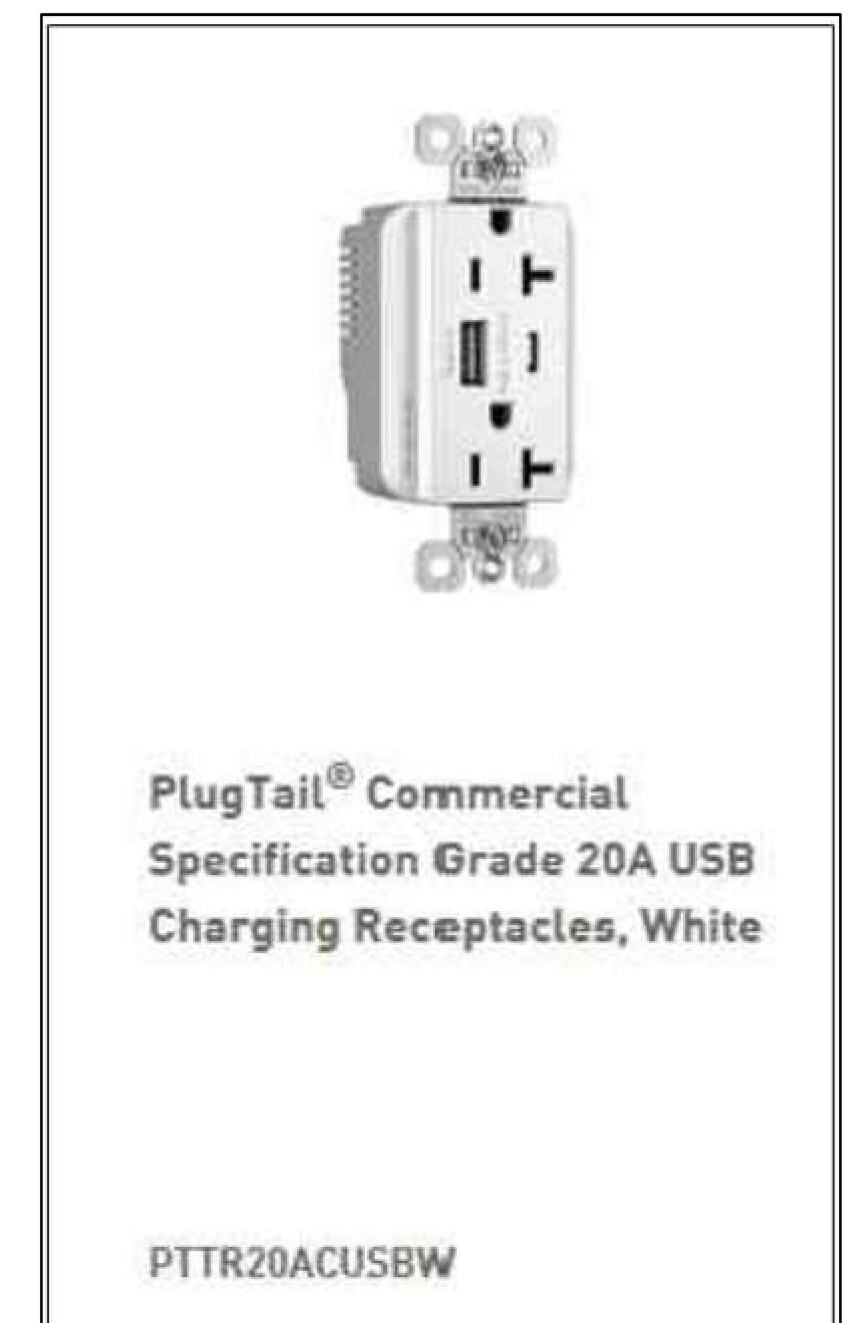








LEVITON T5833 USB CHARGING RECEPTACLE



LEGRAND PTTR20ACUSBW USB CHARGING RECEPTACLE

ALUMINUM CONDUCTOR & CONDUIT SCHEDULE

TYPE	AMP.	COND. SIZE	CONDUCTOR QUAN.	CONDUCTOR SIZE	INSULATION	EQ. GND. COND.(AL)
31X	120	2"	3	1/0	XHHW-2	4
41X	120	2"	4	1/0	XHHW-2	4
51X	96	2"	5*	1/0	XHHW-2	4
32X	135	2"	3	2/0	XHHW-2	4
42X	135	2"	4	2/0	XHHW-2	4
52X	108	2"	5*	2/0	XHHW-2	4
33X	155	2"	3	3/0	XHHW-2	4
43X	155	2"	4	3/0	XHHW-2	4
53X	124	3"	5*	3/0	XHHW-2	4
34X	180	2"	3	4/0	XHHW-2	4
44X	180	3"	4	4/0	XHHW-2	4
54X	144	3"	5*	4/0	XHHW-2	2
325	205	2"	3	250	XHHW-2	2
425	205	3"	4	250	XHHW-2	2
525	164	3"	5*	250	XHHW-2	2
330	230	3"	3	300	XHHW-2	2
430	230	3"	4	300	XHHW-2	2
530	184	3"	5*	300	XHHW-2	2
335	250	3"	3	350	XHHW-2	2
435	250	3"	4	350	XHHW-2	2
535	200	3"	5*	350	XHHW-2	2
340	270	3"	3	400	XHHW-2	2
440	270	3"	4	400	XHHW-2	2
540	216	3"	5*	400	XHHW-2	2
350	310	4"	3	500	XHHW-2	1
450	310	4"	4	500	XHHW-2	1
550	248	4"	5*	500	XHHW-2	1
375	385	4"	3	750	XHHW-2	1
475	385	4"	4	750	XHHW-2	1
575	308	4"	5*	750	XHHW-2	1

ALUMINUM CONDUCTOR & CONDUIT SCHEDULE FOR PARALLEL RUNS

TYPE	MAX. O.C. PROT.	COND. AMPS	SETS	CONDUCTOR QUAN.	CONDUCTOR SIZE	CONDUIT SIZE	EQ. GND. COND.(AL)
325-2	400	410	2	3	250	2-1/2"	2/0
425-2	400	410	2	4	250	2-1/2"	2/0
535-2	400	400	2	5*	350	3"	2/0
350-2	600	620	2	3	500	3"	2/0
450-2	600	620	2	4	500	3"	2/0
535-3	600	600	3	5*	350	3"	2/0
340-3	800	810	3	3	400	2-1/2"	3/0
440-3	800	810	3	4	400	3"	3/0
535-4	800	800	4	5*	350	4"	3/0
375-3	1000	1155	3	3	750	4"	4/0
475-3	1000	1155	3	4	750	4"	4/0
535-5	1000	1000	5	5*	350	4"	4/0
350-4	1200	1240	4	3	500	4"	250
450-4	1200	1240	4	4	500	4"	250
550-5	1200	1240	5	5*	500	4"	250
340-6	1600	1620	6	3	400	4"	350
440-6	1600	1620	6	4	400	4"	350
550-7	1600	1736	7	5*	500	4"	350
475-6	2000	2310	6	4	750	4"	400
475-7	2500	2695	7	4	750	5"	600
475-8	3000	3080	8	4	750	5"	600
475-11	4000	4235	11	4	750	5"	750

NOTES:
IN PARALLEL RUNS SIZE GND. COND. IN ACCORDANCE WITH NEC PARA. 250-122.

GND. CONDUCTOR MAY BE DELETED ON SERVICE ENTRANCE CONDUCTORS

* 200% NEUTRAL, DERATED TO 80% BASED ON NEC 310.15.B(5)(C)

** COPPER CONDUCTOR (XHHW)

PROVIDE COMPACT STRANDED ALUMINUM ASSOCIATION 8000 SERIES ALLOY CONDUCTORS.

PROVIDE TERMINATION FOR ALUMINUM-ALLOY CONDUCTORS OF HYDRAULIC COMPRESSION TYPE ONLY LISTED UNDER UL 486-B MARKED "AL7CU" FOR 75° RATED CIRCUITS.

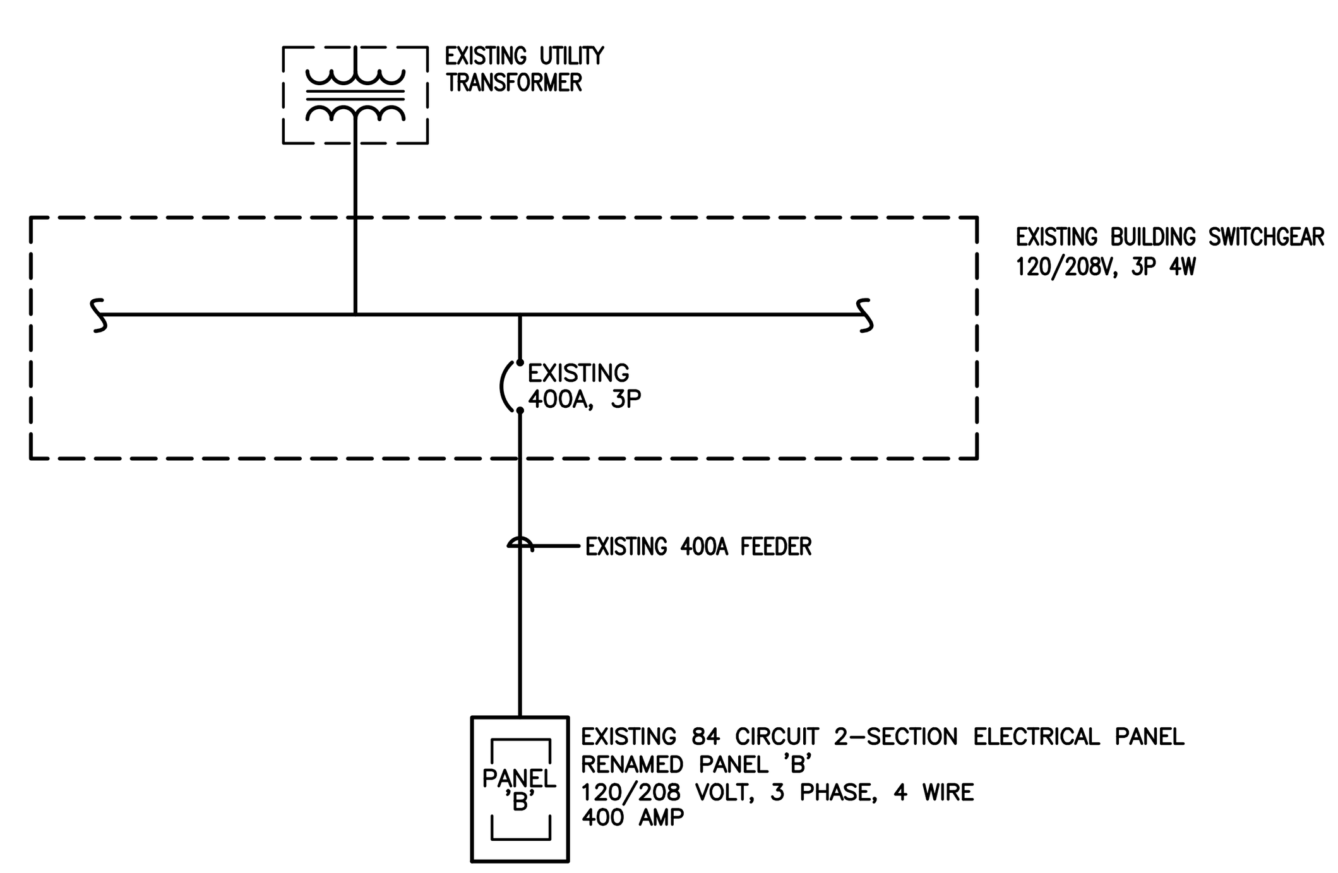
PROVIDE ALL ELECTRICAL EQUIPMENT WITH PROPER SIZING TO ACCOMMODATE ALUMINUM CONDUCTORS, COORDINATE WITH EQUIPMENT SUPPLIER.

COPPER CONDUCTOR & CONDUIT SCHEDULE

TYPE	AMP.	COND. SIZE	CONDUCTOR QUAN.	CONDUCTOR SIZE	INSULATION	EQ. GND. COND.(AL)
20	30	3/4"	2	10	THHN THWN	10
30	30	3/4"	3	10	THHN THWN	10
40	30	3/4"	4	10	THHN THWN	10
28	40	1"	2	8	THHN THWN	10
38	40	1"	3	8	THHN THWN	10
48	40	1"	4	8	THHN THWN	10
26	55	1"	2	6	THHN THWN	8
36	55	1"	3	6	THHN THWN	8
46	55	1"	4	6	THHN THWN	8
24	70	1"	2	4	THHN THWN	8
34	70	1-1/4"	3	4	THHN THWN	8
44	70	1-1/4"	4	4	THHN THWN	8
23	85	1-1/4"	2	3	THHN THWN	8
33	85	1-1/4"	3	3	THHN THWN	8
43	85	1-1/2"	4	3	THHN THWN	8
32	95	1-1/2"	3	2	THHN THWN	6
42	95	1-1/2"	4	2	THHN THWN	6

NOTES:

1. THE CUSTOMER IS NOT ABLE TO PROVIDE EXISTING GEAR SHORT CIRCUIT RATINGS. BEFORE ORDERING ELECTRICAL GEAR, CONTRACTOR SHALL VERIFY THE AIC RATING OF THE EXISTING BUILDING ELECTRICAL SYSTEM EQUIPMENT. IF EXISTING SYSTEM AIC RATING CANNOT BE DETERMINED, ALL NEW ELECTRICAL GEAR SHALL BE FULLY RATED AT 65kAIC.



1 ONE-LINE DIAGRAM
NO SCALE

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
JULY 22, 2021

REVISIONS:

No.	Date	Description

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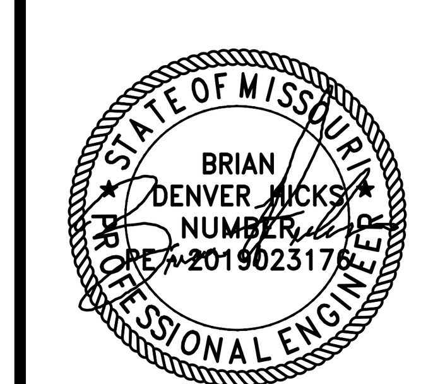

ELECTRICAL DETAILS

E5.3

JZW ARCHITECTS

By: trey; Aug 10, 2021 - 12:54pm
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LIGHT FIXTURE SCHEDULE NOTES

LIGHT FIXTURE ABBREVIATION SCHEDULE

A.F.F.	ABOVE FINISH FLOOR	SCBA	STANDARD PAINTED COLOR AS SELECTED BY THE ARCHITECT
WALL@CLG	WALL MOUNT AT CORNER OF WALL AND CEILING	CFBA	CUSTOM FINISH AS SELECTED BY THE ARCHITECT
CCBA	CUSTOM PAINTED COLOR AS SELECTED BY THE ARCHITECT	SFBA	STANDARD FINISH AS SELECTED BY THE ARCHITECT

LIGHT FIXTURE GENERAL NOTES

1. REFER TO THE ARCHITECTURAL REFLECTED CEILING PLANS FOR LOCATIONS OF LIGHT FIXTURES. BRING ALL DISCREPANCIES OF LOCATIONS AND QUANTITIES TO THE ATTENTION OF THE ARCHITECT AND ELECTRICAL ENGINEER PRIOR TO BIDDING.
2. REFER TO ARCHITECTURAL ELEVATIONS FOR MOUNTING HEIGHTS AND LOCATIONS OF LIGHT FIXTURES. BRING ALL DISCREPANCIES TO THE ATTENTION OF THE ARCHITECT PRIOR TO BIDDING.
3. REFER TO THE SPECIFICATIONS FOR OTHER LIGHT FIXTURE, FUSING, BALLAST, AND LAMP REQUIREMENTS AND ACCEPTABLE MANUFACTURERS.
4. CONFIRM AVAILABLE MOUNTING DEPTHS OF ALL LIGHT FIXTURES AND COMPARE WITH DEPTHS SHOWN ON SHOP DRAWINGS. BRING ALL POTENTIAL CONFLICT AREAS TO THE ATTENTION OF THE ARCHITECT AND ELECTRICAL ENGINEER PRIOR TO RELEASE.
5. REFER TO LIGHTING PLANS FOR ALL LINEAR FIXTURE LENGTHS. THE CATALOG NUMBER IS BASED ON THE FIXTURE SPECIFIED AND MAY NOT REFLECT THE QUANTITY OR OVERALL LENGTH OF LINEAR FIXTURES REQUIRED. CONTRACTOR TO NOTE THAT VARIOUS FIXTURE LENGTHS MAY BE REQUIRED TO ACHIEVE THE OVERALL RUN LENGTH.
6. REFER TO LIGHTING PLANS FOR ALL UNDERCABINET FIXTURE LENGTHS. THE CATALOG NUMBER IS BASED ON THE FIXTURE SPECIFIED AND MAY NOT REFLECT THE QUANTITY OR OVERALL LENGTH OF UNDERCABINET FIXTURES REQUIRED. CONTRACTOR TO NOTE THAT VARIOUS FIXTURE LENGTHS MAY BE REQUIRED TO ACHIEVE THE OVERALL RUN LENGTH OR TO FIT WITHIN THE MILLWORK. COORDINATE FIXTURE LAYOUT WITH MILLWORK SHOP DRAWINGS PRIOR TO LIGHTING SUBMITTALS.
7. WHEN A CONTRADICTION EXISTS BETWEEN A SPECIFIC MODEL NUMBER AND THE DESCRIPTION, THE DESCRIPTION SHALL GOVERN.
8. PRIOR APPROVALS SHALL BE SUBMITTED TO THE ELECTRICAL ENGINEER'S OFFICE AT LEAST (8) EIGHT WORKING DAYS BEFORE THE BID. PRIOR APPROVALS RECEIVED AFTER THIS TIME PERIOD SHALL BE REJECTED.
9. REFER TO SPECIFICATIONS.
10. VALUE ENGINEERING CONDUCTED WITHOUT THE DESIGN TEAM IE; ARCHITECT, OWNER, ENGINEER & LIGHTING CONSULTANT/DESIGNER WILL NOT BE ALLOWED, REVIEWED OR APPROVED.

FIXTURE SCHEDULE

Project Manager: *TREY HILLS*

TYPE	DESCRIPTION	MANUFACTURER	CATALOG NUMBER	VOLTS	TOTAL WATTS	LAMPS
EG	EMERGENCY EGRESS LIGHT; VERIFY FINISH WITH ARCHITECT	LITHONIA	AFB QEL DDBTXDLN/OLT LTP WT CW	UNV	11	LED; INCLUDED
EM1	2-HEAD EM WALL PACK; IVORY WHITE SURFACE MOUNTED	LITHONIA	EU2L M12	UNV	1	LED; INCLUDED
EX1	2-HEAD EM WALL PACK; SURFACE MOUNTED; GREEN LETTERING; WITH EXIT SIGN	LITHONIA	ECG LED M6	UNV	3	LED; INCLUDED
F1	LED 2X4 LAY-IN FIXTURE; 5000K DAYLIGHT BRIGHT; 9200 LUMENS - NO SUBSTITUTIONS	LITHONIA	2GTL4 88L EZ1 LP850	UNV	65	LED; INCLUDED
F2	4" SWITCHABLE WHITE COLOR TEMPERATURE; CANLESS LED RECESSED KIT ON SEPARATE DIMMER SWITCH IN SHELF ABOVE BOXING STATION	LITHONIA	WF4 LED 30K40K50K 90CRI MW	UNV	10	LED; INCLUDED
F3	LED 2X4 FIXTURE WITH DRY WALL KIT; 5000K DAYLIGHT BRIGHT; 3000 LUMENS; ORDER DRY WALL FLANGE KIT - NO SUBSTITUTIONS	LITHONIA	2GTL4 30L EZ1 LP850 DGA 24	UNV	23	LED; INCLUDED

KITCHEN EQUIPMENT SCHEDULE

SYMBOL	DESCRIPTION	SERVICE VOLTS	SERVICE PHASE	DISCONNECT SIZE	DISCONNECT NEMA	LOAD HP/TON	LOAD VA	LOAD AMPS	MOUNTING HEIGHT	REMARKS
1	WARMER	120V	1	PLUG/ CORD	5-15P		1,440	12A		
2	MIXER	208V	3	30A NEMA 1	–	2.5 HP	2,302	6.39A		
3	REFRIGERATOR	120V	1	PLUG/ CORD	5-15P	1 HP	1,320	11A		
4	FREEZER	120V	1	PLUG/ CORD	5-15P		1,320	11A		
5	MICROWAVE	120V	1	PLUG/ CORD	5-15P		1,000	8.3A		
6	OVEN L	120V	1	PLUG/ CORD	5-20P		480	4A		
7	OVEN H	208V	3	PLUG/ CORD	15-60P		18,734	52A		
8	U.C. REFRIGERATOR	120V	1	PLUG/ CORD	5-15P		1000	11A		
9	SMALL FREEZER	120V	1	PLUG/ CORD	5-15P		1,056	8.8A		
10	PLANETARY MIXER	120V	1	PLUG/ CORD	5-15P		1,100	10A		

NOTES:
1. VERIFY ALL EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS (i.e. VOLTAGE, PHASE, FLA, ETC.) WITH KITCHEN DRAWINGS/SUBMITTALS BEFORE ACTUAL EQUIPMENT INSTALL.
2. ALL FUSES SHALL BE DUAL ELEMENT TIME DELAY. FINAL BREAKER/FUSE AND DISCONNECT SIZE SHALL BE DETERMINED BY MANUFACTURER'S RECOMMENDATION FOR ACTUAL EQUIPMENT INSTALL.
3. MAXIMUM VALUES INDICATED.
4. DISCONNECTING MEANS NOT REQUIRED FOR EQUIPMENT WITHIN SIGHT (AS DEFINED IN NEC) OF BRANCH PANEL SERVING EQUIPMENT. SEE NEC 422.31(B).
5. DISCONNECTING MEANS NOT REQUIRED FOR APPLIANCES NOT OVER 300 VA. SEE NEC 422.31(A).

PANELBOARD SCHEDULE

PANEL B (EXIST) TYPE NQ 120/208 VOLTS 3 PH 4 W

MOUNTING: ___ FLUSH, X SURFACE

DIMENSIONS: ___ W, ___ D (in.), ___ H

LOCATION BACK OF HOUSE AMP 400

MAINS: X LUGS, ___ BREAKER, ___ SUBFEED LUGS, ___ ISO GROUND, ___ 200% NEUTRAL, ___ SPD

BRANCH BREAKERS

ITEM	AMPS	POLE	WIRE SIZE	CIR. NO.	LEFT PHASE LOAD A	B	C	RGHT PHASE LOAD A	B	C	CIR NO.	AMPS	POLE	WIRE SIZE	ITEM
RESTROOM GFCI	20	1	12	1	360			6245			2	60	3	6	OVEN
PHONE BOARD	20	1	12	3		360			6245		4	-	-	-	-
GAS WATER HEATER	20	1	12	5			150			6245	6	-	-	-	-
SPARE	20	1	-	7				480			8	20	1	12	OVEN GFCI
WARMER	20	1	12	9	1440				6245		10	60	3	6	OVEN
WARMER	20	1	12	11			1440			6245	12	-	-	-	-
EF-1	15	1	12	13	528			6245			14	-	-	-	-
BACK COUNTER RECEPT	20	1	12	15		1080			480		16	20	1	20	OVEN GFCI
CAMERAS & SPEAKERS	20	1	12	17			500			1000	18	20	1	12	MICROWAVE
EQUIPMENT CABINET	20	1	12	19	720			180			20	20	1	12	DRESSING STN RECEPT
MICROWAVE	20	1	12	21		1000			1000		22	20	1	12	FREEZER
REFRIGERATOR	20	1	12	23			1320			720	24	20	1	12	FRONT STORE RECEPT
REFRIGERATOR	20	1	12	25	1320			720			26	20	1	12	FRONT STORE RECEPT
REFRIGERATOR	20	1	12	27		1320			720		28	20	1	12	FRONT STORE RECEPT
REFRIGERATOR	20	1	12	29			1320			1200	30	20	1	12	STORE FRONT SIGN
MICROWAVE	20	1	12	31	1000			1281			32	20	1	12	LIGHTING
MIXER	30	3	10	33		768			400		34	20	1	12	LIGHTING
-	-	-	-	35			768			4227	36	60	3	6	RTU-2
-	-	-	-	37	768			4227			38	-	-	-	-
MIXER	30	3	10	39		768			4227		40	-	-	-	-
-	-	-	-	41			768			360	42	20	1	12	FRONT STORE RECEPT
-	-	-	-	43	768			1320			44	20	1	12	REFRIGERATOR
PLANETARY MIXER	20	1	12	45		1100			1320		46	20	1	12	REFRIGERATOR
FRONT COUNTER RECEPT	20	1	12	47			720				48	20	1	-	SPARE
FRONT COUNTER RECEPT	20	1	12	49	720			1320			50	20	1	12	REFRIGERATOR
FRONT COUNTER RECEPT	20	1	12	51		720			1000		52	20	1	12	MICROWAVE
FRONT U.C. REFRIG	20	1	12	53			1000				54	20	1	-	SPARE
EF-2	15	1	12	55	528						56	20	1	-	SPARE
RECIRC PUMP RP-1	15	1	12	57		100					58	20	1	-	SPARE
SPARE	20	1	12	59							60	20	1	-	SPARE
SPARE	20	1	12	61							62	20	1	-	SPARE
SPARE	20	1	12	63							64				SPACE ONLY
SPACE ONLY				65							66				SPACE ONLY
SPACE ONLY				67							68				SPACE ONLY
SPACE ONLY				69							70				SPACE ONLY
SPACE ONLY				71							72				SPACE ONLY
SPACE ONLY				73							74				SPACE ONLY
SPACE ONLY				75							76				SPACE ONLY
SPACE ONLY				77							78				SPACE ONLY
SPACE ONLY				79							80				SPACE ONLY
SPACE ONLY				81							82				SPACE ONLY
SPACE ONLY				83							84				SPACE ONLY
					6712	8656	7986	22018	21637	19997					
					28730	30293	27983	TOTAL							CONNECTED LOAD TOTAL
					239	252	233	AMPS/PHASE							87006 VA

* Provide 5 mA GFCI Circuit Break

PROJECT NAME: CRUMBL-Lee's Crossing,MO EQUIP RATING EXISTING AMPS RMS SYM.

ELECTRICAL CALCULATIONS:

PANEL 'B' LOAD = 87,006VA
GRAND TOTAL TENANT LOAD = 87,006VA

BUILDING OPERATING VOLTAGE IS 120/208V 3P 4W

TOTAL AMPERAGE AT MAIN FEEDING BREAKER IN DISTRIBUTION PANEL = 87,006 / (208 * Sqrt (3)) = 87,006 / 359.84 = 242 AMPS (FULL CONNECTED LOAD; WITHOUT DEMAND FACTOR)

DEMAND FACTOR FOR ALL ELECTRIC RESTAURANT LOADS (NEC TABLE 220.88):
[0-200kVA * 0.8 OF TOTAL CONNECTED LOAD]

PANEL 'B' TOTAL CONNECTED LOAD = 87,006;
ALL ELECTRIC RESTAURANT IS LESS THAN 200kVA;
87,006 * 0.8 = 69,605VA

DEMAND FACTOR AMPS:
69,605 / (208 * Sqrt (3)) = 69,605 / 359.84 = 193 AMPS

EQUIPMENT SCHEDULE

UNIT #	FUNCTION	LOAD	VOLT	PHASE	FULL LOAD AMPS	CONDUIT SIZE	WIRES NO. SETS	WIRES NO.	WIRES SIZE	WIRES EQUIP. GND.	OCPD TYPE	OCPD AMPS	STARTER/DISC/VFD (SEE NOTES)	REMARKS
EF-1	EXHAUST FAN - KIT.	1/8 HP	120	1	3.75	3/4"	1	2	12	12	CB	15	2A	
EF-2	EXHAUST FAN - RR	1/8 HP	120	1	3.75	3/4"	1	2	12	12	CB	15	4A	
RP-1	RECIRCULATION PUMP	1/8 HP	120	1	3.75	3/4"	1	2	12	12	CB	20	12A	
RTU-2	ROOF TOP UNIT (NEW)	44 MCA	208	3	35.20	3/4"	1	3	6	10	CB	60	2A	EXISTING - PROVIDE POWER TO EXISTING DISCONNECT. VERIFY ELECTRICAL REQUIREMENTS PRIOR TO POWERING UP

NOTES:
1. NON-FUSED DISCONNECT SWITCH
2. FUSED DISCONNECT SWITCH
3. BREAKER IN ENCLOSURE
4. MANUAL STARTER W/THERMAL OVERLOAD
5. MAGNETIC STARTER
6. MAGNETIC STARTER/NON-FUSED DISCONNECT COMBINATION
7. MAGNETIC STARTER/FUSED DISCONNECT COMBINATION
8. MAGNETIC STARTER/BREAKER COMBINATION
9. VARIABLE FREQUENCY DRIVE
10. REDUCED VOLTAGE STARTER
11. DIRECT CONNECTION
12. RECEPTACLES/SPECIAL PURPOSE OUTLET/ETC.
13. TWO-SPEED STARTER, COORDINATE W/MOTOR TYPE
14. SOLID STATE SOFT STARTER

A. FURNISHED, INSTALLED, AND CONNECTED UNDER DIVISION 26
B. FURNISHED AND INSTALLED UNDER ANOTHER DIVISION REQUIRING CONNECTION UNDER DIVISION 26.
C. FURNISHED UNDER ANOTHER DIVISION BUT INSTALLED AND CONNECTED UNDER DIVISION 26.
D. FURNISHED, INSTALLED AND CONNECTED UNDER ANOTHER DIVISION.

CB = CIRCUIT BREAKER - THERMAL MAGNETIC

NOTE 1: PER 250.122(A), EQUIPMENT GROUND IS NOT REQUIRED TO BE LARGER THAN PHASE CONDUCTOR.
NOTE 2: OVERCURRENT PROTECTION DEVICE (OCPD) SHOWN IS LOCATED AT POWER PANEL. ALL FUSING TO BE SIZED IN ACCORDANCE WITH FUSE MFR RECOMMENDATION FOR MOTOR NAME PLATE RATING. SEE SECTION 26 2815.
NOTE 3: ALL EQUIPMENT TO BE RATED FOR THE ENVIRONMENT FOR WHICH IT IS INSTALLED.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
JULY 22, 2021

REVISIONS:

No.	Date	Description

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STATE OF MISSOURI
BRIAN DENVER MICKS
NUMBER 2019023171
PROFESSIONAL ENGINEER

ELECTRICAL SCHEDULES

E6.1

JZW ARCHITECTS

By: trey, Aug 10, 2021 - 12:54pm
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GENERAL PROVISIONS

A. REFERENCE
1. THE GENERAL CONDITIONS AND OTHER CONTRACT DRAWINGS AS SET FORTH IN THE FOREGOING PAGES ARE HEREBY INCORPORATED INTO AND BECOME A PART OF THE SPECIFICATIONS FOR WORK UNDER THIS TITLE, INSOFAR AS THEY APPLY HERETO.
1. ALL SPECIFICATIONS UNDER THIS DIVISION TITLE ARE DIRECTED TO AND ARE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR, UNLESS OTHER TRADES OR PERSONS ARE SPECIFICALLY MENTIONED. "ELECTRICAL CONTRACTOR" IS INFERRED AND INTENDED.

B. CONTRACT DRAWINGS
1. THE DRAWINGS ACCOMPANYING THESE SPECIFICATIONS ARE COMPLEMENTARY EACH TO THE OTHER AND WHAT IS CALLED FOR BY ONE SHALL BE AS IF CALLED FOR BY BOTH.
2. CONSULT ALL CONTRACT DRAWINGS WHICH MAY AFFECT THE LOCATION OF EQUIPMENT, CONDUIT AND WIRING AND MAKE MINOR ADJUSTMENTS IN LOCATIONS TO SECURE COORDINATION.
3. WIRING LAYOUT IS SCHEMATIC AND EXACT LOCATIONS SHALL BE DETERMINED BY FIELD CONDITIONS.
4. OTHER THAN MINOR ADJUSTMENTS SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR APPROVAL BEFORE PROCEEDING WITH THE WORK.

C. JOB-SITE COPY OF DOCUMENTS
1. MAINTAIN AT THE SITE, ONE COPY OF ALL DRAWINGS, SPECIFICATIONS, ADDENDA APPROVED SHOP DRAWINGS, CHANGE ORDERS AND OTHER MODIFICATIONS. IN GOOD ORDER AND MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION. THESE SHALL BE AVAILABLE TO THE OWNER'S REPRESENTATIVE. THE DRAWINGS MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION SHALL BE DELIVERED TO THE OWNER'S REPRESENTATIVE FOR THE OWNER UPON COMPLETION OF THE WORK. AN ADDITIONAL SET OF DRAWINGS WILL BE FURNISHED BY THE OWNER'S REPRESENTATIVE FOR THIS PURPOSE UPON REQUEST.

D. MANUFACTURER'S DRAWINGS
1. THE CONTRACTOR SHALL SUBMIT TO THE ARCHITECT FOR REVIEW (6) COPIES OF MANUFACTURER'S DRAWINGS AND WIRING DIAGRAMS. THE ENGINEER WILL REVIEW CONTRACTOR'S SHOP DRAWINGS AND RELATED SUBMITTALS (AS INDICATED BELOW) WITH RESPECT TO THE ABILITY OF THE DETAILED WORK, WHEN COMPLETE, TO BE A PROPERLY FUNCTIONING INTEGRAL ELEMENT OF THE OVERALL SYSTEM DESIGNED BY THE ENGINEER. BEFORE SUBMITTING A SHOP DRAWING OF AND RELATED MATERIAL TO THE ENGINEER, CONTRACTOR SHALL: REVIEW EACH SUCH SUBMISSION FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND OPERATIONS OF CONSTRUCTION, AND SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO. ALL OF WHICH ARE THE SOLE RESPONSIBILITY OF CONTRACTOR: APPROVE EACH SUCH SUBMISSION BEFORE SUBMITTING IT, AND SO STAMP EACH SUCH SUBMISSION BEFORE SUBMITTING IT. THE ENGINEER SHALL ASSUME THAT NO SHOP DRAWING OR RELATED SUBMITTAL COMPRISES A VARIATION UNLESS CONTRACTOR ADVISES ENGINEER OTHERWISE VIA A WRITTEN INSTRUMENT WHICH IS ACKNOWLEDGED BY ENGINEER IN WRITING. THE ITEMS, TYPES OF SUBMITTALS AND RELATED MATERIAL (IF ANY) CALLED FOR ARE INDICATED BELOW:

ITEMS	TYPE SUBMITTALS REQUESTED
LIGHTING AND POWER PANELS	SHOP DRAWINGS
LIGHTING FIXTURES	CATALOG CUTS

E. GUARANTEES
1. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEFECTS, REPAIRS AND REPLACEMENTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR AFTER DATE OF SUBSTANTIAL COMPLETION AS DETERMINED BY THE OWNER'S REPRESENTATIVE. PRODUCT GUARANTEES GREATER THAN ONE (1) YEAR SHALL BE PASSED ALONG TO THE OWNER FOR FULL BENEFIT OF THE MANUFACTURER'S WARRANTY.

WORK INCLUDED

A. INSTALLATION, MATERIALS AND WORKMANSHIP
1. FURNISH AND INSTALL ALL NECESSARY ANCHORS, SUPPORTS, STRAPS, BOXES, FITTINGS AND OTHER SIMILAR APPURTENANCES NOT INDICATED ON THE DRAWINGS BUT WHICH ARE REQUIRED FOR A COMPLETE AND PROPERLY INSTALLED SYSTEM CONSISTENT WITH THE ARCHITECTURAL TREATMENT OF THE BUILDING.
2. THE ELECTRICAL CONTRACTOR, INSOFAR AS THE WORK IS CONCERNED, SHALL AT ALL TIMES KEEP THE PREMISES IN A NEAT AND ORDERLY CONDITION. AND AT THE COMPLETION OF THE WORK, SHALL PROPERLY CLEAN UP AND CART AWAY DEBRIS AND EXCESS MATERIALS. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF DUMPSTER AND REFUSED DISPOSAL AS REQUIRED FOR ELECTRICAL WORK.
3. ALL MATERIALS SHALL BE NEW AND UNDETERIORATED AND OF A QUALITY NOT LESS THAN THE MINIMUM SPECIFIED.

B. COORDINATION OF PLANS AND SPECIFICATIONS
1. CONTACT THE OWNER'S REPRESENTATIVE IMMEDIATELY IF THERE ARE ANY QUESTIONS REGARDING THE MEANING OR INTENT OF EITHER PLANS OF SPECIFICATIONS, OR UPON NOTICING ANY DISCREPANCIES OR OMISSIONS IN EITHER PLANS OR SPECIFICATIONS.

C. CUTTING AND PATCHING
1. ALL ELECTRICAL EQUIPMENT SHALL BE KEPT DRY AND CLEAN DURING THE CONSTRUCTION PERIOD. INTERIOR OF ALL ENCLOSURES SHALL BE CLEANED OF DIRT AND DEBRIS BEFORE INSTALLING TRIM OR COVERS.
2. ALL FINISHED SURFACES OF EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE THOROUGHLY CLEANED OF DIRT AND ALL SCRATCHED OR DAMAGED SURFACES SHALL BE TOUCHED UP WITH MATCHING MATERIALS BEFORE FINAL ACCEPTANCE OF THE WORK.
3. WHEN ALL WORK IS COMPLETED AND ALL WORK HAS BEEN SATISFACTORILY TESTED AND ACCEPTED BY THE OWNER'S REPRESENTATIVE, ALL CONDUIT AND OTHER EXPOSED SURFACES SHALL BE THOROUGHLY CLEANED.

CODES AND FEES

A. CODES:
1. ALL WORK PERFORMED UNDER THIS SPECIFCATION SHALL BE DONE IN ACORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AS PREPARED AND PUBLISHED BY THE NATIONAL FIRE PROTECTION ASSOCIATION AND ANY APPLICABLE STATE OR LOCAL CODES.

B. FEES:
1. OBTAIN AND PAY FOR ANY AND ALL PERMITS REQUIRED BY ALL LAWS AND REGULATIONS AND PUBLIC AUTHORITY HAVING SUCH JURISDICTION.

TESTS AND INSPECTIONS

A. OBTAIN ALL INSPECTIONS REQUIRED BY ALL LAWS, ORDINANCES, RULES, REGULATIONS OR PUBLIC AUTHORITY HAVING JURISDICTION AND OBTAIN CERTIFICATES OF SUCH INSPECTIONS AND SUBMIT SAME TO THE OWNER'S REPRESENTATIVE. PAY ALL FEES, CHARGES AND OTHER EXPENSES IN CONNECTION THEREIN. OBTAIN OCCUPANCY PERMIT AS REQUIRED BY OWNER. FINAL PAYMENT SHALL NOT BE MADE UNTIL OCCUPANCY PERMIT IS OBTAINED.

B. WORK SHALL BE UNACCEPTABLE WHEN FOUND TO BE DEFECTIVE OR CONTRARY TO THE PLANS SPECIFICATIONS, CODES SPECIFIED OR ACCEPTED STANDARDS OF GOOD WORKMANSHIP.

C. THE CONTRACTOR SHALL PROMPTLY CORRECT ALL WORK FOUND UNACCEPTABLE BY THE OWNER'S REPRESENTATIVE WHETHER OBSERVED BEFORE OR AFTER SUBSTANTIAL COMPLETION AND WHETHER OR NOT FABRICATED, INSTALLED OR COMPLETED. THE CONTRACTOR SHALL BEAR ALL COSTS OF CORRECTING SUCH UNACCEPTABLE WORK, INCLUDING COMPENSATION FOR THE OWNER'S REPRESENTATIVE ADDITIONAL SERVICES MADE NECESSARY THEREBY.

CONDUIT

A. FURNISH AND INSTALL ALL CONDUITS, BOXES, FITTINGS, ETC., FOR A COMPLETE AND WORKING SYSTEM.

B. ALL WIRING SHALL BE RUN IN EMT CONDUIT OR MC CABLE WITH GROUND CONDUCTOR UNLESS OTHERWISE NOTED.

C. ALL CONDUIT SIZES STATED HEREIN OR MARKED ON THE DRAWINGS ARE MINIMUM SIZE AND SHALL BE NO LESS THAN 1/2" UNLESS OTHERWISE NOTED.

D. ALL CONDUIT SHALL BE SUBSTANTIALLY SUPPORTED BY PIPE STRAPS OR SUITABLE CLAMPS OR HANGERS ATTACHED TO THE ELEMENTS OF THE BUILDING STRUCTURE TO PROVIDE RIGID INSTALLATION; IN NO CASE SHALL CONDUIT BE ATTACHED OR SUPPORTED FROM ADJOINING PIPE OR INSTALLED IN SUCH A MANNER AS TO PREVENT THE READY REMOVAL OF OTHER PIPE FOR REPAIRS.

WIRE AND CABLE

A. ALL CONDUCTORS SHALL BE COPPER AND OF THE AWG SIZE AND TYPE SHOWN ON THE DRAWINGS. WHERE NO SIZE OR TYPE IS SHOWN, CONDUCTORS SHALL NOT BE LESS THAN #12 TYPE XHHW, THHN OR THWN. CONDUCTORS #8 AWG AND LARGER SHALL BE STRANDED COPPER AND HAVE 600 VOLT INSULATION; BE UL LABELED AND OF AMERICAN MANUFACTURER.

B. ALL CONNECTIONS ARE TO BE MADE USING PRESSURE TYPE TERMINALS.

C. THE FOLLOWING COLOR CODE SHALL BE USED:

	120/240 VOLT	120/208 VOLT	277/480 VOLT
PHASE A	BLACK	BLACK	BROWN
PHASE B	RED	RED	ORANGE
PHASE C	BLUE	YELLOW	
NEUTRAL	WHITE	WHITE	WHITE
GROUND	GREEN	GREEN	GREEN

D. CONDUCTORS NO.10 AWG OR SMALLER SHALL HAVE INSULATION COLORED AS NOTED ABOVE.

E. CONDUCTIORS NO. 8 AWG OR LARGER SHALL HAVE INSULATION COLORED AS NOTED ABOVE OR COLORED TAPE, MINIMUM SIZE 1/2", WRAPPED TWICE AROUND AT THE FOLLOWING POINTS:
1. AT EACH TERMINAL.
2. AT EACH CONDUIT ENTRANCE.
3. AT INTERVALS NOT MORE THAN 12 INCHES APART IN ALL BOXES, PANEL TUBS, SWITCHBOARDS, ETC.

G. ALL BRANCH CIRCUITS SHALL BE MARKED IN THE PANEL BOARD GUTTERS. MARKERS SHALL INDICATE CORRESPONDING BRANCH-CIRCUIT NUMBERS.

H. EACH BRANCH CIRCUIT REQUIRING A NEUTRAL SHALL BE FURNISHED WITH A SEPARATE INDIVIDUAL NEUTRAL CONDUCTOR.

BOXES AND PLATES

A. FURNISH AND INSTALL ALL OUTLET, JUNCTION, AND PULL BOXES AS INDICATED ON THE DRAWINGS AND AS NECESSARY TO INSTALL THE REQUIRED CONDUIT AND WIRING IN A NEAT AND WORKMANLIKE MANNER.

B. PULL BOXES AND JUNCTION BOXES SHALL BE GALVANIZED AND OF THE CORRECT SIZE AND GAUGE, SIZED IN ACCORDANCE WITH CODE REQUIREMENTS AND SHALL BE U.L. LABELED.

C. BOXES AT EXTERIOR AREAS TO BE WATERTIGHT AND DUST-TIGHT WITH GASKETED COVERS.

D. ALL BOXES FOR EXPOSED WORK IN FINISHED SPACES SHALL BE "FS" TYPE WITH THREADED HUBS WITH RIGID CONDUIT RISER (DEEP WIRE MOLD BOXES).

E. ALL BOXES SHALL BE RIGIDLY SUPPORTED INDEPENDENT OF THE CONDUIT SYSTEM. BOXES CAST INTO MASONRY OR CONCRETE ARE CONSIDERED TO BE RIGIDLY SUPPORTED.

F. FLOOR BOXES:
1. DESCRIPTION: FLOOR BOXES COMPATIBLE WITH FLOOR BOX SERVICE FITTINGS PROVIDED IN ACCORDANCE WITH THE WIRING DEVICES SECTION OF THIS SPECIFICATION; WITH PARTITIONS TO SEPARATE MULTIPLE SERVICES; FURNISHED WITH ALL COMPONENTS, ADAPTERS, AND TRIMS REQUIRED FOR COMPLETE INSTALLATION.
2. USE CAST IRON OR NONMETALLIC FLOOR BOXES WITHIN SLAB ON GRADE.
3. USE SHEET-STEEL, CAST IRON, OR NONMETALLIC FLOOR BOXES WITHIN SLAB ABOVE GRADE.
4. METALLIC FLOOR BOXES: FULLY ADJUSTABLE (WITH INTEGRAL MEANS FOR LEVELING ADJUSTMENT PRIOR TO AND AFTER CONCRETE POUR).
5. MANUFACTURER: SAME AS MANUFACTURER OF FLOOR BOX SERVICE FITTINGS.

G. UNDERGROUND BOXES/ENCLOSURES:
1. DESCRIPTION: IN-GROUND, OPEN BOTTOM BOXES FURNISHED WITH FLUSH, NON-SKID COVERS WITH LEGEND INDICATING TYPE OF SERVICE AND STAINLESS STEEL TAMPER RESISTANT COVER BOLTS.
2. SIZE: AS INDICATED ON THE DRAWINGS.
3. DEPTH: AS REQUIRED TO EXTEND BELOW FRONT LINE TO PREVENT FROST UPHEAVAL, BUT NOT LESS THAN 12 INCHES.
4. APPLICATIONS:
   a. SIDEWALKS AND LANDSCAPED AREAS SUBJECT ONLY TO OCCASIONAL NONDELIBERATE VEHICULAR TRAFFIC: USE POLYMER CONCRETE OR COMPOSITE ENCLOSURE WITH MINIMUM SCTE 77, TIER 8 LOAD RATINGS.
   b. PARKING LOTS, IN AREAS SUBJECT ONLY TO OCCASIONAL NONDELIBERATE VEHICULAR TRAFFIC: USE POLYMER CONCRETE OR COMPOSITE ENCLOSURE WITH MINIMUM SCTE 77, TIER 15 LOAD RATING.
   c. DO NOT USE POLYMER CONCRETE ENCLOSURES IN AREAS SUBJECT TO DELIBERATE VEHICULAR TRAFFIC.

H. COMPOSITE UNDERGROUND BOXES/ENCLOSURES: COMPLY WITH SCTE 77.

WIRING DEVICES

A. WIRING DEVICES SHALL BE SIMILAR TO THOSE LISTED BELOW AND OF SPECIFIED AMPERAGE. OTHER SPECIAL PURPOSE DEVICES SHALL BE AS SPECIFIED ON THE DRAWINGS.

B. DUPLEX GROUNDING TYPE RECEPTACLE - 20 AMP, 125 VOLT
1. HUBBELL 5352
2. ARROW HART 5352

C. SINGLE POLE SWITCHES - 20 AMP, 120 VOLT

D. WEATHERPROOF RECEPTACLES - 20 AMP, 125 VOLT - NEMA 5-20R
1. HUBBELL 5352 WITH 5205 COVER INTERMATIC GUARDIAN
2. I-SERIES, NEMA 3R COVER
3. ARROW HART 5352 WITH 4500 COVER

E. GFCI RECEPTACLE - 20 AMP, 124 VOLT - NEMA 5-20R
1. HUBBELL GF 5262 WITH MATCHING BYLON COVER PLATE OR WO-26 W.P. COVER

F. GROUND ALL RECEPTACLES IN ACCORDANCE WITH ARTICLE 250.146 OF NEC AND AS INDICATED ON THE GROUNDING SECTION OF THIS SPECIFICATION.

IDENTIFICATION

A. EACH PIECE OF SERVICE EQUIPMENT AND INDIVIDUAL SWITCHES, ALL DISCONNECTS, STARTERS, ALL EXHAUST FAN MANUAL STARTING SWITCHES.

B. IDENTIFICATION SHALL BE IN THE FORM OF LAMINATE PLASTIC NAMEPLATES, BLACK RACE, WITH THE LETTERS ENGRAVED INTO THE WHITE BACKGROUND, MINIMUM 1/4" HIGH. PLATES SHALL BE DRILLED ON EACH END FOR SHEET METAL SCREW ATTACHMENT, TO "DYMO" OR SIMILAR TYPE LABELS WILL BE ALLOWED.

C. PANEL BOARD DIRECTORY: A TYPED CIRCUIT DIRECTORY SHALL BE PROVIDED INDICATING LOCAL AREA SERVED AND LOCATION FOR EACH BRANCH CIRCUIT.

GROUNDING

A. ALL FEEDERS AND BRANCH CIRCUITS OVER 100 VOLTS SHALL INCLUDE A GROUNDING CONDUCTOR SIZED IN ACCORDANCE WITH NEC TABLE 250-122, EXCEPT NOT BE SMALLER THAN #12 FOR POWER AND LIGHTING CIRCUITS AND #14 FOR CONTROL CIRCUITS. ALL GROUND CONDUCTORS SHALL BE GREEN, OR AS SPECIFIED UNDER THE WIRE AND CABLE SECTION OF THIS SPECIFICATION.

B. ALL GROUND CLAMPS SHALL BE PENN-UNION "GPL" TYPE OR SIMILAR BY O.Z. OR BURNDY.

C. CONDUIT FOR SOLITARY GROUND CONDUCTORS SHALL BE RIGID SCHEDULE 40 PVC NON-METALLIC ELECTRICAL CONDUIT WITH U.L. LABEL SOLITARY GROUND CONDUCTORS SHALL NOT BE PLACED THROUGH METALLIC SLEEVES OR CONDUITS AND SHALL NOT BE COMPLETELY ENCIRCLED BY METALLIC HANGERS OR SUPPORTS.

D. THE GROUND CONDUCTOR SHALL BE CONNECTED TO THE NEUTRAL IN ONLY TWO LOCATIONS- ON THE SUPPLY SIDE OF THE SERVICE DISCONNECT MEANS PER NEC-250-24 AND ON SEPARATELY DERIVED SYSTEMS PER NEC 250-30.

E. AT EACH RECEPTACLE BOX, THE GROUND CONDUCTOR SHALL ENTER AND CONNECT, WITH NORMAL WIRING CONNECTOR, TO: 1) THE GROUND PIGTAIL TO RECEPTACLE: 2) THE GROUND PIGTAIL TO THE BOX GROUND SCREW; AND 3) THE OUTGOING GROUND CONDUCTOR TO NEXT DEVICE, IF NOT AT END OF RUN. METAL TO METAL CONTACT BETWEEN THE DEVICE YOKE AND THE OUTLET BOX IS NOT ACCEPTABLE AS A BOND FOR EITHER SURFACE MOUNTED BOXES OR FLUSH TYPE BOXES.

LIGHTING FIXTURES

A. CONTRACTOR SHALL FURNISH AND INSTALL LIGHTING FIXTURES AS INDICATED IN THE FIXTURE SCHEDULE SHOWN ON DRAWINGS, AND SPECIFIED HEREIN.

B. NEUTRAL ASSEMBLY SHALL HAVE INDIVIDUAL ANTI-TURN SOLDERLESS TERMINALS, SIMILAR TO SQUARE D TYPE PK, FOR CONNECTION OF ULTIMATE NUMBER OF NEUTRAL WIRES. SHEET METAL TERMINAL STRIPS AND CONNECTIONS WILL BE REJECTED.

C. ALL LIGHTING FIXTURES INSTALLED BY THE ELECTRICAL CONTRACTOR SHALL BE FURNISHED COMPLETE WITH AS INDICATED ON THE FIXTURE SCHEDULE.

D. ANY LIGHTING FIXTURES SCRATCHED, BENT, CRACKED OR IN ANY WAY DAMAGED BEFORE ACCEPTANCE BY OWNER SHALL BE REPLACED AT THIS CONTRACTOR'S EXPENSE.

E. ALL LIGHTING FIXTURES SHALL BE IN WORKING ORDER AT THE TIME OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER.

F. ALL LIGHTING FIXTURES ARE TO BE GROUNDED ON THE INTERIOR OF THE FIXTURE HOUSING, ON CLEAN BARE METAL (FREE OF PAINT) BY USE OF PIGTAIL AND FASTENED BY A SCREW USED FOR NO OTHER PURPOSE.

TELEPHONE/DATA SYSTEMS

A. SUMMARY
1. INCLUDES BUT NOT LIMITED TO
   a. FURNISH AND INSTALL BUILDING TELEPHONE AND COMPUTER NETWORK RACEWAY AND CABLE SYSTEM AS DESCRIBED IN CONTRACT DOCUMENTS INCLUDING, BUT NOT LIMITED TO, RACEWAY, OUTLETS, MODULAR JACKS, DEVICE PLATES, CABLES, PUNCH DOWN BLOCKS, PATCH PANELS, GROUNDING AND OTHER MISCELLANEOUS ITEMS REQUIRED FOR A COMPLETE SYSTEM.

B. COMPONENTS
1. TELEPHONE OUTLET BOX SHALL BE SINGLE DEVICE BOX.
2. BUILDING TELEPHONE AND COMPUTER NETWORK SYSTEM CABLE
   a. 23 GAUGE, SOLID TINNED COPPER, FOUR TWISTED PAIRS. CATEGORY 6
   b. USE PLENUM-RATED CABLE IN CEILINGS AND AREAS USED FOR PLENUM AIR RETURN
3. TELEPHONE TERMINATION BLOCKS
   a. UL VERIFIED CATEGORY 6
   b. 110 TERMINATION WITH TIN LEAD PLATED IDC
4. TELEPHONE/NETWORK JACKS
   a. WALL JACKS
      1) CAT6 - HUBBELL HXJ6 OR ALTERNATE MANUFACTURER WITH EQUIVALENT PERFORMANCE STANDARD.
   b. PLATES
      1) HUBBELL - IFP SERIES (PORT QUANTITY AS REQUIRED, COLOR BY ARCHITECT)
5. NETWORK PATCH PANELS
   a. UL VERIFIED CATEGORY 6
   b. 110 TERMINATION WITH TIN LEAD PLATED IDC
   c. 19" RACK MOUNT WITH BACKBOARD MOUNTING FRAME.
6. CONNECTOR BLOCKS FOR CATEGORY 6 AND UP CABLING: TYPE 110 INSULATION DISPLACEMENT CONNECTORS; CAPACITY SUFFICIENT FOR CABLES TO BE TERMINATED PLUS 25 PERCENT SPARE.

C. INSTALLATION
1. TERMINATE CABLES AT EACH OUTLET WITH SPECIFIED MODULAR JACK ASSEMBLY.
2. TERMINATE CABLES ON PUNCH DOWN BLOCKS OR PATCH PANELS AT TERMINAL BOARD.
3. PROVIDE TYPED LABELS AT ALL JACKS CORRESPONDING TO TYPED NUMBERING SYSTEM AT TERMINAL STRIP.

D. QUALITY ASSURANCE
1. COMPLY WITH APPLICABLE PORTIONS OF NEC ANSI/EIA/TIA 568 AS TO TYPE PRODUCTS USED AND INSTALLATION OF COMPONENTS. PROVIDE PRODUCTS WITH HAVE BEEN UL LISTED AND LABELED.

ALARM & DETECTION SYSTEMS

A. SUMMARY
1. INCLUDES BUT NOT LIMITED TO: FURNISH AND INSTALL NAC PANEL AND ADDITIONAL NOTIFICATION DEVICES ON EXISTING SYSTEM.

B. SYSTEM DESCRIPTION
1. THE FIRE ALARM SYSTEM SHALL COMPLY WITH REQUIREMENTS OF NFPA STANDARD NO. 72 FOR PROTECTED PREMISES SIGNALING SYSTEMS EXCEPT AS MODIFIED AND SUPPLEMENTED BY THIS SPECIFICATION. THE SYSTEM SHALL BE ELECTRICALLY SUPERVISED AND MONITOR THE INTEGRITY OF ALL CONDUCTORS.

C. QUALITY ASSURANCE
1. REGULATORY REQUIREMENTS
   a. SYSTEM SHALL MEET APPROVAL OF AUTHORITY HAVING JURISDICTION (AHJ). CHANGES OR ADDITIONS SHALL BE MADE TO THE SYSTEM AS REQUIRED WITHOUT ADDITIONAL COST TO OWNER.
   b. EQUIPMENT, DEVICES, AND CABLE SHALL BE UL OR FACTORY MUTUAL LISTED FOR USE IN FIRE ALARM SYSTEMS.
   c. DESIGNER QUALIFICATIONS: NICET LEVEL III OR IV (3 OR 4) CERTIFIED FIRE ALARM TECHNICIAN OR REGISTERED FIRE PROTECTION ENGINEER, EMPLOYED BY FIRE ALARM CONTROL PANEL MANUFACTURER, CONTRACTOR, OR INSTALLER.
   d. INSTALLER QUALIFICATIONS: FIRM WITH MINIMUM 3 YEARS DOCUMENTED EXPERIENCE INSTALLING FIRE ALARM SYSTEMS OF THE SPECIFIED TYPE AND PROVIDING CONTRACT MAINTENANCE SERVICE AS A REGULAR PART OF THEIR BUSINESS.
      1) AUTHORIZED REPRESENTATIVE OF CONTROL UNIT MANUFACTURER; SUBMIT MANUFACTURER'S CERTIFICATION THAT INSTALLER IS AUTHORIZED; INCLUDE NAME AND TITLE OF MANUFACTURER'S REPRESENTATIVE MAKING CERTIFICATION.
      2) INSTALLER PERSONNEL: FACTORY TRAINED AND CERTIFIED WITH AT LEAST 2 YEARS OF EXPERIENCE INSTALLING FIRE ALARM SYSTEMS.
      3) SUPERVISOR: NICET LEVEL III OR IV (3 OR 4) CERTIFIED FIRE ALARM TECHNICIAN; FURNISH NAME AND ADDRESS.

D. FACP COMPONENTS:
1. EQUIPMENT AND ACCESSORIES FURNISHED UNDER TERMS OF THIS SPECIFICATION SHALL BE STANDARD PRODUCTS OF SINGLE MANUFACTURER, OR INCLUDE WRITTEN STATEMENT BY CONTROL PANEL MANUFACTURER CONFIRMING COMPATIBILITY OF COMPONENTS AND INCLUSION OF THESE COMPONENTS UNDER SYSTEM WARRANTY.
2. AUDIBLE HORN ALARM ANNUNCIATION
   a. PROVIDE SEPARATE AND DISTINCT ALARM SIGNALS FOR ALARM AND TROUBLE CONDITIONS.
   b. ALARM SIGNAL SHALL ALSO OPERATE STROBE LIGHTS, IF SPECIFIED.
   c. PROVIDE ALARM SILENCE SWITCHES AT CONTROL PANEL.
   d. TROUBLE ALARM SHALL BE HORN INTEGRAL TO CONTROL PANEL.
   e. SUPERVISORY ALARM MAY BE SAME AUDIBLE ALARM AS TROUBLE ALARM, BUT WITH SEPARATE VISUAL ANNUNCIATION.

E. FIELD MOUNTED SYSTEM COMPONENTS
1. FIRE ALARM ACTUATING DEVICES
   a. NOTIFICATION APPLIANCES
      1) LOW PROFILE HORN-STROBES
         a) AUDIBLE OUTPUT OF 92 DBA AT 10 FT. WHEN MEASURED IN REVERBERATION ROOM PER UL-464.
         b) INTEGRALLY MOUNTED FLASHING LIGHT UNIT WITH BLOCK LETTERS 'FIRE'. MULTI-CANDELA WITH FIELD-SELECTABLE SETTINGS OF 15CD, 30CD, 60CD, 75CD & 110CD, AND FLASH RATE BETWEEN ON AND THREE HERTZ. ALL UNITS SHALL FLASH IN SYNCHRONIZATION WITH EACH OTHER.
         c) THE HORN SHALL HAVE A SELECTABLE STEADY OR SYNCHRONIZED TEMPORAL OUTPUT.
         d) IN AND OUT SCREW TERMINALS SHALL BE PROVIDED FOR WIRING.
         e) LOW PROFILE HORN/STROBES SHALL MOUNT IN A NORTH AMERICAN 1-GANG BOX.
2. LOW PROFILE STROBES
   a) PROVIDE LOW PROFILE WALL MOUNTED STROBES AT THE LOCATIONS SHOWN ON THE DRAWINGS. IN AND OUT SCREW TERMINALS SHALL BE PROVIDED FOR WIRING. STROBES SHALL PROVIDE SYNCHRONIZED FLASH OUTPUTS. STROBE OUTPUT SHALL BE DETERMINED AS REQUIRED BY ITS SPECIFIC LOCATION AND APPLICATION FROM A FAMILY OF 15CD, 30CD, 60CD, 75CD, OR 110CD DEVICES. LOW PROFILE STROBES SHALL MOUNT IN A NORTH AMERICAN 1-GANG BOX.

F. INSTALLATION
1. INSTALL FIRE ALARM AND DETECTION SYSTEMS AS INDICATED, IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS, AND COMPLYING WITH APPLICABLE PORTIONS OF NEC, NFPA AND NECA'S "STANDARD OF INSTALLATION".
2. INSTALL WIRING, RACEWAYS, CONDUCTORS, ELECTRICAL BOXES AND FITTINGS IN ACCORDANCE WITH CONDUIT, WIRE AND CABLE, AND BOXES AND PLATES SECTION OF THIS SPECIFICATION.
3. LABEL, PULL AND JUNCTION BOXES "FIRE ALARM" WITH RED INDELIBLE INK.
4. LOOP WIRES THROUGH EACH DEVICE ON ZONE FOR PROPER SUPERVISION. TEE-TAPS NOT PERMITTED.
5. PROVIDE DUST PROTECTION FOR INSTALLED SMOKE DETECTORS UNTIL FINISH WORK IS COMPLETED AND BUILDING IS READY FOR OCCUPANCY.
6. PROTECT CONDUCTORS FROM CUTS, ABRASIONS AND OTHER DAMAGE DURING CONSTRCUTION.
7. MINIMUM CONDUCTOR SIZE SHALL BE 14 AWG UNLESS OTHERWISE SPECIFIED.
8. DO NOT INSTALL CEILING MOUNTED DETECTORS WITHIN 3 FEET OF AIR DISCHARGE GRILLS.
9. POST COPY OF WIRE IDENTIFICATION LIST INSIDE FIRE ALARM PANEL DOOR OR OTHER AREA ACCESSIBLE TO FIRE ALARM SERVICE PERSONNEL.

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI

09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
JULY 22, 2021

REVISIONS:

No.	Date	Description

CONSULTANT
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Salt Lake City, Utah 84111
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www.bnaconsulting.com

CRUMBL COOKIES - LEE'S SUMMIT
1736 NW CHIPMAN RD
LEE'S SUMMIT, MO 64081

STATE OF MISSOURI
BRIAN DENVER MCKAY
NUMBER 2019025175
PROFESSIONAL ENGINEER

ELECTRICAL SPECIFICATIONS

E7.1

JZW ARCHITECTS

By: trey; Aug 10, 2021 – 12:54pm
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COMcheck Software Version 4.1.5.3

Interior Lighting Compliance Certificate

Project Information

Energy Code: 2018 IECC
Project Title: Crumbl Cookies - Lee's Summit, MO
Project Type: New Construction

Construction Site:
1736 NW Chipman Rd
Lee's Summit, MO 64081

Owner/Agent:

Designer/Contractor:
Trey Hills
BNA Consulting
635 South State Street
Salt Lake City, UT 84111
801-532-2196
trey@bnaconsulting.com

Additional Efficiency Package(s)

Credits: 1.0 Required 1.0 Proposed
Reduced Lighting Power, 1.0 credit

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts (B X C)
1-Retail	2087	0.95	1991
		Total Allowed Watts =	1991

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
1-Retail				
LED 1 copy 1: EM1: 2 HEAD WALL PACK: Other:	1	6	1	6
LED 1 copy 2: EX1: 2 HEAD EM WALL PACK: Other:	1	2	3	6
LED 1 copy 3: F1: 2X4 LAY-IN: Other:	1	25	65	1625
LED 1 copy 4: F2: ULTRA SLIM 3": Other:	1	4	10	40
LED 1 copy 5: F3: 2X4 FIXTURE: Other:	1	1	23	23
		Total Proposed Watts =		1700

Interior Lighting PASSES: Design 15% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2018 IECC requirements in COMcheck Version 4.1.5.3 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Trey Hills - Project Manager — Name - Title
Trey Hills — Signature
7/28/2021 — Date

COMcheck Software Version 4.1.5.3

Exterior Lighting Compliance Certificate

Project Information

Energy Code: 2018 IECC
Project Title: Crumbl Cookies - Lee's Summit, MO
Project Type: New Construction
Exterior Lighting Zone 2 (Neighborhood business district (LZ2))

Construction Site:
1736 NW Chipman Rd
Lee's Summit, MO 64081

Owner/Agent:

Designer/Contractor:
Trey Hills
BNA Consulting
635 South State Street
Salt Lake City, UT 84111
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Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts / Unit	D Tradable Wattage	E Allowed Watts (B X C)
Pedestrian and vehicular entrances and exits	6 ft of door	14	Yes	84
			Total Tradable Watts (a) =	84
			Total Allowed Watts =	84
			Total Allowed Supplemental Watts (b) =	400

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.
(b) A supplemental allowance equal to 400 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
Pedestrian and vehicular entrances and exits (6 ft of door width): Tradable Wattage				
LED 1: EG: EGRESS LIGHT: Other:	1	2	11	22
			Total Tradable Proposed Watts =	22

Exterior Lighting PASSES: Design 95% better than code

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2018 IECC requirements in COMcheck Version 4.1.5.3 and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Trey Hills - Project Manager — Name - Title
Trey Hills — Signature
7/28/2021 — Date

COMcheck Software Version 4.1.5.3

Inspection Checklist

Energy Code: 2018 IECC

Requirements: 100.0% were addressed directly in the COMcheck software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C103.2 [PR8][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C406 [PR9][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.2.2 [EL22][1]	Spaces required to have light-reduction controls have a manual control that allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern >= 50 percent.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.1, C405.2.1.1 [EL18][1]	Occupancy sensors installed in classrooms/lecture/training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges/breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, warehouse storage areas, and other spaces <= 300 sqft that are enclosed by floor-to-ceiling height partitions. Reference section language C405.2.1.2 for control function in warehouses and section C405.2.1.3 for open plan office spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.1.2 [EL19][1]	Occupancy sensors control function in warehouses: In warehouses, the lighting in aisleways and open areas is controlled with occupant sensors that automatically reduce lighting power by 50% or more when the areas are unoccupied. The occupant sensors control lighting in each aisleway independently and do not control lighting beyond the aisleway being controlled by the sensor.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.1.3 [EL20][1]	Occupant sensor control function in open plan office areas: Occupant sensor controls in open office spaces >= 300 sq.ft. have controls 1) configured so that general lighting can be controlled separately in control zones with floor areas <= 600 sq.ft. within the space, 2) automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the space, 3) are configured so that general lighting power in each control zone is reduced by >= 80% of the full zone general lighting power within 20 minutes of all occupants leaving that control zone, and 4) are configured such that any daylight responsive control will activate space general lighting or control zone general lighting only when occupancy for the same area is detected.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.2, C405.2.2.1, C405.2.2.2 [EL21][2]	Each area not served by occupancy sensors (per C405.2.1) have time-switch controls and functions detailed in sections C405.2.2.1 and C405.2.2.2.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.3, C405.2.3.1, C405.2.3.2 [EL23][2]	Daylight zones provided with individual controls that control the lights independent of general area lighting. See code section C405.2.3 Daylight-responsive controls for applicable spaces, C405.2.3.1 Daylight responsive control function and section C405.2.3.2 Sidelit zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.4 [EL26][1]	Separate lighting control devices for specific uses installed per approved lighting plans.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.4 [EL27][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.5 [EL28][2][3]	Automatic lighting controls for exterior lighting installed. Controls will be daylight controlled, set based on business operation time-of-day, or reduce connected lighting > 30%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.3 [EL6][1]	Exit signs do not exceed 5 watts per face.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.6 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.7 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.8.2, C405.8.2.1 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.9 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17][3]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.4.1 [FI18][3]	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Interior Lighting fixture schedule for values.*
C405.5.1 [FI19][3]	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Exterior Lighting fixture schedule for values.*
C408.1.1 [FI57][3]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5.1 [FI16][3]	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.3 [FI33][3]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI

09/07/2021

PROJECT NUMBER
21-202

ISSUE DATE:
JULY 22, 2021

REVISIONS:

No.	Date	Description

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STATE OF MISSOURI
BRIAN DENVER HICKS
NUMBER 2019023171
PROFESSIONAL ENGINEER

LIGHTING COMCHECK

E7.2

JZW ARCHITECTS

By: troy; Aug. 10, 2021 - 12:54pm
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