# LEIS SUMMIT MIDDLE SCHOOL #4

PACKAGE 3 - BUILDING & SITE

1001 SE BAILEY ROAD LEE'S SUMMIT, MO 64081

## ISSUE FOR PERMIT - VOLUME 1 OF 2

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10/08/20

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		A1.1T	FIRST LEVEL FLOOR PLAN - AREA T	A12.5	INTERIOR ELEVATIONS/ DETAILS	\$6.1 \$6.3	BRACED FRAME LITHICAL DETAILS BRACED FRAME ELEVATIONS
		A1.2A	SECOND LEVEL FLOOR PLAN - AREA A	A12.6	INTERIOR DETAILS	30.3	DIAOLD I IAIVIL LLEVATIONS
		A1.2B	SECOND LEVEL FLOOR PLAN - AREA B	A13.0	INTERIOR SCHEDULES		
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		A2.4	LARGE SCALE PLANS	Δ13.1C	EIRST I EVEL FINISH EI OOR DI AN AREA C		

A13.2B

A13.3

A13.4

FIRST LEVEL FINISH FLOOR PLAN - AREA G

FIRST LEVEL FINISH FLOOR PLAN - AREA S

SIGNAGE SCHEDULE AND DETAILS

SIGNAGE TYPES

SECOND LEVEL FINISH FLOOR PLAN - AREA A

SECOND LEVEL FINISH FLOOR PLAN - AREA B

SECOND LEVEL FINISH FLOOR PLAN - AREA C, D

SECOND LEVEL FINISH FLOOR PLAN - AREA E,F, G

A3.1A

A3.1B

A3.1C

A3.1D

FIRST LEVEL REFLECTED CEILING PLAN - AREA A

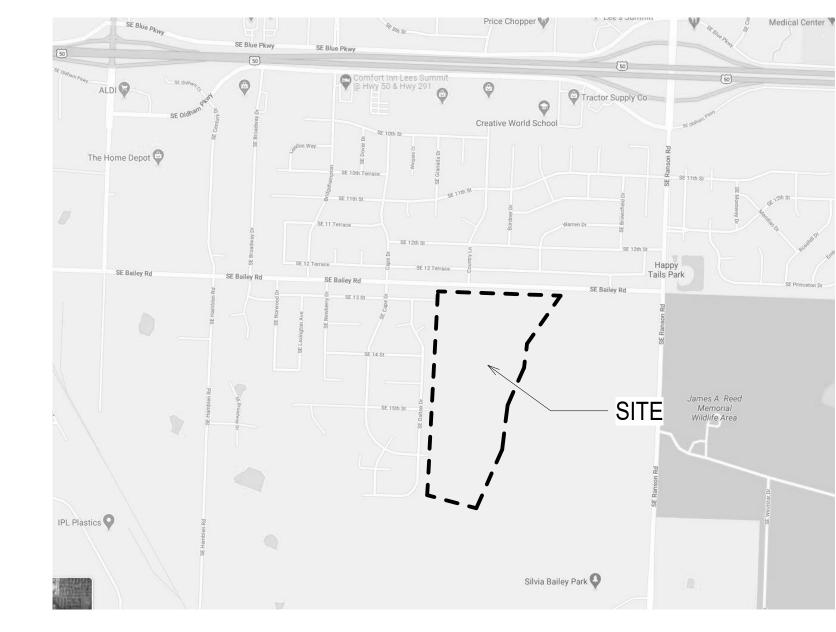
FIRST LEVEL REFLECTED CEILING PLAN - AREA B

FIRST LEVEL REFLECTED CEILING PLAN - AREA C

FIRST LEVEL REFLECTED CEILING PLAN - AREA D

FIRST LEVEL REFLECTED CEILING PLAN - AREA E





PACKAGE 3 - BUILDING &

DLR Group

816.986.3415

LEE'S SUMMIT R-7 SCHOOL DISTRICT 502 SE TRANSPORT DRIVE LEE'S SUMMIT, MO 64063

ARCHITECT OF RECORD: DLR GROUP 7290 WEST 133RD ST OVERLAND PARK, KS 66213 913.897.7811

LENEXA, KS 66214

913.742.5000

913.381.1170 M.E.P. ENGINEER: STRUCTURAL ENGINEER: HENDERSON ENGINEERS DLR GROUP 8435 LENEXA DRIVE SUITE 300 7290 WEST 133RD ST

OLSSON

913.897.7811

OVERLAND PARK, KS 66213

CIVIL ENGINEER: LANDSCAPE ARCHITECT: DLR GROUP 7301 WEST 133RD ST 7290 WEST 133RD ST OVERLAND PARK, KS 66213 OVERLAND PARK, KS 66213 913.897.7811

> CONSTRUCTION MANAGER: MCCOWNGORDON CONSTRUCTION 422 ADMIRAL BOULEVARD KANSAS CITY, MO 64106 816.877.0690

13-20102-00 **COVER SHEET** VOLUME 1

BLKHD

BM(S)

BRDG

BRKT

BTWN

CAB

CANT

CER

CFCI

CFSF

CJA

CLG

CLR

CMU

COL

COM

COMB

COMM

COMPR

CONC

CONF

CONFIG

CONN(S)

CONST

CONT

CONTR

CORR

CSTJ

CSWK

CTG

CTIG

CTR

CU

CU

CV

DBL

DEMO

DEPR

DPFG

DSN

DWG(S)

DWL(S)

**EEWS** 

ELEV

**EMER** 

**ENCL** 

ENG

ENTR

**EQUIP** 

**EQUIV** 

EWC

**EXIST** 

DWR

CLOS

BULKHEAD

BEAM(S)

BOTTOM

BEARING

BRACKET

BASEMENT

BATHTUB

BETWEEN

CHANNEL

CABINET

CANTILEVER

CHALKBOARD

CAPACITY

CERAMIC

CUBIC FEET

CAST IRON

CAST IN PLACE

CENTER LINE

CEILING

CLOSET

COLUMN

COMMON

COMBINATION

COMPRESSIBLE

CONFERENCE

CONFIGURATION

CONNECTION(S)

CONSTRUCTION

CONTINUOUS

CONTRACT(OR)

COVER PLATE

CORRIDOR

CARPET

CHAIR RAIL

CASEWORK

CENTER

COPPER

COMBINATION UNIT

CONDOM VENDOR

DUST COLLECTOR

DEPRESS(ION)(ED)

DRINKING FOUNTAIN

SPECIFICATION DIVISION

DEPARTMENT

DEMOLISH OR DEMOLITION

CUBIC YARD

CYLINDER

DECIBEL

DOUBLE

DEGREE

DETAIL

DETENTION

DOOR GRILLE

DIAMETER

DIMENSION

DAMPROFFING

DISHWASHER

DRAWING(S)

DOWEL(S)

DRAWER

EACH FACE

EACH END

**EXPANSION BOLT** 

**EXPANSION JOINT** 

**ELEVATION** 

ELECTRICAL

**ELEVATOR** 

**EMERGENCY** 

ENCLOSURE

**ENGINEER** 

ENTRANCE

**EQUIVALENT** 

EACH WAY

**EXISTING** 

**EPOXY RESIN FLOORING** 

ENERGY USE INTENSITY

ELECTRIC WATER COOLER

**EQUAL EQUIPMENT** 

ELASTOMERIC

ELECTRICAL CONTRACTOR

EMERGENCY EYE WASH

EMERGENCY EYE WASH SHOWER

EAST

DOWNSPOUT NOZZLE

DOOR

DIAGONAL

CUBIC

COUNTERSINK

CERAMIC TILE

CONSTRUCTION JOINT

CLEAR TEMPERED FLOAT GLASS

CLEAR TEMPERED INSULATING GLASS

CONCRETE

COMMUNICATIONS

CONTROL JOINT

CONTRACTOR FURNISHED CONTRACTOR INSTALLED

COLD-FORMED STEEL FRAMING

CLEAR FLOAT GLASS

CLEAR INSULATING GLASS

CONTROL JOINT ABOVE

CONCRETE MASONRY UNIT

BRIDGING

PAPER TOWEL DISPENSER

POLYVINYL CHLORIDE

SOUND POWER LEVEL

PARTITION

QUARRY TILE

RUBBER BASE

ROOF DRAIN

REFERENCE

REFLECTED

REMOVABLE

REQUIRE(D)

REVISION(S)

ROBE HOOK

ROOM

ROUND

SOUTH

SPLASH BLOCK

SHOWER CURTAIN

SEAT COVER DISPENSER

SHOWER CURTAIN HOOK

SHOWER CURTAIN ROD

STRUCTURAL CLAY TILE

SOAP DISPENSER

SPANDREL GLASS

SECURITY HOLLOW METAL

SANITARY NAPKIN DISPOSAL

SANITARY NAPKIN VENDOR

SOUND PRESSURE LEVEL

SOLID CORE

SCHEDULE

SECTION

SINGLE

SHEET

SIMILAR

SEALANT

SPECIAL

SQUARE

STONE

STAIR

STAGGERED

STANDARD

STRINGER

STORAGE

STRUCTURAL

SUBFLOOR

SURFACE

SUSPENDED

SHEET VINYL

SYMETRICAL

TONGUE AND GROOVE

TOILET COMPARTMENT PARTITION

TREAD

TOP OF

TANGENT

TOWEL BAR

TACK BOARD

TEMPORARY

THRESHOLD

TINTED FLOAT GLASS

TENANT IMPROVEMENT

TILT MIRROR UNIT

TOP OF PAVING

TERRAZZO TILE

TACK WALL

UNEXCAVATED

UNFINISHED

UTILITY SHELF

VAPOR BARRIER

VENTED COVE BASE

VINYL BASE

UTILITY

TYPICAL

TINTED INSULATING GLASS

TOILET TISSUE DISPENSER

TINTED TEMPERED FLOAT GLASS

UNDERWRITERS LABORATORIES

UNLESS NOTED OTHERWISE

TINTED TEMPERED INSULATING GLASS

TERRAZZO

STEEL

SHEET METAL

SPECIFICATION(S)

STAINLESS STEEL

SOLID SURFACE

STORM SHELTER AREA

STAINLESS STEEL SHELF

SOUND TRANSMISSION CLASS

SHOWER

SECRETARY

SINK

RESILIENT FLOORING

RECESSED FLOOR MAT

ROUGH IN AND CONNECT

SPRAYED ACOUSTIC TREATMENT

SOUND ABSORBING WALL UNITS

RUBBER FLOOR

RESILIENT

REMOTE CONTROL

REFLECTED CEILING PLAN

QUANTITY

**RADIUS** 

QUARTER ROUND

COMBINATION TOWEL DISPENSER/RECEPTACLE

PTD

PTD/R

PTN

PVC

PWL

QTR RND

QTY

RAD

REFL

REM

RESIL

RFM

RI&C

RND

SAW

SCD

SCH

SCR

SCT

SECT

SECY

SHM

SPEC

SPL

SSS

STAG'D

STC

STD

STGR

STL

STOR

STRUCT

SUBFL

SURF

SUSP

SYM

T.O.

TAN

TCP

TEMP

TERR

TOP

TTD

TTG

TTIG

TW

TYP

UNEX

UNFIN

UNO

UTIL

VCB

SCHED

REQ(D)

**FUTURE** 

GROUT

GAUGE

GALLON

GALVANIZED

GRAB BAR

GENERAL

GLASS

FIRE VALVE CABINET

FABRIC WALL COVERING

GENERAL CONTRACTOR

GARBAGE DISPOSAL

**GROSS FLOOR AREA** 

**GUARANTTED MAXIMUM PRICE** 

GALVANIZED RIGID STEE

GYPSUM WALL BOARD

GLUE LAMINATED

GOVERNMENT

**GUARD RAIL** 

GRADE

**GYPSUM** 

**HOLLOW CORE** 

HAND DRYER

HARDBOARD

HARDWOOD

HARDWARE

HORIZONTAL

HANDRAIL

THAT IS

HOUR

HOLLOW METAL

HARDWARE SET

HOLLOW STRUCTURAL SHAPE

INTERNATIONAL BUILDING CODE

IN ACCORDANCE WITH

INSIDE DIAMETER

INSIDE FACE

ISOLATION JOINT

IN JOIST SPACE

INCLUDE(ING)

INSULATION

INTERIOR

**JANITOR** 

JOIST

JOINT

JUNCTION

KNOCKDOWN

KITCHEN

ANGLE

LABORATORY

LAMINATED

LAVATORY

POUND(S)

LUMBER

LOADING

LINEAR

LINOLEUM

LOCATION

LIGHTING

THOUSAND

MAGNETIC

MANUAL

MASONRY

MATERIAL

MAXIMUM

MOP BASIN

MEMBRANE

MEZZANINE

MANHOLE

MINIMUM

MOUNTED

MOUNTING

MULLION

NOMINAL

NOT TO SCALE

MANUFACTURER

MISCELLANEOUS

NOT APPLICABLE

NOT IN CONTRACT

NATIONAL FIRE PROTECTION ASSOCIATION

NOISE CRITERIA

MIRROR WITH SHELF

MARKER BOARD

MOP/BROOM HOLDER

MEDICINE CABINET MECHANICAL

MAINTENANCE

LOUVER

LONGITUDINAL

LIFE SAFETY CODE

LUXURY VINYL TILE

LIGHT WEIGHT CONCRETE

LOCKER

LINEAR FOOT

LENGTH (LONG)

LAMINATED GLASS

KITCHEN HOOD

JOINT FILLER BOARD

KEYED CONSTRUCTION JOINT

INCH

HEATING VENTILATING AND AIR CONDITIONING

HEADER

FVC

FWC

GALV

GEN

GOVT

GRS

HDBD

HDR

HDWD

HDWR

HORIZ

HVAC

LAB

LAM

LB(S)

LINO

LONG

LSC

LTG

LVT

MAG

MAINT

MAN

MATL

MEMB

MEZZ

MR/S

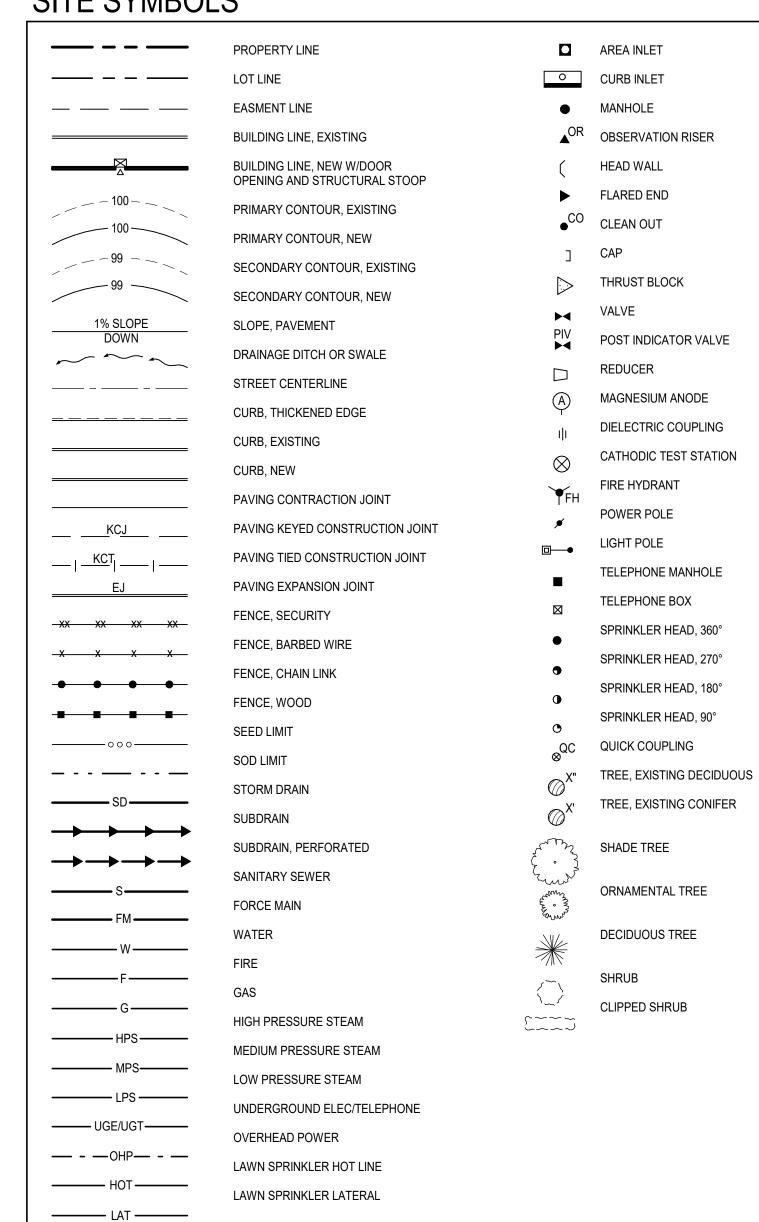
MTD

MTG

NOM

GENERAL SYMBOLS EARTH CROSS REFERENCE SHEET NUMBER GRAVEL SIMILAR OR TYPICAL REFERENCE SAND WALL SECTION CONCRETE \_\_\_\_ DETAIL REFERENCE PRECAST CONCRETE GYM FLOOR **BUILDING SECTION** WOOD (CONTINUOUS BLOCKING) WOOD **BUILDING ELEVATION** (NON-CONTINUOUS INTERIOR ELEVATION BLOCKING) WOOD (TRIM/FINISH) BLOCKING) GLASS **CASEWORK** XX/ A11.X **ELEVATION** STONE SHINGLES KEYNOTE CONCRETE MASONRY UNIT (?)———— COLUMN GRID LINE BRICK VENEER STEEL (LARGE SCALE) ROOM NAME ROOM NUMBER/NAME PLYWOOD (LARGE SCALE) ??? > GYPSUM WALL BOARD DOOR NUMBER / BATT INSULATION INTERIOR WINDOW RIGID INSULATION **EXTERIOR** WINDOW NUMBER SPRAY FOAM INSULATION WALL TYPE **?**> FIRE SAFING INSULATION PROTECTION BOARD REVISION NUMBER DESCRIPTION \_\_\_\_\_ CARPET (LARGE SCALE) ACOUSTIC TILE (LARGE SCALE) TILE (LARGE SCALE)

#### SITE SYMBOLS



PACKAGE 3 - BUILDING & 10/08/20 REVISIONS

13-20102-00 SYMBOLS AND **ABBREVIATIONS** 

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LEE'S SUMMIT R-7 SCHOOL DISTRICT

PACKAGE 3 - BUILDING & SITE 10/08/20

REVISIONS

13-20102-00 CODE ANALYSIS -SITE PLAN

CP0.0

REVISIONS

13-20102-00 **CODE PLAN -**LEVEL 01

**PROJECT LOCATION:** 1001 SE BAILEY ROAD LEE'S SUMMIT, MO 64081 **OWNER NAME:** 

LEE'S SUMMIT R-7 SCHOOL DISTRICT

OWNER CONTACT: KYLE GORRELL, DIRECTOR LSR7 FACILITY SERVICES

**OWNER ADDRESS:** DEPARTMENT OF LEE'S SUMMIT SCHOOL DISTRICT **FACILITY SERVICES** 502 SE TRANSPORT DRIVE LEE'S SUMMIT, MO 64081

**COUNTY: JACKSON COUNTY** 

FIRE DEPARTMENT

**WATER SUPPLY:** 

LEE'S SUMMIT FIRE DEPARTMENT

LEE'S SUMMIT WATER UTILITIES

**AUTHORITY HAVING JURISDICTION:** CITY OF LEE'S SUMMIT

DLR GROUP 7290 WEST 133RD STREET, OVERLAND PARK, KS 66213

**CODES/REGULATIONS:** BUILDING: 2018 IBC FIRE: 2018 INTERNATIONAL FIRE CODE MECHANICAL: 2018 INTERNATIONAL MECHANICAL CODE PLUMBING: 2018 INTERNATIONAL PLUMBING CODE **ELECTRICAL: 2017 NATIONAL ELECTRICAL CODE** ACCESSIBLE STANDARD: ICC/ANSI A117.1-2017

**NEW CONSTRUCTION:** OCCUPANCY:

ARCHITECT OF RECORD:

EDUCATIONAL GROUP E (SECTION 305): INSTRUCTIONAL AREAS CONSTRUCTION TYPE (SECTION 602): TYPE IIB ALLOWABLE HEIGHT (PER IBC TABLE 504.3): 75' - 0" ALLOWABLE NUMBER OF STORIES (PER TABLE 504.4): 3

**SEPARATION REQUIREMENTS: BUILDING SEPARATION** PER TABLE 706.4: 2-HOUR FIRE WALL \*a. IN TYPE II CONSTRUCTION, WALLS SHALL BE PERMITTED TO HAVE A 2-HOUR FIRE-RESISTANCE RATING

**LIFE SAFETY AUTOMATIC FIRE SUPPRESSION SYSTEM THROUGHOUT** FIRE ALARMS THROUGHOUT FIRE EXTINGUISHERS THROUGHOUT **EMERGENCY LIGHTING** FIRE DEPARTMENT CONNECTIONS -SEE CIVIL AND PLUMBING PLANS FIRE ALARM ANNUNCIATOR PANEL (FAAP) - AT RECEPTION D100A FIRE ALARM CONTROL PANEL (FACP) - AT ELECTRICAL C116 SMOKE CONTROL SYSTEM: NOT APPLICABLE

MANUAL ALARMS COMMUNICATIONS AND ELECTRICAL ROOMS: NO UPS PROVIDED, NO RACK OF BATTERIES

PENETRATIONS THROUGH FLOORS (PIPING, CONDUIT, ETC.): ANNULAR SPACE AROUND PENETRATING ITEMS TO BE FILLED WITH APPROVED MATERIALS TO RESIST THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION, PER 2018 IBC 714.6.2 AND 718.2.5. DUCT PENETRATIONS THROUGH FLOORS: ANNULAR SPACE AROUND PENETRATING DUCT TO BE FILLED WITH AN APPROVED NON-COMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION, PER 2018 IBC 717.6.3.2 AND

PLUMBING FIXTURES

I UF													
		# OCC	CCUPANTS WC		REQ'D	WC PR	OVIDED	VIDED LAV REQ'D		LAV PROVIDED		DRINKING FOUNTAINS	
		<u>M</u>	<u>w</u>	<u>M</u>	<u>w</u>	<u>M</u>	<u>w</u>	<u>M</u>	<u>w</u>	<u>M</u>	w	REQ'D.	PROV.
	STUDENTS/ FACULTY  NOTES: CALCULATIONS BASED ON IPC 4.1 REQT'S.  OCCUPANT LOAD BASED ON PROJECTED 1,200  STUDENT/ 260 FACULTY COUNT	730	730	15	15	17	17	15	15	17	17	15	20
_	MAIN GYMNASIUM - PERFORMANCE SPECIAL EVENT  NOTES: COMPETITION & AUXILLARY GYMS ARE NON- SIMULTANEOUS USE FROM STUDENT OCCUPANCY.  BASED ON 1,369 OCCUPANTS SEATED ON BLEACHERS AND FLOOR W/ 63 STAGE OCCUPANTS	716	716	6	12	12	12	4	4	7	7	3	6
	MAIN GYMNASIUM - ATHLETIC COMPETITION (ASSEMBLY)  NOTES: COMPETITION & AUXILLARY GYMS ARE  NON-SIMULTANEOUS USE FROM STUDENT  OCCUPANCY. BASED ON 615 OCCUPANTS SEATED  ON BLEACHERS AND 125 ATHLETES AND OFFICIALS	370	370	3	6	12	12	2	2	7	7	2	6
	BASEBALL/SOFTBALL COMPLEX (ASSEMBLY)  NOTES: CALCULATIONS BASED ON IPC 4.1 REQT'S.  OCCUPANT LOAD BASED ON PROJECTED MAXIMUM 600 ATHLETIC EVENT OCCUPANTS.  FAMILY TOILET INCLUDED WITH FEMALE COUNTS PER 2902.1.2.	300	300	4	8	4	8	2	2	2	4	1	2
	TORNADO SHELTER  NOTES: PER ICC 500 TABLE 702.2.  OCCUPANT LOAD BASED ON PROJECTED 1,200 STUDENT/ 260 FACULTY COUNT. TO BE USED AS DESIGNATED STORM SHELTER FOR STUDENT/FACULTY POPULATION. CALCULATIONS BASED ON ICC-500 REQUIREMENT FOR PLUMBING FIXTURES	730	730	3	3	3	3	1	1	1	1	-	-

### - OCCUPANCY LOAD ALLOWABLE IBC 1005.1 CLEAR WIDTH **FACTOR** OCCUPANCY - ACCESSORY USE AREA (OCCUPANCY LOAD IS NOT INCLUDED IN LOADS BEYOND THIS ROOM) 0.15 - COMBINED OCCUPANT LOAD AT A GIVEN DOOR OR STAIR 0.15 TOTAL EXIT CAPACITY OF DOOR OR STAIR THE CAPACITY OF DOORS ARE DETERMINED AS FOLLOWS 0.15 CLEAR OPENING WIDTH IN INCHES DIVIDED BY 0.15 THE CAPACITY OF STAIRS ARE DETERMINED AS FOLLOWS PAIR 36" 0.15 WIDTH IN INCHES DIVIDED BY 0.2 FOR SPRINKLERED PER 1005.3.1 EXCEPTION 1 PAIR 42" TOTAL EXIT CAPACITY OF DOOR PAIR 48" 0.15 THE CAPACITY OF DOORS ARE DETERMINED AS FOLLOWS: CLEAR OPENING WIDTH IN INCHES DIVIDED BY 0.15) PD - PANIC DEVICE XX MIN - DOOR FIRE RATING

2-HR DOUBLE FIRE WALL PER IBC 706.2 NFPA 221 CHAPTER 4

IMAGINARY PROPERTY LINE

DEPARTMENT CONNECTION

ADMINISTRATION - 4,511 SF BUSINESS AREA @ 150

TOTOAL OCC = 4

PROTECTED OPENINGS ·

86

SECTION 4.5 TABLE 4.5, DOUBLE WALL ASSEMBLIES.

1-HR FIRE BARRIER, UL#U906

1-HR FIRE BARRIER, UL#U415

COMPOSED OF THE FOLLOWING ELEMENTS:

TYPICAL DOOR WIDTHS

637 SF

1411 SF

@ 1/50 NSF

238 SF

34

READING LAB F

AREA IS NOT INCLUDED IN SHELTER

731 SF

**EXIT ACCESS STAIRWAYS:** 

**ENCLOSURE** 

SCIENCE LAB

TWO STORIES PER IBC 712.1.9, EXCEPTION 1.

EXIT ACCESS STAIRWAYS AND RAMPS SERVE ONLY TWO STORIES

PER IBC 1019.3, EXCEPTION 1, AND DO NOT REQUIRE A SHAFT

39

40

MEDIA CENTER

WALL SEPARATION LEGEND

SYMBOL LEGEND

C = CORRIDOR EW = EXTERIOR WALL 1 = 1 HOUR2 = 2 HOURFP = FIRE PARTITION 3 = 3 HOURFSB = FIRE/SMOKE BARRIER SP = SMOKE PARTITION FW = FIRE WALL HX = HORIZONTAL EXIT SW = SMOKE WALL SB = SMOKE BARRIER VS = VERTICAL SHAFT

VX = VERTICAL EXIT

XP = EXIT PASSAGEWAY

**BUILDING 1 - TYPE IIB - 2 STORY** 20,385 SF SPRINKLED

EXIT ACCESS TRAVEL DISTANCE LVL 1: 135' -0" < 250' -0" (TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE)

MAXIMUM COMMON PATH OF TRAVEL: 71'- 0" < 75'- 0" (TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY)

BUILDING 2 - TYPE IIB - 2 STORY 41,978 SF

**SPRINKLED** EXIT ACCESS TRAVEL DISTANCE LVL 1: 187' -0" < 250' -0" (TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE)

MAXIMUM COMMON PATH OF TRAVEL: 73'- 0" < 75'- 0"

BUILDING 3 - TYPE IIB - 1 STORY + MEZZANINE

65,957 SF **SPRINKLED** OCCUPANT LOAD: 1,173 \*1,173 ACCOUNTED FOR IN EXITS

EXIT ACCESS TRAVEL DISTANCE LVL 1: 213' -0" < 250' -0" (TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE) MAXIMUM COMMON PATH OF TRAVEL: 56'- 0" < 75'- 0"

**BUILDING 5 - TYPE IIB - 1 STORY** 

4,829 SF NON-SPRINKLED NONSEPARATED USE OCCUPANCY (A-5,S-2)

\*38 ACCOUNTED FOR IN EXITS EXIT ACCESS TRAVEL DISTANCE: 42' -0" < 250' -0"

MAXIMUM COMMON PATH OF TRAVEL: 15'- 0" < 75'- 0" (TABLE 1006.2.1 SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY)

BUILDING 6 - TYPE IIB - 1 STORY NON-SPRINKLED

CODE PLAN, LEVEL 1

EXIT ACCESS TRAVEL DISTANCE: 82' -0" < 250' -0" (TABLE 1017.2 EXIT ACCESS TRAVEL DISTANCE)

OCCUPANT LOAD: 258

ACCOUNTED FOR IN EXITS

TORNADO SHELTER OCCUPANT LOAD - PER ICC 500 501.1.2.2 REQUIRED NUMBER OF WHEELCHAIR SPACES 1 PER 200 SHELTER OCCUPANTS = 8 USEABLE STORM SHELTER FLOOR AREA - SUBTRACTED WALLS, PARTITIONS, COLUMNS FIXED OR MOVEABLE EQUIPMENT FROM GROSS SQUARE FOOTAGE = 7.361 USEABLE SF 1,456 OCCUPANTS (5 SF PER) = 7,280 SF 8 WHEELCHAIR OCCUPANTS (10 SF PER) = 80 SF TOTAL OCCUPANTS = 1,464

BUILDING 4 - TYPE IIB - 1 STORY

(TORNADO SHELTER)

8,126 SF

**SPRINKLED** 

**BUILDING I: OCCUPANCY GROUP: E** EXIT ACCESS STAIRWAYS AND RAMPS - TRAVEL DISTANCE ON EXIT **CONSTRUCTION TYPE: IIB** ACCESS STAIRWAYS OR RAMPS SHALL BE INCLUDED IN THE EXIT ALLOWABLE AREA (IBC TABLE 506.2): 43,500 SF ACCESS TRAVEL DISTANCE MEASUREMENT PER IBC 2018 1017.3.1 TWO-STORY OPENINGS - OPENINGS DO NOT CONNECT MORE THAN

ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.2.3 SINGLE OCCUPANCY, MULTI STORY BUILDING IBC 506.3 FRONTAGE INCREASE):

IF= .6 Aa=[At + (NS \* If)] \* Sa Aa=[43,500+(14,500\*.6)]

**TOTAL ALLOWABLE AREA PER FLOOR: 52, 200** 

**ACTUAL AREA PER FLOOR:** LEVEL 01: 20,385 SF LEVEL 02: 20,385 SF

MAXIMUM ALLOWABLE BUILDING HEIGHT (PER TABLE 504.3): 75' - 0" ACTUAL BUILDING HEIGHT: 42' - 3"

**BUILDING 2: OCCUPANCY GROUP: E CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 43,500 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.3):

IF= .26 Aa=[At + (NS \* If)] \* Sa Aa=[43,500 + (14,500 \* .26)]

**TOTAL ALLOWABLE AREA PER FLOOR: 47, 270 ACTUAL AREA PER FLOOR:** 

LEVEL 01: 41,978 SF LEVEL 02: 41,842 SF

MAXIMUM ALLOWABLE BUILDING HEIGHT (PER TABLE 504.3): 75' - 0" ACTUAL BUILDING HEIGHT: 42' - 3"

**BUILDING 3: OCCUPANCY GROUP: E CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 58, 000 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.3):

IF= .67 Aa=[At + (NS \* If)] \* Sa Aa=[58,000 + (14,500 \* .67)]

**TOTAL ALLOWABLE AREA PER FLOOR: 67, 715 ACTUAL AREA PER FLOOR:** LEVEL 01: 61,768 SF MEZZANINE AND EQUIPMENT PLATFORMS: 5,718 SF

MAXIMUM ALLOWABLE BUILDING HEIGHT: 75'-0' **ACTUAL BUILDING HEIGHT: 32'-0" BUILDING 4:** OCCUPANCY GROUP: E **CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 58,000 SF

ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.2.2, 506.3):

IF= .46 Aa=[At + (NS \* If)] \* SaAa=[58,000 + (14,500 \* .46)]

Aa=[26, 000 + (26,000 \* .4)]

**TOTAL ALLOWABLE AREA PER FLOOR: 64,670 ACTUAL AREA PER FLOOR:** LEVEL 01: 8,126 SF

MAXIMUM ALLOWABLE BUILDING HEIGHT: 75'-0' **ACTUAL BUILDING HEIGHT: 32'-0" BUILDING 5**:

OCCUPANCY GROUP: S-2 **CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 26,000 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.2.2, 506.3): \*NONSEPARATED USE OCCUPANCY - ALLOWABLE AREA AND HEIGHT OF **BUILDING BASED ON MOST RESTRICTIVE ALLOWANCES PER 508.3.2.** IF=.4 Aa=[At + (NS \* If)] \* Sa

**TOTAL ALLOWABLE AREA PER FLOOR: 36,400 ACTUAL AREA PER FLOOR:** 4,829 SF MAXIMUM ALLOWABLE BUILDING HEIGHT: 55'-0' **ACTUAL BUILDING HEIGHT: 14'-0"** 

**BUILDING 6:** OCCUPANCY GROUP: S-2 **CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 26,000 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.2.2, 506.3): IF=.4 Aa=[At + (NS \* If)] \* Sa Aa=[26, 000 + (26,000 \* .4)]

**TOTAL ALLOWABLE AREA PER FLOOR: 36,400 ACTUAL AREA PER FLOOR:** 740 SF MAXIMUM ALLOWABLE BUILDING HEIGHT: 55'-0' **ACTUAL BUILDING HEIGHT: 14'-0"** 

CP1.1

LEVEL 02

CP1.2

TYPICAL DOOR WIDTHS IBC 1005.1 ALLOWABLE 0.15 0.15 0.15 PAIR 36" 0.15 426 PAIR 42" 0.15 PAIR 48" 0.15

TOTAL EXIT CAPACITY OF DOOR THE CAPACITY OF DOORS ARE DETERMINED AS FOLLOWS: CLEAR OPENING WIDTH IN INCHES DIVIDED BY 0.15)

(THE CAPACITY OF DOORS ARE DETERMINED AS FOLLOWS:

(OCCUPANCY LOAD IS NOT INCLUDED IN LOADS BEYOND THIS ROOM)

WIDTH IN INCHES DIVIDED BY 0.2 FOR SPRINKLERED PER 1005.3.1 EXCEPTION

O - COMBINED OCCUPANT LOAD AT A GIVEN DOOR OR STAIR

CLEAR OPENING WIDHT IN INCHES DIVIDED BY 0.15 THE CAPACITY OF STAIRS ARE DETERMINED AS FOLLOWS

- TOTAL EXIT CAPACITY OF DOOR OR STAIR

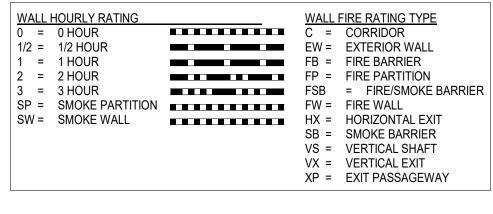
PD - PANIC DEVICE XX MIN - DOOR FIRE RATING

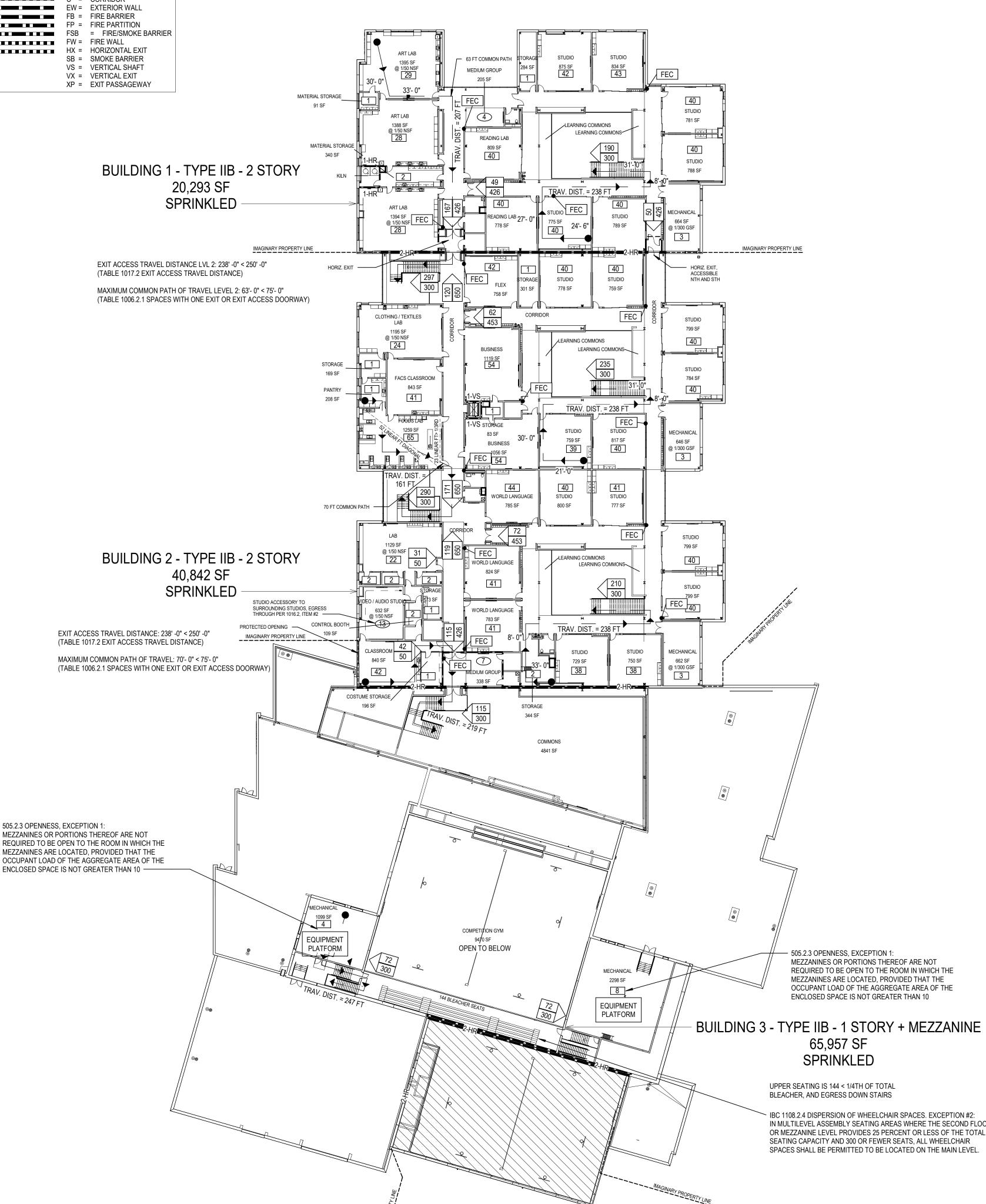
SYMBOL LEGEND

### - OCCUPANCY LOAD

- ACCESSORY USE AREA

#### WALL SEPARATION LEGEND





**BUILDING I:** OCCUPANCY GROUP: E **CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 43,500 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.2.3 SINGLE OCCUPANCY, MULTI STORY BUILDING IBC 506.3 FRONTAGE INCREASE):

IF= .6 Aa=[At + (NS \* If)] \* Sa Aa=[43,500+(14,500\*.6)]

**TOTAL ALLOWABLE AREA PER FLOOR: 52, 200 ACTUAL AREA PER FLOOR:** LEVEL 01: 20,385 SF LEVEL 02: 20,385 SF

MAXIMUM ALLOWABLE BUILDING HEIGHT (PER TABLE 504.3): 75' - 0" ACTUAL BUILDING HEIGHT: 42' - 3"

**BUILDING 2:** OCCUPANCY GROUP: E **CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 43,500 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.3):

IF= .26 Aa=[At + (NS \* If)] \* Sa Aa=[43,500 + (14,500 \* .26)]

**TOTAL ALLOWABLE AREA PER FLOOR: 47, 270 ACTUAL AREA PER FLOOR:** LEVEL 01: 41,978 SF LEVEL 02: 41,842 SF

MAXIMUM ALLOWABLE BUILDING HEIGHT (PER TABLE 504.3): 75' - 0" ACTUAL BUILDING HEIGHT: 42' - 3"

**BUILDING 3: OCCUPANCY GROUP: E CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 58, 000 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.3):

IF= .67 Aa=[At + (NS \* If)] \* Sa Aa = [58,000 + (14,500 \* .67)]

**TOTAL ALLOWABLE AREA PER FLOOR: 67, 715 ACTUAL AREA PER FLOOR:** LEVEL 01: 61,768 SF MEZZANINE AND EQUIPMENT PLATFORMS: 5,718 SF

MAXIMUM ALLOWABLE BUILDING HEIGHT: 75'-0' **ACTUAL BUILDING HEIGHT: 32'-0"** 

**BUILDING 4:** OCCUPANCY GROUP: E **CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 58,000 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.2.2, 506.3):

IF= .46 Aa=[At + (NS \* If)] \* Sa Aa = [58,000 + (14,500 \* .46)]

**TOTAL ALLOWABLE AREA PER FLOOR: 64,670 ACTUAL AREA PER FLOOR:** LEVEL 01: 8,126 SF

MAXIMUM ALLOWABLE BUILDING HEIGHT: 75'-0' ACTUAL BUILDING HEIGHT: 32'-0"

**BUILDING 5**: OCCUPANCY GROUP: S-2 **CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 26,000 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.2.2, 506.3): \*NONSEPARATED USE OCCUPANCY - ALLOWABLE AREA AND HEIGHT OF **BUILDING BASED ON MOST RESTRICTIVE ALLOWANCES PER 508.3.2.** IF=.4 Aa=[At + (NS \* If)] \* Sa Aa=[26,000 + (26,000 \* .4)]

**TOTAL ALLOWABLE AREA PER FLOOR: 36,400 ACTUAL AREA PER FLOOR:** 4,829 SF MAXIMUM ALLOWABLE BUILDING HEIGHT: 55'-0' **ACTUAL BUILDING HEIGHT: 14'-0"** 

**BUILDING 6:** OCCUPANCY GROUP: S-2 **CONSTRUCTION TYPE: IIB** ALLOWABLE AREA (IBC TABLE 506.2): 26,000 SF ALLOWABLE AREA INCREASE FOR FRONTAGE (IBC 506.2.2, 506.3): IF=.4 Aa=[At + (NS \* If)] \* Sa Aa=[26, 000 + (26,000 \* .4)]

**TOTAL ALLOWABLE AREA PER FLOOR: 36,400 ACTUAL AREA PER FLOOR:** 740 SF MAXIMUM ALLOWABLE BUILDING HEIGHT: 55'-0' **ACTUAL BUILDING HEIGHT: 14'-0"** 

CODE PLAN, LEVEL 02

SCALE: 1" = 30'-0"

REVISIONS

13-20102-00

UL DESIGNS

channels are friction fitted into clips. PAC INTERNATIONAL INC -- Type RSIC-1.

7. Joint Tape and Compound -- Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw

8. Siding, Brick or Stucco -- (Optional, not shown) -- Aluminum, vinyl or steel siding, brick veneer or stucco, meeting the requirements of local code agencies, installed over gypsum panels. Brick veneer attached to studs with corrugated metal wall ties attached to each stud with steel screws, not more than each sixth course of brick

9. Caulking and Sealants\* -- (Optional, not shown) -- A bead of acoustical sealant applied around the partition perimeter for UNITED STATES GYPSUM CO -- Type AS

**UL DESIGN U419** 

4. Gypsum Board\* --

Gypsum panels, with beveled, square or tapered edges, nom 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally, attached to studs with 1 in. long Type S steel screws spaced 12 in. when installed vertically or 8 in OC when 24 in. or 600 mm 0.C. installed horizontally. Horizontal joints need not be backed by steel framing CANADIAN GYPSUM COMPANY -- Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, RC. WRX UNITED STATES GYPSUM CO -- Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC, WRX USG MEXICO S A DE C V -- Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC, WRX Horizontal Section Gypsum panels, with beveled, square or tapered edges, nom 1/2 in. or 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally in two layers. Inner or base layer attached to studs with 1 in. long Type S steel screws spaced 24

System A - 1 Hr

Design No. U415

June 10, 2003

Nonbearing Wall Ratings -- 1, 2, 3 or 4 Hr

System A - 1 Hr.

Horizontal Section

System C - 2 Hr.

Horizontal Section

System E - 2 Hr.

Horizontal Section

24 in. or 600 mm 0.C.

System F - 2 Hr.

System G - 3 Hr.

forizontal Section

Horizontal Section

System I - 4 Hr.

1. Floor, Side and Ceiling Runners – "J" - shaped runner, min 2-1/2 in. deep (min 4 in. deep when System C is used). with

unequal legs of 1 in. and 2 in., fabricated from min 24 MSG (min 20 MSG when Item 4A or 7 are used) galv steel. Runners

positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located

not greater than 2 in. from ends and not greater than 24 in. OC. "E" - shaped studs (Item 2A) may be used as side runners

2. Steel Studs -- "C-H" - shaped studs, min 2-1/2 in. deep (min 4 in. deep when System C is used), fabricated from min 25

MSG (min 20 MSG when Item 7 is used) galv steel. Cut to lengths 3/8 to 1/2 in. less than floor-to-ceiling height and spaced

2A. Steel Studs -- (Not Shown) -- "E" - shaped studs installed back to back in place of "C-H" - shaped studs (Item 2) "E" -

2B. Furring Channels -- (Optional, not shown) -- For use with single or double layer systems. Resilient furring channels

fabricated from min 25MSG corrosion protected steel, installed horizontally, and spaced vertically a max 24 in. OC. Flange

portion of channel attached to each intersecting "C-H" or "E" stud on side of stud opposite the 1 in. liner panels with 1/2 in.

2C. Furring Channels -- For use with System I - "Hat" - shaped, 25 MSG galv steel furring channels attached directly over

the inner layers of wallboard to each stud with 2 in. long Type S pan head steel screws. Screws alternate from top flange to

3. Gypsum Board\* -- Gypsum liner panels, nom 1 in. thick, 24 in. or 600 mm (for metric spacing) wide. Panels cut 1 in. less

in length than floor to ceiling height. Vertical edges inserted in "H" portion of "C-H" studs or the gap between the two 3/4 in.

legs of the "E" studs. Free edge of end panels attached to long leg of vertical "J" - runners with 1-5/8 in. long Type S steel

to the full height of the wall. Horizontal joints need not be backed by steel framing. In System I, butt joints in liner panels are

staggered min 36 in. Butt joints backed with 6 in. by 22 in. strips of 3/4 in. thick gypsum wallboard (Item 4). Wallboard strips

centered over butt joints and secured to liner panels with six 1-1/2 in. long Type G steel screws, three screws along the 22

screws spaced not greater than 12 in. OC. When wall height exceeds liner panel length, liner panel may be butted to extend

be used with Type FRX or FRX-G gypsum wallboard (Item 4A) or cementitious backer units (Item 7).

bottom flange at each stud intersection. Furring channels spaced vertically max 24 in. OC.

long Type S or S-12 pan-head steel screws. When furring channels are used, wallboard to be installed vertically only. Not to

shaped studs secured together with steel screws spaced a maximum 12 in. OC. Fabricated from min 25 MSG (min 20 MSG

when Item 7 is used) galy steel, min 2-1/2 in, deep (min 4 in, deep when System C is used), with one leg 1 in, long and two

legs 3/4 in. long. Shorter legs 1 in. apart to engage gypsum liner panels. Cut to lengths 3/8 to 1/2 in. less than floor to ceiling

System B - 2 Hr. in. OC when installed vertically or 16 in. OC when installed horizontally. Outer or face layer attached to studs with 1-5/8 in, long Type S steel screws spaced 12 in, OC when installed vertically and staggered 12 in, from base layer screws or 8 in. OC when installed horizontally and staggered 8 in. from base layer screws. Horizontal joints between inner and outer layers staggered a min of 12 in. Horizontal joints need not be backed by steel framing. Vertical joints centered over studs and staggered 24 in. CANADÍAN GYPSUM COMPANY -- 1/2 in. Type C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC, WRX UNITED STATES GYPSUM CO -- 1/2 in. Types C, IP-X2, IPC-AR, or WRC; 5/8 in. Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2. IPC-AR. SCX. SHX. WRC. WRX USG MEXICO S A DE C V -- 1/2 in. Types C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC, WRX

> Items 1, 2 and 3. Requires min 3 in. thick mineral wool batts per Item 6. CANADIAN GYPSUM COMPANY -- Types IP-X3, ULTRACODE, ULTRACODE SHC, LTRACODE WRC. UNITED STATES GYPSUM CO -- Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE WRC. USG MEXICO S A DE C V -- Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE WRC. Gypsum panels, with beveled, square or tapered edges, nom 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or orizontally, attached directly to studs with 1 in. long Type S steel screws spaced 24 in. when installed vertically or 16 in.

OC when installed horizontally. . Horizontal joints need not be backed by steel framing. Requires face layer of 1/2 or 5/8

in, thick cementitious backer units per Item 7 and min 1-1/2 in, thick mineral wool batts per Item 6.

Gypsum panels, with beveled, square or tapered edges, nom 3/4 in. thick, 48 in. or 1200 mm wide, applied vertically or

orizontally, secured with 1-1/4 in. long Type S steel screws spaced 8 in. OC along vertical edges and 12 in. OC in the

field when installed vertically or 8 in. OC along the vertical edges and in the field when installed horizontally. Horizontal joints need not be backed by steel framing. Screws along side joints offset 4 in. Requires min 4 in. deep framing per

CANADIAN GYPSUM COMPANY -- Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC, WRX UNITED STATES GYPSUM CO -- Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC, WRX USG MEXICO S A DE C V -- Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC. WRX System E - 2 Hr Gypsum panels, with beveled, square or tapered edges, nom 1/2 in. or 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally, attached to studs with 1 in. long Type S steel screws spaced 12 in. OC when installed vertically or 8 in. when installed horizontally. Horizontal joints need not be backed by steel framing CANADIAN GYPSUM COMPANY -- 1/2 in. Types C, IP-X2, IPC-AR; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR UNITED STATES GYPSUM CO -- 1/2 in. Types C, IP-X2, IPC-AR; 5/8 in. Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2,

USG MEXICO S A DE C V -- 1/2 in. Types C, IP-X2, IPC-AR; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX,

Gypsum panels, with beveled, square or tapered edges, nom 1/2 in. or 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically in two layers. Inner or base layer attached to resilient furring channels (Item 2B) with 1 in. long Type S steel screws spaced 24 in. Outer or face layer attached to resilient furring channels (Item 2B) with 1-5/8 in. long Type S steel screws spaced 12 in. OC and staggered 12 in. from base layer screws. Joints between inner and outer layers staggered CANADIAN GYPSUM COMPANY -- 1/2 in. Type C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC, WRX UNITED STATES GYPSUM CO -- 1/2 in. Type C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2 IPC-AR SCX SHX WRC WRX

SCX, SHX, WRC, WRX System G - 3 Hr Gypsum panels, with beveled, square or tapered edges, nom 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically o horizontally in three layers. Inner or base layer attached to studs with 1 in. long Type S steel screws spaced 24 in. OC when installed vertically or 16 in OC when installed horizontally. Middle layer attached to studs with 1-5/8 in. long Type S steel screws spaced 24 in. when installed vertically or 16 in. OC when installed horizontally. Outer or face layer attached to studs with 2-1/4 in. long Type S steel screws spaced 16 in. when installed vertically or 12 in. OC when installed horizontally. Screws offset 6 in. from layer below. Horizontal joints on adjacent layers staggered a min of 12 in. .

USG MEXICO S A DE C V -- 1/2 in. Type C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR,

Horizontal joints need not be backed by steel framing. Vertical joints centered over studs and staggered 24 in. on CANADIAN GYPSUM COMPANY -- Types C, IP-X2, IPC-AR, WRC UNITED STATES GYPSUM CO -- Types C, IP-X2, IPC-AR, WRC USG MEXICO S A DE C V -- Types C, IP-X2, IPC-AR, WRC

IPC-AR, SCX, SHX, WRC, WRX

Gypsum panels, with beveled, square or tapered edges, nom 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally, two layers over the flange of the "C" section of the studs, one layer over the flange of the "H" section of the studs. Inner or base layer attached to studs with 1 in. long Type S steel screws spaced 24 in. OC when installed vertically or 16 in. OC when installed horizontally. Face layer attached to studs with 1-5/8 in. long Type S steel screws spaced 16 in. when installed vertically or 12 in. OC when installed horizontally. Screws offset 6 in. from layer below. Horizontal joints on adjacent layers staggered a min of 12 in. Horizontal joints need not be backed by steel framing. Vertical joints centered over studs and staggered 24 in. on adjacent layers. CANADIAN GYPSUM COMPANY -- Types C, IP-X2, IPC-AR, WRC UNITED STATES GYPSUM CO -- Types C, IP-X2, IPC-AR, WRC USG MEXICO S A DE C V -- Types C, IP-X2, IPC-AR, WRC

Gypsum panels, with beveled, square or tapered edges, nom 3/4 in. thick, 4 ft wide (or 1200 mm for metric spacing) wallboard with square or tapered edges. Total of four layers to be used. First and second (inner) layers applied vertically or horizontally over the steel studs. Horizontal joints need not be backed by steel framing. When applied vertically, joints centered over studs and staggered min 24 in., otherwise all joints staggered min 12 in. First layer secured to studs with 1-1/4 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 24 in. OC. Second layer secured to studs with 2-1/4 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 12 in. OC. Third layer applied vertically over the furring channels (Item 2C) with a 1-1/4 in. long Type S self-drilling, self-tappling bugle-head steel screws spaced 12 in. OC. Fourth layer applied vertically or horizontally with 2-1/4 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 12 in. OC. When applied vertically, joints to be staggered min 24 in. from third layer, otherwise all joints staggered min 12 in.

CANADIAN GYPSUM COMPANY -- Types IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE WRC UNITED STATES GYPSUM CO -- Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE WRC. USG MEXICO S A DE C V -- Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE WRC.

5. Joint Tape and Compound - (Not Shown) Systems A, B, C, E, F, G, H, I Joints on outer layers of gypsum boards (Item 4 and 4A) covered with paper tape and joint compound. Paper tape and joint compound may be omitted when gypsum boards are supplied with square edges. Exposed screw heads covered

Batts and Blankets\* Systems A, B, E, F, G, H, I

(Optional) -- Mineral wool or glass fiber batts partially or completely filling stud cavity. Any mineral wool or glass fiber batt mineral bearing the UL Classification Marking as to Fire Resistance.

Min 3 in. (System C) and min 1-1/2 in. (System D) thick mineral wool batts, friction fitted between the studs and floor and THERMAFIBER INC -- Type SAFB

7. Cementitious Backer Units\* -- (System D) -- Nom 1/2 or 5/8 in. thick panels, square edge, attached to studs over ppsum wallboard with 1-5/8 in. long, Type S-12, corrossion resistant steel screws spaced 8 in. OC and staggered 8 in. from gypsum wall board screws. Joints covered with glass fiber mesh tape. Vertical joints staggered one stud cavity from gypsum wallboard joints. Horizontal joints staggered a min of 12 in. from the gypsum wallboard joints.

8. Laminating Adhesive\* -- (Optional, Not Shown) -- Used to bond outer layer of Cementitious Backer Units (Item 7) to inner layers of Gypsum Board (Item 4) in System D. ANSI A136.1 Type 1 organic adhesive applied with 1/4 in. square notched trowel. See Adhesives (BYWR) in the Fire Resistance Directory or Adhesives (BJLZ) in the Building Materials Directory for names of Classified companies

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Class II and III Movement Capabilities - 12.5% Compression or Extension

1. Floor Assembly The fire rated fluted steel unit/concrete floor assembly shall be constructed of the materials and in a manner described in the individual D700 or D900 Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features: A. Steel Floor and Form Units\* Max 2 in. deep galv steel fluted floor units. B. Concrete Min 2-1/2 in thick reinforced concrete as measured from top plane of the floor units. C. Spray-Applied Fire Resistive Materials\* (Optional)--(Not Shown)--Prior to the installation of the forming

material and fill, void or cavity material (Items 3A, 3B) the steel floor units may be sprayed with a min 5/16 in. to

System No. HW-D-0098

December 04, 2001 Assembly Rating -- 2 Hr

Nominal Joint Width - 1 In.

W R GRACE & CO - CONN CONSTRUCTION PRODUCTS DIV -- Type MK-6-HY

max 1-3/4 in. thickness of fire resistive material.

1A. Roof Assembly (Not Shown) -- As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features: A. Steel Roof Deck Max 2 in. deep galv steel fluted roof deck.

B. Roof Insulation Min 2-1/4 in. thick poured insulating concrete, as measured from the top plane of the floor 1B. Roof Assembly As an alternate to Items 1 and 1A, a fire rated protected fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall A. Steel Roof Deck Max 2 in. deep galv steel fluted roof deck.

Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design. 2. Wall Assembly Min 6 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*.

B. Spray--Applied Fire Resistive Materials\* (Not Shown)--Prior to the installation of the steel ceiling runners,

See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers. 3. Joint System Max separation between bottom of floor or roof and top of wall at time of installation of joint system is 1 in. The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width. The joint system shall consist of the following: insulation cut to the shape of the fluted steel deck, approx 33 percent larger than the flutes. Pieces

A. Forming Material Nom 4.0 pcf mineral wool batt insulation compressed and firmly packed to completely fill the flutes and the gap between the top of the wall and bottom of the floor or roof as a permanent form. Batt compressed and installed vertically into the flutes above the top of the wall. Additional pieces of batt insulation min 6 in. wide, installed edge-first into joint opening between bottom of fluted steel deck and top of wall, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness. Compressed batt sections are flush with both surfaces of wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. apart along the length of the joint. ROCK WOOL MANUFACTURING CO -- Delta Board

A1. Forming Material\*--Plugs (Optional-Not Shown) Performed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling runner. The plugs shall be flush with both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of the wall and the bottom of the steel floor units.

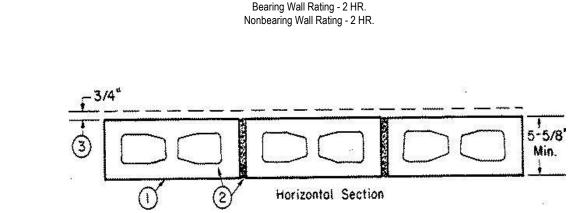
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- CP777 Speed Plugs

B. Fill, Void or Cavity Material\* Min 1/8 in. wet thickness of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. onto wall and steel deck on both sides of wall. When spray-applied fire resistive material\* is applied to the steel steel deck, the fill material is to overlap the wall a min of 1/2 in. and the spray-applied fire resistive material a min of 2 in. on both HILTI CONSTRUCTION CHEMICALS, DIV OF

HILTI INC -- CP672 Firestop Spray \*Bearing the UL Classification Mark

### **UL DESIGN HW-D-0098**

Design No. U906



December 02, 1999

1. Concrete Blocks\* — Nominal 6 by 8 by 16 in, hollow or solid.

ANCHOR CONCRETE PRODUCTS INC GAGNE & SON CONCRETE BLOCK INC

Allowable compressive stress of 57% of max allowable compressive stress in accordance with the empirical design method.

BETCO BLOCK & PRODUCTS INC, DBA ARTHUR WHITCOMB

WESTBROOK CONCRETE BLOCK CO INC

Allowable compressive stress of 75.6% of max allowable compressive stress in accordance with the empirical design method. 2. Mortar — Blocks laid in full bed of mortar, nom. 3/8 in. thick, of not less than 2-1/4 and not more than 3-1/2 parts of clean sharp sand to 1 part Portland cement (proportioned by volume) and not more than 50 percent hydrated lime (by cement volume). Vertical 3. Portland Cement Stucco or Gypsum Plaster — Add 1/2 hr to Classification if used. Attached to concrete blocks (Item 1). 4. Foamed Plastic\* — (Optional-Not Shown) — 1-1/2 in. thick max, 4 ft wide sheathing attached to concrete blocks (Item 1).

1. Wall Assembly -- The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and A. Studs – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC. B. Gypsum Board\* -- Two layers of 5/8 in. thick gypsum wallboard, as specified in the individual Wall and Partition Design. Max 2. Metallic Sleeve -- Nom 10 in. diam (or smaller) Schedule 40 (or thinner) steel pipe cast into wall assembly with joint compound and installed flush with wall surfaces. 3. Through Penetrants -- One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used: A. Steel Pipe -- Nom 4 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.

System No. W-L-5024

January 09, 2003

F Rating -- 2 Hr

L Rating At Ambient -- 4 CFM/Sq Ft

L Rating At 400 F -- Less Than 1 CFM/Sq Ft

form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill 6. Fill, Void or Cavity Material\* -- Sealant -- Min 1-1/2 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. HILTI CONSTRUCTION CHEMICALS, DIV OF

HILTI INC -- FS-ONE Sealant \*Bearing the UL Classification Mark

USG MEXICO S A DE C V -- Type SLX UL DESIGN U415

in. dimension at the top and bottom of the strips.

CANADIAN GYPSUM COMPANY -- Type SLX

UNITED STATES GYPSUM CO -- Type SLX

in place of "J" - shaped runners.

JNITED STATES GYPSUM CO -- DUROCK Exterior Cement Board or DUROCK Brand Cement Board

\*Bearing the UL Classification Mark

For Number of Lavers

and Hourly Ratings

Design No. U419

October 09, 2003

Nonbearing Wall Ratings -- 1, 2, 3 or 4 Hr (See Items 3 & 4)

1. Floor and Ceiling Runners -- (Not shown) -- Channel shaped, fabricated from min 25 MSG corrosion-protected steel, min width to accommodate stud size, with min 1 in. long legs, attached to floor and ceiling with fasteners 24 in. OC max.

2. Steel Studs -- Channel shaped, fabricated from min 25 MSG corrosion-protected steel, min width as indicated under Item 4, min 1-1/4 in. flanges and 1/4 in. return, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly

3. Batts and Blankets\* -- (Required as indicated under Item 4) -- Mineral wool batts, friction fitted between studs and runners. Min nom thickness as indicated under Item 4. See Batts and Blankets (BKNV or BZJZ) Categories for names of Classified

3A. Batts and Blankets\* -- (Optional) -- Placed in stud cavities, any glass fiber or mineral wool insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance. See Batts and Blankets (BKNV or BZJZ) Categories for names of Classified companies.

4. Gypsum Board\* -- Gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Vertical joints in adjacent layers (multilayer systems) staggered one stud cavity. Horizontal joints need not be backed by steel framing. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. Horizontal edge joints and horizontal butt joints in adjacent layers (multilayer systems) staggered a min of 12 in. The thickness and number of layers for the 1 hr, 2 hr, 3 hr and 4 hr ratings are as follows:

Wallboard Protection on Each Side of Wall

Rating	Min Stud Depth	No. of Layers & Thkns of Panel	Min of Inst
1	3-1/2	1 layer, 5/8 in. thick	Opti
1	2-1/2	1 layer, 1/2 in. thick	1-1/2
1	1-5/8	1 layer, 3/4 in. thick	Opti
2	1-5/8	2 layers, 1/2 in. thick	Optio
2	1-5/8	2 layers, 5/8 in. thick	Optio
2	3-1/2	1 layer, 3/4 in. thick	3
3	1-5/8	3 layers, 1/2 in. thick	Optio
3	1-5/8	2 layers, 3/4 in. thick	Optio
3	1-5/8	3 layers, 5/8 in. thick	Optio
4	1-5/8	4 layers, 5/8 in. thick	Optio
4	1-5/8	4 layers, 1/2 in. thick	Optio
4	2-1/2	2 layers, 3/4 in. thick	2

CANADIAN GYPSUM COMPANY -- 1/2 in. thick Type C, IP-X2 or IPC-AR; WRC, 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX or WRC; 3/4 in. thick Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE

AR, C, WRC, FRX-G, IP-AR, IP-X2, IPC-AR; 3/4 in. thick Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE

USG MEXICO S A DE C V -- 1/2 in. thick Type C, IP-X2, IPC-AR or WRC; 5/8 in. thick Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX, WRC or; 3/4 in. thick Type IP-X3, ULTRACODE, ULTRACODE SHC or ULTRACODE WRC. 4A. Gypsum Board\* -- (As an alternate to Item 4) -- 5/8 in. thick, 2 ft. wide, tongue and groove edge, applied horizontally as the outer layer to one side of the assembly. Secured as described in Item 5. Joint covering (Item 7) not required. CANADIAN GYPSUM COMPANY -- Type SHX.

UNITED STATES GYPSUM CO -- 1/2 in. thick Type C, IP-X2, IPC-AR or WRC; 5/8 in. thick Type SCX, SHX, WRX, IP-X1,

UNITED STATES GYPSUM CO -- Type SHX.

USG MEXICO S A DE C V -- Type SHX. 5. Fasteners -- (Not shown) -- Type S or S-12 steel screws used to attach panels to studs (Item 2) or furring channels (Item 6). Single layer systems: 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 8 in. OC when panels are applied horizontally, or 8 in. OC along vertical and bottom edges and 12 in. OC in the field when panels are applied vertically. Two layer systems: First layer- 1 in. long for 1/2 and 5/8 in. thick panels or 1-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels or 2-1/4 in. long for 3/4 in. thick panels, spaced 16 in. OC with screws offset 8 in. from first layer. Three-layer systems: First layer-1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer-1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer-2-1/4 in. long for 1/2 in., 5/8 in. thick panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below. Four-layer systems: First layer- 1 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Second layer- 1-5/8 in. long for 1/2 in., 5/8 in. thick panels, spaced 24 in. OC. Third layer- 2-1/4 in. long for 1/2 in. thick

long for 5/8 in. thick panels, spaced 12 in. OC. Screws offset min 6 in. from layer below. 6. Furring Channels -- (Optional, not shown, for single or double layer systems) -- Resilient furring channels fabricated from min 25 MSG corrosion-protected steel, spaced vertically a max of 24 in. OC. Flange portion attached to each intersecting

panels or 2-5/8 in. long for 5/8 in. thick panels, spaced 24 in. OC. Fourth layer- 2-5/8 in. long for 1/2 in. thick panels or 3 in.

stud with 1/2 in. long Type S-12 steel screws. Not for use with Item 4A. 6A. Steel Framing Members (Not Shown)\* -- (Optional on one or both sides, not shown, for single or double layer systems) -- As an alternate to Item 6, furring channels and Steel Framing Members as described below:

a. Furring Channels -- Formed of No. 25 MSG galv steel. 2-3/8 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board attached to furring channels as described in Item 5. Not for use with Item 4A.

b. Steel Framing Members\* -- Used to attach furring channels (Item 6a) to studs (Item 2). Clips spaced max. 48 in. OC., and secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. Furring

heads of outer layers. Paper tape, nom 2 in. wide, embedded in first layer of compound over all joints of outer layer panels. Paper tape and joint compound may be omitted when gypsum panels are supplied with a square edge.

UL DESIGN U906

\*Bearing the UL Classification Mark

System No. W-L-1171

November 18, 1999

F Ratings---3 and 4 Hr (See Item 1)

L Rating At Ambient -- Less Than 1 CFM/sq ft

L Rating At 400°F -- Less Than 1 CFM/sq ft

1. Wall Assembly The 3 or 4 hr fire-rated gypsum wallboard/steel stud wall assembly shall be constructed of the materials and

in the manner specified in the individual U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall

A. Studs Wall framing shall consist of steel channel studs. Steel studs to be min 3-5/8 in. wide and spaced max 24 in. OC.

layers and orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 22 in.

B. Gypsum Board\* Multiple layers of min 1/2 in. thick gypsum wallboard. The gypsum wallboard type, thickness, number of

2. Steel Sleeve Cylindrical sleeve fabricated from min 0.031 in. thick (No. 22 MSG) galv sheet steel and having a min 2 in. lap

along the longitudinal seam. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting

the coil through the openings and releasing the coil to let it uncoil against the circular cutouts in the gypsum wallboard layers.

The ends of the steel sleeve shall be installed flush with each face of the wall or extend a max 1/4 in. beyond each surface of

3. Through Penetrants One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the

firestop system. The annular space between the pipe, conduit or tubing and the periphery of the opening shall be min 0 in.

(point contact) to max 2 in. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following

C. Conduit Nom 6 in. diam (or smaller) rigid steel conduit, nom 4 in. diam (or smaller) electrical metallic tubing or nom 1 in.

A. Packing Material In 4 hr fire-rated assemblies, min 5-5/8 in. thickness of min 4 pcf mineral wool batt insulation firmly packed

into opening as a permanent form. In 3 hr fire-rated assemblies, min 4-5/8 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as

B. Fill, Void or Cavity Material\* - Caulk Min 1 in. thickness of fill material applied within the annulus, flush with both ends of

When sleeve projects beyond surface of wall, a min 1/4 in. thick bead of caulk shall be applied to outer perimeter of sleeve at

System No. W-L-5021

January 09, 2003

F Rating -- 1 Hr

T Rating -- 1/2 Hr

L Rating At Ambient -- 4 CFM/Sq Ft

L Rating At 400 F -- Less Than 1 CFM/Sq Ft

1. Wall Assembly -- The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the

A. Studs -- Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in.

2. Metallic Sleeve -- Nom 8 in. diam (or smaller) Schedule 40 (or thinner) steel pipe cast into wall assembly with joint

B. Through Penetrants -- One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly

4. Pipe Covering\* -- Nom 1 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with

an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints

manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a

secured with metal fasteners or with butt tape supplied with the product. An annular space of 3/4 in. is required within the

See Pipe and Equipment Covering -- Materials -- (BRGU) category in the Building Material Directory for the names of

5. Packing Material -- Min 2-3/4 in. thickness of min 4.0 pcf mineral wool batt insulation firmly packed into opening as a

permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required

6. Fill, Void or Cavity Material\* - Sealant - Min 1 in. thickness of fill material applied within the annulus, flush with both

supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:

B. Gypsum Board\* -- One layer of 5/8 in. thick gypsum wallboard, as specified in the individual Wall and Partition Design. Max

lumber spaced 16 in. OC. Steel studs to be min 3-1/2 in. wide and spaced max 24 in. OC.

A. Steel Pipe -- Nom 4 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.

C. Copper Pipe -- Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.

L DESIGN W-L-5021

B. Copper Tubing -- Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing.

Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

compound and installed flush with wall surfaces.

HILTI CONSTRUCTION CHEMICALS, DIV OF

thickness of fill material.

HILTI INC -- FS-ONE Sealant

\*Bearing the UL Classification Mark

surfaces of wall.

manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and

steel sleeve. A min 1/4 in. thick bead of fill material shall be applied at the point contact location on both surfaces of walll.

include the following construction features:

diam (or smaller) flexible steel conduit.

interface with wall surfaces.

\*Bearing the UL Classification Marking

types and sizes of metallic pipes, conduits or tubing may be used.

B. Iron Pipe Nom 20 in. diam (or smaller) cast or ductile iron pipe.

4. Firestop System The firestop system shall consist of the following:

required to accommodate the required thickness of fill material.

**UL DESIGN W-L-1171** 

A. Steel Pipe Nom 20 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

D. Copper Tubing Nom 6 in. diam (or smaller) Type M (or heavier) copper tubing.

SPECIFIED TECHNOLOGIES INC -- SpecSeal 100, 101, 102, 129, 105 Sealant

E. Copper Pipe Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.

UL DESIGN W-L-5024

B. Copper Tubing -- Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing. C. Copper Pipe -- Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe. 4. Pipe Covering\* -- Nom 1-1/2 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse ioints secured with metal fasteners or with butt tape supplied with the product. A nom annular space of 1-7/16 in. is required See Pipe and Equipment Covering -- Materials -- (BRGU) category in the Building Material Directory for the names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

5. Packing Material -- Min 2 in. thickness of min 4.0 pcf mineral wool batt insulation firmly packed into opening as a permanent

\*Bearing the UL Classification Mark

THE DOW CHEMICAL CO — Type Thermax

System No. HW-D-0046

August 21, 2002

Assembly Rating -- 1 and 2 Hr

Nominal Joint Width -- 3/4 In.

Class II Movement Capabilities -- 33% Compression or Extension

1. Floor Assembly The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials

and in the manner described in the individual D700 or D900 Floor-Ceiling Design in the Fire Resistance Directory

C. Spray-Applied Fire Resistive Materials (Optional) -- (Not Shown) -- Prior to the installation of the ceiling runner,

Forming Material and Fill, Void or Cavity Materials (Items 2A, 3A, 3B, respectively), the steel floor units may be

1A. Roof Assembly (Not Shown) -- As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly

may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual

P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall

be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following

B. Roof Insulation Min 2-1/4 in. thick poured insulating concrete, as measured from the top plane of the floor units.

1B. Roof Assembly As an alternate to Items 1 and 1A, a fire rated protected fluted steel deck roof assembly may be

used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700

Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be

equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following

B. Spray--Applied Fire Resistive Materials\* (Not Shown)--Prior to the installation of the steel ceiling runners,

type and thickness of fire resistive material indicated in the individual P700 Series design.

Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the

2. Wall Assembly The 1 or 2 hr fire-rated gypsum board /stud wall assembly shall be constructed of the materials

A. Steel Floor and Ceiling Runners Floor and ceiling runners of wall assembly shall consist of galv steel channels

installed perpendicular to direction of fluted steel deck and secured to valleys of steel deck (Item 1A) with steel

fasteners or by welds spaced 12 in. OC. When optional spray-applied fire resistive material is used on steel deck,

A1. Light Gauge Framing\*-Slotted Ceiling Runner As an alternate to the ceiling runner in Item 2A, slotted ceiling

runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted

ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners

spaced max 24 in. OC. When optional spray-applied fire resistive material is used on steel deck, slotted ceiling

runner shall be secured through spray-applied fire resistive material to valleys of steel deck with min 3/16 in. diam

A2. Light Gauge Framing\*-Vertical Deflection Ceiling Runner As an alternate to the ceiling runners in Items 2A and

mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel

perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners spaced max 24 in. OC.

When optional spray-applied fire resistive material is used on steel deck, vertical deflection ceiling runner shall be

secured through spray-applied fire resistive material to valleys of steel deck with min 3/16 in. diam steel masonry

A3. Light Gauge Framing\* -- Clipped Ceiling Runner As an alternate to the ceiling runner in Items 2A, 2A1 and

2A2, clipped runner to consist of galv steel channel with clips preformed in track flanges which positively engage

the inside flange of the steel studs (Item 2B). Track sized to accommodate steel studs (Item 2B). Track flanges to

be min 2-1/2 in. Clipped ceiling runner installed perpendicular to direction of fluted steel floor units and secured to

B. Studs Steel studs to be min 2-1/2 in. wide. Studs cut 1/2 to 3/4 in. less in length than assembly height with

bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. When

slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. long

wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. OC. When

the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. OC.

vertical deflection ceiling runner (Item 2A2) is used steel studs secured to slotted vertical deflection clips, through

C. Gypsum Board\* For 1 hr assembly, one layer of 5/8 in. thick gypsum board is required in the individual Wall and

Partition Design. For both hourly ratings, a nominal 3/4 in. gap shall be maintained between the top of the gypsum

Partition Design. For 2 hr assembly, two layers of 5/8 in. thick gypsum board is required in the individual Wall and

board and the bottom surface of the steel deck and the top row of screws shall be installed into the studs 3 in.

below the valleys of the steel deck. The hourly rating of the joint system is dependent on the hourly rating of the

3. Joint System Max separation between bottom of floor or roof and top of wall is 3/4 in. The joint system is

designed to accommodate a max 33 percent compression or extension from its installed width. The joint system

consists of a packing material and a fill material between the top of the gypsum board and the bottom of the floor,

A. Forming Material\* Nom 4 pcf mineral wool batt cut to the shape of the fluted deck, approx 20 percent larger than

the area of the flutes and compressed into the flutes of the steel deck flutes above the ceiling runner. The mineral

wool insulation is to project beyond each side of ceiling runner, recessed 1/4 in. from both wall surfaces. For 2 hr

assembly, additional 1-1/2 in. thick by 1 in. wide sections of mineral wool batt insulation compressed 50 percent and

installed cut edge first to fill the 3/4 in, gap between the top of gypsum board and bottom of the steel deck. For 1 hr

assembly, additional 1-1/2 in. thick by 3/8 in. wide sections of mineral wool batt insulation compressed 50 percent

and installed cut edge first to fill the 3/4 in. gap between the top of gypsum board and bottom of the steel deck. The

A1. Forming Material\*--Plugs (Optional-Not Shown) Performed mineral wool plugs, formed to the shape of the

fluted floor units, friction fit to completely fill the flutes above the ceiling channel. The plugs shall project beyond

each side of the ceiling runner, recessed 1/4 in. from wall surfaces. Additional forming material, described in Item

3A, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and bottom of steel

B. Fill, Void or Cavity Material\* -- Sealant Min 1/4 in. thickness of fill material installed on each side of the wall in the

flutes of the steel deck and between the top of the gypsum board and the bottom of the steel deck, flush with each

forming material shall be recessed 1/4 in. from each side of the wall.

FIBREX INSULATIONS INC -- FBX Safing Insulation

HILTI CONSTRUCTION CHEMICALS, DIV OF

HILTI CONSTRUCTION CHEMICALS, DIV OF

\*Bearing the UL Classification Mark

HILTI INC -- CP601S Elastomeric Firestop Sealant

HILTI INC -- CP777 Speed Plugs

2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips

studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner installed

THE STEEL NETWORK INC -- VertiTrack VTD250, VTD358, VTD400, VTD600 and VTD800

slotted ceiling runner shall be secured through spray-applied fire resistive material to valleys of steel deck with min

and in the manner specified in the individual U400 Series Wall or Partition Design in the UL Fire Resistance

sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with 2 in. flanges. Ceiling runner

B. Concrete Min 2-1/2 in, thick reinforced concrete, as measured from the top plane of the floor units.

sprayed with a min 5/16 in. thickness to a max 11/16 in. thickness of fire resistive material.

and shall include the following construction features:

CONSTRUCTION PRODUCTS DIV -- Type MK-6/HY

A. Steel Roof Deck Max 3 in. deep galv steel fluted roof deck.

A. Steel Roof Deck Max 3 in. deep galv steel fluted roof deck.

Directory and shall include the following construction features:

3/16 in. diam steel masonry anchors spaced 12 in. OC.

steel masonry anchors spaced 12 in. OC.

SLIPTRACK SYSTEMS INC -- SLP-TRK

valleys with steel fasteners spaced max 24 in. OC.

TOTAL STEEL SOLUTIONS L L C -- Snap Trak

METAL-LITE INC -- The System

anchors spaced 12 in. OC.

W R GRACE & CO - CONN

construction features:

construction features:

A. Steel Floor and Form Units\* Max 3 in. deep galv steel fluted floor units.

**SECTION A-A** 

module at each end of light fixture module. Ends of these additional lengths of primary cross tee are to engage cross tee rout at end of fixture and are to be riveted to nom 4 ft long cross tee at opposite end. Additional short lengths of primary cross tee to be installed perpendicular to main runners near center of nom 50 in, long cross tee on each side of light fixture. Ends of long primary cross tee at opposite end. The main runners, cross tees or cross channels may be riveted or screw-attached to the ARMSTRONG WORLD INDUSTRIES INC — Type DFR-8000. 15C. Alternate Steel Framing Members — \* — (Not shown) — As an alternate to Items 15, 15A, 15B. Main runners nom. 12 ft

Design No. G523

Restrained Assembly Rating — 2 and 3 Hr.

(See Items 2, 15, 15C, 15D, 15E, 15G, 17, 21 and 21A)

Unrestrained Assembly Rating — 2 and 3 Hr.

(See Items 2, 15, 15C, 15D, 15E, 15G, 17, 21 and 21A)

(See Items 2, 15, 15C, 15D, 15E and 17)

This design was evaluated using a load design method other than the Limit States

the Limit States Design Method, such as Canada, a load restriction factor shall be

used — See Guide <u>BXUV</u> or <u>BXUV7</u>

\* Indicates such products shall bear the UL or cUL Certification Mark for

urisdictions employing the UL or cUL Certification (such as Canada), respectively.

1. **Beam** — W10x21, min size. As alternate to steel beam, **joist girders** (Not Shown)-20 in. min depth and 13 lb/lin ft mir

Rating Hr

oncrete thickness shall be measured to the top plane of the steel deck

4. Steel Joists — Type 8J2 or 10K1 min size, spaced 24 in. OC welded to end supports.

VULCRAFT, DIV OF NUCOR CORP — Types 1.5VL, 1.5VLI, 1.5PLVLI.

lateral dimension of duct outlet 12 in.

JOHNS MANVILLE — Rigid, Class I.

fixtures are tabulated below:

THERMAFIBER INC — Type FR.

SPI LLC — SafeLite®

nd air boots with 2 in. wide pressure-sensitive fabric duct tape.

a. **Main Runners** — Nom 12 ft long spaced 4 ft OC.

facilitate the ceiling installation, not to replace hanger wires.

Any Class I Air Duct Material bearing the UL Listing Mark (Gas and Oil Equipment Directory).

KNAUF INSULATION LLC — Rigid, Class I.

2. Normal-Weight Concrete — Carbonate or siliceous aggregate, 152 + or - 3 pcf unit weight, 3000 psi compressive strength

side laps with 18 SWG galv steel wire. As an alternate for 2 Hr assembly rating only, the form material for the concrete may be

3A. Steel Floor and Form Units\* — (Not shown) As an alternate to Item 3, Composite 1-1/2 in. deep, 30, 35 or 36 in. wide, ly steel units. Min gauge is 22 MSG. Welded to supports 12 in. OC. Adiacent units button-punched. welded or si

hanger wires required at all four corners of light fixtures, and at midspan of cross tees at the sides of the light fixture.

8. Air Duct — No. 24 MSG galy steel, Supported on 1-1/2 in., 16 MSG cold-rolled steel channels spaced 24 in. OC Duct

8A. Air Duct Materials\* — (Not shown) — Optional. For the 2 h ratings, as an alternate to steel air duct (Item 8), Rigid Air

pening, not to exceed 144 sq in. per 100 sq ft of ceiling area, with no individual opening greater than 144 sq in. Maximum

of 24 in. long min 0.029 in. thick (22 gauge) galv steel duct liner. These ducts are supported by min 0.053 in. thick (16 gauge)

act liner, one on each side of the throat, and otherwise spaced 72 in. OC for ducts up to 36 in. wide, and 48 in. OC for duct

cold rolled steel channels suspended from the joists by 12 SWG galv steel wire. Channels are placed directly below the stee

between 36 and 60 in. wide. Min clearance of 4 in. required between back of ceiling membrane and bottom of air duct

9. Damper — No. 13 MSG steel, hinged on one side. Protected on both surfaces with 1/16 in. thick ceramic fiber paper.

Damper held in open position with 160 F fusible Link bearing the UL Listing Mark. Damper to overlap duct outlet by 3

10. Fixtures, Recessed Light — (Bearing the UL Listing Mark). Recessed light fixture with steel housing with four adjustable

10A. Alternate Fixtures, Recessed Light — For use with Steel Framing Members, Item 15B, 15D, 15E, 15F, or 15G - (Bearing

be additionally screw-attached to the web of the cross tees near the center of each long side and at both ends

fixtures provided with swing-out steel support hooks near each corner designed to engage the bulb of the steel framing member cross tees. Size of steel framing member module to be nominally 2 in, wider and longer than the nominal fixture size

10B. Alternate Fixtures. Recessed Light — For Use with Steel Framing Members, Item 15A- (Bearing the UL Listing Mark Recessed light fixture with NEMA Type F steel housing, 1 by 2 ft, 1 by 4 ft, 2 by 2 ft or 2 by 4 ft size. Fixtures provided with

swing-out steel support hooks near each corner designed to engage the bulb of the steel framing member cross tees. Fixtures

11. Fixture Protection — Gypsum Board\* — 1/2 or 5/8 in, thick, same as Item 17, cut into pieces to form a box assembly

(Item 10) and the protection enclosure. The pieces are held together by 6d nails at each corner. Overlap on adjacent lay-in

11A. Fixture Protection — Gypsum Board\* — For use with Steel Framing Members, Items 15B, 15D, 15E, 15F, or 15G - 1/2 in.

higher than the NEMA Type F light fixture housing (Item 10A). The fixture protection enclosure is to be installed in the grid

module prior to installation of the NEMA Type F light fixture. The fixture protection side pieces are to be provided with nominal 1-1/4 in. wide by 3-1/2 in. long cutouts to accommodate the swing-out steel support hooks near each corner of the

fixture. The fixture protection side and end pieces rest on the flanges of the primary cross tees and are screw-attached to the

web of the cross tee with No. 6 by 1-5/8 in. long steel drywall screws. The top piece rests on the top edges of the side and end

Top Piece, in. 13-1/2 x 25-1/2 13-1/2 x 49-1/2 25-1/2 x 25-1/2 25-1/2 x 49-1/2 Side Piece, in. 7 x 25-1/2 7 x 49-1/2 7 x 25-1/2 7 x 49-1/2

1B. Fixture Protection — Gypsum Board\* — For Use with Steel Framing Members, Item 15A - 1/2 or 5/8 in. thick, same as

tem 17 or 17A. Cut to form a five sided enclosure, rectangular in cross section, for the NEMA Type F light fixture (Item 10B).

ross tees are removed and the cross tee/gypsum board combinations are placed at each end of the module facing the ligh

fixture opening with the ends of the cross tees resting on the flanges of the main runner. Two side pieces of the gypsum boa

On each side the pieces are installed vertically, resting on the three cross tees intersecting the 50 in. long cross tees and placed 1/4 in from the edge of the 50 in, cross tees. The four side pieces of the light fixture protection box are secured together

screws equally spaced. The dimensions of the fixture protection pieces for the various sizes of NEMA Type F fixtures are listed

Fixture Size 1 by 2 ft 1 by 4 ft 2 by 2 ft 2 by 4 ft

 19 x 31
 19 x 55
 31 x 31
 31 x 55

 6 x 30
 6 x 54
 6 x 30
 6 x 54

 6 x 19
 6 x 19
 6 x 31
 6 x 31

with 6d nails, one at mid-height, and one at each of the four corners. The top piece of gypsum board is loosely-laid on top the four sided box and secured at each of the four corners with 6d nails. Holes are drilled through the top piece of gypsum

board for the attachment of the hanger wires specified in Item 6. Two 4 ft long cross tees are placed on top of the fixt

12. Fixture Protection — Batts and Blankets\* — (Alternate to Item 11)— 1-1/4 in. thick, cut into pieces to form a box

sembly approx 1/2 in. longer and wider than the fixture with sufficient depth to provide at least 1-1/4 in. clearance betweer e fixture and the protection enclosure. The pieces are held together by No. 18 SWG galv steel wire at each corner. Overlap

2A. Fixture Protection - Luminaires, Luminaire Assemblies and Luminaire Enclosures Classified for Fire Resistance\* -

o be installed in accordance with the accompanying installation instructions. When air supply light fixtures with air boots are

3. Flexible Air Duct — (Not shown) — Class I Flexible Air Duct Material — Max inside diam 6 in. attached to supply air duct

14. Air Boots — No. 24 MSG galv steel air boots to be installed in not more than 67 percent of the light fixtures. Air boots are

b. Cross Tees — Nom 4 ft long spaced 24 in. OC perpendicular to main runners with one additional cross tee located

ROXUL USA INC. D/B/A ROCKFON — Types 650, 650C, 670, 670C. the main runner ends may be riveted to the wall moldin

5A. Alternate Steel Framing Members\* — Main runners, cross tees, cross channels and wall angle as listed below

a. Main Runners — Nom 10 or 12 ft. long, 15/16 in. or 1-1/2 in. wide face, spaced 4 ft. OC.

main runner and securing the other end with a pop rivet to the nom 50 in. long cross tee.

in. on each side of each end joint of gypsum board. When Types 654C or 674C cross tees are used, assembly and beam

along one wall and the cross tee ends may be riveted to the wall molding along both adjacent walls. The rivets are intended to

b. Cross Tees — Nom 4 ft. long, 1-1/2 in. wide face or 15/16 in. wide face installed at sides of light fixtures (Item 10),

installed perpendicular to the main runners, spaced 24 in. OC. When Batts and Blankets\* (Item 21) are used, cross tees spaced 16 in. OC. Additional cross tees or cross channels used at 8 in. from each side of butted gypsum board end

joints. The cross tees or cross channels may be riveted or screw attached to the wall angle or channel to facilitate the

ceiling installation. When NEMA Type F (Item 10B) light fixtures are used, nom 4ft long cross tees, 1-1/2 in wide fac nstalled perpendicular to main runners and spaced nom 50 in. O.C. Two nom 50 in. long cross tees, 1-1/2 inch wide

face, spaced nom 14 in. O.C. to accommodate nom 1 by 2 ft or 1 by 4 ft NEMA Type F fixture or spaced 26 in. O.C. to

accommodate nom 2 by 2 ft NEMA or 2 by 4 ft NEMA Type F fixture. When nom 2 by 2 ft NEMA Type F fixture is used nom 26 in. long cross tees to be used to form nom 26 in. module at the center of the nom 50 in. long cross tees. Two

c. Cross Channels — Nom 4 ft. long, installed perpendicular to main runners, spaced 24 in. OC. When Batts and

15B. **Alternate Steel Framing Members\*** — (Not shown) — Main runners nom 12 ft long, spaced 48 in. OC. Primary cross

es (1-1/2 in, wide across flange) or cross channels, nom 4 ft long, installed perpendicular to main runners and spaced 24 in

ross flange), nom 4 ft long, installed at sides of NEMA Type G light fixtures, When NEMA Type F (Item 10A) light fixtures are

primary cross tees installed perpendicular to nom 4 ft long primary cross tees and spaced nom 14 in. OC to accommodate

iom 1 by 2 ft or 1 by 4 ft NEMA Type F fixture or spaced 26 in OC to accommodate nom 2 by 2 ft or 2 by 4 ft NEMA Type

sed, nom 4 ft long primary cross tees installed perpendicular to main runners and spaced nom 50 in. OC. Two nom 50 in. long

ary cross tees or cross channels required at each gypsum board end joint, 8 in. from and on each side c

d. Wall Angle or Channel — Painted or galv steel angle with 1 in. legs or 1-9/16 in. deep painted or galv steel channel

additional nom 4 ft cross tees. 1-1/2 in, wide face are installed perpendicular to the main runners outside each end of fixture opening to support the end pieces of drywall fixture protection. Small cutoff pieces of cross tees were installed at the center of the nom 50 in. long cross tees and main runners by inserting the dip end into a cross tee slot on the

in pairs, along both sides of light fixtures and connected by a No. 24 MSG galv steel, crossover duc

sed, fixtures and air boots shall be fully enclosed except for the opening needed to accommodate connection to air suppl

(Not Shown) - As an alternate to Item 12, luminaire enclosure kits consisting of pre-cut pieces of faced batts and assembl

ardware may be used to form a five-sided rectangular enclosure over NEMA G recessed light fixtures. Luminaire

end pieces of the light fixture protection rest upon the flanges additional nom 4 ft long cross tees placed at each end of l

fixture opening. The pieces of gypsum board are secured to both cross tees with three 1 in. long Type S screws, one at the ter of the cross tee and the remaining two screws spaced 12 in. O.C. in both directions. The end clips of the two additi

eces without mechanical attachment. The dimensions of the fixture protection pieces for the various sizes of NEMA Type F

1 by 4 ft 2 by 2 ft 2 by 4 ft

not exceed 24 sq ft per each 100 sq ft of ceiling area. Wired in conformance with the National Electrical Code.

sq ft per 100 sq ft of ceiling area. Wired in conformance with the National Electrical Code.

of ceiling area. Wired in conformance with the National Electrical Code.

7. Cold Rolled Channels — No. 16 MSG cold-rolled steel channels, 1-1/2 in. deep with 9/16 in. leas.

36 in. OC max along side joints. The concrete thickness shall be measured to the top plane of the steel deck.

Rating Hr

Design Method (e.g., Working Stress Design Method). For jurisdictions empl

Unrestrained Beam Rating — 2 and 3 Hr.

March 10, 2020

tees, 4 ft long installed perpendicular to main runners to support the 4 ft sides of light fixtures. J-shaped metal trim molding, . USA INC. D/B/A ROCKFON — Type 630. When Type 630 Steel Framing Members are used, assembly and beam ratings are 15D. Alternate Steel Framing Members\* — (Not Shown) — As an alternate to Items 15, 15A, 15B and 15C. For use in

wall molding and hanger bars. Locking angle wall molding secured to walls with steel nails or screws spaced max 24 in, OC Slots of locking angle wall molding parallel with hanger bars to be aligned with tabbed cutouts in bottom edge of hanger bars. Hanger bars spaced max 50 in. OC and suspended with No. 12 AWG steel hanger wires spaced max 48 in. OC. Adjoining lengths of hanger bar to overlap 12 in, and to be secured together and suspended by a shared hanger wire. A min clearance of 1/4 in. shall be maintained between the ends of the hanger bars and the walls. Grid runners cut-to-length and installed perpendicular to hanger bars and spaced max 24 in. OC with additional grid runners installed 8 in. OC at gypsum board end oints and adjacent to each side of nom 2 by 2 ft or nom 2 by 4 ft NEMA Type F light fixtures (Item 11A), Grid runners parallel with walls to be spaced max 16 in. from wall. Ends of grid runners to rest on and engage slots of locking angle wall molding with a clearance of 3/8 in. to 1/2 in. maintained between each end of the grid runner and the wall. Bulb of grid runner to be captured by tabbed cutouts in bottom edge of hanger bars. When NEMA Type F light fixtures are used, flange of grid runner cross tees with tabbed ends bent 90 deg are to be formed from lengths of grid runner and are to be secured to the grid runner at each end of the fixture module using steel screws or rivets. Additional cross tees, nom 8 in. long with tabbed end pent 90 deg, are to be formed from lengths of grid runner and are to be secured to the grid runners at the corners and center ARMSTRONG WORLD INDUSTRIES INC — Type DFR-8000-SS. When Type DFR-8000-SS Steel Framing Members are used, assembly and beam ratings are limited to 2 hr.

ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional 6 ft long cross tees required at each gypsun ard end joint with butted gypsum board end joints centered between cross tees spaced 8 in. OC. When NEMA Type F (Iter DA) light fixtures are used, nom 6 ft long cross tees installed perpendicular to main runners and spaced nom 14 in., 26 in. or 50 in. OC, dependent upon fixture size and orientation. Nominal 14 in., 26 in. and/or 50 in. cross tees used in combination with 6 ft long cross tees to create modules to accommodate nom 1 by 2 ft, 1 by 4 ft, 2 by 2 ft and 2 by 4 ft NEMA Type fixtures. Additional lengths of cross tee to be installed between the 6 ft long cross tees at each end of each nominal 14 in., 26 in. or 50 in. long cross tee forming a light fixture module. Ends of these additional lengths of cross tee are to engage cross tee routs at end of fixture and are to be riveted to nom 6 ft long cross tee at opposite end. Additional short lengths of cross tee to be installed perpendicular to main runners near center of nom 50 in. long cross tee on each side of 1 by 4 ft or 2 by 4 ft light ixture which is installed with its long dimension parallel with the main runners. Ends of these additional short lengths of cros ARMSTRONG WORLD INDUSTRIES INC — Type DFR-8000. When Type DFR-8000 Steel Framing Members with 6 ft long cross tees are used, assembly and beam ratings are limited to 2 hr.

long, spaced 72 in. OC. Cross tees, nom 6 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional 6 ft ng cross tees required at each gypsum board end joint with butted gypsum board end joints centered between cross tees runners and spaced nom 14 in., 26 in. or 50 in. OC, dependent upon fixture size and orientation. Nominal 14 in., 26 in. and/or 50 in cross tees used in combination with the 6 ft long cross tees to create modules to accommodate nom 1 by 2 ft. 1 by 4 f each end of each nominal 14 in., 26 in. or 50 in. long cross tee forming a light fixture module. Ends of these additional lengths of cross tee are to engage cross tee routs at end of fixture and are to be riveted to nom 6 ft long cross tee at opposite end.
Additional short lengths of cross tee to be installed perpendicular to main runners near center of nom 50 in. long cross tee or each side of 1 by 4 ft or 2 by 4 ft light fixture which is installed with its long dimension parallel with the main runners. Ends of these additional short lengths of cross tee are to engage rout of main runner at one end and are to be riveted to nom 50 i long cross tee at opposite end. The main runners and cross tees may be riveted or screw-attached to the wall angle or channel USG INTERIORS LLC — Type DGL or RX. When Type DGL or RX Steel Framing Members with 6 ft long cross tees are used, assembly

15G. Alternate Steel Framing Members\* — (Not Shown) - As an alternate to Items 15 through 15F - Main runners nom 12 ft ong, spaced 48 in. OC. Cross tees, nom 4 ft. long, installed perpendicular to main runners and spaced 24 in. OC. Additiona are used, cross tees spaced 16 in. OC with additional cross tees 8 in. away from each side of butted gypsum board end joints The cross tees shall be riveted with 1/8 in. dia. rivets to the wall angle and to the main tee where the cross tee does not align with slot in the main tee. When NEMA Type F (Item 10A) light fixtures are used, nom 4 ft. long cross tees installed perpendicular to main runners and spaced nom 50 in. OC. Two nom 50 in. long cross tees spaced nom 14 in. OC to commodate nom 1 by 2 ft. or 1 by 4 ft. NEMA Type F fixture or spaced 26 in. OC to accommodate nom 2 by 2 ft. NEMA or 2 nom 26 in. module at the center of the nom 50 in. long cross tees. Two additional nom 4 ft. cross tees are installed perpendicular to the main runners outside each end of fixture opening to support the end pieces of drywall fixture protection Small cutoff pieces of cross tees are installed at the center of the nom 50 in. long cross tees and main runners by inserting the dip end into a cross tee slot on the main runner and securing the other end with a pop rivet to the nom 50 in. long cross tee. alvanized steel wall angle with 1-1/2 in. legs attached to walls at perimeter of ceiling with fasteners at 16 in. OC. to supp CERTAINTEED CORP — Types DWS12-13-20, DWS4.16-13-20, DWS4-13-20, DWS2-13-20, DWS2.16-13-20 and DWA1.5-1.5. When Types DWS Steel Framing Members are used, assembly and beam ratings are limited to 2 hr.

spaced 72 in. OC. Main runners suspended by min 12 SWG galv steel hanger wires spaced 48 in. OC. Cross tees, nom 6 ft long stalled perpendicular to main runners and spaced 24 in. OC. Additional 6 ft long cross tees required at each gypsum b end joint with butted gypsum board end joints centered between cross tees spaced 8 in. OC. The main runners and cross tees may be riveted or screw attached to the wall angle or channel to facilitate the ceiling installation. ROXUL USA INC. D/B/A ROCKFON — Type 670C

16. Wall Molding — (Not shown) — Min 0.019 in, thick steel channel, 1-11/16 in, with 15/16 in, legs, nailed to walls along

tees and with side joints centered along main runners. Gypsum board fastened to each cross tee with five drywall screv (Item No. 18) with one screw located at the midspan of the cross tee, one screw located 12 in. from and on each side of the drywall screws shall be located on alternating sides of cross tee flange. At gypsum board end joints, drywall screws shall be located 1/2 in. from the joint. Gypsum board fastened to main runners with drywall screws, 3/8 to 1/2 in. from side joints, y between intersections with cross tees (24 in. OC). End joints of the gypsum board sheets shall be staggered with joints

 $in adjacent\ gypsum\ board\ courses\ not\ less\ than\ 4\ ft\ OC.\ Gypsum\ board\ sheets\ screw-attached\ to\ flange\ of\ wall\ channel\ with$ When alternate Steel Framing Members\* (Item 15C) are used, gypsum board installed with long dimension (side joints) perpendicular to the cross channels and 4 ft cross tees, and with the side joints centered along the main runners. Gypsum board fastened to cross channels with drywall screws located 1/2 in. from butted end joints, with one screw located at the midspan of the cross channel, one screw located be staggered as described above. Joints to be covered with paper tape and joint compound. When alternate Steel Framing Members\* (Item 15D) are used, gypsum board sheets installed with long dimension (side joints perpendicular to the grid runners with the end joints staggered min 4 ft and centered between grid runners which are spaced 8 in. OC. Prior to installation of the gypsum board sheets, backer strips consisting of nom 7-3/4 in. wide by 48 in. logices of gypsum board are to be laid atop the grid runner flanges and centered over each butted end joint location. The backer strips are to be secured to the flanges of the grid runners at opposite corners of the backer strip to prevent the backer strips from being uplifted during screwtachment of the gypsum board sheets. Gypsum board fastened to grid runners with drywall screws spaced 1 in. and 4 in. from the side ints and max 8 in. OC in the field of the board. The butted end joints are to be secured to the backer strip with No. 10 by 1-1/2 in. long OC in the field of the board. Joints to be covered with paper tape and joint compound.

When alternate **Steel Framing Members\*** (Item 15E) are used, gypsum board sheets installed with long dimension (side joints) When alternate **steel Framing Members**" (Item 15t) are used, gypsum board sheets installed with long dimension (side joints) perpendicular to the 6 ft long cross tees with the end joints staggered min 4 ft and centered between cross tees which are spaced 8 in. OC. Gypsum board side joints may occur beneath or between main runners. Prior to installation of the gypsum board sheets, backer strips consisting of nom 7-3/4 in, wide pieces of gypsum board are to be laid atop the cross tee flanges and centered over each butted end joint location. The backer strips are to be secured to the flanges of the cross tees at opposite corners of the backer strip to prevent the backer strips from being uplifted during screw-attachment of the gypsum board sheets. Gypsum board fastened to cross tees with drywall screws spaced 1 in, and 4 in, from the side joints and max 8 in. OC in the field of the board. The butted end joints are to be secured to the backer strip with No. 10 In 12/16 in Jong Tung Glampiating screws (casted 1 in from ach side of the butted end joints are sourced to the backer strip with No. 10 In 12/16 in Jong Tung Glampiating screws (casted 1 in from ach side of the butted end joints are sourced to the backer strip with No. strip with No. 10 by 1-1/2 in. long Type G laminating screws located 1 in. from each side of the butted end joint and spaced 1 in. and 4 in from the side joints and max 8 in. OC in the field of the board. Joints to be covered with paper tape and joint compound. When alternate Steel Framing Members\* (Item 15F and 15H) are used, gypsum board sheets installed with long dimension (side joints) perpendicular to the 6 ft long cross tees with the end joints staggered min 4 ft and centered between cross tees which are spaced 8 in. OC. Sypsum board side joints may occur beneath or between main runners. Prior to installation of the gypsum board sheets, backer strips consisting of nom 7-3/4 in. wide pieces of gypsum board are to be laid atop the cross tee flanges and centered over each butted end joint location. The backer strips are to be secured to the flanges of the cross tees at opposite corners of the backer strip with hold down clips to prevent the backer strips from being uplifted during screw-attachment of the gypsum board sheets. Gypsum board fastened to cross tees with 1in. drywall screws spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. The butted end joints are to be secured to the backer strip with No. 10 by 1-1/2 in. long Type G laminating screws located 1 in. from each side of the butted end joint sare to be secured to the backer strip with No. 10 by 1-1/2 in. long Type G laminating screws located 1 in. from each side of the butted end joint and spaced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. Joints to be covered with paper tape and joint

Assembly Rating Hr	Assembly Rating Hr	Beam Rating Hr	Gypsum Board Thkns In.
2	2	2	1/2
2	2	3	5/8
3	3	3	5/8

CABOT MANUFACTURING ULC — Type O

CONTINENTAL BUILDING PRODUCTS OPERATING CO. L L C — Type LGFC-C/A. GEORGIA-PACIFIC GYPSUM L L C — Types 5, C, DAPC, TG-C.

NATIONAL GYPSUM CO — Types FSK-C, FSW-1, FSW-C.

PABCO BUILDING PRODUCTS L L C. DBA PABCO GYPSUM — Types C. PG-3. PG-C. PANEL REY S A — Type PRC

USG BORAL DRYWALL SFZ LLC — Type C

USG MEXICO S A DE C V — Types C, IP-X2, IPC-AR.

THAI GYPSUM PRODUCTS PCL — Type C

17A. Gypsum Board \* — For use when Batts and Blankets\* (Item 21) and Steel Framing Members\* (Item 15A) are used -5/8 in. thick, 4 ft wide; installed with long dimension perpendicular to cross tees with side joints centered along main runner. end joints centered along cross tees. Fastened to cross tees with 1 in. long steel drywall screws spaced 8 in. OC in the field and 8 in. OC along end joints. Fastened to main runners with 1 in. long drywall screws spaced midway between cross tees. Screws along sides and ends of boards spaced 3/8 to 1/2 in. from board edge. End joints of the sheets shall be staggered witl

UNITED STATES GYPSUM CO — Types C, IP-X2, IPC-AR, WRC, ULIX. USG BORAL DRYWALL SFZ LLC — Type C

USG MEXICO S A DE C V — Types C, IP-X2, IPC-AR, WRC.

METAL INDUSTRIES INC — Model ABV-4, ABV-5, ABV-6

17B. Gypsum Board \* — For use when alternate Steel Framing Members\* (Item 15G) are used - 1/2 in. thick, 4 ft. wide; tered between cross tees which are spaced 6 in. OC. Sheets are attached to cross tees with screws spaced 8 in. OC on the ends and 12 in. OC in the field with additional screws located 1-1/2 in, from the side edges. Sheets are attached to the main tees with screws spaced 8 in. OC with additional screws located 4 in. OC from the edges. Screws on the sides are located 1/2 from the side edge of the gypsum board. When **Batts and Blankets\*** (Item 21A) are used - 5/8 in. thick, 4 ft wide; install ends and 8 in. OC in the field with additional screws located 1-1/2 in. from the side edges. Sheets are attached to main tees with screws spaced 8 in. OC with additional screws located 4 in. OC from the side edges. Screws on the sides located 3/4 in. from the side edge of the gypsum board, and screws at the end of the gypsum board located 1/2 in. from the board ends. CERTAINTEED GYPSUM INC — Type C

18. Drywall Screw — No. 6 Phillips-type, Type S self-drilling and self-tapping, 1 in. long. Screw heads may be either exposed and joint compound. As an alternate, nom 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of the Classified gypsum board.

20. Alternate Acoustical Material\* — (Not shown) — Optional, acoustical tile may be laminated to the entire surface of the 21. Batts and Blankets\* — (Optional, Not Shown) - When used Ratings are limited to 1 Hr. - For use with Steel Framing Members\* (specifically Item 15A) and Gypsum Board\* (specifically Item 17A) - Any thickness mineral wool or glass fiber insulation bearing the UL Classification Marking for Surface Burning Characteristics, having a flame spread value of 25 or less d a smoke spread value of 50 or less. Insulation fitted in the concealed space, draped over steel framing members/gypsur

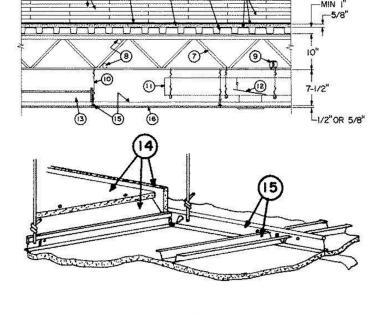
Members\* (specifically Item 15G) and Gypsum Board\* (specifically item 17B) - min. 3-1/2 inch thick, min. density 0.9 lb/ unfaced fiberglass batt insulation bearing the UL Classification Marking for Surface Burning Characteristics, having a flame spread value of 25 or less and a smoke spread value of 50 or less. Insulation fitted in the concealed space, draped over steel

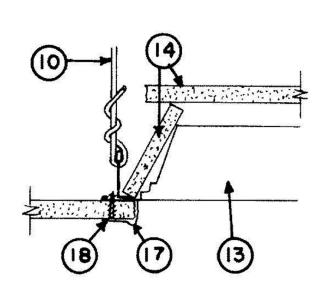
22. Discrete Products Installed in Air-handling Spaces\* — Automatic Balancing Valve/Damper (Not Shown - Optional) instructions. Automatic Balancing Valve/Damper shall be installed within duct such that it is not directly above the ceiling

August 21, 2020 Restrained Assembly Ratings — 1 and 1-1/2 Hr. (See Item 2A, 16) Unrestrained Assembly Ratings — 1 and 1-1/2 Hr. (See Item 2A, 16) This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide <u>BXUV</u> or <u>BXUV7</u>

Design No. P510

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively. VERSICO INC — MP-HWF NH, WeatherBond XP-WF NH





Beam — (Not shown) — W8X13 min size. As alternate to steel beam, Joist girders (Not shown)-20 in. min depth and 13 lb/lin which provide Class A, B or C coverings. See Roofing Materials and Systems Directory-Roof Covering Materials(TEVT 1A. In lieu of Item 1, roof covering consisting of single-ply Roofing Membrane\* — that is either ballasted, adhered of nechanically attached as permitted under the respective Classified company's Classification. See Fire Resistance Directory

1B. Metal Roof Deck Panels\* — (Not shown) — In addition to or in lieu of Items 1 or 1A, the roof covering may consist o mechanically fastened metal roof deck panel assembly. See Fire Resistance Directory-Metal Roof Deck Panels\* (CETW). 2. Roof Insulation — Mineral and Fiber Boards\* — 24 by 48 in. to 48 by 96 in., to be applied in one or more layers. Boards to be installed perpendicular to gypsum board (Item 4) direction with end joints staggered 2 ft in adjacent rows. When applied in more than one layer, each layer of board to be offset in both directions from layer below a min of 12 in. in order to lap all joints. Min thickness 1 in. (No limit on max overall thickness). /hen only one layer is used it must be bonded to gypsum board (Item 4) or vapor barrier with adhesive. When two or more layers are ne insulation may be fastened to steel roof deck (through gypsum board) with mechanical fasteners provided at least ion is used over the mechanical fasteners. The individual layers may be bonded together with adhesive or hot asphalt GAF — Rigid mineral fiber boards — GAFTEMP Perlite.

ROCKWOOL — MonoBoard™, MonoBoard™ Plus, "MonoBoard Plus S", TopRock® DD, TopRock® DD Plus or TopRock DD Plus S. SOPREMA INC — SopraRock®DD and SopraRock®DD Plus.

JOHNS MANVILLE — Rigid mineral fiber boards.

2A. Foamed Plastic\* — As an alternate to Item 2, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in be applied in one or more layers. Min thickness is 1.2 in. for the 1 h ratings and 2.0 in. for the 1-1/2 h ratings. No limit on coverall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. When applied in more nan one layer, each layer to be offset in both directions from layer below a min of 6 in. in order to lap all joints. ATLAS ROOFING CORP — ACFOAM II. Tapered ACFOAM II. ACFOAM III. NH. Tapered ACFOAM II. NH. ACFOAM III. ACFOAM III. NH. Tapered

MULE-HIDE PRODUCTS CO INC — POLY ISO 2 CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC - Types HP, HP-H, HP-N, HP-W.DOW ROOFING SYSTEMS LLC— "Dow Termico Polyisocyanurate Insulation", "Dow Termico ISO 3000 Insulation", "Dow Termico ISO

IRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ GL", "ISO 95+ FK", "ISO 95+ CAN", "ISO 95+ GL NH", "ISOGARD HD Composite  $\mathbf{GAF} - \mathsf{EnergyGuard^{\mathsf{TM}}}, \mathsf{EnergyGuard^{\mathsf{TM}}} \; \mathsf{RA}, \; \mathsf{EnergyGuard^{\mathsf{TM}}} \; \mathsf{NH}.$ 

When EnergyGuard™ or EnergyGuard™ NH are used, all ratings are reduced by 1/2 hr.

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H Shield, H-Shield-F, H-Shield-C, H-Shield Premier, H-Shield HD Composite, H-Shield HD Composite CG, H-Shield RL, H-Shield CG RL, H Shield NH, H-Shield-F NH, H-Shield-CG NH, H-Shield-C NH, H-Shield Premier NH, H-Shield HD Composite CG NH MULE-HIDE PRODUCTS CO INC — Poly ISO 1, Tapered Poly ISO 1, Poly ISO 1-DWD, Tapered Poly ISO 1-DWD, Poly ISO 1-HD, Poly ISO 1-

Spis AGF, Tapered ENRGY 3 2.5; ENRGY 3, rapered ENRGY 3 CBF, Tapered ENRGY 3 CBF, Spis, ENRGY 3 CBF, rapered ENRGY 3 CBF, Tapered ValuTherm AGF, Tapered ValuTherm AGF, Tapered ValuTherm CBF, Va

LOADMASTER SYSTEMS INC — Loadmaster Polyisocyanurate Insulation. MARTIN FIREPROOFING CORP — "Perform-A-Deck I"

RMAX, A BUSINESS UNIT OF SIKA CORPORATION — Multi-Max-3, Multi-Max FA-3, Ultra-Max, Ultra-Max Plus, Tapered Ultra-Max Plus, IKA SARNAFIL INC — Sarnatherm-R Insulation, Sarnatherm-R CG Insulation, Sarnatherm-R Tapered Insulation, Sarnatherm-R CG

SOPREMA INC — Sopra-ISO s, Sopra-ISO s Tapered, Sopra-ISO+ s, Sopra-ISO+ s Tapered, Sopra-ISO H+ s, Sopra-ISO H+ s Tapered. TREMCO INC — Trisotech G. Trisotech CGF 2B. Roof Insulation-Foamed Plastic\* — Alternate to Items 2 through 2A. Any thickness polystyrene foamed plastic insulation

See Foamed Plastic\* (BRYX) category in the Building Materials Directory or Foamed Plastic\* (CCVW) category in the Fire 2C. Building Units — As an alternate to Items 2 through 2B, polyisocyanurate foamed plastic insulation boards, nom. 48 by 4 or 96 in., faced on the top surface with oriented strand board or plywood. Min. thickness of the polyisocyanurate core is 1.2 in for the 1 hr. ratings and 2.0 for the 1-1/2 hr. ratings. No limit on max overall thickness. Boards to be installed with end joints staggered a min. of 6 in. in adjacent rows.

ATLAS ROOFING CORP — ACFoam NailBase Insulation, ACFoam Nail Base Insulation NH, Vented-R, ACFoam CrossVent, ACFoam

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-NB, H-Shield-NB NH FIRESTONE BUILDING PRODUCTS CO L L C — Hailgard, "ISOGARD HG"

SOPREMA INC — Sopra-ISO CV s. THE DOW CHEMICAL CO

JOHNS MANVILLE — Nailboard.

2D. Building Units\* — As an alternate to Items 2 through 2C, polyisocyanurate foamed plastic insulation boards, min hickness of 1.2 in. for 1 hr ratings and 2.0 in. for the 1-1/2 hr ratings, nom 48 by 48 or 96 in. faced on both sides with mineral 2E. Building Units\* — As an alternate to Items 2 through 2D, polyisocyanurate foamed plastic insulation boards faced on the

underside (or both sides) with mineral fiber board. Min thickness of the polyisocyanurate core is 1.2 in. for the 1 hr ratings and 2.0 in. for the 1-1/2 hr ratings. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacent rows. Adhesive (Item 3) may be applied between the building units and the vapor retarder (or gypsum board (Item ATLAS ROOFING CORP — AC Foam II Composite/Perlite, ACFoam Tapered Composite/Perlite FIRESTONE BUILDING PRODUCTS CO L L C — "ISO 95+ Composite"

F. Building Units\* — As an alternate to Items 2 through 2E, polyisocyanurate foamed plastic insulation boards faced on the inderside with wood fiber board. Min thickness of the polyisocyanurate core is 1.2 in. for the 1 hr ratings and 2.0 in. for the 1 1/2 hr ratings. No limit on max overall thickness. Boards to be installed with end joints staggered a min of 6 in. in adjacen ATLAS ROOFING CORP — AC Foam II Composite/Wood Fibe IRESTONE BUILDING PRODUCTS CO L L C — ISO 95+ Wood Fiberboard Composite".

2G. Foamed Plastic\* — As an alternate to Items 2 through 2F, extruded polystyrene foamed plastic insulation boards to be placed on top of Roofing Membrane\* (Item 1A), Min thickness is 2 in, Max thickness is 8 in, Foamed plastic boards to be

2H. Foamed Plastic\* — As an alternate to Items 2 through 2G (for 1 hr. ratings only). Extruded polystyrene foamed plasti poards to be installed in one or more layers over gypsum board (Item 4). Joints of gypsum board to be covered with 4 in. wide foil tape. Min thickness is 1 in. when a min 1/2 in. thick layer of mineral and fiber board (Item 2) is installed on top of the THE DOW CHEMICAL CO 21. Building Units\* — Not Shown — As an alternate to Items 2 through 2H, composite polyisocyanurate foamed plastic insulation board with an adhered nailing surface, norm 48 by 48 or 96 in. may be used with the following limitations. These composite building units have ventilation slots internal to the panels. The thickness of the panel depends upon the thinnest

JOHNS MANVILLE — Type ISO-VENT. 2J. Building Units\* — As an alternate to Items 2 through 2I, polyisocyanurate foamed plastic insulation boards, nom 48 by 48 2.0 in. for the 1-1/2 hr ratings. No limit on overall thickness. Boards to be installed with end joints staggered a min of 6 in. in

portion of the polyisocyanurate insulation. The following dimensions apply to the polyisocyanurate insulation; min. thickness i

in. for the 1 hr ratings and 2.0 in. for the 1-1/2 in. ratings. There is no limit on the maximum insulation thickness.

JOHNS MANVILLE - ENRGY 2 Gypsum Composite  ${\it 2K.} \ \textbf{Foamed Plastic*} \ -- \ \text{Optional - Used in addition to the foam insulation required to achieve fire rating:}$ 2Ka. Foamed Plastic\* — Optional - (Not Shown) - Maximum 1 in. thick polyisocyanurate foamed plastic insulation boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofii

FIRESTONE BUILDING PRODUCTS CO L L C — "ISOGARD HD" or "ISOGARD HD Composite Board" 2Kb. Foamed Plastic\* — Optional — (Not Shown) — Maximum 5/8 inch thick polyisocyanurate foamed plastic insulatio boards, nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any oofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset RMAX, A BUSINESS UNIT OF SIKA CORPORATION — "Ultra-Max HD"

SIKA SARNAFIL INC — "Sarnatherm Roof Board-I 2Kc. Foamed Plastic\* — Optional — (Not Shown) — Maximum 1/2 inch thick polyisocyanurate foamed plastic insulation roofing system described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset nom 48 by 48 or 96 in. Boards may be applied as the top layer in addition to the specified minimum thickness of any roofing m described herein, as long as the roofing system states that there is no limit on maximum thickness. Joints offset in both ATLAS ROOFING CORP — ACFoam HD CoverBoard and ACFoam CoverBoard FR

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield HD, H-Shield HD90, H-Shield HD RL, H-

2L. Building Units\* — As an alternate to Item 2, polyisocyanurate foamed plastic insulation boards, nom. 48 by 48 or 96 in. faced on the top surface with wood fiber board. Min. thickness of the polyisocyanurate core is 1.2 in. for the 1 hr. ratings and 2.0 for the 1-1/2 hr. ratings. No limit on max overall thickness. Boards to be installed with end joints staggered a min. of 6 in. in CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — Polyiso HP-H Composite NH HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-WF, H-Shield-WF NH

2M. Building Units\* — As an alternate to Item 2, polyisocyanurate foamed plastic insulation boards, nom. 48 by 48 or 96 in., and 2.0 for the 1-1/2 hr. ratings. No limit on max overall thickness. Boards to be installed with end joints staggered a min. of 6 R PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-P, H-Shield-RP, H-Shield-P NH, H-Shield-P

2N. Building Units\* — As an alternate to Item 2, polyisocyanurate foamed plastic insulation boards, nom, 48 by 48 or 96 in., ratings and 2.0 for the 1-1/2 hr. ratings. No limit on max overall thickness. Boards to be installed with end joints staggered a CARLISLE SYNTEC SYSTEMS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — Polyiso HP-HDD, Polyiso HP-HDD NH HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — H-Shield-DD, H-Shield-DD NH VERSICO INC - MP-HDD, MP-HDD NH

Roof Insulation — Foamed Plastic\* — As an alternate to Items 2 — Polyurethane foamed plastic roof insulation the manufacturer's instructions. Min thickness is 1.2 in. for the 1 h ratings and 2.0 in. for the 1-1/2 h ratings. No limit on max BASF CORP — Types FE348-2.5, FE348-2.8, FE348-3.0, ELASTOSPRAY 81255, ELASTOSPRAY 81285, ELASTOSPRAY 81305, SKYTITE C BASF CORP — Elastospray 5100-2.0, Elastospray 5100-2.5, Elastospray 81302, Elastospray 81272, Elastospray Alpha System, Elastospray

3. Sheathing Material\* — (Optional) — Vinyl-film vapor barrier, applied with adhesive to gypsum board (Item 4). Adjacent BA. **Sheathing Material\* —** (Optional) — In lieu of Item 3, a self-adhered rubberized asphalt roofing underlayment membr which may be placed on top of the gypsum board (Item 4) or on the roof insulation (Item 2 or any non-polystyrene foamed plastic insulation covered as an alternate to Item 2). GCP APPLIED TECHNOLOGIES INC — Grace Ice and Water Shield, Grace Ice and Water Shield-HT®, Grace Select, Grace Ultra, and Grace

.0 psf. Applied perpendicular to steel roof deck direction with adhesive. End joints to occur over crests of steel roof deck with end joints staggered 2 ft in adjacent rows. 5. Steel Roof Deck — Min 1 in. deep, 25 in. wide, fluted galv steel deck. Min 0.023 in. thick (24 gauge). Flutes approx 4 in. Of sts approx 2-3/4 in, wide. Welded to supports with welding washers 12 in, OC, Side laps of adjacent units welded or secure and Form Units\* min. 1-1/2 in. deep, 24 or 36 in. wide, galv steel units. Min gauge is 22 MSG. Welded to supports with welding washers 12 in. OC. Side laps of adjacent units welded or secured together with No. 12 by 1/2 in. self-drilling, self-

4. Gypsum Board — (Classified or unclassified) — Supplied in sheets nom 2 by 4 ft to 4 by 12 ft, by nom 5/8 in, thick, Min

MARLYN STEEL DECKS INC — Types B, EF, F, HF.

CANAM STEEL CORP — Type P-3606 or P-3615

NEW MILLENNIUM BUILDING SYSTEMS L L C — Types B, BI, F, 1.0RD, N, NW32, and NW32I. Units may be phos/painted or galvanized.

VALLEY JOIST+DECK — Types F, B, BI. VULCRAFT, DIV OF NUCOR CORP — Types 1.0E, 1.5A, 1.5B, 1.5B, 1.5BI, 1.5PLB, 1.5F, 3.0N, 3.0NI, 3.0PLN, 3NL-32, 3NI-32, 3PLN-32; Types BW, B High Strength, BW High Strength, N, TF-75, TF-150, TV-75, TF S3, TV S3.

6. Adhesive\* — Applied between crests of steel roof deck and gypsum board (Item 4) in 1/2 in. wide ribbons 8 in. OC at 0.4 gal per 100 sq ft. Applied in 1/2 in. wide ribbons 6 in. OC, at 0.4 gal per 100 sq ft, between gypsum board and vapor barrier and between vapor barrier and mineral and fiber boards, or directly between gypsum boards and roof insulation when vapor

the purpose, may be used to attach one or more layers of insulation to steel roof deck (through gypsum board). 6B. Hot Asphalt or Coal Tar Pitch — (Not shown) — May be used as an alternate to adhesive between layers of roof

7. Steel Joists — Type 10J4 or 12K3 min size. As an alternate, LH-Series steel joists spanning no greater than 60 ft. may be used. For spans greater than 60 ft. LH-Series joists may be used provided that their vertical deflection under published total load shall not be greater than 1/244 of the joist span. Joists may be spaced a max 72 in. OC and welded to end supports 8. Bridging — Steel angles or bars, min 1/2 in. diam, welded to top and bottom chords of each joist.

gauge) painted cold rolled steel channels, 2 in. deep with 1-1/8 in. flanges. Two channels tied back to back with 18 SWG gal steel wire 48 in. OC and wire-tied to top of joist bottom chord. Channels spaced as required to provide attachment provision 10. Hanger Wire — No. 12 SWG galv steel wire tied to lower chord of joists or cold-rolled channels tied face to face with 18 SWG galv wire. Hanger wires spaced not over 48 in, OC, along main runners and located at ends of main runners at walls and 1. Air Duct — Min 0.034 in. thick (20 gauge) galv steel. Total area of duct openings not to exceed 57 sq in. per 100 sq ft o ceiling area. Area of ind duct opening not to exceed 113 sq in. Max dimension of opening 12 in. Duct supported by cold-rolled

9 Cold Rolled Channels — For joist spacings may 48 in OC min 0.053 in thick (16 gauge) painted cold-rolled steel channels

12. Damper — Min. 0.056 in. thick (16 gauge) galv steel, 16 by 16 in. protected on both surfaces with 1/16 in. thick ceramic fiber paper and held open with a **Fusible Link.** (Bearing the UL Listing Mark.) Damper to overlap duct outlet 1 in. min. 13. Fixtures, Recessed Light — (Bearing the UL Listing Mark) — Recessed light fixture with steel housing, 2 by 4 ft size. Fixtures spaced so their area does not exceed 24 sq ft per 100 sq ft of ceiling area. Wired in conformance with the National 3A. Alternate Fixtures, Recessed Light — For Use with Steel Framing Members, Item 15B, 15D, 15E, 15F, or 15G - (Bearing the UL Listing Mark). Recessed light fixture with NEMA Type F steel housing, 1 by 2 ft, 1 by 4 ft, 2 by 2 ft or 2 by 4 ft s Fixtures provided with swing-out steel support hooks near each corner designed to engage the bulb of the steel framin member cross tees. Size of steel framing member module to be nominally 2 in. wider and longer than the nominal fixture s Fixtures to be additionally screw-attached to the web of the cross tees near the center of each long side and at both ends using No. 6 by 2-5/8 in, long (sides) and No. 6 by 1-5/8 in, long (ends) steel drywall screws. Fixtures spaced so their area does

13B. **Alternate Fixtures, Recessed Light** — For Use with Steel Framing Members, Item 15- (Bearing the UL Listing Mark Recessed light fixture with NEMA Type F steel housing, 1 by 2 ft, 1 by 4 ft, 2 by 2 ft or 2 by 4 ft size. Fixtures provided with swing-out steel support hooks near each corner designed to engage the bulb of the steel framing member cross tees. Fixtures to be additionally screw-attached to the cross tees near the center of each long side and at both ends using 2 in. long Type S-12 (sides) and 3 in. long Type S-12 (ends) steel screws. Fixtures spaced so their area does not exceed 24 sq ft per each 100 sq ft of ceiling area. Wired in conformance with the National Electrical Code. 14. Fixture Protection-Gypsum Board\* — 1/2 or 5/8 in. thick, same as Item 16. 16A or 16B. Cut into pieces to form a five enclosure for the fixture (Item 13), trapezoidal in cross section, approx 1/2 in. longer and wider than the fixture with

sufficient depth to provide at least 1/2 in. clearance between the fixture and enclosure. 14A. Fixture Protection — Gypsum Board\* — For Use with Steel Framing Members, Item 15B, 15D, 15E, 15F, or 15G - 5/8 in. thick, same as Item 16, 16A, 16B, or 16C. Cut to form a five sided enclosure, rectangular in cross-section, at least 1-1/4 in. higher than the NEMA Type F light fixture housing (Item 15A). The fixture protection enclosure is to be installed in the grid nodule prior to installation of the NEMA Type F light fixture. The fixture protection side pieces are to be provided with nominal 1-1/4 in. wide by 3-1/2 in. long cutouts to accommodate the swing-out steel support hooks near each corner of the fixture. The fixture protection side and end pieces rest on the flanges of the primary cross tees and are screw-attached to the web of the cross tee with No. 6 by 1-5/8 in, long steel drywall screws. The top piece rests on the top edges of the side and end fixtures are tabulated below

Fixture Size 1 by 2 ft 1 by 4 ft 2 by 2 ft 2 by 4 ft

Top Piece, in. 13-1/2 x 25-1/2 13-1/2 x 49-1/2 25-1/2 x 25-1/2 x 29-1/2 7 x 49-1/2 7 x 25-1/2 7 x 49-1/2

End Piece, in. 7 x 12-1/4 7 x 12-1/4 7 x 24-1/4 7 x 24-1/4 Item 16 or 16B. Cut to form a five sided enclosure, rectangular in cross section, for the NEMA Type F light fixture (Item 13E ne fixture protection enclosure is installed around the grid module prior to installation of the NEMA Type F light fixture. Th nd pieces of the light fixture protection rest upon the flanges additional nom 4 ft long cross tees placed at each end of ligh fixture opening. The pieces of gypsum board are secured to both cross tees with three 1 in. long Type S screws, one at the enter of the cross tee and the remaining two screws spaced 12 in. O.C. in both directions. The end clips of the two additions fixture opening with the ends of the cross tees resting on the flanges of the main runner. Two side pieces of the gypsum board protection are notched at the bottom with three 1/4 in. wide by 1-9/16 in. long notches to accommodate the cross tee bulbs. On each side the pieces are installed vertically, resting on the three cross tees intersecting the 50 in. long cross tees and placed I/4 in from the edge of the 50 in. cross tees. The four side pieces of the light fixture protection box are secured togethe with 6d nails, one at mid-height, and one at each of the four corners. The top piece of gypsum board is loosely-laid on top the four sided box and secured at each of the four corners with 6d nails. Holes are drilled through the top piece of gypsum board for the attachment of the hanger wires specified in Item 9. Two 4 ft long cross tees are placed on top of the fixture protection box, equally spaced and secured from the underside of the fixture protection box with three 1 in. long Type S screws equally spaced. The dimensions of the fixture protection pieces for the various sizes of NEMA Type F fixtures are listed

NEMA Type F Fixture Size	1 by 2 ft	1 by 4 ft	2 by 2 ft	2 by 4 ft
Top piece, in.	19 x 31	19 x 55	31 x 31	31 x 55
Side pieces, in	6 x 30	6 x 54	6 x 30	6 x 54
End pieces, in	6 x 19	6 x 19	6 x 31	6 x 31

a. Main Runners — Nom 10 or 12 ft. long, 15/16 in. or 1-1/2 in. wide face, spaced 4 ft. OC.

b. Cross Tees — Nom 4 ft. long, 1-1/2 in. wide face or 15/16 in. wide face installed at sides of light fixtures (Item 13), spaced 16 in. OC. Additional cross tees or cross channels used at 8 in. from each side of butted gypsum board end joints. The cross tees or cross channels may be riveted or screw attached to the wall angle or channel to facilitate th installed perpendicular to main runners and spaced nom 50 in. O.C. Two nom 50 in. long cross tees, 1-1/2 inch wide face, spaced nom 14 in. O.C. to accommodate nom 1 by 2 ft or 1 by 4 ft NEMA Type F fixture or spaced 26 in. O.C. to commodate nom 2 by 2 ft NEMA or 2 by 4 ft NEMA Type F fixture. When nom 2 by 2 ft NEMA Type F fixture is user nom 26 in. long cross tees to be used to form nom 26 in. module at the center of the nom 50 in. long cross tees. Two additional nom 4 ft cross tees, 1-1/2 in. wide face are installed perpendicular to the main runners outside each end o at the center of the nom 50 in. long cross tees and main runners by inserting the dip end into a cross tee slot on the main runner and securing the other end with a pop rivet to the nom 50 in. long cross tee.

c. Cross Channels — Nom 4 ft. long, installed perpendicular to main runners, spaced 24 in. OC. When Batts and d. Wall Angle or Channel — Painted or galv steel angle with 1 in. legs or 1-9/16 in. deep painted or galv steel channel with 1 in, legs attached to walls at perimeter of ceiling with fasteners 16 in, OC, to support steel framing member ends t of the gypsum board.

15A. Alternate Steel Framing Members\* — (Not shown) — Main runners nom 12 ft long spaced 48 in. OC. Cross tees non ft long installed perpendicular to main runners and spaced 24 in. OC. Additional cross tees located 8 in. from and on both ROXUL USA INC. D/B/A ROCKFON — Types 650, 650C, 670, 670C

15B. Alternate Steel Framing Members\* — (Not shown) — As an alternate to Items 15 and 15A. Main runners nom 12 ft long, spaced 48 in. OC. Primary cross tees (1-1/2 in. wide across flange) or cross channels, nom 4 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional primary cross tees or cross channels required at each gypsu board end joint, 8 in, from and on each side of gypsum board end joint, and 8 in, from each side of NEMA Type G (Item 13) xtures. Secondary cross tees (15/16 in. wide across flange), nom 4 ft long, installed at sides of NEMA Type G light fixtures. When NEMA Type F (Item 13A) light fixtures are used, nom 4 ft long primary cross tees installed perpendicular to runners and spaced nom 50 in. OC. Two nom 50 in. long primary cross tees installed perpendicular to nom 4 ft long primary cross tees and spaced nom 14 in. OC to accommodate nom 1 by 2 ft or 2 by 4 ft NEMA Type F fixture or spaced 26 in. OC to accommodate nom 2 by 2 ft or 2 by 4 ft NEMA Type F fixture. When nom 1 by 2 ft or 2 by 2 ft NEMA Type F fixtures are use nom 14 in, or 26 in, long primary cross tees to be used to form nom 26 in, long modules at the center of the nom 50 in, long cross tee to create a nominal 14 or 26 in. by 22 or 24 in. module at each end of light fixture module. Ends of these additional lengths of primary cross tee are to engage cross tee routs at end of fixture and are to be riveted to nom 4 ft long cross tee 50 in. long cross tee on each side of light fixture. Ends of these additional short lengths of cross tee are to engage rout of m rupper at one end and are to be riveted to nom 50 in long primary cross tee at opposite end. The main ruppers, cross tees cross channels may be riveted or screw-attached to the wall angle or channel to facilitate the ceiling installation.

ARMSTRONG WORLD INDUSTRIES INC — Type DFR-8000.

15C. **Alternate Steel Members\*** — (Not shown) — As an alternate to Items 15, 15A and 15B. For use with 1/2 in. thick gyps board only. Main runners nom 12 ft long, spaced 48 in. OC. Cross channels, 4 ft. long, installed perpendicular to main runner and spaced 24 in. OC. Additional cross channels required 8 in. from and on each side of gypsum board end joints, and 8 in fixtures. J-shaped metal trim molding, installed at perimeter of light fixtures to cover and support the exposed gypsum boar ROXUL USA INC. D/B/A ROCKFON — Type 630.

15D. Alternate Steel Framing Members\* — (Not Shown) — As an alternate to Items 15, 15A, 15B and 15C. For use in corridors or rooms having a maximum width dimension of 14 ft. Steel framing members consist of grid runners, locking ang wall molding and hanger bars. Locking angle wall molding secured to walls with steel nails or screws spaced max 24 in. OC. Slots of locking angle wall molding parallel with hanger bars to be aligned with tabbed cutouts in bottom edge of hanger bars. Hanger bars spaced max 50 in. OC and suspended with No. 12 AWG steel hanger wires spaced max 48 in. OC. Adjoining lengths of hanger bar to overlap 12 in. and to be secured together and suspended by a shared hanger wire. A min clearance 1/4 in. shall be maintained between the ends of the hanger bars and the walls. Grid runners cut-to-length and installed perpendicular to hanger bars and spaced max 24 in. OC with additional grid runners installed 8 in. OC at gypsum board end joints and adjacent to each side of nom 2 by 2 ft or nom 2 by 4 ft NEMA Type F light fixtures (Item 13A). Grid runners paralle with walls to be spaced max 16 in, from wall. Ends of grid runners to rest on and engage slots of locking angle wall molding with a clearance of 3/8 in. to 1/2 in. minimals considered and of the grid runner and the wall. Bulb of grid runner to be captured by tabbed cutouts in bottom edge of hanger bars. When NEMA Type F light fixtures are used, flange of grid runne on each side of fixture module is to be slit and bent upward 90 deg along the length dimension of the fixture. Nom 24 in. Ic cross tees with tabbed ends bent 90 deg are to be formed from lengths of grid runner and are to be secured to the grid runner at each end of the fixture module using steel screws or rivets. Additional cross tees, nom 8 in. long with tabbed ends bent 90 deg, are to be formed from lengths of grid runner and are to be secured to the grid runners at the corners and cent

these additional short lengths of cross tee are to engage rout of main runner at one end and are to be riveted to nom 50 in cross tee at opposite end. The main runners and cross tees may be riveted or screw-attached to the wall angle or channel USG INTERIORS LLC — Type DGL or RX 5G. **Alternate Steel Framing Members\*** — (Not Shown) — As an alternate to Items 15 through 15F - Main runners nom 1. ft. long, 1-1/2 in. wide face, spaced 4 ft. OC. Cross tees, nom 4 ft. long, installed perpendicular to the main runners, spaced 24 in. OC. Additional cross tees used at 6 in. from each side of butted gypsum board end joints. The cross tees shall be riveted with 1/8 in. dia. rivets to the wall angle and to the main tee where the cross tee does not align with slot in the main tee. When NEMA Type F (Item 13A) light fixtures are used, nom 4ft long cross tees, 1-1/2 in wide face, installed perpendicular to main runners and spaced nom 50 in. O.C. Two nom 50 in. long cross tees, 1-1/2 inch wide face, spaced nom 14 in. O.C. to accommodate nom 1 by 2 ft or 1 by 4 ft NEMA Type F fixture or spaced 26 in. O.C. to accommodate nom 2 by 2 ft NEMA or by 4 ft NEMA Type F fixture. When nom 2 by 2 ft NEMA Type F fixture is used, nom 26 in. long cross tees to be used to form om 26 in. Anodule at the center of the nom 50 in. long cross tees. Two additional nom 4 ft cross tees, 1-1/2 in. wide face are installed perpendicular to the main runners outside each end of fixture opening to support the end pieces of drywall fixture

15E. Alternate Steel Framing Members\* — (Not Shown) — As an alternate to Items 15, 15A, 15B, 15C and 15D. Main runners

between cross tees spaced 8 in OC. When NEMA Type F (Item 13A) light fixtures are used, nom 6 ft long cross tees installed

Nominal 14 in., 26 in. and/or 50 in. cross tees used in combination with the 6 ft long cross tees to create modules to

accommodate nom 1 by 2 ft, 1 by 4 ft, 2 by 2 ft and 2 by 4 ft NEMA Type F fixtures. Additional lengths of cross tee to be

fixture module. Ends of these additional lengths of cross tee are to engage cross tee routs at end of fixture and are to be

riveted to nom 6 ft long cross tee at opposite end. Additional short lengths of cross tee to be installed perpendicular to main

runners near center of nom 50 in. long cross tee on each side of 1 by 4 ft or 2 by 4 ft light fixture which is installed with its long dimension parallel with the main runners. Ends of these additional short lengths of cross tee are to engage rout of main

runner at one end and are to be riveted to nom 50 in. long cross tee at opposite end. The main runners and cross tees may be

e or channel to facilitate the ceiling installation.

15F. Alternate Steel Framing Members\* — (Not Shown) - As an alternate to Items 15 through 15E - Main runners nom 12 ft

long, spaced 72 in. OC. Cross tees, nom 6 ft long, installed perpendicular to main runners and spaced 24 in. OC. Additional 6 ft

ing cross tees required at each gypsum board end joint with butted gypsum board end joints centered between cross tees paced 8 in. OC. When NEMA Type F (Item 13A) light fixtures are used, nom 6 ft long cross tees installed perpendicular to ma

runners and spaced nom 14 in., 26 in. or 50 in. OC, dependent upon fixture size and orientation. Nominal 14 in., 26 in. and/o 50 in, cross tees used in combination with the 6 ft long cross tees to create modules to accommodate nom 1 by 2 ft. 1 by 4 ft 2 by 2 ft and 2 by 4 ft NEMA Type F fixtures. Additional lengths of cross tee to be installed between the 6 ft long cross tees at each end of each nominal 14 in., 26 in. or 50 in. long cross tee forming a light fixture module. Ends of these additional lengths

of cross tee are to engage cross tee routs at end of fixture and are to be riveted to nom 6 ft long cross tee at opposite end

each side of 1 by 4 ft or 2 by 4 ft light fixture which is installed with its long dimension parallel with the main runners. Ends of

long cross tee. Wall angle is a galvanized steel angle with 1-1/2 in. legs attached to walls at perimeter of ceiling with fasteners at 16 in. OC to support steel framing member ends and for screw-attachment of the gypsum board **CERTAINTEED CORP** — Types DWS12-13-20, DWS4.16-13-20, DWS4-13-20, DWS2-13-20, DWS2.16-13-20 and DWA1.5-1.5 15H. Alternate Framing Members\* — (Not Shown) — As an alternate to Items 15 through 15G. Main runners nom 12 ft long, spaced 72 in. OC. Main runners suspended by min 12 SWG galv steel hanger wires spaced 48 in. OC. Cross tees, nom 6 ft long,

installed perpendicular to main runners and spaced 24 in. OC. Additional 6 ft long cross tees required at each gypsum board

screw attached to the wall angle or channel to facilitate the ceiling installation.

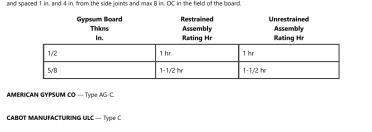
ROXUL USA INC. D/B/A ROCKFON — Type 670C

protection. Small cutoff pieces of cross tees were installed at the center of the nom 50 in. long cross tees and main runners by

16. Gypsum Board\* — (For use with steel framing members described in Items 15 and 15C)— 1/2 and 5/8 in. thick, 4 ft wide, alled with long dimension perpendicular to cross channels with side joints centered along main runners. Gypsum board spaced 12 in. C along the end joints and in the field. End joints of adjacent gypsum board sheets shall be staggered not less han 2 ft. Gypsum board sheets screw-attached to leg of wall angle with drywall screws spaced 12 in, OC. en alternate **Steel Framing Members\*** (Item 15C) are used, gypsum board installed with long dimension (side joints) perpendicular to cross channels and 4 ft cross tees, and with the side joints centered along the main runners. Gypsum board fastened to cross channels of dywall screws located 1/2 in. from butted end joints, with one screw located at the midspan of the cross channel, one screw located n, from and on each side of the channel midspan, and one screw located 2-3/4 in. from each side joint. End joints of the sheets shall When alternate Steel Framing Members\* (Item 15D) are used, gypsum board sheets installed with long dimension (side join

be laid atop the grid runner flanges and centered over each butted end joint location. The backer strips are to be secured to the

When alternate Steel Framing Members\* (Item 15E) are used, gypsum board sheets installed with long dimension (side joints) erpendicular to the 6 ft long cross tees with the end joints staggered min 4 ft and centered between cross tees which are spaced 8 in. VC. Gypsum board side joints may occur beneath or between main runners. Prior to installation of the gypsum board sheets, backer strips ocation. The backer strips are to be secured to the flanges of the cross tees at opposite corners of the backer strip to prevent the back ced 1 in. and 4 in. from the side joints and max 8 in. OC in the field of the board. The butted end joints are to be secured to the ba When alternate Steel Framing Members\* (Item 15F and 15G) are used, gypsum board sheets installed with long dimension (side joints) erpendicular to the 6 ft long cross tees with the end joints staggered min 4 ft and centered between cross tees which are spaced 8 in. VC. Gypsum board side joints may occur beneath or between main runners. Prior to installation of the gypsum board sheets, backer strips ation. The backer strips are to be secured to the flanges of the cross tees at opposite corners of the backer strip with hold down clips to



CABOT MANUFACTURING ULC — Type C CERTAINTEED GYPSUM INC — Type

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Type LGFC-C/A. GEORGIA-PACIFIC GYPSUM L L C — Types 5, DAPC, TG-C

NATIONAL GYPSUM CO — Types FSK-C, FSW-C. PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type C or PG-

THAI GYPSUM PRODUCTS PCL — Type O UNITED STATES GYPSUM CO — Types C, IP-X2, IPC-AR, ULIX USG BORAL DRYWALL SFZ LLC — Type C

16A. Gypsum Board\* — (For use with steel framing members described in Item 15A) — 1/2 and 5/8 in, thick, 4 ft wide fastened to each cross tee with five drywall screws with one screw located at the midspan of the cross tee, one screw located to the control of the cross tee with the cross tee midspan, and one screw located 1-1/2 in. from each system to detect of the cross tee midspan, and one screw located 1-1/2 in. from each system board side joint. Six per the cross tee midspan, and one screw located 1-1/2 in. from each system board side joint. Six per the cross tee flange. At gypsum board side joint. end joints, drywall screws shall be located 1/2 in. from the joint. Gypsum board fastened to main runners with drywall screws 1/2 in. from side joints, midway between intersections with cross tees (24 in. OC). End joints of adjacent gypsum board sheets shall be staggered not less than 4 ft OC. Gypsum board sheets screw-attached to leg of wall angle with drywall screws spaced

Gypsum Board Thkns In.	Restrained Assembly Rating Hr	Unrestrained Assembly Rating Hr	
1/2	1 hr	1 hr	
5/8	1-1/2 hr	1-1/2 hr	

CERTAINTEED GYPSUM INC — Type C CGC INC — Types C, IP-X2, IPC-AR, ULIX. CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Type LGFC-C/A.

GEORGIA-PACIFIC GYPSUM L L C — Types 5, DAPC, TG-C. NATIONAL GYPSUM CO — Types FSK-C, FSW-C PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Types C, PG-C.

UNITED STATES GYPSUM CO — Types C, IP-X2, IPC-AR, ULIX USG BORAL DRYWALL SFZ LLC — Type C

16B. Gypsum Board\* — For use when Batts and Blankets\* (Item 21) and Steel Framing Members\* (Item 15) are used - 5/8 end joints centered along cross tees. Fastened to cross tees with 1 in, long steel drywall screws spaced 8 in. OC in the field and along sides and ends of boards spaced 3/8 to 1/2 in. from board edge. End joints of the sheets shall be staggered with spacing

UNITED STATES GYPSUM CO — Types C, IP-X2, IPC-AR, ULIX USG BORAL DRYWALL SFZ LLC — Type C USG MEXICO S A DE C V — Types C, IP-X2, IPC-AR.

USG MEXICO S A DE C V — Type C, IP-X2 or IPC-AR.

16C. **Gypsum Board\*** — For use when **Steel Framing Members\*** (Item 15G) are used - 5/8 in. thick, 4 ft. wide by 10 ft. long; nstalled with the long dimension parallel to the main runners. Sheets fastened to cross tees with screws spaced 8 in. OC adjacent to end joints, and 8 in. OC along each cross tee in the field. At the side and end joints, screw shall be located 1-1/2 in e of the end joints. Joints to be covered with joint tape and joint compound. CERTAINTEED GYPSUM INC — Type C

17. Metal Trim Molding — Min 0.026 in. thick (22 gauge) galv steel molding, measuring 5/8 in. wide with 9/16 and 1-3/8 in ing legs. Placed on gypsum board edges around light fixtures and secured to the cross tees and main runners with 1 in. long drywall screws. Spacing of screws approx 8 in. O.C. along 4 ft side and 10 in. O C. along 2 ft side of light fixtures. 18. **Drywall Screw** — Type S-12, 1 in. long, self-drilling and self-tapping, 0.163 in. thread diam, 5/16 in. diam heads. 19. **Finishing System** — Paper tape embedded in compound over joints and covered with additional compound. Exposed screw heads covered with compound. Edges of compound feathered out. 20. Wall Angle — (Not shown) — Min 0.019 in. thick (26 gauge) galv steel angle with 1-1/8 in. legs, nailed to the walls along 21. Batts and Blankets\* — (Optional, Not Shown) - When used, ratings are limited to 1 Hr. - For use with Steel Framing

Members\* (specifically Item 15) and Gypsum Board\* (specifically Item 16B) - Any thickness mineral wool or glass fiber

and a smoke spread value of 50 or less. Insulation fitted in the concealed space, draped over steel framing members/gypsum 22. Discrete Products Installed in Air-handling Spaces\* — Automatic Balancing Valve/Damper (Not Shown - Optional) — For use with item 12. Valve/Damper to be provided with ducted installation with steel duct per damper manufacturer's instructions. Automatic Balancing Valve/Damper shall be installed within duct such that it is not directly above the ceiling METAL INDUSTRIES INC — Model ABV-4, ABV-5, ABV-6

System No. HW-D-0001 August 21, 2002 Assembly Rating -- 1 Hr Nominal Joint Width -- 5/8 in.

1A. Roof Assembly -- As an alternate to Item 1 Floor Assembly, the fire-rated roof assembly shall be constructed of the materials and in the manner described in the individual P700, P800 or P900 series Roof-Ceiling Designs in the UL Fire Resistance Directory and shall contain max 1-1/2 in. deep galv steel fluted roof units. The hourly fire rating of the roof assembly shall be equal to or greater than the hourly fire rating of the wall assembly . In the case of spray-applied protection materials on the steel roof units, the joint system shall be installed prior to the spray-applied protection material. 1B. Floor Assembly -- As an alternate to Item 1, Floor Assembly , min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. 2. Wall Assembly -- The 1 hr fire-rated nonbearing gypsum board/steel stud wall assembly shall be constructed of the

THERMAFIBER INC -- Type SAF B. Fill, Void or Cavity Material\* -- Min 1/2 in. thickness of fill material applied within the recess of each steel floor unit flute, flush with the vertical flange of the ceiling track on each side of the wall. Dry mix material mixed with water at a rate of 2.1 parts dry mix to 1 part water, by weight, in accordance with accompanying instructions.

B1. Fill, Void or Cavity Material\* -- Not Shown -- Two component fill material used as an alternate to Item 3B. Min. 1/2 in. thickness of fill material applied within the recess of each steel floor unit flute, flush with the vertical flange of the ceiling track on each side of the wall. Ready-mixed component mixed with accelerator component at a rate of 66 parts of readymixed component to 1 part of accelerator component by weight in accordance with the accompanying installation instructions. UNITED STATES GYPSUM CO -- Type RFC

C. Restraining Angles -- Min 2 1/2 by 2 1/2 in. angles formed from min 25 ga galv steel with one leg lined with a 2 1/2 in. wide piece of gypsum wallboard used for the wall (Item 2C). Gypsum wallboard liner secured to steel angle with min 1 in. long self-drilling, self-tapping Type S bugle head steel screws spaced max 8 in. OC. along longitudinal centerline of steel angle. Screws installed through face of wallboard such that excess screw length protrudes through leg of steel angle. Restraining angles installed along top of wall on each side of wall assembly with gypsum wallboard liner against wall surface and with horizontal leg of steel angle against valleys of steel floor units. Restraining angles secured to valleys of steel floor units or min 1/2 in. long powder-driven steel fasteners, spaced 12 in. OC.

Class II and III Movement Capabilities-- 100% Compression, 60% Extension

L-A (3A)

1. Floor Assembly -- The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features: A. Steel Floor and Form Units\* -- Max 3 in. deep galv steel fluted floor units. B. Concrete -- Min 2 1/2 in. thick reinforced concrete, as measured from the top plane of the floor units.

materials and in the manner described in the individual U400-Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features: A. Steel Floor And Ceiling Runners -- Floor and ceiling runners of wall assembly shall consist of min 25 ga galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with 2 in. flanges. Ceiling runner secured to valleys of steel floor units (Item 1A) with steel fasteners or by welds spaced max 12 in. OC. A1. Light Gauge Framing\* -- Clipped Ceiling Runner -- As an alternate to the ceiling runner in Item 2A, clipped runner to consist of galv steel channel with clips preformed in track flanges which positively engage the inside flange of the steel studs (Item 2B). Track sized to accommodate steel studs (Item 2B). Track flanges to be min 2-1/2 in. Clipped ceiling runner installed perpendicular to direction of fluted steel floor units and secured to valleys with steel fasteners spaced max 12 in. TOTAL STEEL SOLUTIONS L L C -- Snap Trak

B. Studs -- Steel studs to be min 2 1/2 in. wide. Studs cut 5/8 to 1 in. less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. Stud spacing not to exceed C. Gypsum Board\* -- Gypsum board sheets installed to a min total thickness of 1/2 in. on each side of wall. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory except that a nom 5/8 in. gap shall be maintained between the top of the gypsum board and the bottom of the steel floor units. 3. Joint System -- The joint system is designed to accommodate a max 5/8 in. compression and 3/8 in. extension from its installed width. The joint system consists of a forming material and fill material in the flutes of the steel floor units and a "slip track" detail consisting of restraining angles in combination with wallboard on the vertical flanges. When the floor assembly consists of a flat concrete slab (Item 1A), the forming material and fill material are not used A. Forming Material\* -- Min 1 1/2 in. thickness of min 4 pcf density mineral wool batt insulation firmly packed into flutes of steel floor units above ceiling runner as a permanent form. Forming material to be recessed from edges of ceiling runner on each side of wall to accommodate the required thickness of fill material.

UNITED STATES GYPSUM CO -- Type FC

\*Bearing the UL Classification Mark

surface of the wall.

**UL DESIGN P510 UL DESIGN HW-D-0001** L DESIGN G523 UL DESIGN HW-D-0046

ure. When nom 1 by 2 ft or 2 by 2 ft NEMA Type F fixtures are used, nom 14 in. or 26 in. long primary cross tees to be used to form nom 26 in. long modules at the center of the nom 50 in. long primary cross tees. Additional lengths of primary cross tee to be installed at each end of each nominal 50 in. long primary cross tee to create a nominal 14 or 26 in. by 22 or 24 in

 $\mathbf{CGC\ INC} - \mathbf{Type\ DGL\ or\ RX}.$ 

USG INTERIORS LLC — Type DGL or RX.

**UL DESIGNS** 



PACKAGE 3 - BUILDING & SITE 10/08/20 REVISIONS

FIRST LEVEL ORIENTATION PLAN

**KEY PLAN** 

OP1.1

FIRST LEVEL ORIENTATION PLAN

SCALE: 1" = 30'-0"

SCIENCE LAB TECH CLASSROOM SCIENCE LAB SCIENCE LAB SCIENCE LAB SEB COUNSELING E.17 (E.18) (E.19)

(A.1) (A.2) (A.3) (B)

(C) (D) (E.3) (F)



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LEE'S SUMMIT R-7 SCHOOL DISTRICT

PACKAGE 3 - BUILDING & SITE
10/08/20
REVISIONS

13-20102-00

SECOND LEVEL
ORIENTATION
PLAN

OP1.2