4 1/2

1. Floor Assembly Lightweight or normal weight reinforced (100-150 pcf or 1600-2400 kg/m3) structural concrete. The hourly rating of the joint system is dependent upon the min thickness of the floor as tabulated below: Min Thickness of Floor, In (mm)Assembly Rating, Hr 2 1/2 3 1/4

2. Wall Assembly Min 5 in (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks* See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers, 3. Joint System Max separation between bottom of floor and top of wall (at time of

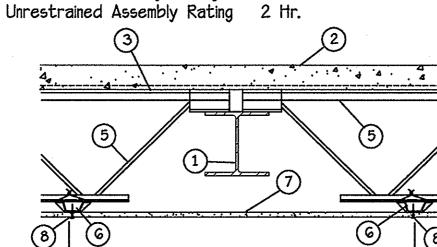
installation of joint system) is 4 in (102 mm). The joint system is designed to accommodate max 25 percent compression or extension from its installed width. The joint system shall consist of the following: A Forming Material* Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form Pieces of batt cut to min width of 4 in (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are recessed from each surface of the wall as required to

accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly butted with butted seams spaced min 16 in (406 mm) apart along the length of the joint.
FIBREX INSULATIONS INC FBX Safing Insulation
IIG MINWOOL L L C MinWool-1200 Safing

ROCK WOOL MANUFACTURING CO Delta Board

ROXUL INC SAFE THERMAFIBER INC Type SAF B. Fill, Vold or Cavity Material* Min 1/2 in (13 mm) thickness of fill material installed within joint on each side of the wall, flush with each surface of wall SPECIFIED TECHNOLOGIES INC Pensil 300 Sealant

TYP. FLOOR CEILING DESIGN NO. G514 Restrained Assembly Rating 2 Hr.



1. Beam W8X31, min size. As an alternate, Steel Joist Girder of 20 in min depth, 14 lbs per lin ft min weight, with min steel area of 1.12 sq in for chord members. Min distance from bottom of joist girder to top of the ceiling is 7/8 in For lowering the ceiling, the suggested method of using intermediate supports described under Suspension Systems in Design Information Section General of this Directory must be followed

2. Normal-Weight Concrete 2-1/2 in thick, carbonate or siliceous aggregate, 150 plus or minus 3 pcf unit weight, 3500 psi compressive strength.

3. Metal Lath 3/8 in rib, 3.4 lb/sq yd expanded steel; tied to each joist at every other rib with 13 SWG gaiv lath clips, and midway between joists at side laps with 18 SWG galv steel wire. As an alternate, the form material for the concrete may be corrugated steel deck 9/16 in deep of 28 MSG (min) galv steel, welded to supports 15 in O.C. using welding washers. The concrete thickness shall be measured to the top plane

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, gaiv steel units. Min gauge is 22 MSG. Welded to supports 12 in OC. Adjacent units button-punched, welded or screwed together 36 in OC max along side joints. The concrete thickness shall be measured to the top plane of the steel deck. 4. Fiber Reinforcement* (Optional) Engineered synthetic fibers may be added to concrete mix to control shrinkage cracks in concrete. See Fiber Reinforcement (CBXQ)

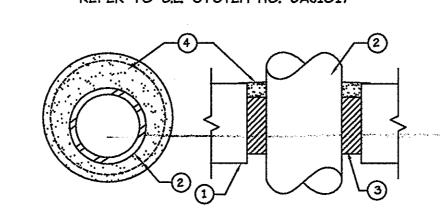
Category for rate that fibers are added to concrete mix 5. Steel Joists Type 10J2 or 10K1 min size; spaced 24 in O.C. and welded to end supports. Bridging provided by 1/2 in diam steel bars welded to top and bottom chords

6. Furring channels 25 MSG galv steel, 2-3/4 in wide at top and 1-3/8 in wide at bottom, by 7/8 in deep, spaced 24 in O.C., and at end joints noted below, secured to the joists a max of 48 in O.C. with a double strand of 18 SWG gaiv steel wire. Adjoining lengths of channels lapped 12 in and wire-tied together with two double strand wire ties, one at each end of overlap. Min end clearance of channels to walks 1/8 in. As an alternate. furthe channels may be secured to 1-1/2 in cold-rolled channels at every intersection with a double strand of 18 SWG galv steel wire. Cold-rolled channels spaced 48 in O.C. and suspended perpendicular from lower chords of joists with 8 SWG galv steel wire, spaces 48 in. O.C. along channels.

7. Gypsum Board* 1/2 in. thick. Nom 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard Joints reinforced Wallboard Installed with long dimensions at right angles to the furring channels. Wallboard at end joints secured to an additional furring channel, wire-tied or clipped to the joists and placed over the joint and extending 3 in beyond each end of the joint. End joints staggered with spacing between joints on adjacent boards not less than 4 ft OC.

8. Wallboard, Screw No. 6 Philips flathead, self-tapping, sheet-metal type screw, 1 in long, spaced 1-1/2 in from edges and 12 in OC. Screw shall be driven no farther than flush with the exposed surface of the wallboard. Wallboard on each side of end joint attached to the 3-in overlap of furring channels with one additional screw. Screws spaced 1/2 in min from the butt joints.

F - RATING 2 AND 3 HOUR ULL PENETRATION REFER TO U.L. SYSTEM NO. CAJ1017



FLOOR OR WALL ASSEMBLY - MIN. 4-1/2 IN THICK LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE, WALL ASSEMBLY MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIA OF OPENING IS 12 IN SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

PIPE OR CONDUIT - NOM 10 IN DIA (OR SMALLER) SCHEDULE 40 (OR HEAVIER) STEEL PIPE, NOM G IN DIA (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE OR RIGID STEEL CONDUIT, NOM 4 IN DIA (OR SMALLER) STEEL EMT OR NOM 2 IN DIA (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING, MAX ONE PIPE OR CONDUIT PER THROUGH OPENING, MIN ANNULAR SPACE BETWEEN PIPE OR CONDUIT AND EDGE OF THROUGH OPENING SHALL BE 1/4 IN PACKING MATERIAL - NOM 3 IN THICKNESS OF MINERAL-WOOL BATT INSULATION OR CERAMIC (ALLMINA SILICA) FIBER BLANKET FIRMLY PACKED INTO OPENING AS A PERMANENT FORM PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE

REQUIRED THICKNESS OF CAULK FILL MATERIAL (ITEM 4). FILL, VOID OR CAVITY MATERIAL* - FILL MATERIAL PUMPED OR TROWELED INTO ANNULAR SPACE TO FILL OPENING ON TOP SURFACE OF FLOOR OR ON BOTH SURFACES OF WALL WITH AN ADDITIONAL BEAD OF CAULK AROUND PERMETER OF THROUGH OPENING LAPPING 1/4 TO 1/2 IN ON FLOOR OR WALL SURFACES, WHEN MAX ANNULAR SPACE IS 1 IN AND WHEN MIN FILL MATERIAL THICKNESS IS 1/2 IN, F RATING IS 2 HR. WHEN NOM PIPE OR CONDUIT DIA IS 6 IN OR LESS AND WHEN MIN FILL MATERIAL THICKNESS IS 1 IN, F RATING IS 3 HR.

*BEARING THE UL CLASSIFICATION MARKING

COMPARTMENTS AREA COMPARTMENTS NOT REQUIRED NFPA 101 14.3.7.2 para 2

INCIDENTAL USE AREAS (PER IBC TABLE 508.2) BOILER ROOM FULLY SPRINKLERED FULLY SPRINKLERED MECHANICAL ROOMS STORAGE ROOMS (OVER 100 S.F.) FULLY SPRINKLERED

403.27 VENTILATION REQUIRMENT FOR STAGE AREA STAGE = 983 S.F.

983 S.F. < 1000 S.F. NO STAGE VENTILATION REQUIRED

-3-HOUR FIREWALL

OVERALL FLOOR PLAN

GYMNASIUM OCCUPANCY LOAD

TELESCOPING BLEACHERS- 13 ROWS X 78.51 LENGTH = 10201 (2) AISLES - 4.5 FT. WIDE X 12 ROWS = - 108.01 (2) AISLES - 3.0 FT. WIDE X 12 ROWS = - 72.01 TOTAL LINEAL FEET OF SEATING $840^{1} \times 2 = 1680^{1}$ LOSS AT HANDICAPPED - 30 FT. WIDE X 2 ROWS = - 60' TOTAL LINEAL FEET OF SEATING 16201

 $\frac{1620^{\circ}}{1575EAT} = 1080 \text{ BLEACHER CAPACITY}$ 1080 + 12 HANDICAPPED = 1092 TOTAL BLEACHER CAPACITY FLOOR CAPACITY FOR GYM $50^{1} \times 84^{1} = 4,200 \text{ S.f.}$ 4,2001 = 280 FLOOR CAPACITY

1092 + 280 = 1372 TOTAL GYMNASIUM CAPACITY

EXITS AT GYMNASIUM

(5) - 3'-0" DOORS AT 33.5" CLEAR = 167.5" PRIMARY EXITS - 167.5" = 837 TOTAL PRIMARY EXIT = 837 PERSONS

TOTAL OCCUPANT CONTENT = 1372 PERSONS 50% OF 1372 = 686 837 > 686 ACCEPTABLE SECONDARY EXITS - 67" EA = 335 PERSONS

SECONDARY EXITS REQUIRED = $\frac{2}{3}$ (1372) = 914 PERSONS TOTAL REQUIRED = 914 PERSONS

TOTAL PROVIDED 335 + 335 + 335 = 1005 PERSONS ACCEPTABLE 1005 > 914

EXITS AT CAFETERIA

TOTAL OCCUPANT CONTENT = 4826 = 7
7 S.F. (CHAIRS ONLY) = 689 PERSONS (3) - 3'-0" DOORS AT 33.5" CLEAR =100.5" PRIMARY EXIT - 100.5" = 502 PERSONS

50% OF 689 = 345 502 > 345 ACCEPTABLE

SECONDARY EXITS REQUIRED = $\frac{2}{3}$ (689) = 338 PERSONS SECONDARY EXITS - G7" EA = 335 PERSONS x 2 = G70 PERSONS

670 > 338 ACCEPTABLE

335 335 335 -3-HOUR FIREWALL ALL CORRIDORS AND ROOMS DESIGNATED SMOKETIGHT TO HAVE 5/8" GYPSUM BOARD ON 3/4" METAL FURRING CHANNELS AT 16" O.C. ON BOTTOM OF TRUSSES OR JOISTS. - SEE SECTIONS. <u>LEGEND</u> UL DESIGN ASSEMBLY ROOF CEILING ASSEMBLY UL P523 ONE HOUR 5/8" FIRE RATED GYP. BOARD ON 3/4" METAL FURRING CHANNELS AT 16" O.C. ON BOTTOM OF ROOF TRUSSES FLOOR CEILING ASSEMBLY UL G514 ONE HOUR 5/8" FIRE RATED GYP. BOARD ON 3/4" METAL FURRING CHANNELS AT 16" O.C. ON BOTTOM OF ROOF TRUSSES ROOF CEILING ASSEMBLY UL P519 ONE HOUR 5/8" FIRE RATED GYP. BOARD ON 3/4" METAL FURRING

CHANNELS AT 16" O.C. ON BOTTOM OF STEEL JOISTS

BUILDING CODE DATA

APPLICABLE CODES

PROTECTION:

AREA OF BUILDING :

TO THE BEST OF OUR KNOWLEDGE, THE CONTRACT

DOCUMENTS COMPLY WITH: 2012 INTERNATIONAL BUILDING CODE 2012 INTERNATIONAL MECHANICAL CODE 2012 INTERNATIONAL ENERGY CONSERVATION CODE 2012 INTERNATIONAL FIRE CODE 2012 NFPA 101 LIFE SAFETY CODE 2012 INTERNATIONAL FUEL GAS CODE

2010 ADA STANDARDS FOR ACCESSIBLE DESIGN

CONSTRUCTION TYPE: 2012 IBC TYPE IIB (FULLY SPRINKLERED)

2008 NATIONAL ELECTRIC CODE NFPA 70

OCCUPANCY: EDUCATIONAL (1100 STUDENT POPULATION NUMBER OF STORIES:

MAJORITY OF BUILDING = HEIGHT OF BUILDING :

121-811 KITCHEN AND CAFETERIA = 181-811 GYMNASIUM = 301-0¹¹

THIS BUILDING IS FULLY SPRINKLERED.

BASE BID FLOOR AREA = ALT. NO. 1 FLOOR AREA =

142,612 SF 6.755 SF TOTAL FLOOR AREA = 149,367 SF

AREA INCREASE CALCULATIONS FROM 2012 IBC

TABLE 503 ALLOWABLE AREA = 14,500 S.F. PER FLOOR TABLE 503 ALLOWABLE HT. = 3 STORIES 651 MAX

506 ALLOWABLE AREA MODIFICATIONS AREA 'A'

AREA 'A' BUILDING - ALLOWABLE AREA

 $Aa = At + \left[\frac{At \times If}{100}\right] + \left[\frac{At \times Is}{100}\right]$

 $= 14,500 \text{ SF} + (14,500 \times .70) + (14,500 \times 3)$

MAXIMUM ALLOWABLE AREA | Aa = 68,875 S.F.

If = 100 (F/P - .25) W/30If = 100 (1784 / 1884 - .25) W/30 W=30 If = 100 (1784 / 1884 - .25) W/30 W=30

If = 0.70AREA A = 61.375 S.F.AREA A = G1,375 S.F. < G8,875 S.F. THEREFORE, ACCEPTABLE

AREA 'B' AREA 'B' BUILDING - ALLOWABLE AREA

 $Aa = At + \left[\frac{At \times If}{100}\right] + \left[\frac{At \times Is}{100}\right]$

If = 0.70

If = 0.70

 $= 14,500 \text{ SF} + (14,500 \times .70) + (14,500 \times 3)$

MAXIMUM ALLOWABLE AREA And = 68,875 S.F.

If = 100 (F/P - .25) W/30If = 100 (1274 / 1384 - .25) W/30 W=30 If = 100 (1274 / 1384 - .25) W/30 W=30

AREA B = 43,587 S.F. AREA B = 43,587 S.F. < 68,875 S.F. THEREFORE, ACCEPTABLE

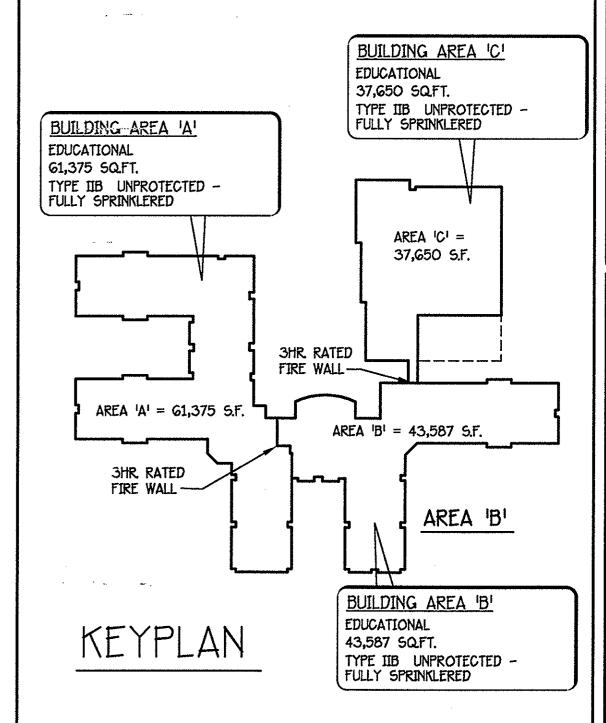
AREA 'C' AREA 'C' BUILDING - ALLOWABLE AREA

 $= 14,500 \text{ SF} + (14,500 \times .70) + (14,500 \times 3)$

MAXIMUM ALLOWABLE AREA | Az = 68,875 S.F.

If = 100 (F/P - .25) W/30If = 100 (927 / 937 - .25) W/30 W=30If = 100 (927 / 937 - .25) W/30 W=30

AREA C = 37,650 S.F.AREA C = 37,650 S.F. < 68,875 S.F. THEREFORE, ACCEPTABLE



LEGEND

NON-RATED SMOKETIGHT WALL ----- 1 HOUR RATED WALL ****** 3 HOUR RATED WALL

FIRE EXTINGUISHER IN CABINET FIRE EXTINGUISHER HOOK MOUNTED

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MAY 2017 Sheet No.:

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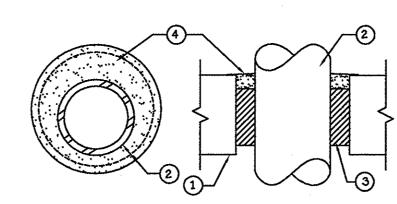
NOTES:

- 1. THE CAULK IS TO BE FORCED INTO THE ANNULAR SPACE TO THE MAXIMUM EXTENT POSSIBLE FLUSH WITH THE EXTERIOR OF THE PENETRATION SURFACE.
- 2. FINISH CAULKING WITH A 1/4"(6MM) MINIMUM BEAD OF CP 25N/S CAULK APPLIED TO THE PERIMETER OF THE CONDUIT/PIPE AT ITS EGRESS FROM THE WALL.
- 3. THE MAXIMUM ANNULAR SPACE IS NOT TO EXCEED 3/16"(5MM).4. INSTALL 3M FIRESTOP ON BOTH SIDES OF THE WALL.
- THESE RECOMMENDATIONS ARE BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) FIRE TEST AND UL THROUGH PENETRATION FIRESTOP SYSTEM #WL1001.

PENETRATION THROUGH GYPSUM WALL BOARD NO SCALE (1-2 HOUR RATING)

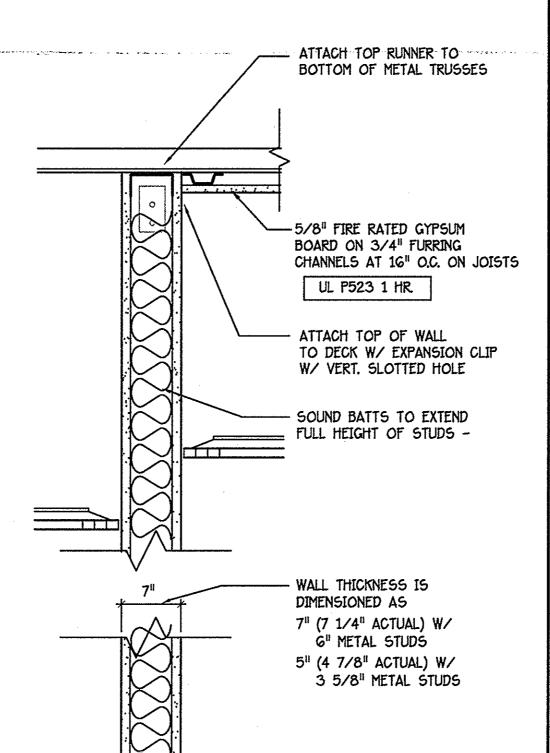
UL SYSTEM #WL1001

F - RATING 2 AND 3 HOUR U.L. PENETRATION REFER TO U.L. SYSTEM NO. CAJ1017



- 1 FLOOR OR WALL ASSEMBLY MIN 4-1/2 IN THICK LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL ASSEMBLY MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS. MAX DIA OF OPENING IS 12 IN SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
- 2 PIPE OR CONDUIT NOM 10 IN DIA (OR SMALLER) SCHEDULE 40 (OR HEAVIER)
 STEEL PIPE, NOM G IN DIA (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE
 OR RIGID STEEL CONDUIT, NOM 4 IN DIA (OR SMALLER) STEEL EMT OR NOM 2 IN
 DIA (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING. MAX ONE PIPE OR
 CONDUIT PER THROUGH OPENING. MIN ANNULAR SPACE BETWEEN PIPE OR CONDUIT
 AND EDGE OF THROUGH OPENING SHALL BE 1/4 IN.
- 3 PACKING MATERIAL NOM 3 IN THICKNESS OF MINERAL-WOOL BATT INSULATION OR CERAMIC (ALUMINA SILICA) FIBER BLANKET FIRMLY PACKED INTO OPENING AS A PERMANENT FORM PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF CAULK FILL MATERIAL (ITEM 4).
- 4 FILL, VOID OR CAVITY MATERIAL* FILL MATERIAL PUMPED OR TROWELED INTO ANNULAR SPACE TO FILL OPENING ON TOP SURFACE OF FLOOR OR ON BOTH SURFACES OF WALL WITH AN ADDITIONAL BEAD OF CAULK AROUND PERIMETER OF THROUGH OPENING LAPPING 1/4 TO 1/2 IN ON FLOOR OR WALL SURFACES, WHEN MAX ANNULAR SPACE IS 1 IN, AND WHEN MIN FILL MATERIAL THICKNESS IS 1/2 IN, F RATING IS 2 HR WHEN NOM PIPE OR CONDUIT DIA IS 6 IN OR LESS AND WHEN MIN FILL MATERIAL THICKNESS IS 1 IN, F RATING IS 3 HR

*BEARING THE UL CLASSIFICATION MARKING



RATED WALL

TYP WALL AT MECH. MEZZANINE

ON 3 5/8" METAL STUDS AT 16" O.C.

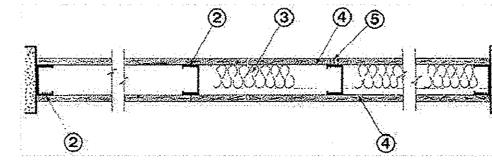
UL U465 1 HR

- BASE - SEE FINISH

SCHEDULE

SCALE: 1 1/2"= 1'-0"

TYP. ROOF CEILING DESIGN NO. U465 Nonbearing Wall Rating -- 1 HR.



1. Floor and Ceiling Runners — (not shown) — Channel shaped runners, 3-5/8 in wide (min), 1-1/4 in legs, formed from min No. 25 MSG gaiv steel, attached to floor and ceiling with fasteners spaced 24 in OC max. 2. Steel Studs — Channel shaped, 3-5/8 in wide (min), 1-1/4 in legs, 3/8 in folded back returns, formed from min No. 25 MSG gaiv steel spaced 24 in OC max.

3. Batts and Blankets* -- (Optional) -- Mineral wool or glass fiber batts partially or completely filling stud cavity.

3A Fiber, Sprayed* -- As an alternate to Batts and Blankets (Item 3) -- Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 3.0 b/ft3. Alternate application method: The fiber is applied with U.S. Greenfiber ILC Type AD100 hot melt adhesive at a nominal ratio of one part adhesive to G.G parts fiber to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 2.5 b/ft3.

3B. Fiber, Sprayed* — As an alternate to Batts and Blankets (Item 3) and Item 3A — Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.

4. Gypsum Board* — 5/8 in thick, 4 ft wide, attached to steel studs and floor and celling track with 1 in long, Type 5 steel screws spaced 8 in OC. along edges of board and 12 in OC in the field of the board. Joints oriented vertically and staggered on opposite sides of the assembly. When attached to item 6 (resilient channels) or GA (furring channels), wallboard is screw attached to furring channels with 1 in long,

channels), wallboard is screw attached to furring channels with 1 in long, Type S steel screws spaced 12 in OC.

4A Gypsum Board* -- (As alternate to Item 4) - Nom 5/8 in thick 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. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered or backed. Panels attached to steel studs and floor runner with 1 in long Type S steel screws spaced 8 in OC when applied horizontally, or 8 in OC along vertical and bottom edges and 12 in OC in the field when panels are

4B. Gypsum Board* -- (As an alternate to Items 4 or 4A) -- Nom 3/4 in thick, 4 ft wide, installed as described in Item 4A with screw length increased to 1-1/4 in

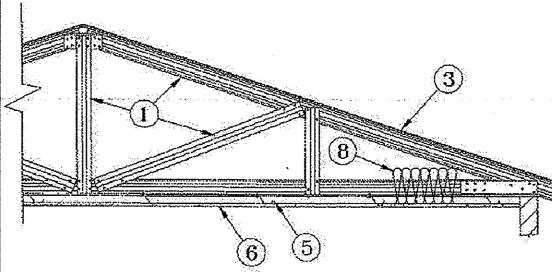
5. Joint Tape and Compound -- Vinyl, dry or premixed joint compound, applied in two coats to joints and screw heads; paper tape, 2 in wide, embedded in first layer of compound over all joints. As an alternate, nominal 3/32 in thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard Joints reinforced.

6. Resilient Channel -- (Optional-Not Shown) -- 25 MSG galv steel resilient channels spaced vertically max 24 in OC, flange portion attached to each intersecting stud with 1/2 in long type S-12 panhead steel

GA Steel Framing Members (Not Shown)* — As an alternate to Item 3, furring channels and resilient sound isolation clip as described below:

Ua Furring Channels — Formed of No. 25 MSG galv steel 2-3/8 in wide by 7/8 in deep, spaced 24 in OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels are overlapped G in and tied together with double strand of No. 18 SWG galv steel wire near each end of overlap. As an alternate, ends of adjoining channels may be overlapped G in and secured together with two self-tapping #G framing screws, min 7/16 in long at the midpoint of the overlap, with one screw on each flange of the channel b. Steel Framing Members* — Used to attach furring channels (Item a) to studs (Item 1). Clips spaced 48 in OC, and secured to studs with 1-5/8 in wafer or hex head Type S steel screw through the center grommet. Furring channels are friction fitted into clips.

TYP. ROOF CEILING DESIGN NO. P523
Restrained Assembly Rating - 1 and 2 Hr.
Unrestrained Assembly Rating - 1 and 2 Hr.



Design No. P523

1. Structural Steel Members* - Pre-fabricated light-gauge steel truss system consisting of cold-formed, galvanized steel chord and web sections. Trusses fabricated in various sizes, depths and from various steel thicknesses. Trusses spaced a max of 48 in OC.

2. Bridging - (Not Shown) - Location of lateral bracing for truss chord and web sections to be specified on truss engineering.

3. Roof system# - Any UL Class A, B or C Roofing System (TGFU) or Prepared Roof Covering (TFWZ) acceptable

for use over nom 23/32 in thick wood structural panels, min grade "C-D" or "Sheathing". Nom 23/32 in thick wood structural panels mechanically fastened to top chord of steel trusses with fasteners spaced a max of 12 in OC. As an option, the wood structural panels may be installed to min 20 ga steel purlins or steel hat channels. Steel purlins or hat channels to be spaced a max 24 in OC and welded or mechanically fastened, transverse to steel roof trusses (Item 1)

3A. Steel Roof Deck — Not Shown — In lieu of, or in addition to the wood structural panels described in Item 3, the steel roof deck may consist of corrugated or fluted steel form units, minimum 9/16 in deep, 22 MSG painted

or gatv steel, welded or mechanically fastened at a max 12 in OC to the top chord of the roof trusses (item 1). When used in addition to the wood structural panels described in Item 3, Batts and Biankets (item 8) is optional. When used lieu of the wood structural panels described in Item 3, Batts and Biankets (item 8) must be used and the Class A, B or C Roofing System must include a min 3/4 in thickness of roof insulation or 1/2 in thickness of Classified gypsum boards. If polystyrene roof insulation is used, it must be installed on top of a min 1/2 in thickness of Classified or unclassified gypsum boards.

38. Steel Floor and Form Units* - As an alternate to Item 3A - min 25 MSG painted or gatv units welded or mechanically fastened max 12 in OC to the top chord of trusses (Item 1). When used in addition to the wood

38. Steel Floor and Form Units* - As an alternate to Item 3A - min 25 MSG painted or galv units welded or mechanically fastened max 12 in. OC to the top chord of trusses (Item 1). When used in addition to the wood structural panels described in Item 3, Batts and Blankets (Item 8) is optional. When used lieu of the wood structural panels described in Item 3, Batts and Blankets (Item 8) must be used and the Class A, B or C Roofing System must include a min 3/4 in thickness of roof insulation or 1/2 in thickness of Classified or unclassified gypsum boards. If polystyrene roof insulation is used, it must be installed on top of a min 1/2 in thickness of Classified or unclassified gypsum boards.

4. Vapor Barrier - (Not Shown) - Optional - Commercial asphalt saturated felt, 0.030 in thick, applied over the

wood structural panels.

5. Furring Channels - Resilient channels formed of 25 MSG galv steel, installed perpendicular to the steel trusses (Item 1), spaced a max of 16 in OC when no insulation (Item 8 or 8A) is fitted in the concealed space, draped over the resilient channel gypsum wallboard celling membrane. Two courses of resilient channel positioned 6 in OC at wallboard butt-joints (3 in from each end of wallboard). Channels oriented opposite at wallboard butt-joints. Channel splices overlapped 4 in beneath steel trusses. Channels secured to each truss with Type 512 by 1/2 in long screws.

5A Furring Channels - (Not Shown) - As an alternate to Item 5 - Hat channels min 20 MSG galv steel, min 2-5/8 in wide by min 7/8 in deep, installed perpendicular to the trusses (Item 1) spaced a max of 16 in OC. When no insulation (Item 8 or 8A) is fitted in the concealed space, or a max 12 in OC when insulation (Item 8 or 8A) is fitted in the concealed space, or a max 12 in OC when insulation (Item 8 or 8A) is fitted in the concealed space, or a max 12 in OC when healthough of the concealed space, draped over the hat channel splices overlapped 6 in beneath steel trusses. Channels secured to each truss with No. 18 SWG steel wire double strand saddle ties. Channels tied together with double strand of No. 18 SWG steel wire at each end overlap.

58. Furring Channels - As an atternate to Items 5 and 5A, resilient channels, double legged formed of 25 MSG galv steel, 2-7/8 in wide by 1/2 in deep, installed perpendicular to the trusses (Item 1) spaced max 16 in OC when no insulation (Item 8 or 8A) is fitted in the concealed space, or a max of 12 in OC when insulation (Item 8 or 8A) is fitted in the concealed space, draped over the resilient channel/gypsum wallboard ceiling membrane. Two courses of resilient channel positioned 6 in OC at wallboard butt-joints (3 in from each end of wallboard). Channel splices overtapped 4 in beneath steel trusses. Channels secured to each truss with Type 512 by 1/2 in long screws or with Na 18 SWG galv steel whe double strand saddle ties. Channels tied together with double strand of Na 18 SWG galv steel whe at each end of overlap.

6 Gunsum Board in - For the 1 the Patrice - One lever of non 5/8 in thick by 48 in wide boards, installed with

G. Gypsum Board® - For the 1 itr. Ratings - One layer of nom 5/8 in thick by 48 in wide boards, installed with long dimension parallel to trusses. Attached to the resilient channels using 1 in long Type 5 bugle-head screws. Screws spaced a max of 12 in OC along butted end-joints and in the field when no insulation (item 8 or 8A) is fitted in the concealed space or a max of 8 in OC along butted end-joints and in the field when insulation (item 8 or 8A) is fitted in the concealed space, draped over the resilient channel/gypsum wallboard ceiling membrane. For the 1-1/2 itr. Ratings - Two layers of nom 5/8 in thick by 48 in wide boards, installed with long dimension parallel to trusses. Base layer attached to the resilient channels using 1 in long Type 5 bugle-head screws spaced a max of 8 in OC along butted end-joints and in the field. Face layer attached to the resilient channels using 1-5/8 in long Type 5 bugle-head screws spaced a max of 8 in OC along butted end-joints and in the field. Screws staggered from base layer screws. Face layer side and end joints offset a min 16 in from base layer side and end joints.

7. Finishing System - (Not shown) - Vinyl, dry or premixed joint compound, applied in two coats to joints and screw-heads; paper tape, 2 in wide, embedded in first layer of compound over all joints. As an alternate, nom 3/32 in thick veneer plaster may be applied to the entire surface of gypsum wallboard.

8. Batts and Blankets* - Optional for the 1 lir. Ratings - 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 and a smoke spread value of 50 or less. Insulation fitted in the concealed space, draped over the resilient charmel/gypsum wallboard ceiling membrane. Mandatory for the 1-1/2 ltr. Ratings-Min 9-1/2 in thick glass fiber 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 the resilient charmel/gypsum wallboard ceiling membrane.

8A Loose Fill Material* - As an alternate to Item 8 - Optional for the 1 ltr. Ratings - Any thickness of loose fill material bearing the Ut Classification Marking for Surface Burning Characteristics, having a flame spread value of

resilient channel/gypsum wallboard ceiling membrane.

8A Loose Fill Material* - As an alternate to Item 8 - Optional for the 1 Hr. Ratings - Any thickness of loose fill material 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 the resilient channel/gypsum wallboard ceiling membrane. Mandatory for the 1-1/2 Hr. Ratings - Min 9-1/2 in thickness of loose fill material 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 the resilient channel/gypsum wallboard ceiling membrane.

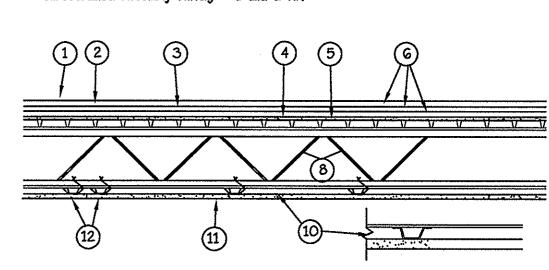
9. Steel Framing Members a. Main Runners - Installed perpendicular to Structural Steel Members - Nom 10 or 12 ft long, 15/16 in or 1-1/2
in wide face, spaced 4 ft OC. Main runners hung a min of 2 in from bottom chord of Structural Steel Members
with 12 SWG galv steel wire. Wires located a max of 48 in OC.
b. Cross tees or channels - Nom 4 ft long, 15/16 in or 1-1/2 in wide face, or cross channels, nom 4 ft long,

b. Cross tees or channels - Nom 4 ft long, 15/16 in or 1-1/2 in wide face, or cross channels, nom 4 ft long, 1-1/2 in wide face, installed perpendicular to the main runners, spaced 16 in OC. Additional cross tees or channels used at 8 in from each side of butted wallboard end joints. The cross tees or channels may be riveted or screw-attached to the wall angle or channel to facilitate the ceiling installation.

c. Wall angles or channels - Used to support steel framing member ends and for screw-attachment of the gypsum wallboard - Min O.016 in thick painted or galvanized steel angle with 1 in legs or min O.016 in thick painted or galvanized steel channel with a 1 by 1-1/2 by 1 in profile, attached to walls at perimeter of ceiling with fasteners 16 in OC.

10. Gypsum Board* - For use with Steel Framing Members (Item 9) when Batts and Blankets* (Item 8) are not used - One layer of nominal 5/8 in thick by 48 in wide boards, installed with long dimension parallel to the main rumers. Wallboard fastened to each cross tee or chamel with five wallboard screws, with one screw located at the midspen of the cross tee or channel, one screw located 12 in from and on each side of the cross tee or channel mid span, and one screw located 1-1/2 in from each wallboard side joint. Except at wallboard end joints, wallboard screws shall be located on alternating sides of cross tee flange. At wallboard end joints, wallboard screws shall be located 1/2 in from the joint. Wallboard fastened to main runners with wallboard screws 1/2 in from side joints, midway between intersections with cross tees or channels (16 in OC). End joints of adjacent wallboard sheets shall be staggered not less than 32 in Wallboard sheets screw attached to leg of wall angle with wallboard screws spaced 12 in OC, Joints treated as described in Item 7, For use with Steel Framing Members* (Item 9) when Batts and Blankets* (Item 8) are used - Ratings limited to 1 Hour- 5/8 in thick, 4 ft wide; installed with long dimension perpendicular to crose tees with side joints centered along main runners and end joints centered along cross tees. Fastened to cross tees with 1 in long steel wallboard screws spaced 8 in OC in the field and 8 in OC along end joints. Fastened to main runners with 1 in long wallboard 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 with spacing between joints on adjacent boards not less than 4 ft OC.

TYP. ROOF CEILING DESIGN NO. P519
Restrained Assembly Rating - 1 and 2 Hr.
Unrestrained Assembly Rating - 1 and 2 Hr.



Design No. P519
1. Roof Covering* - Consisting of hot mopped or cold application materials compatible with insulation(s) described herein which provide Class A, B or C coverings.

1A. In lieu of Item 1, roof covering consisting of single-ply Roofing Membrane* that is either ballasted, adhered or mechanically attached as permitted under the respective manufacturer's Classification.

2. Mineral and Fiber Boards* - 24 by 48 in min size, max size 48 by 96 in to be applied in one or more layers. Boards to be installed perpendicular to gypsum wallboard 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). When only one layer is used, it may be bonded to gypsum wallboard or laid loosely. When two or more layers are used, the insulation may be fastened to steel roof deck (through wallboard) with mechanical fasteners (Item 7) and/or bonded to wallboard or vapor barrier and/or bonded to additional layers of insulation with adhesive (Item 6) or hot asphalt (Item 6A). Adhesive may be omitted from between components secured together by mechanical fasteners.

2A Roof Insulation - Foamed Plastic* - As an alternate to Item 2, any thickness polystyrene foamed plastic insulation boards bearing the UL Classification Marking, having a density of 2.5 pcf max, shall be installed on top of min 1 in thick Mineral and Fiber Boards* (Item 2) and covered with either the Built-Up Roof Covering (Item 1) or single-ply Roofing Membrane (Item 1A). The 1 in thick Mineral and Fiber boards to be installed over the gypsum wallboard (Item 4).

2B. Foamed Plastic* - As an alternate to Item 2 or 2A, polylsocyanurate foamed plastic insulation boards, nom 48 by 48 or 9G in, to be applied in one or more layers over the gypsum wallboard (Item 4). Min thickness is 1.3 in with no limit on max overall thickness. Boards to be installed with end joints staggered a min of G in in adjacent rows. When applied in more than one layer, each layer to be offset in both directions from layer below a min of G in in order to lap all joints.

3. Sheathing Material* - (Optional) - Vinyl film vapor barrier, applied with adhesive to gypsum wallboard. Adjacent sheets overlapped 2 in.

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 weight 2.0 pcf. Applied perpendicular to steel roof deck directly with adhesive or laid loosely. End joints to occur over crests of steel roof deck with end joints staggered 2 ft in adjacent rows.

5. Steel Floor and Form Units* - Noncomposite fluted or corrugated, min 0.034 in thick (20 gauge), 1-1/2 in deep painted or gaiv steel units. Spacing of welds attaching units to supports shall not exceed 12 in 0C. Adjacent units welded or secured together with No. 12 by 1/2 in self-drilling, self-tapping steel screws, 36 in 0C along side joints.

G. Adhesive - Optional - May be applied between crests of steel roof deck and gypsum wallboard in 1/2 in. wide ribbons, G in. OC at 0.4 gal per 100 sq. ft. May also be applied in 1/2 in. wide ribbons G in. OC, at 0.4 gal per 100 sq. ft between gypsum wallboard and vapor barrier, and between vapor barrier and mineral and fiber boards, or directly between gypsum boards and roof insulation when vapor barrier is omitted. May also be applied at the same rate between layers of roof insulation.

7. Mechanical Fasteners - (Not Shown) - Any steel nail or steel clip type fastener designed for the purpose may be used to ened to f? The attach one or more layers of insulation to steel roof deck (through gypsum board). As an alternate, the gypsum wallboard may be attached directlened to f? They to the steel roof deck with the mechanical fasteners.

7. Hot. Asphalt or Goal Tar Pitch - (Not Shown) - May be used as an alternate to

7A Hot Asphalt or Coal Tar Pitch - (Not Shown) - May be used as an alternate to adhesive between layers of roof insulation at a rate not to exceed 35 lb per 100 sq

8. Steel Joists - Type 10K1, min size, spaced a max 48 in. OC. 9 Bridging - Steel bars, 1/2 in diam welded to top and bottom chords of each joist. 10. Furring Channels - For 1 hr restrained and unrestrained assembly rating, No. 26 MSG galv steel 2-5/8 in wide by 7/8 in deep; spaced 24 in OC, perpendicular to joists. Two courses of furring channel positioned 6 in OC, 3 in from each end of wallboard Channels secured to each joist with No. 18 SWG galv steel wire double strand saddle ties. Channels spliced below joists with adjoining pieces overlapped 6 in Channels tied together with double strand No. 18 SWG galv steel wire at each end of overlap, For 2 hr restrained and unrestrained assembly rating, furring channels spaced 16 in OC max 10A Steel Framing Members* - (optional, not shown, for 1 hr restrained and unrestrained assembly ratings only) - Alternate method to attach furring channels (Item 10) to joists (Item 8). Clips spaced max 48 in OC., and secured to joists with cup washer installation kit provided by manufacturer. On underside of bottom chord, 1-1/2 in dia x 3/8 in deep #16 galv steel cup washer is placed to surround the rubber insert. Clip attached to the bottom chord with a 1/4 in dia zinc plated bolt inserted through the center grommet and between the chord members; depth of bolt determined as 1-1/2 in plus the depth of the bottom chord of the joist Fastened on the top side of the bottom chord with a second cup washer placed open side up, and a 1/4 in zinc plated "Nyloc" nut. Furring channels are friction fitted into clips. Ends of adjoining channels are overlapped 6 in and tied together with double strand of No. 18 SWG galv steel wire near each end of overlap. As an alternate, ends of adjoining channels may be overlapped 6 in and secured together with two self-tapping #6 framing screws, min 7/16 in long at the midpoint of the overlap, with one screw on each flange of the channel Additional clips required to hold furring channel that supports the wallboard butt joints, as

11. Gypsum Board* - For 1 hr restrained and unrestrained assembly rating, one layer 5/8 in thick, 4 ft wide, installed with long dimension perpendicular to furring channels with side joints located 1 ft from center lines of joists. Wallboard fastened to furring channels with 1 in wallboard screws spaced 12 in OC, 3/4 and 3 in from butted side and end Joints, respectively. End joints attached to double channels and protected above with 3 in wide strips of 5/8 in thick wallboard. Wallboard joints may be either exposed or covered with joint system. As an alternate, nom 3/32 in thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard. Joints reinforced When Steel Framing Members (Item 4A) are used, wallboard butt joints shall be staggered min. 2 ft. within the assembly, and occur between the main furring channels. Edge joints located 1 ft from center lines of joists. At the wallboard butt joints, each end of the gypsum board shall be supported by a single length of furring channel equal to the width of the wallboard plus 6 in on each end. The furring channels shall be spaced approximately 3-1/2 in OC, and be attached to underside of the joist with one RSIC-1 clip at each end of the channel Gypsum board attached to the furring channels using 1 in long Type 5 bugle-head steel screws spaced 8 in OC along butted end joints and 12 in OC in the field of the board Wallboard Joints covered with fiber tape and joint compound Butt joints protected above with 3 in wide strips of 5/8 in thick gypsumened to f? III in

joints protected above with 3 in wide strips of 5/8 in thick gypsumened to frinn board.

11A Gypsum Board* - For 2 hr restrained and unrestrained assembly rating, two layers nom 1/2 in thick by 48 in wide, installed with long dimensionened to frinn perpendicular to furring channels. Inner layer positioned with end joints midway between furring channels. Secured to furring channels with 1 in long Type 5-12 screws spaced 12 in OC, and located 5/8 in from side joints and 2 in from end joints. Outer layer positioned with end joints between furring channels. End joints and side joints offset joints 16 to 32 in from end and side joints of inner layer. Outer layer secured to furring channels with 1-5/8 in long Type 5-12 screws spaced 12 in OC. End joints of outer layer attached to inner layer with 1-1/2 in long Type G bugle-head steel screws spaced 8 in OC and 3/4 in from end of boards.

12. Screw, Wallboard - Case hardened steel, 1 in long, 0.150 diam shank, self-drilling and self-tapping 0.335 in diam Phillips type head. Screw heads may be either exposed or covered with joint cement.

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Revisions

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