“Gray Areas” in the Fire Stop Industry
The Purpose for this subject

- Educate for Fire and Life Safety
  - Proper installations, system selection & analysis, engineering/engineered Judgments.

- What’s a Grey Area?
  - Misconceptions
  - Lack of experience
  - Improper education

- For some here this may be information that they are already aware of, however we are always getting new members and we all have different levels of experience. Continuing education should be the goal of everyone in the industry.

- Some of these items are not plain to see and will need to be discussed.

- Open forum for discussion on any topic. Invite both Contractors and Manufacturers to weigh in on these issues.
There may be things that you see in this presentation that you are currently doing the opposite way of what may be discussed.

This presentation is not meant to single anyone out, cause anyone discomfort or require anyone to change their methods.

Please do not mention any negative comments about your competition or any other installers in our discussion.

Each contractor has the right to run their business any way they desire.

The Focus of this presentation is on Fire and Life Safety as well as the Liability concerns that may be associated.
Membrane penetrations

- One reason that this topic is being discussed today is due to a discussion we had at a similar FCIA conference when Luke Woods with UL was conducting a question and answer session.

- The issue of whether a membrane penetration (a penetrations that only passes through one side of the rated wall assembly) should be addressed simply by using “half” of a through penetration system with the same parameters.

- The question was, “Is this acceptable”? 
Membrane penetrations

- The answer that was given by Luke Woods was “NO”. He said that the tested fire stop system is to exactly match the condition in the field. A through penetration is not the same as a membrane penetration.

- This was a big shock to many because there are numerous training sessions that indicate the opposite.

- Not to mention, “common sense” would tell us that if the through penetration system works when both sides of the wall are opened, it should Conceptually be easier for the installation to pass ASTM E-814 if only one side of the wall were opened. There should be less heat transfer, less flame spread and less pressure for the fire stop materials to endure.
The problem with this thinking?

There is no room in the fire stop industry for “common sense”.
The reason...

- Put simply, if there are no tested systems that exactly match the parameters of what your company encounters in the field, then an Engineered Judgment must be requested.

- If there is no tested system or engineered judgment stating that the fire stop manufacturer will stand behind their design if installed correctly, then the installation is not installed according to code and there is no certainty that it will maintain the necessary fire rating.

- Due to the fact that we contractors are not designers, but instead are design selectors, we do not have the internal test data information necessary to ensure our ideas will actually work.

- In the event of an actual fire, you will have no liability protection or support from the manufacturer of the product that was used.
Membrane penetration system

UL/cUL SYSTEM NO. W-L 1054
METAL PIPE THROUGH GYPSUM WALL ASSEMBLY
F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR.
L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT
L-RATING AT 400° F = LESS THAN 1 CFM/SQ FT

FRONT VIEW

SECTION A-A

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING)
   (2-HR. SHOWN).
2. (NOT SHOWN) WOOD STUDS TO CONSTITUTE OF NOMINAL 2" X 4" LUMBER. STEEL STUDS TO BE MINIMUM
   2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
   A. MAXIMUM 3/8" DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
   B. MAXIMUM 3/4" DIAMETER CAST IRON PIPE.
   C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
   D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
   E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES:
1. MAXIMUM DIAMETER OF OPENING:
   A. 32-1/4" FOR STEEL STUD WALLS.
   B. 14-1/2" FOR WOOD STUD WALLS.
   C. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2-1/4".
   D. PIPE MAY BE INSTALLED WITH CONTINUOUS POINT OF CONTACT.
2. PIPE MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.

UL/cUL SYSTEM NO. W-L 1110
METAL PIPE THROUGH GYPSUM WALL ASSEMBLY
F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR.
L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT
L-RATING AT 400° F = LESS THAN 1 CFM/SQ FT

FRONT VIEW

SECTION A-A

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, V400, OR W400 SERIES) (1-HR. OR
   2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN) WOOD STUDS TO CONSTITUTE OF NOMINAL 2" X 4" LUMBER (SPACED 16" O.C.).
   STEEL STUDS TO BE MINIMUM 3-1/2" WIDE (SPACED 24" O.C.).
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
   A. MAXIMUM 3" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
   B. MAXIMUM 3" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
   C. MAXIMUM 1" NOMINAL DIAMETER COPPER PIPE OR TUBING.
   D. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT. HILTI CP 606 FLEXIBLE
   FIRESTOP SEALANT. HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT. HILTI CFS-S SIL GG
   FIRESTOP SILICONE SEALANT, OR HILTI CP 618 FIRESTOP PUTTY STICK.

NOTES:
1. MAXIMUM DIAMETER OF OPENING = 5".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
3. (NOT SHOWN) WHEN ANNULAR SPACE IS 0", APPLY MINIMUM 1/2" BEAD
   HILTI SEALANT OR PUTTY AT POINT OF CONTACT.
The problem with this....

• The number of membrane penetration systems are very limited.

• This makes it more difficult, and time consuming to get our project completed.

• This Requires more dedication to our trade.

• Doing fire stop correctly always requires more effort than allowing for incorrect installations that may “just make sense” to us.

• I spoke with the Technical Services departments of three large fire stop product manufacturers. There were differences of opinions regarding this issue.

• Two have a few membrane penetration systems and the third said to just use half of a through penetration system.
The membrane penetrations that are available are for a metallic pipe, a metallic pipe sleeve with cables, and I was told a small PVC pipe but I could not find it.

There are no systems for an Insulated metal pipe.

The third manufacturer said that they would just write a letter that stated we could use half of any of their through penetrations systems for a membrane penetration.
Fire Stopping over Mortar in CMU walls

- If the penetrations are mortared tight in a CMU block wall, how should this be handled? We know it is not a grout filled wall and do not know the depth of the mortar that has been used.

  - A. Seal over the mortar and use a system that allows for a continuous “0” point contact.
  
  - B. Get an EJ that allows for the mortar to be shown.
  
  - C. Chip out the mortar before the fire stopping is installed so that there is a depth of sealant and it bonds directly to the block.
• Is it better to keep the mortar so that the conduits are not passing through the head of wall joint?
Here you can see a conduit passing through the vertical joint where two block walls intersect.

As you can see the installer put sealant over the mortar in the joint as though the joint needed protection. Then the installer skipped the section where the penetrating item is passing through with the joint caulk and sealed the penetration.

Is this correct?
The facts to consider

There is a maximum joint gap allowed in a fire rated U-900 CMU block wall assembly between blocks.

In this context, the mortar is the full depth of the block in some places, and we don’t know how deep in others.

When grout is used around a penetration, it is typically not the full depth of the wall.

Due to the fact that it also surrounds a penetrating item, it will also have more heat transfer.
The facts to consider

The mortar installed around penetrating items is usually just a thin layer. We actually never know what the depth really is.

Under actual fire conditions the moisture will be driven from the grout quickly, possibly causing fire and smoke spread.

No fire stop manufacturers have any systems that allow for the mortar to remain. They all require for the mortar to be removed.
Fire Stopping over tape and mud in Gypsum walls

Tape and mud cannot be used to repair openings.
Scab Patches

Are scab patches acceptable repair methods?

Are they considered part of a U-400 rated assembly?

Is there any testing for scab patches?

Are there any fire stop systems for scab patches?

What happens when the penetrating item goes through half of the scab patch?
FIRE WALL
SEAL ALL
PENETRATIONS
Photos provided by the Gypsum Association
Can this system be used for a shaft wall penetration?

**System No. W-L-1146**

September 13, 2004
F Ratings: 1 and 2 Hr (See Item 1)
T Rating: 0 Hr

**SECTION A-A**

1. **Wall Assembly** – The 1 or 2 hr fire rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   
   A. **Studs** – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of non 2 in. by 4 in. (51 mm by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screwed to the steel studs at each end. The framed opening in the wall shall be 4 in. to 6 in. (102 mm to 152 mm) wider and 4 in. to 6 in. (102 mm to 152 mm) higher than the diam of the penetrating item such that, when the penetrating item is centered in the opening, a 2 in. to 5 in. (51 mm to 76 mm) clearance is present between the penetrating item and the framing in all four sides.

   B. **Gypsum Board** – The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 24 in. (600 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrant** – One metallic pipe, conduit or tubing, installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening shall be min of 0 in. (point contact) to max 2 in. (51 mm) diam (or smaller) steel conduit or 2 in. (51 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.

   A. **Steel Pipe** – Nom 24 in. (610 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.

   B. **Iron Pipe** – Nom 24 in. (610 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in. (305 mm) diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.

   C. **Conduit** – Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in. (102 mm) diam (or smaller) steel
Why could some think so?

The system clearly says any U400 wall assembly, isn't a gyp shaft wall a U400 assembly?

Does not call out for "CH" Studs which are typical in shaft wall designs.

It also does not specify the stud type.
Nominal Insulation Thicknesses

FA-5042 states that a nominal 1 ½” thickness of FG Insulation can be on the pipe.

Can we use this system if we have 1” Thick FG?
1. Floor or Wall Assembly - Min 2-1/2 in. thick reinforced lightweight or normal weight (100-150 psf) concrete floor. Floor may also be constructed of any min 6 in. thick hollow-core Precast Concrete Units. Wall may also be constructed of any UL Classified Concrete Blocks. Max diam of opening is 12 in. Max diam of opening in floors constructed of hollow-core precast concrete units is 7 in. See Concrete Blocks (CAZT) or Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

2. Steel Sleeve - (Optional) - Nom 12 in. diam (or smaller) Schedule 10 (or heavier) steel pipe cast or grouted into floor or wall assembly. Steel sleeve may be installed flush or may project a max 2 in. beyond the floor or wall surfaces. When steel sleeve is used, the T Rating is 3/4 hr. When steel sleeve is omitted in min 4-1/2 in. thick concrete, the T Rating is 1 hr.

3. Through Penetrant - One metallic pipe or tube to be installed eccentrically or concentrically within the firestop system. Pipe or tube to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of metallic pipes and tubes may be used:
   A. Steel Pipe - Nom 6 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. Iron Pipe - Nom 6 in. diam (or smaller) cast or ductile iron pipe.
   C. Copper Pipe - Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
   D. Copper Tube - Nom 4 in. diam (or smaller) Regular L (or heavier) copper tube.

4. Pipe Coverings - One of the following types of pipe coverings shall be used:
   A. Pipe and Equipment Covering Materials - Nom 2 in. thick hollow cylindrical heavy density (min 3.5 psf) 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 secured with metal fasteners or butt tape supplied with the product. See Pipe and Equipment Covering Materials (BRGU) category in the Building Materials Directory for 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.
1. Floor or Wall Assembly - Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UF Classified Concrete Blocks*.* Max dia of opening is 18 in. (457 mm).

See Concrete Blocks (CALT) category in the Fire Resistance Directory for names of manufacturers.

1A. Steel Sleeve - (Optional, not shown) - Nom 10 in. (254 mm) (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Sleeve may extend a max of 2 in. (51 mm) above top of floor or beyond either surface of wall. As an alternative, nom 10 in. (254 mm) dia (or smaller) sleeve fabricated from nom 0.019 in. (0.48 mm) thick galv steel cast or grouted into floor or wall assembly flush with floor or wall surface. T-Rating is 0HR when sleeve is used.

2. Through Penetration - Nom 4 in. (102 mm) dia (or smaller) Type L (or heavier) copper pipe, nom 12 in. (305 mm) dia (or smaller) service weight (or heavier) cast iron soil pipe, nom 12 in. (305 mm) dia (or smaller) Class 50 (or heavier) ductile iron pressure pipe or nom 12 in. (305 mm) dia (or smaller) Schedule 10 (or heavier) steel pipe centered in the opening and rigidly supported on both sides of the floor or wall assembly.

3. Pipe Covering* - Nom 1/2 to 2 in. (13 to 51 mm) thick hollow cylindrical heavy density (min. 3.5 pcf or 56 kg/m³) 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 secured with metal fasteners or wide flat strip tape supplied with the product.

See Pipe and Equipment Covering - Materials* (BRGJ) category in Building Materials Directory for 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.

4. Firestop System - The details of the firestop system shall be as follows:

A. Packing Material - Min 1 in. (25 mm) thickness of tightly packed mineral wool batt insulation used as a permanent form. Packing material to be recessed from top surface of floor or sleeve or from both surfaces of wall as required to accommodate the required thickness of caulk fill material (Item B).

B. Fill Void or Cavity Material* - Caulk or Sealant - Applied to fill the annular space flush with the top surface of the floor or sleeve or flush with both surfaces of wall. When nom pipe covering thickness is 2 in. (51 mm), min thickness of caulk fill material is 1 in. (25 mm). When nom pipe covering thickness is 1-1/2 in. (38 mm) or less, min thickness of caulk fill material is 1 in. (25 mm). The hourly F and T Ratings of the firestop system are dependent upon the thickness of the floor or wall, the size of pipe, the thickness of pipe covering material and the size of the annular space (between the pipe covering material and the edge of the circular opening through the panel), as shown in the following table:

<table>
<thead>
<tr>
<th>Min Floor or Wall Thickness (in.)</th>
<th>Max Pipe Dia. (in.)</th>
<th>Nom Pipe Covering Thickness (in.)</th>
<th>Annular Space In (in.)</th>
<th>F Rating Hr</th>
<th>T Rating Hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1/2 (64)</td>
<td>4</td>
<td>1 or 1-1/2 (25 or 38)</td>
<td>1/2 to 2-3/8 (13 to 60)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>4-1/2 (114)</td>
<td>4</td>
<td>2-1/2 (51)</td>
<td>1/4 to 3-3/8 (6 to 92)</td>
<td>2</td>
<td>1-1/2</td>
</tr>
<tr>
<td>2-1/2 (64)</td>
<td>12 (305)</td>
<td>1 (25)</td>
<td>1/2 to 1-1/2 (13 to 38)</td>
<td>2</td>
<td>1/2</td>
</tr>
<tr>
<td>4-1/2 (114)</td>
<td>12 (305)</td>
<td>1 (25)</td>
<td>1/2 to 2-3/8 (13 to 60)</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2-1/2 (64)</td>
<td>12 (305)</td>
<td>1/2 (13)</td>
<td>1/2 to 2-3/8 (13 to 60)</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

3M COMPANY - CP 25W/B+ or HL-3000 WT

*Bearing the UL Classification Marking

This material was extracted and drawn by 3M Fire Protection Products from the 2007 edition of the UL Fire Resistance Directory.
Continuity of Head of Wall Joints

If the head of wall joint meets a non rated floor or roof above, how do we document the installation rating?

What are we telling the customer we are accomplishing for them? What does our documentation show?

Code states that we need to maintain “continuity” or extend the rating of the wall up to the underside of the deck.

How long will the head of wall joint maintain a rating?
Systems for continuity of joint

• There is now a standard for testing to provide systems that will show a head of wall joint meeting a non rated roof.

Should we use this system?

• There are no systems available for CMU block walls or large beam penetrations through the head of wall joint when a non rated roof is involved.
UL SYSTEM NO. CJD-0004

TOP OF WALL JOINT: GYPSUM WALL TO NON-RATED ROOF/FLOOR DECK

JOINT RATING = 2 HR,
CLASS II MOVEMENT CAPABILITIES • 50% COMPRESSION OR EXTENSION

1. NON-RATED HORIZONTAL ASSEMBLY CONSISTING OF THE FOLLOWING:
   A. SUPPORTS [NOT SHOWN] • STRUCTURAL STEEL OR OTHER MEMBERS SUPPORTING THE STEEL DECK.
   B. MAXIMUM 3” DEEP BY MINIMUM 20 GA. GALVANIZED STEEL DECK, FLUTED MAXIMUM 12” OC.
   C. [OPTIONAL] STEEL DECK MAY BE TOPPED WITH REINFORCED CONCRETE.
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400, V400, OR W400 SERIES) (2-HR, FIRE-RATING),
3. CEILING RUNNER (MIN. 25 GA., FLANGE OF CEILING RUNNER SHALL BE MINIMUM 1/4” GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF DECK WITH STEEL FASTENERS OR WELDS SPACED MAXIMUM 24” OC.
4. STEEL STUDS (MINIMUM 3-1/2” WIDE) CUT 3/4” LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
5. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTE, FLUSH WITH BOTH SIDES OF WALL (SEE NOTE NO. 2 BELOW),
6. HILTI CP 767 SPEED STRIPS COMPRESSED 50% AND INSERTED INTO JOINT, FLUSH WITH BOTH SIDES OF WALL (SEE NOTE NO. 2 BELOW),
7. MINIMUM 1/8” (WET) THICKNESS HILTI CFS-SP WB FRESTOP JOINT SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2” ONTO GYPSUM WALL AND METAL DECK ON BOTH SIDES OF WALL.

NOTES: 1. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 3, SLOTTED CEILING RUNNERS MAY BE USED. CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR APPROVED MANUFACTURERS.
2. AS AN ALTERNATE TO HILTI CP 777 SPEED PLUGS AND/OR CP 767 SPEED STRIPS, MINERAL WOOL SAFING (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.
Continuity of Joint Systems

• Not all manufacturers even have continuity of joint systems for fluted decks or roofs.

• Are these systems of any value?

• Should the manufacturers invest more money in the testing of these systems?
Flute Orientation

UL/Ul System No. HW-D-0042

Top of Wall Joint: 1-Hr. or 2-Hr. Gypsum Wall Assembly

Assembly Rating = 1-Hr. or 2-Hr. (Depending on rating of wall and floor assembly)

Class II Movement Capabilities - 50% Compression or Extension

1. Floor or Roof Assembly (1-Hr. or 2-Hr. Fire-Rating):
   A. Lightweight or Normal Weight Concrete Floor (Min. 2-1/2" thick) over Metal Decking (UL/UlC classified D-700 or D-800 Series).
   B. Insulating Concrete (Min. 2-1/4" thick) over Metal Decking (UL/UlC classified P-900 Series).
   C. (Not shown), Fluted Steel Roof Deck with spray-applied fireproofing (UL/UlC classified P-700 Series).

2. Gypsum Wall Assembly (UL/UlC classified U-H0 Series) (1-Hr. or 2-Hr. Fire-Rating).

3. Ceiling Runner (Min. 25 ga., with 2" flanges) fastened to underside of deck (see note No. 3 below).

4. Steel studs (Min. 2-1/2" wide), cut 1/2" to 3/4" less in length than assembly height, nesting in ceiling runner without attachment.

5. Hilti CP 777 Speed Plugs friction fitted to completely fill flute flush with both sides of wall (see note No. 4 below).

6. Hilti CP 763 Speed Strips compressed 50% and inserted into joint, flush with both sides of wall.

7. Minimum 1/8" (Net) thickness Hilti CP 672 Speed Spray to completely cover Mineral Wool and to overlap a minimum 1/2" onto gypsum and metal decking on both sides of gypsum wall assembly.

Notes:
1. Steel Floor Units may be sprayed with a Min. 5/16" thickness to Max. 1-3/4" thickness of UL classified Monokote Type MK-61HY Fireproofing manufactured by W.R. Grace prior to installation of ceiling runners.
2. When the steel deck is coated with fireproofing, Hilti CP 672 shall overlap the wall a minimum 1/2" and overlap the fireproofing a minimum 1/2" on both sides of gypsum wall assembly.
3. As an alternate to ceiling runner in item No. 3, ceiling runners, manufactured by Sliptrack Systems, Metal-Lite, Total Steel Solutions, or the steel network may be used. When alternate ceiling tracks are used, consult the UL Fire Resistance Directory for installation instructions.
4. As an alternate to Hilti CP 767 Speed Strips and/or CP 777 Speed Plugs, Mineral Wool (Min. 4 pcF density) compressed 50% may be used.
Flute orientation at the head of wall joints.

• Head of wall joints- does the system need to say parallel or perpendicular?

• Should we just go by what the detail on the system shows?
4 HOUR SYSTEM

- HWD 0294 - PERPENDICULAR
- HWD 0296 - PARALLEL
TOP OF WALL JOINT: CONCRETE OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 4-HR.

CLASS II MOVEMENT CAPABILITIES - 12.5% COMPRESSION OR EXTENSION
L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT
L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

SECTION A-A

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING (4-HR. FIRE-RATING).
2. CONCRETE WALL ASSEMBLY (4-HR. FIRE-RATING):
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 7-1/2" THICK).
   B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
3. MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50%, TO COMPLETELY FILL FLUTE, FLUSH WITH BOTH SIDES OF THE WALL.
4. MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT/FLUTE, FLUSH WITH BOTH SIDES OF THE WALL, WIDTH OF MINERAL WOOL TO BE EQUAL TO THE TOTAL THICKNESS OF CONCRETE WALL ASSEMBLY.
5. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO METAL DECK AND CONCRETE WALL.

NOTE: MAXIMUM WIDTH OF JOINT = 1".

HILTI
HILTI Firestop Systems

HILTI, Inc.
Tulsa, Oklahoma USA (800) 875-9600

Sheet 1 of 1 Drawing No. HWD 0294d
Scan 5/32" = 1" Date May 28, 2010

NOTE: MAXIMUM WIDTH OF JOINT = 1".

HILTI
HILTI Firestop Systems

HILTI, Inc.
Tulsa, Oklahoma USA (800) 875-9600

Sheet 1 of 1 Drawing No. HWD 0296c
Scale 1/8" = 1" Date June 29, 2010

Saving Lives through Innovation and Education
HWD 1069- Allows for both

1. FLOOR OR ROOF ASSEMBLY (2-HR. FIRE-RATING):
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2 1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D900 SERIES).
   B. INSULATING CONCRETE (MIN. 2 1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).

2. CONCRETE WALL ASSEMBLY CONSTRUCTED PERPENDICULAR OR PARALLEL TO FLUTES (PERPENDICULAR SHOWN) (2-HR. FIRE-RATING):
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
   B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.

3. MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT. FLUSH WITH BOTH SIDES OF WALL ASSEMBLY.

4. HILTI CP 777 SPEED PLUGS (FRICITION FITTED TO COMPLETELY FILL FLUTE, FLUSH WITH BOTH SIDES OF WALL (WHEN PERPENDICULAR TO FLUTES) (SEE NOTE BELOW).

5. MINIMUM 1 1/8" (WET) THICKNESS HILTI CFS-SP WB FRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO CONCRETE WALL OR CONCRETE BLOCK WALL AND METAL DECK ON BOTH SIDES OF WALL ASSEMBLY.

NOTE: AS AN ALTERNATE TO HILTI CP 777 SPEED PLUGS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.
TOP OF WALL JOINT: CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.
CLASS II MOVEMENT CAPABILITIES = 25% COMPRESSION OR EXTENSION
L-RATING AT AMB. = LESS THAN 1 CFM/LIN FT
L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

FRONT VIEW

SECTION A-A

MAX. 3”
MIN. 2”

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. THICKNESS) OVER METAL DECK ASSEMBLY (2-HR. FIRE-RATING).
2. [OPTIONAL] STEEL BEAM OR PRECAST WEB STEEL JOIST, ORIENTED PERPENDICULAR TO WALL ASSEMBLY (SEE NOTE NO. 2 BELOW).
3. UL CLASSIFIED MONOKOTE TYPE MK-6 HY (MANUFACTURED BY W.R. GRACE) OR TYPE 300 (MANUFACTURED BY ISOLATEK, INC.) FIREPROOFING SPRAYED TO THE THICKNESS SPECIFIED IN THE INDIVIDUAL 0700 SERIES DESIGN (SEE NOTE NO. 3 BELOW).
4. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING):
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6” THICK).
   B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
5. MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT AND BAR JOIST/STEEL BEAM OPENING, FLUSH WITH WALL SURFACES.
6. MINIMUM 1/8” (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2” ONTO CONCRETE WALL ASSEMBLY, AND MINIMUM 2” ONTO FIREPROOFING, ON BOTH SIDES OF WALL ASSEMBLY.

NOTES:
1. MAXIMUM WIDTH OF JOINT = 1”.
2. WHERE OPEN WEB STEEL JOISTS PASS THROUGH THE WALL, 3/8” DIAMOND MESH EXPANDED STEEL LATH (NOMINAL WEIGHT = 1.7 TO 3.4 LB. PER YARD) SHALL BE SECURED TO ONE SIDE OF EACH JOIST WITH STEEL TIE WIRE.
3. FIREPROOFING MATERIAL TO BE EXCLUDED FROM METAL DECK DIRECTLY ABOVE THE CONCRETE WALL ASSEMBLY.
4. OPENING SHALL BE FORMED AROUND EACH STRUCTURAL STEEL MEMBER. MINIMUM CLEARANCE OF 1”, TO MAXIMUM CLEARANCE OF 4”, SHALL BE MAINTAINED BETWEEN WALL ASSEMBLY AND FIREPROOFING ON THE TWO SIDES OF MEMBER. MAXIMUM CLEARANCE OF 2” SHALL BE MAINTAINED ON THE BOTTOM OF THE STEEL SUPPORT MEMBER.
STI HWD-0099

System No. HW-D-0099

A3. Light Gauge Framing® - Slotted Ceiling Runner - As an alternate to the ceiling runners in Items 2A through 2A3, slotted ceiling runner to consist of galv steel channel with 3-1/4 in. (83 mm) high slotted flanges sized to accommodate steel studs (Item 2B). Ceiling runner installed perpendicular to direction of furred steel floor or roof deck and secured to valleys with steel fasteners spaced max 24 in. (610 mm) OC. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used.

B. Studs - Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 in. to 1-1/4 in. (19 to 32 mm) less in length than assembly height with bottom nesting in and secured to floor runner. When slotted ceiling runner (Item 2A4) is used, steel studs secured to slotted ceiling runner with No. 6 by 1/2 (13 mm) long washer head steel screws at midheight of slot on each side when deflection channel (Item 3A) is used, steel studs attached to ceiling runner (Item 2A) with sheet metal screws located 1/2 in. (13 mm) below the bottom of the deflection channel. When deflection channel is not used, studs to rest in ceiling runner without attachment. A framed opening shall be constructed around each structural steel support member. A minimum clearance of 1 in. (25 mm) to a maximum clearance of 3 in. (76 mm) shall be maintained between the framing and the spray applied fire resistive material on the two sides of the structural support member. The clearance between the framing and the spray applied fire resistive material on the bottom of the structural steel support member shall be max 1 in. (25 mm).

B1. Light Gauge Framing® - Slotted Studs - Slotted steel stud to be used in conjunction with Light Gauge Framing®-Floor and Ceiling Runners (Item 2A1). Slotted steel studs to be min 3-1/2 in. (89 mm) wide. Slotted steel studs cut 1/2 in. to 1-1/4 in. (13 to 32 mm) less in length than assembly height with bottom nesting in and secured to both ceiling and floor runners. Ceiling runner secured to preformed slot within steel stud by means of No. 10 by 3/4 in. (19 mm) long low profile head steel screw. Floor runner attached to bottom of steel stud by means of No. 6 by 1/2 in. (13 mm) long pan head steel screw. Slotted steel stud spacing not to exceed 24 in. (610 mm) OC.

STEELER INC - Steeler Slotted Stud

C. Gypsum Board® - Gypsum board sheets installed to a min total 5/8 in. (16 mm) or 1-1/4 in. (32 mm) thickness on each side of wall for 1-2 hr fire rated assemblies, respectively. Wall to be constructed in the individual U400 or V400 Series Design in the UL Fire Resistance Directory, except that a max 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom plane of the floor and ceiling runners. A minimum gap is 3/4 in. (19 mm) and the movement capabilities are 100% compression or extension. The system shall consist of forming and fill materials, with or without a deflection channel (Item 3A), as follows:

1. Deflection Channel - (Optional, Not Shown) - Max 2 in. (51 mm) deep min 24 gauge galv steel channel sized to accommodate ceiling runner (Item 2A). Deflection channel installed parallel to direction of furred steel deck, centered below valley, prior to the application of the sprayed-applied fire resistive material and secured with steel masonry anchors spaced max 6 in. (160 mm) OC. Ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1/2 in. to 3/4 in. (13 to 19 mm) gap between the top of the ceiling runner and the top of the deflection channel. A clearance of 1 in. (25 mm) shall be maintained between the end of the deflection channel and the spray applied fire resistive material on the structural steel support members. The ceiling runner rests inside the deflection channel without attachment.
Beam penetrations in the head of wall joint

Each of these three manufacturers systems only work if the beam is passing through a wall that is running parallel with the flutes of the deck.

If the wall is running perpendicular to the flutes, each manufacturer states that we need to get an EJ.
This system is for a stuff spray stuff installation also called the “sandwich” method. There is no system for when the wall runs parallel with the fluted deck above.
Do we need a continuous track at the bottom of wall?
Bottom of wall joint systems - minimum floor thicknesses

- Each of the three manufacturers have bottom of wall systems. They each have a min floor thickness of 4 ½”. (There is one system for a 2 ½” thick floor with a shaft wall.)

- This means that we need to get an EJ every time we have a fluted deck that is less than 4 ½”.
Hollow Core Floor Joints
Unprotected beams in the head of wall joint.

- Can we use a fire stop system to address an unprotected beam?

- If we get an EJ for the unprotected beam, should it be a caulk system or should the opening be framed out with stud materials, stuffed with mineral wool and sprayed?

- What hourly rating is achieved?
How are beams in head of wall joints to be addressed?

• Can the gyp around a beam be cut to the contour of the beam?
• Should the opening around the beam be framed out?
• Should we use a sealant to address the beam?
• If the opening is not framed, can we install mineral wool the depth of the gyp and spray over it?
• What does the ‘SYSTEM or EJ’ Say?
Is this acceptable?
What if a silicone sealant is used?
TOP OF WALL JOINT: CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES + 25% COMPRESSION OR EXTENSION
L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT
L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

FRONT VIEW

SECTION A-A

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECK ASSEMBLY (2-HR. FIRE-RATING).
2. [OPTIONAL] STEEL BEAM OR OPEN WEB STEEL JOIST, ORIENTED PERPENDICULAR TO WALL ASSEMBLY (SEE NOTE NO. 2 BELOW).
3. UL CLASSIFIED MONOKOTE TYPE MK-6 HY (MANUFACTURED BY W.R. GRACE) OR TYPE 300 (MANUFACTURED BY ISOLATECH, INT.) FIREPROOFING SPRAYED TO THE THICKNESS SPECIFIED IN THE INDIVIDUAL 700 SERIES DESIGN (SEE NOTE NO. 3 BELOW).
4. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING):
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
   B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
5. MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 53% AND INSERTED INTO JOIST AND BAR JOIST/STEEL BEAM OPENING, FLUSH WITH WALL SURFACES.
6. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO CONCRETE WALL ASSEMBLY, AND MINIMUM 2" ONTO FIREPROOFING, ON BOTH SIDES OF WALL ASSEMBLY.

NOTES:
1. MAXIMUM WIDTH OF JOINT = 1".
2. WHERE OPEN WEB STEEL JOISTS PASS THROUGH THE WALL, 3/8" DIAMOND MESH EXPANDED STEEL LATH (NOMINAL WEIGTH = 1.7 TO 3.4 LB. PER YARD) SHALL BE SECURED TO ONE SIDE OF EACH JOIST WITH STEEL TIE WIRE.
3. FIREPROOFING MATERIAL TO BE EXCLUDED FROM METAL DECK DIRECTLY ABOVE THE CONCRETE WALL ASSEMBLY.
4. OPENING SHALL BE FORMED AROUND EACH STRUCTURAL STEEL MEMBER. MINIMUM CLEARANCE OF 1", TO MAXIMUM CLEARANCE OF 4", SHALL BE MAINTAINED BETWEEN WALL ASSEMBLY AND FIREPROOFING ON THE TWO SIDES OF MEMBER, MAXIMUM CLEARANCE OF 2" SHALL BE MAINTAINED ON THE BOTTOM OF THE STEEL SUPPORT MEMBER.
Angled Beam

• If the beam is not passing straight through the wall, do we need an EJ?
Med gas boxes- are they to be protected?
Edge of Slab / Perimeter Fire Barriers
Tight Studs
Obstructions at Edge of Slab
Detail at exterior

Scheduled partition to extend to 5/8" exterior sheathing

Acoustical batt insulation in interrupted cavity and first full cavity each side of partition

5/8" exterior sheathing

Plan detail partition at exterior wall

1 1/2" = 1'-0"
Perimeter Beams
Gypsum Wallboard Enclosures
Any other ideas of gray areas that we need to research or consider?