DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
SECTION: 07 84 00—FIRESTOPPING

REPORT HOLDER:
PASSIVE FIRE PROTECTION PARTNERS
1412 DERWENT WAY
DELTA, BRITISH COLUMBIA V3M 6H9
CANADA

EVALUATION SUBJECT:
PASSIVE FIRE PROTECTION PARTNERS THROUGH-PENETRATION FIRESTOP
SYSTEMS AND FIRE-RESISTIVE JOINT SYSTEMS

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1412 DERWENT WAY
DELTA, BRITISH COLUMBIA V3M 6H9
CANADA
(604) 515-1788
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EVALUATION SUBJECT:
PASSIVE FIRE PROTECTION PARTNERS THROUGH-PENETRATION FIRESTOP SYSTEMS AND FIRE-RESISTIVE JOINT SYSTEMS

1.0 EVALUATION SCOPE
Compliance with the following codes:
- 2006 International Building Code® (IBC)
- 2006 International Residential Code® (IRC)
- 1997 Uniform Building Code™ (UBC)

Property evaluated:
Fire-resistance-rated construction

2.0 USES
The Passive Fire Protection Partners Through-penetration Firestop Systems and Fire-resistive Joint Systems are for use in fire-resistance-rated wall assemblies or floor/ceiling assemblies when installed in accordance with this report and IBC Section 712 (for penetrations), IBC Section 713 (for fire-resistance joint systems), UBC Section 706 (for fire-resistive joint systems) and UBC Section 714 (for through-penetration firestops).

3.0 DESCRIPTION
3.1 General:
The Passive Fire Protection Partners Through-penetration Firestop Systems are designed to seal through-penetrations in fire-resistant-rated wall assemblies or floor/ceiling assemblies described in Figures 1 through 5, 7, and 11. The Passive Fire Protection Partners Fire-resistive Joint Systems are designed to seal construction and expansion joints in the fire-resistant-rated assemblies described in Figures 6, 8, 9 and 10. The F-ratings, T-ratings and L-ratings are as indicated in the figures. The systems are installed in steel or wood-framed gypsum board partitions, wood-framed floor/ceiling assemblies, concrete walls and concrete floors.

3.2 Material:
3.2.1 4100SL™ (Self-leveling) Fire and Smoke Stop Sealant: 4100SL™ is a self-leveling, modified latex, pourable elastomeric sealant designed to prevent the passage of fire and hot gases through fire-resistive separations. The sealant is packaged in 29-fluid-ounce (850 mL) cartridges, 35.2-fluid-ounce (1.0 L) bottles, 2.65-gallon (10.0 L) bottles, and 5-gallon (18.9 L) plastic pails. Unopened containers of the sealant should be stored in an area where the temperature is between 40°F and 90°F (4°C and 32°C), and must not be allowed to freeze. The sealant has a shelf life of one year when stored under protective cover in its original sealed container.

3.2.2 4800DW™ Fire and Smoke Stop Sealant: 4800DW™ is a high-solid, latex-based, elastomeric sealant designed to be a one-component firestop seal for penetrations in fire-resistive concrete, concrete block, and gypsum board/wood partition walls and floors and top-of-wall joints as noted in Figure 8. The sealant is packaged in 10.1-fluid-ounce (300 mL) cartridges, 20-fluid-ounce (600 mL) foil packs, 29-fluid-ounce (850 mL) cartridges, 3.17-gallon (12 L) plastic pails and 5-gallon (18.9 L) plastic pails. It should be stored in an area where the temperature is between 40°F and 90°F (4°C and 32°C), and must not be allowed to freeze. The sealant has a shelf life of one year when stored under protective cover in its original sealed container.

3.2.3 5100SP™ (Sprayable Mastic) Fire and Smoke Stop Sealant: 5100SP™ is a spray-, brush- or trowel-grade elastomeric sealant. It is a modified latex elastomer designed to prevent the passage of fire and hot gases through fire-resistive penetrations and top-of-wall and floor-to-wall joints described in Figures 6, 9 and 10. The sealant is packaged in 5-gallon (18.9 L) plastic pails and should be stored in an area where the temperature is between 40°F and 90°F (4°C and 32°C), and must not be allowed to freeze. The sealant has a shelf life of one year when stored under protective cover in its original sealed container.

4.0 INSTALLATION
4.1 General:
The through-penetrating item, penetration opening, joint opening and related surfaces must be clean and free of...
contaminants that may inhibit adhesion or curing, such as dirt, dust, oil, moisture, frost, grease and wax. The sealant must be installed in accordance with Figures 1 through 11. Installation of through-penetration firestops must comply with IBC Section 712, and installation of fire-resistant joint systems must comply with IBC Section 713 or UBC Section 714, as applicable.

4.2 4100SL™ (Self-leveling) Fire and Smoke Stop Sealant:
The 4100SL™ sealant must be installed in accordance with Figure 1, with a backing of mineral wool insulation having a 4 to 6 pcf (64 to 96 kg/m³) density, compressed at a minimum of 25 percent to a minimum depth of 3 1/2 inches (87 mm). The 4100SL™ sealant is installed to a dry-film sealant depth of 1/4 inch (6 mm). Installation temperature must be between 50°F and 90°F (10°C and 32°C).

4.3 4800DW™ Fire and Smoke Stop Sealant:
The 4800DW™ sealant must be installed to a depth and thickness outlined in Figures 1 through 8, and 11. Installation temperature must be between 45°F and 90°F (7°C and 32°C).

4.4 5100SP™ (Sprayable Mastic) Fire and Smoke Stop Sealant:
The 5100SP™ sealant must be installed in accordance with Figures 1, 6, 9 and 10, with a backing of mineral wool insulation having a 4 to 6 pcf (64 to 96 kg/m³) density, compressed at a minimum of 25 percent to a minimum depth of 3 1/2 inches (87 mm). The 5100SP™ sealant is applied in layers, with each layer having a thickness of 1/16 to 1/4 inch (1.6 to 6 mm). Installation temperature must be between 43°F and 90°F (6°C and 32°C).

5.0 CONDITIONS OF USE
The Passive Fire Protection Partners Through-penetration Firestop Systems and Fire-resistant Joint Systems described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. In the case of a conflict between this report and the manufacturer's published installation instructions this report governs.

5.2 Fire-resistant-rated wall assemblies and floor/ceiling assemblies must comply with the applicable code.

5.3 Pipe insulation, when required, must have a flame-spread index not exceeding 25 and a smoke-density index not exceeding 50.

6.0 EVIDENCE SUBMITTED
Data and reports of testing in accordance with the ICC-ES Acceptance Criteria for Fire-resistant Joint Systems (AC30), dated June 2006; ASTM E 119 (UBC Standards 7-1); ASTM E 814 (UBC Standard 7-5); UL 1479; and UL 2079.

7.0 IDENTIFICATION
The containers of sealant used in the Passive Fire Protection Partners Through-penetration Firestop Systems and Fire-resistant Joint Systems are identified by a stamp or label bearing the manufacturer's name (Passive Fire Protection Partners), the product name, the batch number, the expiration date, the storage instructions, and the evaluation report number (ESR-2996).
**General Notes on Figures**

1. **Assemblies:** All fire-resistive assemblies must comply with Chapter 7 of the UBC or the IBC, as applicable. The minimum dimensions in figures must be observed.

2. **Concrete Assemblies:** The concrete assemblies are normal-weight concrete and must comply with Chapter 19 of the UBC or the IBC, as applicable.

3. **Gypsum Wallboard and Wall Assemblies:**
   a. **Steel Studs:** Minimum No. 25 gage [0.021 inch (0.53 mm)], galvanized steel studs at least 2 1/2 inches (64 mm) wide. Allowable spacing is up to 24 inches (610 mm) on center. Studs must comply with Chapter 22 of the UBC or the IBC, as applicable.
   b. **Wood Studs:** Minimum nominal 2-by-4 wood studs must comply with Chapter 23 of the UBC or the IBC, as applicable. The maximum spacing is 16 inches (406 mm) on center.
   c. **Gypsum Wallboard:** The gypsum wallboard thicknesses required on each side of the wall assembly are as indicated in the figures. The wallboard must be Type X complying with ASTM C 36, as referenced in Chapter 25 of the UBC or the IBC, as applicable.

4. **One-hour Fire-resistive Wood Floor/Chase Wall Assemblies:**
   a. **Floor:** Lumber or plywood subfloor with lumber, plywood or concrete or gypsum topping finish must comply with Chapter 23 of the UBC or the IBC, as applicable.
   b. **Wood Joists:** Nominal 2-by-10 or larger lumber joists with 1-by-3 lumber bridging and fire-blocked ends must comply with Chapter 23 of the UBC or the IBC, as applicable. Joist spacing is 16 inches (406 mm) on center.
   c. **Gypsum Wallboard:** One layer of 5/8-inch-thick (16 mm), Type X gypsum wallboard ceiling must comply with ASTM C 36, as referenced in Chapter 25 of the UBC or the IBC, as applicable. The wallboard is directly attached to wood joists.

5. **Two-hour Fire-resistive Wood Floor/Chase Wall Assemblies:**
   a. **Floor:** Lumber or plywood subfloor with lumber, plywood or concrete or gypsum topping finish must comply with Chapter 23 of the UBC or the IBC, as applicable.
   b. **Wood Joists:** Nominally 2-by-10 or larger lumber joists with 1-by-3 lumber bridging and fire-blocked ends must comply with Chapter 23 of the UBC or the IBC, as applicable. Joist spacing is 16 inches (406 mm) on center.
   c. **Furring Channels:** No. 25 gage [0.0209 inch (0.53 mm)] steel channels, 5/8 inch (16 mm) deep by 1 1/2 inches (38 mm) wide, are fastened to wood joists. Spacing is 24 inches (610 mm) on center.
   d. **Gypsum Wallboard:** Two layers of 5/8-inch-thick (16 mm), Type X gypsum wallboard ceiling must comply with ASTM C 36, as referenced in Chapter 25 of the UBC or the IBC, as applicable. The base layer is fastened to the joists, and the face layer is fastened to the channels.

6. **Chase Wall:**
   a. **Wood Studs:** Single 2-by-6 or double 2-by-4 wood studs must comply with Chapter 23 of the UBC or the IBC, as applicable. Spacing up to 16 inches (406 mm) on center is permitted.
   b. **Sole Plate:** Single 2-by-6 or two parallel 2-by-4 lumber plates must comply with Chapter 23 of the UBC or the IBC, as applicable.
   c. **Top Plate:** The double top plate is constructed using either two 2-by-6 lumber plates or two parallel sets of two 2-by-4 lumber plates complying with Chapter 23 of the UBC or the IBC, as applicable.
   d. **Gypsum Wallboard:** One or two layers of 5/8-inch-thick (16 mm). Type X gypsum wallboard on each side of the wall must comply with Chapter 25 of the UBC or the IBC, as applicable. When the double stud wall is constructed, the penetrating pipe must be surrounded on all four sides with the wallboard.
FIGURE 1
METALLIC PIPE THROUGH CONCRETE WALL OR FLOOR

<table>
<thead>
<tr>
<th>F RATING</th>
<th>T RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 HR</td>
<td>0 HR</td>
</tr>
</tbody>
</table>

SECTION A-A

1. 3 HOUR FIRE RATED CONCRETE WALL OR FLOOR ASSEMBLY
   MAX 2½–1/4" DIAMETER OPENING

   A. MIN 4½–1/2" LIGHTWEIGHT OR NOMINAL WEIGHT CONCRETE WALL OR FLOOR
   B. 2½ HOUR RATED CONCRETE BLOCK WALL
   C. 1 HOUR RATED CONCRETE BLOCK WALL

2. ONE OF THE FOLLOWING PENETRATING ITEMS TO BE INSTALLED:
   A. STEEL PIPE: MAX 2½" Diam (or smaller) SCH 10 (or HEAVER)
   B. CONDUIT: NOM 2½" Diam (or smaller) RIGID STEEL CONDUIT
   C. CONDUIT: NOM 4" Diam (or smaller) STEEL ELECTRICAL METALLIC TUBING
   D. IRON PIPE: NOM 3½" Diam (or smaller) CAST OR DUCTILE
   E. COPPER TUBING: NOM 6" Diam (or smaller) TYPE L (or HEAVER)
   F. COPPER PIPE: NOM 6" Diam (or smaller) REGULAR (or HEAVER)

3. FIRESTOP SYSTEM – THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
   A. MIN 4" THICKNESS. 4 P.F. DENSITY MINERAL WOOL, COMPRESSED 25%
   B. FIRESTOP PARTNER – 4 1/2" THICKNESS FLUSH WITH BOTH SIDES OF WALL OR TOP SURFACE OF FLOOR
   C. “L” BEAMS AND JOISTS WITH W 10×16 OR W 12×20 (16") BEAD AT POINT CONTACT LOCATION

FIGURE 2
INSULATED METALLIC PIPE THROUGH CONCRETE WALL OR FLOOR

<table>
<thead>
<tr>
<th>F RATING</th>
<th>T RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 HR</td>
<td>1 HR</td>
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</tbody>
</table>

SECTION A-A

1. 2 HOUR FIRE RATED CONCRETE WALL OR FLOOR ASSEMBLY
   MAX 2½–1/4" DIAMETER OPENING

   A. MIN 4½–1/2" LIGHTWEIGHT OR NOMINAL WEIGHT CONCRETE WALL OR FLOOR
   B. 2½ HOUR RATED CONCRETE BLOCK WALL
   C. 1 HOUR RATED CONCRETE BLOCK WALL

2. ONE OF THE FOLLOWING PENETRATING ITEMS TO BE INSTALLED:
   A. STEEL PIPE MAX 2½" Diam (or SMALLER) SCH 10 (or HEAVER)
   B. CONDUIT: NOM 2½" Diam (or SMALLER) RIGID STEEL CONDUIT
   C. CONDUIT: NOM 4" Diam (or SMALLER) STEEL ELECTRICAL METALLIC TUBING
   D. IRON PIPE: NOM 3½" Diam (or SMALLER) CAST OR DUCTILE
   E. COPPER TUBING: NOM 6" Diam (or SMALLER) TYPE L (or HEAVER)
   F. COPPER PIPE: NOM 6" Diam (or SMALLER) REGULAR (or HEAVER)

3. PIPE COVERING – MAX 2½" THICK HOLLOW CYLINDRICAL HEAVY DENSITY MIN 3.5 P.C. GLASS FIBER UNITS WITH ALL SERVICE JACKET PIPE MUST BE COVERED WITH INSULATION THROUGHOUT ITS LENGTH

4. FIRESTOP SYSTEM – THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
   A. MIN 4" THICKNESS. 4 P.F. DENSITY MINERAL WOOL, COMPRESSED 25%
   B. FIRESTOP PARTNER – 4½" THICKNESS FLUSH WITH BOTH SIDES OF WALL OR TOP SURFACE OF FLOOR
   C. “L” BEAMS AND JOISTS WITH W 10×16 OR W 12×20 (16") BEAD AT POINT CONTACT LOCATION

FIGURE 3
METALLIC PIPE THROUGH WOOD FRAMED FLOOR

<table>
<thead>
<tr>
<th>F RATING</th>
<th>T RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 HR</td>
<td>0 HR</td>
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</table>

1. 1 HR FIRE RATED FLOOR–CEILING ASSEMBLY
   MAX 2–1/4" DIAMETER OPENING

   A. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD OR FLOOR TABBING MIXTURE
   B. NOM 2½" LUMBER JOIST SPACED 16" OC WITH 1½" LUMBER BRIDGING AND ENDS FIRESTOPPED
   C. NOM 2½" STEEL OR COMBINATION LUMBER AND STEEL JOISTS SPACED 16" OC WITH BRIDGING AS REQUIRED AND ENDS FIRESTOPPED
   D. NOM 2½" TRUSSES OR STRUCTURAL WOOD MEMBERS SPACED 16" OC WITH BRIDGING AS REQUIRED AND ENDS FIRESTOPPED
   E. NOM 5/8" THICK GLASS FIBER WALLBOARD NAIL TO LOWER SURFACE OF JOIST ADDITIONAL PIECE 2" LINDER AND WIDER THAN RECTANGULAR OPENING IN SUBFLOOR, SCREWD TO SUBFLOOR, MAX 3" Diam OPENING

FIGURE 4
NONMETALLIC PIPE THROUGH WOOD FRAMED FLOOR

<table>
<thead>
<tr>
<th>F RATING</th>
<th>T RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 HR</td>
<td>0 HR</td>
</tr>
</tbody>
</table>

1. 1 HR FIRE RATED FLOOR–CEILING ASSEMBLY
   MAX 2½" OR DOUBLE 2½" LUMBER STUDS
   A. NOM 2½" OR PARALLEL 2½" LUMBER PLATE, MAX 3" Diam OPENING
   B. TWO NOM 2½" OR TWO SETS 2½" LUMBER PLATE, MAX 3" Diam OPENING
   C. ONE LAYER NOM 5/8" THICKNESS

2. ONE OF THE FOLLOWING PENETRATING ITEMS TO BE INSTALLED:
   A. STEEL PIPE: MAX 2½" Diam (or SMALLER) SCH 10 (or HEAVER)
   B. CONDUIT: NOM 2½" Diam (or SMALLER) RIGID STEEL CONDUIT
   C. CONDUIT: NOM 4" Diam (or SMALLER) STEEL ELECTRICAL METALLIC TUBING
   D. COPPER TUBING: NOM 4" Diam (or SMALLER) TYPE L (or HEAVER)
   E. COPPER PIPE: NOM 4" Diam (or SMALLER) REGULAR (or HEAVER)

3. 3/4" THICKNESS FLUSH WITH TOP SURFACE OF FLOOR
   5/8" THICKNESS FLUSH WITH THE SURFACE OF CEILING
FIGURE 9
FLOOR TO WALL JOINT
CONCRETE FLOOR TO EXTERIOR INSULATION FINISH SYSTEM
F RATING – 2 HR
L RATING AT 400°F < 1 CFM/LIN FT
1. 2 HR FIRE RATED CONCRETE FLOOR/CEILING ASSEMBLY.
A. MIN 4–1/2" THICKNESS LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE.
B. MIN 1–1/2" x 1–1/2" x 3/16" CAST-IN-PLACE STRUCTURAL STEEL ANGLE.

2. EXTERIOR INSULATION FINISH SYSTEM SHALL BE CONSTRUCTED AS PER MANUFACTURER'S GUIDELINES AND INCLUDE THE FOLLOWING:
A. MIN 1/4" THICK CEMENTitous FINISH COATING.
B. MAX 3" THICK EXPANDED POLYSTYRENE FOAM BOARDS APPLIED TO EXTERIOR GYPSUM BOARDS (ITEM 1C).
C. MIN 1/2" THICK EXTERIOR GYPSUM BOARDS APPLIED TO STEEL STUDS (ITEM 2D) WITH 1" LONG PAN HEAD SCREWS, SPACED 16" OC.
D. MIN 5–3/4" x 1–1/4" GAL VERTICAL STEEL C-STUD FRAMING, SPACED 24" OC.
E. MIN 1–1/2" x 1–1/2" x 3/16" STRUCTURAL STEEL ANGLE WELDED TO STEEL FRAMING AND CAST-IN-PLACE STRUCTURAL STEEL ANGLE.
F. MIN 6–1/2" LONG, 12 GA, IMPAKING PINS, WELDED OR MECHANICALLY FASTENED TO FLAT SIDE OF VERTICAL FRAMING AND BENT 90° INTO CURTAIN WALL INSULATION, SPACED 8" OC VERTICALLY AND 24" OC HORIZONTALLY.
G. MIN 4", 4 PCF DENSITY MINERAL WOOL, IMPAIRED ON PINS AND FLUSH WITH INTERIOR SURFACE OF STEEL STUDS. MINERAL WOOL TO EXTEND MIN 12" BELOW AND 8" ABOVE JOINT.
H. FIRESTOP SYSTEM – THE FIRESTOP SYSTEM SHALL INCLUDE THE FOLLOWING:
A. MIN 18 GA STEEL ANGLE WELDED TO VERTICAL FRAMING SUCH THAT HORIZONTAL LEG IS MIN 4" BELOW TOP SURFACE OF FLOOR/CEILING ASSEMBLY.
B. JOINTS RANGING FROM 0 TO 2 IN. – NO ANGLE IS REQUIRED.
C. JOINTS RANGING FROM 2" TO 5" – MIN 1" x 1" ANGLE.
D. JOINTS RANGING FROM 5" TO 10" – MIN 1" x 3/4" ANGLE INSTALLED SUCH THAT 3/4" LEG IS HORIZONTAL.
E. MIN 4" THICKNESS, 4 PCF DENSITY MINERAL WOOL INSTALLED SUCH THAT FIBERS ARE PARALLEL WITH CURTAIN WALL, COMPRESSED 40%.
F. MIN 4" THICKNESS, 4 PCF DENSITY MINERAL ROCK WOOL OR CERAMIC FIBER INSULATION, INSTALLED SUCH THAT FIBERS ARE PARALLEL WITH CURTAIN WALL, COMPRESSED 20%.
G. PFP PARTNERS – 5100SP 3/32" WET THICKNESS COMPLETELY COVERING TOP SURFACE OF MINERAL WOOL 1" OVERLAP ONTO FLOOR/CEILING ASSEMBLY AND EXTERIOR INSULATION FINISH SYSTEM.

FIGURE 10
TOP OF WALL JOINT
CONCRETE WALL TO CONCRETE FLOOR/CEILING
F RATING – 4 HR
L RATING AT 400°F < 1 CFM/LIN FT
1. 4 HR FIRE RATED CONCRETE FLOOR/CEILING ASSEMBLY. MIN 5" THICKNESS.
2. 4 HR FIRE RATED CONCRETE WALL ASSEMBLY. MIN 6–3/4" THICKNESS.
3. FIRESTOP SYSTEM – THE FIRESTOP SYSTEM SHALL INCLUDE THE FOLLOWING:
A. MIN 6–3/4" THICKNESS LIGHTWEIGHT TO NORMAL CONCRETE WALL.
B. 4 HOUR FIRE RATED, MIN 8", HOLLOW OR CONCRETE FILLED CONCRETE BLOCK WALL.
C. PFP PARTNERS – 5100SP 1/16" DRY THICKNESS COMPLETELY COVERING MINERAL WOOL ON BOTH SIDES OF WALL, MIN 1" OVERLAP ONTO WALL AND FLOOR/CEILING.

FIGURE 11
NONMETALLIC PIPE THROUGH HOLLOW CORE CONCRETE
F RATING – 3 HR
T RATING – 3 HR
1. 3 HR FIRE RATED CONCRETE FLOOR ASSEMBLY. MAX 5" DIA OPENING.
A. 8" THICK UL CLASSIFIED HOLLOW CORE PREFAB CONCRETE UNITS.
B. MIN 8" THICK LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR.
2. ONE OF THE FOLLOWING PENETRATING ITEMS FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS MAY BE USED: ANNUAL SPACE = 0" (POINT CONTACT) TO 5/8".
A. PVC PIPE: NOM 4" DIAM (OR SMALLer) SCH 40 SOLID OR CELLULAR CORE
B. ABS PIPE: NOM 4" DIAM (OR SMALLer) SCH 40 SOLID OR CELLULAR CONE
C. CPVC PIPE: NOM 4" DIAM (OR SMALLer) SDR 17
3. FIRESTOP SYSTEM – THE FIRESTOP SYSTEM SHALL INCLUDE THE FOLLOWING:
A. MIN 1" THICKNESS, 4 PCF DENSITY MINERAL WOOL, FIRMLY PACKED AS A PERMANENT FORM, FLUSH WITH BOTTOM OF FLOOR ASSEMBLY.
B. PFP PARTNERS – PLASTIC PIPE COLLAR TO BE INSTALLED IN ACCORDANCE WITH ACCOMPANYING INSTRUCTIONS AND SECURED WITH MIN 3/16" DIAM x 1/14" LONG STEEL COUNTERSUNK MULTI-HOLE"