<table>
<thead>
<tr>
<th>M.1.1</th>
<th>Details</th>
</tr>
</thead>
</table>

**Notes to designer (delete this note after reading and replace with title block information)**

**CONCRETE FLOOR (2-HR.)**

1. **M.1.1**

   - **PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)**
   - **MULTIPLE METAL PIPES THROUGH CONCRETE FLOOR (2-HR.)**
   - **PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)**
   - **METAL PIPE WITH AB/PVC INSULATION THROUGH CONCRETE FLOOR (2-HR.)**
   - **METAL DUCT (WITHOUT DAMPER) THROUGH CONCRETE FLOOR**
   - **ROUND SHEET METAL DUCT THROUGH CONCRETE FLOOR**
   - **SHEET METAL DUCT WITH GLASS FIBER INSULATION THROUGH CONCRETE FLOOR (2-HR.)**
   - **MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR (2-HR.)**

---

**PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)**

- Use Hilti FS-One Max Firestop Sealant
- Install per UL System C-AJ-8099

**METAL PIPE WITH AB/PVC INSULATION THROUGH CONCRETE FLOOR (2-HR.)**

- Use Hilti FS-One Max Firestop Sealant
- Install per UL System C-AJ-7051
- Sleeves optional

**METAL DUCT (WITHOUT DAMPER) THROUGH CONCRETE FLOOR**

- Use Hilti CP 606 or FS-One Max Firestop Sealant
- Install per UL System C-AJ-2109

**ROUND SHEET METAL DUCT THROUGH CONCRETE FLOOR**

- Use Hilti CP 643N or CP 644 Firestop Collar and Hilti CP 601S, CFS-S SIL GG, CP 601S, CP 606
- Install per UL System C-AJ-5090

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**PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)**

- Use Hilti FS-One Max Firestop Sealant
- Install per UL System C-AJ-2167

**METAL PIPE WITH AB/PVC INSULATION THROUGH CONCRETE FLOOR (2-HR.)**

- Use Hilti CP 601S, CFS-S SIL GG, CFS-S SIL 5.000, OR CFS-S SIL 5.000 (Closed Piping System Only)
- Install per UL System C-AJ-7084
- Sleeves optional

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**Metal Pipe**

- **Type and thickness of fire-rated construction.**
- **Movement**
- **Percent Fill**
- **Water Rating (W-Rating)**
- **Leakage Rating (L-Rating)**
- **Temperature Rating (T-Rating)**
- **Fire Rating (F-Rating)**

**Plastic Pipe**

- **Type and thickness of fire-rated construction.**
- **Movement**
- **Percent Fill**
- **Water Rating (W-Rating)**
- **Leakage Rating (L-Rating)**
- **Temperature Rating (T-Rating)**
- **Fire Rating (F-Rating)**

**Usage:**

- Refer to the following specifications for firestopping:
  - UL or Intertek Classification or the intended temperature or fire ratings.
  - *Classifications of the Underwriters Laboratories Fire Resistance Directory (volume 2).*
  - For Quality Control requirements, refer to the Quality Control Guide for Evaluating Firestop Systems.
  - For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 1)."

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**Notation:**

- 

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**Notes:**

1. Refer to the following specifications for firestopping:
   - a. NFPA 70 - National Electric Code
   - c. NFPA 72 - National Fire Alarm Code
   - d. NFPA 13 - Standard for the Installation of Sprinkler Systems
   - e. NFPA 25 - Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems

2. Details shown are up to date as of February 2015.

3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 2)."

4. Refer to the following specifications for firestopping:
   - a. NFPA 70 - National Electric Code
   - c. NFPA 72 - National Fire Alarm Code
   - d. NFPA 13 - Standard for the Installation of Sprinkler Systems
   - e. NFPA 25 - Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems

5. Firestop System installation must meet requirements of ASTM E-144 (UL, 1978) to be included in an assembly providing a fire rating equal to that of construction being penetrated. All governing code and regional building codes must be verified for compliance with the details, including but not limited to the following:
   - *Type of Firestop Material.**
   - *Fire Rating (F-Rating).**
   - *Temperature Rating (T-Rating).**
   - *Movement.**

6. Design requirements, field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   - *Water Rating (W-Rating).**
   - *Leakage Rating (L-Rating).**
   - *Temperature Rating (T-Rating).**
   - *Fire Rating (F-Rating).**
   - *Notice! - Do Not Disturb.**

7. For useful rules requiring protection, use only Wall Opening Protection Materials, category D.C. as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1).
1. Details shown are typical details, containing general information only. Always refer to the manufacturer’s engineering judgment drawings are acceptable. Contact Hilti Inc. for alternative systems or Engineering Manufacturer’s engineering judgment drawings are acceptable.

2. References:
   c. NFPA 70: National Electric Code
   d. NFPA 25: Residential Electrical Code
   e. NFPA 24: Water Mains and Fire Protection Systems
   f. NFPA 26: Building and Fire Protection Systems
   g. NFPA 27: Penetration Firestop Systems
   h. NFPA 28: Penetration Firestop Systems
   i. NFPA 29: Penetration Firestop Systems
   j. NFPA 30: Penetration Firestop Systems
   k. NFPA 31: Penetration Firestop Systems
   l. NFPA 32: Penetration Firestop Systems
   m. NFPA 33: Penetration Firestop Systems
   n. NFPA 34: Penetration Firestop Systems
   o. NFPA 35: Penetration Firestop Systems
   p. NFPA 36: Penetration Firestop Systems
   q. NFPA 37: Penetration Firestop Systems
   r. NFPA 38: Penetration Firestop Systems
   s. NFPA 39: Penetration Firestop Systems
   t. NFPA 40: Penetration Firestop Systems
   u. NFPA 41: Penetration Firestop Systems
   v. NFPA 42: Penetration Firestop Systems
   w. NFPA 43: Penetration Firestop Systems
   x. NFPA 44: Penetration Firestop Systems
   y. NFPA 45: Penetration Firestop Systems
   z. NFPA 46: Penetration Firestop Systems

3. If alternate details matching the field conditions are not available, acceptance of the manufacturer’s engineering judgment drawings is acceptable. Design requirements, field conditions and dimensions must be verified with the details, including but not limited to the following:
   a. Fire Rating (F-Rating)
   b. Temperature Rating (T-Rating)
   c. Leakage Rating (L-Rating)
   d. Annular Space
   e. Water Rating (W-Rating)
   f. Movement
   g. Type and Finish of Fire-resistant construction.

4. For Quality Control requirements, refer to the Quality Control System Requirements. If field conditions do not match the installation, the manufacturer's engineering judgment drawings are acceptable. Contact Hilti Inc. for alternative systems or Engineering Manufacturer’s engineering judgment drawings are acceptable.

5. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 2.)" Laboratories, Fire Resistance Directory (Volume 1.)

6. For Quality Control requirements, refer to the Quality Control System Requirements. If field conditions do not match the installation, the manufacturer's engineering judgment drawings are acceptable. Contact Hilti Inc. for alternative systems or Engineering Manufacturer’s engineering judgment drawings are acceptable.
MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR (3-HR.)

1. METAL PIPE THROUGH CONCRETE FLOOR (3-HR.)
2. MULTIPLE METAL PIPES THROUGH CONCRETE FLOOR (3-HR.)
3. PLASTIC PIPE THROUGH CONCRETE FLOOR (3-HR.)
4. METAL PIPE WITH GLASS FIBER INSULATION THROUGH CONCRETE FLOOR (3-HR.)
5. METAL PIPE WITH AB/PVC INSULATION THROUGH CONCRETE FLOOR (3-HR.)
6. METAL DUCT (WITHOUT DAMPER) THROUGH CONCRETE FLOOR (3-HR.)
7. MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR (3-HR.)

Notes:
1. Refer to the following specifications for firestopping:
   a. 07-94-039 Penetration Firestop
   b. 07-94-17 Penetration Firestop
   c. 22-03-00 Penetration
   d. 23-01-00 Insulation
   e. 24-02-00 Duct
   f. 27-90-37 Communication
2. All details shown are typical details, containing general information only. Always refer to the NFPA system data for complete requirements. Design requirements, field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   a. Fire Rating (F-Rating)
   b. Temperature Rating (T-Rating)
   c. Leakage Rating (L-Rating)
   d. Acoustic Rating (A-Rating)
   e. Dimension
   f. Movement
   g. Type and thickness of fire-resistant construction
3. If alternate details matching the field conditions are not available, manufacturer’s engineering judgment should be utilized. Design requirements, field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   a. Type and thickness of fire-resistant construction
4. Firestop System installation must meet requirements of ASTM E-144 (F-144) listed assemblies that provide a fire rating equal to that of construction being penetrated.
5. Penetration Firestop System installation must meet requirements of ASTM E-144 (F-144) listed assemblies that provide a fire rating equal to that of construction being penetrated.
6. Refer to the following specifications for firestopping:
   a. For Europe: EN 1363-1
   b. For Asia and Australia: AS/NZS 2148
   c. For other regions: UL or Intertek Classification or the intended temperature or fire ratings.
7. For outlet boxes requiring protection, use only Wall Opening Protection Materials, category (2) or as classified by Underwriter’s Laboratories, Fire Resistance Directory (Volume 1.)
Metal Pipe with AB/PVC or Glass Fiber Insulation Through Concrete Floor (3-HR)

Plastic Pipe Through Concrete Floor (3-HR)

Plastic Pipe Through Concrete Floor (3-HR)

Metal Pipe Through Concrete Floor (3-HR)

Metal Pipe Through Concrete Floor (3-HR)

Metal Pipe Through Concrete Floor (3-HR)

Plastic Pipe Through Concrete Floor (3-HR)

Plastic Pipe Through Concrete Floor (3-HR)

Notes:
1. Refer to the following specifications for firestopping:
   a. 27 00 00 Firestop Systems
   b. 22 00 00 Firestop Systems
   c. 22 05 00 Firestop Systems
   d. 22 02 05 Firestop Systems
   e. 22 02 02 Firestop Systems
   f. 22 03 02 Firestop Systems
   g. 22 03 02 Firestop Systems
2. Details shown are typical details, containing general information only. Always refer to the NUL system detail for complete system requirements. If field conditions do not match requirements of details, approved alternate details shall be utilized. Design requirements, field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   * Fire Rating (F-Rating)
   * Temperature Rating (T-Rating)
   * Leakage Rating (L-Rating)
   * Acoustic Rating (A-Rating)
   * Water Rating (W-Rating)
   * Ventilation
   * Type and Finish of Event System
3. If alternate details cannot be used due to the field conditions, see the manufacturer’s engineering judgment drawings are acceptable. Contact UL Inc. for alternative systems or Engineering Judgment (EJ) (Series) drawings shall include the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems and Engineering Judgments.
4. References:
   - 2013 Underwriter's Laboratories Fire Resistance Directory, Volumes 1 & 2
   - NFPA 100: National Electrical Code
   - NFPA 100: National Electrical Code
   - All governing local and regional building codes
   - Firestop System installation must meet requirements of ASTM E-119, UL 1709, NFPA 130, and NFPA 130x. Refer to the UL System detail for complete system requirements.
   - See manufacturer’s engineering judgment drawings for specific information.
   - For additional information, refer to the most current "Underwriter’s Laboratories Fire Resistance Directory (Volume 1)."
1. Metal Pipe Through Concrete Wall (2-HR.)

2. Multiple Metal Pipes Through Concrete Wall (2-HR.)

3. Plastic Pipe Through Concrete Wall (2-HR.)

4. Plastic Pipe Through Concrete Wall (2-HR.)

5. Metal Pipe With 48 PVC Insulation Through Concrete Wall (2-HR.)

6. Metal Pipe With Glass Fiber or Calcium Silicate Insulation Through Concrete Wall (2-HR.)

7. Metal Duct (Without Damper) Through Concrete Wall (2-HR.)

8. Round Sheet Metal Duct Through Concrete Wall (2-HR.)

9. Sheet Metal Duct With Glass Fiber Insulation Through Concrete Wall (2-HR.)

10. Multiple Penetrations Through Concrete Wall (2-HR.)

Note:
- Refer to the following specifications for firestopping:
  - NFPA 70 National Electric Code
  - NFPA 13 Standard for the Installation of Sprinkler Systems
  - NFPA 80 Standard for Access to Fire and Smoking Areas
  - NFPA 130 Standard for the Installation and Testing of Fire Sprinkler Systems

- All governing local and regional building codes.

- Firestopping System installation must meet requirements of ASTM E-144 (UL 508) listed assemblies that provide a fire resistance rating of 2 hours when being penetrated.

- All pipe and metal ducts installed with the appropriate Firestop label equipped with QR code must be verified for compliance with the details, including but not limited to the following:
  - Fire Rating (F-Rating)
  - Temperature Rating (T-Rating)
  - Load Rating (L-Rating)
  - Acoustic Rating (A-Rating)
  - Pressure Rating
  - Microseal
  - Type and thickness of fire-rated construction.

- Always refer to the full UL system detail for complete requirements of details, approved alternate details shall be utilized. Design requirements, field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:

- Use Hilti FS-One Max Firestop Sealant

- Install Per UL System C-AJ-7084

- Use Hilti CP 606 or FS-One Max Firestop Collar

- Install Per UL System C-AJ-1513

- SLEEVE OPTIONAL

- For Quality Control requirements, refer to the Quality Control Manual.

- For alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable.

- If alternate detail drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems, Engineering Judgments.

- For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory, Volumes 1 & 2".

- For fire suppression systems, refer to the UL Underwriters Laboratories Fire Resistance Directory (Volume 1).
**NOT TO SCALE**

**M.2.2**

**SHEET NAME:**

**3 HR. MECHANICAL PENETRATIONS**

**CONTENTS:**

**REVISIONS:**

**ISSUE DATE:**

**CHECKED:**

**DRAWN:**

**JOB NUMBER:**

** Laboratories, Fire Resistance Directory (Volume 1.)**

**Protective Materials, category CLIV as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 2.)**

6. All rated through-penetration assemblies shall be prominently labeled with a Hilti Firestop Label equipped with a QR code with E-814 (UL 1479) tested assemblies that provide a fire rating equal to or greater than the calculated hour(s) of fire protection being provided.

5. Firestop System installation must meet requirements of ASTM E-144 (UL 1744) tested assembly that provide a fire rating equal to or greater than the calculated hour(s) of fire protection being provided. Note: This specification requires the use of a Firestop Systems and Products Panel (FSP) product panel. For Quality Control requirements, refer to the Quality Control chapter of this manual. For additional information and details, refer to the Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments and UL or Intertek Classification or the intended temperature or fire ratings.

4. References:
   - 2013 Underwriter’s Laboratories Fire Resistance Directory, Volumes 1 & 2
   - NFPA 70 - National Electric Code
   - NFPA 160 - Flammable and Combustible Liquids Code
   - NFPA 30 - Flammable and Combustible Liquids Code
   - NFPA 30A - Flammable and Combustible Liquids Code
   - NFPA 30B - Flammable and Combustible Liquids Code
   - NFPA 30C - Flammable and Combustible Liquids Code
   - NFPA 30D - Flammable and Combustible Liquids Code
   - NFPA 30E - Flammable and Combustible Liquids Code
   - NFPA 30F - Flammable and Combustible Liquids Code
   - NFPA 30G - Flammable and Combustible Liquids Code
   - NFPA 30H - Flammable and Combustible Liquids Code
   - NFPA 30I - Flammable and Combustible Liquids Code
   - NFPA 30J - Flammable and Combustible Liquids Code
   - NFPA 30K - Flammable and Combustible Liquids Code
   - NFPA 30L - Flammable and Combustible Liquids Code
   - NFPA 30M - Flammable and Combustible Liquids Code
   - NFPA 30N - Flammable and Combustible Liquids Code
   - NFPA 30O - Flammable and Combustible Liquids Code
   - NFPA 30P - Flammable and Combustible Liquids Code
   - NFPA 30Q - Flammable and Combustible Liquids Code
   - NFPA 30R - Flammable and Combustible Liquids Code
   - NFPA 30S - Flammable and Combustible Liquids Code
   - NFPA 30T - Flammable and Combustible Liquids Code
   - NFPA 30U - Flammable and Combustible Liquids Code
   - NFPA 30V - Flammable and Combustible Liquids Code
   - NFPA 30W - Flammable and Combustible Liquids Code
   - NFPA 30X - Flammable and Combustible Liquids Code
   - NFPA 30Y - Flammable and Combustible Liquids Code
   - NFPA 30Z - Flammable and Combustible Liquids Code
   - NFPA 30AA - Flammable and Combustible Liquids Code
   - NFPA 30BB - Flammable and Combustible Liquids Code
   - NFPA 30CC - Flammable and Combustible Liquids Code
   - NFPA 30DD - Flammable and Combustible Liquids Code
   - NFPA 30EE - Flammable and Combustible Liquids Code
   - NFPA 30FF - Flammable and Combustible Liquids Code
   - NFPA 30GG - Flammable and Combustible Liquids Code
   - NFPA 30HH - Flammable and Combustible Liquids Code
   - NFPA 30II - Flammable and Combustible Liquids Code
   - NFPA 30JJ - Flammable and Combustible Liquids Code
   - NFPA 30KK - Flammable and Combustible Liquids Code
   - NFPA 30LL - Flammable and Combustible Liquids Code
   - NFPA 30MM - Flammable and Combustible Liquids Code
   - NFPA 30NN - Flammable and Combustible Liquids Code
   - NFPA 30OO - Flammable and Combustible Liquids Code
   - NFPA 30PP - Flammable and Combustible Liquids Code
   - NFPA 30QQ - Flammable and Combustible Liquids Code
   - NFPA 30RR - Flammable and Combustible Liquids Code
   - NFPA 30SS - Flammable and Combustible Liquids Code
   - NFPA 30TT - Flammable and Combustible Liquids Code
   - NFPA 30UU - Flammable and Combustible Liquids Code
   - NFPA 30VV - Flammable and Combustible Liquids Code
   - NFPA 30WW - Flammable and Combustible Liquids Code
   - NFPA 30XX - Flammable and Combustible Liquids Code
   - NFPA 30YY - Flammable and Combustible Liquids Code
   - NFPA 30ZZ - Flammable and Combustible Liquids Code
   - NFPA 30AAA - Flammable and Combustible Liquids Code
   - NFPA 30BBB - Flammable and Combustible Liquids Code
   - NFPA 30CCC - Flammable and Combustible Liquids Code
   - NFPA 30DDD - Flammable and Combustible Liquids Code
   - NFPA 30EEE - Flammable and Combustible Liquids Code
   - NFPA 30FFF - Flammable and Combustible Liquids Code
   - NFPA 30GGG - Flammable and Combustible Liquids Code
   - NFPA 30HHH - Flammable and Combustible Liquids Code
   - NFPA 30IIII - Flammable and Combustible Liquids Code
   - NFPA 30JJJ - Flammable and Combustible Liquids Code
   - NFPA 30KKK - Flammable and Combustible Liquids Code
   - NFPA 30LLL - Flammable and Combustible Liquids Code
   - NFPA 30MMM - Flammable and Combustible Liquids Code
   - NFPA 30NNN - Flammable and Combustible Liquids Code
   - NFPA 30OOO - Flammable and Combustible Liquids Code
   - NFPA 30PPP - Flammable and Combustible Liquids Code
   - NFPA 30QQQ - Flammable and Combustible Liquids Code
   - NFPA 30RRR - Flammable and Combustible Liquids Code
   - NFPA 30SSS - Flammable and Combustible Liquids Code
   - NFPA 30TTT - Flammable and Combustible Liquids Code
   - NFPA 30UUU - Flammable and Combustible Liquids Code
For outlet boxes requiring protection, use only Wall Opening Penetration Firestop System.

Refer to the following specifications for firestopping:

- UL or Intertek Classification or the intended temperature or fire ratings.

- Firestop Systems provided and installed in accordance with the following firestop systems:
  - UL System # 31021
  - Intertek System # 31021

- Material classification as follows:
  - Firestop Materials, category CLIV as classified by Underwriter’s Laboratories, Fire Resistance Directory (Volume 1.)
  - Protective Materials, category CL IV as classified by Underwriter’s Laboratories, Fire Resistance Directory (Volume 2.)

- Glass fiber insulation:
  - E-814 (UL 1479) tested assemblies that provide a fire rating

- Metal Decking (2-HR.)
  - No Damper
  - Min. 4-1/2"

- Steel Duct
  - Min. 24 GA.

- Steel Retaining Angles
  - Use Hilti FS-One Max Firestop Sealant

- Steel Pipe (SCH. 5 or Heavier)
  - Min. 4-1/2"

- Copper Pipe or Iron Pipe
  - Min. 4-1/2"

- Round Sheet Metal Duct Through Concrete Over Metal Decking (2-HR.)
  - Min. 24 GA.

- Plastic Pipe Through Concrete Over Metal Decking
  - Min. 24 GA.

- Metal Pipe Through Concrete Over Metal Decking (2-HR.)
  - Min. 24 GA.

- Metal Pipe with Glass Fiber or Calcium Sulfate Insulation Through Concrete Over Metal Decking (2-HR.)
  - Min. 24 GA.

- Sheet Metal Duct Through Concrete Over Metal Decking (2-HR.)
  - Min. 24 GA.

- Sheet Metal Duct with Glass Fiber Insulation Through Concrete Over Metal Decking (2-HR.)
  - Min. 24 GA.

- Multiple Penetrations Through Concrete Over Metal Decking (2-HR.)
  - Min. 24 GA.
1. Any modification to these details could result in an application/system not meeting the requirements of the specification.

2. Details shown are up to date as of February 2015.

3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 1.)" or "Underwriter's Laboratories Fire Resistance Directory (Volume 2.)".

4. References:
   - NFPA 70 - National Electric Code
   - UL System # * Product(s) used
   - All governing local and regional building codes
   - 7. For outlet boxes requiring protection, use only Wall Opening Protective Materials, category (2.0) as classified by Underwriters' Laboratories, Fire Resistance Directory (Volume 1.).
   - 2. Details shown are typical details, containing general information only. Always refer to the full UL system detail for complete system requirements. If field conditions do not match requirements of details, approved alternate details shall be utilized. Design requirements, field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
     - Fire Rating (F-Rating)
     - Temperature Rating (T-Rating)
     - Leakage Rating (L-Rating)
     - Acoustic Space
     - Pressure Test
     - Movement

3. If alternate details matching the field conditions are not available, use Hilti's engineering judgment drawings are acceptable. Contact Hilti Engineering for alternative systems or Engineering Judgment (800-879-8000). Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.

4. For Quality Control requirements, refer to the Quality Control Laboratories, Fire Resistance Directory (Volume 1.).

5. Firestop System installation must meet the requirements of ASTM E-119 (UL 1709) listed assemblies that provide a fire rating equal to that of construction being penetrated. Firestop System installation must be performed by or under the direction of a certified firestop installer. The installer shall verify the installation is in accordance with the manufacturer's instructions and/or drawings.

6. All rated through-penetration assemblies shall be prominently labeled with a Hilti Firestop Label equipped with a QR code with information of the installation (Contractor's Name, Installation Date,* UL System # * Product(s) used).

7. Note: Refer to the following specifications for firestopping:
   a. 27 06 37 Communication Systems Engineering Judgments
   b. 26 00 00 Electrical
   c. 22 00 00 Plumbing
   d. 07 84 13 Penetration Firestopping
   e. 07 84 00 Firestopping
   f. 23 00 00 HVAC
   g. 22 00 00 Plumbing
   h. 07 84 13 Penetration Firestopping
   i. UL System # * Product(s) used
   j. Hourly Rating (H-Rating)
   k. Insulation Code
   l. For metal foils requiring protection, use only Wall Opening Protective Materials, category (2.0) as classified by Underwriters' Laboratories, Fire Resistance Directory (Volume 1.)
2. Details shown are typical details, containing general information only. Always refer to the UL System data for complete system requirements. If field conditions do not match requirements of details, approved alternate details shall be utilized. Design requirements, field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:

- Type Rating (Type Rating)
- Temperature Rating (T-Rating)
- Leakage Rating (L-Rating)
- Acoustic Space
- Pressure Flange
- Movement
- Type and Finish of Fireproof Construction

3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Contact Hilti Inc. for alternate systems or Engineering Judgments (ESD-270/271/272). Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.

4. References:

- 2013 International Building Code
- NFPA 70 National Electric Code
- NFPA 219, Residential Electrical Code
- NFPA 110, Emergency Electric Code
- All governing local and regional building codes

5. Firestop System installation must meet requirements of ASTM E-814 (U.S.) tests assembled that provide a fire rating of 3 hours. When construction is being penetrated by a service or mechanical penetration, penetrations shall be completely sealed with a UL Listed Firestop Label equipped with a QR code with the following information:

- Warning: Do Not Disturb
- Through-Floor Firestop System
- UL System Type: Product(s) Listed
- Hourly Rating (H-Rating)
- Installation Date
- Contractor's Name

6. For cast-in firestop systems, refer to the following specifications for firestopping.

<table>
<thead>
<tr>
<th>MAX. DIA.</th>
<th>MIN. CLEARANCE</th>
<th>DEVICE</th>
<th>TYPE</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; (SCH. 40)</td>
<td>5&quot;</td>
<td>USE HILTI CP 680-M OR CP 680-P CAST-IN FIRESTOP INSTALL PER UL SYSTEM F-A-2054</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot; (SCH. 40)</td>
<td>5&quot;</td>
<td>AB/PVC OR GLASS FIBER INSULATION</td>
<td>ATTACH DEVICE WITH METAL DECK ADAPTER KIT</td>
<td></td>
</tr>
<tr>
<td>4&quot; (SCH. 40)</td>
<td>5&quot;</td>
<td>Piping System Only</td>
<td>CAST OR DUCTILE CAST OR DUCTILE</td>
<td></td>
</tr>
</tbody>
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* For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory" volumes 1 & 2.
1. Any modification to these details could result in an application/system not meeting the fire resistance requirements of the building or structure.

2. Details shown are up to date as of February 2015.

3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 2.)"

References:
2. UL or Intertek Classification or the intended temperature or fire ratings.
4. Judgment (800-879-8000) Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems or Engineering Judgments
5. Systems Engineering Judgments.

Manufacturers' engineering judgment drawings are acceptable. The Engineering Judgment (800-879-8000) needs to be reviewed by the firestop manufacturer.

Note: For outlet boxes requiring protection, use only Wall Opening Firestop System.

Install per UL System W-L-1389

Materials: Use Hilti FS-ONE MAX Firestop Sealant

1. Any modification to these details could result in an application/system not meeting the fire resistance requirements of the building or structure.

2. Details shown are up to date as of February 2015.

3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 2.)"

References:
2. UL or Intertek Classification or the intended temperature or fire ratings.
4. Judgment (800-879-8000) Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems or Engineering Judgments
5. Systems Engineering Judgments.

Manufacturers' engineering judgment drawings are acceptable. The Engineering Judgment (800-879-8000) needs to be reviewed by the firestop manufacturer.

Note: For outlet boxes requiring protection, use only Wall Opening Firestop System.

Install per UL System W-L-2078

Materials: Use Hilti FS-ONE MAX Firestop Sealant

1. Any modification to these details could result in an application/system not meeting the fire resistance requirements of the building or structure.

2. Details shown are up to date as of February 2015.

3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 2.)"

References:
2. UL or Intertek Classification or the intended temperature or fire ratings.
4. Judgment (800-879-8000) Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems or Engineering Judgments
5. Systems Engineering Judgments.

Manufacturers' engineering judgment drawings are acceptable. The Engineering Judgment (800-879-8000) needs to be reviewed by the firestop manufacturer.

Note: For outlet boxes requiring protection, use only Wall Opening Firestop System.

Install per UL System W-L-2128

Materials: Use Hilti FS-ONE MAX Firestop Sealant