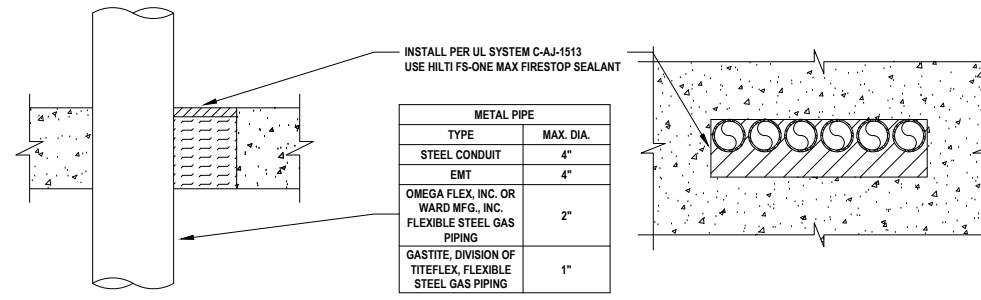


INSTALL PER UL SYSTEM C-AJ-1226  
USE HILTI FS-ONE MAX FIRESTOP SEALANT

SLEEVE OPTIONAL

METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	30"
CAST IRON PIPE	30"
COPPER PIPE	6"
STEEL CONDUIT	6"
EMT	4"

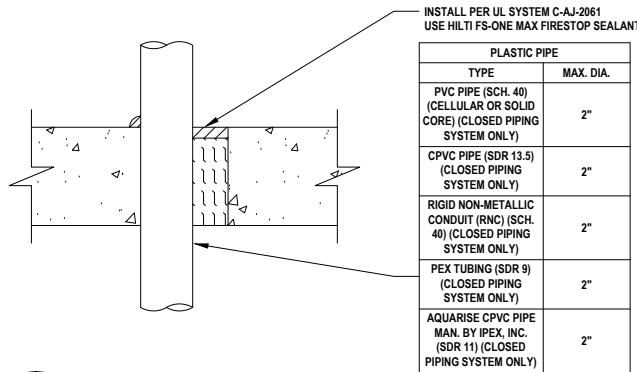
1 METAL PIPE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.1 NOT TO SCALE



INSTALL PER UL SYSTEM C-AJ-1513  
USE HILTI FS-ONE MAX FIRESTOP SEALANT

METAL PIPE	
TYPE	MAX. DIA.
STEEL CONDUIT	4"
EMT	4"
OMEGA FLEX, INC. OR WARD MFG. INC. FLEXIBLE STEEL GAS PIPING	2"
GASTITE, DIVISION OF TITFLEX, FLEXIBLE STEEL GAS PIPING	1"

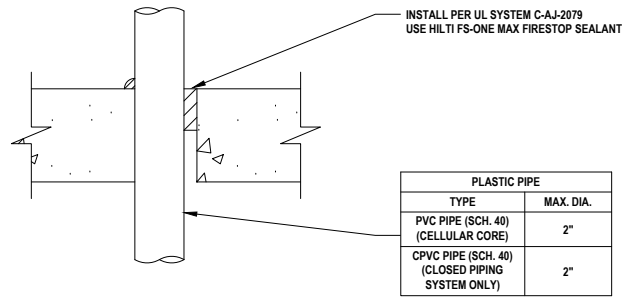
2 MULTIPLE METAL PIPE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.1 NOT TO SCALE



INSTALL PER UL SYSTEM C-AJ-2061  
USE HILTI FS-ONE MAX FIRESTOP SEALANT

PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE) (CLOSED PIPING SYSTEM ONLY)	2"
CPVC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY)	2"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40) (CLOSED PIPING SYSTEM ONLY)	2"
PEX TUBING (SDR 9) (CLOSED PIPING SYSTEM ONLY)	2"
AQUARISE CPVC PIPE MAN. BY IPEX, INC. (SDR 11) (CLOSED PIPING SYSTEM ONLY)	2"

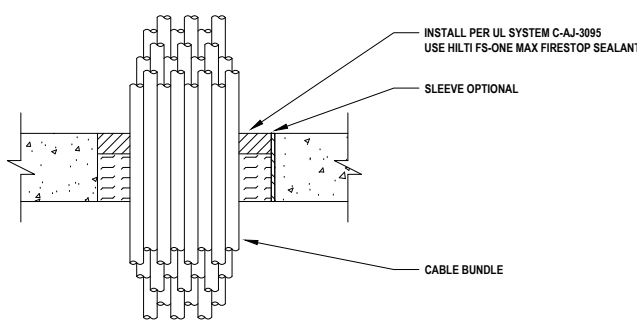
3 PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.1 NOT TO SCALE



INSTALL PER UL SYSTEM C-AJ-2079  
USE HILTI FS-ONE MAX FIRESTOP SEALANT

PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR CORE)	2"
CPVC PIPE (SCH. 40) (CLOSED PIPING SYSTEM ONLY)	2"

4 PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.1 NOT TO SCALE

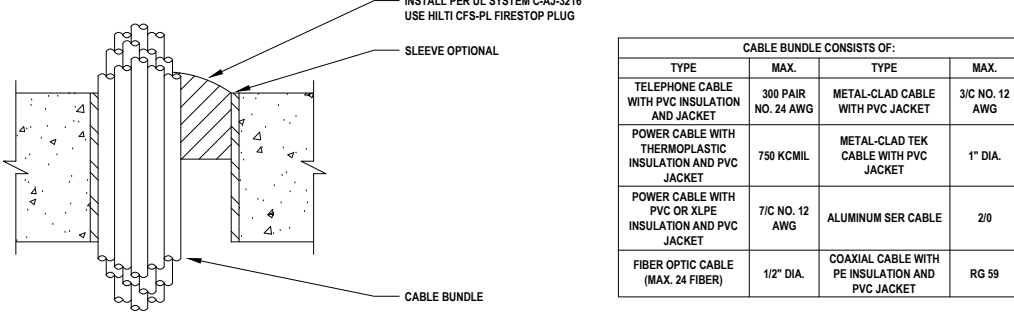


INSTALL PER UL SYSTEM C-AJ-3095  
USE HILTI FS-ONE MAX FIRESTOP SEALANT

SLEEVE OPTIONAL

CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/8" NO. 12 AWG
POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR)	500 KCMIL	COPPER CONDUCTOR SER CABLE WITH PVC JACKET	3/8" (+GROUND) 2/0 AWG
POWER CABLE WITH PVC JACKET (ALUMINUM OR COPPER CONDUCTOR)	350 KCMIL	COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET	RGU
POWER CABLE WITH PVC JACKET	7/8" NO. 12 AWG	CABLE WITH PVC JACKET	3/8" NO. 6 AWG
FIBER OPTIC CABLE (24 FIBER)	1/2" DIA.	SINGLE OR MULTIPLE CONDUCTOR TYPE MI CABLE (MIN. 1/8" SEPERATION BETWEEN MI CABLES AND ANY OTHER TYPES OF CABLE)	1-1/4" DIA.

5 CABLE BUNDLE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.1 NOT TO SCALE

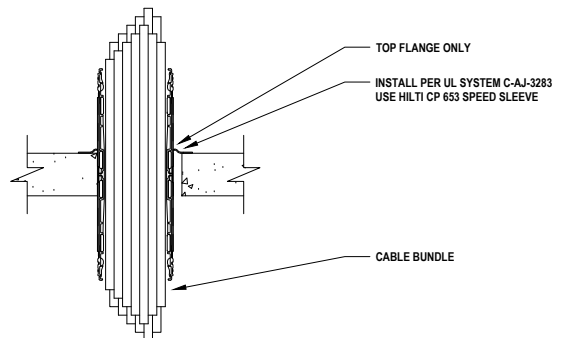


INSTALL PER UL SYSTEM C-AJ-3216  
USE HILTI CFS-PL FIRESTOP PLUG

SLEEVE OPTIONAL

CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC INSULATION AND JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE WITH PVC JACKET	3/8" NO. 12 AWG
POWER CABLE WITH THERMOPLASTIC INSULATION AND PVC JACKET	750 KCMIL	METAL-CLAD TEK CABLE WITH PVC JACKET	1" DIA.
POWER CABLE WITH PVC OR XLPE INSULATION AND PVC JACKET	7/8" NO. 12 AWG	ALUMINUM SER CABLE	2/0
FIBER OPTIC CABLE (MAX. 24 FIBER)	1/2" DIA.	COAXIAL CABLE WITH PE INSULATION AND PVC JACKET	RG 59

6 CABLE BUNDLE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.1 NOT TO SCALE



INSTALL PER UL SYSTEM C-AJ-3283  
USE HILTI CP 653 SPEED SLEEVE

TOP FLANGE ONLY

CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	100 PAIR NO. 24 AWG	FIBER OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION	1/2" DIA.
COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION	7/8" NO. 12 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET	20/0" NO. 22 AWG
SHIELDED PRINTER CABLE WITH PVC JACKET	4/0 AWG	POWER OR NON-POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT METAL JACKET (MAN. BY AFC CABLE SYSTEMS, INC.)	2/0" NO. 18 AWG
COMPUTER CABLE	4 PAIR NO. 22 AWG CAT 6	S-VIDEO CABLE CONSISTING OF MAX. 24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET	1/4" DIA.
COAXIAL CABLE	RG 6U		

7 CABLE BUNDLE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.1 NOT TO SCALE

Notes:

- Refer to the following specifications for firestopping.
  - 07 84 00 Firestopping
  - 07 84 13 Penetration Firestopping
  - 22 00 00 Plumbing
  - 23 00 00 HVAC
  - 26 00 00 Electrical
  - 27 06 37 Communication

For Quality Control requirements, refer to the Quality Control portion of the specification.

- 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)
  - \* Water Rating (W-Rating)
  - \* Annular Space
  - \* Percent Fill
  - \* Movement
  - \* Type and thickness of fire-rated construction.

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

References:

- \* 2013 Underwriter's Laboratories Fire Resistance Directory, Volumes 1 & 2
- \* NFPA 101 Life Safety Code
- \* NFPA 70 - National Electric Code
- \* All governing local and regional building codes

- Firestop System installation must meet requirements of ASTM E-814 (UL 1479) tested assemblies that provide a fire rating equal to that of construction being penetrated.

- All rated through-penetration assemblies shall be prominently labeled with a Hilti Firestop Label equipped with a QR code with the following information:
  - \*Warning! - Do Not Disturb
  - \*Through Penetration Firestop System
  - \* UL System # \* Product(s) used
  - \* Hourly Rating (F-Rating)
  - \* Installation Date
  - \* Contractor's Name

- For outlet boxes requiring protection, use only Wall Opening Protective Materials, category CLIV as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1.)

<Notes to designer (delete this note after reading and replace with title block information)>  
 1. Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.  
 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.)"

JOB NUMBER:

CHECKED:

ISSUE DATE:

REVISIONS:

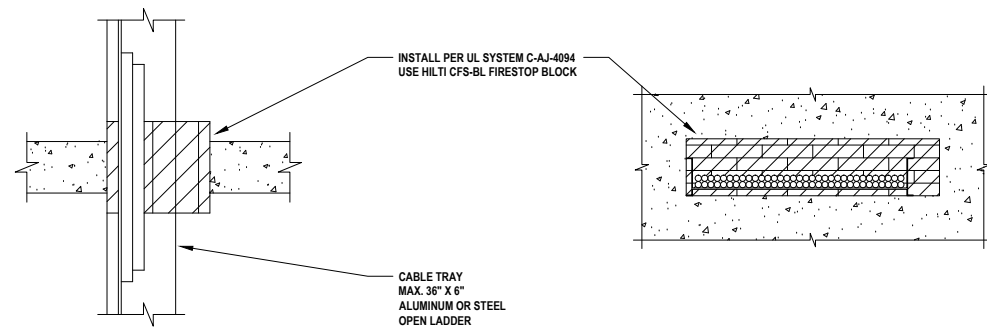
CONTENTS:

ELECTRICAL PENETRATIONS  
FLAT CONCRETE FLOOR  
2 HR.

SHEET NAME:

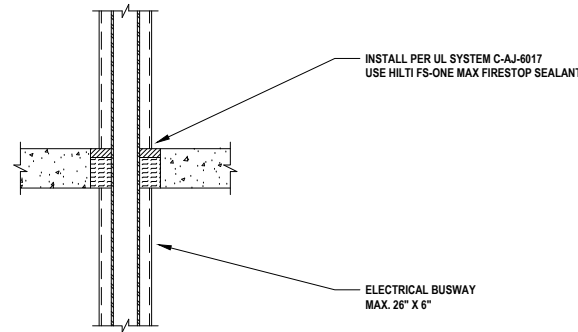
**E.1.1**

SHEET NUMBER:

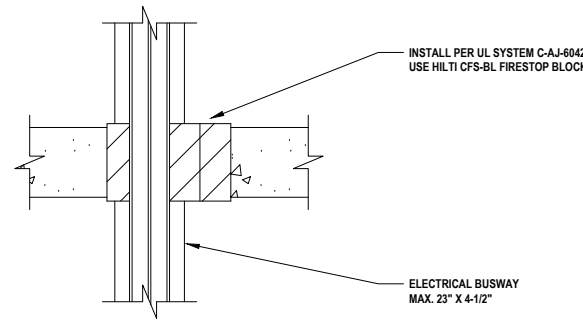


CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/C NO. 12 AWG
SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET	750 KCMIL	POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG
FIBER OPTIC CABLE (24 FIBER) WITH PVC JACKET	1/2" DIA.		

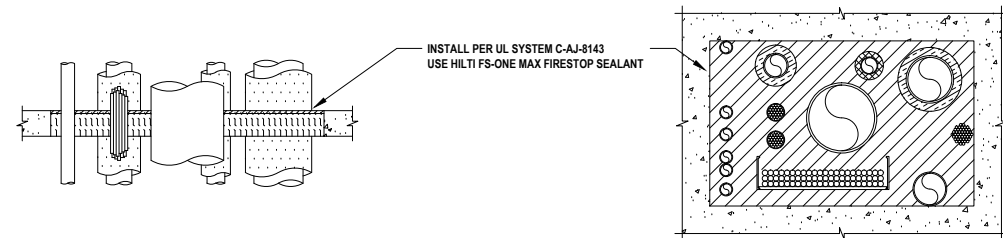
**1** CABLE TRAY THROUGH CONCRETE FLOOR (2-HR.)  
E.1.2 NOT TO SCALE



**2** ELECTRICAL BUSWAY THROUGH CONCRETE FLOOR (2-HR.)  
E.1.2 NOT TO SCALE



**3** ELECTRICAL BUSWAY THROUGH CONCRETE FLOOR (2-HR.)  
E.1.2 NOT TO SCALE



**4** MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR (2-HR.)  
E.1.2 NOT TO SCALE

Notes:

1. Refer to the following specifications for firestopping.
  - a. 07 84 00 Firestopping
  - b. 07 84 13 Penetration Firestopping
  - c. 22 00 00 Plumbing
  - d. 23 00 00 HVAC
  - e. 26 00 00 Electrical
  - f. 27 06 37 Communication

For Quality Control requirements, refer to the Quality Control portion of the specification.

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)
- \* Water Rating (W-Rating)
- \* Annular Space
- \* Percent Fill
- \* Movement
- \* Type and thickness of fire-rated construction.

3. If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Contact Hilti Inc. 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. References:

- \* 2013 Underwriter's Laboratories Fire Resistance Directory, Volumes 1 & 2
- \* NFPA 101 Life Safety Code
- \* NFPA 70 - National Electric Code
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5. Firestop System installation must meet requirements of ASTM E-814 (UL 1479) tested assemblies that provide a fire rating equal to that of construction being penetrated.

6. All rated through-penetration assemblies shall be prominently labeled with a Hilti Firestop Label equipped with a QR code with the following information:

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- \*Through Penetration Firestop System
- \* UL System # \* Product(s) used
- \* Hourly Rating (F-Rating)
- \* Installation Date
- \* Contractor's Name

7. For outlet boxes requiring protection, use only Wall Opening Protective Materials, category CLIV as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1.)

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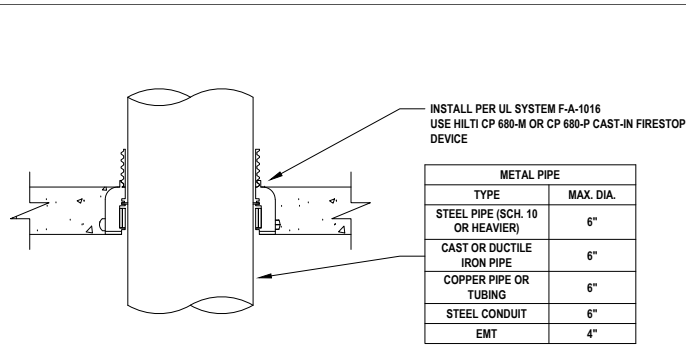
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ELECTRICAL PENETRATIONS  
FLAT CONCRETE FLOOR  
2 HR.

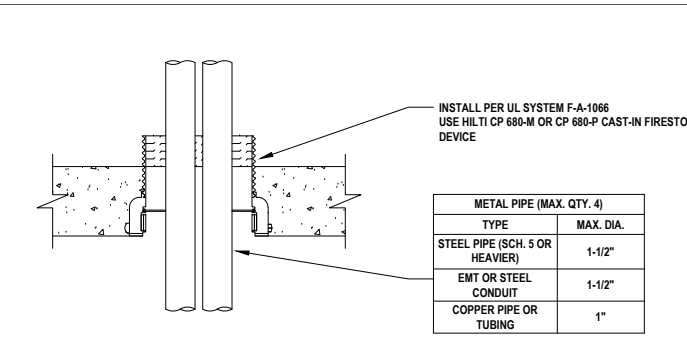
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**E.1.2**

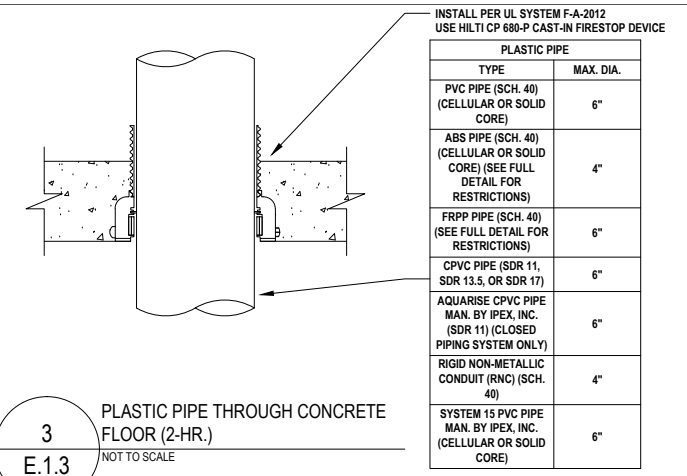
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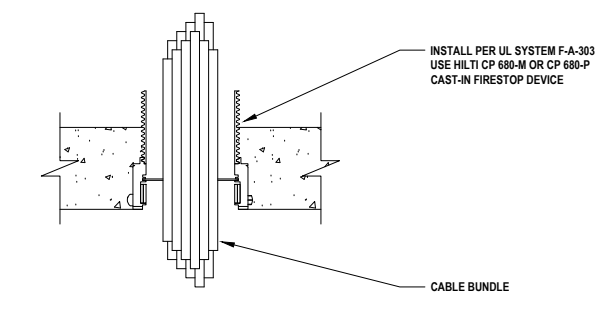
1 METAL PIPE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.3 NOT TO SCALE



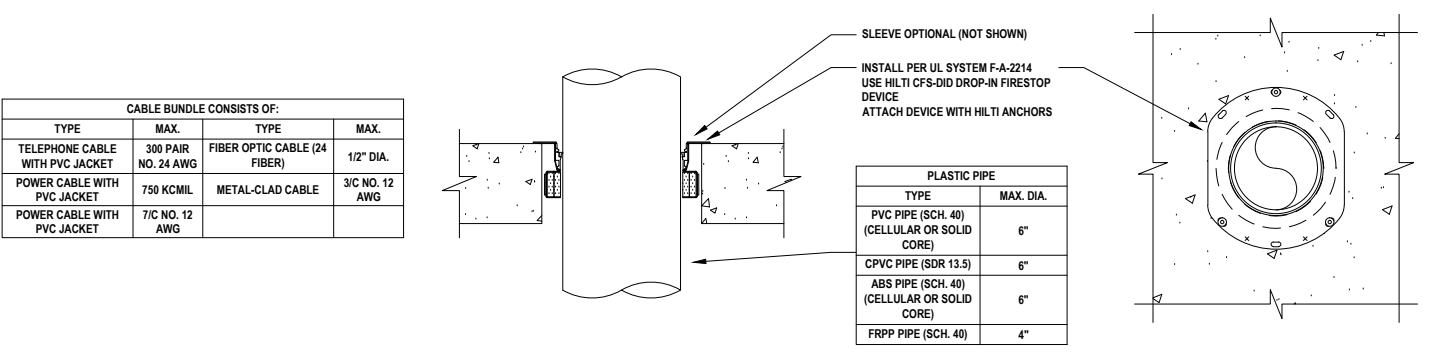
2 MULTIPLE METAL PIPES THROUGH CONCRETE FLOOR (2-HR.)  
E.1.3 NOT TO SCALE



3 PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.3 NOT TO SCALE



4 CABLE BUNDLE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.3 NOT TO SCALE



5 PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)  
E.1.3 NOT TO SCALE

Notes:

- Refer to the following specifications for firestopping.
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  - 07 84 13 Penetration Firestopping
  - 22 00 00 Plumbing
  - 23 00 00 HVAC
  - 26 00 00 Electrical
  - 27 06 37 Communication

For Quality Control requirements, refer to the Quality Control portion of the specification.
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ELECTRICAL PENETRATIONS  
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2 HR.

SHEET NAME: \_\_\_\_\_

**E.1.3**

SHEET NUMBER: \_\_\_\_\_