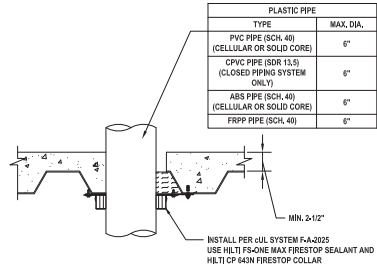


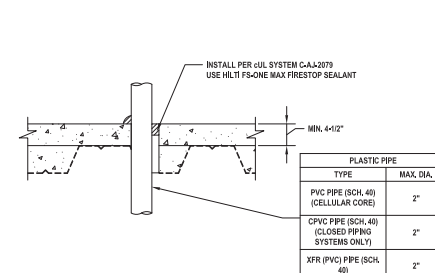
1 METAL PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

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



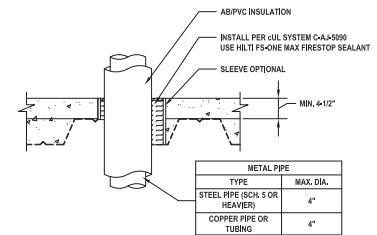
2 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
CPVC PIPE (SOR 11.3) (CLOSED PIPING SYSTEM ONLY)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
FRPP PIPE (SCH. 40)	6"



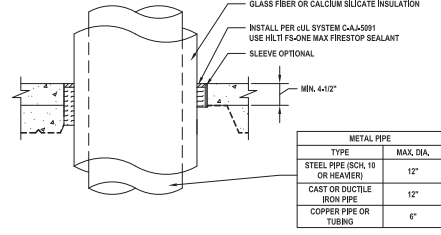
3 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

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



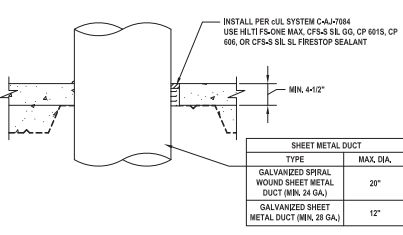
4 METAL PIPE WITH AB/PVC INSULATION THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 5 OR HEAVIER)	4"
COPPER PIPE OR TUBING	4"



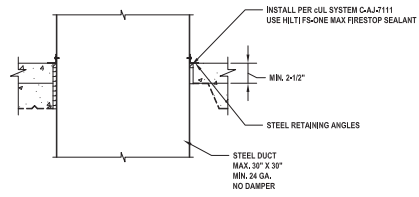
5 METAL PIPE WITH GLASS FIBER OR CALCIUM SILICATE INSULATION THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	12"
CAST OR DUCTILE IRON PIPE	12"
COPPER PIPE OR TUBING	6"

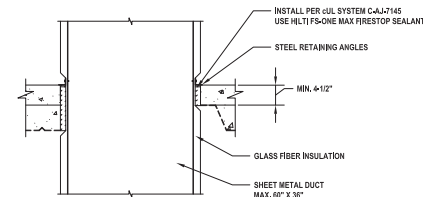


6 ROUND SHEET METAL DUCT THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

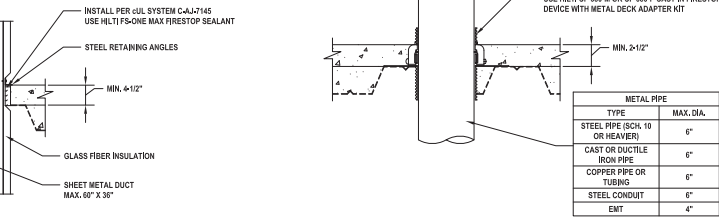
SHEET METAL DUCT	
TYPE	MAX. DIA.
GALVANIZED SPIRAL WOUND SHEET METAL DUCT (MIN. 24 GA.)	20"
GALVANIZED SHEET METAL DUCT (MIN. 24 GA.)	12"



7 METAL PIPE (WITHOUT DAMPER) THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

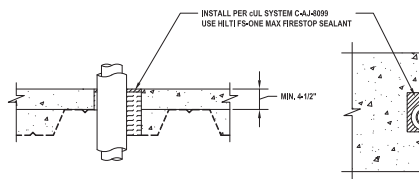


8 SHEET METAL DUCT WITH GLASS FIBER INSULATION THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

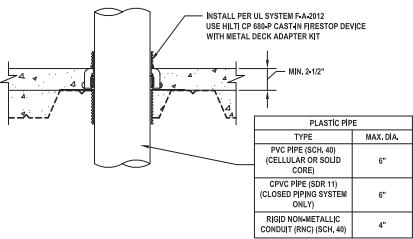


9 METAL PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

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



10 MULTIPLE PENETRATIONS THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



11 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
CPVC PIPE (SOR 11) (CLOSED PIPING SYSTEM ONLY)	6"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40)	4"

- 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
 - 28 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 c.U.L. 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 Canada Inc. for alternative systems or Engineering Judgment (800-363-4458) Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
 - Firestop System installation must meet requirements of CANULC-S115 tested assemblies
 - 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
 - * c.U.L. 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 CLV7 as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1.)
 - For all CPVC pipes systems, compatibility should be verified by the CPVC pipes manufacturer.

CONCRETE FLOORS		
TYPE OF PENETRANT	RATING (HR)	FILTERING - BASES OF DESIGN UL SYSTEM
CIRCULAR BLANK OPENINGS	1	FA-4000, CA-2000, CA-2000
	2	FA-4000, CA-4000, CA-2000
	3	FA-4000, CA-4000, CA-2000
	1	CA-1200, FA-1200, FA-1017
SINGLE METAL PIPES OR CONDUIT	2	CA-1200, FA-1200, FA-1017
	3	CA-1200, FA-1017
	4	CA-1000, CA-1000
	1	FA-2010, FA-2000, CA-2000, CA-4000, CA-2000
SINGLE NON-METALLIC PIPE OR CONDUIT (IE, PVC, CPVC, ABS, FRPP, EMT)	2	FA-2010, FA-2000, CA-2000, CA-4000, CA-2000
	3	FA-2010, CA-2000, CA-2000
	1	FA-2010, CA-2000, CA-2000
SINGLE CABLE BUNDLES	1	FA-2000, CA-2000, CA-2000, CA-2000
	2	FA-2000, CA-2000, CA-2000, CA-2000
	3	FA-2000, CA-2000, CA-2000
CABLE TRAY	1	CA-4000, CA-4000
	2	CA-4000, CA-4000
	3	CA-4000, CA-4000
SINGLE INSULATED PIPES	1	FA-5010, FA-5017, CA-2000, CA-4000, CA-4000, CA-4000
	2	FA-5010, FA-5017, CA-2000, CA-4000, CA-4000
	3	FA-5010, CA-4000, FA-5010
	4	CA-4000
ELECTRICAL BURWAY	1	CA-4000, CA-4000, CA-4000, CA-4000
	2	CA-4000, CA-4000, FA-5010, CA-4000
	3	CA-4000, CA-4000
MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CA-4000, CA-4000
	2	CA-4000, CA-4000
	3	CA-4000, CA-4000
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	1	CA-4000, CA-4000
	2	CA-4000, CA-4000
	3	CA-4000, CA-4000
MIXED PENETRANTS	1	CA-4000, CA-4000, CA-4000
	2	CA-4000, CA-4000, CA-4000
	3	CA-4000, CA-4000
	4	CA-4000

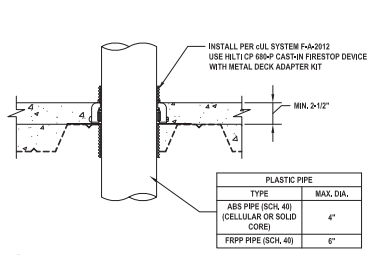
CONTENTS:
MEP PENETRATIONS
CONCRETE OVER METAL DECK
2 HR

SHEET NAME:

M.3.1

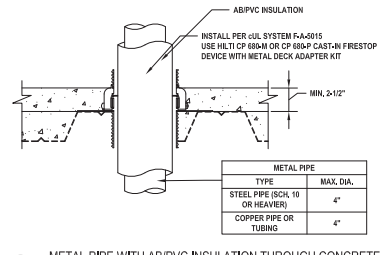
SHEET NUMBER:

<Notes to designer (delete this note after reading and replace with file block information)>
 1. Any modification to these details could result in an application/system not meeting the c.U.L. or Intertek Classification or the intended temperature or fire ratings.
 2. Details shown are up to date as of March 2020.
 3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 2.)"



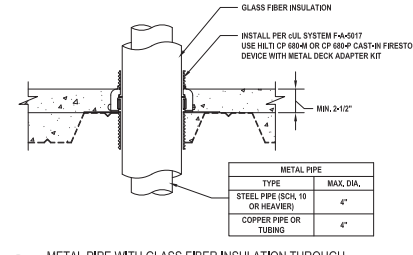
PLASTIC PIPE	
TYPE	MAX. DIA.
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	4"
FRPP PIPE (SCH. 40)	6"

1 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



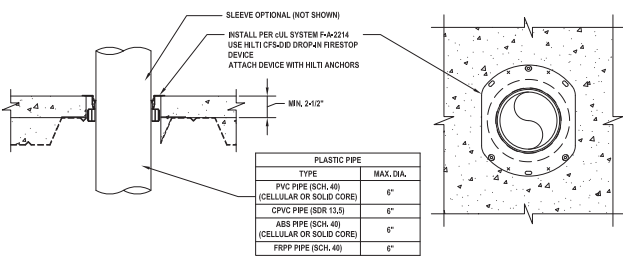
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	4"
COPPER PIPE OR TUBING	4"

2 METAL PIPE WITH AB/PVC INSULATION THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



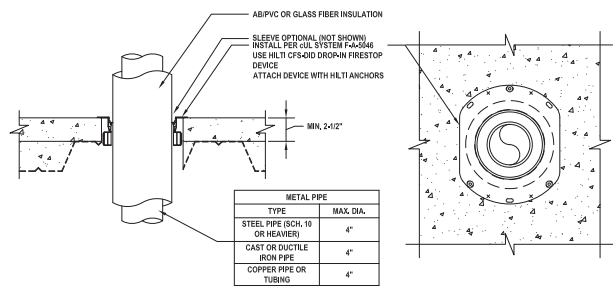
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	4"
COPPER PIPE OR TUBING	4"

3 METAL PIPE WITH GLASS FIBER INSULATION THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



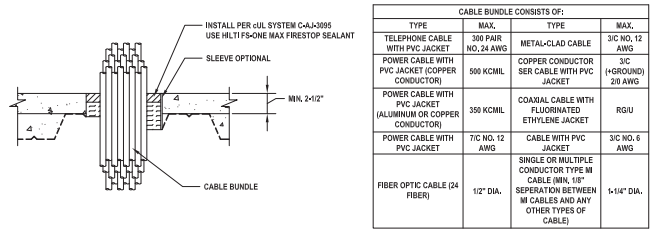
PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
CPVC PIPE (SCR 13.5)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
FRPP PIPE (SCH. 40)	6"

4 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



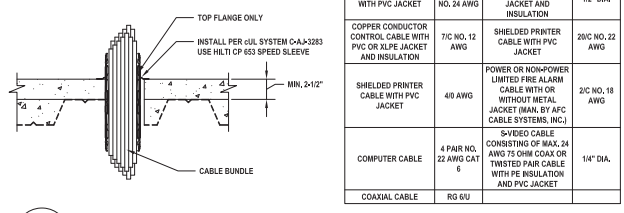
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	4"
CAST OR DUCTILE IRON PIPE	4"
COPPER PIPE OR TUBING	4"

5 METAL PIPE WITH AB/PVC OR GLASS FIBER INSULATION THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



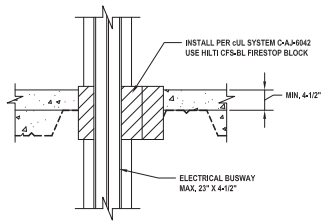
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-GLAD CABLE	3/8" NO. 12 AWG
POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR)	500 KCMIL	COPPER CONDUCTOR SER. CABLE WITH PVC JACKET	3/8" (HORIZONTAL) 2/0 AWG
POWER CABLE WITH PVC JACKET (ALUMINUM OR 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 III CABLE (MIN. 1/8" SEPERATION BETWEEN IN CABLES AND ANY OTHER TYPES OF CABLE)	1-1/4" DIA.

6 CABLE BUNDLE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

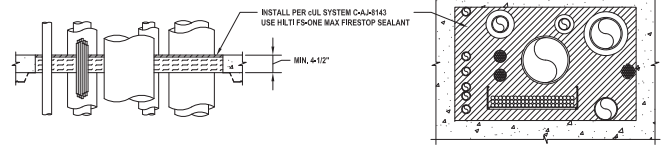


CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	100 PAIR NO. 24 AWG	FIBER OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION	1/2" DIA.
COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION	7/8" NO. 12 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET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

7 CABLE BUNDLE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



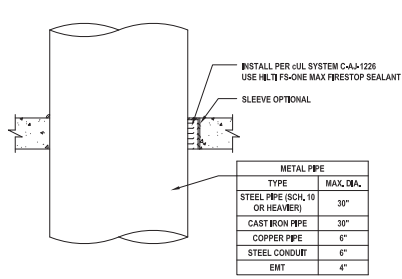
8 ELECTRICAL BUSWAY THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



9 MULTIPLE PENETRATIONS THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE

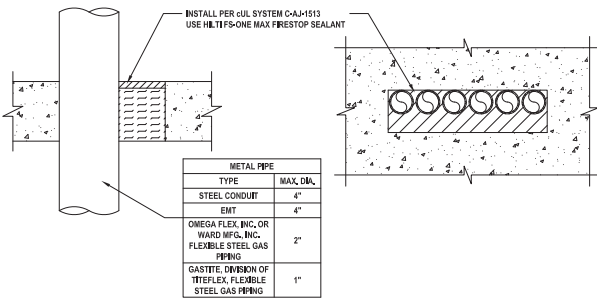
- Notes:
- Refer to the following specifications for firestopping.
 - 07 84 00 Firestopping
 - 07 84 13 Penetration Firestopping
 - 22 00 00 Plumbing
 - 23 00 00 HVAC
 - 28 00 00 Electrical
 - 27 06 37 Communication
 - For Quality Control requirements, refer to the Quality Control portion of the specification.
 - Details shown are typical details, containing general information only. Always refer to the full cUL 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 Canada Inc. for alternative systems or Engineering Judgment (800-363-4458) Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
 - Firestop System installation must meet requirements of CAN/ULC-S115 tested assemblies. 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
 - *cUL 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 CLIV7 as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1).
 - For all CPVC pipes systems, compatibility should be verified by the CPVC pipes manufacturer.

<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 cUL or Intertek Classification or the intended temperature or fire ratings.
 2. Details shown are up to date as of March 2020.
 3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 2)".



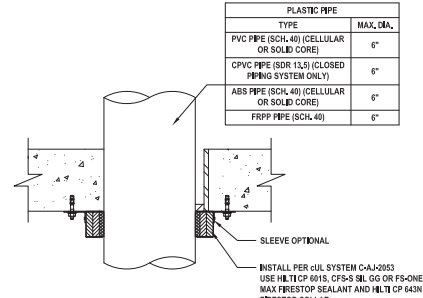
1 METAL PIPE THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

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



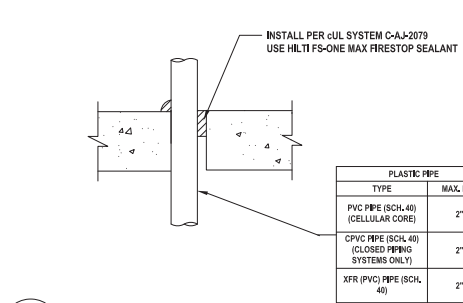
2 MULTIPLE METAL PIPES THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

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 TITELFLEX, FLEXIBLE STEEL GAS PIPING	1"



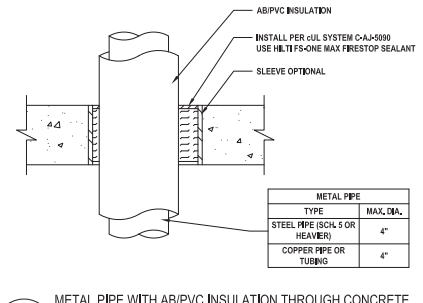
3 PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
CPVC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
FRPP PIPE (SCH. 40)	6"



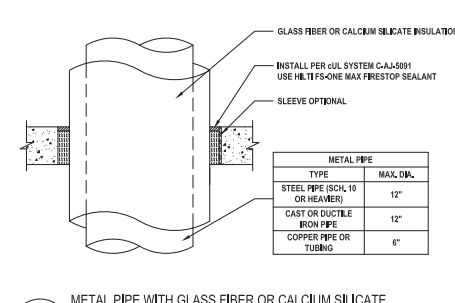
4 PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

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



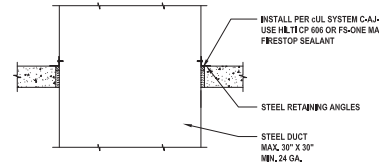
5 METAL PIPE WITH AB/PVC INSULATION THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 5 OR HEAVIER)	4"
COPPER PIPE OR TUBING	4"



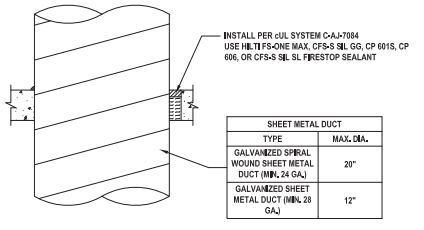
6 METAL PIPE WITH GLASS FIBER OR CALCIUM SILICATE INSULATION THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	12"
CAST OR DUCTILE IRON PIPE	12"
COPPER PIPE OR TUBING	6"



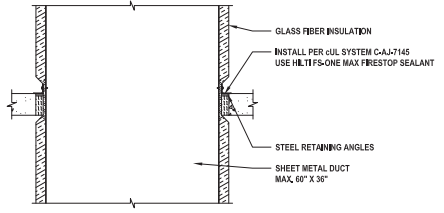
7 METAL DUCT (WITHOUT DAMPER) THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

STEEL DUCT MAX. 30" X 30" MIN. 24 GA, NO DAMPER



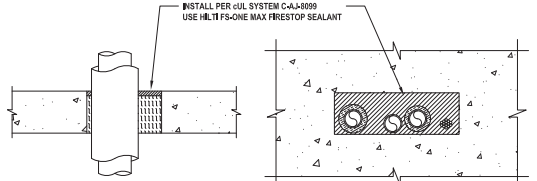
8 ROUND SHEET METAL DUCT THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

SHEET METAL DUCT	
TYPE	MAX. DIA.
GALVANIZED SPIRAL WOUND SHEET METAL DUCT (MIN. 24 GA.)	20"
GALVANIZED SHEET METAL DUCT (MIN. 20 GA.)	12"

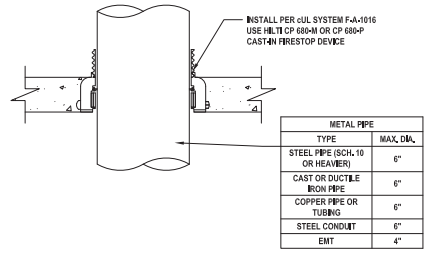


9 SHEET METAL DUCT WITH GLASS FIBER INSULATION THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

GLASS FIBER INSULATION
INSTALL PER cUL SYSTEM C-AJ-7145 USE HILTI FS-ONE MAX FIRESTOP SEALANT
STEEL RETAINING ANGLES
SHEET METAL DUCT MAX. 60" X 30"

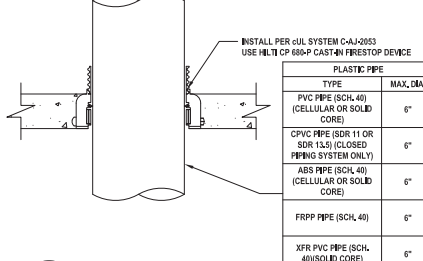


10 MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE



11 METAL PIPE THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

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



12 PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)
M.1.1 NOT TO SCALE

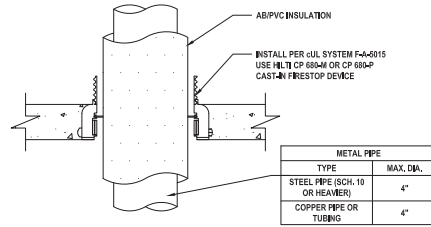
PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
CPVC PIPE (SDR 11 OR SDR 13.5) (CLOSED PIPING SYSTEM ONLY)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
FRPP PIPE (SCH. 40)	6"
XFR PVC PIPE (SCH. 40) (SOLID CORE)	6"

- 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 cUL 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 Canada Inc. for alternative systems or Engineering Judgment (800-363-4458) Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
 - Firestop System installation must meet requirements of CAN/ULC-S115 tested assemblies
 - 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
 - * cUL 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 CLV7 as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1).
 - For all CPVC pipes systems, compatibility should be verified by the CPVC pipes manufacturer.

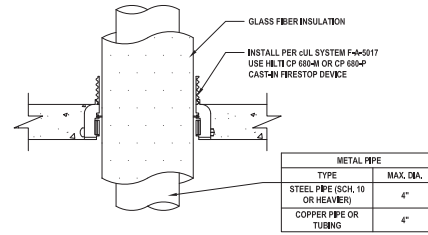
CONCRETE FLOORS			
TYPE OF PENETRANT	F-RATING (HR)	HILTI INC. - BASES OF DESIGN UL SYSTEM	
CIRCULAR BLANK OPENINGS	1	FA-0008, CA-A0055, CA-A0090	
	2	FA-0005, CA-A0055, CA-A0090	
	3	FA-0006, CA-A0055, CA-A0098	
SINGLE METAL PIPES OR CONDUIT	1	CA-A128, FA-0128, FA-0117	
	2	CA-A128, FA-0128, FA-0117	
	3	CA-A128, FA-0117	
	4	CA-0107, CA-0104	
SINGLE NONMETALIC PIPE OR CONDUIT (PVC, CPVC, ABS, FRP, EMT)	1	FA-0212, FA-0205, CA-A0205, CA-A2079, CA-A2053, CA-A2102	
	2	FA-0212, FA-0205, CA-A2028, CA-A2079, CA-A2053, CA-A2102	
	3	FA-0212, CA-A0205, CA-A0203	
SINGLE CABLE BUNDLES	1	FA-3007, CA-A3009, CA-A3180, CA-A3203	
	2	FA-3007, CA-A3009, CA-A3334, FA-A3000	
	3	FA-3007, CA-J3005, CA-A3285	
CABLE TRAY	1	CA-A4034, CA-A4035	
	2	CA-A4036, CA-A4035	
SINGLE INSULATED PIPES	1	FA-5015, FA-5017, CA-A5030, CA-A5091, CA-A5090, CA-A5048	
	2	FA-5015, FA-5017, CA-A5030, CA-A5091, CA-A5090	
	3	FA-5015, CA-A5030, FA-A5018	
	4	CA-5009	
ELECTRICAL BUSWAY	1	CA-A4036, CA-A4017, FA-A4032, CA-A4038	
	2	CA-A4036, CA-A4017, FA-A4032, CA-A4038	
	3	CA-A4036, CA-A4017	
MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CA-A7086, CA-A7051, CA-A7084	
	2	CA-A7086, CA-A7051, CA-A7084	
NON-INSULATED	3	CA-A7086, CA-A7051	
MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	NA**	NA**	
	1	CA-A8036, CA-A8036, CA-A8143	
MIXED PENETRANTS	2	CA-A3009, CA-A3006, CA-A3143	
	3	CA-A3009, CA-A3006, CA-A3143	
	2	CA-A3009, CA-A3006	
	4	CA-A8039	

Notes to designer (delete this note after reading and replace with file block information)
 1. Any modification to these details could result in an application/system not meeting the cUL or Intertek Classification or the intended temperature or fire ratings.
 2. Details shown are up to date as of March 2020.
 3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (volumes 2)"

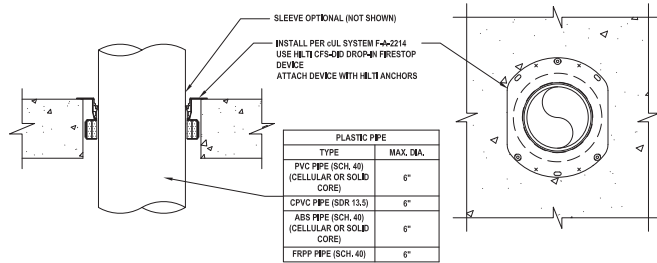
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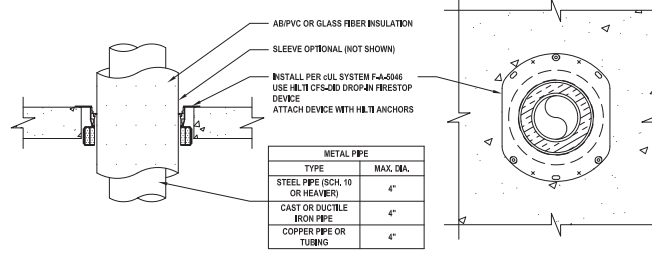
1 METAL PIPE WITH AB/PVC INSULATION THROUGH CONCRETE FLOOR (2-HR.)
M.1.2 NOT TO SCALE



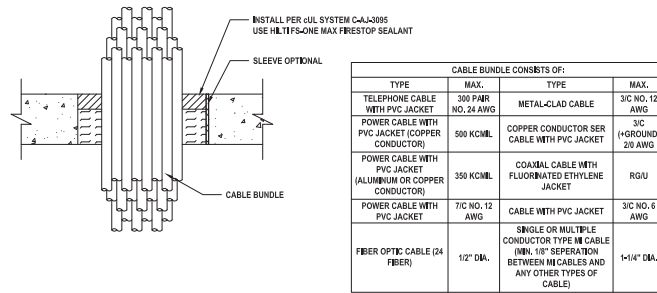
2 METAL PIPE WITH GLASS FIBER INSULATION THROUGH CONCRETE FLOOR (2-HR.)
M.1.2 NOT TO SCALE



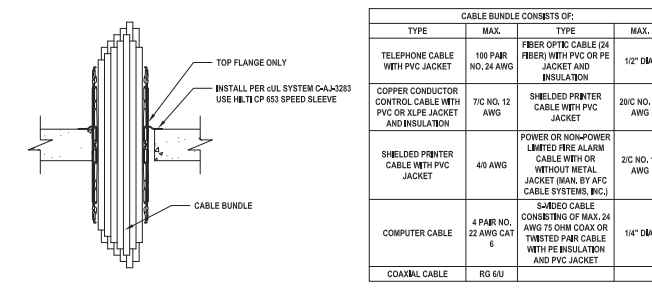
3 PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)
M.1.2 NOT TO SCALE



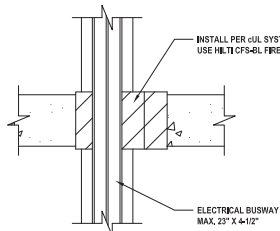
4 METAL PIPE WITH AB/PVC OR GLASS FIBER INSULATION THROUGH CONCRETE FLOOR (2-HR.)
M.1.2 NOT TO SCALE



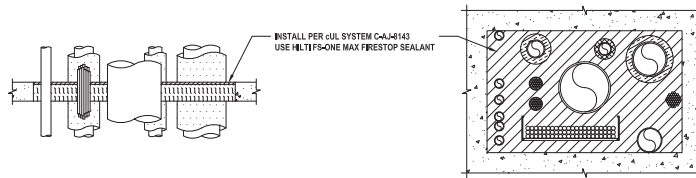
5 CABLE BUNDLE THROUGH CONCRETE FLOOR (2-HR.)
M.1.2 NOT TO SCALE



6 CABLE BUNDLE THROUGH CONCRETE FLOOR (2-HR.)
M.1.2 NOT TO SCALE



7 ELECTRICAL BUSWAY THROUGH CONCRETE FLOOR (2-HR.)
M.1.2 NOT TO SCALE



8 MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR (2-HR.)
M.1.2 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.

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If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Contact Hilti Canada Inc. for alternative systems or Engineering Judgment (800-363-4458) Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.

- Firestop System installation must meet requirements of CAN/ULC-S115 tested assemblies
- All rated through-penetration assemblies shall be prominently labeled with a Hilti Firestop Label equipped with a QR code with the following information:
 - cUL 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 CLIVT as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1.)
- For all CPVC pipes systems, compatibility should be verified by the CPVC pipes manufacturer.

TYPE OF PENETRANT	CONCRETE FLOORS	
	FAB/TYPE	HILTI, INC. - BASE OF DESIGN UL SYSTEM
CIRCULAR BLANK OPENINGS	1	F-4-008, CA-4055, CA-4090
	2	F-4-008, CA-4055, CA-4090
	3	F-4-008, CA-4055, CA-4090
SINGLE METAL PIPES OR CONDUIT	1	CA-4-128, FA-1028, FA-1017
	2	CA-4-128, FA-1028, FA-1017
	3	CA-4-128, FA-1017
	4	CA-4-107, CA-4-104
SINGLE NONMETALLIC PIPE OR CONDUIT (E.E. PVC, CPVC, ABS, FRP, ETC.)	1	F-4-012, F-4-025, CA-4-015, CA-4-070, CA-4-203, CA-4-202
	2	F-4-012, F-4-025, CA-4-015, CA-4-070, CA-4-203, CA-4-202
	3	F-4-012, CA-4-203, CA-4-203
	4	F-4-007, CA-4-090, CA-4-180, CA-4-283
SINGLE/CABLE BUNDLES	1	F-4-307, CA-4-308, CA-4-304, F-4-300
	2	F-4-307, CA-4-308, CA-4-304, F-4-300
	3	F-4-307, CA-4-308, CA-4-305
CABLE TRAY	1	CA-4-304, CA-4-305
	2	CA-4-304, CA-4-305
	3	CA-4-304, CA-4-305
SINGLE INSULATED PIPES	1	F-4-515, FA-517, CA-4-500, CA-4-501, CA-4-500
	2	F-4-515, FA-517, CA-4-500, CA-4-501, CA-4-500
	3	FA-515, CA-4-500, FA-4-518
ELECTRICAL BUSWAY	1	CA-4-608, CA-4-617, F-4-602, CA-4-608
	2	CA-4-608, CA-4-617, F-4-602, CA-4-608
	3	CA-4-608, CA-4-617
	4	CA-4-608, CA-4-617
MECHANICAL DUCTWORK WITHOUT DAMPERS	1	CA-4-784, CA-4-781, CA-4-784
	2	CA-4-784, CA-4-781, CA-4-785
	3	CA-4-784, CA-4-781
MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	1	CA-4-784, CA-4-781, CA-4-785
	2	CA-4-784, CA-4-781, CA-4-785
MIXED PENETRANTS	1	CA-4-899, CA-4-898, CA-4-843
	2	CA-4-899, CA-4-898, CA-4-843
	3	CA-4-899, CA-4-898
	4	CA-4-899

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 cUL or Intertek Classification or the intended temperature or fire ratings.
 2. Details shown are up to date as of March 2020.
 3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (Volume 2)".

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

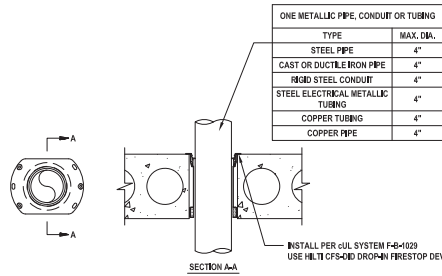
CONTENTS:

MEP PENETRATIONS
FLAT CONCRETE FLOOR
2 HR.

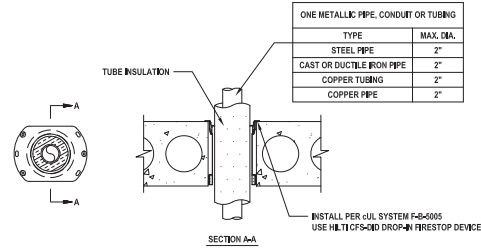
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M.1.2

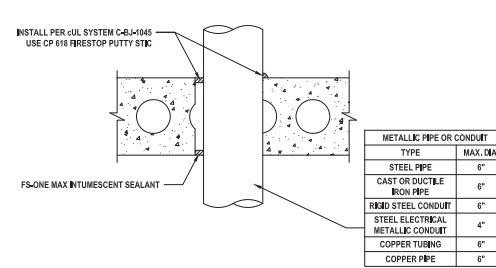
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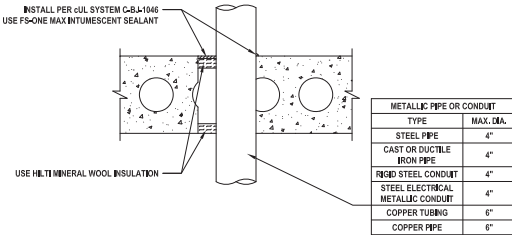
1 METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (3-HR.)
HC.1.1 NOT TO SCALE



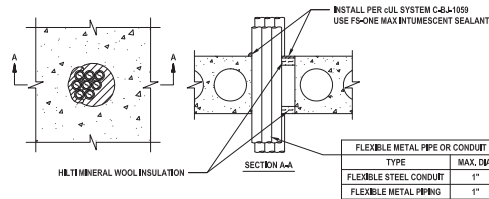
2 INSULATED (AB/PVC & GLASS FIBER) METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (3-HR.)
HC.1.1 NOT TO SCALE



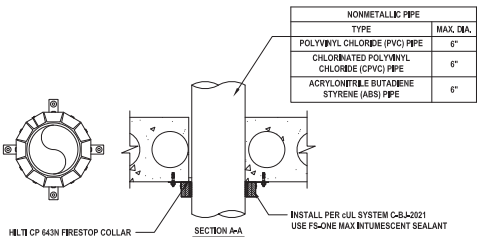
3 METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (2-HR.)
HC.1.1 NOT TO SCALE



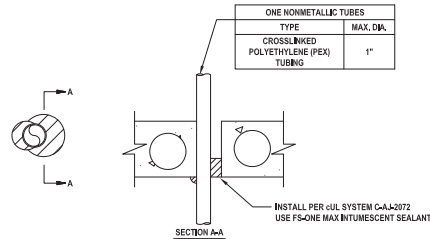
4 METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (2-HR.)
HC.1.1 NOT TO SCALE



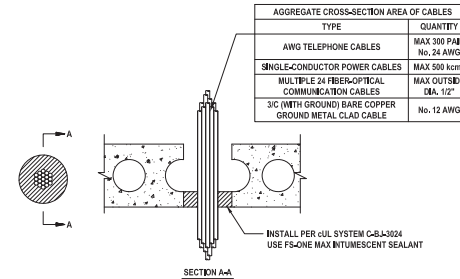
5 MULTIPLE METALLIC PIPES THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (3-HR.)
HC.1.1 NOT TO SCALE



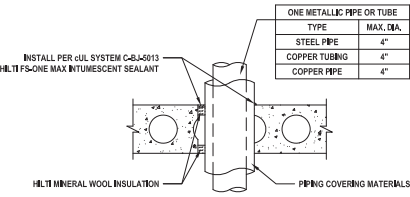
6 PLASTIC PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (2-HR.)
HC.1.1 NOT TO SCALE



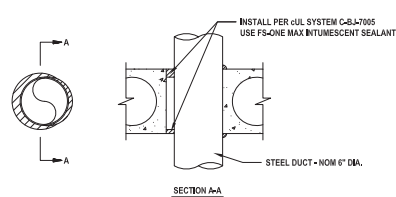
7 PEX TUBING THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (2-HR.)
HC.1.1 NOT TO SCALE



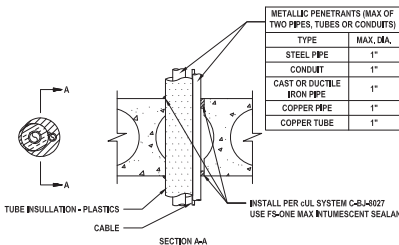
8 CABLE BUNDLE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (2-HR.)
HC.1.1 NOT TO SCALE



9 INSULATED (GLASS FIBER) METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (2-HR.)
HC.1.1 NOT TO SCALE



10 METAL DUCT THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (3-HR.)
HC.1.1 NOT TO SCALE

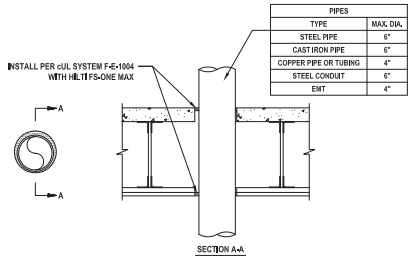


11 HVAC LINE SET THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (3-HR.)
HC.1.1 NOT TO SCALE

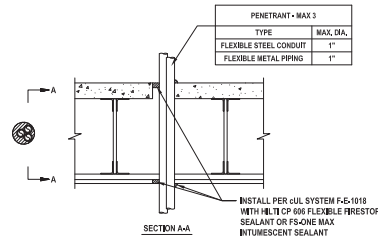
- Notes:
- Refer to the following specifications for firestopping.
 - 07 84 00 Firestopping
 - 07 84 13 Penetration Firestopping
 - 22 00 00 Plumbing
 - 23 00 00 HVAC
 - 26 00 00 Electrical
 - 27 06 37 Communication
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 - * Percent Fill
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 - * cUL 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 CLIV7 as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1.)
 - For all CPVC pipes systems, compatibility should be verified by the CPVC pipes manufacturer.

Schedule of penetration firestop systems		
Basis of design: Hilti, Inc.		
HOLLOW-CORE CONCRETE FLOORS		
TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN cUL SYSTEM
CIRCULAR BLANK OPENINGS	1	C-B-I-0022, C-A-I-0142
	2	C-B-I-0022, C-A-I-0142
SINGLE METAL PIPES OR CONDUIT	1	C-B-I-1045, C-B-I-1046, F-B-1029
	2	C-B-I-1045, C-B-I-1046, F-B-1029
	3	F-B-1028, F-B-1029, F-B-1170
MULTIPLE METAL PIPES OR CONDUIT	2	C-B-I-1059, C-B-I-1049
	3	C-B-I-1059, C-B-I-1049
SINGLE NONMETALLIC PIPE OR CONDUIT (E.G. PVC, CPVC, ABS, FRP, ENT)	1	C-A-I-2021, C-A-I-2035, C-A-I-2054, C-A-I-2070, C-A-I-2072, C-A-I-2098
	2	C-A-I-2021, C-A-I-2035, C-A-I-2054, C-A-I-2070, C-A-I-2072, C-A-I-2098
	3	C-A-I-2021, C-A-I-2035
	1	C-B-I-3024, C-A-I-3320
SINGLE CABLE BUNDLES	1	C-B-I-3024, C-A-I-3320
	2	C-A-I-3254, C-A-I-3285
	3	C-B-I-4026, F-B-4008
CABLE TRAY	1	C-B-I-4026, F-B-4008
	2	C-B-I-4026, F-B-4008
SINGLE INSULATED PIPES	1	C-B-I-5013, F-B-5003, C-B-I-5018
	2	C-B-I-5013, F-B-5003, C-B-I-5018
	3	C-B-I-5018, F-B-5004, F-B-5005
MECHANICAL DUCTWORK WITHOUT DAMPERS	1	C-B-I-7103
	2	C-B-I-7103
	3	C-B-I-7005
MIXED PENETRANTS	1	F-B-6003, F-B-6010, C-B-I-6020
	2	F-B-6003, F-B-6010, C-B-I-6020
	3	C-B-I-1059, C-B-I-8016, C-B-I-8027, C-B-I-8099

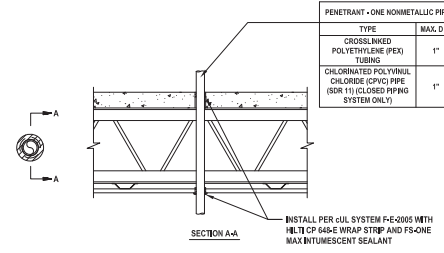
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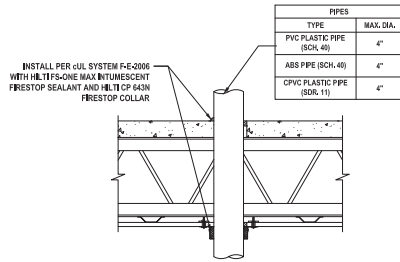
1 METAL PIPE THROUGH CONCRETE FLOOR/ CEILING ASSEMBLY (1-HR)
BJ.1.1 NOT TO SCALE



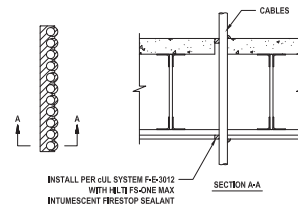
2 FLEXIBLE STEEL CONDUIT THROUGH CONCRETE FLOOR/ CEILING ASSEMBLY (1-HR)
BJ.1.1 NOT TO SCALE



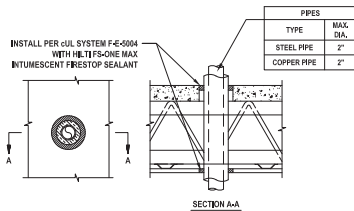
3 PLASTIC PIPE OR TUBING THROUGH CONCRETE FLOOR/ CEILING ASSEMBLY (1-HR)
BJ.1.1 NOT TO SCALE



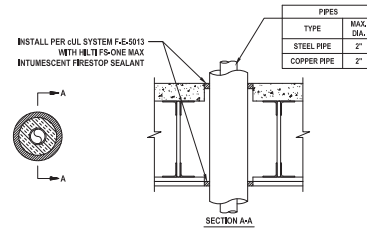
4 PLASTIC PIPE THROUGH CONCRETE FLOOR/ CEILING ASSEMBLY (1-HR)
BJ.1.1 NOT TO SCALE



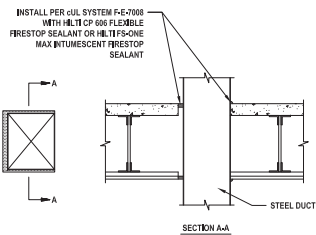
5 CABLES THROUGH CONCRETE FLOOR/ CEILING ASSEMBLY (1-HR)
BJ.1.1 NOT TO SCALE



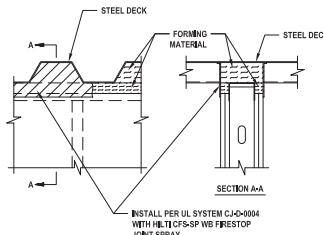
6 INSULATED (AB/PVC) METAL PIPE THROUGH CONCRETE FLOOR/ CEILING ASSEMBLY (1-HR)
BJ.1.1 NOT TO SCALE



7 INSULATED (GLASS-FIBER) METAL PIPE THROUGH CONCRETE FLOOR/ CEILING ASSEMBLY (1-HR)
BJ.1.1 NOT TO SCALE



8 STEEL METAL DUCT THROUGH CONCRETE FLOOR/ CEILING ASSEMBLY (1-HR)
BJ.1.1 NOT TO SCALE



9 TOP OF WALL JOINT: GYPSUM WALL TO NON-RATED ROOF/ FLOOR DECK (2-HR)
BJ.1.1 NOT TO SCALE

Notes:

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 - Contractor's Name
- For outlet boxes requiring protection, use only Wall Opening Protective Materials, category CLIV7 as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1.)
- For all CPVC pipes systems, compatibility should be verified by the CPVC pipes manufacturer.

<Notes to designer (delete this note after reading and replace with title block information)>
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JOB NUMBER:

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REVISIONS:

CONTENTS:

BAR JOINT ASSEMBLY FLOOR/ CEILING

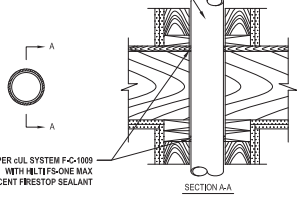
SHEET NAME:

BJ.1.1

SHEET NUMBER:

Schedule of penetration firestop systems		
Basis of design: Hilti, Inc.		
CONCRETE FLOOR/CEILING ASSEMBLIES		
TYPE OF PENETRANT	F-RATING (HR)	BASES OF DESIGN UL SYSTEM
METAL PIPES OR CONDUIT	1	F-E-1004, F-E-1035, F-E-1018
NON-METAL PIPES OR CONDUIT	1	F-E-2005, F-E-2006
SINGLE OR BUNDLED CABLES	1	F-E-3005, F-E-3012, F-E-3021
INSULATED PIPES	1	F-E-5013, F-E-5004
NON-INSULATED MECHANICAL DUCTWORK WITHOUT CAMPS	1	F-E-1008
MIXED PENETRANTS	1	F-E-1018

PIPES	
TYPE	MAX. DIA.
STEEL PIPE	4"
CAST OR DUCTILE IRON PIPE	4"
COPPER PIPE OR TUBING	4"
STEEL CONDUIT OR EMT	4"

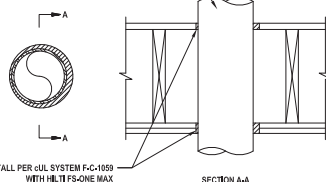


INSTALL PER cUL SYSTEM F-C-1009 WITH HL, TI FS-ONE MAX INTUMESCENT FIRESTOP SEALANT

SECTION A-A

1 METAL PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (2-HR)
FC.1.1 NOT TO SCALE

PIPES	
TYPE	MAX. DIA.
STEEL PIPE	6"
CAST IRON PIPE	6"
STEEL CONDUIT	6"
EMT	4"
FLEXIBLE STEEL CONDUIT	2"

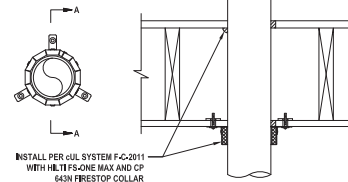


INSTALL PER cUL SYSTEM F-C-1059 WITH HL, TI FS-ONE MAX INTUMESCENT FIRESTOP SEALANT

SECTION A-A

2 METAL PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (2-HR)
FC.1.1 NOT TO SCALE

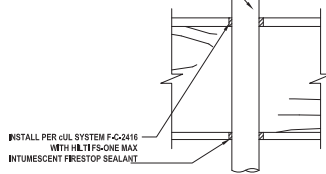
PIPES	
TYPE	MAX. DIA.
PVC PLASTIC PIPE	4"
ABS PLASTIC PIPE	4"
XFR&PVC PLASTIC PIPE	4"
CPVC PLASTIC PIPE	4"



INSTALL PER cUL SYSTEM F-C-2011 WITH HL, TI FS-ONE MAX AND CP 643N FIRESTOP COLLAR

3 PLASTIC PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.1 NOT TO SCALE

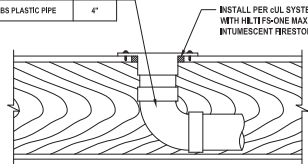
PIPES	
TYPE	MAX. DIA.
PVC PLASTIC PIPE	2"
ABS PLASTIC PIPE	2"
CPVC PLASTIC PIPE	2"
CROSS LINKED POLYETHYLENE (PEX) PIPE	1-1/2"



INSTALL PER cUL SYSTEM F-C-2016 WITH HL, TI FS-ONE MAX INTUMESCENT FIRESTOP SEALANT

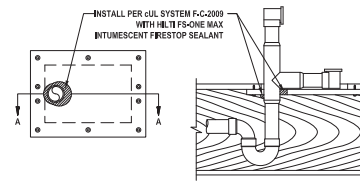
4 PLASTIC PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.1 NOT TO SCALE

PIPES	
TYPE	MAX. DIA.
PVC PLASTIC PIPE	4"
ABS PLASTIC PIPE	4"



INSTALL PER cUL SYSTEM F-C-2010 WITH HL, TI FS-ONE MAX INTUMESCENT FIRESTOP SEALANT

5 CLOSET FLANGE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.1 NOT TO SCALE

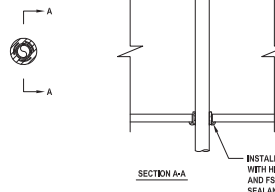


INSTALL PER cUL SYSTEM F-C-2009 WITH HL, TI FS-ONE MAX INTUMESCENT FIRESTOP SEALANT

SECTION A-A

6 PLASTIC PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.1 NOT TO SCALE

PENETRANTS	
TYPE	MAX. DIA.
CROSSLINKED POLYETHYLENE (PEX) TUBING	1"
CPVC PIPE (CLOSED PIRING SYSTEMS ONLY)	1"



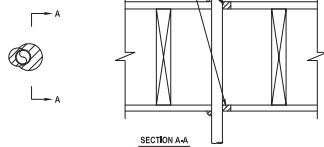
INSTALL PER cUL SYSTEM F-C-2005 WITH HL, TI CP 648E WRAP STRIP AND FS-ONE MAX INTUMESCENT SEALANT

SECTION A-A

8 PLASTIC PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.1 NOT TO SCALE

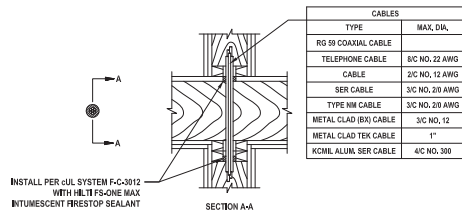
PENETRANTS	
TYPE	MAX. DIA.
CROSSLINKED POLYETHYLENE (PEX) TUBING	1"

INSTALL PER cUL SYSTEM F-C-2045 WITH HL, TI FS-ONE MAX INTUMESCENT SEALANT



SECTION A-A

7 PLASTIC PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.1 NOT TO SCALE



INSTALL PER cUL SYSTEM F-C-3912 WITH HL, TI FS-ONE MAX INTUMESCENT FIRESTOP SEALANT

SECTION A-A

CABLES	
TYPE	MAX. DIA.
RG 59 COAXIAL CABLE	
TELEPHONE CABLE	8/C NO. 22 AWG
CABLE	2/C NO. 12 AWG
SER CABLE	3/C NO. 20 AWG
TYPE RW CABLE	3/C NO. 20 AWG
METAL CLAD (BX) CABLE	3/C NO. 12
METAL CLAD TWX CABLE	1"
KCMIL ALUM. SER CABLE	4/C NO. 300

9 CABLE/ CABLE BUNDLE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (2-HR)
FC.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 cUL 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 Canada Inc. for alternative systems or Engineering Judgment (800-363-4458) Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
- Firestop System installation must meet requirements of CAN/ULC-S115 tested assemblies
- 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
 - cUL 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 CLIV7 as classified by Underwriter's Laboratories, Fire Resistance Directory (Volume 1.)
- For all CPVC pipes systems, compatibility should be verified by the CPVC pipes manufacturer.

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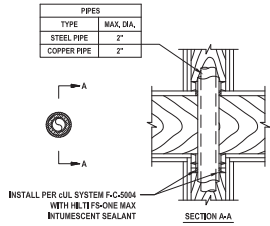
ISSUE DATE:

REVISIONS:

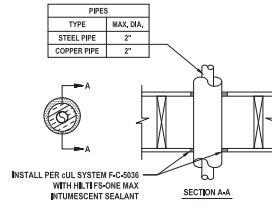
CONTENTS:
ELECTRICAL AND MECHANICAL PENETRATIONS FOR FLOOR/CEILING ASSEMBLY 1HR, AND 2 HR,
SHEET NAME:

FC.1.1

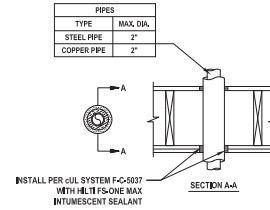
SHEET NUMBER:



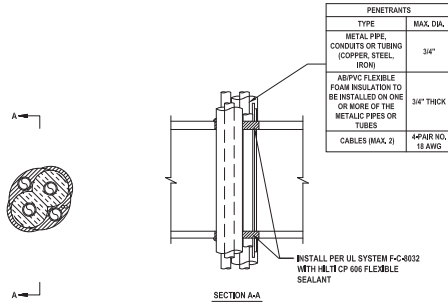
1 INSULATED (GLASS-FIBER OR AB/PVC FLEXIBLE FOAM INSULATION) METAL PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (2-HR)
FC.1.2 NOT TO SCALE



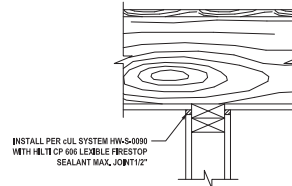
2 INSULATED (GLASS-FIBER) METAL PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.2 NOT TO SCALE



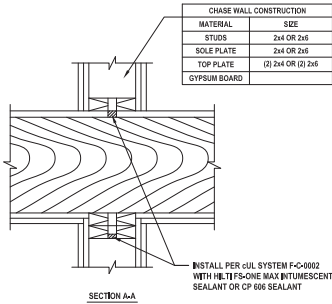
3 INSULATED (AB/PVC FLEXIBLE FOAM) METAL PIPE THROUGH WOOD FLOOR/ CEILING ASSEMBLY (2-HR)
FC.1.2 NOT TO SCALE



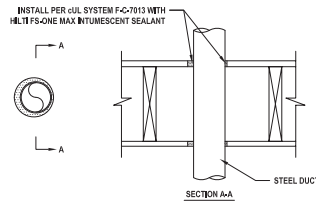
4 MULTIPLE HVAC LINE SET THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.2 NOT TO SCALE



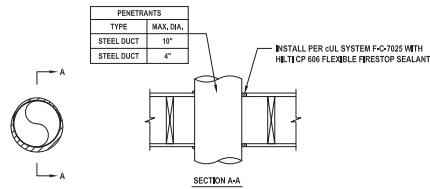
5 TOP OF WALL JOINT: GYPSUM WALL ASSEMBLY (1-HR)
FC.1.2 NOT TO SCALE



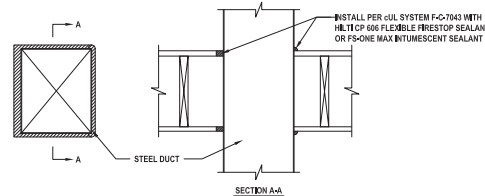
6 WOOD FLOOR/ CEILING ASSEMBLY (2-HR)
FC.1.2 NOT TO SCALE



7 DUCT PENETRATION THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.2 NOT TO SCALE



8 PENETRATION THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.2 NOT TO SCALE



9 DUCT PENETRATION THROUGH WOOD FLOOR/ CEILING ASSEMBLY (1-HR)
FC.1.2 NOT TO SCALE

Notes:

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- For all CPVC pipes systems, compatibility should be verified by the CPVC pipes manufacturer.

WOOD FLOORS		
TYPE OF PENETRANT	RA/T/RG (HR)	HILTI BASIS OF DESIGN UL SYSTEM
METAL PIPES OR CONDUIT	1	F-C-1009, F-C-1059, F-C-1168
	2	F-C-1009, F-C-1059, F-C-1168
NON-METALLIC PIPE OR CONDUIT	1	F-C-2005, F-C-2011, F-C-2045, F-C-2416, F-C-2207
	2	F-C-2012, F-C-3110, F-C-3044
SINGLE OR BUNDLED CABLES	1	F-C-3012, F-C-3110
	2	F-C-3012, F-C-3110
CABLE TRAY	1	W-4-4011, W-4-4019, W-4-4091
	2	W-4-4011, W-4-4019, W-4-4091
INSULATED PIPES	1	F-C-6004, F-C-6037, F-C-6036
	2	F-C-6004, F-C-6037
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	F-C-7013
INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	N/A**
	2	N/A**
MIXED PENETRANTS	1	F-C-8032

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ELECTRICAL AND MECHANICAL PENETRATIONS FOR FLOOR/CEILING ASSEMBLY 1HR, AND 2 HR.

SHEET NAME:

FC.1.2

SHEET NUMBER: