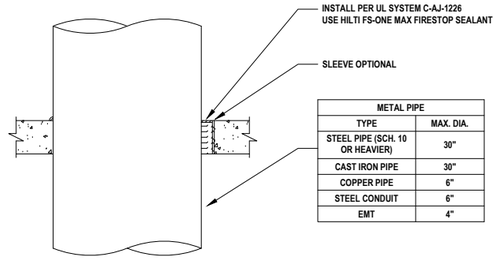
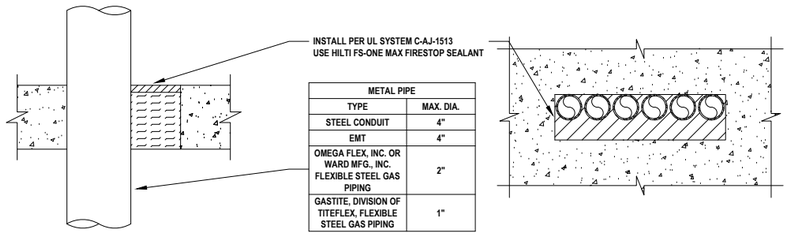


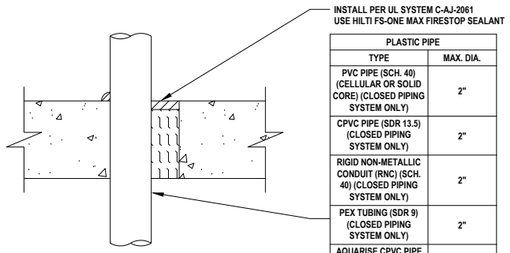
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	30"
CAST IRON PIPE	30"
COPPER PIPE	6"
STEEL CONDUIT	6"
EMT	4"

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



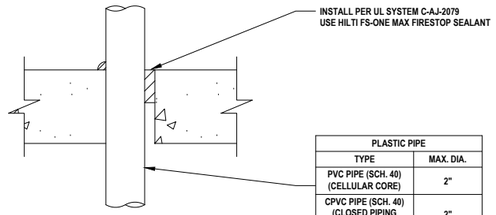
METAL PIPE	
TYPE	MAX. DIA.
STEEL CONDUIT	4"
EMT	4"
OMEGA FLEX, INC. OR WARD MFG., INC. FLEXIBLE STEEL GAS PIPING	2"
GASTITE, DIVISION OF TITEFLEX, FLEXIBLE STEEL GAS PIPING	1"

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



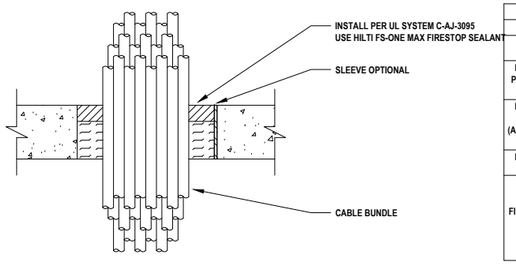
PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE) (CLOSED PIPING SYSTEM ONLY)	2"
CPVC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY)	2"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40) (CLOSED PIPING SYSTEM ONLY)	2"
PEX TUBING (SDR 9) (CLOSED PIPING SYSTEM ONLY)	2"
AQUARISE CPVC PIPE MAN.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

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



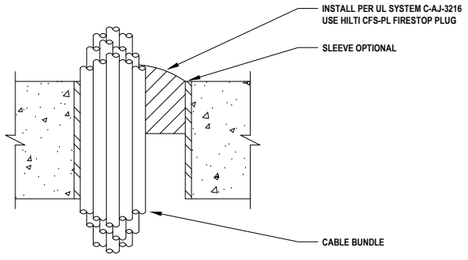
PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR CORE)	2"
CPVC PIPE (SCH. 40) (CLOSED PIPING SYSTEM ONLY)	2"

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



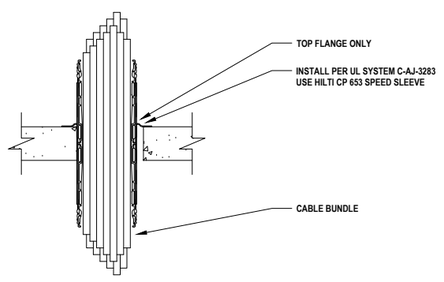
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/C NO. 12 AWG
POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR)	500 KCMIL	COPPER CONDUCTOR SER CABLE WITH PVC JACKET	3/C (+GROUND) 2/0 AWG
POWER CABLE WITH PVC JACKET (ALUMINUM OR COPPER CONDUCTOR)	350 KCMIL	COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET	RG/U
POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG	CABLE WITH PVC JACKET	3/C 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 E.1.1 CABLE BUNDLE THROUGH CONCRETE FLOOR (2-HR.)
NOT TO SCALE



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/C 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/C 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 E.1.1 CABLE BUNDLE THROUGH CONCRETE FLOOR (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/C NO. 12 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET	20/C 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/C 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 6/U		

7 E.1.1 CABLE BUNDLE THROUGH CONCRETE FLOOR (2-HR.)
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*
   * *All governing local and regional building codes*
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:*
   **Warning! - Do Not Disturb*
   **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.)*

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

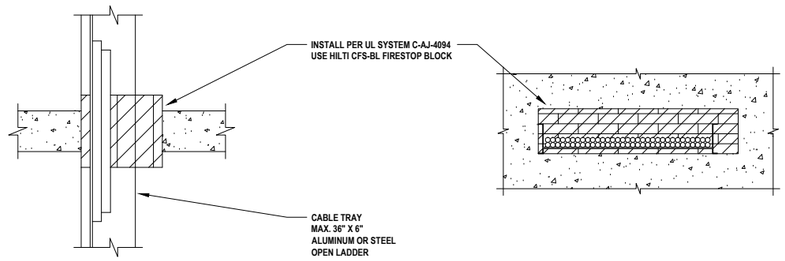
CONTENTS:

ELECTRICAL PENETRATIONS FLAT CONCRETE FLOOR 2 HR.

SHEET NAME:

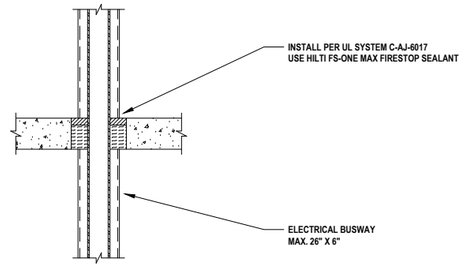
E.1.1

SHEET NUMBER:

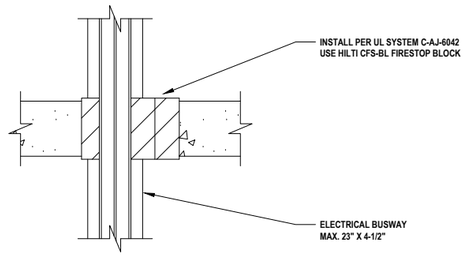


CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/C NO. 12 AWG
SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET	750 KCMIL	POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG
FIBER OPTIC CABLE (24 FIBER) WITH PVC JACKET	1/2" DIA.		

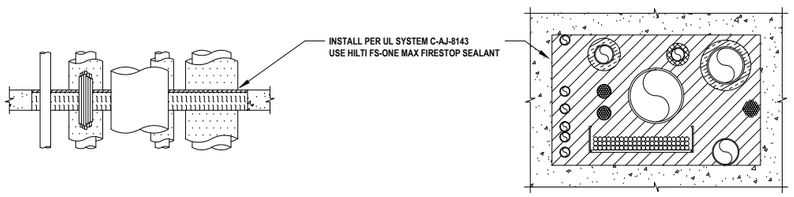
1 / E.1.2 CABLE TRAY THROUGH CONCRETE FLOOR (2-HR.)
NOT TO SCALE



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



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



4 / E.1.2 MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR (2-HR.)
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*
   * *All governing local and regional building codes*
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:*
   **Warning! - Do Not Disturb*
   **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.)*

<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.
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ISSUE DATE:

REVISIONS:

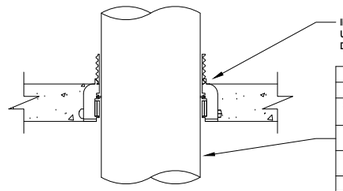
CONTENTS:

ELECTRICAL PENETRATIONS FLAT CONCRETE FLOOR 2 HR.

SHEET NAME:

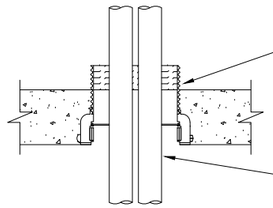
E.1.2

SHEET NUMBER:



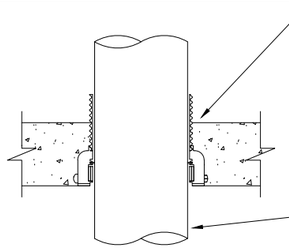
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	6"
CAST OR DUCTILE IRON PIPE	6"
COPPER PIPE OR TUBING	6"
STEEL CONDUIT	6"
EMT	4"

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



METAL PIPE (MAX. QTY. 4)	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 5 OR HEAVIER)	1-1/2"
EMT OR STEEL CONDUIT	1-1/2"
COPPER PIPE OR TUBING	1"

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



PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE) (SEE FULL DETAIL FOR RESTRICTIONS)	4"
FRPP PIPE (SCH. 40) (SEE FULL DETAIL FOR RESTRICTIONS)	6"
CPVC PIPE (SDR 11, SDR 13.5, OR SDR 17)	6"
AQUARISE CPVC PIPE MAN. BY IPEX, INC. (SDR 11) (CLOSED PIPING SYSTEM ONLY)	6"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40)	4"
SYSTEM 15 PVC PIPE MAN. BY IPEX, INC. (CELLULAR OR SOLID CORE)	6"

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

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

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

PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
CPVC PIPE (SDR 13.5)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
FRPP PIPE (SCH. 40)	4"

5 E.1.3 PLASTIC PIPE THROUGH CONCRETE FLOOR (2-HR.)
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.
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   * *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*
   * *All governing local and regional building codes*
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:*
   **Warning! - Do Not Disturb*
   **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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2. Details shown are up to date as of February 2015.
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JOB NUMBER:

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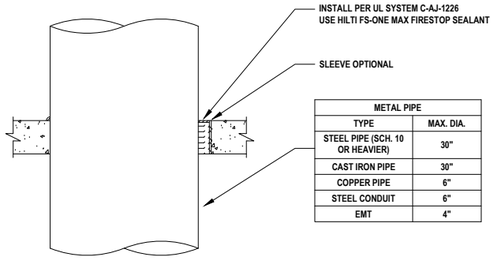
ELECTRICAL PENETRATIONS
FLAT CONCRETE FLOOR
2 HR.

SHEET NAME:

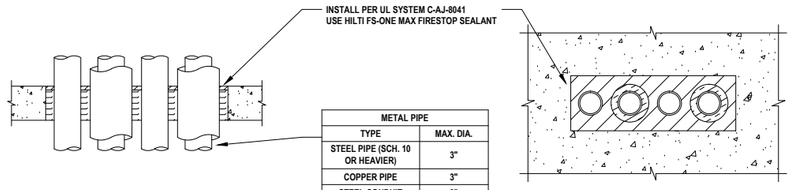
E.1.3

SHEET NUMBER:



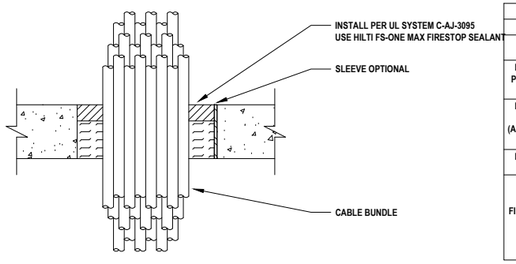
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	30"
CAST IRON PIPE	30"
COPPER PIPE	6"
STEEL CONDUIT	6"
EMT	4"

1 E.1.4 METAL PIPE THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE



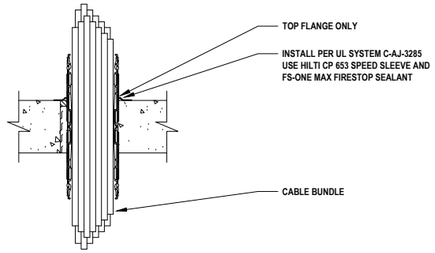
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	3"
COPPER PIPE	3"
STEEL CONDUIT	3"
EMT	3"

2 E.1.4 MULTIPLE METAL PIPES THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE



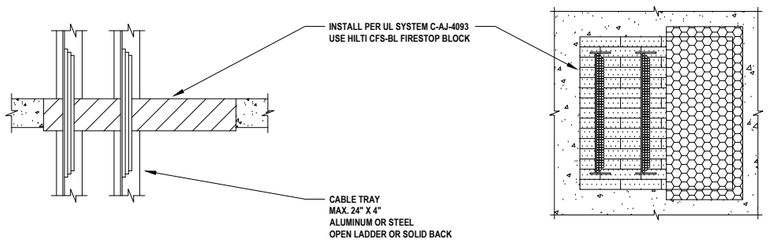
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/C NO. 12 AWG
POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR)	500 KCMIL	COPPER CONDUCTOR SER CABLE WITH PVC JACKET	3/C (+GROUND) 2/0 AWG
POWER CABLE WITH PVC JACKET (ALUMINUM OR COPPER CONDUCTOR)	350 KCMIL	COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET	RG/U
POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG	CABLE WITH PVC JACKET	3/C 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.

3 E.1.4 CABLE BUNDLE THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE



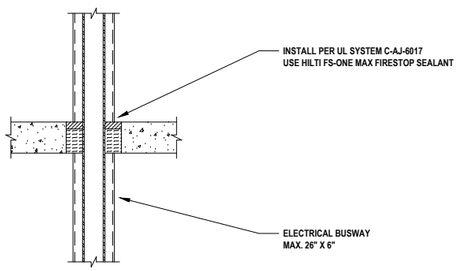
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	100 PAIR NO. 24 AWG	FIBER OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION	1/2" DIA.
COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION	7/C NO. 12 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET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

4 E.1.4 CABLE BUNDLE THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE

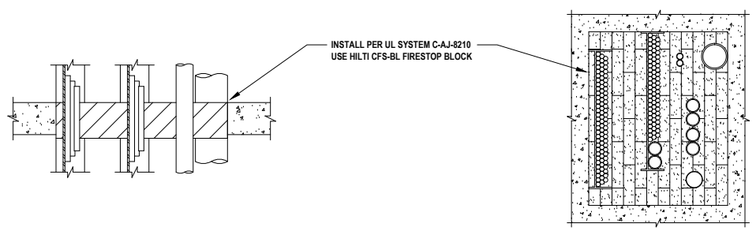


CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
COPPER CONDUCTOR CABLE WITH PVC JACKET	7/C NO. 12 AWG	SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET	500 KCMIL
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	FIBER OPTIC CABLE WITH PVC JACKET	24
SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET	350 KCMIL		

5 E.1.4 MULTIPLE CABLE TRAYS THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE



6 E.1.4 ELECTRICAL BUSWAY THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE



7 E.1.4 MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR (3-HR.)
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*
   * *All governing local and regional building codes*
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:*
   *Warning! - Do Not Disturb
   *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.)*

<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:

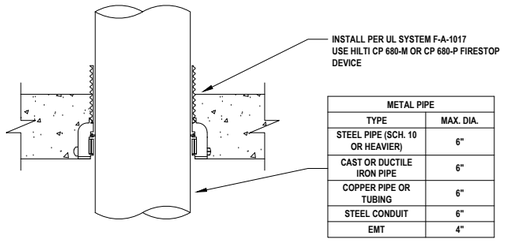
CONTENTS:

ELECTRICAL PENETRATIONS
FLAT CONCRETE FLOOR
3 HR.

SHEET NAME:

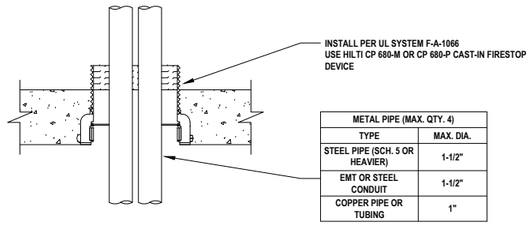
E.1.4

SHEET NUMBER:



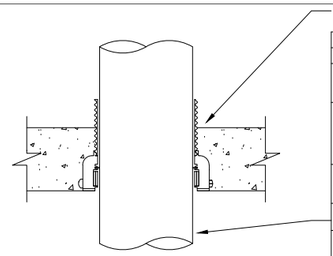
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	6"
CAST OR DUCTILE IRON PIPE	6"
COPPER PIPE OR TUBING	6"
STEEL CONDUIT	6"
EMT	4"

1 E.1.5 METAL PIPE THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE



METAL PIPE (MAX. QTY. 4)	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 5 OR HEAVIER)	1-1/2"
EMT OR STEEL CONDUIT	1-1/2"
COPPER PIPE OR TUBING	1"

2 E.1.5 MULTIPLE METAL PIPES THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE



PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE) (SEE FULL DETAIL FOR RESTRICTIONS)	4"
FRPP PIPE (SCH. 40) (SEE FULL DETAIL FOR RESTRICTIONS)	6"
CPVC PIPE (SDR 11, SDR 13.5, OR SDR 17)	6"
AQUARISE CPVC PIPE MAN. BY IPEX, INC. (SDR 11) (CLOSED PIPING SYSTEM ONLY)	6"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40)	4"
SYSTEM 15 PVC PIPE MAN. BY IPEX, INC. (CELLULAR OR SOLID CORE)	6"

3 E.1.5 PLASTIC PIPE THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE

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

4 E.1.5 CABLE BUNDLE THROUGH CONCRETE FLOOR (3-HR.)
NOT TO SCALE

PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
CPVC PIPE (SDR 13.5)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
FRPP PIPE (SCH. 40)	4"

5 E.1.5 PLASTIC PIPE THROUGH CONCRETE FLOOR (3-HR.)
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*
   * *All governing local and regional building codes*
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:*
   **Warning! - Do Not Disturb*
   **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.)*

<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:

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ISSUE DATE:

REVISIONS:

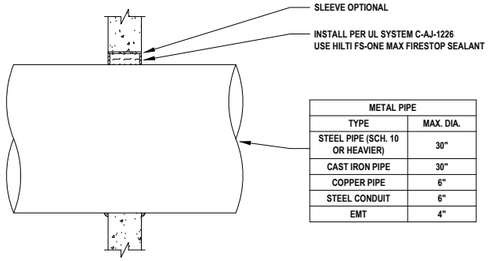
CONTENTS:

ELECTRICAL PENETRATIONS
FLAT CONCRETE FLOOR
3 HR.

SHEET NAME:

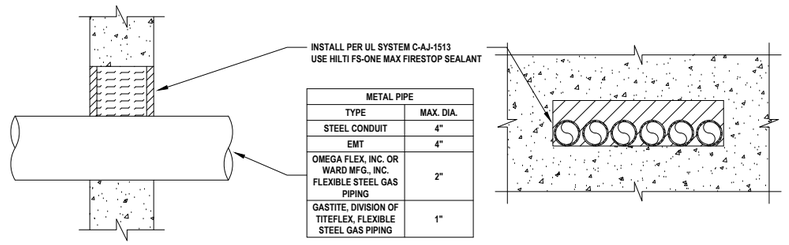
E.1.5

SHEET NUMBER:



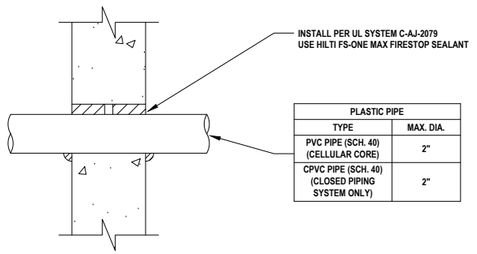
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	30"
CAST IRON PIPE	30"
COPPER PIPE	6"
STEEL CONDUIT	6"
EMT	4"

1 E.2.1 METAL PIPE THROUGH CONCRETE WALL (2-HR.)
NOT TO SCALE



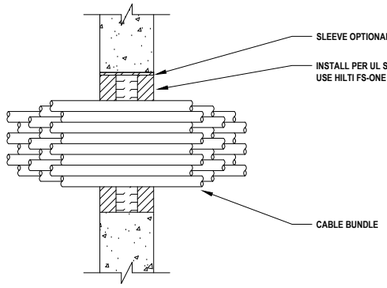
METAL PIPE	
TYPE	MAX. DIA.
STEEL CONDUIT	4"
EMT	4"
OMEGA FLEX, INC. OR WARD MFG., INC. FLEXIBLE STEEL GAS PIPING	2"
GASTITE, DIVISION OF TITEFLEX, FLEXIBLE STEEL GAS PIPING	1"

2 E.2.1 MULTIPLE METAL PIPES THROUGH CONCRETE WALL (2-HR.)
NOT TO SCALE



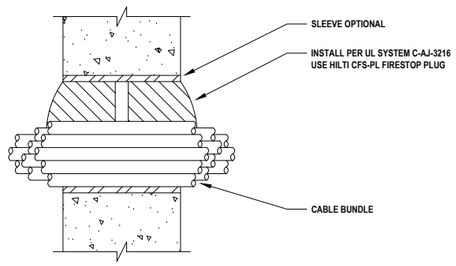
PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR CORE)	2"
CPVC PIPE (SCH. 40) (CLOSED PIPING SYSTEM ONLY)	2"

3 E.2.1 PLASTIC PIPE THROUGH CONCRETE WALL (2-HR.)
NOT TO SCALE



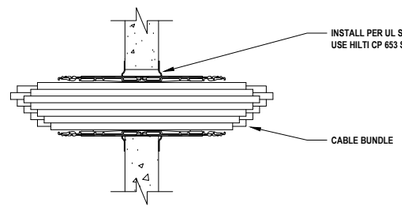
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/C NO. 12 AWG
POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR)	500 KCMIL	COPPER CONDUCTOR SER CABLE WITH PVC JACKET	3/C (+GROUND) 2/0 AWG
POWER CABLE WITH PVC JACKET (ALUMINUM OR COPPER CONDUCTOR)	350 KCMIL	COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET	RG/U
POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG	CABLE WITH PVC JACKET	3/C 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.

4 E.2.1 CABLE BUNDLE THROUGH CONCRETE WALL (2-HR.)
NOT TO SCALE



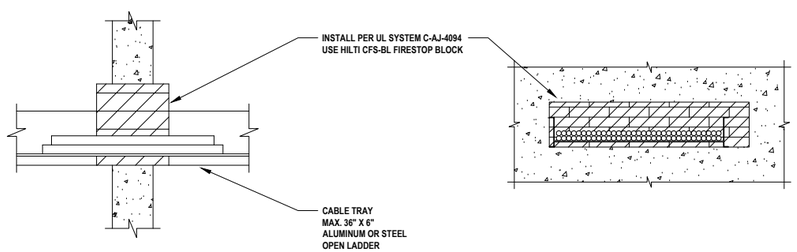
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC INSULATION AND JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE WITH PVC JACKET	3/C NO. 12 AWG
POWER CABLE WITH THERMOPLASTIC INSULATION AND PVC JACKET	750 KCMIL	METAL-CLAD TEK CABLE WITH PVC JACKET	1" DIA.
POWER CABLE WITH PVC OR XLPE INSULATION AND PVC JACKET	7/C 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

5 E.2.1 CABLE BUNDLE THROUGH CONCRETE WALL (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/C NO. 12 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET	20/C 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/C 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 6/U		

6 E.2.1 CABLE BUNDLE THROUGH CONCRETE WALL (2-HR.)
NOT TO SCALE



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.		

7 E.2.1 CABLE TRAY THROUGH CONCRETE WALL (2-HR.)
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*
   * *All governing local and regional building codes*
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:*
   *Warning! - Do Not Disturb
   *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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JOB NUMBER:

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ISSUE DATE:

REVISIONS:

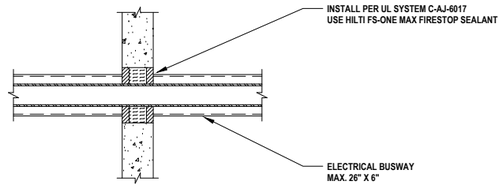
CONTENTS:

ELECTRICAL PENETRATIONS CONCRETE/BLOCK WALL 2 HR.

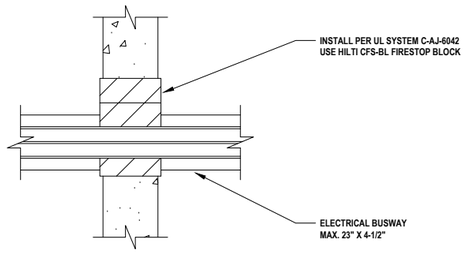
SHEET NAME:

E.2.1

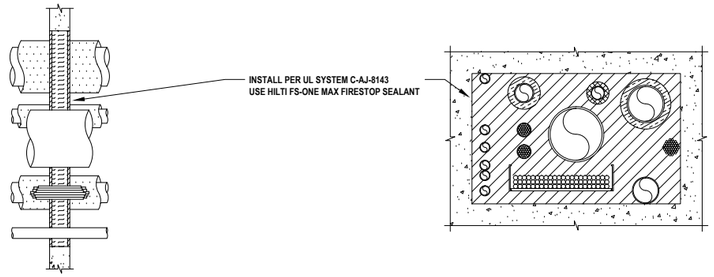
SHEET NUMBER:



1 E.2.2 ELECTRICAL BUSWAY THROUGH CONCRETE WALL (2-HR.)
NOT TO SCALE



2 E.2.2 ELECTRICAL BUSWAY THROUGH CONCRETE WALL (2-HR.)
NOT TO SCALE



3 E.2.2 MULTIPLE PENETRATIONS THROUGH CONCRETE WALL (2-HR.)
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*
   * *All governing local and regional building codes*
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:*
   Warning! - Do Not Disturb
   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.)*

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

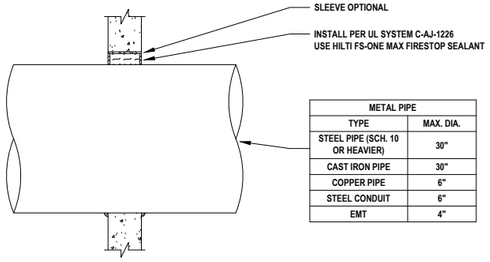
CONTENTS:

ELECTRICAL PENETRATIONS CONCRETE/BLOCK WALL 2 HR.

SHEET NAME:

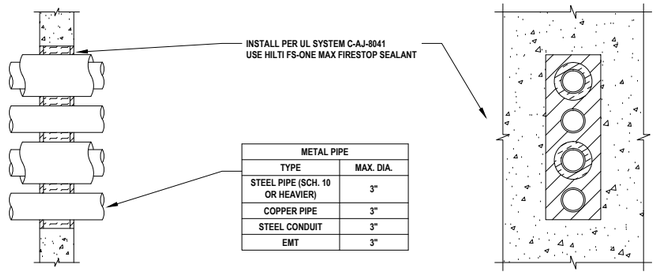
E.2.2

SHEET NUMBER:



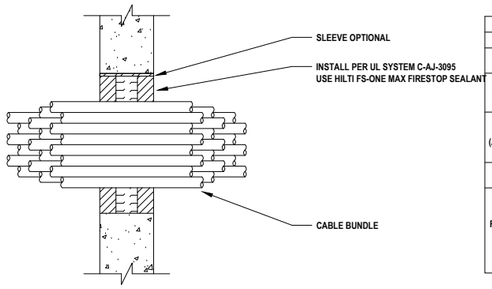
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	30"
CAST IRON PIPE	30"
COPPER PIPE	6"
STEEL CONDUIT	6"
EMT	4"

1 E.2.3 METAL PIPE THROUGH CONCRETE WALL (3-HR.)
NOT TO SCALE



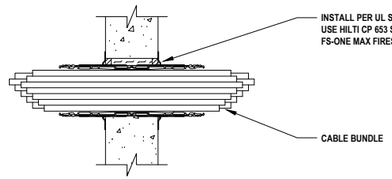
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	3"
COPPER PIPE	3"
STEEL CONDUIT	3"
EMT	3"

2 E.2.3 MULTIPLE METAL PIPES THROUGH CONCRETE WALL (3-HR.)
NOT TO SCALE



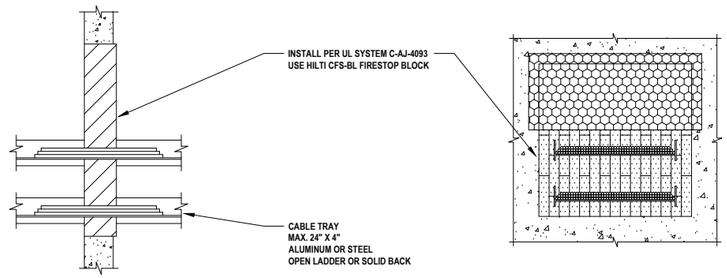
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/C NO. 12 AWG
POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR)	500 KCMIL	COPPER CONDUCTOR SER CABLE WITH PVC JACKET	3/C (+GROUND) 2/0 AWG
POWER CABLE WITH PVC JACKET (ALUMINUM OR COPPER CONDUCTOR)	350 KCMIL	COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET	RG/U
POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG	CABLE WITH PVC JACKET	3/C 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.

3 E.2.3 CABLE BUNDLE THROUGH CONCRETE WALL (3-HR.)
NOT TO SCALE



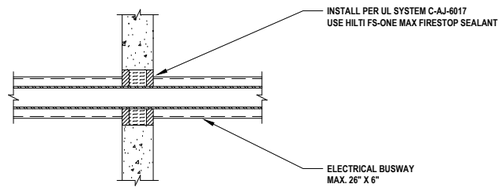
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	100 PAIR NO. 24 AWG	FIBER OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION	1/2" DIA.
COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION	7/C NO. 12 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET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

4 E.2.3 CABLE BUNDLE THROUGH CONCRETE WALL (3-HR.)
NOT TO SCALE

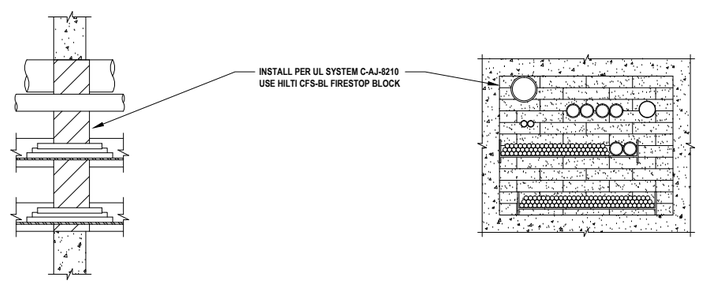


CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
COPPER CONDUCTOR CABLE WITH PVC JACKET	7/C NO. 12 AWG	SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET	500 KCMIL
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	FIBER OPTIC CABLE WITH PVC JACKET	24
SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET	350 KCMIL		

5 E.2.3 MULTIPLE CABLE TRAYS THROUGH CONCRETE WALL (3-HR.)
NOT TO SCALE



6 E.2.3 ELECTRICAL BUSWAY THROUGH CONCRETE WALL (3-HR.)
NOT TO SCALE



7 E.2.3 MULTIPLE PENETRATIONS THROUGH CONCRETE WALL (3-HR.)
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.
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   * *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*
   * *All governing local and regional building codes*
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:*
   Warning! - Do Not Disturb
   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.)*

<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:

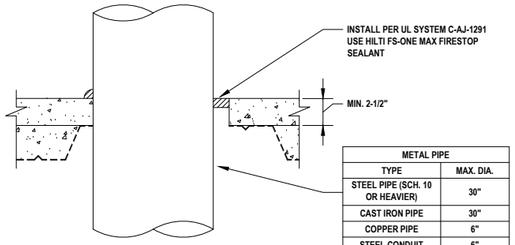
CONTENTS:

ELECTRICAL PENETRATIONS CONCRETE/BLOCK WALL 3 HR.

SHEET NAME:

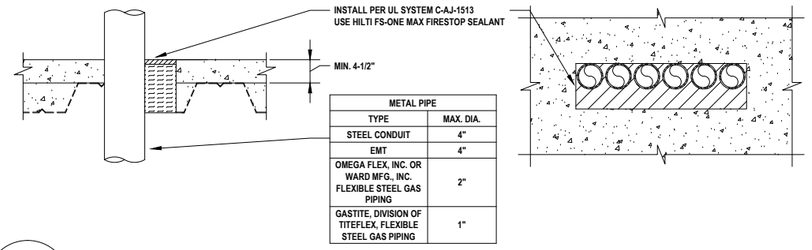
E.2.3

SHEET NUMBER:



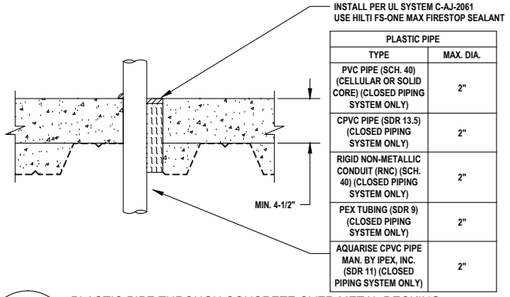
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	30"
CAST IRON PIPE	30"
COPPER PIPE	6"
STEEL CONDUIT	6"
EMT	4"

1 E.3.1 METAL PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



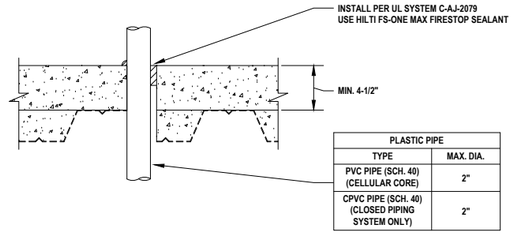
METAL PIPE	
TYPE	MAX. DIA.
STEEL CONDUIT	4"
EMT	4"
OMEGA FLEX, INC. OR WARD MFG., INC. FLEXIBLE STEEL GAS PIPING	2"
GASTITE, DIVISION OF TITEFLEX, FLEXIBLE STEEL GAS PIPING	1"

2 E.3.1 MULTIPLE METAL PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



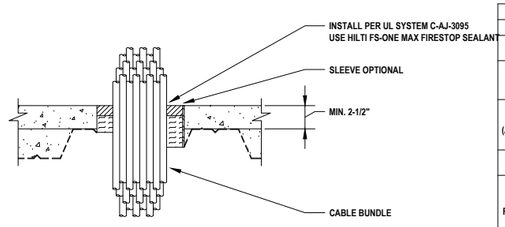
PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE) (CLOSED PIPING SYSTEM ONLY)	2"
CPVC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY)	2"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40) (CLOSED PIPING SYSTEM ONLY)	2"
PEX TUBING (SDR 9) (CLOSED PIPING SYSTEM ONLY)	2"
AQUARISE CPVC PIPE MAN.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

3 E.3.1 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



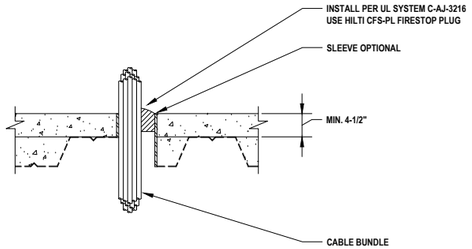
PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR CORE)	2"
CPVC PIPE (SCH. 40) (CLOSED PIPING SYSTEM ONLY)	2"

4 E.3.1 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



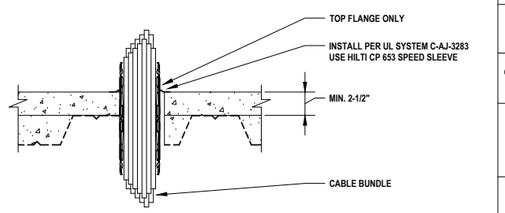
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/C NO. 12 AWG
POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR)	500 KCMIL	COPPER CONDUCTOR SER CABLE WITH PVC JACKET	3/C (+GROUND) 2/0 AWG
POWER CABLE WITH PVC JACKET (ALUMINUM OR COPPER CONDUCTOR)	350 KCMIL	COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET	RG/U
POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG	CABLE WITH PVC JACKET	3/C 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 E.3.1 CABLE BUNDLE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



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/C 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/C 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 E.3.1 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/C NO. 12 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET	20/C 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/C 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 6/U		

7 E.3.1 CABLE BUNDLE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
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:*
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   * *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*
   * *All governing local and regional building codes*
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:*
   **Warning! - Do Not Disturb*
   **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.)*

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

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ISSUE DATE:

REVISIONS:

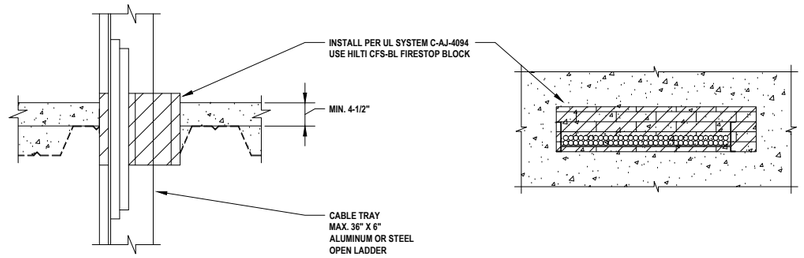
CONTENTS:

ELECTRICAL PENETRATIONS CONCRETE OVER METAL DECK 2 HR.

SHEET NAME:

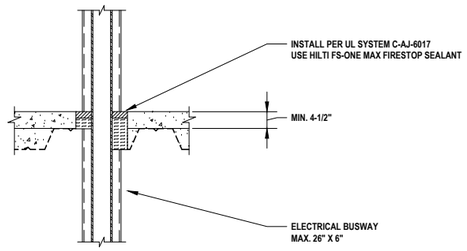
E.3.1

SHEET NUMBER:

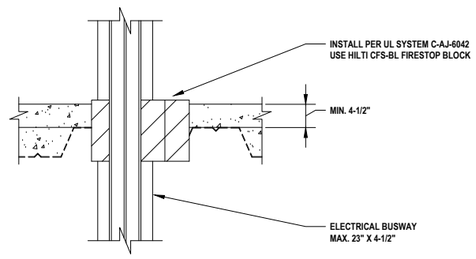


CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/C NO. 12 AWG
SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET	750 KCMIL	POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG
FIBER OPTIC CABLE (24 FIBER) WITH PVC JACKET	1/2" DIA.		

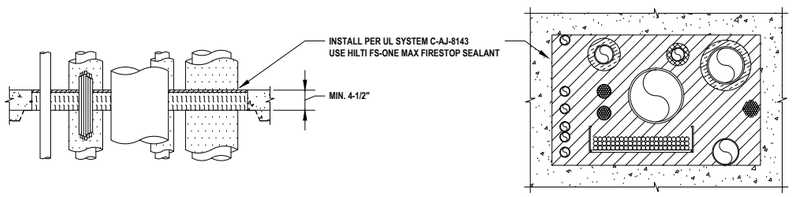
1 / E.3.2 CABLE TRAY THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



2 / E.3.2 ELECTRICAL BUSWAY THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



3 / E.3.2 ELECTRICAL BUSWAY THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



4 / E.3.2 MULTIPLE PENETRATIONS THROUGH CONCRETE OVER METAL DECKING (2-HR.)
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*
   * *All governing local and regional building codes*
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:*
   **Warning! - Do Not Disturb*
   **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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JOB NUMBER:

CHECKED:

ISSUE DATE:

REVISIONS:

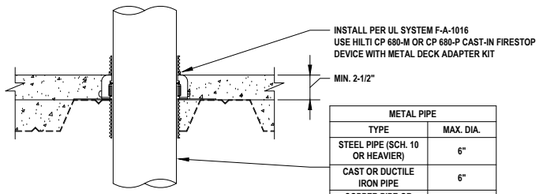
CONTENTS:

ELECTRICAL PENETRATIONS CONCRETE OVER METAL DECK 2 HR.

SHEET NAME:

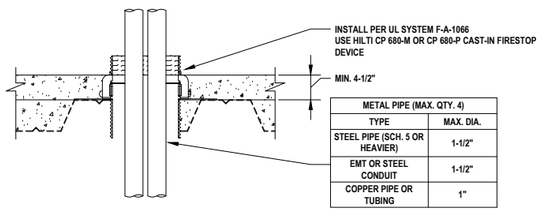
E.3.2

SHEET NUMBER:



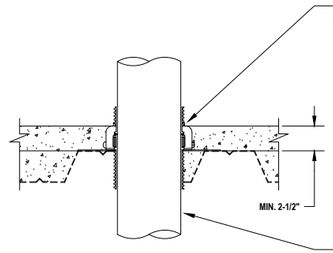
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	6"
CAST OR DUCTILE IRON PIPE	6"
COPPER PIPE OR TUBING	6"
STEEL CONDUIT	6"
EMT	4"

1 E.3.3 METAL PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



METAL PIPE (MAX. QTY. 4)	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 5 OR HEAVIER)	1-1/2"
EMT OR STEEL CONDUIT	1-1/2"
COPPER PIPE OR TUBING	1"

2 E.3.3 MULTIPLE METAL PIPES THROUGH CONCRETE OVER METAL DECKING (2-HR.)
NOT TO SCALE



PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE) (SEE FULL DETAIL FOR RESTRICTIONS)	4"
FRPP PIPE (SCH. 40) (SEE FULL DETAIL FOR RESTRICTIONS)	6"
CPVC PIPE (SDR 11, SDR 13.5, OR SDR 17)	6"
AQUARISE CPVC PIPE MAN. BY IPEX, INC. (SDR 11) (CLOSED PIPING SYSTEM ONLY)	6"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40)	4"
SYSTEM 15 PVC PIPE MAN. BY IPEX, INC. (CELLULAR OR SOLID CORE)	6"

3 E.3.3 PLASTIC PIPE 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	FIBER OPTIC CABLE (24 FIBER)	1/2" DIA.
POWER CABLE WITH PVC JACKET	750 KCMIL	METAL-CLAD CABLE	3/C NO. 12 AWG
POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG		

4 E.3.3 CABLE BUNDLE 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 (SDR 13.5)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
FRPP PIPE (SCH. 40)	4"

5 E.3.3 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (2-HR.)
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.*
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   * *NFPA 70 - National Electric Code*
   * *All governing local and regional building codes*
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:*
   **Warning! - Do Not Disturb*
   **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.)*

<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:

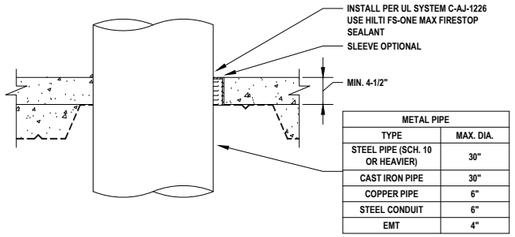
CONTENTS:

ELECTRICAL PENETRATIONS CONCRETE OVER METAL DECK 2 HR.

SHEET NAME:

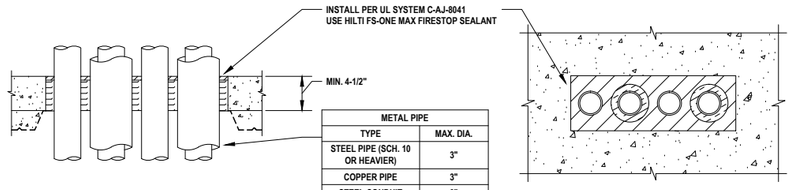
E.3.3

SHEET NUMBER:



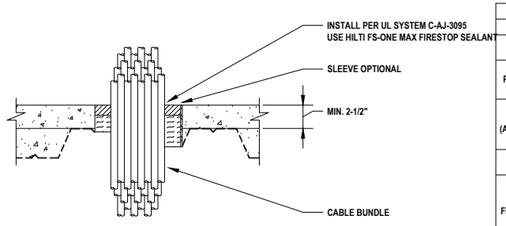
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	30"
CAST IRON PIPE	30"
COPPER PIPE	6"
STEEL CONDUIT	6"
EMT	4"

1 E.3.4 METAL PIPE THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE



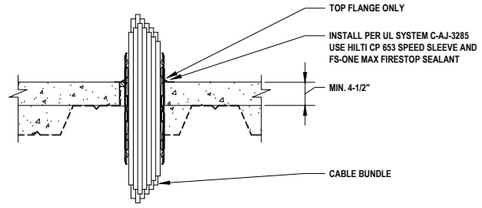
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	3"
COPPER PIPE	3"
STEEL CONDUIT	3"
EMT	3"

2 E.3.4 MULTIPLE METAL PIPES THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE



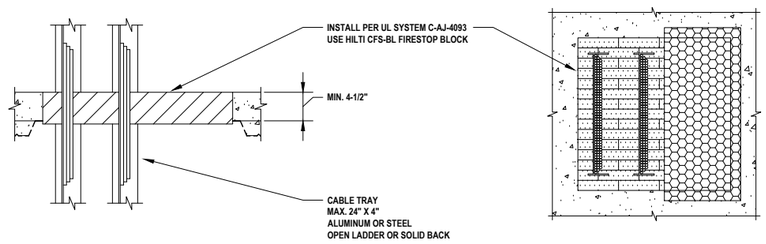
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	METAL-CLAD CABLE	3/C NO. 12 AWG
POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR)	500 KCMIL	COPPER CONDUCTOR SER CABLE WITH PVC JACKET	3/C (+GROUND) 2/0 AWG
POWER CABLE WITH PVC JACKET (ALUMINUM OR COPPER CONDUCTOR)	350 KCMIL	COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET	RG/U
POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG	CABLE WITH PVC JACKET	3/C 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.

3 E.3.4 CABLE BUNDLE THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE



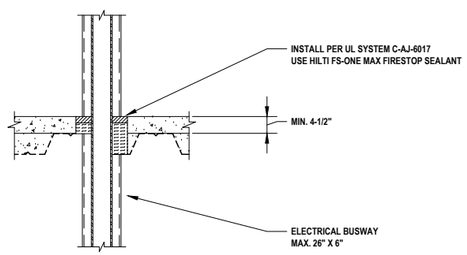
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	100 PAIR NO. 24 AWG	FIBER OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION	1/2" DIA.
COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION	7/C NO. 12 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET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

4 E.3.4 CABLE BUNDLE THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE

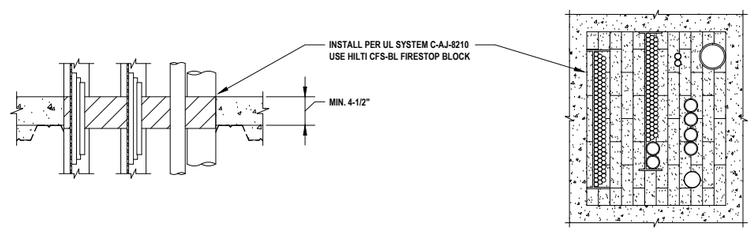


CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
COPPER CONDUCTOR CABLE WITH PVC JACKET	7/C NO. 12 AWG	SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET	500 KCMIL
TELEPHONE CABLE WITH PVC JACKET	300 PAIR NO. 24 AWG	FIBER OPTIC CABLE WITH PVC JACKET	24
SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET	350 KCMIL		

5 E.3.4 MULTIPLE CABLE TRAYS THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE



6 E.3.4 ELECTRICAL BUSWAY THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE



7 E.3.4 MULTIPLE PENETRATIONS THROUGH CONCRETE OVER METAL DECKING (3-HR.)
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*
   * *All governing local and regional building codes*
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:*
   *Warning! - Do Not Disturb
   *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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JOB NUMBER:

CHECKED:

ISSUE DATE:

REVISIONS:

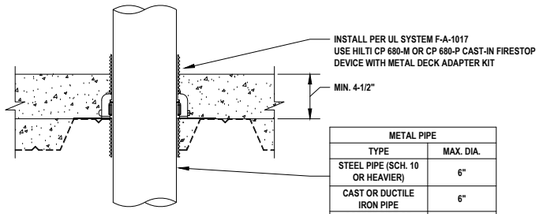
CONTENTS:

ELECTRICAL PENETRATIONS CONCRETE OVER METAL DECK 3 HR.

SHEET NAME:

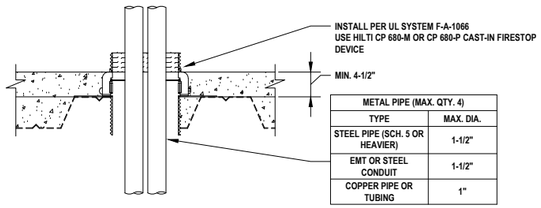
E.3.4

SHEET NUMBER:



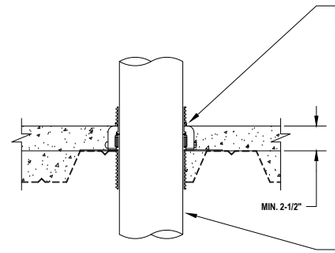
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	6"
CAST OR DUCTILE IRON PIPE	6"
COPPER PIPE OR TUBING	6"
STEEL CONDUIT	6"
EMT	4"

1 E.3.5 METAL PIPE THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE



METAL PIPE (MAX. QTY. 4)	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 5 OR HEAVIER)	1-1/2"
EMT OR STEEL CONDUIT	1-1/2"
COPPER PIPE OR TUBING	1"

2 E.3.5 MULTIPLE METAL PIPES THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE



PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE) (SEE FULL DETAIL FOR RESTRICTIONS)	4"
FRPP PIPE (SCH. 40) (SEE FULL DETAIL FOR RESTRICTIONS)	6"
CPVC PIPE (SDR 11, SDR 13.5, OR SDR 17)	6"
AQUARISE CPVC PIPE MAN. BY IPEX, INC. (SDR 11) (CLOSED PIPING SYSTEM ONLY)	6"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40)	4"
SYSTEM 15 PVC PIPE MAN. BY IPEX, INC. (CELLULAR OR SOLID CORE)	6"

3 E.3.5 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE

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

4 E.3.5 CABLE BUNDLE THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE

PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
CPVC PIPE (SDR 13.5)	6"
ABS PIPE (SCH. 40) (CELLULAR OR SOLID CORE)	6"
FRPP PIPE (SCH. 40)	4"

5 E.3.5 PLASTIC PIPE THROUGH CONCRETE OVER METAL DECKING (3-HR.)
NOT TO SCALE

Notes:

1. *Refer to the following specifications for firestopping.*
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   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*

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   * *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.*
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   * *NFPA 101 Life Safety Code*
   * *NFPA 70 - National Electric Code*
   * *All governing local and regional building codes*
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:*
   Warning! - Do Not Disturb
   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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ISSUE DATE:

REVISIONS:

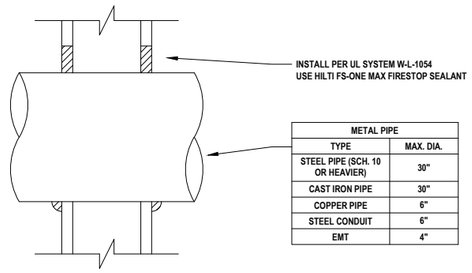
CONTENTS:

ELECTRICAL PENETRATIONS CONCRETE OVER METAL DECK 3 HR.

SHEET NAME:

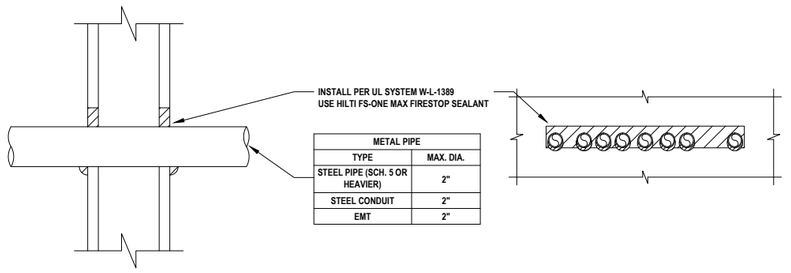
E.3.5

SHEET NUMBER:



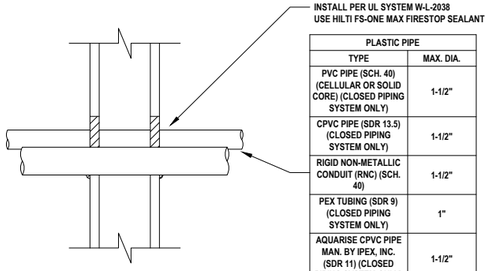
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	30"
CAST IRON PIPE	30"
COPPER PIPE	6"
STEEL CONDUIT	6"
EMT	4"

1 E.4.1 METAL PIPE THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
NOT TO SCALE



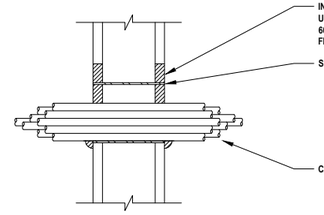
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 5 OR HEAVIER)	2"
STEEL CONDUIT	2"
EMT	2"

2 E.4.1 MULTIPLE METAL PIPES THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
NOT TO SCALE



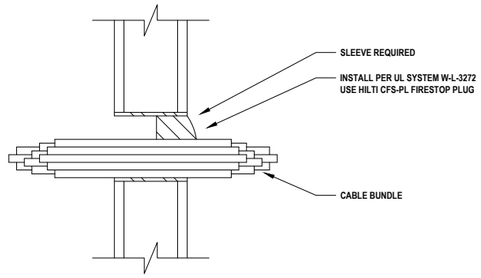
PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE) (CLOSED PIPING SYSTEM ONLY)	1-1/2"
CPVC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY)	1-1/2"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40)	1-1/2"
PEX TUBING (SDR 9) (CLOSED PIPING SYSTEM ONLY)	1"
AQUARISE CPVC PIPE MAN. BY IPEX, INC. (SDR 11) (CLOSED PIPING SYSTEM ONLY)	1-1/2"

3 E.4.1 MULTIPLE PLASTIC PIPES THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
NOT TO SCALE



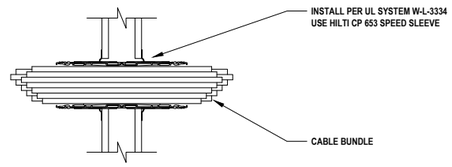
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG	COPPER GROUND CABLE WITH OR WITHOUT PVC JACKET	3/4" DIA.
TELEPHONE CABLE WITH PVC JACKET	25 PAIR NO. 24 AWG	SINGLE OR MULTIPLE CONDUCTOR TYPE MI CABLE (MIN. 1/8" SEPERATION BETWEEN MI CABLES AND ANY OTHER TYPES OF CABLE)	1-1/4" DIA.
COAXIAL CABLE WITH PVC JACKET	1/2" DIA. RG/U	ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY	-
METAL-CLAD CABLE	3/C NO. 8 AWG	ALUMINUM SER CABLE	4/C (+GROUND) NO. 300 KCMIL
COPPER CONDUCTOR CABLE (ROMEX)	3/C (+GROUND) NO. 8 AWG	CABLE	4 PAIR NO. 22 AWG CAT 5 OR CAT 6
FIBER OPTIC CABLE WITH PVC JACKET	5/8" DIA.	COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET	RG 6/U

4 E.4.1 CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
NOT TO SCALE



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

5 E.4.1 CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
NOT TO SCALE



CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	100 PAIR NO. 24 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET	20/C NO. 22 AWG
COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION	7/C NO. 12 AWG	POWER OR NON-POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT METAL JACKET (MAN. BY AFC CABLE SYSTEMS, INC.)	2/C NO. 18 AWG
TYPE RHH GROUND CABLE	4/0 AWG	S-VIDEO CABLE CONSISTING OF TWO MAX. 24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET	1/4" DIA.
COMPUTER CABLE	4 PAIR NO. 22 AWG CAT 5 OR CAT 6	METAL-CLAD CABLE	3/C NO. 12 AWG
COAXIAL CABLE	RG 6/U	ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY	-
FIBER OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION	1/2" DIA.		

6 E.4.1 CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
NOT TO SCALE

Notes:

1. *Refer to the following specifications for firestopping.*
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   b. *07 84 13 Penetration Firestopping*
   c. *22 00 00 Plumbing*
   d. *23 00 00 HVAC*
   e. *26 00 00 Electrical*
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   * *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.*
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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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JOB NUMBER:

CHECKED:

ISSUE DATE:

REVISIONS:

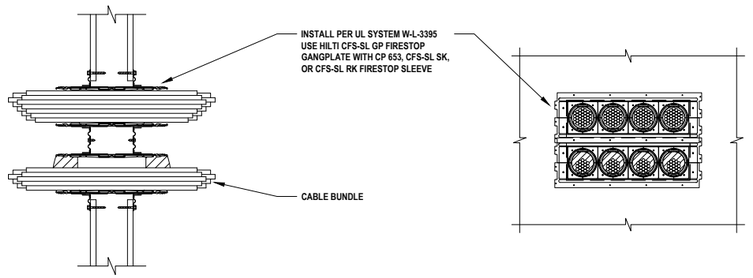
CONTENTS:

ELECTRICAL PENETRATIONS GYPSUM WALL 1 HR.

SHEET NAME:

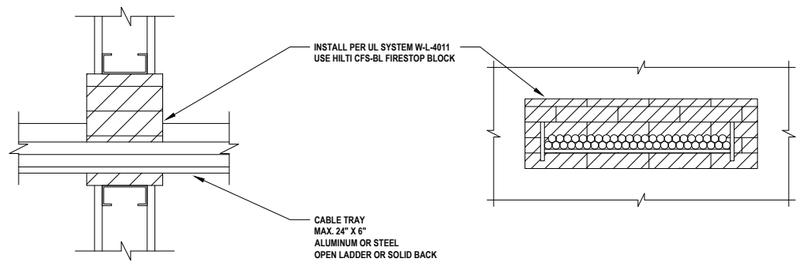
E.4.1

SHEET NUMBER:



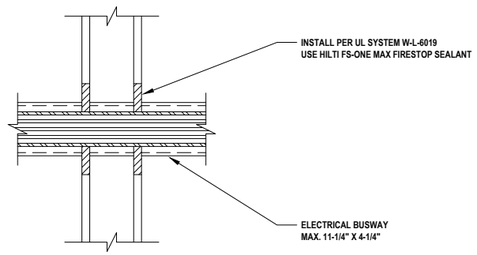
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	100 PAIR NO. 24 AWG	COAXIAL CABLE	RG 6/U
COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION	7/C NO. 12 AWG	FIBER OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION	1/2" DIA.
TYPE RHH GROUND CABLE	4/0 AWG	MC CABLE	3/C NO. 12 AWG
COMPUTER CABLE	4 PAIR NO. 22 AWG CAT 5 OR CAT 6		

1 E.4.2 MULTIPLE CABLE BUNDLES THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
NOT TO SCALE

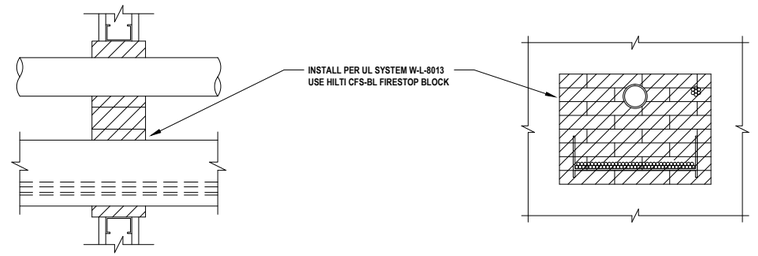


CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE	300 PAIR NO. 24 AWG	FIBER OPTIC CABLE (24 FIBER)	1/2" DIA.
SINGLE CONDUCTOR POWER CABLE	750 KCMIL	METAL-CLAD CABLE	3/C NO. 12 AWG

2 E.4.2 CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
NOT TO SCALE



3 E.4.2 ELECTRICAL BUSWAY THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
NOT TO SCALE



4 E.4.2 MULTIPLE PENETRATIONS THROUGH GYPSUM WALL ASSEMBLY (1-HR.)
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*
   * *All governing local and regional building codes*
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:*
   Warning! - Do Not Disturb
   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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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:

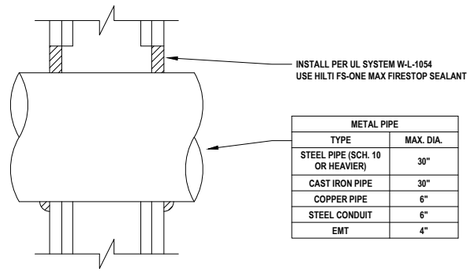
CONTENTS:

ELECTRICAL PENETRATIONS GYPSUM WALL 1 HR.

SHEET NAME:

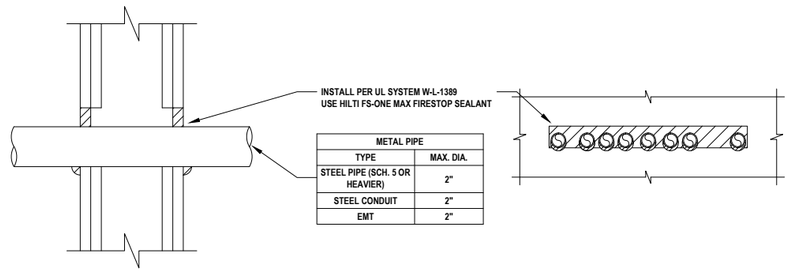
E.4.2

SHEET NUMBER:



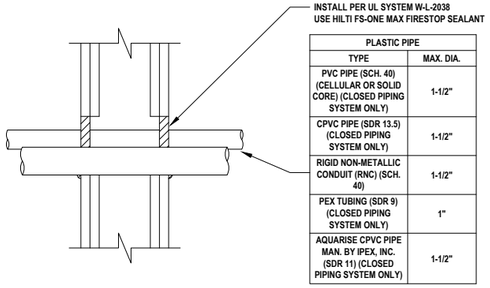
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 10 OR HEAVIER)	30"
CAST IRON PIPE	30"
COPPER PIPE	6"
STEEL CONDUIT	6"
EMT	4"

1 / E.4.3 METAL PIPE THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE



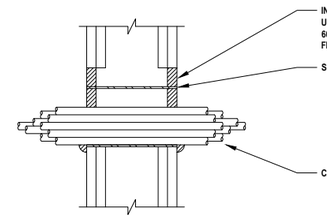
METAL PIPE	
TYPE	MAX. DIA.
STEEL PIPE (SCH. 5 OR HEAVIER)	2"
STEEL CONDUIT	2"
EMT	2"

2 / E.4.3 MULTIPLE METAL PIPES THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE



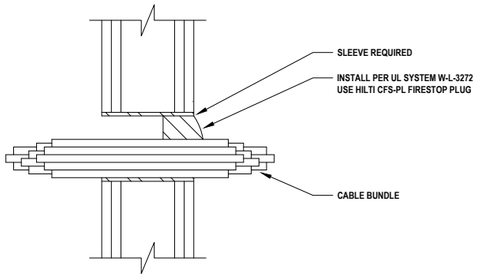
PLASTIC PIPE	
TYPE	MAX. DIA.
PVC PIPE (SCH. 40) (CELLULAR OR SOLID CORE) (CLOSED PIPING SYSTEM ONLY)	1-1/2"
CPVC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY)	1-1/2"
RIGID NON-METALLIC CONDUIT (RNC) (SCH. 40)	1-1/2"
PEX TUBING (SDR 9) (CLOSED PIPING SYSTEM ONLY)	1"
AQUARISE CPVC PIPE MAN. BY IPEX, INC. (SDR 11) (CLOSED PIPING SYSTEM ONLY)	1-1/2"

3 / E.4.3 MULTIPLE PLASTIC PIPES THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE



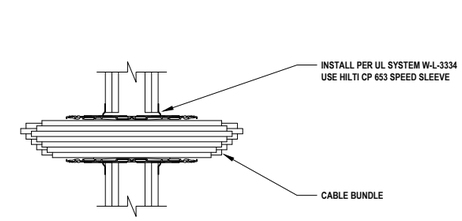
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
POWER CABLE WITH PVC JACKET	7/C NO. 12 AWG	COPPER GROUND CABLE WITH OR WITHOUT PVC JACKET	3/4" DIA.
TELEPHONE CABLE WITH PVC JACKET	25 PAIR NO. 24 AWG	SINGLE OR MULTIPLE CONDUCTOR TYPE MI CABLE (MIN. 1/8" SEPERATION BETWEEN MI CABLES AND ANY OTHER TYPES OF CABLE)	1-1/4" DIA.
COAXIAL CABLE WITH PVC JACKET	1/2" DIA. RG/U	ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY	-
METAL-CLAD CABLE	3/C NO. 8 AWG	ALUMINUM SER CABLE	4/C (+GROUND) NO. 300 KCMIL
COPPER CONDUCTOR CABLE (ROMEX)	3/C (+GROUND) NO. 8 AWG	CABLE	4 PAIR NO. 22 AWG CAT 5 OR CAT 6
FIBER OPTIC CABLE WITH PVC JACKET	5/8" DIA.	COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET	RG 6/U

4 / E.4.3 CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE



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

5 / E.4.3 CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE



CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	100 PAIR NO. 24 AWG	SHIELDED PRINTER CABLE WITH PVC JACKET	20/C NO. 22 AWG
COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION	7/C NO. 12 AWG	POWER OR NON-POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT METAL JACKET (MAN. BY AFC CABLE SYSTEMS, INC.)	2/C NO. 18 AWG
TYPE RHH GROUND CABLE	4/0 AWG	S-VIDEO CABLE CONSISTING OF TWO MAX. 24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET	1/4" DIA.
COMPUTER CABLE	4 PAIR NO. 22 AWG CAT 5 OR CAT 6	METAL-CLAD CABLE	3/C NO. 12 AWG
COAXIAL CABLE	RG 6/U	ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY	-
FIBER OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION	1/2" DIA.		

6 / E.4.3 CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE

Notes:

1. *Refer to the following specifications for firestopping.*
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   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*

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   * *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:*
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   * *NFPA 101 Life Safety Code*
   * *NFPA 70 - National Electric Code*
   * *All governing local and regional building codes*
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:*
   **Warning! - Do Not Disturb*
   **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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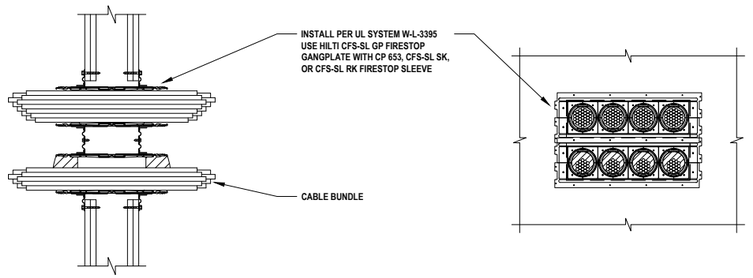
ELECTRICAL PENETRATIONS GYPSUM WALL 2 HR.

SHEET NAME:

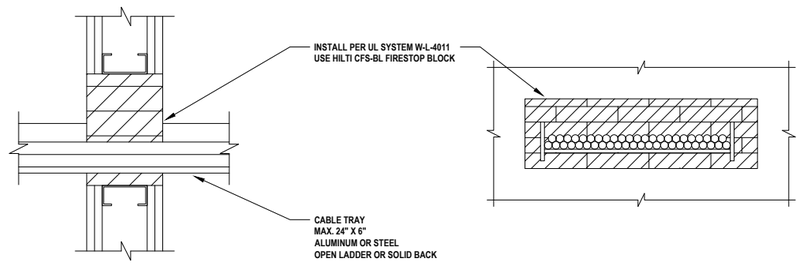
E.4.3

SHEET NUMBER:



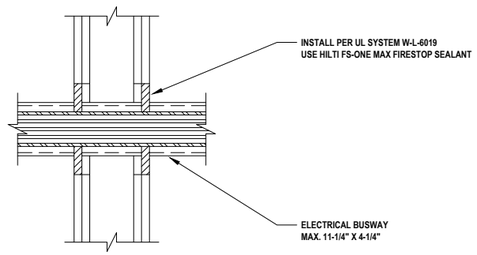
CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE WITH PVC JACKET	100 PAIR NO. 24 AWG	COAXIAL CABLE	RG 6/U
COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION	7/C NO. 12 AWG	FIBER OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION	1/2" DIA.
TYPE RHH GROUND CABLE	4/0 AWG	MC CABLE	3/C NO. 12 AWG
COMPUTER CABLE	4 PAIR NO. 22 AWG CAT 5 OR CAT 6		

1 E.4.4 MULTIPLE CABLE BUNDLES THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE

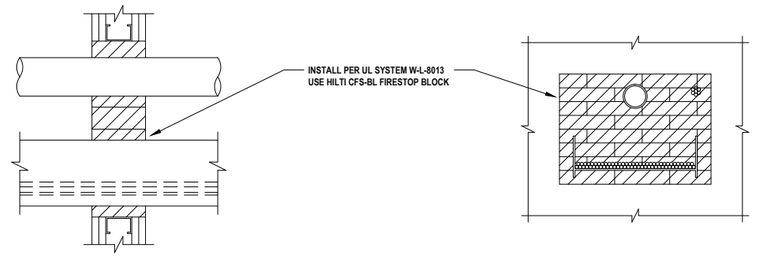


CABLE BUNDLE CONSISTS OF:			
TYPE	MAX.	TYPE	MAX.
TELEPHONE CABLE	300 PAIR NO. 24 AWG	FIBER OPTIC CABLE (24 FIBER)	1/2" DIA.
SINGLE CONDUCTOR POWER CABLE	750 KCMIL	METAL-CLAD CABLE	3/C NO. 12 AWG

2 E.4.4 CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE



3 E.4.4 ELECTRICAL BUSWAY THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE



4 E.4.4 MULTIPLE PENETRATIONS THROUGH GYPSUM WALL ASSEMBLY (2-HR.)
NOT TO SCALE

Notes:

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ELECTRICAL PENETRATIONS GYPSUM WALL 2 HR.

SHEET NAME:

E.4.4

SHEET NUMBER: