



Quality People. Building Solutions.

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Date: 7/17/2026

Return Request: 7/24/2026

Project: Hot Springs National Park – Rehabilitate Bathhouses – Maurice Bathhouse

Supplier: Hilti

Manufacturer: Hilti

Submittal: Through Penetration Firestopping (Re-Submittal #2)

Submittal Number: 230503.001

Spec Section: 230503

Drawing # and Installation Location: MP1.0 through MP1.3, and MP4.0

ARCHITECT

Strata Architecture
1701 Oak Street, Suite 100
Kansas City, Missouri 64108
(816)474-0900

GENERAL CONTRACTOR

Tepa, LLC
2345 Grand Blvd, Suite 700
Kansas City, Missouri 64108
(816)708-1110

ENGINEER

IMEG Corp.
1600 Baltimore Street, Suite 300
Kansas City, Missouri 64108
(816)842-8437

MECHANICAL SUBCONTRACTOR

Comfort Systems USA (Arkansas), Inc.
9924 Landers Road
North Little Rock, Arkansas 72117
(501)834-3320

Comments:

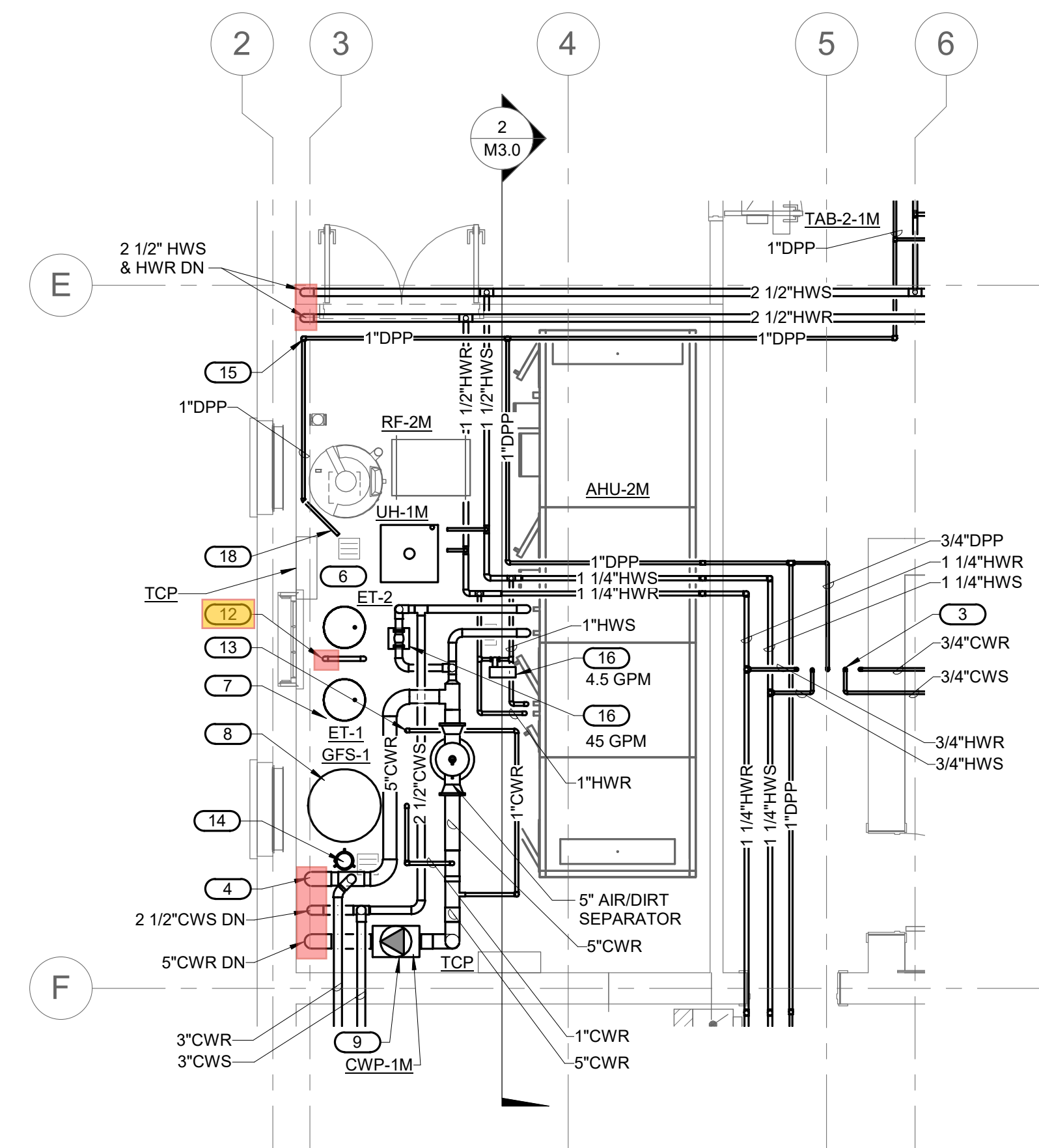
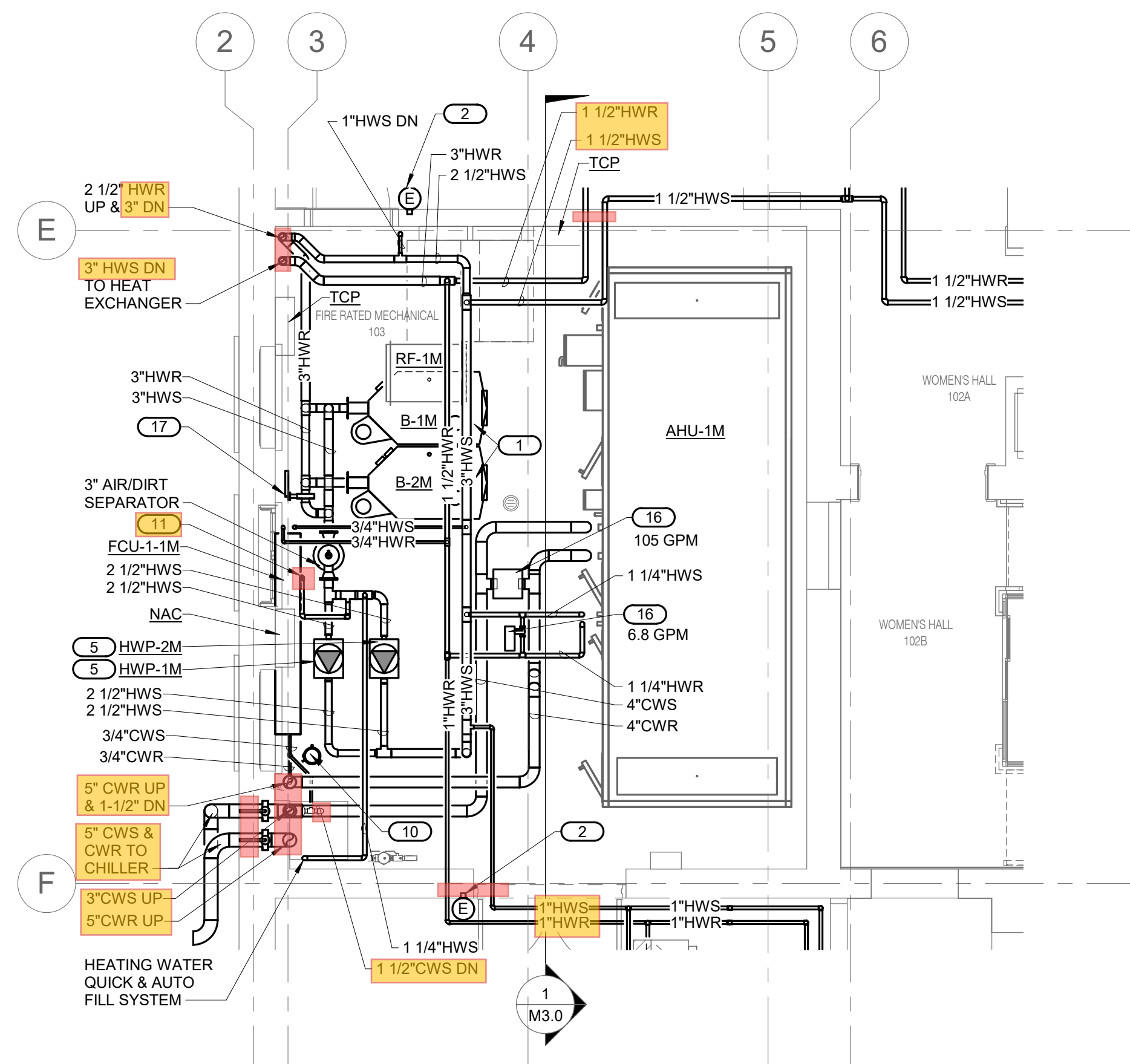
There are HWS/R, CHWS/R, and DPP piping penetrations and ductwork penetrations into and out of this mechanical room (see plan page MP4.0 for penetrations). These will all receive FS-One per Hilti System C-AJ-5090.

CSUSA PROJECT NO.

25-7065

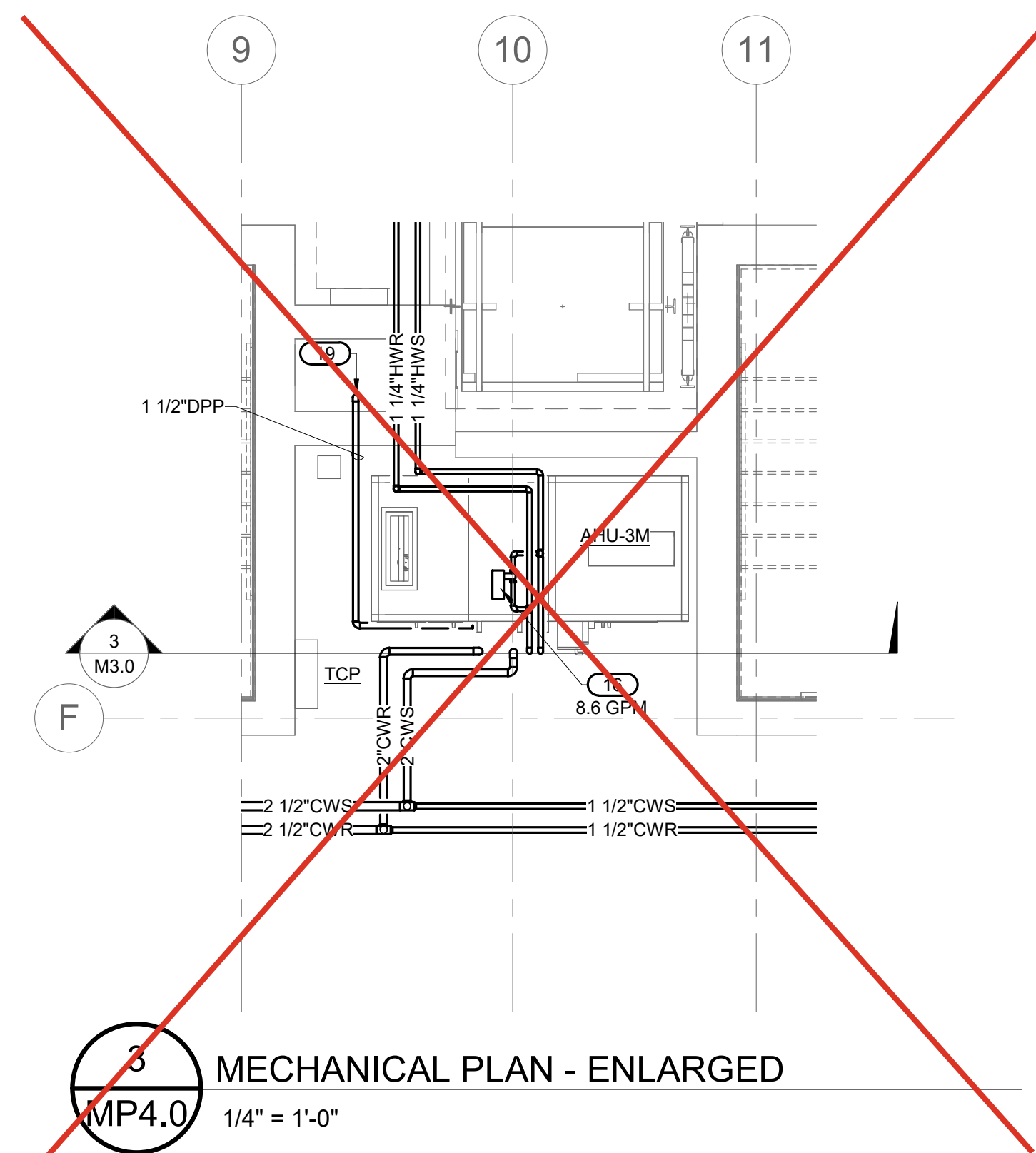
joe@comfortar.com

9924 Landers Road
No. LittleRock, AR 72117



- SHEET NOTES:**
1. ROUTING OF TERMINAL EQUIPMENT AND PIPING SHALL BE VERY CAREFULLY COORDINATED WITH EXISTING CONDITIONS, PRESERVATION ZONES AND HISTORIC NATURE OF BUILDING TO CONFORM WITH THE SECRETARY OF THE INTERIOR'S REHABILITATION REQUIREMENTS AND PRESERVATION BRIEFS RELATED TO MEP DESIGN AND INSTALLATION .

- KEYNOTES:**
1. HIGH EFFICIENCY HOT WATER CONDENSING BOILER. MOUNT ON 4" MIN. HIGH HOUSEKEEPING PAD. EXTEND COMBUSTION AIR AND BOILER FLUE DUCTS THROUGH EXTERIOR WALL.
 2. BOILER EMERGENCY SHUTDOWN PUSH BUTTON.
 3. 3/4" HWS, HWR AND 1" CWS, CWR UP TO FCU ABOVE.
 4. CHILLED WATER RETURN DOWN TO AHU-1M AND FAN COIL UNITS.
 5. SPLIT COUPLED IN-LINE PUMP.
 6. HEATING WATER EXPANSION TANK MOUNTED ON 4" HIGH CONCRETE HOUSEKEEPING PAD.
 7. CHILLED WATER EXPANSION TANK MOUNTED ON 4" HIGH CONCRETE HOUSEKEEPING PAD.
 8. CHILLED WATER GLYCOL FILL SYSTEM MOUNTED ON 4" HIGH CONCRETE HOUSEKEEPING PAD.
 9. COIL MOUNTED SPLIT COUPLED IN-LINE CHILLED WATER PUMP.
 10. HEATING WATER POT EXPANSION FEEDER.
 11. 1"-1/4" HWS UP TO EXPANSION TANK.
 12. 1"-1/4" HWS DN & UP TO CONNECT TO ET-2.
 13. 1" CWR DN TO ET-1.
 14. CHILLED WATER POT EXPANSION FEEDER.
 15. DROP DDP DN AND ROUTE TO FLOOR SINK.
 16. HOT WATER FLOW AUTO BYPASS VALVE. SEE PLANS FOR GPM.
 17. BOILER BYPASS CONTROL VALVE.
 18. ROUTE DPP ALONG FLOOR TO FLOOR SINK.
 19. ROUTE DPP DN IN CHASE TO BASEMENT.



FS-ONE High Performance Intumescent Firestop Sealant

Product description

- Intumescent (expands when exposed to fire) firestop sealant that helps protect combustible and non-combustible penetrations for up to 4 hours fire rating

Product features

- Smoke, gas and water resistant after material has cured
- Contains no halogen, solvents or asbestos
- High fire rating properties
- Water based, easy to clean
- Protects most typical firestop penetration applications
- Paintable
- Single component systems available
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

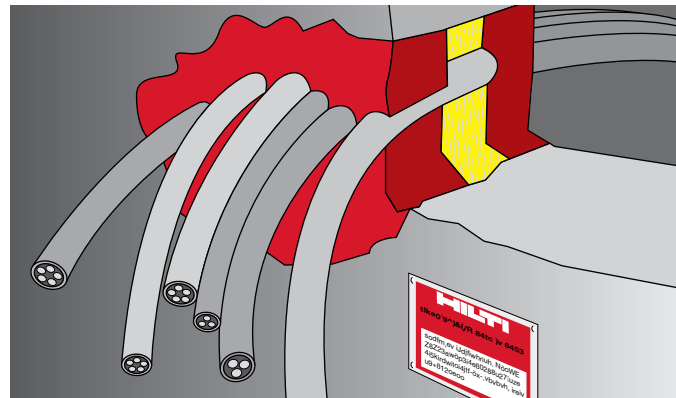
- Steel, copper and EMT pipes
- Insulated steel and copper pipes
- Cable bundles
- Closed or vented plastic pipes
- HVAC penetrations

For use with

- Concrete, masonry, drywall and wood floor assemblies
- Wall and floor assemblies rated up to 4 hours

Examples

- Sealing around combustible pipe penetrations in fire rated construction
- Sealing around non-combustible penetrations in fire rated construction



Technical Data*

Chemical basis

FS-ONE

Water-based intumescent acrylic dispersion

Color

Red

Application temperature

40°F to 104°F (5°C to 40°C)

Skin forming time

Approx. 20-30 min.

Curing time

Approx. 2 mm / 3 days

Movement capability

Approx. 5%

Expansion rate (unrestricted)

Up to 3-5 times original volume

Temperature resistance (cured)

-40°F to 212°F (-40°C to 100°C)

Surface burning characteristics (ASTM E 84-96)

Flame Spread: 0
Smoke Development: 5

Sound transmission classification (ASTM E 90-99)

56 (Relates to specific construction)

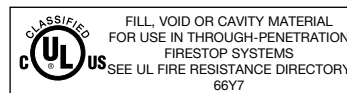
Approvals

- California State Fire Marshal - No. 4485-1200:108
- City of New York - MEA 326-96-M Vol. IV

Tested in accordance with

- UL 1479
- ASTM E 814
- ASTM E 84

*At 73°F (23°C) and 50% relative humidity



Installation instructions for FS-ONE

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

- Clean the opening. Surfaces to which FS-ONE will be applied should be cleaned of loose debris, dirt, oil, moisture, frost and wax. Structures supporting penetrating items must be installed in compliance with local building and electrical standards.

Application of firestop sealant

- Install the prescribed backfilling material type and depth to obtain the desired rating (if required). Leave sufficient depth for applying FS-ONE.
- Application of firestop sealant: Apply FS-ONE to the required depth in order to obtain the desired fire rating. Make sure FS-ONE contacts all surfaces to provide maximum adhesion. For application of FS-ONE use a standard caulking gun, foil pack gun, bulk loader and bulk gun. With FS-ONE buckets, Graco type sealant pumps may be used. (Contact pump manufacturer for proper selection).

- Smoothing of firestop sealant: To complete the seal, tool immediately to give a smooth appearance. Excess sealant, prior to curing, can be cleaned away from adjacent surfaces and tools with water.
- Leave completed seal undisturbed for 48 hours.
- For maintenance reasons, a penetration seal could be permanently marked with an identification plate. In such a case, mark the identification plate and fasten it in a visible position next to the seal.

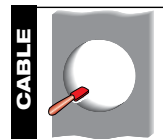
Not for use

- High movement expansion joints
- Underwater

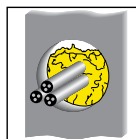
- On materials where oil, plasticizers or solvents may bleed i.e. impregnated wood, oil based seals, green or partially vulcanized rubber
- In any penetration other than those specifically described in this manual or the test reports

Storage

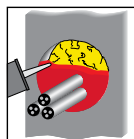
- Store only in the original packaging in a location protected from moisture at temperatures between 40°F (5°C) and 86°F (30°C)
- Observe expiration date on the package



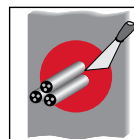
1. Clean opening.



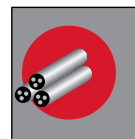
2. Pack mineral wool. (If required)



3. Apply FS-ONE.



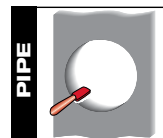
4. Smooth FS-ONE.



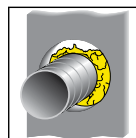
5. Leave completed seal undisturbed for 48 hours.



6. Fasten identification plate (if required).



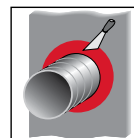
1. Clean opening.



2. Pack mineral wool. (If required)



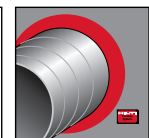
3. Apply FS-ONE.



4. Smooth FS-ONE.



5. Leave completed seal undisturbed for 48 hours.



6. Fasten identification plate (if required).

Hilti. Outperform. Outlast.



MSDS No.: 259
Revision No.: 010
Revision Date: 08/17/04
Page: 1 of 2

MATERIAL SAFETY DATA SHEET

Product name: FS-ONE High Performance Intumescent Firestop Sealant
Description: One-part acrylic-based sealant
Supplier: Hilti, Inc. P.O. Box 21148, Tulsa, OK 74121
Emergency # (Chem-Trec.): 1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)

INGREDIENTS AND EXPOSURE LIMITS

Ingredients:	CAS Number:	PEL:	TLV:	STEL:
Polyacrylate dispersion	Mixture	NE	NE	NE
Calcium carbonate	001317-65-3	5 mg/m ³ (T)	10 mg/m ³ (T)	NE
Zinc borate	138265-88-0	NE	NE	NE
Ammonium polyphosphate	068333-79-9	NE	NE	NE
Talc	014807-96-6	20 mppcf	2 mg/m ³	NE
Expandable graphite	012777-87-6	5 mg/m ³ (T)	2 mg/m ³ (T)	NE
Ethylene glycol	000107-21-1	NE	C:100 mg/m ³ (A)	NE
Polybutene	009003-29-6	NE	NE	NE
Iron oxide	001309-37-1	10 mg/m ³	5 mg/m ³	NE
Glass filament	065997-17-3	NE	5 mg/m ³ (T)	NE
Silicon dioxide	014808-60-7	0.05 mg/m ³ (T)	0.1 mg/m ³ (T)	NE
Water	007732-18-5	NE	NE	NE

Abbreviations: PEL = OSHA Permissible Exposure Limit. TLV = ACGIH Threshold Limit Value. C = Ceiling. STEL = Short Term Exposure Limit. NE = None Established. NA = Not Applicable. (T) indicates "as total dust". (R) indicates "as respirable fraction". (A) indicates "as an aerosol". mppcf = million particles per cubic foot.

PHYSICAL DATA

Appearance:	Red paste.	Odor:	Odorless.
Vapor Density: (air = 1)	Not determined.	Vapor Pressure:	23mbar @ 20C / 68F
Boiling Point:	Not applicable.	VOC Content:	75.0 g/L.
Evaporation Rate:	Not applicable.	Solubility in Water:	Soluble.
Specific Gravity:	1.5	pH:	Not determined.

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	Non-flammable.	Flammable Limits:	Not applicable.
Extinguishing Media:	Not applicable. Use extinguishing media as appropriate for surrounding fire.		
Special Fire Fighting Procedures:	None known. Use a self-contained breathing apparatus when fighting fires involving chemicals.		
Unusual Fire and Explosion Hazards:	None known. Thermal decomposition products can be formed such as oxides of carbon, sulfur and phosphorous.		

REACTIVITY DATA

Stability:	Stable.	Hazardous Polymerization:	Will not occur.
Incompatibility:	Strong acids, peroxides, and oxidizing agents.		
Decomposition Products:	Thermal decomposition can yield CO and CO ₂ .		
Conditions to Avoid:	None known.		

HEALTH HAZARD DATA

Known Hazards:	None known.
Signs and Symptoms of Exposure:	Possibly irritating upon contact with the eyes or upon repeated contact with the skin.
Medical Conditions Aggravated by Exposure:	Eye and skin conditions.
Routes of Exposure:	Dermal.

Carcinogenicity:	IARC classifies crystalline silica (quartz sand) as Group I based upon evidence among workers in industries where there has been long-term and chronic exposure (via inhalation) to silica dust; e.g. mining, quarry, stone crushing, refractory brick and pottery workers. This product does not pose a dust hazard; therefore, this classification is not relevant. Based upon the nature and intended use of this product, it does not pose an increased cancer risk to workers.
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EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Immediately flush with plenty of water. Call a physician if symptoms occur.
Skin:	Immediately wipe off material and wash with soap and water. Material can adhere to the skin. If material has adhered to the skin, use an abrasive containing hand cleaner. If material does not come off, buff with a pumice stone.
Inhalation:	Move victim to fresh air if discomfort develops. Call a physician if symptoms persist.
Ingestion:	Seek medical attention. Do not induce vomiting unless directed by a physician. If a large quantity was ingested, give 1 to 2 glasses of water to dilute. <u>Never</u> give anything by mouth to an unconscious person.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT

Ventilation:	General (natural or mechanically induced fresh air movements).
Eye Protection:	Not required, however, safety glasses should be worn in most industrial settings.
Skin Protection:	Avoid skin contact. Cloth gloves are suitable for hand protection.
Respiratory Protection:	None normally required. Where ventilation is inadequate to control vapors, use a NIOSH-approved respirator with organic vapor cartridges. Never enter a confined space without an appropriate air-supplied respirator.

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions:	Store in a cool, dry area preferably between 40° and 77° F. Keep from freezing. Do not store in direct sunlight. Avoid contact with the eyes or skin. Practice good hygiene; i.e. always wash thoroughly after handling and before eating or smoking. For industrial use only. Keep out of reach of children. Follow label/use instructions.
Spill Procedures:	Immediately wipe away spilled material before it hardens. Place in a container for proper disposal in accordance with all applicable local, state, or federal requirements.

REGULATORY INFORMATION

Hazard Communication:	This MSDS has been prepared in accordance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
HMIS Codes:	Health 1, Flammability 0, Reactivity 0, PPE B
DOT Shipping Name:	Not regulated.
IATA / ICAO Shipping Name:	Not regulated.
TSCA Inventory Status:	Chemical components listed on TSCA inventory.
SARA Title III, Section 313:	This product contains < 3% ethylene glycol (CAS 107-21-1) and < 15% zinc borate (re: zinc compounds) which are subject to reporting under Section 313 of SARA Title III (40 CFR Part 372).
EPA Waste Code(s):	Not regulated by EPA as a hazardous waste.
Waste Disposal Methods:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, state, and federal safety, health and environmental regulations.

CONTACTS

Customer Service:	1 800 879 8000	Technical Service:	1 800 879 8000
Health / Safety:	1 800 879 6000	Jerry Metcalf	(x6704)
Emergency # (Chem-Trec):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

INSULATED METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

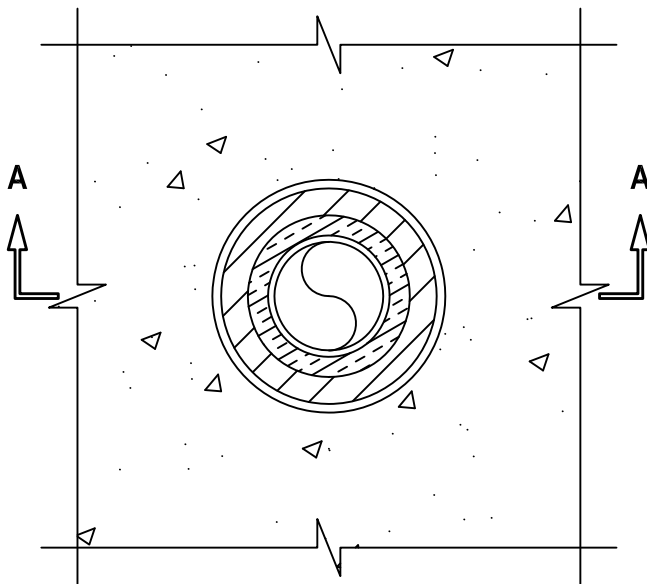
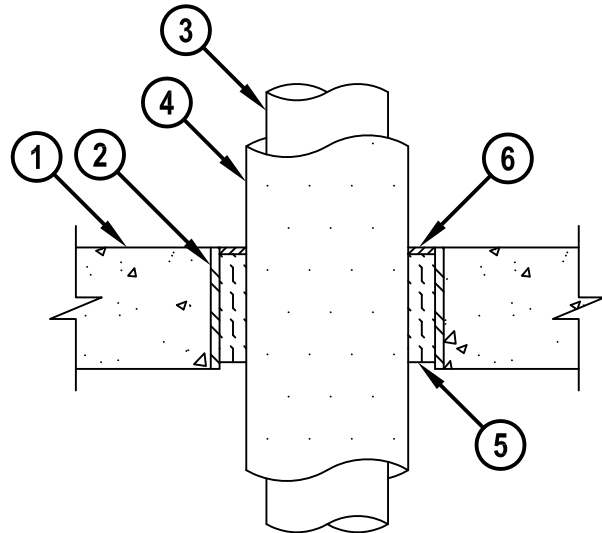
F-RATING = 2-HR. OR 3-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = 4 CFM / SQ FT

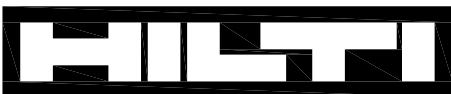
L-RATING AT 400°F = LESS THAN 1 CFM / SQ FT

CAJ5090h.010615

FRONT VIEW**SECTION A-A**

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. OR 3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] MAXIMUM 18" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) MAY EXTEND MAXIMUM 3" ABOVE FLOOR, OR BOTH SURFACES OF WALL.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. MINIMUM 1/2" TO MAXIMUM 3/4" THICK AB/PVC PIPE INSULATION. NOMINAL 1" THICK AB/PVC PIPE INSULATION MAY BE USED ON 3" PIPES AND SMALLER FOR A MAXIMUM 2-HR. FIRE-RATING.
5. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
6. MINIMUM 1/4" DEPTH HILTI FS-ONE MAX OR FS-ONE INTUMESCENT FIRESTOP SEALANT, WHEN MAXIMUM ANNULAR SPACE DOES NOT EXCEED 1-1/2". WHEN MAXIMUM ANNULAR SPACE DOES EXCEED 1-1/2", APPLY MINIMUM 1/2" DEPTH HILTI FS-ONE MAX OR FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 18".
 2. ANNULAR SPACE [FOR 2-HR. FIRE-RATING] = MINIMUM 1/2", MAXIMUM 12".
 3. ANNULAR SPACE [FOR 3-HR. FIRE-RATING] = MINIMUM 1/2", MAXIMUM 1-1/2".
 4. HILTI FS-ONE MAX OR FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.

**Hilti Firestop Systems**

HILTI, Inc.
 Tulsa, Oklahoma USA (800) 879-8000

Sheet	1 of 1
Scale	9/64" = 1"
Date	Jan. 06, 2015

Drawing No.

CAJ
5090h

Saving Lives through Innovation and Education