FIRESTOP SUBMITTAL PACKAGE

ELECTRICAL

Materials
FS-ONE Intumescent Caulk
FS 657 Firestop Blocks
CP 617 Putty Pads
Thermafiber Safing

Includes:
Technical and Installation Data
UL Certificate of Compliance
LEED information
MSDS

UL Details

Concrete Assemblies
C-AJ-1184 – Max. 4” copper, steel conduit or EMT (Top or Underside)
C-AJ 1226 – Max. 6” steel conduit or Max 4” EMT (optional sleeve)
C-AJ-3095 - Cable bundles (various cables) - (optional sleeve)
C-AJ-8099 - Multiple steel conduit or EMT and cable bundles

Gypsum Wall Assemblies
W-L-1054 - Max. 6” copper, steel conduit, or max 4” EMT
W-L-1243 - Max. 2” flexible aluminum or steel conduit
W-L-1389 - Multiple Max. 2” steel pipe, steel conduit or EMT
W-L-1408 - Multiple steel conduit or EMT, Max 4”, single row
W-L-3065 - Cable bundles (various cables) - (optional sleeve)
W-L-3071 - SER Cables
W-L-4011 - Cable tray (various cables)

Electrical Boxes
Putty Pads
Electrical Box Inserts
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
- Can be painted
- Single component systems available
- Meets LEED™ requirements for indoor environmental quality credit

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

Installation instructions for FS-ONE

Notice
- Before handling, read Material Safety DataSheet 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 Firestops Systems Guide for complete installation information

Opening
1. 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
2. Install the prescribed backfilling material type and depth to obtain the desired rating (if required). Leave sufficient depth for applying FS-ONE.
3. 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).

4. 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.
5. Leave completed seal undisturbed for 48 hours.
6. 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 packaging
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

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS Number</th>
<th>PEL:</th>
<th>TLV:</th>
<th>STEL:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polycrylate dispersion</td>
<td>Mixture</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>Calcium carbonate</td>
<td>001317-65-3</td>
<td>5 mg/m³ (T)</td>
<td>10 mg/m³ (T)</td>
<td>NE</td>
</tr>
<tr>
<td>Zinc borate</td>
<td>138266-88-0</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>Ammonium polyphosphate</td>
<td>068333-79-9</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>Talc</td>
<td>014807-96-6</td>
<td>20 mppcf</td>
<td>2 mg/m³</td>
<td>NE</td>
</tr>
<tr>
<td>Expandable graphite</td>
<td>012777-87-6</td>
<td>5 mg/m³ (T)</td>
<td>2 mg/m³ (T)</td>
<td>NE</td>
</tr>
<tr>
<td>Ethylene glycol</td>
<td>000107-21-1</td>
<td>NE</td>
<td>C:100 mg/m³ (A)</td>
<td>NE</td>
</tr>
<tr>
<td>Polybutene</td>
<td>009003-29-6</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>Iron oxide</td>
<td>001309-37-1</td>
<td>10 mg/m³</td>
<td>5 mg/m³</td>
<td>NE</td>
</tr>
<tr>
<td>Glass filament</td>
<td>065997-17-3</td>
<td>NE</td>
<td>5 mg/m³ (T)</td>
<td>NE</td>
</tr>
<tr>
<td>Silicon dioxide</td>
<td>014808-60-7</td>
<td>0.05 mg/m³ (T)</td>
<td>0.1 mg/m³ (T)</td>
<td>NE</td>
</tr>
<tr>
<td>Water</td>
<td>007732-18-5</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Red paste</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Vapor Density: (air = 1)</td>
<td>Not determined</td>
</tr>
<tr>
<td>Vapor Pressure:</td>
<td>23mbar @ 20C / 68F</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>VOC Content:</td>
<td>75.0 g/L</td>
</tr>
<tr>
<td>Evaporation Rate:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility in Water:</td>
<td>Soluble</td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td>1.5</td>
</tr>
<tr>
<td>pH:</td>
<td>Not determined</td>
</tr>
</tbody>
</table>

FIRE AND EXPLOSION HAZARD DATA

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

REACTIVITY DATA

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability:</td>
<td>Stable</td>
</tr>
<tr>
<td>Hazardous Polymerization:</td>
<td>Will not occur</td>
</tr>
<tr>
<td>Incompatibility:</td>
<td>Strong acids, peroxides, and oxidizing agents.</td>
</tr>
<tr>
<td>Decomposition Products:</td>
<td>Thermal decomposition can yield CO and CO₂.</td>
</tr>
<tr>
<td>Conditions to Avoid:</td>
<td>None known.</td>
</tr>
</tbody>
</table>

HEALTH HAZARD DATA

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Known Hazards:</td>
<td>None known.</td>
</tr>
<tr>
<td>Signs and Symptoms of Exposure:</td>
<td>Possibly irritating upon contact with the eyes or upon repeated contact with the skin.</td>
</tr>
<tr>
<td>Medical Conditions:</td>
<td>Eye and skin conditions</td>
</tr>
<tr>
<td>Aggravated by Exposure:</td>
<td>Dermal.</td>
</tr>
</tbody>
</table>
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.

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. Never 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 40o and 77o 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.
Certificate of Compliance

Certificate Number 20060214-R13240E
Report Reference 2006 February 14
Issue Date 2006 February 14

Issued to: Hilti, Inc.
5400 S 122ND East Ave
Tulsa, OK 74146 USA

This is to certify that representative samples of
Fill, Void or Cavity Materials
FS-ONE

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 1479, ANSI/UL 2079, CAN/ULC-S115-05


Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle symbol: © with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product

Issued by: Mona Couloute
Underwriters Laboratories Inc.

Reviewed by: Christopher Johnson
Underwriters Laboratories Inc.
February 24, 2009

To Whom It May Concern:

Re: Hilti FS-ONE Intumescent Firestop – LEED Info.

The Hilti FS-ONE Intumescent Firestop is manufactured in Kaufering, Germany.

The FS-ONE pail is made of polyethylene and can be completely recycled. There is no post-consumer or post-industrial content in FS-ONE and it cannot be recycled. The VOC content for FS-ONE is 75 grams/liter.

FS-ONE is not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf  MPH, CHMM
Safety/Environmental Manager
Hilti Inc
(918) 872 3704
jerry.metcalf@hilti.com

Rev. Date: 2/24/09
FS 657
Fire Block

Product description
- Ready-to-use, intumescent flexible block based on a two-component polyurethane foam

Product features
- Suitable for re-penetration or new penetrations
- Economical to use with short installation times
- Easy installation — no special tools required
- Ideal for use in floors — no forming required
- One sided wall systems available
- Halogen, asbestos and solvent free
- Operational immediately after installation
- Can be painted
- Smoke resistant

Areas of application
- Sealing single or multiple penetrations in small to large openings
- Temporary or permanent sealing of cables and cable tray penetrations
- Temporary or permanent sealing of insulated and non-insulated metallic pipes and combustible pipe penetrations

For use with
- Walls (UL tested up to max. opening 52" x 48")
- Floors (UL tested up to max. opening 36" x 36")
- Concrete, porous concrete, masonry and gypsum wall assemblies
- Wall assemblies rated up to 4 hours
- Floor assemblies rated up to 3 hours

Examples
- Completely dust and fiber free rooms and places where electrical installations are frequently used (i.e. computer centers, hospitals, laboratories, etc.)
- New buildings in the construction phase and during renovation
- Large openings containing multiple penetrations as found in production bays, warehouses, hospitals etc.

Installation instructions for FS 657

Notice
- Before handling, read Material Safety DataSheet 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
1. Clean the opening. Penetration and penetration supporting structures must be installed in compliance with local building and electrical standards.

Application of Fire Blocks
2a. If no penetrations are located, build up FS 657 FIRE BLOCK firmly seated, within opening.
2b. If penetrations are located, build up FS 657 FIRE BLOCK firmly seated, while cutting blocks with a knife or tool to suit the placed penetrations.
3. Finish building up FIRE BLOCKS until entire opening is filled.

4. Completely fill cable spaces, gaps between blocks and pipes, and joints with FS-ONE Firestop Sealant.
5. 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.

Re-installing cables or other penetrations
- Remove or cut the block from the seal.
- Install the penetrant and re-lay the block in place.

Not for use
- In wet rooms, outdoors or exposed to the weather or UV radiation (can be done only after applying an additional silicone coating, i.e. CP 601S).

Storage
- Store only in the original packaging in a location protected from moisture and direct sunlight

Hilti Firestop
Saving Lives through innovation and education

Hilti, Inc. (U.S.) 1-800-879-8000 • www.us.hilti.com • en español 1-800-879-5000 • Hilti Firestop Systems Guide 2007
# Material Safety Data Sheet

**Product name:** FS 657 Fire Block; CP 658T Firestop Plug  
**Description:** Intumescent polyurethane foam  
**Supplier:** Hilti, Inc. P.O. Box 21146, 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
These products are regarded as “articles” by definition under OSHA Regulation 29 CFR 1910.1200 (c). FS 657/CP 658T can best be described as a sponge-like polyurethane materials, which expand when exposed to excessive heat/fire conditions. The physical form of the products preclude exposure to workers under normal conditions of use or any foreseeable emergency.

### PHYSICAL DATA

<table>
<thead>
<tr>
<th>Appearance:</th>
<th>Rust colored foam block</th>
<th>Odor:</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor Density:</td>
<td>Not applicable</td>
<td>Vapor Pressure:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Ignition Point:</td>
<td>420° C / 788° F</td>
<td>VOC Content:</td>
<td>3.9 g/l</td>
</tr>
<tr>
<td>Evaporation Rate:</td>
<td>Not applicable</td>
<td>Solubility in Water:</td>
<td>Not soluble</td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td>0.25 g/cm³</td>
<td>pH:</td>
<td>Not applicable</td>
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### FIRE AND EXPLOSION HAZARD DATA

<table>
<thead>
<tr>
<th>Flash Point:</th>
<th>Not applicable</th>
<th>Flammable Limits:</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extinguishing Media:</td>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Fire Fighting Procedures:</td>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unusual Fire and Explosion Hazards:</td>
<td>None known</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### REACTIVITY DATA

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Incompatibility:</td>
<td>None known; see special handling and storage instructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decomposition Products:</td>
<td>If heated to decomposition, can yield CO₂, NOₓ, HCN, HCl, and/or HF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conditions to Avoid:</td>
<td>See handling and storage requirements.</td>
<td></td>
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</tr>
</tbody>
</table>

### HEALTH HAZARD DATA

<table>
<thead>
<tr>
<th>Known Hazards:</th>
<th>None known</th>
<th>Routes of Exposure:</th>
<th>None expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs and Symptoms of Exposure:</td>
<td>None expected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carcinogenicity:</td>
<td>No ingredients are classified as a carcinogen by IARC, NTP or OSHA.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Conditions:</td>
<td>None known</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggravated by Exposure:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### EMERGENCY AND FIRST AID PROCEDURES

<table>
<thead>
<tr>
<th>Skin:</th>
<th>No effects expected</th>
<th>Inhalation: Not a route of exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes:</td>
<td>No effects expected</td>
<td></td>
</tr>
<tr>
<td>Ingestion:</td>
<td>Not a likely route of exposure</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>Referral to a physician is recommended if there is any question about the seriousness of any injury/exposure.</td>
<td></td>
</tr>
</tbody>
</table>
CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT

Ventilation: General (natural or mechanically induced fresh air movements).

Eye Protection: As appropriate for the work area or the work being done.

Skin Protection: Not required.

Respiratory Protection: Not applicable.

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions: For industrial use only. Keep out of reach of children. Observe good hygiene practices; i.e. wash after using and before eating or smoking. Store in a cool dry area out of direct sunlight. Storage above 140° F may degrade product.

Spill Procedures: Not applicable

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 0, Flammability 0, Reactivity 0, PPE A

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 is classified as an “article” and is not 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.
Certificate of Compliance

Certificate Number 20060214-R13240F
Report Reference 2006 February 14
Issue Date 2006 February 14

Issued to: Hilti, Inc.
5400 S 122ND East Ave
Tulsa, OK 74146 USA

This is to certify that representative samples of Fill, Void or Cavity Materials
FS 657, CP 658T

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: ANSI/UL 1479, CAN/ULC-S115-05


Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product

Issued by: Môna Couloute
Underwriters Laboratories Inc.

Reviewed by: Christopher Johnson
Underwriters Laboratories Inc.
## THERMAFIBER® Safing Insulation

### UL- and OPL-labeled* safing insulation for firestops and fire-containment systems

- Firestop product for curtain wall fire and smoke containment systems, floor and wall penetrations, head-of-wall, and other construction joint systems.
- Fire resistant and noncombustible.
- Economical; installs quickly and easily.
- Aids sound control in many assemblies.
- Available in unfaced felt (plain) or with a tough scrim-reinforced foil facing (FSP).
- Durable; nondeteriorating and noncorrosive.

## Description

THERMAFIBER® Safing Insulation is a mineral-wool-type insulation that resists temperatures up to 2,000 °F (1,093 °C), thus offering superior fire protection in a wide variety of fire-rated applications. It is a UL- and OPL-labeled product especially intended for tested UL and OPL Designs, as well as many other fire- and smoke-tested assemblies. This product is noncombustible per Standard NFPA 220 when tested in accordance with ASTM E 136, and moisture-resistant, noncorrosive, nondeteriorating, mildew-proof and vermin-proof. It permits dry construction for all-year-round work. Also, THERMAFIBER Safing Insulation is available plain, or with scrim-reinforced foil facing (FSP) that serves as a vapor retarder and/or smoke barrier.

THERMAFIBER Safing Insulation is compatible with both THERMAFIBER® Curtain Wall CW Insulations and THERMAFIBER FIRESPAN™ Insulations.

## Perimeter Fire Containment, Penetrations and Construction Joints

THERMAFIBER Safing Insulation is a key element in a wide variety of fire-tested construction assemblies. It is used with THERMAFIBER Curtain Wall and FIRESPAN Insulations in applications to contain both fire and smoke to the area of origin. Especially for mid- and high-rise buildings, where fire and smoke must be prevented from spreading to the next floor. Since the floor assembly is typically fire-rated, one route for the fire spread is through and up the exterior curtain wall system. THERMAFIBER Safing Insulation is also used in conjunction with various sealants and caulks, in wall and floor penetration (poke-through) applications, head-of-wall construction joints, and other construction joints.

It is important to note that one of the most valuable yet misunderstood applications of THERMAFIBER Safing Insulation is its use in exterior curtain wall assemblies to safe-off the opening between concrete floor slabs and the curtain wall assemblies. Many people still believe the myth that all thermal insulations are the same when used in the curtain wall spandrel panels as long as THERMAFIBER Safing Insulation is used in the assembly. This is simply not true. Actual fire tests have proven that low-melt-point insulations, such as glass fiber types, will disintegrate quickly once exposed to fire, leaving the curtain wall unprotected. Then, as the now-protected curtain wall disintegrates or falls away, the safing insulation will no longer be supported, and the fire will spread to the floor(s) above. Effective perimeter fire containment can only be achieved when a fire-compatible product with the ability to resist high temperatures (such as THERMAFIBER Curtain Wall Insulations or THERMAFIBER FIRESPAN Insulations) is used in conjunction with the THERMAFIBER Safing Insulation, acting together as a system. (See TF685, TF686 and TF871 for additional information).

## Installation

### Perimeter Installation

In curtain wall fire-containment applications, THERMAFIBER Safing Insulation fills the void between the slab edge and the curtain wall insulation to contain fire. Foil-faced insulation impedes the passage of smoke and noxious gases. Install THERMAFIBER Safing Insulation, of proper width (2" to 8” max. opening), compression fit in safe-off area (foil side up, if required) between THERMAFIBER FIRESPAN or CW Curtain Wall Insulation and floor slabs, on safing “Z” clips spaced as required in the design (24” or 12” o.c. maximum), leaving no voids. Compression fitting the safing around critical to achieving a tight seal. See specific test description for proper installation details. Install proper topping material, such as THERMAFIBER SMOKE SEAL Compound, or other approved smoke sealants as indicated in the specific test description or architectural specification.

### Penetration Application

THERMAFIBER Safing Insulation provides a noncombustible, fire-resistant forming/packing material for many types of penetrations in walls and floor/ceilings. In all poke-through penetrations, clean substrate of dirt, dust, grease, oil, efflorescence, loose material or other matter. With a serrated knife, cut THERMAFIBER Safing Insulation slightly wider than the opening. Compress and tightly fit the minimum thickness and density of insulation required (per system specification) completely around penetrant. For floor slab openings, compress or install THERMAFIBER Safing Insulation according to details indicated in the specific test description or architectural specification to seal completely around cables, ducts, piping or other utilities.

### Construction Joint Application

THERMAFIBER Safing Insulation is also used as a forming material in head-of-wall, floor to floor, floor to wall, and wall to wall construction joints. It is compressed and slid into joint openings to completely fill the gap between the intersection of the walls, floor, etc.

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* UL is an abbreviation for Underwriters Laboratories Inc.; OPL is an abbreviation for Omega Point Laboratories, Inc.
## Technical Data

### Surface Burning Characteristics (According to ASTM E 84)

<table>
<thead>
<tr>
<th>Product Designation</th>
<th>Flame Spread</th>
<th>Smoke Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safing, Regular (Unfaced)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Safing (Foil-Faced)</td>
<td>25</td>
<td>0</td>
</tr>
</tbody>
</table>

Products have a class A interior finish rating per NFPA 101, life safety code.

### Product Density

<table>
<thead>
<tr>
<th>Product Designation</th>
<th>Actual Density</th>
<th>Density Tolerance-pcf(1)</th>
<th>Minimum Thickness</th>
<th>Application Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safing</td>
<td>4.0</td>
<td>-0.5 +1.0</td>
<td>1&quot;</td>
<td>safing clips and/or compression fit</td>
</tr>
<tr>
<td>Safing</td>
<td>6.0</td>
<td>-0.75 +2.0</td>
<td>1-1/2&quot;</td>
<td>safing clips and/or compression fit</td>
</tr>
<tr>
<td>Safing</td>
<td>8.0</td>
<td>-1.0 +2.0</td>
<td>1&quot;</td>
<td>safing clips and/or compression fit</td>
</tr>
</tbody>
</table>

(1) On packaging weight basis.

For the most up-to-date technical data, please refer to our website at www.thermafiber.com

## Product Data

### Standards Compliance

- **ASTM C 612-00** - Federal Specification HH-I-558B—Safing insulation as Types IA, IB and II.
- **ASTM E 136** - Rated noncombustible as defined by NFPA Standard 220 when tested according to ASTM E 136.
- **ASTM E 814 or UL 1479** - Safing insulation used in conjunction with SMOKE SEAL Compound, or other approved material in through-penetration firestop systems.
- **UL 2079** - Safing insulation used in conjunction with various sealants and caulks in construction joint systems.
- **ASTM C 553** - THERMAFIBER Insulations absorb less than 1% moisture by weight and volume.

Safing insulation products are approved by: **New York City Board of Standards & Appeals**– 39-74-SM & MEA 209-82-M, Vol. II.

### Composition and Materials

THERMAFIBER blankets are a mineral fiber material manufactured from blast furnace slag, a by-product of iron ore reduction, and naturally occurring rock. THERMAFIBER blankets contain greater than 80% post-industrial recycle content. This product contains No Asbestos.

### Warranty

System performance following substitution of materials or compromise in assembly design cannot be certified and may result in failure of fire performance under certain conditions. Products and systems provided by Thermafiber Inc. are warranted to be free from defects in material workmanship. Contact Thermafiber Inc. for complete warranty details.

### Storage

Store in a cool, dry place.

## Submittal Approvals:

<table>
<thead>
<tr>
<th>Job Name</th>
<th>Contractor</th>
<th>Date</th>
</tr>
</thead>
</table>

### Trademarks

THERMAFIBER, FIRESPAN and THE NAME IN MINERAL WOOL are trademarks of Thermafiber Inc. SMOKE SEAL is a trademark of United States Gypsum Company.

### Note

Products described here may not be available in all geographic markets. Consult your local sales office or representative for information.

### Notice

THERMAFIBER INC. shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. THERMAFIBER’S liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing within thirty (30) days from date it was or reasonably should have been discovered.

### Safety First!

Follow good safety and industrial hygiene practices while handling and installing products and systems. Take necessary precautions and wear the appropriate personal protective equipment as needed. Read material safety data sheets and related literature on products before specification and/or installation.

### Health Aspects

Information about health aspects of using THERMAFIBER® Insulation products are thoroughly explained in North American Insulation Manufacturers Association’s (NAIMA) Health and Safety facts for rock and slag wool insulation document #63. Contact Thermafiber, Inc. for more details.

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TF612/Rev 11/06
Copyright 2004, Thermafiber Inc.
Printed in U.S.A.
**Material Safety Data Sheet**

**Product name:** Mineral wool

**Description:** Synthetic vitreous fiber

**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

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS Number</th>
<th>PEL</th>
<th>TLV</th>
<th>STEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slag wool fiber</td>
<td>65997-17-3</td>
<td>NE</td>
<td>1 fiber / cc</td>
<td>NE</td>
</tr>
<tr>
<td>Phenolic resin</td>
<td>09003-35-4</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>Polyvinyl alcohol</td>
<td>09002-89-5</td>
<td>NE</td>
<td>NE</td>
<td>NE</td>
</tr>
</tbody>
</table>

**Abbreviations:**
- **PEL** = OSHA Permissible Exposure Limit.
- **TLV** = ACGIH Threshold Limit Value.
- **STEL** = Short Term Exposure Limit.
- **NE** = None Established.
- **NA** = Not Applicable.

### PHYSICAL DATA

**Appearance:** 2’ x 4’ x 4” sheets.

**Odor:** Negligible.

**Boiling Point:** Not applicable.

**Vapor Pressure:** Not applicable.

**Melting Point:** Approx. 2400° F

**VOC Content:** Not applicable.

**Evaporation Rate:** Not applicable.

**Solubility in Water:** Insoluble.

**pH:** Not applicable.

**Specific Gravity:** Not determined.

### FIRE AND EXPLOSION HAZARD DATA

**Flash Point:** Not applicable.

**Flammable Limits:** Not applicable.

**Extinguishing Media:** As appropriate for surrounding fire; material does not burn.

**Special Fire Fighting Procedures:** Soak cartons to help prevent the spread of fire. Use a self-contained breathing apparatus when fighting fires involving chemicals.

**Unusual Fire and Explosion Hazards:** None known.

### REACTIVITY DATA

**Stability:** Stable.

**Hazardous Polymerization:** Will not occur.

**Incompatibility:** Strong acids.

**Hazardous Decomposition Products:** Thermal decomposition products can be formed at temperatures exceeding 2000° F. Thermal decomposition can yield CO and CO2.

**Conditions to Avoid:** None known.

### HEALTH HAZARD DATA

**Known Hazards:**
- **Acute:** Eye, skin and respiratory irritation.
- **Chronic:** Respiratory impairment.

**Routes of Exposure:** Inhalation, Dermal.

**Signs and Symptoms of Exposure:**
- **Eyes:** Mechanical irritation.
- **Skin:** Itching, irritation.
- **Inhalation:** Nose, throat and upper respiratory tract irritation.

**Carcinogenicity:** Slag wool has been classified by the IARC as Group 3 - Unclassifiable as to Carcinogenicity in Humans.

**Medical Conditions Aggravated by Exposure:**
- Eye, skin, and respiratory conditions.
EMERGENCY AND FIRST AID PROCEDURES

Eyes: Flush with plenty of water while holding eyelids apart. Avoid rubbing the eyes as mechanical abrasions can occur. Call a physician if symptoms persist.

Skin: Wash with soap and water. Launder clothing before reuse.

Inhalation: Move to fresh air.

Ingestion: No ill effects expected.

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: Safety goggles recommended to prevent particulates from irritating the eyes.

Skin Protection: Cloth gloves and long sleeves to protect skin from irritating fibers.

Respiratory Protection: Use local exhaust and/or a NIOSH-approved dust respirator when air movement is inadequate to control dusts/fibers below recommended exposure levels.

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions: Avoid generating dusts. Local exhaust may be required to control dusts if power tools are used for cutting/trimming. Wear appropriate personal protective equipment. Store away from moisture; keep dry.

Spill Procedures: Not applicable.

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 (Gloves, Goggles)

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 does not contain any toxic chemicals 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.
CERTIFICATE OF COMPLIANCE

CERTIFICATE NUMBER: 20040809-R10905
ISSUE DATE: August 9, 2004

Issued to: Thermafiber Inc.
3711 W Mill St Ext
Wabash, IN 46992

Report Reference: R10905

This is to Certify that representative samples of: Forming Material, designated as Type SAF mineral wool batts.

Have been investigated by Underwriters Laboratories Inc.® in accordance with the Standard(s) indicated on this Certificate.


Only those products bearing the UL Classification Marking should be considered as being covered by UL’s Classification and Follow-Up Service.

The UL Classification Marking includes: UL in a circle symbol with the word “CLASSIFIED” (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL’s evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Engineer: Mona Couloute
Underwriters Laboratories Inc.

Review Engineer: Chris Johnson
Underwriters Laboratories Inc.
February 24, 2009

To Whom It May Concern:

Re: Hilti Mineral Wool-LEED Info.

The Hilti Mineral Wool is manufactured in Waubash Indiana.

There is no post-consumer or post-industrial content in Hilti Mineral Wool. There is no detectable VOC content in this product.

Hilti Mineral Wool is not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

Please feel free to contact me at (918) 872-3704 if you have questions.

Sincerely,

Jerry Metcalf MPH, CHMM
Safety/Environmental Manager
Hilti Inc.
918 872 3704
jerry.metcalf@hilti.com

Rev. Date: 2/24/09
NOTES:

1. MAXIMUM DIAMETER OF OPENING = 14" FOR NORMAL CONCRETE, 7" FOR PRECAST (HOLLOW-CORE) CONCRETE.

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 3-1/4".

3. MINIMUM 1" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.

4. WHEN PRECAST (HOLLOW-CORE) UNITS ARE USED, HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT SHALL BE INSTALLED FLUSH WITH LOWER SURFACE OF FLOOR.

5. MINERAL WOOL MAY BE USED AS A BACKER FOR PROPER INSTALLATION OF FIRESTOP SEALANT.
1. CONCRETE FLOOR OR WALL ASSEMBLY (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] ANY OF THE FOLLOWING STEEL SLEEVES MAY BE USED:
   A. MAXIMUM 32" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER) MAY EXTEND
      MAXIMUM 3" ABOVE FLOOR OR BEYOND BOTH SURFACES OF WALL.
   B. MAXIMUM 6" (MIN. 26 GA.) OR 12" (MIN. 24 GA.) DIAMETER GALVANIZED STEEL SLEEVE WITH
      SQUARE FLANGE SPOT WELDED TO BOTTOM OR MID-HEIGHT OF SLEEVE AND SIZED MINIMUM 2"
      LARGER THAN SLEEVE DIAMETER. SLEEVE MAY EXTEND MAXIMUM 1" ABOVE TOP SURFACE OF
      FLOOR, AND MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR.

3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
   A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
   B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON PIPE.
   C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
   D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
   E. MAXIMUM 4" NOMINAL DIAMETER EMT.

4. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED
   TO ACCOMMODATE FIRESTOP SEALANT.

5. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF
   PIPE SLEEVE OR FLOOR ASSEMBLY.

6. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES:
1. MAXIMUM DIAMETER OF OPENING = 32".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
3. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS
   REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.
4. PIPE MAY BE INSTALLED WITH CONTINUOUS POINT OF CONTACT.
UL/cUL SYSTEM NO. C-AJ-3095

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 3-HR.
T-RATING = 0-HR, 1/2-HR, & 3/4-HR.
(SEE UL FIRE RESISTANCE DIRECTORY VOL. 2)

1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING):
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK).
   B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 3" THICK).
   C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.

2. [OPTIONAL] MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) MAY EXTEND MAXIMUM 3" ABOVE FLOOR, OR BOTH SURFACES OF WALL.

3. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING:
   A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
   B. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR).
   C. MAXIMUM 350 KCMIL POWER CABLE WITH PVC JACKET (ALUMINUM OR COPPER CONDUCTOR).
   D. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
   E. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
   F. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
   G. MAXIMUM 3/C (+GROUND) 2/0 AWG COPPER CONDUCTOR SER CABLE WITH PVC JACKET.
   H. MAXIMUM RG/U COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET.
   I. MAXIMUM 3/C NO. 6 AWG CABLE WITH PVC JACKET.
   J. MAXIMUM 1-1/4" DIAMETER SINGLE OR MULTIPLE CONDUCTOR TYPE MI CABLE (SEE NOTE NO. 4 BELOW).
   K. ANY CABLES, METAL-CLAD CABLES, OR ARMOURED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.

4. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.

5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES:
1. MAXIMUM DIAMETER OF OPENING = 6".
2. CABLES TO FILL MINIMUM 25%, TO MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.
3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.
4. A MINIMUM 1/8" SEPARATION SHOULD BE MAINTAINED BETWEEN MI CABLES AND ANY OTHER TYPES OF CABLE.
UL/cUL SYSTEM NO. C-AJ-8099
MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.
T-RATING = 0-HR. OR 3/4-HR.

TOP VIEW

SECTION A-A

Hilti Firestop Systems
Tulsa, Oklahoma USA (800) 879-8000

Hilti, Inc.
MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.
T-RATING = 0-HR. OR 3/4-HR.

1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING):
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
   B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
   C. PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
   D. ANY UL CLASSIFIED CONCRETE BLOCK WALL.

2. ONE OR MORE OF THE FOLLOWING PIPES, AND IN ANY COMBINATION MAY BE INSTALLED WITHIN THE OPENING:
   A. MAXIMUM 3" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
   B. MAXIMUM 3" NOMINAL DIAMETER CAST IRON PIPE.
   C. MAXIMUM 3" NOMINAL DIAMETER COPPER PIPE.
   D. MAXIMUM 3" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
   E. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
   F. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE STEEL GAS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY OMEGA FLEX, INC. OR WARD MFG., INC.
   G. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL GAS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY GASTITE, DIVISION OF TITEFLEX.

3. [OPTIONAL] ANY OR ALL PIPES MAY BE INSULATED WITH MAXIMUM 1" THICK GLASS-FIBER OR MAXIMUM 3/4" THICK AB/PVC PIPE INSULATION.

4. MAXIMUM 2" DIAMETER CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING:
   A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
   B. MAXIMUM 500 KCMIIL POWER CABLE WITH PVC JACKET.
   C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
   D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
   E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.

5. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED. WHEN INSTALLED IN PRECAST (HOLLOW-CORE) CONCRETE FLOOR, MINERAL WOOL TO FILL FLOOR, FLUSH WITH BOTTOM AND RECESSED TO ACCOMMODATE SEALANT ON TOP SIDE.

6. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES:
1. MAXIMUM AREA OF SQUARE, RECTANGULAR, OR CIRCULAR OPENING IS 192 SQ. IN. WITH A MAXIMUM DIMENSION OF 24" IN NORMAL CONCRETE, 49 SQ. IN. WITH A MAXIMUM DIMENSION OF 7" IN PRECAST (HOLLOW-CORE) CONCRETE.
2. ANNULAR SPACE BETWEEN CABLE BUNDLE, PIPES, AND INSULATED PIPES = MINIMUM 1/2", MAXIMUM 3-1/8".
3. ANNULAR SPACE BETWEEN PIPES/INSULATED PIPES AND PERIPHERY OF OPENING = MINIMUM 1/2", MAXIMUM 5".
4. ANNULAR SPACE BETWEEN CABLE BUNDLE & PERIPHERY OF OPENING = MIN. 2", MAX. 4".
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.
1. GYPSUM WALL ASSEMBLY (UL/ULC CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
   A. MAXIMUM 30" DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
   B. MAXIMUM 30" DIAMETER CAST IRON PIPE.
   C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
   D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
   E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES:
1. MAXIMUM DIAMETER OF OPENING:
   A. 32-1/4" FOR STEEL STUD WALLS.
   B. 14-1/2" FOR WOOD STUD WALLS.
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2-1/4".
3. PIPE MAY BE INSTALLED WITH CONTINUOUS POINT OF CONTACT.
4. PIPE MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.
1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 OR U400 SERIES WALL) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
   A. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE ALUMINUM OR STEEL CONDUIT.
   B. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL GASS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY OMEGA FLEX INC., TITEFLEX CORP., OR WARD MANUFACTURING INC.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES: 1. MAXIMUM DIAMETER OF OPENING = 3-1/2".
   2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. STEEL STUDS TO BE MINIMUM 3-5/8" WIDE.
3. ANY COMBINATION OF THE FOLLOWING PIPES MAY BE INSTALLED IN A SINGLE ROW:
   A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
   B. MAXIMUM 2" NOMINAL DIAMETER STEEL CONDUIT.
   C. MAXIMUM 2" NOMINAL DIAMETER EMT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT (SEE NOTE NO. 4 BELOW).
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT (SEE NOTE NO. 4 BELOW).

NOTES:
1. MAXIMUM SIZE OF OPENING = 32" x 3-1/2".
2. ANNULAR SPACE BETWEEN PIPES AND PERIPHERY OF OPENING = MINIMUM 0", MAXIMUM 1-3/8".
3. ANNULAR SPACE BETWEEN PIPES = MINIMUM 0", MAXIMUM 1-1/4".
4. AS AN ALTERNATE TO FS-ONE ON 1-HR. RATED WALLS ONLY, HILTI CP 606 FLEXIBLE FIRESTOP SEALANT MAY BE USED.
1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. STEEL STUDS TO BE MINIMUM 3-5/8" WIDE.
3. ONE OR MORE OF THE FOLLOWING PENETRATING ITEMS TO BE INSTALLED IN A SINGLE ROW:
   A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
   B. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
   C. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES:
1. MAXIMUM SIZE OF OPENING = 23" x 5".
2. ANNUAL SPACE BETWEEN PENETRANTS AND PERIPHERY OF OPENING = MINIMUM 0", MAXIMUM 1".
3. ANNUAL SPACE BETWEEN PENETRANTS = MINIMUM 0", MAXIMUM 1-1/2".

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

Sheet
1 of 1
Scale
1/8" = 1"
Date
Sep. 14, 2006
CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR.

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400) (1-HR. OR 2-HR.
FIRE-RATING) (2-HR. SHOWN).

2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE
MINIMUM 2-1/2" WIDE.

3. [OPTIONAL] MAXIMUM 4" NOMINAL DIAMETER EMT, STEEL PIPE (SCHEDULE 5 OR HEAVIER) OR
28 GA. GALVANIZED STEEL SLEEVE, CAST INTO WALL WITH JOINT COMPOUND FLUSH WITH
WALL SURFACES (SEE NOTE NO. 5 BELOW).

4. CABLE BUNDLE TO CONSIST OF ANY COMBINATION OF THE FOLLOWING:
   A. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
   B. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
   C. RG/U COAXIAL CABLE WITH PVC JACKET.
   D. MAXIMUM 3/C NO. 8 AWG METAL-CLAD CABLE.
   E. MAXIMUM 3/C (+GROUND) NO. 8 AWG COPPER CONDUCTOR CABLE (ROMEX).
   F. MAXIMUM 5/8 DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
   G. MAXIMUM 3/4" DIAMETER COPPER GROUND CABLE WITH OR WITHOUT PVC JACKET.
   H. MAXIMUM 1-1/4" DIAMETER SINGLE OR MULTIPLE CONDUCTOR TYPE MI CABLE (SEE NOTE
      NO. 4 BELOW).
   I. ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER
      THE THROUGH PENETRATING PRODUCTS CATEGORY.

5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC
   FIRESTOP SEALANT, CP 606 FLEXIBLE FIRESTOP SEALANT OR CP 618 FIRESTOP PUTTY STICK.

6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC
   FIRESTOP SEALANT, CP 606 FLEXIBLE FIRESTOP SEALANT OR CP 618 FIRESTOP PUTTY STICK
   APPLIED AT WALL/SLEEVE INTERFACE WHEN STEEL SLEEVE EXTENDS BEYOND ONE OR BOTH
   SIDES OF WALL.

NOTES:

1. MAXIMUM DIAMETER OF OPENING WITH SLEEVE = 5-1/2".
2. MAXIMUM DIAMETER OF OPENING WITHOUT SLEEVE = 4".
3. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
4. A MINIMUM 1/8" SEPARATION SHOULD BE MAINTAINED BETWEEN MI CABLES
   AND ANY OTHER TYPES OF CABLE.
5. CABLES TO FILL MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.
6. WHEN SCHEDULE 5 STEEL PIPE OR EMT IS USED, SLEEVE MAY EXTEND UP TO
   18" BEYOND WALL SURFACE.
UL/cUL SYSTEM NO. WL3071

CABLES THROUGH 1-HR. OR 2-HR. GYPSUM WALL ASSEMBLY

F RATING = 1-HR. OR 2-HR.
T RATING = 1/4 HR. OR 3/4 HR.
L RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.
L RATING AT 400° F = 4 CFM/SQ. FT.

1. GYPSUM WALL ASSEMBLY (UL/ULC CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. MAXIMUM 3/C (+ GRND) NO. 2/0 AWG ALUMINUM OR COPPER SER CABLE WITH PVC INSULATION (MAX. QTY. = 2).
3. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT:
   A. MINIMUM 5/8" DEPTH, FOR A 1-HR. FIRE-RATING.
   B. MINIMUM 1-1/4" DEPTH, FOR A 2-HR. FIRE-RATING.

NOTES: 1. MAXIMUM DIAMETER OF OPENING = 3".
2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1-1/2".
UL/cUL SYSTEM NO. W-L-4011

CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1 AND 2-HR.
T-RATING = 0-HR.
L-RATING AT AMBIENT = 5 CFM/SQ. FT.
L-RATING AT 400°F = 2 CFM/SQ. FT.

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. OPENING TO BE "FRAMED OUT" WITH ADDITIONAL FRAMING MEMBERS.
4. MAXIMUM 24" x 6" ALUMINUM OR STEEL OPEN LADDER OR SOLID BACK CABLE TRAY.
5. CABLES TO BE ANY COMBINATION OF THE FOLLOWING:
   A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE.
   B. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE.
   C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
   D. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
6. HILTI FS 657 FIRE BLOCKS (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW).

NOTES: 1. MAXIMUM SIZE OF OPENING = 30" x 9".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 4".
3. MAXIMUM AREA OF CABLES EQUALS 45% OF CROSS-SECTIONAL AREA OF CABLE TRAY BASED ON A MAXIMUM 5" CABLE LOADING DEPTH.
4. FOR WALLS CONSTRUCTED OF STEEL STUDS LARGER THAN 3-5/8", FS 657 FIRE BLOCKS SHOULD BE INSTALLED 8" DEEP.
5. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 618 FIRESTOP PUTTY STICK INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, AND ANY VOIDS TO MAXIMUM EXTENT POSSIBLE.
6. L-RATINGS ONLY APPLY WHEN HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS USED.
Wall Opening Protective Materials (CLIV) as Tested to ANSI/UL 263  
1 or 2 Hr Rating

CP 617 Firestop Putty Pads, for use with max 4 by 4 in. flush device UL Listed Metallic Outlet Boxes installed with steel cover plates in 1 and 2 hr. fire rated gypsum wallboard wall assemblies framed with min 3-1/2 in. deep wood or steel studs and constructed as specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and completely seal against the stud within the stud cavity. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back to back.

CP 617 Firestop Putty Pads, for use with max 4-11/16 by 4-11/16 in., or max 4-3/8 by 4-7/8 in., flush device UL Listed Metallic Outlet Boxes installed with steel cover plates for use in 1 hr fire rated V446 gypsum board/steel stud or U341 gypsum board/wood stud Wall and Partition Design No. in the Fire Resistance Directory. When U341 wall design is used, wall shall be sheathed with 5/8 in. gypsum board, and glass or mineral fiber batt insulation shall be installed in stud cavities in accordance with U341 design. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the box within the stud cavity. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. and the boxes may be installed back-to-back.

CP 617 Firestop Putty Pads, for use with max 4-11/16 by 4-11/16 in. flush device UL Listed Metallic Outlet Boxes installed with steel cover plates for use in 1 and 2 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep steel studs and constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Min 0.8 pcf density fiberglass batt insulation is to be installed within the wall cavity required for 1 hr fire rated gypsum board wall assemblies and optional in 2 hr fire rated gypsum wallboard assemblies. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the box within the stud cavity. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.
CP 617 Firestop Putty Pads, for use with max 4 by 3-3/4 by 3 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Carlon Electrical Products, made from polyvinyl chloride, and bearing a 2 hr rating under the “Outlet Boxes and Fittings Classification for Fire Resistance” category in the Fire Resistance Directory. Putty pads and boxes for use in 1 and 2 hr fire rated gypsum wallboard assemblies, framed with min 3-1/2 in. deep wood studs and constructed as specified in the individual U300 Series Wall and Partition Designs in the Fire Resistance Directory. Outlet box secured to wood stud by means of two nailing tabs supplied with the outlet box. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) including the nailing tab and completely seal against the stud within the stud cavity. Outlet boxes installed with steel or plastic cover plates. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back to back.

CP 617 Firestop Putty Pads, for use with max 4 by 4 by 2-7/8 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Carlon Electrical Products, made from polyvinyl chloride, and bearing a 2 hr rating under the “Outlet Boxes and Fittings Classification for Fire Resistance” category in the Fire Resistance Directory. Putty pads and boxes for use in the 1 hr fire rated V446 gypsum board/steel stud or U341 gypsum board/wood stud Wall and Partition Design in the Fire Resistance Directory. When U341 wall design is used, wall shall be sheathed with 5/8 in. gypsum board, and glass or mineral fiber batt insulation shall be installed in stud cavities in accordance with U341 design. Outlet box secured to steel stud by means of fastening tab supplied with the outlet box. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) including the tab and completely seal against the stud within the stud cavity. Outlet boxes installed with steel or plastic cover plates. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between boxes on opposite sides of the wall may be less than 24 in. and the boxes may be installed back to back.

CP 617 Firestop Putty Pads, for use with max 2-1/4 by 3-3/4 by 2-3/4 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Pass and Seymour, Inc., and bearing a 2 hr rating under the “Outlet Boxes and Fittings Classification for Fire Resistance” category in the Fire Resistance Directory. Putty pads and boxes for use in 1 and 2 hr fire rated gypsum wallboard assemblies, framed with min 3-1/2 in. deep wood studs and constructed as specified in the individual U300 Series Wall and Partition Designs in the Fire Resistance Directory. Outlet box secured to wood stud by means of two nailing tabs supplied with the outlet box. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) including the nailing tab and completely seal against the stud within the stud cavity. Outlet boxes installed with steel or plastic cover plates. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back to back.

CP 617 Firestop Putty Pads, for use with max 4 by 3-3/4 by 3 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Allied Molded Products, Inc., made from fiber reinforced thermoplastic and bearing a 2 hr rating under the “Outlet Boxes and Fittings Classification for Fire Resistance” category in the Fire Resistance Directory. Putty pads and boxes for use in 1 hr fire rated gypsum wallboard assemblies, framed with min 3-1/2 in. deep wood studs and constructed as specified in the individual U300 Series Wall and Partition Designs in the Fire Resistance Directory. Outlet box secured to wood stud by means of two nailing tabs supplied with the outlet box. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) including the nailing tab and completely seal against the stud within the stud cavity. Outlet boxes installed with plastic cover plates. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back to back.

CP 617 Firestop Putty Pads, for use with max 4 by 4 in. by 1-1/2 in. deep flush device UL Listed Metallic Outlet Boxes installed with steel cover plates in 1 hr. fire rated gypsum wallboard wall assemblies framed with min 3-1/2 in. deep wood or steel studs and constructed as specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and completely seal against the stud within the stud cavity. The boxes are installed back to back with 5 in. by 4 in. UL Classified fire block, FS 657 or CP 657 installed in the cavity between the two boxes.
Wall Opening Protective Materials (CLIV)
as Tested to ANSI/UL 263
1 or 2-Hr. Rating

1 or 2-Hr. Gypsum Wall Assembly
(2-Hr. Shown)

Steel Stud or Wood Stud (Not Shown)

Power Cable

Firestop Box Insert

UL Listed Metallic Outlet Box
(Refer to UL Listing)
Wall Opening Protective Materials (CLIV)

as Tested to ANSI/UL 263
1 or 2-Hr. Rating

HILTI Firestop Box Insert, for use with max 4-11/16 by 4-11/16 by 2-1/8 in. deep UL Listed Metallic Outlet Boxes without internal clamps in 1 or 2 hr fire rated gypsum wallboard wall assemblies framed with min 3 1/2 in. deep steel studs and constructed of materials and in the manner specified in the individual U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Outlet boxes in 1 hr fire rated walls may be installed with plastic or steel cover plates. Outlet boxes in 2 hr fire rated walls shall be installed with steel cover plates. One 4-3/8 by 4-3/8 in. insert adhered to the interior back wall of the outlet box in accordance with the instructions supplied with the product. Smaller sized inserts may be cut and combined to achieve the 4-3/8 x 4-3/8 in coverage. Installation to comply with Article 314.16 of the National Electrical Code, (NFPA 70). When protective material is used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

HILTI Firestop Box Insert, for use with max 4 by 4 by 1-1/2 in. deep and 2-1/8 in. deep UL Listed Metallic Outlet Boxes without internal clamps in 1 or 2 hr fire rated gypsum wallboard wall assemblies framed with min 3-1/2 in. deep steel or wood studs and constructed of materials and in the manner specified in the individual U400, V400 or U300 Series Wall and Partition Designs in the Fire Resistance Directory, as summarized in the Table below. One 3-11/16 by 3-3/4 in. insert adhered to the interior back wall of the outlet box in accordance with the instructions supplied with the product. Smaller sized inserts may be cut and combined to achieve the 3-11/16 x 3-3/4 in coverage. Installation to comply with Article 314.16 of the National Electrical Code (NFPA 70). When protective material is used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

<table>
<thead>
<tr>
<th>Box Size</th>
<th>Type of Box and Cover Plate</th>
<th>Hourly Rating</th>
<th>Wall Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 x 4 x 2-1/8 in deep</td>
<td>Metallic w/ steel cover plates</td>
<td>2-hour</td>
<td>U400 or V400 – steel studs</td>
</tr>
<tr>
<td>4 x 4 x 2-1/8 in deep</td>
<td>Metallic w/ plastic cover plates</td>
<td>1-hour</td>
<td>U400 or V400 - steel studs</td>
</tr>
<tr>
<td>4 x 4 x 1-1/2 in deep</td>
<td>Metallic w/ plastic cover plates</td>
<td>1-hour</td>
<td>U300 – wood studs</td>
</tr>
</tbody>
</table>

HILTI Firestop Box Insert, for use with max 2 1/8 x 4 x 2 1/8 in. deep UL Listed Metallic Outlet Boxes without internal clamps in 2 hr fire rated gypsum wallboard wall assemblies framed with min 3 1/2 in. deep steel studs and constructed of materials and in the manner specified in the individual U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Outlet boxes may be installed with steel cover plates. One 1-7/8 x 2-13/16 insert adhered to the interior back wall of the outlet box in accordance with the instructions supplied with the product. Installation to comply with Article 314.16 of the National Electrical Code, (NFPA 70). When protective material is used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

HILTI Firestop Box Insert, for use with max 4-1/2 x 8-1/2 x 1-5/8 in. deep or max 3-3/4 x 5-1/2 in by 2-1/2 in deep UL Listed Metallic Outlet Boxes without internal clamps in 1 hr or 2 hr fire rated gypsum wallboard wall assemblies framed with min 3 1/2 in. deep steel or wood studs and constructed of materials and in the manner specified in the individual U400, V400 or U300 Series Wall and Partition Designs in the Fire Resistance Directory, as summarized in the Table below. Outlet boxes installed with steel cover plates. Box inserts evenly spaced and adhered to the interior back wall of the outlet box in accordance with the instructions supplied with the product. Installation to comply with Article 314.16 of the National Electrical Code, (NFPA 70). When protective material is used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

<table>
<thead>
<tr>
<th>Box Size</th>
<th>Inserts Used</th>
<th>Fire Rating</th>
<th>Wall Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-1/2 x 8-1/2 x 1-5/8 in deep</td>
<td>Two 3-11/16 x 3-3/4 in. inserts **</td>
<td>2 hour</td>
<td>U400 or V400 – steel studs</td>
</tr>
<tr>
<td>3-3/4 x 5-1/2 x 2-1/2 in deep</td>
<td>One 3-11/16 x 3-3/4 in. insert and one 1-7/8 x 2-13/16 in. insert</td>
<td>1 hour</td>
<td>U300, U400, or V400 – wood or steel studs</td>
</tr>
</tbody>
</table>

** - Min 3/4 in. deep plaster rings installed over outlet box. After installation of gypsum board, nom 1/4 in. thickness of Hilti FS-ONE Sealant, bearing the UL Classification Marking for Fill, Void or Cavity Materials, applied between the base layer of wallboard and the plaster ring.