DAMMON
ENGINEERING, INC.
Architects & Engineers

554 Old Spanish Trail
Slidell, LA 70458
985.649.5832
www.dammonengineering.com
info@dammonengineering.com

SHOP DRAWING and SAMPLE TRANSMITTAL

DATE: 05/07/2026

TO: Dynamic Constructors
1028 Market St.
Metairie, La. 70003
Jeffrey R. Hymel, Jr. (Jeff)

FROM: Chuck Dammon

SUBMITTAL **No.: 078413**

REFERENCE: **Fire Station #10**

DE Project: 2519

WE TRANSMIT:

☒ enclosed ☐ under separate cover ☐ _____

_____

FOR YOUR:

☐	use	☒	record	☐	approval
☐	review and comment	☐	information	☐	drafting

THE FOLLOWING:

☐	drawing(s)	☐	contracts	☐	specifications
☐	shop drawings	☐	samples	☐	change order(s)
☒	product information	☐	warranty	☐	substitution request

# COPIES	DESCRIPTION	ACTION
Electronic	Penetration Firestopping	A

ACTION CODES:

A. Reviewed/No Exceptions
B. Reviewed/Exceptions Noted
C. Revise and Resubmit
D. No Action Required
E. For Signature and Return to this Office
F. See Remarks Below
G. Rejected

REMARKS:

Fire Caulking

COPIES TO: File

AIA® Document G810™ – 2001

Transmittal Letter

PROJECT: *(Name and address)*
St. Tammany Fire Protection District No.1 - Fire Station #10
2745 Lakeshore Vista Blvd
Slidell,Louisiana 70461

TO: *(Name and address)*
Dammon Engineering Inc.
554 Old Spanish Trail
Slidell, LA 70458

FROM: *(Name and address)*
Dynamic Constructors, LLC
1028 Market St.
Metairie, LA 70003
Jeffrey R. Hymel, Jr. (Jeff)

J-Kaulk Firestopping
21 Alex Place
Picayune, MS 39466
Section 078413 Penetration Firestopping

WE TRANSMIT:
- ☒ Attached
- ☐ Under separate cover

VIA:
- ☐ Overnight delivery
- ☐ Mail
- ☒ E-mail
- ☐ Courier
- ☐ Fax
- ☐ Other

FOR:
- ☒ Approval / Action
- ☐ Information
- ☐ Use as requested
- ☐ Comment
- ☐ Distribution
- ☐ Other

THE FOLLOWING:
- ☐ Drawings
- ☐ Specifications
- ☐ Digital Files
- ☒ Submittals
- ☐ Other

NO. OF COPIES	DATE	FORMAT	DESCRIPTION
1	5.7.26	PDF	SUBMITTALS

REMARKS:
For review and approval.

BY:
Dynamic Constructors, LLC, Georgia Barrett

COPIES TO:
Dammon Engineering Inc., Chuck Dammon

Prepared By: Daniel Penton
Mobile Number: (601)-590-1219

Date: 04/20/2026

J-KAULK FIRESTOPPING INCORPORATED

SHOP DRAWING / SUBMITTAL REVIEW

☒ REVIEWED ☐ REVIEWED AS NOTED
☐ REVISE AND RESUBMIT ☐ REJECTED

Project No.: 2519 Submittal No.: Two

Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with requirements of the drawings and specifications. This check is only for review of the general conformance with the design concept of the project and general compliance with the information given in the Contract documents. This contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his or her work with that and other trades and performing all in a safe and satisfactory manner.

By: Chuck Dammon Date: 05-07-26

DAMMON ENGINEERING, INC.
Slidell, LA

Submittal Package

- **Project:** St. Tammany Fire Station #10
- **Contractor:** Dynamic Constructors
- **Distributor:** J-Kaulk Firestopping inc.
- **Manufacture:** Rectorseal
- **Manufacture Contact:** Melinda Ellis
  Mobile: (985)-288-7466
- **Installer:** J-Kaulk Firestopping inc.
- J-Kaulk Contact: Daniel Penton
  Mobile: (601)-590-1219

Address: 21 Alex Pl. Picayune, MS 39466
Phone: (601)-798-0827 Fax: (601)-798-9056

LA# 38664
MS#13695

TABLE OF CONTENTS

Balco and Rectorseal Inc.
Firestop Installer Program

J-Kaulk Firestopping

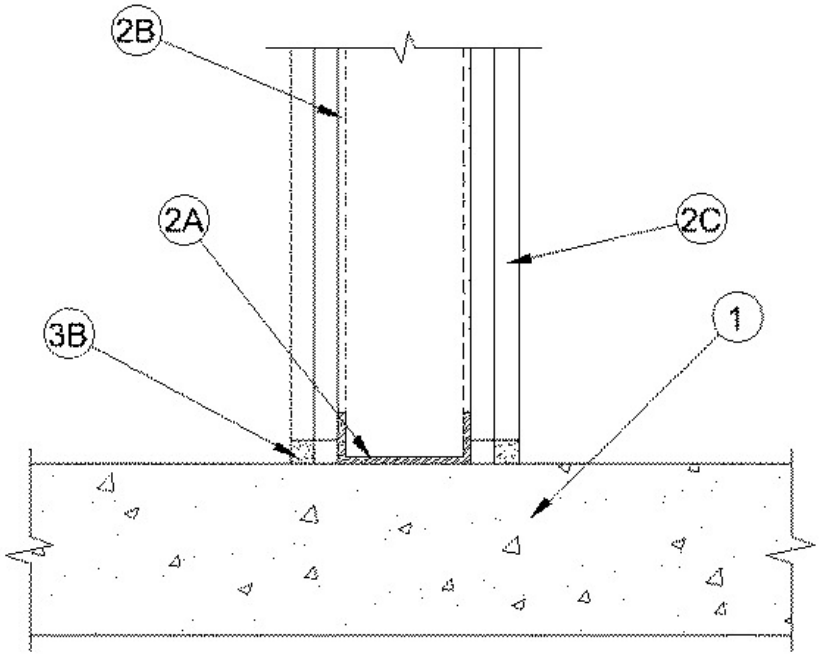
This is to recognize that the above-mentioned company has completed Balco - Rectorseals Installer Program for Firestop and Smoke/Sound products, Photoluminescent Stair Nosing and Markings, and Expansion Joint Covers.

Steven J Cooper

Steve Cooper
VP Sales

Date: August 17, 2022

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 1 and 2 Hr (See Item 2)	F Rating — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1 In.	FT Rating — 1 and 2 Hr (See Item 2)
	FH Rating — 1 and 2 Hr (See Item 2)
	FTH Rating — 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 25 mm



1. **Floor Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 -150 pcf or 1600-2400 kg/m^3) structural concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***.
See **Precast Concrete Units** category in the Fire Resistance Directory for names of manufactures.

2. **Wall Assembly —** The 1 or 2 h fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system constructed as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:

A. **Steel Floor Runner —** Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/4 in. (32 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.

B. **Studs —** Steel studs to be min 3-5/8 in. (92 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in, resting on and fastened to floor runner with sheet metal screws. Stud spacing not to exceed 24 in. (610 mm) OC.

C. **Gypsum Board* —** Gypsum board installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall for a 1 or 2 hr rated wall, respectively. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory except that a max 1 in. (32 mm) gap shall be maintained between the bottom of the gypsum board and the top of the concrete floor.
The hourly ratings of the joint system are equal to the hourly fire rating of the wall.

3. **Joint System —** Max separation between top of floor and bottom of gypsum board is 1 in. (25 mm). The joint system consists of a packing material and a fill material, as follows:

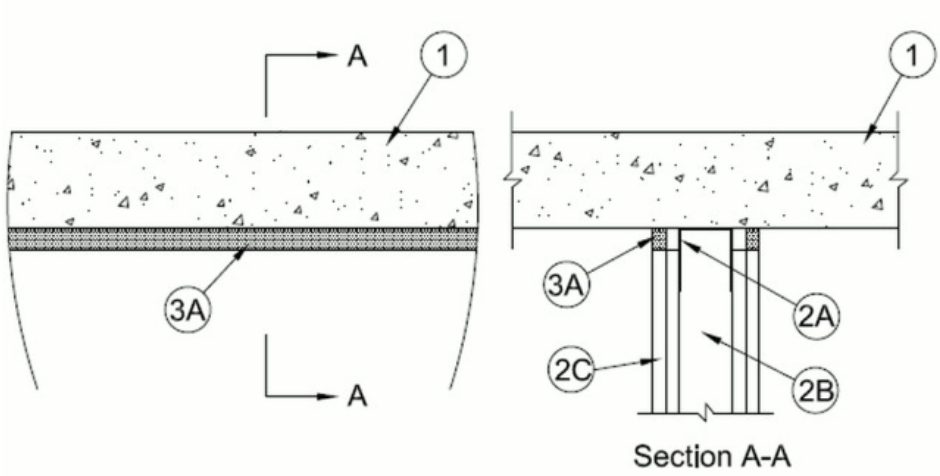
A. **Packing Material —** (Optional, Not Shown) - Foam backer rod firmly packed into the gap between the

bottom of the gypsum board and the top of the concrete floor and recessed from each surface of the wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material*-Sealant —** Min 5/8 in. (16 mm) thickness of fill material installed on each side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with each surface of the wall.
RECTORSEAL — FlameSafe, FS 900+ FlameSafe FS 1900, Metacaulk 1000, Metacaulk MC 150+, Metacaulk 350i, Biostop 350i, Biostop BF 150+ or Biostop 500+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 3/4 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II and III Movement Capabilities — 20% Compression or Extension or 33% Compression Only (See Item 3)	FH Ratings — 1 and 2 Hr (See Item 2)
	FTH Ratings — 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 3/4 In.
	Class II and III Movement Capabilities — 20% Compression or Extension or 33% Compression Only (See Item 3)



Section A-A

1. **Floor Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) structural concrete or any UL Classified **Concrete Blocks***.
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Ceiling Runners —** Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with min 1-1/4 in. (32 mm) flanges. Ceiling runner shall be secured to floor with steel fasteners spaced max 24 in. (610 mm) OC.

B. **Studs —** Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner. Studs secured only to floor runner with sheet metal screw. Stud spacing not to exceed 24 in. (610 mm) OC.

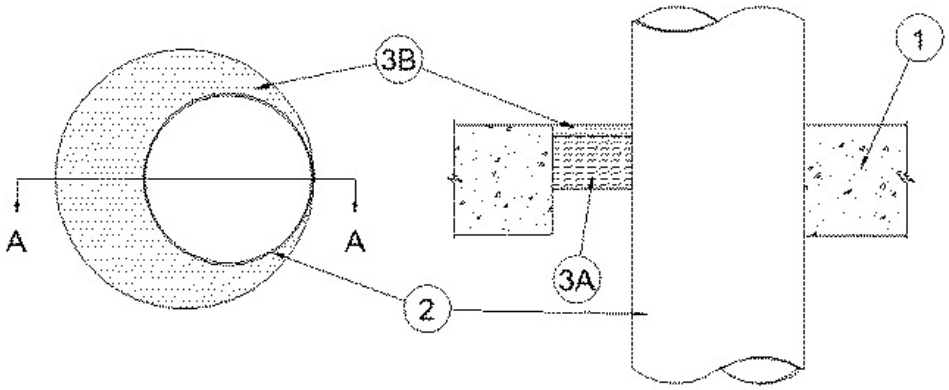
C. **Gypsum Board* —** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall, for 1 and 2 hr rated wall assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 3/4 in. (19 mm) gap shall be maintained between the top of the gypsum board and the bottom of the floor and the top row of screws shall be installed into the studs 2 in. (51 mm) below the lower surface the floor. **The hourly assembly ratings of the joint system are equal to the fire rating of the wall.**

3. **Joint System — Max separation between bottom of floor and top of wall at time of installation of joint system is 3/4 in. (19 mm). The joint system is designed to accommodate a max 20 percent compression or extension from its installed width or max 33 percent compression only from its installed width.** The joint system consists of a fill material, as follows:

A. **Fill, Void or Cavity Material* - Caulk —** Min 5/8 in. (16 mm) thickness of fill material applied within the joint, flush with both surfaces of wall.
RECTORSEAL — MC 150+, Metacaulk 1200 Caulk

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Ratings — 0, 1/4 and 1/2 Hr (See Item 2)	FT Ratings — 0, 1/4 and 1/2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 2 Hr
L Rating At 400°F — Less Than 1 CFM/ft^2	FTH Ratings — 0, 1/4 and 1/2 Hr (See Item 2)
W Rating — Class 1 (See Item 2B)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204°C — Less Than 5.1 L/s/m^2



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 -150 pcf or 1600-2400 kg/m^3) concrete. Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 11-1/4 in. (286 mm). In hollow-core floors, max diam of opening is 7 in. (178 mm).

See **Concrete Blocks** (CAZT) or Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

1A. **Steel Sleeve —** (Optional, not shown) - Max 11-1/4 in. (286 mm) diam sleeve fabricated from min 0.018 in. (0.46 mm) thick (28 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Sheet steel coiled to a diam less than circular cutouts in floor or wall assembly, inserted opening and allowed to uncoil against the circular cutouts. Sleeve to be installed flush with or extending max 1 in. (25 mm) beyond each surface of the floor or wall assembly.

1B. **Steel Sleeve —** (Optional, not shown) - As an alternate to Item 1A, max 10 in. (254 mm) Schedule 5 (or heavier) steel pipe, rigid steel conduit or max 4 in. (102 mm) EMT cast or grouted into floor or wall assembly, flush with or extending a max 4 in. (102 mm) beyond each surface of the floor or wall assembly.

2. **Through Penetrant —** One metallic pipe, tubing or conduit installed concentrically or eccentrically within the firestop system. An annular space of min 0 in. (point contact) to a max 2-3/4 in. (70 mm) is required between the penetrant and the periphery of the opening or sleeve.When W Rating applies, annular space to be min 1/2 in. (13 mm). Pipe, tubing or conduit to be rigidly supported on each side of the floor or wall assembly. The following types and sizes of metallic pipes, tubing or conduit may be used:

A. **Steel Pipe —** Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Copper Pipe —** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

C. **Copper Tubing —** Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

D. **Conduit —** Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in. diam (or smaller) steel electrical metallic tubing.

T, FT and FTH Ratings are 1/2 hr when annular space is 1-7/8 in. (48 mm) or less and min 1/2 in. (13 mm) thickness of sealant and min 4 in. (102 mm) thickness of mineral wool is used. T, FT and FTH Ratings are 1/4 hr when annular space is 1-7/8 in. (48 mm) or less, and min 1/4 in. (6 mm) thickness of sealant and min 2 in. (51 mm) thickness of mineral wool is used. The T, FT and FTH Ratings are 0 hr for annular spaces greater than 1-7/8 in. (48 mm). When steel sleeve is used, T, FT and FTH Ratings are 0 hr.

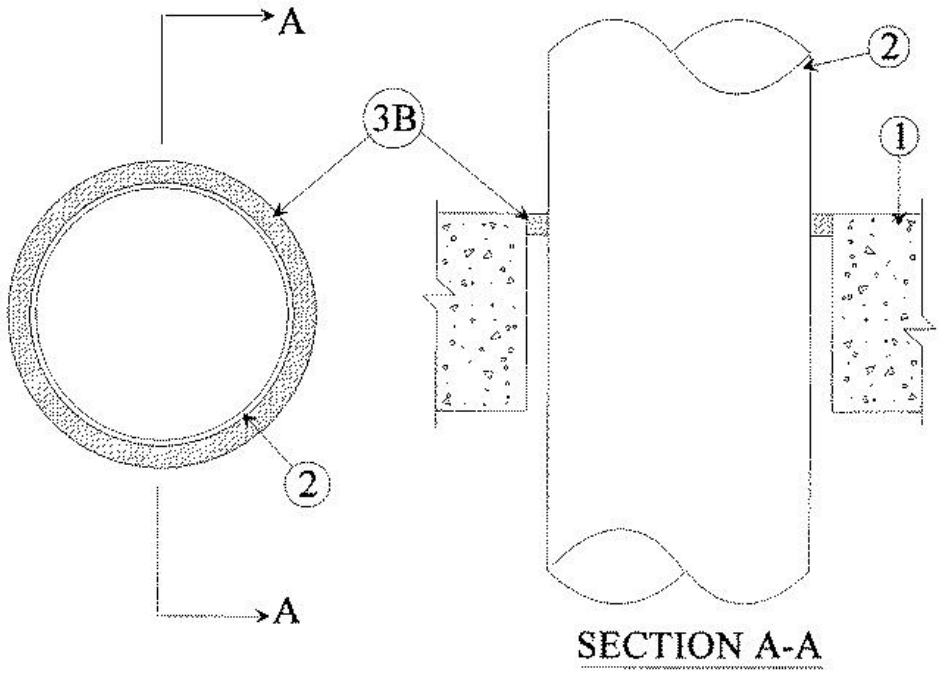
3. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Nom 2 in. (51 mm) or 4 in. (102 mm) thickness of min 4 pcf (64 k/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. (See Item 2 above) Packing material to be recessed from top surface of floor/sleeve or from both surfaces of wall/sleeve or from both surfaces of hollow-core floor to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* - Caulk —** Min 1/4 in. (6 mm) or 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall or with both surfaces of hollow-core floor. (See Item 2 above). When sheet metal sleeve (Item 1A) is used, fill material to be installed flush with top surface of floor or with both surfaces of wall or with both surfaces of hollow-core floor within the sleeve. When rigid steel sleeve (Item 1B) is used, fill material may be installed flush with top end of sleeve in floors or both ends of sleeve in walls.
RECTORSEAL — MC 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight concrete (100-150 pcf or 1600-2400 kg/m^3) floor or wall. Wall may also be constructed of any UL Classified **Concrete Blocks*.** Max diam of opening is 7 in. (178 mm).
See **Concrete Block** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants —** One metallic pipe, conduit or tubing to be centered within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The annular space between pipe or conduits and periphery of opening shall be 3/16 in. (7 mm). The following types and sizes of metallic pipes, conduits or tubing may be used:

A. Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. Nom 6 in. (152 mm) diam (or smaller) rigid galv steel conduit.

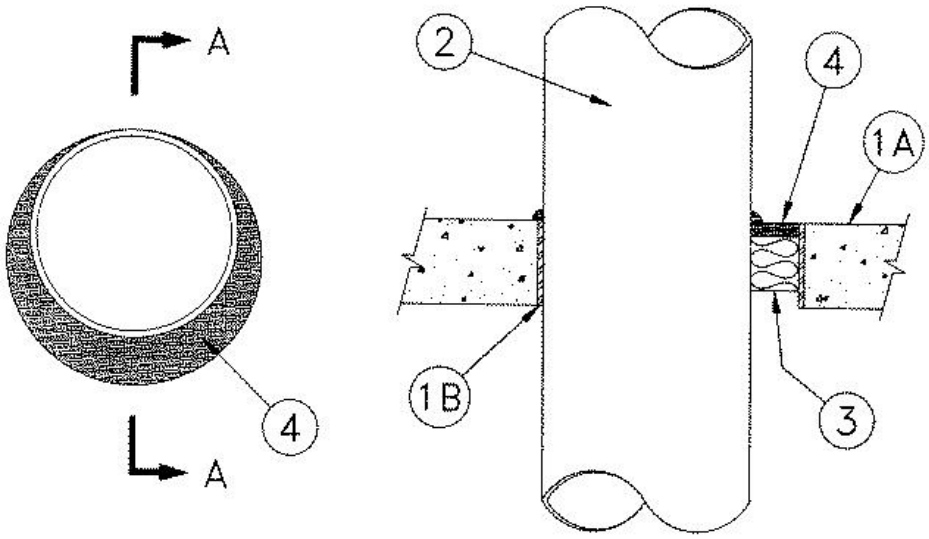
3. **Firestop System —** The firestop system shall consist of the following:

A. **Forming Material* —** (Not Shown, Optional) — Min 1/2 in. (13 mm) thick boards friction-fitted into annular space between through-penetrant and periphery of opening. Forming material to be recessed a min of 1/2 in. (13 mm) from top surface of floor or from both surfaces of wall. Forming material may be removed after fill material cures.

B. **Fill, Void or Cavity Material* — Sealant —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
RECTORSEAL — Types FS900, FS901, FS903, FS903CG, FS905, FS905CG, FS929, FST901, FST903, FST905, Metacaulk 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL2079	CAN/ULC S115
F Rating 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



SECTION 'A–A'

1A. **Floor or Wall Assembly —** Min 4-1/2 in. thick reinforced normal weight (150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 26-1/2 in.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Rating Directory for names of manufacturers.

1B. **Metallic Sleeve (optional) —** Nom 16 in. (or smaller), Schedule 10 (or heavier) steel pipe sleeve, cast or grouted into floor or wall assembly. Sleeve is not permitted when nominal diameter of penetrating pipe (Item 2) is above 12 in.

2. **Through Penetrants —** One metallic pipe or tubing to be installed concentrically or eccentrically into opening such that the annular space between the pipe and the periphery of the opening is min 0 in. (point of contact) to max 2-1/2 in. Pipe to be firmly supported on both sides of opening. The following types and sizes of pipes may be used:

(a) Nom 24 in. diam (or smaller) Schedule 30 (or heavier) steel or iron pipe.

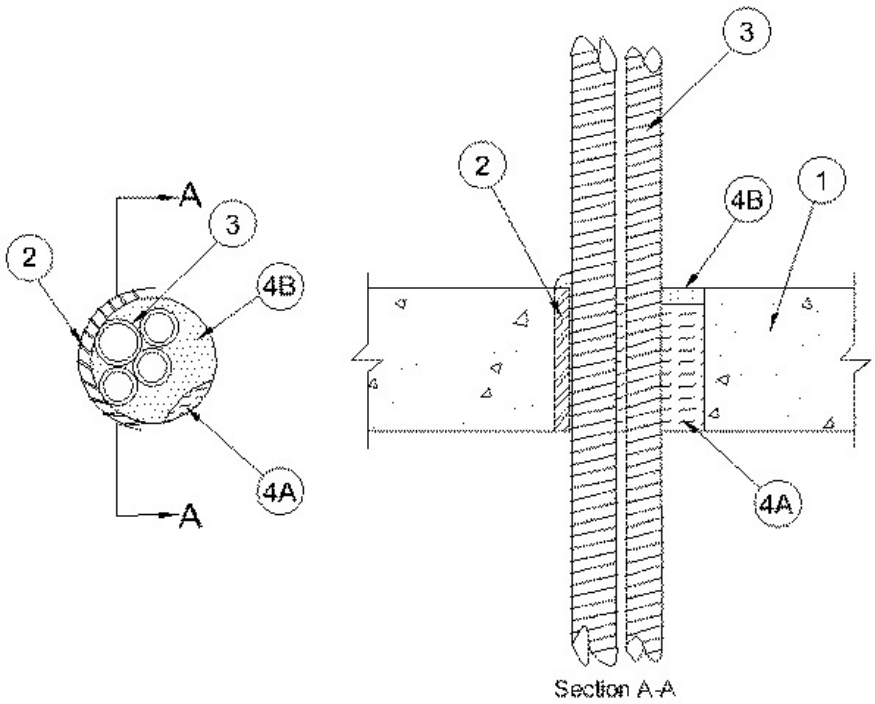
(b) Nom 4 in. diam (or smaller) electrical metallic tubing.

3. **Packing Metallic —** Mineral wool insulation of min 4 pcf firmly pressed into opening as a permanent form. Insulation material to be recessed by min depth of 1/2 in. from top surface of floor or both surfaces of wall.

4. **Fill, Void or Cavity Materials* — Caulk —** Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall. A min 1/4 in. crown of the caulking material shall be applied around the entire circumference of the pipe at the level of the floor surface or both wall surfaces.
RECTORSEAL — FlameSafe® FS900+, Metacaulk MC 150+ and Biostop BF 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 and 3 Hr (See Item 3)	F Rating — 2 and 3 Hr (See Item 3)
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 2 and 3 Hr (See Item 3)
	FTH Rating — 0 Hr
L Rating at Ambient - Less than 1 CFM/sq ft	L Rating at Ambient - Less than 1 CFM/sq ft
L Rating at 400° F - Less than 1 CFM/sq ft	L Rating at 400° F - Less than 1 CFM/sq ft



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight wall. Wall may also be constructed of any UL Classified **Concrete Blocks***. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***. The max diam of the opening is dependent upon the type of through penetrant (Item 3) used. If flexible steel conduit is installed within the opening, the max diam of the opening is 6 in. (152 mm) If flexible aluminum conduit is installed within the opening, the max diam of the opening is 4 in. (102 mm).

See **Concrete Block** (CAZT) and Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve —** (Optional) Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces. The max diam of the steel sleeve is dependent upon the type of through penetrant used. If flexible steel conduit is used, the max diam of the steel sleeve is 6 in. (152 mm). If flexible aluminum conduit is used, the max diam of the steel sleeve is 4 in. (102 mm).

3. **Through Penetrants —** One or more nom 1-1/2 in. (38 mm) diam (or smaller) flexible steel conduit or one or more nom 1 in. (25 mm) diameter (or smaller) flexible aluminum conduit bundled together and installed within the opening. Max diam of through penetrant bundle shall not exceed 4 in. (102 mm) and 2-1/2 in. (64 mm) for flexible steel conduit and flexible aluminum conduit, respectively. The space between the through penetrants shall be a min 0 in. (0 mm, point contact) to a max 1/4 in. (6 mm). The annular space between the through penetrants and periphery of opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm) for flexible steel conduit. The annular space between the through penetrants and periphery of opening shall be min 0 in. (0 mm, point contact) to max 1-1/2 in. (38 mm) for flexible aluminum conduit. Through penetrants to be rigidly supported on both sides of floor or wall assembly.

See **Flexible Metal Conduit** (DXUZ) category in the Electrical Construction Materials Directory for names of manufacturers.

The F Rating of the firestop system is dependent upon the type of through penetrant used. If flexible aluminum conduit is used, the F Rating of the firestop system is 2 hr. If flexible steel conduit is used, the F Rating of the firestop system is 3 hr.

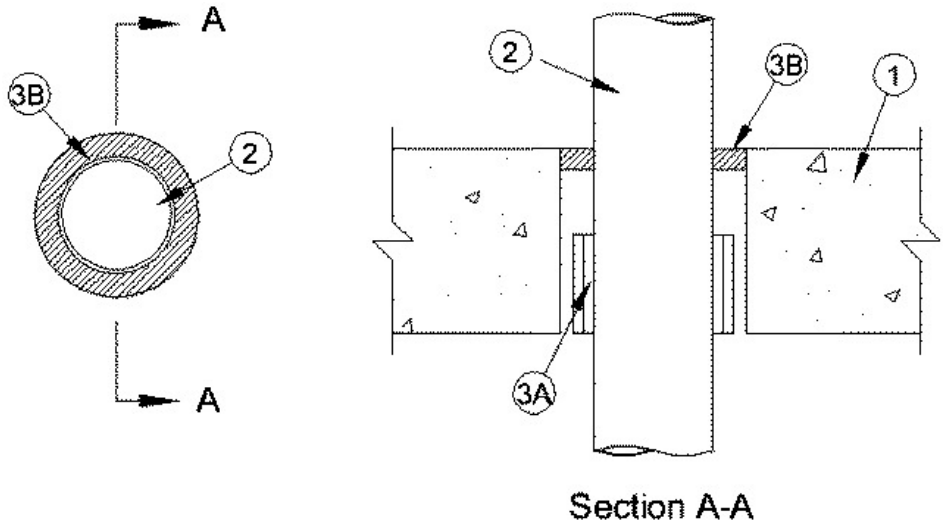
4. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Additional packing material shall be forced into interstices of flexible aluminum conduit to max extent possible. Packing material to be recessed from top surface of floor or from both surfaces of wall and hollow-core precast concrete units as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. At the point contact location between penetrating items and concrete, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the concrete/penetrating item interface on the top surface of floor and on both surfaces of wall or hollow-core precast concrete units. Additional sealant shall be forced into interstices of through penetrants to max extent possible.
RECTORSEAL — FS900+ Sealant, FS 1900 Sealant, Metacaulk MC 150+ or Biostop BF 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1/4 and 1-1/4 Hr (See Item 2)	FT Rating — 1/4 and 1-1/4 Hr (See Item 2)
	FH Rating — 2 Hr
	FTH Rating — 1/4 and 1-1/4 Hr (See Item 2)



Section A-A

System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. **Floor or Wall Assembly —** Min 4-1/2 in (114 mm). thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg) concrete. Max diam of opening is 6 in. (152 mm).

1A. **Steel Deck/Floor Assembly —** (Not Shown) — As an alternate to Item 1, the floor assembly may consist of a fluted steel deck/concrete floor assembly. The floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Form Units* —** Min 2-1/2 in. (64 mm) deep galv fluted units.

B. **Concrete —** Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

2. **Through Penetrants —** One nonmetallic pipe or conduit centered within opening with a nom 3/4 in. (19 mm) annular space between penetrant and periphery of opening. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of penetrants may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. **FT and FTH Ratings are 1-1/4 Hr.**

B. **Fire Retardant Polypropylene (FRPP) Pipe —** Nom 4 in. (102 mm) in. diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. **FT and FTH Ratings are 1/4 Hr.**

4. **Firestop System —** The firestop system shall consist of the following:

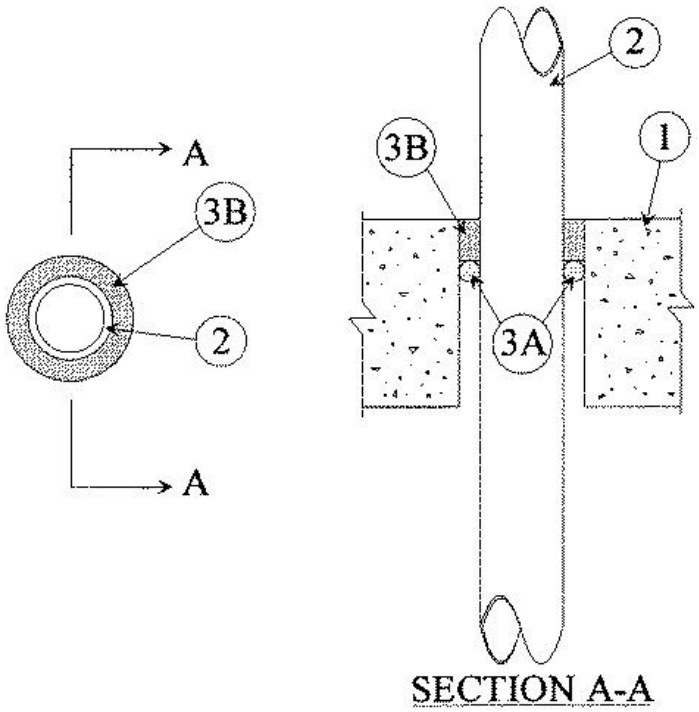
A. **Fill, Void or Cavity Materials* - Wrap Strip —** Nom 1/4 in. (6.4 mm) thick intumescent material supplied in 2 in. (51 mm) wide strips. Min two layers of wrap strip individually wrapped tightly around the nonmetallic penetrant with ends butted and held in place with masking tape. Butted ends in successive layers shall be offset. Bottom edge of wrap strip to be flush with the bottom surface of floor or with both surfaces of wall assembly. When used with the steel deck floor assembly, bottom edge of wrap strip shall be flush with the crest of the steel form units.

RECTORSEAL — Metacaulk Wrap Strip

B. **Fill, Void or Cavity Material* — Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall assembly.
RECTORSEAL — Metacaulk 1000 or Metacaulk 350i

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Rating — 3 Hr
T Ratings — 1 and 1-1/2 Hr (See Item 2)
L Rating At Ambient — 2.8 CFM/sq ft
L Rating At 400 F — Less Than 1 CFM/sq ft



1. **Floor or Wall Assembly —** Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks*.** Max diam of opening is 4 in.
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants —** One nonmetallic pipe to be centered within the firestop system. Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 2 in. diam (or smaller) Schedule 40 solid-core PVC pipe for use in closed (process or supply) piping system. A nom annular space of 7/8 in. is required within the firestop system. When PVC pipe is used, the T Rating is 1-1/2 h.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 2 in. diam (or smaller) SDR 17 CPVC pipe for use in closed (process or supply) piping systems. A nom annular space of 7/8 in. is required within the firestop system. When CPVC pipe is used, the T Rating is 1-1/2 h.

C. **Polybutylene (PB) Pipe —** Nom 2 in. diam (or smaller) SDR11 PB pipe for use in closed (process or supply) piping systems. A nom annular space of 1 in. is required within the firestop system. When PB pipe is used, the T Rating is 1 h.

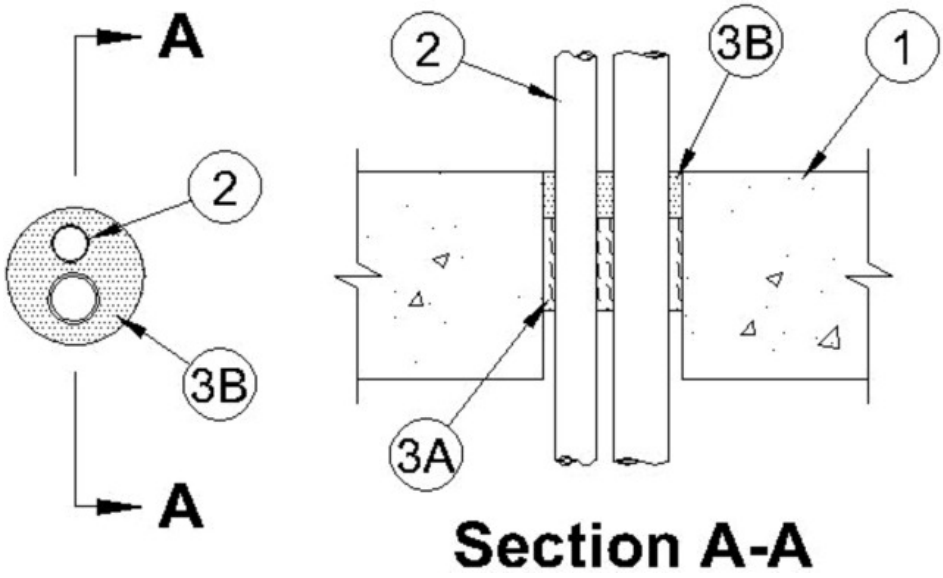
3. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** (Optional) — Foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* —** Sealant — Min 1 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
RECTORSEAL — Metacaulk 1000

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)
F Ratings - 3 Hr
T Rating - 0 Hr



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 3 in. (76 mm).
See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants —** Nom 1 in. diam (or smaller) SDR 9 cross linked polyethylene (PEX) tubing for use in closed (process or supply) piping systems. A max of two through penetrants may be included in the opening. Of the two through penetrants, only one through penetrant shall have a nom diam greater than 3/4 in. (19 mm). The space between the through penetrants shall be nom 3/8 in. (10 mm). The annular space between the through penetrants and periphery of opening shall be min 1/2 in. (13 mm) to max 3/4 in. (19 mm). Through penetrants to be rigidly supported on both sides of floor or wall assembly.

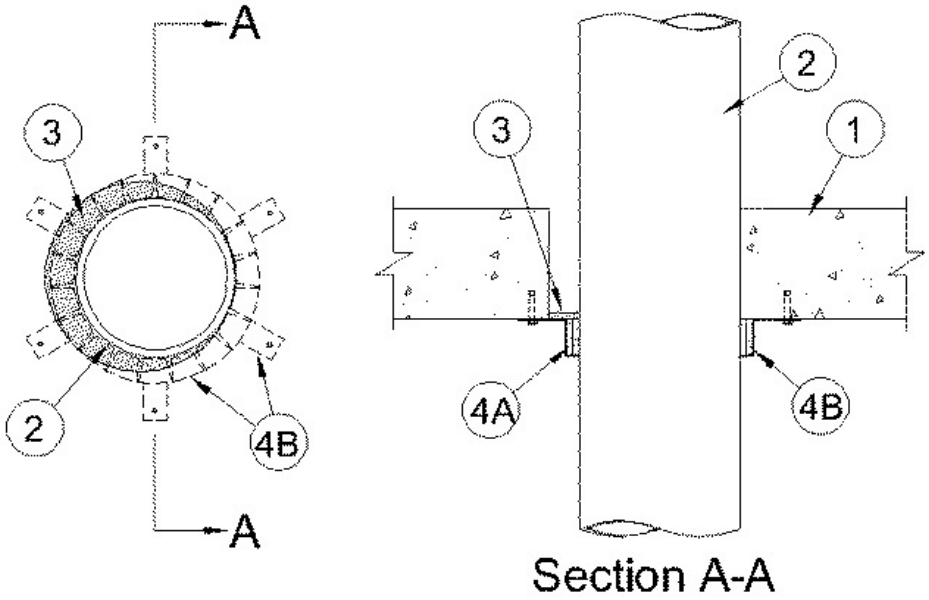
3. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Min 2 in. (51 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall or precast concrete unit floors as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with top surface of floor or flush with both surfaces of wall or precast concrete unit floor. Additional fill material to be installed such that a min 1/4 in. (6 mm) crown is formed around the through penetrants.
RECTORSEAL — FlameSafe FS 900+, FlameSafe FS1900, FlameSafe FS1901, FlameSafe FS1905, FlameSafe FS1929 Sealant, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Rating — 2 Hr
T Rating — 2 Hr
W Rating - Class 1 (See Item 3)



Section A-A

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 5 in. (127 mm).

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants —** One nonmetallic pipe to be installed either eccentrically or concentrically within the firestop system. The annular space shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) SDR 13.5 or Schedule 40 CPVC pipe for use in closed (process or supply) piping systems. Schedule 40 CPVC pipe for use in vented (drain, waste or vent) piping systems.

C. **Acrylonitrile Butadiene Styrene (ABS) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Fill, Void or Cavity Materials* - Caulk —** Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with the bottom surface of floor or with both surfaces of wall.
RECTORSEAL — Metacaulk 1000 or Metacualk 1200

W-Rating only applies when Metacaulk 1200 is used.

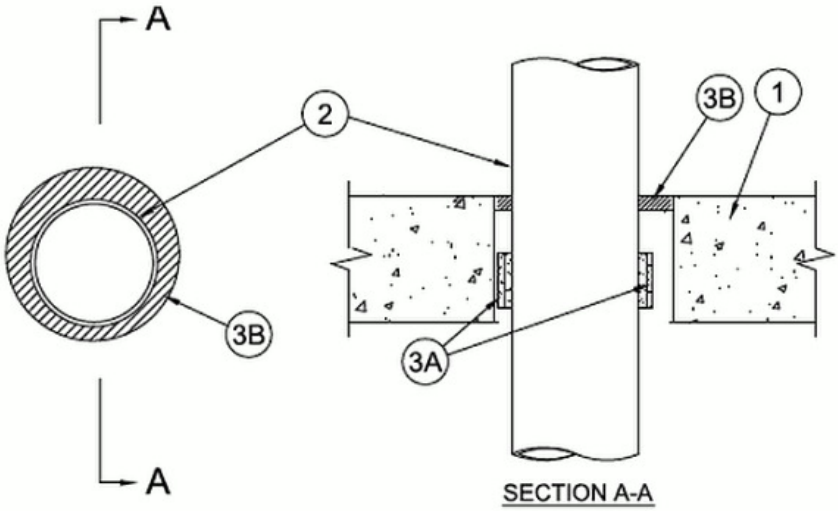
4. **Firestop System —** The firestop system shall consist of the following:

A. **Fill, Void or Cavity Materials* - Wrap Strip —** Nom 1/4 in. (6 mm) thick by 1 in. (25 mm) wide intumescent wrap strip. Two layers of wrap strip are individually wrapped around the through-penetrant with ends butted and held in place with masking tape. Butted ends in successive layer shall be offset. When diameter of penetrant is equal to or less than 3 in.(76 mm), one layer of wrap strip is wrapped around the through-penetrant with ends butted and held in place with masking tape. Wrap strips butted tightly against both surface of wall.
RECTORSEAL — Metacaulk Wrap Strip

B. **Steel Collar —** Collar fabricated from coils of precut 0.016 in. thick (No. 30 MSG) galv sheet steel available from wrap strip manufacturer. Collar shall be nom 1 in. (25 mm) deep with min 1 in. (25 mm) wide by 1-1/4 in. (32 mm) long anchor tabs on 4 in. (102 mm) centers for securement to underside of concrete floor and both sides of concrete wall. In addition, collar contains retainer tabs, 1/4 in. (6 mm) wide by 3/8 in. (10 mm) long located opposite the anchor tabs. Collar shall be wrapped over the wrap strip, with ends overlapping min 1 in. (25 mm) The retainer tabs are folded 90 deg towards the pipe to maintain the annular space around the pipe and to retain the wrap strip. Collar secured to bottom surface of the floor or both surfaces of wall at each anchor tab by means of min 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long steel expansion bolts or steel Tapcon® concrete anchors in conjunction with 1/4 in. (6 mm) by 5/8 in.(16 mm) diam fender washers.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 2 Hr
L Rating At 400°F — Less Than 1 CFM/ft^2	FTH Rating — 0 Hr
W Rating - Class 1 (See Item 3B and 3C)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204°C— Less Than 5.1 L/s/m^2



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow core Precast Concrete Units*. Max diam of opening is 6 in. (152 mm).

See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrant —** One nonmetallic pipe to be installed concentrically or eccentrically within the firestop system. Annular space between penetrant and opening shall be min 3/8 in. (9.5 mm) to max 3/4 in. (19 mm). When W Rating applies, annular space shall be a min 1/2 in. (13 mm). Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) SDR 17 CPVC pipe for use in closed (process or supply) piping systems.

C. **Acrylonitrile Butadiene Styrene (ABS) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

D. **Rigid Nonmetallic Conduit+ —** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

E. **Crosslinked Polyethylene (PEX) Tubing —** Nom 1 in. (25 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.

F. **Flame Retardant Polypropylene (FRPP) Pipe —** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Firestop System —** The firestop system shall consist of the following:

A. **Fill, Void or Cavity Materials* —** Nom 2 mm thick by 3 in. (76 mm) wide intumescent joint strip tightly wrapped around the outer circumference of the pipe with ends butted and held in place with tape. Joint strip slid into the annular space with the bottom edge of the joint strip recessed 1/2 in. (13 mm) from bottom surface of floor or both surfaces of wall. Four layers are to be used for nom 4 in. (102 mm) diam pipe, three layers for nom 3 in. (76 mm) diam pipe, and two layers for nom 2 in. (51 mm) diam pipe.
RECTORSEAL — Metacaulk, Flame Safe Joint Strip, Biostop Joint Strip

B. **Fill, Void or Cavity Material* — Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall assembly. When FRPP penetrant (Item 2E) and/or hollow core floor is used, sealant to be applied flush with top and bottom of floor.
RECTORSEAL — Metacaulk 1000, Metacaulk 350i, Biostop 500+, Biostop 350i.

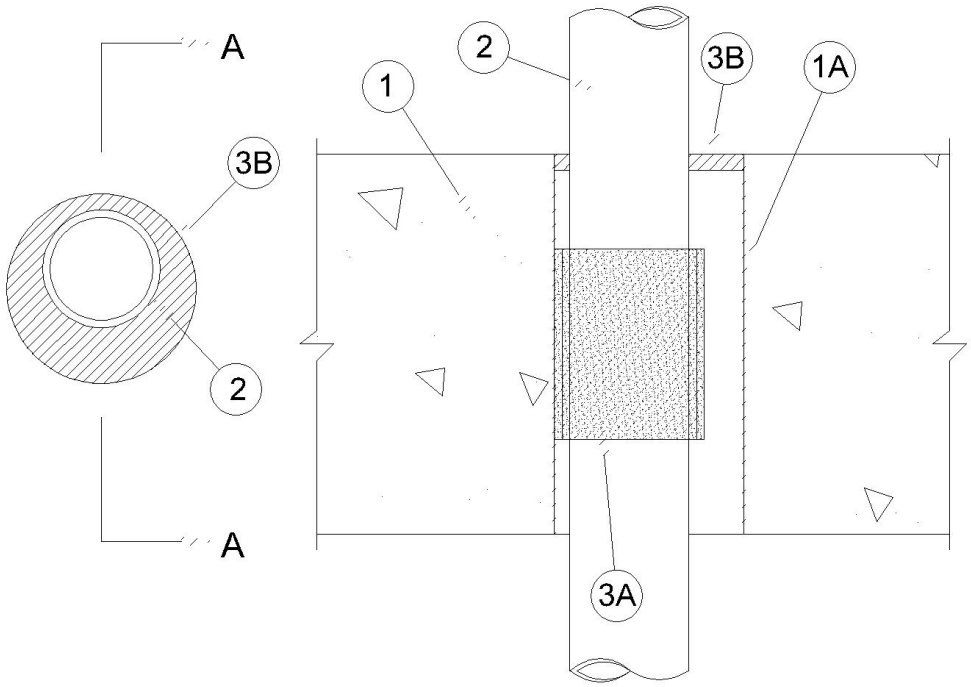
W Rating applies only when Metacaulk 1000 or Biostop 500+ is used.

C. **Packing Material —** (Optional, not shown) — When W Rating applies, packing material is required. Min 4 pcf (64 m^3) mineral wool batt insulation firmly packed into opening or min 1 in. (25 mm) diam backer rod friction fitted into the opening as a form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

December 22, 2023

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 2 Hr
L Rating At 400°F — Less Than 1 CFM/ft^2	FTH Rating — 0 Hr
W Rating - Class 1 (See Item 3B and 3C)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204°C— Less Than 5.1 L/s/m^2



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. (See Item 2)

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 -150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Floor may also be constructed of any 6 in. (152 mm)

thick UL Classified hollow core Precast Concrete Units*. When hollow core Precast concrete is used the max diam of opening is 6 in. (152 mm).

See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

1A. **Metallic Sleeve —** Required for use with Concrete Blocks or hollow core Precast Concrete Units, optional for solid block or solid wall construction. Nom 7 in. (178 mm) Diam (or smaller) cylindrical sleeve fabricated from min 0.018 in. (0.46 mm) thick (28 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along longitudinal seam. Length of sleeve to be installed flush with wall surfaces.

2. **Through Penetrant —** One nonmetallic pipe to be installed concentrically or eccentrically within the firestop system. Annular space within the firestop system is dependent upon the max diam and type of penetrant as shown in Table 1. When W Rating applies, annular space shall be a min 1/2 in. (13 mm). Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polypropylene (PP-R) Pipe** — Nom 8 in. (203 mm) diam SDR 11 or Nom 6 in. (152 mm) (or smaller) Aquatherm or Niron with an SDR of 7.4, 9, 11, 17 or 17.6 pipe for use in closed (process or supply) or vented (drain, waste, or vent) piping systems. Pipes larger than 6 in. (152 mm) diam are restricted to SDR 11 only.

B **Polypropylene (PP-RCT) Pipe** — As an alternate to Item A, nom 8 in. (203 mm) diam SDR 11 or nom 6 in. (152 mm) (or smaller) Aquatherm or Niron with an SDR of 7.4, 9, 11, 17 or 17.6 pipe for use in closed (process or supply) or vented (drain, waste, or vent) piping systems. Pipes larger than 6 in. (152 mm) diam are restricted to SDR 11 only.

Penetrants A, B larger than nom 6 in. (152 mm) diam are limited to 2.5 Pa only for CAN/ULC - S115.

3. **Firestop System —** The firestop system shall consist of the following:

A. **Fill, Void or Cavity Materials* —** Nom 2 mm thick by 3 in. (76 mm) wide intumescent joint strip (See Table 1). Strips tightly wrapped around the outer circumference of the pipe with ends butted and held in place with tape. Joint strip slid into the annular space with the bottom edge of the joint strip recessed 3/4 in. (18 mm) from bottom surface of floor or 1-1/2 in. (38 mm) from both surfaces of wall.

RECTORSEAL — Metacaulk Joint Strip, Flame Safe Joint Strip, Biostop Joint Strip

Table 1:

Penetrant Item	Nom Diam of Pipe In. (mm)	No. of layers	Min Annular Space in. (mm)	Max Annular Space in. (mm)	Max Opening Diam In. (mm)	Sealant Thickness In. (mm)
A, B	8(203)	6	1/2 (12.7)	1-5/8 (41.2)	++10 (254)	1/4 (6)
A, B	6(152)	4	3/8 (9.5)	1-3/8 (35)	++8 (203)	1/4 (6)
A, B	4(102)	2	3/16 (4.8)	1-1/4 (31.8)	6 (152)	1/4 (6)
A, B	3(76)	1	1/16 (3.2)	1-1/4 (31.8)	4 (102)	1/4 (6)

++ opening diameters larger than 6 in. (152 mm) are not eligible for use in UL Classified hollow core Precast Concrete Units.

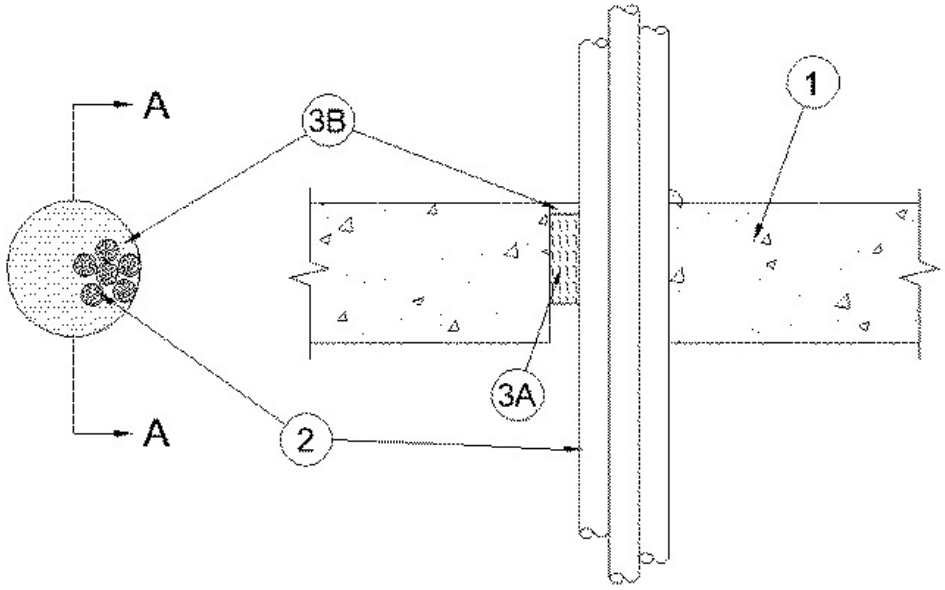
B. **Fill, Void or Cavity Material* — Caulk —** Min 1/4 in. (6 mm) thickness (see Table 1) of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall assembly. When penetrant is nom. 6 in. (152 mm) diameter, Metacaulk 1000 is required. W Rating applies only when Metacaulk 1000 or Biostop 500+ is used.

RECTORSEAL — Metacaulk 1000, Metacaulk 150+, Metacaulk 350i, Biostop 500+, Biostop 350i.

C. **Packing Material —** (Optional, not shown) — When W Rating applies, packing material is required. Min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening or min 1 in. (25 mm) diam backer rod friction fitted into the opening as a form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Ratings — 1/4 and 1/2 Hr (See Item 2)r	FT Ratings — 1/4 and 1/2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/ft^2 (Item 2)	FH Rating — 2 Hr
L Rating At 400 F — 1.4 CFM/ft^2 (See Item 2)	FTH Ratings — 1/4 and 1/2 Hr (See Item 2)
W Rating - Class1 (See Item 2)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204 C —7.1 L/s/m^2



SECTION A-A

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 4 in. (102 mm). See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Cables —** Aggregate cross-sectional area of cables in opening to be min 10 percent to max 66 percent of the aggregate cross-sectional area of the opening. Cables to be tightly bundled and rigidly supported on both sides of floor or wall assembly. The annular space between the cable bundle and the periphery of the opening shall be a min 0 in. (point contact) to a max 2-3/4 in. (70 mm). **When L and W Ratings apply, the min separation between the individual cables is equal to or greater than 1/8 in. (3 mm).** Any combination of the following types and sizes of cables may be used:

A. Max 2/C No. 12 AWG MC (BX) cable with copper conductors and polyvinyl chloride (PVC) insulation.

B. Max 3/C No. 8 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.

C. Max 3/C with ground, No. 10 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.

D. Max 25 pair No. 20 AWG (or smaller) copper conductor cable with XLPE/PVC insulation, with or without PVC jacket.

E. Max RG59/U (or smaller) coaxial cable with aluminum or copper conductors and fluorinated ethylene insulation and jacketing.

F. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with Hylar insulation and jacketing.

G. Max 2/C No. 22 AWG (or smaller) copper conductor alarm cable with PVC insulation.

H. Max 1/C No. 14 AWG (or smaller) copper conductor Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

I. Max 1/C No. 10 AWG (or smaller) copper conductor Type THHN or THWN gasoline & oil resistant II 600V VW-1 E116364

(UL) power cable.

J. Max 4/C No. 18 AWG bimetal conductors Type CL-2 Barostat II Sun res (UL) Listed thermostat cable.

K. Max 3/C No. 4 AWG aluminum Triple E Alloy AA8176 Type SE cable Style U Type XHH-W-2 CDRS E32071 (UL) service entrance cable.

L. Max 1/C 300 MCM type MTW or THHN or THWN for CT use gas & oil res. II sun res. 600V (UL) or AWM, 300 kcmil, copper conductor power cable.

M. Max 6/C Commscope Optical Reach 2001 006 fiber optic cable.

N. Max 3/C No. 18 AWG copper Manhattan / CDT-F P/N M244826 E-120910 18 AWG Shielded CMP (UL) c(UL), Foil Shield, 300V power cable.

O. Max 4 pr No. 24 AWG copper Belden-M DataTwist (R) Five 1583A CM 4PR24, computer network cable.

When annular space is greater than 3/4 in. (19 mm), the T Rating is 1/4 hr. When annular space is 3/4 in. (19 mm) or less, T Rating is 1/2 hr.

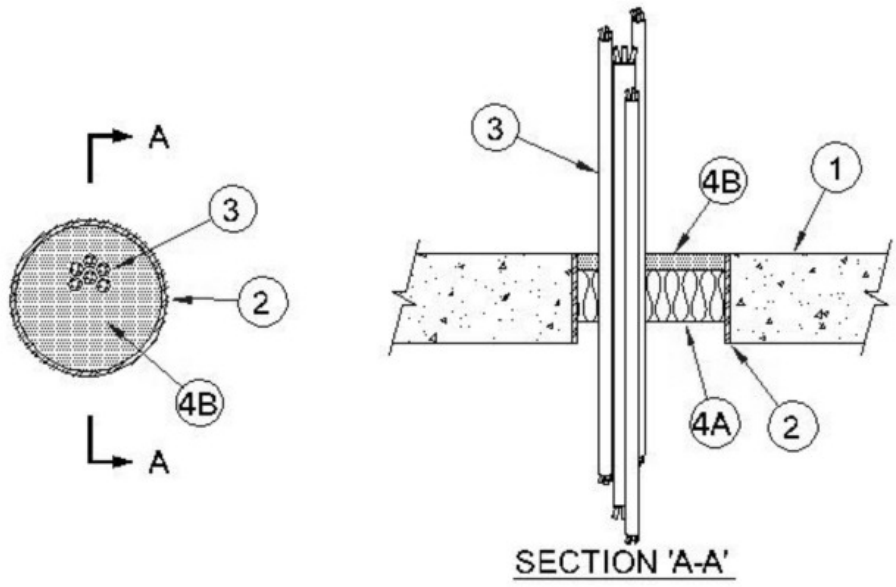
3. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* - Caulk —** Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall. At point contact location between concrete floor or wall and cables, a min 1/2 in. (13 mm) diam bead of fill material shall be applied to the concrete/cable interface on top surface of floor or both surfaces of wall.
RECTORSEAL — MC 150+.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating —1/2 Hr
L Rating At Ambient — Less Than 1 CFM/ft^2 (Item 2)	FH Rating — 3 Hr
L Rating At 400 F — 1.4 CFM/ft^2 (See Item 3)	FTH Rating — 1/2 Hr
W Rating - Class 1 (See Items 3 and 4B)	L Rating At Ambient — Less Than 5.1 L/s/m^2 (See Item 3)
	L Rating At 204 C —7.1 L/s/m^2 (See Item 3)



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 6 in. (152 mm).
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Nonmetallic Sleeve (Optional) —** Nom 6 in. (12 mm) diam (or smaller) Schedule 40 polyvinyl chloride (PVC) pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

3. **Cables —** Aggregate cross-sectional area of cable bundle in opening to be max 45 percent of the cross-sectional area of the opening. Min separation between cable bundle and between cables and periphery of opening is 1/4 in. (6 mm). Max annular space between cable bundle and periphery of opening is 2 in. (51 mm). **L and W Ratings apply only when the min separation between the individual cables is equal to or greater than 1/8 in. (3 mm).** Cables to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of copper or aluminum conductor cables may be used:

A. Max 1/C 350 kcmil cable with crosslinked polyethylene (XLPE) jacket.

B. Max 400 pair No. 24 AWG cable with PVC insulation and jacket.

C. Max. 3/C No. 2/0 AWG aluminum conductor SER cable with PVC insulation and jacketing.

D. Max. 3/C No. 12 AWG copper conductor cable with PVC insulation and jacket (Romex).

E. Max. RG59/U copper conductor coaxial cable with fluorinated ethylene insulation and jacket.

F. Max. 62.5/125 fiber optic cable with PVC insulation and jacket.

G. Max. RG/6 No. 18 AWG copper conductor CATV coaxial cable with PVC insulation and jacket.

H. Max. 4/C No. 2/0 AWG copper conductor, steel or aluminum armored or metal clad cable (MC cable).

4. **Firestop System —** The firestop system shall consist of the following:

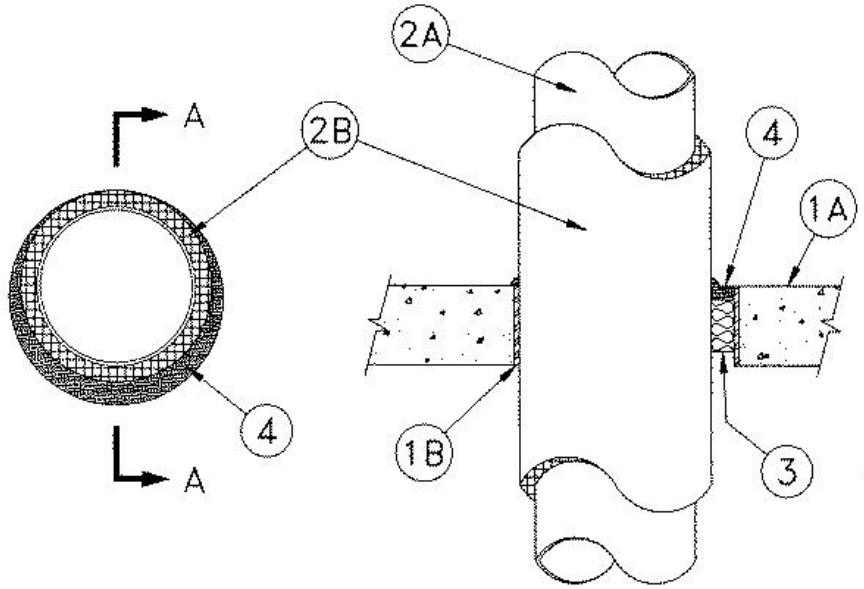
A. **Packing Material —** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall or hollow-core concrete floor as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* - Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed symmetrically on both sides of floor, flush with both floor surfaces.
RECTORSEAL — FlameSafe® FS900+, FlameSafe FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

W Rating applies only when Metacaulk MC 150+, Metacaulk 1000, Biostop BF 150+, FlameSafe FS900+ or FlameSafe FS1900 is used.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3/4 Hr	FT Rating — 3/4 Hr
	FH Rating — 3 Hr
	FTH Rating — 3/4 Hr



SECTION 'A–A'

1A. **Floor or Wall Assembly —** Min 4-1/2 in. thick reinforced normal weight (150 pcf) concrete. Wall may also be constructed of any UL classified **Concrete Blocks***. Max diam of opening is 18 in.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

1B. **Metallic Sleeve (Optional) —** Nom 18 in. (or smaller) Schedule 10 (or heavier) steel pipe sleeve, cast or grouted into floor or wall assembly.

2A. **Through Penetrants —** One nom 10 in. (or smaller) Schedule 40 (or heavier) steel or iron pipe. Pipe to be firmly supported on both sides of opening. Pipe installed concentrically or eccentrically such that the annular space between the insulated pipe and the periphery of the opening is min 0 in. (point of contact) to max 4-1/4 in.

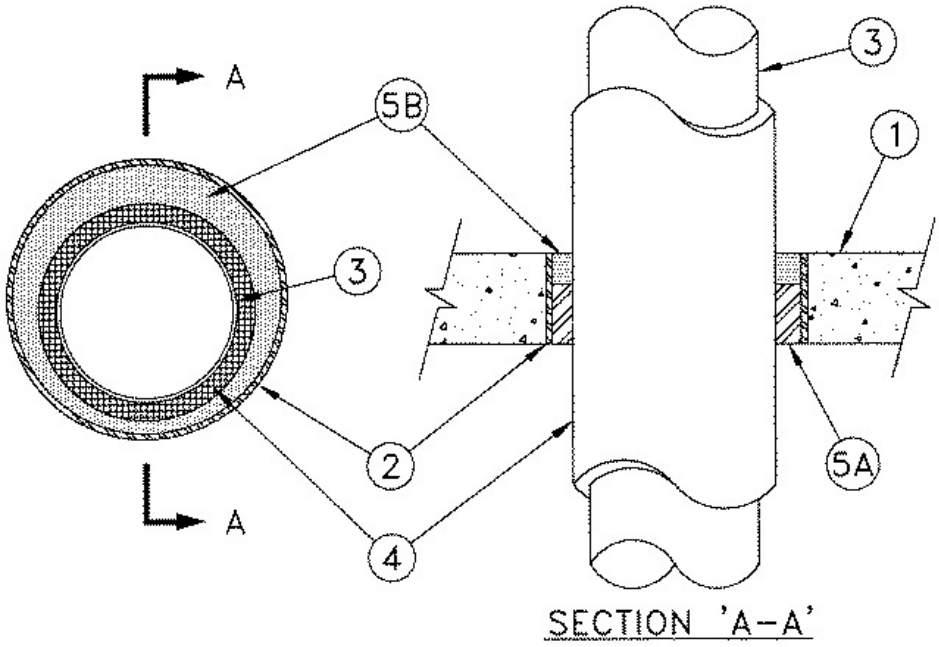
2B. **Pipe Covering Material* —** Cellular Glass Insulation — Nom 1 in. thick cellular glass units sized to the outside diam of the metallic pipe and supplied in 18 or 24 in. long, half sections. Pipe insulation installed on pipe in accordance with manufacturer's instructions. The insulation material may be jacketed with 0.010 in. thick aluminum sheet wrapped tightly around with a min 2 in. overlap. Jacket to be installed with edge abutting surface of caulk fill material (Item 4) on top surface of floor or both surfaces of wall. Jacket to be well secured with metallic bands.

3. **Packing Material —** Mineral wool insulation of min 4 pcf density and min 2 in. thickness, compressed 33%, and installed into the opening as a permanent form. Insulation to be recessed by a min depth of 1 in. from top surface of floor or both surfaces of wall.

4. **Fill, Void, or Cavity Materials* —** Caulk. Installed to fill annular space to a min depth of 1 in. over mineral wool insulation and made flush with top surface of floor or both surfaces of wall. Additional material to be installed to form a 1/4 in. crown around the circumference of the insulated pipe at the point of contact with the periphery of opening.
RECTORSEAL — FlameSafe® FS900+, Metacaulk MC 150+ and Biostop BF 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
L Rating At Ambient — Less Than 1 CFM/sq ft	FH Rating — 2 Hr
L Rating At 400 F — Less Than 1 CFM/sq ft	FTH Rating —1/2 Hr



1. **Floor or Wall Assembly —** Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete floor or min 3-1/2 in. (89 mm) thick reinforced lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 8-1/4 in. (210 mm).

See **Concrete Blocks** (CAZT) in Volume 1 of the Fire Resistance Directory for names of manufacturers.

2. **Metallic Sleeve (Optional) —** Nom 8 in. (203 mm) diam (or smaller) Schedule 10 steel pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

3. **Through Penetrants —** One metallic pipe or tubing to be installed concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may by used:

A. **Steel Pipe —** Steel Pipe - Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing..

D. **Copper Pipe —** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

4. **Pipe Insulation —** Plastics+ Nom 1 in. thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space shall be min 1/2 in. to max 1-3/8 in. Plastics+ Nom 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space shall be min 1/2 in. (13 mm) to max 1-3/8 in. (35 mm).

See **Plastics+** (QMFZ2) category in the Plastic Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification 0f 94-5VA may be used.

5. **Firestop System —** The firestop system shall consist of the following:

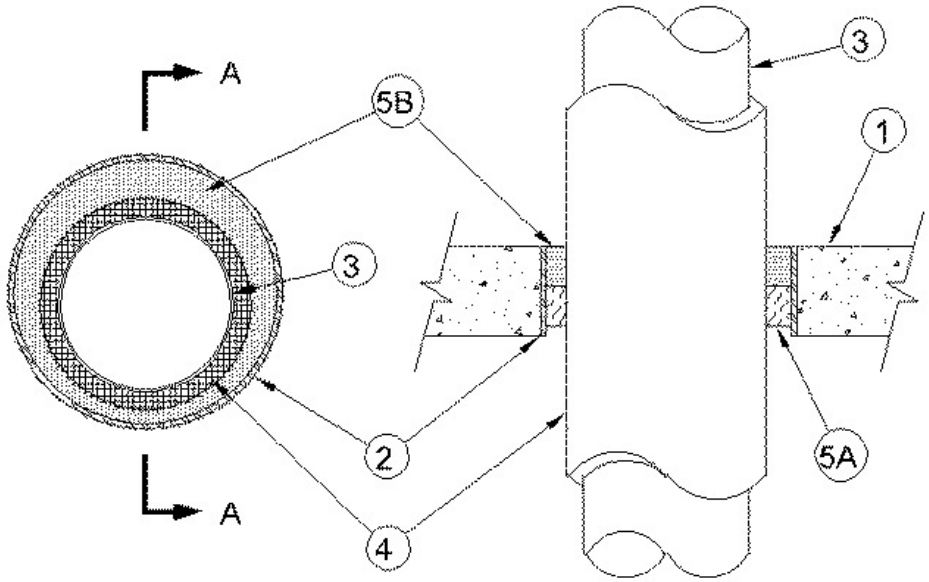
A. **Packing Material —** Min 1-1/2 in. (38 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* —** Sealant Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
RECTORSEAL — FlameSafe® FS1900, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+

+Bearing the UL Recognized Component Marking

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr (see Item 5)
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 3 Hr
L Rating At 400°F — Less Than 1 CFM/ft^2	FTH Rating — 1 Hre
W Rating - Class 1 (Sees Item 4A and 5B)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204°C — Less Than 5.1 L/s/m^2



SECTION 'A-A'

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced light weight or normal weight (100150 pcf or 1600-2400 kg/m^3) concrete floor or min 5 in. (127 mm) thick reinforced light weight or normal weight concrete wall. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow core **Precast Concrete Units*.** When precast concrete units are used, the max diam of opening is 7 in. (178 mm). Wall may also be constructed of any UL Classified **Concrete Units*.** Max diam of opening is 30 in. (762 mm).

See **Concrete Blocks** (CAZT) and Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

2. **Metallic Sleeve —** (Optional) - Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

3. **Through Penetrant —** One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:

A. **Steel Pipe —** Nom 24 in. (610 mm) diam (or smaller) Schedule 20 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 24 in. (610 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.

D. **Copper Pipe —** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

4. **Pipe Covering* —** Nom 2 in. (51 mm) thick hollow cylindrical glass fiber units, nom 3.5 pcf (56 kg/m^3) density, jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. Annular space between insulated pipe and periphery of the opening shall be min 1/4 in. (6 mm) to max 1-1/4 in. (32 mm). When W Rating applies, annular space shall be min 1/2 in. (13 mm).

See **Pipe and Equipment Covering - Materials** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

4A. **PVC Jacket+ —** (Optional) An additional PVC jacketing (Item 4,B), supplied in sheet form, shall be tightly wrapped around the all service jacket on the pipe covering with the longitudinal seam continuously sealed using the adhesive supplied with the jacket. The jacket is to be nom 48 in. (1219 mm) wide by nom 20 or 30 mil (0.5 or 0.8 mm) thick. The jacket shall be installed at a point 36 in. (914 mm) to 40 in. (1016 mm) above the top surface of the floor assembly and shall extend downward into and/or through the opening.

See Plastics (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

The PVC jacket is required for all fiberglass pipe coverings for the W Rating to apply.

5. **Firestop System —** The firestop system shall consist of the following:

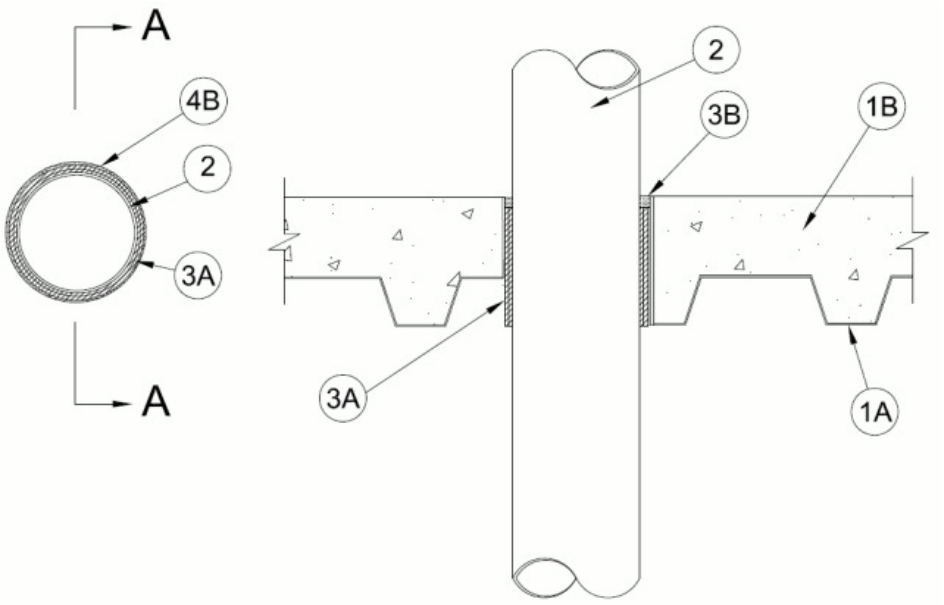
A. **Packing Material —** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material. When the floor is constructed of hollow-core precast concrete units, packing material shall be recessed from both surfaces of floor to accommodate the required thickness of fill material.

B. **Fill, Void, or Cavity Materials* - Sealant —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed symmetrically on both sides of floor, flush with both floor surfaces.
RECTORSEAL — FlameSafe FS900+ FlameSafe FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

W Rating applies only when Metacaulk MC 150+, Metacaulk 1000, Biostop BF 150+, FlameSafe FS900+ or FlameSafe FS1900 is used.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 3/4 Hr	FT Rating — 3/4 Hr
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 2 Hr
L Rating At 400 F — Less Than 1 CFM/ft^2	FTH Rating — 3/4 Hr
	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 400 F — Less Than 5.1 L/s/m^2



SECTION A-A

System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. **Steel Deck/Floor Assembly —** The floor assembly shall consist of a fluted steel deck/concrete floor assembly. The floor assembly shall be constructed of the materials and in the manner described in the individual D900 Series design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Form Units* —** Max 3 in. (76 mm) deep galv fluted units.

B. **Concrete —** Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units. Max diam of opening is 5 in. (127 mm).

2. **Through Penetrant —** One nonmetallic pipe centered in the firestop system. The annular space between the penetrant and the periphery of opening shall be nom 1/4 in. (6 mm). Penetrant to be rigidly supported on both sides of floor assembly. The following types and sizes of nonmetallic pipe may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

B. **Rigid Nonmetallic Conduit+ —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

D. **Acrylonitrile Butadiene Styrene (ABS) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Firestop System —** The firestop system shall consist of the following:

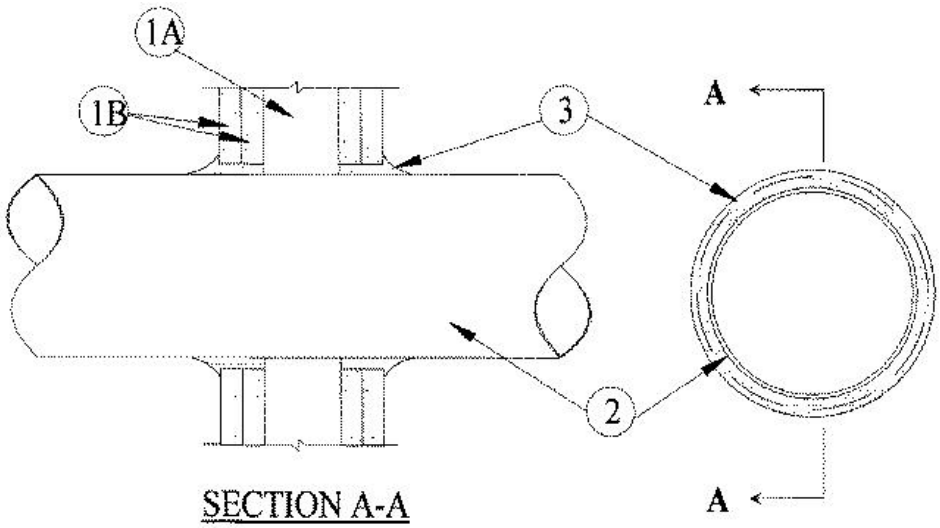
A. **Fill, Void or Cavity Materials* —** Two layers of nom 2 mm thick by 3 in. (76 mm) wide intumescent joint strip tightly

wrapped around the outer circumference of the pipe with ends butted and held in place with tape. Joint strip slid into the annular space and recessed 1/2 in. (13 mm) from top surface of floor.
RECTORSEAL — Metacaulk Joint Strip, Flame Safe Joint Strip, Biostop Joint Strip

B. **Fill, Void or Cavity Material* — Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied at the joint strip/wall interface on both sides of the wall assembly.
RECTORSEAL — Metacaulk 1000, Metacaulk 350i, Biostop 500+, Biostop 350i, or FlameSafe FS1900

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr
T Rating — 0 hr



1. **Wall Assembly —** The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.

B. **Gypsum Board* —** 5/8 in. thick, 4 ft wide with square or tapered edge. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 13-1/4 in.
The hourly F rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrants —** One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The annular space shall be min 0 in. to max 1/4 in. The following types and sizes of metallic pipes or tubing may be used:

A. **Steel Pipe —** Nom 12 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 12 in. diam (or smaller) cast or ductile iron pipe.

C. **Conduit —** Nom 6 in. diam (or smaller) steel electrical metallic tubing or steel conduit.

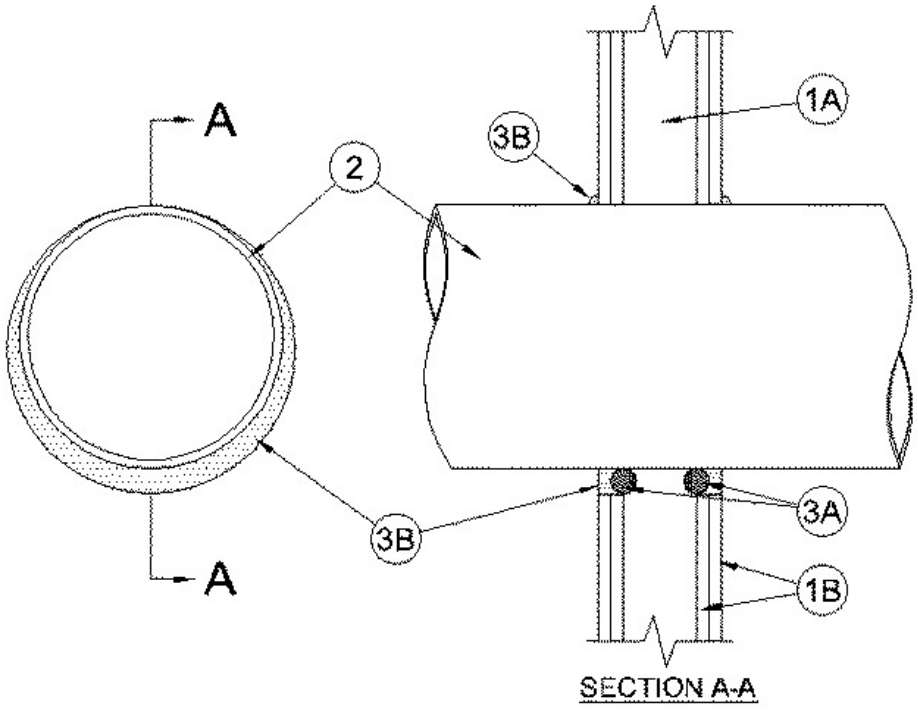
D. **Copper Tubing —** Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.

E. **Copper Pipe —** Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.

3. **Fill, Void or Cavity Material* — Caulk —** Fill material to be forced into the annulus to maximum extent possible. Additional fill material to be installed such that a min 1/2 in. crown is formed around the penetrating item and lapping 1/4 in. beyond the periphery of the opening.
RECTORSEAL — MC-150 Caulk

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See I Item 1)
T Rating — 0 Hr
M Rating (Movement) — See Table 1



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
A. **Studs —** Wall framing consists of steel channel studs Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** One or two layers of nom 5/8 in. thick gypsum wallboard as specified in the individual Wall and Partition Design. Max diam of opening is 14 in. (356 mm)
The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly.

2. **Through Penetrants —** One metallic pipe, conduit or tubing to be installed concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
A. **Steel Pipe —** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe. A nom annular space of 0 (point contact) to 1-1/4 in. (32 mm) is required within the firestop system.

B. **Iron Pipe —** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) cast iron pipe. A nom annular space of 0 (point contact) to 1-1/4 in. (32 mm) is required within the firestop system.

C. **Copper Tubing —** Nom 4 in (102 mm) diam (or smaller) Type L (or heavier) copper tube. A nom annular space of 0 (point contact) to 1 in. (25.4 mm) is required within the firestop system.

D. **Copper Pipe —** Nom 4 in. (102mm) diam (or smaller) Regular (or heavier) copper pipe. A nom annular space of 0 (point contact) to 1 in. (25.4 mm) is required within the firestop system.

E. **Conduit —** Nom 6 in. (152 mm) (or smaller) steel conduit or nom 4 in. (102 mm) diam (or smaller) steel electrical metallic conduit A nom annular space of 0 (point contact) to 1 in. (25.4 mm) is required within the firestop system.

3. **Firestop System —** The firestop system shall consist of the following:
A. **Packing Material —** (Optional) In 2 hr wall assemblies, foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from each surface of the wall to accommodate the required thickness of fill material.

B. **Fill Void or Cavity Materials* - Caulk —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus on both surfaces of the wall assembly. A min 1/2 in. (13 mm) diam bead of caulk shall be applied to the pipe/gypsum board interface at the point contact

location on both sides of wall.
RECTORSEAL — MC 150+ Caulk

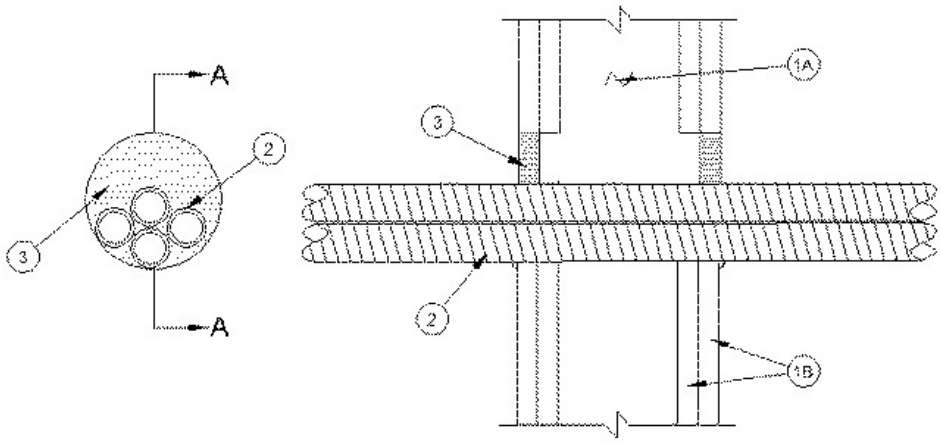
The M Rating for the firestop system is dependent on the variables as noted in the Table 1 below.

Table 1

Movement Direction	Penetrant Item	Nominal Penetrant Diameter	Annular Space	Movement	Sealant Depth	F Rating	L Rating
Y	2A, 2B, 2E	2 in. (52 mm)	Max 1 in. (25.4 mm)	5%	5/8 in. (16 mm)	2 hr	N/A
Z	2A, 2B, 2E	2 in. (52 mm)	1 in. (25.4 mm)	0.25 in. (6mm)	5/8 in. (16 mm)	2 hr	N/A

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - 1.7 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - 1.7 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (406 mm) OC.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 6 in. (152 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrants —** One or more nom 1-1/2 in. (38 mm) diam (or smaller) flexible steel conduits bundled together and installed within the opening. Max diam of through penetrant bundle shall be 4 in. (102 mm). The space between the through penetrants shall be a min of 0 in. (point contact) to a max of 2 in. (51 mm). The annular space between the through penetrants and periphery of opening shall be min 0 in. (point contact) to max 2 in. (51 mm). Conduit to be rigidly supported on both sides of wall assembly.

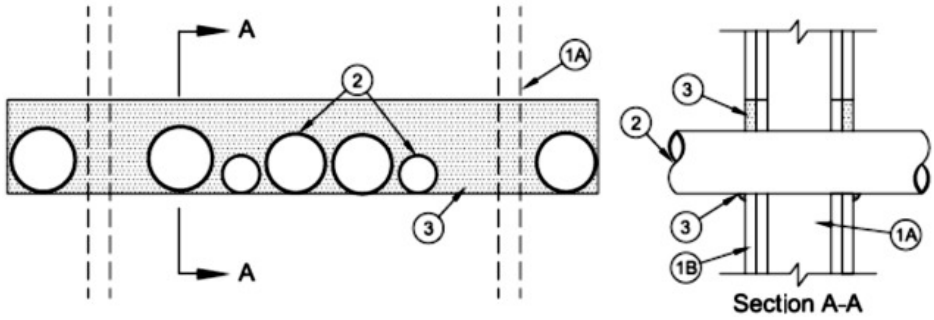
See **Flexible Metal Conduit** (DXUZ) category in the Electrical Construction Materials Directory for names of manufacturers.

3. **Fill, Void or Cavity Material* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At the point contact location between through penetrants and gypsum board, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the gypsum board/through penetrant interface on both surfaces of wall. Additional sealant shall be forced into interstices of through penetrants to max extent possible.

RECTORSEAL — FS 900+ Sealant, Metacaulk MC 150+, Biostop BF 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings —1 and 2 Hr (See Item 1)
T Ratings — 0 and 1/4 Hr (See Item 1)



1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of min 3-5/8 in. (92 mm) wide steel channel studs spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** Min 5/8 in. (16 mm) thick. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U400 or V400 Wall and Partition Design. Max area of opening is 216 in.2 (1394 cm^2) with a max dimension of 36 in. (914 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. The hourly T Rating is 0 hr and 1/4 hr for 1 hr and 2 hr fire rated assemblies, respectively.

2. **Through Penetrants —** Multiple pipes or conduits installed in single layer array within the firestop system. The annular space between the pipes and conduits and the edges of the opening shall be min 0 in. (point contact) to max 3 in. (76 mm). The separation between pipes and conduits to be min 1/4 in. (6 mm) to max 3 in. (76 mm). Pipes and conduits to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or conduits may be used:

A. **Steel Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

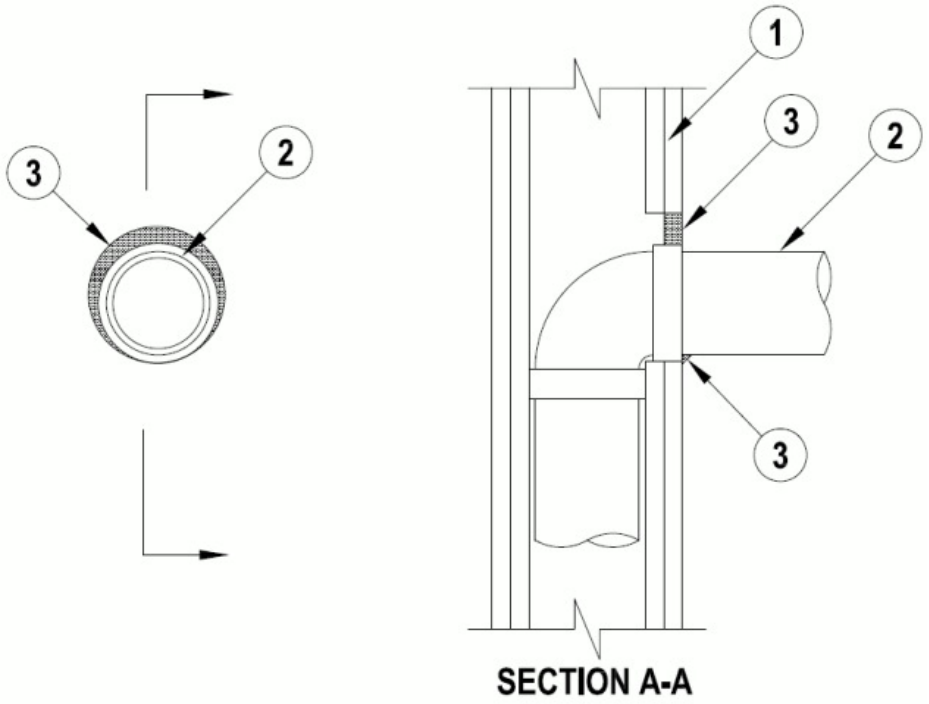
B. **Conduit —** Nom 4 in. (51 mm) diam (or smaller) rigid steel conduit or steel electrical metallic tubing (EMT).

3. **Fill Void or Cavity Materials* - Caulk —** Min 5/8 in. (16 mm) thickness of fill material installed to completely fill annular space between pipes, conduits and gypsum flush with each surface of wall. Min 1/4 in. (6 mm) diam bead of fill material applied to the through penetrant/wall interface at the point contact locations on both sides of the wall.
RECTORSEAL — MC 150+

4. **Packing Material —** (Optional, Not Shown) - For 2 hr fire rated walls only, optional foam backer rod may be installed within the annulus and recessed a min 5/8 in. (16 mm) from both surfaces of wall.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 1 and 2 Hr (See Item 1)	FT Ratings — 1 and 2 Hr (See Item 1)
	FH Ratings — 1 and 2 Hr (See Item 1)
	FTH Ratings — 1 and 2 Hr (See Item 1)



1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (91 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening may be circular or elliptical in shape. Max dimension of opening is 6-1/2 in. (165 mm) with max area of 17.87 in^2 (115.3 cm^2).

The hourly F, T and FH and FTH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly.

2. **Through penetrants —** One metallic pipe, tubing or conduit to be installed either concentrically or eccentrically within the firestop system. The penetrant may be installed at an angle not greater than 45 degrees from perpendicular. The annular space shall be 0 in. (point contact) to 1 in. (25 mm). Pipe, tubing or conduit to be rigidly supported on the penetrated side of the wall assembly. The following types and sizes of metallic pipes, tubing or conduits may be used:

A. **Steel pipe —** Nom 3 in. (76 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

B. **Conduit —** Nom 3 in. (76 mm) diam (or smaller) steel electrical metallic tubing (EMT), nom 3 in. (76 mm) diam (or smaller) steel conduit or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.

C. **Copper Tubing —** Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tubing.

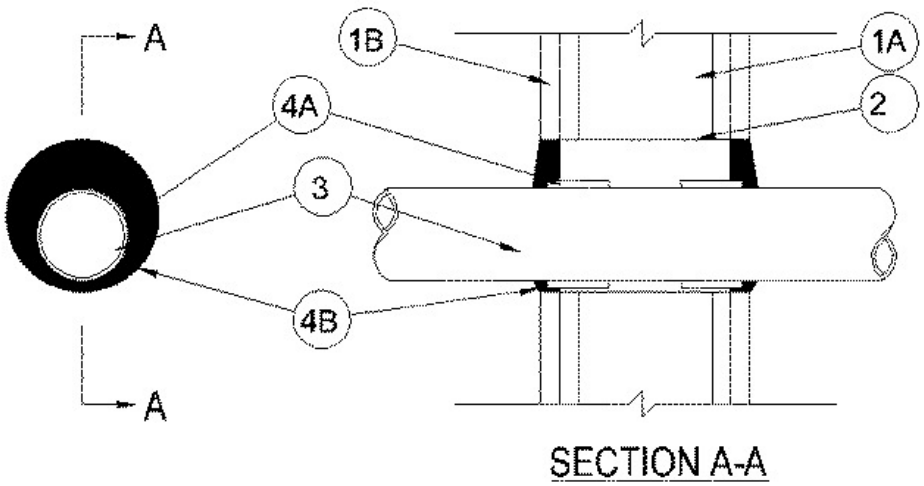
D. **Copper Pipe —** Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Fill, Void or Cavity Material*— Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with surface of wall. Min 1/4 in. (6 mm) diam bead of sealant applied at point contact location.

RECTORSEAL — Metacaulk 150+, Metacaulk 1000, Metacaulk Fire Rated Putty, Biostop 150+, Biostop 500+, Biostop Fire Rated Putty

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr
L Rating at Ambient - Less than 1 CFM/sq ft
L Rating at 400° F - Less than 1 CFM/sq ft



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud assembly shall be constructed of the materials and in the manner described in the individual U300, U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in (51 by 102 mm) lumber spaced 16 in.(406 mm) OC. Steel studs to be min 3-5/8 in.(92 mm) wide and spaced max 24 in.(610 mm) OC.

B. **Gypsum Board* —** Min 5/8 in. (16 mm) thick. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Design in the UL Fire Resistance Directory. Max diam of opening is 5 in. (127 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed

2. **Metallic Sleeve —** (Optional) Cylindrical sleeve fabricated from min 0.018 in. (0.46 mm) thick (28 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Sheet steel coiled to a diam less than circular cutouts in wall assembly, inserted through both sides of wall and allowed to uncoil against the circular cutouts in the wall assembly. Sleeve to be installed flush with each surface of the wall assembly.

2A. **Metallic Sleeve —** (Optional, Not Shown) - As an alternate to Item 2A, steel sleeve may consist of Schedule 5 (or heavier) steel pipe, rigid steel conduit or EMT friction-fitted into wall assembly flush with each surface of the wall assembly.

3. **Through Penetrants —** One nonmetallic pipe or conduit to be installed either concentrically or eccentricity within the firestop system. The annular space between the pipe or conduit and the periphery of the opening shall be a min 1/4 in. (6 mm) to max 1-1/4 in. (32 mm). Pipe or conduit to be rigidly supported on both sides of wall. The following types and sizes of pipes or conduits may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste, or vent) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 3 in. diam (76 mm) (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply).

C. **Rigid Nonmetallic Conduit+ —** Nom 3 in. (76 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code, (NFPA No. 70).

4. **Firestop System —** The firestop system shall consist of the following:

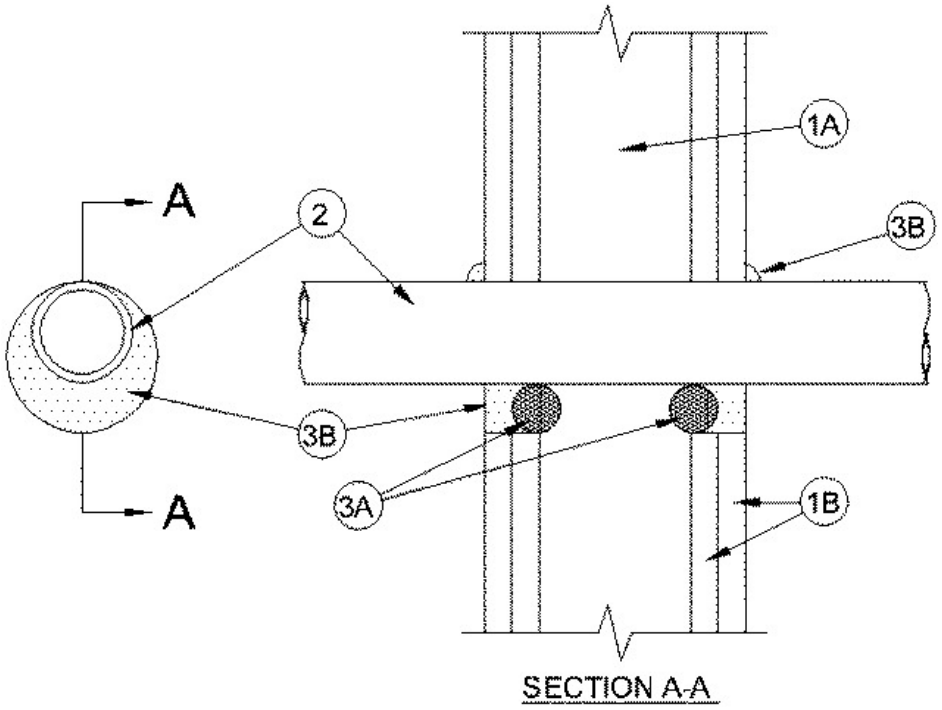
A. **Fill, Void or Cavity Materials* — Wrap Strip —** Nom 1/4 in. (6 mm) thick intumescent material faced on both sides with a plastic film, supplied in 1-1/2 in. (38 mm) wide wrap strips. Single layer of wrap strip wrapped around the through penetrant with ends butted and secured together by means of masking tape.

Wrap strip slid into annular space such that the visible ends are recessed 1/4 in. (6 mm) from each surface of the wall.
RECTORSEAL — FlameSafe (TM) Wrap Strip, Metacaulk Wrap Strip or Biostop Wrap Strip

B. **Fill, Void or Cavity Materials* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus flush with both surfaces of wall. Additional fill material to be installed such that a min 3/8 in. (10 mm) thick crown is formed around the through penetrant.
RECTORSEAL — FlameSafe FS1900, FS1901, FS1905, FS1929, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+

*Bearing the UL Classification Marking

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 1 and 2 Hr (See Item 1)



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hour fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 inch lumber spaced 16 inch OC. Steel studs to be min 2-1/2 inch wide and spaced max 24 inch OC.

B. **Gypsum Board* —** 5/8 in. thick, 4 feet wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Maximum diameter of opening is 3-5/8 in.

The hourly F and T Ratings of the firestop system are equal to the hourly fire rating of the wall assembly.

2. **Nonmetallic Pipe —** One non-metallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 (point contact) to max 1-1/4 in. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of non-metallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 2 in. diam (or smaller) Schedule 40 solid core or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 2 in. diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

C. **Electrical Non-Metallic Tubing (ENT) —** Nom 2 in. (or smaller) PVC tubing installed in accordance with Article 331 of the National Electrical Code (NFPA 70).

D. **Cross Linked Polyethylene (PEX) Tubing —** Nom 1 in. diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.

3. **Firestop System —** The firestop system shall consist of the following:

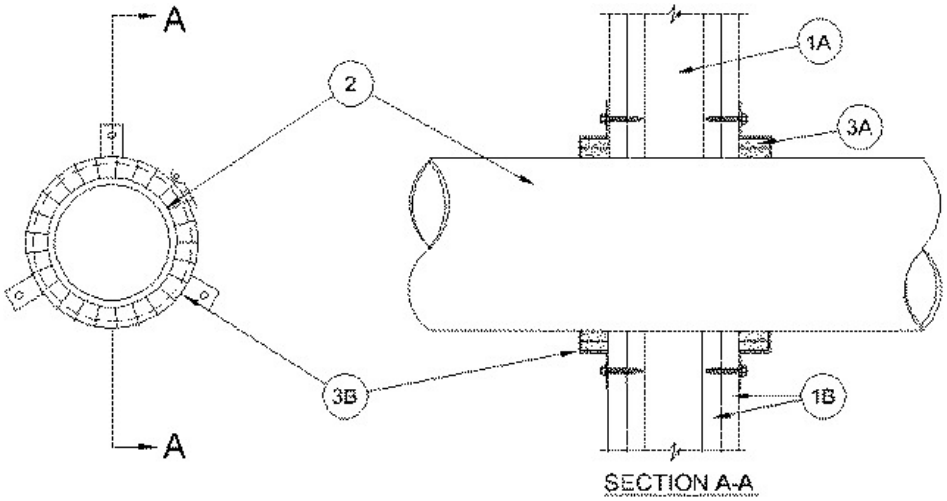
A. **Packing Material —** (Optional) For 2 hr wall assemblies, foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from each surface of the wall to accommodate the required thickness of fill material.

B. **Fill Void or Cavity Materials* - Caulk —** Min 5/8 in. thickness of fill material applied within the annulus on both surfaces of the wall assembly. A min 1/2 in. diam bead of caulk shall be applied to the pipe/gypsum board interface at the point contact location on both sides of wall.

RECTORSEAL — MC 150+ Caulk

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Rating — 1 and 2 Hr (See Item 1)
T Rating — 1 and 2 Hr (See Item 1)



1. **Wall Assembly —** The 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of either wood or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm)OC.

B. **Gypsum Board* —** Min 5/8 in. (16 mm) thick, 4 ft (1.22 m)wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U400 Wall and Partition Design. Max diam of opening is 5 in. (127 mm).

The hourly F and T Ratings of the firestop system re equal to the hourly rating of the wall in which it is installed.

2. **Through Penetrants —** One nonmetallic pipe to be installed concentrically within the firestop system. A max annular space of 1/4 in. (6 mm) is required within the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (6 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 4 in. (6 mm) diam (or smaller) SDR 13.5 or Schedule 40 CPVC pipe for use in closed (process or supply) piping systems. Schedule 40 CPVC pipe for use in vented (drain, waste or vent) piping systems.

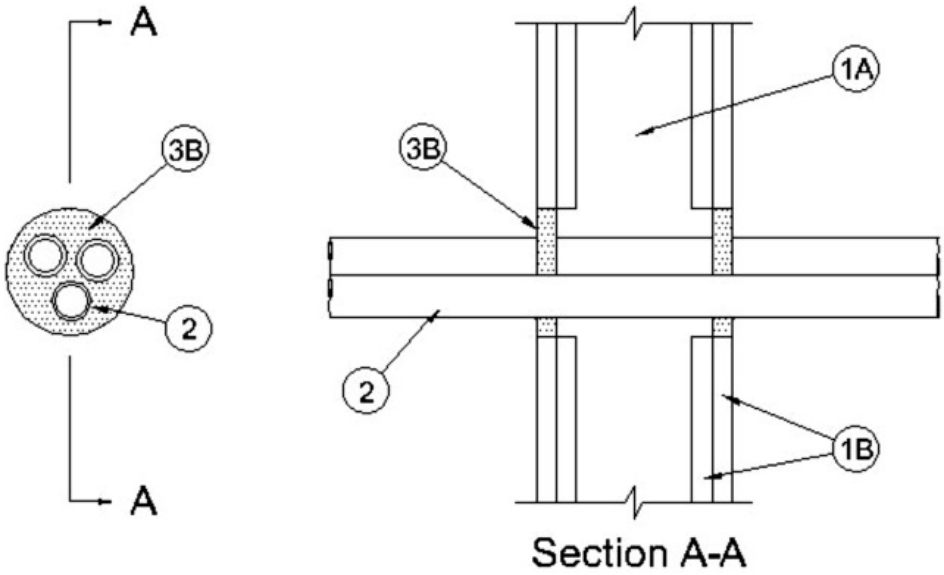
3. **Firestop System —** The firestop system shall consist of the following:

A. **Fill, Void or Cavity Material* - Wrap Strip —** Two layers of nom 1/4 in. (6 mm) thick by 2 in. (51 mm) wide intumescent wrap strip individually wrapped around the outer circumference of the penetrant. Butted ends in successive layers shall be offset. Wrap strip butted tightly against both surfaces of wall. Wrap strip secured with tape or tie wire.
RECTORSEAL — Metacaulk Wrap Strip

B. **Steel Collar —** Collar fabricated from coils of precut min 0.016 in. thick (No. 28 gauge) galv steel available from fill material manufacturer. Collar shall be nom 2 in. (51 mm) deep with 1 in. (25 mm) wide by 1-1/2 in. (38 mm) long anchor tabs on 4 in. (102 mm) centers for secure to both surfaces of wall. In addition, collar contains retainer tabs, 1/2 in. wide by 3/4 in. (19 mm) long, located opposite the anchor tabs. Collar shall be wrapped over the wrap strip, overlapping min 1 in. (25 mm) The retainer tabs are folded 90 deg towards the pipe to maintain the annular space around the pipe and to retain the wrap strip. Collar secured to both surfaces of wall at each anchor tab by means of 1-1/2 in. (38 mm) long steel laminate screws or 1/8 in. (3 mm) diam by 2 in. (51 mm) long steel hollow wall anchors in conjunction with 1/4 in. (6 mm) by 5/8 in. (16 mm) diam washers.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)
F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1 and 1-1/2 Hr (See Item 1)
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft



Section A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.2 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall or Partition Design in the UL Fire Resistance Directory. Max diam of opening is 4 in. (102 mm).

The hourly F and T Ratings of the firestop system are dependent on the hourly fire rating of the wall assembly in which it is installed as shown in the table below:

Rating of Wall, Hr	F Rating, Hr	T Rating, Hr
2	1	1-1/2
1	1	1

2. **Through Penetrant —** Nom 1 in. (25 mm) diam (or smaller) SDR 9 (or heavier) cross-linked polyethylene (PEX) tubing for use in closed (process or supply) piping systems. A max of three tubes to be bundled together and installed eccentrically or concentrically within the firestop system. Of the three tubes, a max of one shall have a nom diam greater than 3/4 in. (19 mm). The annular space between the tubing and the periphery of the opening shall be min 5/8 in. to max 1-1/4 in. Separation between the tubing shall be a min 0 in. (point contact) to max 3/8 in. (10 mm). Tubing to be rigidly supported on both sides of the wall assembly.

3. **Firestop System —** The firestop system shall consist of the following:

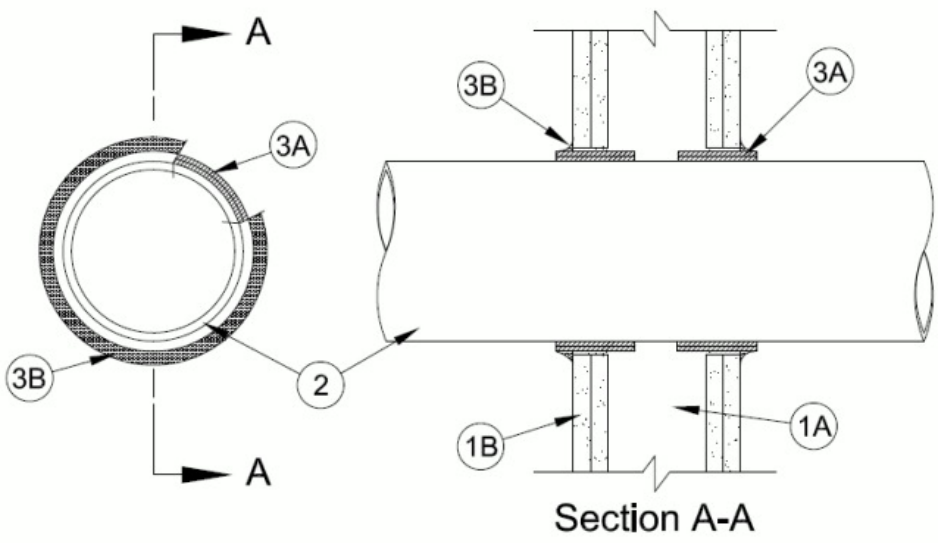
A. **Packing Material —** (Optional, Not shown) - Polyethylene backer rod or foam plastic sheets friction fitted into annular space for 2 hr fire-rated wall assemblies only. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. Additional fill material to be forced within tubing bundle to max

extent possible.
RECTORSEAL — FlameSafe FS 900+, FS 1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1-3/4 and 2 Hr (See Item 3A)



Section A-A

1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Design in the UL Fire Resistance Directory. Max diam of opening is 7-3/8 in. (187 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrant —** One nonmetallic pipe centered in the firestop system. The annular space between the penetrant and the periphery of opening shall be nom 3/8 in. (9.5 mm). Penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipe may be used:
A. **Polyvinyl Chloride (PVC or uPVC) Pipe —** Nom 6 in. (152 mm) diam (or smaller) Schedule 40 cellular or solid core PVC**or uPVC** pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

B. **Rigid Nonmetallic Conduit (RNC)+ —** Nom 6 in. (152 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 6 in. (152 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

D. **Acrylonitrile Butadiene Styrene (ABS) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

The diam and type of penetrant used is dependent upon the hourly rating of the wall assembly, the F and T Ratings of the firestop system and the number of layers of wrap strip used as shown in Item 3.

3. **Firestop System —** The firestop system shall consist of the following:
A. **Fill, Void or Cavity Materials* —** Nom 2 mm thick by 3 in. (76 mm) wide intumescent joint strip tightly wrapped continuously around the outer circumference of the pipe and held in place with tape. Joint strip slid into the annular space on both sides of wall with the outer edges of the joint strip extending 1/2 in. (13 mm) from both surfaces of wall. The number of wrap strips required is dependent upon the nom diam and type of through penetrant as shown in the table below.
RECTORSEAL — Metacaulk Joint Strip,

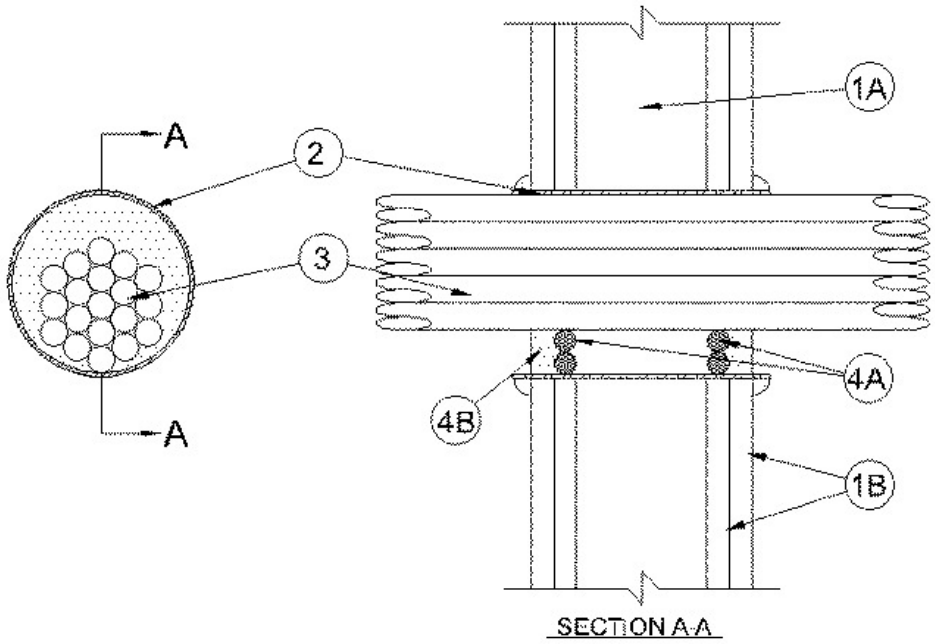
The F and T Ratings of the firestop system are dependent upon the hourly rating of the wall assembly, type and diam of the penetrant and the number of layers of wrap strip used as shown in the table below:

Hourly Raing of Wall Assembly, Hr	Type of Penetrant	Diam of Penetrant, in (mm)	Number of Layers of Wrap Strip	F Rating, Hr	T Rating, Hr
1	PVC or uPVC Pipe, CPVC Pipe, RNC,	6 (152)	5	1	0
1	PVC or uPVC Pipe, CPVC Pipe, RNC,, ABS Pipe	4 (102)	2	1	0
2	ABS Pipe	4 (102)	2	2	1-3/4
2	PVC or uPVC Pipe, CPVC Pipe, RNC,	6 (152)	5	2	2
2	PVC or uPVC Pipe, CPVC Pipe, RNC,	4 (102)	2	2	2

B. **Fill, Void or Cavity Material* — Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied at the joint strip/wall interface on both sides of the wall assembly.
RECTORSEAL — Metacaulk 1000, Metacaulk 350i, Metacaulk 150+,

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0 and 1/2 Hr (See Items 1 and 2)	FT Ratings — 0 and 1/2 Hr (See Items 1 and 2)
	FH Ratings — 1 and 2 Hr (See Item 1)Hr
	FTH Ratings — 0 and 1/2 Hr (See Items 1 and 2)



1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Max diam of opening is 4 in. (102 mm).
The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly. The T, FT and FTH Rating is 0 and 1/2 for 1 and 2 Hr assemblies, respectively.

2. **Steel Sleeve —** (Optional) — Max 4 in. (102 mm) diam sleeve fabricated from min 0.018 in. (0.46 mm) thick (28 gauge) galv sheet steel and floor or wall assembly, inserted opening and allowed to uncoil against the circular cutouts. Sleeve to be installed flush with or extending max 1 in. (25 mm) beyond each surface of the wall assembly.

2A. **Steel Sleeve —** (Optional) - As an alternate to Item 2, max 4 in. (102 mm) Schedule 5 (or heavier) steel pipe, rigid steel conduit or EMT, friction-fit into wall assembly, flush with or extending a max 4 in. (102 mm) beyond each surface of the floor or wall assembly.
When steel sleeve is used, T, FT and FTH Ratings are 0 hr.

3. **Cables —** Aggregate cross-sectional area of cables to be min 25 percent to max 64 percent of the aggregate cross-sectional area of the opening. Cables to be tightly bundled and rigidly supported on both sides of wall assembly. The annular space between the cables and the periphery of opening shall be min 0 in. (point contact) to max 2 in. (51 mm). Any combination of following types and sizes of copper conductor cables may be used:

A. Max 2/C with ground, No. 12 AWG MC (BX) cable with polyvinyl chloride (PVC) insulation on conductors inside a steel armored jacket.

B. Max 3/C with ground, No. 12 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.

C. Max 8/C No. 12 AWG (or smaller) Type SOW-A P-123-70-MSHA.

D. Max 25 pair, No. 24 AWG (or smaller) copper conductor telephone cable with XLPE/PVC insulation, with or without PVC jacket.

E. Max RG6 (or smaller) television coaxial cable CATVX.

F. Max 4 pair, No. 24 AWG (or smaller) copper conductor data cable with Hylar insulation and jacketing.

G. Max 1/C, No. 18 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

H. Max 1/C, No. 14 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

I. Max 1/C, No. 10 AWG (or smaller) Type THHN or THWN gasoline & oil resistant II 600V VW-1 E116364 (UL) power cable.

J. Optical Fiber Cable max 62.5/125 Type UFNR.

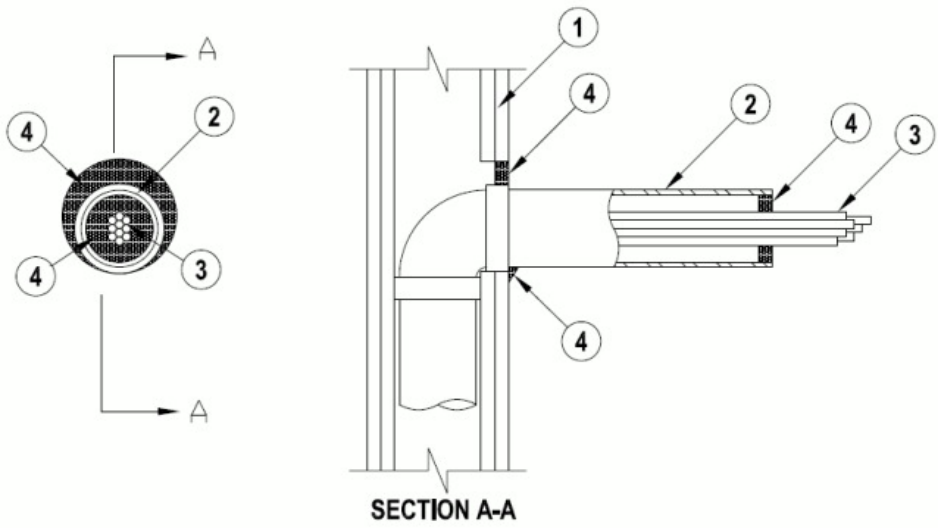
K. Max 3/C, No. 4/0 with ground, AWG aluminum Triple E Alloy AA8176 Type SE cable Style U Type XHH-W-2 CDRS E32071 (UL) service entrance cable.

L. Max 3/C, No. 18 AWG with ground and shield E120910.

4. **Firestop System —** The firestop system shall consist of the following:
   A. **Fill, Void or Cavity Material* - Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. When steel sleeve is not used or when steel sleeve is flush with the wall surfaces, a min 1/4 in. (6 mm) diam bead of caulk shall be applied at interface of cables and periphery of opening at point contact location on both surfaces of wall. When steel sleeve is used, a bead of caulk is applied to the steel sleeve/gypsum board interface on both sides of wall. When sheet metal sleeve (Item 2) is used, fill material to be installed flush with both surfaces of wall within the sleeve. When rigid steel sleeve (Item 2A) is used, fill material may be installed flush with both ends of sleeve in walls.
   RECTORSEAL — MC 150+, Metacaulk 1000

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 & 2 Hr (See Item 1)	F Ratings — 1 & 2 Hr (See Item 1)
T Ratings — 1 & 2 Hr (See Item 1)	FT Ratings — 1 & 2 Hr (See Item 1)
	FH Ratings — 1 & 2 Hr (See Item 1)
	FTH Ratings — 1 & 2 Hr (See Item 1)



1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (91 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening may be circular or elliptical in shape. Max diam of opening is 6-1/2 in. (165 mm) with max area of 17.87 in^2.

The hourly F, T, FH and FTH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly.

2. **Sleeve —** Nom 3 in. (76 mm) diam (or smaller) steel EMT, steel conduit or Schedule 5 (or heavier) steel pipe. The steel sleeve may be installed at an angle not greater than 45 degrees from perpendicular. The annular space between sleeve and periphery of opening shall be min. 0 in. (point contact) to max 1 in. (25 mm). Maximum projection from wall is 12 in. (305 mm). Sleeve to be rigidly supported on penetrated side of wall assembly.

3. **Cables —** Aggregate cross-sectional area of cables to be min 25 percent to max 64 percent of the aggregate cross-sectional area of the opening. Cables to be tightly bundled and rigidly supported on the penetrated side of wall assembly. The annular space between the cables and the sleeve shall be min 0 in. (point contact) to max 2 in. (51 mm). Any combination of following types and sizes of copper conductor cables may be used:

A. Max 2/C with ground, No. 12 AWG MC (BX) cable with polyvinyl chloride (PVC) insulation on conductors inside a steel armored jacket.

B. Max 3/C with ground, No. 12 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.

C. Max 8/C No. 12 AWG (or smaller) Type SOW-A P-123-70-MSHA.

D. Max 25 pair, No. 24 AWG (or smaller) copper conductor telephone cable with XLPE/PVC insulation, with or without PVC jacket.

E. Max RG6 (or smaller) television coaxial cable CATVX.

F. Max 4 pair, No. 24 AWG (or smaller) copper conductor data cable with Hylar insulation and jacketing.

G. Max 1/C, No. 18 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

H. Max 1/C, No. 14 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

I. Max 1/C, No. 10 AWG (or smaller) Type THHN or THWN gasoline & oil resistant II 600V VW-1 E116364 (UL) power cable.

J. Optical Fiber Cable max 62.5/125 Type UFNR.

K. Max 3/C, No. 4/0 with ground, AWG aluminum Triple E Alloy AA8176 Type SE cable Style U Type XHH-W-2 CDRS E32071 (UL) service entrance cable.

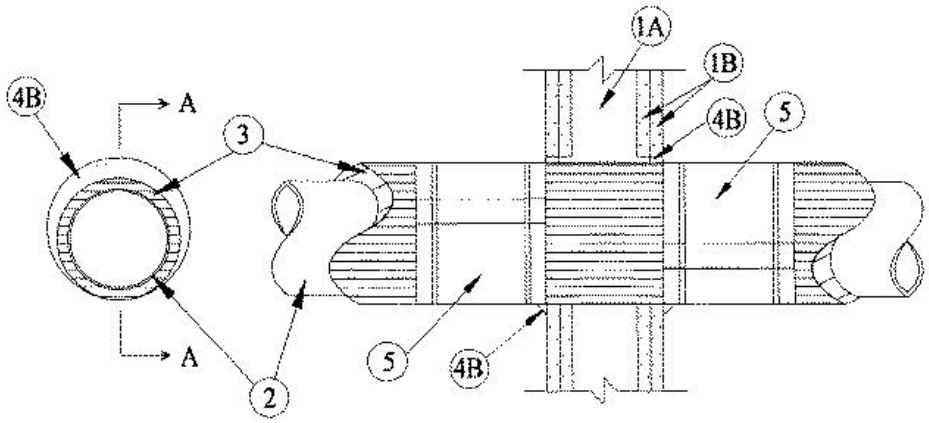
L. Max 3/C, No. 18 AWG with ground and shield E120910.

4. **Fill, Void or Cavity Material*— Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with surface of wall. Min. 1/2 in. thickness of fill material installed within the sleeve, flush with the end of the sleeve. Min 1/4 in. (6 mm) diam bead of sealant applied at point contact location.
RECTORSEAL — Metacaulk 150+, Metacaulk 1000, Metacaulk Fire Rated Putty, Biostop 150+, Biostop 500+, Biostop Fire Rated Putty

5. **Packing Material —** (Optional, Not Shown) — Mineral wool forming material or foam backer rod may be used as a backer for the sealant. When used, it shall be firmly packed into annular space between cables and sleeve as a permanent form and recessed from end of sleeve to accommodate the required thickness of fill material.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 3/4, 1and 1-1/2 Hr (See Item 1)	FT Ratings — 0, 3/4, 1and 1-1/2 Hr (See Item 1)
L Rating At Ambient — Less Than 1 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Item 1)
L Rating At 400 F — Less Than 1 CFM/sq ft	FTH Ratings — 0, 3/4, 1and 1-1/2 Hr (See Item 1)
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may be consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 18 in. (457 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

The hourly Ratings of the firestop system are dependent on the hourly fire rating of the wall assembly in which it is installed as shown in the table below:

Rating of Wall Hr	Penetrant Diam/Type	F and FH Ratings, Hr	T, FT and FTH Ratings Hr	Sealant
2	10 in. (254 mm) steel & iron	2	1-1/2	FS1900 series, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+
2	6 in. (152 mm) copper, steel or iron	2	1	FS 900+
1	6 in. (152 mm) copper, steel or iron	1	0	FS 900+
1	10 in. (254 mm) steel & iron	1	3/4	FS1900 series, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+

2. **Through Penetrant —** One metallic pipe to be installed either concentrically or eccentrically within the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes may be used:

A. **Steel Pipe —** Nom 10 in. (254 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 10 in. (254 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.

3. **Through Penetrating Product* — Cellular Glass Insulation —** Nom 3 in. (76 mm) thick cellular glass units sized to the outside diam of the through-penetrant and supplied in nom 24 in. (610 mm) long half sections or nom 18 in. (457 mm) long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions. The annular space between insulated pipes and periphery of opening shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm).

4. **Firestop System —** The firestop system shall consist of the following:

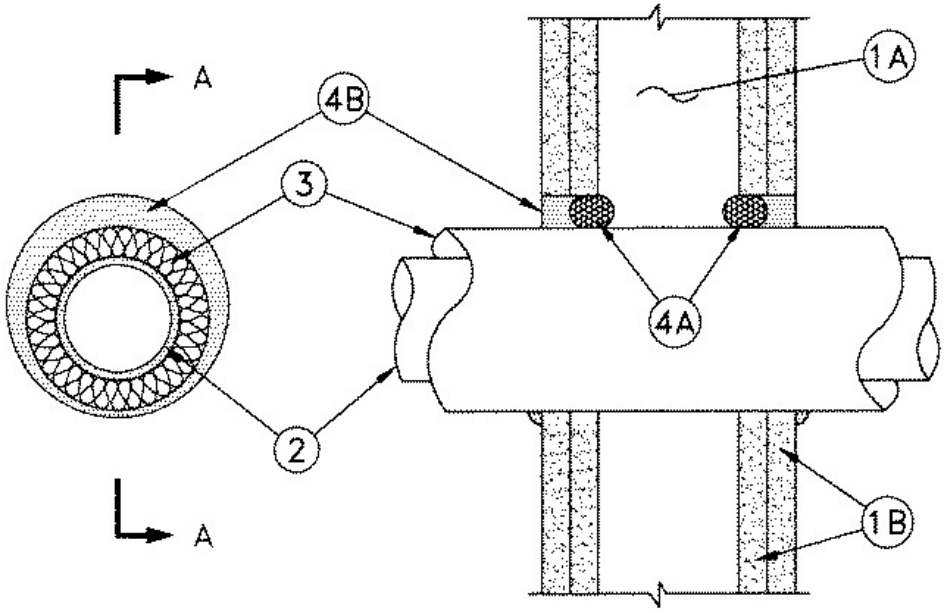
A. **Forms —** (Not Shown) — Used to prevent the leakage of fill material during installation in 2 hr fire-rated assemblies. Forms to be rigid sheet material or polyurethane backer rod, cut to fit the contour of the insulated through penetrant and friction fitted into the opening on both sides of wall. Forms to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus flush with both surfaces of wall. After installation of the metal jacket (Item 5), min 3/8 in. (10 mm) diam bead of fill material shall be applied to the metal jacketing/fill material interface on both sides of wall.
RECTORSEAL — FlameSafe FS 900+, FS1900, FS1901, FS1905, FS1929, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

5. **Metal Jacket —** (Not required for FS900+) — Min 12 in. (305 mm) long jacket formed of min 0.010 in. (0.25 mm) thick aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. (51 mm) lap and secured using 1/2 in. (13 mm) wide by 0.028 in. (0.71 mm) thick stainless steel hose clamps. Clamps to be located within 2 in. (51 mm) of each end of the jacket and spaced max 10 in. (254 mm) OC. Jacket to be installed with edge abutting surface of fill material (Item 4B) on each side of wall. Metal jacket to be used in addition to any other jacketing material which may be required or desired on the pipe insulation.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings— 1 and 2 Hr (See Item 4B)	F Ratings — 1 and 2 Hr (See Item 4B)
T Ratings — 0, 3/4, 1 and 1-1/2 Hr (See Item 4B)	FT Ratings — 0, 3/4, 1 and 1-1/2 Hr (See Item 4B)
L Rating At Ambient — Less Than 1 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Item 4B)
L Rating At 400 F — Less Than 1 CFM/sq ft	FTH Ratings — 0, 3/4, 1 and 1-1/2 Hr (See Item 4B)
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft



SECTION 'A-A'

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced 24 in. (610 mm) OC.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Designs in the UL Fire Resistance Directory. Max diam of opening in wood stud walls is 14-1/2 in. (368 mm) Max diam of opening in steel stud walls is 18-5/16 in. (465 mm). The inside diam of the opening shall be min 1 in. (25 mm) to max 3 in. (76 mm) larger than the outside diam of pipe covering (see Item 3).

2. **Through Penetrants —** One metallic pipe or tube installed concentrically or eccentrically within the firestop system. Pipe or tube to be rigidly supported on both sides of the wall. The following types and sizes of through penetrants may be used:

A. **Steel Pipe —** Nom 12 in. (305 mm) diam (or smaller) Schedule 30 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.

D. **Copper Pipe —** Nom 6 in. diam (152 mm) (or smaller) Regular (or heavier) copper pipe.

The type and max nom diam of the through penetrant is dependent upon the rating of the wall assembly, and the type of fill material as shown in Item 4B.

3. **Pipe Covering* —** One of the following types of pipe coverings shall be used:

A. **Pipe and Equipment Covering Materials* —** Nom 2 in. (51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m^3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or

factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or butt tape supplied with the product. The annular space between the insulated through penetrant and the periphery of the opening shall be min 0 in. (0 mm, point contact) to max 1-9/16 in. (40 mm)

See **Pipe and Equipment Covering Materials*** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

B. **Pipe and Equipment Covering Materials* —** Nom 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a nom density of 3.5 pcf (56 kg/m^3 or heavier) and sized to the outside diam of the pipe or tube. Pipe insulation secured with min 18 AWG steel wire spaced 12 in. (305 mm) OC. The annular space between insulated penetrating item and the periphery of the through opening shall be min 0 in. (0 mm, point contact) to max 1-9/16 in. (40 mm).

C. **Sheathing Material* —** Used in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal and transverse joints sealed with metal fasteners or butt tape.

See **Sheathing Materials*** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

4. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Nom 1 in. (25 mm) foam backer rod firmly packed into the opening as a permanent form in 2 hr fire-rated assemblies to prevent leakage of fill material during installation. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* —** Sealant Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with each surface of wall. At point contact location, a min 3/8 in. (10 mm) bead of fill material shall be applied to the wall/pipe covering interface on both surfaces of the wall.
The F and T Ratings of the firestop system are dependent upon the hourly rating of the wall assembly, max nom diam and type of the through penetrant and type of fill material as shown in the table below:

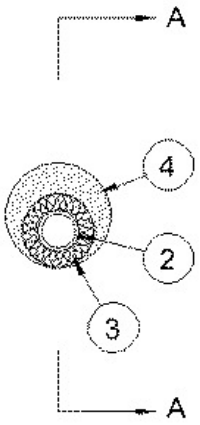
Rating of Wall, Hr	Type of Through Penetrant	Max Nom Diam of Through Penetrant, In. (mm)	Type of Fill Material	F and FH Ratings, Hr	T, FT and FTH Rating, Hr
2	Copper Tube, Copper Pipe, Steel Pipe, or Iron Pipe	4 (102)	FS1900, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+	2	1-1/2
1	Copper Tube, Copper Pipe, Steel Pipe, or Iron Pipe	4 (102)	FS1900, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+	1	1
2	Copper Tube, Copper Pipe, Steel Pipe, or Iron Pipe	6 (152)	FS900+, Metacaulk MC 150+, Biostop BF 150+	2	1
1	Copper Tube, Copper Pipe, Steel Pipe, or Iron Pipe	6 (152)	FS900+, Metacaulk MC 150+, Biostop BF 150+	1	0

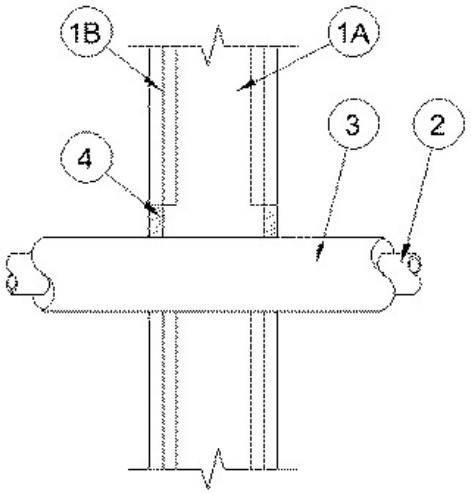
2	Steel Pipe, or Iron Pipe	12 (152)	FS900+, FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+	2	1-1/2
1	Steel Pipe, or Iron Pipe	12 (152)	FS900+, FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+	1	3/4

RECTORSEAL — FlameSafe® FS900+, FlameSafe® FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 or 2 Hr (See item 1)
T Rating — 3/4 Hr





Section A-A

1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel channel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** Nom 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 5 in. (127 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly.

2. **Through Penetrant —** One metallic pipe or tube installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of wall assembly. The following types of metallic pipes or tubes may be used:

A. **Steel Pipe —** Nom 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 2 in. (51 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.

D. **Copper Pipe —** Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Pipe Covering* — Plastics+ —** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space shall be min 0 in. (point contact) to max 1-3/8 in. (35 mm).

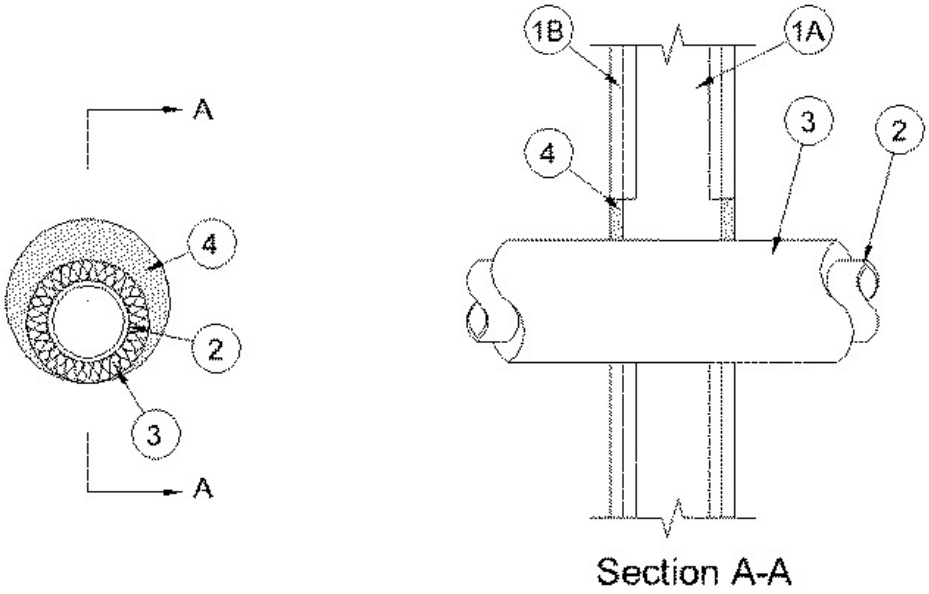
See **Plastics+** (QMFZ2) category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

4. **Fill, Void or Cavity Materials* - Caulk —** Min 5/8 in. (16 mm) thickness of caulk applied within annulus, flush with both surfaces of wall assembly.

RECTORSEAL — MC 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Rating — 1 or 2 Hr (See item 1)
T Rating — 1 Hr



Section A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel channel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** Nom 5/8 in. (16 mm) thick, 4 ft. (1.2 m) wide with square or tapered edges. The gypsum board type, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 8 in. (203 mm).
The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly.

2. **Through Penetrant —** One metallic pipe, tube or conduit installed within the firestop system. Pipe, tube or conduit to be rigidly supported on both sides of wall assembly. The following types of metallic pipes or tubes may be used:

A. **Steel Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

C. **Conduit —** Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or steel conduit.

D. **Copper Tubing —** Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

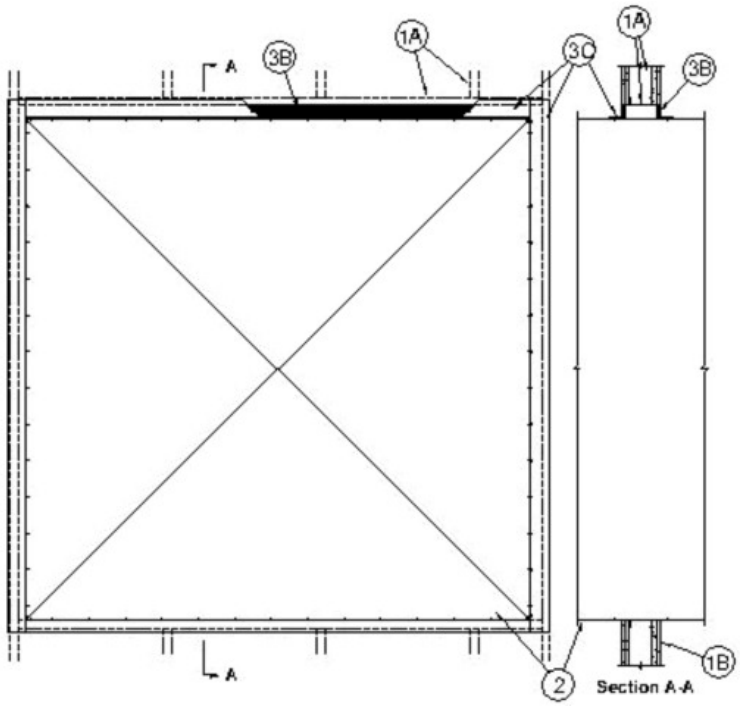
E. **Copper Pipe —** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Pipe Covering* —** Nom 1 in. (25 mm) thick hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. An annular space of min 0 in. (point contact) to max 1-7/8 in. (48 mm) is required within the firestop system.

4. **Fill, Void or Cavity Materials* - Caulk —** Min 5/8 in. (16 mm) thickness of caulk applied within annulus, flush with both surfaces of wall assembly.
RECTORSEAL — MC 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr



1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of min 3-1/2 in. (89 mm) wide steel channel studs spaced max 24 in. (610 mm) OC. Additional steel studs shall be used to completely frame the opening.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory. Max area of opening is 73.7 sq ft (6.85 m^2) with a max dimension of 104 in. (2.64 m).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Steel Duct —** Max 100 in. by 100 in. (2.5 by 2.5 m) galv steel duct to be installed either concentrically or eccentrically within the firestop system. The duct shall be constructed and reinforced in accordance with SMACNA construction standards. The space between the steel duct and periphery of opening shall be min 0 in. (point contact) to max 2 in. (51 mm). Steel duct to be rigidly supported on both sides of the wall assembly.

3. **Firestop System —** The firestop system shall consist of the following:

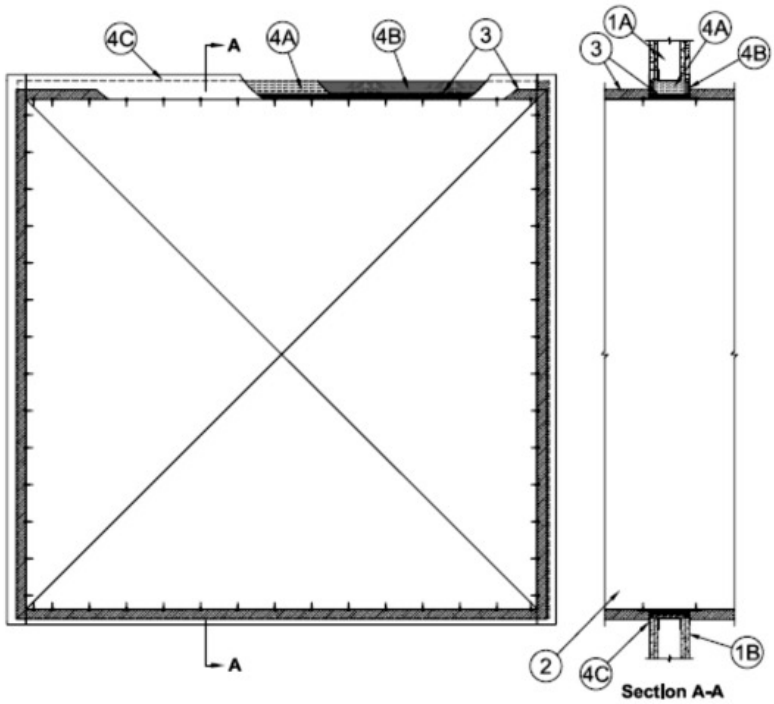
A. **Packing Material —** (Optional, Not Shown) — Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fitted into annular space. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material shall be applied at the point contact location between the steel duct and the gypsum board.
RECTORSEAL — Metacaulk 1000

C. **Steel Retaining Angles —** Min No. 16 gauge galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and to lap wall surfaces a min of 1 in. (25 mm). Angles attached to steel duct on both sides of wall with min No. 10 by 1/2 in. (13 mm) long steel sheet metal screws located a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr



1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. Additional framing members shall be used to completely frame around opening.

B. **Gypsum Board* —** Min 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U300, U400 or V400 Wall and Partition Design. Max size of opening is 210 sq in. (1355 cm^2) with a max width of 14-1/2 in. (368 mm) for wood stud (U300 Series) walls. Max size of opening is 77.3 sq ft. (7.2 m^2) with a max width of 105-1/2 in. (2.7 m) for steel stud (U400 or V400 Series) walls.

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall in which it is installed.

2. **Steel Duct —** Max 100 by 100 in. (2.5 by 2.5 m) steel duct to be installed within the framed opening. The duct shall be constructed and reinforced in accordance with SMACNA construction standards. Steel duct to be rigidly supported on both sides of wall assembly.

3. **Batts and Blankets* —** Nom 1-1/2 or 2 in. (38 or 51 mm) thick glass fiber batt or blanket (min 3/4 pcf or 12 kg/m^3) jacketed on the outside with a foil-scrim-kraft facing. Longitudinal and transverse joints sealed with aluminum foil tape. During the installation of the fill material, the batt or blanket shall be compressed minimum 50 percent such that the annular space within the firestop system shall be min 1/2 in. (13 mm) to max 2 in. (51 mm).

See **Batts and Blankets** (BKNV) category in the Building Materials Directory for names of manufacturers. Any batt or blanket meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index 50 or less may be used.

4. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Min 3-5/8 (92 mm) or 4-7/8 in. (124 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form for 1 or 2 hr fire-rated walls, respectively. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall.
RECTORSEAL — Metacaulk 1000, 350i, MC150+, Biostop 500+, 350i, BF-150+, Flamesafe 1900, 900+

C. **Steel Retaining Angles —** Min No. 16 gauge (0.059 in. or 1.5 mm) galv steel angles sized to lap steel duct a min of 1 in. (25 mm) and lap wall surfaces a min of 2 in. (51 mm). Angles attached to steel duct on both sides of wall with min No. 10 steel sheet metal screws spaced a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® JOINT STRIP

Flexible Material for up to 2" Wide Joints

Description

A flexible, highly intumescent firestop material used in concrete and masonry control floor and wall joints up to 2" (51 mm) wide. It forms a strong char that prevents the passage of flame, smoke, and hot gases between control joints. Can be used with plastic pipe penetrations. Metacaulk Joint Strips are ideal for stadium construction, tilt up panels, curtain wall panels and all concrete and masonry construction joint applications where a fire rated control joint is required. Can be used with any UL listed sealant.

Applications

Install Metacaulk Joint Strip along with any normal backer rod, cover it with approved architectural caulk or sealant, and you have a fire rated control joint. No longer do you need to use firestop caulks that are difficult to install and impossible to paint over. No need for mineral wool or expensive, difficult to install backing materials. Metacaulk Joint Strip has the capability for 1, 2, 3 and 4 hour assembly ratings, refer to the UL systems for specific installation instructions.

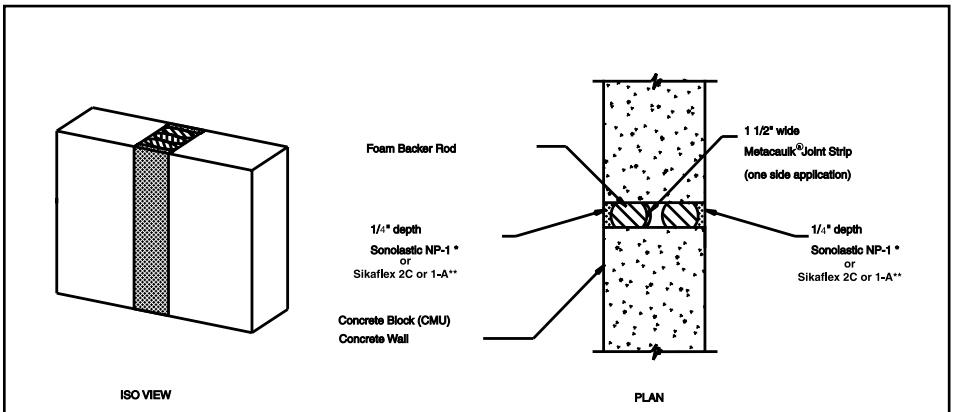
Characteristics | Features

- Easy to install
- Versatile, flexible
- Highly intumescent (multiple staged)
- Forms a strong char to prevent passage of flame, smoke and hot gases

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66700	1"x82'	6	10x10x10	.58
66701	1.5"x82'	4	10x10x10	.58
66702	2.5"x82'	4	10x10x10	.58
66703	3"x82'	2	10x10x10	.58
66704	2"x82'	3	10x10x10	.58
66705	4"x82' w/ adhesive backing	2	10x10x10	.58

Installation Data



For additional Technical Service, call toll free 800-231-3345

Step 1 Clean all surfaces in joint area to remove loose debris, dirt, oil, wax, grease, old caulking, etc.

Step 2 For floor applications, install a separate base section of backer rod recessed approximately 2" down from the top of the floor. Bend and friction fit Metacaulk® Joint Strip longitudinally into joint using the backer rod as the transport mechanism. Push into joint far enough to accommodate the required depth of caulk.

Step 3 Gun, trowel, or pump approved sealants to minimum 1/4" depth on both sides of wall or top of floor over the backer rod.

Step 4 Trowel sealant to the desired finish. See tested UL systems for complete installation instructions.

No longer do you need to use firestop caulks that are difficult to install and impossible to paint over. No need for mineral wool or expensive, difficult to install backing materials. Metacaulk®Joint Strip has the capability for 1, 2, 3 and 4 hour assembly ratings, refer to the UL systems for systems for specific installation instructions.

Testing Data

Metacaulk® Joint Strip is UL Classified and tested to UL 2079.

Degree of intumescence per DIN standard
≥18x with weight imposed
≥ 37x free intumescing

Tested to CAN/ULC-S115 (Fire Tests of Firestop Systems) test standards. Tested to the time-temperature requirements of ASTM E119 (UL 263). Complies to Required Environmental Exposure Testing of Accelerated Aging and High Humidity as per UL 1479 Fire Test of Through-Penetration Firestops.

Class II and III Movement 25% compression & extension

FBC™ System Compatible indicates that this product has been tested, and is monitored on an ongoing basis, to assure its chemical compatibility with Flowguard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology. The FBC System Compatible Logo, FBC™, FlowGuard Gold®, BlazeMaster®, Corzan® and TempRite® are trademarks of Lubrizol Advanced Materials, Inc. or its affiliates.

Material Properties

Carcinogenic Fillers	None
Solvents	None
Color	Dark Gray

ASTM E 84, UL 723 Tunnel Test ASTM E 1966, UL 2076	
Flame Spread	5
Smoke Index	5

Inspection & Repair

RectorSeal recommends that a firestop system inspection be conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk Joint Strip should be stored between 35˚F (2˚C) and 120˚F (49˚C). Keep products stored under protective cover, in their original containers. A stock rotation program is recommended. Shelf life of the product is indefinite.

Limitations

To be used only in the tested configurations or as recommended by RectorSeal.

WARNING

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

KEEP OUT OF REACH OF CHILDREN.

For additional information, refer to Safety Data Sheet (SDS).

Limited Warranty

For more information on our product warranty, visit rectorseal.com.

Distributed by

RectorSeal, LLC

2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • rectorseal.com

3255 Wyandotte St. East, Windsor, ON N8Y 1E9, Canada • 519-966-4901

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® 150+

General Purpose Firestop Sealant

Description

Metacaulk 150+ is a one component, general purpose fire rated sealant, acoustic sealant and smoke seal for construction joints and through-penetrations. Metacaulk 150+ is a water based, non-sag caulking grade sealant that is easy to apply as well as retrofit. It cures to an elastomeric seal that is suitable where dynamic movement is expected. In the event of a fire, Metacaulk 150+ will prevent the spread of flames, smoke, hot gases and water through joint openings and through-penetrations. No dilution or mixing is required for use. No special skills are necessary for installation. Metacaulk 150+ is applied with a conventional caulking gun, bulk loading gun or can be troweled from the pail. For large applications, it can be pumped directly from the pail. Metacaulk 150+ systems are rated for up to 4 hours in accordance with ASTM E814 (UL 1479) and ASTM E1966 (UL 2079) test standards. Metacaulk 150+ is protected in a wet stage as well as in a dry stage against mold growth with a combination of biocides.

Applications

Metacaulk 150+ can be used in interior applications as a general purpose fire rated sealant, acoustic sealant and smoke seal for construction joints on both vertical and horizontal surfaces. Metacaulk 150+ is also an excellent fire rated acoustical sealant and can be used in areas under constant vibration or movement. Metacaulk 150+ can also be used on various penetrations such as EMT, telephone & power cables in concrete floors and walls, gypsum walls as well as wood floors. Use Metacaulk 150+ to prevent the spread of fire and smoke through joints in fire rated gypsum wallboard partitions, concrete block or concrete walls and/or concrete or corrugated steel deck floor/ceiling assemblies.

Characteristics | Features

- Water based
- Excellent freeze-thaw
- Flexible set
- Paintable
- VOC compliant
- Safe and easy to use
- 3 Year shelf life
- STC rating 65

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66648	10.3 oz cartridge	12	8x6x12	.34
66385	20.2 oz foil pack	12	9x14x7	.51
66383	30 oz. cartridge	12	11x9x17	.97
66389	5 Gallon	1	13 dia x14	1.08
Gray				
66424	20.2 oz foil pack	12	9x14x7	.51
66425	5 gallon	1	13 dia x 14	1.08

Installation Data

Install Metacaulk 150+ using standard caulking techniques or trowel from pails. Metacaulk MC 150+ may also be pumped from the pails. When damming materials are needed, use only materials approved for the specific application.

TYPICAL GYPSUM WALLBOARD INSTALLATION

Step 1 Cut opening in wall.

Step 2 Clean penetration opening and surfaces from loose debris, dirt, oil and wax.

Step 3 If required, install sleeve and backing material.

Step 4 Gun the sealant as required to the specified depth. Trowel surface flush with wall.

Consult third part testing agency product listing directory for complete instructions and system listings.

Testing Data

For specific test criteria, refer to Intertek Directory and UL Product iQ or call RectorSeal.

Metacaulk 150+ was tested at positive pressure with a minimum 0.01 inches of water (2.5 Pa) and in accordance with ASTM E814 (UL 1479), ASTM E1966 (UL 2079). Tested to the time-temperature requirements of ASTM E119 (UL 263). L rating > 1 cfm cu.ft. Class 1 W-Rated.

Sound Transmission Class (STC) 65 - The test was performed in accordance with ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

FBC™ System Compatible indicates that this product has been tested, and is monitored on an on-going basis, to assure its chemical compatibility with FlowGuard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology.

Inspection & Repair

RectorSeal recommends that a firestop system inspection be conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk 150+ should be stored between 35˚F (2˚C) and 120˚F (49˚ C) to obtain a 3 year shelf life.

NOTE: Do not dilute, no mixing is required. Best if protected from freezing. If freezing occurs, thaw completely before using. Keep products stored under protective cover in original containers.

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	None
Application	Caulking Gun or Towel
Application Temperature between	40˚F - 120˚F 4˚C - 49˚C
Color	Red / Gray
Cure Time	3 to 4 weeks (at 77˚F/25˚C)
Density	12.5 lbs/gal
Elastomeric	Yes
Freeze/Thaw	Excellent
Skin Over Time	30 min. (at 77˚F/25˚C)
pH Value	7 to 8

Volume Coverage:	
for 10.3 oz. tube	(304 ml) 18 cu. in.
for 20.2 oz. foil packs	(597 ml) 36 cu. in.
for 30 oz. tube	(887 ml) 54 cu. in.
for 5 gallon	(18.9 liter) 1155 cu. in.

VOC	< 10 g/l

ASTM E84, UL 723 Tunnel Test	
Flame Spread	10
Smoke Index	0

Limitations

Metacaulk 150+ is not designed to be used in areas under continuous immersion or in areas which would be continuously wet. Metacaulk 150+ should not be used against hot uninsulated surfaces above 300˚F (149˚C).

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

Precautionary Statements

Prevention: Wear protective gloves/protective clothing/eye protection/face protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. **Response:** If exposed or concerned: Call a POISON CENTER or doctor/physician. **Storage:** Store locked up. Disposal: Dispose of contents/container in accordance with local regulations. **KEEP OUT OF REACH OF CHILDREN.**

For additional information, refer to Safety Data Sheet.

Limited Warranty

RectorSeal, LLC makes the Limited Express Warranty that when the instructions for storage and handling of our products are followed we warrant our products to be free from defects. THIS LIMITED EXPRESS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION ON THE PART OF RectorSeal, LLC. The sole remedy for breach of the Limited Express Warranty shall be the refund of the purchase price. All other liability is negated and disclaimed, and RectorSeal, LLC shall not be liable for incidental or consequential damages.

IFC INTERNATIONAL FIRESTOP COUNCIL
THE Source of Firestop Expertise®
MEMBER

Manufactured by **RectorSeal, LLC • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® 1000

Highly Intumescent Firestop Sealant

Description

Metacaulk 1000 is a single component, general purpose fire rated sealant and smoke seal for construction joints and through-penetrations. Metacaulk 1000 is a water based, extremely intumescent, non-sag caulking grade sealant that is easy to apply. It cures to an elastomeric seal that is suitable where dynamic movement is expected.

In the event of a fire, Metacaulk 1000 will prevent the spread of flames, smoke, hot gases and water through joint openings and through-penetrations. Metacaulk 1000 systems are rated for 1, 2, 3 and 4 hours in accordance with the ASTM E814 (UL1479), ASTM E1966 (UL 2079) and CAN/ULC-S115 test standards. Metacaulk 1000 is protected in a wet stage as well as in a dry stage against mold growth with a combination of biocides. Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

Applications

Metacaulk 1000 can be used in interior applications as a general purpose fire rated sealant and smoke seal for construction joints, through penetrations and blank openings on both vertical and horizontal surfaces. Use Metacaulk 1000 to prevent the spread of fire and smoke through joints in fire rated gypsum wallboard partitions, concrete block or concrete walls and/or concrete or corrugated steel deck floor/ceiling assemblies. Metacaulk 1000 is also an excellent fire rated acoustical sealant and can be used in areas under constant vibration or movement to reduce the transfer of noise through assemblies. Metacaulk 1000 can also be used on various penetrations such as EMT, telephone & power cables, insulated pipes, etc. in concrete floors and walls, gypsum walls as well as wood floors.

Characteristics | Features

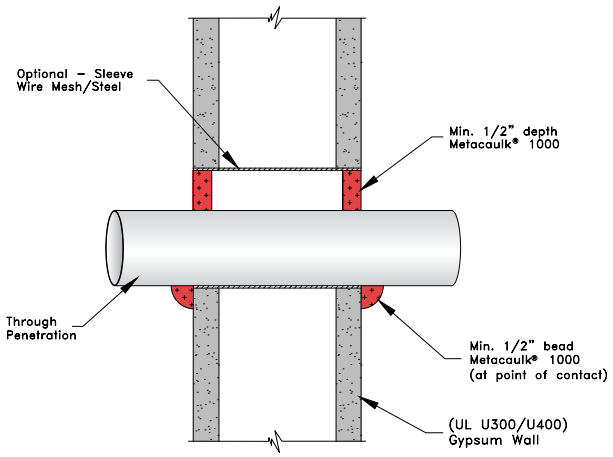
- Water based
- Excellent freeze-thaw
- Flexible set
- Highly intumescent
- Paintable
- VOC compliant
- Safe and easy to use
- 3 Year shelf life

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66640	10.3 oz cartridge	12	8x6x12	.34
66312	20.2 oz foil pack	12	9x14x7	.51
66303	30 oz. cartridge	12	11x9x17	.97
66309	5 Gallon	1	13 dia x14	1.08

Installation Data

Install Metacaulk 1000 using standard caulking techniques or trowel from pails. Metacaulk 1000 may also be pumped from the pails. When damming materials are needed, use only materials approved for the specific application.



UL Listed Syste: WL1114
Tested as Per UL 2079 @ 25% Compression or extension for 500 cylces

For additional Technical Service, call toll free 800-231-3345

TYPICAL TOP OF WALL INSTALLATION

Step 1 Gun, trowel or pump the sealant as required to the specified depth. Properly tool sealant surface flush with the wall.

Consult UL Directory for complete instructions and system listings.

Testing Data

For specific test criteria, refer to the UL Product iQ and Interek Directory of Building Products or call RectorSeal

Metacaulk 1000 was tested at positive pressure with a minimum 0.01 (2.5 Pa) inches water and in accordance with ASTM E814 (UL 1479), ASTM E1966 (UL 2079) and tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side in accordance with CAN/ULC S115 testing standards. Tested to the time-temperature requirements of ASTM E119 (UL 263). Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

Sound Transmission Class (STC) 62 - The test was performed in accordance with ASTM 90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

Complies to Required Environmental Exposure Testing of Accelerated Aging and

High Humidity as per UL 1479 Fire Test of Through-Penetration Firestops.

FBC™ System Compatible* indicates that this product has been tested, and is monitored on an ongoing basis, to assure its chemical compatibility with FlowGuard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology..
The FBC System Compatible Logo, FBC™, FlowGuard Gold®, BlazeMaster®, Corzan® and TempRite® are trademarks of Lubrizol Advanced Materials, Inc. or its affiliates.·

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	None
Application	Caulking Gun or Trowel
Application Temperature between	40˚F - 120˚F 4˚C - 49˚C

Activation of Intumescence:	
Expansion Begins	375˚F (190˚C)
Expansion Greatest	575˚F - 1100˚F 302˚C - 593˚C

Color	Red
Cure Time	3 to 4 weeks (at 77˚F/25˚C)
Density	~11 lbs/gal ~1.32 kg/L
Elastomeric	Yes
Freeze/Thaw	Excellent
Skin Over Time	30 min. (at 77˚F/25˚C)
pH Value	6.5 to 7

Volume Coverage:	
for 10.3 oz. tube	18 cu. in. (304 ml)
for 20.2 oz. foil packs	36 cu. in (597 ml)
for 30 oz. tube	54 cu. in. (887 ml)
for 5 gallon	1155 cu. in. (18.9 liter)

VOC	< 10 g/L

ASTM E 84, UL 723 Tunnel Test	
Flame Spread	0
Smoke Index	0

Inspection & Repair

RectorSeal recommends firestop system inspection is conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk 1000 should be stored between 35˚F (2˚C) and 120˚ F (49˚ C) to obtain a 3 year shelf life.

NOTE: Do not dilute, no mixing is required. Best if protected from freezing. If freezing occurs, thaw completely before using. Keep products stored under protective cover in original containers.

Limitations

Metacaulk 1000 is not designed to be used in areas under continuous immersion or in areas which would be continuously wet. Metacaulk 1000 should not be used against hot uninsulated surfaces above 300˚ F (149˚ C).

Cautions

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

PRECAUTIONS: Do not take internally. May be harmful if swallowed. May cause eye and skin irritation if prolonged or repeated contact occurs. Wash after handling. **FIRST AID:** For any overexposure, get immediate medical attention after first aid is given. **EYES-**Flush 15 minutes with clean water. **SKIN-**Wash with soap and water. **INHALATION-**Remove to fresh air. **INGESTION-**Only if conscious, give large amounts of water and INDUCE VOMITING. **FIRE AND SPILLS**: Use water fog, CO_2, foam, or dry chemicals. Wipe up spills to prevent footing hazard. Clean up with scrapers and water. **STORAGE AND HANDLING:** Store away from heat sources. Keep container closed. Do not reuse empty container. **KEEP OUT OF REACH OF CHILDREN.**

For additional information, refer to Safety Data Sheet.

Limited Warranty

RectorSeal, LLC makes the Limited Express Warranty that when the instructions for storage and handling of our products are followed we warrant our products to be free from defects. THIS LIMITED EXPRESS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION ON THE PART OF RectorSeal, LLC. The sole remedy for breach of the Limited Express Warranty shall be the refund of the purchase price. All other liability is negated and disclaimed, and RectorSeal, LLC shall not be liable for incidental or consequential damages.

IFC INTERNATIONAL FIRESTOP COUNCIL THE Source of Firestop Expertise® MEMBER

Manufactured by **RectorSeal® LLC • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® PUTTY & PADS

Fire-rated pad or stick

Description

Metacaulk Putty is a moldable non-curing one component fire rated material for through-penetration firestop systems. Metacaulk Putty will intumesce when heated, forming an insulating char. In the event of a fire, Metacaulk Putty will prevent the spread of flames, smoke, gas and water through penetration openings. Metacaulk Putty is applied by hand, no tools or mixing is required.

Applications

Use Metacaulk Fire Rated Putty for various penetrations: small openings, EMT Pipe, Steel, Conduit, and Cabling, (Telephone, Power, Communications), metal or non-metallic electrical boxes, large steel boxes and junction boxes. UL approved designs using Metacaulk Putty Pads with FRM Mortar designs to help provide a barrier or buffer for energized bus ducts or conduits as well as provide a barrier from vibration and movement.

Characteristics | Features

- Expands when exposed to fire
- No volatile solvents
- No asbestos fillers
- Single Component
- Applied by hand
- Adheres to all common building surfaces
- STC rating 60 - Pads

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66345	18 cubic in	12	5 x 11 x 8	.25
66340	6 x 7 x 1/8	20	8 x 7 x 4	.13
66335	7 x 7 x 1/8	20	8 x 8 x 4	.15
66475	9 x 9 x 1/8	20	9 x 9 x 4	.19

Installation Data

PUTTY: Penetrating items should be firmly anchored. Clean opening of dust, dirt and oil. Refer to RectorSeal® application guide or current UL Product iQ™ for selection of proper system design detailing depths of putty and backing material. Optionally, putty may be packed into inside of conduit fittings to prevent passage of smoke.

PUTTY PADS: Remove liner from one side of pad (Step 1). Align with the side of the box partially overlapping the stud and adhere. Work pad to the opposite side of the box and over the edges (Step 2). If wall membrane is in place, pack putty into gaps between box and gypsum board slightly overlapping inner wallboard surface. If membrane is to be installed after pad installation, overlap front edge of box so that putty will be compressed around edges of box as wallboard is installed. Cut slits in pad to fit around conduit or cables (Step 3). Press pad to surface of top, bottom, and sides of box (Step 4). Trim excess at corners and apply to conduit fittings connected to the box. Remove exposed liner. Only one putty pad thickness (1/8") is needed for a 1 or 2 hour rating.

Testing Data

Metacaulk Fire-Rated Putty are classified by Underwriters Laboratories as a fill, void or cavity material. Metacaulk Fire-Rated Putty Pads are classified as a wall opening protective material. For specific test criteria see UL Product iQ or call RectorSeal. Metacaulk Firestop Putty was tested to a positive pressure at a minimum .01 inches of water in accordance with UL 1479 and ASTM E814 test standards. Tested to CAN/ULC-S115 (Fire Tests of Firestop Systems) test standards. Tested to the time-temperature requirements of ASTM E119 (UL 263). Pads - Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

Inspection & Repair

RectorSeal recommends that a firestop system inspection be conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk Fire Rated Putty is not to be stored in areas where the temperatures exceed 120˚F or drop below 0˚F. Best if protected from freezing. If freezing occurs, thaw completely before using. Keep products dry and stored under protective cover in their original containers. A stock rotation program is recommended.

Limitations

To be used only in the tested configurations or as recommended by RectorSeal.

Cautions

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

PRECAUTIONS: Do not take internally.
KEEP OUT OF REACH OF CHILDREN.
For additional information, refer to Safety Data Sheet.

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	None

Activation of Intumescence:	
Expansion Begins	220˚F (104˚C)

Color	Red
Cure Time	None

ASTM E 84, UL 723 Tunnel Test	
Flame Spread	10
Smoke Index	125

Limited Warranty

RectorSeal, LLC makes the Limited Express Warranty that when the instructions for storage and handling of our products are followed we warrant our products to be free from defects. THIS LIMITED EXPRESS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION ON THE PART OF RectorSeal, LLC. The sole remedy for breach of the Limited Express Warranty shall be the refund of the purchase price. All other liability is negated and disclaimed, and RectorSeal, LLC shall not be liable for incidental or consequential damages.

INTERNATIONAL FIRESTOP COUNCIL
THE Source of Firestop Expertise®
MEMBER

Manufactured by **RectorSeal® • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**

RECTORSEAL

A CSW Industrials Company

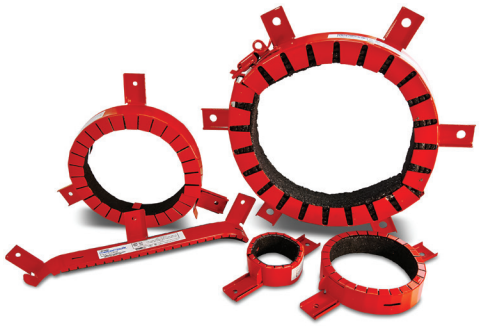
PRODUCT DATA SHEET

METACAULK® PIPE COLLAR

Prefabricated Firestop System

Description

Metacaulk® Pipe Collars are prefabricated for open and closed through-penetration firestop systems using 1 1/2"(38 mm) to 6" (152 mm) combustible plastic pipe. An easy locking tab assures quick and efficient installation. The collar design greatly reduces the time and expense that is required to install competitive collars.



Applications

Metacaulk Pipe Collars are used to seal off plastic pipe both in closed and vented (DWV) conditions. Also for used to close of combustible pipes in both up to 6" (152 mm) diameter ABS (cellular core or solid core), FRPP, PVC and CPVC pipe. The collar may be used on up to 3 hour rated concrete floors and walls, up to 2 hour rated gypsum walls and up to 2 hour rated wood floors.

Packaging

Code	Size	Qty. per Case
66352	1½"	12
66353	2"	12
66350	3"	6
66351	4"	6
66354	6"	2

Characteristics | Features

- Saves on labor cost
- Easy installation
- Economical
- No measurement of material required
- Highly intumescent
- Tested forPVC, CPVC, ABS and PVC/ABS Foam Core, FRPP

Installation Data

Metacaulk Pipe Collar are prefilled and very easy to install.

Step 1 Select the proper collar to fit the diameter of pipe used.

Step 2 Making sure annular space is within the limits set by the tested conditions, attach collar around the pipe on the underside of the floor or to each side of a wall by firmly placing against the wall or floor and securing interlocking tabs [1 1/2" (38 mm), 2" (51 mm), 3" (76 mm) and 4" (102 mm)] or fastening the buckle [6" (152 mm)].

Step 3 If needed, mark and predrill wall or floor for required anchors. Properly secure the appropriate anchor into each of the anchoring tabs. In concrete, use 1/4" (6 mm) x 1 1/4" (32 mm) hex washer head type concrete anchors or appropriate steel expansion/wedge anchors. In gypsum, use 1/8" (3 mm) x 2" (51 mm) MOLLY type hollow wall anchors or 1 1/2" drywall or drywall laminating screws. Fender washers have been provided to be used with the fasteners.

Step 4 If an additional smoke seal is required, Metacaulk 1000 may be applied within the annular space before the attachment of the collar.

Consult UL Product iQ for complete instructions and system listings.

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	None

Activation of Intumescence:	
Expansion Begins	375˚F (190˚C)
Expansion Greatest	575˚F - 1100˚F 302˚C - 593˚C

Testing Data

Metacaulk Pipe Collars are classified by Underwriters Laboratories as a Firestop Device. For specific test criteria, see UL Product iQ or call RectorSeal. Metacaulk® Pipe Collars were tested at a minimum .01 inches (2.5 Pa) of water positive pressure in accordance with ASTM E814 (UL 1479) test standards. Tested to the time-temperature requirements of ASTM E119 (UL 263). Tested to CAN/ULC-S115 (Fire Tests of Firestop Systems) test standards. Complies with Accelerated Aging and High Humidity Environmental Exposure Test for Intumescent Material per UL 1479 Fire Test of Through-Penetration Firestops. Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

FBC™ System Compatible* indicates that this product has been tested, and is monitored on an ongoing basis, to assure its chemical compatibility with FlowGuard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology.

Inspection & Repair

RectorSeal recommends that a firestop system inspection be conducted during installation of the material in accordance with ASTM E2174 and ASTM E 2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk Pipe Collars should be stored in a dry place. Keep product stored under protective cover in original container.

Limitations

Not for use in outdoor environments where long-term exposure to rainfall or saltwater spray may occur. No other limitations known if used as directed.

Cautions

Refer to Safety Data Sheet (SDS)

KEEP OUT OF REACH OF CHILDREN.

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

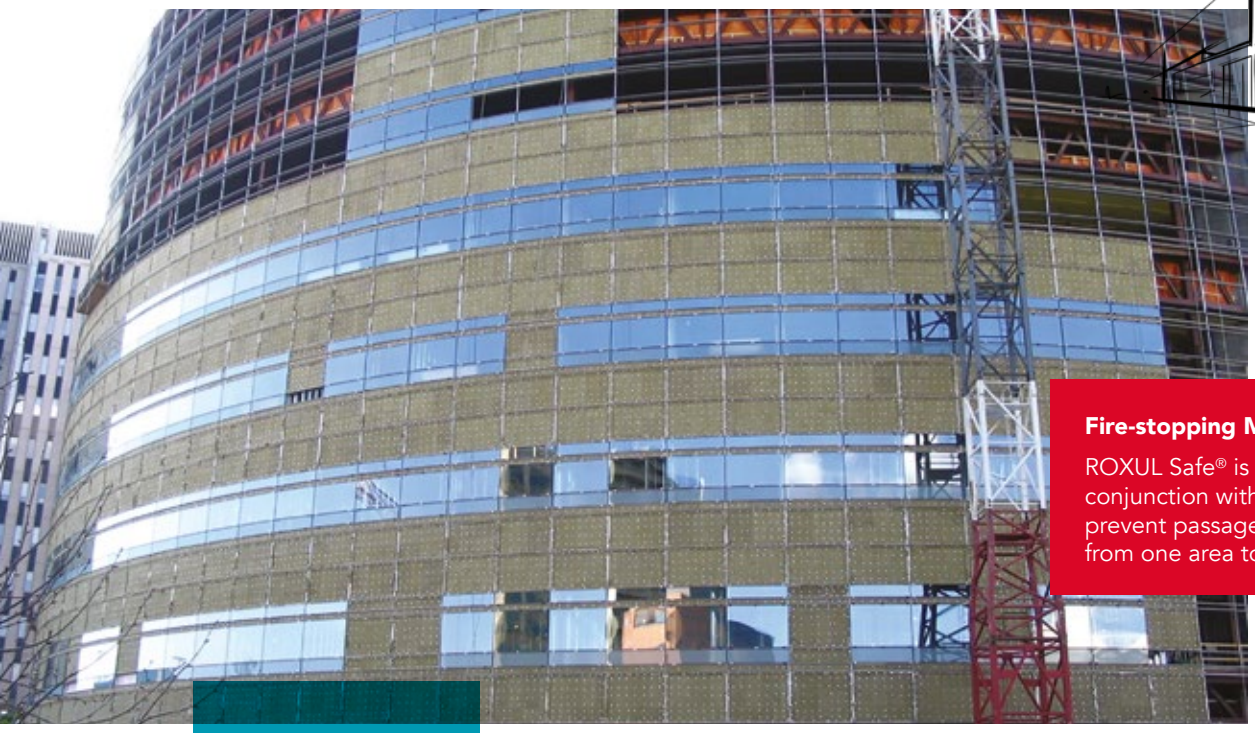
Limited Warranty

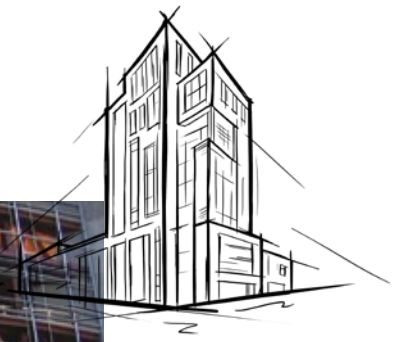
For more information on our product limited warranty, visit RectorSeal.com

Manufactured by **RectorSeal® LLC • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**

ROXUL Safe®

Fire Stopping Insulation





Fire-stopping Material

ROXUL Safe® is always used in conjunction with a fire sealant to prevent passage of fire and smoke from one area to the next.

ROCKWOOL ROXUL Safe® is a lightweight, semi-rigid stone wool insulation that provides fire-stopping and acoustical properties. It is designed to fill perimeter gaps between concrete floor slabs and exterior wall systems, between firewalls and ceiling slabs, and around conduit pipes and duct openings through walls and floor slabs.

It is non-combustible and fire resistant, and will not develop toxic smoke or promote flame spread, even when exposed directly to a fire. When ROXUL Safe® is used with ROCKWOOL Curtainrock®, it provides a comprehensive fire-stopping system that has been UL/ULC/Intertek tested and approved for perimeter fire containment systems.

Fire stopping insulation should be installed per the listed assembly with compression fitting requirements to form a tight seal between the floor line and exterior curtain wall assembly in perimeter installations so that flame and hot gases cannot pass through the joint. For through penetrations and construction joints, ROXUL Safe® should be cut as needed for compression fit leaving no voids.

Moisture resistant, non-corrosive and mildew-resistant, ROXUL Safe® also helps to reduce noise transmission into and out of the building for improved occupant comfort.

Learn more at rockwool.com

ROCKWOOL®

ROXUL Safe®
Fire Stopping Insulation

Technical Data Sheet

Firestopping 07840* • Firestopping 07 84 00**
Fibrous Fire Safing 07 84 56.13** • Curtain wall & glazed assemblies 08 44 00**

ROCKWOOL ROXUL Safe® is semi-rigid, mineral wool batt insulation approved for use in fire rated joints, through penetrations and perimeter fire containment systems.

	Performance	Test Standard
Compliance	Mineral Fiber Block and Board Thermal Insulation - Type IVA Compliant MEA Approval, New York City Approval	ASTM C612 339-97-M
Reaction to Fire	Flame spread index = 0; Smoke developed index = 0 Flame spread index = 0; Smoke developed index = 0 Determination of Non Combustibility of Building Materials - Non Combustible Test for Non-Combustibility - Non Combustible Fire Tests of Firestop Systems Fire Tests of Penetration Firestop Systems Tests for Fire Resistance of Building Joint Systems Perimeter Fire Barrier Systems Smoulder Resistance - 0.01% Consult UL, ULC and Intertek Directories for fire rated designs	ASTM E84 (UL 723) CAN/ULC S102 CAN/ULC S114 ASTM E136 CAN/ULC S115 ASTM E814 (UL 1479) UL 2079 ASTM E2307/E119 CAN/ULC S129
Density	Actual Density - 4.0 lbs/ft³ (64 kg/m³)	ASTM C303
Corrosion Resistance	Stress Corrosion Cracking Tendency of Austenitic Stainless Steel - Passed Corrosion of Steel - Passed	ASTM C795 ASTM C665
Reaction to Moisture	Moisture Sorption by weight - 0.04% Determination of Fungi Resistance - Passed	ASTM C1104 ASTM C1338
Thickness Dimensions	Product is available in 1.5", 2", 3", 4", 5" and 6" (38.1 mm, 50.8 mm, 76.2 mm, 101.6 mm, 127 mm and 152.4 mm), 24" x 48" (610 mm x 1219 mm)	

For more information regarding the certifications and listings of our stone wool insulation products, please visit:

rockwool.com/north-america/about-us/sustainability/certifications-and-listings/

Issued 07-22
Supersedes 03-22

NOTE: *Master Format 1995 Edition **Master Format 2004 Edition. As ROCKWOOL has no control over installation design and workmanship, accessory materials or application conditions, ROCKWOOL does not warranty the performance or results of any installation containing ROCKWOOL's products. ROCKWOOL's overall liability and the remedies available are limited by the general terms and conditions of sale. This warranty is in lieu of all other warranties and conditions expressed or implied, including the warranties of merchantability and fitness for a particular purpose.

ROCKWOOL®

8024 Esquesing Line, Milton, ON L9T 6W3
Tel: 800-265-6878 • Fax: 800-991-0110
rockwool.com

Fire Containment Insulation

Thermafiber® Safing™

- Exceptional performance in Perimeter Fire Containment Systems
- Provides life saving fire protection in rated assemblies
- Fire resistant to temperatures above 2,000°F (1,093°C)
- Easy to fabricate for through penetrations and firestopping
- Conserves energy, reduces greenhouse gas emissions
- Resists moisture
- Controls noise and sound

LEED® v2009 Green Building Credits

Minimum 70% Recycled Content[1]	Energy & Atmosphere	Materials & Resources	Indoor Environmental Quality	Innovation in Design
	1	2.1, 2.2 4.1, 4.2 5.1, 5.2	9	1

Thermafiber Safing and FireSpan® insulation provide the critical components of the perimeter fire containment system in the 111 South Wacker Building in Chicago, IL. Thermafiber insulation also contributed to the building's LEED® Gold Rating.

Thermafiber® Safing™ is compression fitted between FireSpan® insulation and the concrete slab edge to create a perimeter fire containment system.

Owens Corning® Thermafiber®

Made in the USA

CLASSIFIED UL

Intertek

Thermafiber® Safing™ Insulation

Description:

THERMAFIBER Safing™ products are designed to provide life saving fire protection in perimeter fire containment systems, floor and wall penetrations, construction joints, and other firestopping applications. These products are noncombustible, moisture-resistant, noncorrosive, nondeteriorating, mildew-proof and vermin-proof. Thermafiber Safing provides thermal insulation, fire protection, and acoustical control in many different UL and Intertek (formerly OPL) listed fire containment assemblies of 1, 2, and 3-hr ratings.

Product Options:

- Safing 4.0 pcf, 2" or greater thickness, is available with or without a vapor retarding foil facing.
- Safing 6.0 pcf, 1.5" or greater thickness, is available with or without a vapor retarding foil facing.
- Recycled Content Options[1]:

  EPA Choice Fiber (US Government Buildings)..... Minimum 75%

  Standard Fiber..... 70%

  [1]Recycled content options other than Standard must be specified at time of order.

Installation:

All firestopping insulation should be installed per the architectural specification or system specific test description. All compressed Safing insulation should be installed per the listed assembly.

- Perimeter Installation: Safing™ insulation should be compression fitted between the slab edge and the FireSpan curtain wall insulation, leaving no voids.
- Penetration Application: Safing insulation should be cut slightly larger than the opening and compression fitted into the opening, leaving no voids.
- Construction Joint Application: Safing insulation should be compression fitted into the joint opening, leaving no voids.

Standard Sizes:

	Thickness*	Widths**	Lengths**
Safing 4.0 pcf	1"- 7"	16", 24", 36"	48", 60"
Safing 6.0 pcf	1"- 7"	16", 24", 36"	48", 60"
Tolerances	+1/4" - 1/8"	±1/8"	±1/2"

*Thicknesses are available in ½" increments. **Custom sizes are available upon request.

Technical Data:

		Tested to ASTM C 518		Tested to ASTM E 84			
				Unfaced		Foil Faced	
Product Designation	Actual Density	"k" @ 75° [24°C] BTU.in/hr.sq. ft. °F	"R" value per inch of thickness***	Flame Spread	Smoke Developed	Flame Spread	Smoke Developed
Safing	4.0 pcf	0.24	'R'= 4.2	0	0	25	0
Safing	6.0 pcf	0.24	'R'= 4.2	0	0	25	0

***R = thickness divided by 'k'

Fire-Containment Tests Per ASTM E 2307

Safing™ insulation is a critical component of any perimeter fire containment system. Thermafiber® has performed decades of testing in all of the containment systems listed below. For more complete test information, see SA707, THERMAFIBER Life-Safety Fire Containment Systems technical catalog or UL® and Intertek® (formerly OPL) Directories. For a full listing of containment systems visit www.thermafiber.com and click on Fire Rated Assemblies. UL Reference = TYPE SAF

- Aluminum Spandrel Curtain Wall Fire Containment
- Steel Stud-Framed/Gypsum Sheathing Curtain Wall Fire Containment
- Glass Spandrel Curtain Wall Fire Containment
- Granite Spandrel Curtain Wall Fire Containment
- Precast Concrete Spandrel

Standards Compliance:

Safing™ Insulation meets the following:

ASTM C 665	**Non-corrosive, Type I, III**
ASTM C 612	**Type IA, IB, II**
ASTM E 136	**Rated Non-combustible per NFPA Standard 220**
CAN/ULC S114	**Complies**
ASTM E 96	**Unfaced, 50 Perms as tested**
ASTM E 96	**Foil Faced, 0.02 Perms as tested**
ASTM C 1104	**Absorbs less than 1% by volume**
CAN/ULC S102	**Flame Spread 0, Smoke Developed 0**
ASTM E 814 or UL 1479	**Safing Insulation used in conjunction with an approved fill, void, or cavity material sealant or other approved material in through – penetration firestop systems - Complies**
UL 2079	**Safing Insulation used in conjunction with an approved fill, void or cavity material in construction joint systems - Complies**
CAN/ULC S115	**Complies**

Safing products are approved by: **New York City Board of Standards & Appeals** – (under BSA 39-74-SM & accepted by MEA-209-82-M, Vol. 4).

Thermafiber® Insolutions®:

Thermafiber offers industry leading technical and engineering assistance to architects, specifiers, and contractors. These services include CAD drawings, engineering judgments, LEED® Credit Information, product recommendations, and customized products. Contact our technical services department at 1-888-834-2371, or email technicalservice@owenscorning.com

For Further Information:

For additional information about these or other Thermafiber products contact us at 1-888-834-2371 or visit our website www.thermafiber.com.

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 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.

Submittal Approvals:

Job Name	
Contractor	Date

3711 Mill Street | Wabash, IN 46992 | 888-TFIBER1 [834-2371] | [260] 563-2111 | www.thermafiber.com

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® SAS SMOKE & ACOUSTIC

High-grade acrylic latex sealant

Description

Metacaulk Smoke and Acoustic Sealant is high-grade acrylic latex sealant formulated to provide a permanent seal for penetrations, membrane openings, and static or dynamic joints in smoke or sound rated assemblies.
Metacaulkl Smoke and Acoustic Sealant has been tested in accordance to the following standards: ASTM E84, ASTM E90, ASTM E1399, ASTM C834, ASTM G21 and tested for air leakage in accordance to modified UL 1479 and modified UL 2079.
Metacaulk Smoke and Acoustic Sealant meets the requirements for LEED criteria under Environmental Air Quality and Regional Materials. Metacaulk Smoke and Acoustic Sealant is protected in a wet stage as well as in a dry stage against mold growth with a combination of biocides.

Applications

Metacaulk Smoke and Acoustic Sealant is designed to be used in interior applications to prevent the passage of smoke and impede the transfer of sound in non-fire rated assemblies. Metacaulk Smoke and Acoustic Sealant may be used in vertical and horizontal assemblies in linear joints in walls or floors. Metacaulk Smoke and Acoustic Sealant can also be installed around pipe, conduit, electrical cable, ventilation duct, electrical boxes and any other through or membrane penetration in a non-fire rated vertical or horizontal assembly.

USES:

Smoke: Prevents the passage of smoke through walls or floors as required in smoke partitions.

Sound: Reduces the passage of sound through voids created in walls in accordance with ASTM E90.

Airborn Particles: Reduces the movement of materials carried by air such as dust and allergens as demonstrated in air leakage testing modified UL 1479 and modified UL 2079.

Use Metacaulk Smoke and Acoustic Sealant for various applications:

Metallic and nonmetallic pipes, outlet and receptacle boxes, membrane penetrations, head of wall, bottom of wall, wall to wall joints

Characteristics | Features

- Highest STC rating in market*
- Easy to dispense
- Flexible
- Low VOC
- Meets LEED criteria
- Water clean up
- Paintable

* tested to E90 standards as a smoke sealant

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66650	5 gal. spray grade	1	13x14 dia	1.08
66652	20.2 oz foil pack	12	9x14x7	.51

Installation Data

Install Metacaulk Smoke and Acoustic Sealant Caulk Grade with standard latex caulking tools and methods. Use only approved backing material when needed.
For Metacaulk Smoke and Acoustic Sealant Spray Grade application, use recommended Sealant Spray Grade equipment. Contact Technical service at 1-800-231-3345 or 713-263-8001 for current recommendations.
NOTE: SPRAY EQUIPMENT CAN BE DANGEROUS! USE ONLY PROPERLY TRAINED PERSONNEL. FOLLOW ALL SAFETY AND OPERATION INSTRUCTIONS AND PROCEDURES.

TYPICAL TOP OF WALL INSTALLATION

Linear Joint

Step 1 Thoroughly clean joint opening to remove all loose material to allow for Metacaulk Smoke and Acoustic Sealant to be easily installed.

Step 2 Gun, trowel or pump sealant to required depth and tool to be flushed with surface of wall or floor or spray or brush with appropriate equipment to required depth creating a complete seal.

Penetration

Step 1 Thoroughly clean opening around penetrating pipe, conduit, duct or other miscellaneous item to allow for Metacaulk Smoke and Acoustic Sealant to be easily installed.

Step 2 Gun, trowel or pump sealant to required depth and tool to be flush with surface of wall or floor or spray or brush with appropriate equipement to required depth creating a complete seal.

Consult RectorSeal for complete instructions and system listings.

Testing Data

For specific test criteria call RectorSeal.

Tested in accordance to the following standards:

ASTM E84, ASTM E1399, ASTM E90, ASTM C834, modified UL 1479*, modified UL 2079*

Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

* tested for air leakage at ambient temperature
Class II and III movement capability +-33% (tested to ASTM E1399)

Sound Transmission Class (STC) 69 - The test was performed in accordance with ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

Complies to Required Environmental Exposure Testing of Accelerated Aging and High Humidity as per UL 1479 Fire Test of Through-Penetration Firestops.

L rating > 1 cfm cu. ft.

CERTIFIED CLEAN AIR GOLD

FBC SYSTEM COMPATIBLE

FBC™ System Compatible* indicates that this product has been tested, and is monitored on an ongoing basis, to assure its chemical compatibility with FlowGuard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology.

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	<1%
Application	Caulking Gun or Trowel
Application Temperature between	40˚F - 120˚F 4˚C - 49˚C

Activation of Intumescence:	
Color	White
Density	Caulk 11.1 lbs./gal 1.33 kg/L Spray 10.9 lbs/gal 1.31 kg/L
Elastomeric	Yes
Freeze/Thaw	Excellent
Skin Over Time	30 min. (at 77˚F/25˚C)
pH Value	6.5 to 8

Volume Coverage:	
for 20.2 oz. foil packs	36 cu. in (597 ml)
for 5 gallon	1155 cu. in. (18.9 liter)

VOC	< 0.5 mg/m3

TVOC 44.6 (µgm–3) per CDPH Standard Method V1.2, CA Section 01350. Test Results Pass Private Office (PO) & School Classroom (SC)

ASTM E 84, UL 723 Tunnel Test	
Flame Spread	0
Smoke Index	5

Inspection & Repair

RectorSeal recommends firestop system inspection is conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk Smoke and Acoustic Sealant should be stored between 35˚F (2˚C) and 120˚ F (49˚ C). to obtain a minimum 2 year shelf life, subject to inspection. NOTE: Do not dilute, no mixing is required. Keep from freezing. Keep products stored under protective cover in original containers.

Limitations

Metacaulk Smoke and Acoustic Sealant is not designed to be used in fire rated assemblies, conditions that are immersed in water or continuously wet. Metacaulk Smoke and Acoustic Sealant application temperature range is 40ºF to 120ºF and should not be installed on un-insulated surfaces that exceed 120ºF degrees.

Cautions

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

Refer to Safety Data Sheet (SDS)

KEEP OUT OF REACH OF CHILDREN.

Limited Warranty

RectorSeal, LLC makes the Limited Express Warranty that when the instructions for storage and handling of our products are followed we warrant our products to be free from defects. THIS LIMITED EXPRESS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION ON THE PART OF RectorSeal, LLC. The sole remedy for breach of the Limited Express Warranty shall be the refund of the purchase price. All other liability is negated and disclaimed, and RectorSeal, LLC shall not be liable for incidental or consequential damages.

IFC INTERNATIONAL FIRESTOP COUNCIL
THE Source of Firestop Expertise®
MEMBER

Manufactured by **RectorSeal® LLC • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**

Prepared By: Daniel Penton
Mobile Number: (601)-590-1219

Date: 04/20/2026

J-KAULK FIRESTOPPING INCORPORATED

Submittal Package

- **Project:** St. Tammany Fire Station #10
- **Contractor:** Dynamic Constructors
- **Distributor:** J-Kaulk Firestopping inc.
- **Manufacture:** Rectorseal
- **Manufacture Contact:** Melinda Ellis
Mobile: (985)-288-7466
- **Installer:** J-Kaulk Firestopping inc.
- J-Kaulk Contact: Daniel Penton
Mobile: (601)-590-1219

Address: 21 Alex Pl. Picayune, MS 39466
Phone: (601)-798-0827 Fax: (601)-798-9056

LA# 38664
MS#13695

TABLE OF CONTENTS

Balco and Rectorseal Inc.
Firestop Installer Program

J-Kaulk Firestopping

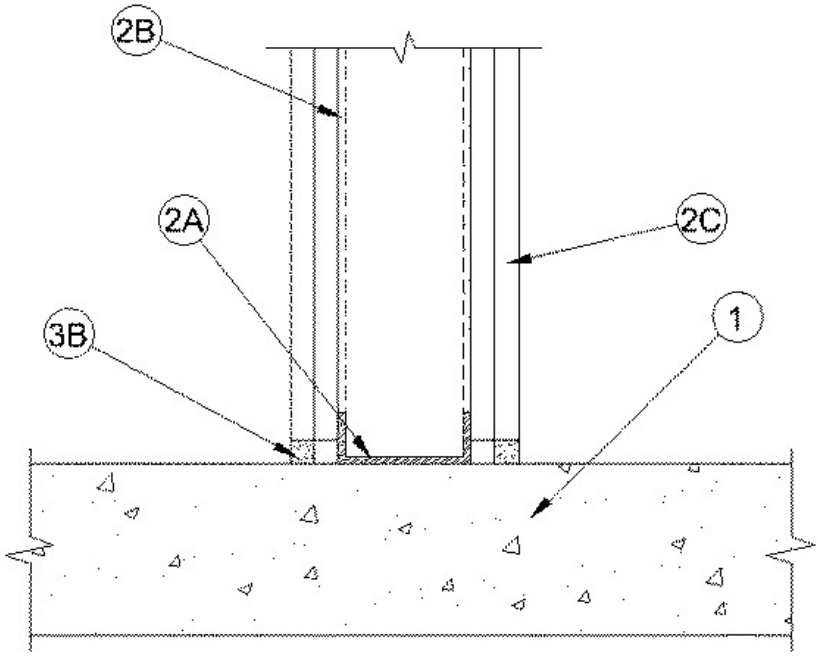
This is to recognize that the above-mentioned company has completed Balco - Rectorseals Installer Program for Firestop and Smoke/Sound products, Photoluminescent Stair Nosing and Markings, and Expansion Joint Covers.

Steven J Cooper

Steve Cooper
VP Sales

Date: August 17, 2022

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 1 and 2 Hr (See Item 2)	F Rating — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1 In.	FT Rating — 1 and 2 Hr (See Item 2)
	FH Rating — 1 and 2 Hr (See Item 2)
	FTH Rating — 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 25 mm



1. **Floor Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 -150 pcf or 1600-2400 kg/m^3) structural concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***.
See **Precast Concrete Units** category in the Fire Resistance Directory for names of manufactures.

2. **Wall Assembly —** The 1 or 2 h fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system constructed as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:

A. **Steel Floor Runner —** Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with min 1-1/4 in. (32 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.

B. **Studs —** Steel studs to be min 3-5/8 in. (92 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in, resting on and fastened to floor runner with sheet metal screws. Stud spacing not to exceed 24 in. (610 mm) OC.

C. **Gypsum Board* —** Gypsum board installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall for a 1 or 2 hr rated wall, respectively. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory except that a max 1 in. (32 mm) gap shall be maintained between the bottom of the gypsum board and the top of the concrete floor.
The hourly ratings of the joint system are equal to the hourly fire rating of the wall.

3. **Joint System —** Max separation between top of floor and bottom of gypsum board is 1 in. (25 mm). The joint system consists of a packing material and a fill material, as follows:

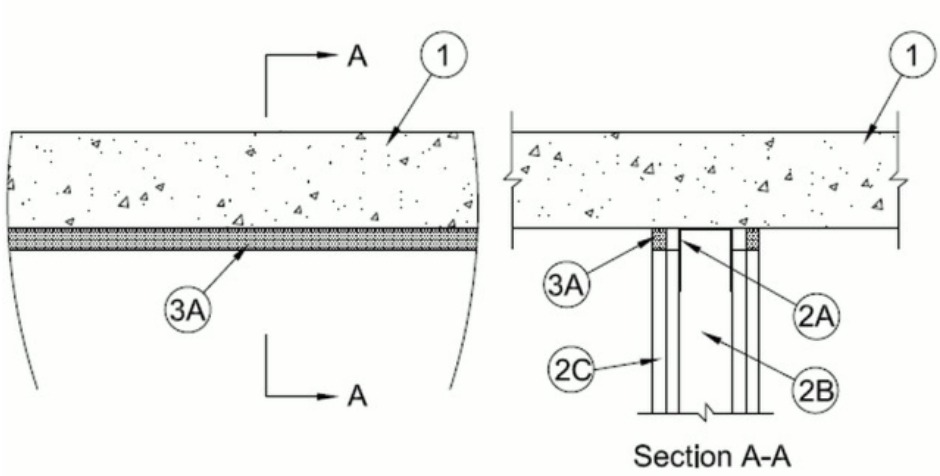
A. **Packing Material —** (Optional, Not Shown) - Foam backer rod firmly packed into the gap between the

bottom of the gypsum board and the top of the concrete floor and recessed from each surface of the wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material*-Sealant —** Min 5/8 in. (16 mm) thickness of fill material installed on each side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with each surface of the wall.
RECTORSEAL — FlameSafe, FS 900+ FlameSafe FS 1900, Metacaulk 1000, Metacaulk MC 150+, Metacaulk 350i, Biostop 350i, Biostop BF 150+ or Biostop 500+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 3/4 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II and III Movement Capabilities — 20% Compression or Extension or 33% Compression Only (See Item 3)	FH Ratings — 1 and 2 Hr (See Item 2)
	FTH Ratings — 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 3/4 In.
	Class II and III Movement Capabilities — 20% Compression or Extension or 33% Compression Only (See Item 3)



Section A-A

1. **Floor Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) structural concrete or any UL Classified **Concrete Blocks***.
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Ceiling Runners —** Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with min 1-1/4 in. (32 mm) flanges. Ceiling runner shall be secured to floor with steel fasteners spaced max 24 in. (610 mm) OC.

B. **Studs —** Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner. Studs secured only to floor runner with sheet metal screw. Stud spacing not to exceed 24 in. (610 mm) OC.

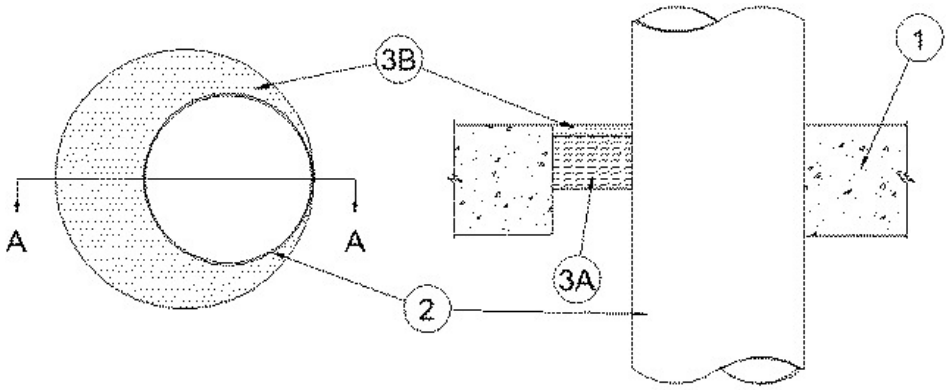
C. **Gypsum Board* —** Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall, for 1 and 2 hr rated wall assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 3/4 in. (19 mm) gap shall be maintained between the top of the gypsum board and the bottom of the floor and the top row of screws shall be installed into the studs 2 in. (51 mm) below the lower surface the floor. **The hourly assembly ratings of the joint system are equal to the fire rating of the wall.**

3. **Joint System — Max separation between bottom of floor and top of wall at time of installation of joint system is 3/4 in. (19 mm). The joint system is designed to accommodate a max 20 percent compression or extension from its installed width or max 33 percent compression only from its installed width.** The joint system consists of a fill material, as follows:

A. **Fill, Void or Cavity Material* - Caulk —** Min 5/8 in. (16 mm) thickness of fill material applied within the joint, flush with both surfaces of wall.
RECTORSEAL — MC 150+, Metacaulk 1200 Caulk

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Ratings — 0, 1/4 and 1/2 Hr (See Item 2)	FT Ratings — 0, 1/4 and 1/2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 2 Hr
L Rating At 400°F — Less Than 1 CFM/ft^2	FTH Ratings — 0, 1/4 and 1/2 Hr (See Item 2)
W Rating — Class 1 (See Item 2B)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204°C — Less Than 5.1 L/s/m^2



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 -150 pcf or 1600-2400 kg/m^3) concrete. Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 11-1/4 in. (286 mm). In hollow-core floors, max diam of opening is 7 in. (178 mm).

See **Concrete Blocks** (CAZT) or Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

1A. **Steel Sleeve —** (Optional, not shown) - Max 11-1/4 in. (286 mm) diam sleeve fabricated from min 0.018 in. (0.46 mm) thick (28 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Sheet steel coiled to a diam less than circular cutouts in floor or wall assembly, inserted opening and allowed to uncoil against the circular cutouts. Sleeve to be installed flush with or extending max 1 in. (25 mm) beyond each surface of the floor or wall assembly.

1B. **Steel Sleeve —** (Optional, not shown) - As an alternate to Item 1A, max 10 in. (254 mm) Schedule 5 (or heavier) steel pipe, rigid steel conduit or max 4 in. (102 mm) EMT cast or grouted into floor or wall assembly, flush with or extending a max 4 in. (102 mm) beyond each surface of the floor or wall assembly.

2. **Through Penetrant —** One metallic pipe, tubing or conduit installed concentrically or eccentrically within the firestop system. An annular space of min 0 in. (point contact) to a max 2-3/4 in. (70 mm) is required between the penetrant and the periphery of the opening or sleeve.When W Rating applies, annular space to be min 1/2 in. (13 mm). Pipe, tubing or conduit to be rigidly supported on each side of the floor or wall assembly. The following types and sizes of metallic pipes, tubing or conduit may be used:

A. **Steel Pipe —** Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Copper Pipe —** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

C. **Copper Tubing —** Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

D. **Conduit —** Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in. diam (or smaller) steel electrical metallic tubing.

T, FT and FTH Ratings are 1/2 hr when annular space is 1-7/8 in. (48 mm) or less and min 1/2 in. (13 mm) thickness of sealant and min 4 in. (102 mm) thickness of mineral wool is used. T, FT and FTH Ratings are 1/4 hr when annular space is 1-7/8 in. (48 mm) or less, and min 1/4 in. (6 mm) thickness of sealant and min 2 in. (51 mm) thickness of mineral wool is used. The T, FT and FTH Ratings are 0 hr for annular spaces greater than 1-7/8 in. (48 mm). When steel sleeve is used, T, FT and FTH Ratings are 0 hr.

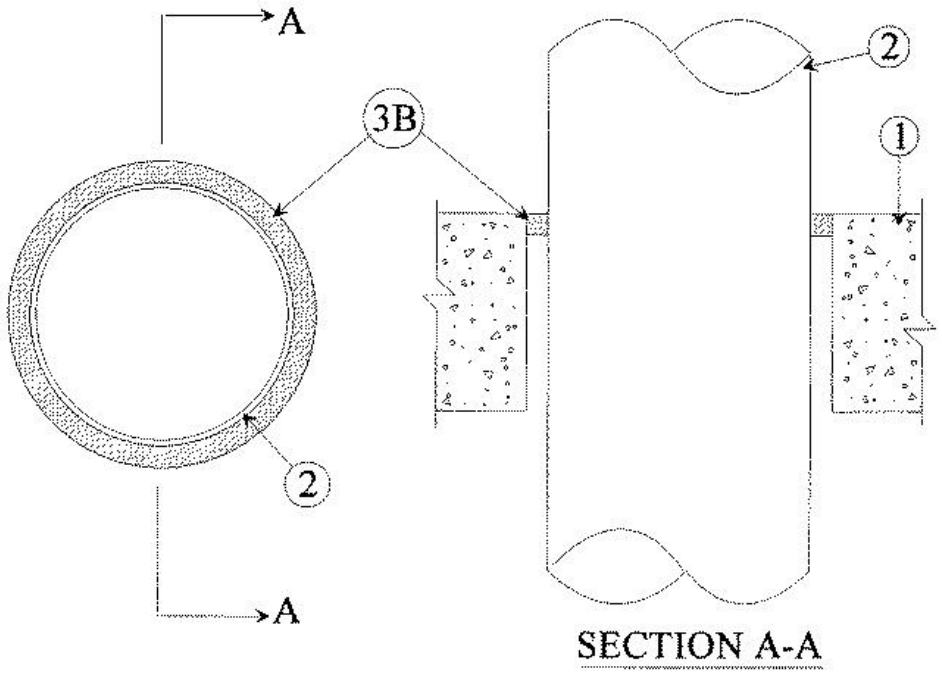
3. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Nom 2 in. (51 mm) or 4 in. (102 mm) thickness of min 4 pcf (64 k/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. (See Item 2 above) Packing material to be recessed from top surface of floor/sleeve or from both surfaces of wall/sleeve or from both surfaces of hollow-core floor to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* - Caulk —** Min 1/4 in. (6 mm) or 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall or with both surfaces of hollow-core floor. (See Item 2 above). When sheet metal sleeve (Item 1A) is used, fill material to be installed flush with top surface of floor or with both surfaces of wall or with both surfaces of hollow-core floor within the sleeve. When rigid steel sleeve (Item 1B) is used, fill material may be installed flush with top end of sleeve in floors or both ends of sleeve in walls.
RECTORSEAL — MC 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight concrete (100-150 pcf or 1600-2400 kg/m^3) floor or wall. Wall may also be constructed of any UL Classified **Concrete Blocks*.** Max diam of opening is 7 in. (178 mm).
See **Concrete Block** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants —** One metallic pipe, conduit or tubing to be centered within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The annular space between pipe or conduits and periphery of opening shall be 3/16 in. (7 mm). The following types and sizes of metallic pipes, conduits or tubing may be used:

A. Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. Nom 6 in. (152 mm) diam (or smaller) rigid galv steel conduit.

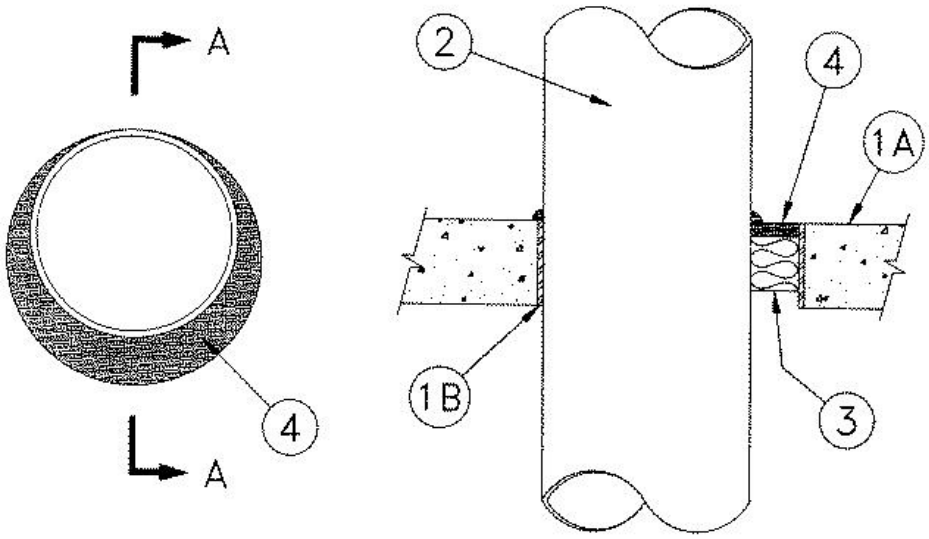
3. **Firestop System —** The firestop system shall consist of the following:

A. **Forming Material* —** (Not Shown, Optional) — Min 1/2 in. (13 mm) thick boards friction-fitted into annular space between through-penetrant and periphery of opening. Forming material to be recessed a min of 1/2 in. (13 mm) from top surface of floor or from both surfaces of wall. Forming material may be removed after fill material cures.

B. **Fill, Void or Cavity Material* — Sealant —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
RECTORSEAL — Types FS900, FS901, FS903, FS903CG, FS905, FS905CG, FS929, FST901, FST903, FST905, Metacaulk 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL2079	CAN/ULC S115
F Rating 3 Hr	F Rating — 3 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 3 Hr
	FTH Rating — 0 Hr



SECTION 'A–A'

1A. **Floor or Wall Assembly —** Min 4-1/2 in. thick reinforced normal weight (150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 26-1/2 in.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Rating Directory for names of manufacturers.

1B. **Metallic Sleeve (optional) —** Nom 16 in. (or smaller), Schedule 10 (or heavier) steel pipe sleeve, cast or grouted into floor or wall assembly. Sleeve is not permitted when nominal diameter of penetrating pipe (Item 2) is above 12 in.

2. **Through Penetrants —** One metallic pipe or tubing to be installed concentrically or eccentrically into opening such that the annular space between the pipe and the periphery of the opening is min 0 in. (point of contact) to max 2-1/2 in. Pipe to be firmly supported on both sides of opening. The following types and sizes of pipes may be used:

(a) Nom 24 in. diam (or smaller) Schedule 30 (or heavier) steel or iron pipe.

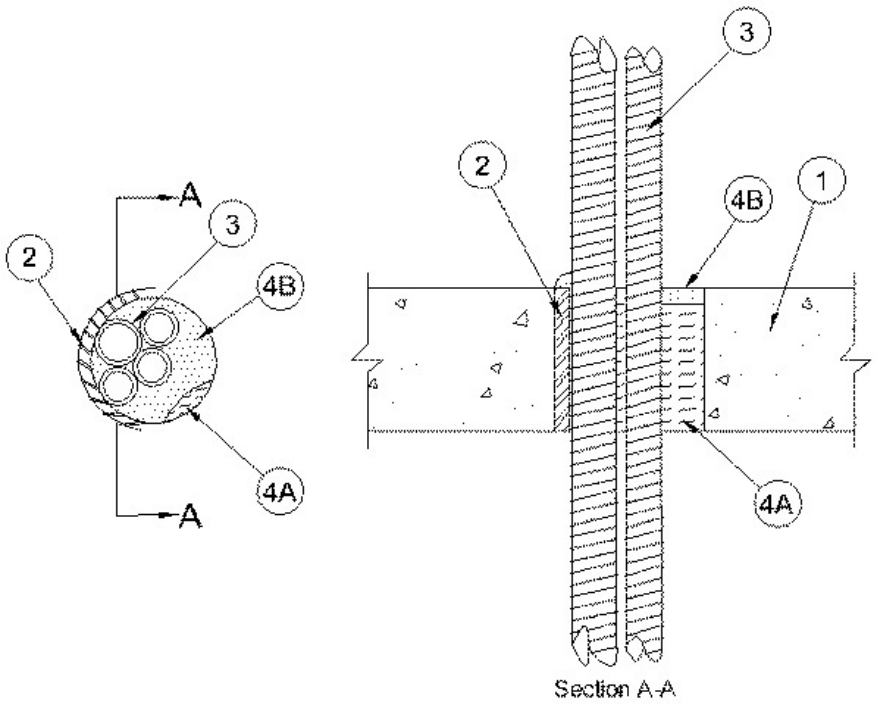
(b) Nom 4 in. diam (or smaller) electrical metallic tubing.

3. **Packing Metallic —** Mineral wool insulation of min 4 pcf firmly pressed into opening as a permanent form. Insulation material to be recessed by min depth of 1/2 in. from top surface of floor or both surfaces of wall.

4. **Fill, Void or Cavity Materials* — Caulk —** Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall. A min 1/4 in. crown of the caulking material shall be applied around the entire circumference of the pipe at the level of the floor surface or both wall surfaces.
RECTORSEAL — FlameSafe® FS900+, Metacaulk MC 150+ and Biostop BF 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 and 3 Hr (See Item 3)	F Rating — 2 and 3 Hr (See Item 3)
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Rating — 2 and 3 Hr (See Item 3)
	FTH Rating — 0 Hr
L Rating at Ambient - Less than 1 CFM/sq ft	L Rating at Ambient - Less than 1 CFM/sq ft
L Rating at 400° F - Less than 1 CFM/sq ft	L Rating at 400° F - Less than 1 CFM/sq ft



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight wall. Wall may also be constructed of any UL Classified **Concrete Blocks***. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***. The max diam of the opening is dependent upon the type of through penetrant (Item 3) used. If flexible steel conduit is installed within the opening, the max diam of the opening is 6 in. (152 mm) If flexible aluminum conduit is installed within the opening, the max diam of the opening is 4 in. (102 mm).

See **Concrete Block** (CAZT) and Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve —** (Optional) Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces. The max diam of the steel sleeve is dependent upon the type of through penetrant used. If flexible steel conduit is used, the max diam of the steel sleeve is 6 in. (152 mm). If flexible aluminum conduit is used, the max diam of the steel sleeve is 4 in. (102 mm).

3. **Through Penetrants —** One or more nom 1-1/2 in. (38 mm) diam (or smaller) flexible steel conduit or one or more nom 1 in. (25 mm) diameter (or smaller) flexible aluminum conduit bundled together and installed within the opening. Max diam of through penetrant bundle shall not exceed 4 in. (102 mm) and 2-1/2 in. (64 mm) for flexible steel conduit and flexible aluminum conduit, respectively. The space between the through penetrants shall be a min 0 in. (0 mm, point contact) to a max 1/4 in. (6 mm). The annular space between the through penetrants and periphery of opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm) for flexible steel conduit. The annular space between the through penetrants and periphery of opening shall be min 0 in. (0 mm, point contact) to max 1-1/2 in. (38 mm) for flexible aluminum conduit. Through penetrants to be rigidly supported on both sides of floor or wall assembly.

See **Flexible Metal Conduit** (DXUZ) category in the Electrical Construction Materials Directory for names of manufacturers.

The F Rating of the firestop system is dependent upon the type of through penetrant used. If flexible aluminum conduit is used, the F Rating of the firestop system is 2 hr. If flexible steel conduit is used, the F Rating of the firestop system is 3 hr.

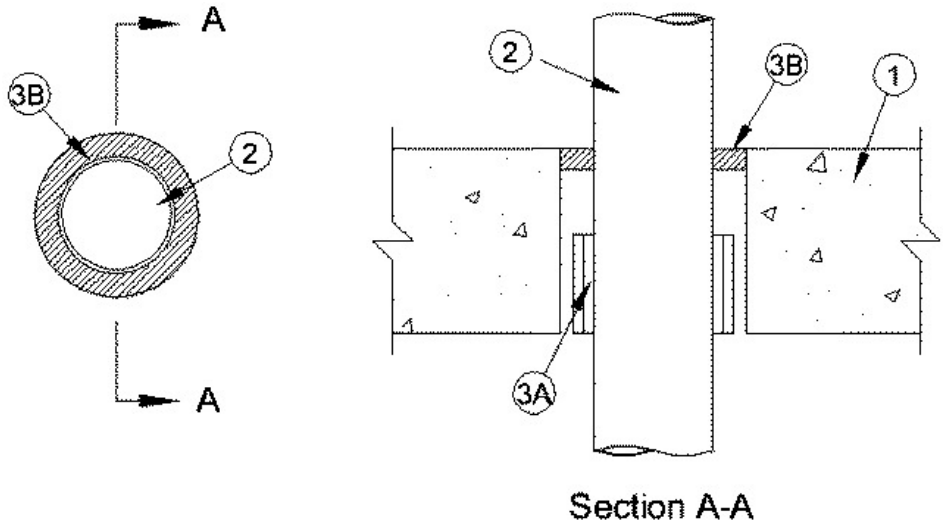
4. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Additional packing material shall be forced into interstices of flexible aluminum conduit to max extent possible. Packing material to be recessed from top surface of floor or from both surfaces of wall and hollow-core precast concrete units as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. At the point contact location between penetrating items and concrete, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the concrete/penetrating item interface on the top surface of floor and on both surfaces of wall or hollow-core precast concrete units. Additional sealant shall be forced into interstices of through penetrants to max extent possible.
RECTORSEAL — FS900+ Sealant, FS 1900 Sealant, Metacaulk MC 150+ or Biostop BF 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1/4 and 1-1/4 Hr (See Item 2)	FT Rating — 1/4 and 1-1/4 Hr (See Item 2)
	FH Rating — 2 Hr
	FTH Rating — 1/4 and 1-1/4 Hr (See Item 2)



Section A-A

System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. **Floor or Wall Assembly —** Min 4-1/2 in (114 mm). thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg) concrete. Max diam of opening is 6 in. (152 mm).

1A. **Steel Deck/Floor Assembly —** (Not Shown) — As an alternate to Item 1, the floor assembly may consist of a fluted steel deck/concrete floor assembly. The floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Form Units* —** Min 2-1/2 in. (64 mm) deep galv fluted units.

B. **Concrete —** Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

2. **Through Penetrants —** One nonmetallic pipe or conduit centered within opening with a nom 3/4 in. (19 mm) annular space between penetrant and periphery of opening. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of penetrants may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. **FT and FTH Ratings are 1-1/4 Hr.**

B. **Fire Retardant Polypropylene (FRPP) Pipe —** Nom 4 in. (102 mm) in. diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. **FT and FTH Ratings are 1/4 Hr.**

4. **Firestop System —** The firestop system shall consist of the following:

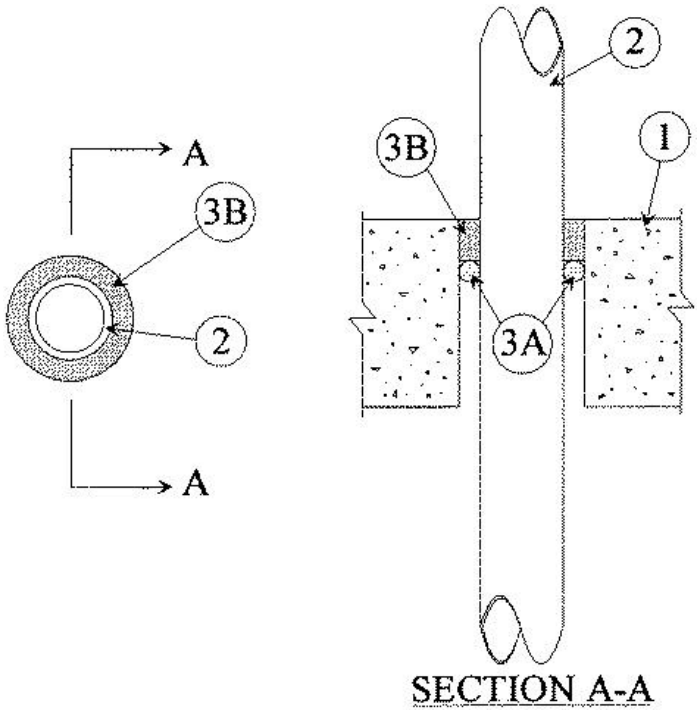
A. **Fill, Void or Cavity Materials* - Wrap Strip —** Nom 1/4 in. (6.4 mm) thick intumescent material supplied in 2 in. (51 mm) wide strips. Min two layers of wrap strip individually wrapped tightly around the nonmetallic penetrant with ends butted and held in place with masking tape. Butted ends in successive layers shall be offset. Bottom edge of wrap strip to be flush with the bottom surface of floor or with both surfaces of wall assembly. When used with the steel deck floor assembly, bottom edge of wrap strip shall be flush with the crest of the steel form units.

RECTORSEAL — Metacaulk Wrap Strip

B. **Fill, Void or Cavity Material* — Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall assembly.
RECTORSEAL — Metacaulk 1000 or Metacaulk 350i

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Rating — 3 Hr
T Ratings — 1 and 1-1/2 Hr (See Item 2)
L Rating At Ambient — 2.8 CFM/sq ft
L Rating At 400 F — Less Than 1 CFM/sq ft



1. **Floor or Wall Assembly —** Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks*.** Max diam of opening is 4 in.
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants —** One nonmetallic pipe to be centered within the firestop system. Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 2 in. diam (or smaller) Schedule 40 solid-core PVC pipe for use in closed (process or supply) piping system. A nom annular space of 7/8 in. is required within the firestop system. When PVC pipe is used, the T Rating is 1-1/2 h.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 2 in. diam (or smaller) SDR 17 CPVC pipe for use in closed (process or supply) piping systems. A nom annular space of 7/8 in. is required within the firestop system. When CPVC pipe is used, the T Rating is 1-1/2 h.

C. **Polybutylene (PB) Pipe —** Nom 2 in. diam (or smaller) SDR11 PB pipe for use in closed (process or supply) piping systems. A nom annular space of 1 in. is required within the firestop system. When PB pipe is used, the T Rating is 1 h.

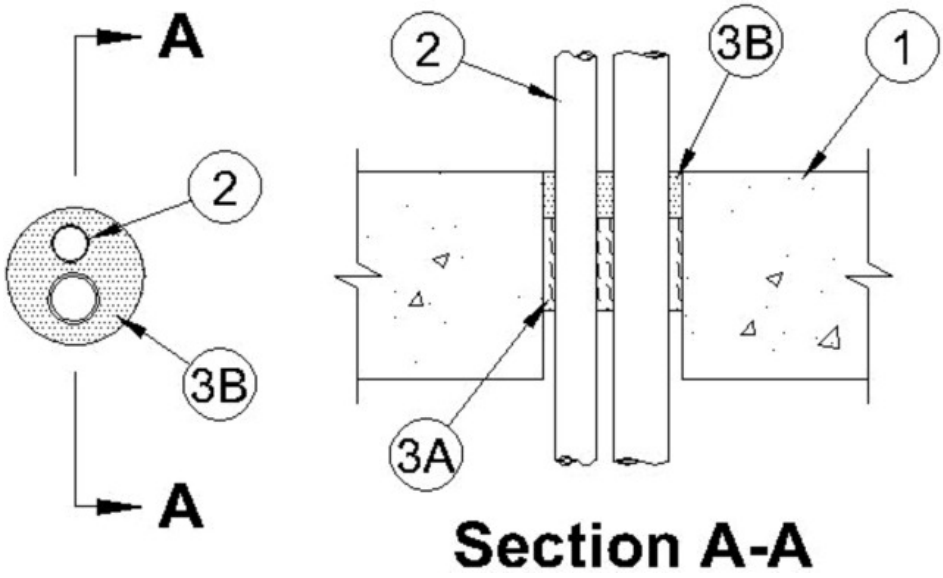
3. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** (Optional) — Foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* —** Sealant — Min 1 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
RECTORSEAL — Metacaulk 1000

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)
F Ratings - 3 Hr
T Rating - 0 Hr



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Floor may also be constructed of any min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 3 in. (76 mm).
See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants —** Nom 1 in. diam (or smaller) SDR 9 cross linked polyethylene (PEX) tubing for use in closed (process or supply) piping systems. A max of two through penetrants may be included in the opening. Of the two through penetrants, only one through penetrant shall have a nom diam greater than 3/4 in. (19 mm). The space between the through penetrants shall be nom 3/8 in. (10 mm). The annular space between the through penetrants and periphery of opening shall be min 1/2 in. (13 mm) to max 3/4 in. (19 mm). Through penetrants to be rigidly supported on both sides of floor or wall assembly.

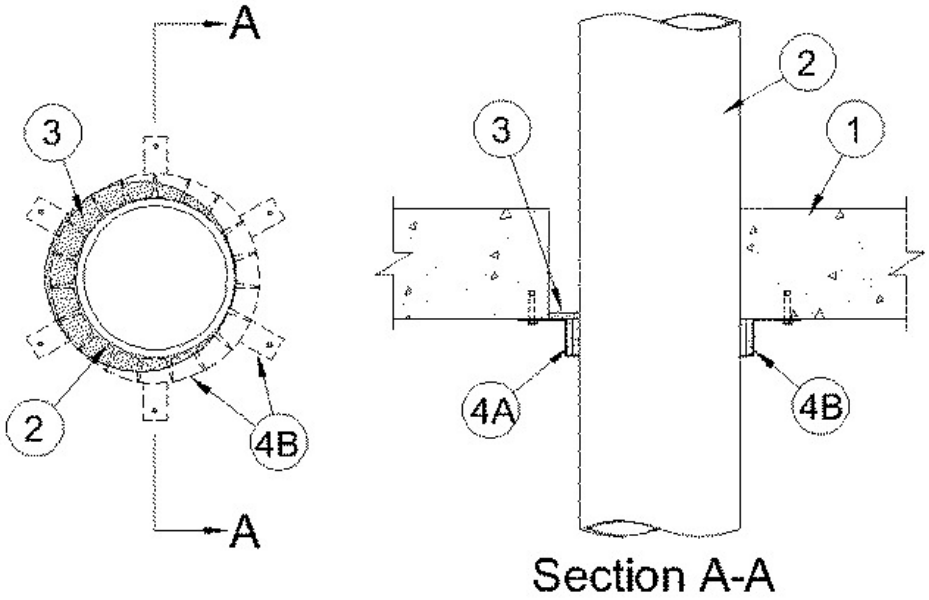
3. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Min 2 in. (51 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall or precast concrete unit floors as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with top surface of floor or flush with both surfaces of wall or precast concrete unit floor. Additional fill material to be installed such that a min 1/4 in. (6 mm) crown is formed around the through penetrants.
RECTORSEAL — FlameSafe FS 900+, FlameSafe FS1900, FlameSafe FS1901, FlameSafe FS1905, FlameSafe FS1929 Sealant, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Rating — 2 Hr
T Rating — 2 Hr
W Rating - Class 1 (See Item 3)



Section A-A

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 5 in. (127 mm).

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants —** One nonmetallic pipe to be installed either eccentrically or concentrically within the firestop system. The annular space shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) SDR 13.5 or Schedule 40 CPVC pipe for use in closed (process or supply) piping systems. Schedule 40 CPVC pipe for use in vented (drain, waste or vent) piping systems.

C. **Acrylonitrile Butadiene Styrene (ABS) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Fill, Void or Cavity Materials* - Caulk —** Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with the bottom surface of floor or with both surfaces of wall.
RECTORSEAL — Metacaulk 1000 or Metacualk 1200

W-Rating only applies when Metacaulk 1200 is used.

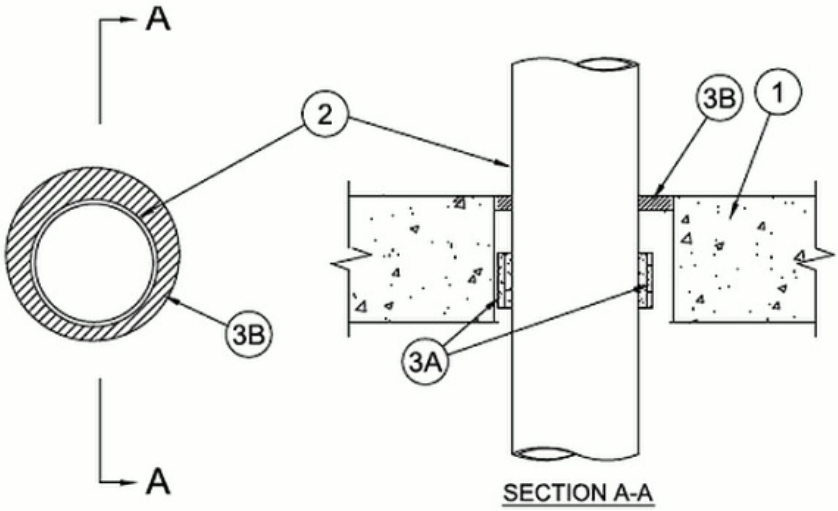
4. **Firestop System —** The firestop system shall consist of the following:

A. **Fill, Void or Cavity Materials* - Wrap Strip —** Nom 1/4 in. (6 mm) thick by 1 in. (25 mm) wide intumescent wrap strip. Two layers of wrap strip are individually wrapped around the through-penetrant with ends butted and held in place with masking tape. Butted ends in successive layer shall be offset. When diameter of penetrant is equal to or less than 3 in.(76 mm), one layer of wrap strip is wrapped around the through-penetrant with ends butted and held in place with masking tape. Wrap strips butted tightly against both surface of wall.
RECTORSEAL — Metacaulk Wrap Strip

B. **Steel Collar —** Collar fabricated from coils of precut 0.016 in. thick (No. 30 MSG) galv sheet steel available from wrap strip manufacturer. Collar shall be nom 1 in. (25 mm) deep with min 1 in. (25 mm) wide by 1-1/4 in. (32 mm) long anchor tabs on 4 in. (102 mm) centers for securement to underside of concrete floor and both sides of concrete wall. In addition, collar contains retainer tabs, 1/4 in. (6 mm) wide by 3/8 in. (10 mm) long located opposite the anchor tabs. Collar shall be wrapped over the wrap strip, with ends overlapping min 1 in. (25 mm) The retainer tabs are folded 90 deg towards the pipe to maintain the annular space around the pipe and to retain the wrap strip. Collar secured to bottom surface of the floor or both surfaces of wall at each anchor tab by means of min 1/4 in. (6 mm) diam by 1-1/4 in. (32 mm) long steel expansion bolts or steel Tapcon® concrete anchors in conjunction with 1/4 in. (6 mm) by 5/8 in.(16 mm) diam fender washers.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 2 Hr
L Rating At 400°F — Less Than 1 CFM/ft^2	FTH Rating — 0 Hr
W Rating - Class 1 (See Item 3B and 3C)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204°C— Less Than 5.1 L/s/m^2



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow core Precast Concrete Units*. Max diam of opening is 6 in. (152 mm).

See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrant —** One nonmetallic pipe to be installed concentrically or eccentrically within the firestop system. Annular space between penetrant and opening shall be min 3/8 in. (9.5 mm) to max 3/4 in. (19 mm). When W Rating applies, annular space shall be a min 1/2 in. (13 mm). Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) SDR 17 CPVC pipe for use in closed (process or supply) piping systems.

C. **Acrylonitrile Butadiene Styrene (ABS) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

D. **Rigid Nonmetallic Conduit+ —** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

E. **Crosslinked Polyethylene (PEX) Tubing —** Nom 1 in. (25 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.

F. **Flame Retardant Polypropylene (FRPP) Pipe —** Nom 2 in. (51 mm) diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Firestop System —** The firestop system shall consist of the following:

A. **Fill, Void or Cavity Materials* —** Nom 2 mm thick by 3 in. (76 mm) wide intumescent joint strip tightly wrapped around the outer circumference of the pipe with ends butted and held in place with tape. Joint strip slid into the annular space with the bottom edge of the joint strip recessed 1/2 in. (13 mm) from bottom surface of floor or both surfaces of wall. Four layers are to be used for nom 4 in. (102 mm) diam pipe, three layers for nom 3 in. (76 mm) diam pipe, and two layers for nom 2 in. (51 mm) diam pipe.
RECTORSEAL — Metacaulk, Flame Safe Joint Strip, Biostop Joint Strip

B. **Fill, Void or Cavity Material* — Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall assembly. When FRPP penetrant (Item 2E) and/or hollow core floor is used, sealant to be applied flush with top and bottom of floor.
RECTORSEAL — Metacaulk 1000, Metacaulk 350i, Biostop 500+, Biostop 350i.

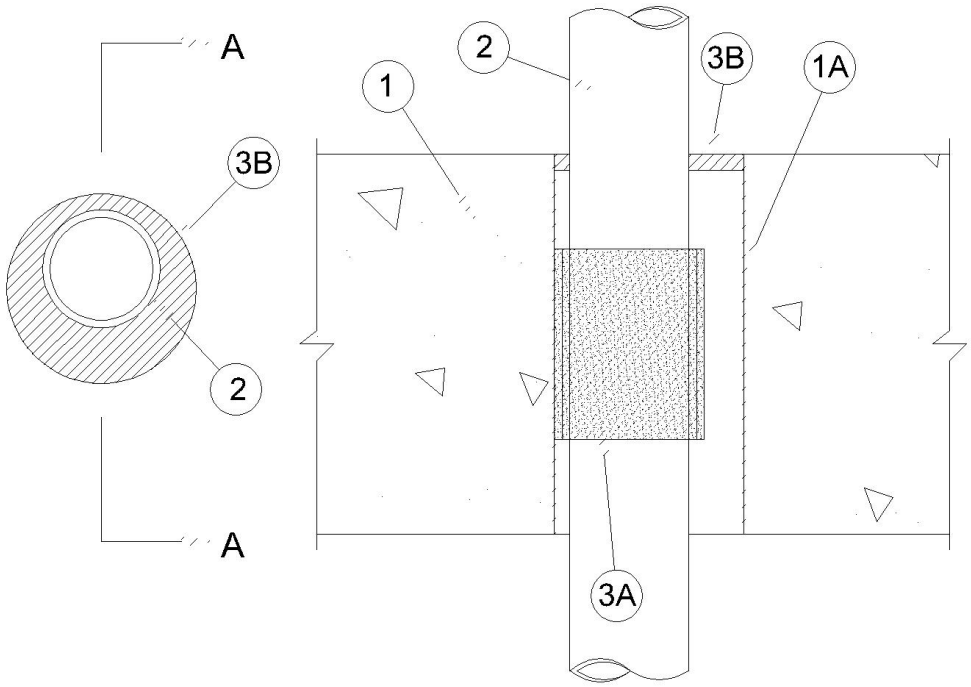
W Rating applies only when Metacaulk 1000 or Biostop 500+ is used.

C. **Packing Material —** (Optional, not shown) — When W Rating applies, packing material is required. Min 4 pcf (64 m^3) mineral wool batt insulation firmly packed into opening or min 1 in. (25 mm) diam backer rod friction fitted into the opening as a form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

December 22, 2023

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 2 Hr
L Rating At 400°F — Less Than 1 CFM/ft^2	FTH Rating — 0 Hr
W Rating - Class 1 (See Item 3B and 3C)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204°C— Less Than 5.1 L/s/m^2



System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. (See Item 2)

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 -150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Floor may also be constructed of any 6 in. (152 mm)

thick UL Classified hollow core Precast Concrete Units*. When hollow core Precast concrete is used the max diam of opening is 6 in. (152 mm).

See **Concrete Blocks** (CAZT) and **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

1A. **Metallic Sleeve —** Required for use with Concrete Blocks or hollow core Precast Concrete Units, optional for solid block or solid wall construction. Nom 7 in. (178 mm) Diam (or smaller) cylindrical sleeve fabricated from min 0.018 in. (0.46 mm) thick (28 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along longitudinal seam. Length of sleeve to be installed flush with wall surfaces.

2. **Through Penetrant —** One nonmetallic pipe to be installed concentrically or eccentrically within the firestop system. Annular space within the firestop system is dependent upon the max diam and type of penetrant as shown in Table 1. When W Rating applies, annular space shall be a min 1/2 in. (13 mm). Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polypropylene (PP-R) Pipe** — Nom 8 in. (203 mm) diam SDR 11 or Nom 6 in. (152 mm) (or smaller) Aquatherm or Niron with an SDR of 7.4, 9, 11, 17 or 17.6 pipe for use in closed (process or supply) or vented (drain, waste, or vent) piping systems. Pipes larger than 6 in. (152 mm) diam are restricted to SDR 11 only.

B **Polypropylene (PP-RCT) Pipe** — As an alternate to Item A, nom 8 in. (203 mm) diam SDR 11 or nom 6 in. (152 mm) (or smaller) Aquatherm or Niron with an SDR of 7.4, 9, 11, 17 or 17.6 pipe for use in closed (process or supply) or vented (drain, waste, or vent) piping systems. Pipes larger than 6 in. (152 mm) diam are restricted to SDR 11 only.

Penetrants A, B larger than nom 6 in. (152 mm) diam are limited to 2.5 Pa only for CAN/ULC - S115.

3. **Firestop System —** The firestop system shall consist of the following:

A. **Fill, Void or Cavity Materials* —** Nom 2 mm thick by 3 in. (76 mm) wide intumescent joint strip (See Table 1). Strips tightly wrapped around the outer circumference of the pipe with ends butted and held in place with tape. Joint strip slid into the annular space with the bottom edge of the joint strip recessed 3/4 in. (18 mm) from bottom surface of floor or 1-1/2 in. (38 mm) from both surfaces of wall.

RECTORSEAL — Metacaulk Joint Strip, Flame Safe Joint Strip, Biostop Joint Strip

Table 1:

Penetrant Item	Nom Diam of Pipe In. (mm)	No. of layers	Min Annular Space in. (mm)	Max Annular Space in. (mm)	Max Opening Diam In. (mm)	Sealant Thickness In. (mm)
A, B	8(203)	6	1/2 (12.7)	1-5/8 (41.2)	++10 (254)	1/4 (6)
A, B	6(152)	4	3/8 (9.5)	1-3/8 (35)	++8 (203)	1/4 (6)
A, B	4(102)	2	3/16 (4.8)	1-1/4 (31.8)	6 (152)	1/4 (6)
A, B	3(76)	1	1/16 (3.2)	1-1/4 (31.8)	4 (102)	1/4 (6)

++ opening diameters larger than 6 in. (152 mm) are not eligible for use in UL Classified hollow core Precast Concrete Units.

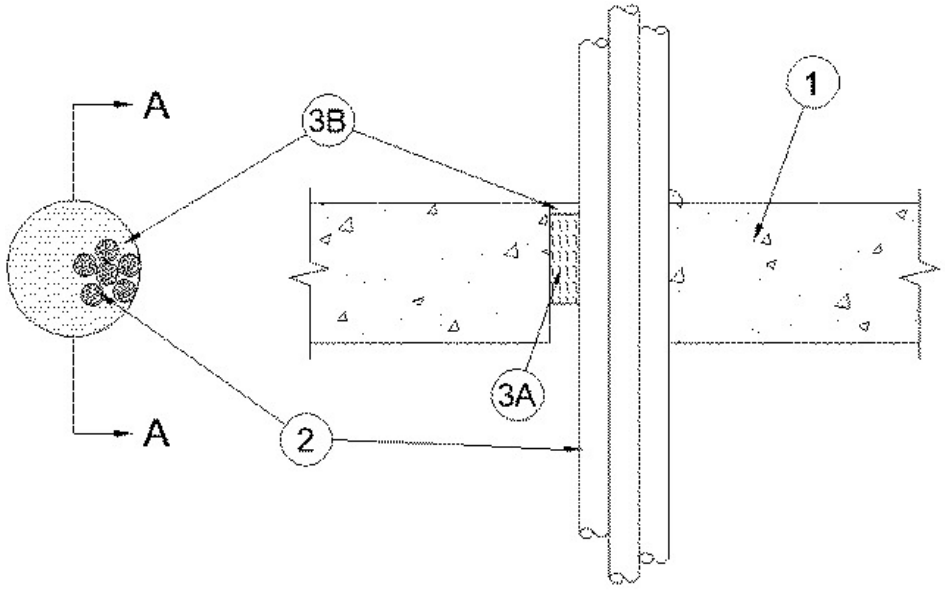
B. **Fill, Void or Cavity Material* — Caulk —** Min 1/4 in. (6 mm) thickness (see Table 1) of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall assembly. When penetrant is nom. 6 in. (152 mm) diameter, Metacaulk 1000 is required. W Rating applies only when Metacaulk 1000 or Biostop 500+ is used.

RECTORSEAL — Metacaulk 1000, Metacaulk 150+, Metacaulk 350i, Biostop 500+, Biostop 350i.

C. **Packing Material —** (Optional, not shown) — When W Rating applies, packing material is required. Min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening or min 1 in. (25 mm) diam backer rod friction fitted into the opening as a form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Ratings — 1/4 and 1/2 Hr (See Item 2)r	FT Ratings — 1/4 and 1/2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/ft^2 (Item 2)	FH Rating — 2 Hr
L Rating At 400 F — 1.4 CFM/ft^2 (See Item 2)	FTH Ratings — 1/4 and 1/2 Hr (See Item 2)
W Rating - Class1 (See Item 2)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204 C —7.1 L/s/m^2



SECTION A-A

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 4 in. (102 mm). See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Cables —** Aggregate cross-sectional area of cables in opening to be min 10 percent to max 66 percent of the aggregate cross-sectional area of the opening. Cables to be tightly bundled and rigidly supported on both sides of floor or wall assembly. The annular space between the cable bundle and the periphery of the opening shall be a min 0 in. (point contact) to a max 2-3/4 in. (70 mm). **When L and W Ratings apply, the min separation between the individual cables is equal to or greater than 1/8 in. (3 mm).** Any combination of the following types and sizes of cables may be used:

A. Max 2/C No. 12 AWG MC (BX) cable with copper conductors and polyvinyl chloride (PVC) insulation.

B. Max 3/C No. 8 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.

C. Max 3/C with ground, No. 10 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.

D. Max 25 pair No. 20 AWG (or smaller) copper conductor cable with XLPE/PVC insulation, with or without PVC jacket.

E. Max RG59/U (or smaller) coaxial cable with aluminum or copper conductors and fluorinated ethylene insulation and jacketing.

F. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with Hylar insulation and jacketing.

G. Max 2/C No. 22 AWG (or smaller) copper conductor alarm cable with PVC insulation.

H. Max 1/C No. 14 AWG (or smaller) copper conductor Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

I. Max 1/C No. 10 AWG (or smaller) copper conductor Type THHN or THWN gasoline & oil resistant II 600V VW-1 E116364

(UL) power cable.

J. Max 4/C No. 18 AWG bimetal conductors Type CL-2 Barostat II Sun res (UL) Listed thermostat cable.

K. Max 3/C No. 4 AWG aluminum Triple E Alloy AA8176 Type SE cable Style U Type XHH-W-2 CDRS E32071 (UL) service entrance cable.

L. Max 1/C 300 MCM type MTW or THHN or THWN for CT use gas & oil res. II sun res. 600V (UL) or AWM, 300 kcmil, copper conductor power cable.

M. Max 6/C Commscope Optical Reach 2001 006 fiber optic cable.

N. Max 3/C No. 18 AWG copper Manhattan / CDT-F P/N M244826 E-120910 18 AWG Shielded CMP (UL) c(UL), Foil Shield, 300V power cable.

O. Max 4 pr No. 24 AWG copper Belden-M DataTwist (R) Five 1583A CM 4PR24, computer network cable.

When annular space is greater than 3/4 in. (19 mm), the T Rating is 1/4 hr. When annular space is 3/4 in. (19 mm) or less, T Rating is 1/2 hr.

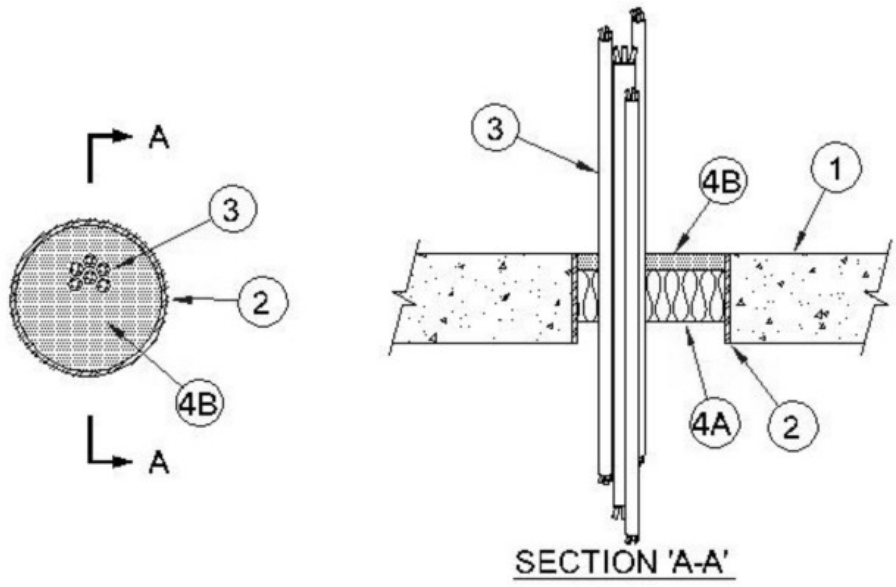
3. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* - Caulk —** Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall. At point contact location between concrete floor or wall and cables, a min 1/2 in. (13 mm) diam bead of fill material shall be applied to the concrete/cable interface on top surface of floor or both surfaces of wall.
RECTORSEAL — MC 150+.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1/2 Hr	FT Rating —1/2 Hr
L Rating At Ambient — Less Than 1 CFM/ft^2 (Item 2)	FH Rating — 3 Hr
L Rating At 400 F — 1.4 CFM/ft^2 (See Item 3)	FTH Rating — 1/2 Hr
W Rating - Class 1 (See Items 3 and 4B)	L Rating At Ambient — Less Than 5.1 L/s/m^2 (See Item 3)
	L Rating At 204 C —7.1 L/s/m^2 (See Item 3)



1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 6 in. (152 mm).
See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Nonmetallic Sleeve (Optional) —** Nom 6 in. (12 mm) diam (or smaller) Schedule 40 polyvinyl chloride (PVC) pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

3. **Cables —** Aggregate cross-sectional area of cable bundle in opening to be max 45 percent of the cross-sectional area of the opening. Min separation between cable bundle and between cables and periphery of opening is 1/4 in. (6 mm). Max annular space between cable bundle and periphery of opening is 2 in. (51 mm). **L and W Ratings apply only when the min separation between the individual cables is equal to or greater than 1/8 in. (3 mm).** Cables to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of copper or aluminum conductor cables may be used:

A. Max 1/C 350 kcmil cable with crosslinked polyethylene (XLPE) jacket.

B. Max 400 pair No. 24 AWG cable with PVC insulation and jacket.

C. Max. 3/C No. 2/0 AWG aluminum conductor SER cable with PVC insulation and jacketing.

D. Max. 3/C No. 12 AWG copper conductor cable with PVC insulation and jacket (Romex).

E. Max. RG59/U copper conductor coaxial cable with fluorinated ethylene insulation and jacket.

F. Max. 62.5/125 fiber optic cable with PVC insulation and jacket.

G. Max. RG/6 No. 18 AWG copper conductor CATV coaxial cable with PVC insulation and jacket.

H. Max. 4/C No. 2/0 AWG copper conductor, steel or aluminum armored or metal clad cable (MC cable).

4. **Firestop System —** The firestop system shall consist of the following:

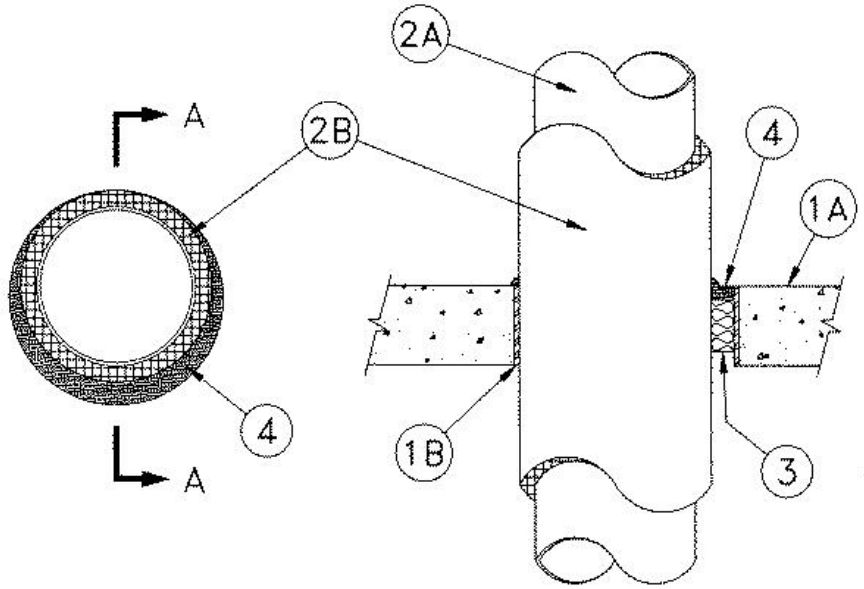
A. **Packing Material —** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall or hollow-core concrete floor as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* - Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed symmetrically on both sides of floor, flush with both floor surfaces.
RECTORSEAL — FlameSafe® FS900+, FlameSafe FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

W Rating applies only when Metacaulk MC 150+, Metacaulk 1000, Biostop BF 150+, FlameSafe FS900+ or FlameSafe FS1900 is used.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 3/4 Hr	FT Rating — 3/4 Hr
	FH Rating — 3 Hr
	FTH Rating — 3/4 Hr



SECTION 'A–A'

1A. **Floor or Wall Assembly —** Min 4-1/2 in. thick reinforced normal weight (150 pcf) concrete. Wall may also be constructed of any UL classified **Concrete Blocks***. Max diam of opening is 18 in.

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

1B. **Metallic Sleeve (Optional) —** Nom 18 in. (or smaller) Schedule 10 (or heavier) steel pipe sleeve, cast or grouted into floor or wall assembly.

2A. **Through Penetrants —** One nom 10 in. (or smaller) Schedule 40 (or heavier) steel or iron pipe. Pipe to be firmly supported on both sides of opening. Pipe installed concentrically or eccentrically such that the annular space between the insulated pipe and the periphery of the opening is min 0 in. (point of contact) to max 4-1/4 in.

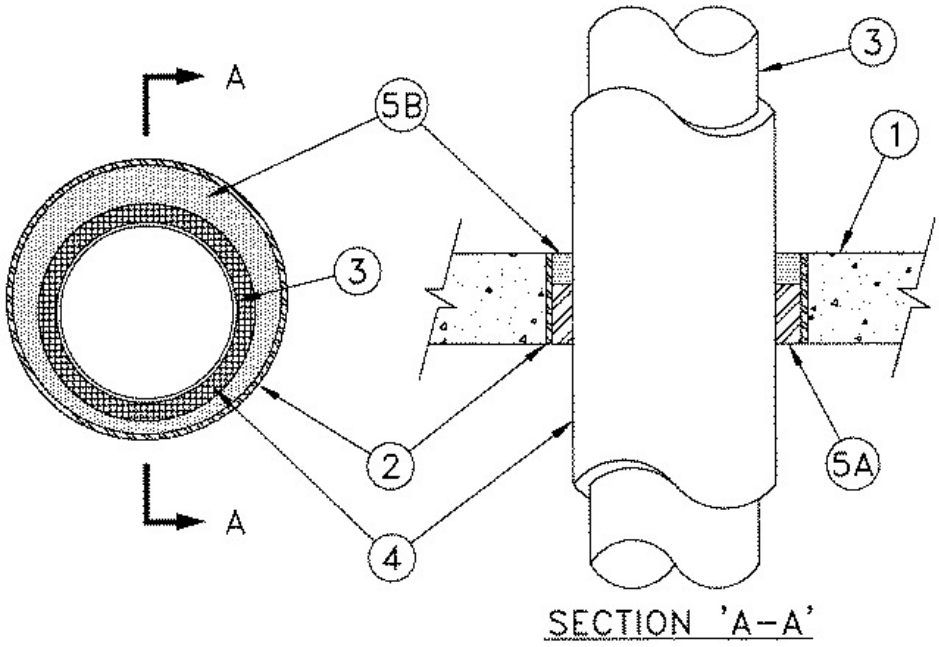
2B. **Pipe Covering Material* —** Cellular Glass Insulation — Nom 1 in. thick cellular glass units sized to the outside diam of the metallic pipe and supplied in 18 or 24 in. long, half sections. Pipe insulation installed on pipe in accordance with manufacturer's instructions. The insulation material may be jacketed with 0.010 in. thick aluminum sheet wrapped tightly around with a min 2 in. overlap. Jacket to be installed with edge abutting surface of caulk fill material (Item 4) on top surface of floor or both surfaces of wall. Jacket to be well secured with metallic bands.

3. **Packing Material —** Mineral wool insulation of min 4 pcf density and min 2 in. thickness, compressed 33%, and installed into the opening as a permanent form. Insulation to be recessed by a min depth of 1 in. from top surface of floor or both surfaces of wall.

4. **Fill, Void, or Cavity Materials* —** Caulk. Installed to fill annular space to a min depth of 1 in. over mineral wool insulation and made flush with top surface of floor or both surfaces of wall. Additional material to be installed to form a 1/4 in. crown around the circumference of the insulated pipe at the point of contact with the periphery of opening.
RECTORSEAL — FlameSafe® FS900+, Metacaulk MC 150+ and Biostop BF 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 1/2 Hr	FT Rating — 1/2 Hr
L Rating At Ambient — Less Than 1 CFM/sq ft	FH Rating — 2 Hr
L Rating At 400 F — Less Than 1 CFM/sq ft	FTH Rating —1/2 Hr



1. **Floor or Wall Assembly —** Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete floor or min 3-1/2 in. (89 mm) thick reinforced lightweight or normal weight concrete wall. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 8-1/4 in. (210 mm).

See **Concrete Blocks** (CAZT) in Volume 1 of the Fire Resistance Directory for names of manufacturers.

2. **Metallic Sleeve (Optional) —** Nom 8 in. (203 mm) diam (or smaller) Schedule 10 steel pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

3. **Through Penetrants —** One metallic pipe or tubing to be installed concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may by used:

A. **Steel Pipe —** Steel Pipe - Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing..

D. **Copper Pipe —** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

4. **Pipe Insulation —** Plastics+ Nom 1 in. thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space shall be min 1/2 in. to max 1-3/8 in. Plastics+ Nom 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space shall be min 1/2 in. (13 mm) to max 1-3/8 in. (35 mm).

See **Plastics+** (QMFZ2) category in the Plastic Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification 0f 94-5VA may be used.

5. **Firestop System —** The firestop system shall consist of the following:

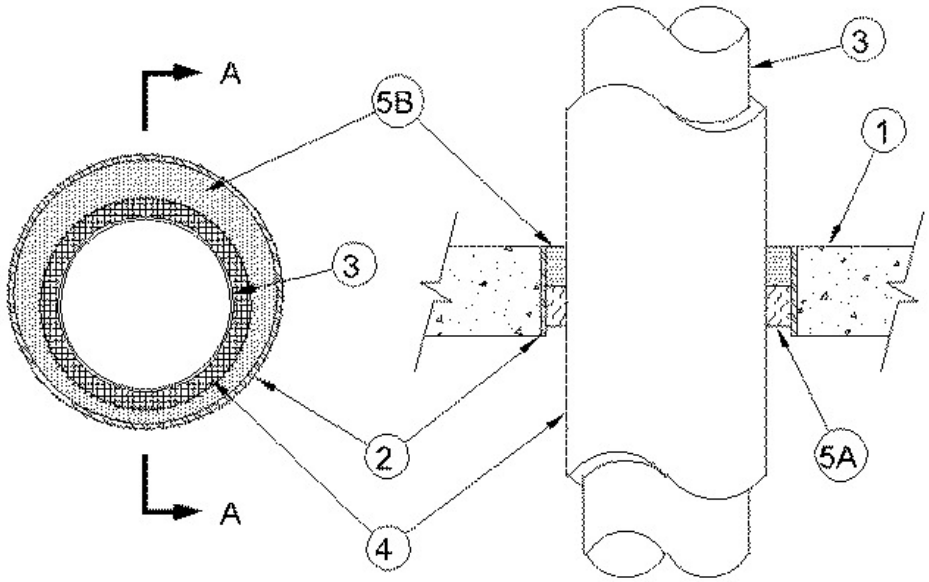
A. **Packing Material —** Min 1-1/2 in. (38 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* —** Sealant Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
RECTORSEAL — FlameSafe® FS1900, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+

+Bearing the UL Recognized Component Marking

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 3 Hr	F Rating — 3 Hr
T Rating — 1 Hr	FT Rating — 1 Hr (see Item 5)
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 3 Hr
L Rating At 400°F — Less Than 1 CFM/ft^2	FTH Rating — 1 Hre
W Rating - Class 1 (Sees Item 4A and 5B)	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 204°C — Less Than 5.1 L/s/m^2



SECTION 'A-A'

1. **Floor or Wall Assembly —** Min 4-1/2 in. (114 mm) thick reinforced light weight or normal weight (100150 pcf or 1600-2400 kg/m^3) concrete floor or min 5 in. (127 mm) thick reinforced light weight or normal weight concrete wall. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow core **Precast Concrete Units*.** When precast concrete units are used, the max diam of opening is 7 in. (178 mm). Wall may also be constructed of any UL Classified **Concrete Units*.** Max diam of opening is 30 in. (762 mm).

See **Concrete Blocks** (CAZT) and Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers.

2. **Metallic Sleeve —** (Optional) - Nom 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

3. **Through Penetrant —** One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubing may be used:

A. **Steel Pipe —** Nom 24 in. (610 mm) diam (or smaller) Schedule 20 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 24 in. (610 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.

D. **Copper Pipe —** Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

4. **Pipe Covering* —** Nom 2 in. (51 mm) thick hollow cylindrical glass fiber units, nom 3.5 pcf (56 kg/m^3) density, jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. Annular space between insulated pipe and periphery of the opening shall be min 1/4 in. (6 mm) to max 1-1/4 in. (32 mm). When W Rating applies, annular space shall be min 1/2 in. (13 mm).

See **Pipe and Equipment Covering - Materials** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

4A. **PVC Jacket+ —** (Optional) An additional PVC jacketing (Item 4,B), supplied in sheet form, shall be tightly wrapped around the all service jacket on the pipe covering with the longitudinal seam continuously sealed using the adhesive supplied with the jacket. The jacket is to be nom 48 in. (1219 mm) wide by nom 20 or 30 mil (0.5 or 0.8 mm) thick. The jacket shall be installed at a point 36 in. (914 mm) to 40 in. (1016 mm) above the top surface of the floor assembly and shall extend downward into and/or through the opening.

See Plastics (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

The PVC jacket is required for all fiberglass pipe coverings for the W Rating to apply.

5. **Firestop System —** The firestop system shall consist of the following:

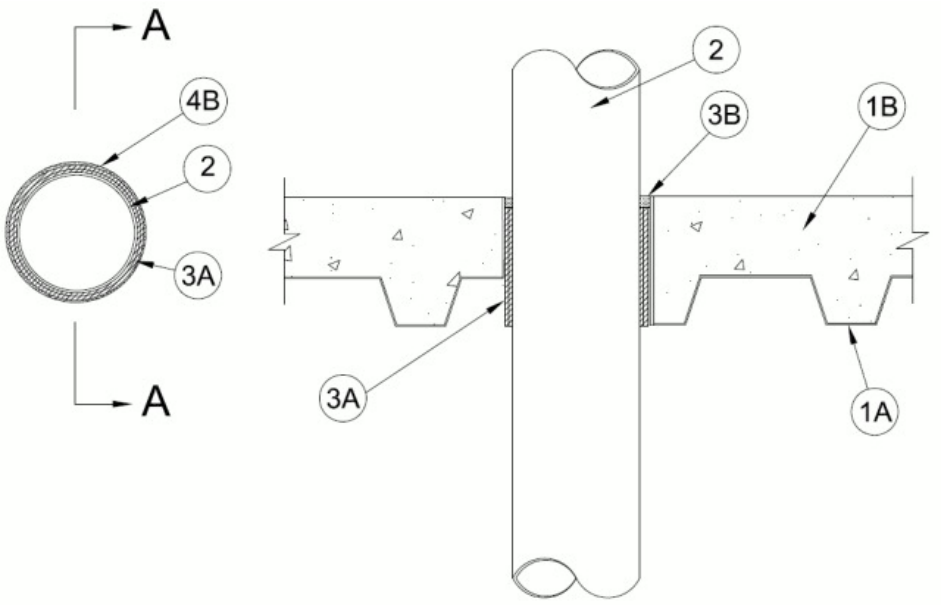
A. **Packing Material —** Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material. When the floor is constructed of hollow-core precast concrete units, packing material shall be recessed from both surfaces of floor to accommodate the required thickness of fill material.

B. **Fill, Void, or Cavity Materials* - Sealant —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed symmetrically on both sides of floor, flush with both floor surfaces.
RECTORSEAL — FlameSafe FS900+ FlameSafe FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

W Rating applies only when Metacaulk MC 150+, Metacaulk 1000, Biostop BF 150+, FlameSafe FS900+ or FlameSafe FS1900 is used.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 3/4 Hr	FT Rating — 3/4 Hr
L Rating At Ambient — Less Than 1 CFM/ft^2	FH Rating — 2 Hr
L Rating At 400 F — Less Than 1 CFM/ft^2	FTH Rating — 3/4 Hr
	L Rating At Ambient — Less Than 5.1 L/s/m^2
	L Rating At 400 F — Less Than 5.1 L/s/m^2



SECTION A-A

System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.

1. **Steel Deck/Floor Assembly —** The floor assembly shall consist of a fluted steel deck/concrete floor assembly. The floor assembly shall be constructed of the materials and in the manner described in the individual D900 Series design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Form Units* —** Max 3 in. (76 mm) deep galv fluted units.

B. **Concrete —** Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units. Max diam of opening is 5 in. (127 mm).

2. **Through Penetrant —** One nonmetallic pipe centered in the firestop system. The annular space between the penetrant and the periphery of opening shall be nom 1/4 in. (6 mm). Penetrant to be rigidly supported on both sides of floor assembly. The following types and sizes of nonmetallic pipe may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

B. **Rigid Nonmetallic Conduit+ —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 4 in. (102 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

D. **Acrylonitrile Butadiene Styrene (ABS) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Firestop System —** The firestop system shall consist of the following:

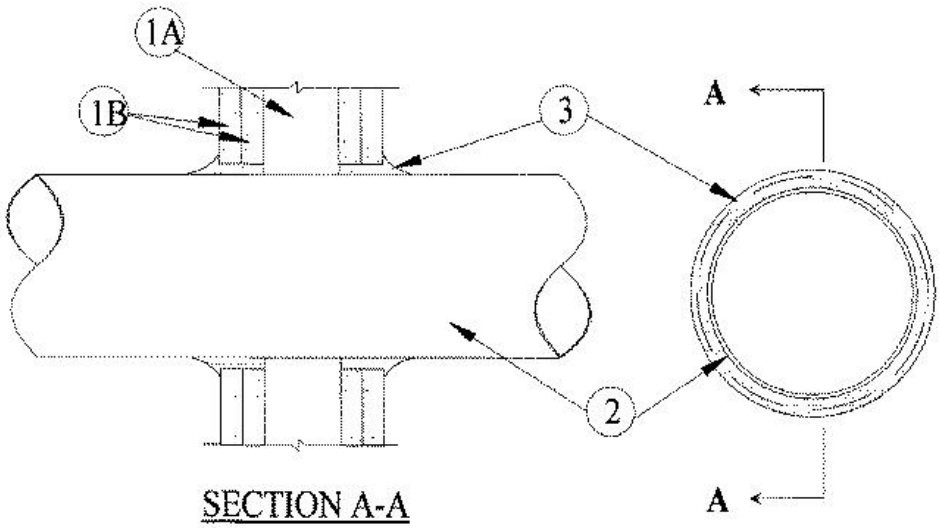
A. **Fill, Void or Cavity Materials* —** Two layers of nom 2 mm thick by 3 in. (76 mm) wide intumescent joint strip tightly

wrapped around the outer circumference of the pipe with ends butted and held in place with tape. Joint strip slid into the annular space and recessed 1/2 in. (13 mm) from top surface of floor.
RECTORSEAL — Metacaulk Joint Strip, Flame Safe Joint Strip, Biostop Joint Strip

B. **Fill, Void or Cavity Material* — Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied at the joint strip/wall interface on both sides of the wall assembly.
RECTORSEAL — Metacaulk 1000, Metacaulk 350i, Biostop 500+, Biostop 350i, or FlameSafe FS1900

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr
T Rating — 0 hr



1. **Wall Assembly —** The fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC.

B. **Gypsum Board* —** 5/8 in. thick, 4 ft wide with square or tapered edge. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 13-1/4 in.
The hourly F rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrants —** One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The annular space shall be min 0 in. to max 1/4 in. The following types and sizes of metallic pipes or tubing may be used:

A. **Steel Pipe —** Nom 12 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 12 in. diam (or smaller) cast or ductile iron pipe.

C. **Conduit —** Nom 6 in. diam (or smaller) steel electrical metallic tubing or steel conduit.

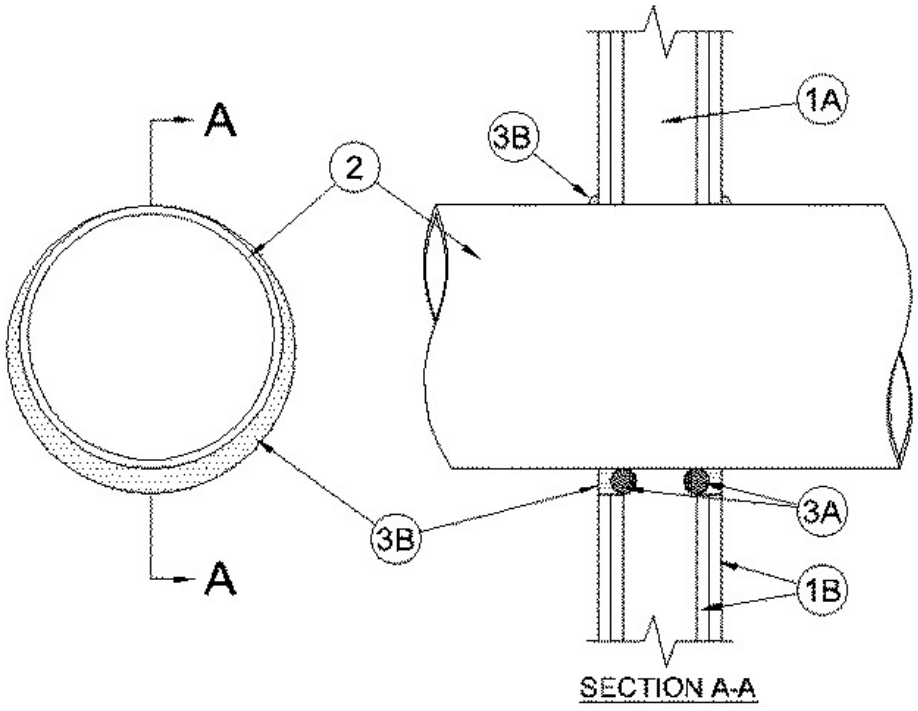
D. **Copper Tubing —** Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.

E. **Copper Pipe —** Nom 6 in. diam (or smaller) Regular (or heavier) copper pipe.

3. **Fill, Void or Cavity Material* — Caulk —** Fill material to be forced into the annulus to maximum extent possible. Additional fill material to be installed such that a min 1/2 in. crown is formed around the penetrating item and lapping 1/4 in. beyond the periphery of the opening.
RECTORSEAL — MC-150 Caulk

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See I Item 1)
T Rating — 0 Hr
M Rating (Movement) — See Table 1



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
A. **Studs —** Wall framing consists of steel channel studs Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** One or two layers of nom 5/8 in. thick gypsum wallboard as specified in the individual Wall and Partition Design. Max diam of opening is 14 in. (356 mm)
The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly.

2. **Through Penetrants —** One metallic pipe, conduit or tubing to be installed concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
A. **Steel Pipe —** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe. A nom annular space of 0 (point contact) to 1-1/4 in. (32 mm) is required within the firestop system.

B. **Iron Pipe —** Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) cast iron pipe. A nom annular space of 0 (point contact) to 1-1/4 in. (32 mm) is required within the firestop system.

C. **Copper Tubing —** Nom 4 in (102 mm) diam (or smaller) Type L (or heavier) copper tube. A nom annular space of 0 (point contact) to 1 in. (25.4 mm) is required within the firestop system.

D. **Copper Pipe —** Nom 4 in. (102mm) diam (or smaller) Regular (or heavier) copper pipe. A nom annular space of 0 (point contact) to 1 in. (25.4 mm) is required within the firestop system.

E. **Conduit —** Nom 6 in. (152 mm) (or smaller) steel conduit or nom 4 in. (102 mm) diam (or smaller) steel electrical metallic conduit A nom annular space of 0 (point contact) to 1 in. (25.4 mm) is required within the firestop system.

3. **Firestop System —** The firestop system shall consist of the following:
A. **Packing Material —** (Optional) In 2 hr wall assemblies, foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from each surface of the wall to accommodate the required thickness of fill material.

B. **Fill Void or Cavity Materials* - Caulk —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus on both surfaces of the wall assembly. A min 1/2 in. (13 mm) diam bead of caulk shall be applied to the pipe/gypsum board interface at the point contact

location on both sides of wall.
RECTORSEAL — MC 150+ Caulk

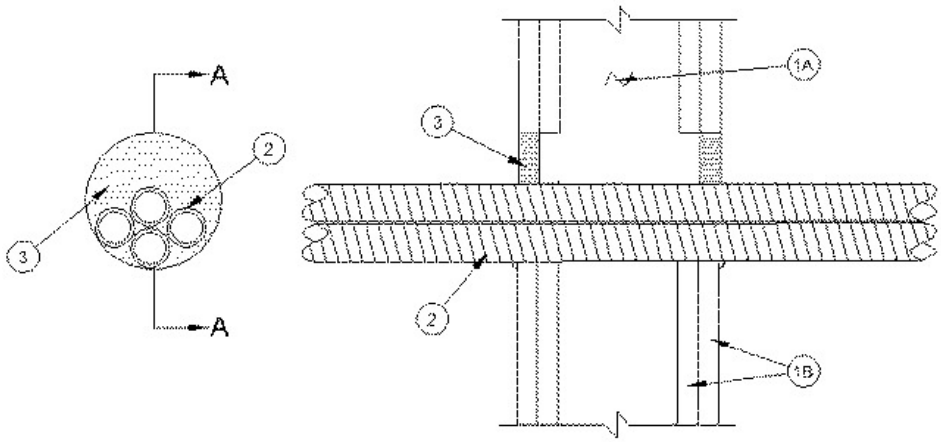
The M Rating for the firestop system is dependent on the variables as noted in the Table 1 below.

Table 1

Movement Direction	Penetrant Item	Nominal Penetrant Diameter	Annular Space	Movement	Sealant Depth	F Rating	L Rating
Y	2A, 2B, 2E	2 in. (52 mm)	Max 1 in. (25.4 mm)	5%	5/8 in. (16 mm)	2 hr	N/A
Z	2A, 2B, 2E	2 in. (52 mm)	1 in. (25.4 mm)	0.25 in. (6mm)	5/8 in. (16 mm)	2 hr	N/A

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Rating - 0 Hr
L Rating At Ambient - 1.7 CFM/sq ft	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating At 400 F - Less Than 1 CFM/sq ft	FTH Rating - 0 Hr
	L Rating At Ambient - 1.7 CFM/sq ft
	L Rating At 400 F - Less Than 1 CFM/sq ft



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (406 mm) OC.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 6 in. (152 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrants —** One or more nom 1-1/2 in. (38 mm) diam (or smaller) flexible steel conduits bundled together and installed within the opening. Max diam of through penetrant bundle shall be 4 in. (102 mm). The space between the through penetrants shall be a min of 0 in. (point contact) to a max of 2 in. (51 mm). The annular space between the through penetrants and periphery of opening shall be min 0 in. (point contact) to max 2 in. (51 mm). Conduit to be rigidly supported on both sides of wall assembly.

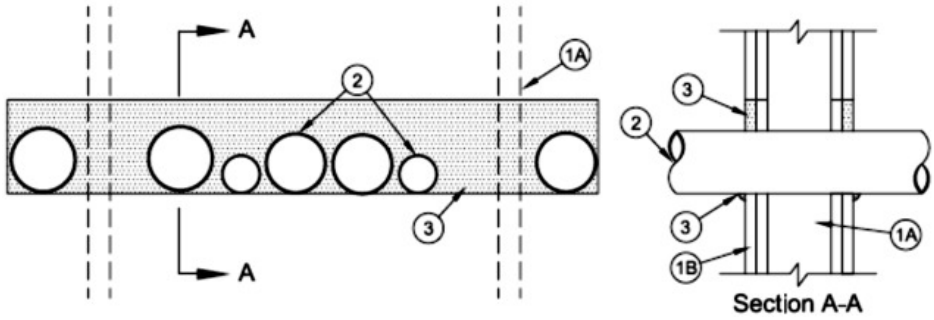
See **Flexible Metal Conduit** (DXUZ) category in the Electrical Construction Materials Directory for names of manufacturers.

3. **Fill, Void or Cavity Material* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At the point contact location between through penetrants and gypsum board, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the gypsum board/through penetrant interface on both surfaces of wall. Additional sealant shall be forced into interstices of through penetrants to max extent possible.

RECTORSEAL — FS 900+ Sealant, Metacaulk MC 150+, Biostop BF 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings —1 and 2 Hr (See Item 1)
T Ratings — 0 and 1/4 Hr (See Item 1)



1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of min 3-5/8 in. (92 mm) wide steel channel studs spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** Min 5/8 in. (16 mm) thick. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U400 or V400 Wall and Partition Design. Max area of opening is 216 in.2 (1394 cm^2) with a max dimension of 36 in. (914 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. The hourly T Rating is 0 hr and 1/4 hr for 1 hr and 2 hr fire rated assemblies, respectively.

2. **Through Penetrants —** Multiple pipes or conduits installed in single layer array within the firestop system. The annular space between the pipes and conduits and the edges of the opening shall be min 0 in. (point contact) to max 3 in. (76 mm). The separation between pipes and conduits to be min 1/4 in. (6 mm) to max 3 in. (76 mm). Pipes and conduits to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or conduits may be used:

A. **Steel Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

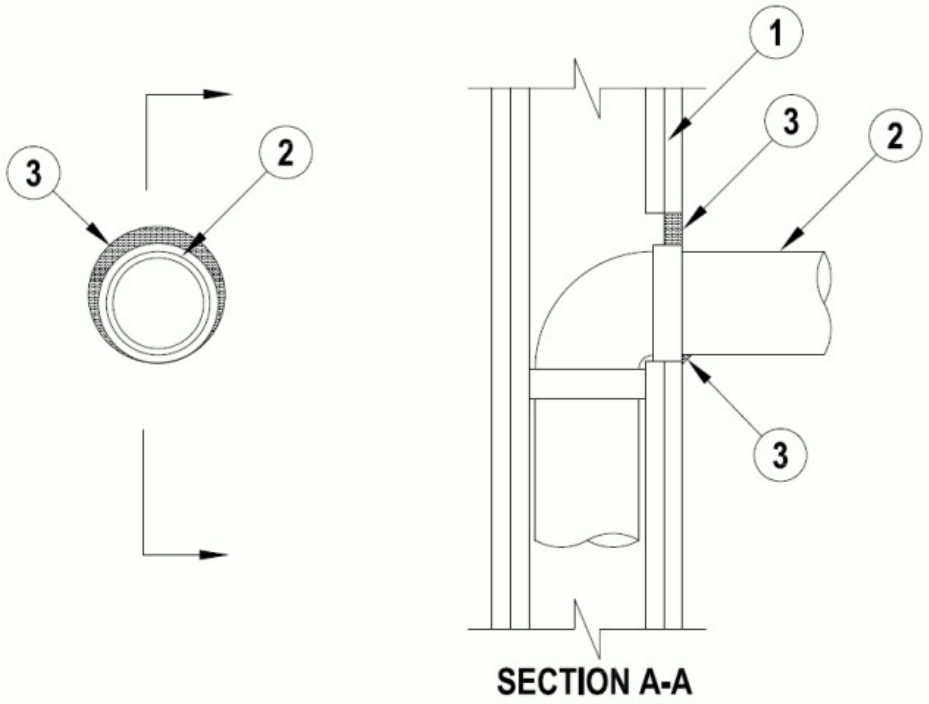
B. **Conduit —** Nom 4 in. (51 mm) diam (or smaller) rigid steel conduit or steel electrical metallic tubing (EMT).

3. **Fill Void or Cavity Materials* - Caulk —** Min 5/8 in. (16 mm) thickness of fill material installed to completely fill annular space between pipes, conduits and gypsum flush with each surface of wall. Min 1/4 in. (6 mm) diam bead of fill material applied to the through penetrant/wall interface at the point contact locations on both sides of the wall.
RECTORSEAL — MC 150+

4. **Packing Material —** (Optional, Not Shown) - For 2 hr fire rated walls only, optional foam backer rod may be installed within the annulus and recessed a min 5/8 in. (16 mm) from both surfaces of wall.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 1 and 2 Hr (See Item 1)	FT Ratings — 1 and 2 Hr (See Item 1)
	FH Ratings — 1 and 2 Hr (See Item 1)
	FTH Ratings — 1 and 2 Hr (See Item 1)



1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (91 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening may be circular or elliptical in shape. Max dimension of opening is 6-1/2 in. (165 mm) with max area of 17.87 in^2 (115.3 cm^2).

The hourly F, T and FH and FTH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly.

2. **Through penetrants —** One metallic pipe, tubing or conduit to be installed either concentrically or eccentrically within the firestop system. The penetrant may be installed at an angle not greater than 45 degrees from perpendicular. The annular space shall be 0 in. (point contact) to 1 in. (25 mm). Pipe, tubing or conduit to be rigidly supported on the penetrated side of the wall assembly. The following types and sizes of metallic pipes, tubing or conduits may be used:

A. **Steel pipe —** Nom 3 in. (76 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

B. **Conduit —** Nom 3 in. (76 mm) diam (or smaller) steel electrical metallic tubing (EMT), nom 3 in. (76 mm) diam (or smaller) steel conduit or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.

C. **Copper Tubing —** Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tubing.

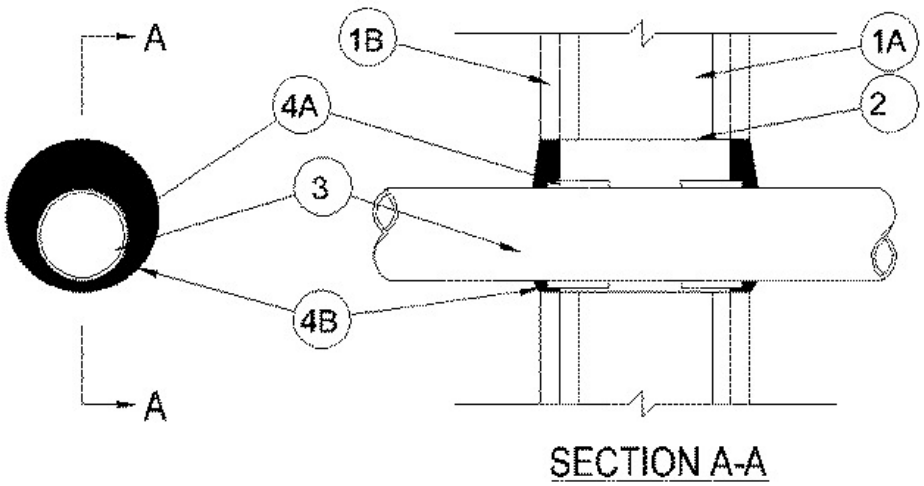
D. **Copper Pipe —** Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Fill, Void or Cavity Material*— Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with surface of wall. Min 1/4 in. (6 mm) diam bead of sealant applied at point contact location.

RECTORSEAL — Metacaulk 150+, Metacaulk 1000, Metacaulk Fire Rated Putty, Biostop 150+, Biostop 500+, Biostop Fire Rated Putty

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr
L Rating at Ambient - Less than 1 CFM/sq ft
L Rating at 400° F - Less than 1 CFM/sq ft



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud assembly shall be constructed of the materials and in the manner described in the individual U300, U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in (51 by 102 mm) lumber spaced 16 in.(406 mm) OC. Steel studs to be min 3-5/8 in.(92 mm) wide and spaced max 24 in.(610 mm) OC.

B. **Gypsum Board* —** Min 5/8 in. (16 mm) thick. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Design in the UL Fire Resistance Directory. Max diam of opening is 5 in. (127 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed

2. **Metallic Sleeve —** (Optional) Cylindrical sleeve fabricated from min 0.018 in. (0.46 mm) thick (28 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Sheet steel coiled to a diam less than circular cutouts in wall assembly, inserted through both sides of wall and allowed to uncoil against the circular cutouts in the wall assembly. Sleeve to be installed flush with each surface of the wall assembly.

2A. **Metallic Sleeve —** (Optional, Not Shown) - As an alternate to Item 2A, steel sleeve may consist of Schedule 5 (or heavier) steel pipe, rigid steel conduit or EMT friction-fitted into wall assembly flush with each surface of the wall assembly.

3. **Through Penetrants —** One nonmetallic pipe or conduit to be installed either concentrically or eccentricity within the firestop system. The annular space between the pipe or conduit and the periphery of the opening shall be a min 1/4 in. (6 mm) to max 1-1/4 in. (32 mm). Pipe or conduit to be rigidly supported on both sides of wall. The following types and sizes of pipes or conduits may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste, or vent) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 3 in. diam (76 mm) (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply).

C. **Rigid Nonmetallic Conduit+ —** Nom 3 in. (76 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code, (NFPA No. 70).

4. **Firestop System —** The firestop system shall consist of the following:

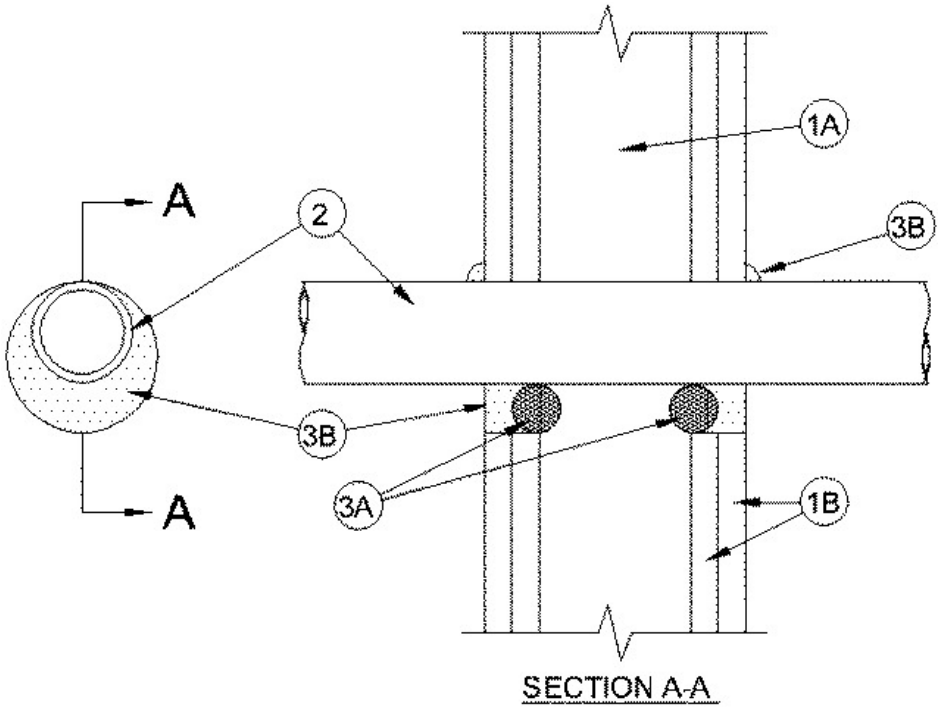
A. **Fill, Void or Cavity Materials* — Wrap Strip —** Nom 1/4 in. (6 mm) thick intumescent material faced on both sides with a plastic film, supplied in 1-1/2 in. (38 mm) wide wrap strips. Single layer of wrap strip wrapped around the through penetrant with ends butted and secured together by means of masking tape.

Wrap strip slid into annular space such that the visible ends are recessed 1/4 in. (6 mm) from each surface of the wall.
RECTORSEAL — FlameSafe (TM) Wrap Strip, Metacaulk Wrap Strip or Biostop Wrap Strip

B. **Fill, Void or Cavity Materials* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus flush with both surfaces of wall. Additional fill material to be installed such that a min 3/8 in. (10 mm) thick crown is formed around the through penetrant.
RECTORSEAL — FlameSafe FS1900, FS1901, FS1905, FS1929, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+

*Bearing the UL Classification Marking

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 1 and 2 Hr (See Item 1)



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hour fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 inch lumber spaced 16 inch OC. Steel studs to be min 2-1/2 inch wide and spaced max 24 inch OC.

B. **Gypsum Board* —** 5/8 in. thick, 4 feet wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Maximum diameter of opening is 3-5/8 in.

The hourly F and T Ratings of the firestop system are equal to the hourly fire rating of the wall assembly.

2. **Nonmetallic Pipe —** One non-metallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 (point contact) to max 1-1/4 in. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of non-metallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 2 in. diam (or smaller) Schedule 40 solid core or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 2 in. diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

C. **Electrical Non-Metallic Tubing (ENT) —** Nom 2 in. (or smaller) PVC tubing installed in accordance with Article 331 of the National Electrical Code (NFPA 70).

D. **Cross Linked Polyethylene (PEX) Tubing —** Nom 1 in. diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.

3. **Firestop System —** The firestop system shall consist of the following:

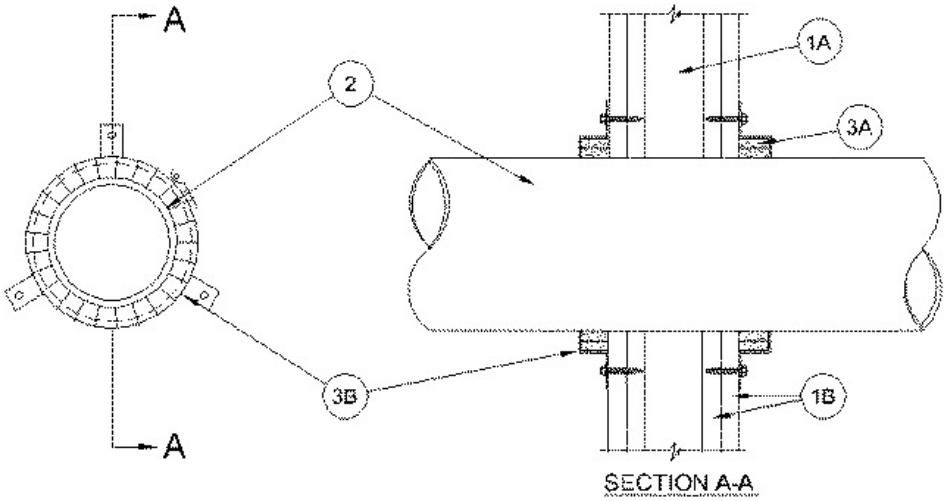
A. **Packing Material —** (Optional) For 2 hr wall assemblies, foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from each surface of the wall to accommodate the required thickness of fill material.

B. **Fill Void or Cavity Materials* - Caulk —** Min 5/8 in. thickness of fill material applied within the annulus on both surfaces of the wall assembly. A min 1/2 in. diam bead of caulk shall be applied to the pipe/gypsum board interface at the point contact location on both sides of wall.

RECTORSEAL — MC 150+ Caulk

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Rating — 1 and 2 Hr (See Item 1)
T Rating — 1 and 2 Hr (See Item 1)



1. **Wall Assembly —** The 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of either wood or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm)OC.

B. **Gypsum Board* —** Min 5/8 in. (16 mm) thick, 4 ft (1.22 m)wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U400 Wall and Partition Design. Max diam of opening is 5 in. (127 mm).

The hourly F and T Ratings of the firestop system re equal to the hourly rating of the wall in which it is installed.

2. **Through Penetrants —** One nonmetallic pipe to be installed concentrically within the firestop system. A max annular space of 1/4 in. (6 mm) is required within the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe —** Nom 4 in. (6 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 4 in. (6 mm) diam (or smaller) SDR 13.5 or Schedule 40 CPVC pipe for use in closed (process or supply) piping systems. Schedule 40 CPVC pipe for use in vented (drain, waste or vent) piping systems.

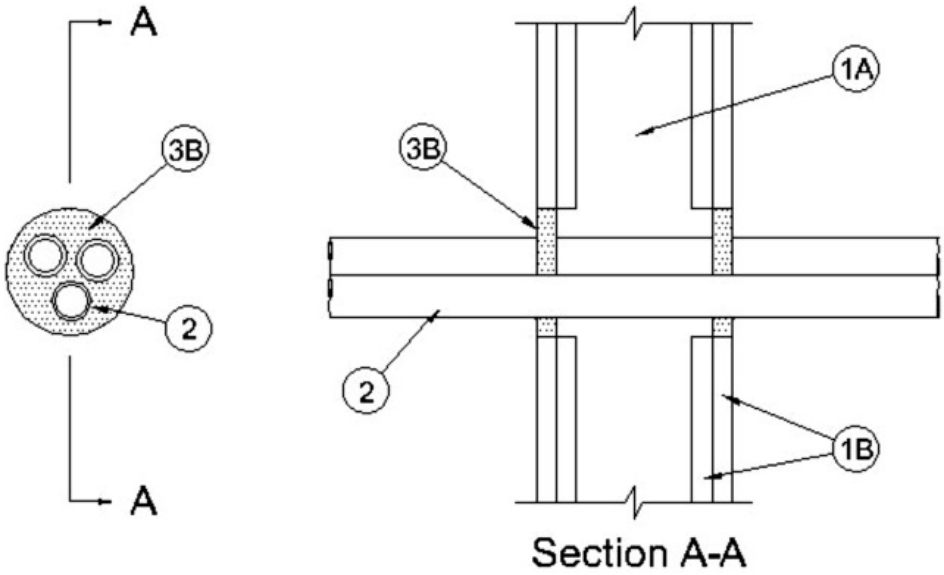
3. **Firestop System —** The firestop system shall consist of the following:

A. **Fill, Void or Cavity Material* - Wrap Strip —** Two layers of nom 1/4 in. (6 mm) thick by 2 in. (51 mm) wide intumescent wrap strip individually wrapped around the outer circumference of the penetrant. Butted ends in successive layers shall be offset. Wrap strip butted tightly against both surfaces of wall. Wrap strip secured with tape or tie wire.
RECTORSEAL — Metacaulk Wrap Strip

B. **Steel Collar —** Collar fabricated from coils of precut min 0.016 in. thick (No. 28 gauge) galv steel available from fill material manufacturer. Collar shall be nom 2 in. (51 mm) deep with 1 in. (25 mm) wide by 1-1/2 in. (38 mm) long anchor tabs on 4 in. (102 mm) centers for secure to both surfaces of wall. In addition, collar contains retainer tabs, 1/2 in. wide by 3/4 in. (19 mm) long, located opposite the anchor tabs. Collar shall be wrapped over the wrap strip, overlapping min 1 in. (25 mm) The retainer tabs are folded 90 deg towards the pipe to maintain the annular space around the pipe and to retain the wrap strip. Collar secured to both surfaces of wall at each anchor tab by means of 1-1/2 in. (38 mm) long steel laminate screws or 1/8 in. (3 mm) diam by 2 in. (51 mm) long steel hollow wall anchors in conjunction with 1/4 in. (6 mm) by 5/8 in. (16 mm) diam washers.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)
F Ratings - 1 and 2 Hr (See Item 1)
T Ratings - 1 and 1-1/2 Hr (See Item 1)
L Rating At Ambient - Less Than 1 CFM/sq ft
L Rating At 400 F - Less Than 1 CFM/sq ft



Section A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.2 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall or Partition Design in the UL Fire Resistance Directory. Max diam of opening is 4 in. (102 mm).

The hourly F and T Ratings of the firestop system are dependent on the hourly fire rating of the wall assembly in which it is installed as shown in the table below:

Rating of Wall, Hr	F Rating, Hr	T Rating, Hr
2	1	1-1/2
1	1	1

2. **Through Penetrant —** Nom 1 in. (25 mm) diam (or smaller) SDR 9 (or heavier) cross-linked polyethylene (PEX) tubing for use in closed (process or supply) piping systems. A max of three tubes to be bundled together and installed eccentrically or concentrically within the firestop system. Of the three tubes, a max of one shall have a nom diam greater than 3/4 in. (19 mm). The annular space between the tubing and the periphery of the opening shall be min 5/8 in. to max 1-1/4 in. Separation between the tubing shall be a min 0 in. (point contact) to max 3/8 in. (10 mm). Tubing to be rigidly supported on both sides of the wall assembly.

3. **Firestop System —** The firestop system shall consist of the following:

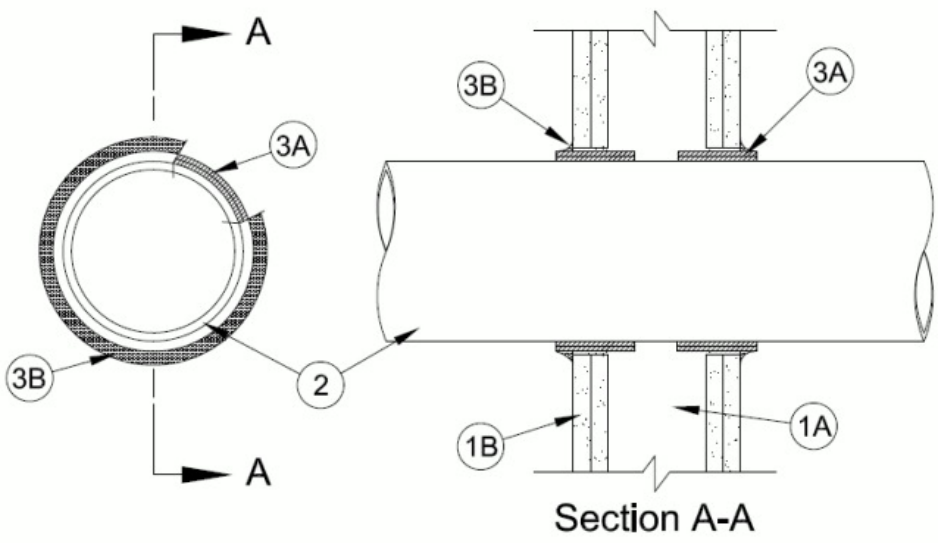
A. **Packing Material —** (Optional, Not shown) - Polyethylene backer rod or foam plastic sheets friction fitted into annular space for 2 hr fire-rated wall assemblies only. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. Additional fill material to be forced within tubing bundle to max

extent possible.
RECTORSEAL — FlameSafe FS 900+, FS 1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1-3/4 and 2 Hr (See Item 3A)



Section A-A

1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Design in the UL Fire Resistance Directory. Max diam of opening is 7-3/8 in. (187 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrant —** One nonmetallic pipe centered in the firestop system. The annular space between the penetrant and the periphery of opening shall be nom 3/8 in. (9.5 mm). Penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipe may be used:
A. **Polyvinyl Chloride (PVC or uPVC) Pipe —** Nom 6 in. (152 mm) diam (or smaller) Schedule 40 cellular or solid core PVC**or uPVC** pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

B. **Rigid Nonmetallic Conduit (RNC)+ —** Nom 6 in. (152 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

C. **Chlorinated Polyvinyl Chloride (CPVC) Pipe —** Nom 6 in. (152 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

D. **Acrylonitrile Butadiene Styrene (ABS) Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

The diam and type of penetrant used is dependent upon the hourly rating of the wall assembly, the F and T Ratings of the firestop system and the number of layers of wrap strip used as shown in Item 3.

3. **Firestop System —** The firestop system shall consist of the following:
A. **Fill, Void or Cavity Materials* —** Nom 2 mm thick by 3 in. (76 mm) wide intumescent joint strip tightly wrapped continuously around the outer circumference of the pipe and held in place with tape. Joint strip slid into the annular space on both sides of wall with the outer edges of the joint strip extending 1/2 in. (13 mm) from both surfaces of wall. The number of wrap strips required is dependent upon the nom diam and type of through penetrant as shown in the table below.
RECTORSEAL — Metacaulk Joint Strip,

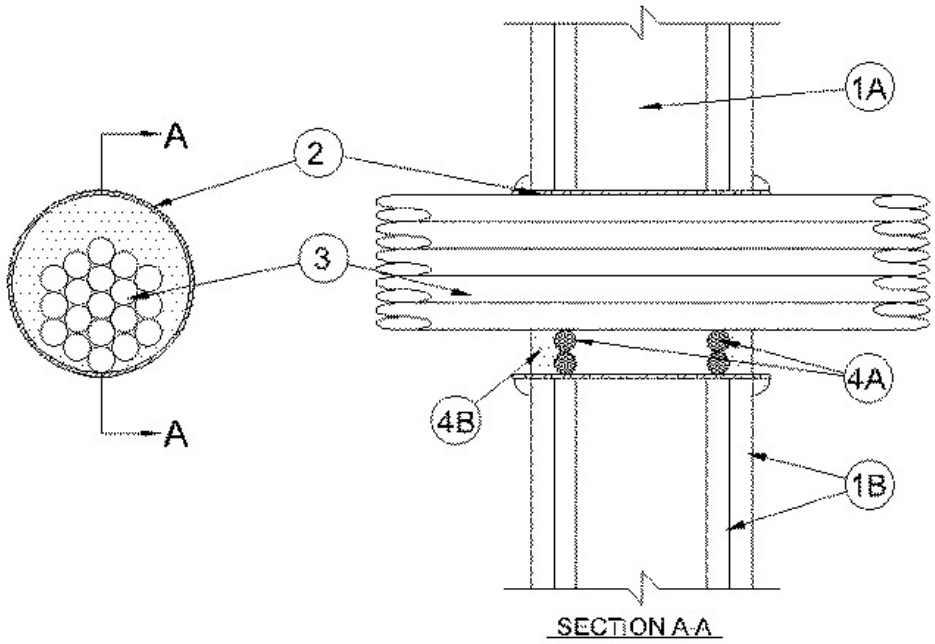
The F and T Ratings of the firestop system are dependent upon the hourly rating of the wall assembly, type and diam of the penetrant and the number of layers of wrap strip used as shown in the table below:

Hourly Raing of Wall Assembly, Hr	Type of Penetrant	Diam of Penetrant, in (mm)	Number of Layers of Wrap Strip	F Rating, Hr	T Rating, Hr
1	PVC or uPVC Pipe, CPVC Pipe, RNC,	6 (152)	5	1	0
1	PVC or uPVC Pipe, CPVC Pipe, RNC,, ABS Pipe	4 (102)	2	1	0
2	ABS Pipe	4 (102)	2	2	1-3/4
2	PVC or uPVC Pipe, CPVC Pipe, RNC,	6 (152)	5	2	2
2	PVC or uPVC Pipe, CPVC Pipe, RNC,	4 (102)	2	2	2

B. **Fill, Void or Cavity Material* — Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied at the joint strip/wall interface on both sides of the wall assembly.
RECTORSEAL — Metacaulk 1000, Metacaulk 350i, Metacaulk 150+,

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0 and 1/2 Hr (See Items 1 and 2)	FT Ratings — 0 and 1/2 Hr (See Items 1 and 2)
	FH Ratings — 1 and 2 Hr (See Item 1)Hr
	FTH Ratings — 0 and 1/2 Hr (See Items 1 and 2)



1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Max diam of opening is 4 in. (102 mm).
The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly. The T, FT and FTH Rating is 0 and 1/2 for 1 and 2 Hr assemblies, respectively.

2. **Steel Sleeve —** (Optional) — Max 4 in. (102 mm) diam sleeve fabricated from min 0.018 in. (0.46 mm) thick (28 gauge) galv sheet steel and floor or wall assembly, inserted opening and allowed to uncoil against the circular cutouts. Sleeve to be installed flush with or extending max 1 in. (25 mm) beyond each surface of the wall assembly.

2A. **Steel Sleeve —** (Optional) - As an alternate to Item 2, max 4 in. (102 mm) Schedule 5 (or heavier) steel pipe, rigid steel conduit or EMT, friction-fit into wall assembly, flush with or extending a max 4 in. (102 mm) beyond each surface of the floor or wall assembly.
When steel sleeve is used, T, FT and FTH Ratings are 0 hr.

3. **Cables —** Aggregate cross-sectional area of cables to be min 25 percent to max 64 percent of the aggregate cross-sectional area of the opening. Cables to be tightly bundled and rigidly supported on both sides of wall assembly. The annular space between the cables and the periphery of opening shall be min 0 in. (point contact) to max 2 in. (51 mm). Any combination of following types and sizes of copper conductor cables may be used:

A. Max 2/C with ground, No. 12 AWG MC (BX) cable with polyvinyl chloride (PVC) insulation on conductors inside a steel armored jacket.

B. Max 3/C with ground, No. 12 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.

C. Max 8/C No. 12 AWG (or smaller) Type SOW-A P-123-70-MSHA.

D. Max 25 pair, No. 24 AWG (or smaller) copper conductor telephone cable with XLPE/PVC insulation, with or without PVC jacket.

E. Max RG6 (or smaller) television coaxial cable CATVX.

F. Max 4 pair, No. 24 AWG (or smaller) copper conductor data cable with Hylar insulation and jacketing.

G. Max 1/C, No. 18 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

H. Max 1/C, No. 14 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

I. Max 1/C, No. 10 AWG (or smaller) Type THHN or THWN gasoline & oil resistant II 600V VW-1 E116364 (UL) power cable.

J. Optical Fiber Cable max 62.5/125 Type UFNR.

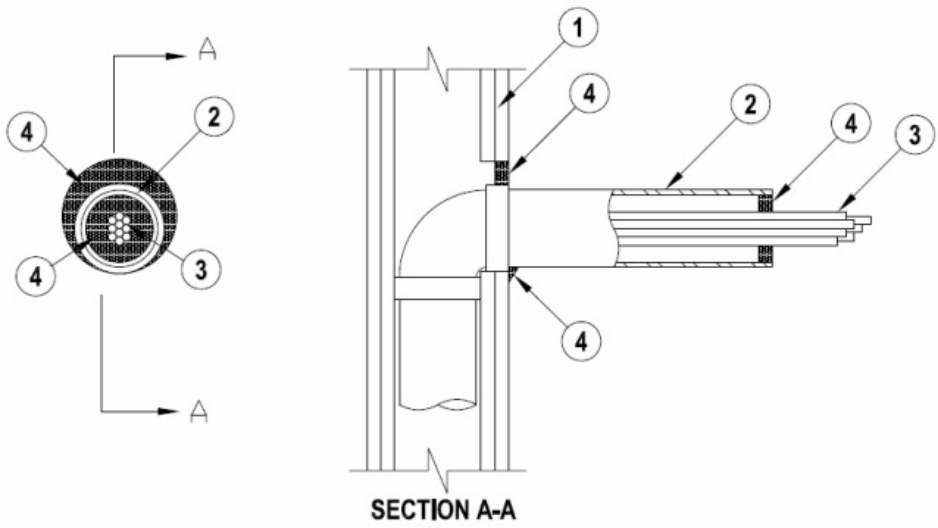
K. Max 3/C, No. 4/0 with ground, AWG aluminum Triple E Alloy AA8176 Type SE cable Style U Type XHH-W-2 CDRS E32071 (UL) service entrance cable.

L. Max 3/C, No. 18 AWG with ground and shield E120910.

4. **Firestop System —** The firestop system shall consist of the following:
   A. **Fill, Void or Cavity Material* - Caulk —** Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. When steel sleeve is not used or when steel sleeve is flush with the wall surfaces, a min 1/4 in. (6 mm) diam bead of caulk shall be applied at interface of cables and periphery of opening at point contact location on both surfaces of wall. When steel sleeve is used, a bead of caulk is applied to the steel sleeve/gypsum board interface on both sides of wall. When sheet metal sleeve (Item 2) is used, fill material to be installed flush with both surfaces of wall within the sleeve. When rigid steel sleeve (Item 2A) is used, fill material may be installed flush with both ends of sleeve in walls.
   RECTORSEAL — MC 150+, Metacaulk 1000

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 & 2 Hr (See Item 1)	F Ratings — 1 & 2 Hr (See Item 1)
T Ratings — 1 & 2 Hr (See Item 1)	FT Ratings — 1 & 2 Hr (See Item 1)
	FH Ratings — 1 & 2 Hr (See Item 1)
	FTH Ratings — 1 & 2 Hr (See Item 1)



1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (91 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening may be circular or elliptical in shape. Max diam of opening is 6-1/2 in. (165 mm) with max area of 17.87 in^2.

The hourly F, T, FH and FTH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly.

2. **Sleeve —** Nom 3 in. (76 mm) diam (or smaller) steel EMT, steel conduit or Schedule 5 (or heavier) steel pipe. The steel sleeve may be installed at an angle not greater than 45 degrees from perpendicular. The annular space between sleeve and periphery of opening shall be min. 0 in. (point contact) to max 1 in. (25 mm). Maximum projection from wall is 12 in. (305 mm). Sleeve to be rigidly supported on penetrated side of wall assembly.

3. **Cables —** Aggregate cross-sectional area of cables to be min 25 percent to max 64 percent of the aggregate cross-sectional area of the opening. Cables to be tightly bundled and rigidly supported on the penetrated side of wall assembly. The annular space between the cables and the sleeve shall be min 0 in. (point contact) to max 2 in. (51 mm). Any combination of following types and sizes of copper conductor cables may be used:

A. Max 2/C with ground, No. 12 AWG MC (BX) cable with polyvinyl chloride (PVC) insulation on conductors inside a steel armored jacket.

B. Max 3/C with ground, No. 12 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.

C. Max 8/C No. 12 AWG (or smaller) Type SOW-A P-123-70-MSHA.

D. Max 25 pair, No. 24 AWG (or smaller) copper conductor telephone cable with XLPE/PVC insulation, with or without PVC jacket.

E. Max RG6 (or smaller) television coaxial cable CATVX.

F. Max 4 pair, No. 24 AWG (or smaller) copper conductor data cable with Hylar insulation and jacketing.

G. Max 1/C, No. 18 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

H. Max 1/C, No. 14 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

I. Max 1/C, No. 10 AWG (or smaller) Type THHN or THWN gasoline & oil resistant II 600V VW-1 E116364 (UL) power cable.

J. Optical Fiber Cable max 62.5/125 Type UFNR.

K. Max 3/C, No. 4/0 with ground, AWG aluminum Triple E Alloy AA8176 Type SE cable Style U Type XHH-W-2 CDRS E32071 (UL) service entrance cable.

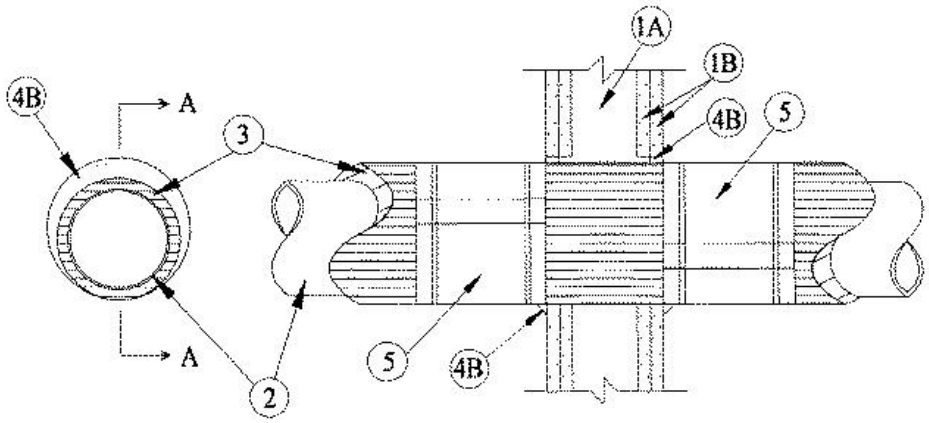
L. Max 3/C, No. 18 AWG with ground and shield E120910.

4. **Fill, Void or Cavity Material*— Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with surface of wall. Min. 1/2 in. thickness of fill material installed within the sleeve, flush with the end of the sleeve. Min 1/4 in. (6 mm) diam bead of sealant applied at point contact location.
RECTORSEAL — Metacaulk 150+, Metacaulk 1000, Metacaulk Fire Rated Putty, Biostop 150+, Biostop 500+, Biostop Fire Rated Putty

5. **Packing Material —** (Optional, Not Shown) — Mineral wool forming material or foam backer rod may be used as a backer for the sealant. When used, it shall be firmly packed into annular space between cables and sleeve as a permanent form and recessed from end of sleeve to accommodate the required thickness of fill material.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 3/4, 1and 1-1/2 Hr (See Item 1)	FT Ratings — 0, 3/4, 1and 1-1/2 Hr (See Item 1)
L Rating At Ambient — Less Than 1 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Item 1)
L Rating At 400 F — Less Than 1 CFM/sq ft	FTH Ratings — 0, 3/4, 1and 1-1/2 Hr (See Item 1)
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft



SECTION A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may be consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 18 in. (457 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

The hourly Ratings of the firestop system are dependent on the hourly fire rating of the wall assembly in which it is installed as shown in the table below:

Rating of Wall Hr	Penetrant Diam/Type	F and FH Ratings, Hr	T, FT and FTH Ratings Hr	Sealant
2	10 in. (254 mm) steel & iron	2	1-1/2	FS1900 series, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+
2	6 in. (152 mm) copper, steel or iron	2	1	FS 900+
1	6 in. (152 mm) copper, steel or iron	1	0	FS 900+
1	10 in. (254 mm) steel & iron	1	3/4	FS1900 series, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+

2. **Through Penetrant —** One metallic pipe to be installed either concentrically or eccentrically within the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes may be used:

A. **Steel Pipe —** Nom 10 in. (254 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 10 in. (254 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.

3. **Through Penetrating Product* — Cellular Glass Insulation —** Nom 3 in. (76 mm) thick cellular glass units sized to the outside diam of the through-penetrant and supplied in nom 24 in. (610 mm) long half sections or nom 18 in. (457 mm) long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions. The annular space between insulated pipes and periphery of opening shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm).

4. **Firestop System —** The firestop system shall consist of the following:

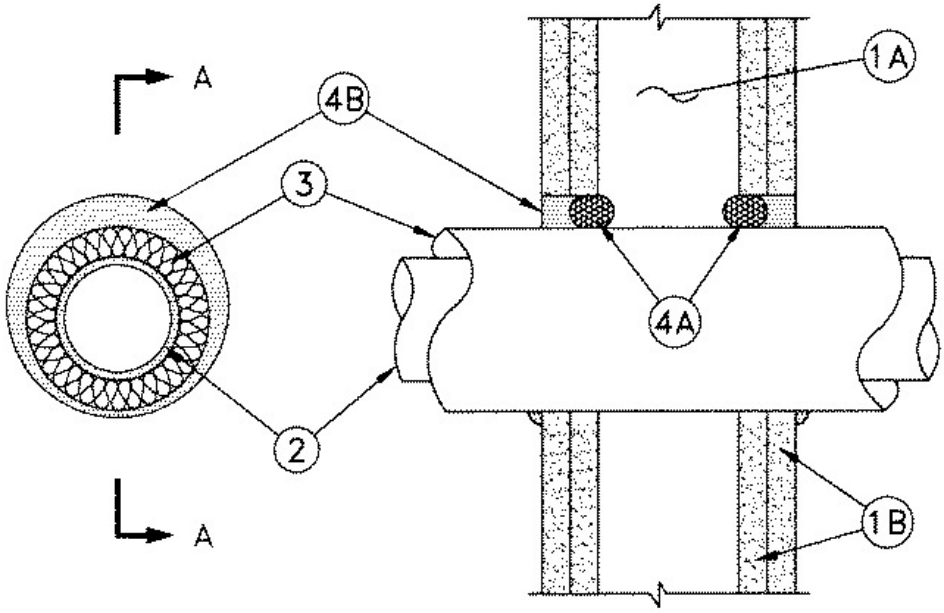
A. **Forms —** (Not Shown) — Used to prevent the leakage of fill material during installation in 2 hr fire-rated assemblies. Forms to be rigid sheet material or polyurethane backer rod, cut to fit the contour of the insulated through penetrant and friction fitted into the opening on both sides of wall. Forms to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus flush with both surfaces of wall. After installation of the metal jacket (Item 5), min 3/8 in. (10 mm) diam bead of fill material shall be applied to the metal jacketing/fill material interface on both sides of wall.
RECTORSEAL — FlameSafe FS 900+, FS1900, FS1901, FS1905, FS1929, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+

5. **Metal Jacket —** (Not required for FS900+) — Min 12 in. (305 mm) long jacket formed of min 0.010 in. (0.25 mm) thick aluminum sheet cut to wrap tightly around the pipe insulation with a min 2 in. (51 mm) lap and secured using 1/2 in. (13 mm) wide by 0.028 in. (0.71 mm) thick stainless steel hose clamps. Clamps to be located within 2 in. (51 mm) of each end of the jacket and spaced max 10 in. (254 mm) OC. Jacket to be installed with edge abutting surface of fill material (Item 4B) on each side of wall. Metal jacket to be used in addition to any other jacketing material which may be required or desired on the pipe insulation.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings— 1 and 2 Hr (See Item 4B)	F Ratings — 1 and 2 Hr (See Item 4B)
T Ratings — 0, 3/4, 1 and 1-1/2 Hr (See Item 4B)	FT Ratings — 0, 3/4, 1 and 1-1/2 Hr (See Item 4B)
L Rating At Ambient — Less Than 1 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Item 4B)
L Rating At 400 F — Less Than 1 CFM/sq ft	FTH Ratings — 0, 3/4, 1 and 1-1/2 Hr (See Item 4B)
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft



SECTION 'A-A'

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced 24 in. (610 mm) OC.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Designs in the UL Fire Resistance Directory. Max diam of opening in wood stud walls is 14-1/2 in. (368 mm) Max diam of opening in steel stud walls is 18-5/16 in. (465 mm). The inside diam of the opening shall be min 1 in. (25 mm) to max 3 in. (76 mm) larger than the outside diam of pipe covering (see Item 3).

2. **Through Penetrants —** One metallic pipe or tube installed concentrically or eccentrically within the firestop system. Pipe or tube to be rigidly supported on both sides of the wall. The following types and sizes of through penetrants may be used:

A. **Steel Pipe —** Nom 12 in. (305 mm) diam (or smaller) Schedule 30 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.

D. **Copper Pipe —** Nom 6 in. diam (152 mm) (or smaller) Regular (or heavier) copper pipe.

The type and max nom diam of the through penetrant is dependent upon the rating of the wall assembly, and the type of fill material as shown in Item 4B.

3. **Pipe Covering* —** One of the following types of pipe coverings shall be used:

A. **Pipe and Equipment Covering Materials* —** Nom 2 in. (51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m^3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or

factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or butt tape supplied with the product. The annular space between the insulated through penetrant and the periphery of the opening shall be min 0 in. (0 mm, point contact) to max 1-9/16 in. (40 mm)

See **Pipe and Equipment Covering Materials*** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

B. **Pipe and Equipment Covering Materials* —** Nom 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a nom density of 3.5 pcf (56 kg/m^3 or heavier) and sized to the outside diam of the pipe or tube. Pipe insulation secured with min 18 AWG steel wire spaced 12 in. (305 mm) OC. The annular space between insulated penetrating item and the periphery of the through opening shall be min 0 in. (0 mm, point contact) to max 1-9/16 in. (40 mm).

C. **Sheathing Material* —** Used in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal and transverse joints sealed with metal fasteners or butt tape.

See **Sheathing Materials*** (BVDV) category in the Building Materials Directory for names of manufacturers. Any sheathing material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

4. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Nom 1 in. (25 mm) foam backer rod firmly packed into the opening as a permanent form in 2 hr fire-rated assemblies to prevent leakage of fill material during installation. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* —** Sealant Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with each surface of wall. At point contact location, a min 3/8 in. (10 mm) bead of fill material shall be applied to the wall/pipe covering interface on both surfaces of the wall.
The F and T Ratings of the firestop system are dependent upon the hourly rating of the wall assembly, max nom diam and type of the through penetrant and type of fill material as shown in the table below:

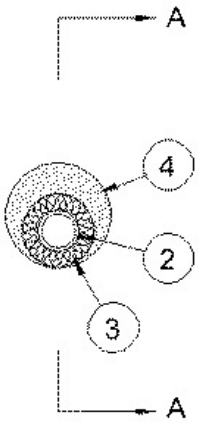
Rating of Wall, Hr	Type of Through Penetrant	Max Nom Diam of Through Penetrant, In. (mm)	Type of Fill Material	F and FH Ratings, Hr	T, FT and FTH Rating, Hr
2	Copper Tube, Copper Pipe, Steel Pipe, or Iron Pipe	4 (102)	FS1900, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+	2	1-1/2
1	Copper Tube, Copper Pipe, Steel Pipe, or Iron Pipe	4 (102)	FS1900, Metacaulk 1000, Metacaulk 350i, Biostop 350i or Biostop 500+	1	1
2	Copper Tube, Copper Pipe, Steel Pipe, or Iron Pipe	6 (152)	FS900+, Metacaulk MC 150+, Biostop BF 150+	2	1
1	Copper Tube, Copper Pipe, Steel Pipe, or Iron Pipe	6 (152)	FS900+, Metacaulk MC 150+, Biostop BF 150+	1	0

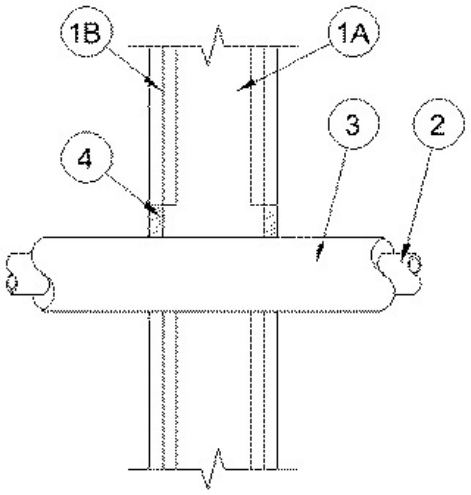
2	Steel Pipe, or Iron Pipe	12 (152)	FS900+, FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+	2	1-1/2
1	Steel Pipe, or Iron Pipe	12 (152)	FS900+, FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+	1	3/4

RECTORSEAL — FlameSafe® FS900+, FlameSafe® FS1900, Metacaulk MC 150+, Metacaulk 1000, Metacaulk 350i, Biostop BF 150+, Biostop 350i or Biostop 500+.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 or 2 Hr (See item 1)
T Rating — 3/4 Hr





Section A-A

1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel channel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** Nom 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 5 in. (127 mm).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly.

2. **Through Penetrant —** One metallic pipe or tube installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of wall assembly. The following types of metallic pipes or tubes may be used:

A. **Steel Pipe —** Nom 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 2 in. (51 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing —** Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.

D. **Copper Pipe —** Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Pipe Covering* — Plastics+ —** Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space shall be min 0 in. (point contact) to max 1-3/8 in. (35 mm).

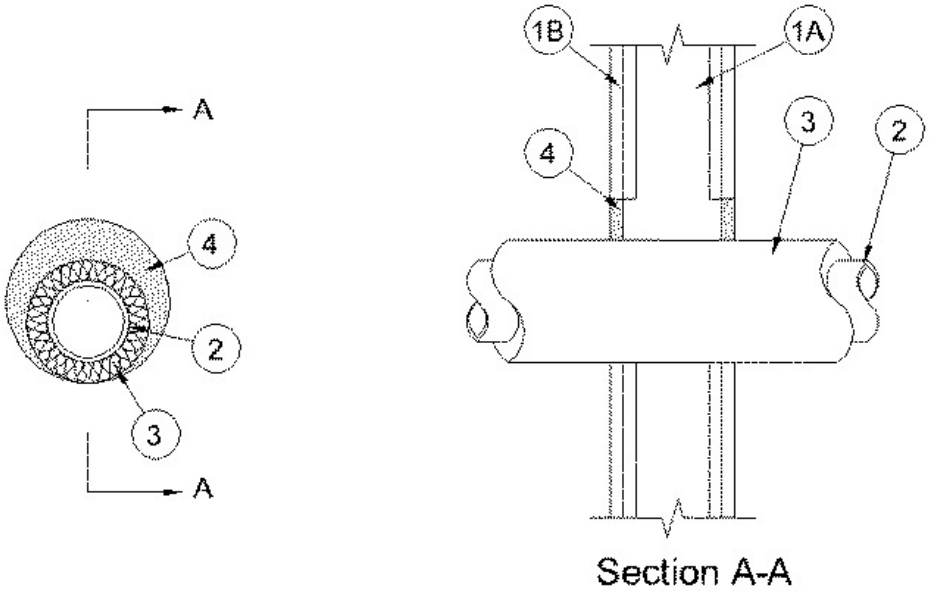
See **Plastics+** (QMFZ2) category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

4. **Fill, Void or Cavity Materials* - Caulk —** Min 5/8 in. (16 mm) thickness of caulk applied within annulus, flush with both surfaces of wall assembly.

RECTORSEAL — MC 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Rating — 1 or 2 Hr (See item 1)
T Rating — 1 Hr



Section A-A

1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel channel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board* —** Nom 5/8 in. (16 mm) thick, 4 ft. (1.2 m) wide with square or tapered edges. The gypsum board type, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 8 in. (203 mm).
The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly.

2. **Through Penetrant —** One metallic pipe, tube or conduit installed within the firestop system. Pipe, tube or conduit to be rigidly supported on both sides of wall assembly. The following types of metallic pipes or tubes may be used:

A. **Steel Pipe —** Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe —** Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

C. **Conduit —** Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or steel conduit.

D. **Copper Tubing —** Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.

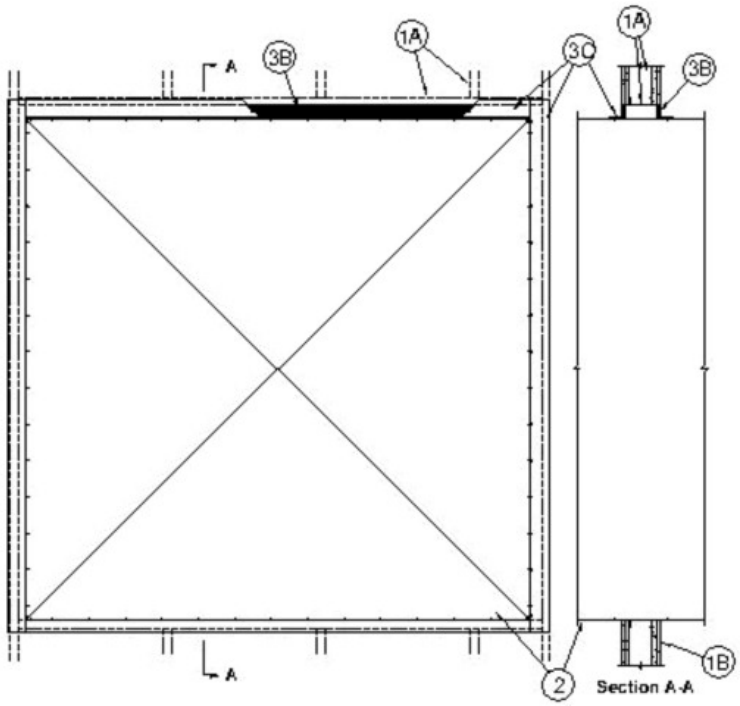
E. **Copper Pipe —** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Pipe Covering* —** Nom 1 in. (25 mm) thick hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. An annular space of min 0 in. (point contact) to max 1-7/8 in. (48 mm) is required within the firestop system.

4. **Fill, Void or Cavity Materials* - Caulk —** Min 5/8 in. (16 mm) thickness of caulk applied within annulus, flush with both surfaces of wall assembly.
RECTORSEAL — MC 150+

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr



1. **Wall Assembly —** The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of min 3-1/2 in. (89 mm) wide steel channel studs spaced max 24 in. (610 mm) OC. Additional steel studs shall be used to completely frame the opening.

B. **Gypsum Board* —** 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory. Max area of opening is 73.7 sq ft (6.85 m^2) with a max dimension of 104 in. (2.64 m).

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Steel Duct —** Max 100 in. by 100 in. (2.5 by 2.5 m) galv steel duct to be installed either concentrically or eccentrically within the firestop system. The duct shall be constructed and reinforced in accordance with SMACNA construction standards. The space between the steel duct and periphery of opening shall be min 0 in. (point contact) to max 2 in. (51 mm). Steel duct to be rigidly supported on both sides of the wall assembly.

3. **Firestop System —** The firestop system shall consist of the following:

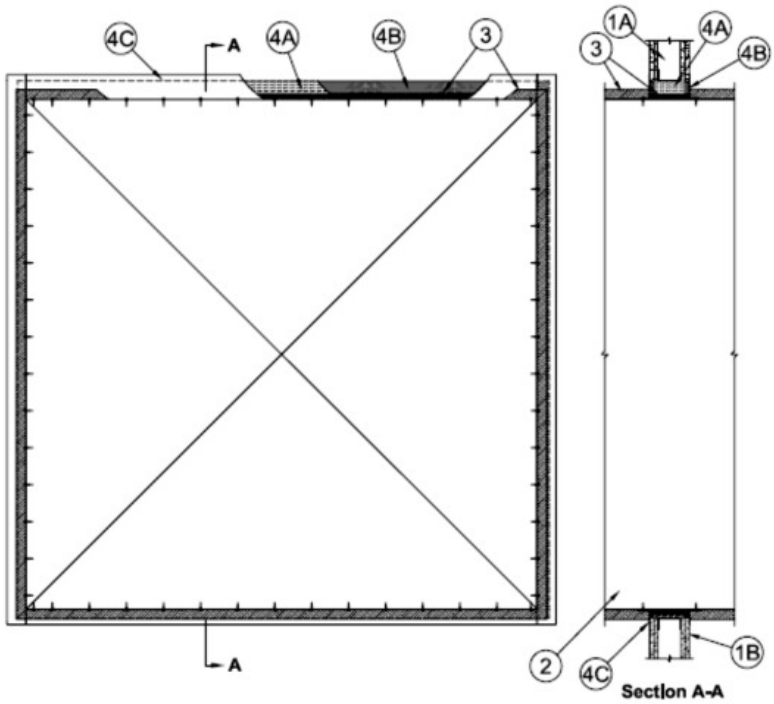
A. **Packing Material —** (Optional, Not Shown) — Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fitted into annular space. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material shall be applied at the point contact location between the steel duct and the gypsum board.
RECTORSEAL — Metacaulk 1000

C. **Steel Retaining Angles —** Min No. 16 gauge galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and to lap wall surfaces a min of 1 in. (25 mm). Angles attached to steel duct on both sides of wall with min No. 10 by 1/2 in. (13 mm) long steel sheet metal screws located a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr



1. **Wall Assembly —** The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs —** Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. Additional framing members shall be used to completely frame around opening.

B. **Gypsum Board* —** Min 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U300, U400 or V400 Wall and Partition Design. Max size of opening is 210 sq in. (1355 cm^2) with a max width of 14-1/2 in. (368 mm) for wood stud (U300 Series) walls. Max size of opening is 77.3 sq ft. (7.2 m^2) with a max width of 105-1/2 in. (2.7 m) for steel stud (U400 or V400 Series) walls.

The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall in which it is installed.

2. **Steel Duct —** Max 100 by 100 in. (2.5 by 2.5 m) steel duct to be installed within the framed opening. The duct shall be constructed and reinforced in accordance with SMACNA construction standards. Steel duct to be rigidly supported on both sides of wall assembly.

3. **Batts and Blankets* —** Nom 1-1/2 or 2 in. (38 or 51 mm) thick glass fiber batt or blanket (min 3/4 pcf or 12 kg/m^3) jacketed on the outside with a foil-scrim-kraft facing. Longitudinal and transverse joints sealed with aluminum foil tape. During the installation of the fill material, the batt or blanket shall be compressed minimum 50 percent such that the annular space within the firestop system shall be min 1/2 in. (13 mm) to max 2 in. (51 mm).

See **Batts and Blankets** (BKNV) category in the Building Materials Directory for names of manufacturers. Any batt or blanket meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index 50 or less may be used.

4. **Firestop System —** The firestop system shall consist of the following:

A. **Packing Material —** Min 3-5/8 (92 mm) or 4-7/8 in. (124 mm) thickness of min 4 pcf (64 kg/m^3) mineral wool batt insulation firmly packed into opening as a permanent form for 1 or 2 hr fire-rated walls, respectively. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material* — Sealant —** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall.
RECTORSEAL — Metacaulk 1000, 350i, MC150+, Biostop 500+, 350i, BF-150+, Flamesafe 1900, 900+

C. **Steel Retaining Angles —** Min No. 16 gauge (0.059 in. or 1.5 mm) galv steel angles sized to lap steel duct a min of 1 in. (25 mm) and lap wall surfaces a min of 2 in. (51 mm). Angles attached to steel duct on both sides of wall with min No. 10 steel sheet metal screws spaced a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC.

*,+ Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® JOINT STRIP

Flexible Material for up to 2" Wide Joints

Description

A flexible, highly intumescent firestop material used in concrete and masonry control floor and wall joints up to 2" (51 mm) wide. It forms a strong char that prevents the passage of flame, smoke, and hot gases between control joints. Can be used with plastic pipe penetrations. Metacaulk Joint Strips are ideal for stadium construction, tilt up panels, curtain wall panels and all concrete and masonry construction joint applications where a fire rated control joint is required. Can be used with any UL listed sealant.

Applications

Install Metacaulk Joint Strip along with any normal backer rod, cover it with approved architectural caulk or sealant, and you have a fire rated control joint. No longer do you need to use firestop caulks that are difficult to install and impossible to paint over. No need for mineral wool or expensive, difficult to install backing materials. Metacaulk Joint Strip has the capability for 1, 2, 3 and 4 hour assembly ratings, refer to the UL systems for specific installation instructions.

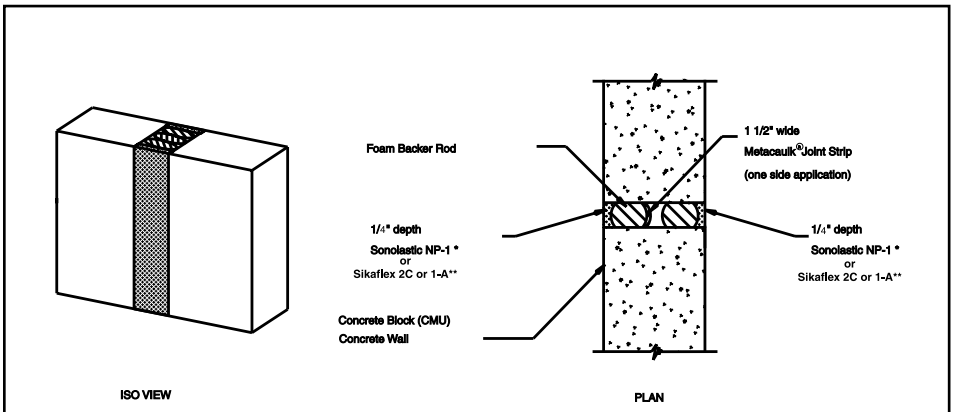
Characteristics | Features

- Easy to install
- Versatile, flexible
- Highly intumescent (multiple staged)
- Forms a strong char to prevent passage of flame, smoke and hot gases

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66700	1"x82'	6	10x10x10	.58
66701	1.5"x82'	4	10x10x10	.58
66702	2.5"x82'	4	10x10x10	.58
66703	3"x82'	2	10x10x10	.58
66704	2"x82'	3	10x10x10	.58
66705	4"x82' w/ adhesive backing	2	10x10x10	.58

Installation Data



For additional Technical Service, call toll free 800-231-3345

Step 1 Clean all surfaces in joint area to remove loose debris, dirt, oil, wax, grease, old caulking, etc.

Step 2 For floor applications, install a separate base section of backer rod recessed approximately 2" down from the top of the floor. Bend and friction fit Metacaulk® Joint Strip longitudinally into joint using the backer rod as the transport mechanism. Push into joint far enough to accommodate the required depth of caulk.

Step 3 Gun, trowel, or pump approved sealants to minimum 1/4" depth on both sides of wall or top of floor over the backer rod.

Step 4 Trowel sealant to the desired finish. See tested UL systems for complete installation instructions.

No longer do you need to use firestop caulks that are difficult to install and impossible to paint over. No need for mineral wool or expensive, difficult to install backing materials. Metacaulk®Joint Strip has the capability for 1, 2, 3 and 4 hour assembly ratings, refer to the UL systems for systems for specific installation instructions.

Testing Data

Metacaulk® Joint Strip is UL Classified and tested to UL 2079.

Degree of intumescence per DIN standard
≥18x with weight imposed
≥ 37x free intumescing

Tested to CAN/ULC-S115 (Fire Tests of Firestop Systems) test standards. Tested to the time-temperature requirements of ASTM E119 (UL 263). Complies to Required Environmental Exposure Testing of Accelerated Aging and High Humidity as per UL 1479 Fire Test of Through-Penetration Firestops.

Class II and III Movement 25% compression & extension

FBC™ System Compatible indicates that this product has been tested, and is monitored on an ongoing basis, to assure its chemical compatibility with Flowguard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology. The FBC System Compatible Logo, FBC™, FlowGuard Gold®, BlazeMaster®, Corzan® and TempRite® are trademarks of Lubrizol Advanced Materials, Inc. or its affiliates.

Material Properties

Carcinogenic Fillers	None
Solvents	None
Color	Dark Gray

ASTM E 84, UL 723 Tunnel Test ASTM E 1966, UL 2076	
Flame Spread	5
Smoke Index	5

Inspection & Repair

RectorSeal recommends that a firestop system inspection be conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk Joint Strip should be stored between 35˚F (2˚C) and 120˚F (49˚C). Keep products stored under protective cover, in their original containers. A stock rotation program is recommended. Shelf life of the product is indefinite.

Limitations

To be used only in the tested configurations or as recommended by RectorSeal.

WARNING

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

KEEP OUT OF REACH OF CHILDREN.

For additional information, refer to Safety Data Sheet (SDS).

Limited Warranty

For more information on our product warranty, visit rectorseal.com.

Distributed by

RectorSeal, LLC

2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • rectorseal.com

3255 Wyandotte St. East, Windsor, ON N8Y 1E9, Canada • 519-966-4901

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® 150+

General Purpose Firestop Sealant

Description

Metacaulk 150+ is a one component, general purpose fire rated sealant, acoustic sealant and smoke seal for construction joints and through-penetrations. Metacaulk 150+ is a water based, non-sag caulking grade sealant that is easy to apply as well as retrofit. It cures to an elastomeric seal that is suitable where dynamic movement is expected. In the event of a fire, Metacaulk 150+ will prevent the spread of flames, smoke, hot gases and water through joint openings and through-penetrations. No dilution or mixing is required for use. No special skills are necessary for installation. Metacaulk 150+ is applied with a conventional caulking gun, bulk loading gun or can be troweled from the pail. For large applications, it can be pumped directly from the pail. Metacaulk 150+ systems are rated for up to 4 hours in accordance with ASTM E814 (UL 1479) and ASTM E1966 (UL 2079) test standards. Metacaulk 150+ is protected in a wet stage as well as in a dry stage against mold growth with a combination of biocides.

Applications

Metacaulk 150+ can be used in interior applications as a general purpose fire rated sealant, acoustic sealant and smoke seal for construction joints on both vertical and horizontal surfaces. Metacaulk 150+ is also an excellent fire rated acoustical sealant and can be used in areas under constant vibration or movement. Metacaulk 150+ can also be used on various penetrations such as EMT, telephone & power cables in concrete floors and walls, gypsum walls as well as wood floors. Use Metacaulk 150+ to prevent the spread of fire and smoke through joints in fire rated gypsum wallboard partitions, concrete block or concrete walls and/or concrete or corrugated steel deck floor/ceiling assemblies.

Characteristics | Features

- Water based
- Excellent freeze-thaw
- Flexible set
- Paintable
- VOC compliant
- Safe and easy to use
- 3 Year shelf life
- STC rating 65

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66648	10.3 oz cartridge	12	8x6x12	.34
66385	20.2 oz foil pack	12	9x14x7	.51
66383	30 oz. cartridge	12	11x9x17	.97
66389	5 Gallon	1	13 dia x14	1.08
Gray				
66424	20.2 oz foil pack	12	9x14x7	.51
66425	5 gallon	1	13 dia x 14	1.08

Installation Data

Install Metacaulk 150+ using standard caulking techniques or trowel from pails. Metacaulk MC 150+ may also be pumped from the pails. When damming materials are needed, use only materials approved for the specific application.

TYPICAL GYPSUM WALLBOARD INSTALLATION

Step 1 Cut opening in wall.

Step 2 Clean penetration opening and surfaces from loose debris, dirt, oil and wax.

Step 3 If required, install sleeve and backing material.

Step 4 Gun the sealant as required to the specified depth. Trowel surface flush with wall.

Consult third part testing agency product listing directory for complete instructions and system listings.

Testing Data

For specific test criteria, refer to Intertek Directory and UL Product iQ or call RectorSeal.

Metacaulk 150+ was tested at positive pressure with a minimum 0.01 inches of water (2.5 Pa) and in accordance with ASTM E814 (UL 1479), ASTM E1966 (UL 2079). Tested to the time-temperature requirements of ASTM E119 (UL 263). L rating > 1 cfm cu.ft. Class 1 W-Rated.

Sound Transmission Class (STC) 65 - The test was performed in accordance with ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

FBC™ System Compatible indicates that this product has been tested, and is monitored on an on-going basis, to assure its chemical compatibility with FlowGuard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology.

Inspection & Repair

RectorSeal recommends that a firestop system inspection be conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk 150+ should be stored between 35˚F (2˚C) and 120˚F (49˚ C) to obtain a 3 year shelf life.

NOTE: Do not dilute, no mixing is required. Best if protected from freezing. If freezing occurs, thaw completely before using. Keep products stored under protective cover in original containers.

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	None
Application	Caulking Gun or Towel
Application Temperature between	40˚F - 120˚F 4˚C - 49˚C
Color	Red / Gray
Cure Time	3 to 4 weeks (at 77˚F/25˚C)
Density	12.5 lbs/gal
Elastomeric	Yes
Freeze/Thaw	Excellent
Skin Over Time	30 min. (at 77˚F/25˚C)
pH Value	7 to 8

Volume Coverage:	
for 10.3 oz. tube	(304 ml) 18 cu. in.
for 20.2 oz. foil packs	(597 ml) 36 cu. in.
for 30 oz. tube	(887 ml) 54 cu. in.
for 5 gallon	(18.9 liter) 1155 cu. in.

VOC	< 10 g/l

ASTM E84, UL 723 Tunnel Test	
Flame Spread	10
Smoke Index	0

Limitations

Metacaulk 150+ is not designed to be used in areas under continuous immersion or in areas which would be continuously wet. Metacaulk 150+ should not be used against hot uninsulated surfaces above 300˚F (149˚C).

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

Precautionary Statements

Prevention: Wear protective gloves/protective clothing/eye protection/face protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. **Response:** If exposed or concerned: Call a POISON CENTER or doctor/physician. **Storage:** Store locked up. Disposal: Dispose of contents/container in accordance with local regulations. **KEEP OUT OF REACH OF CHILDREN.**

For additional information, refer to Safety Data Sheet.

Limited Warranty

RectorSeal, LLC makes the Limited Express Warranty that when the instructions for storage and handling of our products are followed we warrant our products to be free from defects. THIS LIMITED EXPRESS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION ON THE PART OF RectorSeal, LLC. The sole remedy for breach of the Limited Express Warranty shall be the refund of the purchase price. All other liability is negated and disclaimed, and RectorSeal, LLC shall not be liable for incidental or consequential damages.

IFC INTERNATIONAL FIRESTOP COUNCIL
THE Source of Firestop Expertise®
MEMBER

Manufactured by **RectorSeal, LLC • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® 1000

Highly Intumescent Firestop Sealant

Description

Metacaulk 1000 is a single component, general purpose fire rated sealant and smoke seal for construction joints and through-penetrations. Metacaulk 1000 is a water based, extremely intumescent, non-sag caulking grade sealant that is easy to apply. It cures to an elastomeric seal that is suitable where dynamic movement is expected.

In the event of a fire, Metacaulk 1000 will prevent the spread of flames, smoke, hot gases and water through joint openings and through-penetrations. Metacaulk 1000 systems are rated for 1, 2, 3 and 4 hours in accordance with the ASTM E814 (UL1479), ASTM E1966 (UL 2079) and CAN/ULC-S115 test standards. Metacaulk 1000 is protected in a wet stage as well as in a dry stage against mold growth with a combination of biocides. Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

Applications

Metacaulk 1000 can be used in interior applications as a general purpose fire rated sealant and smoke seal for construction joints, through penetrations and blank openings on both vertical and horizontal surfaces. Use Metacaulk 1000 to prevent the spread of fire and smoke through joints in fire rated gypsum wallboard partitions, concrete block or concrete walls and/or concrete or corrugated steel deck floor/ceiling assemblies. Metacaulk 1000 is also an excellent fire rated acoustical sealant and can be used in areas under constant vibration or movement to reduce the transfer of noise through assemblies. Metacaulk 1000 can also be used on various penetrations such as EMT, telephone & power cables, insulated pipes, etc. in concrete floors and walls, gypsum walls as well as wood floors.

Characteristics | Features

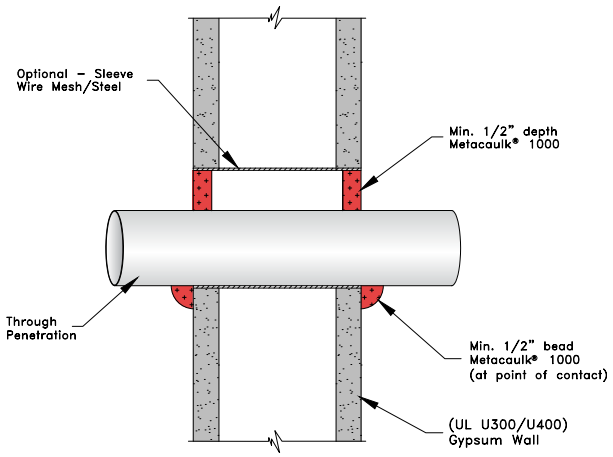
- Water based
- Excellent freeze-thaw
- Flexible set
- Highly intumescent
- Paintable
- VOC compliant
- Safe and easy to use
- 3 Year shelf life

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66640	10.3 oz cartridge	12	8x6x12	.34
66312	20.2 oz foil pack	12	9x14x7	.51
66303	30 oz. cartridge	12	11x9x17	.97
66309	5 Gallon	1	13 dia x14	1.08

Installation Data

Install Metacaulk 1000 using standard caulking techniques or trowel from pails. Metacaulk 1000 may also be pumped from the pails. When damming materials are needed, use only materials approved for the specific application.



UL Listed Syste: WL1114
Tested as Per UL 2079 @ 25% Compression or extension for 500 cylces

For additional Technical Service, call toll free 800-231-3345

TYPICAL TOP OF WALL INSTALLATION

Step 1 Gun, trowel or pump the sealant as required to the specified depth. Properly tool sealant surface flush with the wall.

Consult UL Directory for complete instructions and system listings.

Testing Data

For specific test criteria, refer to the UL Product iQ and Interek Directory of Building Products or call RectorSeal

Metacaulk 1000 was tested at positive pressure with a minimum 0.01 (2.5 Pa) inches water and in accordance with ASTM E814 (UL 1479), ASTM E1966 (UL 2079) and tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side in accordance with CAN/ULC S115 testing standards. Tested to the time-temperature requirements of ASTM E119 (UL 263). Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

Sound Transmission Class (STC) 62 - The test was performed in accordance with ASTM 90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

Complies to Required Environmental Exposure Testing of Accelerated Aging and

High Humidity as per UL 1479 Fire Test of Through-Penetration Firestops.

FBC™ System Compatible* indicates that this product has been tested, and is monitored on an ongoing basis, to assure its chemical compatibility with FlowGuard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology..
The FBC System Compatible Logo, FBC™, FlowGuard Gold®, BlazeMaster®, Corzan® and TempRite® are trademarks of Lubrizol Advanced Materials, Inc. or its affiliates.·

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	None
Application	Caulking Gun or Trowel
Application Temperature between	40˚F - 120˚F 4˚C - 49˚C

Activation of Intumescence:	
Expansion Begins	375˚F (190˚C)
Expansion Greatest	575˚F - 1100˚F 302˚C - 593˚C

Color	Red
Cure Time	3 to 4 weeks (at 77˚F/25˚C)
Density	~11 lbs/gal ~1.32 kg/L
Elastomeric	Yes
Freeze/Thaw	Excellent
Skin Over Time	30 min. (at 77˚F/25˚C)
pH Value	6.5 to 7

Volume Coverage:	
for 10.3 oz. tube	18 cu. in. (304 ml)
for 20.2 oz. foil packs	36 cu. in (597 ml)
for 30 oz. tube	54 cu. in. (887 ml)
for 5 gallon	1155 cu. in. (18.9 liter)

VOC	< 10 g/L

ASTM E 84, UL 723 Tunnel Test	
Flame Spread	0
Smoke Index	0

Inspection & Repair

RectorSeal recommends firestop system inspection is conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk 1000 should be stored between 35˚F (2˚C) and 120˚ F (49˚ C) to obtain a 3 year shelf life.

NOTE: Do not dilute, no mixing is required. Best if protected from freezing. If freezing occurs, thaw completely before using. Keep products stored under protective cover in original containers.

Limitations

Metacaulk 1000 is not designed to be used in areas under continuous immersion or in areas which would be continuously wet. Metacaulk 1000 should not be used against hot uninsulated surfaces above 300˚ F (149˚ C).

Cautions

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

PRECAUTIONS: Do not take internally. May be harmful if swallowed. May cause eye and skin irritation if prolonged or repeated contact occurs. Wash after handling. **FIRST AID:** For any overexposure, get immediate medical attention after first aid is given. **EYES-**Flush 15 minutes with clean water. **SKIN-**Wash with soap and water. **INHALATION-**Remove to fresh air. **INGESTION-**Only if conscious, give large amounts of water and INDUCE VOMITING. **FIRE AND SPILLS**: Use water fog, CO_2, foam, or dry chemicals. Wipe up spills to prevent footing hazard. Clean up with scrapers and water. **STORAGE AND HANDLING:** Store away from heat sources. Keep container closed. Do not reuse empty container. **KEEP OUT OF REACH OF CHILDREN.**

For additional information, refer to Safety Data Sheet.

Limited Warranty

RectorSeal, LLC makes the Limited Express Warranty that when the instructions for storage and handling of our products are followed we warrant our products to be free from defects. THIS LIMITED EXPRESS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION ON THE PART OF RectorSeal, LLC. The sole remedy for breach of the Limited Express Warranty shall be the refund of the purchase price. All other liability is negated and disclaimed, and RectorSeal, LLC shall not be liable for incidental or consequential damages.

IFC INTERNATIONAL FIRESTOP COUNCIL THE Source of Firestop Expertise® MEMBER

Manufactured by **RectorSeal® LLC • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® PUTTY & PADS

Fire-rated pad or stick

Description

Metacaulk Putty is a moldable non-curing one component fire rated material for through-penetration firestop systems. Metacaulk Putty will intumesce when heated, forming an insulating char. In the event of a fire, Metacaulk Putty will prevent the spread of flames, smoke, gas and water through penetration openings. Metacaulk Putty is applied by hand, no tools or mixing is required.

Applications

Use Metacaulk Fire Rated Putty for various penetrations: small openings, EMT Pipe, Steel, Conduit, and Cabling, (Telephone, Power, Communications), metal or non-metallic electrical boxes, large steel boxes and junction boxes. UL approved designs using Metacaulk Putty Pads with FRM Mortar designs to help provide a barrier or buffer for energized bus ducts or conduits as well as provide a barrier from vibration and movement.

Characteristics | Features

- Expands when exposed to fire
- No volatile solvents
- No asbestos fillers
- Single Component
- Applied by hand
- Adheres to all common building surfaces
- STC rating 60 - Pads

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66345	18 cubic in	12	5 x 11 x 8	.25
66340	6 x 7 x 1/8	20	8 x 7 x 4	.13
66335	7 x 7 x 1/8	20	8 x 8 x 4	.15
66475	9 x 9 x 1/8	20	9 x 9 x 4	.19

Installation Data

PUTTY: Penetrating items should be firmly anchored. Clean opening of dust, dirt and oil. Refer to RectorSeal® application guide or current UL Product iQ™ for selection of proper system design detailing depths of putty and backing material. Optionally, putty may be packed into inside of conduit fittings to prevent passage of smoke.

PUTTY PADS: Remove liner from one side of pad (Step 1). Align with the side of the box partially overlapping the stud and adhere. Work pad to the opposite side of the box and over the edges (Step 2). If wall membrane is in place, pack putty into gaps between box and gypsum board slightly overlapping inner wallboard surface. If membrane is to be installed after pad installation, overlap front edge of box so that putty will be compressed around edges of box as wallboard is installed. Cut slits in pad to fit around conduit or cables (Step 3). Press pad to surface of top, bottom, and sides of box (Step 4). Trim excess at corners and apply to conduit fittings connected to the box. Remove exposed liner. Only one putty pad thickness (1/8") is needed for a 1 or 2 hour rating.

Testing Data

Metacaulk Fire-Rated Putty are classified by Underwriters Laboratories as a fill, void or cavity material. Metacaulk Fire-Rated Putty Pads are classified as a wall opening protective material. For specific test criteria see UL Product iQ or call RectorSeal. Metacaulk Firestop Putty was tested to a positive pressure at a minimum .01 inches of water in accordance with UL 1479 and ASTM E814 test standards. Tested to CAN/ULC-S115 (Fire Tests of Firestop Systems) test standards. Tested to the time-temperature requirements of ASTM E119 (UL 263). Pads - Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

Inspection & Repair

RectorSeal recommends that a firestop system inspection be conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk Fire Rated Putty is not to be stored in areas where the temperatures exceed 120˚F or drop below 0˚F. Best if protected from freezing. If freezing occurs, thaw completely before using. Keep products dry and stored under protective cover in their original containers. A stock rotation program is recommended.

Limitations

To be used only in the tested configurations or as recommended by RectorSeal.

Cautions

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

PRECAUTIONS: Do not take internally.
KEEP OUT OF REACH OF CHILDREN.
For additional information, refer to Safety Data Sheet.

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	None

Activation of Intumescence:	
Expansion Begins	220˚F (104˚C)

Color	Red
Cure Time	None

ASTM E 84, UL 723 Tunnel Test	
Flame Spread	10
Smoke Index	125

Limited Warranty

RectorSeal, LLC makes the Limited Express Warranty that when the instructions for storage and handling of our products are followed we warrant our products to be free from defects. THIS LIMITED EXPRESS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION ON THE PART OF RectorSeal, LLC. The sole remedy for breach of the Limited Express Warranty shall be the refund of the purchase price. All other liability is negated and disclaimed, and RectorSeal, LLC shall not be liable for incidental or consequential damages.

INTERNATIONAL FIRESTOP COUNCIL
THE Source of Firestop Expertise®
MEMBER

Manufactured by **RectorSeal® • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**

RECTORSEAL

A CSW Industrials Company

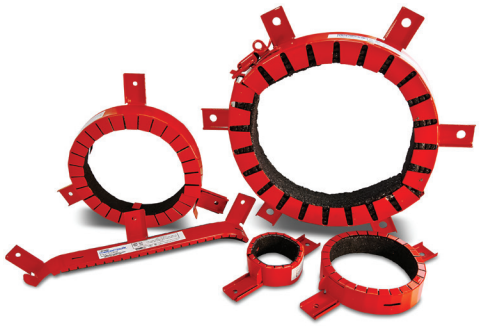
PRODUCT DATA SHEET

METACAULK® PIPE COLLAR

Prefabricated Firestop System

Description

Metacaulk® Pipe Collars are prefabricated for open and closed through-penetration firestop systems using 1 1/2"(38 mm) to 6" (152 mm) combustible plastic pipe. An easy locking tab assures quick and efficient installation. The collar design greatly reduces the time and expense that is required to install competitive collars.



Applications

Metacaulk Pipe Collars are used to seal off plastic pipe both in closed and vented (DWV) conditions. Also for used to close of combustible pipes in both up to 6" (152 mm) diameter ABS (cellular core or solid core), FRPP, PVC and CPVC pipe. The collar may be used on up to 3 hour rated concrete floors and walls, up to 2 hour rated gypsum walls and up to 2 hour rated wood floors.

Packaging

Code	Size	Qty. per Case
66352	1½"	12
66353	2"	12
66350	3"	6
66351	4"	6
66354	6"	2

Characteristics | Features

- Saves on labor cost
- Easy installation
- Economical
- No measurement of material required
- Highly intumescent
- Tested forPVC, CPVC, ABS and PVC/ABS Foam Core, FRPP

Installation Data

Metacaulk Pipe Collar are prefilled and very easy to install.

Step 1 Select the proper collar to fit the diameter of pipe used.

Step 2 Making sure annular space is within the limits set by the tested conditions, attach collar around the pipe on the underside of the floor or to each side of a wall by firmly placing against the wall or floor and securing interlocking tabs [1 1/2" (38 mm), 2" (51 mm), 3" (76 mm) and 4" (102 mm)] or fastening the buckle [6" (152 mm)].

Step 3 If needed, mark and predrill wall or floor for required anchors. Properly secure the appropriate anchor into each of the anchoring tabs. In concrete, use 1/4" (6 mm) x 1 1/4" (32 mm) hex washer head type concrete anchors or appropriate steel expansion/wedge anchors. In gypsum, use 1/8" (3 mm) x 2" (51 mm) MOLLY type hollow wall anchors or 1 1/2" drywall or drywall laminating screws. Fender washers have been provided to be used with the fasteners.

Step 4 If an additional smoke seal is required, Metacaulk 1000 may be applied within the annular space before the attachment of the collar.

Consult UL Product iQ for complete instructions and system listings.

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	None

Activation of Intumescence:	
Expansion Begins	375˚F (190˚C)
Expansion Greatest	575˚F - 1100˚F 302˚C - 593˚C

Testing Data

Metacaulk Pipe Collars are classified by Underwriters Laboratories as a Firestop Device. For specific test criteria, see UL Product iQ or call RectorSeal. Metacaulk® Pipe Collars were tested at a minimum .01 inches (2.5 Pa) of water positive pressure in accordance with ASTM E814 (UL 1479) test standards. Tested to the time-temperature requirements of ASTM E119 (UL 263). Tested to CAN/ULC-S115 (Fire Tests of Firestop Systems) test standards. Complies with Accelerated Aging and High Humidity Environmental Exposure Test for Intumescent Material per UL 1479 Fire Test of Through-Penetration Firestops. Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

FBC™ System Compatible* indicates that this product has been tested, and is monitored on an ongoing basis, to assure its chemical compatibility with FlowGuard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology.

Inspection & Repair

RectorSeal recommends that a firestop system inspection be conducted during installation of the material in accordance with ASTM E2174 and ASTM E 2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk Pipe Collars should be stored in a dry place. Keep product stored under protective cover in original container.

Limitations

Not for use in outdoor environments where long-term exposure to rainfall or saltwater spray may occur. No other limitations known if used as directed.

Cautions

Refer to Safety Data Sheet (SDS)

KEEP OUT OF REACH OF CHILDREN.

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

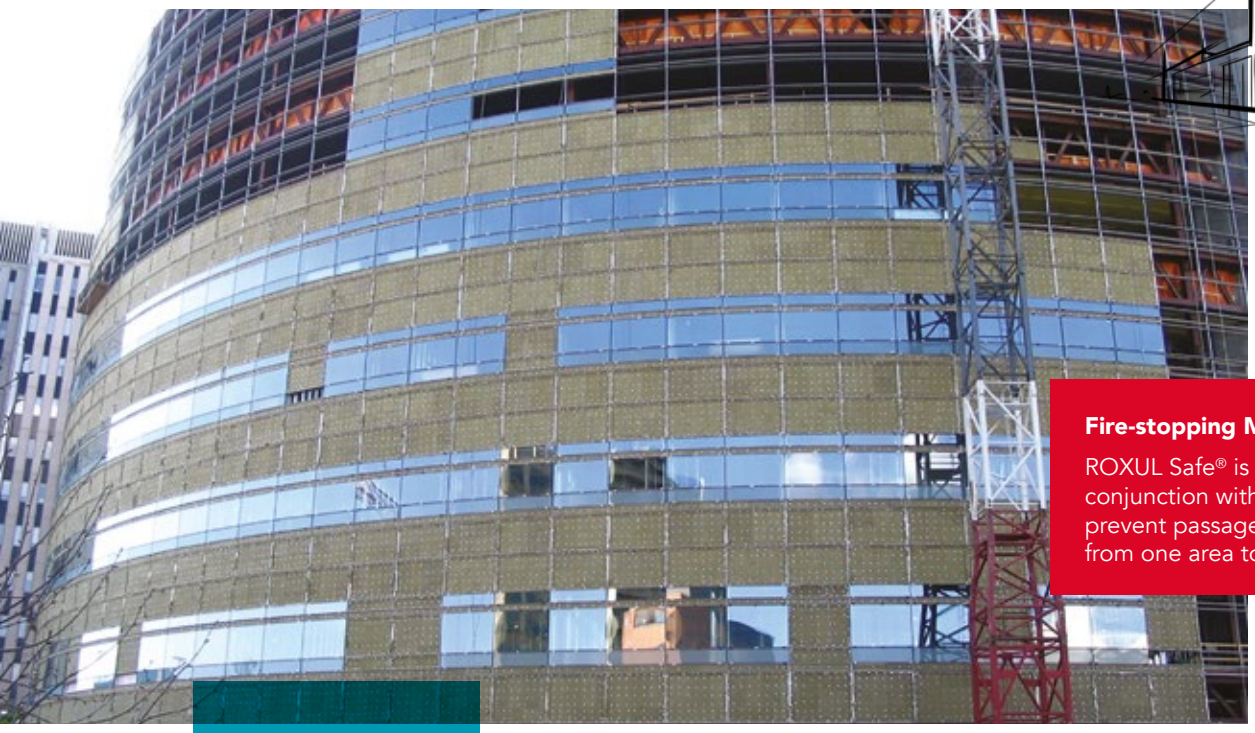
Limited Warranty

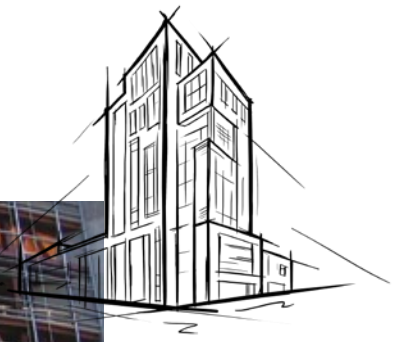
For more information on our product limited warranty, visit RectorSeal.com

Manufactured by **RectorSeal® LLC • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**

ROXUL Safe®

Fire Stopping Insulation





Fire-stopping Material

ROXUL Safe® is always used in conjunction with a fire sealant to prevent passage of fire and smoke from one area to the next.

ROCKWOOL ROXUL Safe® is a lightweight, semi-rigid stone wool insulation that provides fire-stopping and acoustical properties. It is designed to fill perimeter gaps between concrete floor slabs and exterior wall systems, between firewalls and ceiling slabs, and around conduit pipes and duct openings through walls and floor slabs.

It is non-combustible and fire resistant, and will not develop toxic smoke or promote flame spread, even when exposed directly to a fire. When ROXUL Safe® is used with ROCKWOOL Curtainrock®, it provides a comprehensive fire-stopping system that has been UL/ULC/Intertek tested and approved for perimeter fire containment systems.

Fire stopping insulation should be installed per the listed assembly with compression fitting requirements to form a tight seal between the floor line and exterior curtain wall assembly in perimeter installations so that flame and hot gases cannot pass through the joint. For through penetrations and construction joints, ROXUL Safe® should be cut as needed for compression fit leaving no voids.

Moisture resistant, non-corrosive and mildew-resistant, ROXUL Safe® also helps to reduce noise transmission into and out of the building for improved occupant comfort.

Learn more at rockwool.com

ROCKWOOL®

ROXUL Safe®
Fire Stopping Insulation

Technical Data Sheet

Firestopping 07840* • Firestopping 07 84 00**
Fibrous Fire Safing 07 84 56.13** • Curtain wall & glazed assemblies 08 44 00**

ROCKWOOL ROXUL Safe® is semi-rigid, mineral wool batt insulation approved for use in fire rated joints, through penetrations and perimeter fire containment systems.

	Performance	Test Standard
Compliance	Mineral Fiber Block and Board Thermal Insulation - Type IVA Compliant MEA Approval, New York City Approval	ASTM C612 339-97-M
Reaction to Fire	Flame spread index = 0; Smoke developed index = 0 Flame spread index = 0; Smoke developed index = 0 Determination of Non Combustibility of Building Materials - Non Combustible Test for Non-Combustibility - Non Combustible Fire Tests of Firestop Systems Fire Tests of Penetration Firestop Systems Tests for Fire Resistance of Building Joint Systems Perimeter Fire Barrier Systems Smoulder Resistance - 0.01% Consult UL, ULC and Intertek Directories for fire rated designs	ASTM E84 (UL 723) CAN/ULC S102 CAN/ULC S114 ASTM E136 CAN/ULC S115 ASTM E814 (UL 1479) UL 2079 ASTM E2307/E119 CAN/ULC S129
Density	Actual Density - 4.0 lbs/ft³ (64 kg/m³)	ASTM C303
Corrosion Resistance	Stress Corrosion Cracking Tendency of Austenitic Stainless Steel - Passed Corrosion of Steel - Passed	ASTM C795 ASTM C665
Reaction to Moisture	Moisture Sorption by weight - 0.04% Determination of Fungi Resistance - Passed	ASTM C1104 ASTM C1338
Thickness Dimensions	Product is available in 1.5", 2", 3", 4", 5" and 6" (38.1 mm, 50.8 mm, 76.2 mm, 101.6 mm, 127 mm and 152.4 mm), 24" x 48" (610 mm x 1219 mm)	

For more information regarding the certifications and listings of our stone wool insulation products, please visit:

rockwool.com/north-america/about-us/sustainability/certifications-and-listings/

Issued 07-22
Supersedes 03-22

NOTE: *Master Format 1995 Edition **Master Format 2004 Edition. As ROCKWOOL has no control over installation design and workmanship, accessory materials or application conditions, ROCKWOOL does not warranty the performance or results of any installation containing ROCKWOOL's products. ROCKWOOL's overall liability and the remedies available are limited by the general terms and conditions of sale. This warranty is in lieu of all other warranties and conditions expressed or implied, including the warranties of merchantability and fitness for a particular purpose.

ROCKWOOL®

8024 Esquesing Line, Milton, ON L9T 6W3
Tel: 800-265-6878 • Fax: 800-991-0110
rockwool.com

Fire Containment Insulation

Thermafiber® Safing™

- Exceptional performance in Perimeter Fire Containment Systems
- Provides life saving fire protection in rated assemblies
- Fire resistant to temperatures above 2,000°F (1,093°C)
- Easy to fabricate for through penetrations and firestopping
- Conserves energy, reduces greenhouse gas emissions
- Resists moisture
- Controls noise and sound

LEED® v2009 Green Building Credits

Minimum 70% Recycled Content[1]	Energy & Atmosphere	Materials & Resources	Indoor Environmental Quality	Innovation in Design
	1	2.1, 2.2 4.1, 4.2 5.1, 5.2	9	1

Thermafiber Safing and FireSpan® insulation provide the critical components of the perimeter fire containment system in the 111 South Wacker Building in Chicago, IL. Thermafiber insulation also contributed to the building's LEED® Gold Rating.

Thermafiber® Safing™ is compression fitted between FireSpan® insulation and the concrete slab edge to create a perimeter fire containment system.

Owens Corning® Thermafiber®

Made in the USA

CLASSIFIED UL

Intertek

Thermafiber® Safing™ Insulation

Description:

THERMAFIBER Safing™ products are designed to provide life saving fire protection in perimeter fire containment systems, floor and wall penetrations, construction joints, and other firestopping applications. These products are noncombustible, moisture-resistant, noncorrosive, nondeteriorating, mildew-proof and vermin-proof. Thermafiber Safing provides thermal insulation, fire protection, and acoustical control in many different UL and Intertek (formerly OPL) listed fire containment assemblies of 1, 2, and 3-hr ratings.

Product Options:

- Safing 4.0 pcf, 2" or greater thickness, is available with or without a vapor retarding foil facing.
- Safing 6.0 pcf, 1.5" or greater thickness, is available with or without a vapor retarding foil facing.
- Recycled Content Options[1]:

  EPA Choice Fiber (US Government Buildings)..... Minimum 75%

  Standard Fiber..... 70%

  [1]Recycled content options other than Standard must be specified at time of order.

Installation:

All firestopping insulation should be installed per the architectural specification or system specific test description. All compressed Safing insulation should be installed per the listed assembly.

- Perimeter Installation: Safing™ insulation should be compression fitted between the slab edge and the FireSpan curtain wall insulation, leaving no voids.
- Penetration Application: Safing insulation should be cut slightly larger than the opening and compression fitted into the opening, leaving no voids.
- Construction Joint Application: Safing insulation should be compression fitted into the joint opening, leaving no voids.

Standard Sizes:

	Thickness*	Widths**	Lengths**
Safing 4.0 pcf	1"- 7"	16", 24", 36"	48", 60"
Safing 6.0 pcf	1"- 7"	16", 24", 36"	48", 60"
Tolerances	+1/4" - 1/8"	±1/8"	±1/2"

*Thicknesses are available in ½" increments. **Custom sizes are available upon request.

Technical Data:

		Tested to ASTM C 518		Tested to ASTM E 84			
				Unfaced		Foil Faced	
Product Designation	Actual Density	"k" @ 75° [24°C] BTU.in/hr.sq. ft. °F	"R" value per inch of thickness***	Flame Spread	Smoke Developed	Flame Spread	Smoke Developed
Safing	4.0 pcf	0.24	'R'= 4.2	0	0	25	0
Safing	6.0 pcf	0.24	'R'= 4.2	0	0	25	0

***R = thickness divided by 'k'

Fire-Containment Tests Per ASTM E 2307

Safing™ insulation is a critical component of any perimeter fire containment system. Thermafiber® has performed decades of testing in all of the containment systems listed below. For more complete test information, see SA707, THERMAFIBER Life-Safety Fire Containment Systems technical catalog or UL® and Intertek® (formerly OPL) Directories. For a full listing of containment systems visit www.thermafiber.com and click on Fire Rated Assemblies. UL Reference = TYPE SAF

- Aluminum Spandrel Curtain Wall Fire Containment
- Steel Stud-Framed/Gypsum Sheathing Curtain Wall Fire Containment
- Glass Spandrel Curtain Wall Fire Containment
- Granite Spandrel Curtain Wall Fire Containment
- Precast Concrete Spandrel

Standards Compliance:

Safing™ Insulation meets the following:

ASTM C 665	**Non-corrosive, Type I, III**
ASTM C 612	**Type IA, IB, II**
ASTM E 136	**Rated Non-combustible per NFPA Standard 220**
CAN/ULC S114	**Complies**
ASTM E 96	**Unfaced, 50 Perms as tested**
ASTM E 96	**Foil Faced, 0.02 Perms as tested**
ASTM C 1104	**Absorbs less than 1% by volume**
CAN/ULC S102	**Flame Spread 0, Smoke Developed 0**
ASTM E 814 or UL 1479	**Safing Insulation used in conjunction with an approved fill, void, or cavity material sealant or other approved material in through – penetration firestop systems - Complies**
UL 2079	**Safing Insulation used in conjunction with an approved fill, void or cavity material in construction joint systems - Complies**
CAN/ULC S115	**Complies**

Safing products are approved by: **New York City Board of Standards & Appeals** – (under BSA 39-74-SM & accepted by MEA-209-82-M, Vol. 4).

Thermafiber® Insolutions®:

Thermafiber offers industry leading technical and engineering assistance to architects, specifiers, and contractors. These services include CAD drawings, engineering judgments, LEED® Credit Information, product recommendations, and customized products. Contact our technical services department at 1-888-834-2371, or email technicalservice@owenscorning.com

For Further Information:

For additional information about these or other Thermafiber products contact us at 1-888-834-2371 or visit our website www.thermafiber.com.

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 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.

Submittal Approvals:

Job Name	
Contractor	Date

3711 Mill Street | Wabash, IN 46992 | 888-TFIBER1 [834-2371] | [260] 563-2111 | www.thermafiber.com

RECTORSEAL

A CSW Industrials Company

PRODUCT DATA SHEET

METACAULK® SAS SMOKE & ACOUSTIC

High-grade acrylic latex sealant

Description

Metacaulk Smoke and Acoustic Sealant is high-grade acrylic latex sealant formulated to provide a permanent seal for penetrations, membrane openings, and static or dynamic joints in smoke or sound rated assemblies.
Metacaulkl Smoke and Acoustic Sealant has been tested in accordance to the following standards: ASTM E84, ASTM E90, ASTM E1399, ASTM C834, ASTM G21 and tested for air leakage in accordance to modified UL 1479 and modified UL 2079.
Metacaulk Smoke and Acoustic Sealant meets the requirements for LEED criteria under Environmental Air Quality and Regional Materials. Metacaulk Smoke and Acoustic Sealant is protected in a wet stage as well as in a dry stage against mold growth with a combination of biocides.

Applications

Metacaulk Smoke and Acoustic Sealant is designed to be used in interior applications to prevent the passage of smoke and impede the transfer of sound in non-fire rated assemblies. Metacaulk Smoke and Acoustic Sealant may be used in vertical and horizontal assemblies in linear joints in walls or floors. Metacaulk Smoke and Acoustic Sealant can also be installed around pipe, conduit, electrical cable, ventilation duct, electrical boxes and any other through or membrane penetration in a non-fire rated vertical or horizontal assembly.

USES:

Smoke: Prevents the passage of smoke through walls or floors as required in smoke partitions.

Sound: Reduces the passage of sound through voids created in walls in accordance with ASTM E90.

Airborn Particles: Reduces the movement of materials carried by air such as dust and allergens as demonstrated in air leakage testing modified UL 1479 and modified UL 2079.

Use Metacaulk Smoke and Acoustic Sealant for various applications:

Metallic and nonmetallic pipes, outlet and receptacle boxes, membrane penetrations, head of wall, bottom of wall, wall to wall joints

Characteristics | Features

- Highest STC rating in market*
- Easy to dispense
- Flexible
- Low VOC
- Meets LEED criteria
- Water clean up
- Paintable

* tested to E90 standards as a smoke sealant

Packaging

Code	Size	Qty. per Case	Dimensions (in)	Cubic Feet
66650	5 gal. spray grade	1	13x14 dia	1.08
66652	20.2 oz foil pack	12	9x14x7	.51

Installation Data

Install Metacaulk Smoke and Acoustic Sealant Caulk Grade with standard latex caulking tools and methods. Use only approved backing material when needed.
For Metacaulk Smoke and Acoustic Sealant Spray Grade application, use recommended Sealant Spray Grade equipment. Contact Technical service at 1-800-231-3345 or 713-263-8001 for current recommendations.
NOTE: SPRAY EQUIPMENT CAN BE DANGEROUS! USE ONLY PROPERLY TRAINED PERSONNEL. FOLLOW ALL SAFETY AND OPERATION INSTRUCTIONS AND PROCEDURES.

TYPICAL TOP OF WALL INSTALLATION

Linear Joint

Step 1 Thoroughly clean joint opening to remove all loose material to allow for Metacaulk Smoke and Acoustic Sealant to be easily installed.

Step 2 Gun, trowel or pump sealant to required depth and tool to be flushed with surface of wall or floor or spray or brush with appropriate equipment to required depth creating a complete seal.

Penetration

Step 1 Thoroughly clean opening around penetrating pipe, conduit, duct or other miscellaneous item to allow for Metacaulk Smoke and Acoustic Sealant to be easily installed.

Step 2 Gun, trowel or pump sealant to required depth and tool to be flush with surface of wall or floor or spray or brush with appropriate equipement to required depth creating a complete seal.

Consult RectorSeal for complete instructions and system listings.

Testing Data

For specific test criteria call RectorSeal.

Tested in accordance to the following standards:

ASTM E84, ASTM E1399, ASTM E90, ASTM C834, modified UL 1479*, modified UL 2079*

Tested by a third party independent laboratory to the ASTM G21 standard with Fungal Growth Rating results of zero.

* tested for air leakage at ambient temperature
Class II and III movement capability +-33% (tested to ASTM E1399)

Sound Transmission Class (STC) 69 - The test was performed in accordance with ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

Complies to Required Environmental Exposure Testing of Accelerated Aging and High Humidity as per UL 1479 Fire Test of Through-Penetration Firestops.

L rating > 1 cfm cu. ft.

CERTIFIED CLEAN AIR GOLD

FBC SYSTEM COMPATIBLE

FBC™ System Compatible* indicates that this product has been tested, and is monitored on an ongoing basis, to assure its chemical compatibility with FlowGuard Gold®, BlazeMaster® and Corzan® piping systems and products made with TempRite® Technology.

Material Properties

Asbestos Fillers	None
Solvents	None
Hazardous Ingredients	<1%
Application	Caulking Gun or Trowel
Application Temperature between	40˚F - 120˚F 4˚C - 49˚C

Activation of Intumescence:	
Color	White
Density	Caulk 11.1 lbs./gal 1.33 kg/L Spray 10.9 lbs/gal 1.31 kg/L
Elastomeric	Yes
Freeze/Thaw	Excellent
Skin Over Time	30 min. (at 77˚F/25˚C)
pH Value	6.5 to 8

Volume Coverage:	
for 20.2 oz. foil packs	36 cu. in (597 ml)
for 5 gallon	1155 cu. in. (18.9 liter)

VOC	< 0.5 mg/m3

TVOC 44.6 (µgm–3) per CDPH Standard Method V1.2, CA Section 01350. Test Results Pass Private Office (PO) & School Classroom (SC)

ASTM E 84, UL 723 Tunnel Test	
Flame Spread	0
Smoke Index	5

Inspection & Repair

RectorSeal recommends firestop system inspection is conducted during installation of the material in accordance with ASTM E2174 and ASTM E2393. In the event post-installation inspection and destructive sampling is necessary, RectorSeal advises repairing the damaged firestop system by replacing any material that was removed or damaged with the same product originally installed, and ensuring the assembly matches the original firestop listing. RectorSeal advises, that due to the chemical nature of firestop products and sealants, material depth should be determined by measuring the points of adhesion at the substrate bond area as sealants may decrease in size during the curing process.

Storage & Handling

Metacaulk Smoke and Acoustic Sealant should be stored between 35˚F (2˚C) and 120˚ F (49˚ C). to obtain a minimum 2 year shelf life, subject to inspection. NOTE: Do not dilute, no mixing is required. Keep from freezing. Keep products stored under protective cover in original containers.

Limitations

Metacaulk Smoke and Acoustic Sealant is not designed to be used in fire rated assemblies, conditions that are immersed in water or continuously wet. Metacaulk Smoke and Acoustic Sealant application temperature range is 40ºF to 120ºF and should not be installed on un-insulated surfaces that exceed 120ºF degrees.

Cautions

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC-DAY OR NIGHT 1-800-424-9300.

Refer to Safety Data Sheet (SDS)

KEEP OUT OF REACH OF CHILDREN.

Limited Warranty

RectorSeal, LLC makes the Limited Express Warranty that when the instructions for storage and handling of our products are followed we warrant our products to be free from defects. THIS LIMITED EXPRESS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION ON THE PART OF RectorSeal, LLC. The sole remedy for breach of the Limited Express Warranty shall be the refund of the purchase price. All other liability is negated and disclaimed, and RectorSeal, LLC shall not be liable for incidental or consequential damages.

IFC INTERNATIONAL FIRESTOP COUNCIL
THE Source of Firestop Expertise®
MEMBER

Manufactured by **RectorSeal® LLC • 2601 Spenwick Drive, Houston, TX 77055, USA • 800-231-3345 • Fax 800-441-0051 • RectorSeal.com**