

# Fire Stopping Manual for Automatic Sprinkler and Fire Hose Systems



Note: The architectural drawings have been reviewed to determine the fire separations, fire walls and non-rated walls that require fire stopping or smoke sealing as part of our contract. If there are no fire stopping or smoke sealing systems indicated on our drawings then either none are required or they are to be completed by others. This book will provide the details for sealing our penetrations and can be used by others if this work is not our contractual obligation.

Updated March 22/19

***SPIRA* Fire Stopping of Piping in Fire Separations (FS) & Fire Walls (FW)  
with NUCO - Self Seal GG-200 OR GG-266 (Last Updated October 19/16)**

FS1 = ½" - 4" Steel pipe, Sch 5 or heavier in 1 & 2 hr Block, Poured Concrete, or Pre-Cast Floors or Walls (cUL C-AJ-1201)

- Maximum 6" opening, no steel sleeves allowed, **core drill only or knock out with 0"** minimum to 1-1/2" maximum annular space
- 0" to 1-1/2" maximum annular space (no mineral wool required).
- 5/8" thick GG-200 or GG-266 on both sides of floor or wall for 1 hour rating or 1-1/4" thick of same for 2 hour rating.

FS2 = ½" - 4" Steel pipe, Sch 10 or heavier in 3 & 4 hr 200mm Block, Poured Concrete, Floors or Walls (ULC SP771)

Note: If block is less than 200mm, use C-AJ-1227)

- Maximum 6" opening (optional 6" or smaller Sch 40 steel or Sch 40 PVC sleeve flush to wall or floor).
- ½" minimum to 2-3/8" maximum annular space c/w 3-3/4" thickness of MW-300 or 72 KG/m3 mineral wool compressed to min. 50%.
- 1/4" thick GG-200 or 1/4" of SL-100 flush on top surface of concrete floor.
- 1/4" thick GG-200 on both sides of walls.

FS3 = 4"-16" Steel pipe, Sch 40 in 1,2,3 OR 4 hr Block, Poured Concrete, or Pre-Cast Floors or Walls (ULC SP116)

- Maximum 2.8 square foot opening 285mm x 915mm (optional sleeve of 1mm thick galvanized sheet metal, minimum 2" between pipes).
- 2" minimum annular space c/w 3-3/4" thickness of mineral wool for 1 & 2 hr. rating, 5-3/4" thickness for 3 & 4 hr. rating.
- 1/4" thick GG-200 on both sides or 1/4" thick SL-100 flush with top surface of concrete floor.

FS4 = ½" - 4" Steel pipe Sch 5 or heavier & ½" - 8" Sch 10 or heavier in 1 & 2 hr Drywall steel or wood stud Partitions (cUL W-L-1086)

- Maximum 10" opening (no sleeves allowed.).
- 0" minimum to 1 ½" maximum annular space (no mineral wool required).
- 5/8" thick GG-200 on both sides for 1 hr rating or 1-1/4" thick of same for 2 hour rating.

FS5A = ½" - 2" CPVC in 1 & 2 hr Block or Poured Concrete Walls or Poured Concrete & Pre-Cast Floors (cUL C-AJ-2314)

- Maximum 1" opening bigger than pipe (optional Sch 40 steel sleeved 1" larger than penetrating pipe).
- 0" minimum to 5/8" maximum annular space (mineral wool optional). 1/4" minimum and 3/8" maximum if steel sleeve is used.
- 5/8" thick GG-266 on both sides for 1 hr. rating or 1" thick of same for 2 hour rating.
- Additional 1/4" thick bead of GG-266 at point of contact between pipe and floor/walls.

FS5B = ½" - 2" CPVC in 1 & 2 hr Drywall steel or wood stud Partitions (cUL W-L-2145)

- 5/16" annular space is required (no mineral wool required).
- 5/8" thick GG-266 on both sides for 1 hr. rating or 1-1/4" thick of same for 2 hour rating.

FS6 = ½" - 4" CPVC in 1 hr Combustible Wood Floor Assembly (cUL F-C-2430)

- Maximum 5" opening (1" larger than nominal diameter of pipe, no sleeves allowed).
- 0" minimum to ½" maximum annular space (no mineral wool required).
- 3/4" thick GG-266 flush with top surface of sole plate and flush with bottom of top plate.
- ½" diameter bead where pipe has point contact with either top surface of sole plate or bottom surface of top plate.

FS7 = ½" - 2" CPVC in 2 hr Poured Concrete Floor or Block Walls (cUL C-AJ-2027C)

- Maximum 1" opening bigger than pipe no sleeves required. Optional Sch 40 steel sleeves allowed 1" larger than penetrating pipe.
- 5/16" annular space c/w backer rod or mineral wool to the minimum depth of 2" for gauging purposes.
- 2" thick GG-266 on both sides of walls and on the top surface only of floors.

FS8 = 3" or 4" CPVC in 1 & 2 hr Metal Stud Drywall Partitions (cUL W-L-2566)

- See application sheet for the self seal type-SSC collar (Note: 2-1/2" collars not made).

FS9 = ½"-4" Steel Sch 5 or heavier in 1 hr Solid Wood or Wood Truss Ceiling Assembly with two layers of 5/8" Drywall (cUL F-C-1093)

- Maximum 5.5" opening (no sleeves allowed).
- 0" minimum to 1" maximum annular space (no mineral wool required).
- 3/4" thick GG-200 in annular space on both top and bottom surface plus 1/4" dia. bead at point contacts.

FS10 = ½" - 8" Steel pipe. Sch 10 or heavier in 2 & 3 hr Block or Poured Concrete Floors or Walls (cUL C-AJ-1369)

- Maximum 10-1/2" opening (optional sch 40 steel sleeves allowed, core drill or plastic knock outs).
- 0" to 1-7/8" maximum annular space c/w 3-3/4" thickness of 4.0 pcf mineral wool for 2 hr. rating, 5-3/4" thickness for 3 hr. rating
- 1/4" thick GG-200 or GG-266 flush with top side of floor only or both sides of wall.

FW1 = ½" - 2" CPVC in 1 and 2 hr Block, Poured Concrete, or Pre-Cast Floors or Walls (cUL C-AJ-2026C)

- Maximum 1" opening bigger than pipe (no steel sleeves allowed, plastic knock outs or core drill only).
- 5/16" annular space c/w optional backer rod or mineral wool to the depth of 1" for gauging purposes.
- 5/8" thick GG-266 on both sides of floor or wall for 1hr rating or 1" thick of same for 2 hour rating.

FW2 = ½" - 2" CPVC in 2 hr Metal Stud Drywall Partitions with 2 Layers of 5/8" Drywall (ULC SP947)

- Maximum ½" to ¾" opening bigger than pipe (no steel sleeves allowed).
- ¼" minimum to 3/8" maximum annular space (no mineral wool required but allowed).
- 1-1/4" thick GG-266 on both sides of wall.

FW3 = 3" - 4" CPVC in 2 hr Block, Poured Concrete, or Pre-Cast Floors or Walls (cUL C-AJ-2025)

- See application sheet for the self seal type-SSC collar (Note: 2-1/2" collars are not made).

FW4 = ½" - 8" Steel Sch 10 or Heavier in Concrete Floor/Wall or Block Fire Wall (cUL C-AJ-5229)

- Maximum 10" opening (no steel sleeves allowed, plastic knock outs or core drill only).
- 0" minimum to 1-3/8" maximum annular space c/w 3-3/4" thickness of 4.0 pcf (64 kg/m3) mineral wool.
- 3/8" thick GG-200 or GG-266 flush with top of floor or on both sides of walls. (SL-100 can be used flush on top of floor as well).
- 2" thick for 2hr or 3" thick for 4 hr X 36" long (min 6.5 pcf or 104 kg/m3) ULC or cUL mineral wool all service jacket pipe insulation. Flame spread < 25 and smoke < 50 tightly butted against both sides of wall or floor with a minimum ½" overlap beyond the opening. Joints sealed with minimum 2" wide 3mil aluminum tape.

SS1 = Smoke Seal of Any Size Steel or CPVC Pipe in Any Type of Wall Assembly

- Bead of GG-200 or GG-266.

2. **Steel Sleeve – (Optional)** - Nom 10 in. (254 mm) diam (or smaller) Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly.
- 2A. **Metallic Sleeve – (Optional, for wall installations only)** - Cylindrical sleeve fabricated from min No. 30 gauge galv sheet steel and having a min 2 in. (51 mm) lap along the longitudinal seam. Length of the sleeve to be equal to the thickness of the wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the opening and releasing the coil to let it uncoil against the circular cutouts in the gypsum board layers. The ends of the steel sleeve shall be flush with each surface of the wall.

3. **Through-Penetrant** - One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening or sleeve shall be min of 0 in. (0 mm, point contact) to max 1-7/8 in. (48 mm). Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
- A. **Steel Pipe** - Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
  - B. **Iron Pipe** - Nom 8 in. (203 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 8 in. (203 mm) diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.
  - C. **Conduit** - Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in. diam (or smaller) steel electrical metallic tubing.
  - D. **Copper Tubing** - Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tubing.
  - E. **Copper Pipe** - Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
4. **Firestop System** - The details of the firestop system shall be as follows:
- A. **Packing Material** - Min 3-3/4 in. and 5-1/2 in. (95 and 140 mm) thickness of min 4.0 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form for 2 and 3 Hr rated assemblies, respectively. 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 Materials\* - Sealant** - Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material applied to the penetrant / concrete or penetrant / sleeve interface at the point contact location on the top surface of floor or both surfaces of wall. When optional sheet metal sleeve (Item 2A) is used, a thin film of sealant shall be applied over edges of sleeve and overlapping onto wall a min of 1/2 in. (13 mm) on both sides of wall.

**NUCO INC.** - Self Seal GG-200 or •GG-266 (floors or walls) or Self Seal SL-100 (floors only)

\* Bearing the UL Classification Mark

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

# FS1

## System No. C-AJ-1201

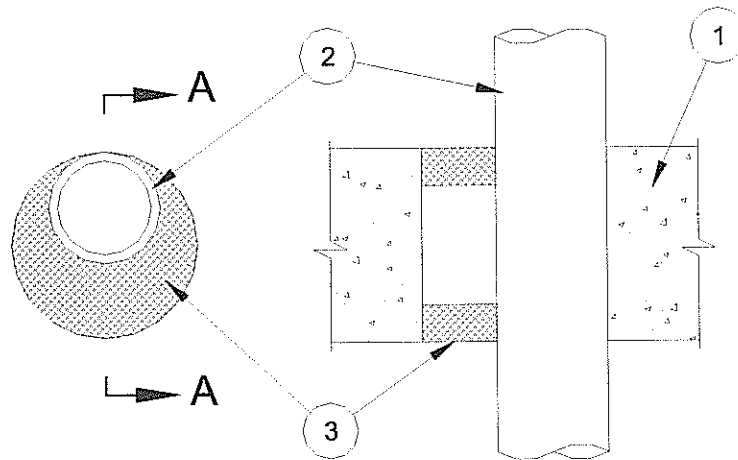


F Ratings - 1 and 2 Hr (See Item 1)

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

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 3 CFM / Sq. Ft.



SECTION A-A

1. **Floor or Wall Assembly** - Min 3-3/4 in. and 4-1/2 in. thick reinforced lightweight or normal weight (100 - 150 pcf) concrete for 1 and 2 hr rated assemblies, respectively. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Floor may also be constructed of min 6 in. thick UL Classified hollow-core **Precast Concrete Units\***. Max diam of opening is 6 in.

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

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

- A. **Steel Pipe** - Nom 4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
- B. **Copper Tubing** - Nom 3 in. diam (or smaller) Type L (or heavier) copper tubing.
- C. **Copper Pipe** - Nom 3 in. diam (or smaller) Regular (or heavier) copper pipe.
- D. **Conduit** - Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT) or steel conduit.
- E. **Iron Pipe** - Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

T Rating is 1/4 hr for Items A and D, 0 hr for Items B and C.

3. **Fill, Void or Cavity Material\* - Sealant** - Min 5/8 in. and 1-1/4 in. thickness of fill material for 1 and 2 hr rated assemblies, respectively, applied within the annulus, flush with both surfaces of floor or wall.

**NUCO INC.** - Self Seal GG-200 or •Self Seal GG-266

\* Bearing the UL Classification Mark

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

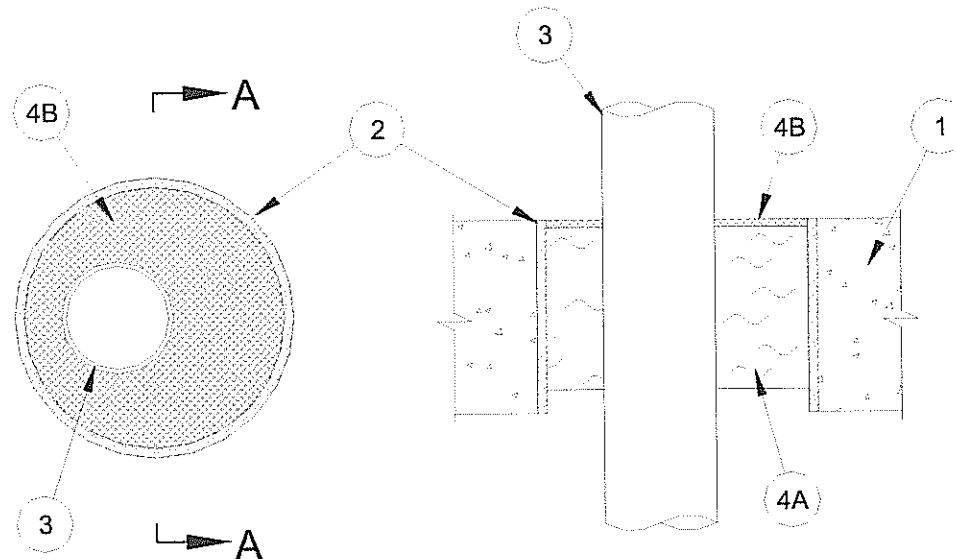
# FS2

## System No. SP771



(FOR HORIZONTAL OR VERTICAL SEPARATIONS)

F Rating	- 3 and 4 hr (See Item 1)
FT Rating	- 0 hr
FH Rating	- 3 and 4 hr (See Item 1)
FTH Rating	- 0 hr



### SECTION A-A

1. **Floor or Wall Assembly** - For 3 hr rating, minimum 102 mm thick; for 4 hr rating, minimum 114 mm thick reinforced low density or normal density (1600 to 2400 kg/m<sup>3</sup>) structural concrete. Wall may also be constructed of nominal 200 mm thick concrete blocks. Maximum diameter of opening is 150 mm.
2. **Sleeves (Optional)** - The following sleeves may be used:
  - A. **Metallic Sleeve** - Nominal 150 mm diameter (or smaller) Schedule 40 (or heavier) steel pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.
  - B. **Nonmetallic Sleeve** - Nominal 150 mm diameter (or smaller) Schedule 40 polyvinyl chloride (PVC) pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.
3. **Through-Penetrants** - One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space shall be minimum 13 mm to maximum 60 mm. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types of pipe, conduit or tubing may be used:
  - A. **Steel Pipe** - Nominal 100 mm diameter (or smaller) Schedule 10 (or heavier) steel pipe.
  - B. **Conduit** - Nominal 100 mm diameter (or smaller) steel electrical metallic tubing (EMT) or steel conduit.
  - C. **Copper Tubing** - Nominal 75 mm diameter (or smaller) Type M (or heavier) copper tubing.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*



\*4. **Firestop System Components (Guide No. 40 U19.13)** - The firestop system shall consist of the following:

- A. Type Self Seal MW-300 mineral wool insulation or minimum 72 kg/m<sup>3</sup> mineral wool batt insulation installed to a minimum depth of 95 mm, compressed minimum 50%, and firmly packed into opening as a permanent form. End joints to be firmly butted. Material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of sealant.
- B. Type Self Seal GG-200 (floors or walls) or Self Seal SL-100 (floors only) - Minimum 6.5 mm thickness of sealant applied within the annulus, flush with the top surface of floor or with both surfaces of wall.

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\* Listed by Underwriters' Laboratories of Canada for use as a component within the appropriate System.

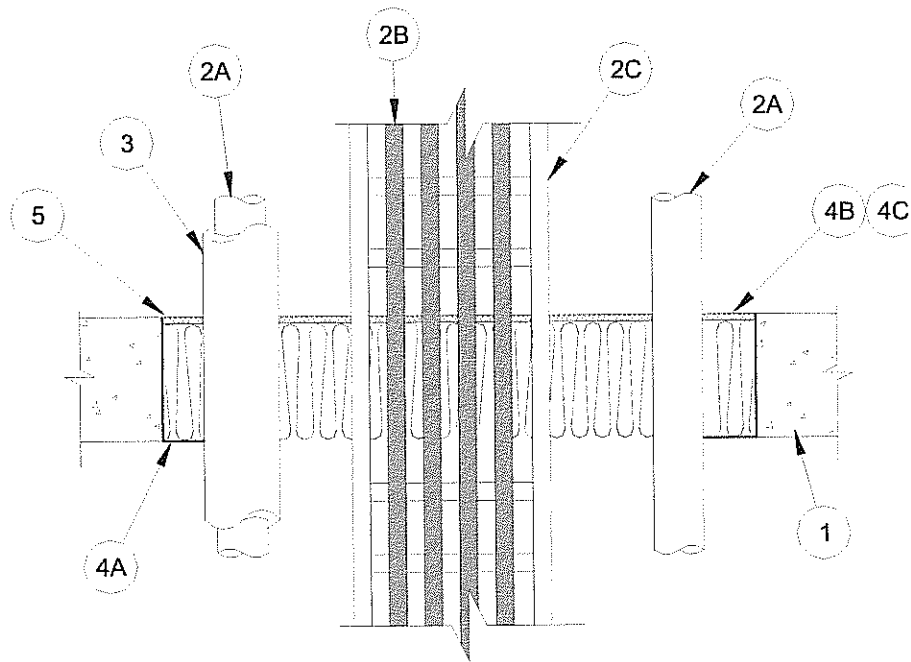
# FS3

## System No. SP116



(FOR HORIZONTAL OR VERTICAL SEPARATIONS)

F Rating	- 2 or 4hr (See Items 1 and 4a)
FT Rating	- (See Item 2)
FH Rating	- 2 or 4hr (See Items 1 and 4a)
FTH Rating	- (See Item 2)



### 1. Floor or Wall Assembly -

Minimum 114 mm thickness for 2 hr rating or 190 mm thickness for 4 hr rating reinforced low density or normal density (1600 to 2400 kg/m<sup>3</sup>) structural concrete. Alternate floor construction may consist of minimum 190 mm thick hollow core precast concrete unit having a ULC fire resistance rating equal to or greater than that of the low or normal density concrete floor assembly. Wall may also be constructed of nominal 200 mm thick concrete blocks. Maximum size of rectangular opening 285 mm by 915 mm.

### 2. Pipe, Cables and Cable Tray --

- a) Steel pipe, nominal 406 mm OD, Schedule 40; EMT nominal 100 mm OD, 2 mm (or greater) wall thickness; copper pipe nominal 75 mm OD (5.4 mm thick or greater). Pipes to be reliably supported above through-openings and installed minimum 50 mm space between pipes, edge of opening, and between other penetrating items.
- b) Individual cables , Type 300 MCM Type THW Tech 90; 16 AWG 600V 90 C UL-FR-1; 12 AWG Type TC XHHW CDRS 600V cables. Maximum of 17 cables, minimum 7 mm space required between individual cables, minimum 50 mm space between cables and other penetrating items.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*

- c) Nominal 900 mm by 90 mm open ladder galvanized steel or aluminum cable tray. Maximum loading of 40% consisting of the following cables:
- i) Maximum of 46 (forty-six) 14 AWG/2 600V TECH 90 cables,
  - ii) Maximum of 19 (nineteen) 20 AWG 300V shielded 12 pair cables,
  - iii) Maximum of 8 (eight) 500 MCM TECH 90 XLPE cables.

Minimum 50 mm space required between cable tray and other penetrating items.

<u>Pipe or Cable Type</u>	<u>FT and FTH Rating, Hr</u>
Steel Pipe non-insulated (Item 2a)	0
Insulated steel pipe (Item 2a)	1
EMT (Item 2a)	0
Non-insulated copper (Item 2a)	0
Insulated copper (Item 2a)	3/4
300 MCM (Item 2b)	0
16 AWG (Item 2b)	3/4
12 AWG (Item 2b)	2
14 AWG (Item 2c (i))	0
20 AWG (Item 2c (ii))	1-1/2
500 MCM (Item 2c (iii))	0
No penetrations	4

3. **Pipe Insulation** - Pipe, Item 2a, to be wrapped with minimum 25 mm thick ULC labelled hollow cylindrical heavy density (minimum 112 kg/m<sup>3</sup>) mineral wool fiber units with an all service jacket. Longitudinal joints sealed with metal fasteners or with butt tape supplied with the product.

**\*4. Firestop System Components - (Guide No. 40 U19.13)**

- (a) Type Self Seal MW-300 mineral wool insulation or minimum 80 kg/m<sup>3</sup> mineral wool insulation installed to a minimum depth of 95 mm for 2hr or 145 mm for 4hr, leaving minimum of 6.4 mm deep space between top of insulation and top surface of floor, or 10 mm space on both sides of wall for vertical separation. Uncompressed total width of material to be 50 ± 10% wider than width of opening to be filled (i.e. 270 mm wide for 180 mm wide opening). Length of individual pieces to match length of opening so as to avoid end joints and butted tightly against penetrating items. Remaining voids and spaces between cables to be firmly packed by hand (50 ± 10% compression) with insulation.
- (b) Type Self Seal SL-100 (floors only) sealant applied over insulation (Item 4a) to minimum depth of 6.4 mm and flush with top of floor.

OR

- (c) Type Self Seal GG-200 (floors or walls) sealant to be applied over insulation (Item 4a) on both sides of opening to minimum depth of 6.4 mm for vertical separations.

**NUCO INC.**

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*

5. **Sleeve (optional)** - Opening can be sleeved with 1 mm thick galvanized sheet metal.

\*Listed by Underwriters' Laboratories of Canada for use as a component within the appropriate System.

# FS4

## System No. W-L-1086

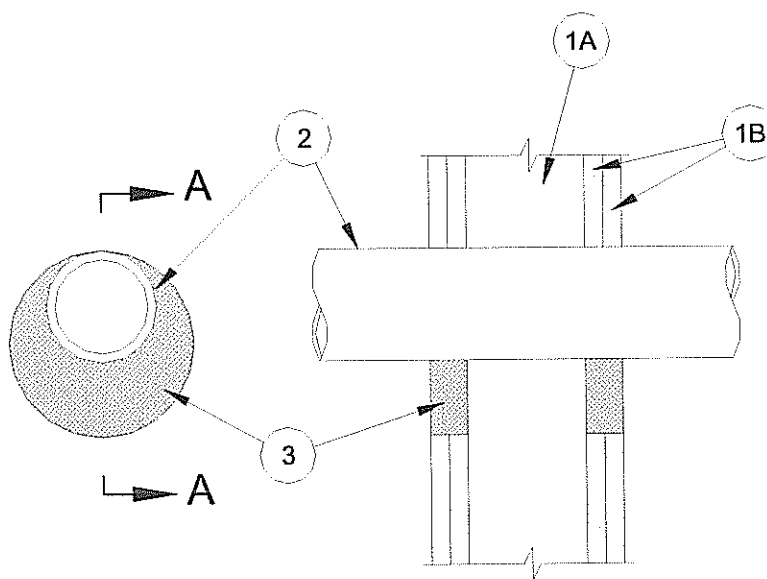


F Ratings - 1 and 2 Hr (See Item 1)

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

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 3 CFM / Sq. Ft.



### SECTION A-A

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 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. **Wallboard, Gypsum\*** - Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 10 in.

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

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

- A. **Steel Pipe** - Nom 4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
- B. **Copper Tubing** - Nom 3 in. diam (or smaller) Type L (or heavier) copper tubing.

*The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115*

- C. **Copper Pipe** - Nom 3 in. diam (or smaller) Regular (or heavier) copper pipe.
- D. **Conduit** - Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT) or steel conduit.
- E. **Steel Pipe** - Nom 8 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

**T Rating is 1/4 hr for Items A, D and E, 0 hr for Items B and C.**

- 3. **Fill, Void or Cavity Material\* - Sealant** - Min 5/8 in. or 1-1/4 in. thickness of fill material applied within the annulus, flush with both surfaces of wall for 1 or 2 hr walls, respectively.

**NUCO INC.** - Self Seal GG-200

\* Bearing the UL Classification Mark

# FS5A

## System No. C-AJ-2314

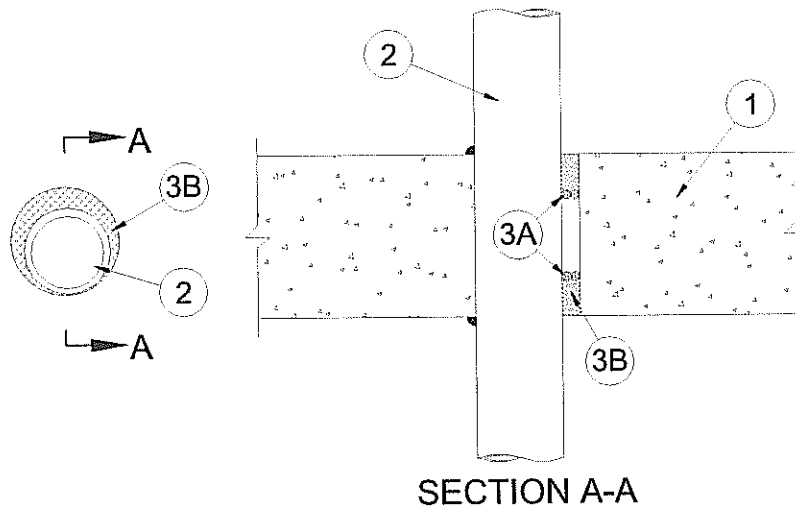


F Ratings - 1 and 2 Hr (See Item 1)

T Ratings - 0, 1 and 2 Hr (See Item 2)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 5 CFM / Sq. Ft.



1. **Floor or Wall Assembly** - Min 3-3/4 in. (95 mm) or min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600 – 2400 kg/m<sup>3</sup>) concrete for 1 and 2 Hr rated assemblies, respectively. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Floor assembly may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units\***. The opening shall be 1 in. (25 mm) larger than the nom diam of penetrant.

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

- 1A. **Steel Sleeve – (Optional, Not Shown)** – Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with both surfaces of floor or wall assembly. The nom size of sleeve shall be 1 in. (25 mm) larger than the nom size of through-penetrant.
2. **Through-Penetrant** - One nonmetallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space between the penetrant and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 5/8 in. (16 mm). When steel sleeve is used, the annular space between the penetrant and the sleeve shall be a min 1/4 in. (6 mm) to a max 3/8 in. (10 mm). Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:
  - A. **Polyvinyl Chloride (PVC) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

*The basic Standard used to evaluate this Firestop System is ANSI/UL 1479 (ASTM E814)*

- B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe†** - Nom 2 in. (51 mm) diam (or smaller) SDR13.5 or SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
- D. **Crosslinked Polyethylene (PEX) Tubing‡** - Nom 2 in. diam (55 mm OD) (or smaller) SDR9 PEX tubing for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- E. **Electrical Nonmetallic Tubing (ENT)+** - Nom 2 in. (51 mm) diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- F. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 2 in. (51 mm) diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

- G. **Polyvinyl Chloride (PVC) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- H. **Acrylonitrile Butadiene Styrene (ABS) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- I. **Chlorinated Polyvinyl Chloride (CPVC) Pipe‡** - Nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

**IPEX INC.** - AquaRise

T Rating is 0 Hr when steel sleeve is used. When steel sleeve is not used, the T Rating is 1 and 2 Hr for Penetrants A, B, C, D, E, and F for 1 and 2 Hr rated assemblies, respectively. T Rating is 0 Hr for Penetrants G and H. T Rating is 1 Hr for Penetrant I.

3. **Firestop System** - The details of the firestop system shall be as follows:

- A. **Packing Material (Optional)** – Nom 3/8 in. (10 mm) diam polyethylene backer rod or min 3/8 in. (10 mm) thickness of mineral wool batt insulation firmly packed into opening as a permanent form and recessed from both surfaces of floor or wall as required to accommodate the required thickness of fill material.

*The basic Standard used to evaluate this Firestop System is ANSI/UL 1479 (ASTM E814)*



- B. **Fill, Void or Cavity Material\* - Caulk** - Min 5/8 in. (16 mm) or min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with both surfaces of floor or wall, for 1 and 2 Hr rated assemblies, respectively. An additional 1/4 in. (6 mm) bead of fill material applied at the penetrant / concrete interface at the point contact location.

**NUCO INC. - •Self Seal GG-266**

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

# FS5B

## System No. W-L-2145

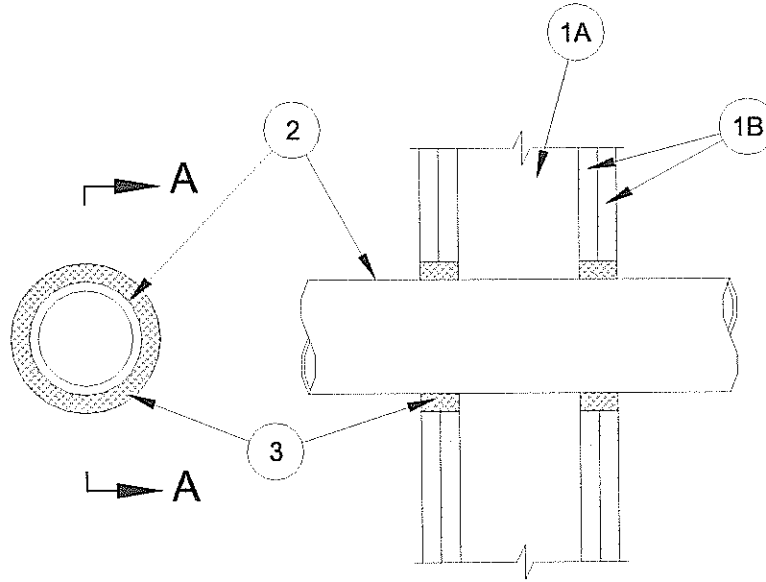


F Ratings - 1 and 2 Hr (See Item 1)

T Ratings - 0, 1, 1-1/2 and 2 Hr (See Item 2)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 5 CFM / Sq. Ft.



### SECTION A-A

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 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. (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. **Wallboard, Gypsum\*** - Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 3 in. (76 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, conduit or tubing to be centered within the firestop system. A nom annular space of 5/16 in. (8 mm) is required within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:

- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

*The basic Standard used to evaluate this Firestop System is ANSI/UL 1479 (ASTM E814)*

- B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe‡** - Nom 2 in. (51 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
- D. **Crosslinked Polyethylene (PEX) Tubing‡** - Nom 2 in. (55 mm OD) diam (or smaller) SDR9 PEX tubing for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- E. **Acrylonitrile Butadiene Styrene (ABS) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- F. **Electrical Nonmetallic Tubing (ENT)+** - Nom 2 in. (51 mm) diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- G. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 2 in. (51 mm) diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

- H. **Chlorinated Polyvinyl Chloride (CPVC) Pipe‡** - Nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

IPEX INC. - AquaRise

The T Rating is 0 Hr and 1-1/2 Hr for 1 and 2 Hr rated assemblies, respectively, for Penetrants A, B and C. The T Rating is 0 Hr and 2 Hr for 1 and 2 Hr rated assemblies, respectively, for Penetrants D, F, and G. The T Rating is 0 Hr for Penetrant E. The T Rating is 1 Hr for Penetrant H.

- 3. **Fill, Void or Cavity Material\* - Caulk** - Min 5/8 in. (16 mm) and 1-1/4 in. (32 mm) thicknesses of fill material for 1 and 2 Hr rated assemblies, respectively, applied within the annulus flush with both surfaces of wall.

NUCO INC. - •Self Seal GG-266

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

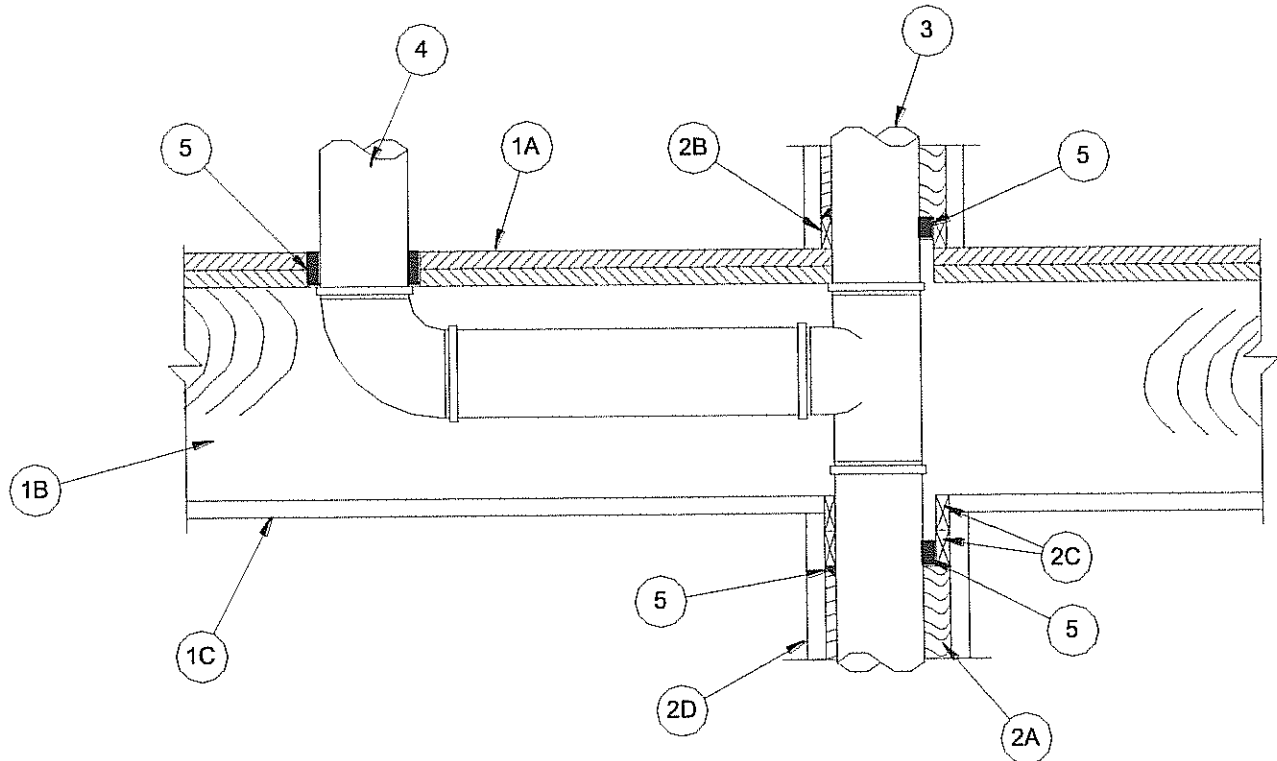
Form: WL2145 Rev.: 8 Date: 05/11

# FS6

## System No. F-C-2430



<u>ANSI / UL1479 (ASTM E814)</u>	<u>CAN / ULC - S115-11</u>
F Rating - 1 Hr	F Rating - 1 Hr
T Rating - 1 Hr	FT Rating - 1 Hr
L Rating At Ambient - Less Than 1 CFM / Sq. Ft.	FH Rating - 1 Hr
L Rating At 400°F - Less Than 1 CFM / Sq. Ft.	FTH Rating - 1 Hr
	L Rating At Ambient - Less Than 5.1 L/s/m <sup>2</sup>
	L Rating At 400°F - Less Than 5.1 L/s/m <sup>2</sup>



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. System No. F-C-2430 meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

1. **Floor-Ceiling Assembly** - The 1 Hr fire-rated wood truss or combination wood and steel truss floor-ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 series Floor-Ceiling designs in the UL Fire Resistance Directory and shall include the following construction features:
  - A. **Flooring System** - Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture\*** as specified in the individual Floor-Ceiling design. Max diam of opening shall be 1 in. (25 mm) larger than the nom diam of nonmetallic pipe (Item 3) and max 2 in. (51 mm) larger than the nom diam of nonmetallic branch pipe (Item 4) except as noted under Item 6. As an option, the opening for the branch piping (Item 4) may be rectangular, 8 in. by 12 in. (204 mm by 305 mm) max. Cutout to be patched on the underside of subfloor using one layer of min 3/4 in. (19 mm) thick plywood or min 5/8 in. (16 mm) thick gypsum board (Item 1C) sized to lap min 2 in. (51 mm) beyond each edge of rectangular cutout. Diam of opening hole sawed through patch to accommodate branch piping (Item 4) to be max 1 in.

(25 mm) larger than diam of branch piping. Patch split into two pieces at opening hole-sawed for branch piping. Two pieces positioned around branch piping, with cut edges tightly-butted, and screw attached to the underside of subfloor using 1-1/4 in. (32 mm) long Type S steel screws spaced max 6 in. (152 mm) OC.

- B. **Joists** - Min 9 in. (229 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members\*** with bridging as required and with ends firestopped.
  - C. **Gypsum Board\*** - Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling design.
2. **Chase Wall** - The through-penetrant (Item 3) shall be routed through a 1 Hr fire-rated or non-rated single, double or staggered wood stud / gypsum board chase wall constructed of the materials and Partition design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs** - Nom 2 in. by 4 in. (51 mm by 102 mm) or nom 2 in. by 6 in. (51 mm by 152 mm) or double nom 2 in. by 4 in. (51 mm by 102 mm) lumber studs.
  - B. **Sole Plate** - Nom 2 in. by 4 in. (51 mm by 102 mm) or nom 2 in. by 6 in. (51 mm by 152 mm) or parallel 2 in. by 4 in. (51 mm by 102 mm) lumber plates, tightly butted.
  - C. **Top Plate** - The double top plate shall consist of two nom 2 in. by 4 in. (51 mm by 102 mm) or nom 2 in. by 6 in. (51 mm by 152 mm) or two sets of parallel 2 in. by 4 in. (51 mm by 102 mm) lumber plates, tightly butted. Diam of opening shall be 1 in. (25 mm) larger than the nom diam of nonmetallic pipe (Item 3) except as noted under Item 6.
  - D. **Gypsum Board\*** - Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition design .
3. **Through Penetrant** - One nonmetallic pipe to be installed within the firestop system. Pipe to be rigidly supported on both sides of the floor-ceiling assembly. The annular space between the pipe and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 1/2 in. (13 mm). 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 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 4 in. (102 mm) diam (or smaller) SDR13.5 CPVC pipe or nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - C. **Acrylonitrile Butadiene Styrene (ABS) Pipe** - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- Note:** When chase wall is constructed of nom 2 in. by 4 in. (51 mm by 102 mm) studs, through penetrants are restricted to nom 2 in. (51 mm) diam (or smaller).
4. **Branch Piping (Optional)** - One nonmetallic pipe to be connected to through-penetrant (Item 3) and installed within opening in subfloor or gypsum board plate. The annular space between the pipe and the periphery of the opening shall be min 1/2 in. (13 mm) to max 1 in. (25 mm). The following types and sizes of nonmetallic pipe may be used:

- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 3 in. (76 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.
  - B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe†** - Nom 3 in. (76 mm) diam (or smaller) SDR13.5 CPVC pipe or nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - C. **Acrylonitrile Butadiene Styrene (ABS) Pipe** - Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 4A. **P-Trap (Optional, not shown)** - Nom 2 in. (51 mm) diam (or smaller) nonmetallic P-trap for use in connection with branch pipe. P-trap to be of same type of nonmetallic pipe used for branch piping.
5. **Fill, Void or Cavity Material\* - Sealant** - Min 3/4 in. (19 mm) thickness of sealant applied within the annular space around perimeter of through-penetrant (Item 3), flush with top surface of floor or sole plate and flush with bottom surface of top plate. Min 3/4 in. (19 mm) thickness of sealant applied within annular space around perimeter of branch piping (Item 4), flush with top surface of floor.
- NUCO INC.** - •Self Seal GG-266. When Self Seal Type-SSC Collar (Item 6) is used, GG-200 Sealant may be used as an alternate to the GG-266 Sealant to seal the annular space above the collar.
6. **Firestop Device\* - Collar – (Not Shown)** – When the diam of the opening made in the flooring system (Item 1) or in the top plate of the chase wall (Item 2) is less than 1/2 in. (13 mm) larger than the diam of the through penetrant, a firestop collar is to be installed in addition to the Sealant in the annular space. Firestop collar to be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around pipe and butted tightly to underside of flooring system or chase wall top plate and secured with a min 1-1/4 in. (32 mm) long steel screw in conjunction with a min 1-1/4 in. (32 mm) diam steel fender washer at each anchor tab.

**NUCO INC.** – •Self Seal Type-SSC

\* Bearing the UL Classification Mark

† The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 and Type-SSC were also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

# FS7

## System No. C-AJ-2027C



F Rating - 2 Hr

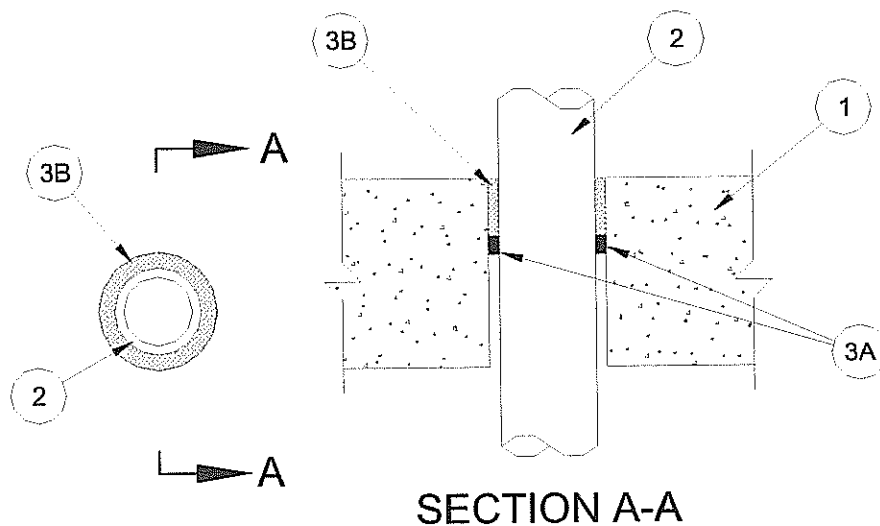
FT Rating - 0 and 2 Hr (See Item 1A)

FH Rating - 2 Hr

FTH Rating - 0 and 2 Hr (See Item 1A)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 5 CFM / Sq. Ft.



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. System No. C-AJ-2027C meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

1. **Floor or Wall Assembly** - Min 114 mm thick reinforced lightweight or normal weight (1600 – 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening shall be 25 mm larger than the nom size of through-penetrant (Item 2).

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

- 1A. **Steel Sleeve – (Optional, not shown)** – Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with both surfaces of floor or wall assembly. The nom size of sleeve shall be 25 mm larger than the nom size of through-penetrant.

The hourly FT and FTH Ratings are 0 Hr when steel sleeve is used, otherwise the hourly FT, FH and FTH Ratings are equal to the hourly F Rating of the assembly.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*

2. **Through-Penetrant** - One nonmetallic pipe, conduit or tubing to be centered within the firestop system. A nom annular space of 8 mm is required within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:

- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 50 mm inside diam (or smaller) Schedule 40 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 50 mm diam (or smaller) SDR11, SDR13.5 or SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 50 mm inside diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70).
- D. **Electrical Nonmetallic Tubing (ENT)+** - Nom 50 mm inside diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 331 of the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- E. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 50 mm inside diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 351 of the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

3. **Firestop System** - The details of the firestop system shall be as follows:

- A. **Packing Material (Optional)** – Nom 9.5 mm diam polyethylene backer rod or min 9.5 mm thickness of mineral wool batt insulation firmly packed into opening as a permanent form and recessed from top surface of floor or both surfaces wall as required to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\* - Caulk** - Min 50 mm thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces wall.

**NUCO INC. - •Self Seal GG-266**

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

Form: CAJ2027C Rev.: 4 Date: 11/06

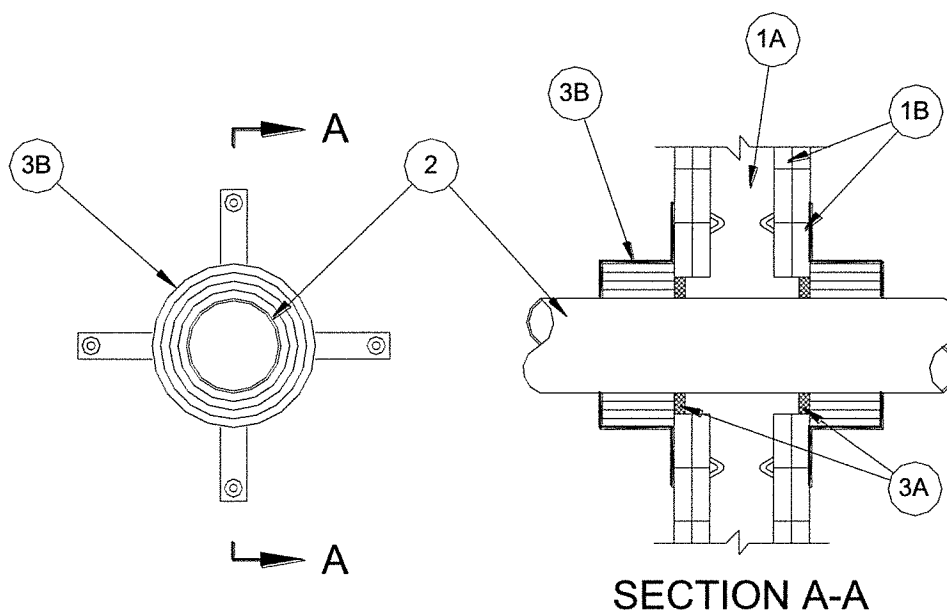


# FS8

## System No. W-L-2566



ANSI / UL1479 (ASTM E814)	CAN / ULC - S115
F Ratings - 1 and 2 Hr (See Item 1)	F, FH Ratings – 1 and 2 Hr (See Item 1)
T Ratings - 0 and 1 Hr (See Item 1)	FT, FTH Ratings – 0 and 1 Hr (See Item 1)
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 – 3 CFM / Sq. Ft.	L Rating At 400°F – 3 CFM / Sq. Ft.
W Rating – Class 1 (See Item 2B)	



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. System No. W-L-2566 meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

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 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. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC.
  - B. **Wallboard, Gypsum\*** - Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 5 in. (127 mm).

The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed. The hourly T, FT and FTH Ratings are 0 Hr and 1 Hr for 1 and 2 Hr rated assemblies, respectively.

*The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115*

2. **Through-Penetrants** - One nonmetallic pipe or conduit installed either concentrically or eccentrically within the firestop system. The annular space between the penetrant and the edge of the opening shall be min 5/16 in. (8 mm) to max 5/8 in. (16 mm). Penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 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) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems or nom 3 in. (76 mm) diam (or smaller) SDR13.5 CPVC pipe or nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) piping systems.
  - C. **Rigid Nonmetallic Conduit+** - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
  - D. **Polyvinyl Chloride-XFR (PVC-XFR) Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core PVC-XFR pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - E. **Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe** - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - F. **Polypropylene (PP) Pipe** – Nom 2 in. (51 mm) diam (or smaller) Aquatherm Climatherm or Aquatherm Fusiotherm SDR11 polypropylene pipe to be installed either concentrically or eccentrically within the firestop system for closed (process or supply) or vented (drain, waste or vent) piping systems.
  - G. **Polyvinyl Chloride-HRS (PVC-HRS-2550) Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core PVC-HRS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - H. **Cross-Linked Polyethylene (PEX) Tubes** — Nom 2 in. (51 mm) diam (or smaller) SDR 9 cross-linked polyethylene (PEX) tubes 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 Material\* - Sealant** - Min 1/4 in. (6.4 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall assembly.  
  
**NUCO INC.** - Self Seal GG-200 or •Self Seal GG-266
  - B. **Firestop Device\* - Collar** - Collar to be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around pipe and secured to both sides of wall with min 3/16 in. (4.8 mm) diam steel toggle bolts in conjunction with min 1-1/4

*The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115*

in. (32 mm) diam steel fender washers. Min of two, three or four anchor bolts, symmetrically located, for nom 1-1/2 in. (38 mm) and 2 in. (51 mm) diam, nom 3 in. (76 mm) diam and nom 4 in. (102 mm) diam pipes, respectively.

**NUCO INC. - •Self Seal Type-SSC**

- \* Bearing the UL Classification Mark
- + Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 and Type-SSC were also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

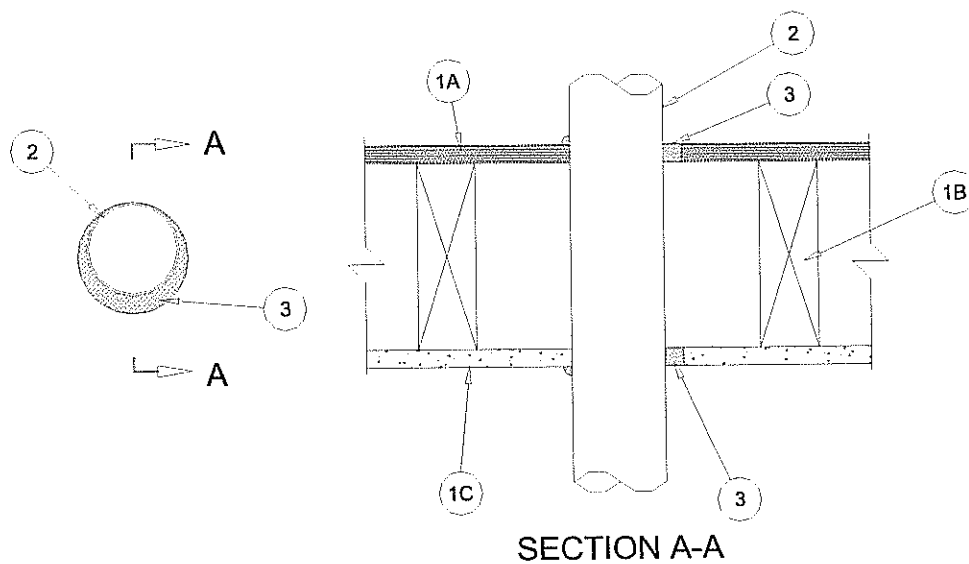
Form: WL2566 Rev.: 2 Date: 07/14

# FS9

## System No. F-C-1093



ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1 Hr	F Rating — 1 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/ft <sup>2</sup>	FH Rating — 1 Hr
L Rating At 400 F — 3 CFM/sq ft <sup>2</sup>	FTH Rating — 0 Hr
	L Rating At Ambient — Less Than 5.1/L/s/m <sup>2</sup>
	L Rating At 204 C — 15.2 L/s/m <sup>2</sup>



1. **Floor-Ceiling Assembly** - The 1 Hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction details of the floor-ceiling assembly are summarized below:
  - A. **Flooring System** - Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture\*** as specified in the individual Floor-Ceiling Design. Max diam of opening is 5-1/2 in. (140 mm).
  - B. **Wood Joists** - Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members\*** with bridging as required and with ends firestopped.
  - C. **Gypsum Board\*** - Nom 4 ft (1219 mm) wide by 5/8 in. (16 mm) thick, as specified in the individual Floor-Ceiling Design. Max diam of opening is 5-1/2 in. (140 mm).

- 1.1 **Chase Wall (Optional, not shown)** - The through-penetrants (Item 2) may be routed through a fire-rated single, double or staggered wood stud / gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs** - Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
  - B. **Sole Plate** - Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 5-1/2 in. (140 mm).
  - C. **Top Plate** - The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 5-1/2 in. (140 mm).
  - D. **Gypsum Board\*** - Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design .
2. **Through-Penetrant** – One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the opening. The annular space between pipe, conduit or tubing and periphery of opening to be min 0 in. (0 mm, point contact) to max 1 in. (25 mm). Pipe, conduit or tubing to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
- A. **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. **Conduit** - Nom 4 in. (102 mm) diam (or smaller) rigid steel conduit or nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT).
  - D. **Copper Tubing** - Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tubing.
  - E. **Copper Pipe** - Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
  - F. **Flexible Metal Piping** — Nom 2 in. (51 mm) diam (or smaller) steel flexible metal piping.  
**GASTITE, DIV OF TITEFLEX — CSST or FlashShield CSST**
3. **Fill, Void or Cavity Material\* - Sealant** - Min 3/4 in. (19 mm) thickness of sealant applied within the annulus, flush with top surface of floor or sole plate. Min 5/8 in. (16 mm) thickness of sealant applied within the annulus, flush with bottom surface of ceiling or top plate. Min 1/4 in. (6 mm) diam bead of sealant applied at point contact locations at penetrant / floor or sole plate interface on top surface of floor or sole plate and at the penetrant / ceiling or top plate interface.

**NUCO INC.** - Self Seal GG-200 or Self Seal GG-266

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

# FW1

## System No. C-AJ-2026C



F Ratings - 1 and 2 Hr (See Item 1)

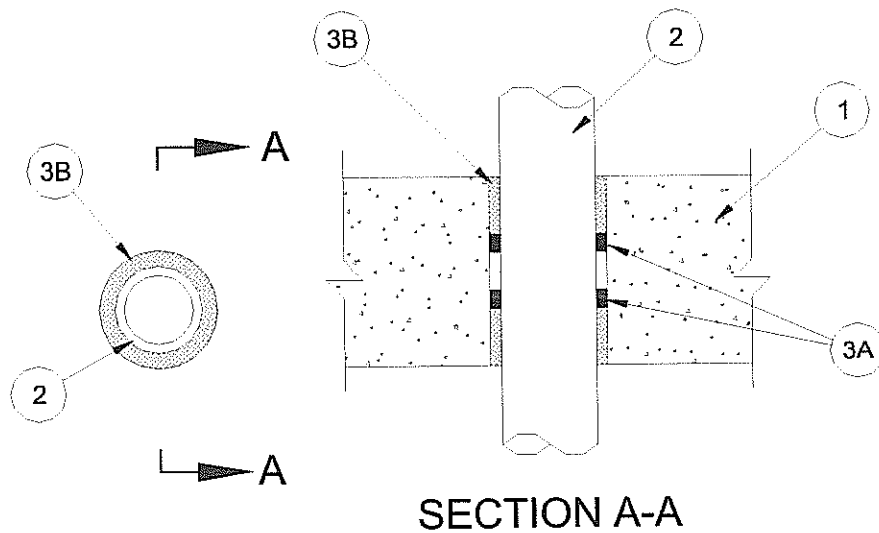
FT Ratings - 0, 1 and 2 Hr (See Item 1A)

FH Ratings - 1 and 2 Hr (See Item 1)

FTH Ratings - 0, 1 and 2 Hr (See Item 1A)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 5 CFM / Sq. Ft.



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. System No. C-AJ-2026C meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

1. **Floor or Wall Assembly** - Min 95 mm or min 114 mm thick reinforced lightweight or normal weight (1600 – 2400 kg/m<sup>3</sup>) concrete for 1 and 2 Hr F Ratings, respectively. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Floor assembly may also be constructed of any min 152 mm thick UL Classified hollow-core **Precast Concrete Units\***. Max diam of opening shall be 25 mm larger than the nom size of through-penetrant (Item 2).

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

- 1A. **Steel Sleeve – (Optional, not shown)** – Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with both surfaces of floor or wall assembly. The nom size of sleeve shall be 25 mm larger than the nom size of through-penetrant.

The hourly FT and FTH Ratings are 0 Hr when steel sleeve is used, otherwise the hourly FT, FH and FTH Ratings are equal to the hourly F Rating of the assembly.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*

2. **Through-Penetrant** - One nonmetallic pipe, conduit or tubing to be centered within the firestop system. A nom annular space of 8 mm is required within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:

- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 50 mm inside diam (or smaller) Schedule 40 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 50 mm diam (or smaller) SDR13.5 or SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 50 mm inside diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70).
- D. **Electrical Nonmetallic Tubing (ENT)+** - Nom 50 mm inside diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 331 of the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- E. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 50 mm inside diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 351 of the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

3. **Firestop System** - The details of the firestop system shall be as follows:

- A. **Packing Material (Optional)** – Nom 9.5 mm diam polyethylene backer rod or min 9.5 mm thickness of mineral wool batt insulation firmly packed into opening as a permanent form and recessed from both surfaces of floor or wall as required to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\* - Caulk** - Min 15.9 mm or min 25.4 mm thickness of fill material applied within the annulus, flush with both surfaces of floor or wall, for 1 and 2 Hr rated assemblies, respectively.

**NUCO INC.** - •Self Seal GG-266

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

Form: CAJ2026C Rev.: 3 Date: 05/05

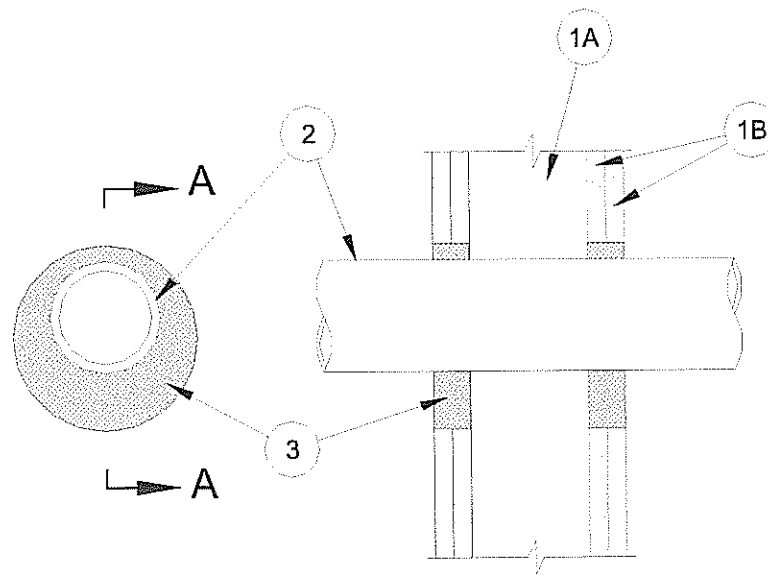
# FW2

## System No. SP947



(FOR VERTICAL SEPARATIONS)

F Rating	- 2 hr
FT Rating	- 2 hr
FH Rating	- 2 hr
FTH Rating	- 2 hr



SECTION A-A

1. **Wall Assembly** - The fire-rated gypsum wallboard and stud wall assembly shall be constructed of the materials and in the manner described in the individual Wall or Partition Designs in the ULC List of Equipment and Materials, Fire Resistance Ratings, and shall include the following construction features:
  - A. **Studs** - Wall framing consisting of minimum 64 mm wide by 28.6 mm deep channel steel studs with 6.4 mm lip on each flange tip formed from minimum 0.48 mm thick galvanized steel. Steel studs cut 19 mm less in length than the height of the assembly and secured to channel-shaped galvanized steel floor and ceiling tracks with 13 mm long self-drilling, self-tapping screws on both sides of studs. Steel stud spacing not to exceed 600 mm OC.
  - B. **Gypsum Wallboard** - Minimum of two layers of 15.9 mm thick gypsum wallboard as specified in the individual Wall or Partition Designs. Maximum diameter of opening is 76.2 mm.
2. **Through-Penetrant** - Nominal 50 mm diameter (60.3 mm OD) (or smaller) Schedule 40 PVC plastic pipe or conduit or CPVC† plastic pipe for use in closed (process or water supply) applications. The annular space shall be minimum 6 mm to maximum 10 mm. A maximum of one pipe is permitted within the opening and must be rigidly supported on both sides of wall assembly.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*



- \*3. **Firestop System Component (Guide No. 40 U19.13)** - Self Seal GG-266 applied in the annular space around the penetrating item (Item 2) to a minimum depth of 32 mm on both sides in a wall assembly.

**NUCO INC.**

\*Listed by Underwriters' Laboratories of Canada for use as a component within the appropriate System.

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

# FW3

## System No. C-AJ-2025



F Rating - 2 Hr

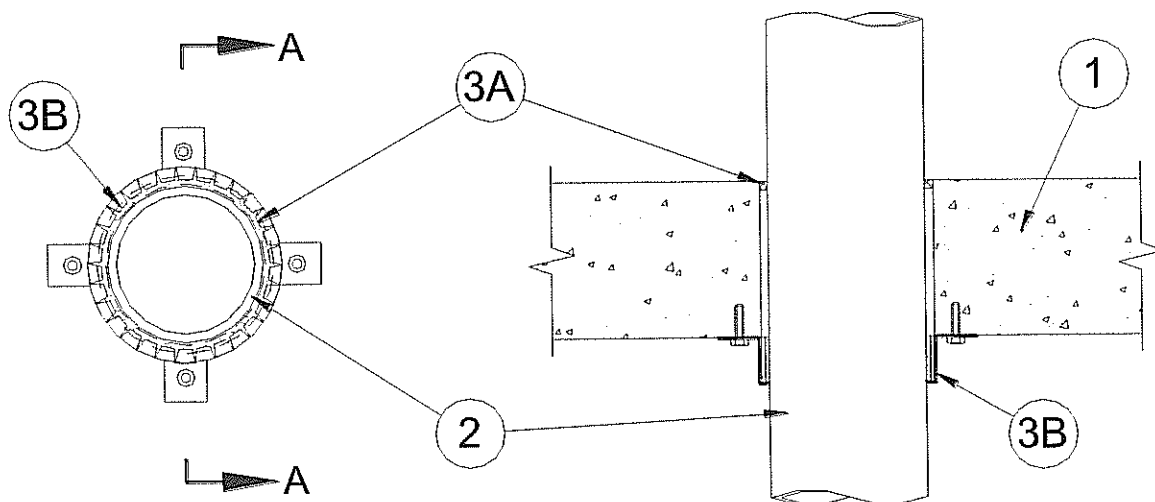
FT Ratings - 1/4, 1-3/4 and 2 Hr (See Item 2)

FH Ratings - 0 and 2 Hr (See Item 2)

FTH Ratings - 0, 1/4, and 2 Hr (See Item 2)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 3 CFM / Sq. Ft.



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. System No. C-AJ-2025 meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

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

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

2. **Through-Penetrants** - One nonmetallic pipe or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between the pipe or conduit and the edge of the opening shall be min 3.1 mm (1/8 in.) to max 6.4 mm (1/4 in.). Pipe or conduit to be rigidly supported on both sides of the floor or wall assembly. The following types of pipe or conduit may be used:

- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 152 mm (6 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 152 mm (6 in.) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems or nom 152 mm (6 in.) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 152 mm (6 in.) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
- D. **Fire Retardant Polypropylene (FRPP) Pipe†** - Nom 51 mm (2 in.) diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- E. **Electrical Nonmetallic Tubing (ENT)+** - Nom 51 mm (2 in.) diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- F. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 51 mm (2 in.) diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 351 of the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

- G. **Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 102 mm (4 in.) diam (or smaller) Schedule 40 solid core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- H. **Polyvinyl Chloride-XFR (PVC 15-50 XFR) Pipe** — Nom 102 mm (4 in.) diam (or smaller) Schedule 40 solid core PVC-XFR pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- I. **Chlorinated Polyvinyl Chloride (CPVC) Pipe†** - Nom 76 mm (3 in.) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.  
  
**IPEX INC.** – AquaRise
- J. **Polyvinyl Chloride-HRS (PVC-HRS-2550) Pipe** — Nom 102 mm (4 in.) diam (or smaller) Schedule 40 PVC-HRS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

FT Rating is 1-3/4 Hr for nom 152 mm (6 in.) diam pipes. FH and FTH Ratings are 0 Hr for nom 152 mm (6 in.) diam pipes. F, FT, FH and FTH Ratings are 2 Hr for nom 102 mm (4 in.) diam (or smaller) pipes. FT and FTH Rating is 1/4 Hr for Penetrant I.

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

- A. **Fill, Void or Cavity Material\* - Sealant** - Min 3.1 mm (1/8 in.) thickness of fill material applied within the annulus, flush with the top surface of floor or with both sides of wall assembly.

**NUCO INC.** - Self Seal GG-200 or •Self Seal GG-266

- B. **Firestop Device\* - Collar** - Collar to be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around pipe and secured to underside of floor or to both sides of wall with min 5 mm (3/16 in.) diam by min 31.8 mm (1-1/4 in.) long steel concrete anchors in conjunction with min 31.8 mm (1-1/4 in.) diam steel fender washers. Min of two, three, four or seven concrete anchors, symmetrically located, for nom 38 mm (1-1/2 in.) and 51 mm (2 in.) diam, nom 76 mm (3 in.) diam, nom 102 mm (4 in.) and nom 152 mm (6 in.) diam pipes, respectively.

**NUCO INC.** - •Self Seal Type-SSC

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 and Type-SSC were also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

# FW4

## System No. C-AJ-5229



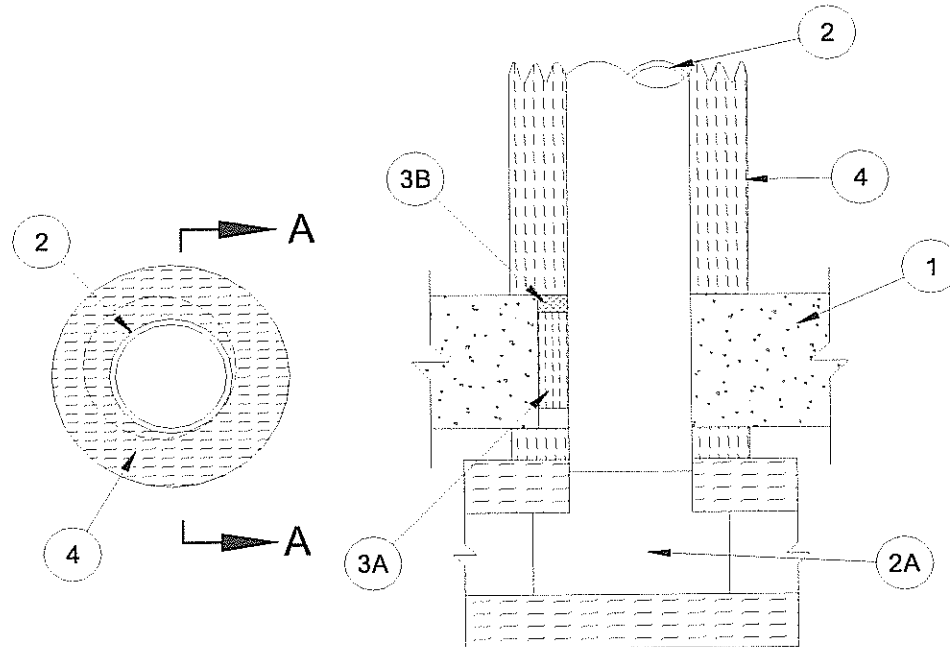
F Rating - 2 Hr

T Rating - 2 Hr

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 3 CFM / Sq. Ft.

W Rating - Class 1 (See Items 3B and 4A)



**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<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 10 in. (254 mm).

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

2. **Through-Penetrant** - One metallic pipe or tubing installed either concentrically or eccentrically within opening. Annular space between penetrant and periphery of opening shall be min of 0 in. (0 mm, point contact) to max 1-3/8 in. (35 mm). Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of penetrants may be used:
  - A. **Steel Pipe** - Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
  - B. **Iron Pipe** - Nom 8 in. (203 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe or Class 50 (or heavier) ductile iron pressure pipe.
  - C. **Copper Tubing** - Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tubing.

*The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115*

- D. **Copper Pipe** - Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
- 2A. **Pipe Fitting (Optional)** - Pipe or tube elbow, coupling or tee of the same type and size as penetrant (Item 2) may be attached to penetrant 4 in. (102 mm) or more below bottom surface of floor or either surface of wall.
3. **Firestop System**-The firestop system shall consist of the following:
- A. **Packing Material** - Min 3-3/4 in. (95 mm) thickness of min 4.0 pcf (64 kg/m<sup>3</sup>) 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 3/8 in. (10 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. **A min 3/8 in. (10 mm) bead of sealant shall be applied around the base of the PVC jacket (Item 4A) on the top surface of the floor to attain the W Rating.**
- NUCO INC.** - Self Seal SL-100 (floors only), Self Seal GG-200 or •Self Seal GG-266
4. **Pipe Covering\*** - Nom 2 or 3 in. (51 or 76 mm) thick hollow cylindrical heavy density (min 6.5 pcf or 104 kg/m<sup>3</sup>) mineral fiber units with foil-scrim-kraft all service jacket. Longitudinal and traverse joints sealed with min 2 in. (51 mm) wide tape, 3 mil aluminum tape. Pipe covering to be tightly butted against both sides of floor or wall surfaces with a min 1/2 in. (13 mm) overlap beyond the periphery of opening.
- See **Pipe and Equipment Covering - Materials** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering 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, Not Shown)** - An additional PVC jacketing, 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. (1.22 m) wide by nom 20 or 30 mil (0.5 or 0.8 mm) thick. The jacket shall extend downward into and / or through the opening from a point 36 to 40 in. (0.91 to 1.02 m) above the top surface of the floor assembly. **The PVC jacket must be used for the W Rating to apply. The W Rating applies only with floor assemblies.**

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

\* Bearing the UL Classification Mark

+ Bearing the UL Recognized Component Mark

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

Form: CAJ5229 Rev.: 2 Date: 11/04

*The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115*

***SPIRA* Fire Stopping of Piping in Fire Separations (FS) & Fire Walls (FW)  
with NUCO - Self Seal GG-200 OR GG-266 (Last Updated October 19/16)**

FS1 = ½" - 4" Steel pipe, Sch 5 or heavier in 1 & 2 hr Block, Poured Concrete, or Pre-Cast Floors or Walls (cUL C-AJ-1201)

- Maximum 6" opening, no steel sleeves allowed, **core drill only or knock out with 0"** minimum to 1-1/2" maximum annular space
- 0" to 1-1/2" maximum annular space (no mineral wool required).
- 5/8" thick GG-200 or GG-266 on both sides of floor or wall for 1 hour rating or 1-1/4" thick of same for 2 hour rating.

FS2 = ½" - 4" Steel pipe, Sch 10 or heavier in 3 & 4 hr 200mm Block, Poured Concrete, Floors or Walls (ULC SP771)

Note: If block is less than 200mm, use C-AJ-1227)

- Maximum 6" opening (optional 6" or smaller Sch 40 steel or Sch 40 PVC sleeve flush to wall or floor).
- ½" minimum to 2-3/8" maximum annular space c/w 3-3/4" thickness of MW-300 or 72 KG/m3 mineral wool compressed to min. 50%.
- 1/4" thick GG-200 or 1/4" of SL-100 flush on top surface of concrete floor.
- 1/4" thick GG-200 on both sides of walls.

FS3 = 4"-16" Steel pipe, Sch 40 in 1,2,3 OR 4 hr Block, Poured Concrete, or Pre-Cast Floors or Walls (ULC SP116)

- Maximum 2.8 square foot opening 285mm x 915mm (optional sleeve of 1mm thick galvanized sheet metal, minimum 2" between pipes).
- 2" minimum annular space c/w 3-3/4" thickness of mineral wool for 1 & 2 hr. rating, 5-3/4" thickness for 3 & 4 hr. rating.
- 1/4" thick GG-200 on both sides or 1/4" thick SL-100 flush with top surface of concrete floor.

FS4 = ½" - 4" Steel pipe Sch 5 or heavier & ½" - 8" Sch 10 or heavier in 1 & 2 hr Drywall steel or wood stud Partitions (cUL W-L-1086)

- Maximum 10" opening (no sleeves allowed.).
- 0" minimum to 1 ½" maximum annular space (no mineral wool required).
- 5/8" thick GG-200 on both sides for 1 hr rating or 1-1/4" thick of same for 2 hour rating.

FS5A = ½" - 2" CPVC in 1 & 2 hr Block or Poured Concrete Walls or Poured Concrete & Pre-Cast Floors (cUL C-AJ-2314)

- Maximum 1" opening bigger than pipe (optional Sch 40 steel sleeved 1" larger than penetrating pipe).
- 0" minimum to 5/8" maximum annular space (mineral wool optional). 1/4" minimum and 3/8" maximum if steel sleeve is used.
- 5/8" thick GG-266 on both sides for 1 hr. rating or 1" thick of same for 2 hour rating.
- Additional 1/4" thick bead of GG-266 at point of contact between pipe and floor/walls.

FS5B = ½" - 2" CPVC in 1 & 2 hr Drywall steel or wood stud Partitions (cUL W-L-2145)

- 5/16" annular space is required (no mineral wool required).
- 5/8" thick GG-266 on both sides for 1 hr. rating or 1-1/4" thick of same for 2 hour rating.

FS6 = ½" - 4" CPVC in 1 hr Combustible Wood Floor Assembly (cUL F-C-2430)

- Maximum 5" opening (1" larger than nominal diameter of pipe, no sleeves allowed).
- 0" minimum to ½" maximum annular space (no mineral wool required).
- 3/4" thick GG-266 flush with top surface of sole plate and flush with bottom of top plate.
- ½" diameter bead where pipe has point contact with either top surface of sole plate or bottom surface of top plate.

FS7 = ½" - 2" CPVC in 2 hr Poured Concrete Floor or Block Walls (cUL C-AJ-2027C)

- Maximum 1" opening bigger than pipe no sleeves required. Optional Sch 40 steel sleeves allowed 1" larger than penetrating pipe.
- 5/16" annular space c/w backer rod or mineral wool to the minimum depth of 2" for gauging purposes.
- 2" thick GG-266 on both sides of walls and on the top surface only of floors.

FS8 = 3" or 4" CPVC in 1 & 2 hr Metal Stud Drywall Partitions (cUL W-L-2566)

- See application sheet for the self seal type-SSC collar (Note: 2-1/2" collars not made).

FS9 = ½"-4" Steel Sch 5 or heavier in 1 hr Solid Wood or Wood Truss Ceiling Assembly with two layers of 5/8" Drywall (cUL F-C-1093)

- Maximum 5.5" opening (no sleeves allowed).
- 0" minimum to 1" maximum annular space (no mineral wool required).
- 3/4" thick GG-200 in annular space on both top and bottom surface plus 1/4" dia. bead at point contacts.

FS10 = ½" - 8" Steel pipe. Sch 10 or heavier in 2 & 3 hr Block or Poured Concrete Floors or Walls (cUL C-AJ-1369)

- Maximum 10-1/2" opening (optional sch 40 steel sleeves allowed, core drill or plastic knock outs).
- 0" to 1-7/8" maximum annular space c/w 3-3/4" thickness of 4.0 pcf mineral wool for 2 hr. rating, 5-3/4" thickness for 3 hr. rating
- 1/4" thick GG-200 or GG-266 flush with top side of floor only or both sides of wall.

FW1 = ½" - 2" CPVC in 1 and 2 hr Block, Poured Concrete, or Pre-Cast Floors or Walls (cUL C-AJ-2026C)

- Maximum 1" opening bigger than pipe (no steel sleeves allowed, plastic knock outs or core drill only).
- 5/16" annular space c/w optional backer rod or mineral wool to the depth of 1" for gauging purposes.
- 5/8" thick GG-266 on both sides of floor or wall for 1hr rating or 1" thick of same for 2 hour rating.

FW2 = ½" - 2" CPVC in 2 hr Metal Stud Drywall Partitions with 2 Layers of 5/8" Drywall (ULC SP947)

- Maximum ½" to ¾" opening bigger than pipe (no steel sleeves allowed).
- ¼" minimum to 3/8" maximum annular space (no mineral wool required but allowed).
- 1-1/4" thick GG-266 on both sides of wall.

FW3 = 3" - 4" CPVC in 2 hr Block, Poured Concrete, or Pre-Cast Floors or Walls (cUL C-AJ-2025)

- See application sheet for the self seal type-SSC collar (Note: 2-1/2" collars are not made).

FW4 = ½" - 8" Steel Sch 10 or Heavier in Concrete Floor/Wall or Block Fire Wall (cUL C-AJ-5229)

- Maximum 10" opening (no steel sleeves allowed, plastic knock outs or core drill only).
- 0" minimum to 1-3/8" maximum annular space c/w 3-3/4" thickness of 4.0 pcf (64 kg/m3) mineral wool.
- 3/8" thick GG-200 or GG-266 flush with top of floor or on both sides of walls. (SL-100 can be used flush on top of floor as well).
- 2" thick for 2hr or 3" thick for 4 hr X 36" long (min 6.5 pcf or 104 kg/m3) ULC or cUL mineral wool all service jacket pipe insulation. Flame spread < 25 and smoke < 50 tightly butted against both sides of wall or floor with a minimum ½" overlap beyond the opening. Joints sealed with minimum 2" wide 3mil aluminum tape.

SS1 = Smoke Seal of Any Size Steel or CPVC Pipe in Any Type of Wall Assembly

- Bead of GG-200 or GG-266.



# Fire Stopping Manual for Automatic Sprinkler and Fire Hose Systems



Note: The architectural drawings have been reviewed to determine the fire separations, fire walls and non-rated walls that require fire stopping or smoke sealing as part of our contract. If there are no fire stopping or smoke sealing systems indicated on our drawings then either none are required or they are to be completed by others. This book will provide the details for sealing our penetrations and can be used by others if this work is not our contractual obligation.

Updated October 19/16

# FS10

## System No. C-AJ-1369



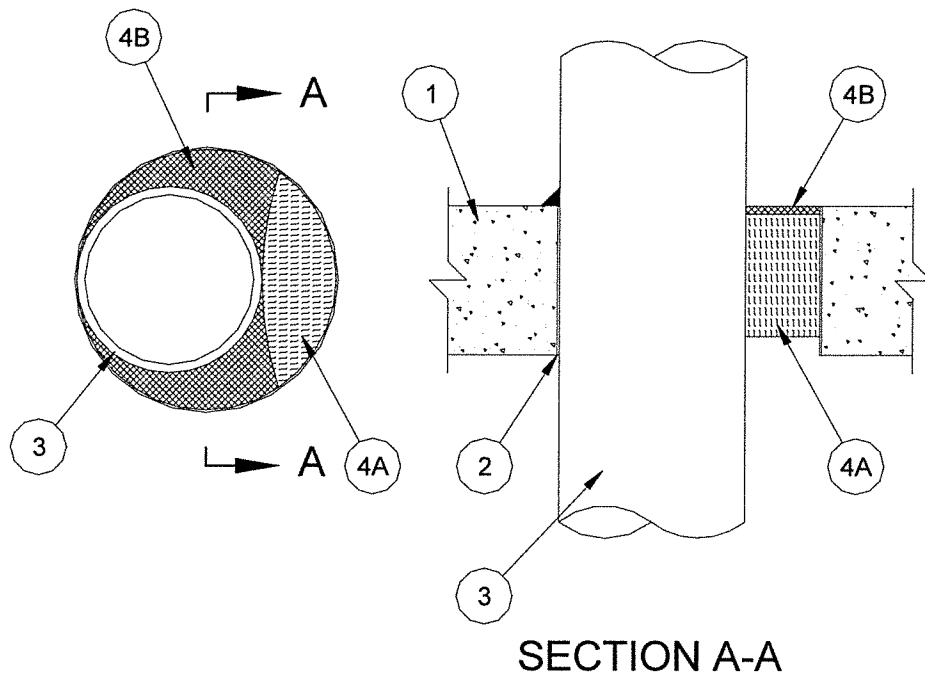
F Ratings - 2 and 3 Hr (See Item 1)

T Rating - 0 Hr

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 3 CFM / Sq. Ft.

W Rating - Class 1



1. **Floor or Wall Assembly** - Min 4-1/2 and 6 in. (114 and 152 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600 - 2400 kg/m<sup>3</sup>) concrete for 2 and 3 Hr rated assemblies, respectively. Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Max diam of opening is 10-1/2 in. (267 mm).

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

2. **Steel Sleeve – (Optional)** - Nom 10 in. (254 mm) diam (or smaller) Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly.
- 2A. **Metallic Sleeve – (Optional, for wall installations only)** - Cylindrical sleeve fabricated from min No. 30 gauge galv sheet steel and having a min 2 in. (51 mm) lap along the longitudinal seam. Length of the sleeve to be equal to the thickness of the wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the opening and releasing the coil to let it uncoil against the circular cutouts in the gypsum board layers. The ends of the steel sleeve shall be flush with each surface of the wall.

3. **Through-Penetrant** - One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening or sleeve shall be min of 0 in. (0 mm, point contact) to max 1-7/8 in. (48 mm). Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
- A. **Steel Pipe** - Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
  - B. **Iron Pipe** - Nom 8 in. (203 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, nom 8 in. (203 mm) diam (or smaller) or Class 50 (or heavier) ductile iron pressure pipe.
  - C. **Conduit** - Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in. diam (or smaller) steel electrical metallic tubing.
  - D. **Copper Tubing** - Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tubing.
  - E. **Copper Pipe** - Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
4. **Firestop System** - The details of the firestop system shall be as follows:
- A. **Packing Material** - Min 3-3/4 in. and 5-1/2 in. (95 and 140 mm) thickness of min 4.0 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form for 2 and 3 Hr rated assemblies, respectively. 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 Materials\* - Sealant** - Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material applied to the penetrant / concrete or penetrant / sleeve interface at the point contact location on the top surface of floor or both surfaces of wall. When optional sheet metal sleeve (Item 2A) is used, a thin film of sealant shall be applied over edges of sleeve and overlapping onto wall a min of 1/2 in. (13 mm) on both sides of wall.

**NUCO INC.** - Self Seal GG-200 or •GG-266 (floors or walls) or Self Seal SL-100 (floors only)

\* Bearing the UL Classification Mark

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

# FS1

## System No. C-AJ-1201

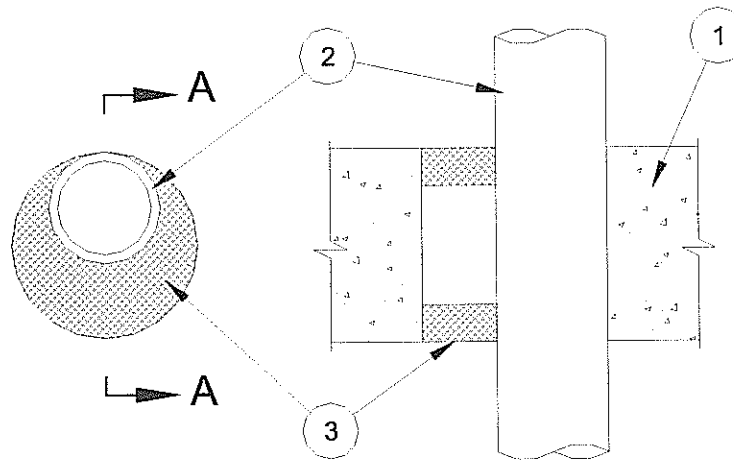


F Ratings - 1 and 2 Hr (See Item 1)

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

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 3 CFM / Sq. Ft.



SECTION A-A

1. **Floor or Wall Assembly** - Min 3-3/4 in. and 4-1/2 in. thick reinforced lightweight or normal weight (100 - 150 pcf) concrete for 1 and 2 hr rated assemblies, respectively. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Floor may also be constructed of min 6 in. thick UL Classified hollow-core **Precast Concrete Units\***. Max diam of opening is 6 in.

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

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

- A. **Steel Pipe** - Nom 4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
- B. **Copper Tubing** - Nom 3 in. diam (or smaller) Type L (or heavier) copper tubing.
- C. **Copper Pipe** - Nom 3 in. diam (or smaller) Regular (or heavier) copper pipe.
- D. **Conduit** - Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT) or steel conduit.
- E. **Iron Pipe** - Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

T Rating is 1/4 hr for Items A and D, 0 hr for Items B and C.

3. **Fill, Void or Cavity Material\* - Sealant** - Min 5/8 in. and 1-1/4 in. thickness of fill material for 1 and 2 hr rated assemblies, respectively, applied within the annulus, flush with both surfaces of floor or wall.

**NUCO INC.** - Self Seal GG-200 or •Self Seal GG-266

\* Bearing the UL Classification Mark

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

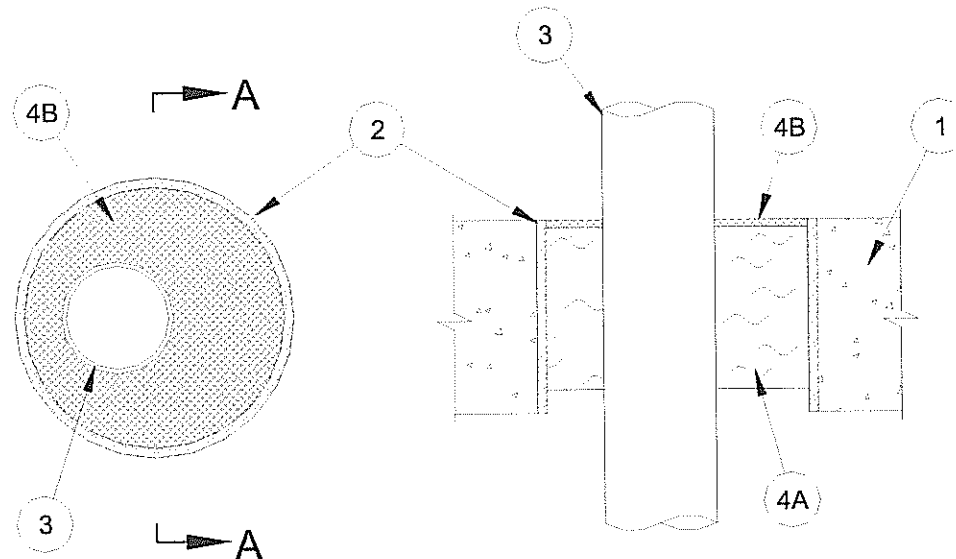
# FS2

## System No. SP771



(FOR HORIZONTAL OR VERTICAL SEPARATIONS)

F Rating	- 3 and 4 hr (See Item 1)
FT Rating	- 0 hr
FH Rating	- 3 and 4 hr (See Item 1)
FTH Rating	- 0 hr



**SECTION A-A**

1. **Floor or Wall Assembly** - For 3 hr rating, minimum 102 mm thick; for 4 hr rating, minimum 114 mm thick reinforced low density or normal density (1600 to 2400 kg/m<sup>3</sup>) structural concrete. Wall may also be constructed of nominal 200 mm thick concrete blocks. Maximum diameter of opening is 150 mm.
2. **Sleeves (Optional)** - The following sleeves may be used:
  - A. **Metallic Sleeve** - Nominal 150 mm diameter (or smaller) Schedule 40 (or heavier) steel pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.
  - B. **Nonmetallic Sleeve** - Nominal 150 mm diameter (or smaller) Schedule 40 polyvinyl chloride (PVC) pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.
3. **Through-Penetrants** - One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the firestop system. The annular space shall be minimum 13 mm to maximum 60 mm. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types of pipe, conduit or tubing may be used:
  - A. **Steel Pipe** - Nominal 100 mm diameter (or smaller) Schedule 10 (or heavier) steel pipe.
  - B. **Conduit** - Nominal 100 mm diameter (or smaller) steel electrical metallic tubing (EMT) or steel conduit.
  - C. **Copper Tubing** - Nominal 75 mm diameter (or smaller) Type M (or heavier) copper tubing.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*

\*4. **Firestop System Components (Guide No. 40 U19.13)** - The firestop system shall consist of the following:

- A. Type Self Seal MW-300 mineral wool insulation or minimum 72 kg/m<sup>3</sup> mineral wool batt insulation installed to a minimum depth of 95 mm, compressed minimum 50%, and firmly packed into opening as a permanent form. End joints to be firmly butted. Material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of sealant.
- B. Type Self Seal GG-200 (floors or walls) or Self Seal SL-100 (floors only) - Minimum 6.5 mm thickness of sealant applied within the annulus, flush with the top surface of floor or with both surfaces of wall.

**NUCO INC.**

\* Listed by Underwriters' Laboratories of Canada for use as a component within the appropriate System.

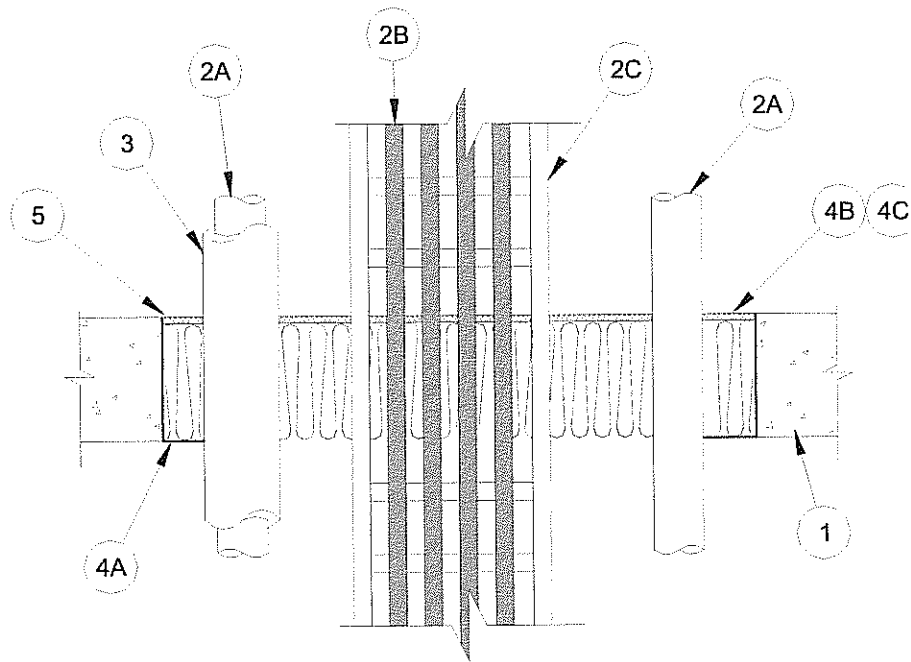
# FS3

## System No. SP116



(FOR HORIZONTAL OR VERTICAL SEPARATIONS)

F Rating	- 2 or 4hr (See Items 1 and 4a)
FT Rating	- (See Item 2)
FH Rating	- 2 or 4hr (See Items 1 and 4a)
FTH Rating	- (See Item 2)



### 1. Floor or Wall Assembly -

Minimum 114 mm thickness for 2 hr rating or 190 mm thickness for 4 hr rating reinforced low density or normal density (1600 to 2400 kg/m<sup>3</sup>) structural concrete. Alternate floor construction may consist of minimum 190 mm thick hollow core precast concrete unit having a ULC fire resistance rating equal to or greater than that of the low or normal density concrete floor assembly. Wall may also be constructed of nominal 200 mm thick concrete blocks. Maximum size of rectangular opening 285 mm by 915 mm.

### 2. Pipe, Cables and Cable Tray --

- Steel pipe, nominal 406 mm OD, Schedule 40; EMT nominal 100 mm OD, 2 mm (or greater) wall thickness; copper pipe nominal 75 mm OD (5.4 mm thick or greater). Pipes to be reliably supported above through-openings and installed minimum 50 mm space between pipes, edge of opening, and between other penetrating items.
- Individual cables , Type 300 MCM Type THW Tech 90; 16 AWG 600V 90 C UL-FR-1; 12 AWG Type TC XHHW CDRS 600V cables. Maximum of 17 cables, minimum 7 mm space required between individual cables, minimum 50 mm space between cables and other penetrating items.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*



- c) Nominal 900 mm by 90 mm open ladder galvanized steel or aluminum cable tray. Maximum loading of 40% consisting of the following cables:
- i) Maximum of 46 (forty-six) 14 AWG/2 600V TECH 90 cables,
  - ii) Maximum of 19 (nineteen) 20 AWG 300V shielded 12 pair cables,
  - iii) Maximum of 8 (eight) 500 MCM TECH 90 XLPE cables.

Minimum 50 mm space required between cable tray and other penetrating items.

<u>Pipe or Cable Type</u>	<u>FT and FTH Rating, Hr</u>
Steel Pipe non-insulated (Item 2a)	0
Insulated steel pipe (Item 2a)	1
EMT (Item 2a)	0
Non-insulated copper (Item 2a)	0
Insulated copper (Item 2a)	3/4
300 MCM (Item 2b)	0
16 AWG (Item 2b)	3/4
12 AWG (Item 2b)	2
14 AWG (Item 2c (i))	0
20 AWG (Item 2c (ii))	1-1/2
500 MCM (Item 2c (iii))	0
No penetrations	4

3. **Pipe Insulation** - Pipe, Item 2a, to be wrapped with minimum 25 mm thick ULC labelled hollow cylindrical heavy density (minimum 112 kg/m<sup>3</sup>) mineral wool fiber units with an all service jacket. Longitudinal joints sealed with metal fasteners or with butt tape supplied with the product.

\*4. **Firestop System Components - (Guide No. 40 U19.13)**

- (a) Type Self Seal MW-300 mineral wool insulation or minimum 80 kg/m<sup>3</sup> mineral wool insulation installed to a minimum depth of 95 mm for 2hr or 145 mm for 4hr, leaving minimum of 6.4 mm deep space between top of insulation and top surface of floor, or 10 mm space on both sides of wall for vertical separation. Uncompressed total width of material to be 50 ± 10% wider than width of opening to be filled (i.e. 270 mm wide for 180 mm wide opening). Length of individual pieces to match length of opening so as to avoid end joints and butted tightly against penetrating items. Remaining voids and spaces between cables to be firmly packed by hand (50 ± 10% compression) with insulation.
- (b) Type Self Seal SL-100 (floors only) sealant applied over insulation (Item 4a) to minimum depth of 6.4 mm and flush with top of floor.

OR

- (c) Type Self Seal GG-200 (floors or walls) sealant to be applied over insulation (Item 4a) on both sides of opening to minimum depth of 6.4 mm for vertical separations.

**NUCO INC.**

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*

5. **Sleeve (optional)** - Opening can be sleeved with 1 mm thick galvanized sheet metal.

\*Listed by Underwriters' Laboratories of Canada for use as a component within the appropriate System.

# FS4

## System No. W-L-1086

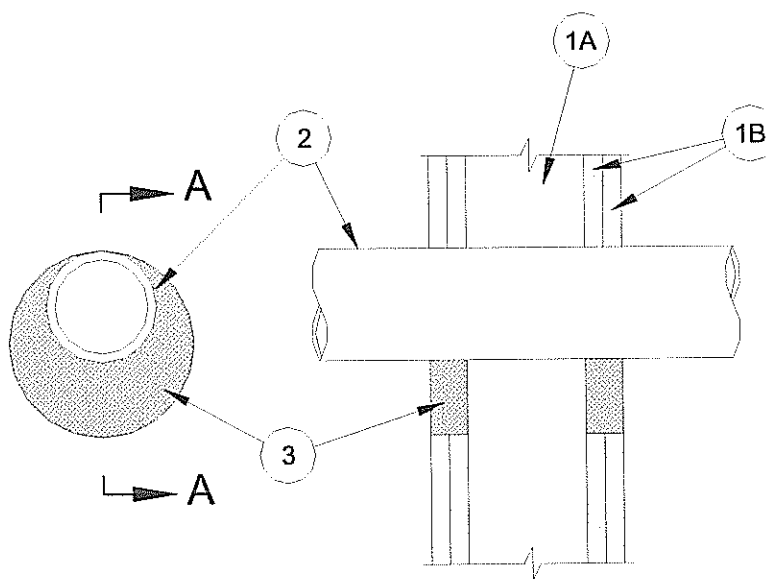


F Ratings - 1 and 2 Hr (See Item 1)

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

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 3 CFM / Sq. Ft.



### SECTION A-A

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 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. **Wallboard, Gypsum\*** - Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 10 in.

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

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

- A. **Steel Pipe** - Nom 4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
- B. **Copper Tubing** - Nom 3 in. diam (or smaller) Type L (or heavier) copper tubing.

*The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115*

- C. **Copper Pipe** - Nom 3 in. diam (or smaller) Regular (or heavier) copper pipe.
- D. **Conduit** - Nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT) or steel conduit.
- E. **Steel Pipe** - Nom 8 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

**T Rating is 1/4 hr for Items A, D and E, 0 hr for Items B and C.**

- 3. **Fill, Void or Cavity Material\* - Sealant** - Min 5/8 in. or 1-1/4 in. thickness of fill material applied within the annulus, flush with both surfaces of wall for 1 or 2 hr walls, respectively.

**NUCO INC.** - Self Seal GG-200

\* Bearing the UL Classification Mark

# FS5A

## System No. C-AJ-2314

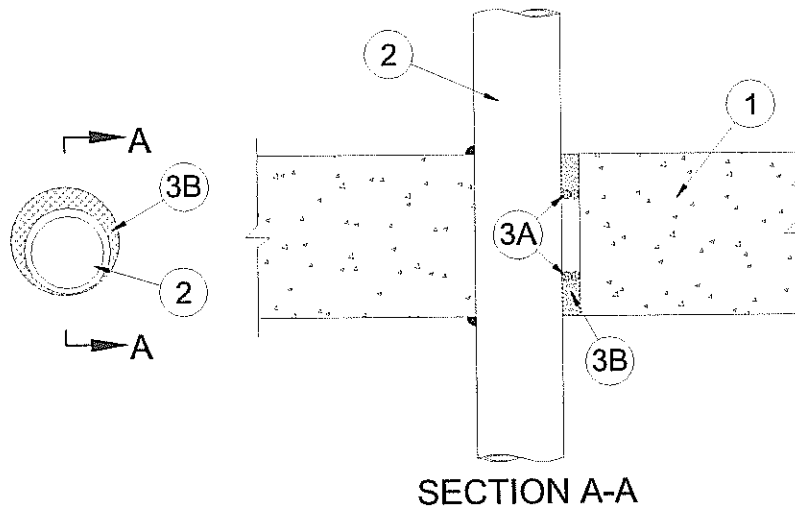


F Ratings - 1 and 2 Hr (See Item 1)

T Ratings - 0, 1 and 2 Hr (See Item 2)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 5 CFM / Sq. Ft.



1. **Floor or Wall Assembly** - Min 3-3/4 in. (95 mm) or min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600 – 2400 kg/m<sup>3</sup>) concrete for 1 and 2 Hr rated assemblies, respectively. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Floor assembly may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units\***. The opening shall be 1 in. (25 mm) larger than the nom diam of penetrant.

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

- 1A. **Steel Sleeve – (Optional, Not Shown)** – Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with both surfaces of floor or wall assembly. The nom size of sleeve shall be 1 in. (25 mm) larger than the nom size of through-penetrant.
2. **Through-Penetrant** - One nonmetallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space between the penetrant and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 5/8 in. (16 mm). When steel sleeve is used, the annular space between the penetrant and the sleeve shall be a min 1/4 in. (6 mm) to a max 3/8 in. (10 mm). Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:
  - A. **Polyvinyl Chloride (PVC) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

*The basic Standard used to evaluate this Firestop System is ANSI/UL 1479 (ASTM E814)*

- B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe†** - Nom 2 in. (51 mm) diam (or smaller) SDR13.5 or SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
- D. **Crosslinked Polyethylene (PEX) Tubing‡** - Nom 2 in. diam (55 mm OD) (or smaller) SDR9 PEX tubing for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- E. **Electrical Nonmetallic Tubing (ENT)+** - Nom 2 in. (51 mm) diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- F. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 2 in. (51 mm) diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

- G. **Polyvinyl Chloride (PVC) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- H. **Acrylonitrile Butadiene Styrene (ABS) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- I. **Chlorinated Polyvinyl Chloride (CPVC) Pipe‡** - Nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

**IPEX INC.** - AquaRise

T Rating is 0 Hr when steel sleeve is used. When steel sleeve is not used, the T Rating is 1 and 2 Hr for Penetrants A, B, C, D, E, and F for 1 and 2 Hr rated assemblies, respectively. T Rating is 0 Hr for Penetrants G and H. T Rating is 1 Hr for Penetrant I.

3. **Firestop System** - The details of the firestop system shall be as follows:

- A. **Packing Material (Optional)** – Nom 3/8 in. (10 mm) diam polyethylene backer rod or min 3/8 in. (10 mm) thickness of mineral wool batt insulation firmly packed into opening as a permanent form and recessed from both surfaces of floor or wall as required to accommodate the required thickness of fill material.

*The basic Standard used to evaluate this Firestop System is ANSI/UL 1479 (ASTM E814)*

- B. **Fill, Void or Cavity Material\* - Caulk** - Min 5/8 in. (16 mm) or min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with both surfaces of floor or wall, for 1 and 2 Hr rated assemblies, respectively. An additional 1/4 in. (6 mm) bead of fill material applied at the penetrant / concrete interface at the point contact location.

**NUCO INC. - •Self Seal GG-266**

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

# FS5B

## System No. W-L-2145

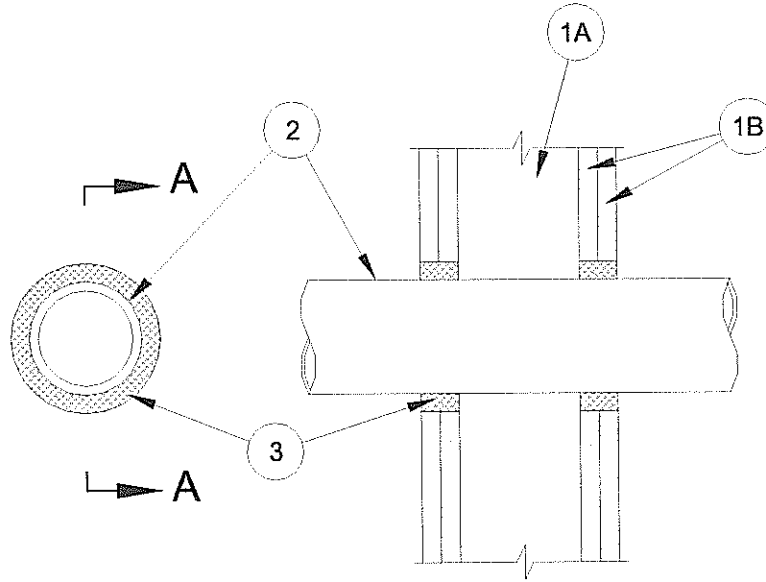


F Ratings - 1 and 2 Hr (See Item 1)

T Ratings - 0, 1, 1-1/2 and 2 Hr (See Item 2)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 5 CFM / Sq. Ft.



### SECTION A-A

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 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. (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. **Wallboard, Gypsum\*** - Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 3 in. (76 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, conduit or tubing to be centered within the firestop system. A nom annular space of 5/16 in. (8 mm) is required within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:

- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

*The basic Standard used to evaluate this Firestop System is ANSI/UL 1479 (ASTM E814)*



- B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe‡** - Nom 2 in. (51 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
- D. **Crosslinked Polyethylene (PEX) Tubing‡** - Nom 2 in. (55 mm OD) diam (or smaller) SDR9 PEX tubing for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- E. **Acrylonitrile Butadiene Styrene (ABS) Pipe** - Nom 2 in. (51 mm) diam (or smaller) Schedule 40 solid or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- F. **Electrical Nonmetallic Tubing (ENT)+** - Nom 2 in. (51 mm) diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- G. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 2 in. (51 mm) diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

- H. **Chlorinated Polyvinyl Chloride (CPVC) Pipe‡** - Nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

IPEX INC. - AquaRise

The T Rating is 0 Hr and 1-1/2 Hr for 1 and 2 Hr rated assemblies, respectively, for Penetrants A, B and C. The T Rating is 0 Hr and 2 Hr for 1 and 2 Hr rated assemblies, respectively, for Penetrants D, F, and G. The T Rating is 0 Hr for Penetrant E. The T Rating is 1 Hr for Penetrant H.

- 3. **Fill, Void or Cavity Material\* - Caulk** - Min 5/8 in. (16 mm) and 1-1/4 in. (32 mm) thicknesses of fill material for 1 and 2 Hr rated assemblies, respectively, applied within the annulus flush with both surfaces of wall.

NUCO INC. - •Self Seal GG-266

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

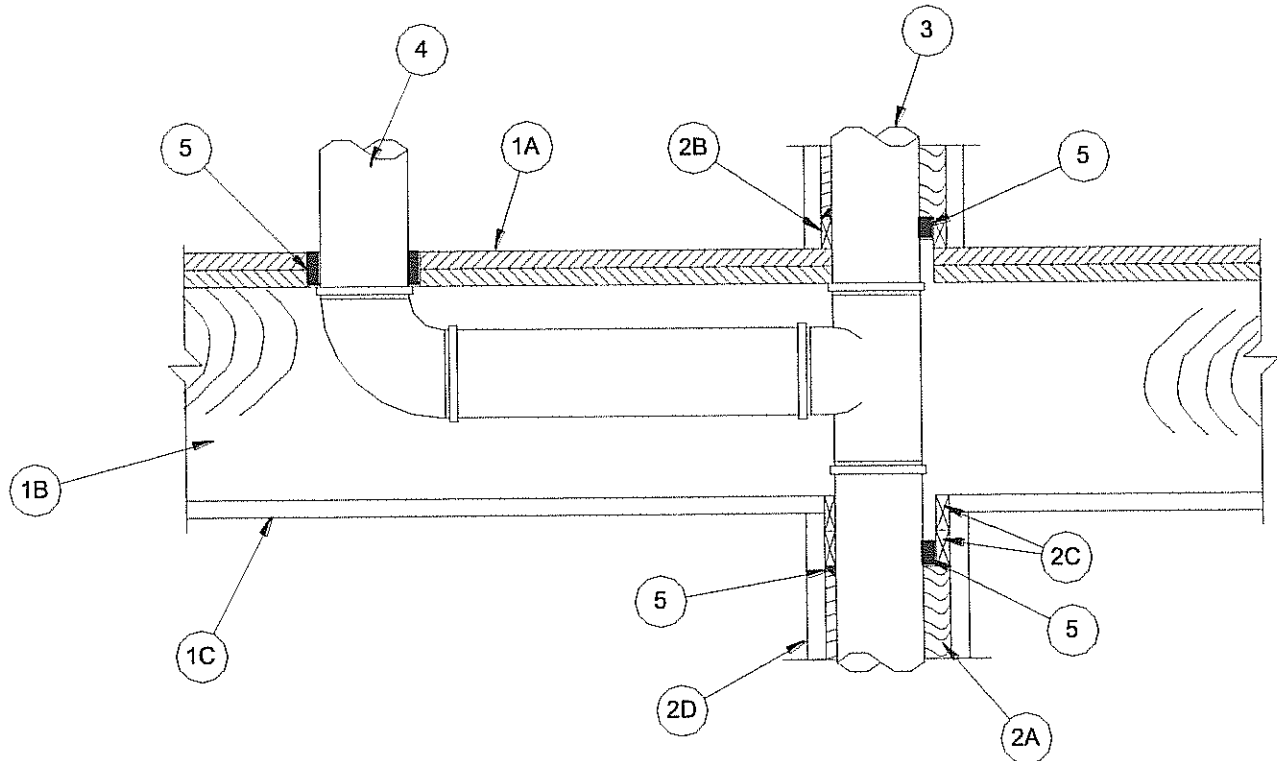
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# FS6

## System No. F-C-2430



<u>ANSI / UL1479 (ASTM E814)</u>	<u>CAN / ULC - S115-11</u>
F Rating - 1 Hr	F Rating - 1 Hr
T Rating - 1 Hr	FT Rating - 1 Hr
L Rating At Ambient - Less Than 1 CFM / Sq. Ft.	FH Rating - 1 Hr
L Rating At 400°F - Less Than 1 CFM / Sq. Ft.	FTH Rating - 1 Hr
	L Rating At Ambient - Less Than 5.1 L/s/m <sup>2</sup>
	L Rating At 400°F - Less Than 5.1 L/s/m <sup>2</sup>



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. System No. F-C-2430 meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

1. **Floor-Ceiling Assembly** - The 1 Hr fire-rated wood truss or combination wood and steel truss floor-ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 series Floor-Ceiling designs in the UL Fire Resistance Directory and shall include the following construction features:
  - A. **Flooring System** - Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture\*** as specified in the individual Floor-Ceiling design. Max diam of opening shall be 1 in. (25 mm) larger than the nom diam of nonmetallic pipe (Item 3) and max 2 in. (51 mm) larger than the nom diam of nonmetallic branch pipe (Item 4) except as noted under Item 6. As an option, the opening for the branch piping (Item 4) may be rectangular, 8 in. by 12 in. (204 mm by 305 mm) max. Cutout to be patched on the underside of subfloor using one layer of min 3/4 in. (19 mm) thick plywood or min 5/8 in. (16 mm) thick gypsum board (Item 1C) sized to lap min 2 in. (51 mm) beyond each edge of rectangular cutout. Diam of opening hole sawed through patch to accommodate branch piping (Item 4) to be max 1 in.

(25 mm) larger than diam of branch piping. Patch split into two pieces at opening hole-sawed for branch piping. Two pieces positioned around branch piping, with cut edges tightly-butted, and screw attached to the underside of subfloor using 1-1/4 in. (32 mm) long Type S steel screws spaced max 6 in. (152 mm) OC.

- B. **Joists** - Min 9 in. (229 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members\*** with bridging as required and with ends firestopped.
  - C. **Gypsum Board\*** - Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling design.
2. **Chase Wall** - The through-penetrant (Item 3) shall be routed through a 1 Hr fire-rated or non-rated single, double or staggered wood stud / gypsum board chase wall constructed of the materials and Partition design in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs** - Nom 2 in. by 4 in. (51 mm by 102 mm) or nom 2 in. by 6 in. (51 mm by 152 mm) or double nom 2 in. by 4 in. (51 mm by 102 mm) lumber studs.
  - B. **Sole Plate** - Nom 2 in. by 4 in. (51 mm by 102 mm) or nom 2 in. by 6 in. (51 mm by 152 mm) or parallel 2 in. by 4 in. (51 mm by 102 mm) lumber plates, tightly butted.
  - C. **Top Plate** - The double top plate shall consist of two nom 2 in. by 4 in. (51 mm by 102 mm) or nom 2 in. by 6 in. (51 mm by 152 mm) or two sets of parallel 2 in. by 4 in. (51 mm by 102 mm) lumber plates, tightly butted. Diam of opening shall be 1 in. (25 mm) larger than the nom diam of nonmetallic pipe (Item 3) except as noted under Item 6.
  - D. **Gypsum Board\*** - Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition design .
3. **Through Penetrant** - One nonmetallic pipe to be installed within the firestop system. Pipe to be rigidly supported on both sides of the floor-ceiling assembly. The annular space between the pipe and the periphery of the opening shall be min 0 in. (0 mm) (point contact) to max 1/2 in. (13 mm). 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 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 4 in. (102 mm) diam (or smaller) SDR13.5 CPVC pipe or nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - C. **Acrylonitrile Butadiene Styrene (ABS) Pipe** - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- Note:** When chase wall is constructed of nom 2 in. by 4 in. (51 mm by 102 mm) studs, through penetrants are restricted to nom 2 in. (51 mm) diam (or smaller).
4. **Branch Piping (Optional)** - One nonmetallic pipe to be connected to through-penetrant (Item 3) and installed within opening in subfloor or gypsum board plate. The annular space between the pipe and the periphery of the opening shall be min 1/2 in. (13 mm) to max 1 in. (25 mm). The following types and sizes of nonmetallic pipe may be used:

- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 3 in. (76 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.
  - B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe†** - Nom 3 in. (76 mm) diam (or smaller) SDR13.5 CPVC pipe or nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - C. **Acrylonitrile Butadiene Styrene (ABS) Pipe** - Nom 3 in. (76 mm) diam (or smaller) Schedule 40 solid core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- 4A. **P-Trap (Optional, not shown)** - Nom 2 in. (51 mm) diam (or smaller) nonmetallic P-trap for use in connection with branch pipe. P-trap to be of same type of nonmetallic pipe used for branch piping.
5. **Fill, Void or Cavity Material\* - Sealant** - Min 3/4 in. (19 mm) thickness of sealant applied within the annular space around perimeter of through-penetrant (Item 3), flush with top surface of floor or sole plate and flush with bottom surface of top plate. Min 3/4 in. (19 mm) thickness of sealant applied within annular space around perimeter of branch piping (Item 4), flush with top surface of floor.
- NUCO INC.** - •Self Seal GG-266. When Self Seal Type-SSC Collar (Item 6) is used, GG-200 Sealant may be used as an alternate to the GG-266 Sealant to seal the annular space above the collar.
6. **Firestop Device\* - Collar – (Not Shown)** – When the diam of the opening made in the flooring system (Item 1) or in the top plate of the chase wall (Item 2) is less than 1/2 in. (13 mm) larger than the diam of the through penetrant, a firestop collar is to be installed in addition to the Sealant in the annular space. Firestop collar to be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around pipe and butted tightly to underside of flooring system or chase wall top plate and secured with a min 1-1/4 in. (32 mm) long steel screw in conjunction with a min 1-1/4 in. (32 mm) diam steel fender washer at each anchor tab.

**NUCO INC.** – •Self Seal Type-SSC

\* Bearing the UL Classification Mark

† The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 and Type-SSC were also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

# FS7

## System No. C-AJ-2027C



F Rating - 2 Hr

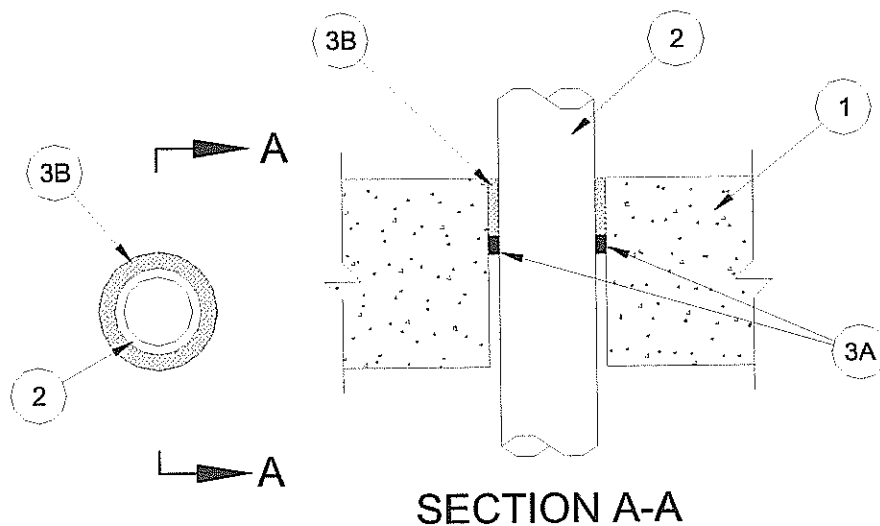
FT Rating - 0 and 2 Hr (See Item 1A)

FH Rating - 2 Hr

FTH Rating - 0 and 2 Hr (See Item 1A)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 5 CFM / Sq. Ft.



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. System No. C-AJ-2027C meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

1. **Floor or Wall Assembly** - Min 114 mm thick reinforced lightweight or normal weight (1600 – 2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening shall be 25 mm larger than the nom size of through-penetrant (Item 2).

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

- 1A. **Steel Sleeve – (Optional, not shown)** – Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with both surfaces of floor or wall assembly. The nom size of sleeve shall be 25 mm larger than the nom size of through-penetrant.

The hourly FT and FTH Ratings are 0 Hr when steel sleeve is used, otherwise the hourly FT, FH and FTH Ratings are equal to the hourly F Rating of the assembly.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*

2. **Through-Penetrant** - One nonmetallic pipe, conduit or tubing to be centered within the firestop system. A nom annular space of 8 mm is required within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:

- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 50 mm inside diam (or smaller) Schedule 40 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 50 mm diam (or smaller) SDR11, SDR13.5 or SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 50 mm inside diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70).
- D. **Electrical Nonmetallic Tubing (ENT)+** - Nom 50 mm inside diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 331 of the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- E. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 50 mm inside diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 351 of the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

3. **Firestop System** - The details of the firestop system shall be as follows:

- A. **Packing Material (Optional)** – Nom 9.5 mm diam polyethylene backer rod or min 9.5 mm thickness of mineral wool batt insulation firmly packed into opening as a permanent form and recessed from top surface of floor or both surfaces wall as required to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\* - Caulk** - Min 50 mm thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces wall.

**NUCO INC. - •Self Seal GG-266**

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

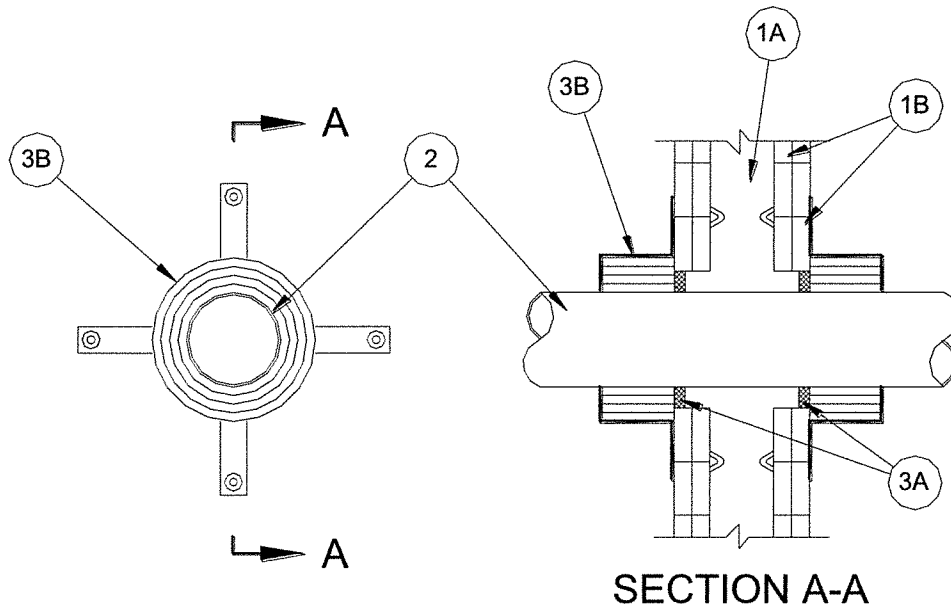
Form: CAJ2027C Rev.: 4 Date: 11/06

# FS8

## System No. W-L-2566



ANSI / UL1479 (ASTM E814)	CAN / ULC - S115
F Ratings - 1 and 2 Hr (See Item 1)	F, FH Ratings – 1 and 2 Hr (See Item 1)
T Ratings - 0 and 1 Hr (See Item 1)	FT, FTH Ratings – 0 and 1 Hr (See Item 1)
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 – 3 CFM / Sq. Ft.	L Rating At 400°F – 3 CFM / Sq. Ft.
W Rating – Class 1 (See Item 2B)	



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. System No. W-L-2566 meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

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 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. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC.
  - B. **Wallboard, Gypsum\*** - Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 5 in. (127 mm).

The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed. The hourly T, FT and FTH Ratings are 0 Hr and 1 Hr for 1 and 2 Hr rated assemblies, respectively.

The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115

2. **Through-Penetrants** - One nonmetallic pipe or conduit installed either concentrically or eccentrically within the firestop system. The annular space between the penetrant and the edge of the opening shall be min 5/16 in. (8 mm) to max 5/8 in. (16 mm). Penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
  - A. **Polyvinyl Chloride (PVC) Pipe** - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 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) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems or nom 3 in. (76 mm) diam (or smaller) SDR13.5 CPVC pipe or nom 2 in. (51 mm) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) piping systems.
  - C. **Rigid Nonmetallic Conduit+** - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
  - D. **Polyvinyl Chloride-XFR (PVC-XFR) Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core PVC-XFR pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - E. **Cellular Core Acrylonitrile Butadiene Styrene (ccABS) Pipe** - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - F. **Polypropylene (PP) Pipe** – Nom 2 in. (51 mm) diam (or smaller) Aquatherm Climatherm or Aquatherm Fusiotherm SDR11 polypropylene pipe to be installed either concentrically or eccentrically within the firestop system for closed (process or supply) or vented (drain, waste or vent) piping systems.
  - G. **Polyvinyl Chloride-HRS (PVC-HRS-2550) Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid core PVC-HRS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
  - H. **Cross-Linked Polyethylene (PEX) Tubes** — Nom 2 in. (51 mm) diam (or smaller) SDR 9 cross-linked polyethylene (PEX) tubes 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 Material\* - Sealant** - Min 1/4 in. (6.4 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall assembly.  
  
**NUCO INC.** - Self Seal GG-200 or •Self Seal GG-266
  - B. **Firestop Device\* - Collar** - Collar to be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around pipe and secured to both sides of wall with min 3/16 in. (4.8 mm) diam steel toggle bolts in conjunction with min 1-1/4

*The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115*



in. (32 mm) diam steel fender washers. Min of two, three or four anchor bolts, symmetrically located, for nom 1-1/2 in. (38 mm) and 2 in. (51 mm) diam, nom 3 in. (76 mm) diam and nom 4 in. (102 mm) diam pipes, respectively.

**NUCO INC. - •Self Seal Type-SSC**

- \* Bearing the UL Classification Mark
- + Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 and Type-SSC were also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

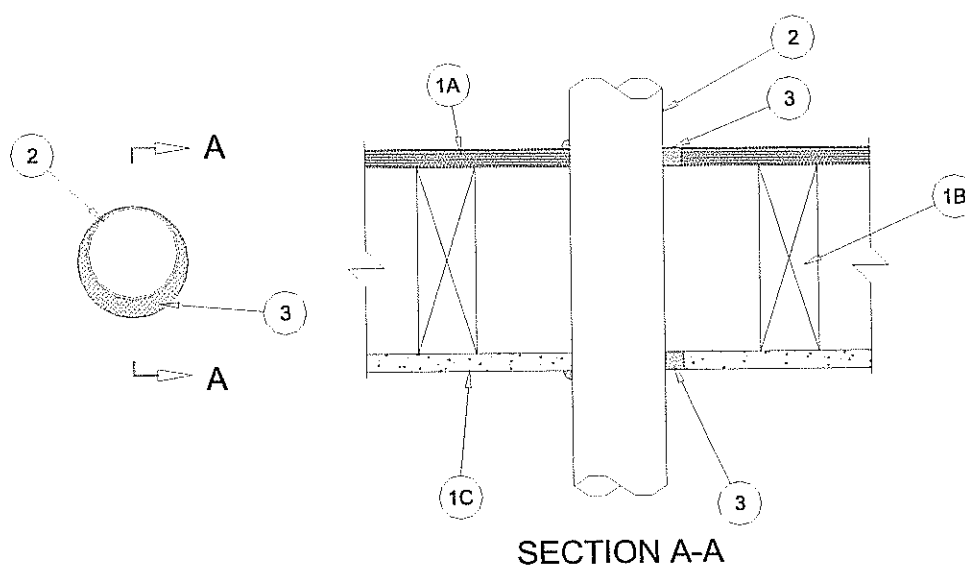
Form: WL2566 Rev.: 2 Date: 07/14

# FS9

## System No. F-C-1093



ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1 Hr	F Rating — 1 Hr
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/ft <sup>2</sup>	FH Rating — 1 Hr
L Rating At 400 F — 3 CFM/sq ft <sup>2</sup>	FTH Rating — 0 Hr
	L Rating At Ambient — Less Than 5.1/L/s/m <sup>2</sup>
	L Rating At 204 C — 15.2 L/s/m <sup>2</sup>



1. **Floor-Ceiling Assembly** - The 1 Hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction details of the floor-ceiling assembly are summarized below:
  - A. **Flooring System** - Lumber or plywood subfloor with finish floor of lumber, plywood or **Floor Topping Mixture\*** as specified in the individual Floor-Ceiling Design. Max diam of opening is 5-1/2 in. (140 mm).
  - B. **Wood Joists** - Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or **Structural Wood Members\*** with bridging as required and with ends firestopped.
  - C. **Gypsum Board\*** - Nom 4 ft (1219 mm) wide by 5/8 in. (16 mm) thick, as specified in the individual Floor-Ceiling Design. Max diam of opening is 5-1/2 in. (140 mm).

- 1.1 **Chase Wall (Optional, not shown)** - The through-penetrants (Item 2) may be routed through a fire-rated single, double or staggered wood stud / gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
- A. **Studs** - Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
  - B. **Sole Plate** - Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 5-1/2 in. (140 mm).
  - C. **Top Plate** - The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 5-1/2 in. (140 mm).
  - D. **Gypsum Board\*** - Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design .
2. **Through-Penetrant** – One metallic pipe, conduit or tubing installed either concentrically or eccentrically within the opening. The annular space between pipe, conduit or tubing and periphery of opening to be min 0 in. (0 mm, point contact) to max 1 in. (25 mm). Pipe, conduit or tubing to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
- A. **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. **Conduit** - Nom 4 in. (102 mm) diam (or smaller) rigid steel conduit or nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT).
  - D. **Copper Tubing** - Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tubing.
  - E. **Copper Pipe** - Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
  - F. **Flexible Metal Piping** — Nom 2 in. (51 mm) diam (or smaller) steel flexible metal piping.  
**GASTITE, DIV OF TITEFLEX — CSST or FlashShield CSST**
3. **Fill, Void or Cavity Material\* - Sealant** - Min 3/4 in. (19 mm) thickness of sealant applied within the annulus, flush with top surface of floor or sole plate. Min 5/8 in. (16 mm) thickness of sealant applied within the annulus, flush with bottom surface of ceiling or top plate. Min 1/4 in. (6 mm) diam bead of sealant applied at point contact locations at penetrant / floor or sole plate interface on top surface of floor or sole plate and at the penetrant / ceiling or top plate interface.

**NUCO INC.** - Self Seal GG-200 or Self Seal GG-266

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

# FW1

## System No. C-AJ-2026C



F Ratings - 1 and 2 Hr (See Item 1)

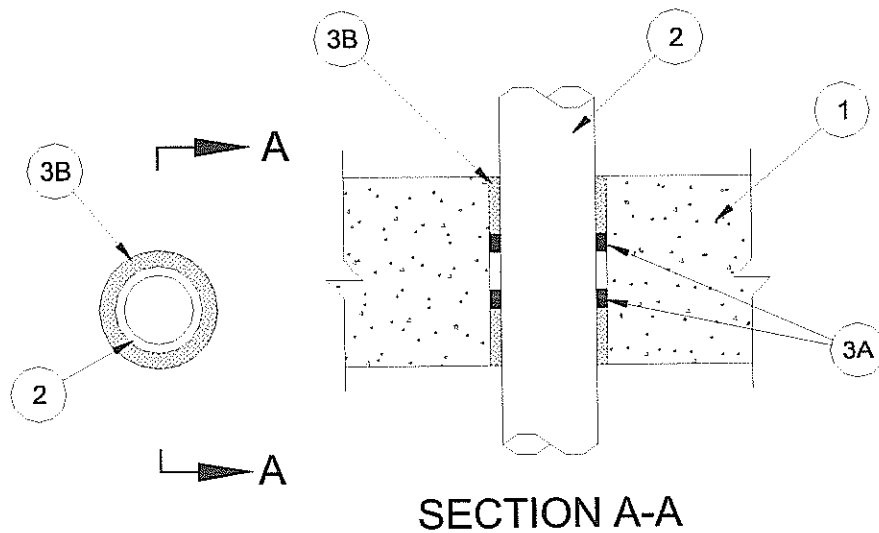
FT Ratings - 0, 1 and 2 Hr (See Item 1A)

FH Ratings - 1 and 2 Hr (See Item 1)

FTH Ratings - 0, 1 and 2 Hr (See Item 1A)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 5 CFM / Sq. Ft.



System tested with a pressure differential of 50 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side. System No. C-AJ-2026C meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

1. **Floor or Wall Assembly** - Min 95 mm or min 114 mm thick reinforced lightweight or normal weight (1600 – 2400 kg/m<sup>3</sup>) concrete for 1 and 2 Hr F Ratings, respectively. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Floor assembly may also be constructed of any min 152 mm thick UL Classified hollow-core **Precast Concrete Units\***. Max diam of opening shall be 25 mm larger than the nom size of through-penetrant (Item 2).

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

- 1A. **Steel Sleeve – (Optional, not shown)** – Schedule 40 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with both surfaces of floor or wall assembly. The nom size of sleeve shall be 25 mm larger than the nom size of through-penetrant.

The hourly FT and FTH Ratings are 0 Hr when steel sleeve is used, otherwise the hourly FT, FH and FTH Ratings are equal to the hourly F Rating of the assembly.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*

2. **Through-Penetrant** - One nonmetallic pipe, conduit or tubing to be centered within the firestop system. A nom annular space of 8 mm is required within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:

- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 50 mm inside diam (or smaller) Schedule 40 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 50 mm diam (or smaller) SDR13.5 or SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 50 mm inside diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70).
- D. **Electrical Nonmetallic Tubing (ENT)+** - Nom 50 mm inside diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 331 of the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- E. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 50 mm inside diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 351 of the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

3. **Firestop System** - The details of the firestop system shall be as follows:

- A. **Packing Material (Optional)** – Nom 9.5 mm diam polyethylene backer rod or min 9.5 mm thickness of mineral wool batt insulation firmly packed into opening as a permanent form and recessed from both surfaces of floor or wall as required to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\* - Caulk** - Min 15.9 mm or min 25.4 mm thickness of fill material applied within the annulus, flush with both surfaces of floor or wall, for 1 and 2 Hr rated assemblies, respectively.

**NUCO INC.** - •Self Seal GG-266

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

Form: CAJ2026C Rev.: 3 Date: 05/05

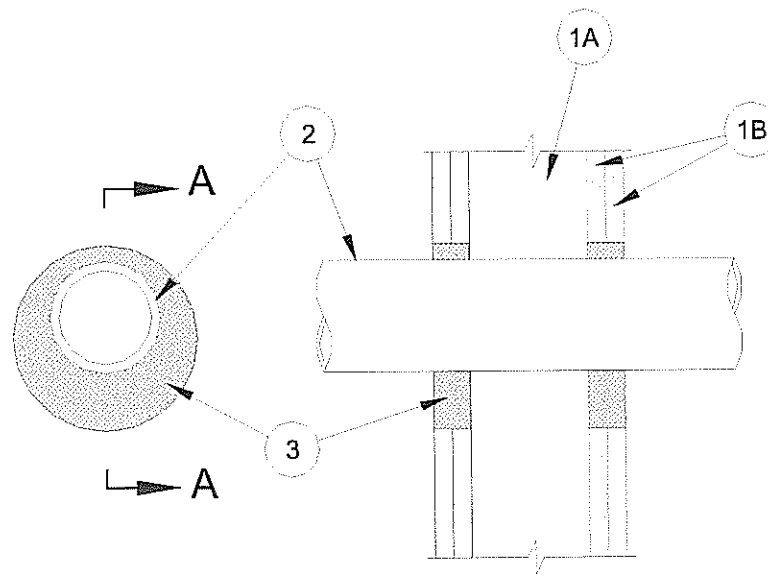
# FW2

## System No. SP947



(FOR VERTICAL SEPARATIONS)

F Rating	- 2 hr
FT Rating	- 2 hr
FH Rating	- 2 hr
FTH Rating	- 2 hr



SECTION A-A

1. **Wall Assembly** - The fire-rated gypsum wallboard and stud wall assembly shall be constructed of the materials and in the manner described in the individual Wall or Partition Designs in the ULC List of Equipment and Materials, Fire Resistance Ratings, and shall include the following construction features:
  - A. **Studs** - Wall framing consisting of minimum 64 mm wide by 28.6 mm deep channel steel studs with 6.4 mm lip on each flange tip formed from minimum 0.48 mm thick galvanized steel. Steel studs cut 19 mm less in length than the height of the assembly and secured to channel-shaped galvanized steel floor and ceiling tracks with 13 mm long self-drilling, self-tapping screws on both sides of studs. Steel stud spacing not to exceed 600 mm OC.
  - B. **Gypsum Wallboard** - Minimum of two layers of 15.9 mm thick gypsum wallboard as specified in the individual Wall or Partition Designs. Maximum diameter of opening is 76.2 mm.
2. **Through-Penetrant** - Nominal 50 mm diameter (60.3 mm OD) (or smaller) Schedule 40 PVC plastic pipe or conduit or CPVC† plastic pipe for use in closed (process or water supply) applications. The annular space shall be minimum 6 mm to maximum 10 mm. A maximum of one pipe is permitted within the opening and must be rigidly supported on both sides of wall assembly.

*The basic Standard used to evaluate this Firestop System is CAN/ULC-S115*

- \*3. **Firestop System Component (Guide No. 40 U19.13)** - Self Seal GG-266 applied in the annular space around the penetrating item (Item 2) to a minimum depth of 32 mm on both sides in a wall assembly.

**NUCO INC.**

\*Listed by Underwriters' Laboratories of Canada for use as a component within the appropriate System.

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

# FW3

## System No. C-AJ-2025



F Rating - 2 Hr

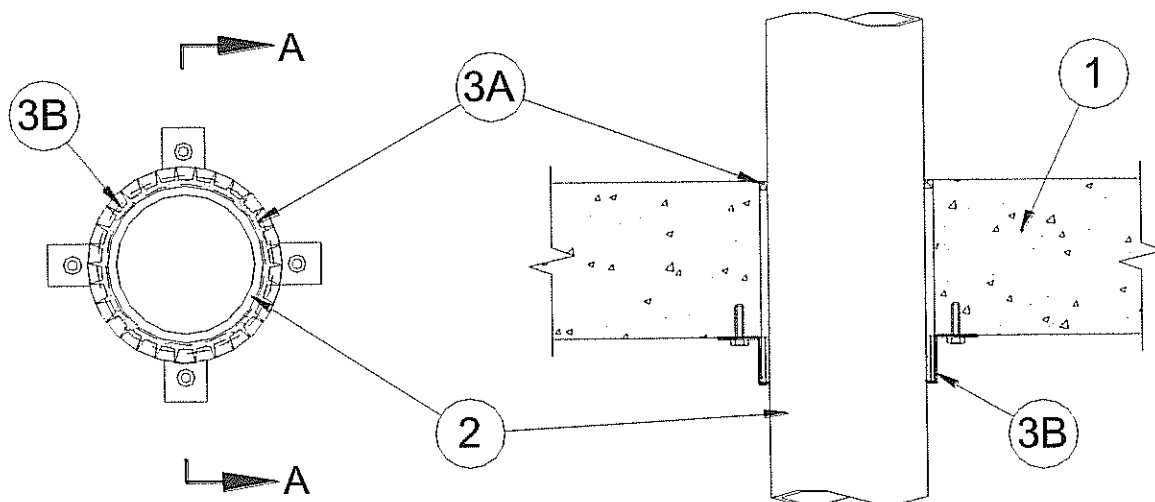
FT Ratings - 1/4, 1-3/4 and 2 Hr (See Item 2)

FH Ratings - 0 and 2 Hr (See Item 2)

FTH Ratings - 0, 1/4, and 2 Hr (See Item 2)

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 3 CFM / Sq. Ft.



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. System No. C-AJ-2025 meets Canadian building code requirements for drain, waste and vent (DWV) pipe penetrations.

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

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

2. **Through-Penetrants** - One nonmetallic pipe or conduit to be installed either concentrically or eccentrically within the firestop system. The annular space between the pipe or conduit and the edge of the opening shall be min 3.1 mm (1/8 in.) to max 6.4 mm (1/4 in.). Pipe or conduit to be rigidly supported on both sides of the floor or wall assembly. The following types of pipe or conduit may be used:



- A. **Polyvinyl Chloride (PVC) Pipe** - Nom 152 mm (6 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 152 mm (6 in.) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems or nom 152 mm (6 in.) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
- C. **Rigid Nonmetallic Conduit+** - Nom 152 mm (6 in.) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
- D. **Fire Retardant Polypropylene (FRPP) Pipe†** - Nom 51 mm (2 in.) diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- E. **Electrical Nonmetallic Tubing (ENT)+** - Nom 51 mm (2 in.) diam (or smaller) corrugated-wall electrical nonmetallic tubing (ENT) constructed of polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70).

See **Electrical Nonmetallic Tubing** (FKHU) category in the Electrical Construction Materials Directory for names of manufacturers.

- F. **Flexible Nonmetallic Conduit, Liquid-Tight (FNMC)+** - Nom 51 mm (2 in.) diam (or smaller) corrugated-wall flexible nonmetallic conduit, liquid-tight (FNMC) constructed of polyvinyl chloride (PVC) and installed in accordance with Article 351 of the National Electrical Code (NFPA No. 70).

See **Flexible Nonmetallic Conduit, Liquid-Tight** (DXOQ) category in the Electrical Construction Materials Directory for names of manufacturers.

- G. **Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 102 mm (4 in.) diam (or smaller) Schedule 40 solid core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- H. **Polyvinyl Chloride-XFR (PVC 15-50 XFR) Pipe** — Nom 102 mm (4 in.) diam (or smaller) Schedule 40 solid core PVC-XFR pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- I. **Chlorinated Polyvinyl Chloride (CPVC) Pipe†** - Nom 76 mm (3 in.) diam (or smaller) SDR11 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.  
  
**IPEX INC.** – AquaRise
- J. **Polyvinyl Chloride-HRS (PVC-HRS-2550) Pipe** — Nom 102 mm (4 in.) diam (or smaller) Schedule 40 PVC-HRS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

FT Rating is 1-3/4 Hr for nom 152 mm (6 in.) diam pipes. FH and FTH Ratings are 0 Hr for nom 152 mm (6 in.) diam pipes. F, FT, FH and FTH Ratings are 2 Hr for nom 102 mm (4 in.) diam (or smaller) pipes. FT and FTH Rating is 1/4 Hr for Penetrant I.

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

- A. **Fill, Void or Cavity Material\* - Sealant** - Min 3.1 mm (1/8 in.) thickness of fill material applied within the annulus, flush with the top surface of floor or with both sides of wall assembly.

**NUCO INC.** - Self Seal GG-200 or •Self Seal GG-266

- B. **Firestop Device\* - Collar** - Collar to be installed in accordance with the accompanying installation instructions. Collar to be installed and latched around pipe and secured to underside of floor or to both sides of wall with min 5 mm (3/16 in.) diam by min 31.8 mm (1-1/4 in.) long steel concrete anchors in conjunction with min 31.8 mm (1-1/4 in.) diam steel fender washers. Min of two, three, four or seven concrete anchors, symmetrically located, for nom 38 mm (1-1/2 in.) and 51 mm (2 in.) diam, nom 76 mm (3 in.) diam, nom 102 mm (4 in.) and nom 152 mm (6 in.) diam pipes, respectively.

**NUCO INC.** - •Self Seal Type-SSC

\* Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

‡ The through-penetrant is not to be stressed beyond the permissible bending deflection for the intended operating temperature as established by the pipe manufacturer.

• In addition to the standardized environmental exposures, Self Seal GG-266 and Type-SSC were also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

# FW4

## System No. C-AJ-5229



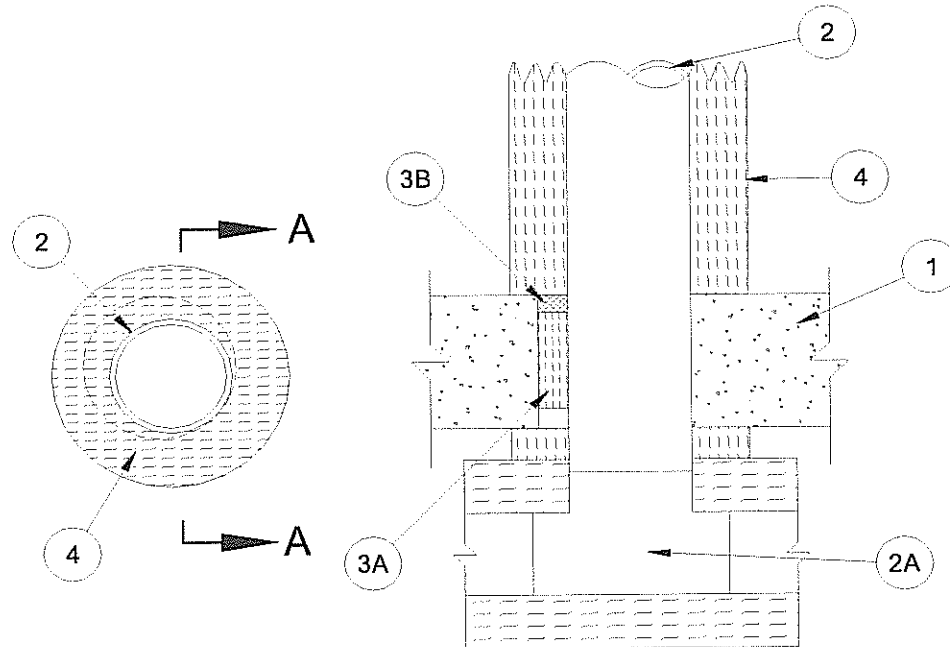
F Rating - 2 Hr

T Rating - 2 Hr

L Rating At Ambient – Less Than 1 CFM / Sq. Ft.

L Rating At 400°F – 3 CFM / Sq. Ft.

W Rating - Class 1 (See Items 3B and 4A)



**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<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 10 in. (254 mm).

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

2. **Through-Penetrant** - One metallic pipe or tubing installed either concentrically or eccentrically within opening. Annular space between penetrant and periphery of opening shall be min of 0 in. (0 mm, point contact) to max 1-3/8 in. (35 mm). Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of penetrants may be used:
  - A. **Steel Pipe** - Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
  - B. **Iron Pipe** - Nom 8 in. (203 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe or Class 50 (or heavier) ductile iron pressure pipe.
  - C. **Copper Tubing** - Nom 4 in. (102 mm) diam (or smaller) Type M (or heavier) copper tubing.

*The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115*

- D. **Copper Pipe** - Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
- 2A. **Pipe Fitting (Optional)** - Pipe or tube elbow, coupling or tee of the same type and size as penetrant (Item 2) may be attached to penetrant 4 in. (102 mm) or more below bottom surface of floor or either surface of wall.
3. **Firestop System**-The firestop system shall consist of the following:
- A. **Packing Material** - Min 3-3/4 in. (95 mm) thickness of min 4.0 pcf (64 kg/m<sup>3</sup>) 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 3/8 in. (10 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. **A min 3/8 in. (10 mm) bead of sealant shall be applied around the base of the PVC jacket (Item 4A) on the top surface of the floor to attain the W Rating.**
- NUCO INC.** - Self Seal SL-100 (floors only), Self Seal GG-200 or •Self Seal GG-266
4. **Pipe Covering\*** - Nom 2 or 3 in. (51 or 76 mm) thick hollow cylindrical heavy density (min 6.5 pcf or 104 kg/m<sup>3</sup>) mineral fiber units with foil-scrim-kraft all service jacket. Longitudinal and traverse joints sealed with min 2 in. (51 mm) wide tape, 3 mil aluminum tape. Pipe covering to be tightly butted against both sides of floor or wall surfaces with a min 1/2 in. (13 mm) overlap beyond the periphery of opening.
- See **Pipe and Equipment Covering - Materials** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering 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, Not Shown)** - An additional PVC jacketing, 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. (1.22 m) wide by nom 20 or 30 mil (0.5 or 0.8 mm) thick. The jacket shall extend downward into and / or through the opening from a point 36 to 40 in. (0.91 to 1.02 m) above the top surface of the floor assembly. **The PVC jacket must be used for the W Rating to apply. The W Rating applies only with floor assemblies.**

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

\* Bearing the UL Classification Mark

+ Bearing the UL Recognized Component Mark

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.

Form: CAJ5229 Rev.: 2 Date: 11/04

*The basic Standards used to evaluate this Firestop System are ANSI/UL 1479 (ASTM E814) and CAN/ULC-S115*

# SELF SEAL®

## GG-200

### Protects Your Wall and Floor Openings

\*Tested at positive pressure to simulate the pressure differentials that can occur in a fire situation\*

#### PRODUCT:

SELF SEAL® GG-200 is a single-component, low modulus, non-slumping silicone sealant designed for Wall and Floor applications. It is available in standard limestone or gray. It forms a pressure tight seal resistant to water, smoke and toxic gases. The sealant is also resistant to cracking, ultraviolet radiation and ozone.

#### COMPATIBILITY:

SELF SEAL® GG-200 is compatible with the following:

- 1 Aluminum, pre-cast concrete and most exterior wall systems.
- 2 Gypsum wallboard
- 3 Thermally expanding pipes that are insulated at fire separations with SELF SEAL® PI-400.
- 4 Power / communication cables and aluminum / galvanized steel cable trays.
- 5 Static / non-static pipes and conduits.
- 6 Chlorinated Polyvinyl Chloride (CPVC) sprinkler pipe.
- 7 Steel, Polyvinyl Chloride (PVC) sleeving or cored concrete openings.

#### TYPICAL USE:

SELF SEAL® GG-200 seals service penetrations and expansion joints in fire and smoke rated wall or floor separations. See ARCHITECTURAL, MECHANICAL and ELECTRICAL APPLICATION CHARTS.

#### INSTALLATION:

- All substrates must be clean and sound; free of oil, frost, grease, dust, and other foreign materials.
- For WALLS, pack voids with SELF SEAL® MW-300 mineral wool where applicable. Recess wool from each side of the wall as required to accommodate the specified thickness of SELF SEAL® GG-200 and then fill the cavity with the sealant ‡.
- For FLOORS, pack voids with SELF SEAL® MW-300 mineral wool where applicable. Recess wool from top surface of floor as required to accommodate the specified thickness of SELF SEAL® GG-200 and then fill the cavity with the sealant ‡. (‡ see current listings in UL Fire Resistance Directory Vol. 2, ULC List of Equipment and Materials, Firestop Systems and Components, and Factory Mutual Research Approval Guide).

#### TYPICAL PROPERTIES\*:

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##### Supplied:

Type:	one part silicone sealant
Cure Method:	neutral, moisture cure
Specific Gravity:	1.33
Working Time:	10 - 40 minutes
Application Temperature Range:	-20°F to 122°F (-29°C to 50°C)
Full Cure/Adhesion:	14 - 21 days

##### Cured:

100% Modulus (ASTM D412):	45 psi (0.310 MPa)
Elongation at Break (ASTM D412):	600%
Tear Strength (ASTM D624, die 'C'):	35 ppi (6.13 kN/m)
Hardness (ASTM D2240, Shore A):	20 - 25
Dielectric Strength (ASTM D149):	479 V/mil (19.0 kV/mm)
UPITT Combustion Toxicity (LC <sub>50</sub> ):	33 grams
Service Temperature Range (ASTM C1299):	-60°F to 300°F (-51°C to 149°C)
Surface Burning Characteristics (ASTM E-84):	Flame Spread Index - 3 Smoke Developed - 22
Fire Tests (UL 1479, UL2079, ASTM E-814, CAN4-S115M):	1, 2, 3, and 4 hrs

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\*THESE VALUES ARE FOR GENERAL INFORMATION AND NOT FOR SPECIFICATION PURPOSES

**PRIMING:**

Normally SELF SEAL® GG-200 does not require priming for most common building materials. However, some special surfaces may require primer. A trial application is recommended before commencement of a project.

**SHELF-LIFE:**

Shelf-life is 12 months from date of shipment from our plant when stored in clean, dry area with temperature between 50°F to 77°F (10°C to 25°C).

**WARRANTY:**

The company warrants that each quantity of SELF SEAL® GG-200 product delivered will be of the kind designated or specified by it and no other warranty (except of title) is implied.

**ORDERING INFORMATION:**

- 10.1 fluid ounce (300 ml) cartridges (12 cartridges to a case)
- 28.6 fluid ounce (850 ml) cartridges (12 cartridges to a case)
- 2.6 gallon (10 liter) pails
- 4.5 gallon (17 litre) pails

**CAUTION:**

- Use in well ventilated areas and avoid breathing vapors.
- On contact, uncured sealant irritates eyes. Flush eyes with lukewarm water. Call physician.
- Avoid skin contact and do not ingest.
- Consult Material Safety Data Sheet.

**SEALANT SPECIFICATIONS:**

SELF SEAL® GG-200 meets ASTM C920, Type S, Grade NS, Class 25, Use NT, M, G, A, O and CAN/CGSB-19.13-M87, Class MCG-2-25-A-L.

**Manufactured by:**

NUCO INC.                      Tel: (519)-823-4994  
150 Regal Road  
Guelph, Ontario              Fax: (519)-823-1099  
N1K 1B9

Distributed by:

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The information and data contained herein is BASED ON INFORMATION WE BELIEVE TO BE RELIABLE. Please read all statements, recommendations or suggestions herein in conjunction with our CONDITIONS of SALE which apply to all goods supplied by us. We assume no responsibility for the use of these statements, recommendations or suggestions, nor do we intend them as recommendation for any use which would infringe any patent or copyright.

# SELF SEAL®

## GG-266

## Intumescent Silicone Firestop Caulk That Protects Your Wall and Floor Openings

\*Tested at positive pressure to simulate the pressure differentials that can occur in a fire situation\*

### PRODUCT:

SELF SEAL® GG-266 is a single-component, neutral cure, non-slumping intumescent silicone caulk designed to seal combustible pipe penetrations in fire-rated walls and floors. The cured silicone rubber composition exhibits excellent performance stability and provides a pressure tight seal that will prevent the spread of fire, smoke, and toxic gases. When exposed to temperatures in excess of 300°F (150°C) it will begin to expand. As the pipe softens and collapses under fire conditions, the silicone composition will rapidly intumesce to fill the void with a patented char composite that contains expanded graphite.

SELF SEAL® GG-266 is ideally suited for "caulk & walk" type applications, particularly where collar systems cannot be accommodated. For up to 2 inch (50 mm) trade size diameter Polyvinyl Chloride (PVC) pipe penetrations only a minimum 5/16 inch (8 mm) annular space is required. Drain, waste and vent piping firestopped with SELF SEAL® GG-266 meets the Canadian building code test requirement for a pressure differential of 50 Pa between the exposed and unexposed sides of the fire separation. SELF SEAL® GG-266 is also suitable for AB/PVC flexible foam insulated copper pipe, PEX process and supply tubing penetrations and metallic pipe penetrations.

### TYPICAL USE:

SELF SEAL® GG-266 seals combustible service penetrations through fire and smoke rated concrete wall and floor separations.

### INSTALLATION:

- All substrates must be clean and sound; free of oil, frost, grease, dust, and other foreign materials.
- Recess a polyethylene foam backer rod from the surface of the wall or floor to accommodate the specified thickness of SELF SEAL® GG-266 and then fill the annular space with the caulk (see current listings in the UL Fire Resistance Directory, Volume 2 and the ULC List of Equipment and Materials, Firestop Systems and Components).

### TYPICAL PROPERTIES\*:

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#### Supplied:

Type:	one part silicone sealant
Cure Method:	neutral, moisture cure
Specific Gravity:	1.25
Working Time:	20 - 40 minutes
Application Temperature Range:	-20°F to 122°F (-29°C to 50°C)

#### Cured:

Free Expansion Volume:	> 6 times original volume when heated at 662°F (350°C)
Service Temperature Range:	-14°F to 230°F (-10°C to 110°C)
Surface Burning Characteristics (ASTM E-84):	Flame Spread Index – 0 Smoke Developed - 27

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\*THESE VALUES ARE FOR GENERAL INFORMATION AND NOT FOR SPECIFICATION PURPOSES

### PRIMING:

Normally SELF SEAL® GG-266 does not require priming for most common building materials. However, some special surfaces may require primer. A trial application is recommended before commencement of a project.

**SHELF-LIFE:**

Shelf-life is 12 months from date of shipment from our plant when stored in clean, dry area with temperature between 40°F to 90°F (4°C to 32°C).

**WARRANTY:**

The company warrants that each quantity of SELF SEAL® GG-266 product delivered will be of the kind designated or specified by it and no other warranty (except of title) is implied.

**ORDERING INFORMATION:**

- 10.1 fluid ounce (300 ml) cartridges (12 cartridges to a case)

**CAUTION:**

- Avoid breathing vapors.
- On contact, uncured sealant irritates eyes. Flush eyes with lukewarm water. Call physician.
- Avoid skin contact and do not ingest.
- Consult Material Safety Data Sheet.

**SPECIFICATIONS:**

SELF SEAL® GG-266 meets ASTM E-814, UL1479, UBC 7-5, and CAN4/ULC-S115M.

**Manufactured by:**

NUCO INC.  
150 Regal Road  
Guelph, Ontario  
N1K 1B9

Tel: (519)-823-4994

Fax: (519)-823-1099

**Distributed by:**

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# SELF SEAL®

## GG-200

### Protects Your Wall and Floor Openings

\*Tested at positive pressure to simulate the pressure differentials that can occur in a fire situation\*

#### PRODUCT:

SELF SEAL® GG-200 is a single-component, low modulus, non-slumping silicone sealant designed for Wall and Floor applications. It is available in standard limestone or gray. It forms a pressure tight seal resistant to water, smoke and toxic gases. The sealant is also resistant to cracking, ultraviolet radiation and ozone.

#### COMPATIBILITY:

SELF SEAL® GG-200 is compatible with the following:

- 1 Aluminum, pre-cast concrete and most exterior wall systems.
- 2 Gypsum wallboard
- 3 Thermally expanding pipes that are insulated at fire separations with SELF SEAL® PI-400.
- 4 Power / communication cables and aluminum / galvanized steel cable trays.
- 5 Static / non-static pipes and conduits.
- 6 Chlorinated Polyvinyl Chloride (CPVC) sprinkler pipe.
- 7 Steel, Polyvinyl Chloride (PVC) sleeving or cored concrete openings.

#### TYPICAL USE:

SELF SEAL® GG-200 seals service penetrations and expansion joints in fire and smoke rated wall or floor separations. See ARCHITECTURAL, MECHANICAL and ELECTRICAL APPLICATION CHARTS.

#### INSTALLATION:

- All substrates must be clean and sound; free of oil, frost, grease, dust, and other foreign materials.
- For WALLS, pack voids with SELF SEAL® MW-300 mineral wool where applicable. Recess wool from each side of the wall as required to accommodate the specified thickness of SELF SEAL® GG-200 and then fill the cavity with the sealant ‡.
- For FLOORS, pack voids with SELF SEAL® MW-300 mineral wool where applicable. Recess wool from top surface of floor as required to accommodate the specified thickness of SELF SEAL® GG-200 and then fill the cavity with the sealant ‡. (‡ see current listings in UL Fire Resistance Directory Vol. 2, ULC List of Equipment and Materials, Firestop Systems and Components, and Factory Mutual Research Approval Guide).

#### TYPICAL PROPERTIES\*:

---

##### Supplied:

Type:	one part silicone sealant
Cure Method:	neutral, moisture cure
Specific Gravity:	1.33
Working Time:	10 - 40 minutes
Application Temperature Range:	-20°F to 122°F (-29°C to 50°C)
Full Cure/Adhesion:	14 - 21 days

##### Cured:

100% Modulus (ASTM D412):	45 psi (0.310 MPa)
Elongation at Break (ASTM D412):	600%
Tear Strength (ASTM D624, die 'C'):	35 ppi (6.13 kN/m)
Hardness (ASTM D2240, Shore A):	20 - 25
Dielectric Strength (ASTM D149):	479 V/mil (19.0 kV/mm)
UPITT Combustion Toxicity (LC <sub>50</sub> ):	33 grams
Service Temperature Range (ASTM C1299):	-60°F to 300°F (-51°C to 149°C)
Surface Burning Characteristics (ASTM E-84):	Flame Spread Index - 3 Smoke Developed - 22
Fire Tests (UL 1479, UL2079, ASTM E-814, CAN4-S115M):	1, 2, 3, and 4 hrs

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\*THESE VALUES ARE FOR GENERAL INFORMATION AND NOT FOR SPECIFICATION PURPOSES

**PRIMING:**

Normally SELF SEAL® GG-200 does not require priming for most common building materials. However, some special surfaces may require primer. A trial application is recommended before commencement of a project.

**SHELF-LIFE:**

Shelf-life is 12 months from date of shipment from our plant when stored in clean, dry area with temperature between 50°F to 77°F (10°C to 25°C).

**WARRANTY:**

The company warrants that each quantity of SELF SEAL® GG-200 product delivered will be of the kind designated or specified by it and no other warranty (except of title) is implied.

**ORDERING INFORMATION:**

- 10.1 fluid ounce (300 ml) cartridges (12 cartridges to a case)
- 28.6 fluid ounce (850 ml) cartridges (12 cartridges to a case)
- 2.6 gallon (10 liter) pails
- 4.5 gallon (17 litre) pails

**CAUTION:**

- Use in well ventilated areas and avoid breathing vapors.
- On contact, uncured sealant irritates eyes. Flush eyes with lukewarm water. Call physician.
- Avoid skin contact and do not ingest.
- Consult Material Safety Data Sheet.

**SEALANT SPECIFICATIONS:**

SELF SEAL® GG-200 meets ASTM C920, Type S, Grade NS, Class 25, Use NT, M, G, A, O and CAN/CGSB-19.13-M87, Class MCG-2-25-A-L.

**Manufactured by:**

NUCO INC.                      Tel: (519)-823-4994  
150 Regal Road  
Guelph, Ontario              Fax: (519)-823-1099  
N1K 1B9

Distributed by:

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## Intumescent Silicone Firestop Caulk That Protects Your Wall and Floor Openings

\*Tested at positive pressure to simulate the pressure differentials that can occur in a fire situation\*

### PRODUCT:

SELF SEAL® GG-266 is a single-component, neutral cure, non-slumping intumescent silicone caulk designed to seal combustible pipe penetrations in fire-rated walls and floors. The cured silicone rubber composition exhibits excellent performance stability and provides a pressure tight seal that will prevent the spread of fire, smoke, and toxic gases. When exposed to temperatures in excess of 300°F (150°C) it will begin to expand. As the pipe softens and collapses under fire conditions, the silicone composition will rapidly intumesce to fill the void with a patented char composite that contains expanded graphite.

SELF SEAL® GG-266 is ideally suited for "caulk & walk" type applications, particularly where collar systems cannot be accommodated. For up to 2 inch (50 mm) trade size diameter Polyvinyl Chloride (PVC) pipe penetrations only a minimum 5/16 inch (8 mm) annular space is required. Drain, waste and vent piping firestopped with SELF SEAL® GG-266 meets the Canadian building code test requirement for a pressure differential of 50 Pa between the exposed and unexposed sides of the fire separation. SELF SEAL® GG-266 is also suitable for AB/PVC flexible foam insulated copper pipe, PEX process and supply tubing penetrations and metallic pipe penetrations.

### TYPICAL USE:

SELF SEAL® GG-266 seals combustible service penetrations through fire and smoke rated concrete wall and floor separations.

### INSTALLATION:

- All substrates must be clean and sound; free of oil, frost, grease, dust, and other foreign materials.
- Recess a polyethylene foam backer rod from the surface of the wall or floor to accommodate the specified thickness of SELF SEAL® GG-266 and then fill the annular space with the caulk (see current listings in the UL Fire Resistance Directory, Volume 2 and the ULC List of Equipment and Materials, Firestop Systems and Components).

### TYPICAL PROPERTIES\*:

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#### Supplied:

Type:	one part silicone sealant
Cure Method:	neutral, moisture cure
Specific Gravity:	1.25
Working Time:	20 - 40 minutes
Application Temperature Range:	-20°F to 122°F (-29°C to 50°C)

#### Cured:

Free Expansion Volume:	> 6 times original volume when heated at 662°F (350°C)
Service Temperature Range:	-14°F to 230°F (-10°C to 110°C)
Surface Burning Characteristics (ASTM E-84):	Flame Spread Index – 0 Smoke Developed - 27

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\*THESE VALUES ARE FOR GENERAL INFORMATION AND NOT FOR SPECIFICATION PURPOSES

### PRIMING:

Normally SELF SEAL® GG-266 does not require priming for most common building materials. However, some special surfaces may require primer. A trial application is recommended before commencement of a project.

**SHELF-LIFE:**

Shelf-life is 12 months from date of shipment from our plant when stored in clean, dry area with temperature between 40°F to 90°F (4°C to 32°C).

**WARRANTY:**

The company warrants that each quantity of SELF SEAL® GG-266 product delivered will be of the kind designated or specified by it and no other warranty (except of title) is implied.

**ORDERING INFORMATION:**

- 10.1 fluid ounce (300 ml) cartridges (12 cartridges to a case)

**CAUTION:**

- Avoid breathing vapors.
- On contact, uncured sealant irritates eyes. Flush eyes with lukewarm water. Call physician.
- Avoid skin contact and do not ingest.
- Consult Material Safety Data Sheet.

**SPECIFICATIONS:**

SELF SEAL® GG-266 meets ASTM E-814, UL1479, UBC 7-5, and CAN4/ULC-S115M.

**Manufactured by:**

NUCO INC.  
150 Regal Road  
Guelph, Ontario  
N1K 1B9

Tel: (519)-823-4994

Fax: (519)-823-1099

**Distributed by:**

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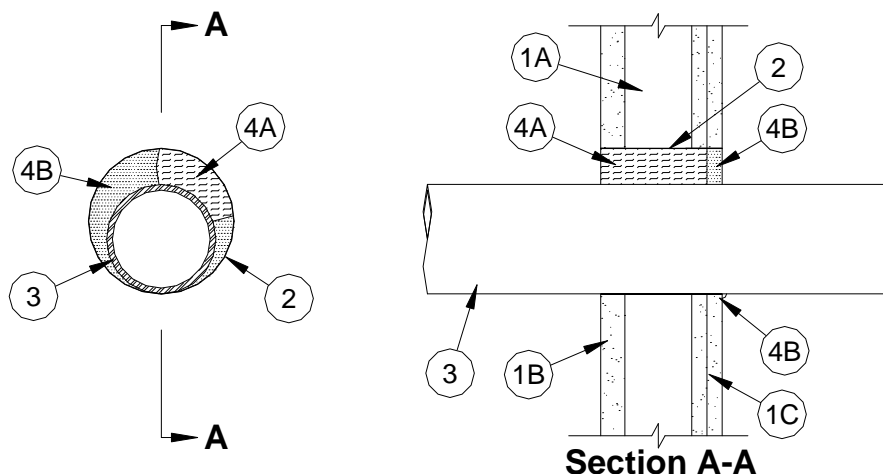
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## System No. W-L-1364



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 shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 and V400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
  - A. **Steel Studs** - "C-H", "C-T" or "I" shaped studs, min 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min No. 25 gauge galv steel, spaced max 24 in. (610 mm) OC.
  - B. **Gypsum Board\*** - 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner panels installed vertically. Circular cutout in gypsum liner panel to be min 1 in. (25 mm) to max 2-1/2 in. (64 mm) larger than outside diam of through penetrant (Item 3). Max diam of circular cutout in gypsum liner panel is 11 in. (279 mm).
  - C. **Gypsum Board\*** - 1/2 in. (13 mm) or 5/8 in. (16 mm) thick, 48 in. (1220 mm) wide gypsum boards. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Circular cutout in gypsum board to align with and be equal in diam to the circular cutout in the liner panel (Item 1B).

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** - Cylindrical sleeve fabricated from min No. 30 gauge galv sheet steel and having a min 2 in. (51 mm) lap along the longitudinal seam. Length of the sleeve to be equal to the thickness of the wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the opening and releasing the coil to let it uncoil against the circular cutouts in the gypsum board layers. The ends of the steel sleeve shall be flush with each surface of the wall.
3. **Through Penetrant** - One metallic pipe, tube or conduit installed concentrically or eccentrically within the firestop system. The annular space between the pipe, tube or conduit and the periphery of the sleeved opening to be min 0 in. (0 mm, point contact) to max 2-3/8 in. (60 mm). Pipe, tube or conduit to be rigidly supported on both sides of wall assembly. One of the following types and sizes of pipe, tube or conduit may be used:
  - A. **Steel Pipe** - Nom 8 in. (203 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
  - B. **Iron Pipe** - Nom 8 in. (203 mm) diam (or smaller) cast or ductile iron pipe.
  - C. **Conduit** - Nom 4 in. (102 mm) diam (or smaller) rigid steel conduit, steel electrical metallic tubing (EMT) or flexible steel conduit.
  - D. **Copper Pipe or Tube** - Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe or Type M (or heavier) copper tube.
4. **Firestop System** - The firestop system consist of the following items:
  - A. **Packing Material** - Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into sleeved opening as a permanent form. Packing material to extend throughout thickness of wall except for a 5/8 in. (16 mm) deep recess on the finished side of wall to accommodate the fill material.
  - B. **Fill Void or Cavity Materials\* — Sealant** - Min 5/8 in. (16 mm) thickness of fill material applied within sleeve, flush with finished surface of wall. At the point contact location, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the penetrant / sleeve interface.

**NUCO INC.** - Self Seal GG-200 or •Self Seal GG-266

\* Bearing the UL Classification Mark

• In addition to the standardized environmental exposures, Self Seal GG-266 was also exposed to supplemental environmental exposures of an Industrial Atmosphere (CO<sub>2</sub>/SO<sub>2</sub>) and Combination Wet, Freeze and Dry Cycling.