



**BOSS 136 Fireblock/Draftstop Sealant:**

A single component, non-slumping, noncombustible, fire rated sealant used as a filler for fireblocking and draftstopping in the annular spaces around cables, wire, pipes, ducts, and vents. For use in non-fire rated applications.

**BOSS 137 Firestop Spray Coating:**

A water based, elastomeric Firestop coating that is designed to be sprayed, brushed or rolled over static or dynamic fire rated construction joints. Tested to the stringent ASTM E-1399 and UL2079 for the flexibility requirements of Firestopping these joints allowing for seismic, wind sway and thermal expansion and contraction of construction joints.

**BOSS 760 Firestop Silicone:**

A single component, non-slumping, low modulus neutral cure silicone Firestop sealant. Due to its high elasticity, will not crack under vibration, seismic or thermal shock movement. Has great adhesion to most substrates.

**BOSS 810 Non-Intumescent Latex Firestop Sealant:**

A single component, acrylic latex, multi-purpose sealant that remains extremely flexible and is ideal for horizontal and vertical construction joints and penetrations that may be subject to vibration or dynamic movement. Paintable and water cleanup.

**BOSS 813 Expanding Firestop Foam:**

A ready-to-use foam that expands to three times its original volume on contact with air. This expanding action makes this product excellent for use in filling annular spaces and interstices that have multiple penetrating items such as cables or pipes. For use in both non-rated and rated construction.

**BOSS 814 Intumescent Latex Firestop Sealant:**

A one part intumescent, elastomeric Firestop sealant that expands when exposed to high heat or flame. Ideal for penetrations subject to vibration or movement.

**Boss 815 Firestop insert for Electrical Outlet Boxes:**

An intumescent pad that is inserted into the back of an electrical box, designed to expand and fill the void within the box to stop the fire at this point. Adhesive backed for easy installation. Available in two sizes: 2"x4" & 4"x4"

**BOSS 816 Intumescent Firestop Sealant:**

A single component, water-based, intumescent Firestop sealant that expands rapidly to form a char when exposed to high heat or while combustible penetrants, such as plastic pipe or cables, are melted in a fire. Contains biocides to protect against mold growth in both wet and dry stages.

**BOSS 816+ Intumescent Firestop Sealant:**

A single component, water-based, intumescent Firestop sealant that expands rapidly to form a char when exposed to high heat or while combustible penetrants, such as plastic pipe or PEX pipe, are melted in a fire. Contains biocides to protect against mold growth in both wet and dry stages.

**BOSS 817 Wrap Strip:**

A pre-formed strip of highly intumescent material designed to Firestop plastic and insulated pipe penetrations. Supplied in 12' rolls, ready to cut to length. Available in 1" and 2" widths.

**BOSS 818 Fire Rated Putty Pads:**

A single component, moldable, fire rated pad designed to be applied to the exterior outlet boxes, electrical and mechanical cabinets. Expands when exposed to high heat or flame to prevent spread of flames, smoke and toxic gases. Can be applied in seconds by hand.

**BOSS 819 Pipe Collar:**

A factory formed steel collar filled with highly intumescent material designed for simple application to plastic pipe penetrations. Installed with a unique side lock closure, making it ideal for retro-fit installations. Available in: 2", 3" and 4" Pipe Sizes.

# Firestop System Index

## BOSS Firestop Product Descriptions

Product No.	Product Description	Fire Test Compliance
BOSS 136	Firestop / Draftstop Sealant	ASTM E-136/UL 136
BOSS 137	Firestop Spray Coating	ASTM E- 1399/UL 2079
BOSS 760	Silicone Firestop Sealant	ASTM E-814/UL 1479
BOSS 810	Non-Intumescent Latex Firestop Sealant	ASTM E-814/UL 1479
BOSS 812	Fire Block Foam	ASTM E-84 Class A
BOSS 813	Expanding Firestop Foam	ASTM E-84, E-814/UL 1479
BOSS 814	Intumescent Latex Firestop Sealant	ASTM E-814/UL 1479
BOSS 815	Intumescent Insert for Electrical Boxes	UL CLIV Outlet Box 1 & 2 Hour
BOSS 816	Intumescent Firestop Sealant (advanced)	ASTM E-814/UL 1479, UL 2079
BOSS 816+	Intumescent Firestop Sealant (advanced)	ASTM E-814/UL 1479, UL 2079
BOSS 817	Intumescent Firestop Wrap Strip	ASTM E-814/UL 1479, ASTM E-84/UL 723
BOSS 818	Intumescent Electrical Box Putty Pads	UL CLIV Outlet Box 1 & 2 Hour
BOSS 819	Intumescent Firestop Pipe Collars	ASTM E-814/UL 1479

UL SYSTEMS / INDEX	PAGE
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<b>Technical Data Sheets</b>	<b>Appendix</b>

**Passive Fire Protection products are tested to various test requirements, please check with your local building code for the requirements within your municipality.**

**Firestop Systems are tested to worse case senario, use this guide as a rule of thumb.**

- Any pipe or conduit with a diameter smaller than the listed value may be used.
- Any pipe or conduit with a wall thickness heavier than the listed value may be used.
- Any cable tray with a width and / or loading depth narrower than the listed value may be used.
- Any cable with similar insulation / jacketing and smaller size or gauge may be used.
- A rated Firestop system "F" rating may be applied to a wall or floor of equal or lesser "F" rating, the systemt hen is rated at the lesser "F" rating. References to tested systems are as follows:

**UL** indicates Underwriters Laboratories, Inc. (US)

**cUL** indicates Underwriters Laboratories, Inc. to Canadian Standards (Canada)

**FM** indicates Factory Mutual Research

**SP** indicates Underwriters Laboratories of Canada **SWR** indicates Southwest Research Institute

**ITS** indicates ETL Intertek Testing Services (formerly Warnock Hersey) **OPL** indicates Omega Point Laboratories, now owned & operated by ITS

## Brief Definitions: Firestop & Draftstop

- **ASTM E-84:** "Surface Burning Characteristics of Building Materials" or ASTM E-84 usually refers to the flame spread or smoke development characteristics of a product (i.e. wall paper, coatings, carpet, etc.)
- **ASTM E-119:** "Fire Test of Building Construction and Materials", constructed to evaluate the ability of a fire-resistive floor or wall assembly to perform its barrier function, resisting the passage of heat, flames, hot gasses, and smoke in a fire situation.
- **ASTM E-136:** "Test Method for Behavior of Materials in a vertical Tube Furnace at 1400 degrees F". This test evaluates the ability of a material to be considered non-combustible. Weight loss of the test sample and heat rise due to the flammable content of the sample, are key criteria.
- **ASTM E-814 / UL1479:** "Standard Method of Fire Tests of Through Penetration Firestops". ASTM E-814 is a test to measure the performance of Firestop sealants in through penetration applications. The wall / ceiling / floor unit will be exposed to a furnace at temperatures ranging from 1725 to 2000° for a certain amount of time. At the conclusion of the test, the assembly will be subjected to a hose stream test. To pass the test, a fire-stop must stop the fire from traveling from the exposed side of the wall to the other side of the wall. It also must withstand the exposure to the hose stream test (30 psi if less than a four hour rating is achieved).
- **ASTM E-1966 / UL2079:** "Tests for Fire Resistance of Building Joint Systems". Expansion (Floor to Floor, Wall to Floor, Wall to Wall & Head of Wall) Joints that are first tested to the ASTM E-1399 where the joint is cycled (typically 500 times) through an intended range of movement before it is exposed to fire temperatures as those stated above. For the Head of Wall (HW-D) and Wall to Wall (WW-D) the joint is exposed to a hose stream test similar to the above after the fire temperature exposure test.
- **Draft Stop:** A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor-ceiling assemblies and roof-ceiling assemblies and attics. This may apply in residential and commercial construction.
- **Fireblocking:** Building materials installed to resist the free passage of flame and gasses to other areas of the building through small concealed spaces. This applies mainly to residential One & Two Family homes only.
- **Fireproofing:** The application of fire retardant cementitious, fibrous, wrap, or intumescent products to bare, unprotected steel structural beams, columns, or decks of a building. Fireproofing is most commonly spray applied, although it is possible to trowel apply as well. Fireproofing is designed to prevent the flash spread of fire, but will not prevent smoke and toxic gasses from traveling to unprotected areas.
- **Firestopping:** The installation of specially designed materials into an opening in a fire rated separation (floor, ceiling or wall) to contain the spread of fire, smoke, and toxic gas between areas of a building. Firestopping is commonly needed in such areas as mechanical, plumbing, and electrical penetrations, head of wall, edge of slab, and expansion construction joints. It is intended to buy time to exit the area of a fire and prevent the spread of the fire before it can be brought under control.

### Metallic Pipe / Conduit / HVAC Duct

Assembly	Penetrant	Boss Product	U.L. System	F-Rating	Page
Minimum 2 ½" Concrete Floor or 3" Concrete Wall	Multiple- Max 6" Steel, / 2" Conduit, / ¾" Copper Tubing, / 4" Copper Pipe	816	C-AJ-1591	2 Hr.	14
	Multiple Pipes including jacketed and insulated.	816	C-AJ-8194	2 Hr.	15
Minimum 4 ½" Concrete Floor or Wall	Max 8" Steel Pipe, 4" Copper Pipe/Tubing, 6" Conduit	814	C-AJ-1555	2 Hr.	17
	Max 24" Steel/ Iron Pipe, / 6" Copper Pipe/Tubing, / 4" Conduit	816	C-AJ-1585	3 Hr.	18
	Multiple- Max 1 ½" Flexible Steel or Aluminum Conduit	816	C-AJ-1592	3 Hr.	20
	Mineral Fiber Pipe Insulation- Max 12" Steel/Iron Pipe, / 4" Copper Tubing/Pipe	816	C-AJ-1593	3 Hr.	22
	Foamglass Insulation- Max 8" Schedule 30 Steel/Iron Pipe	816	C-AJ-5319	2 Hr.	24
	Glass Fiber Covering- Max 24" Steel/Iron Pipe, / 6" Copper Tubing/Pipe	816	C-AJ-5322 C-AJ-5323	2 Hr. 3 Hr.	25 27
	Tube Insulation Plastics - 2 1/8" Aluminum Tubing	816+	C-AJ-5447	2 Hr.	29
	Max 24" x 12" 24 Gauge or Heavier Steel Duct	816	C-AJ-7134	2 Hr.	31
	Max 36" x 20" 24 Gauge or Heavier Steel Duct	816	C-AJ-7135	2 Hr.	32
	Max 30" x 10" 24 Gauge or Heavier Steel Duct	816	C-AJ-7137	3 Hr.	33
	Max 24" 22 Gauge or Heavier Steel Duct	816	C-AJ-7138	3 Hr.	34
	Multiple- Max 2 Pipes including insulated- Max 1" Copper Tubing/Pipe & Steel Pipe	816	C-AJ-8195	2 Hr.	35
	Multiple – Max 3 Pipes including insulated – 1" Copper Tubing/Pipe & Steel Pipe Max 1 1.25" PVC/CPVC/Conduit Max 4 Cables	816+	C-AJ-8325	2 Hr	37
Minimum 9" Concrete Floor or Wall	Max 4" Steel Pipe or Conduit	760 or 814	C-BJ-1048	1 Hr.	40
	Max 4" Steel Pipe or Conduit	814, 810, 760	C-BK-1037	2 Hr.	41
	Max 4" Steel Pipe or Conduit	136 or 139	C-BK-1038	2 Hr.	42
	Max 2" Copper Pipe	814	C-BK-1039	2 Hr.	43
Minimum 9 1/4" Concrete Floor or Wall	Max 4" Steel Pipe, Iron, or Conduit	760 or 814	C-BJ-1048	1 Hr.	44
Wood Joist Floor/ Ceiling	Max 4" Steel/Iron Pipe & Conduit, / Max 3" Copper Tubing/Pipe	816 or 816+	F-C-1157	2 Hr.	45
	One or More Max 1 ½" Flexible Steel Conduit	816 or 816+	F-C-1158	2 Hr.	47
	Insulated Pipe- Max 3" Copper Pipe/Tubing or Steel Pipe	816 or 816+	F-C-5082	2 Hr.	49

**Metallic Pipe / Conduit / HVAC Duct (Continued)**

<b>Assembly</b>	<b>Penetrant</b>	<b>Boss Product</b>	<b>U.L. System</b>	<b>F-Rating</b>	<b>Page</b>
Wood Joist Floor/ Ceiling	Insulated Pipe – Max 2" Steel, Iron, or Copper Pipe/Tubing	816+	F-C-5097	1 Hr.	52
	Max 6" x 30 MSG or Heavier Steel Duct	816 or 816+	F-C-7052	2 Hr.	54
	Min ¼" Wire Rope	816+	F-C-7084	1 Hr.	56
Floor-Ceiling Concrete Floor over Metal or Steel Deck Steel Joist with Gypsum Ceiling	Max 4" Steel/Iron Pipe and Conduit, / Max 3" Copper Tubing/Pipe	816 or 816+	F-E-1025	1 Hr.	58
	Max 6" x 30 MSG or Heavier Steel Duct	816 or 816+	F-E-7009	1 Hr.	60
Minimum 5" Concrete Wall	Steel Sleeve- Max 1 ¼" Flexible Gas Pipe	814	W-J-1132	2 Hr.	61
	Multiple- Max 3" Steel/Iron Pipe and Conduit	816 or 816+	W-J-1211	2 Hr.	62
Minimum 6" Concrete Wall	One or More Max 1 ½" Flexible Steel Conduits	816 or 816+	W-J-1212	2 Hr.	64
	Max ¾" Steel/Iron Pipe, ¾" Copper Pipe/Tubing/Conduit	816/813	W-J-1213	2 Hr.	65
	Max 1" Steel Conduit, Max 1/2" Flexible Metal Conduit	813	W-J-1235	2 Hr.	67
	Max 8" Steel/Iron Pipe, Max 4" Copper Tubing/Pipe, Max 4" EMT, Max 6" Steel Conduit	813 & 814 or 816	W-J-1236	2 Hr.	69
	Max 24" Steel/Iron Pipe, Max 6" Copper Tubing/Pipe, Max 4" Steel Electrical Tubing, Max 6" Steel Conduit	816 or 816+	W-J-1209	2 Hr.	71
	Max 6" Glass Pipe	816 or 816+	W-J-2228	2 Hr.	73
	Foamglas Insulated- Max 6" Steel/Iron Pipe or Copper Tubing	816 or 816+	W-J-5141	2 Hr.	75
	Insulated Covering- Max 12" Steel/Iron Pipe, / Max 6" Copper Pipe/Tubing	816 or 816+	W-J-5142	2 Hr.	77
	Insulated Foam Covering- Max 12" Steel/Iron Pipe, / Max 6" Copper Pipe/Tubing	816 or 816+	W-J-5143	2 Hr.	79
	Insulated Covering – Max 2 1/8" Aluminum Tubing	816+	W-J-5209	2 Hr.	81
	Max 23" x 23" 24 Gauge or Heavier Steel Duct	814	W-J-7090	2 Hr.	83
	Max 67" x 18" 24 Gauge or Heavier Steel Duct	816 or 816+	W-J-7105	2 Hr.	84
	Max 30" x 24" 24 Gauge or Heavier Steel Duct	816 or 816+	W-J-7106	2 Hr.	86
	Multiple- Max Four 1" and Three 4" Steel/Iron Pipe, Conduit or Copper Pipe/Tubing	816 or 816+	W-J-8046	2 Hr.	88
	Multiple – Max 2 of 1" Steel Pipe, Iron Pipe, Copper Pipe/Tubing AC Line Set	816+	W-J-8085	2 Hr.	90
Gypsum Wall	Max 1" EMT or Steel Conduit, Max 1/2" Steel Flexible Metal Conduit	813	W-L-1485	2 Hr.	92

**Metallic Pipe / Conduit / HVAC Duct (Continued)**

<b>Assembly</b>	<b>Penetrant</b>	<b>Boss Product</b>	<b>U.L. System</b>	<b>F-Rating</b>	<b>Page</b>
Gypsum Wall	Max 1 ¼" Flexible Steel Gas Pipe	814	W-L-1307	2 Hr.	94
	Max 4" Steel/Iron Pipe and Conduit	814	W-L-1409	2 Hr.	95
	Max 8" Steel/Iron Pipe, Max 4" Copper Tubing/Pipe, Max 4" EMT, Max 6" Steel Conduit	813 & 814 or 816	W-L-1484	2 Hr.	96
	Max 24" Steel/Iron Pipe, / Max 4" Conduit, / Max 6" Copper Pipe/Tubing	816 or 816+	W-L-1433	2 Hr.	98
	Multiple- Max 3" Steel/Iron Pipe and Conduit	816 or 816+	W-L-1435	2 Hr.	100
	Max ½" Aluminum or Steel Flexible Metal Conduit	816 or 816+	W-L-1436	2 Hr.	102
	One or More Max 1 ½" Flexible Steel Conduits	816 or 816+	W-L-1437	2 Hr.	104
	Max 24" Steel/Iron Pipe, / Max 6" Rigid Steel Conduit, / Max 4" EMT, / Max 1" Flexible Steel Conduit, / Max 6" Copper Pipe/Tubing	816 or 816+	W-L-1438	2 Hr.	106
	Max ¾" Steel/Iron Pipe, ¾" Copper Pipe/Tubing/Conduit	813 & 814 or 816	W-L-1439	2 Hr.	108
	Max 6" Glass Pipe	816 or 816+	W-L-2536	2 Hr.	110
	Foamglas Insulated- Max 10" Steel/Iron Pipe, / Max 6" Copper Tubing	816 or 816+	W-L-5280	2 Hr.	112
	Foam Insulated- Max 12" Steel/Iron Pipe, / Max 6" Copper Pipe/Tubing	816 or 816+	W-L-5284	2 Hr.	114
	Plastic Insulated – Max 3 of 2 1/8" Aluminum Tubing	816+	W-L-5377 W-L-5378	2 Hr. 2 Hr.	116 118
	Max 23" x 23" 24 Gauge or Heavier Steel Duct	814	W-L-7150	2 Hr.	120
	Max 67" x 18" 24 Gauge or Heavier Steel Duct	816 or 816+	W-L-7183	2 Hr.	121
	Max 4" 30 MSG or Heavier, / Max 6" 28 MSG or Heavier, / Max 20" 22 MSG or Heavier Steel Vent Duct	816 or 816+	W-L-7184	2 Hr.	123
	Max 24" x 30" 24 Gauge or Heavier Steel Duct with Max 1 ½" Batt or Blanket	816 or 816+	W-L-7185	2 Hr.	125
	Multiple Max 4" Steel, Iron, Copper Pipe/Tubing & Conduit & Cables	816 or 816+	W-L-8083	2 Hr.	127
	Multiple – Max 2 of 1" Steel Pipe, Iron Pipe, Copper Pipe/Tubing AC Line Set	816+	W-L-8133	2 Hr.	129

### Non-Metallic Pipe

Assembly	Penetrant	Boss Product	U.L. System	F-Rating	Page
Minimum 4 ½" Concrete Floor or Wall	Max 15" Opening	816	C-AJ-0129	3 Hr	131
	Max 4" PVC, CPVC or ABS Pipe	817	C-AJ-2501	3 Hr.	132
	Max 2" PVC, CPVC Pipe, Rigid Conduit and Electrical Tubing	816	C-AJ-2608	3 Hr.	134
	Max 4" PVC or ABS Pipe for Use in Vented Piping Systems (Drain, Waste or Vent)	816	F-A-2187	2 Hr.	136
Minimum 9 ¼" Concrete Floor or Wall	Max 1 ½" PVC or CPVC Pipe	814	C-BJ-2015	1 Hr.	137
Minimum 9" Concrete Floors or Walls	Max 2" PVC or CPVC Pipe	814 & 819	C-BJ-2025	2 Hr.	138
	Max 4" PVC or CPVC, Max 2" PEX Tubing	814	C-BK-2035	2 Hr.	139
	Max 4" PVC or CPVC Pipe	814 & 819	F-B-2023	2 Hr.	140
Wood Joist Floor/Ceiling	PVC or ABS Closet Flange- Max 4" PVC or ABS Pipe	816 or 816+	F-C-2375	1 Hr.	141
	Max 1 ½" PVC or ABS Pipe and Drain Fittings with PVC Bathtub Waste/Overflow Fitting	816 or 816+	F-C-2379	1 Hr.	143
	Max 3" PVC, CPVC, Non-Metallic Conduit, or Nonmetallic Tubing; 1 ½" PEX; or 2" PP, CPVC	816+	F-C-2520	1 Hr.	145
	Multiple- Max 3 Max of 1 Tube is 1", / Max Three ¾" Aluminum PEX	816	F-C-2380	2 Hr.	147
Minimum 4 7/8" Concrete Wall	Max 3" PVC or CPVC Pipe	814 & 819	W-J-2166	2 Hr.	149
	Max 2" PVC, CPVC or ABS Pipe	814 & 819	W-J-2167	2 Hr.	150
Minimum 6" Concrete Wall	Max 4" PVC, CPVC or ABS Pipe	817	W-J-2174	2 Hr.	151
	Max 2" PVC, CPVC, ABS Pipe and Rigid Conduit	816 or 816+	W-J-2219	2 Hr.	152
	Multiple Max 1 ½" PVC, CPVC, Nonmetallic Conduit, or 1" PEX	816+	W-J-2356	2 Hr.	153

### Non-Metallic Pipe (Continued)

<b>Assembly</b>	<b>Penetrant</b>	<b>Boss Product</b>	<b>U.L. System</b>	<b>F-Rating</b>	<b>Page</b>
Gypsum Wall	Max 3" PVC or CPVC Pipe	814 & 819	W-L-2409	2 Hr.	154
	Max 2" PVC, CPVC and ABS	814 & 819	W-L-2410	1 Hr.	156
	Max 4" PVC, CPVC and ABS	817	W-L-2419	2 Hr.	158
	Max 2" PVC, CPVC ABS and Rigid Conduit	816 or 816+	W-L-2519	2 Hr.	159
	Max 1" PEX Tubing	816+	W-L-2680	2 Hr.	161
	Max 2" PVC, CPVC, ENT or 1" PEX	816+	W-L-2794	2 Hr.	163
	Max 3" PVC or CPVC Pipe	816+	W-L-2799	1 Hr.	165
	Multiple Max 1 1/2" PVC, CPVC, Right Nonmetallic Conduit, or 1" PEX	816+	W-L-2800	2 Hr.	167
	Max 2" PVC, ABS, or CPVC Pipe	816+	W-L-2802	2 Hr.	169



**Cables - Datacom or Electrical**

<b>Assembly</b>	<b>Penetrant</b>	<b>Boss Product</b>	<b>U.L. System</b>	<b>F-Rating</b>	<b>Page</b>
Minimum 4 ½" Concrete Floor or Wall	Multiple Copper & CATV Communications & Power Cable Combinations	813 & 136 or 139	C-AJ-3249	2 Hr.	171
Minimum 4 ½" Concrete Floor and Minimum 5" Concrete Wall	Max 3" Diameter Bundle of Telecom Cables w/Max 6" Diameter Steel Sleeve Opening	816	C-AJ-3295	2 Hr.	172
	One Busway Max 19" x 6" w/Max 345 Square Inch Opening	816	C-AJ-6040	3 Hr.	174
Minimum 4 ½" Concrete Floor and Minimum 6" Concrete Wall	Max 19% Fill of Telecom, Coaxial, Metal Clad & Fiber Optic Cables w/Max 6" Diameter Opening	816	C-AJ-3296	3 Hr.	175
	Max 1" Metallic & Insulated Pipe w/Mixed Electrical Cables in Max 4" Diameter Opening	816	C-AJ-8195	2 Hr.	177
Wood Joist Floor/Ceiling	Multiple Communication Cable Combinations	813 & 136 or 139	F-C-3090	1 Hr.	179
	Telecom, Romex, Coaxial & Metal Clad Cables w/Max 4" Diameter Opening	816 or 816+	F-C-3104	2 Hr.	181
Floor/Ceiling Concrete Floor over Metal or Steel Deck Steel Joist w/Gypsum Ceiling	Telecom, Romex, Coaxial & Metal Clad Cables w/Max 4" Diameter Opening	816 or 816+	F-E-3016	1 Hr.	183
Minimum 4 ½" Concrete Wall	Telecom, Romex, Coaxial & Metal Clad Cables w/Max 4" Diameter Opening	814	W-J-3161	2 Hr.	185
Minimum 5" Concrete Wall	Multiple Communications Cable Combinations & Fiber Optics	814	W-J-3101	2 Hr.	187
Minimum 4 7/8" (1 Hr) or 6 1/8" (2 Hr.) Concrete Wall	Max 64% Fill of Coaxial, SER, Romex Cables w/Max 5" Diameter Opening	816 or 816+	W-J-3176	1 & 2 Hr.	188
Minimum 6" Concrete Wall	Max 19% Fill of Multiconductor & Telecom Cables w/Max 4 ½" Diameter Opening & Max 4" Diameter Sleeve	816 or 816+	W-J-3175	2 Hr.	190
	Multiple Copper & CATV Communication Cable Combinations w/Max 3" Diameter Opening	813 & 814 or 816	W-J-3153	2 Hr.	192
	Multiple Copper & CATV Communication Cable Combinations w/Max 4" Diameter Opening	813 & 814 or 816	W-J-3203	2 Hr.	194
	Multiple Metallic Pipes and Cables w/Max 10" Diameter Opening	816 or 816+	W-J-8046	2 Hr.	196
	Multiple Metallic Pipes and Cables w/Max 1 4 pair No. 18 AWG Thermostat Cable	816+	W-J-8085	2 Hr.	198
	Multiple Copper & CATV Communication Cable Combinations w/Max 2" / ½" Diameter Opening	813	W-J-3204	2 Hr.	200
Gypsum Wall	Multiple Copper & CATV Communication Cable Combinations	813 & 814 or 816	W-L-3298	2 Hr.	202

**Cables - Datacom or Electrical (Continued)**

<b>Assembly</b>	<b>Penetrant</b>	<b>Boss Product</b>	<b>U.L. System</b>	<b>F-Rating</b>	<b>Page</b>
Gypsum Wall	Multi-conductor, Telephone & Fiber Optic Cables w/Nom ¾" Diameter Opening	814	W-L-3222	1 & 2 Hour	204
	Max 64% Fill of Coaxial, Telecom, Metal Clad & SER Cables w/Max 5" Diameter Opening	816 or 816+	W-L-3342	2 Hr.	205
	Max 64% Fill of Coaxial, Telecom, Metal Clad & SER Cables w/Max 4" Diameter Opening	814	W-L-3315	1 & 2 Hr.	207
	Max 19% Fill of Multi-conductor & Telecom Cables w/Max 4 ½" Opening & Max 4" Sleeve	816 or 816+	W-L-3345	2 Hr.	209
	Multiple Max 4" Steel, Iron, Copper Pipe/Tubing & Conduit & Cables w/Max 10" Diameter Opening	816 or 816+	W-L-8083	2 Hr.	211
	Multiple Metallic Pipes and Cables w/Max 1 4 pair No. 18 AWG Thermostat Cable	816+	W-L-8133	2 Hr.	213
	Max 40% Fill of Coaxial, Telecom, Power, & Copper Conductor Cables w/Max 4" Diameter Opening	813 & 816	W-L-3399	2 Hr.	215
	Multiple Copper & Metal Clad Cables w/Max 2" / ½" Diameter Opening	813	W-L-3400	2 Hr.	217

**Electrical Outlet Box**

<b>Assembly</b>	<b>Penetrant</b>	<b>Boss Products</b>	<b>CLIV</b>	<b>F-Rating</b>	<b>Page</b>
Gypsum Wall	Electrical Box 2 1/8" x 4" x 2 1/8"	815	R16844	2 Hr.	219
Gypsum Wall	Electrical Box 4" x 4" x 1 1/2"	815	R16844	2 Hr.	219
Gypsum Wall	Electrical Box 4" x 4" x 2 1/8"	815	R16844	2 Hr.	219
Gypsum Wall	Electrical Box Max 4" x 4"	818	R20964	2 Hr.	221

### Head of Wall, Expansion & Control Joints

Assembly	Boss Products	U.L. System	Movement Capability	F-Rating	Page
Gypsum Wall / Fluted Floor Ceiling or Roof Deck	137	HW-D-0409	25%	1-4 Hr.	222
Gypsum Wall / Floor Slab or Pre Cast	137	HW-D-0410	25%	1-4 Hr.	228
Gypsum Wall / Fluted Floor Ceiling or Roof Deck	137	HW-D-0411	25%	1 & 2 Hr.	231
Gypsum Wall / Fluted Floor Ceiling or Roof Deck	137	HW-D-0412	12.5%	1 & 2 Hr.	233
Concrete Wall / Fluted Floor Ceiling or Roof Deck	137	HW-D-0413	12.5%	2 Hr.	236
Concrete Wall / Floor Slab or Precast	137	HW-D-0414	25%	2 & 3 Hr.	239
Concrete Wall / Fluted Floor Ceiling or Roof Deck	137	HW-D-0415	25%	2 & 3 Hr.	241
CMU Block Wall / Fluted Floor or Roof	137	HW-D-0416	12.5%	3 Hr.	245
Concrete Wall / Fluted Floor Ceiling or Roof Deck	137	HW-D-0417	12.5%	2 Hr.	247
Gypsum Wall / Fluted Floor Ceiling or Roof Deck	816 or 816+	HW-D-0507	25%	1 & 2 Hr.	249
Concrete Wall / Floor Slab or Precast	816 or 816+	HW-D-0508	13%	4 Hr.	254
Concrete Wall / Fluted Floor Ceiling or Roof Deck	816 or 816+	HW-D-0509	25%	2 Hr.	256
Concrete Wall / Floor Slab or Precast	816 or 816+	HW-D-0510	12.5%	2 Hr.	258
Gypsum Wall / Fluted Floor Ceiling or Roof Deck	816 or 816+	HW-D-0511	25%	1 & 2 Hr.	260
Gypsum Wall / Floor Slab or Precast	816+	HW-D-0921	20%	1 & 2 Hr.	263
Gypsum Wall / Floor Slab or Precast	816+	HW-D-0922	25%	2 Hr.	265
Concrete Wall / Floor Slab or Precast	816 or 816+	HW-D-1071	15%	3 Hr.	267
Gypsum Wall / Floor Slab or Precast	816 or 816+	BW-S-0018		1 & 2 Hr.	269
Concrete Floor to Floor	816 or 816+	FF-D-0067	12.5%	4 Hr.	271
Concrete Floor to Floor	816 or 816+	FF-D-0068	25%	2 Hr.	273
Concrete Floor to Floor	816 or 816+	FF-D-1084	15%	3 Hr.	274

**Head of Wall, Expansion & Control Joints (Continued)**

<b>Assembly</b>	<b>Boss Products</b>	<b>U.L. System</b>	<b>Movement Capability</b>	<b>F-Rating</b>	<b>Page</b>
Concrete Floor to Concrete Wall	816 or 816+	FW-D-0044	12.5%	4 Hr.	276
Concrete Floor to Concrete Wall	816 or 816+	FW-D-0045	25%	2 Hr.	278
Concrete Floor to Concrete Wall	816 or 816+	FW-D-1068	15%	3 Hr.	279
Concrete Wall to Wall	816 or 816+	WW-D-0075	13%	4 Hr.	281
Concrete Wall to Wall	816 or 816+	WW-D-0081	12.5%	2 Hr.	283
Concrete Wall to Wall	816 or 816+	WW-D-1076	15%	3 Hr.	284

## Through-penetration Firestop Systems

System No. C-AJ-1591

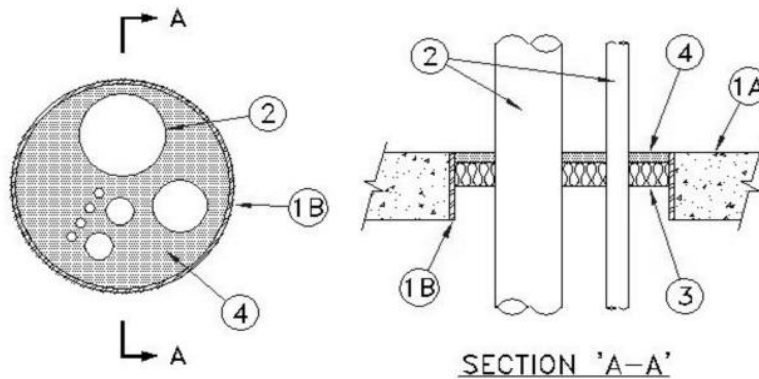
July 02, 2008

F Rating — 2 Hr

T Rating — 0 Hr

L Rating at Ambient - Less than 1 CFM/sq ft

L Rating at 400° F - Less than 1 CFM/sq ft



**1A. Floor or Wall Assembly** — Min 2-1/2 in (64 mm) thick floor or 3 in. (76 mm) thick wall of reinforced light weight 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 15-1/4 in. (387 mm).

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

**1B. Metallic Sleeve (Optional)** — Nom 15-1/4 in. (387 mm) diam (or smaller), Schedule 30 (or heavier) steel pipe sleeve, cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

**2. Through Penetrants** — A max of eight pipes, conduits or tubing to be installed within the opening. The space between pipes, conduits or tubing shall be min 1/2 in. (13 mm) to max 3 in. (76 mm). The space between pipes, conduits or tubing and periphery of opening shall be min 1/2 in. (13 mm) to max 5 in. (127 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 6 in. (152 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
- B. **Conduit** — Nom 2 in. (51 mm) diam (or smaller) electrical metallic tubing.
- C. **Copper Tubing** — Nom 3/4 in. (19 mm) diam (or smaller) Type L (or heavier) copper tubing.
- D. **Copper Pipe** — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

**3. Packing Material** — Min 2 in. (51 mm) thick mineral wool insulation of min 4 pcf (64 kg/m<sup>3</sup>) firmly pressed into opening as a permanent form. Insulation material to be recessed by min depth of 1/2 in. (13 mm) from top surface of floor or both surfaces of wall.

**4. Fill, Void, or Cavity Materials\* - Caulk** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark



**A. Tube Insulation - Plastics+** — Nom 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The insulated pipe or tubing shall be spaced a nom 1-1/4 in. (32 mm) from the other through-penetrants. The annular space between the insulated pipe or tubing and periphery of the opening shall be a min of 1/2 in. (13 mm) to max 1-3/4 in. (44 mm).

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

**B. Pipe and Equipment Covering Materials** — Nom 1 in. (25 mm) thick hollow cylindrical glass fiber units, nom 3.5 pcf (56 kg/m<sup>3</sup>), jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The insulated pipe or tubing shall be spaced a nom 1-1/4 in. (32 mm) from the other through-penetrants. The annular space between the insulated pipe or tubing and periphery of the opening shall be a min of 1/2 in. (13 mm) to max 1-3/4 in. (44 mm).

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

**4. Cables** — Max two cable bundles to be installed within the opening. Each bundle to consist of 3 cable lengths of cables specified below. Cable to be tightly bundled and supported on both sides of floor or wall. The annular space between cable bundles and periphery of the opening shall be min 3/8 in. (10 mm) to max 2-5/8 in. (67 mm).

A. Max 400 pair No. 24 AWG (or smaller) telephone cables with PVC insulation and jacket.

B. Max 3/C, No. 2/0 AWG (or smaller) copper conductor, PVC jacketed aluminum clad or steel clad cable.

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

**A. Packing Material** — Min 2 in. (51 mm) thickness of min 4 pcf (64 kg/m<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 both surfaces of wall to accommodate the required thickness of fill material.

**B. Fill, Void or Cavity Material\*—Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor and both surfaces of wall. Fill material to be forced into interstices of cable group to max extent possible.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark



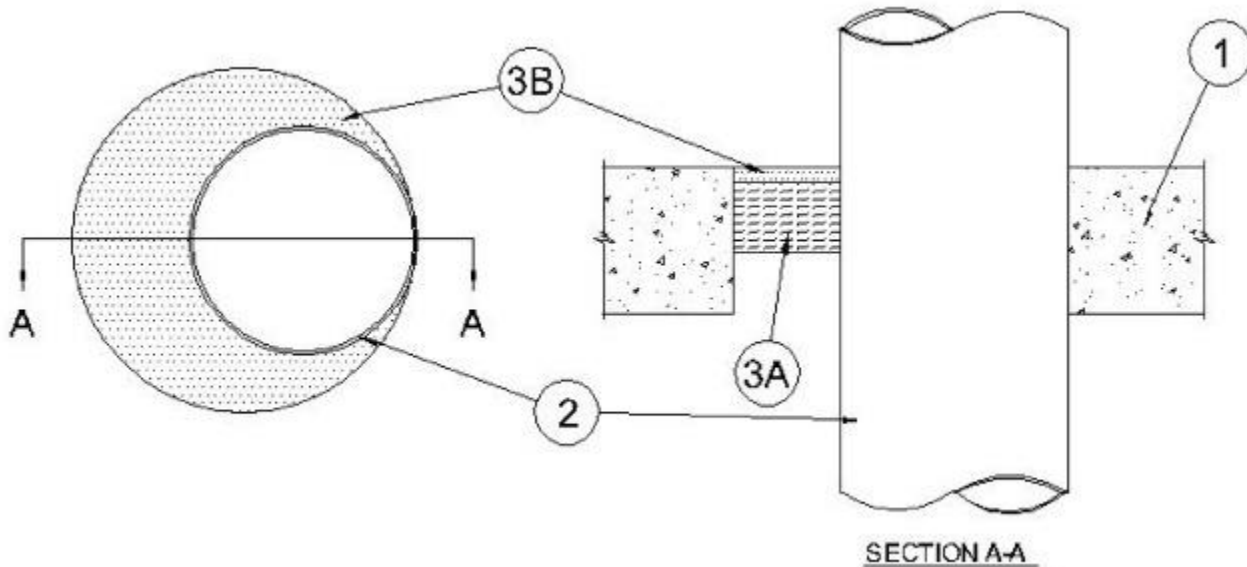
## Through-penetration Firestop Systems

System No. C-AJ-1555

December 04, 2009

F Rating — 2 Hr

T Rating — 0 Hr



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Max diam of opening is 11-1/4 in. (284 mm)

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

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

- A. **Steel Pipe** — Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. **Copper Pipe** — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
- C. **Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
- D. **Conduit** — Nom 6 in. (152 mm) diam (or smaller) steel conduit or nom 4 in. diam (or smaller) steel electrical metallic tubing.

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

- A. **Packing Material** — Min 2 in. (51 mm) thickness of min 4 pcf (64 kg/m<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 as required to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\* - Caulk** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. C-AJ-1585

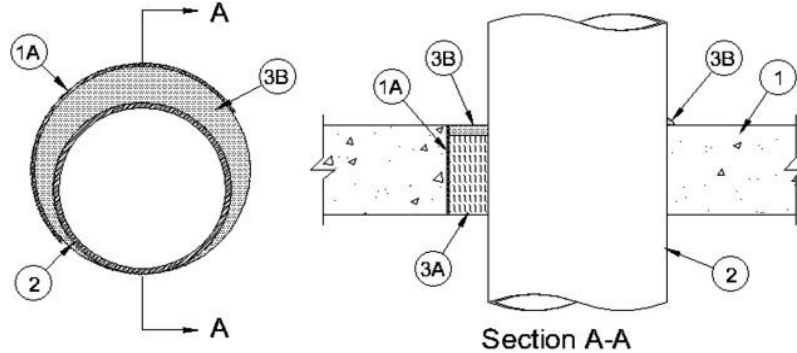
April 10, 2008

F Ratings — 3 Hr (See Item 3B)

T Rating — 0 Hr

L Rating at Ambient - Less than 1 CFM/sq ft

L Rating at 400° F - Less than 1 CFM/sq ft



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced normal weight (140-150 pcf or 2200-2400 kg/m<sup>3</sup>) concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units\***. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 26 in. (660 mm). If the firestop system is installed within a hollow-core hollow-core precast concrete unit, max diam of opening shall be 7 in. (178 mm).

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

1A. **Metallic Sleeve** — (Not shown, Optional) — Nom 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces. The use and the max diam of the steel sleeve is dependent upon the type and max diam of the through penetrant (Item 3) and type and min fill material thickness as tabulated in Item 3B.

2. **Through Penetrants** — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space between the pipe, conduit or tubing and the periphery of the opening shall be min 0 in. (point contact) to a 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 24 in. (610 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

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

C. **Conduit** — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT) or nom 6 in. (152 mm) diam (or smaller) steel conduit.

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

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

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

A. **Packing Material** — Min 4 pcf (64 m<sup>3</sup>) mineral wool batt insulation firmly packed into opening or min 1 in. (25 mm) diam backer rod friction fitted into the opening as a form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material. When the floor is constructed of hollow-core precast concrete units, packing material shall be recessed from both surfaces of floor to accommodate the required thickness of fill materials. In floors, the packing material may be removed after the fill material cures.

B. **Fill, Void or Cavity Material\* — Sealant** — Fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. At the point contact location between through penetrant and concrete, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the concrete/through penetrant

interface on the top surface of floor and on both surfaces of wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed symmetrically on both sides of floor, flush with both floor surfaces. The F Rating of the firestop system is dependent upon the use and the max diam of the steel sleeve, type and max diam of the through penetrant and type and min fill material thickness as tabulated below:

<b>Use of Steel Sleeve</b>	<b>Max Diam of Steel Sleeve In.</b>	<b>Type of Through Penetrant</b>	<b>Max Diam of Through Penetrant In.</b>	<b>Type of Fill Mtl</b>	<b>Min Fill Mtl Thkns In.</b>	<b>F Rating Hr</b>
Not permitted	—	Steel or Iron Pipe	24 (610)	Boss 816	1/2 (13)	3
Permitted	8 (203)	Steel or Iron Pipe	6 (152)	Boss 816	1/2 (13)	3
Permitted	8 (203)	Copper Pipe, Copper Tube or Steel Conduit	6 (152)	Boss 816	1/2 (13)	3
Permitted	6 (152)	Steel EMT	4 (102)	Boss 816	1/2 (13)	3

**ACCUMETRIC L L C — Boss 816**

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. C-AJ-1592

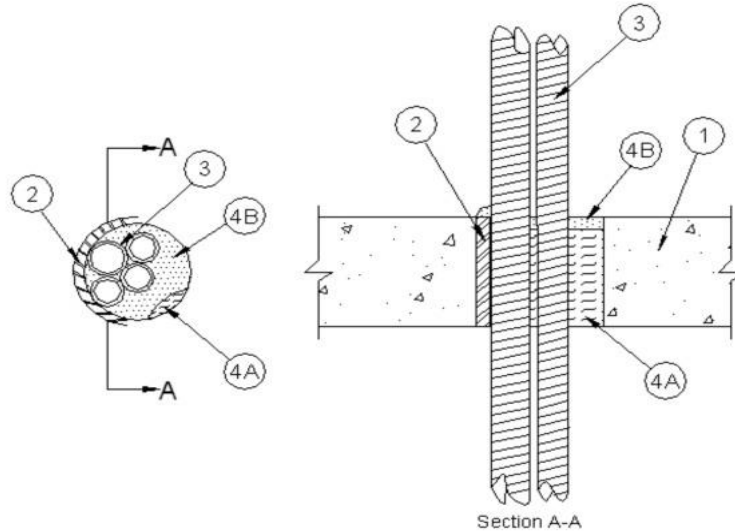
June 24, 2008

F Ratings — 2 and 3 Hr (See Item 3)

T Rating — 0 Hr

L Rating at Ambient - Less than 1 CFM/sq ft

L Rating at 400° F - Less than 1 CFM/sq ft



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 floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight wall. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units\***. The max diam of the opening is dependent upon the type of through penetrant (Item 3) used. If flexible steel conduit is installed within the opening, the max diam of the opening is 6 in. (152 mm) If flexible aluminum conduit is installed within the opening, the max diam of the opening is 4 in. (102 mm).

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

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

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

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

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

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

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

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

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. C-AJ-1593

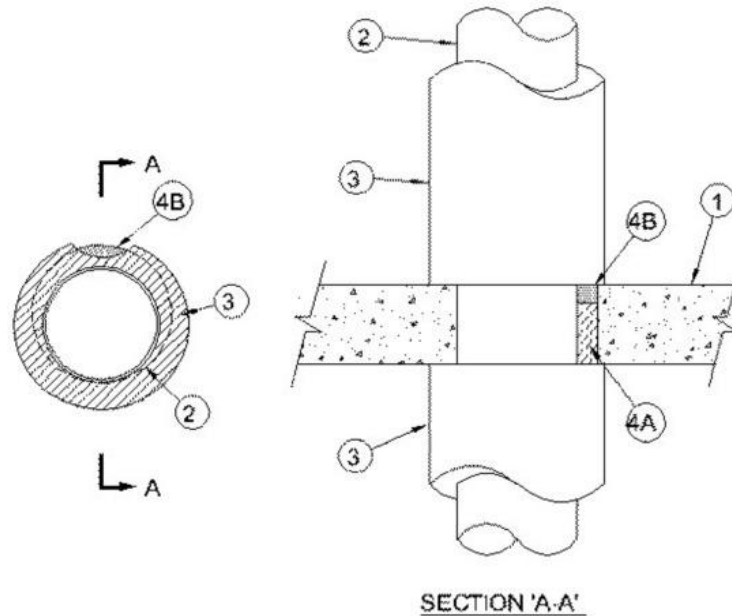
June 24, 2008

F Rating — 3 Hr

T Ratings — 1-3/4 and 2Hr (see Item 2)

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units\***. Max diam of opening 14 in. (356 mm). When precast concrete units are used the max diam of opening is 7 in. (127 mm).

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

2. **Through-Penetrant** — One metallic pipe or tubing installed concentrically or eccentrically within opening. Annular space between penetrant and periphery of opening shall be min of 0 in. (point contact) to max 1-1/4 in. (32 mm) for steel/iron through penetrants and max 2 in. (51 mm) for copper through penetrants. 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 12 in. (305 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Steel Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
- D. **Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
- E. **Copper Pipe** — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

**When penetrant diameter is 4 in. (102 mm) or smaller the T Rating is 2 h. When penetrant diameter is greater than 4 in. (102 mm) the T Rating is 1-3/4 h.**

3. **Pipe Covering Materials\*** — (Partial Insulation) — Max 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a nom density of 4 pcf (64 kg/m<sup>3</sup>) (or heavier) and sized to fit the outside diam of pipe or tube. Pipe insulation

installed around penetrant and shall extend 12 in. (305 mm) below floor and 36 in. (914 mm) above floor or 36 in. (914 mm) beyond both surfaces of wall. Pipe insulation secured with min 8 AWG steel wire spaced 12 in. (305 mm) OC. All longitudinal and transverse joints to be sealed with 4 in. (102 mm) wide aluminum foil tape.

**IG MINWOOL L L C** — High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT and High Temperature Pipe Insulation Thermaloc

4. **Firestop System** — The details of the firestop system shall be as follows:

A. **Packing Material** — Min 4 in. (102 mm) thickness of min 4 pcf ( $64 \text{ kg/m}^3$ ) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\*** — **Sealant** — Min 1/2 in. (13 mm) thickness of sealant applied within the annulus, flush with top surface of floor or with both surfaces of wall. In floors of precast concrete units, sealant shall be installed symmetrically on both sides of the floor.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

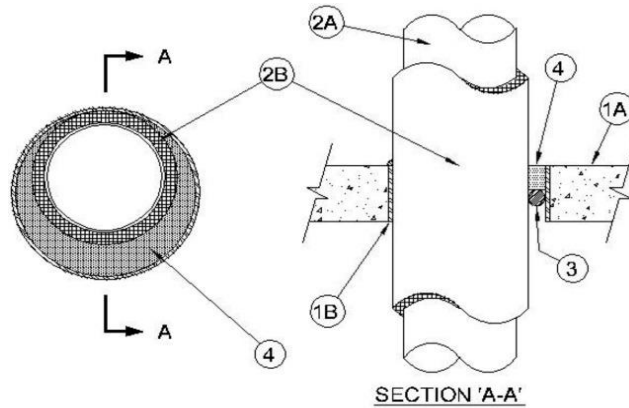
## Through-penetration Firestop Systems

System No. C-AJ-5319

April 10, 2008

F Rating — 2 Hr

T Rating — 1/2 Hr



1. **Floor or Wall Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL classified **Concrete Blocks\***. Max diam of opening is 17-1/2 in.

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

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

2A. **Through Penetrants** — One nom 8 in. (or smaller) Schedule 30 (or heavier) steel or iron pipe. Pipe to be firmly supported on both sides of opening. Pipe installed concentrically or eccentrically such that the annular space between the insulated pipe and the periphery of the opening is min 0 in. (point of contact) to max 2-1/8 in.

2B. **Pipe Covering Material\*** — Cellular Glass Insulation - Nom 3 in. thick cellular glass units sized to the outside diam of the metallic pipe and supplied in 18 or 24 in. long, half sections. Pipe insulation installed on pipe in accordance with manufacturer's instructions. The insulation material may be jacketed with 0.010 in. thick aluminum sheet wrapped tightly around with a min 2 in. overlap. Jacket to be installed with edge abutting surface of caulk fill material (Item 4) on top surface of floor or both surfaces of wall. Jacket to be well secured with metallic bands.

### PITTSBURGH CORNING CORP — FOAMGLAS

3. **Packing Material** — Min 1 in. diam foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the thickness of fill material.

4. **Fill, Void, or Cavity Materials\*** — Caulk. Min 1 in. thickness of fill material applied within annulus, flush with top surface of floor or both surfaces of wall. Additional material to be installed to form a min 3/8 in. bead at the concrete/penetrating item interface on the top surface of the floor and both surfaces of the wall.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark



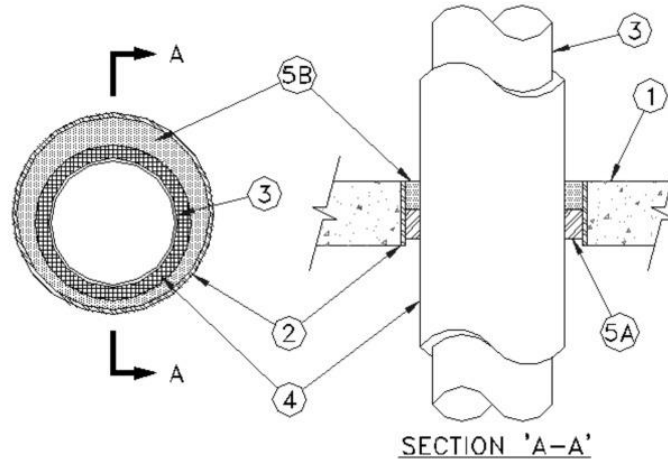
## Through-penetration Firestop Systems

System No. C-AJ-5322

July 02, 2008

F Rating — 2 Hr

T Rating — 3/4 Hr and 1 Hr (See Item 5)



1. **Floor or Wall Assembly** — Min 4-1/2 in. thick reinforced light weight or normal weight (100-150 pcf) concrete floor or min 6 in. thick reinforced light weight or normal weight concrete wall. Floor may also be constructed of any min 6 in. thick UL Classified hollow core **Precast Concrete Units\***. When precast concrete units are used, the max diam of opening is 7 in. Wall may also be constructed of any UL Classified **Concrete Units\***. Max diam of opening is 29-1/2 in.

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

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

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

- A. **Steel Pipe** — Nom 24 in. diam (or smaller) Schedule 20 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 24 in. diam (or smaller) cast or ductile iron pipe.
- C. **Copper Tubing** — Nom 4 or 6 in. diam (or smaller) Type L (or heavier) copper tubing. See table below.
- D. **Copper Pipe** — Nom 4 or 6 in. diam (or smaller) Regular (or heavier) copper pipe. See table below.

4. **Pipe Covering\*** — Nom 2 in. thick hollow cylindrical glass fiber units, of min 4.5 pcf density, jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between insulated pipe and periphery of the opening is specified in the table below.

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

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

- A. **Packing Material** — Min 2 in. thickness of min 4 pcf mineral wool batt insulation or nom 1 in. diam foam backer rod (see table below) firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.

**B. Fill, Void, or Cavity Materials\* - Sealant** — Min 1, 1-3/4 or 2 in. thickness (see table below) of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.

Type of Pipe	Nom Pipe Diam, in.	Annular Space, in.	Type of Packing Material	Thickness of Sealant, in.	F Rating Hr.	T Rating Hr.
Steel and Iron Pipe	24	5/8 to 1-1/4	Mineral Wool	2	2	3/4
Copper Tube and Pipe	4	5/8 to 1-1/4	Mineral Wool	2	2	3/4
Steel and Iron Pipe	24	5/8 to 1-1/4	Mineral Wool	2	2	1
Copper Tube and Pipe	6	5/8 to 1-1/2	Mineral Wool	1	2	1
Steel and Iron Pipe	12	5/8 to 1-1/2	Mineral Wool	1	2	1
Steel and Iron Pipe	12	1/2 to 3/4	Foam Backer Rod	1-3/4	2	3/4

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. C-AJ-5323

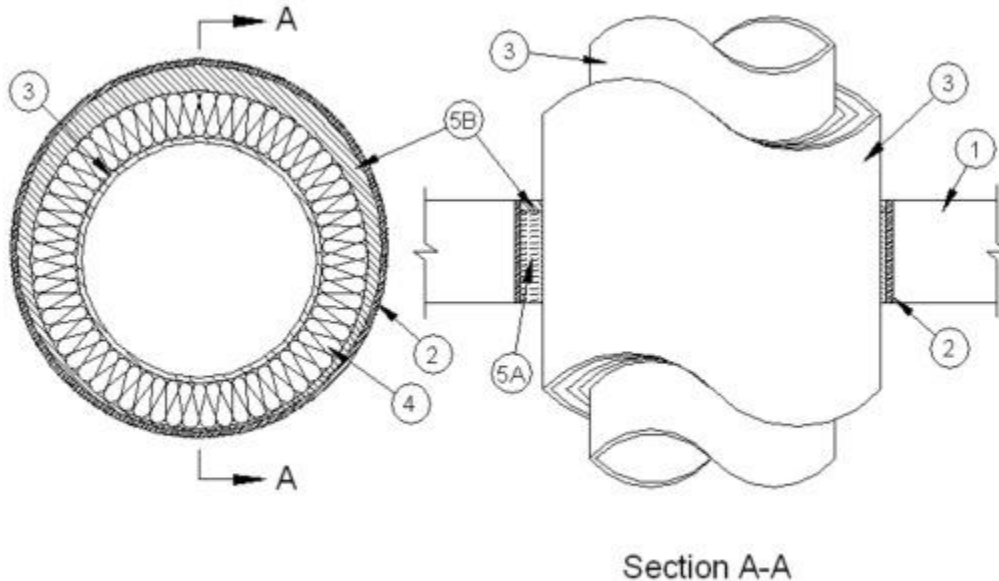
September 08, 2008

F Rating — 3 Hr

T Ratings — 1-1/2 and 1-3/4 Hr (See Item 3)

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced light weight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete floor or min 5 in. (127 mm) thick reinforced light weight or normal weight concrete wall. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow core **Precast Concrete Units\***. When precast concrete units are used, the max diam of opening is 7 in. (178 mm). Wall may also be constructed of any UL Classified **Concrete Units\***. Max diam of opening is 30 in. (762 mm).

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

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

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

- A. **Steel Pipe** — Nom 24 in. (610 mm) diam (or smaller) Schedule 20 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 24 in. (610 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Copper Tubing** — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
- D. **Copper Pipe** — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

**When copper through penetrants are used the T Rating is 1-1/2 h. When steel or iron through penetrants are used the T Rating is 1-3/4 h.**

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

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

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

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

B. **Fill, Void, or Cavity Materials\*** — **Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed symmetrically on both sides of floor, flush with both floor surfaces.

**ACCUMETRIC L L C** — Boss 816

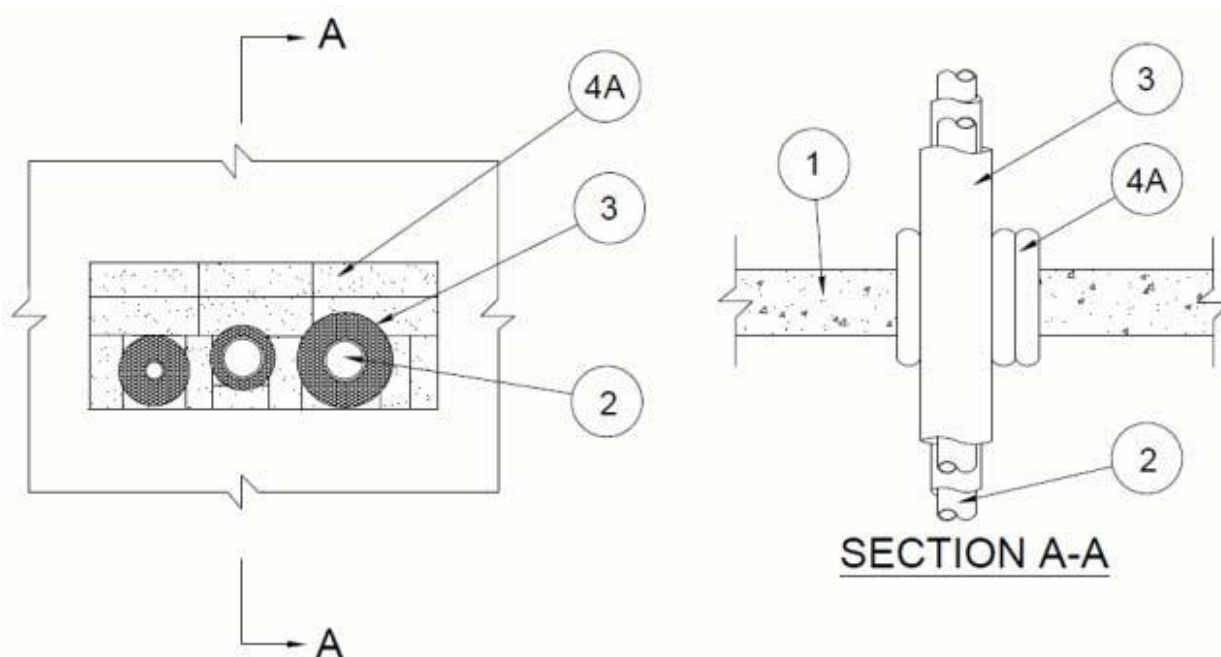
\*Bearing the UL Classification Mark

## System No. C-AJ-5447

January 22, 2021

**F Rating — 2 Hr**

**T Rating — 1/2 Hr**



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete floor or wall. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max size of opening is 144 in<sup>2</sup> (929 cm<sup>2</sup>) with a max dimension of 18 in. (457 mm). See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrant** — Max three tubes installed eccentrically or concentrically within opening. Tubes to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic tubing may be used:

A. **Aluminum Tubing** — Reflok 6061-T4 ASTM B210 seamless aluminum tubing for use in closed (process or supply) piping systems. Tubing sizes shall be maximum 2-1/8 in. (54 mm) to minimum 3/4 in. (19 mm) outer diameter (OD) having wall thickness ranging from 0.080 in. (2 mm) to 0.030 in. (0.8 mm) respectively.

3. **Pipe Covering** — The following pipe covering shall be used with each Through Penetrant (Item 2).

A. **Tube Insulation-Plastics+** — Min 1/2 in. (13 mm) thick to max 1-1/2 in. (38 mm) thick Aerocel Ethylene Propylene Diene Terpolymer (EPDM) pipe insulation furnished in the form of tubing. The annular space between the insulated penetrants and the edge of the opening shall be min 1 in. (25 mm) to max 4 in. (102 mm). The annular space between insulated penetrants shall be min 1 in. (25 mm) to max 4 in. (102 mm). See **Plastics+ - (QMFZ2)** category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications of having a UL 94 Flammability Classification of 94-5VA may be used.

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

A. **Fill, Void or Cavity Material\*** — **Pillows** — Max 6 in. (152 mm) long by 9 in. (229 mm) wide by 2 in. (51 mm) thick plastic covered intumescent pillows tightly packed into opening filling annular space between and around penetrants and between penetrants and periphery. Pillows installed with 9 in. (229 mm) dimension projecting through wall and centered within opening.

**SODAL ACCUMETRIC - Boss 808 Firestop Pillows**

B. **Fill, Void or Cavity Material \*** — **Caulk** — (Optional) — After installation of pillows, min 1/4 in. (6 mm) depth of fill material applied to seal any voids between pillows and periphery of opening, between pillows and through penetrants and between pillows on finished side of wall.

**SODAL ACCUMETRIC - Boss 816+**

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

## Through-penetration Firestop Systems

System No. C-AJ-7134

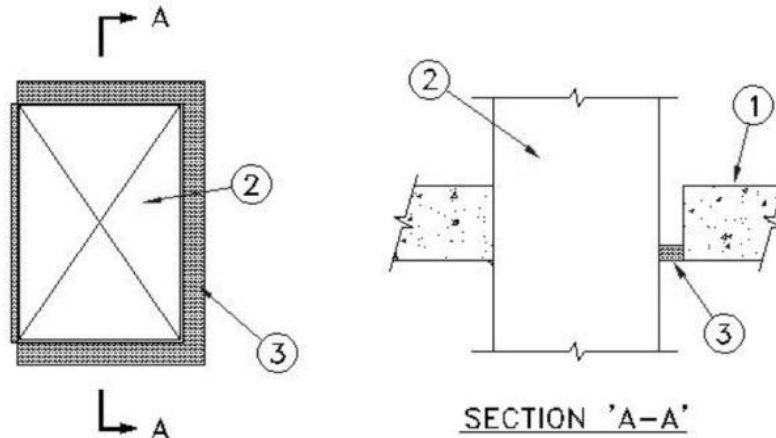
September 08, 2008

F Rating — 2 Hr

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced light weight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow core **Precast Concrete Units\***. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max area of opening is 364 sq. in. (2348 cm<sup>2</sup>) with max dimension of 26 in. When precast concrete units are used the max area of opening is 49 sq. in. (316 cm<sup>2</sup>) with max dimension of 7 in. (178 mm).

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

2. **Steel Duct** — Nom 24 by 12 in. (610 by 305 mm) (or smaller) by No. 24 gauge (or heavier) galv steel duct. One steel duct to be positioned within the firestop system. The annular space shall be min 0 in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides of floor or wall assembly.

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

A. **Packing Material** — (Not Shown) - Min 1 in. (25 mm) thick polystyrene board, firmly packed into opening as a permanent form. Packing material to be recessed from bottom or top surface of floor or from one surface of wall to accommodate the required thickness of fill material.

B. **Fill, Void, or Cavity Materials\* - Sealant** — Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with either the top or bottom surface of floor or one surface of wall. When wall is constructed of concrete blocks, fill material shall be installed within the annular space on both sides of the wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed on the bottom side of the floor. At the point contact location between duct and concrete a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the concrete/duct interface on the same side of floor or wall as the sealant in the annular space bottom or top surface of floor or one surface of wall.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. C-AJ-7135

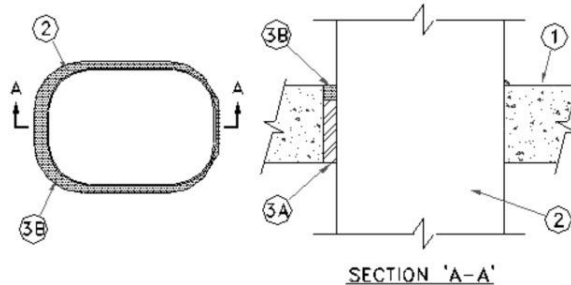
July 07, 2008

F Rating — 2 Hr

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced light weight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete floor or min 5 in. (127 mm) thick light weight or normal weight concrete wall. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max area of opening is 715 sq in. (4613 cm<sup>2</sup>) with max dimension of 37-1/4 in. (946 mm).

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

2. **Steel Duct** — Nom 36 by 20 in. (915 by 508 mm) (or smaller) by No. 24 gauge (or heavier) galv steel, oval HVAC duct. One steel duct to be positioned within the firestop system. The annular space shall be min 0 in. (point of contact) to max 2 in. (51 mm). Duct to be rigidly supported along its entire perimeter 8 in. (203 mm) from both surfaces of floor or wall assembly.

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

A. **Packing Material** — Min 4 in. thickness of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form between the bare steel duct and the periphery of the opening. 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 1/2 in. (13 mm) thickness of fill material applied within the annulus over the mineral wool insulation, flush with top surface of floor or both surfaces of wall. A 3/8 in. (10 mm) diam bead of the sealant shall be applied along the point of contact of the duct and periphery of the opening at top surface of floor or both surfaces of wall.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark



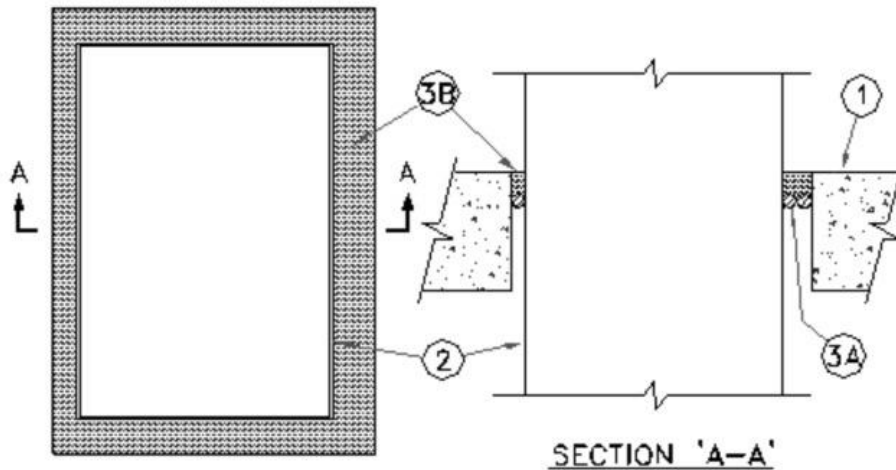
## Through-penetration Firestop Systems

System No. C-AJ-7137

July 10, 2008

F Rating — 3 Hr

T Rating — 0 Hr



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced light weight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Floor may also be constructed of any min 8 in. (203 mm) thick UL Classified hollow core **Precast Concrete Units\***. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max area of opening is 384 sq. in. (0.25 m<sup>2</sup>) with max dimension of 32 in. (813 mm). When precast concrete units are used the max area of opening is 49 sq. in. (316 cm<sup>2</sup>) with max dimension of 7 in. (178 mm).

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

2. **Steel Duct** — Max 30 by 10 in. (762 by 254 mm) No. 24 gauge (or heavier) galv steel duct. One steel duct to be positioned within the firestop system. The annular space shall be min 1/2 in. (13 mm) to max 1-1/2 in. (38 mm). Duct to be rigidly supported along its entire perimeter 4 in. (102 mm) from both floor or wall surfaces.

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

A. **Packing Material** — Nom 1 in. (25 mm) diam foam backer rod or min 4 pcf (64 kg/m<sup>3</sup>) mineral wool insulation, firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill Void or Cavity Material\* - Sealant** — Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with the top surface of floor or both surfaces of wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed on both sides of the floor.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. C-AJ-7138

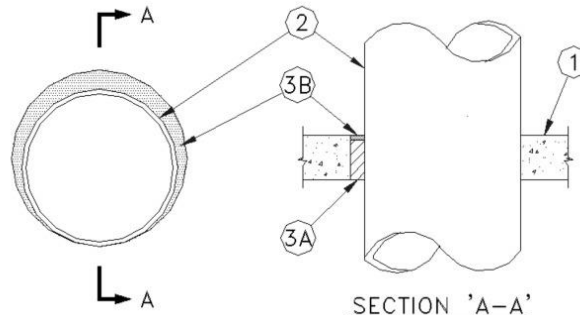
July 10, 2008

F Rating — 3 Hr

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick floor or 5 in. (127 mm) thick wall of 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 28 in. (711 mm).

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

2. **Steel Duct** — Max 24 in. (610 mm) diam No. 22 gauge (or heavier) steel HVAC duct to be installed either concentrically or eccentrically within the firestop system. The annular space between duct and periphery of opening shall be min 0 in (point contact) to max 4 in. (102 mm). Duct to be rigidly supported on both sides of floor or wall assembly.

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

A. **Packing Material** — Min 4 in. (102 mm) thickness of min 4 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 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. Additional fill material installed to form a min 1/4 in. (6 mm) bead at the point of contact of the duct and periphery of the opening on the top floor surface or both wall surfaces.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. C-AJ-8195

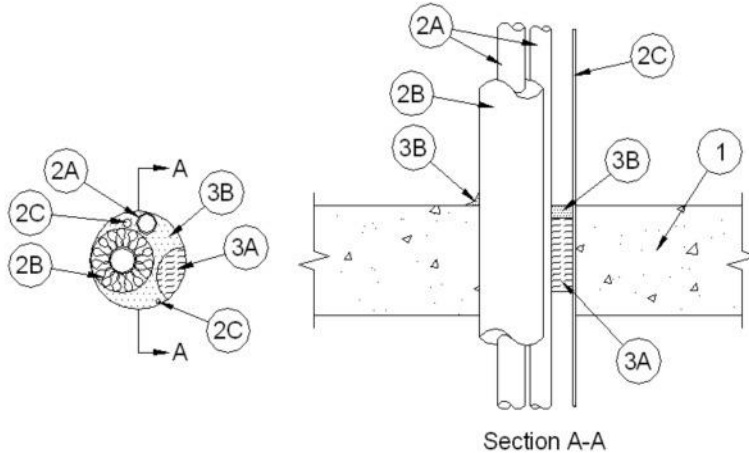
June 24, 2008

F Rating — 2 Hr

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



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. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units\***. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 4 in. (102 mm).

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

2. **Through Penetrants** — Metallic pipes, tubing or cable to be installed either concentrically or eccentrically within the firestop system. Penetrants to be rigidly supported on both sides of floor assembly. The following types and sizes of penetrants may be used:

A. **Metallic Pipes** — Max two metallic pipes or tubing. The annular space between penetrant and periphery of opening shall be min 0 in. (point contact) to max 2-1/4 in. (57 mm). The following types and sizes of metallic pipes or tubing may be used:

A1. **Copper Tubing** — Nom 1 in. (25 mm) diam (or smaller) Type M (or heavier) copper tube.

A2. **Copper Pipe** — Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.

A3. **Steel Pipe** — Nom 1 in. (25 mm) diam (or smaller) Schedule 10 steel pipe.

B. **Tube Insulation - Plastics+** — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on all tubing. The annular space between the insulated penetrating item and uninsulated metallic pipes, conduit or tubing shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm) The annular space between the insulated penetrating item and the periphery of the opening shall be min 0 in. (point contact) to max 2-1/4 in. (57 mm).

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

C. **Cables** — Max two cables spaced min 0 in. (point contact) from tube insulation or min 1/2 in. (13 mm) from other penetrants. The annular space between cable and periphery of opening is min 0 in. (point contact) to max

2-1/4 in. (57 mm). Cables to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of cables may be used:

C1. Max 7/C No. 24 AWG (or smaller) control cable with polyvinyl chloride (PVC) insulation and jacket.

C2 NMax 2/C No. 10 AWG (or smaller) thermostat wire.

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

A. **Packing Material** — Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m<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 both surfaces of wall to accommodate the required thickness of fill material. When the floor is constructed of hollow-core precast concrete units, packing material shall be recessed from both surfaces of floor to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall. Min 1/2 in. (13 mm) diam bead of fill material applied to the penetrant/concrete interface at the point contact location on the top surface of floor or both surfaces of wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed flush with both surfaces of floor. Sealant shall be forced into interstices between penetrants to max extent possible.

**ACCUMETRIC L L C** — Boss 816

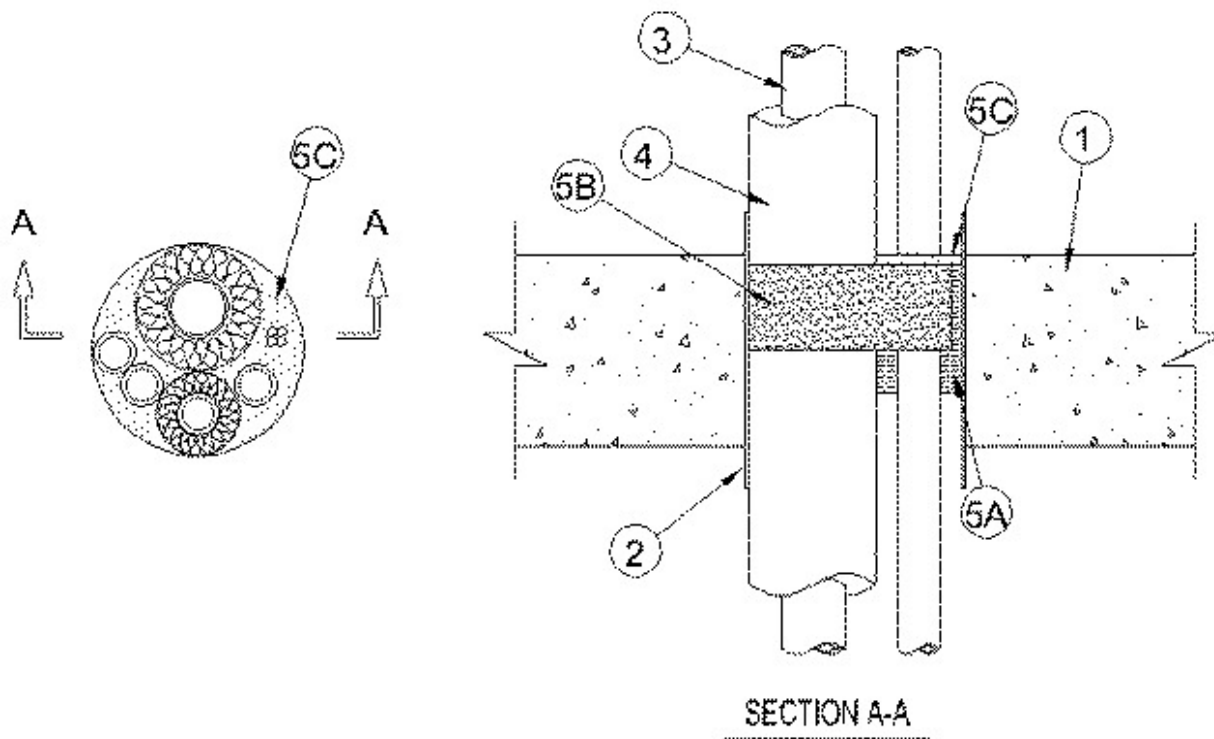
\*Bearing the UL Classification Mark

## System No. C-AJ-8325

January 22, 2021

**F Rating — 2 Hr**

**T Rating — 1 Hr**



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

2. **Steel Sleeve** — (Optional) - Cylindrical sleeve fabricated from min 0.036 in. (.91 mm) thick (No. 20 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Length of steel sleeve to be 1/2 in. to 2 in. (13 mm to 51 mm) more than the overall thickness of the floor or wall, respectively, such that, when installed in circular opening, the end of the sleeve projects a max 1 in. (25 mm) from top surface of the floor and a max of 1 in. (25 mm) from each surface of wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the circular openings in the concrete floor or wall.

3. **Through Penetrants** — A max of four pipes, conduits or tubes and a max of four cable lengths to be installed within the opening. Annular space between the penetrants and the periphery of the opening shall be min 1/4 in. (6 mm) to max 1-1/2 in. (38 mm). Penetrants 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. **Metallic Pipes** — A max of three metallic pipes, conduits or tubing may be used. The following types and sizes may be used:

A1. **Steel Pipe** — Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

A2. **Conduit** — Nom 1 in. (25 mm) diam (or smaller) electrical metallic tubing or rigid steel conduit.

A3. **Copper Tubing** — Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tubing.

A4. **Copper Pipe** — Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.

B. **Nonmetallic Pipes** — A max of one nonmetallic pipe or conduit may be used. A min 1/4 in. space must be maintained between uninsulated metallic pipes, conduits or tubing and nonmetallic pipes or conduits. The following types and sizes of nonmetallic pipes or conduits may be used:

B1. **Polyvinyl Chloride (PVC) Pipe** — Nom 1-1/4 in. (32 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

B2. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 1-1/4 in. (32 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

B3. **Rigid Nonmetallic Conduit**++ — Nom 1-1/4 in. (32 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70.)

C. **Cables** — A max of four cables may be used. Max 1/C No. 12 AWG power and control cables; XLPE or PVC insulation with XLPE or PVC jacket.

4. **Pipe Covering** — The following types and sizes of pipe coverings may be used with the metallic pipes or tubes:

A. **Tube Insulation - Plastics**++ — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL94 Flammability Classification of 94-5VA may be used.

B. **Pipe Covering\*** — Nom 1/2 in. (13 mm) thick hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. See **Pipe and Equipment Covering – Materials** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

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

A. **Packing Material** — Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m<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 Materials\* - Wrap Strip** — Nom 1/4 in. (6 mm) thick by 2 in. (51 mm) wide intumescent wrap strips. One layer of wrap strip is wrapped tightly encompassing the penetrants with the ends butted and held in place with duct tape. Wrap strip to be recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material (See item 5C).

**SODAL ACCUMETRIC – BOSS 817 Wrap Strip**

**C. Fill, Void or Cavity Materials\* - Caulk** — Min 1/2 in. (13 mm) thickness of caulk applied within the annulus, flush with top surface of floor or with both surfaces of wall.

**SODAL ACCUMETRIC - Boss 816+**

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

**++ Bearing the UL Recognized Component Mark**

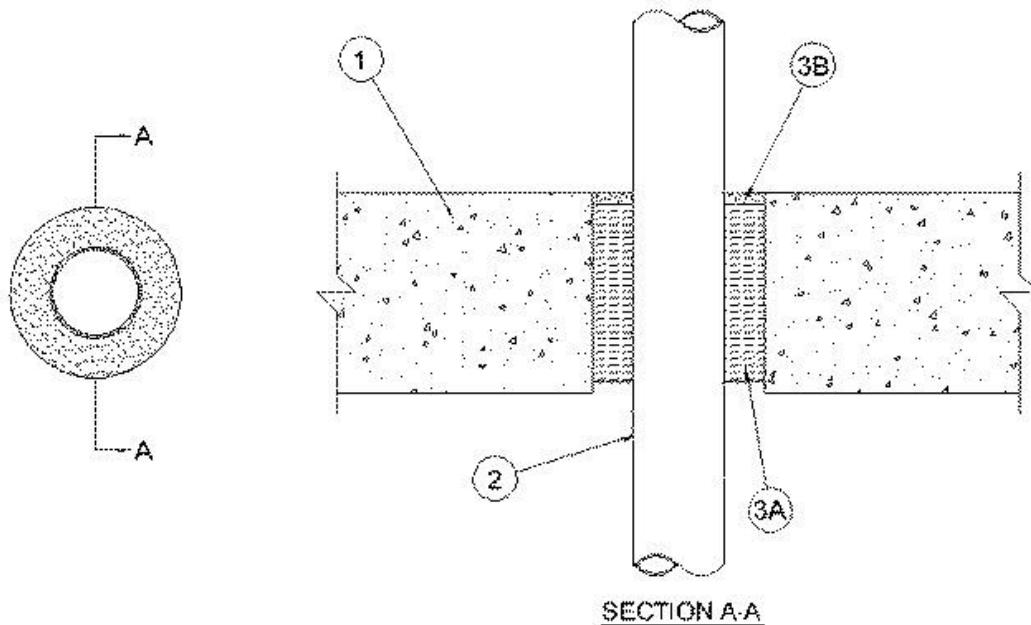
## Through-penetration Firestop Systems

System No. C-BJ-1048

June 26, 2003

F Rating - 1 h

T Rating - 0 h



1. **Floor or Wall Assembly** — Min 9 1/4 in. thick lightweight or normal weight (100-150 pcf) reinforced concrete. Max diam of opening is 8 in. Wall may also be constructed of any UL Classified **Concrete Blocks**\*.

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

2. **Through Penetrants** — One metallic pipe, conduit, or tubing to be installed concentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening shall be 1-3/4 to 2-13/16 in. 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 tubes may be used:

A. **Steel Pipe** — Nom 4 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.

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

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

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

A. **Packing Material** — Min 8 in. thickness of min 2.8 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. thickness of fill material applied within annulus, flush with top surface of floor or both surfaces of wall.

**ACCUMETRIC L L C** — Boss 760 Silicone, Boss 814, Latex Boss 814 Intumescent B.

\*Bearing the UL Classification Mark



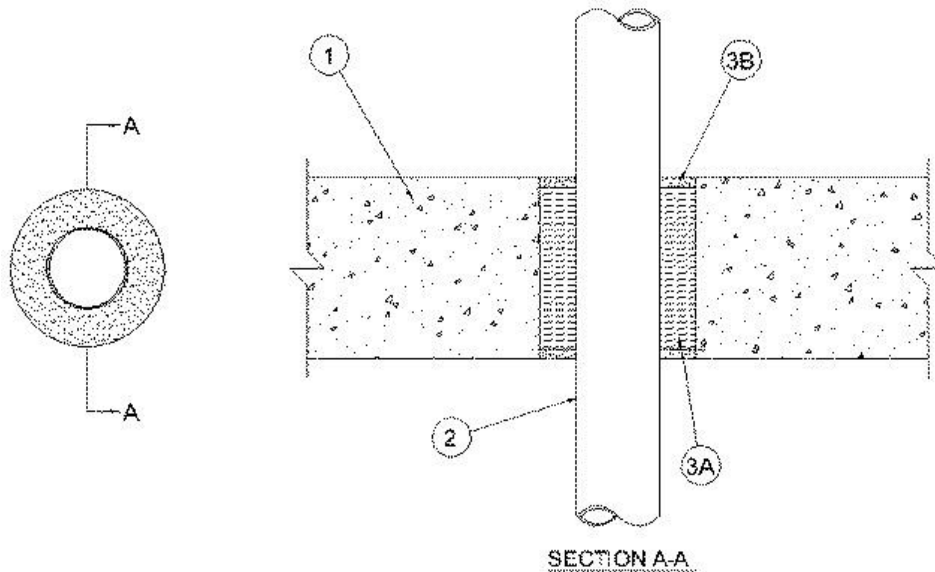
## Through-penetration Firestop Systems

System No. C-BK-1037

November 10, 2008

F Rating — 2 Hr

T Rating — 0 Hr



1. **Floor or Wall Assembly** — Min 9 in. thick lightweight or normal weight (100-150 pcf) reinforced concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 6 in.

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

2. **Through Penetrants** — One metallic pipe or conduit to be installed concentrically within the firestop system. The annular space between pipe or conduit and periphery of opening shall be  $\frac{3}{4}$  in. Pipe or conduit to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or conduits may be used:

- A. **Steel Pipe** — Nom 4 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 4 in. diam (or smaller) cast or ductile iron pipe.
- C. **Conduit** — Nom 4 in. diam (or smaller), rigid steel conduit.

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

- A. **Packing Material** — Min 8 in. thickness of min 2.8 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. thickness of fill material applied within annulus, flush with both surfaces of floor or wall.

**ACCUMETRIC L L C** — Boss 814, Boss 810, Boss 760 Silicone

\*Bearing the UL Classification Mark

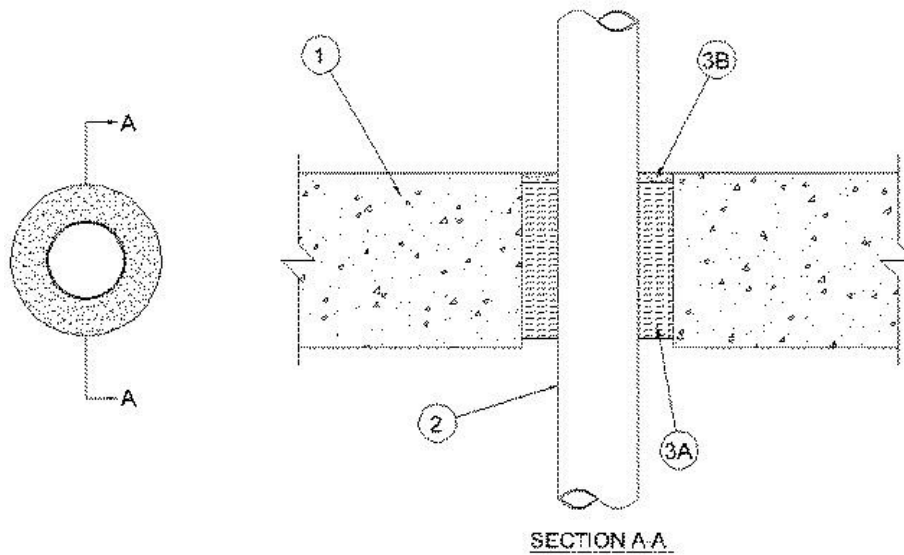
## Through-penetration Firestop Systems

System No. C-BK-1038

November 10, 2008

F Rating — 2 Hr

T Rating — 0 Hr



1. **Floor or Wall Assembly** — Min 9 in. thick lightweight or normal weight (100-150 pcf) reinforced concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 6 in.

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

2. **Through Penetrants** — One metallic pipe or conduit to be installed concentrically within the firestop system. The annular space between pipe or conduit and periphery of opening shall be 5/8 in. Pipe or conduit to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or conduits may be used:

A. **Steel Pipe** — Nom 4 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.

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

C. **Conduit** — Nom 4 in. diam (or smaller) rigid steel conduit.

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

A. **Packing Material** — Min 8 in. thickness of min 2.8 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. thickness of fill material applied within annulus, flush with top surface of floor or both surfaces of wall.

ACCUMETRIC L L C — Boss 136, Boss 139

\*Bearing the UL Classification Mark

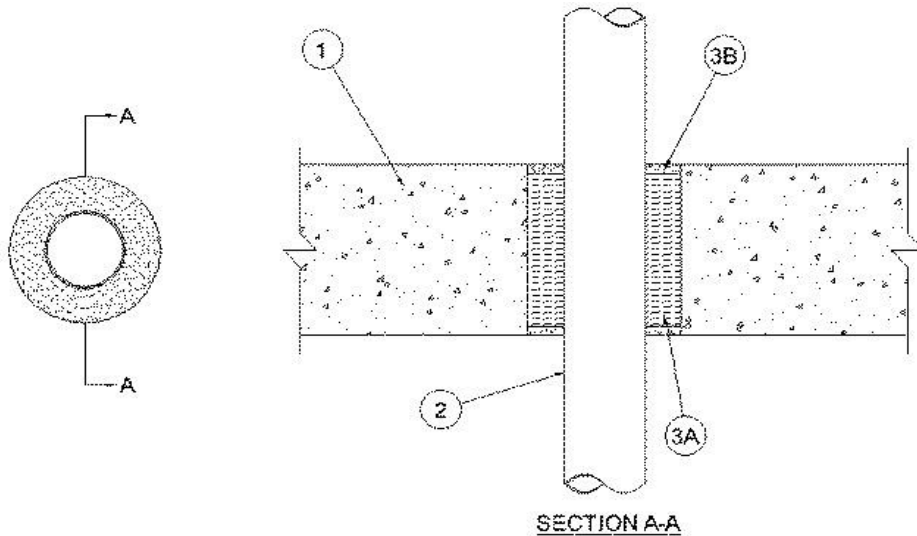
## Through-penetration Firestop Systems

System No. C-BK-1039

November 06, 2008

F Rating — 2 Hr

T Rating — 0 Hr



1. **Floor or Wall Assembly** — Min 9 in. thick lightweight or normal weight (100-150 pcf) reinforced concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 6 in.

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

2. **Through Penetrants** — One metallic pipe or tubing to be installed concentrically within the firestop system. The annular space between pipe or tubing and periphery of opening shall be 1-15/16 in. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or tubes may be used:

A. **Copper Tubing** — Nom 2 in. diam (or smaller) Type K (or heavier) copper tubing.

B. **Copper Pipe** — Nom 2 in. diam (or smaller) Regular copper pipe.

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

A. **Packing Material** — Min 8 in. thickness of min 2.8 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. thickness of fill material applied within annulus, flush with both surfaces of floor or wall.

**ACCUMETRIC L L C** — Boss 814

\*Bearing the UL Classification Mark

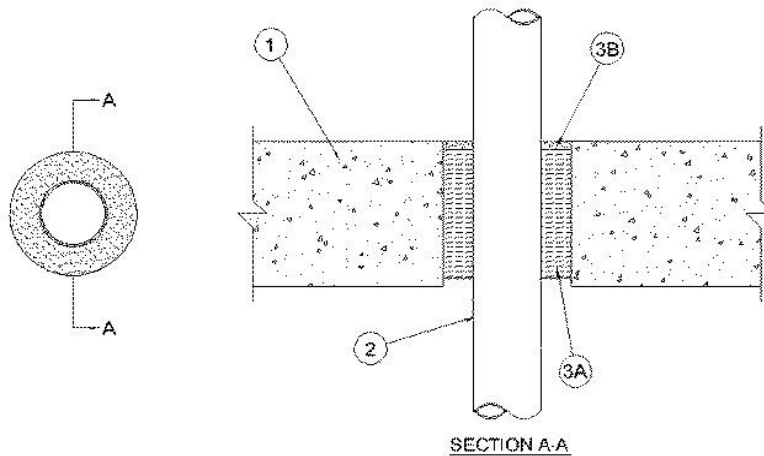
## Through-penetration Firestop Systems

System No. C-BJ-1048

November 05, 2008

F Rating - 1 h

T Rating - 0 h



1. **Floor or Wall Assembly** — Min 9 1/4 in. thick lightweight or normal weight (100-150 pcf) reinforced concrete. Max diam of opening is 8 in. Wall may also be constructed of any UL Classified **Concrete Blocks\***.

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

2. **Through Penetrants** — One metallic pipe, conduit, or tubing to be installed concentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening shall be 1-3/4 to 2-13/16 in. 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 tubes may be used:

- A. **Steel Pipe** — Nom 4 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 4 in. diam (or smaller) cast or ductile iron pipe.
- C. **Conduit** — Nom 4 in. diam (or smaller) steel electrical metallic tubing or steel conduit.

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

- A. **Packing Material** — Min 8 in. thickness of min 2.8 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. thickness of fill material applied within annulus, flush with top surface of floor or both surfaces of wall.

**ACCUMETRIC L L C** — Boss 760 Silicone, Boss 814, Latex Boss 814 Intumescent B.

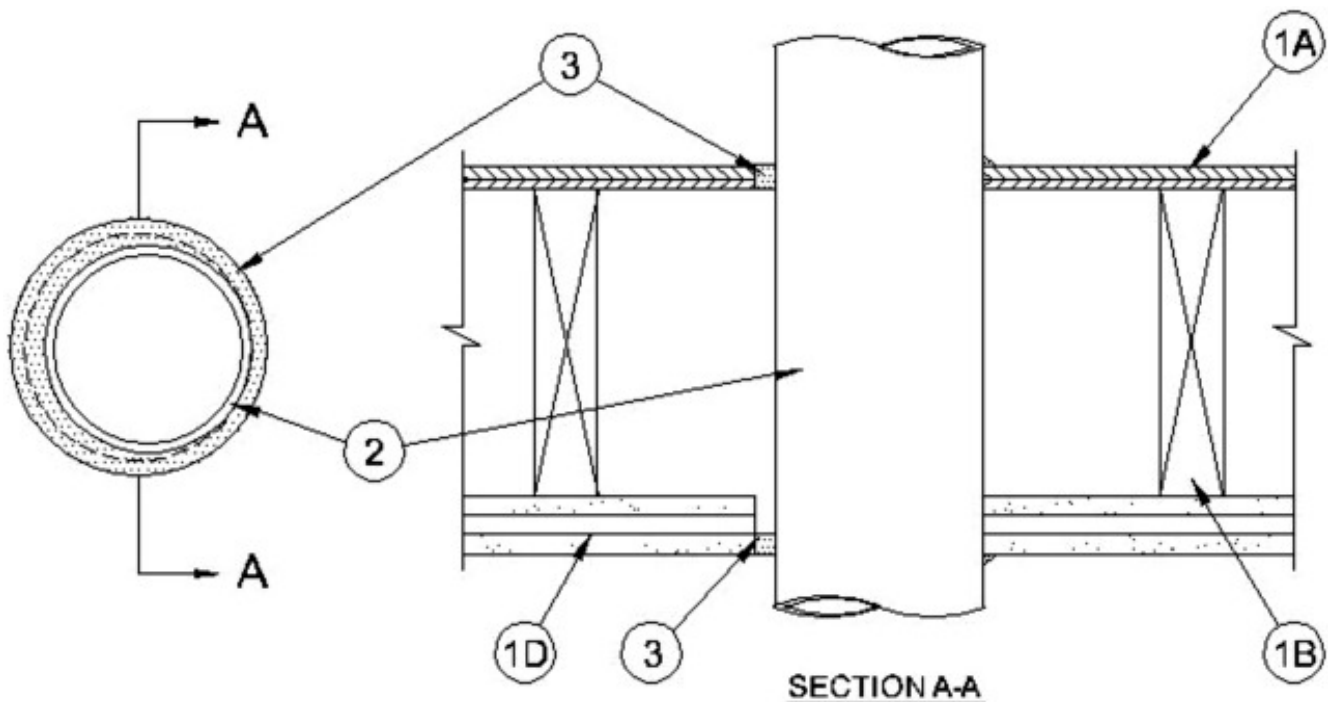
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. F-C-1157

October 26, 2020

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



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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 2 hr fire-rated wood joist floor ceiling assembly shall be constructed of the materials and in the manner specified in Design Nos. L505, L511 or L536 in the UL Fire Resistance Directory. The general construction features 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 floor opening is 5 in.(127 mm).

B. **Wood Joists\*** — For 1 hr fire-rated floor-ceiling assemblies 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. For 2 hr fire-rated floor-ceiling assemblies, nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped.

C. **Furring Channels** — (Not Shown) — In 2 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between first and second layers of wallboard (Item 1D). Furring channels spaced max 24 in. (610 mm) OC. In 1 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to

wood joists between wallboard and wood joists as specified in the individual Floor-Ceiling Design. Furring channels spaced max 24 in. (610 mm) OC.

D. **Gypsum Board\*** — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. First layer of gypsum board secured to wood joists or furring channels as specified in the individual Floor-Ceiling Design. Second layer of gypsum board (2 hr fire-rated assembly) screw-attached to furring channels as specified in the individual Floor-Ceiling Design. Max diam of ceiling opening is 5 in. (127 mm).

**The F Rating of the firestop system is equal to the hourly fire rating of the floor-ceiling assembly in which it is installed.**

1.1 **Chase Wall (Not Shown, Optional)** — The through penetrants (Item 2) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum board 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) lumber 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) lumber or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted.

C. **Top Plate** — The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm) lumber plates or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted. Max diam of opening is 5 in. (127 mm).

D. **Gypsum Board\*** — Thickness, type, number or layers and fasteners shall be as specified in individual Wall and Partition Designs.

2. **Through Penetrants** — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The space between pipes, conduits or tubing and periphery of opening is dependent upon the type of penetrant 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 metallic pipes, conduits or tubing may be used:

A. **Steel Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe. The annular space within the firestop system shall be a 0 in. (point contact) to max 1/2 in. (13 mm).

B. **Iron Pipe** — Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe. The annular space within the firestop system shall be a 0 in. (point contact) to max 1/2 in. (13 mm).

C. **Conduit** — Nom 4 in. diam (or smaller) steel electrical metallic tubing or rigid galv steel conduit. The annular space within the firestop system shall be a 0 in. (point contact) to max 1/2 in. (13 mm).

D. **Copper Tubing** — Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tubing. The annular space within the firestop system shall be a 0 in. (point contact) to max 7/8 in. (22 mm).

E. **Copper Pipe** — Nom 3 in. (76 mm) diam (or smaller) Regular (or heavier) copper pipe. The annular space within the firestop system shall be a 0 in. (point contact) to max 7/8 in. (22 mm).

**The T Rating of the firestop system is dependent upon the type of penetrant, used within the firestop system. If a steel or iron pipe, steel electrical metallic tubing or rigid galv steel**

**conduit is used, the T Rating is 1 hr. If a copper tube or copper pipe is used, the T Rating is 1/2 hr.**

3. **Fill, Void or Cavity Material\* — Sealant** — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or

bottom top plate. At point contact, min 3/8 in. (10 mm) diam bead of fill material applied at penetrant/floor or sole plate interface and at penetrant/ceiling or top plate interface. Additional sealant shall be applied in such a manner that the sealant overlaps a min 1/2 in. (13 mm) beyond

the periphery of the opening on the top surface of the floor or sole plate and bottom surface of ceiling or bottom top plate.

**SODAL ACCUMETRIC** — Boss 816, BOSS 816+

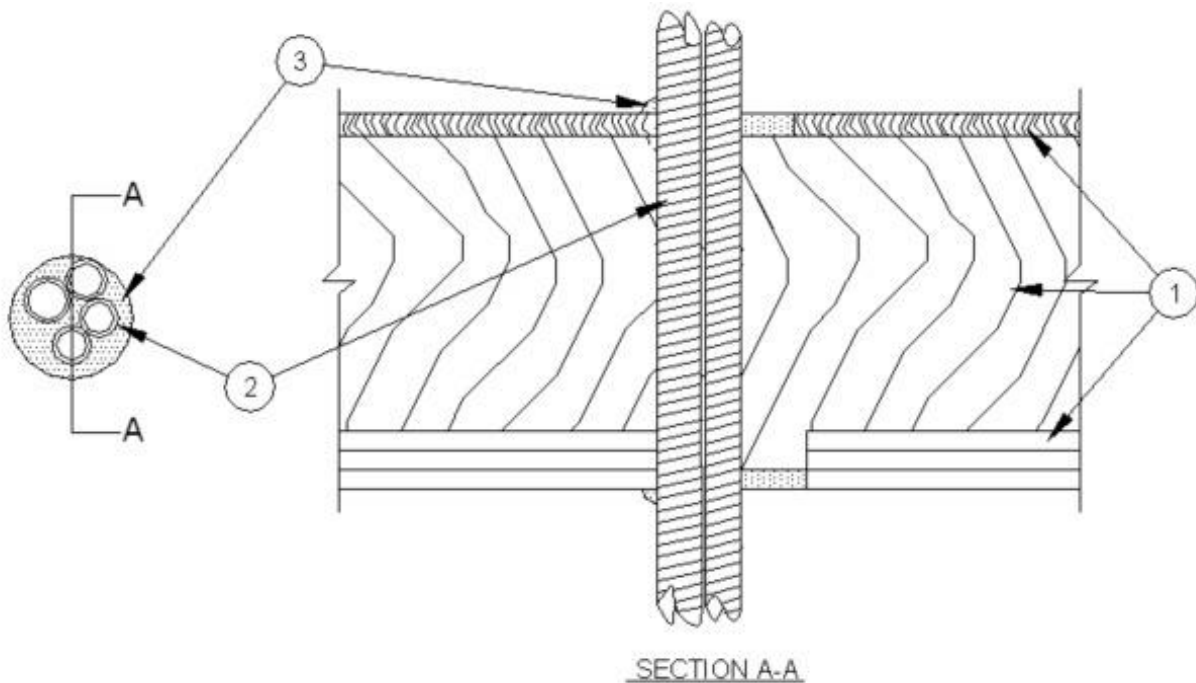
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

### System No. F-C-1158

October 26, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings – 1 and 2 Hr (See Item 1)	F Ratings -1 and 2 Hr (See Item 1)
	FH Ratings -1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Rating - 0 Hr
	FTH Rating -0 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less than 1.55 L/s/m
L Rating At 400 F - Less than 1 CFM/sq ft	L Rating At 400 F - Less than 1.55 L/s/m



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**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 2 hr fire-rated wood joist floor ceiling assembly shall be constructed of the materials and in the manner specified in Design Nos. L505, L511 or L536 in the UL Fire Resistance Directory. The general construction features 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 floor opening is 4 in. (102 mm).
- B. Wood Joists\*** — For 1 hr fire-rated floor-ceiling assemblies 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. For 2 hr fire-rated floor-ceiling assemblies, nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped.
- C. Furring Channels** — In 2 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between first and second layers of board (Item 1D). Furring channels spaced max 24 in. (610 mm) OC. In 1 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood

joists between board and wood joists as specified in the individual Floor- Ceiling Design. Furring channels spaced max 24 in. (610 mm) OC.

D. **Gypsum Board\*** — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. First layer of gypsum board secured to wood joists or furring channels as specified in the individual Floor-Ceiling Design. Second layer of gypsum board (2 hr fire-rated assembly) screw-attached to furring channels as specified in the individual Floor-Ceiling Design. Max diam of ceiling opening is 4 in. (102 mm).

**The F Rating of the firestop system is equal to the hourly fire rating of the floor-ceiling assembly in which it is installed.**

1.1 **Chase Wall** — (Not Shown, Optional) The through penetrants (Item 2) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum board 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) lumber 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) lumber or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted.

C. **Top Plate** — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) lumber plates or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted. Max diam of opening is 4 in. (102 mm).

D. **Gypsum Board\*** — Thickness, type, number or layers and fasteners shall be as specified in individual Wall and Partition Designs.

2. **Through Penetrants** — One or more nom 1-1/2 in. (38 mm) diam (or smaller) flexible steel conduit bundled together and installed within the opening. Max diam of through penetrant bundle shall be 3 in. (76 mm). The space between the through penetrants shall be a min of 0 in. (point contact) to a max of 1/4 in. (6 mm). The annular space between the through penetrants and periphery of opening shall be min 0 in. (point contact) to max 1 in. (25 mm). Through penetrants to be rigidly supported on both sides of floor-ceiling assembly assembly. See **Flexible Metal Conduit (DXUZ)** category in the Electrical Construction Materials Directory for names of manufacturers.

3. **Fill, Void or Cavity Material\*** — **Sealant** — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, on the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or bottom top plate. Additional min 1/8 in. (3.2 mm) thickness of sealant shall extend a min 1/2 in. (13 mm) beyond the periphery of the opening on the top surface of the floor or sole plate and bottom surface of the ceiling or bottom top plate. At point contact, min 3/8 in. (10 mm) diam bead of fill material applied at penetrant/floor or sole plate interface and at penetrant/ceiling or top plate interface. Additional sealant shall be forced into interstices of through penetrants to max extent possible.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

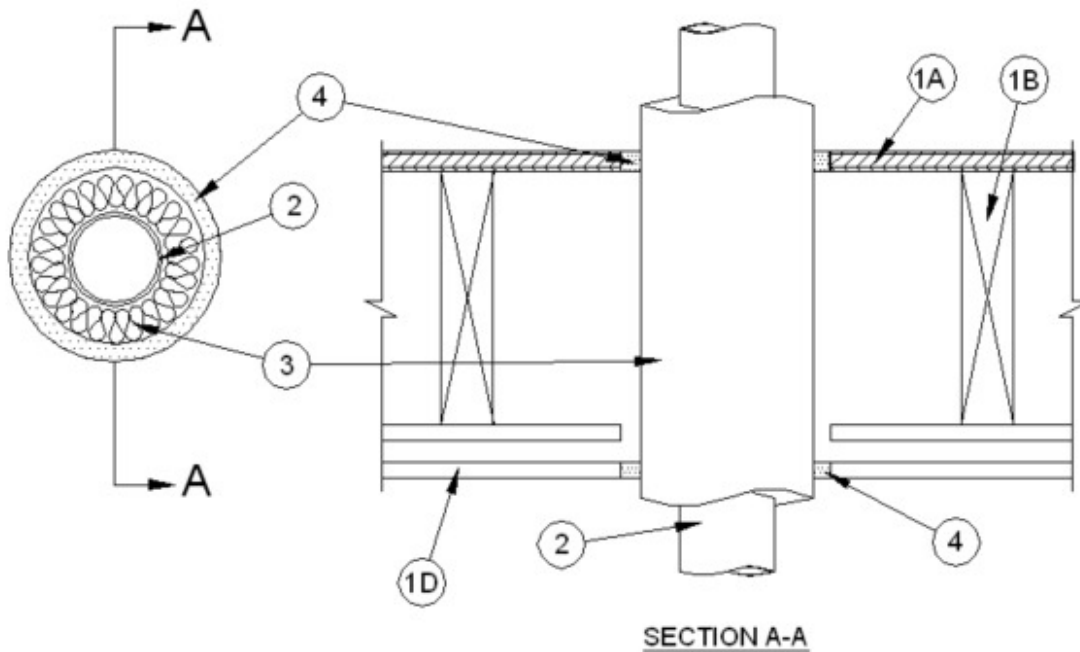


## Through-penetration Firestop Systems

System No. F-C-5082

October 26, 2020

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



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 2 hr fire-rated wood joist floor/ceiling assembly shall be constructed of the materials and in the manner specified in Design No. L505, L511 or L536 in the UL Fire Resistance Directory. The general construction features 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 floor opening is 6 in. (152 mm).

B. **Wood Joists\*** — For 1 hr fire-rated floor-ceiling assemblies, 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. For 2 hr fire-rated floor-ceiling assemblies, nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped.

C. **Furring Channels** — (Not Shown) - In 2 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between first and second layers of gypsum board (Item 1D). Furring channels spaced max 24 in. (610 mm) OC. In 1 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between gypsum board and wood joists as specified in the individual Floor-Ceiling Design. Furring channels spaced max 24 in. (610 mm) OC.

**D. Gypsum Board\*** — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. First layer of gypsum board nailed to wood joists. Second layer of gypsum board (2 hr fire-rated assembly) screw-attached to furring channels. Max diam of ceiling opening is 6 in. (152 mm).

**The F and T Ratings of the firestop system are dependent upon the hourly rating of the assembly in which the firestop system is installed as shown in the table below:**

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

**1.1 Chase Wall** — (Not Shown, Optional)- The through penetrants (Item 2) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum board 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 8 in. (51 by 203 mm) lumber or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
- B. **Sole Plate** — Nom 2 by 8 in. (51 by 203 mm) lumber or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 6 in. (152 mm).
- C. **Top Plate** — The double top plate shall consist of two nom 2 by 8 in. (51 by 203 mm) lumber plates or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 6 in. (152 mm).
- D. **Gypsum Board\*** — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

**2. Through Penetrants** — One metallic tube or pipe to be installed within the firestop system. Tube or pipe to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic tubes or pipes may be used:

- A. **Copper Tubing** — Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tubing.
- B. **Copper Pipe** — Nom 3 in. (76 mm) diam (or smaller) Regular (or heavier) copper pipe.
- C. **Steel Pipe** — Nom 3 in. (76 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

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

- A. **Pipe and Equipment Covering Materials\*** — Nom 1 in. (25 mm) thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space between the insulated penetrating item and the periphery of the opening shall be a min of 3/8 in. (10 mm) to a max of 5/8 in. (16 mm).

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

- B. **Pipe Covering Materials\*** — Nom 1 in. (25 mm) thick mineral fiber pipe insulation sized to the outside diam of pipe or tube. Pipe insulation secured with min 8 AWG steel wire space max 12 in. (305 mm) OC. The annular space between the insulated through penetrant and the periphery of the opening shall be a min of 3/8 in. (10 mm) to a max 5/8 in. (16 mm).

**INDUSTRIAL INSULATION GROUP L L C** — High Temperature Pipe Insulation 1200, High Temperature Pipe Insulation BWT or High Temperature Pipe Insulation Thermaloc.

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

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

4. **Fill, Void or Cavity Materials\* - Sealant** — Min 3/4 in. (19 mm) thickness of sealant applied within annular space, flush with top surface of floor. Min 5/8 in. (16 mm) thickness of sealant applied within the annular space, flush with bottom surface of gypsum board ceiling or lower top plate of chase wall assembly.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

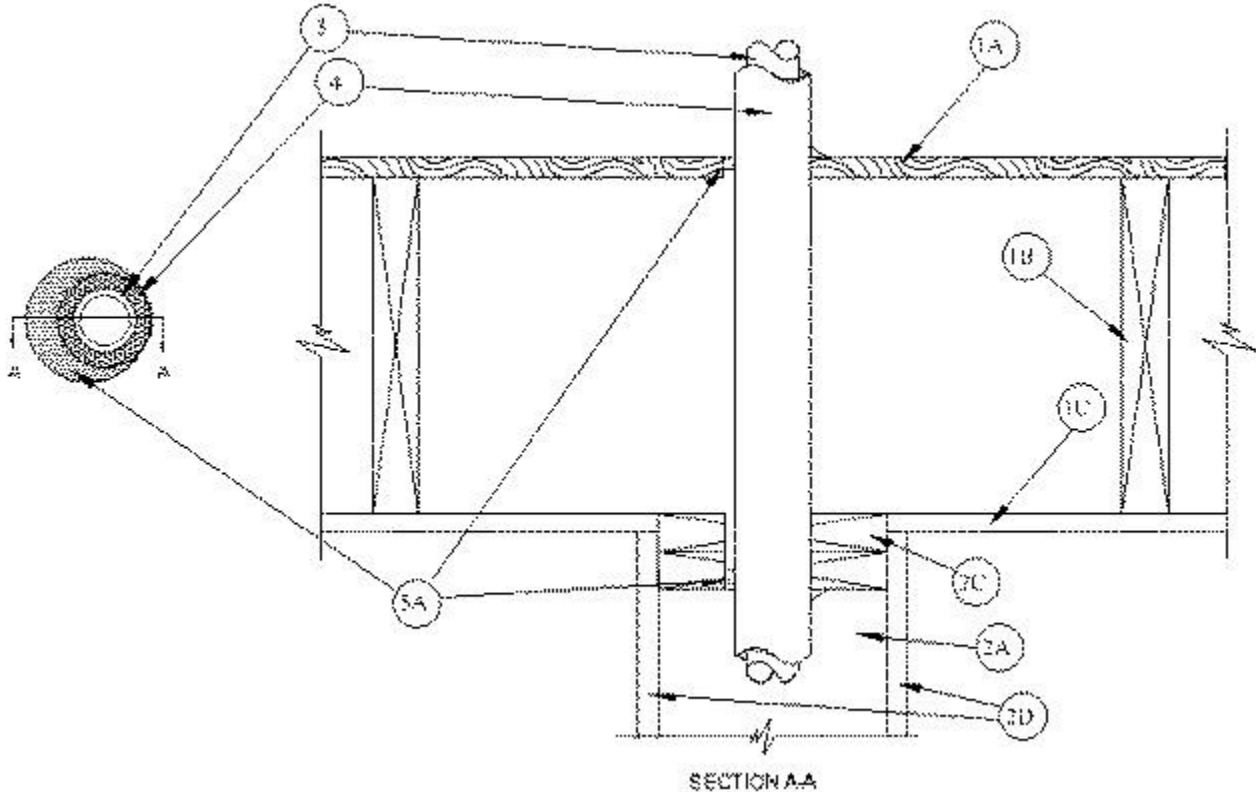
\*Bearing the UL Classification Mark

**System No. F-C-5097**

November 20, 2020

**F Rating — 1 Hr**

**T Rating — 1 Hr**



1. **Floor-Ceiling Assembly** — The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as 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 floor opening is 5 in.

B. **Wood Joists** — Nom 10 in. 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 5/8 in. thick as specified in the individual Floor-Ceiling Design. Gypsum board secured to joists 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 single, double or staggered wood stud/gypsum board chase wall 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. lumber or double nom 2 by 4 in. lumber studs.

B. **Sole Plate** — Nom 2 by 6 in. lumber or parallel 2 by 4 in. lumber plates, tightly butted.

C. **Top Plate** — The double top plate shall consist of two nom 2 by 6 in. lumber plates or two sets of nom 2 by 4 in. lumber plates, tightly butted. Max diam of opening is 5 in.

D. **Gypsum Board\*** — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

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

A. **Steel Pipe** — Nom 2 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.

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

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

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

4. **Tube Insulation — Plastics+** — Nom 1 in. thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between insulation and the periphery of the opening shall be min 0 in. (point contact) to max 7/8 in. See **Plastics+** (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized tube insulation material meeting the above specifications and having a min UL94 Flammability Classification of 94-5VA may be used.

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

A. **Fill, Void or Cavity Material\*** — **Caulk** — Min 1/4 in. thickness of fill material applied within annulus, flush with top surface of subfloor. Min 1/2 in. thickness of fill material applied within annulus flush with bottom surface of lower top plate. At point contact location, a min 1/2 in. diam bead of fill material shall be applied to the penetrant/opening interfaces on top surface of subfloor and bottom surface of lower top plate

**SODAL ACCUMETRIC** — Boss 816+

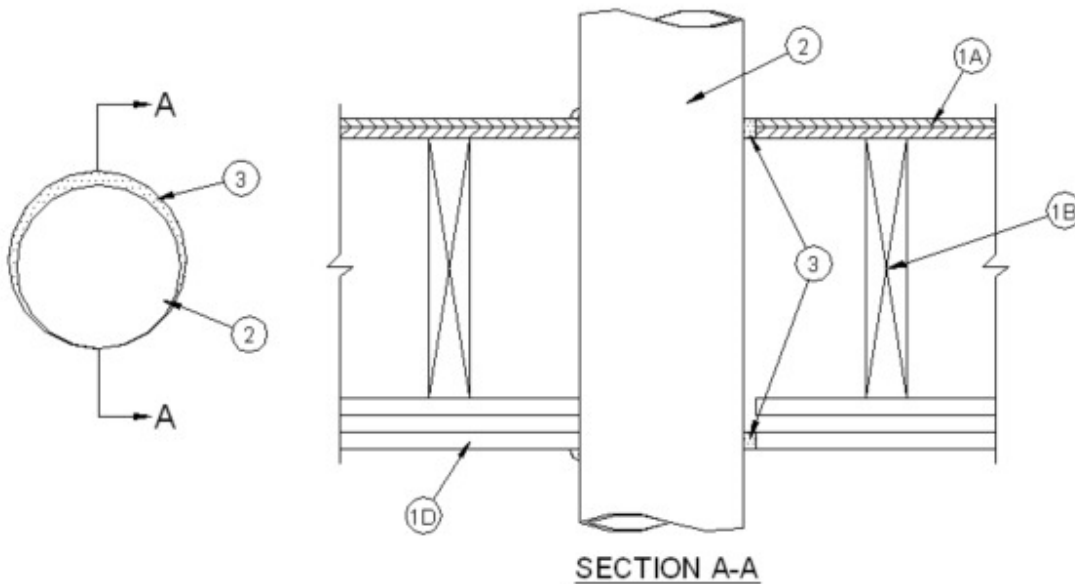
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

## Through-penetration Firestop Systems

System No. F-C-7052

October 27, 2020

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



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 2 hr fire-rated wood joist floor/ceiling assembly shall be constructed of the materials and in the manner specified in Design Nos. L505, L511 or L536 in the UL Fire Resistance Directory. The general construction features 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 floor opening is 6-1/2 in. (165 mm).

B. **Wood Joists\*** — For 1 hr fire-rated floor-ceiling assemblies 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. For

2 hr fire-rated floor-ceiling assemblies, nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped.

C. **Furring Channels** — (Not Shown) — In 2 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between first and second layers of gypsum board (Item 1D). Furring channels spaced max 24 in. (610 mm) OC. In 1 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between gypsum board and wood joists as specified in the individual Floor-Ceiling Design. Furring channels spaced max 24 in. (610 mm) OC.

D. **Gypsum Board\*** — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. First layer of gypsum board secured to wood joists or furring channels as specified in the

individual Floor-Ceiling Design. Second layer of gypsum board (2 hr fire-rated assembly) screw-attached to furring channels as specified in the individual Floor-Ceiling Design. Max diam of ceiling opening is 6-1/2 in. (165 mm).

**The F and T Ratings of the firestop system are dependent upon the hourly rating of the assembly in which the firestop system is installed as shown in the table below:**

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

1.1 **Chase Wall** — (Not Shown, Optional) — The through penetrants (Item 2) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum board 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 8 in. (51 by 203 mm) lumber or double nom 2 by 6 in. (51 by 152 mm) lumber studs.
- B. **Sole Plate** — Nom 2 by 8 in. (51 by 203 mm) lumber or parallel 2 by 6 in. (51 by 152 mm) lumber plates, tightly butted.
- C. **Top Plate** — The double top plate shall consist of two nom 2 by 8 in. (51 by 203 mm) lumber plates or two sets of nom 2 by 6 in. (51 by 152 mm) lumber plates tightly butted. Max diam of opening is 6-1/2 in. (165 mm).
- D. **Gypsum Board\*** — Thickness, type, number or layers and fasteners shall be as specified in individual Wall and Partition Designs.

2. **Through Penetrant** — Nom 6 in. (152 mm) diam (or smaller) by No. 30 MSG (or heavier) steel duct. One steel duct to be installed either concentrically or eccentrically within the firestop system. The annular space within the firestop system shall be a min 0 in. (point contact) to a max 1/2 in. (13 mm). Steel duct to be rigidly supported on both sides of floor-ceiling assembly.

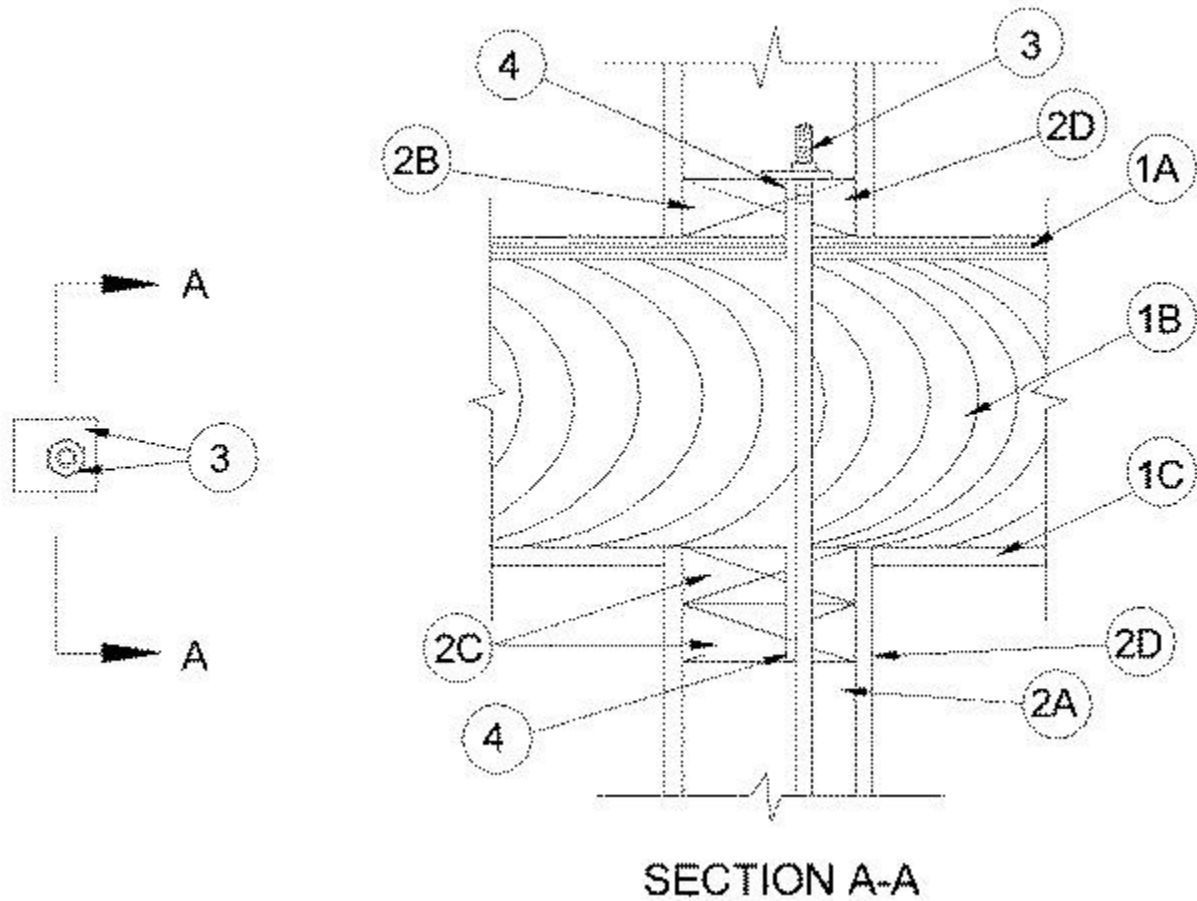
3. **Fill, Void or Cavity Material\*** — **Sealant** — Min 3/4 in. (19 mm) thickness of fill material applied flush with annulus on top surface of floor or sole plate. Min 1/2 in. (13 mm) thickness of fill material applied flush with annulus on bottom surface of ceiling or on bottom surface of lower top plate of chase wall assembly. At point contact, min 3/8 in. (10 mm) diam bead of fill material applied at penetrant/floor or sole plate interface and at penetrant/ceiling or top plate interface.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

**System No. F-C-7084**  
November 20, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1 Hr	F Rating — 1 Hr
T Rating — 1 Hr	FT Rating — 1 Hr
	FH Rating — 1 Hr
	FTH Rating — 1 Hr



**SECTION A-A**

1. **Floor-Ceiling Assembly** — The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as 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 floor opening is 2 in. (51 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 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Gypsum board secured to joists 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 single, double or staggered wood stud/gypsum board chase wall 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) lumber 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) lumber or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 2 in. (51 mm).



C. **Top Plate** — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) lumber plates or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 2 in. (51 mm).

D. **Gypsum Board\*** — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

3. **Through Penetrant** — One min 1/4 in. (6 mm) diam galvanized wire rope to be installed either concentrically or eccentrically within the firestop system. The wire rope shall be coupled to a min 1/2 in. (13 mm) diam to max 1-1/2 in. (38 mm) diam threaded steel rod penetrating the sole plate on the top side of the floor-ceiling assembly or the top side of the top plate at the top of the wall. The annular space shall be 0 in. (point contact) to max 1/2 in. (13 mm). The threaded rod is secured to the sole plate or top plate with a steel nut in conjunction with a min 3 by 3 in. (76 by 76 mm) by 1/4 in. (6 mm) thick steel plate such that the length and width of the plate is min. 2 in. (51 mm) larger than the diameter of opening. Opening in steel plate sized to accommodate nom OD of through penetrant.

4. **Fill, Void or Cavity Material\* - Caulk** — Min 1/2 in. (13 mm) thickness of fill material applied within annulus, flush with top surface of sole plate. Min 1/2 in. (13 mm) thickness of fill material applied within annulus flush with bottom surface of lower top plate.

**SOUDAL ACCUMETRIC** — Boss 816+

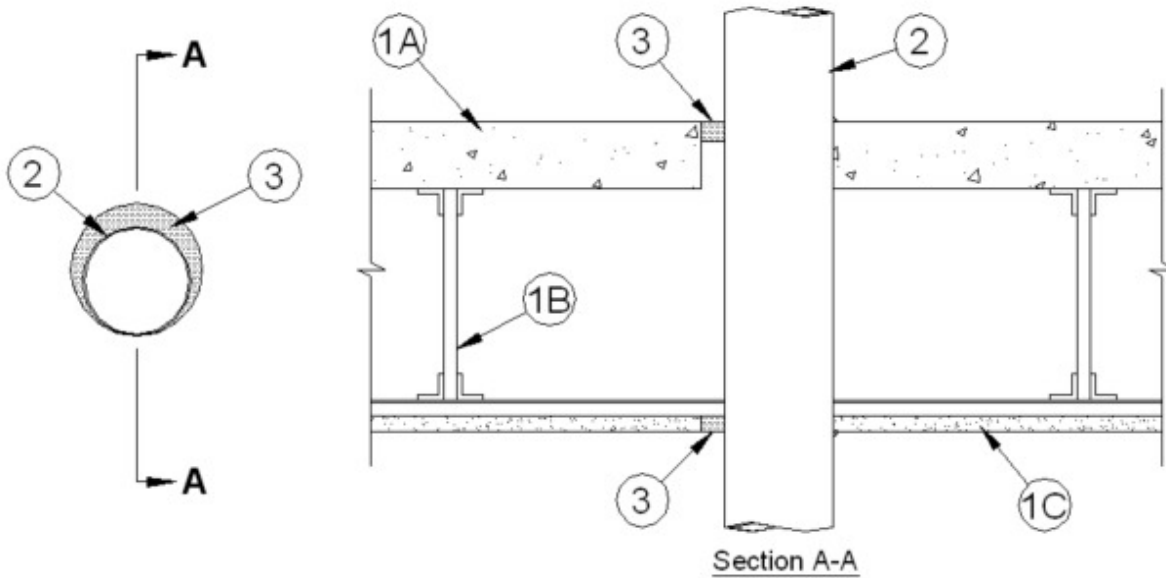
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

## Through-penetration Firestop Systems

System No. F-E-1025

October 27, 2020

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



1. **Floor-Ceiling Assembly** — The 1 hr fire-rated concrete and steel joist Floor-Ceiling assembly shall be constructed of the materials and in the manner described in the individual G500 Series Design in the UL Fire Resistance Directory, as summarized below:

- A. **Concrete Floor** — Normal weight or lightweight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete over metal lath or steel deck as specified in the individual G500 Series Design. Max diam of floor opening is 5 in. (127 mm).
- B. **Joists** — Steel joists or **Structural Steel Members\*** as specified in the individual G500 Series Design.
- C. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick, screw-attached to furring channels as specified in the individual G500 Series Design. Max diam of ceiling opening is 5 in. (127 mm).

2. **Through Penetrant** — One metallic pipe, conduit or tube to be installed either concentrically or eccentrically within the opening. Penetrant to be located approx midway between joists and rigidly supported on both sides of floor-ceiling assembly. The space between pipes, conduits or tubing and periphery of opening is dependent upon the type of penetrant within the firestop system. The following types and sizes of metallic pipe, conduit or tubing may be used:

- A. **Steel Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe. The annular space within the firestop system shall be 0 in. (point contact) to max 1/2 in. (13 mm).
- B. **Iron Pipe** — Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe. The annular space within the firestop system shall be 0 in. (point contact) to max 1/2 in. (13 mm).
- C. **Conduit** — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or rigid galv steel conduit. The annular space within the firestop system shall be 0 in. (point contact) to max 1/2 in. (13 mm).

D. **Copper Tubing** — Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tubing. The annular space within the firestop system shall be 0 in. (point contact) to max 7/8 in. (22 mm).

E. **Copper Pipe** — Nom 3 in. (76 mm) diam (or smaller) Regular (or heavier) copper pipe. The annular space within the firestop system shall be 0 in. (point contact) to max 7/8 in. (22 mm).

3. **Fill, Void or Cavity Materials\*** — **Sealant** — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with top surface of floor. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling. At point contact locations, min 1/4 in. (6 mm) diam bead of fill material applied at penetrant/concrete interface on top surface of floor and penetrant/gypsum board interface on bottom surface of ceiling.

**SUDAL ACCUMETRIC** — Boss 816; BOSS 816+

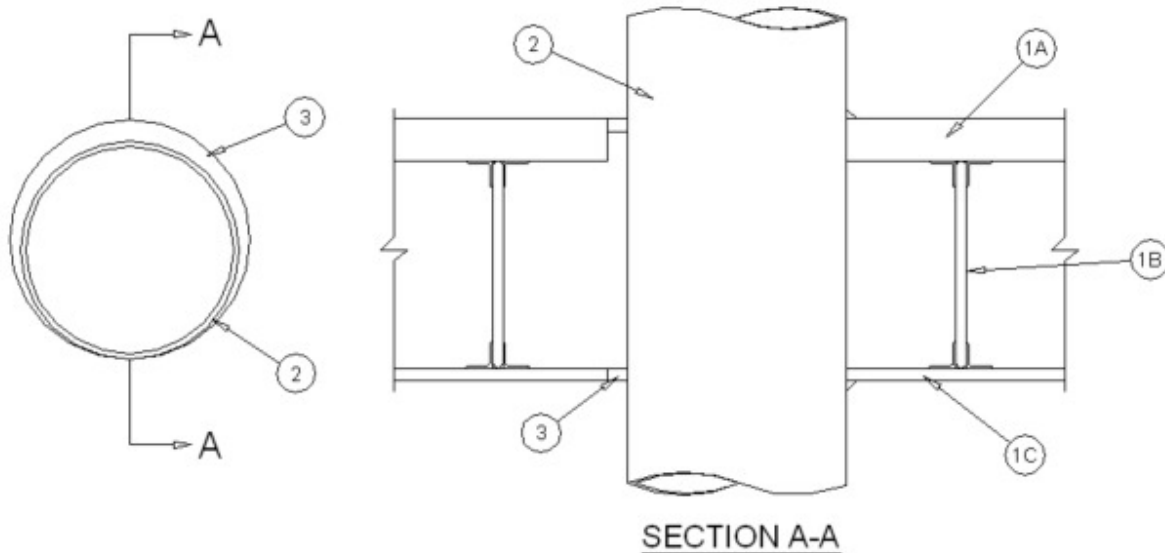
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. F-E-7009

October 27, 2020

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



1. **Floor-Ceiling Assembly** — The 1 hr fire-rated concrete and steel joist Floor-Ceiling assembly shall be constructed of the materials and in the manner described in the individual G500 Series Design in the UL Fire Resistance Directory, as summarized below:

A. **Concrete Floor** — Normal weight or lightweight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete over metal lath or steel deck as specified in the individual G500 Series Design. Max diam of floor opening is 6-1/2 in. (165 mm).

B. **Joists** — Steel joists or **Structural Steel members\*** as specified in the individual G500 Series Design.

C. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick, screw-attached to furring channels as specified in the individual G500 Series Design. Max diam of ceiling opening is 6-1/2 in. (165 mm).

2. **Through Penetrant** — Nom 6 in. (152 mm) diam (or smaller) by No. 30 MSG (or heavier) steel duct. One steel duct to be installed either concentrically or eccentrically within the firestop system. The annular space within the firestop system shall be min 0 in. (point contact) to a max 1/2 in. (13 mm). Steel duct to be located approx midway between joists and rigidly supported on both sides of floor-ceiling assembly.

3. **Fill, Void or Cavity Materials\*** — **Sealant** — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with top surface of floor. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling. At point contact locations, min 1/4 in. (6 mm) diam bead of fill material applied at penetrant/concrete interface on top surface of floor and penetrant/gypsum board interface on bottom surface of ceiling.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

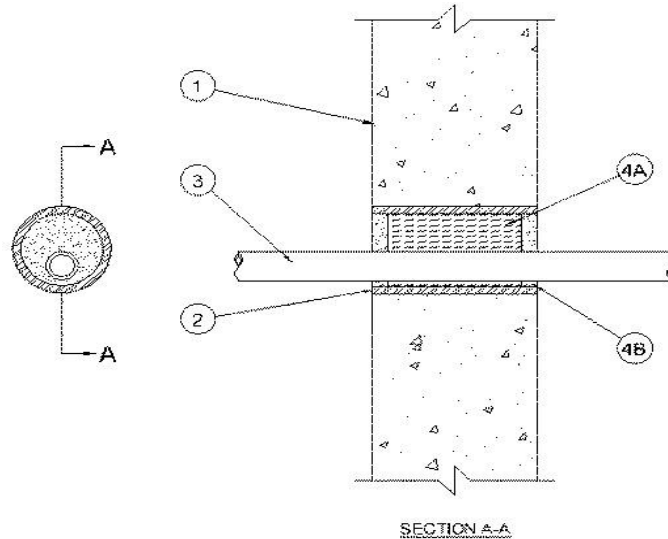
## Through-penetration Firestop Systems

System No. W-J-1132

November 06, 2008

F Rating — 2 Hr

T Rating — 0 Hr



1. **Wall Assembly** — Min 5 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 3 in.

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

2. **Steel Sleeve** — Nom. 3 in diam (or smaller) Schedule 40 (or heavier) steel pipe cast or grouted into wall. Length of steel sleeve to be equal to thickness of wall.

3. **Through Penetrant** — One nom 1-1/4 in. OD (or smaller) flexible steel gas pipe, to be installed concentrically or eccentrically within the firestop system. The annular space shall be min 1/4 in. to max 1-1/8 in. Piping to be rigidly supported on both sides of wall assembly.

### OMEGA FLEX INC

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

A. **Packing Material** — Min 4 in. thickness of min 2.8 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Sealant** — Min 1/2 in. thickness of fill material applied within annulus, flush with both surfaces of wall.

ACCUMETRIC L L C — Boss 814

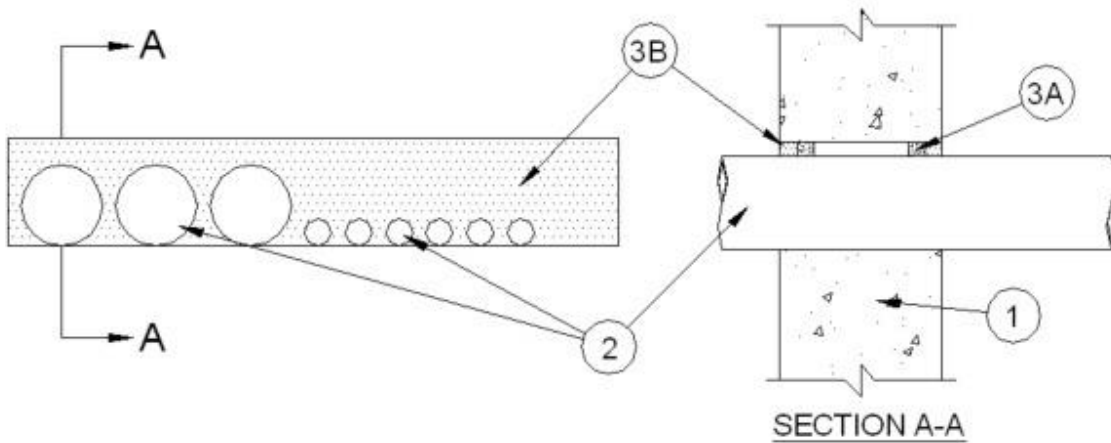
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-1211

October 27, 2020

F Rating – 2 Hr	F Rating -2 Hr
	FH Rating -2 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
	FTH Rating -0 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less than 1 CFM/sq ft
L Rating At 400 F - Less than 1 CFM/sq ft	L Rating At 400 F - Less than 1 CFM/sq ft



1. **Wall Assembly** — Min 6 in. (152 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 area of opening is 90-1/2 sq in. (584 cm<sup>2</sup>) with max dimensions of 22-5/8 in. (575 mm). See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants** — One or more through penetrants to be installed within the opening. Only three through penetrants shall have a nom diam greater than 1 in. (25 mm). The space between the through penetrants shall be a nom 1/2 in. (13 mm). The annular space between through penetrants and periphery of opening shall be min 0 in. (point contact) to max 1/2 in.

(13 mm) for through penetrants having a nom diam greater than 1 in. The annular space between through penetrants and periphery of opening shall be min 0 in. (point contact) to max 2-1/8 in. (54 mm) for through penetrants having a nom diam of 1 in. (25 mm) or less. Through penetrants to be rigidly supported on both sides of wall assembly. The following types and sizes of through penetrants may be used:

A. **Steel Pipe** — Nom 3 in. (76 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe** — Nom 3 in. (76 mm) diam (or smaller) cast or ductile iron pipe.

C. **Conduit** — Nom 3 in. (76 mm) diam (or smaller) steel electrical metallic tubing or galv steel conduit.

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

A. **Forms** — (Optional) — Used to prevent the leakage of fill material during installation. Forms to be rigid sheet material or polyurethane backer rod, cut to fit the contour of the through penetrant and friction fitted into the opening on both sides of wall. Forms to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* — Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At the point contact location between through penetrants and concrete, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the concrete/through penetrant interface on both surfaces of wall.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

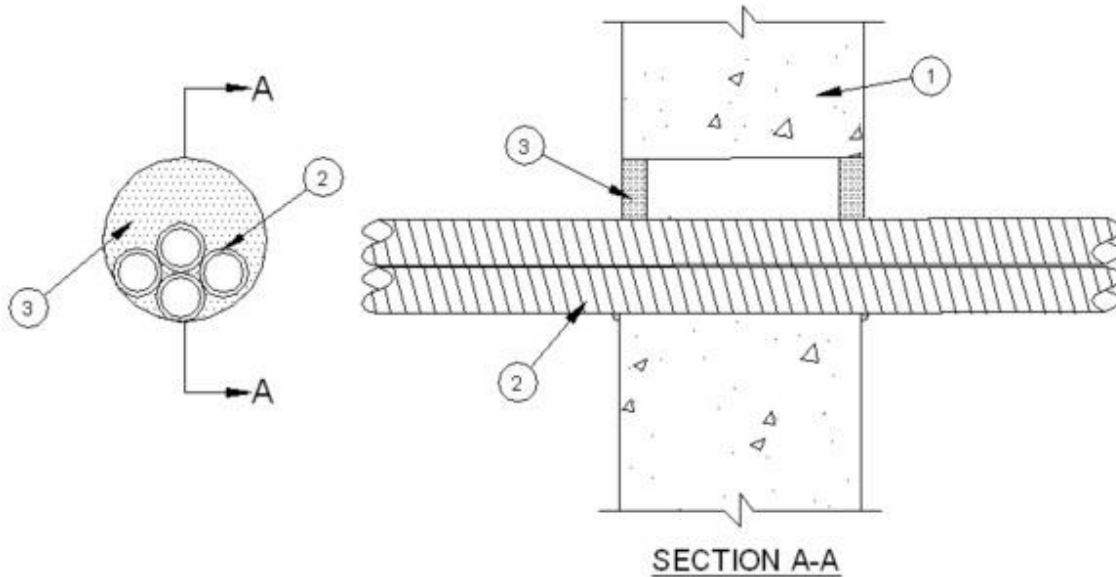
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-1212

October 28, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating – 2 Hr	F Rating -2 Hr
	FH Rating -2 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
	FTH Rating -0 Hr



1. **Wall Assembly** — Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf) (1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 6 in. (152 mm). See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants** — One or more nom 1-1/2 in. (38 mm) diam (or smaller) flexible steel conduits to be installed within the opening. Max diam of through penetrant bundle shall be 4 in. (102 mm). The space between the through penetrants shall be a min of 0 in. (point contact) to a max of 1/4 in. (6 mm). The annular space between the through penetrants and periphery of opening shall be min 0 in. (point contact) to max 2 in. (51 mm). Conduit to be rigidly supported on both sides of wall assembly. See **Flexible Metal Conduit (DXUZ)** category in the Electrical Construction Materials Directory for names of manufacturers.

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

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark



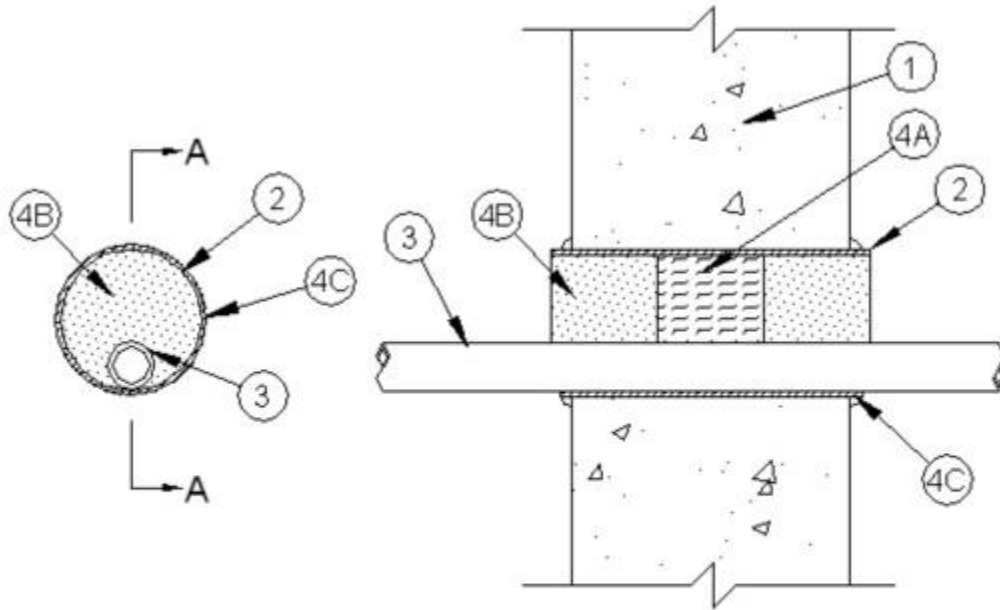
## Through-penetration Firestop Systems

System No. W-J-1213

July 07, 2008

F Rating — 2 Hr

T Rating — 0 Hr



Section A-A

1. **Wall Assembly** — Min 6 in. (152 mm) thick 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 3 in. (76 mm).

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

2. **Metallic Sleeve** — Cylindrical sleeve fabricated from nom 0.034 in. (0.86 mm) thick (or lighter) galv sheet steel and having a min 1/2 in. (13 mm) lap along the longitudinal seam. Length of steel sleeve to be equal to the thickness of the wall plus a min 1/2 in. (13 mm), such that when installed, the ends of the steel sleeve extend a min 1/4 in. (6 mm) to a max 1 in. (25 mm) beyond each surface 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 openings in the concrete.

3. **Through Penetrant** — One metallic pipe, tubing or conduit to be installed concentrically or eccentrically within opening. The annular space between the through penetrant and the periphery of opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). Through penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of through penetrants may be used:

- A. **Steel Pipe** — Nom 3/4 in. (19 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 3/4 in. (19 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Copper Tubing** — Nom 3/4 in. (19 mm) diam (or smaller) Type L (or heavier) copper tube.

- D. **Copper Pipe** — Nom 3/4 in. (19 mm) diam (or smaller) Regular (or heavier) copper pipe.
- E. **Conduit** — Nom 3/4 in. (19 mm) diam (or smaller) electric metallic tubing (EMT) or rigid steel conduit.

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

A. **Packing Material** — Min 2 in. (52 mm) thickness of min 4 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 both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Foam** — Min 2-1/4 in. (57 mm) thickness of fill material applied within the annulus on both sides of mineral wool insulation. Foam installed flush with both ends of steel sleeve.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

C. **Fill, Void or Cavity Material\* - Sealant** — Min 1/4 in. (6 mm) diam bead of fill material applied at the steel sleeve/concrete interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant or Boss 816 Sealant

\*Bearing the UL Classification Mark

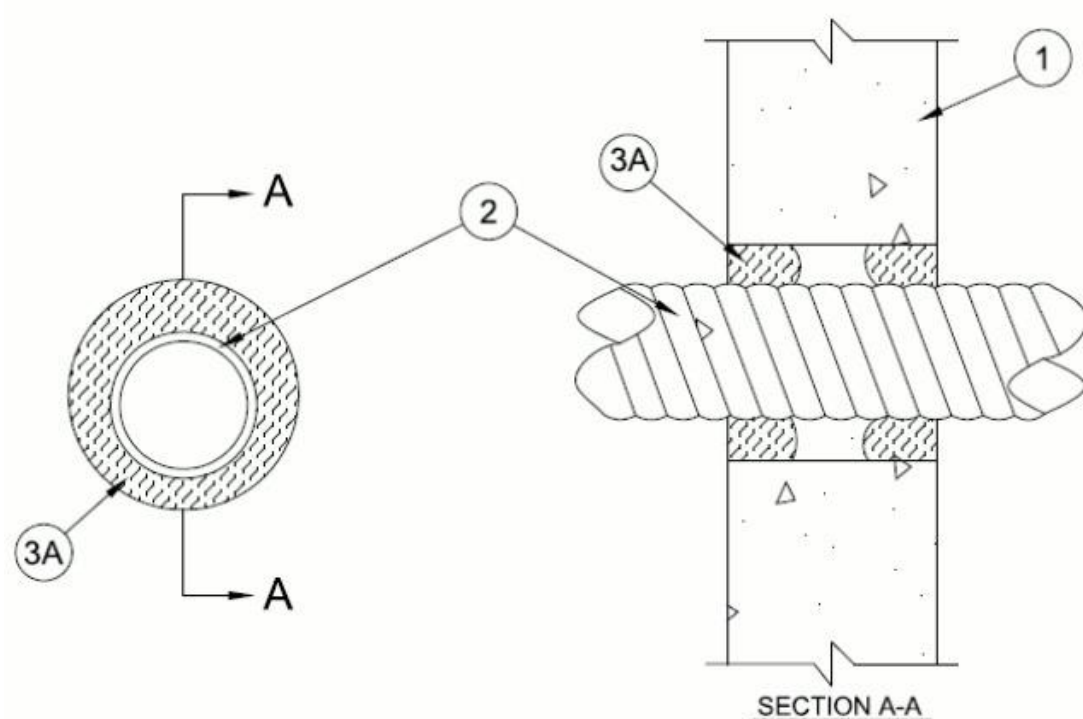
## Through-penetration Firestop Systems

System No. W-J-1235

October 29, 2013

F Rating – 2 Hr

T Rating – 0 Hr



1. **Wall Assembly** — Min 6 in. (152 mm) thick 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 2 in. (51 mm).

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

2. **Through Penetrant** — One penetrant to be installed concentrically within the firestop system. The annular space between the penetrant and the periphery of the opening shall be 1/2 in. (13 mm). Penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of penetrants may be used:

A. **Conduit** — Nom 1 in. (25 mm) diam (or smaller) steel electric metallic tubing (EMT) or rigid steel conduit.

B. **Through-Penetrating Product\*** — Nom 1/2 in. (13 mm) diam (or smaller) steel **Flexible Metal Conduit+** installed in accordance with the National Electrical Code (NFPA No. 70).

### INTERNATIONAL METAL HOSE CO

C. **Through-Penetrating Product\*** — Nom 1 in. (25 mm) diam (or smaller) steel **Flexible Metal Conduit+** installed in accordance with the National Electrical Code (NFPA No. 70).

### AFC CABLE SYSTEMS INC

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

**A. Fill, Void or Cavity Materials\* - Foam** — Min 1-1/4 in. (32 mm) thickness of fill material applied within the annulus between penetrant and concrete, on both sides of wall.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

\*Bearing the UL Classification Mark

+Bearing the UL Listing Mark

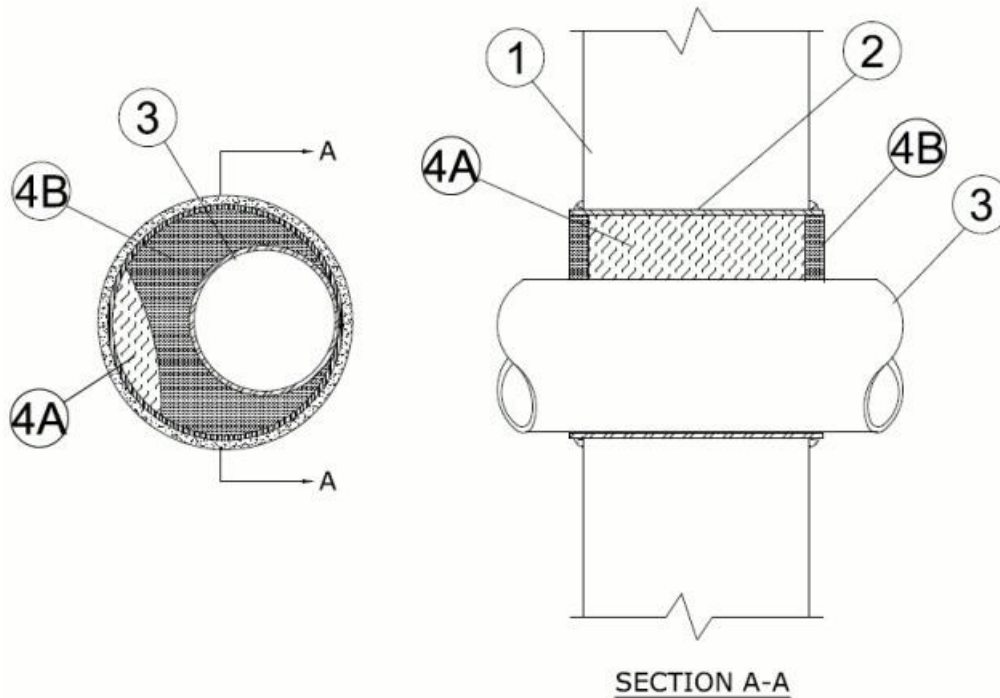
## Through-penetration Firestop System

System No. W-J-1236

November 13, 2013

F-Rating 2 Hr

T-Rating 1/4 Hr



1. **Wall Assembly** — Min 6 in. (152 mm) thick 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 10-3/4 in. (273 mm). **The L Ratings apply when the opening diam does not exceed 3 in. (76 mm).**

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

2. **Metallic Sleeve** — Max 10-3/4 in. (273 mm) diam cylindrical sleeve fabricated from min 28 gauge galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Length of steel sleeve to be equal to the thickness of the wall plus a min 1/2 in. (13 mm), such that when installed, the ends of the steel sleeve extend a min 1/4 in. (6 mm) to a max 1/2 in. (13 mm) beyond each surface 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 cutout in the wall.

3. **Through Penetrant** — One metallic pipe, tubing or conduit to be installed concentrically or eccentrically within opening. The annular space between the through penetrant and the sleeve shall be min 0 in. (point contact) to max 1-3/4 in. (44 mm). Through penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of through penetrants 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. **Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.
- D. **Copper Pipe** — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

E. **Conduit** — Nom 4 in. (102 mm) diam (or smaller) electric metallic tubing (EMT) or nom 6 in.(152 mm) diam (or smaller) rigid steel conduit.

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

A. **Fill, Void or Cavity Materials\*** — **Foam** — Fill material applied to fill the annulus between penetrant and sleeve. Foam to be recessed from both ends of sleeve to accommodate the required thickness of caulk fill material (Item 4B).

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

B. **Fill, Void or Cavity Material\*** — **Caulk** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with both ends of sleeve. Min 3/8 in. (9.5 mm) diam bead of fill material applied at the steel sleeve/wall interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant or Boss 816 Sealant

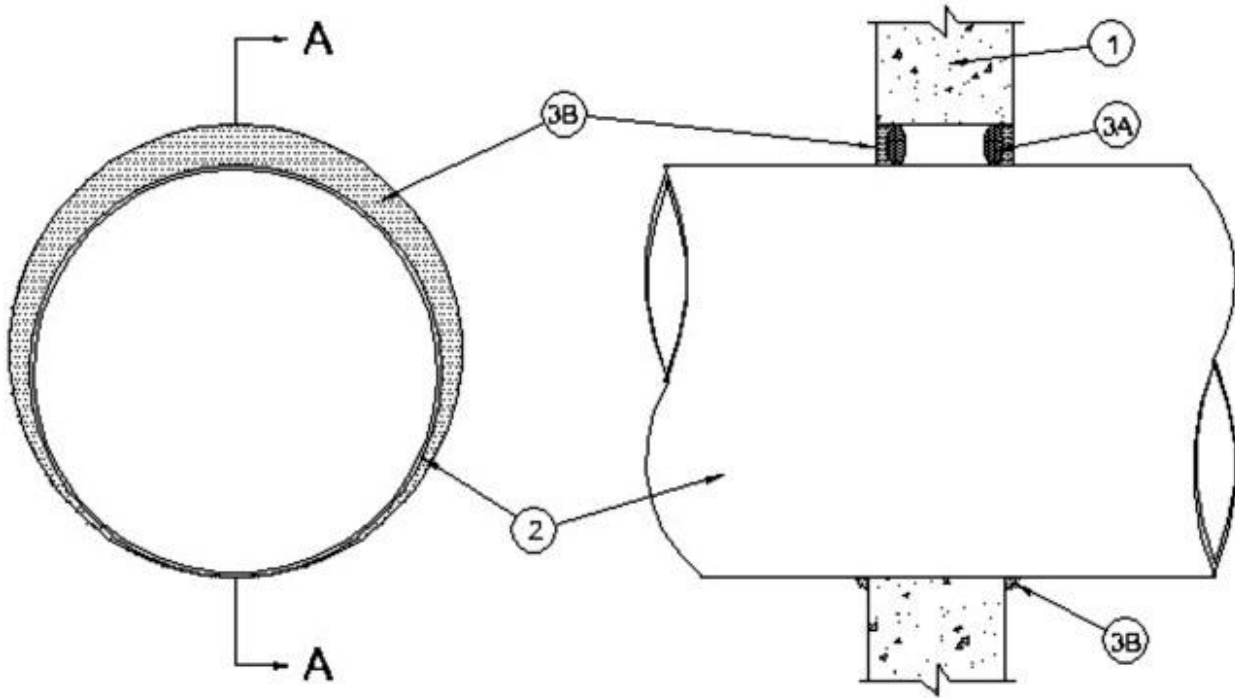
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-1209

October 27, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating - 2 Hr	F Rating -2 Hr
	FH Rating -2 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
	FTH Rating -0 Hr



### SECTION A-A

1. **Wall Assembly** — Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf) (1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Max diam of opening is 26 in. (660 mm). See **Concrete Block (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrant** — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening is dependent upon the type of fill material used as shown in Item 3B. Pipe, conduit or tubing to be rigidly supported on both sides of wall

assembly. The following types and sizes of metallic pipes, conduit or tubing may be used:

- A. **Steel Pipe** — Nom 24 in. (610 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 24 in. (610 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Conduit** — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or nom 6 in. (152 mm) diam (or smaller) steel conduit.
- D. **Copper Tubing** — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
- E. **Copper Pipe** — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

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

- A. **Forms** — Used to prevent the leakage of fill material during installation. Forms to be rigid sheet material or polyurethane backer rod, cut to fit the contour of the through penetrant and friction fitted into the opening on

both sides of wall. Forms to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

**B. Fill, Void or Cavity Material\* — Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At the point contact location between through penetrant and concrete, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the concrete/through penetrant interface on both surfaces of wall. The annular space within the firestop system shall be min 0 in. (point contact) to max 2 in. (51 mm).

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark



## Through-penetration Firestop Systems

System No. W-J-2228

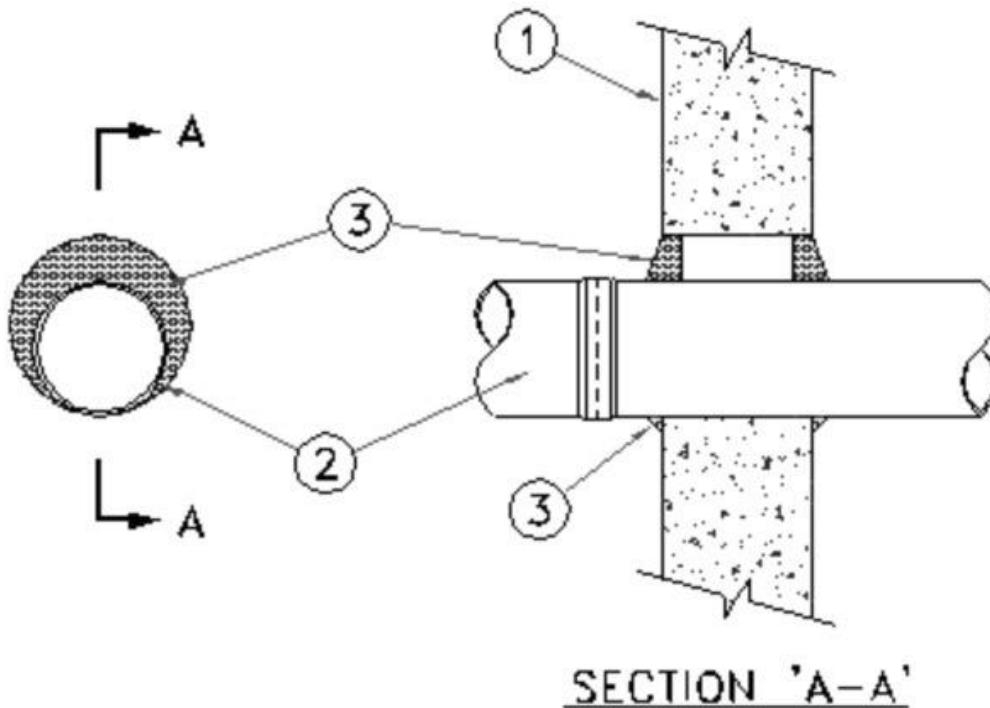
October 28, 2020

F Rating — 2 Hr

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



1. **Wall Assembly** — Min 6 in. (152 mm) thick normal weight or lightweight (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 8 in. (203 mm).

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

2. **Through Penetrating Products\* - Glass Pipe** — Nom 6 in. (152 mm) diam (or smaller) glass pipe installed concentrically or eccentrically in opening, for use in closed (process or supply) or vented (drain, waste or vent) piping systems. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 1-3/8 in. (35 mm). Pipe to be rigidly supported on both sides of wall assembly. Pipe connections to be located min 3 in. (76 mm) from wall surfaces.

### SCHOTT NORTH AMERICA INC

3. **Fill, Void, or Cavity Materials\* - Sealant** — Min thickness of 5/8 in. (16 mm) applied within the annulus between pipe and periphery of the opening, flush with both surfaces of wall assembly. Additional sealant to be applied such that a min 1/4 in. (6 mm) crown is formed around the through penetrant on both surfaces of wall.

**SUDAL ACCUMETRIC** — Boss 816; BOSS 816+

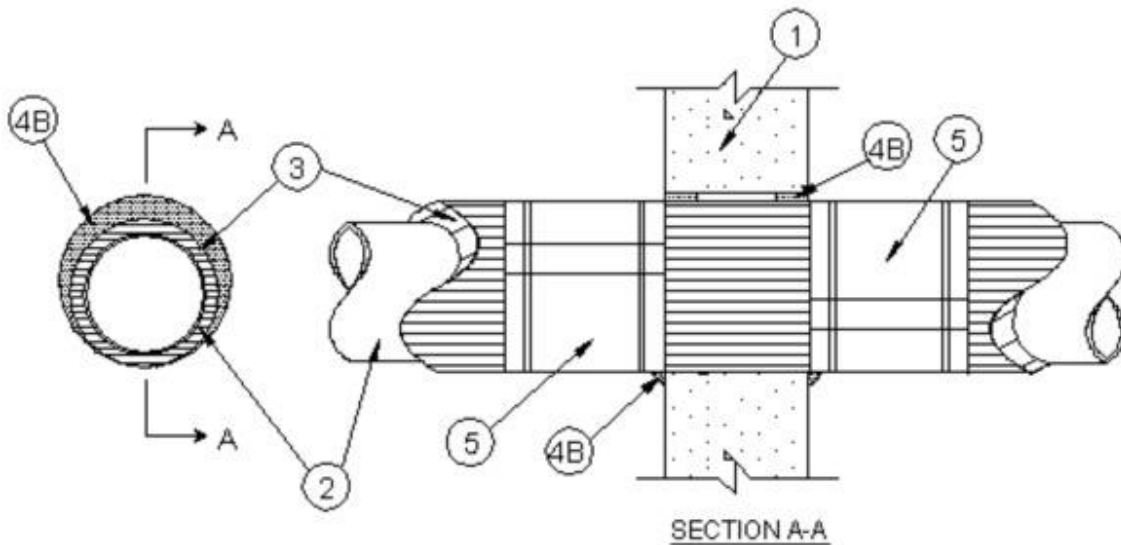
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-5141

October 28, 2020

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



1. **Wall Assembly** — Min 6 in. (152 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 18 in. (457 mm). See **Concrete Block (CAZT)** category in the Fire Resistance Directory for names of manufacturers.
2. **Through Penetrant** — One metallic pipe to be installed either concentrically or eccentrically within the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes may be used:
  - A. **Steel Pipe** — Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
  - B. **Iron Pipe** — Nom 6 in. (152 mm) diam (or smaller) cast or ductile iron pipe.
  - C. **Copper Tubing** — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
3. **Through Penetrating Product\*** — **Cellular Glass Insulation** — Nom 3 in. (76 mm) thick cellular glass units sized to the outside diam of the through-penetrant and supplied in nom 24 in. (610 mm) long half sections or nom 18 in. (457 mm) long segments. Pipe insulation installed on pipe in accordance with the manufacturer's instructions. The annular space between insulated pipe and periphery of opening shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm).

### PITTSBURGH CORNING CORP — FOAMGLAS

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

**B. Fill, Void or Cavity Materials\* — Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus flush with both surfaces of wall.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

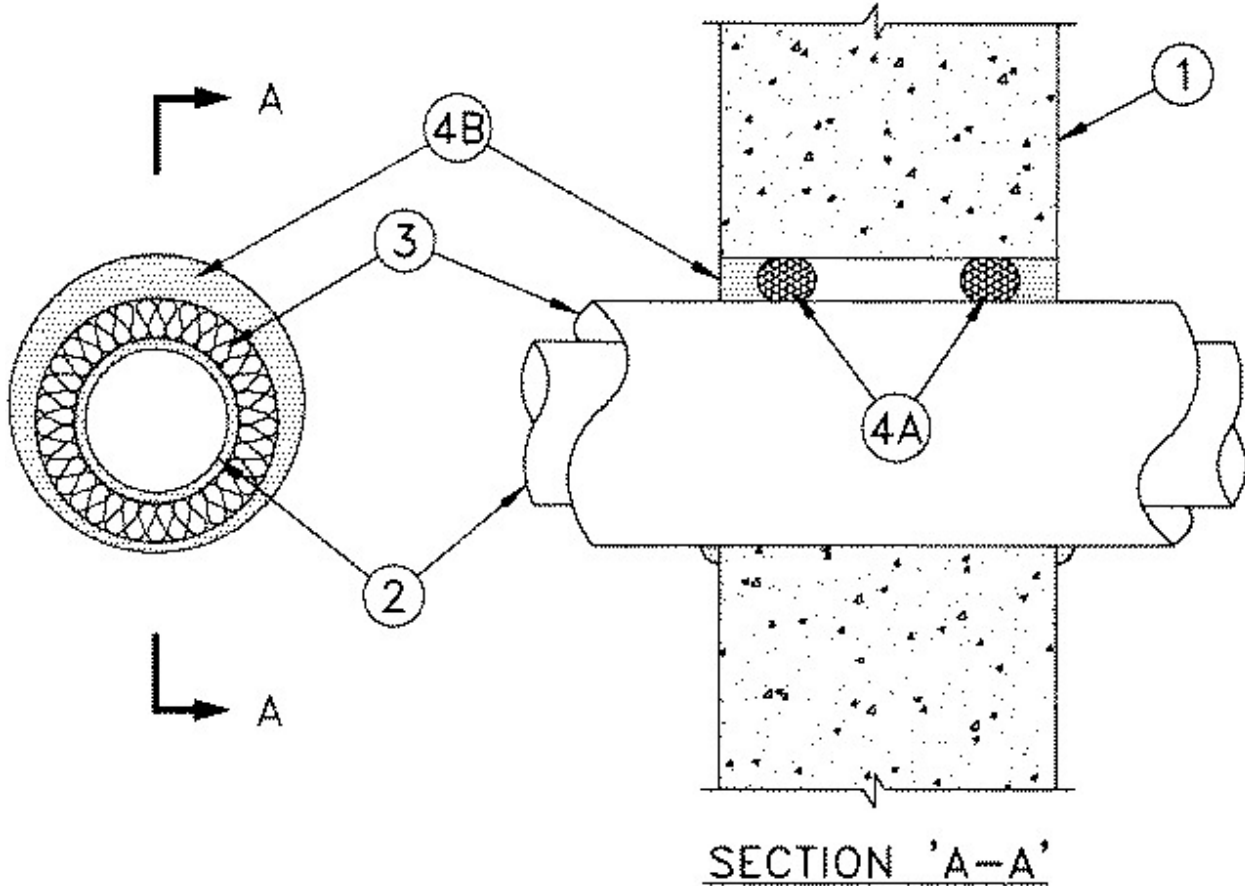
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-5142

October 28, 2020

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



1. **Wall Assembly** — Min 6 in. (152 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 18-5/16 in. (465 mm). The diam of the opening shall be min 1 in. (25 mm) to max 3 in. (76 mm) larger than the outside diam of pipe covering (see Item 3). See **Concrete Blocks (CAZT)** in Volume 1 of the Fire Resistance Directory for names of manufacturers.

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

- A. **Steel Pipe** — Nom 12 in. (305 mm) diam (or smaller) Schedule 30 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Copper Tubing** — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
- D. **Copper Pipe** — Nom 6 in. diam (152 mm) (or smaller) Regular (or heavier) copper pipe.

**The T Rating is 1 hr when copper penetrant is used. The T Rating is 1-1/2 hr when steel or iron penetrant is used.**

3. **Pipe Covering\*** — One of the following types of pipe coverings shall be used:
- A. **Pipe and Equipment Covering Materials\*** — Nom 2 in. (51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m<sup>3</sup>) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or butt tape supplied with the product. The annular space between the insulated through penetrant and the periphery of the opening shall be min 0 in. (0 mm, point contact) to max 1-9/16 in. (40 mm). See **Pipe and Equipment Covering Materials\* (BRGU)** category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
  - B. **Pipe and Equipment Covering Materials\*** — Nom 2 in. (51 mm) thick unfaced mineral fiber pipe insulation having a min density of 3.5 pcf (56 kg/m<sup>3</sup>) and sized to the outside diam of the pipe or tube. Pipe insulation secured with min 18 AWG steel wire spaced 12 in. (305 mm) OC. The annular space between insulated penetrating item and the periphery of the through opening shall be min 0 in. (0 mm, point contact) to max 1-9/16 in. (40 mm).
  - C. **Sheathing Material\*** — Used in conjunction with Item 3B. Foil-scrim-kraft or all service jacket material shall be wrapped around the outer circumference of the pipe insulation (Item 3B) with the kraft side exposed. Longitudinal and transverse joints sealed with metal fasteners or butt tape. See **Sheathing Materials\* (BVDV)** category in the Building Materials Directory for names of manufacturers. Any sheathing material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
4. **Firestop System** — The firestop system shall consist of the following:
- A. **Packing Material** — Nom 1 in. (25 mm) foam backer rod firmly packed into the opening as a permanent form to prevent leakage of fill material during installation. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.
  - B. **Fill, Void or Cavity Material\*- Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with each surface of wall. At point contact location, a min 3/8 in. (10 mm) bead of fill material shall be applied to the wall/pipe covering interface on both surfaces of the wall.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

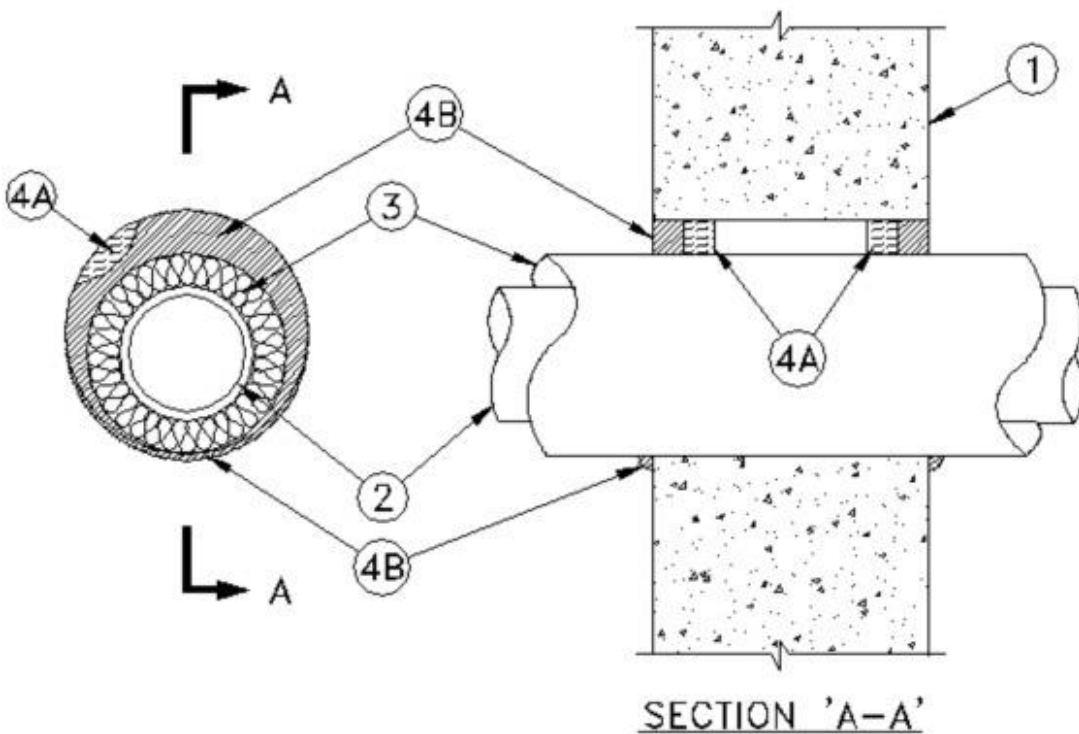
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-5143

October 28, 2020

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



1. **Wall Assembly** — Min 6 in. (152 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 15-1/4 in. (387 mm). The inside diam of the opening shall be min 1 in. (25 mm) larger than the outside diam of the pipe covering (see Item 3). See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

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

- A. **Steel Pipe** — Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Copper Tubing** — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
- D. **Copper Pipe** — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

The max diam of the through penetrant is dependent upon the type of fill material used, as shown in Item 4B.

3. **Tube Insulation — Plastics+** — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated through penetrant and the periphery of the opening shall be a min of 0 in. (0 mm, point contact) to a max 1 in. (25 mm). See **Plastics+** (QMFZ2) category in the Plastics Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL94 Flammability Classification of 94-5VA may be used.

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

A. **Packing Material** — Forms used to prevent leakage of fill material during installation. Forms to be rigid sheet or polyurethane backer rod, cut to fit the contour of the penetrating item and friction fitted into opening on both sides of wall. Forms to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point contact location between insulated through penetrant and periphery of opening, a min 3/8 in. (10 mm) diam bead of fill material shall be applied on both surfaces of wall.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

+Bearing the UL Recognized Component Mark

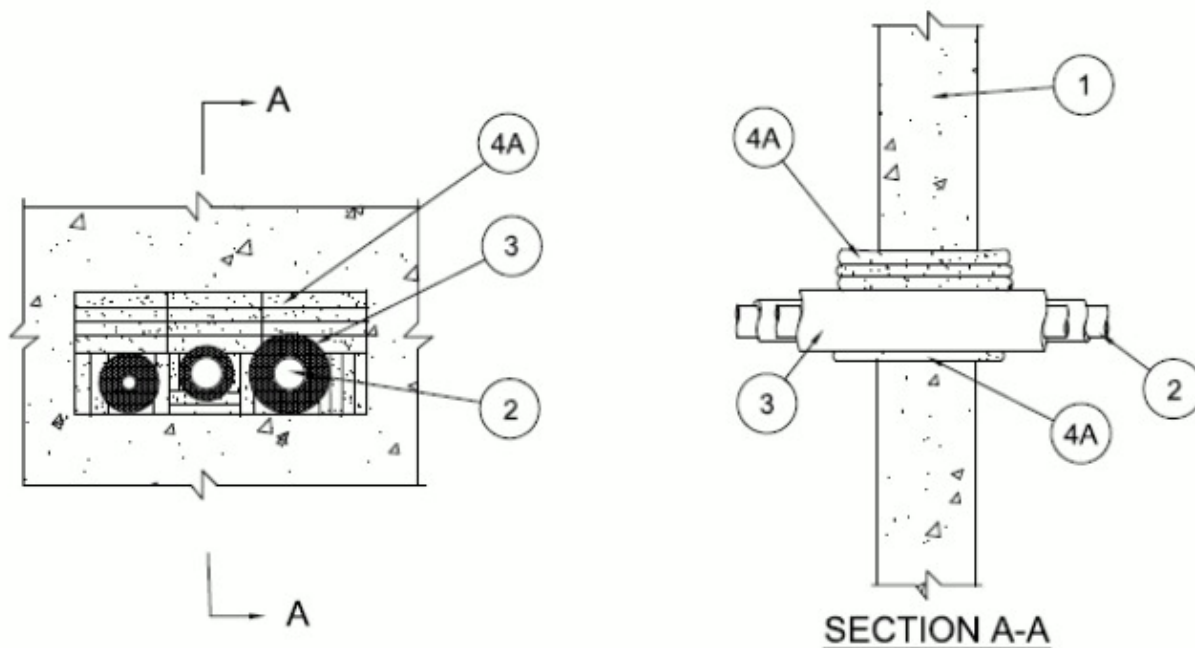


System No. W-J-5209

January 25, 2021

F Rating — 2 Hr

T Rating — 1 Hr



1. **Wall Assembly** — Min 6 in. (152 mm) thick 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 size of opening is 144 in<sup>2</sup> with a max dimension of 18 in. (457 mm). See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Through Penetrants** — Max three tubes installed eccentrically or concentrically within opening. Tubes to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic tubing may be used:
  - A. **Aluminum Tubing** — Reflok 6061-T4 ASTM B210 seamless aluminum tubing for use in closed (process or supply) piping systems. Tubing sizes shall be maximum 2-1/8 in. (54 mm) to minimum 1/4 in. (6 mm) outer diameter (OD) having wall thickness ranging from 0.080 in. (2 mm) to 0.030 in. (0.8 mm) respectively.
3. **Pipe Covering** — The following pipe covering shall be used with each Through Penetrant (Item 2).
  - A. **Tube Insulation-Plastics+** — Min 1/2 in. (13 mm) thick to max 1-1/2 in. (38 mm) thick Aerocel Ethylene Propylene Diene Terpolymer (EPDM) pipe insulation furnished in the form of tubing. The annular space between the insulated penetrants and the edge of the opening shall be min 0 in. (point contact) to max 4 in. (102 mm). The annular space between insulated penetrants shall be min 5/8 in. (16 mm) to max 4 in. (102 mm). See **Plastics+** - (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications of having a UL 94 Flammability Classification of 94-5VA may be used.
4. **Firestop System** — The firestop system shall consist of the following:
  - A. **Fill, Void or Cavity Material\*** — **Pillows** — Max 6 in. (152 mm) long by 9 in. (229 mm) wide by 3 in. (76 mm) thick plastic covered intumescent pillows tightly packed into opening filling annular space between and around penetrants and between penetrants and periphery. Pillows installed with 9 in. (229 mm) dimension projecting through wall and centered within opening.

**SODAL ACCUMETRIC - Boss 808 Firestop Pillows**

**B. Fill, Void or Cavity Material\* - Caulk (Optional)** — After installation of pillows, min 1/4 in. (6 mm) depth of fill material applied to seal any voids between pillows and periphery of opening, between pillows and through penetrants and between pillows on one or both sides of wall.

**SODAL ACCUMETRIC - Boss 816+**

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

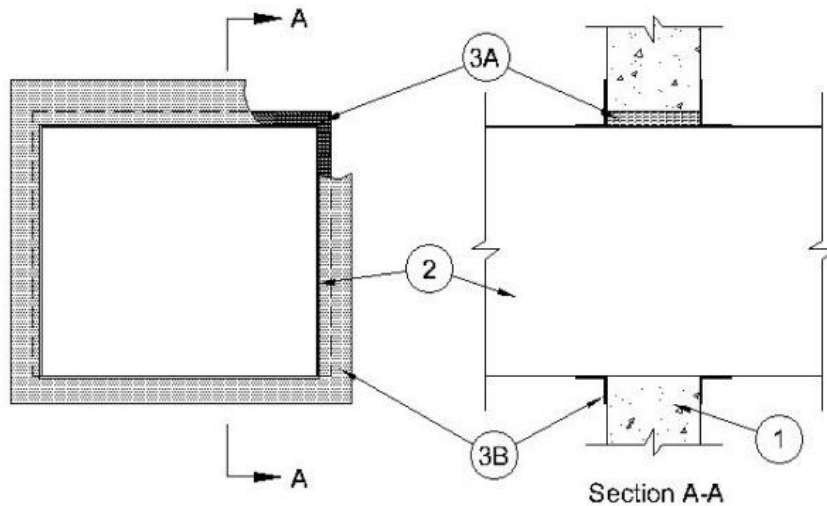
## Through-penetration Firestop Systems

System No. W-J-7090

March 21, 2008

F Rating — 2 Hr

T Rating — 0 Hr



1. **Wall Assembly** — Min 6 in.(152 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 area of opening is 576 sq in.(0.37 m<sup>2</sup>) with a max dimension of 24 in (610mm).

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

2. **Steel Duct** — Max 23 by 23 in. No. 24 gauge (or heavier) steel duct to be installed either concentrically or eccentrically within the opening. The annular space shall be min 0 in. (point contact) to max 1 in. (25 mm). Duct to be rigidly supported on both sides of wall assembly.

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

A. **Packing Material** — Min 6 in.(152 mm) thickness of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form, flush with both surfaces of wall.

B. **Fill Void or Cavity Material\***— **Caulk** — Min 3/16 in. (5 mm) wet thickness of fill material sprayed or brushed to completely cover mineral wool packing material on each side of the wall and to overlap a min of 2 in. onto wall and duct surfaces.

**ACCUMETRIC L L C** — Boss 814 Sealant

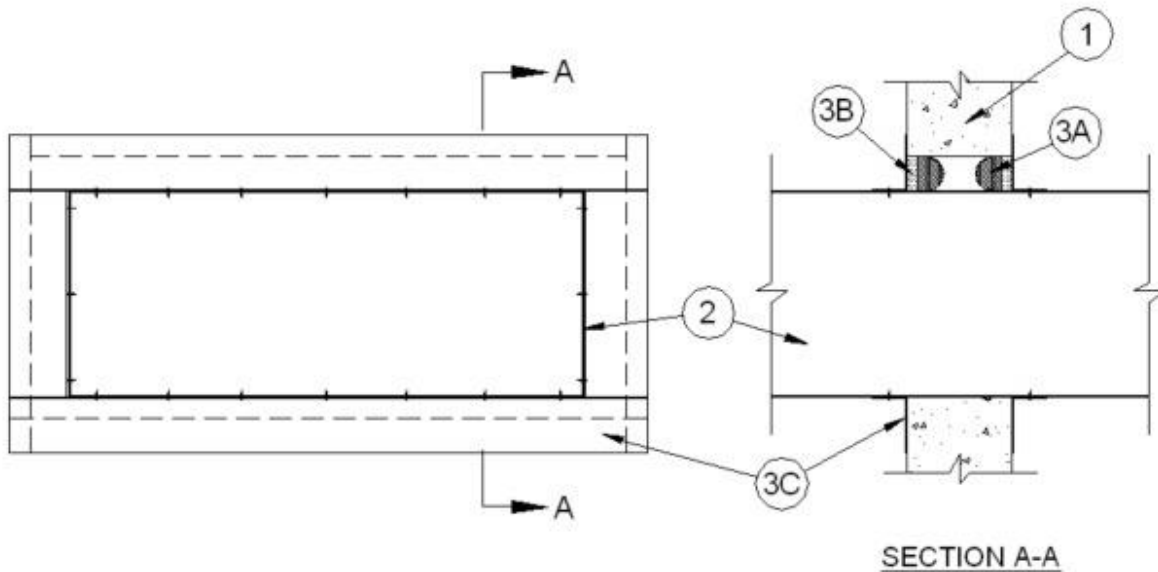
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-7105

October 28, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating – 2 Hr	F Rating -2 Hr
	FH Rating -2 Hr
T Rating - 0 Hr	FT Rating - 0 Hr
	FTH Rating -0 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less than 1 CFM/sq ft
L Rating At 400 F - Less than 1 CFM/sq ft	L Rating At 400 F – Less than 1 CFM/sq ft



1. **Wall Assembly** — Min 6 in. (152 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 size of opening is 1470 sq in. (0.95 m<sup>2</sup>) with a max dimension of 70 in. (1.78 m). See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Steel Duct** — Max 67 by 18 in. (1702 by 457 mm) No. 24 gauge (or heavier) galv steel duct to be installed either concentrically or eccentrically within the firestop system. The space between the steel duct and periphery of opening shall be min 0 in. (point contact) to max 3-1/2 in. (89 mm). Steel duct to be rigidly supported on both sides of the wall assembly.

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

A. **Packing Material** — Polyethylene backer rod, mineral wool batt insulation, fiberglass batt insulation or foam plastic sheets friction fitted into annular space. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material**\* — **Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point contact location between steel duct and concrete, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the concrete/steel duct interface on both surfaces of wall assembly.

**SODAL ACCUMETRIC** — Boss 816; Boss 816+

**C. Steel Retaining Angles** — Min No. 22 gauge galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and lap wall surfaces a min 1-1/2 in. (38 mm). Angles attached to steel duct on both sides of wall with min No. 10 steel sheet metal screws spaced a max of 1 in. (25 mm) from each end of steel duct and spaced a max 6 in. (152 mm) OC.

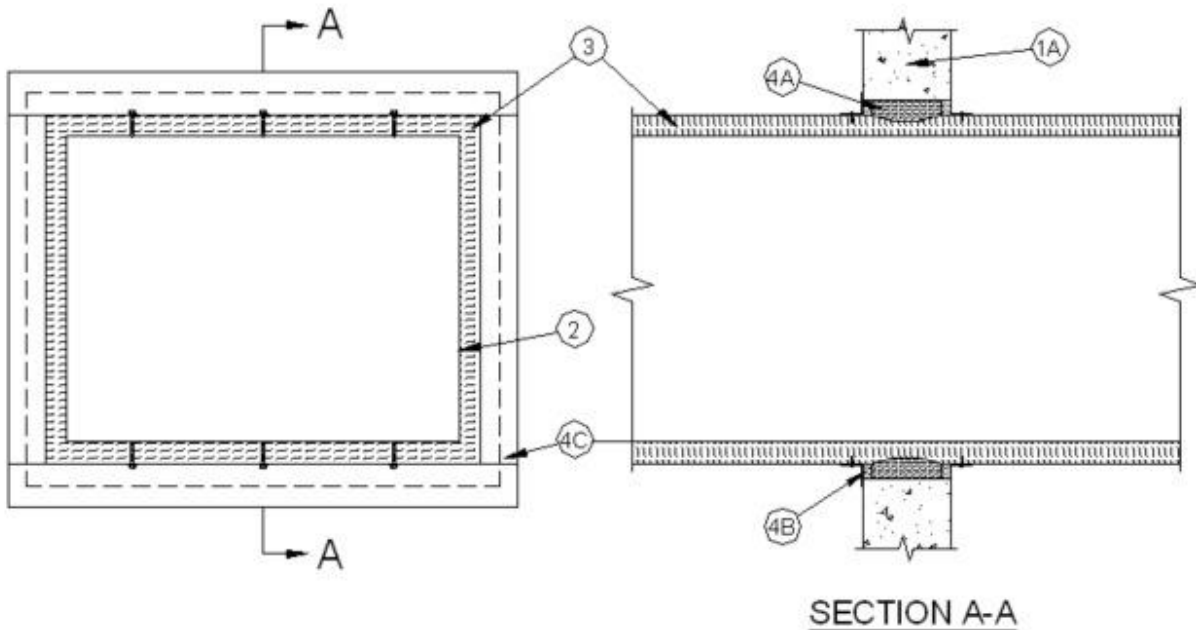
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-7106

October 29, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating – 2 Hr	F Rating -2 Hr
	FH Rating -2 Hr
T Rating – 0 Hr	FT Rating -0 Hr
	FTH Rating -0 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less than 1 CFM/sq ft
L Rating At 400 F - Less than 1 CFM/sq ft	L Rating At 400 F - Less than 1 CFM/sq ft



1. **Wall Assembly** — Min 6 in. (152 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 size of opening is 1050 sq in. (0.68 m<sup>2</sup>) with a max dimension of 35 in. (889 mm). See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Steel Duct** — Max 30 by 24 in. (762 by 610 mm) No. 24 gauge (or heavier) steel duct to be installed eccentrically within the opening. Steel duct to be rigidly supported on both sides of wall assembly.

3. **Batts and Blankets**\* — Max 1-1/2 in. (38 mm) thick glass fiber batt or blanket (min 3/4 pcf or 12 kg/m<sup>3</sup>) jacketed on the outside with a foilscriim-kraft facing. Longitudinal and transverse joints sealed with aluminum foil tape. During the installation of the fill material, the batt or blanket shall be compressed 50% such that the annular space within the firestop system shall be min 1 in. (25 mm) to max 2-3/4 in. (70 mm). See **Batts and Blankets** - (BKNV) category in the Building Materials Directory for names of manufacturers. Any batt or blanket meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index 50 or less may be used.

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

A. **Packing Material** — Min 4-7/8 in. (124 mm) thickness of min 4 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 both surfaces of wall as required to accommodate the required thickness of fill material.

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

**SODAL ACCUMETRIC** — Boss 816; Boss 816+

C. **Steel Retaining Angles** — Min No. 22 gauge galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and lap wall surfaces a min 1-1/2 in. (38 mm). Angles attached to steel duct on both sides of wall with min No. 10 steel sheet metal screws spaced a max of 1 in. (25 mm) from each end of steel duct and spaced a max 6 in. (152 mm) OC.

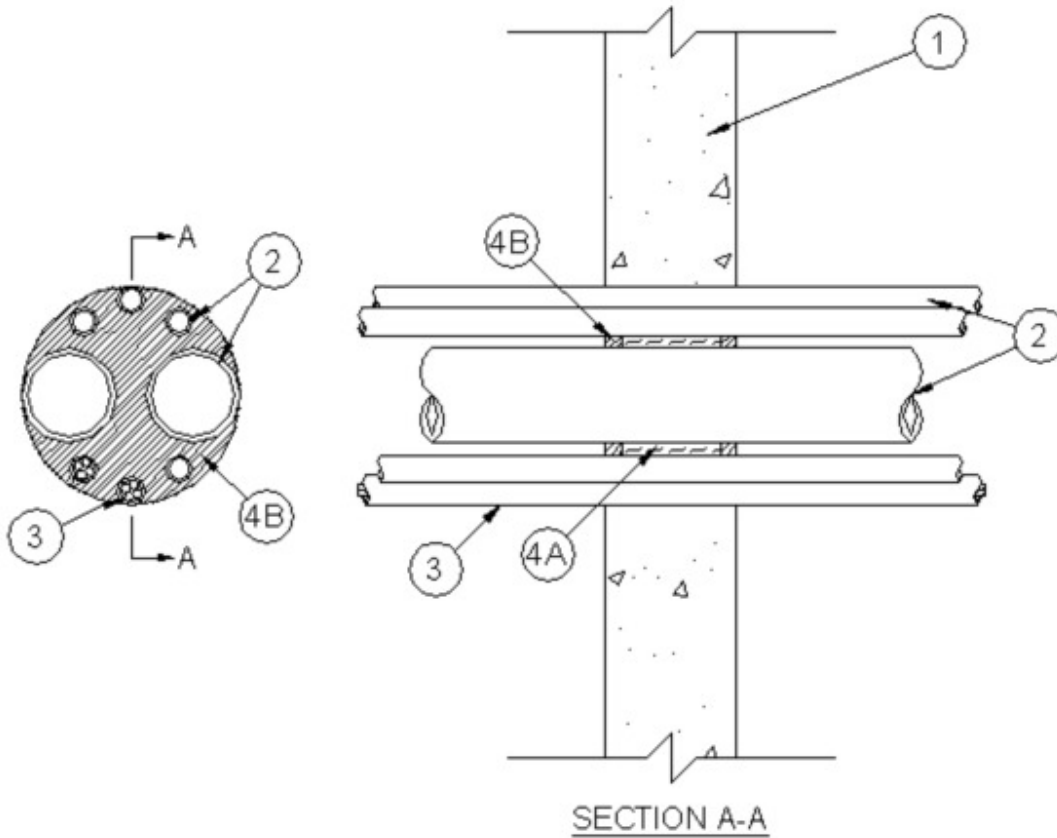
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-8046

October 29, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating – 2 Hr	F Rating -2 Hr
	FH Rating -2 Hr
T Ratings - 0 and 1 Hr (See Items 2 and 3)	FT Ratings - 0 and 1 Hr (See Items 2 and 3)
	FTH Ratings -0 and 1 Hr (See Items 2 and 3)



1. **Wall Assembly** — Min 6 in. (152 mm) thick 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)** in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants** — A max of four 1 in. (25 mm) diam and three 4 in. (102 mm) diam (or smaller) metallic pipes, conduits or tubing to be installed within the firestop system. The annular space between the pipes, conduits or tubing and the periphery of the opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Separation between pipes, conduits or tubing shall be min 1/2 in. (13 mm) to max 1-5/8 in. (156 mm). Pipes, conduits or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of pipes, conduits and tubes 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 steel electrical metallic tubing (EMT).
- D. **Copper Pipe** — Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
- E. **Copper Tube** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.
- F. **Copper Pipe** — Nom 1 in. (25 mm) diam Type K copper pipe.

**When any metallic penetrant is used the T Rating is 0 hr.**

3. **Cables** — Nom 3 in. (76 mm) diam (or smaller) tight bundle of cables. Cable bundle spaced min 1 in. (25 mm) from other penetrants. Annular space between cable bundle and periphery of opening to be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Cable bundle to be rigidly

supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:

- A. Max 400 pair, 24 AWG telephone communication cable with PVC insulation and jacket.
- B. 4/C No. 14 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TEK cable with XLPE insulation.
- C. Max 7/C No. 12 AWG copper conductor power and control cables; XLPE or PVC insulation with XLPE or PVC jacket.
- D. Max RG59/U (or smaller) coaxial cable with fluorinated ethylene insulation and jacketing.
- E. Type RG 59/U coaxial cable with polyethylene (PE) insulation and PVC jacket.

**When cable bundle is used without any metallic penetrant the T Rating is 1 hr.**

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

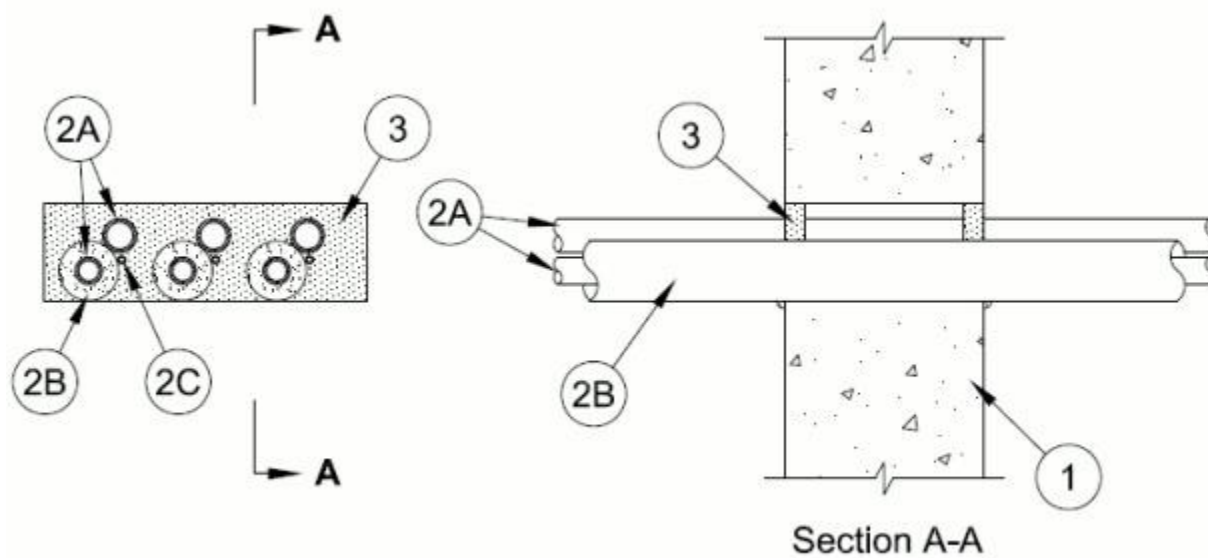
- A. **Packing Material** — Foam plastic backer material or backer rod or mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material. When annular space between penetrants and/or between penetrants and edge of opening is 3/4 in. (19 mm) or less packing material is optional.
- B. **Fill, Void or Cavity Material\*** — **Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact locations, min 1/2 in (13 mm) diam bead of fill material applied at through penetrant/concrete interface on both surfaces of wall.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

**System No. W-J-8085**  
**November 23, 2020**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 3/4 Hr	FT Rating — 3/4 Hr
L Rating at Ambient — Less Than 1 CFM/ft <sup>2</sup>	FH Rating — 2 Hr
L Rating At 400°F — Less Than 1 CFM/ft <sup>2</sup>	FTH Rating — 3/4 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>



1. **Wall Assembly** — Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf) (1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Max area of opening is 30 in. (762 mm) with a max dimension of 10 in. (254 mm). See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

2. **Air Conditioning (AC) Line Set** — One or more AC line sets installed eccentrically or concentrically within opening. Each AC line set consists of two pipes or tubes (Item 2A), tubing insulation (Item 2B) and a thermostat cable (Item 2C). The space between the AC line sets shall be min 1/2 in. to max 3/4 in. (13 mm to max 19 mm). The space between the AC line sets and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm).

2A. **Through Penetrant** — A max of two pipes or tubes to be installed in each AC line set. Of the two pipes or tubes, only one may have a nom diam greater than 1/2 in. (13 mm). Annular space between pipes or tubing and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Pipes or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of through penetrants may be used:

- A. **Steel Pipe** — Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Copper Pipe** — Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
- D. **Copper Tube** — Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tube.

2B. **Tube Insulation - Plastics#** — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on one max 1/2 in. (13 mm) diam pipe or tube in each AC line set. The annular space between the penetrating item and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). The space between the pipes or tubing within each AC line set shall be 0 in. (point contact). See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of

manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

2C. **Cable** — One 4 pair No. 18 AWG (or smaller) thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials may be installed with each AC line set. Cable to be spaced min 0 in. (point contact) to max 1/2 in. (13 mm) from the other penetrants in each line set. The space between the cable and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Cable to be rigidly supported on both sides of wall assembly.

3. **Fill, Void or Cavity Material\* Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied with annulus, flush with both surfaces of wall assembly. At point contact location, min 1/4 in. (6 mm) diam bead of fill material applied at through penetrant/concrete interface on both surfaces of wall. Additional fill material forced into grouped penetrant interstices to max extent possible.

**SODAL ACCUMETRIC** — Boss 816+

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

**# Bearing the UL Recognized Component Marking**

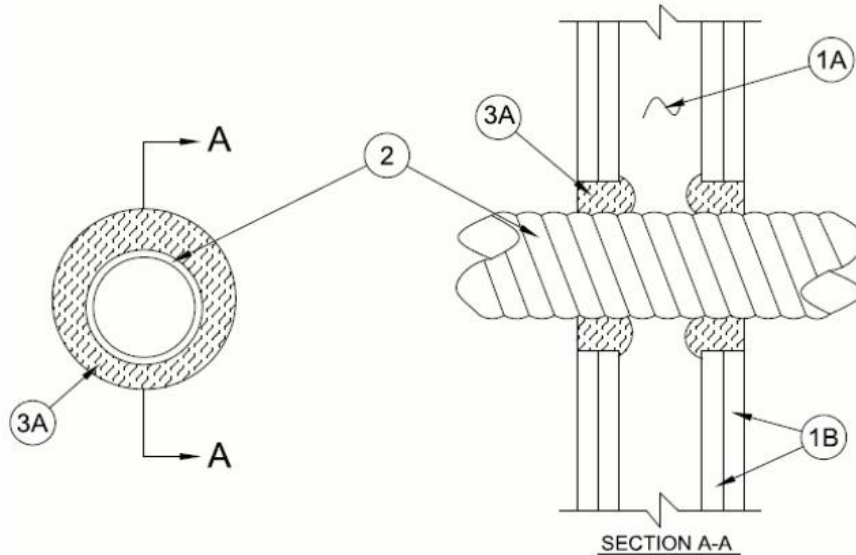
## Through-penetration Firestop Systems

System No. W-L-1485

October 29, 2013

F Rating – 2 Hr

T Rating – 0 Hr



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

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

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick gypsum board. The gypsum board type, number of layers and orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 2 in. (51 mm).

2. **Through Penetrant** — One penetrant to be installed concentrically within the firestop system. The annular space between the penetrant and the periphery of the opening shall be 1/2 in. (13 mm). Penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of penetrants may be used:

A. **Conduit** — Nom 1 in. (25 mm) diam (or smaller) steel electric metallic tubing (EMT) or rigid steel conduit.

B. **Through-Penetrating Product\*** — Nom 1/2 in. (13 mm) diam (or smaller) steel **Flexible Metal Conduit+** installed in accordance with the National Electrical Code (NFPA No. 70).

### INTERNATIONAL METAL HOSE CO

C. **Through Penetrating Product\*** — Nom 1 in. (25 mm) diam (or smaller) steel Flexible Metal Conduit+ installed in accordance with the National Electrical Code (NFPA No. 70).

### AFC CABLE SYSTEMS INC

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

**A. Fill, Void or Cavity Materials\* - Foam** — Min 1-1/4 in. (32 mm) thickness of fill material applied to completely fill the annulus between gypsum board and penetrant on both sides of wall. During installation, foam will mushroom into wall cavity.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

\*Bearing the UL Classification Mark

+Bearing the UL Listing Mark

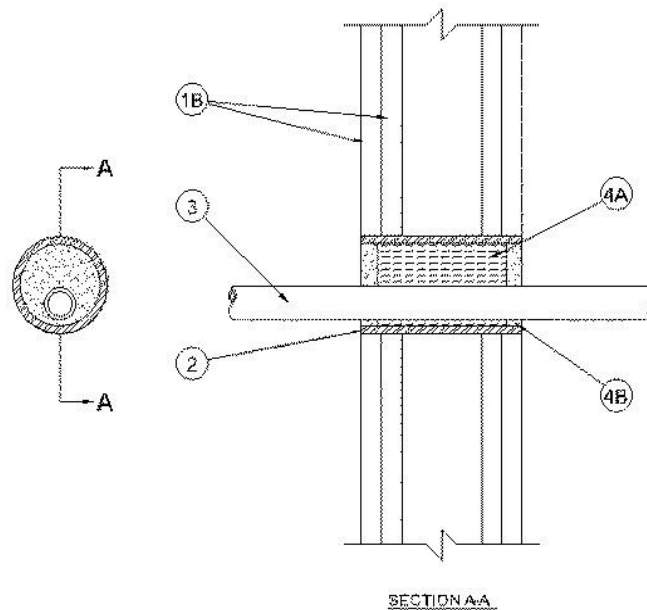
## Through-penetration Firestop Systems

System No. W-L-1307

November 06, 2008

F Rating — 1 and 2 Hr

T Rating — 0 Hr



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

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

B. **Gypsum Board\*** — One or two layers of nom 5/8 in. thick gypsum board as specified in the individual Wall and Partition Design. Max diam of opening is 3 in. **The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.**

2. **Steel Sleeve** — Nom. 3 in diam (or smaller) Schedule 40 (or heavier) steel pipe sleeve friction fit in nom 3 in. diam opening. Length of steel sleeve to be equal to thickness of wall.

3. **Through Penetrant** — One nom 1-1/4 in. diam (or smaller) flexible steel gas pipe, to be installed concentrically or eccentrically within the firestop system. The annular space shall be min 1/4 in. to max 1-1/8 in. Piping to be rigidly supported on both sides of wall assembly.

### OMEGA FLEX INC

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

A. **Packing Material** — Min 4 in. thickness of min 2.8 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill Void or Cavity Materials\* - Sealant** — Min 1/2 in. thickness of fill material applied within annulus, flush with both surfaces of wall.

ACCUMETRIC L L C — Boss 814

\*Bearing the UL Classification Mark

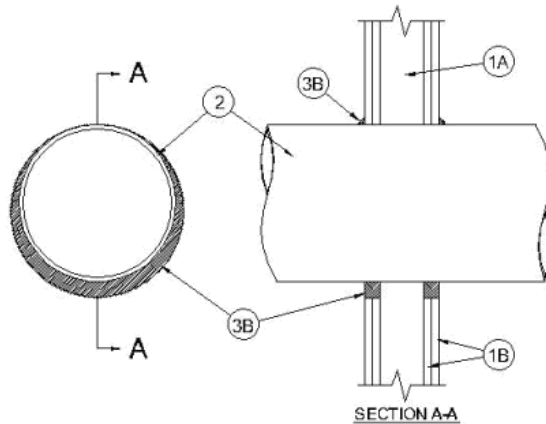
## Through-penetration Firestop Systems

System No. W-L-1409

March 21, 2008

F Ratings — 1 and 2 Hr (See I Item 1)

T Rating — 0 Hr



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

A. **Studs** — Wall framing consists of steel channel studs. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — One or two layers of nom 5/8 in. (16 mm) thick gypsum wallboard as specified in the individual Wall and Partition Design. Max diam of opening is 14 in. (356 mm).

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

A. **Steel Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe. A nom annular space of 0 (point contact) to 1-1/4 in. (32 mm) is required within the firestop system.

B. **Iron Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) cast iron pipe. A nom annular space of 0 (point contact) to 1-1/4 in. (32 mm) is required within the firestop system.

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

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

A. **Packing Material** — (**Optional, Not Shown**) — In 2 hr wall assemblies, foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from each surface of the wall to accommodate the required thickness of fill material.

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

**ACCUMETRIC L L C** — Boss 814 Sealant

\*Bearing the UL Classification Mark

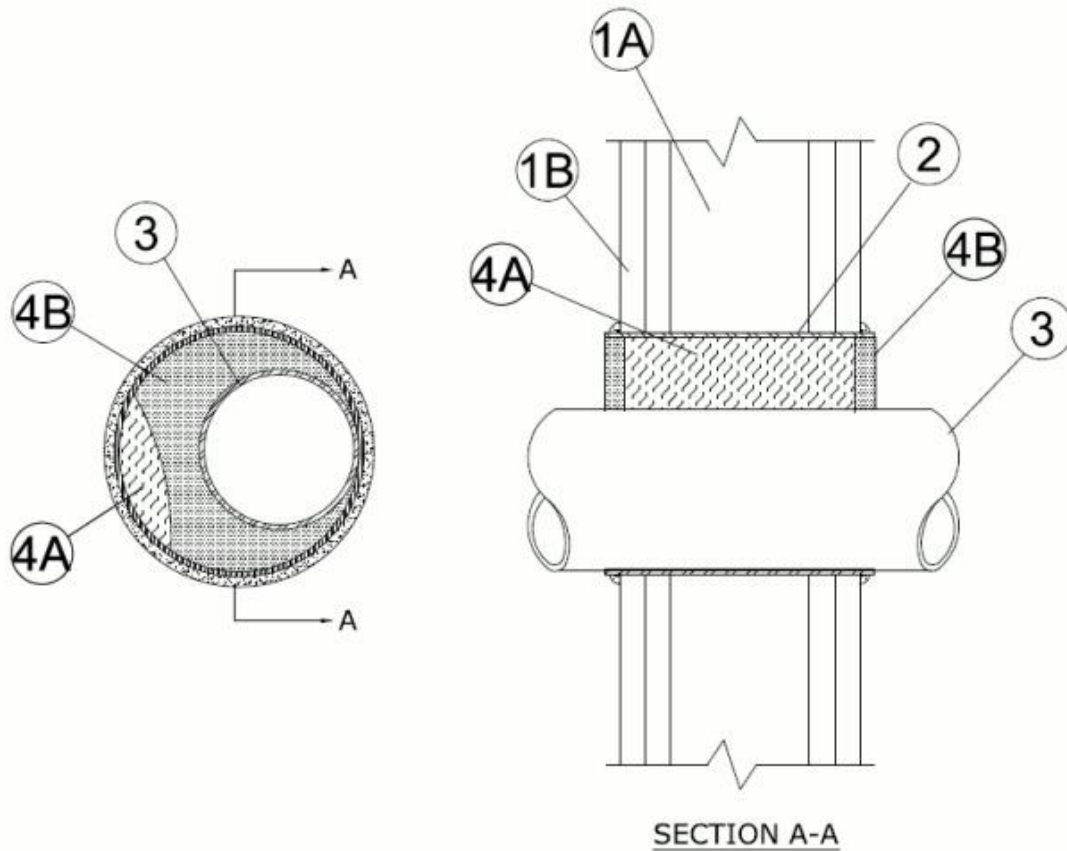
## Through-penetration Firestop Systems

System No. W-L-1484

November 13, 2013

F Rating – 2 Hr

T Rating – 1/4 Hr



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

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

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick gypsum board. The gypsum board type, number of layers and orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 10-3/4 in. (273 mm). The L Ratings apply when the opening diam does not exceed 3 in. (76 mm).

2. **Metallic Sleeve** — Max 10-3/4 in. (273 mm) diam cylindrical sleeve fabricated from min 28 gauge galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Length of steel sleeve to be equal to the thickness of the wall plus a min 1/2 in. (13 mm), such that when installed, the ends of the steel sleeve extend a min 1/4 in. (6 mm) to a max 1/2 in. (13 mm) beyond each surface 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.



3. **Through Penetrant** — One metallic pipe, tubing or conduit to be installed concentrically or eccentrically within opening. The annular space between the through penetrant and the sleeve shall be min 0 in. (point contact) to max 1-3/4 in. (44 mm). Through penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of through penetrants 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. **Copper Tubing** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.
- D. **Copper Pipe** — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
- E. **Conduit** — Nom 4 in. (102 mm) diam (or smaller) electric metallic tubing (EMT) or nom 6 in.(152 mm) diam (or smaller) rigid steel conduit.

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

A. **Fill, Void or Cavity Materials\*** — **Foam** — Fill material applied to fill the annulus between penetrant and sleeve. Foam to be recessed from both ends of sleeve to accommodate the required thickness of caulk fill material (Item 4B).

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

B. **Fill, Void or Cavity Material\*** — **Caulk** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with both ends of sleeve. Min 3/8 in. (9.5 mm) diam bead of fill material applied at the steel sleeve/gypsum board interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant or Boss 816 Sealant

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-1433

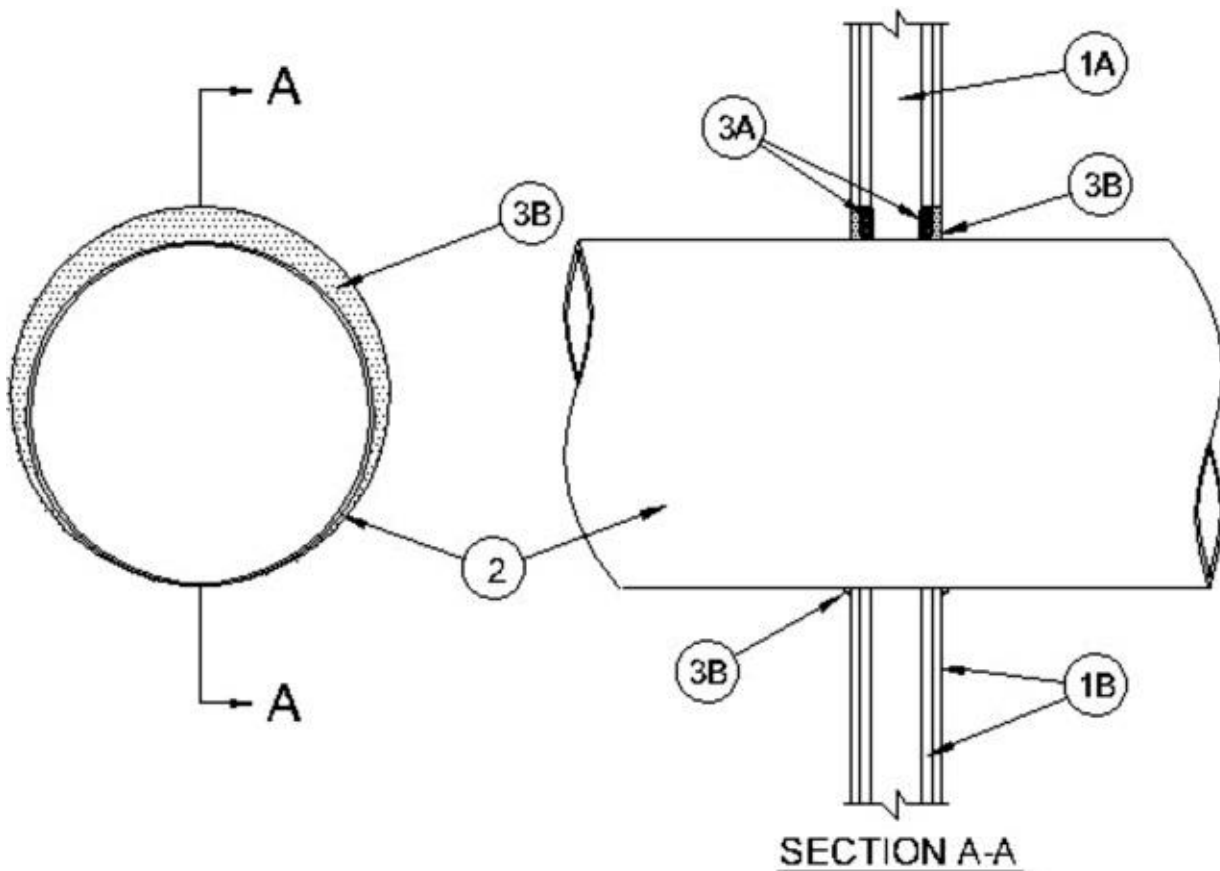
October 29, 2020

F Ratings — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



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

**A. Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. (102 to 152 mm) wider and 4 to 6 in. (102 to 152 mm) higher than the diam of the penetrating item such that,

when the penetrating item is installed in the opening, a 2 to 3 in. (51 to 76 mm) clearance is present between the penetrating item and the framing in all four sides.

**B. Gypsum Board\*** — 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, or U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 26-3/8 in. (670 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

**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 metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space between pipe, conduit or tubing and periphery of opening is dependent upon the type of fill material used as shown in Item 3B. Pipe, conduit or tubing to be rigidly supported on both sides of wall

assembly. The following types and sizes of metallic pipes, conduit or tubing may be used:

**A. Steel Pipe** — Nom 24 in. (610 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

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

**C. Conduit** — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or nom 6 in. diam (or smaller) steel conduit.

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

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

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

**A. Forms** — Use to prevent the leakage of fill material during installation in 2 hr fire-rated assemblies. Forms to be rigid sheet material or polyurethane backer rod, cut to fit the contour of the through penetrant and friction fitted into the opening on both sides of wall. Forms to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

**B. Fill, Void or Cavity Material\* — Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At the point contact location between through penetrant and gypsum board, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the gypsum board/through penetrant interface on both surfaces of wall. The annular space within the firestop system shall be min 0 in. (point contact) to max 2 in. (51 mm).

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

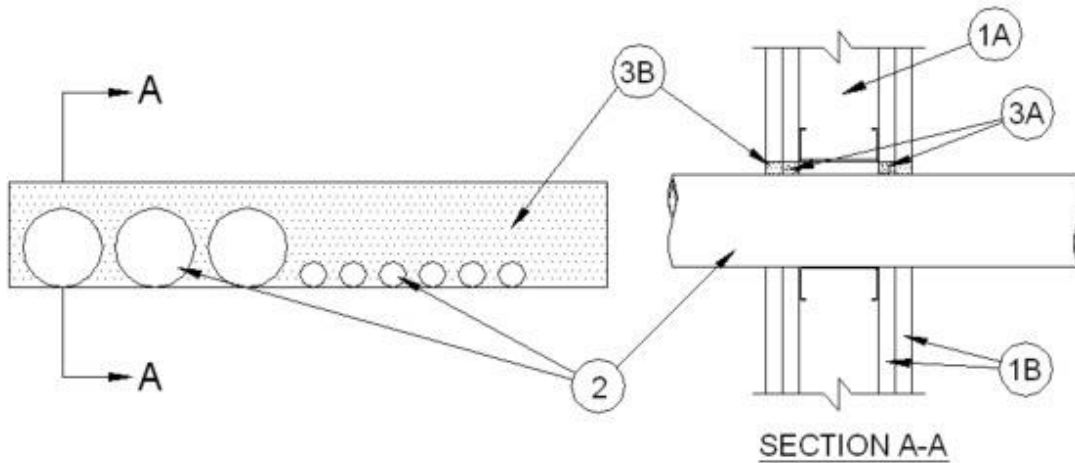
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-1435

October 29, 2020

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



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

A. **Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC. Additional framing members to be installed in stud cavity containing the through penetrants to form a rectangular box around the through penetrants.

B. **Gypsum Board\*** — 8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max area of opening is 90-1/2 sq in. (584 cm<sup>2</sup>) with max dimensions of 22-5/8 in. (575 mm) for steel stud walls. Max area of opening is 58 sq in. (374 cm<sup>2</sup>) with max dimensions of 14-1/2 in. (368 mm) for wood stud walls.

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

2. **Through Penetrants** — One or more through penetrants to be installed within the opening. Only three through penetrants shall have a nom diam greater than 1 in. (25 mm). The space between the through penetrants shall be a nom 1/2 in. (13 mm). The annular space between through penetrants and periphery of opening shall be min 0 in. (point contact) to max 1/2 in.

(13 mm) for through penetrants having a nom diam greater than 1 in. (25 mm). The annular space between through penetrants and periphery of opening shall be min 0 in. (point contact) to max 2-7/8 in. (73 mm) for through penetrants

having a nom diam 1 in. (25 mm) or less. The through penetrants to be rigidly supported on both sides of wall assembly. The following types and sizes of through penetrants may be used:

A. **Steel Pipe** — Nom 3 in. (76 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe** — Nom 3 in. (76 mm) diam (or smaller) cast or ductile iron pipe.

C. **Conduit** — Nom 3 in. (76 mm) diam (or smaller) steel electrical metallic tubing or galv steel conduit.

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

A. **Forms** — (Optional) Used to prevent the leakage of fill material during installation in 2 hr fire-rated assemblies. Forms to be rigid sheet material or polyurethane backer rod, cut to fit the contour of the through penetrant and friction fitted into the opening on both sides of wall. Forms to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

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

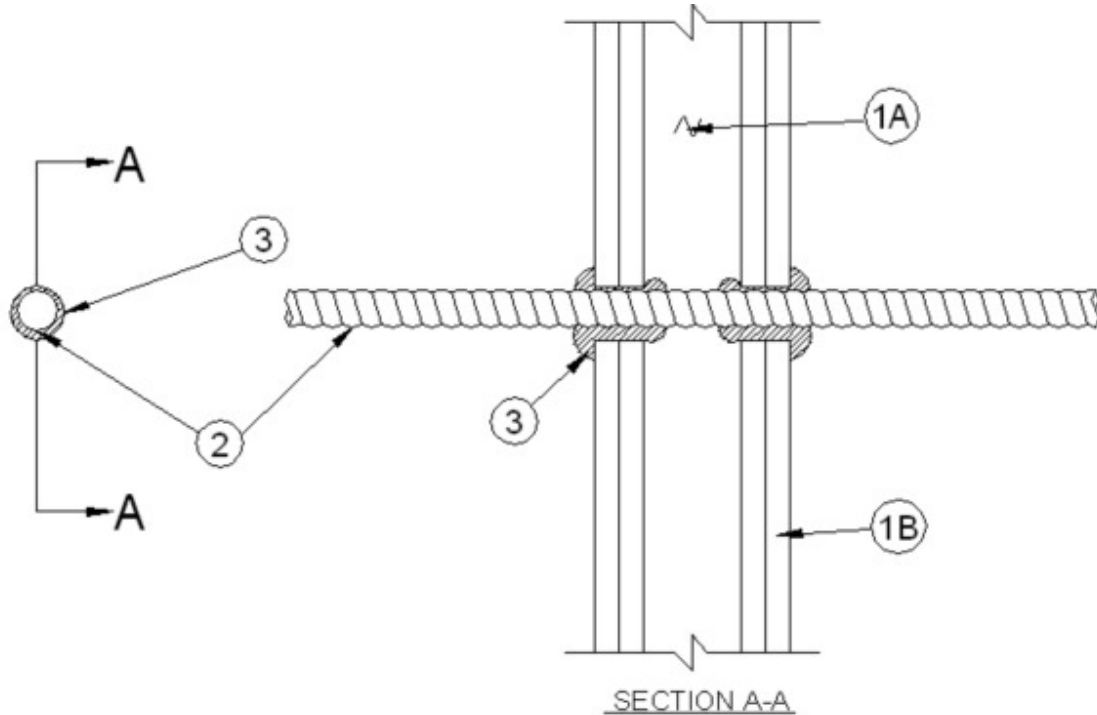
**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

### System No. W-L-1436

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



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

A. **Studs** — Wall framing 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 in.) wide and spaced max 24 in. (610 mm) OC.

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 1-3/8 in. (35 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-Penetrating Product\*** — Nom 1/2 in. (13 mm) diam (or smaller) aluminum or steel Flexible Metal Conduit+ installed in accordance with the National Electrical Code (NFPA No. 70). The annular space shall be min 1/8 in. (3.2 mm) to a max 1/4 in. (6 m). Conduit to be rigidly supported on both sides of wall assembly.

**INTERNATIONAL METAL HOSE CO**

**3. Fill, Void or Cavity Material\* — Sealant** — Fill material applied to completely fill the annular space between the through-penetrating product and the periphery of the opening to max extent possible. In 2 hr fire-rated assemblies, additional fill material to be installed such that a min 3/8 in. (10 mm) crown is formed around the penetrating item and lapping 1/2 in. (13 mm) beyond the periphery of the opening. In 1 hr fire-rated assemblies, additional fill material to be installed such that a min 1 in. (25 mm) crown is formed around the penetrating item and lapping a min 1/2 in. (13 mm) beyond the periphery of the opening.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

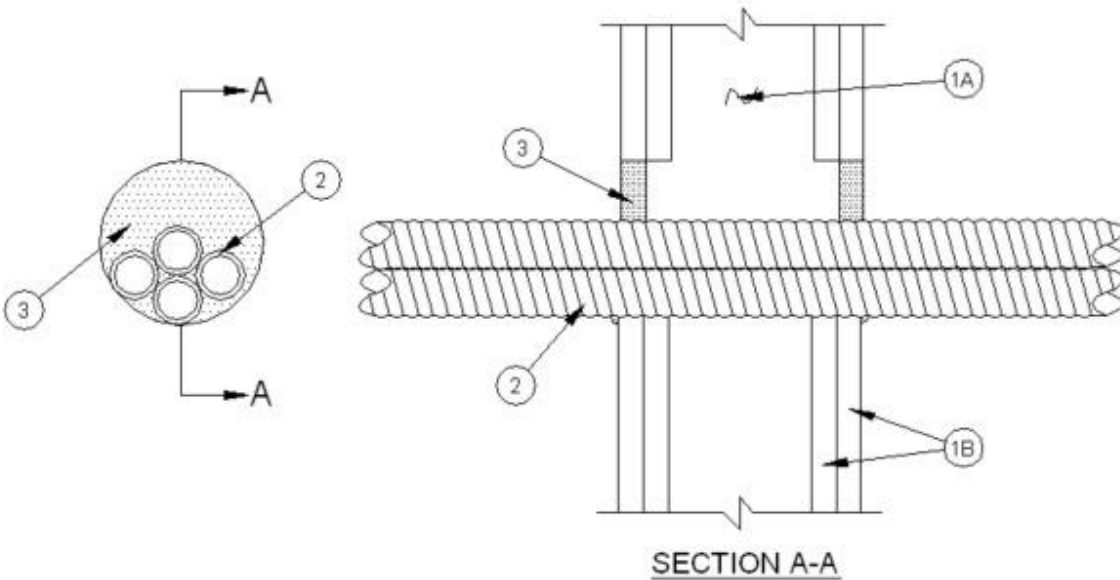
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-1437

July 07, 2008

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



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

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

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

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

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



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

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

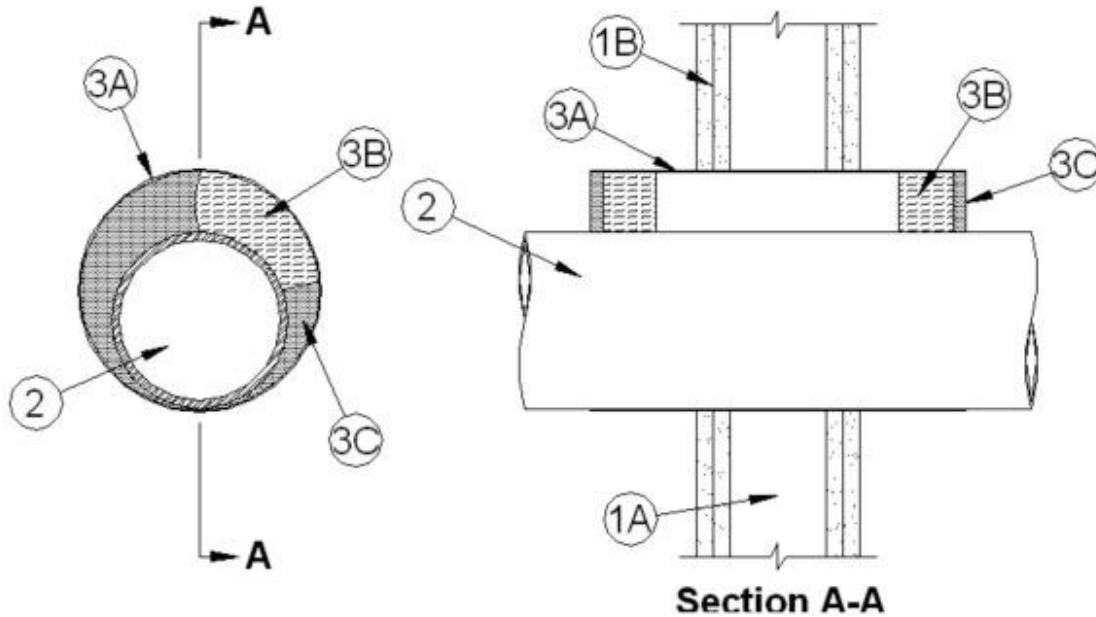
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-1438

October 29, 2020

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



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

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

**B. Gypsum Board\*** — Min 5/8 in. (16 mm) thick. Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 26-3/8 in. (670 mm). Max diam of opening is 14-1/2 in. (368 mm) when wood studs are used.

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

**2. Through Penetrants** — One metallic pipe, conduit or tube installed concentrically or eccentrically within the firestop system. Annular space to be min 0 in. (point contact) to max 2 in. (51 mm). Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:

**A. Steel Pipe** — Nom 24 in. (610 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

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

**C. Conduit** — Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) electrical metallic tubing (EMT) or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.

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

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

**A. Metallic Sleeve** — A steel sleeve consisting of Schedule 5 (or heavier) steel pipe, rigid steel conduit or EMT friction-fitted into wall assembly flush with or extending a max 4 in. (102 mm) beyond each surface of the wall assembly.

**A1. Metallic Sleeve** — As an alternate to Item 3A, Cylindrical sleeve fabricated from min 0.018 in. (0.46 mm) thick (28 gauge) galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Sheet steel coiled to a diam less than circular cutouts in wall assembly, inserted through both sides of wall and allowed to uncoil against the circular cutouts in the wall assembly. Sleeve to be installed flush with or extending max 4 in. (102 mm) beyond each surface of the wall assembly.

**B. Packing Material** — Min 2 in. (51 mm) thickness of nom 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation tightly-packed into ends of steel sleeve and recessed as required to accommodate required thickness of fill material (Item 3C).

**C. Fill, Void or Cavity Materials\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annular space flush with edges of steel sleeve on both sides of the wall assembly. Nom 3/8 in. (10 mm) diam bead of fill material to be applied at the point contact location between the metallic penetrant and the steel sleeve. Additional nom 3/8 in. (10 mm) diam bead of fill material applied at the steel sleeve/gypsum board interface when sleeve projects beyond the surface of the wall assembly.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

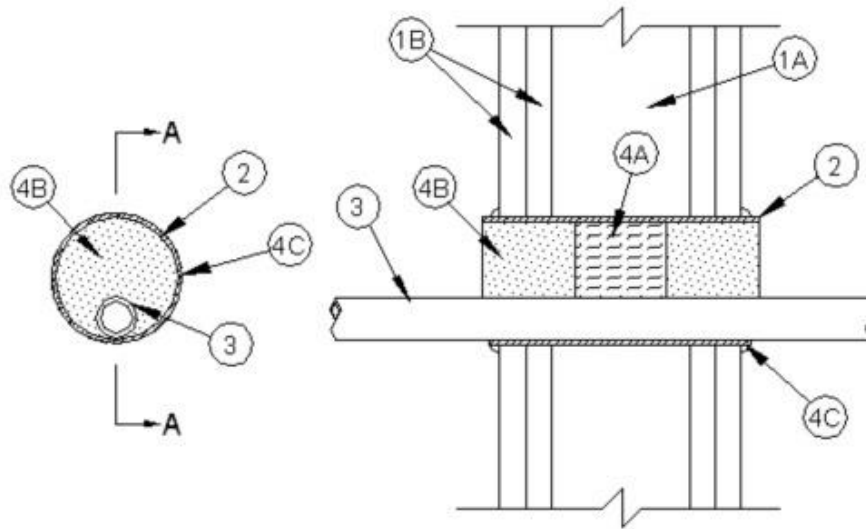
## Through-penetration Firestop Systems

System No. W-L-1439

November 13, 2013

F Ratings — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr



Section A-A

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

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

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick gypsum board. Max diam of opening shall be 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. **Metallic Sleeve** — Cylindrical sleeve fabricated from nom 0.034 in. (0.86 mm) thick (or lighter) galv sheet steel and having a min 1/2 in. (13 mm) lap along the longitudinal seam. In 2 hr wall assemblies, length of steel sleeve to be equal to the thickness of the wall plus a min 1/2 in. (13 mm), such that when installed, the ends of the steel sleeve extend a min 1/4 in. (6 mm) to a max 1 in. (25 mm) beyond each surface of the wall. In 1 hr wall assemblies, length of steel sleeve to be equal to the thickness of the wall plus a nom 2 in. (51 mm), such that when installed, the ends of the steel sleeve extend a nom 1 in. (22 mm) beyond each surface 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.

3. **Through Penetrant** — One metallic pipe, tubing or conduit to be installed concentrically or eccentrically within opening. The annular space between the through penetrant and the periphery of opening shall be min 0 in. (0 mm, point

contact) to max 2 in. (51 mm). Through penetrant to be rigidly supported on both sides of wall assembly. The following types and sizes of through penetrants may be used:

- A. **Steel Pipe** — Nom 3/4 in. (19 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 3/4 in. (19 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Copper Tubing** — Nom 3/4 in. (19 mm) diam (or smaller) Type L (or heavier) copper tube.
- D. **Copper Pipe** — Nom 3/4 in. (19 mm) diam (or smaller) Regular (or heavier) copper pipe.
- E. **Conduit** — Nom 3/4 in. (19 mm) diam (or smaller) electric metallic tubing (EMT) or rigid steel conduit.

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

A. **Packing Material** — Min 2-1/8 in. (54 mm) thickness of min 4 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 both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Foam** — Min 2-1/4 in. (57 mm) thickness of fill material applied within the annulus on both sides of mineral wool insulation. Foam installed flush with both ends of steel sleeve.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

C. **Fill, Void or Cavity Material\* - Sealant** — Min 1/4 in. (6 mm) diam bead of fill material applied at the steel sleeve/gypsum board interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant or Boss 816 Sealant

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-2536

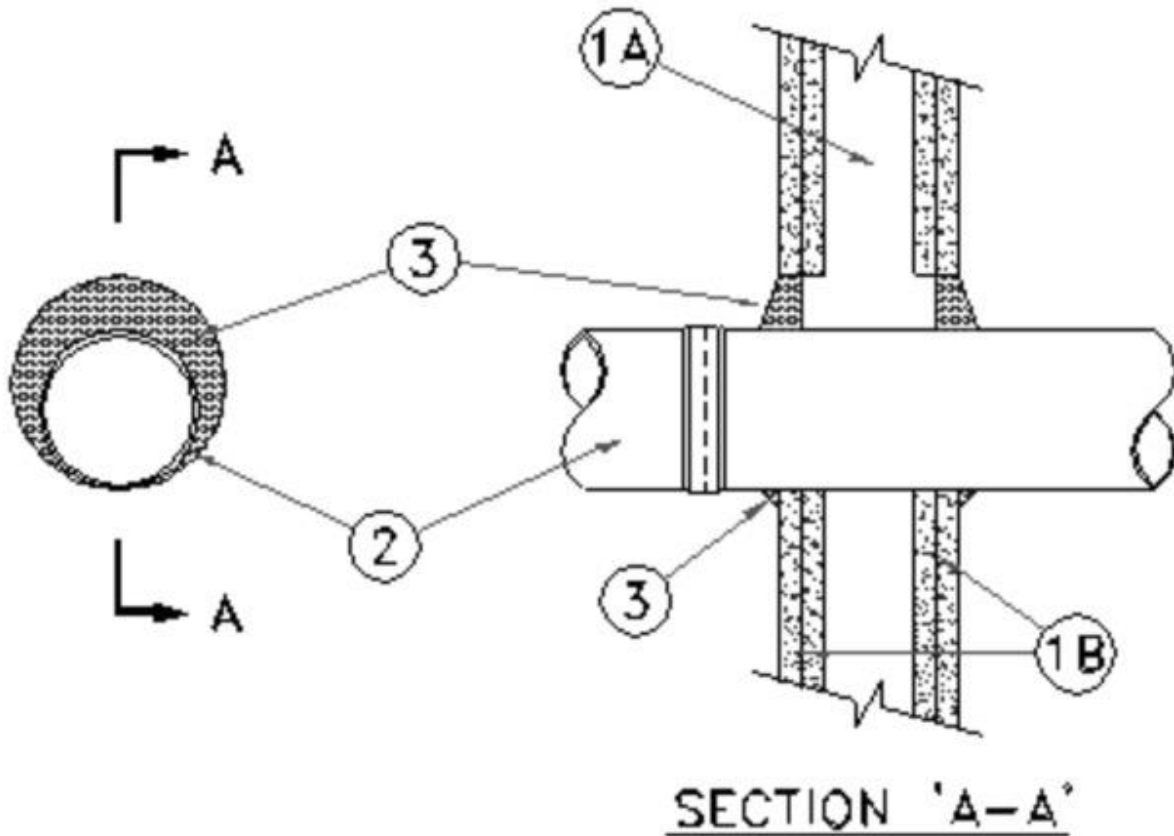
October 29, 2020

F Ratings — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



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

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

B. **Gypsum Board\*** — Nom 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board thickness, type, number of layers, fastener types and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 8 in. (203 mm).

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

2. **Through Penetrating Products\* - Glass Pipe** — Nom 6 in. (152 mm) diam (or smaller) glass pipe installed concentrically or eccentrically in opening, for use in closed (process or supply) or vented (drain, waste or vent) piping systems. The annular space between pipe and periphery of opening shall be min 0 in. to max 1-3/8 in. (35 mm). Pipe to be rigidly supported on both sides of wall assembly. Pipe connections to be located min 3 in. (76 mm) from wall surfaces.

**SCHOTT NORTH AMERICA INC**

3. **Fill, Void, or Cavity Materials\* - Sealant** — Min thickness of 5/8 in. (16 mm) applied within the annulus between pipe and periphery of the opening, flush with both surfaces of wall assembly. Additional sealant to be applied such that a min 1/4 in. (6 mm) crown is formed around the through penetrant on both surfaces of wall.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-5280

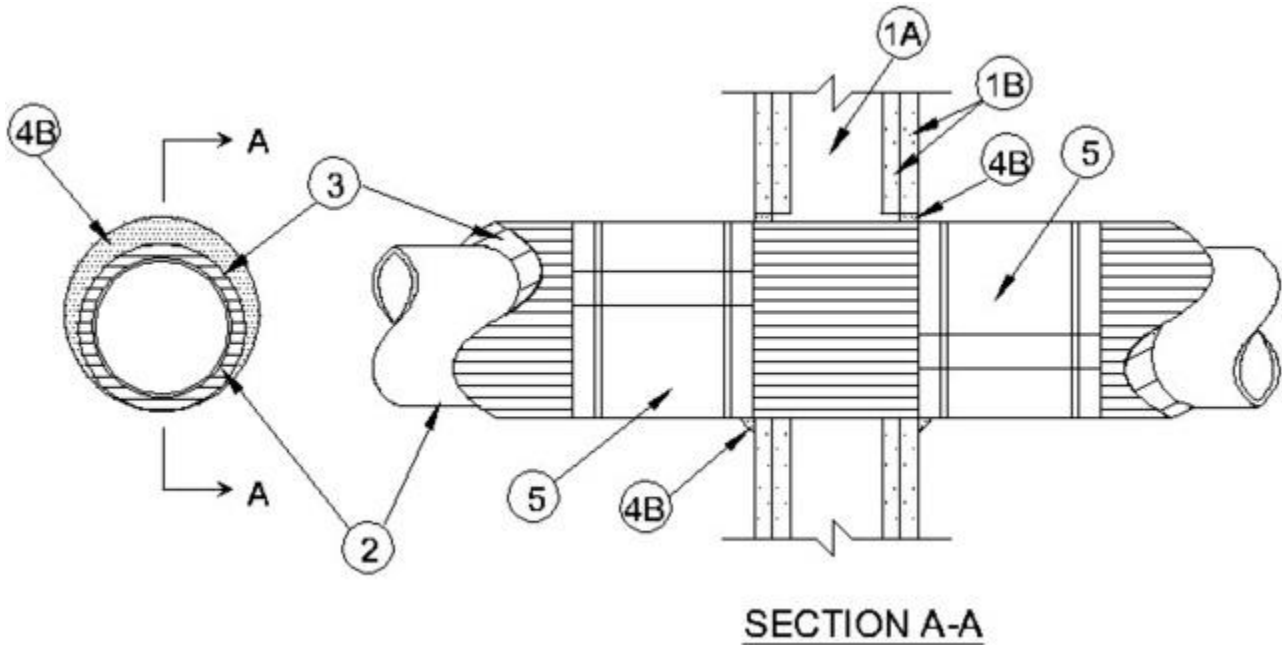
November 24, 2020

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

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

**L Rating at Ambient — Less than 1 CFM/sq ft**

**L Rating at 400° F — Less than 1 CFM/sq ft**



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

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

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

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

Rating of Wall Hr	Penetrant Diam/Type	F Rating Hr	T Rating Hr	Sealant
2	6 in. (152 mm) copper, steel or iron	2	1	Boss 816+
1	6 in. (152 mm) copper, steel or iron	1	0	Boss 816+



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

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

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

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

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

**PITTSBURGH CORNING CORP — FOAMGLAS**

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

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

B. **Fill, Void or Cavity Materials\*** — **Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus flush with both surfaces of wall. After installation of the metal jacket (Item 5), min 3/8 in. (10 mm) diam bead of fill material shall be applied to the metal jacketing/fill material interface on both sides of wall.

**ACCUMETRIC L L C — Boss 816**

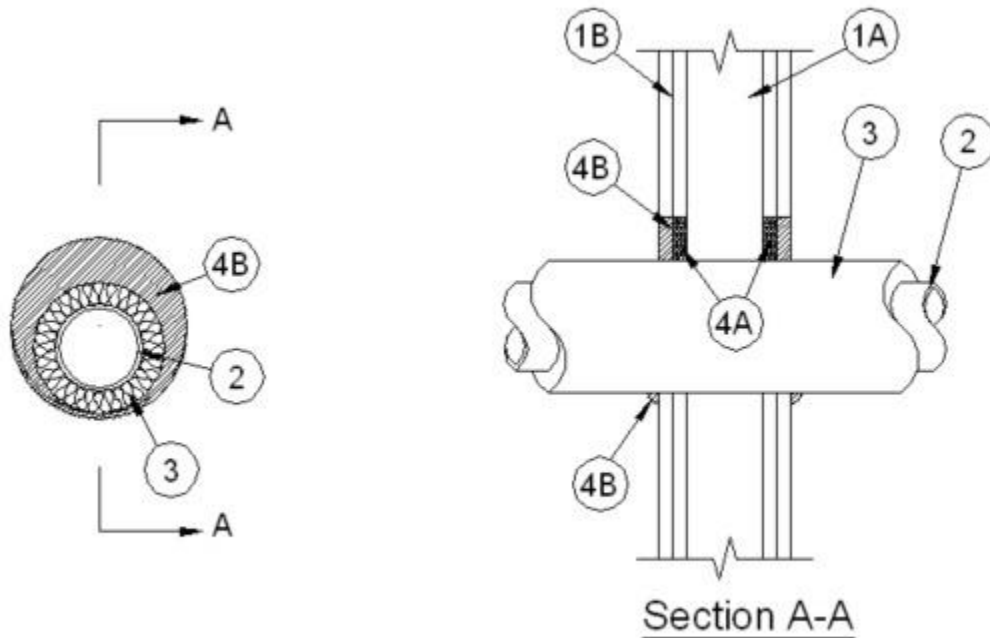
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-5284

November 24, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1B)	F Ratings -1 and 2 Hr (See Item 1B)
	FH Ratings -1 and 2 Hr (See Item 1B)
T Rating - 1/2 Hr	FT Rating - 1/2 Hr
	FTH Rating -1/2 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less Than 1.55 L/s/m
L Rating At 400°F - Less than 1 CFM/sq ft	L Rating At 400°F - Less Than 1.55 L/s/m



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

**A. Studs Wall** — 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 with nom 2 by 4 in. (51 by 102 mm) lumber end plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC.

**B. Gypsum Board\*** — Min 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Designs in the UL Fire Resistance Directory. Max diam of opening in wood stud walls is 14-1/2 in. (368 mm) Max diam of opening in steel stud walls is 18-3/4 in. (476 mm).

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

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

- A. **Steel Pipe** — Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 12 in. (305 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Copper Tubing** — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
- D. **Copper Pipe** — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

The max diam of the through penetrant is dependent upon the type of fill material used, as shown in Item 4B.

3. **Tube Insulation** — - **Plastics+** — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space between the insulated through penetrant and the periphery of the opening shall be a min of 0 in. (0 mm, point contact) to a max 1 in. (25 mm). See **Plastics+ (QMFZ2)** category in the Plastics Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL94 Flammability Classification of 94-5VA may be used.

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

A. **Packing Material** — Forms used to prevent leakage of fill material during installation in 2 hr fire-rated wall assemblies. Forms to be rigid sheet or polyurethane backer rod, cut to fit the contour of the penetrating item and friction fitted into opening on both sides of wall. Forms to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Sealant** — Min 5/8 in. (19 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point contact location between insulated through penetrant and gypsum board, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the gypsum board/insulated through penetrant interface on both surfaces of wall.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

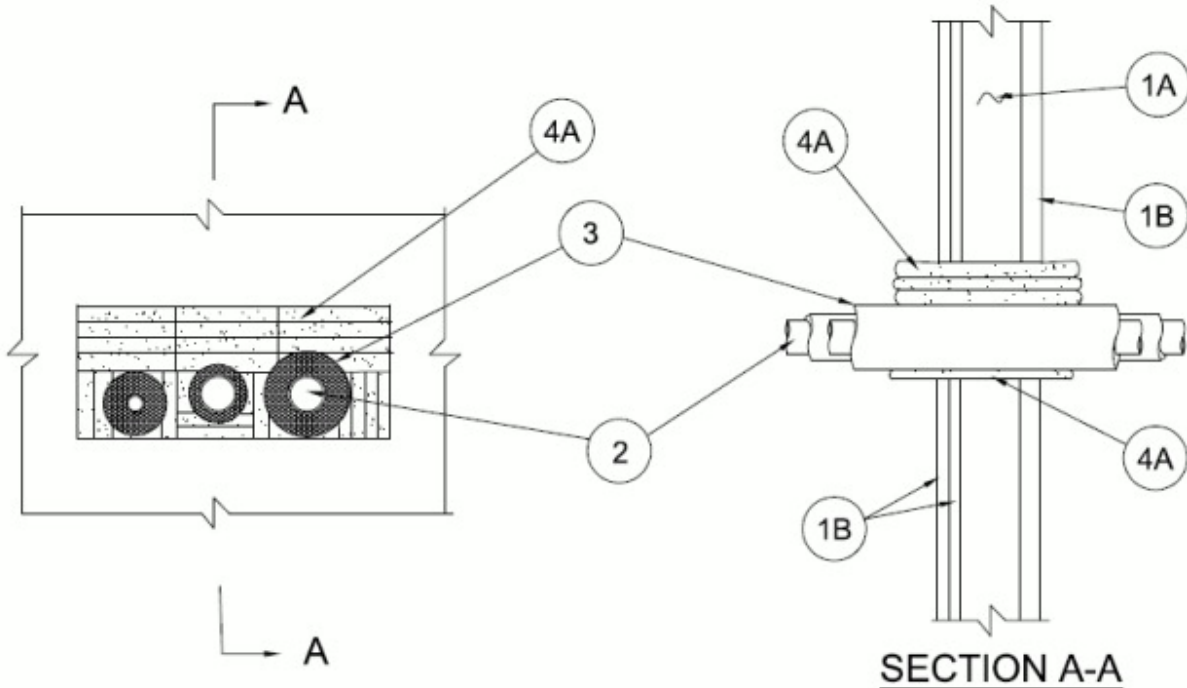
+Bearing the UL Recognized Component Mark

System No. W-L-5377

January 25, 2021

F Ratings — 1 and 2 Hr (See Item 1)

T Ratings — 0 and 1 Hr (See Item 1)



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, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:

A. **Steel Studs** — "C-H" or "C-T" shaped studs, min 3-1/2 in. (89 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. Max size of opening is 144 in<sup>2</sup> with a max dimension of 18 in. (457 mm).

C. **Gypsum Board\*** — 5/8 in. (16 mm) thick, 48 in. (1.2 m) 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. Max size of opening is 144 in<sup>2</sup> with a max dimension of 18 in. (457 mm).

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

2. **Through Penetrants** — Max three tubes installed eccentrically or concentrically within opening. Tubes to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic tubing may be used:

A. **Aluminum Tubing** — Reflok 6061-T4 ASTM B210 seamless aluminum tubing for use in closed (process or supply) piping systems. Tubing sizes shall be maximum 2-1/8 in. (54 mm) to minimum 1/4 in. (6 mm) outer diameter (OD) having wall thickness ranging from 0.080 in. (2 mm) to 0.030 in. (0.8 mm) respectively.

3. **Pipe Covering** — The following pipe covering shall be used with each Through Penetrant (Item 2).

A. **Tube Insulation-Plastics+** — Min 1/2 in. (13 mm) thick to max 1-1/2 in. (38 mm) thick Aerocel Ethylene Propylene Diene Terpolymer (EPDM) pipe insulation furnished in the form of tubing. The annular space between the insulated penetrants and the edge of the opening shall be min 0 in. (point contact) to max 4 in. (102 mm). The annular space between insulated penetrants shall be min 5/8 in. (16 mm) to max 4 in. (102 mm). See **Plastics+** - (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers.

Any Recognized Component tube insulation material meeting the above specifications of having a UL 94 Flammability Classification of 94-5VA may be used.

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

A. **Fill, Void or Cavity Material\*** — **Pillows** — Max 6 in. (152 mm) long by 9 in. (229 mm) wide by 3 in. (76 mm) thick plastic covered intumescent pillows tightly packed into opening filling annular space between and around penetrants and between penetrants and periphery. Pillows installed with 9 in. (229 mm) dimension projecting through wall and centered within opening.

**SODAL ACCUMETRIC - Boss 808 Firestop Pillows**

B. **Fill, Void or Cavity Material\* - Caulk (Optional)** — After installation of pillows, min 1/4 in. (6 mm) depth of fill material applied to seal any voids between pillows and periphery of opening, between pillows and through penetrants and between pillows on finished side of wall.

**SODAL ACCUMETRIC - Boss 816+**

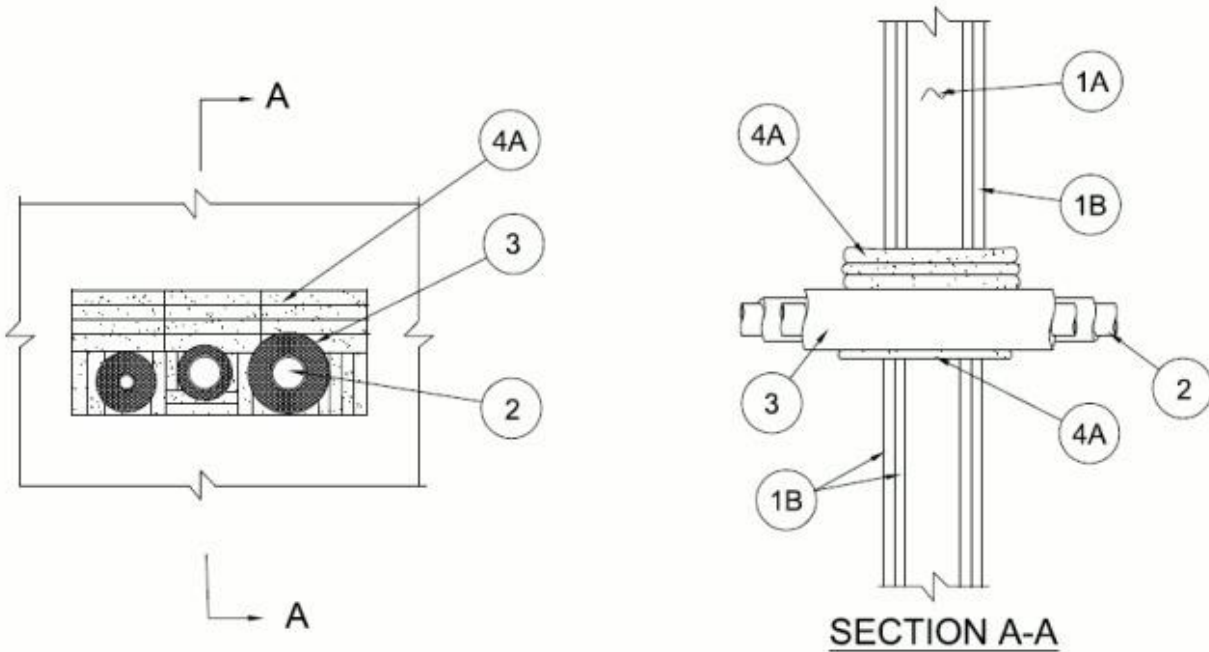
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. W-L-5378

January 25, 2021

F Ratings — 1 and 2 Hr (See Item 1)

T Ratings — 0 and 1 Hr (See Item 1)



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

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

B. **Gypsum Board\*** — 5/8 in. (16 mm) thick with square or tapered edged. The type, thickness, number of layers and fasteners shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max size of opening is 144 in<sup>2</sup> with a max dimension of 18 in. (457 mm).

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

2. **Through Penetrants** — Max three tubes installed eccentrically or concentrically within opening. Tubes to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic tubing may be used:

A. **Aluminum Tubing** — Reflok 6061-T4 ASTM B210 seamless aluminum tubing for use in closed (process or supply) piping systems. Tubing sizes shall be maximum 2-1/8 in. (54 mm) to minimum 1/4 in. (6 mm) outer diameter (OD) having wall thickness ranging from 0.080 in. (2 mm) to 0.030 in. (0.8 mm) respectively.

3. **Pipe Covering** — The following pipe covering shall be used with each Through Penetrant (Item 2).

A. **Tube Insulation-Plastics+** — Min 1/2 in. (13 mm) thick to max 1-1/2 in. (38 mm) thick Aerocel Ethylene Propylene Diene Terpolymer (EPDM) pipe insulation furnished in the form of tubing. The annular space between the insulated penetrants and the edge of the opening shall be min 0 in. (point contact) to max 4 in. (102 mm). The annular space between insulated penetrants shall be min 5/8 in. (16 mm) to max 4 in. (102 mm). See **Plastics+** - (QMFZ2) category in the Plastics Recognized Component Directory for names of manufacturers.

Any Recognized Component tube insulation material meeting the above specifications of having a UL 94 Flammability Classification of 94-5VA may be used.

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

A. **Fill, Void or Cavity Material\*** — **Pillows** Max 6 in. (152 mm) long by 9 in. (229 mm) wide by 3 in. (76 mm) thick plastic covered intumescent pillows tightly packed into opening filling annular space between and around penetrants and between penetrants and periphery. Pillows installed with 9 in. (229 mm) dimension projecting through wall and centered within opening.

**SODAL ACCUMETRIC - Boss 808 Firestop Pillows**

B. **Fill, Void or Cavity Material\* - Caulk (Optional)** — After installation of pillows, min 1/4 in. (6 mm) depth of fill material applied to seal any voids between pillows and periphery of opening, between pillows and through penetrants and between pillows on finished side of wall.

**SODAL ACCUMETRIC - Boss 816+**

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

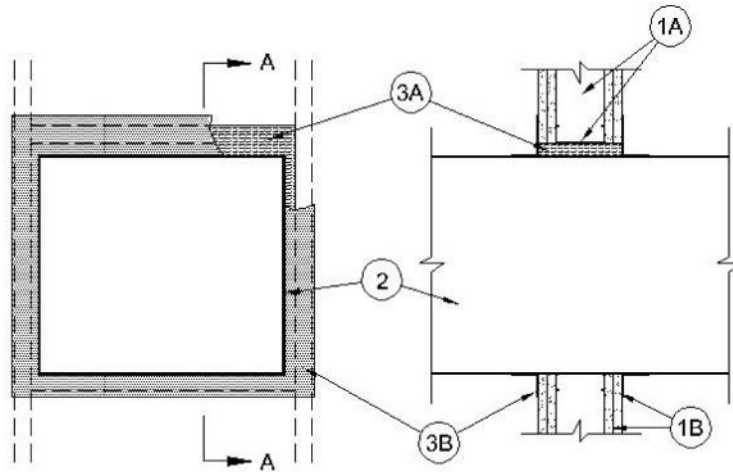
## Through-penetration Firestop Systems

System No. W-L-7150

March 21, 2008

F Ratings — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr



Section A-A

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

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

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick, 4 ft (1219 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U400 or V400 Wall and Partition Design. Max area of opening is 576 sq in. (0.37 m<sup>2</sup>) with a max dimension of 24 in. (610 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. **Steel Duct** — Max 23 by 23 in. (584 by 584 mm) No. 24 gauge (or heavier) steel duct to be installed either concentrically or eccentrically within the opening. The annular space shall be min 0 in. (point contact) to max 1 in. (25 mm) Duct to be rigidly supported on both sides of wall assembly.

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

A. **Packing Material** — Min 6 in. thickness of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form, flush with both surfaces of wall.

B. **Fill Void or Cavity Material\*— Caulk** — Min 3/16 in. (5 mm) wet thickness of fill material sprayed or brushed to completely cover mineral wool packing material on each side of the wall and to overlap a min of 2 in. (51 mm) onto gypsum board and duct surfaces.

**ACCUMETRIC L L C** — Boss 814 Sealant

\*Bearing the UL Classification Mark



## Through-penetration Firestop Systems

System No. W-L-7183

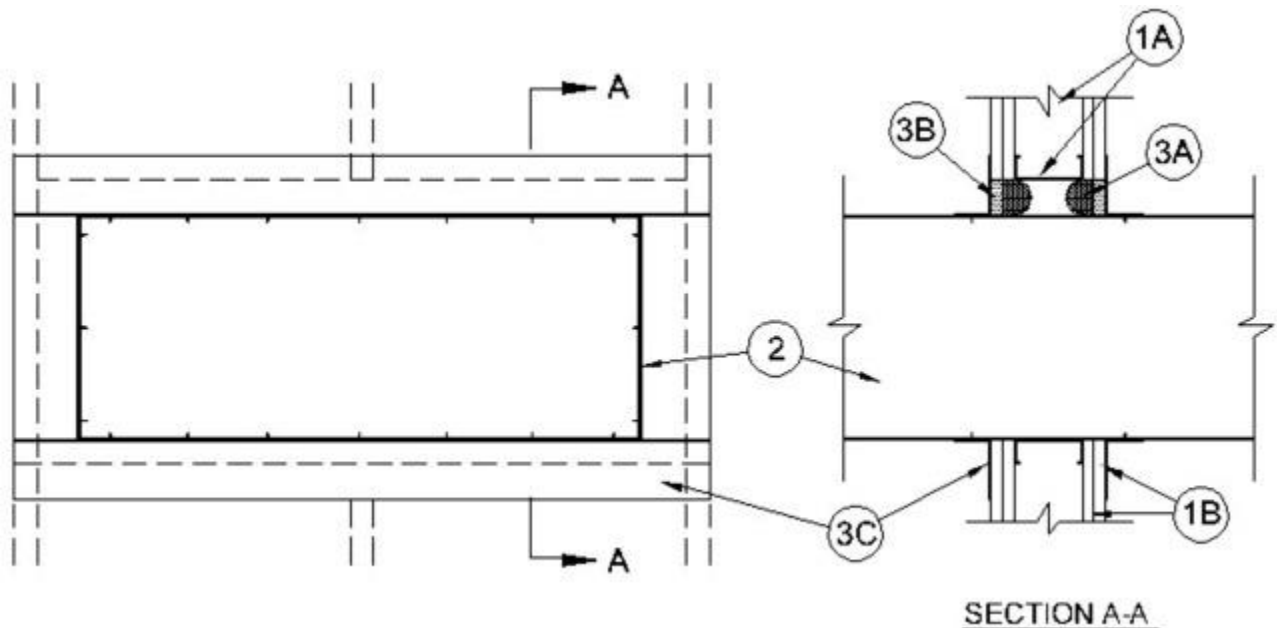
November 24, 2020

F Ratings — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr

L Rating at Ambient - Less than 1 CFM/sq ft

L Rating at 400° F - Less than 1 CFM/sq ft



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

A. **Studs** — Wall framing shall consist of steel channel studs. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC. Additional framing members shall be used to completely frame around opening.

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U400 or V400 Wall and Partition Design. Max size of opening is 1470 sq in. (9484 mm) with a max dimension of 70 in. (1778).

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

2. **Steel Duct** — Nom 67 in. (1702 mm) by 18 in. (457 mm) (or smaller) No. 24 gauge (or heavier) galv steel duct to be installed either concentrically or eccentrically within the firestop system. The space between the steel duct and periphery of opening shall be min 0 in. (point contact) to max 3-1/2 in. (89 mm). Steel duct to be rigidly supported on both sides of the wall assembly.

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

A. **Packing Material** — Polyethylene backer rod, mineral wool batt insulation, fiberglass batt insulation or foam plastic sheets friction fitted into annular space for 2 hr fire-rated wall assemblies only. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* — Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point contact location between steel duct and gypsum

wallboard, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the gypsum board/steel duct interface on both surfaces of wall assembly.

**SODAL ACCUMETRIC** — Boss 816; Boss 816+

**C. Steel Retaining Angles** — Min No. 22 gauge galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and lap wall surfaces a min 1-1/2 in. (38 mm). Angles attached to steel duct on both sides of wall with min No. 10 steel sheet metal screws spaced a max of 1 in. (25 mm) from each end of steel duct and spaced a max 6 in. (152 mm) OC.

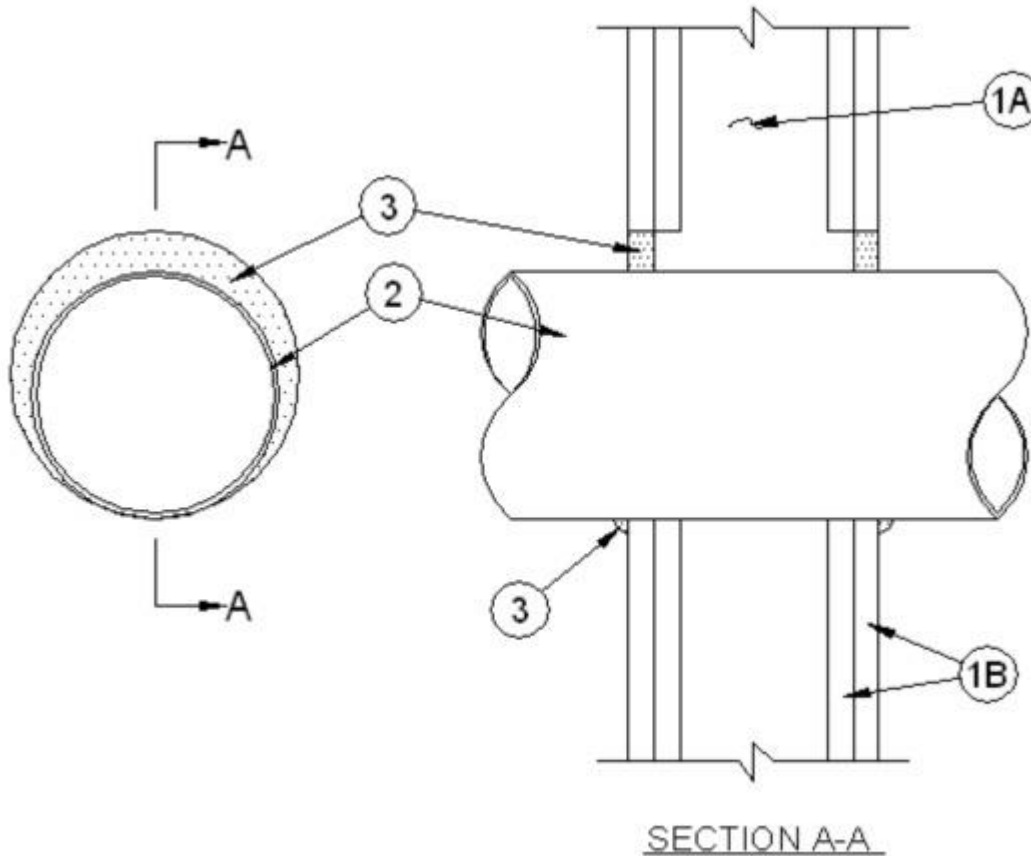
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-7184

November 24, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1B)	F Ratings -1 and 2 Hr (See Item 1B)
	FH Ratings -1 and 2 Hr (See Item 1B)
T Rating - 0 Hr	FT Rating - 0 Hr
	FTH Rating -0 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less Than 1.55 L/s/m
L Rating At 400°F - Less than 1 CFM/sq ft	L Rating At 400°F - Less Than 1.55 L/s/m



1. **Wall Assembly** — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400 or V400Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC with nom 2 by 4 in. (51 by 102 mm) lumber end plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide and spaced max 24 in. (610 mm) OC.
- B. **Gypsum Board\*** — 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the

individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening as shown in table below.

**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 nom 4 in. (102 mm) diam (or smaller) No. 30 MSG (or heavier), or one nom 6 in. (152 mm) diam (or smaller) No. 28 MSG (or heavier), or nom 20 in. (508 mm) diam (or smaller) No. 22 MSG (or heavier) steel vent duct to be installed either concentrically or eccentrically within the firestop system (see table below). The annular space between duct and periphery of opening shall be min 0 in. (point contact) to max value shown in table below. Duct to be rigidly supported on both sides of wall assembly.

3. **Packing Material** — (not shown). Nom 1 in. (25 mm) foam backer rod firmly packed into the opening as a permanent form in 2 hr fire-rated wall assemblies to prevent leakage of fill material during installation. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

4. **Fill, Void or Cavity Materials\*** — **Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At the point contact location between through penetrant and gypsum board, a min 3/8 in. (10 mm) diam bead of fill material shall be applied at the gypsum board/through penetrant interface on both surfaces of wall.

Max Diam of Through Opening In. (mm)	Max Duct Diam In. (mm)	Min Duct Thickness MSG	Annular Space In. (mm)
7 (178)	6 (152)	28	0 to 1 (0 to 25)
22 (559)	20 (508)	22	0 to 2 (0 to 51)

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

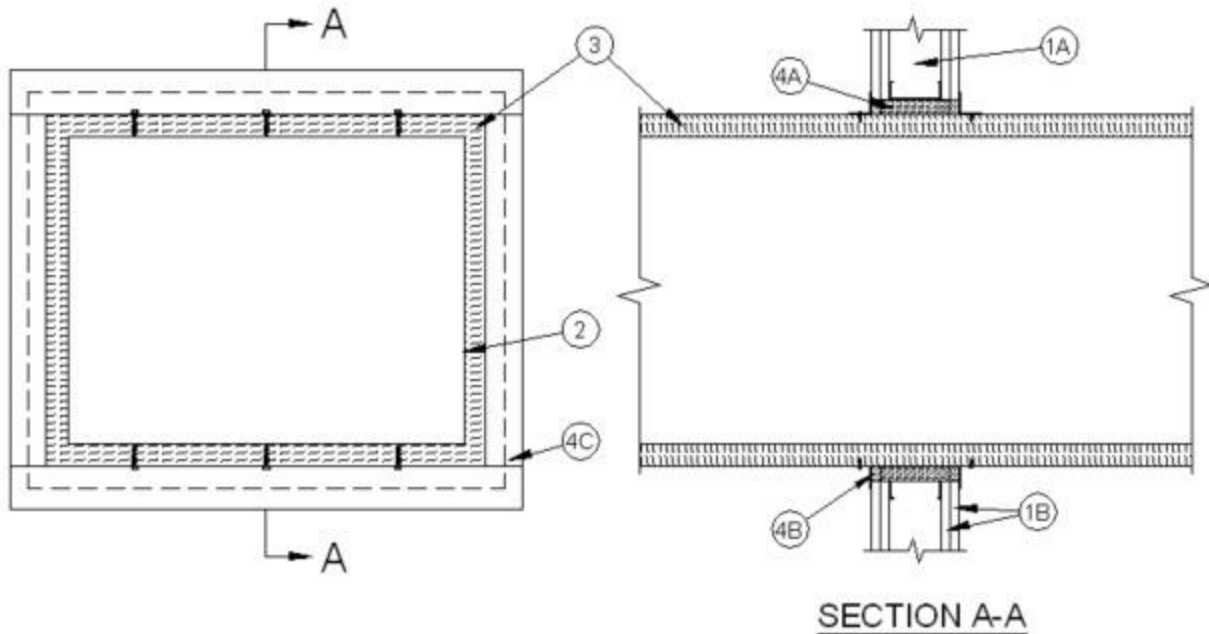
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-7185

November 24, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings -1 and 2 Hr (See Item 1)
	FH Ratings -1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Rating - 0 Hr
	FTH Rating -0 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less than 5.1 L/s/m <sup>2</sup>
L Rating At 400°F - Less than 1 CFM/sq ft	L Rating At 400°F - Less than 5.1 L/s/m <sup>2</sup>



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

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

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U300 or U400 Wall and Partition Design. Max size of opening is 210 sq in. (1355 cm<sup>2</sup>) with a max width of 14-1/2 in. (368) for wood studs. Max size of opening is 1050 sq in. (0.68 m<sup>2</sup>) with a max width of 30 in. (762 mm) for steel studs.

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

2. **Steel Duct** — Max 24 by 30 in. (610 by 762 mm) No. 24 gauge (or heavier) steel duct to be installed eccentrically within the framed opening. Steel duct to be rigidly supported on both sides of wall assembly.

3. **Batts and Blankets\*** — Max 1-1/2 in. (38 mm) thick glass fiber batt or blanket (min 3/4 pcf or 12 kg/m<sup>3</sup>) jacketed on the outside with a foil-scrim-kraft facing. Longitudinal and transverse joints sealed with aluminum foil tape. During the

installation of the fill material, the batt or blanket shall be compressed 50% such that the annular space within the firestop system shall be min 1 in. (25 mm) to max 2-3/4 in. (70 mm). See **Batts and Blankets** - (BKNV) category in the Building Materials Directory for names of manufacturers. Any batt or blanket meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index 50 or less may be used.

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

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

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

**SOUDAL ACCUMETRIC** — Boss 816; Boss 816+

C. **Steel Retaining Angles** — Min No. 22 gauge galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and lap wall surfaces a min 1-1/2 in. (38 mm). Angles attached to steel duct on both sides of wall with min No. 10 steel sheet metal screws spaced a max of 1 in. (25 mm) from each end of steel duct and spaced a max 6 in. (152 mm) OC.

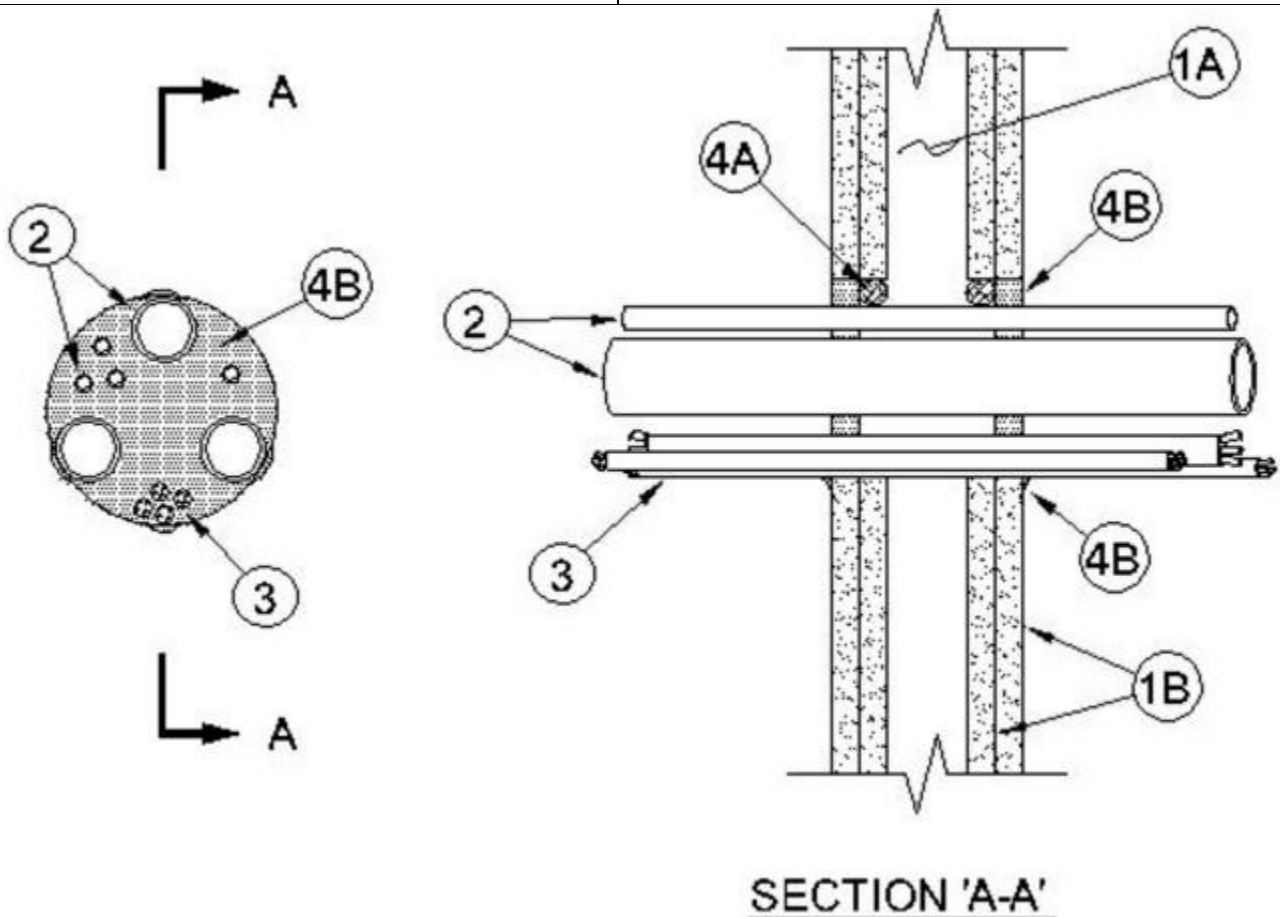
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-8083

November 24, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings -1 and 2 Hr (See Item 1)
	FH Ratings -1 and 2 Hr (See Item 1)
T Ratings - 0, 1/2 and 1 Hr (See Items 2 and 3)	FT Ratings - 0, 1/2 and 1 Hr (See Items 2 and 3)
	FTH Ratings -0, 1/2 and 1 Hr (See Items 2 and 3)



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

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

**B. Gypsum Board\*** — Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. Max diam of opening is 10 in. (254 mm)

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

2. **Through Penetrants** — A max of four 1 in. (25 mm) diam and three 4 in. (102 mm) diam (or smaller) metallic pipes, conduits or tubing to be installed within the firestop system. The annular space between the pipes, conduits or tubing and the periphery of the opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Separation between pipes, conduits or tubing shall be min 1/2 in. to max 1-5/8 in. (41 mm). Pipes, conduits or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of pipes, conduits and tubes 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 Pipe** — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
- E. **Copper Tube** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.
- F. **Copper Pipe** — Nom 1 in. (25 mm) diam Type K copper pipe.

**When any metallic penetrant is used the T Rating is 0 hr.**

3. **Cables** — Nom 3 in. (76 mm) diam (or smaller) tight bundle of cables. Cable bundle spaced min 1 in. (25 mm) from other penetrants. Annular space between cable bundle and periphery of opening to be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Cable bundle to be rigidly supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:

- A. Max 400 pairs, 24 AWG telephone communication cable with PVC insulation and jacket.
- B. 4/C No. 14 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TEK cable with XLPE insulation.
- C. Max 7/C No. 12 AWG copper conductor power and control cables; XLPE or PVC insulation with XLPE or PVC jacket.
- D. Max RG59/U (or smaller) coaxial cable with fluorinated ethylene insulation and jacketing.
- E. Type RG 59/U coaxial cable with polyethylene (PE) insulation and PVC jacket.

**When cable bundle is used without any metallic penetrant the T rating is 1/2 hr and 1 hr for 1 hr and 2hr fire rated wall assemblies, respectively.**

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

- A. **Packing Material** — Foam plastic backer material or backer rod or mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material. When annular space between penetrants and/or between penetrants and edge of opening is 3/4 in. (19 mm) or less packing material is optional.
- B. **Fill, Void or Cavity Material\*** — **Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact locations, min 1/2 in. (13 mm) diam bead of fill material applied at through penetrant/gypsum board interface on both surfaces of wall.

**SOULDAL ACCUMETRIC** — Boss 816; BOSS 816+

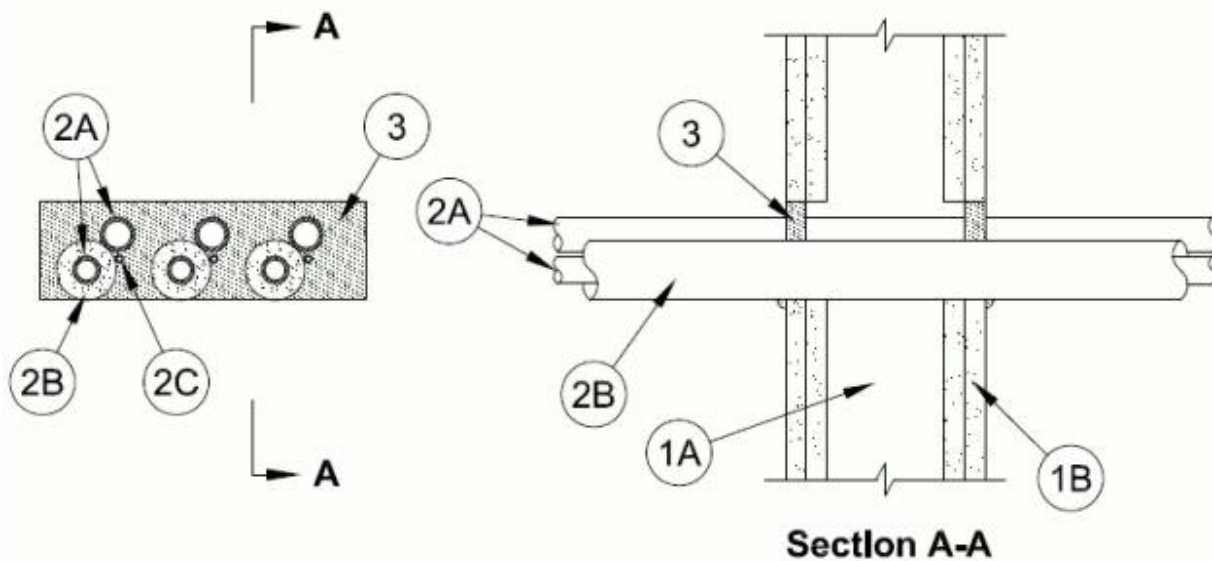
\*Bearing the UL Classification Mark



System No. W-L-8133

January 25, 2021

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



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

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

B. **Gypsum Board\*** — Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. Max area of opening is 30 sq in. (0.019 m<sup>2</sup>) with a max dimension of 10 in. (254 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. **Air Conditioning (AC) Line Set** — One or more AC line sets installed eccentrically or concentrically within opening. Each AC line set consists of two pipes or tubes (Item 2A), tubing insulation (Item 2B) and a thermostat cable (Item 2C). The space between the AC line sets shall be min 1/2 in. (13 mm) to max 3/4 in. (19 mm). The space between the AC line sets and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm).

2A. **Through Penetrant** — A max of two pipes or tubes to be installed in each AC line set. Of the two pipes or tubes, only one may have a nom diam greater than 1/2 in. (13 mm) Annular space between pipes or tubing and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Pipes or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of through penetrants may be used:

A. **Steel Pipe** — Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

B. **Iron Pipe** — Nom. 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.

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

D. **Copper Tube** — Nom. 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tube.

2B. **Tube Insulation - Plastics#** — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on one max 1/2 in. (13 mm) diam pipe or tube in each AC line set. The annular space between the penetrating item and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). The space between the pipes or tubing within each AC line set shall be 0 in. (point contact). See **Plastics (QMFZ2)** category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

2C. **Cable** — One 4 pair No. 18 AWG (or smaller) thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials may be installed with each AC line set. Cable to be spaced min 0 in (point contact) to max 1/2 in. (13 mm) from the other penetrants in each line set. The space between the cable and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Cable to be rigidly supported on both sides of wall assembly.

3. **Fill, Void or Cavity Material\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact location, min 1/4 in. (6 mm) diam bead of fill material applied at through penetrant/gypsum board interface on both surfaces of wall. Additional fill material forced into grouped penetrant interstices to max extent possible.

#### **SODAL ACCUMETRIC - Boss 816+**

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

**# Bearing the UL Recognized Component Marking**

## Through-penetration Firestop Systems

System No. C-AJ-0129

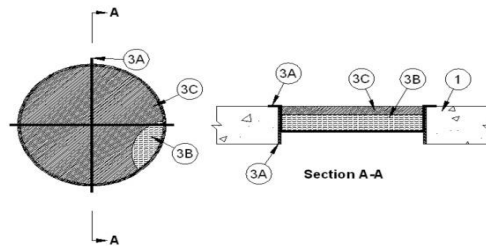
June 24, 2008

**F Ratings — 2 and 3 Hr (See item 3)**

**T Ratings — 1/2 and 2 Hr (See item 3)**

**L Rating at Ambient - Less than 1 CFM/sq ft**

**L Rating at 400° F - Less than 1 CFM/sq ft**



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Max diam of opening is 15 in. (381 mm).

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

2. **Metallic Sleeve** — (Optional)-Nom 14 in. (356 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

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

A. **Wire Hangers** — Two No. 9 gauge steel wire bend in a U-shaped hanger and placed in the opening one over the other to form an "X" design.

B. **Packing Material** — Min 2 in. (51 mm) thickness of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form as shown in the table below . Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.

C. **Fill, Void or Cavity Material\*** — **Sealant** — Min 1 in. (25 mm) thickness of fill material applied within annulus, flush with top surface of floor or with both surfaces of wall. If cracking occurs after the fill material cures, the cracks shall be sealed with sealant.

F Rating Hr	T Rating Hr	Metallic Sleeve	Wire Hangers
3	1/2	Permitted	Not required
2	2	Not Permitted	Required

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

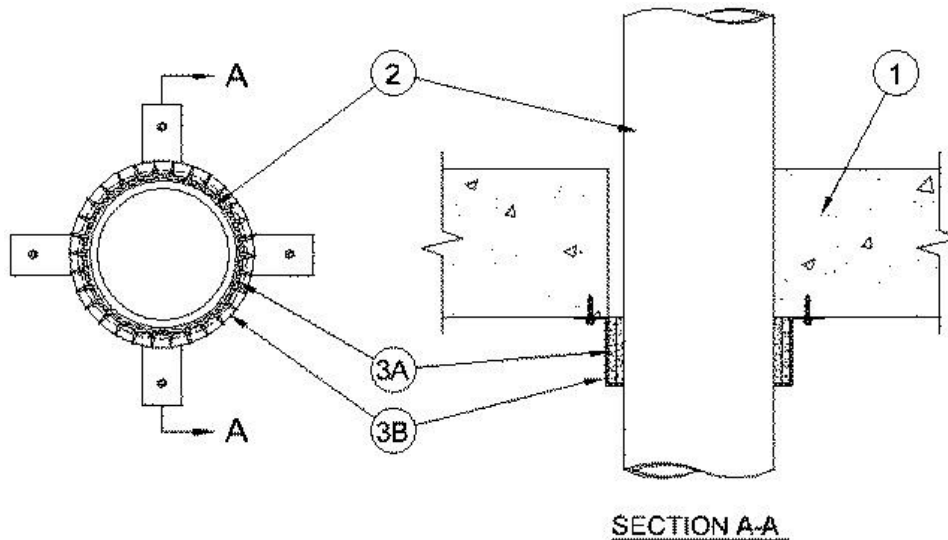
## Through-penetration Firestop Systems

System No. C-AJ-2501

November 07, 2008

F Rating — 3 Hr

T Rating — 3 Hr



1. **Floor or Wall Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. The diam of opening shall be 5 in.

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

2. **Through Penetrants** — One nonmetallic penetrant installed concentrically within the firestop system. The annular space between pipe and periphery of opening shall be min 0 (point contact) to max 1/2 in. Pipe to be rigidly supported on both sides of the floor assembly. The following types and sizes of non-metallic pipe may be used:

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

C. **Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 4 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.

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

A. **Fill, Void or Cavity Materials\* - Wrap Strip** — Two layers of nom 1/4 in. thick intumescent elastomeric material faced on one side with a plastic film, supplied in 2 in. wide strips. Strips tightly wrapped around nonmetallic pipe (film side exposed) with the edges butted against the underside of the concrete floor or both sides of wall surface. Butted ends in successive layers shall be offset. Wrap strip layers temporarily held in position using tape, wire or equivalent.

**ACCUMETRIC L L C** — Boss 817 Wrap Strip

B. **Steel Collar** — Collar fabricated from coils of precut 0.016 in. thick (No. 30 MSG) galv sheet steel available from wrap strip manufacturer. Collar shall be nom 2 in. deep with min 1 in. wide by 1-1/4 in. long anchor tabs on 4 in. centers for securement to underside of concrete floor and both sides of concrete wall. In addition, collar contains retainer tabs, 1/2 wide by 3/4 in. long located opposite the anchor tabs. Collar shall be wrapped over the wrap strip, with ends overlapping min 1 in. The retainer tabs are folded 90 deg towards the pipe to maintain the annular space around the pipe and to retain the wrap strip. Steel collar tightened around wrap strips and through

penetrant using min 1/2 in. wide by 0.028 in. thick stainless steel hose clamp installed at midheight of the collar. Collar secured to bottom surface of the floor or both surfaces of wall at each anchor tab by means of min 1/4 in. diam by 1-1/4 in. long steel expansion bolts or steel Tapcon® concrete anchors in conjunction with 1/4 in. by 5/8 in. diam fender washers.

\*Bearing the UL Classification Mark

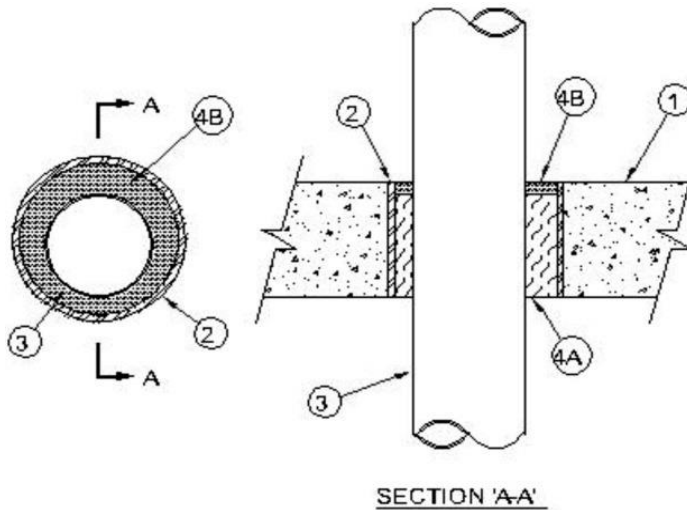
## Through-penetration Firestop Systems

System No. C-AJ-2608

April 10, 2008

F Rating — 3 Hr

T Ratings — 2-1/2 Hr



1. **Floor or Wall Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete floor or min 5 in. thick reinforced light weight or normal weight concrete wall. Floor may also be constructed of any min 6 in. thick hollow-core **Precast Concrete Units\***. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 4 in.

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

2. **Steel Sleeve** — (optional) - Nom 4 in. diam (or smaller) Schedule 10 (or heavier) steel pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

3. **Through Penetrant** — One nonmetallic pipe, conduit or tube to be installed eccentrically or concentrically within the firestop system. The annular space between the pipe, conduit or tube and the periphery of the opening shall be min 0 in. (point contact) to max 1-3/4 in. Pipe, conduit or tube to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of nonmetallic pipes, conduits and tubes may be used:

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

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 2 in. diam (or smaller) SDR17 chlorinated polyvinyl chloride (CPVC) pipe for use in closed (process or supply) piping systems.

C. **Rigid Nonmetallic Conduit+** — Nom 2 in. diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA 70).

D. **Electrical Nonmetallic Tubing+** — Nom 2 in. diam (or smaller) PVC tubing installed in accordance with Article 331 of the National Electrical Code (NFPA 70).

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

A. **Packing Material** — Min 4 in. thickness of min 4 pcf mineral wool batt insulation compressed and tightly packed into opening. Packing material recessed from top surface of floor or both surfaces of wall or precast concrete units to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. thickness of fill material installed within annulus, flush with top surface of floor or both surfaces of wall assembly. In floors constructed of precast hollow core

units, fill material installed to min 1/2 in. depth flush with each surface of the floor. At the point of contact of pipe and concrete a min 1/2 in. diam bead of fill material shall be applied at top surface of floor or both surfaces of wall or precast concrete units.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

+Bearing the UL Listing Mark

## Through-penetration Firestop Systems

System No. F-A-2187

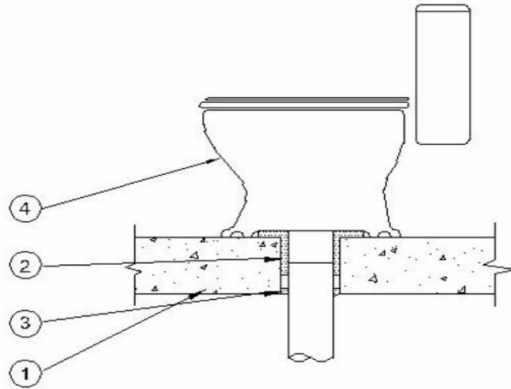
July 02, 2008

F Rating — 2 Hr

T Rating — 2 Hr

L Rating at Ambient - Less than 1 CFM/sq ft

L Rating at 400° F - Less than 1 CFM/sq ft



1. **Floor Assembly** — Min 4-1/2 in. (114 mm) thick lightweight or normal weight concrete (100-150 pcf or 1600-2400 kg/m<sup>3</sup>). Max diam of opening is 6 in. (152 mm).

2. **Nonmetallic Pipe** — One nonmetallic drain pipe with max 4 in. (102 mm) diam toilet flange installed either concentrically or eccentrically within the firestop system. The annular space between drain pipe and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Pipe to be rigidly supported on underside of floor assembly. The following types and sizes of nonmetallic pipes, fittings and flanges 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 vented (drain, waste or vent) piping system.

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

3. **Fill, Void or Cavity Material\* - Sealant** — Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with bottom surface of floor. At point contact location between concrete and pipe, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the pipe/concrete interface on bottom surface of floor assembly. A min 1/2 in. (13 mm) diam bead of fill material shall also be applied around top edge of toilet flange.

ACCUMETRIC LLC — Boss 816

4. **Water Closet** — Floor mounted vitreous china water closet.

\*Bearing the UL Classification Mark



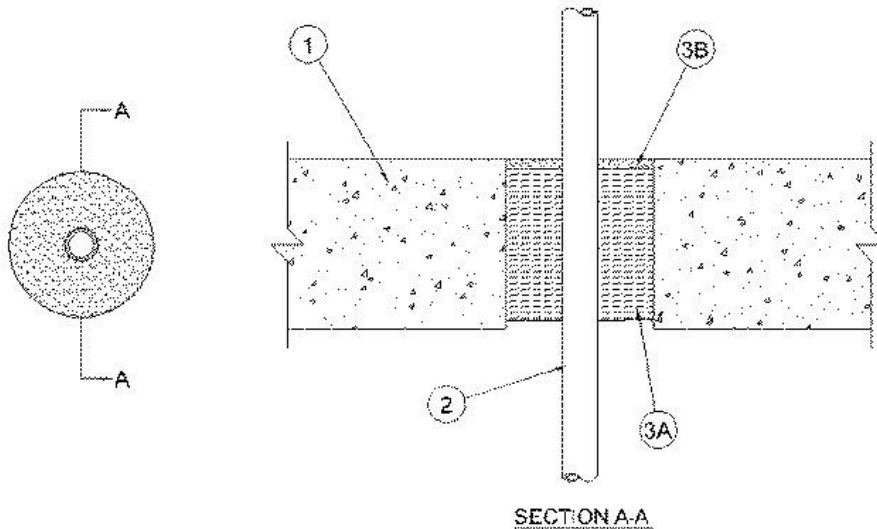
## Through-penetration Firestop Systems

System No. C-BJ-2015

November 05, 2008

F Rating - 1 h

T Rating - 0 h



1. **Floor or Wall Assembly** — Min 9-1/4 in. thick lightweight or normal weight (100-150 pcf) reinforced concrete. Max diam of opening is 8 in. Wall may also be constructed of any UL Classified **Concrete Blocks**\*

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

2. **Through Penetrants** — One nonmetallic pipe to be installed concentrically within opening. The annular space between pipe and periphery shall be 3-1/16 in. Pipe to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 1- 1/2 in. 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 1-1/2 in. diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

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

A. **Packing Material** — Min 8 in. thickness of min 2.8 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Sealant** — Min 1/2 in. thickness of fill material applied within annulus, flush with top surface of floor or both surfaces of wall.

ACCUMETRIC L L C — Boss 814

\*Bearing the UL Classification Mark

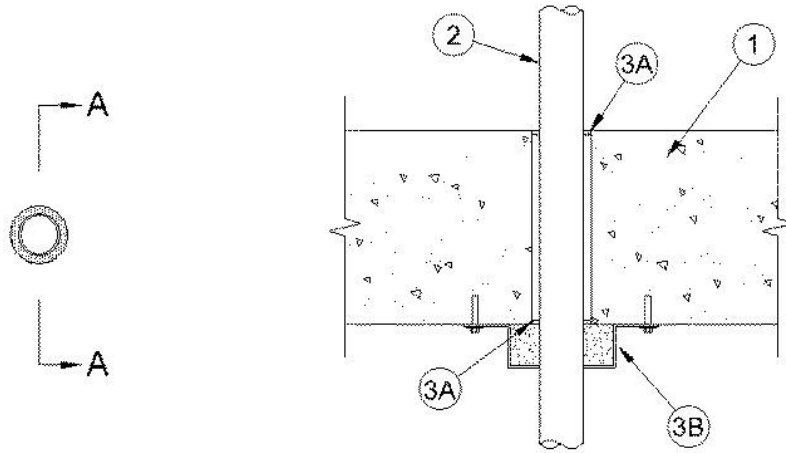
## Through-penetration Firestop Systems

System No. C-BJ-2025

November 05, 2008

F Rating — 2 Hr

T Rating — 0 Hr



### SECTION A-A

1. **Floor or Wall Assembly** — Min 9 in. thick lightweight or normal weight (100-150 pcf) reinforced concrete. Wall may also be constructed of any min 9 in. thick UL Classified **Concrete Blocks\***. Max diam of opening is 2-3/4 in.

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

2. **Through Penetrants** — One nonmetallic pipe to be installed concentrically within opening. The annular space between pipe and periphery shall be 3/16 in. Pipe to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

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

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

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

A. **Fill, Void or Cavity Materials\* - Sealant** — Min 1/4 in. thickness of fill material applied within annulus, flush with both surfaces of floor or wall.

**ACCUMETRIC L L C** — Boss 814

B. **Firestop Device\*** — Galvanized or stainless steel collar lined with an intumescent material sized to fit specific diam of the through penetrant. Device to be installed around the through penetrant in accordance with accompanying installation instructions. Device incorporates four anchor tabs for securement to underside of the concrete floor or both surfaces of the wall by means of 1/4 in. diam by 1-1/2 in. long steel expansion bolts.

**ACCUMETRIC L L C** — Boss 819 Pipe Collar

\*Bearing the UL Classification Mark

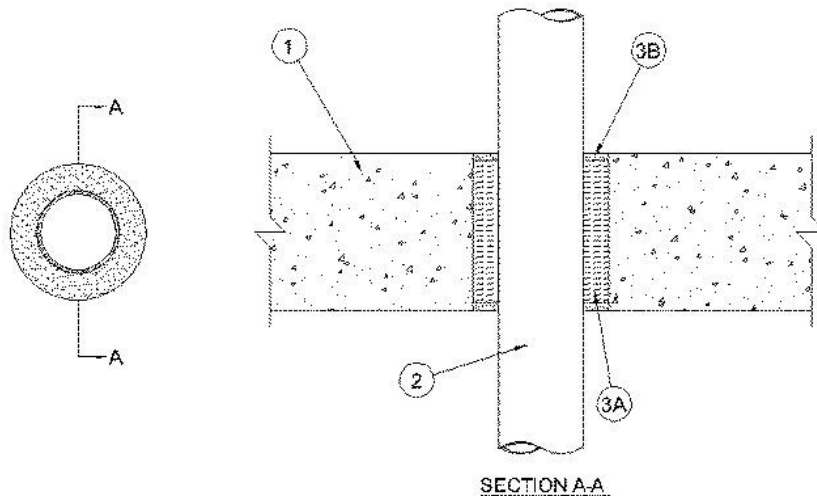
## Through-penetration Firestop Systems

System No. C-BK-2035

November 06, 2008

F Rating — 2 Hr

T Rating — 0 Hr



1. **Floor or Wall Assembly** — Min 9 in. thick lightweight or normal weight (100-150 pcf) reinforced concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 6 in.

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

2. **Through Penetrants** — One nonmetallic pipe to be installed concentrically within opening. The annular space between pipe and periphery of opening shall be  $\frac{3}{4}$  in. Pipe to be rigidly supported on both sides of the floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 4 in. diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) piping systems.

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 4 in. diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.

C. **Crosslinked Polyethylene (PEX) Tubing** — Nom 2 in. diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.

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

A. **Packing Material** — Min 8 in. thickness of min 2.8 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Sealant** — Min 1/2 in. thickness of fill material applied within annulus, flush with both surfaces of floor or wall.

**ACCUMETRIC L L C** — Boss 814

\*Bearing the UL Classification Mark

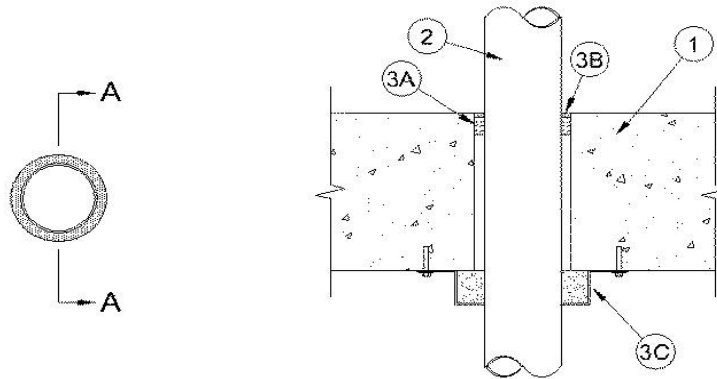
## Through-penetration Firestop Systems

System No. F-B-2023

November 06, 2008

F Rating — 2 Hr

T Rating — 0 Hr



SECTION A-A

1. **Floor Assembly** — Min 9 in. thick lightweight or normal weight (100-150 pcf) reinforced concrete. Max diam of opening is 5 in.

2. **Through Penetrants** — One nonmetallic pipe to be installed concentrically within opening. The annular space between pipe and periphery of opening shall be 1/4 in. Pipe to be rigidly supported on both sides of the floor assembly. The following types and sizes of nonmetallic pipes may be used:

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

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

A. **Packing Material** — Min 1 in. thickness of min 10 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor as required to accommodate the required thickness of fill material.

B. **Fill Void or Cavity Materials\* - Sealant** — Min 1/4 in. thickness of fill material applied within annulus, flush with top surface of floor.

**ACCUMETRIC L L C** — Boss 814

C. **Firestop Device\*** — Galv steel collar lined with an intumescent material sized to fit specific diam of the through penetrant. Device to be installed around the through penetrant in accordance with accompanying installation instructions. Device incorporates four anchor tabs for securement to underside of the concrete floor by means of 1/4 in. diam by 1-1/2 in. long steel expansion bolts.

**ACCUMETRIC L L C** — Boss 819 Pipe Collar

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. F-C-2375

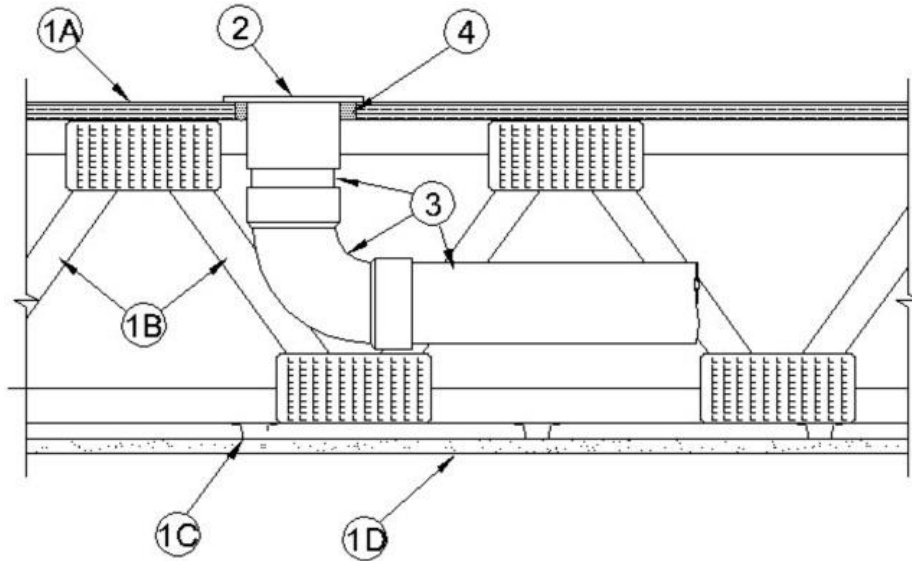
October 26, 2020

F Rating — 1 Hr

T Rating — 1 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



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 individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory, as 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 in. (127 mm).
- B. **Wood Joists** — Nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped. As an alternate to lumber 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 with ends firestopped.
- C. **Furring Channels** — (Not Shown) — Resilient galv steel furring installed perpendicular to wood joists (Item 1B) between gypsum board (Item 1D) and wood joists as required in the individual Floor-Ceiling Design.
- D. **Gypsum Board\*** — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Gypsum board secured to wood joists as specified in the individual Floor-Ceiling Design.

2. **Closet Flange** — Polyvinyl chloride (PVC) or acrylonitrile butadiene styrene (ABS) closet flange installed in hole-sawed opening in flooring system with flange secured to top of flooring with steel screws. Diam of circular opening through flooring (Item 1A) to be max 1/2 in. (13 mm) larger than outside diam of closet flange.

3. **Drain Piping** — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC or ABS drain piping and fittings. Short length of pipe with 90 degree elbow fitting cemented into bottom socket of closet flange. Drain piping to soil stack cemented into elbow.

4. **Fill, Void or Cavity Material\* — Sealant** — Fill material forced into annulus between closet stub and periphery opening in flooring to max extent possible, flush with bottom surface of floor. Additional fill material to be installed such that a min 3/8 in. (10 mm) crown is formed around the closet stub on bottom surface of floor.

**SUDAL ACCUMETRIC** — Boss 816, BOSS 816+

5. **Water Closet** — (Not Shown) — Floor mounted vitreous china water closet.

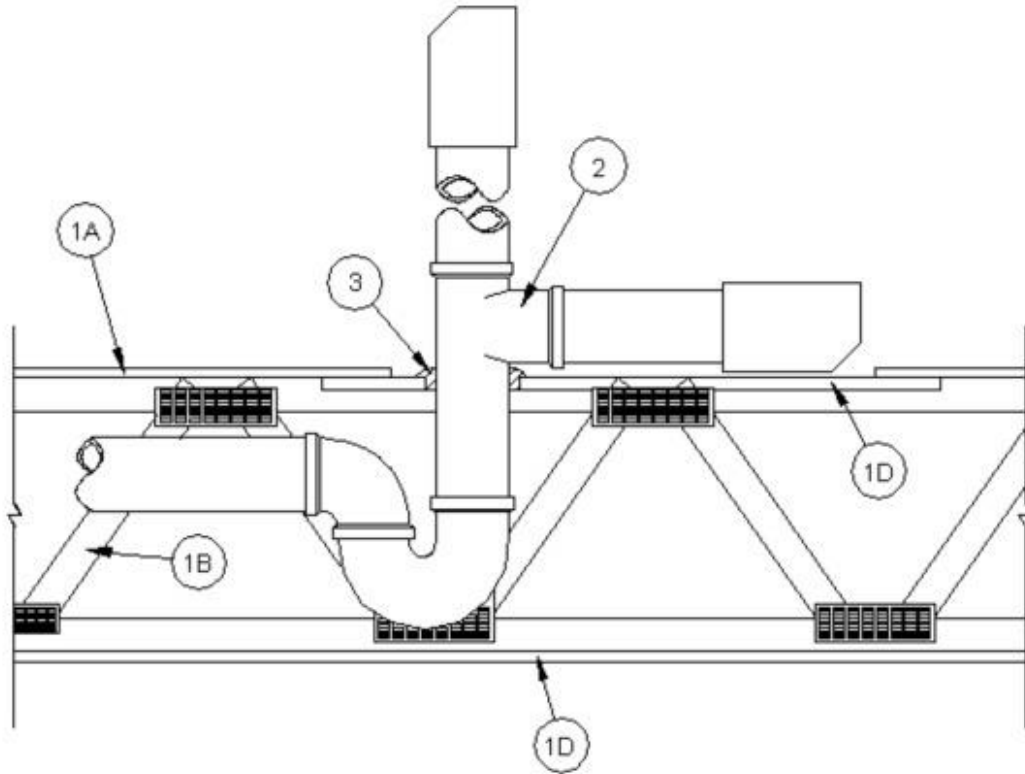
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. F-C-2379

October 26, 2020

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



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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 individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory, as 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. Rectangular cutout in flooring to accommodate the bathtub drain piping (Item 2) to be max 8 by 12 in. (203 by 305 mm).
- B. **Wood Joists** — Nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped. As an alternate to lumber 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 with ends firestopped.
- C. **Furring Channels** — (Not Shown) — Resilient galv steel furring installed perpendicular to wood joists (Item 1B) between gypsum board (Item 1D) and wood joists as required in the individual Floor Ceiling Design.

**D. Gypsum Board\*** — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Gypsum board secured to wood joists as specified in the individual Floor-Ceiling Design. One piece of gypsum board, min 4 in. (102 mm) longer and wider than the cutout in the flooring, screw-attached to bottom of flooring  
concentric with cutout by means of 1 in. (25 mm) long Type S steel screws spaced max 5 in. (127 mm) OC.  
Diam of opening hole-sawed through the gypsum board patch to be 1 in. (25 mm) larger than outside diam of bathtub drain piping (Item 2).

2. **Drain Piping** — Nom 1-1/2 in. (38 mm) diam Schedule 40 solid or cellular core polyvinyl chloride (PVC) or acrylonitrile butadiene styrene (ABS) pipe and drain fittings cemented together and provided with PVC bathtub waste/overflow fitting. Pipe to be installed either concentrically or eccentrically within the firestop system. The annular space within the firestop system shall be a min 3/8 in. (10 mm) to a max 5/8 in. (16 mm).

3. **Fill, Void or Cavity Material\*** — **Sealant** — Min 5/8 in. (16 mm) thickness of fill material to be applied within annulus between the tee of the drain fitting and gypsum board patch on the top surface of the floor. An additional 1/4 in. (6 mm) crown of fill material shall be applied around tee of drain fitting on top surface of the gypsum board patch.

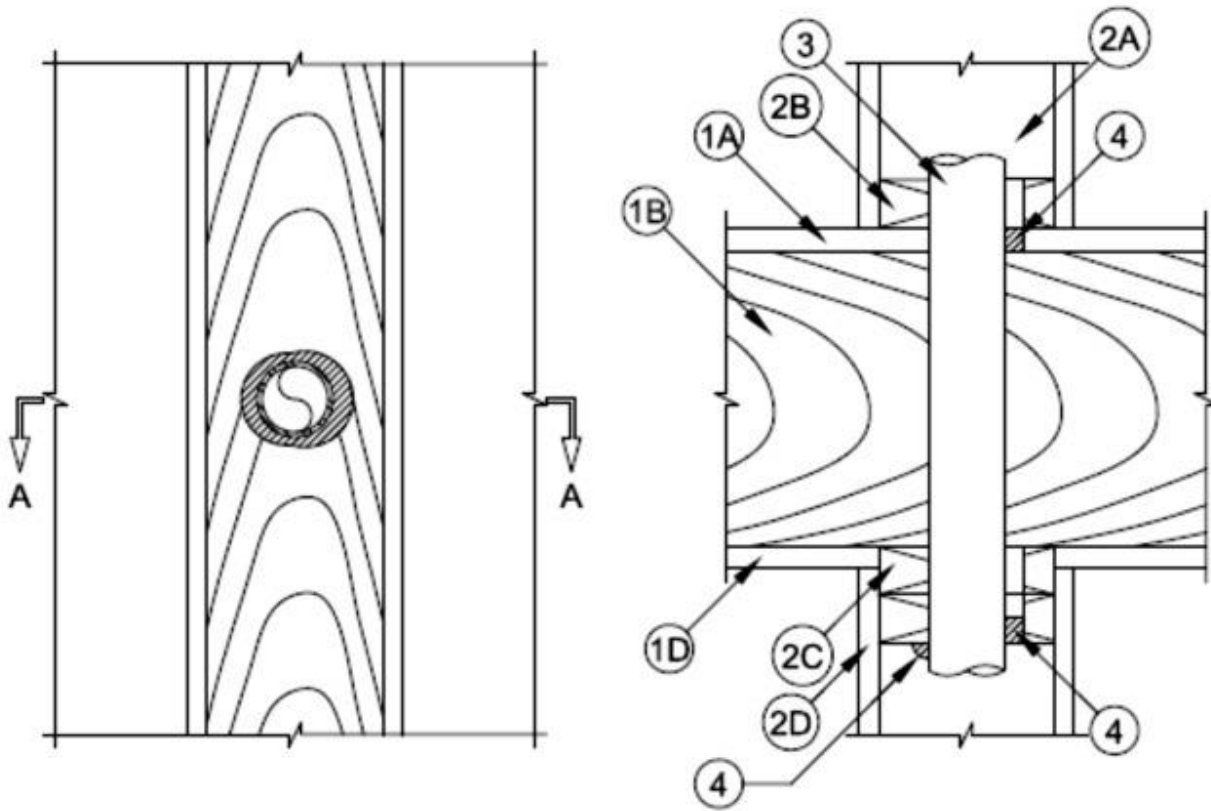
**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark



**System No. F-C-2520**  
November 20, 2020

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



1. **Floor — Ceiling Assembly** — The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as 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 floor opening is 4 in. (102 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 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Wallboard secured to joists as specified in the individual Floor-Ceiling Design.

2. **Chase Wall** — The through penetrant (Item No. 3) shall be routed through wood stud/gypsum board chase wall and shall include the following construction features:

- A. **Studs** — Nom 2 by 6 in. (51 by 152 mm) lumber studs.
- B. **Sole Plate** — Nom 2 by 6 in. (51 by 152 mm) lumber plates. Diam of opening or length of notch-out in sole plate to be 1/2 in. (13 mm) larger than outside diam of pipe.

C. **Top Plate** — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) lumber plates. Diam of opening or length of notch-out in top plate to be 1/2 in. (13 mm) larger than outside diam of pipe.

D. **Gypsum Board** — Min 1/2 in. (13 mm) thick rated or nonrated gypsum board.

2A. **Alternate Chase Wall** — (Not Shown) — For nom 2 in. diam (or smaller) through penetrants (Item No. 3), the pipes may be routed through wood stud/gypsum board chase wall as an alternate to Item 2 and shall include the following construction features:

A. **Studs** — Nom 2 by 4 in. (51 by 102 mm) lumber studs.

B. **Sole Plate** — Nom 2 by 4 in. (51 by 102 mm) lumber plates. Diam of opening or length of notch-out in sole plate to be 1/2 in. (13 mm) larger than outside diam of pipe.

C. **Top Plate** — The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm) lumber plates. Diam of opening or length of notch-out in top plate to be 1/2 in. (13 mm) larger than outside diam of pipe.

D. **Gypsum Board** — Min 1/2 in. (13 mm) thick rated or nonrated gypsum board.

3. **Through Penetrants** — One nonmetallic pipe to be centered within the firestop system. The annular space between pipe and periphery of opening shall be 0 in. (point contact) to 1/2 in. (13 mm) Pipe to be rigidly supported on both sides of floor assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 3 in. (76 mm) Schedule 40 solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems. **T Rating is 1 h.**

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 3 in. (76 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems. **T Rating is 1 h.**

C. **Rigid Non-Metallic Conduit +** — Nom 3 in. (76 mm) Diam (or smaller) PVC conduit installed in accordance with the National Electrical Code (NFPA 70). **T Rating is 1 h.**

D. **Electrical Nonmetallic Tubing+** — Nom 3 in. (76 mm) (or smaller) PVC tubing installed in accordance with the National Electrical Code (NFPA 70). **T Rating is 1 h.**

E. **Crosslinked Polyethylene (PEX) tubing** — Nom 1-1/2 in. (38 mm) diam (or smaller) SDR 9 tube used for closed (process or supply) or vented (drain, waste or vent) piping systems. **T Rating is 3/4 h.**

F. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom. 2 in. (51 mm) diam (or smaller) Blazemaster® SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems. **T Rating is 1 h.**

G. **Polypropylene (PP) Pipe** — Nom 2 in. (51 mm) diam (or smaller) Aquatherm Greenpipe SDR 11 PP pipe for use in closed (process or supply) piping systems. Maximum total annular space shall be 1/2 in. with no point contact. **T Rating is 1 hr.**

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

A. **Fill, Void or Cavity Material\*** — **Caulk** — Min 3/4 in. (19 mm) thickness of fill material applied within annulus, flush with top surface of floor. Min 3/4 in. (19 mm) thickness of fill material applied within annulus, flush with bottom surface of top plate. Min 1/2 in. (13 mm) crown bead at point contact.

**SOULDAL ACCUMETRIC** — Boss 816+

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

+Bearing the UL Listing Mark

## Through-penetration Firestop Systems

System No. F-C-2380

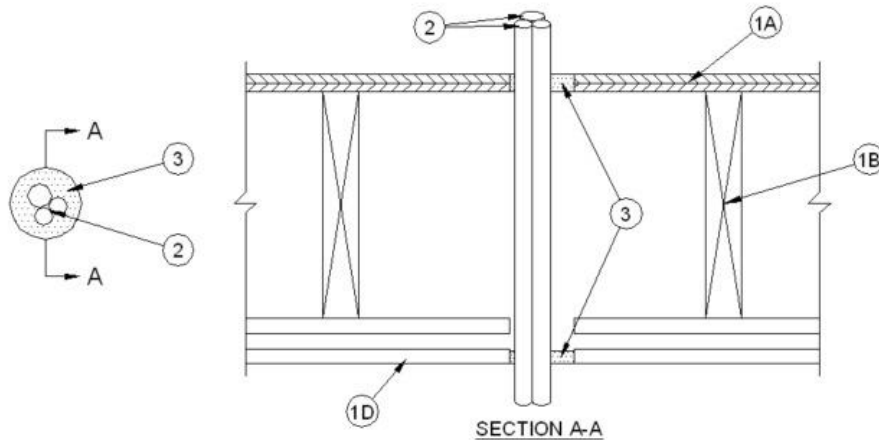
July 07, 2008

F Ratings — 1 and 2 Hr (See Item 3)

T Ratings — 1 and 2 Hr (See Item 3)

L Rating at Ambient - Less than 1 CFM/sq ft

L Rating at 400° F - Less than 1 CFM/sq ft



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 2 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in Design Nos. L505, L511 or L536 in the UL Fire Resistance Directory. The general construction features 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 floor opening is 3 in. (76 mm).

B. **Wood Joists\*** — For 1 hr fire-rated floor-ceiling assemblies 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. For 2 hr fire-rated floor-ceiling assemblies, nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped.

C. **Furring Channels** — (Not Shown) — In 2 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between first and second layers of gypsum board (Item 1D). Furring channels spaced max 24 in. (610 mm) OC. In 1 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between gypsum board and wood joists as specified in the individual Floor-Ceiling Design. Furring channels spaced max 24 in. (610 mm) OC.

D. **Gypsum Board\*** — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. First layer of gypsum board secured to wood joists or furring channels as specified in the individual Floor-Ceiling Design. Second layer of gypsum board (2 hr fire-rated assembly) screw-attached to furring channels as specified in the individual Floor-Ceiling Design. Max diam of ceiling opening is 3 in. (76 mm).

**The hourly F and T Ratings of the firestop system are dependent upon the hourly rating of the floor-ceiling assembly in which it is installed, type of through penetrant and type of fill material as shown in Item 3 .**

**1.1 Chase Wall** — (Not Shown, Optional) — The through penetrants (Item 2) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum board 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) lumber 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) lumber or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 3 in. (76 mm).
- C. **Top Plate** - The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) lumber plates or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted. Max diam of opening is 3 in. (76 mm).
- D. **Gypsum Board\*** - Thickness, type, number or layers and fasteners shall be as specified in individual Wall and Partition Designs.

**2. Through Penetrant** — The following types of through penetrants shall be used:

- A. **Cross-Linked Polyethylene Tubing** — A max of three SDR 9 (or heavier) cross-linked polyethylene (PEX) tubing for use in closed (process or supply) piping systems. Of the three tubes, a max of one shall have a nom diam greater than 3/4 in. (19 mm). The max diam of one tube is 1 in. (25 mm). The annular space between the tubing and the periphery of the opening shall be a min 3/16 in. (4.8 mm) and a max of 1 in. (25 mm). The space between the tubing shall be a min 0 in. (point contact) to a max 1/4 in. (6 mm). Tubing to be rigidly supported on both sides of the floor-ceiling assembly.
- B. **Aluminum Cross-Linked Polyethylene Tubing** — A max of three nominal 3/4 in. (19 mm) diameter SDR 9 (or heavier) aluminum cross-linked polyethylene (AL PEX) tubing for use in closed (process or supply) piping systems. The annular space between the tubing and the periphery of the opening shall be a min 1/8 in. (3.2 mm) and a max of 1 in. (25 mm). The space between the tubing shall be a min 0 in. (point contact) to a max 1/4 in. (6 mm). Tubing to be rigidly supported on both sides of the floor-ceiling assembly.

**The hourly F and T Ratings of the firestop system are dependent upon the hourly rating of the floor-ceiling assembly in which it is installed, type of through penetrant and type of fill material as shown in Item 3.**

**3. Fill, Void or Cavity Material\* — Sealant** — Min 3/4 in. (19 mm) thickness of fill material applied flush with annulus on top surface of floor or sole plate. Min 1/2 in. (13 mm) thickness of fill material applied flush with annulus on bottom surface of ceiling or on bottom surface of lower top plate of chase wall assembly. Additional fill material forced within the group of tubing to max extent possible on the top surface of floor or sole plate and bottom surface of ceiling or on bottom surface of lower plate of chase wall assembly.

**The hourly F and T Ratings of the firestop system are dependent upon the hourly rating of the floor-ceiling assembly in which it is installed and type of through penetrant, as shown in the table below:**

Rating of Assembly, Hr	Type of Through Penetrant	F Rating, Hr	T Rating, Hr
1	PEX	1	1
1	AL PEX	1	1
2	AL PEX	2	2
1	PEX	1	1
2	PEX	2	2

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

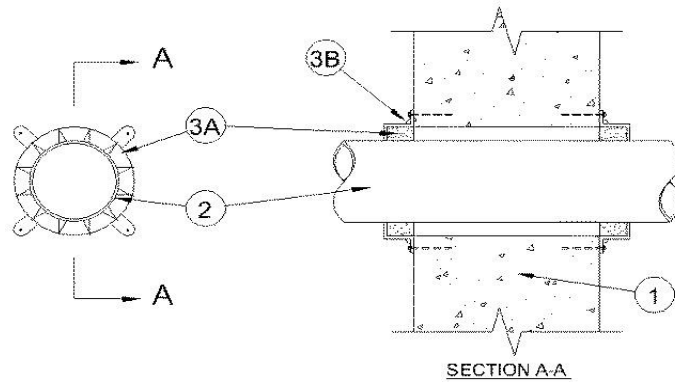
## Through-penetration Firestop Systems

System No. W-J-2166

November 06, 2008

F Rating — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr



1. **Wall Assembly** — Min 4-7/8 in. or 6-1/8 in. thick 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\***. Max diam of opening is 4 in.

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

2. **Through Penetrant** — One nonmetallic pipe to be centered within the firestop system. Annular space to be min 1/4 in. Pipe to be located near the center of the stud cavity width and to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 3 in. 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 3 in. diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

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

A. **Firestop Device\*** — Galvanized or stainless steel collar lined with an intumescent material sized to fit specific diam of the through penetrant. Device to be installed around the through penetrant and to both surfaces of wall in accordance with accompanying installation instructions. Device incorporates four anchor tabs for securement to both surfaces of the wall by means of 1/4 in. diam by 1-1/2 in. long steel expansion bolts.

**ACCUMETRIC L L C** — Boss 819 Pipe Collar

B. **Fill Void or Cavity Materials\* - Sealant** — Min 3/16 in. thick bead of fill material applied around annulus at the firestop device / wall surface interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814

\*Bearing the UL Classification Mark

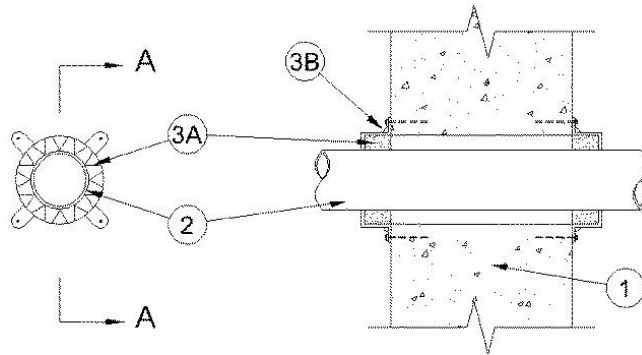
## Through-penetration Firestop Systems

System No. W-J-2167

November 06, 2008

F Rating — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr



SECTION A-A

1. **Wall Assembly** — Min 4-7/8 in. thick lightweight or normal weight (100-150 pcf) concrete for 1 hr rated assemblies. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 3 in.

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

2. **Through Penetrant** — One nonmetallic pipe to be centered within the firestop system. Annular space to be min 5/16 in. Pipe to be located near the center of the stud cavity width and to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 2 in. 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 2 in. diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply).

C. **Rigid Nonmetallic Conduit+** — Nom 2 in. diam (or smaller) Schedule 40 PVC conduit installed in accordance with Articles 347 and 710 of the National Electrical Code (NFPA No. 70).

D. **Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 2 in. diam (or smaller) Schedule 40 solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

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

A. **Firestop Device\*** — Galvanized or stainless steel collar lined with an intumescent material sized to fit specific diam of the through penetrant. Device to be installed around the through penetrant and to both surfaces of wall in accordance with accompanying installation instructions. Device incorporates four anchor tabs for securement to both surfaces of the wall by means of 1/4 in. diam by 1-1/2 in. long steel expansion bolts.

**ACCUMETRIC L L C** — Boss 819 Pipe Collar

B. **Fill Void or Cavity Materials\* - Sealant** — Min 3/16 in. thick bead of fill material applied around annulus at the firestop device / wall surface interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814

\*Bearing the UL Classification Mark

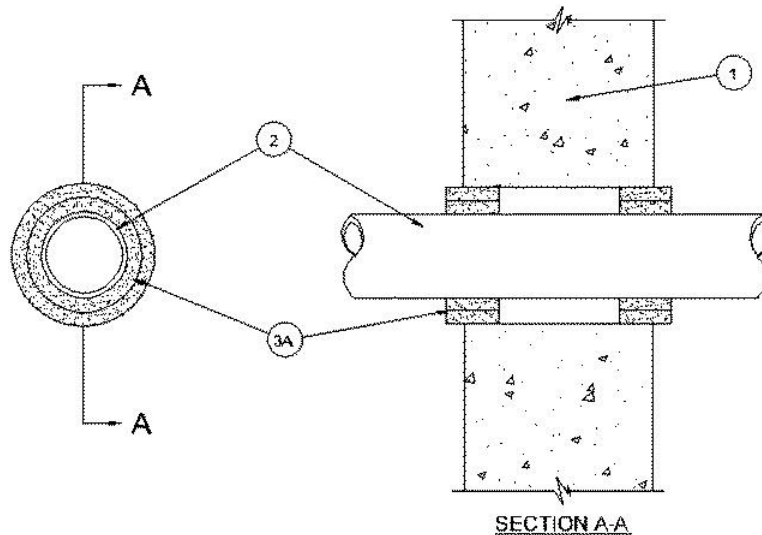
## Through-penetration Firestop Systems

System No. W-J-2174

November 07, 2008

F Rating — 2 Hr

T Rating — 2 Hr



1. **Wall Assembly** — Min 6 in. thick lightweight or normal weight (100-150 pcf) concrete wall assembly. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 5-1/2 in.

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

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

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

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

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

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

A. **Fill, Void or Cavity Material\* - Wrap Strip** — Two layers of nom 1/4 in. thick by 2 in. wide intumescent wrap strip individually wrapped around the outer circumference of the pipe and slid into the annular space on each side of wall such that wrap strip extends 3/4 in. beyond each surface of wall. Butted ends in successive layers shall be offset. Wrap strip secured with tape, wire or tie wire.

**ACCUMETRIC L L C** — Boss 817 Wrap Strip

\*Bearing the UL Classification Mark

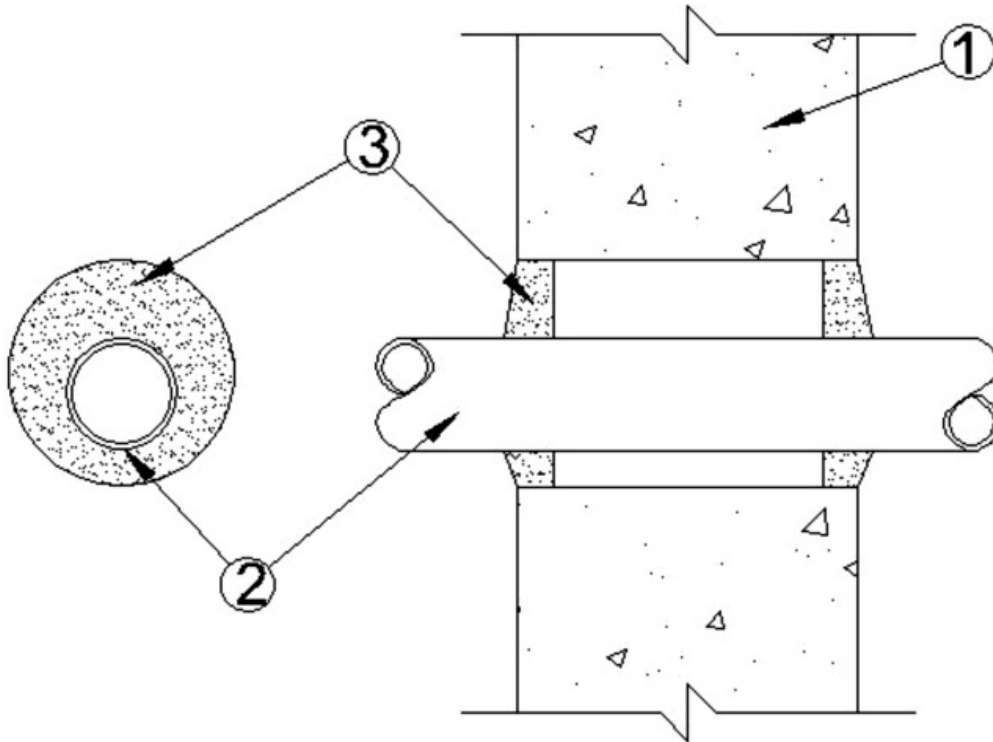
## Through-penetration Firestop Systems

System No. W-J-2219

October 28, 2020

F Rating — 2 Hr

T Rating — 0 Hr



1. **Wall Assembly** — Min 6 in. (152 mm) thick normal weight or lightweight (100-150 pcf) (1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 4 in. (102 mm) See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Nonmetallic Pipe** — One nonmetallic pipe or conduit to be installed either concentrically or eccentricity within the firestop system. The annular space between the through penetrant and the periphery of the opening shall be a min 5/8 in. (16 mm) to a max 1 in. (25 mm). Pipe or conduit to be rigidly supported on both sides of wall assembly. The following types of nonmetallic pipes or conduits may be used:

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

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 2 in. (51 mm) diam (or smaller) SDR 13.5 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 Article 347 of the National Electrical Code, (NFPA No. 70).

D. **Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 2 in. (51 mm) diam Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) pipingsystems.

3. **Fill, Void, or Cavity Materials\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Additional fill material to be installed such that a min 1/4 in. (6 mm) thick crown is formed around the through penetrant on both surfaces of wall.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

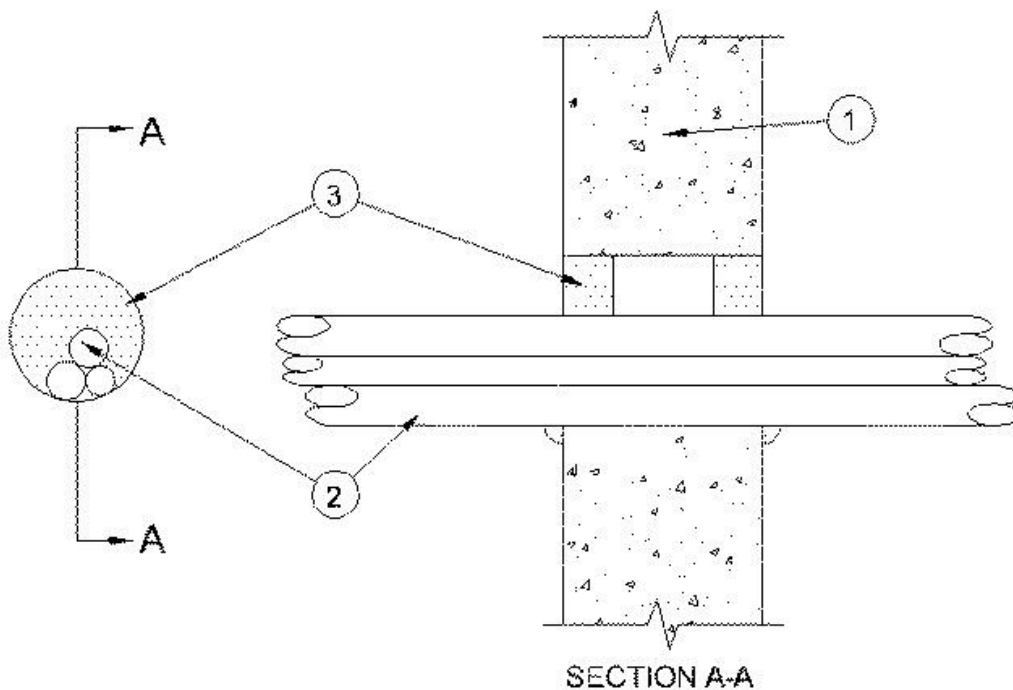


System No. W-J-2356

November 23, 2020

F Rating — 2 Hr

T Rating — 0 Hr



1. **Wall Assembly** — Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf) (1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 4 in. (102 mm). See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

2. **Through-Penetrants** — Multiple nonmetallic pipes, tubing or conduit installed within opening. Aggregate cross-sectional area of penetrants in opening to be max 33 percent of the aggregate cross-sectional area of the opening. Annular space between pipes, tubing or conduit and edge of opening shall be min 0 in. (point contact) to max 1 in. (25 mm). Separation between pipes, tubing or conduit shall be min 0 in. (point contact). Pipes, tubing or conduit to be rigidly supported on both sides of wall assembly. The following types of pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 1-1/2 in. (38 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 1-1/2 in. (38 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

C. **Rigid Nonmetallic Conduit\*** — Nom 1-1/2 in. (38 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with Article 347 of the National Electrical Code (NFPA No. 70).

D. **Crosslinked Polyethylene (PEX) Tubing** — Nom 1 in. (25 mm) diam (or smaller) SDR 7.3 or 9 PEX tubing for use in closed (process or supply) piping systems.

3. **Fill, Void or Cavity Material\* - Sealant** — Min 5/8 in. (16 mm) thickness of sealant applied within annulus, flush with both surfaces of wall assembly.

**SODAL ACCUMETRIC** — Boss 816+

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

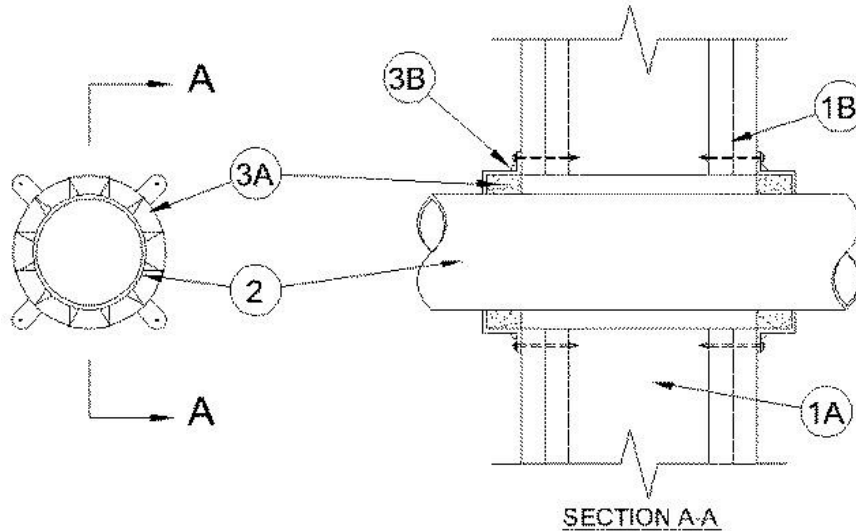
## Through-penetration Firestop Systems

System No. W-L-2409

November 06, 2008

F Rating — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr



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

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

B. **Gypsum Board\*** — Min 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers and orientation shall be as specified in the individual U300 or U400 Wall and Partition Design. Max diam of opening is 4 in.

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

2. **Through Penetrant** — One nonmetallic pipe to be centered within the firestop system. Annular space to be min 1/4 in. Pipe to be located near the center of the stud cavity width and to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 3 in. 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 3 in. diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

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

A. **Firestop Device\*** — Galvanized or stainless steel collar lined with an intumescent material sized to fit specific diam of the through penetrant. Device to be installed around the through penetrant and to both surfaces of wall in accordance with accompanying installation instructions. Device incorporates four anchor tabs for securement to the wall by means of 1/8 in. diam by 2 in. long steel hollow wall anchors in conjunction with 1/4 in. by 5/8 in. diam washers.

**ACCUMETRIC L L C** — Boss 819 Pipe Collar

**B. Fill Void or Cavity Materials\* - Sealant** — Min 3/16 in. thick bead of fill material applied around annulus at the firestop device / wall surface interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814

\*Bearing the UL Classification Mark

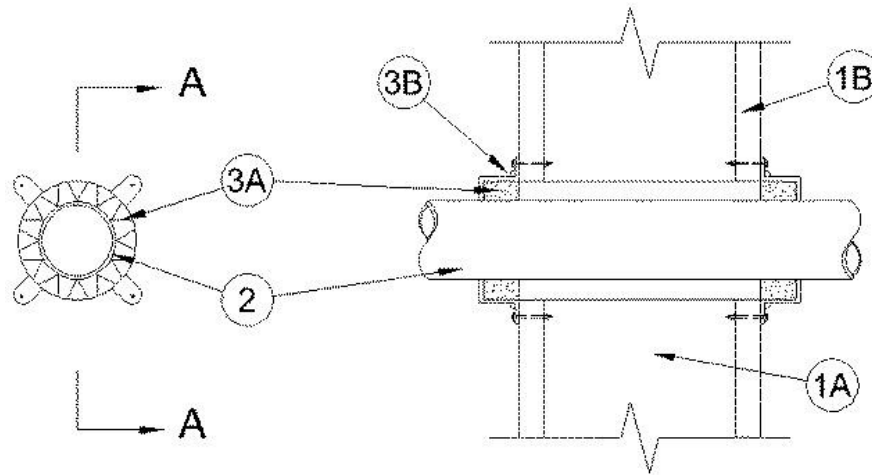
## Through-penetration Firestop Systems

System No. W-L-2410

November 06, 2008

F Rating — 1 Hr

T Rating — 0 Hr



SECTION A-A

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

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

B. **Gypsum Board\*** — Min 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers and orientation shall be as specified in the individual design. Max diam of opening is 3 in.

2. **Through Penetrant** — One nonmetallic pipe to be centered within the firestop system. Annular space to be min 5/16 in. Pipe to be located near the center of the stud cavity width and to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 2 in. 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 2 in. diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply).

C. **Rigid Nonmetallic Conduit+** — Nom 2 in. diam (or smaller) Schedule 40 PVC conduit installed in accordance with Articles 347 and 710 of the National Electrical Code (NFPA No. 70).

D. **Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 2 in. diam (or smaller) Schedule 40 solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

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

A. **Firestop Device\*** — Galvanized or stainless steel collar lined with an intumescent material sized to fit specific diam of the through penetrant. Device to be installed around the through penetrant and to both surfaces of wall in accordance with accompanying installation instructions. Device incorporates four anchor tabs for securement to the wall by means of 1/8 in. diam by 2 in. long steel hollow wall anchors in conjunction with 1/4 in. by 5/8 in. diam washers.

**ACCUMETRIC L L C** — Boss 819 Pipe Collar

**B. Fill Void or Cavity Materials\* - Sealant** — Min 3/16 in. thick bead of fill material applied around annulus at the firestop device / wall surface interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814

\*Bearing the UL Classification Mark

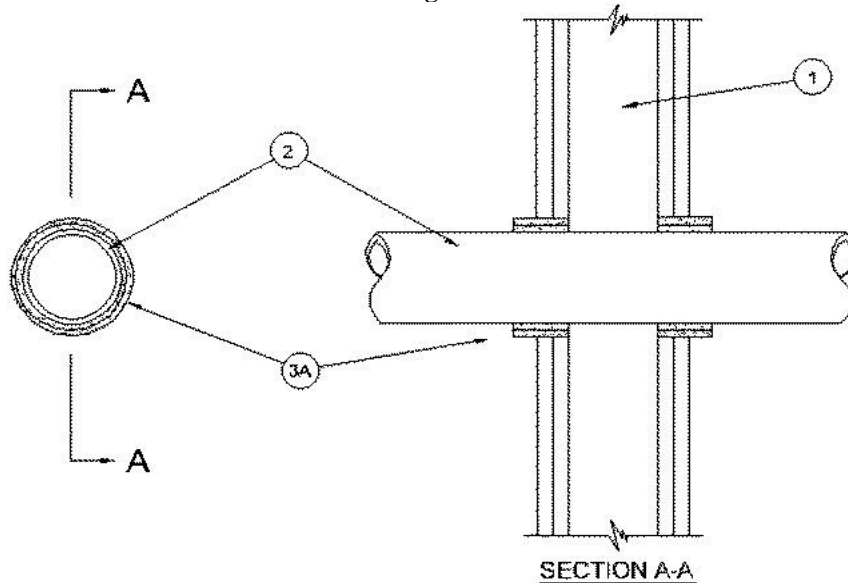
## Through-penetration Firestop Systems

System No. W-L-2419

November 07, 2008

F Rating — 2 Hr

T Rating — 2 Hr



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

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

B. **Gypsum Board\*** — Min 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U300 or U400 Wall and Partition Design. Max diam of opening is 5-1/2 in.

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

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

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

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

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

A. **Fill, Void or Cavity Material\* - Wrap Strip** — Two layers of nom 1/4 in. thick by 2 in. wide intumescent wrap strip individually wrapped around the outer circumference of the pipe and slid into the annular space such that wrap strip extends 3/4 in. beyond both surfaces of wall. Butted ends in successive layers shall be offset. Wrap strip secured with tape, wire or tie wire.

**ACCUMETRIC L L C** — Boss 817 Wrap Strip

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-2519

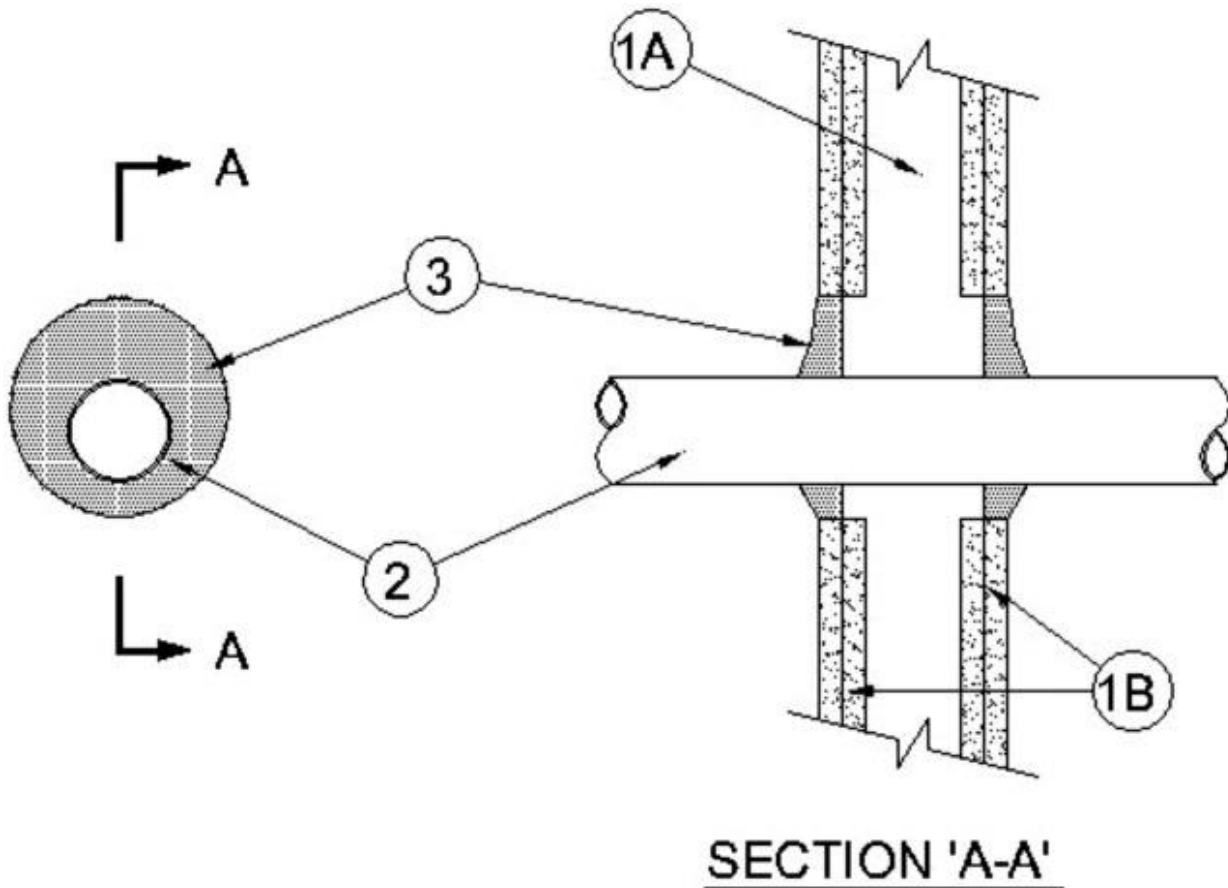
October 29, 2020

F Ratings — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



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

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

B. **Gypsum Board\*** — Nom 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board thickness, type, number of layers, fasteners type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 4 in. (102 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. **Nonmetallic Pipe** — One nonmetallic pipe or conduit to be installed either concentrically or eccentricity within the firestop system. The annular space between the through penetrant and the periphery of the opening shall be a min 5/8 in.(16 mm) to a max 1 in. (25 mm). Pipe or conduit to be rigidly supported on both sides of wall assembly. The following types of nonmetallic pipes or conduits may be used:

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

B. **Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 2 in. (51 mm) diam (or smaller) SDR 13.5 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. **Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 2 in. (51 mm) diam Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

3. **Fill, Void, or Cavity Materials\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Additional fill material to be installed such that a min 1/4 in. (6 mm) thick crown is formed around the through penetrant at both surfaces of wall.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

+ Bearing the UL Listing Mark



System No. W-L-2680

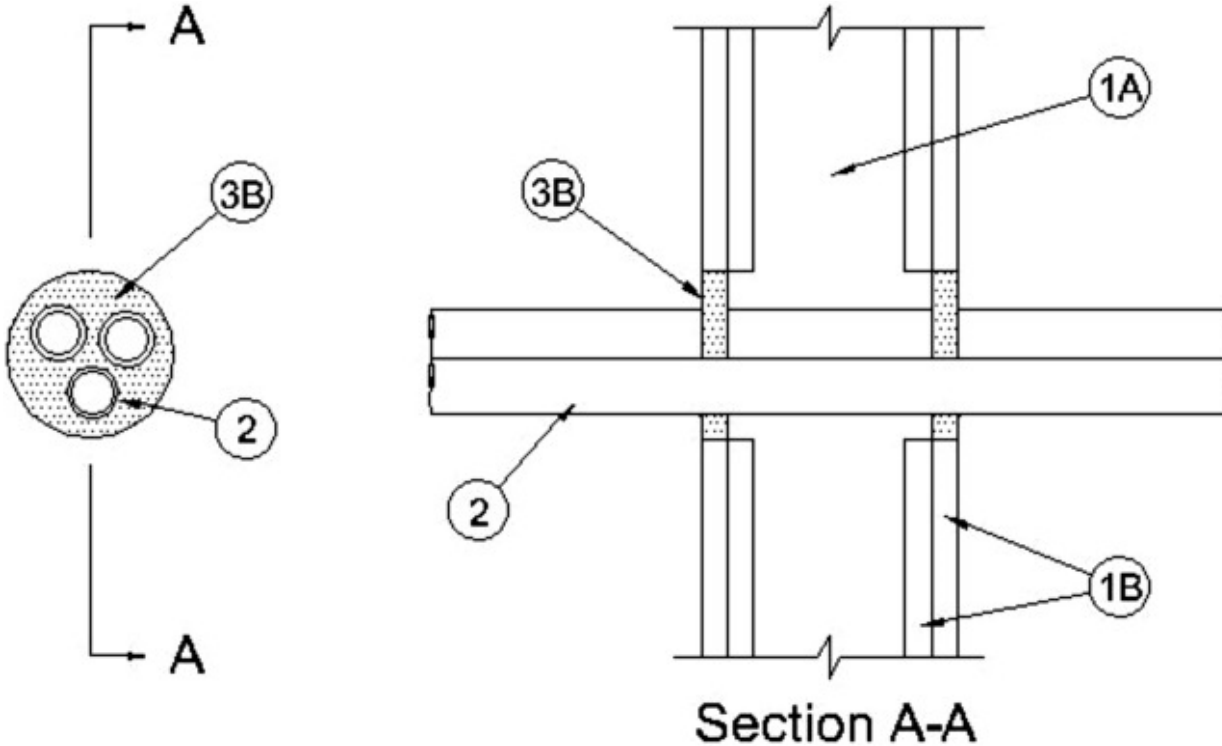
January 25, 2021

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

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

L Rating At Ambient - Less Than 1 CFM/sq ft

L Rating At 400 F - Less Than 1 CFM/sq ft



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

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

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

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

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

2. **Through Penetrant** — Nom 1 in. (25 mm) diam (or smaller) SDR 9 (or heavier) cross-linked polyethylene (PEX) tubing for use in closed (process or supply) piping systems. A max of three tubes to be bundled together and installed eccentrically or concentrically within the firestop

system. Of the three tubes, a max of one shall have a nom diam greater than 3/4 in. (19 mm). The annular space between the tubing and the periphery of the opening shall be min 5/8 in. to max 1-1/4 in. Separation between the tubing shall be a min 0 in. (point contact) to max 3/8 in. (10 mm). Tubing to be rigidly supported on both sides of the wall assembly.

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

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

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

**SODAL ACCUMETRIC** — Boss 816+

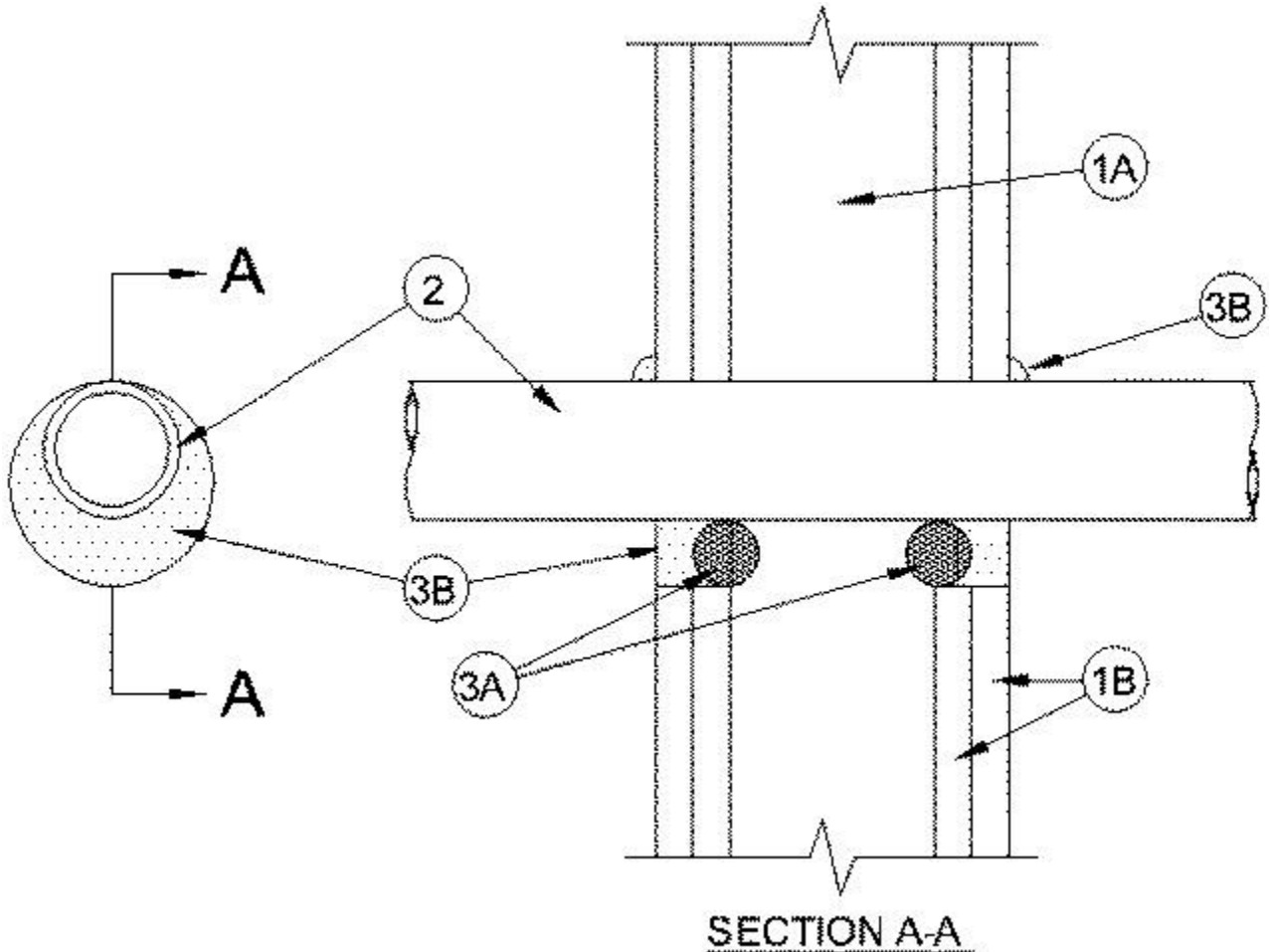
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. W-L-2794

November 23, 2020

F Ratings — 1 and 2 Hr (See Item 1)

T Ratings — 1 and 2 Hr (See Item 1)



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

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

B. **Gypsum Board\*** — 5/8 in. (16 mm) thick, 4 feet (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Maximum diameter of opening is 3-5/8 in. (92 mm).

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

2. **Nonmetallic Pipe** — One non-metallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 (point contact) to max 1-1/4 in. (32 mm). Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of non-metallic pipes may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 2 in. (51 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 2 in. (51 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

**C. Electrical Non-Metallic Tubing (ENT)** — Nom 2 in. (51 mm) (or smaller) PVC tubing installed in accordance with Article 331 of the National Electrical Code (NFPA 70).

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

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

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

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

**SODAL ACCUMETRIC** — Boss 816+

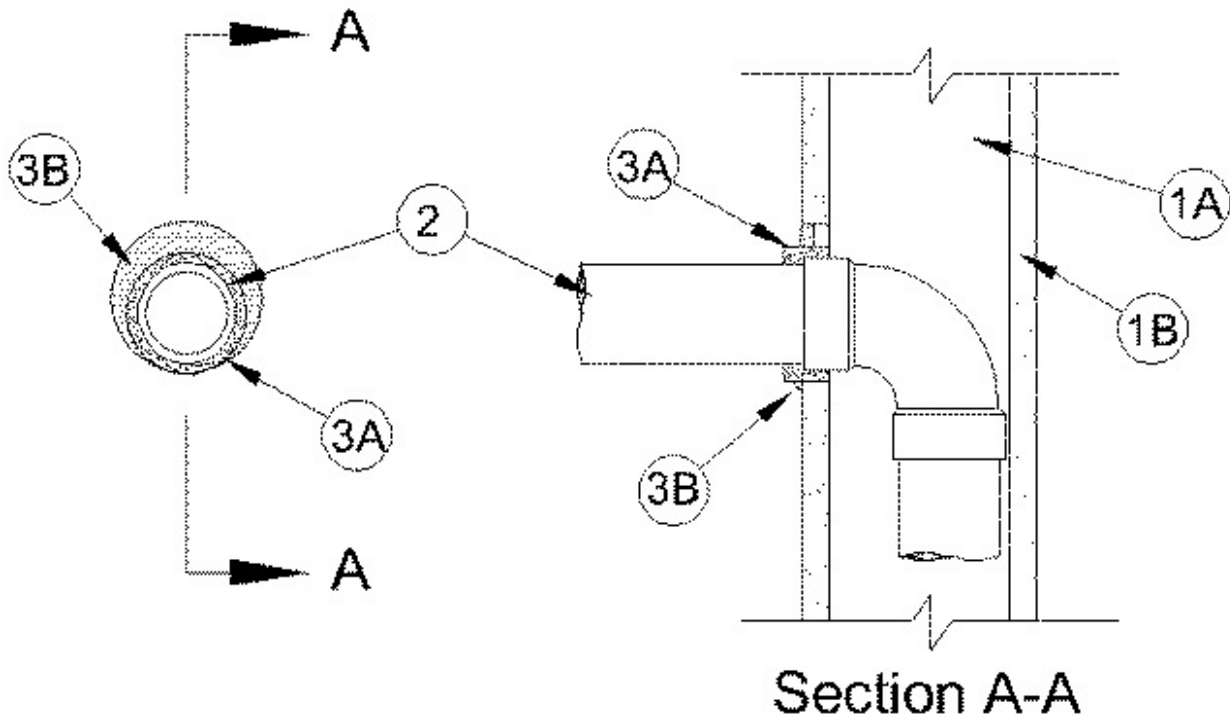
\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

System No. W-L-2799

January 25, 2021

F Rating — 1 Hr

T Rating — 3/4 Hr



1. **Wall Assembly** — The 1 hr fire-rated gypsum board/stud wall assembly 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** — Wall framing shall consist of wood studs. Wood studs to consist of nom 2 by 6 in. (51 by 152 mm) lumber spaced 16 in. (406 mm) OC.

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual U300 Wall and Partition Design. Max diam of opening is 5-1/2 in. (140 mm).

2. **Through Penetrants** — One nonmetallic pipe installed within stud cavity and connected to a 90° elbow. Additional nonmetallic pipe connected to elbow and penetrates one side of wall concentrically or eccentrically within the opening. The annular space between nonmetallic pipe and periphery of opening shall be min 1/2 in (13 mm) to max 1 in. (25 mm). Pipe to be rigidly supported within wall and on penetrated side of wall assembly. The following types and sizes of nonmetallic pipes may be used:

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

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

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

A. **Fill, Void or Cavity Material\* - Wrap Strip** — Nom 1/4 in. (6 mm) thick by 1 in. (25 mm) wide intumescent wrap strip. Two layers of wrap strip are individually wrapped around the through-penetrant with ends butted and held in place with tie wire. Butted ends in successive layer shall be offset. Wrap strips extend 1/4 in. (6 mm) beyond surface of wall.

**SODAL ACCUMETRIC – BOSS 817 Wrap Strip**

**B. Fill, Void or Cavity Material\* - Caulk** — Min 1/4 in. (6 mm) thickness of fill material applied between wrap strip and periphery of opening, flush with surface of wall.

**SODAL ACCUMETRIC - Boss 816+**

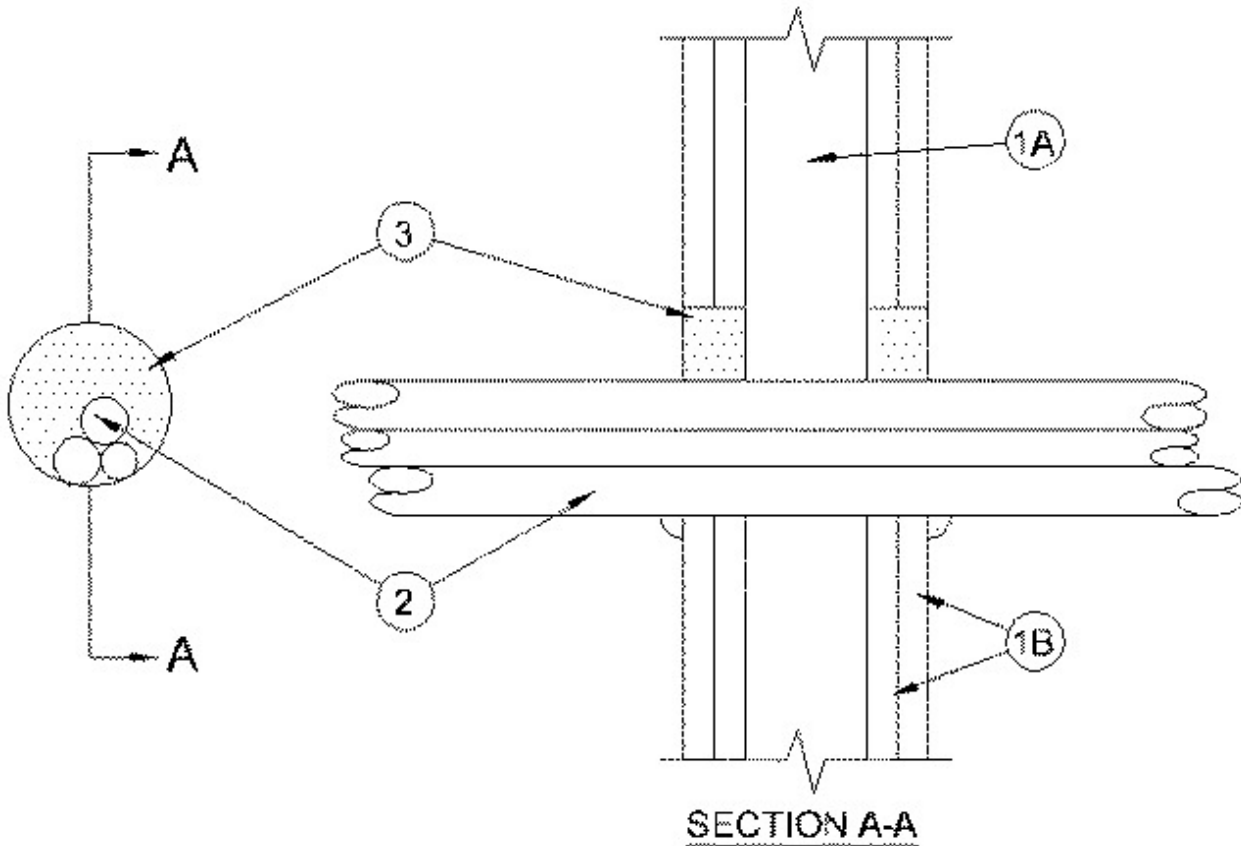
**\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

System No. W-L-2800

January 25, 2021

F Ratings — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr



1. **Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 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. Steel studs to be min 3-1/2 in. (89 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. **Gypsum Board\*** — Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 4 in. (102 mm).

**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-Penetrants** — Multiple nonmetallic pipes, tubing or conduit installed within opening. Aggregate cross-sectional area of penetrants in opening to be max 33 percent of the aggregate cross-sectional area of the opening. Annular space between pipes, tubing or conduit and edge of opening shall be min 0 in. (point contact) to max 1 in. (25 mm). Separation between pipes, tubing or conduit shall be min 0 in. (point contact). Pipes, tubing or conduit to be rigidly supported on both sides of wall assembly. The following types of pipes, tubing or conduit may be used:

A. **Polyvinyl Chloride (PVC) Pipe** — Nom 1-1/2 in. (38 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 1-1/2 in. (38 mm) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

C. **Rigid Nonmetallic Conduit+** — Nom 1-1/2 in. (38 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 1 in. (25 mm) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.

3. **Fill, Void or Cavity Material\*- Sealant** — Min 5/8 in. (16 mm) thickness of sealant applied within annulus, flush with both surfaces of wall assembly. A min 1/4 in. (6 mm) diam bead of caulk shall be applied to the penetrant/gypsum board interface at the point contact location on both sides of wall.

**SODAL ACCUMETRIC - Boss 816+**

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

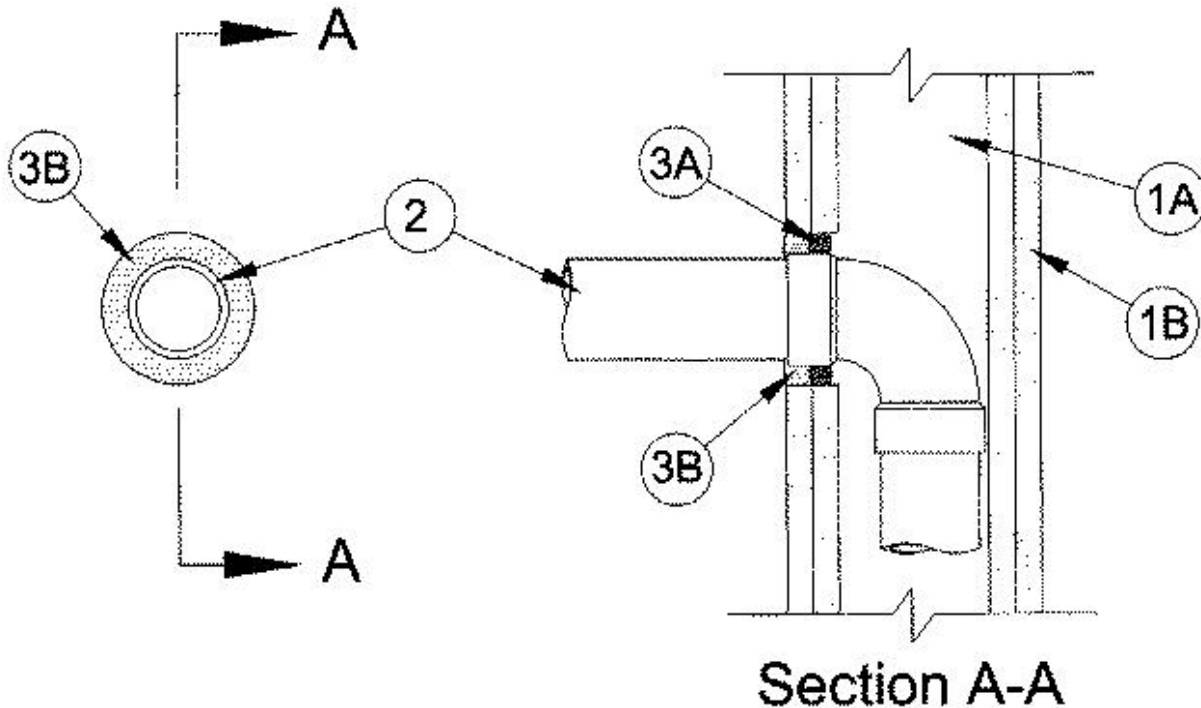


System No. W-L-2802

January 25, 2021

F Ratings — 1 and 2 Hr (See Item 1)

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



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 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. **Studs** — Wall framing shall consist of wood studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC.

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers and orientation shall be as specified in the individual U300 Wall and Partition Design. Max diam of opening is 3-5/8 in. (92 mm).

**The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. The hourly T Rating of the firestop system is 1 when installed in 1 hr rated walls. The hourly T Rating of the firestop system when installed in 2 hr rated walls is dependent upon which side of the wall is exposed to the fire. If the side opposite the pipe is exposed, the T Rating is 1-3/4 hr. If the side containing the pipe is exposed, the T Rating is 2 hr.**

2. **Through Penetrants** — One nonmetallic pipe installed within stud cavity and connected to a 90° elbow. Additional nonmetallic pipe connected to elbow and penetrates one side of wall concentrically within the opening. The annular space between nonmetallic pipe and periphery of opening shall be nom 5/8 in. Pipe to be rigidly supported within wall and on penetrated side of wall assembly. The following types and sizes of nonmetallic pipes may be used:

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

B. **Acrylonitrile Butadiene Styrene (ABS) Pipe** — Nom 2 in. (51 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

**C. Chlorinated Polyvinyl Chloride (CPVC) Pipe** — Nom 2 in. (51 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

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

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

**B. Fill, Void or Cavity Material\*—Caulk** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with surface of wall.

**SODAL ACCUMETRIC - Boss 816+**

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

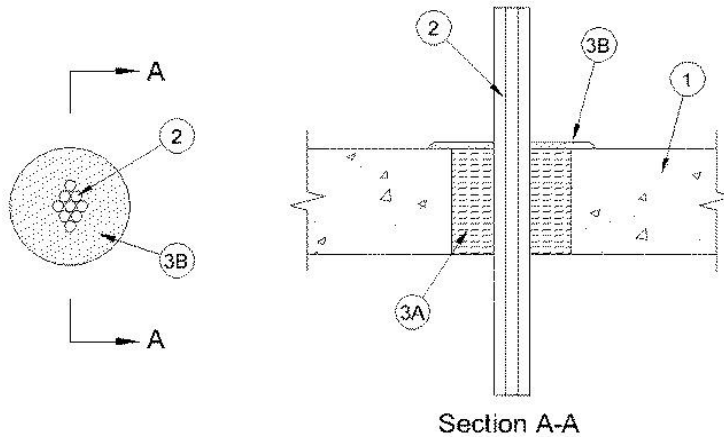
## Through-penetration Firestop Systems

System No. C-AJ-3249

November 07, 2008

F Rating — 2 Hr

T Rating — 2 Hr



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

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

2. **Cables** — Aggregate cross-sectional area of cables in opening to be max 2 percent of the cross-sectional area of the opening. Cable bundle to be centered within opening and rigidly supported on both sides of floor or wall assembly. Any combination of the following types and sizes of cables may be used:

- A. Max 2/C No. 18 AWG with polyvinyl chloride (PVC) insulation and jacket materials.
- B. Max 4 pair No. 24 AWG telephone cable with PVC insulation and jacket materials.
- C. Max RG/U (or smaller) coaxial cable with fluorinated ethylene insulation and jacket materials.
- D. Max 3/C (with ground) No. 14 AWG (or smaller) nonmetallic sheathed (Romex) cable with PVC insulation and jacket materials.

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

A. **Fill, Void or Cavity Materials\* - Foam** — Min 4-1/2 in. (114 mm) thickness of fill material within the annulus, flush with top surface of floor or with both surfaces of wall.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

B. **Fill, Void or Cavity Materials\* - Sealant** — Min 1/4 in. (6 mm) thickness of fill material applied over foam (Item 3B) on top surface of floor or on both surfaces of wall. Fill material shall overlap a min of 1 in. (25 mm) beyond periphery of opening on top surface of floor or on both surfaces of wall.

**ACCUMETRIC L L C** — Boss 136 or 139 Sealant

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. C-AJ-3295

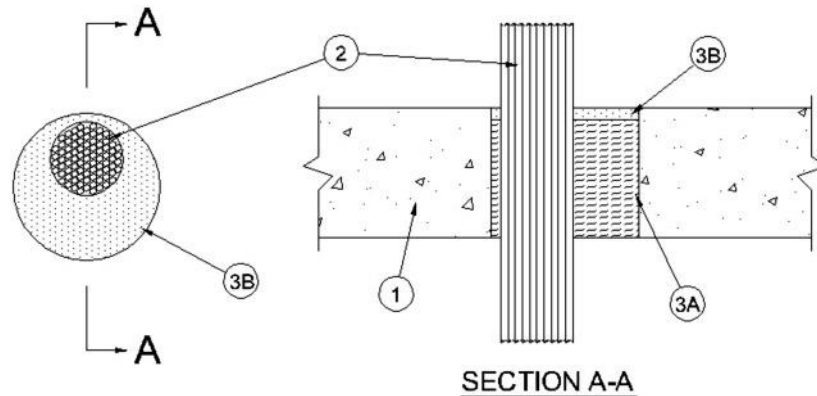
April 10, 2008

F Rating — 2 Hr

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — 1.4 CFM/sq ft



1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete floor or min 5 in. (127 mm) thick reinforced lightweight or normal weight wall. Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units**\*. Max diam of the opening is 6 in. (152 mm).

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

2. **Cables** — Aggregate cross-sectional area of cables in opening to be max 25 percent of the cross-sectional area of the opening. Cables installed individually or in bundles having a max bundle diam of 3 in. (76 mm). The annular space between cable bundle and the periphery of the opening shall be min 3/8 in. (10 mm) to max 2-5/8 in. (67 mm). Cables to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of cables may be used:

- A. Max 100 pair No. 24 AWG (or smaller) copper conductor cable with polyvinyl chloride (PVC) jacketing and insulation.
- B. Max 3/C No. 2/0 AWG (or smaller) aluminum conductor service entrance cable with PVC insulation and jacket.
- C. Max 3/C with ground No. 12 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
- D. Max 1/C No. 350 kcmil (or smaller) copper conductor power cable with XLPE (cross-linked polyethylene) or PVC insulation and XLPE or PVC jacket.
- E. Max RG59/U (or smaller) copper conductor coaxial cable with fluorinated ethylene insulation and jacketing.
- F. Max 62.5/125 fiber optic cable with PVC insulation and jacketing.
- G. Max RG/6 No. 18 AWG Type copper conductor CATV coaxial cable with PVC insulation and jacket.
- H. Max 7/C No. 12 AWG (or smaller) copper conductor cable with XLPE or PVC insulation and jacket.

2A. **Through Penetrating Product\*** — (Not Shown) As an alternate to Item 2, max 3/C No. 2/0 AWG (or smaller) copper conductors aluminum or steel **Metal Clad Cable+**. One or more cables to be installed either concentrically or eccentrically within the firestop system. Aggregate cross-sectional area of cables in opening to be max 25 percent of the aggregate cross-sectional area of the opening. Cables installed individually or in bundles having a max bundle diam of 3 in. (76 mm). The annular space between the cable bundle and the periphery of the opening shall be a min 3/8 in. (10 mm) to a max 2-5/8 in. (67 mm). Cables to be rigidly supported on both sides of floor or wall assembly.

**AFC CABLE SYSTEMS INC**

**ALFLEX CORP**

**KAF-TECH INC**

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

A. **Packing Material** — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m<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 and hollow-core precast concrete units as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall or hollow-core precast concrete units. Additional sealant shall be forced into interstices of cable bundle to max extent possible.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

+Bearing the UL Listing Mark

## Through-penetration Firestop Systems

System No. C-AJ-6040

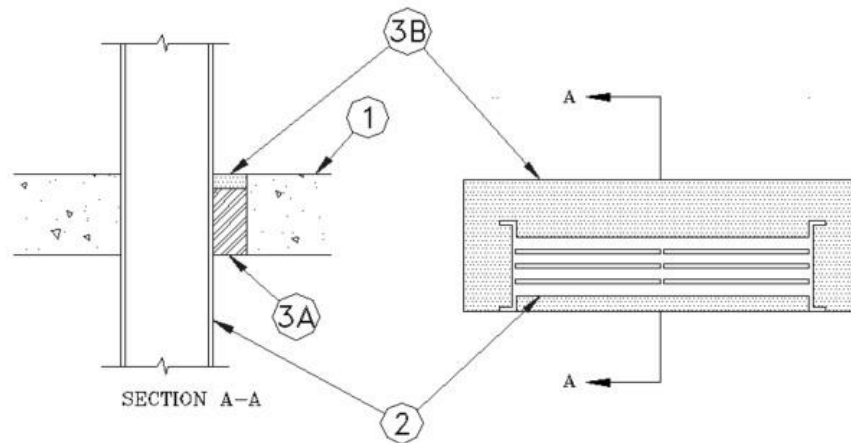
July 07, 2008

F Rating — 3 Hr

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



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 floor or min 5 in. (127 mm) thick reinforced lightweight or normal concrete wall. Wall may also be constructed of any UL classified **Concrete Blocks\***. Max area of opening is 345 sq.in. (2226 cm<sup>2</sup>) with max dimension of 28-1/2 in. (724 mm).

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

2. **Busway+** — Nom 19 in. (483 mm) wide (or smaller) by 6 in. (102 mm) deep "I" shaped aluminum and steel enclosure containing factory mounted aluminum bars rated for 600 V, 4000A.

One busway to be installed within the opening. The annular space between the flange tip of the busway and the periphery of the opening shall be min 0 in. (point contact) to max 5-1/8 in. (130 mm). The annular space between the web section of the busway and the periphery of the opening shall be a nom 8 in. (203 mm). Busway to be rigidly supported on both sides of floor or wall assembly. The busway shall bear the UL Listing Mark and shall be installed in accordance with all provisions of the National Electrical Code, NFPA 70.

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

A. **Packing Material** — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m<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 thickness of fill material.

B. **Fill, Void, or Cavity Materials\* - Caulk** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor and both surfaces of wall.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

+ Bearing the UL Listing Mark

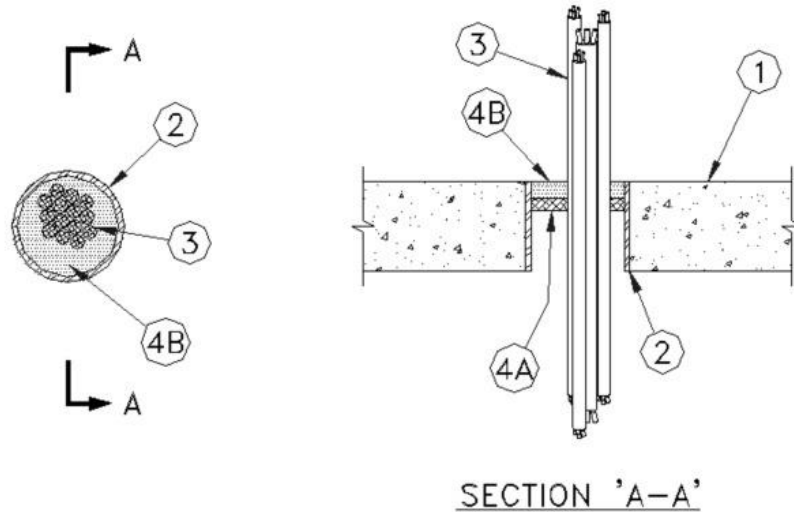
## Through-penetration Firestop Systems

System No. C-AJ-3296

July 10, 2008

F Rating — 3 Hr

T Rating — 1/2 Hr



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

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

2. **Metallic Sleeve** — (Optional) — Nom 6 in. (152 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

3. **Cables** — Aggregate cross-sectional area of cables in sleeve or opening to be max 19 percent of the cross-sectional area inside the sleeve/opening or a max 2-9/16 in. (65 mm) diam cable bundle may be used. The annular space between cables and periphery of opening shall be min of 0 in. (point contact) to max 3-1/8 in. (79 mm). Cables to be bundled together and rigidly supported on both sides of floor or wall assembly. Any combination of the following types and sizes of cable may be used:

- A. Max 400 pair No. 24 AWG telephone communication cable with PVC insulation and jacket.
- B. Max 62.5/125 fiber optic cable with PVC insulation and jacketing.
- C. Max 4/C No. 2/0 AWG (or smaller) aluminum or copper conductor aluminum or steel jacketed Metal-Clad or Armored-Clad cable.
- D. Max 7/C No. 12 AWG copper conductor power and control cables; XLPE or PVC insulation with XLPE or PVC jacket.
- E. Max RG59/U (or smaller) coaxial cable with fluorinated ethylene insulation and jacketing.
- F. Type RG 59/U coaxial cable with polyethylene (PE) insulation and PVC jacket.

4. **Firestop System** — The details of the firestop system shall be as follows:

A. **Packing Material** — Min 1 in. (25 mm) thick backer rod, mineral wool or fiberglass batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or both surfaces of wall as required to accommodate the required thickness of fill material. When the floor is constructed of hollow-core precast concrete units, packing material shall be installed symmetrically on both sides of floor and recessed from both floor surfaces.

**B. Fill, Void or Cavity Materials\*** — Min 1in. (25 mm) thickness of fill material applied within annulus, flush with top surface of floor or both surfaces of wall assembly. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed symmetrically on both sides of floor, flush with both floor surfaces.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark



## Through-penetration Firestop Systems

System No. C-AJ-8195

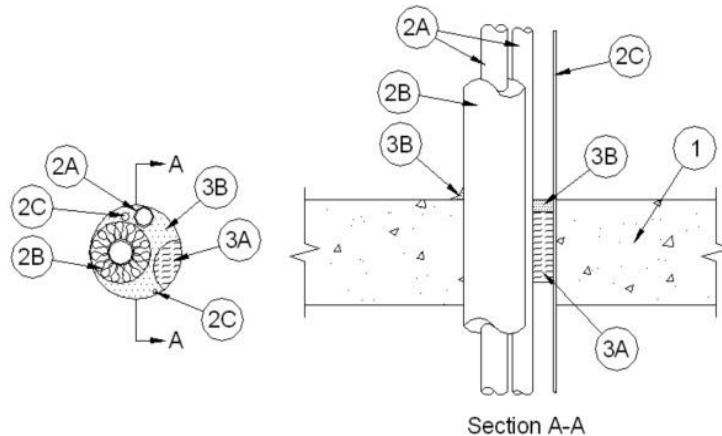
June 24, 2008

F Rating — 2 Hr

T Rating — 0 Hr

L Rating at Ambient — Less than 1 CFM/sq ft

L Rating at 400° F — Less than 1 CFM/sq ft



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. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units\***. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Max diam of opening is 4 in. (102 mm).

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

2. **Through Penetrants** — Metallic pipes, tubing or cable to be installed either concentrically or eccentrically within the firestop system. Penetrants to be rigidly supported on both sides of floor assembly. The following types and sizes of penetrants may be used:

A. **Metallic Pipes** — Max two metallic pipes or tubing. The annular space between penetrant and periphery of opening shall be min 0 in. (point contact) to max 2-1/4 in. (57 mm). The following types and sizes of metallic pipes or tubing may be used:

A1. **Copper Tubing** — Nom 1 in. (25 mm) diam (or smaller) Type M (or heavier) copper tube.

A2. **Copper Pipe** — Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.

A3. **Steel Pipe** — Nom 1 in. (25 mm) diam (or smaller) Schedule 10 steel pipe.

B. **Tube Insulation - Plastics+** — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on all tubing. The annular space between the insulated penetrating item and uninsulated metallic pipes, conduit or tubing shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm) The annular space between the insulated penetrating item and the periphery of the opening shall be min 0 in. (point contact) to max 2-1/4 in. (57 mm).

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

C. **Cables** — Max two cables spaced min 0 in. (point contact) from tube insulation or min 1/2 in. (13 mm) from other penetrants. The annular space between cable and periphery of opening is min 0 in. (point contact) to max 2-1/4 in. (57 mm). Cables to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of cables may be used:

C1. Max 7/C No. 24 AWG (or smaller) control cable with polyvinyl chloride (PVC) insulation and jacket.

C2 NMax 2/C No. 10 AWG (or smaller) thermostat wire.

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

A. **Packing Material** — Min 3 in. (76 mm) thickness of min 4 pcf (64 kg/m<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 both surfaces of wall to accommodate the required thickness of fill material. When the floor is constructed of hollow-core precast concrete units, packing material shall be recessed from both surfaces of floor to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall. Min 1/2 in. (13 mm) diam bead of fill material applied to the penetrant/concrete interface at the point contact location on the top surface of floor or both surfaces of wall. When the floor is constructed of hollow-core precast concrete units, fill material shall be installed flush with both surfaces of floor. Sealant shall be forced into interstices between penetrants to max extent possible.

**ACCUMETRIC L L C** — Boss 816

\*Bearing the UL Classification Mark

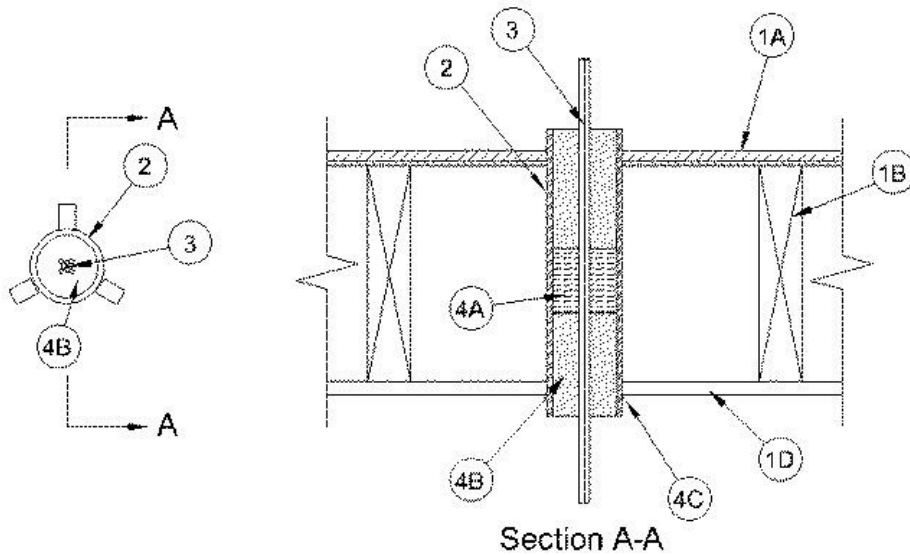
## Through-penetration Firestop Systems

System No. F-C-3090

November 07, 2008

F Rating — 1 Hr

T Rating — 1 Hr



1. **Floor or Wall Assembly** — The 1 hr fire-rated wood joist, 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 Design 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 floor opening is 3 in. (76 mm).

B. **Joists** — Nom 2 by 10 in. (51 by 254 mm) deep (or deeper) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped or steel or combination lumber and steel joists, trusses or **Structural Wood Members\*** with bridging as required and with ends firestopped.

C. **Furring Channels** — (Not Shown) - Resilient galv steel furring channels installed perpendicular to wood joists (Item 1B) as required in the individual Floor-Ceiling Design.

D. **Gypsum Board\*** — Nom 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Max diam of opening is 3 in. (76 mm).

1. **Chase Wall** — (Optional, Not Shown) - The through penetrant (Item 2) may be routed through a 1 hr fire rated single, double or staggered wood stud/gypsum board chase wall 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 3 in. (76 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 3 in. (76 mm).

D. **Gypsum Board\*** — Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.

2. **Steel Sleeve** — Cylindrical sleeve fabricated from min 0.030 in. (0.76 mm) thick galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Length of sleeve to be equal to thickness of floor-ceiling assembly plus 2 in. (51 mm) such that, when installed, the ends of the sleeve will project approx 1 in. (25 mm) above the top surface of

floor and 1 in. (25 mm) below the bottom surface of ceiling or lower top plate of chase wall assembly. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the openings and releasing the coil to let it uncoil against the circular cutouts in the plywood floor and gypsum board ceiling or top plates of chase wall assembly. As a final step, three nom 1/2 in. (13 mm) wide by 1 in. (25 mm) long mounting tabs shall be formed bent at 90° towards the surface of the floor.

3. **Cables** — Aggregate cross-sectional area of cables in opening to be max 5 percent of the aggregate cross-sectional area of the opening. Cable bundle to be centered within opening and rigidly supported on both sides of floor-ceiling assembly. Any combination of the following types and sizes of cables may be used:

- A. Max 2 /C No. 18 AWG with polyvinyl chloride (PVC) insulation and jacket materials.
- B. Max 4 pair No. 24 AWG telephone cable with PVC insulation and jacket materials.
- C. Max RG/U (or smaller) coaxial cable with fluorinated ethylene insulation and jacket materials.
- D. Max 3/C (with ground) No. 14 AWG (or smaller) nonmetallic sheathed (Romex) cable with PVC insulation and jacket materials.

4. **Firestop System** — The details of the firestop system shall be as follows:

A. **Packing Material** — Min 3 in. (76 mm) thickness of min 4 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 and bottom surface of ceiling or lower top plate of chase wall assembly to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Foam** — Min 4-1/2 in. (114 mm) thickness of fill material applied within the annulus on both top and bottom surfaces of mineral wool insulation. Foam installed flush with both ends of steel sleeve.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

C. **Fill, Void or Cavity Material\* - Sealant** — Prior to the fabrication of the mounting tabs of the steel sleeve (Item 2), min 1/4 in. (6 mm) diam bead of fill material applied around the outer circumference of steel sleeve at on top surface of floor and bottom surface of ceiling or lower top plate of chase wall assembly.

**ACCUMETRIC L L C** — Boss 136 or 139 Sealant

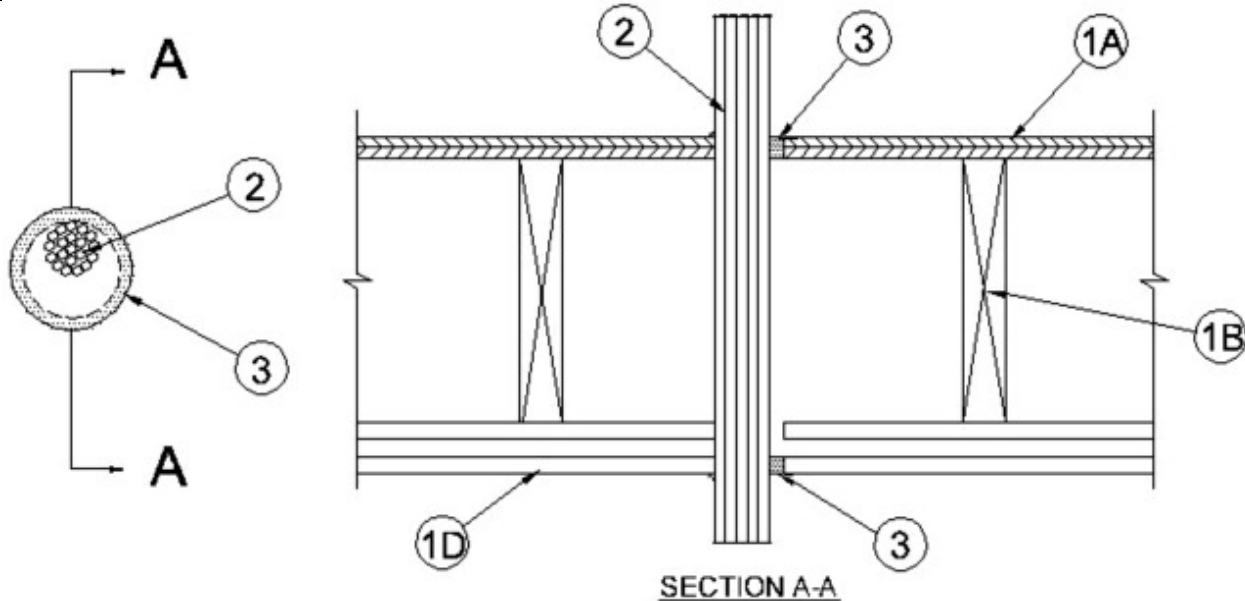
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. F-C-3104

October 26, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings – 1 and 2 Hr (See Item 1)	F Ratings -1 and 2 Hr (See Item 1)
	FH Ratings -1 and 2 Hr (See Item 1)
T Rating - 0 Hr	FT Ratings - 0 Hr
	FTH Ratings -0 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less than 1 CFM/sq ft
L Rating At 400 F - 1.4 CFM/sq ft	L Rating At 400 F - 1.4 CFM/sq ft



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 2 hr fire-rated wood joist floor ceiling assembly shall be constructed of the materials and in the manner specified in Design Nos. L505, L511 or L536 in the UL Fire Resistance Directory. The general construction features 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 floor opening is 4 in. (102 mm).

B. **Wood Joists\*** — For 1 hr fire-rated floor-ceiling assemblies 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 fireblocked. For

2 hr fire-rated floor-ceiling assemblies, nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends fireblocked.

C. **Furring Channels (Not Shown)** — In 2 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between first and second layers of gypsum board (Item 1D). Furring channels spaced max 24 in. (610 mm) OC. In 1 hr fire-rated assemblies, resilient galv steel furring installed perpendicular to wood joists between gypsum board and wood joists as specified in the individual Floor-Ceiling Design. Furring channels spaced max 24 in. (610 mm) OC.

D. **Gypsum Board\*** — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. First layer of gypsum board secured to wood joists or furring channels as specified in the individual Floor-Ceiling Design. Second layer of gypsum board (2 hr fire-rated assembly) screw-attached to furring channels as specified in the individual Floor-Ceiling Design. Max diam of ceiling opening is 4 in. (102 mm).

**The F Rating of the firestop system is equal to the hourly fire rating of the floor-ceiling assembly in which it is installed.**

1.1 **Chase Wall** — (Optional, Not Shown) — The through penetrants (Item 2) may be routed through a 1 or 2 hr fire-rated single, double or staggered wood stud/gypsum board 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) lumber 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) lumber or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted.
- C. **Top Plate** — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) lumber plates or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted. Max diam of opening is 4 in. (102 mm).
- D. **Gypsum Board\*** — Thickness, type, number or layers and fasteners shall be as specified in individual Wall and Partition Designs.

2. **Cables** — Max 3-1/2 in. (89 mm) diam bundle tight bundle of cables to be installed either concentrically or eccentrically within the firestop system. The annular space between cable bundle and the periphery of the opening shall be a min 0 in. (point contact) to max 1/2 in. (13 mm). Penetrants to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of cables may be used:

- A. Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with PVC insulation and jacketing.
- B. Max 3/C No. 2/0 AWG (or smaller) aluminum conductor SER cable with PVC insulation and jacketing.
- C. Max 3/C with ground No. 12 AWG (or smaller) Type NM (Romex) nonmetallic sheathed cable with PVC insulation and jacketing.
- D. Max 7/C No. 12 AWG (or smaller) power/control cables with PVC insulation and jacketing.
- E. Max RG/U (or smaller) copper conductor coaxial cable with fluorinated ethylene insulation and jacketing materials.

2A. **Through Penetrating Products\*** — Max 4/C with ground No. 2 AWG (or smaller) aluminum or copper conductor aluminum jacketed Metal-Clad+ cable. Max one cable to be installed within the cable bundle. Max diam of cable bundle including this metal clad cable not to exceed 3- 1/2 in. (89 mm).

**GENERAL CABLE INDUSTRIES INC**

3. **Fill, Void or Cavity Material\* — Sealant** — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling or top plate. Fill material to forced within interstices of cable bundle to max extent possible. At point contact, min 3/8 in. (10 mm) diam bead of fill material applied at cable bundle/floor or sole plate interface and at cable bundle/ceiling or top plate interface. Additional sealant shall be applied in such a manner that the sealant overlaps a min 1/2 in. (13 mm) beyond the periphery of the opening on the top surface of the floor or sole plate and bottom surface of ceiling or bottom top plate.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

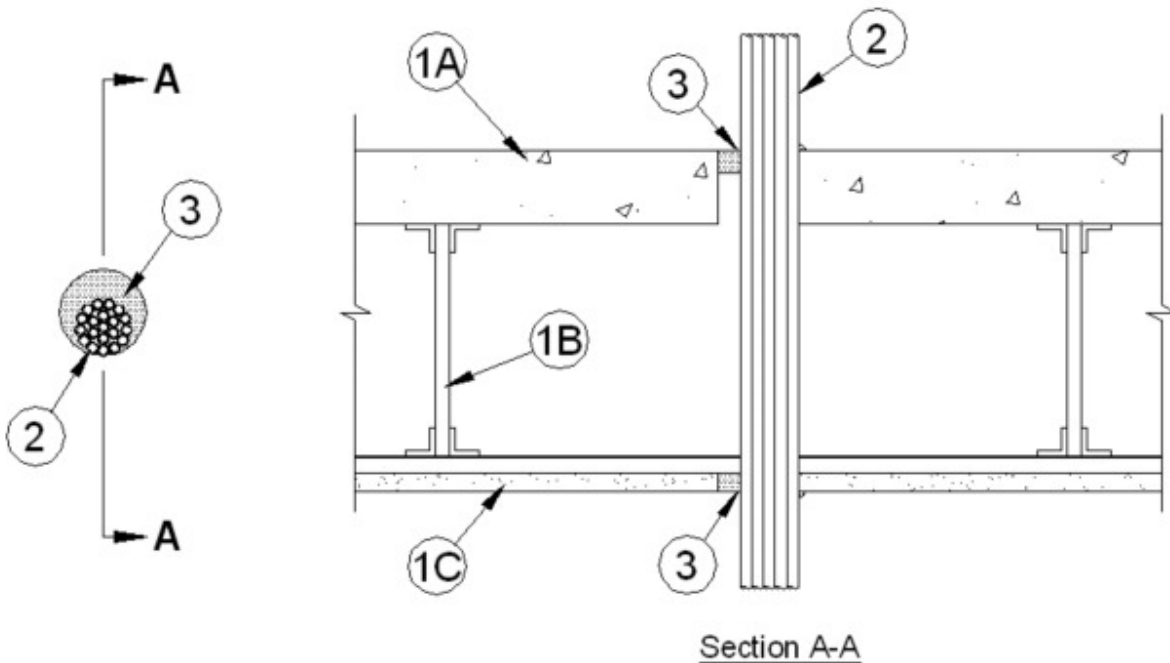
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## Through-penetration Firestop Systems

System No. F-E-3016

October 27, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating – 1 Hr	F Rating -1 Hr
	FH Rating -1 Hr
T Rating - 1 Hr	FT Rating -1 Hr
	FTH Rating -1 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less than 1 CFM/sq ft
L Rating At 400 F - 1.4 CFM/sq ft	L Rating At 400 F - 1.4 CFM/sq ft



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1. **Floor -Ceiling Assembly** — The 1 hr fire-rated concrete and steel joist Floor-Ceiling assembly shall be constructed of the materials and in the manner described in the individual G500 Series Design in the UL Fire Resistance Directory, as summarized below:

A. **Concrete Floor** — Normal weight or lightweight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete over metal lath or steel deck as specified in the individual G500 Series Design. Max diam of floor opening is 4 in. (102 mm).

B. **Joists** — Steel joists or **Structural Steel Members\*** as specified in the individual G500 Series Design.

C. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick, screw-attached to furring channels as specified in the individual G500 Series Design. Max diam of ceiling opening is 4 in. (102 mm).

2. **Cables** — Max 3-1/2 in. (89 mm) diam tight bundle of cables to be installed either concentrically or eccentrically within the firestop system. The annular space between cable bundle and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Penetrants to be located approx midway between joists and rigidly supported on both sides

of floor-ceiling assembly. The following types and sizes of cables may be used:

A. Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) insulation and jacketing.

- B. Max 3/C No. 2/0 AWG (or smaller) aluminum conductor SER cable with PVC insulation and jacketing.
- C. Max 3/C with ground No. 12 AWG (or smaller) Type NM (Romex) nonmetallic sheathed cable with PVC insulation and jacketing.
- D. Max 7/C No. 12 AWG (or smaller) power/control cables with PVC insulation and jacketing.
- E. Max RG/U (or smaller) copper conductor coaxial cable with fluorinated ethylene insulation and jacketing materials.

2A. **Through Penetrating Products\*** — Max 4/C with ground No. 2 AWG (or smaller) aluminum or copper conductor aluminum jacketed Metal-Clad+ cable. Max one cable to be installed within the cable bundle. Max diam of cable bundle including metal clad cable not to exceed 3-1/2 in. (89 mm).

#### **GENERAL CABLE INDUSTRIES INC**

3. **Fill, Void or Cavity Materials\*** — **Sealant** — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with top surface of floor. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of ceiling. Fill material to be forced within interstices of cable bundle to max extent possible. At point contact locations, min 1/4 in. (6 mm) diam bead of fill material applied at penetrant/concrete interface on top surface of floor and penetrant/gypsum board interface on bottom surface of ceiling.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark



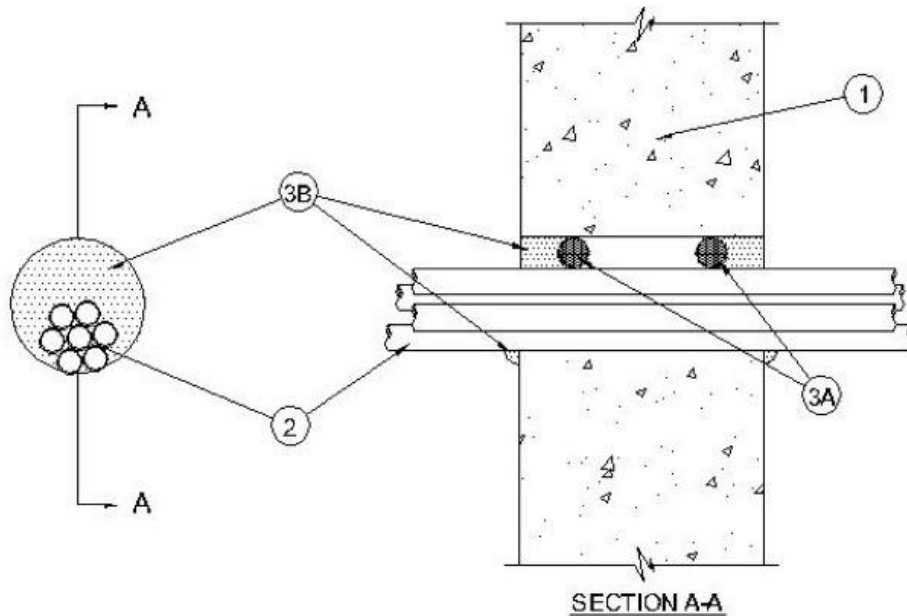
## Through-penetration Firestop Systems

System No. W-J-3161

March 21, 2008

F Rating — 2 Hr

T Rating — 1/2 Hr



1. **Wall Assembly** — Min 4-1/2 in. ( 114 mm) thick 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 4 in.(102 mm).

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

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

- A. Max 2/C with ground, No. 12 AWG MC (BX) cable with polyvinyl chloride (PVC) insulation on conductors inside a steel armored jacket.
- B. Max 3/C with ground, No. 12 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
- C. Max 3/C with ground, No. 10 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
- D. Max 25 pair, No. 20 AWG (or smaller) copper conductor telephone cable with XLPE/PVC insulation, with or without PVC jacket.
- E. Max RG59/U (or smaller) television coaxial cable with fluorinated ethylene insulation and jacketing.
- F. Max 4 pair, No. 24 AWG (or smaller) copper conductor data cable with Hylar insulation and jacketing.
- G. Max 2/C, No. 22 AWG (or smaller) copper conductor alarm cable with PVC insulation.
- H. Max 1/C, No. 14 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.
- I. Max 1/C, No. 10 AWG (or smaller) Type THHN or THWN gasoline & oil resistant II 600V VW-1 E116364 (UL) power cable.
- J. Max 4/C, No. 18 AWG Type CL-2 Barostat II Sun res (UL) Listed thermostat cable.

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

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

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

B. **Fill, Void or Cavity Material\* - Caulk** — Min 5/8 in.(16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At point contact location, a 1/2 in.(13 mm) diam bead of caulk applied at interface of cables and periphery of opening on both surfaces of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant

\*Bearing the UL Classification Mark

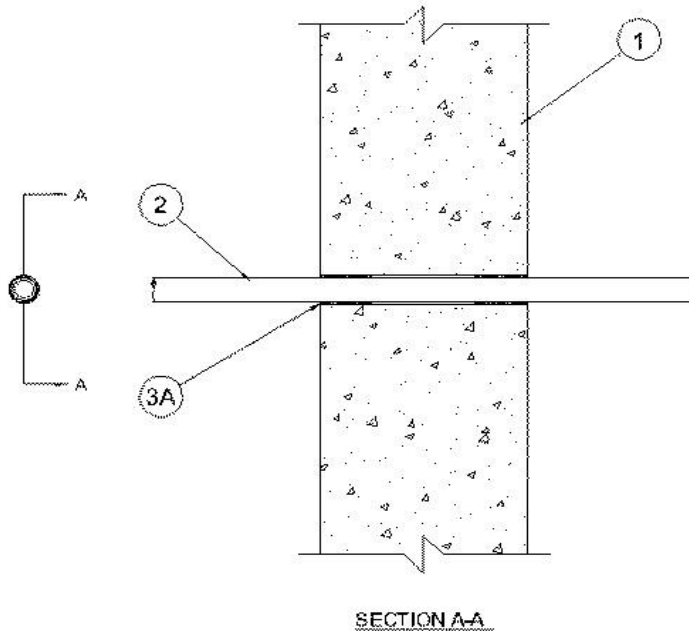
## Through-penetration Firestop Systems

System No. W-J-3101

November 06, 2008

F Rating — 2 Hr

T Rating — 0 Hr



SECTION A-A

1. **Wall Assembly** — Min 5 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. Diameter of opening is 3/4 in.

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

2. **Cables** — One multi-conductor cable centered within a nom 3/4 in. opening. Cable to be rigidly supported on both sides of the wall assembly. The following types and sizes of cables may be used:

- A. Max 25 pr telephone cable No. 24 AWG (or smaller). Max diam. 0.40 in.
- B. Max seven conductor No. 12 AWG (or smaller). Max diam 1/2 in. wire cable.
- C. Max. 50 cond. (or smaller) fiber optic cable. Max. diam 0.68 in.

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

- A. **Fill, Void or Cavity Materials\* - Sealant** — Min 1-1/4 in. fill material applied within annulus, flush with both surfaces of wall.

**ACCUMETRIC L L C** — Boss 814

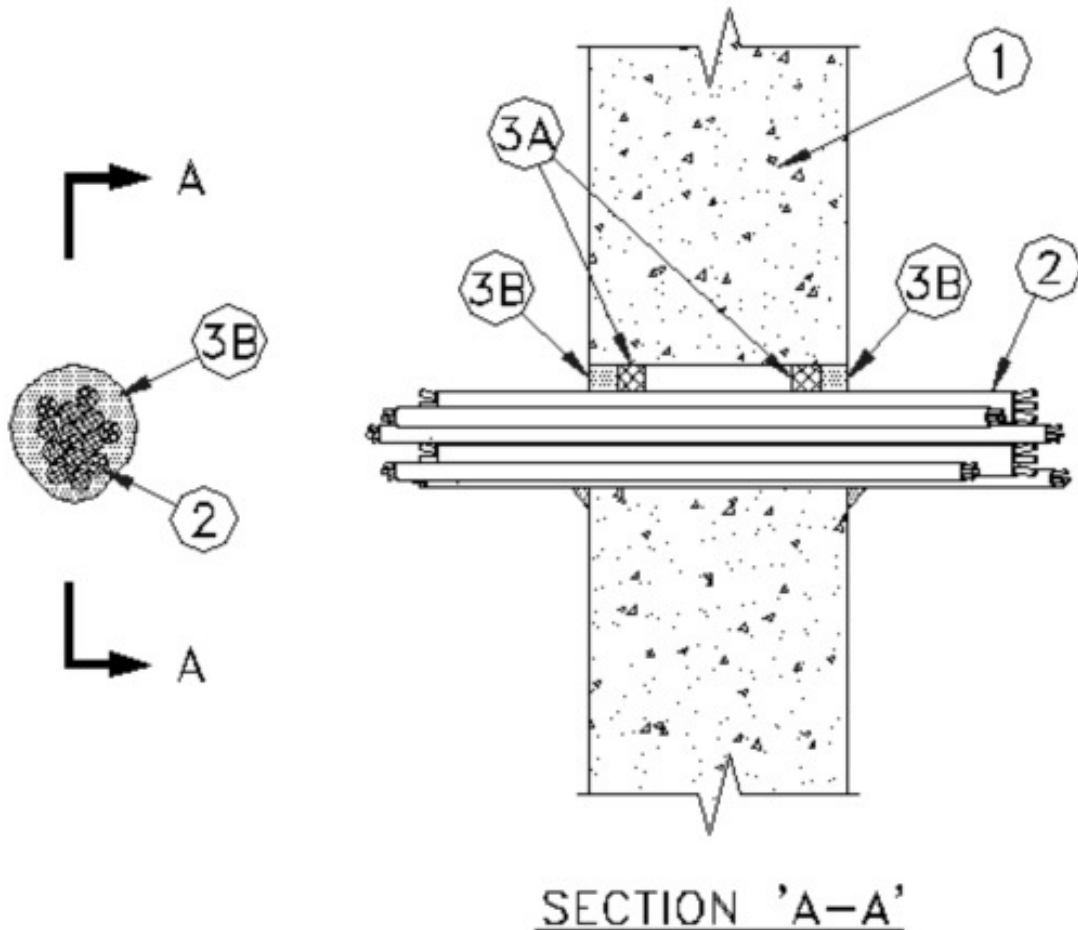
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-3176

October 28, 2020

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



1. **Wall Assembly** — Min 4-7/8 in. (124 mm) and 6-1/8 in. (156 mm) thick 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**\*. Max diam of opening is 5 in. (127 mm). See **Concrete Blocks** (CAZT) in Volume 1 of the Fire Resistance Directory for names of manufacturers.

**The hourly T Rating is 1/2 hr and 1 hr for 1 and 2 hr rated assemblies, respectively.**

2. **Cables** — Aggregate cross-sectional area of cables to be max 64 percent of the cross-sectional area of the opening. Cables to be tightly bundled and rigidly supported on both sides of wall assembly. The annular space between the cables and the periphery of opening shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm). Any combination of following types and sizes of copper conductor cables may be used:

- A. Max 3/C with ground, No. 12 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
- B. Max 1/C No. 350 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
- C. Max 7/C No. 12 AWG (or smaller) copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
- D. Max 400 pair No. 24 AWG copper telephone cables, with Polyvinyl Chloride (PVC) insulation and jacket.
- E. Max 4/C No. 2/0 (or smaller) aluminum or copper conductor, aluminum or steel jacketed metal-clad or armored-clad cable.
- F. Max RG/6 No. 18 AWG Type CATV copper conductor coaxial cable with Polyvinyl Chloride (PVC) insulation and jacket.
- G. Max 3/C No. 2/0 AWG (or smaller) copper or aluminum conductor SER cables with PVC insulation and jacket.
- H. Max RG59/U (or smaller) television coaxial cable with fluorinated ethylene insulation and jacketing.
- I. Max 62.5/125 micron fiber optic cables with PVC insulation and jacket.

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

- A. **Packing Material** — (Optional) — Mineral wool or fiberglass insulation or foam backer rod compressed and firmly packed into annular space from each end of opening and recessed 5/8 in. (16 mm) from each wall surface.
- B. **Fill, Void or Cavity Material\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At point contact location, 1/2 in. (13 mm) diam bead of sealant applied at interface of cables and periphery of opening on both surfaces of wall.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

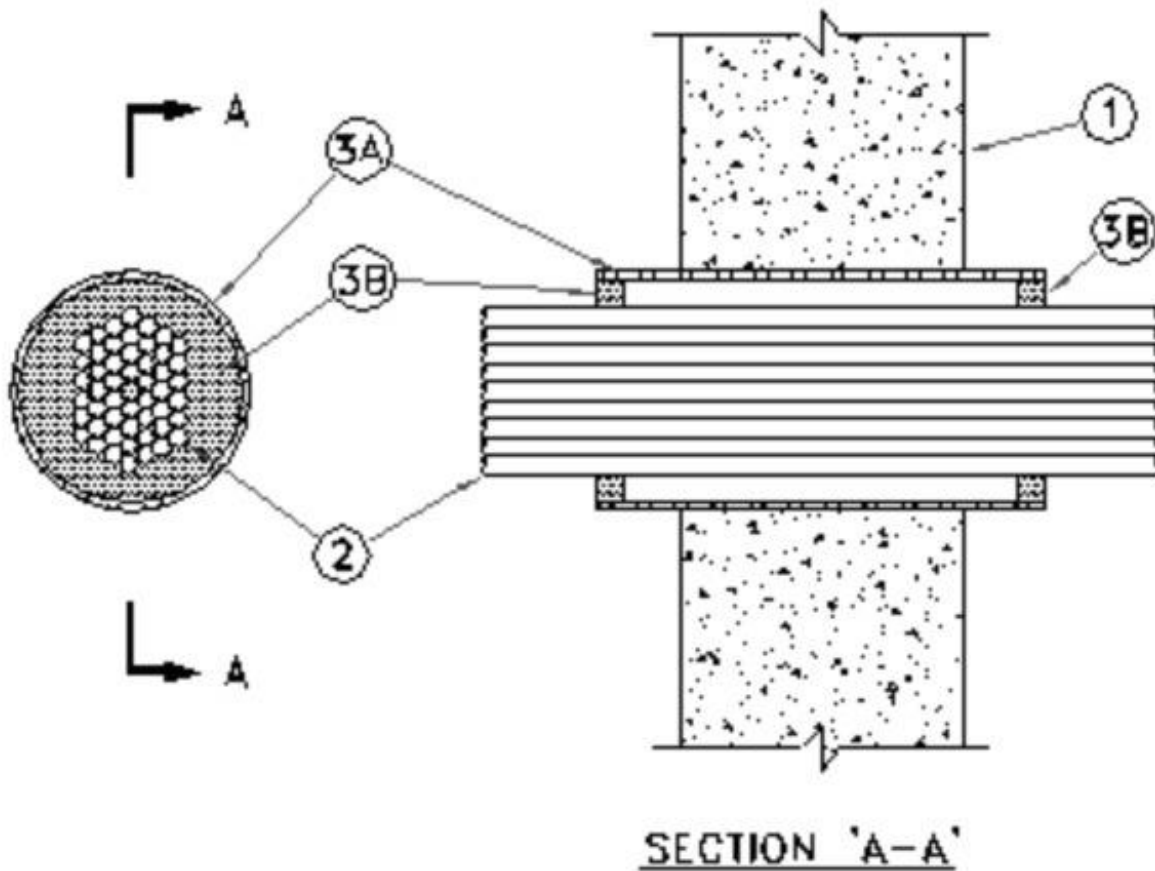
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-3175

October 28, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating – 2 Hr	F Rating -2 Hr
T Rating - 1 Hr	FH Rating -2 Hr
L Rating At Ambient - Less than 1 CFM/sq ft	FT Rating - 1 Hr
L Rating At 400 F - 1.4 CFM/sq ft	FTH Rating -1 Hr
	L Rating At Ambient - Less than 1 CFM/sq ft
	L Rating At 400 F - 1.4 CFM/sq ft



1. **Wall Assembly** — Min 6 in. (152 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 4-1/2 in. (114 mm). See **Concrete Blocks** (CAZT) in Volume 1 of the Fire Resistance Directory for names of manufacturers.
2. **Cables** — Aggregate cross-sectional area of cables in opening to be max 19 percent of the cross-sectional area of the opening. Cables to be bundled together and rigidly supported on both sides of wall assembly. The annular space between cable bundle and edge of metallic sleeve (Item 3A) shall be min 0 in. to max 2 in. (51 mm). The following types and sizes of cables may be used:
  - A. Max 7/C No. 16 AWG (or smaller) copper conductor power and control cables with XLPE or PVC insulation and XLPE or PVC jacket.

B. Max 4 pairs No. 24 AWG (or smaller) copper conductor data cables with Hylar insulation and jacket.

C. Max 2/C No. 12 AWG (or smaller) cables with PVC insulation and jacket.

D. Max 62.5/125 micron fiber optic cables with PVC insulation and jacket.

E. Type RG59/U coaxial cables with polyethylene (PE) insulation and PVC jacket.

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

A. **Metallic Sleeve** — Nom 4 in. (102 mm) diam (or smaller) steel, iron or EMT sleeve with min 0.083 in. (2.1 mm) wall thickness, tightly fitted into wall opening. Length of sleeve to be equal to thickness of wall plus 2 in. (51 mm) such that, when installed, the ends of the sleeve project 1 in. (25 mm) beyond each surface of the wall. Sleeve is optional when wall thickness is equal to or greater than 8 in. (203 mm).

B. **Fill, Void or Cavity Material\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with ends of steel sleeve. Fill material to be forced into interstices of cable group to seal any voids on both surfaces of wall. A min 3/8 in. (10 mm) bead of the sealant shall be applied at the interfaces of the sleeve and both wall surfaces.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

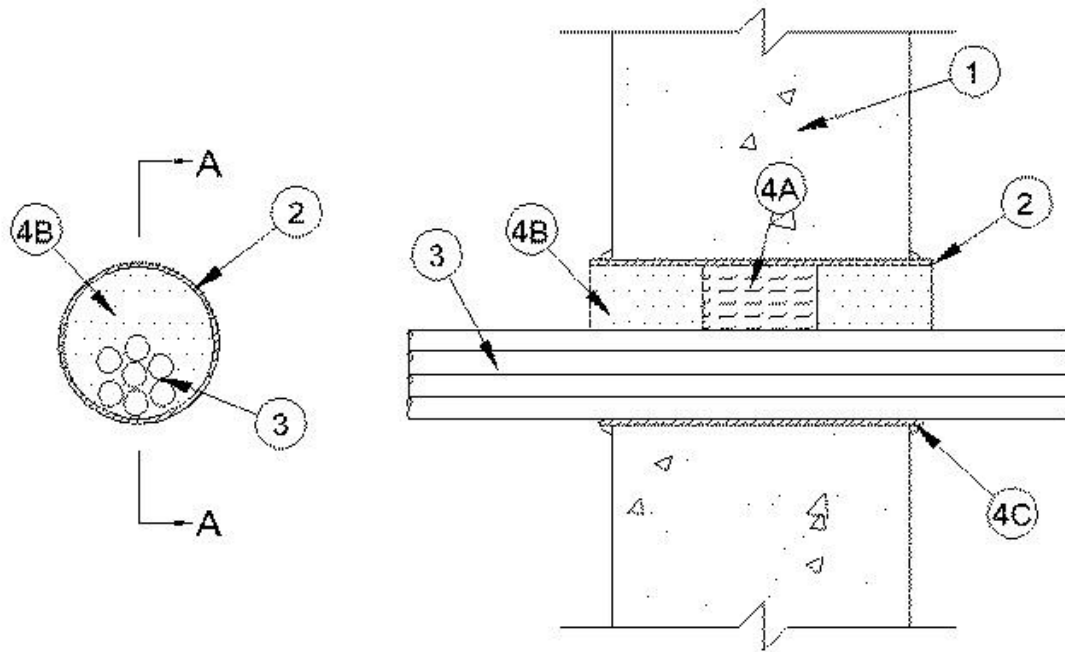
## Through-penetration Firestop Systems

System No. W-J-3153

November 13, 2013

F Rating — 2 Hr

T Rating — 0 Hr



### Section A-A

1. **Wall Assembly** — Min 6 in. (152 mm) thick 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 3 in. (76 mm).

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

2. **Metallic Sleeve** — Cylindrical sleeve fabricated from min 0.034 in. (0.86 mm) thick galv sheet steel and having a min 1/2 in. (13 mm) lap along the longitudinal seam. Length of steel sleeve to be equal to the thickness of the wall plus a min 1/2 in. (13 mm), such that when installed, the ends of the steel sleeve extend a min 1/4 in. (6 mm) to a max 1 in. (25 mm) beyond each surface 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 openings in the concrete.

3. **Cables** — Aggregate cross-sectional area of cables in opening to be max 34 percent of the aggregate cross-sectional area of the opening. The annular space between the cable bundle and the periphery of the opening shall be min 0 in. (0 mm, point contact) to max 1-1/4 in. (32 mm). Cables to be rigidly supported on both surfaces of the wall assembly. Any combination of the following types and sizes of cables may be used:

- A. Max 4 pair No. 24 AWG copper conductor Cat5e or Cat 6 telephone cable with polyvinyl chloride (PVC) insulation and jacket materials.
- B. Max 12 core No. 26 AWG shielded multi coax cable with foam high density polyethylene insulation and PVC jacket.
- C. Max 1/C No. 8 AWG copper conductor cable with PVC insulation and nylon jacket materials.
- D. Max 100 pair No. 24 AWG copper conductor telephone cable with PVC insulation and jacket materials.
- E. Max RG/6 (or smaller) coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket materials.



F. Max 7/C No. 12 AWG copper conductors with PVC insulation and jacket materials.

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

A. **Packing Material** — Min 2 in. (52 mm) thickness of min 4 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 both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Foam** — Min 2-1/4 in. (57 mm) thickness of fill material applied within the annulus on both sides of mineral wool insulation. Foam installed flush with both ends of steel sleeve.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

C. **Fill, Void or Cavity Material\* - Sealant** — Min 1/4 in. (6 mm) diam bead of fill material applied at the steel sleeve/concrete interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant or Boss 816 Sealant

\*Bearing the UL Classification Mark

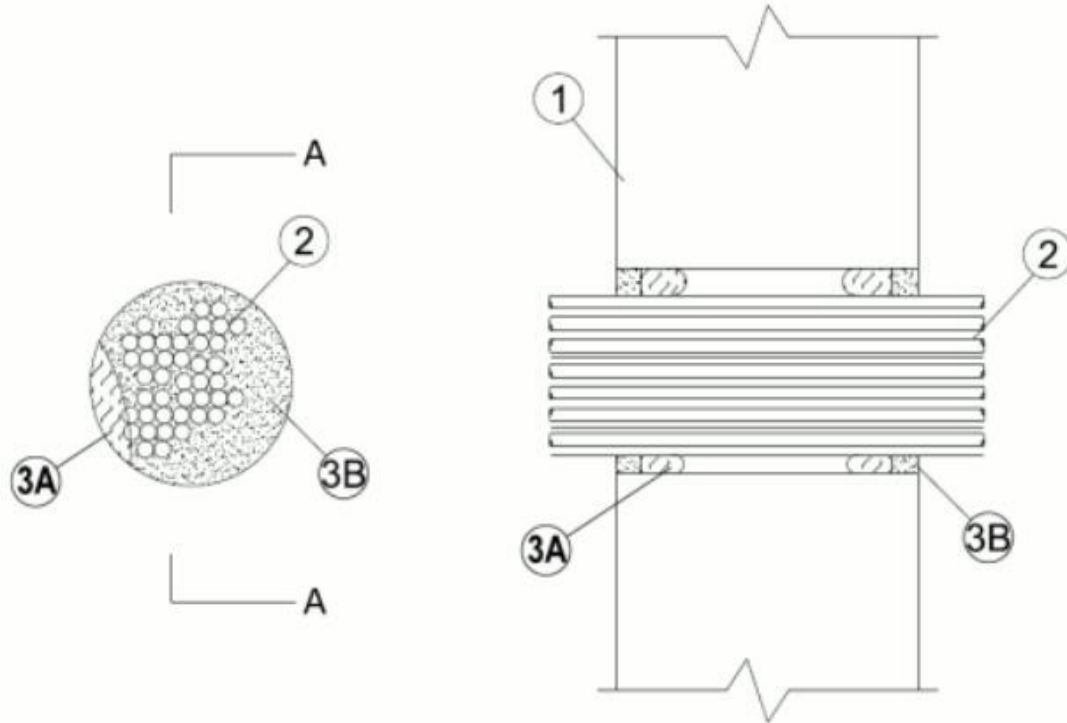
## Through-penetration Firestop Systems

System No. W-J-3203

November 13, 2013

F Rating- 2Hr

T Rating- 1/2 Hr



### SECTION A-A

1. **Wall Assembly** — Min 6 in. (152 mm) thick 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 4 in. (102 mm).

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

2. **Cables** — Cables installed in a tight bundle having a max bundle diam of 2-1/2 in. (64 mm). The aggregate cross-sectional area of cables in opening to be max 40 percent of the cross-sectional area of the opening. The annular space between cable bundle and the periphery of the opening shall be min 1/2 in. (13 mm) to max 1 in. (25 mm). Cables to be rigidly supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:

- A. Max 2/C No. 18 AWG copper conductor thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials.
- B. Max 4 pair No. 24 AWG Cat5e or No. 22 AWG Cat 3 and Cat 6e copper conductor telephone cable with PVC insulation and jacket materials.
- C. Max RG/U (or smaller) coaxial cable with high density polyethylene insulation and jacket materials.
- D. Max 3/C (with ground) No. 14 AWG (or smaller) nonmetallic sheathed (Romex) cable with PVC insulation and jacket materials.
- E. Max 60 pair No. 22 AWG copper conductor telephone cable with PVC insulation and jacket.

- F. Max 30 pair No. 24 copper conductor shielded switchboard cable with PVC insulation and jacket materials.
- G. Max RG/6 (or smaller) coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket materials.
- H. Max 1/C, No. 14 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

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

A. **Fill, Void or Cavity Materials\*** — **Foam** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus between concrete and cable bundle and recessed from both surfaces of wall to accommodate the required thickness of caulk fill material (Item 3B).

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

A1. **Packing Material** — As an alternate to Item 3A, min 5/8 in. (16 mm) thickness of min 4 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 both surfaces of wall to accommodate the required thickness of fill material (Item 3B).

B. **Fill, Void or Cavity Material\*** — **Caulk** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant or Boss 816 Sealant

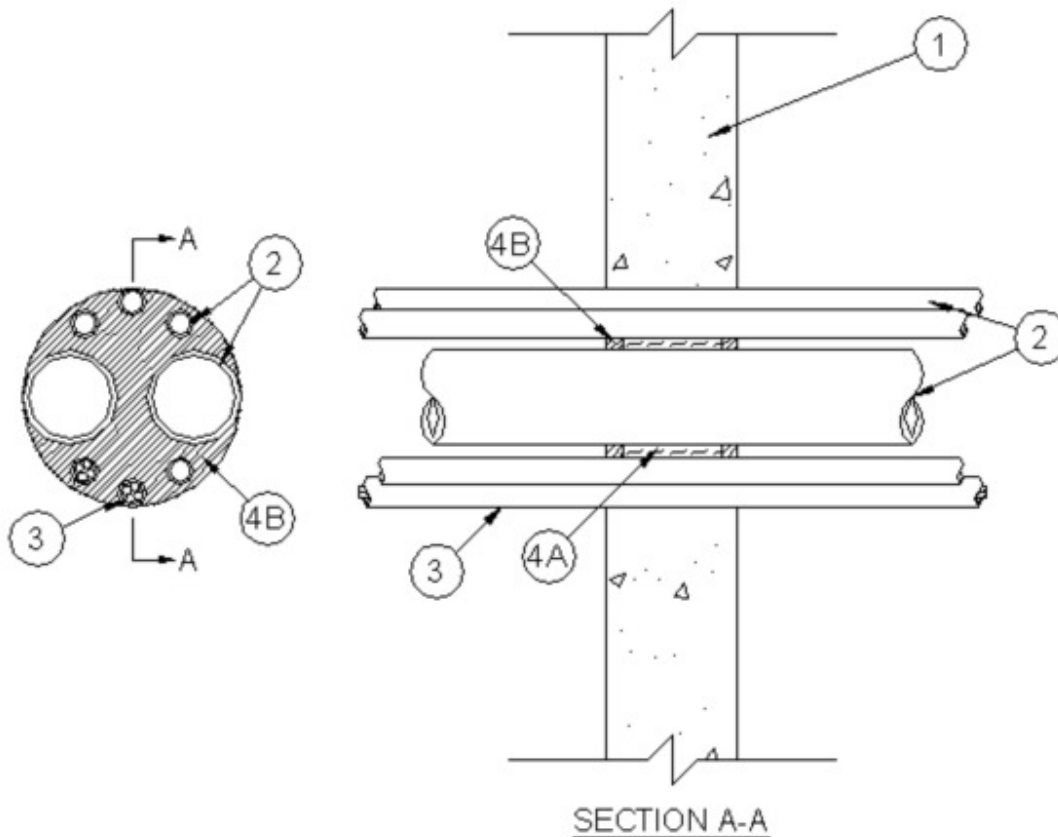
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-J-8046

October 29, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating – 2 Hr	F Rating -2 Hr
	FH Rating -2 Hr
T Ratings - 0 and 1 Hr (See Items 2 and 3)	FT Ratings - 0 and 1 Hr (See Items 2 and 3)
	FTH Ratings -0 and 1 Hr (See Items 2 and 3)



1. **Wall Assembly** — Min 6 in. (152 mm) thick 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)** in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants** — A max of four 1 in. (25 mm) diam and three 4 in. (102 mm) diam (or smaller) metallic pipes, conduits or tubing to be installed within the firestop system. The annular space between the pipes, conduits or tubing and the periphery of the opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Separation between pipes, conduits or tubing shall be min 1/2 in. (13 mm) to max 1-5/8 in. (156 mm). Pipes, conduits or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of pipes, conduits and tubes 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 steel electrical metallic tubing (EMT).

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

E. **Copper Tube** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.

F. **Copper Pipe** — Nom 1 in. (25 mm) diam Type K copper pipe.

**When any metallic penetrant is used the T Rating is 0 hr.**

3. **Cables** — Nom 3 in. (76 mm) diam (or smaller) tight bundle of cables. Cable bundle spaced min 1 in. (25 mm) from other penetrants. Annular space between cable bundle and periphery of opening to be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Cable bundle to be rigidly

supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:

A. Max 400 pair, 24 AWG telephone communication cable with PVC insulation and jacket.

B. 4/C No. 14 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TEK cable with XLPE insulation.

C. Max 7/C No. 12 AWG copper conductor power and control cables; XLPE or PVC insulation with XLPE or PVC jacket.

D. Max RG59/U (or smaller) coaxial cable with fluorinated ethylene insulation and jacketing.

E. Type RG 59/U coaxial cable with polyethylene (PE) insulation and PVC jacket.

**When cable bundle is used without any metallic penetrant the T Rating is 1 hr.**

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

A. **Packing Material** — Foam plastic backer material or backer rod or mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material. When annular space between penetrants and/or between penetrants and edge of opening is 3/4 in. (19 mm) or less packing material is optional.

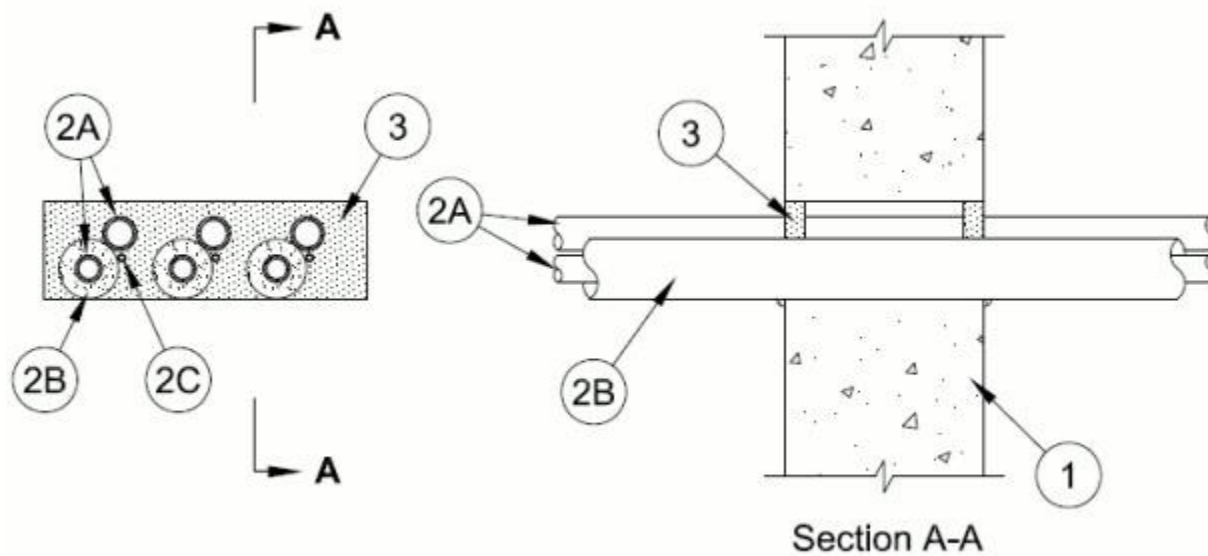
B. **Fill, Void or Cavity Material\*** — **Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact locations, min 1/2 in (13 mm) diam bead of fill material applied at through penetrant/concrete interface on both surfaces of wall.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

**System No. W-J-8085**  
**November 23, 2020**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 2 Hr	F Rating — 2 Hr
T Rating — 3/4 Hr	FT Rating — 3/4 Hr
L Rating at Ambient — Less Than 1 CFM/ft <sup>2</sup>	FH Rating — 2 Hr
L Rating At 400°F — Less Than 1 CFM/ft <sup>2</sup>	FTH Rating — 3/4 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>



1. **Wall Assembly** — Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf) (1600-2400 kg/m<sup>3</sup>) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks**\*. Max area of opening is 30 in. (762 mm) with a max dimension of 10 in. (254 mm). See **Concrete Blocks** (CAZT) in the Fire Resistance Directory for names of manufacturers.

2. **Air Conditioning (AC) Line Set** — One or more AC line sets installed eccentrically or concentrically within opening. Each AC line set consists of two pipes or tubes (Item 2A), tubing insulation (Item 2B) and a thermostat cable (Item 2C). The space between the AC line sets shall be min 1/2 in. to max 3/4 in. (13 mm to max 19 mm). The space between the AC line sets and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm).

2A. **Through Penetrant** — A max of two pipes or tubes to be installed in each AC line set. Of the two pipes or tubes, only one may have a nom diam greater than 1/2 in. (13 mm). Annular space between pipes or tubing and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Pipes or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of through penetrants may be used:

- A. **Steel Pipe** — Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
- B. **Iron Pipe** — Nom 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.
- C. **Copper Pipe** — Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
- D. **Copper Tube** — Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tube.

2B. **Tube Insulation - Plastics#** — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on one max 1/2 in. (13 mm) diam pipe or tube in each AC line set. The annular space between the penetrating item and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). The space between the pipes or tubing within each AC line set shall be 0 in. (point contact). See **Plastics** (QMFZ2) category in the Plastics Recognized Component Directory for names of

manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

2C. **Cable** — One 4 pair No. 18 AWG (or smaller) thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials may be installed with each AC line set. Cable to be spaced min 0 in. (point contact) to max 1/2 in. (13 mm) from the other penetrants in each line set. The space between the cable and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Cable to be rigidly supported on both sides of wall assembly.

3. **Fill, Void or Cavity Material\* Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied with annulus, flush with both surfaces of wall assembly. At point contact location, min 1/4 in. (6 mm) diam bead of fill material applied at through penetrant/concrete interface on both surfaces of wall. Additional fill material forced into grouped penetrant interstices to max extent possible.

**SODAL ACCUMETRIC** — Boss 816+

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

**# Bearing the UL Recognized Component Marking**

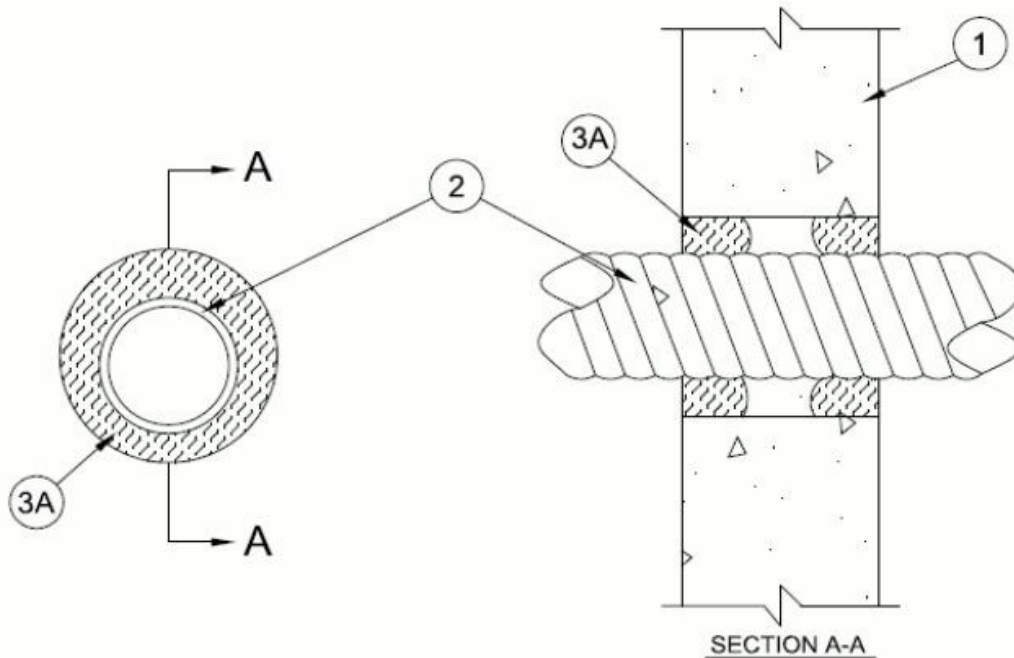
## Through-penetration Firestop Systems

System No. W-J-3204

October 29, 2013

F Rating – 2 Hr

T Rating – 1/2 and 2 Hr (See Items 2 and 2A)



1. **Wall Assembly** — Min 6 in. (152 mm) thick 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 2 in. (51 mm) when penetrating Item 2 is used. Max diam of opening is 1/2 in. (13 mm) when penetrating Item 2A is used.

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

2. **Through Penetrating Product\*** — Nom 1 in. (25 mm) diam (or smaller) unjacketed steel Metal Clad (Type MC) cable with max four 750 kcmil (or smaller) copper Type THHN or XHHW conductors. Max one metal clad cable to be installed concentrically within the circular opening in wall. The annular space between the cable and the periphery of the opening shall be 1/2 in. (13 mm). Penetrant to be rigidly supported on both sides of wall assembly. **The T, FT and FTH Ratings of the firestop system are 1/2 hr when this penetrant is used.**

See **Through-Penetrating Products** (XHLY) category in the Fire Resistance Directory for names of manufacturers.

2A. **Cables** — As an alternate to Item 2, one cable bundle consisting of max three of the following types and sizes of cables may be used. Cables are tightly bundled and installed within the opening. The annular space between cable bundle and the periphery of the opening shall be min 0 in. (point contact) to max 1/4 in. (6 mm). Cables to be rigidly supported on both sides of wall assembly. **The T, FT and FTH Ratings of the firestop system are 2 hr when this penetrant is used.**

A. Max 2/C No. 18 AWG copper conductor thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials.

B. Max 4 pair No. 24 AWG Cat 5e or No. 23 AWG Cat 6e copper conductor telephone cable with PVC insulation and jacket materials.

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



**A. Fill, Void or Cavity Materials\* — Foam** — Min 1-1/4 in. (32 mm) thickness of fill material applied within the annulus between penetrant and concrete, on both sides of wall.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

\*Bearing the UL Classification Mark

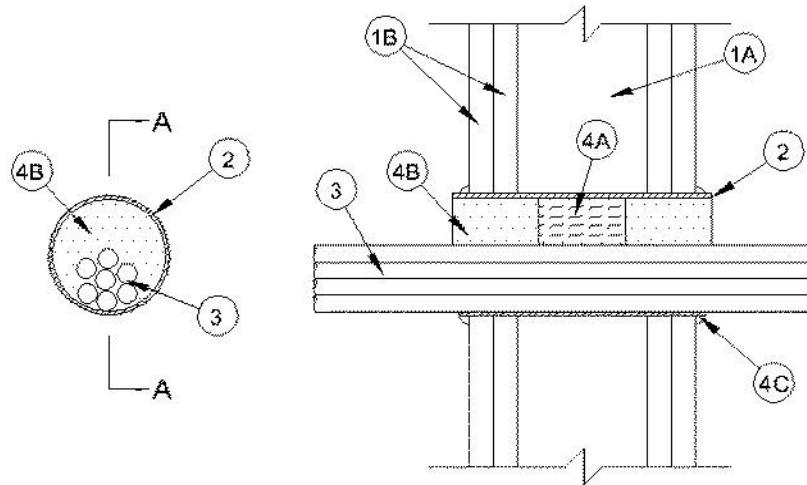
## Through-penetration Firestop Systems

System No. W-L-3298

November 13, 2013

F Ratings — 1 and 2 Hr (See Item 1)

T Rating — 0 Hr



Section A-A

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

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

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick gypsum board. Max diam of opening shall be 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. **Metallic Sleeve** — Cylindrical sleeve fabricated from min 0.034 in. (0.86 mm) thick galv sheet steel and having a min 1/2 in. (13 mm) lap along the longitudinal seam. In 2 hr wall assemblies, length of steel sleeve to be equal to the thickness of the wall plus a min 1/2 in. (13 mm), such that when installed, the ends of the steel sleeve extend a min 1/4 in. (6 mm) to a max 1 in. (25 mm) beyond each surface of the wall. In 1 hr wall assemblies, length of steel sleeve to be equal to the thickness of the wall plus a nom 2 in. (51 mm), such that when installed, the ends of the steel sleeve extend a nom 1 in. (25 mm) beyond each surface 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.

3. **Cables** — Aggregate cross-sectional area of cables in opening to be max 34 percent of the aggregate cross-sectional area of the opening. The annular space between the cable bundle and the periphery of the opening shall be min 0 in. (0 mm, point contact) to max 1-1/4 in. (32 mm). Cables to be rigidly supported on both surfaces of the wall assembly. Any combination of the following types and sizes of cables may be used:

A. Max 4 pair No. 24 AWG copper conductor Cat5e or Cat 6 telephone cable with polyvinyl chloride (PVC) insulation and jacket materials.

- B. Max 12 core No. 26 AWG shielded multi coax cable with foam high density polyethylene insulation and PVC jacket.
- C. Max 1/C No. 8 AWG copper conductor cable with PVC insulation and nylon jacket materials.
- D. Max 100 pair No. 24 AWG copper conductor telephone cable with PVC insulation and jacket materials.
- E. Max RG/6 (or smaller) coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket materials.
- F. Max 7/C No. 12 AWG copper conductors with PVC insulation and jacket materials.

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

A. **Packing Material** — Min 2-1/8 in. (54 mm) thickness of min 4 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 both surfaces of wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Materials\* - Foam** — Min 2-1/4 in. (57 mm) thickness of fill material applied within the annulus on both sides of mineral wool insulation. Foam installed flush with both ends of steel sleeve.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

C. **Fill, Void or Cavity Material\* - Sealant** — Min 1/4 in. (6 mm) diam bead of fill material applied at the steel sleeve/gypsum board interface on both sides of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant or Boss 816 Sealant

\*Bearing the UL Classification Mark

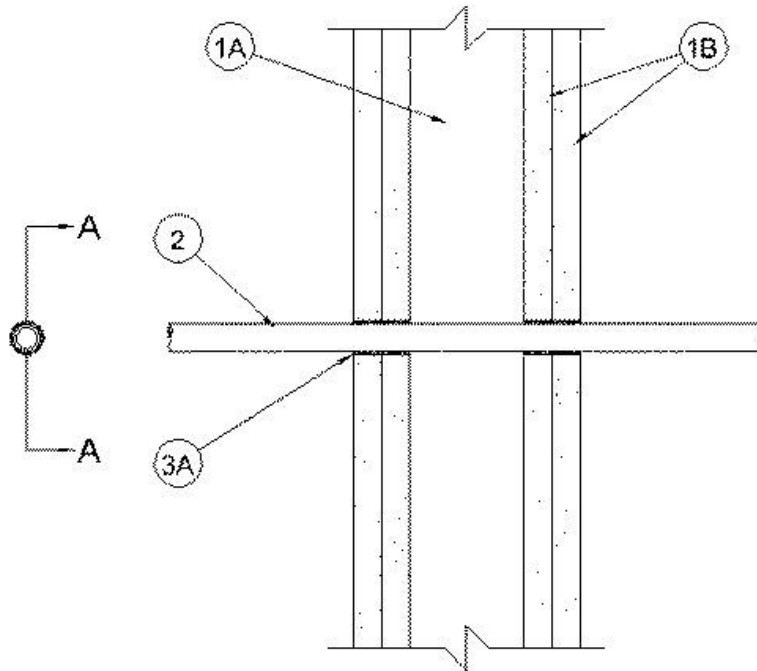
## Through-penetration Firestop Systems

System No. W-L-3222

November 06, 2008

F Ratings — 1 and 2 Hr

T Rating — 0 Hr



SECTION A-A

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

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

B. **Gypsum Board\*** — One or two layers of nom 5/8 in. thick gypsum board as specified in the individual Wall and Partition Design. Nom. diam of opening is 3/4 in. **The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.**

2. **Cables** — One multi-conductor cable centered within a nom 3/4 in. diam opening. Cable to be rigidly supported on both sides of wall assembly. The following types and sizes of cables may be used:

A. Max 25 pr telephone cable No. 24 AWG (or smaller). Max diam 0.40 in.

B. Max seven conductor No. 12 AWG (or smaller). Max diam 1/2 in. wire cable.

C. Max. 50 cond. (or smaller) fiber optic cable. Max. diam 0.68 in.

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

A. **Fill, Void or Cavity Materials\* - Sealant** — Min 1-1/4 in. fill material applied within annulus, flush with both surfaces of wall.

**ACCUMETRIC L L C** — Boss 814

\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-3342

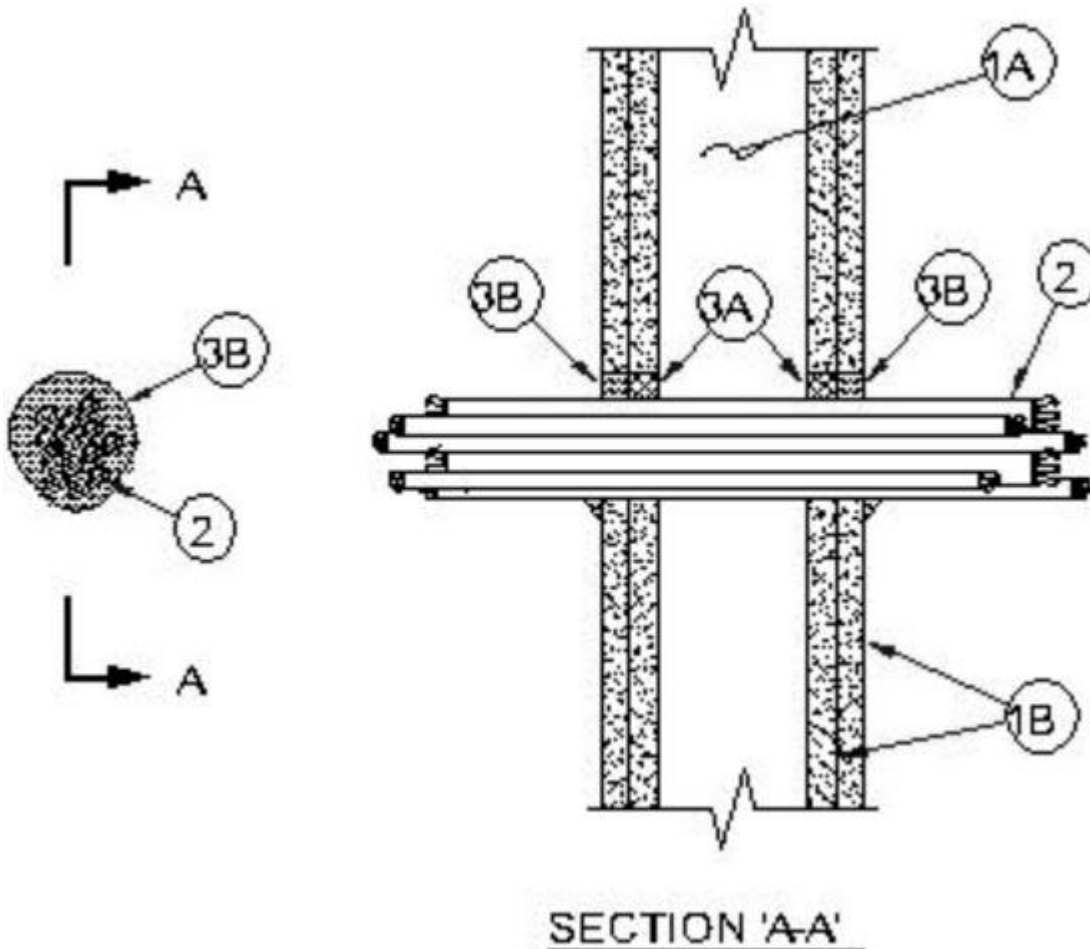
November 23, 2020

F Ratings — 1 and 2 Hr (See Item 1)

T Ratings — 1/2 and 1 Hr (See Item 1)

L Rating at Ambient — Less than 1 CFM/sq ft (See Item 3)

L Rating at 400° F — Less than 1 CFM/sq ft (See Item 3)



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

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

B. **Gypsum Board\*** — One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Max diam of opening is 5 in. (127 mm).

**The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly. The hourly T Rating is 1/2 and 1 Hr for 1 and 2 Hr rated assemblies, respectively.**

2. **Cables** — Aggregate cross-sectional area of cables to be max 64 percent of the cross-sectional area of the opening. Cables to be tightly bundled and rigidly supported on both sides of wall assembly. The annular space between the cables and the periphery of opening shall be min 0 in. (point contact) to max 1-1/4 in. (32 mm). Any combination of following types and sizes of copper conductor cables may be used:

- A. Max 3/C with ground, No. 12 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
- B. Max 1/C No. 350 kcmil (or smaller) copper conductor cable with cross-linked polyethylene (XLPE) jacket.
- C. Max 7/C No. 12 AWG (or smaller) copper conductor power and control cables with XLPE or PVC insulation with XLPE or PVC jacket.
- D. Max 400 pair No. 24 AWG copper telephone cables, with Polyvinyl Chloride (PVC) insulation and jacket.
- E. Max 4/C No. 2/0 (or smaller) aluminum or copper conductor, aluminum or steel jacketed metal-clad or armored-clad cable.
- F. Max RG/6 No. 18 AWG Type CATV copper conductor coaxial cable with Polyvinyl Chloride (PVC) insulation and jacket.
- G. Max 3/C No. 2/0 AWG (or smaller) copper or aluminum conductor SER cables with PVC insulation and jacket.
- H. Max RG59/U (or smaller) television coaxial cable with fluorinated ethylene insulation and jacketing.
- I. Max 62.5/125 micron fiber optic cables with PVC insulation and jacket.

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

- A. **Packing Material** — (Optional) — Mineral wool or fiberglass insulation or foam backer rod compressed and firmly packed into annular space from each end of opening and recessed 5/8 in. (16 mm) from each wall surface.
- B. **Fill, Void or Cavity Material\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At point contact location, 1/2 in. (13 mm) diam bead of sealant applied at interface of cables and periphery of opening on both surfaces of wall. The fill material to be applied within the interstices of the cables to max extent possible for the L Ratings to apply.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

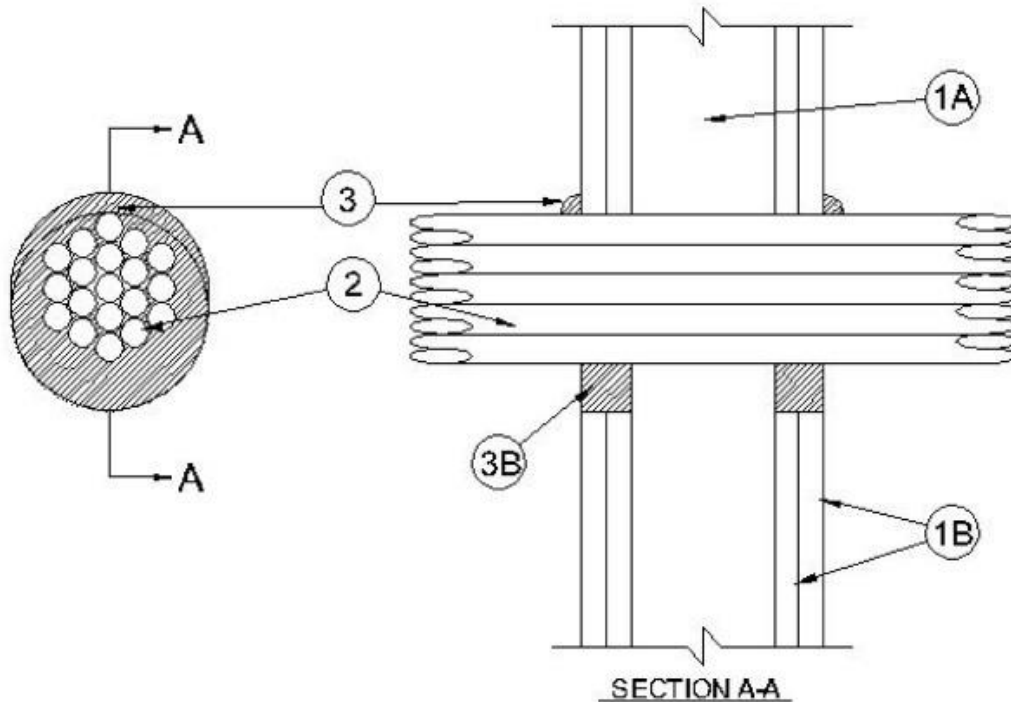
## Through-penetration Firestop Systems

System No. W-L-3315

March 21, 2008

F Ratings — 1 and 2 Hr (See Item 1)

T Rating — 1/2 Hr



1. **Wall Assembly** — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 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. (52 by 102 mm) lumber spaced 16 in.(406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in.(610) OC.

B. **Gypsum Board\*** — One or two layers of nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Max diam of opening is 4 in.(102 mm).

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

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

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

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

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

- D. Max 25 pair, No. 20 AWG (or smaller) copper conductor telephone cable with XLPE/PVC insulation, with or without PVC jacket.
- E. Max RG59/U (or smaller) television coaxial cable with fluorinated ethylene insulation and jacketing.
- F. Max 4 pair, No. 24 AWG (or smaller) copper conductor data cable with Hylar insulation and jacketing.
- G. Max 2/C, No. 22 AWG (or smaller) copper conductor alarm cable with PVC insulation.
- H. Max 1/C, No. 14 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.
- I. Max 1/C, No. 10 AWG (or smaller) Type THHN or THWN gasoline & oil resistant II 600V VW-1 E116364 (UL) power cable.
- J. Max 4/C, No. 18 AWG Type CL-2 Barostat II Sun res (UL) Listed thermostat cable.
- K. Max 3/C, No. 4/0 with ground, AWG aluminum Triple E Alloy AA8176 Type SE cable Style U Type XHH-W-2 CDRS E32071 (UL) service entrance cable.

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

- A. **Packing Material** — **(Optional, Not Shown)** — For 2 hr wall assemblies, foam backer rod firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material.
- B. **Fill, Void or Cavity Material\* - Caulk** — Min 5/8 in.(16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At point contact location, 1/2 in. (13 mm) diam bead of caulk applied at interface of cables and periphery of opening on both surfaces of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant

\*Bearing the UL Classification Mark

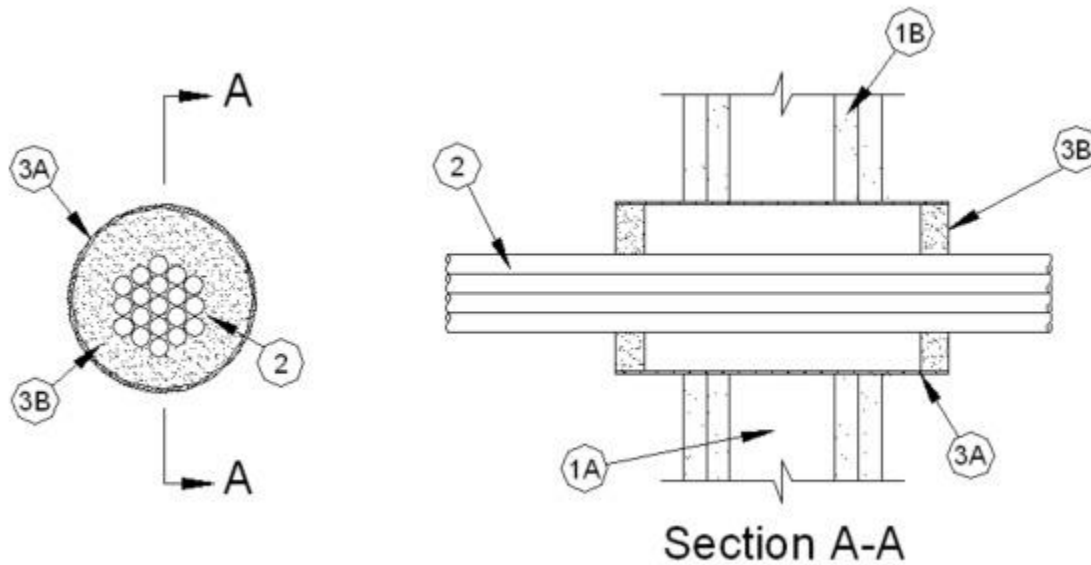


## Through-penetration Firestop Systems

System No. W-L-3345

November 23, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 & 2 Hr (See Item 1)	F Ratings -1 & 2 Hr (See Item 1)
	FH Ratings -1 & 2 Hr (See Item 1)
T Ratings	FT Ratings - 1/2 and 1 Hr (See Item 1)
	FTH Ratings -1/2 and 1 Hr (See Item 1)
L Rating At Ambient - Less than 1 CFM/sq ft	L Rating At Ambient - Less Than 1.55 L/s/m
L Rating At 400°F - 1.4 CFM/sq ft	L Rating At 400°F -- 2.2 L/s/m



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

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

**B. Gypsum Board\*** — 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 4-1/2 in. (114 mm).

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

**The hourly T Rating is 1/2 hr and 1 hr for 1 and 2 hr rated assemblies, respectively.**

**2. Cables** — Aggregate cross-sectional area of cables in opening to be max 18.6 percent of the cross-sectional area of the opening. Cables to be bundled together and rigidly supported on both sides of wall assembly. The annular space between cable bundle and edge of metallic sleeve (Item 3A) shall be min 0 in. (point contact) to max 2 in. (51 mm). The following types and sizes of cables may be used:

**A.** Max 7/C No. 16 AWG (or smaller) copper conductor power and control cables with XLPE or PVC insulation and XLPE or PVC jacket.

B. Max 4 pairs No. 24 AWG (or smaller) copper conductor data cables with Hylar insulation and jacket.

C. Max 2/C No. 12 AWG (or smaller) cables with PVC insulation and jacket.

D. Max 62.5/125 micron fibre optic cables with PVC insulation and jacket.

E. Type RG59/U coaxial cables with polyethylene (PE) insulation and PVC jacket.

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

A. **Metallic Sleeve** — Nom 4 in. (102 mm) diam (or smaller) steel, iron, or EMT sleeve with 0.083 in. (2.1 mm) wall thickness (or thicker), tightly fitted into wall opening. Length of sleeve to be equal to thickness of wall plus 2 in. (51 mm) such that, when installed, the ends of the sleeve project 1 in. (25 mm) beyond each surface of the wall.

B. **Fill, Void or Cavity Material\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with ends of steel sleeve. Fill material to be forced into interstices of cable group to seal any voids on both surfaces of wall. A min 3/8 in. (10 mm) bead of the sealant shall be applied at the interfaces of the sleeve and both wall surfaces.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

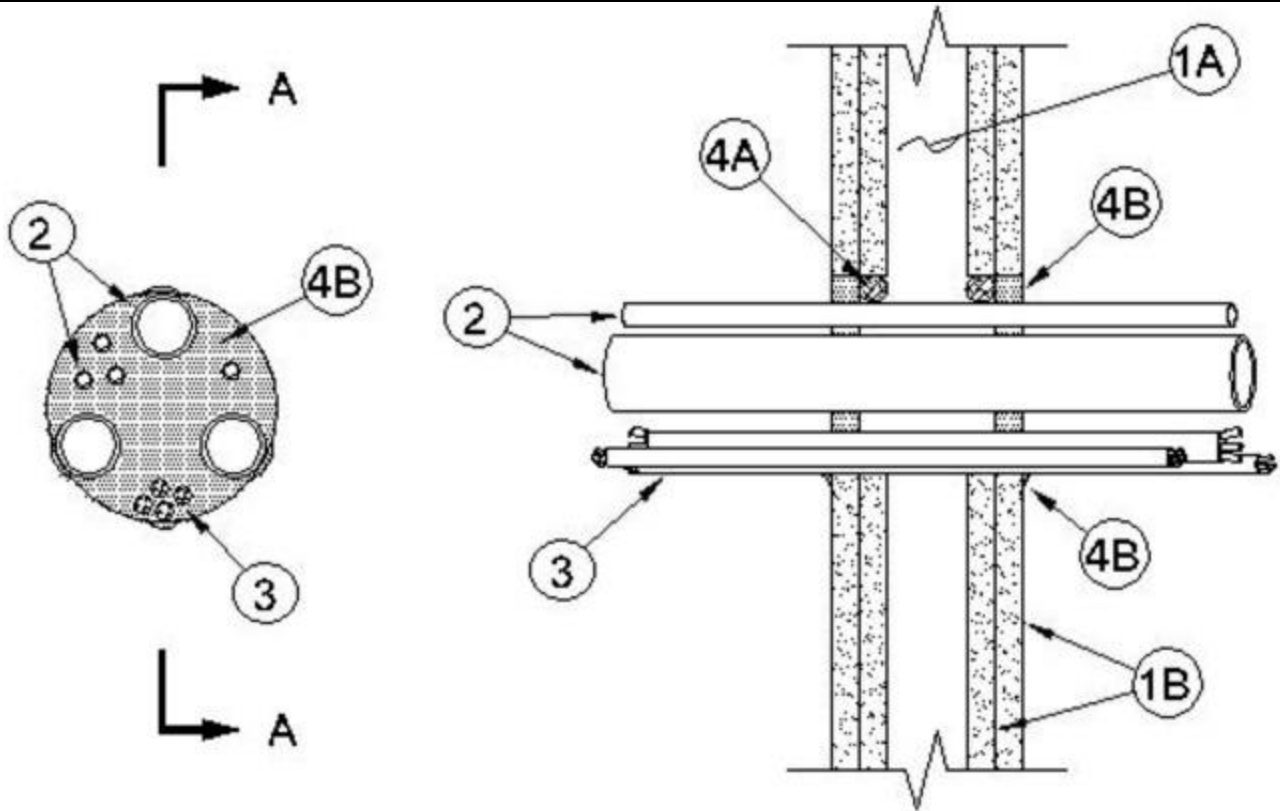
\*Bearing the UL Classification Mark

## Through-penetration Firestop Systems

System No. W-L-8083

November 24, 2020

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings -1 and 2 Hr (See Item 1)
	FH Ratings -1 and 2 Hr (See Item 1)
T Ratings - 0, 1/2 and 1 Hr (See Items 2 and 3)	FT Ratings - 0, 1/2 and 1 Hr (See Items 2 and 3)
	FTH Ratings -0, 1/2 and 1 Hr (See Items 2 and 3)



**SECTION 'A-A'**

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

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

**B. Gypsum Board\*** — Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. Max diam of opening is 10 in. (254 mm)

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

**2. Through Penetrants** — A max of four 1 in. (25 mm) diam and three 4 in. (102 mm) diam (or smaller) metallic pipes, conduits or tubing to be installed within the firestop system. The annular space between the pipes, conduits or tubing and

the periphery of the opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Separation between pipes, conduits or tubing shall be min 1/2 in. to max 1-5/8 in. (41 mm). Pipes, conduits or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of pipes, conduits and tubes 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 Pipe** — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
- E. **Copper Tube** — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.
- F. **Copper Pipe** — Nom 1 in. (25 mm) diam Type K copper pipe.

**When any metallic penetrant is used the T Rating is 0 hr.**

3. **Cables** — Nom 3 in. (76 mm) diam (or smaller) tight bundle of cables. Cable bundle spaced min 1 in. (25 mm) from other penetrants. Annular space between cable bundle and periphery of opening to be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Cable bundle to be rigidly supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:

- A. Max 400 pairs, 24 AWG telephone communication cable with PVC insulation and jacket.
- B. 4/C No. 14 AWG (or smaller) copper conductor PVC jacketed aluminum clad or steel clad TEK cable with XLPE insulation.
- C. Max 7/C No. 12 AWG copper conductor power and control cables; XLPE or PVC insulation with XLPE or PVC jacket.
- D. Max RG59/U (or smaller) coaxial cable with fluorinated ethylene insulation and jacketing.
- E. Type RG 59/U coaxial cable with polyethylene (PE) insulation and PVC jacket.

**When cable bundle is used without any metallic penetrant the T rating is 1/2 hr and 1 hr for 1 hr and 2hr fire rated wall assemblies, respectively.**

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

- A. **Packing Material** — Foam plastic backer material or backer rod or mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from both surfaces of wall as required to accommodate the required thickness of fill material. When annular space between penetrants and/or between penetrants and edge of opening is 3/4 in. (19 mm) or less packing material is optional.
- B. **Fill, Void or Cavity Material\*** — **Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact locations, min 1/2 in. (13 mm) diam bead of fill material applied at through penetrant/gypsum board interface on both surfaces of wall.

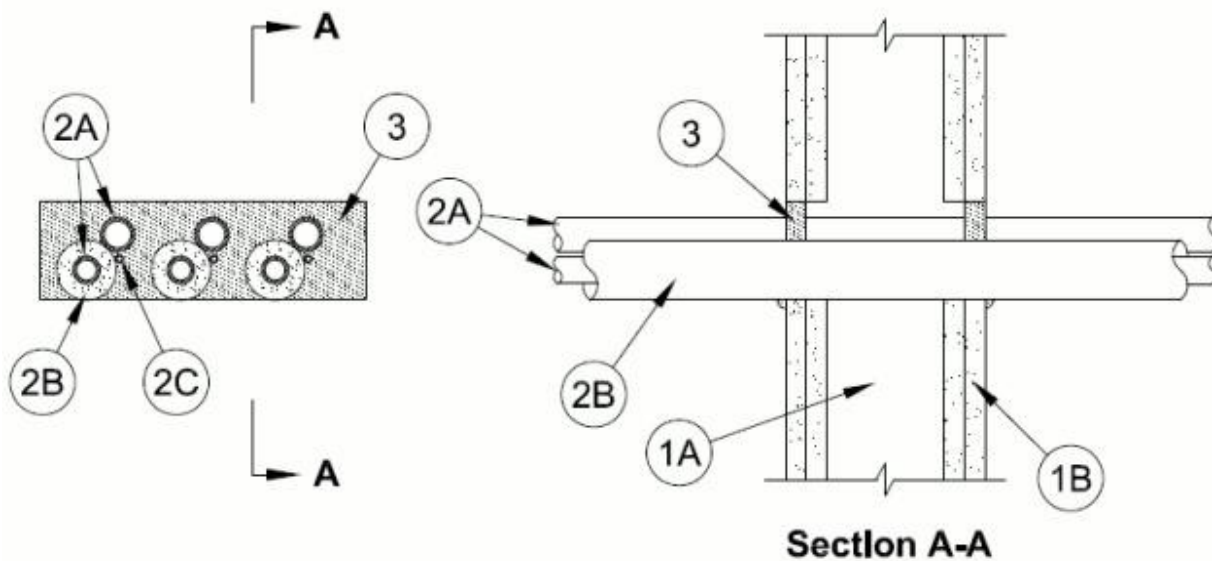
**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

System No. W-L-8133

January 25, 2021

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



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

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

B. **Gypsum Board\*** — Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. Max area of opening is 30 sq in. (0.019 m<sup>2</sup>) with a max dimension of 10 in. (254 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. **Air Conditioning (AC) Line Set** — One or more AC line sets installed eccentrically or concentrically within opening. Each AC line set consists of two pipes or tubes (Item 2A), tubing insulation (Item 2B) and a thermostat cable (Item 2C). The space between the AC line sets shall be min 1/2 in. (13 mm) to max 3/4 in. (19 mm). The space between the AC line sets and the periphery of the opening shall be min 0 in. (point contact) to max 1 in. (25 mm).

2A. **Through Penetrant** — A max of two pipes or tubes to be installed in each AC line set. Of the two pipes or tubes, only one may have a nom diam greater than 1/2 in. (13 mm) Annular space between pipes or tubing and periphery of opening shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). Pipes or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of through penetrants may be used:

A. **Steel Pipe** — Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

B. **Iron Pipe** — Nom. 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.

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

D. **Copper Tube** — Nom. 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tube.

2B. **Tube Insulation - Plastics#** — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The tube insulation may be installed on one max 1/2 in. (13 mm) diam pipe or tube in each AC line set. The annular space between the penetrating item and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). The space between the pipes or tubing within each AC line set shall be 0 in. (point contact). See **Plastics (QMFZ2)** category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

2C. **Cable** — One 4 pair No. 18 AWG (or smaller) thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials may be installed with each AC line set. Cable to be spaced min 0 in (point contact) to max 1/2 in. (13 mm) from the other penetrants in each line set. The space between the cable and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Cable to be rigidly supported on both sides of wall assembly.

3. **Fill, Void or Cavity Material\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact location, min 1/4 in. (6 mm) diam bead of fill material applied at through penetrant/gypsum board interface on both surfaces of wall. Additional fill material forced into grouped penetrant interstices to max extent possible.

#### **SODAL ACCUMETRIC - Boss 816+**

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

**# Bearing the UL Recognized Component Marking**

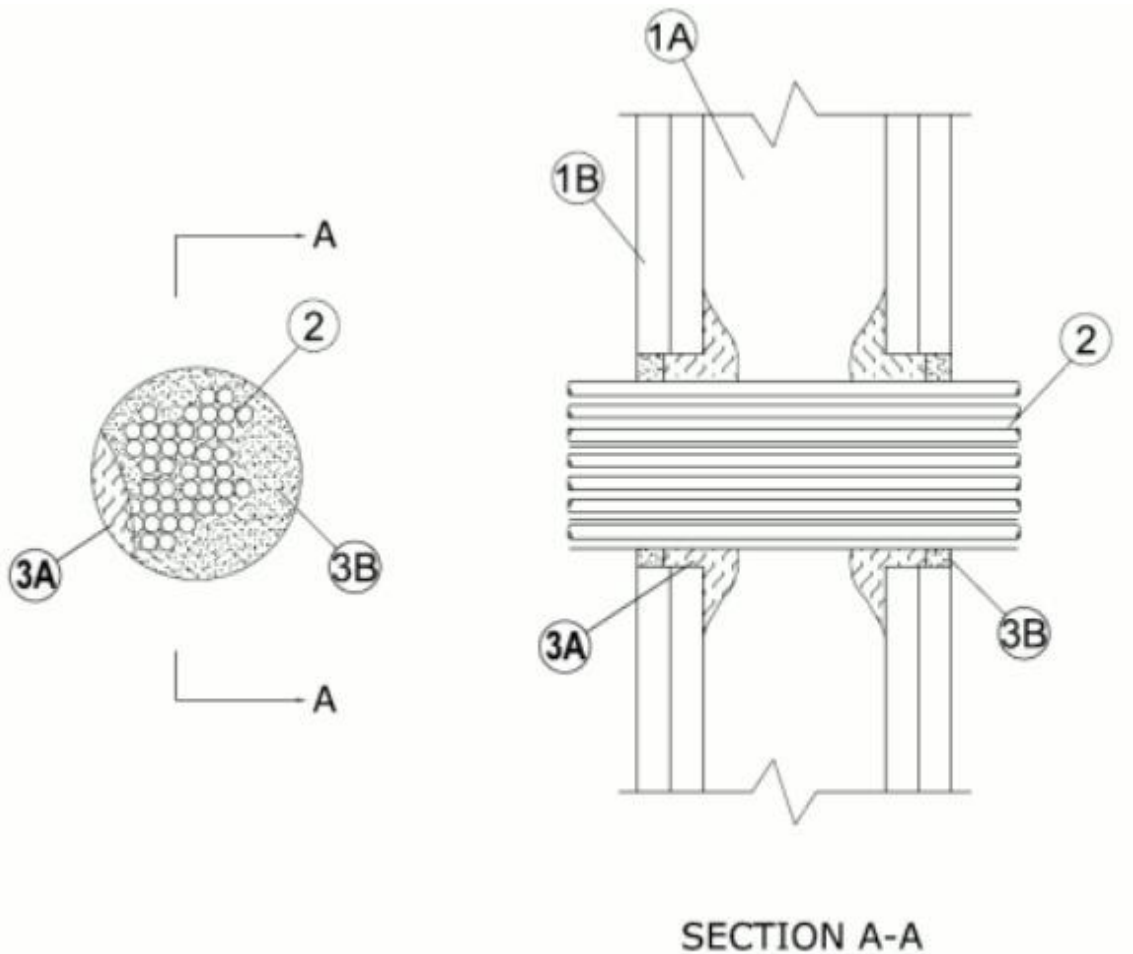
## Through-penetration Firestop Systems

System No. W-L-3399

November 13, 2013

F Rating – 2 Hr

T Rating – 1/2 Hr



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

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

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick gypsum board. The gypsum board type, number of layers and orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 4 in. (102 mm).

2. **Cables** — Cables installed in a tight bundle having a max bundle diam of 2-1/2 in. (64 mm). The aggregate cross-sectional area of cables in opening to be max 40 percent of the cross-sectional area of the opening. The annular space between cable bundle and the periphery of the opening shall be min 1/2 in. (13 mm) to max 1 in. (25 mm). Cables to be

rigidly supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:

- A. Max 2/C No. 18 AWG copper conductor thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials.
- B. Max 4 pair No. 24 AWG Cat5e or No. 22 AWG Cat 3 and Cat 6e copper conductor telephone cable with PVC insulation and jacket materials.
- C. Max RG/U (or smaller) coaxial cable with high density polyethylene insulation and jacket materials.
- D. Max 3/C (with ground) No. 14 AWG (or smaller) nonmetallic sheathed (Romex) cable with PVC insulation and jacket materials.
- E. Max 60 pair No. 22 AWG copper conductor telephone cable with PVC insulation and jacket.
- F. Max 30 pair No. 24 copper conductor shielded switchboard cable with PVC insulation and jacket materials.
- G. Max RG/6 (or smaller) coaxial cable with fluorinated ethylene (FE) or PVC insulation and jacket materials.
- H. Max 1/C, No. 14 AWG (or smaller) Type MTW or THHN or THWN or gas & oil res II 600V (UL) or AWM VW-1 power cable.

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

A. **Fill, Void or Cavity Materials\*** — **Foam** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus between gypsum board and cable bundle and recessed from both surfaces of wall to accommodate the required thickness of caulk fill material (Item 3B). During installation, foam will mushroom into wall cavity.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

A1. **Packing Material** — As an alternate to Item 3A, min 5/8 in. (16 mm) thickness of min 4 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 both surfaces of wall to accommodate the required thickness of fill material (Item 3B).

B. **Fill, Void or Cavity Material\*** — **Caulk** — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall.

**ACCUMETRIC L L C** — Boss 814 Sealant or Boss 816 Sealant

\*Bearing the UL Classification Mark



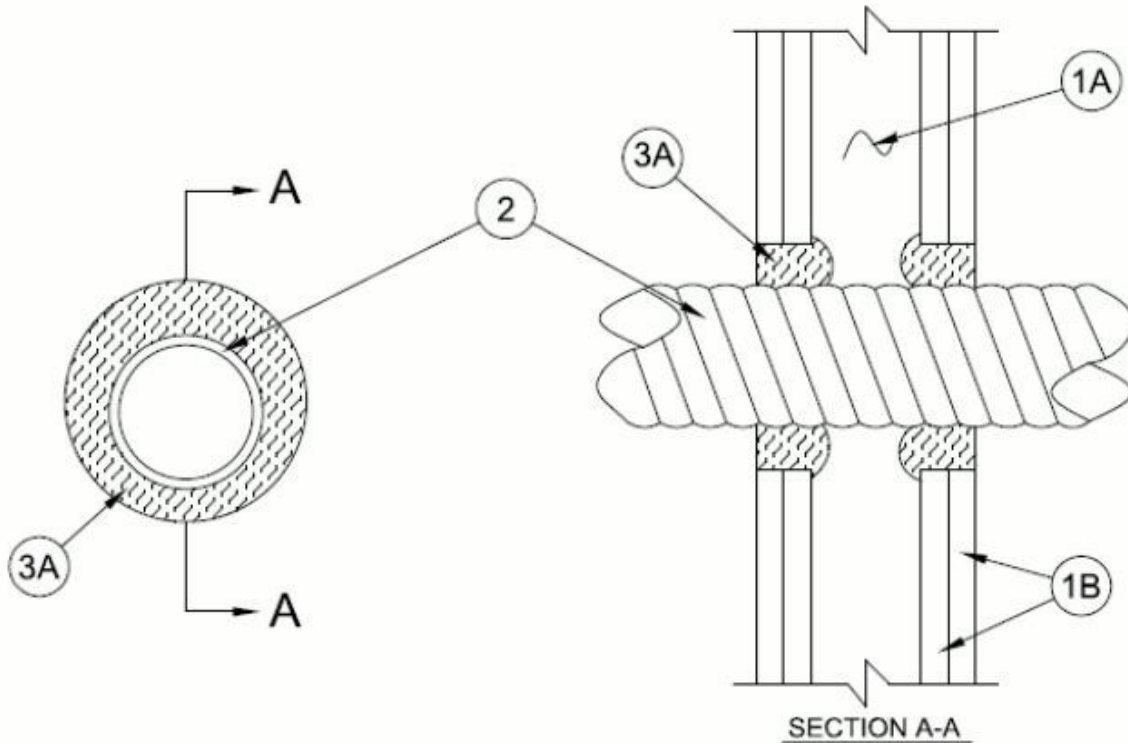
## Through-penetration Firestop Systems

System No. W-L-3400

October 29, 2013

F Rating – 2 Hr

T Ratings – 1/2 and 2 Hr (See Items 2 and 2A)



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

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

B. **Gypsum Board\*** — Min 5/8 in. (16 mm) thick gypsum board. The gypsum board type, number of layers and orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 2 in. (51 mm) when penetrating Item 2 is used. Max diam of opening is 1/2 in. (13 mm) when penetrating Item 2A is used.

2. **Through Penetrating Product\*** — Nom 1 in. (25 mm) diam (or smaller) unjacketed steel Metal Clad (Type MC) cable with max four 750 kcmil (or smaller) copper Type THHN or XHHW conductors. Max one metal clad cable to be installed concentrically within the circular opening in gypsum board layers. The annular space between the cable and the periphery of the opening shall be 1/2 in. (13 mm). Penetrant to be rigidly supported on both sides of wall assembly. **The T, FT and FTH Ratings of the firestop system are 1/2 hr when this penetrant is used.**

See **Through-Penetrating Products** (XHLY) category in the Fire Resistance Directory for names of manufacturers.

2A. **Cables** — As an alternate to Item 2, one cable bundle consisting of max three of the following types and sizes of cables may be used . Cables are tightly bundled and installed within the opening. The annular space between cable bundle and the periphery of the opening shall be min 0 in. (point contact) to max 1/4 in. (6 mm). Cables to be rigidly supported on both sides of wall assembly. **The T, FT and FTH Ratings of the firestop system are 2 hr when this penetrant is used.**

A. Max 2/C No. 18 AWG copper conductor thermostat cable with polyvinyl chloride (PVC) insulation and jacket materials. B. Max 4 pair No. 24 AWG Cat 5e or No. 23 AWG Cat 6e copper conductor telephone cable with PVC insulation and jacket materials.

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

A. **Fill, Void or Cavity Materials\* - Foam** — Min 1-1/4 in. (32 mm) thickness of fill material applied to completely fill the annulus between gypsum board and penetrant on both sides of wall. During installation, foam will mushroom into wall cavity.

**ACCUMETRIC L L C** — Boss 813 FR Expanding Foam

\*Bearing the UL Classification Mark

# Wall Opening Protective Materials

ACCUMETRIC L L C

R16844

350 RING RD

ELIZABETHTOWN, KY 42701 USA

**BOSS 815 Electrical Outlet Insert**, for use with max 2-1/8 by 4 by 2-1/8 in deep flush device UL Listed Metallic Outlet Boxes without internal clamps in 2 h fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep steel studs and constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the Fire Resistance Directory. One 1-7/8 in. wide by 2-13/16 in. high insert adhered to the interior back wall of the outlet box in accordance with the installation instructions supplied with the product. Installation to comply with Article 370-16 of the National Electrical code, (NFPA 70). Outlet boxes installed with steel cover plates. When inserts are used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

**BOSS 815 Electrical Outlet Insert**, for use with max 4 by 4 by 2-1/8 in deep flush device UL Listed Metallic Outlet Boxes without internal clamps in 2 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep steel studs and constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the Fire Resistance Directory. One 3-11/16 in. wide by 3-3/4 in high insert adhered to the interior back wall of the outlet box in accordance with the installation instructions supplied with the product. Installation to comply with Article 370-16 of the National Electrical Code, (NFPA 70). Outlet boxes installed with steel cover plates. When inserts are used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

**BOSS 815 Electrical Outlet Insert**, for use with max 4 by 4 by 1-1/2 in. deep flush device UL Listed Metallic Outlet Boxes without internal clamps in 1 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep wood studs and with max 4 by 4 by 2-1/8 in. deep flush device UL Listed Metallic Outlet Boxes without internal clamps in 1 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep steel studs and constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the Fire Resistance Directory. One 3-11/16 in wide by 3-3/4 in high insert adhered to the interior back wall of the outlet box in accordance with the installation instructions supplied with the product. Installation to comply with Article 370-16 of the National Electrical Code, (NFPA 70). Outlet boxes installed with plastic cover plates. When inserts are used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

# Wall Opening Protective Materials

## Canada

ACCUMETRIC L L C

R16844

350 RING RD

ELIZABETHTOWN, KY 42701 USA

**BOSS 815 Electrical Outlet Insert**, for use with max 2-1/8 by 4 by 2-1/8 in deep flush device UL Listed Metallic Outlet Boxes without internal clamps in 2 h fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep steel studs and constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the Fire Resistance Directory. One 1-7/8 in. wide by 2-13/16 in. high insert adhered to the interior back wall of the outlet box in accordance with the installation instructions supplied with the product. Installation to comply with Article 370-16 of the National Electrical code, (NFPA 70). Outlet boxes installed with steel cover plates. When inserts are used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

**BOSS 815 Electrical Outlet Insert**, for use with max 4 by 4 by 2-1/8 in deep flush device UL Listed Metallic Outlet Boxes without internal clamps in 2 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep steel studs and constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Designs in the Fire Resistance Directory. One 3-11/16 in. wide by 3-3/4 in high insert adhered to the interior back wall of the outlet box in accordance with the installation instructions supplied with the product. Installation to comply with Article 370-16 of the National Electrical Code, (NFPA 70). Outlet boxes installed with steel cover plates. When inserts are used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

**BOSS 815 Electrical Outlet Insert**, for use with max 4 by 4 by 1-1/2 in. deep flush device UL Listed Metallic Outlet Boxes without internal clamps in 1 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep wood studs and with max 4 by 4 by 2-1/8 in. deep flush device UL Listed Metallic Outlet Boxes without internal clamps in 1 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep steel studs and constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the Fire Resistance Directory. One 3-11/16 in wide by 3-3/4 in high insert adhered to the interior back wall of the outlet box in accordance with the installation instructions supplied with the product. Installation to comply with Article 370-16 of the National Electrical Code, (NFPA 70). Outlet boxes installed with plastic cover plates. When inserts are used within outlet boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

# Wall Opening Protective Materials

ACCUMETRIC L L C

R20964

411 E DIXIE HWY

ELIZABETHTOWN, KY 42701 USA

**Boss 818 Putty Pads** for use with max 4 by 4 in. flush device UL Listed Metallic Outlet Boxes installed with steel cover plates in 1 and 2 h fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep wood or steel studs and constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the Fire Resistance Directory. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and completely seal against the stud within the stud cavity. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

## Joint Systems

System No. HW-D-0409

October 31, 2008

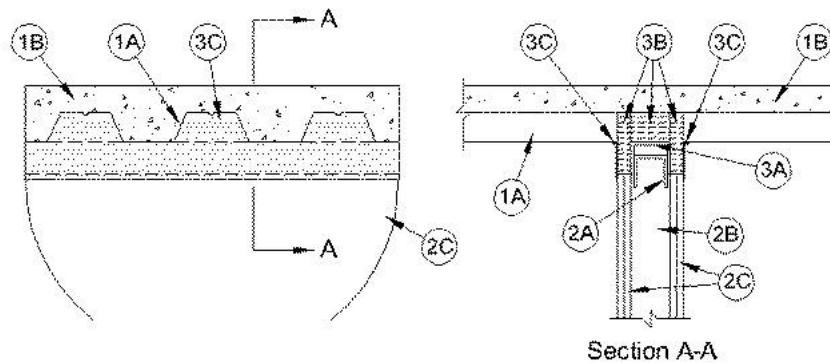
Assembly Ratings — 1, 2, 3 and 4 Hr (See Items 2 and 4)

L Rating at Ambient — Less than 1 CFM/Lin Ft

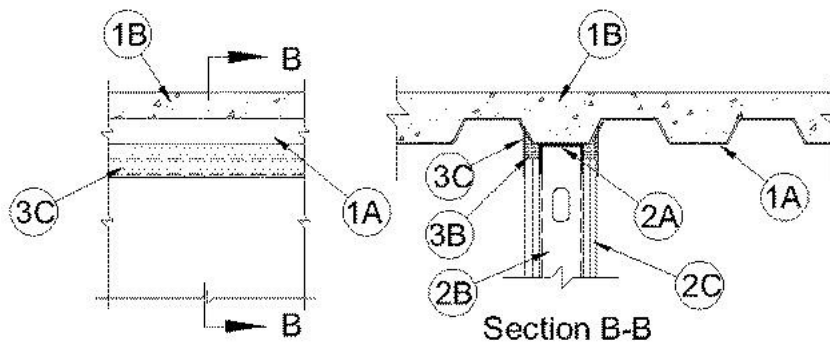
L Rating at 400 F — Less than 1 CFM/Lin FT

Nominal Joint Width — 1-1/2 and 2 In. (See Item 3)

Class II Movement Capabilities — 25% Compression or Extension



Configuration A



Configuration B

1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Floor Units\*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) reinforced concrete, as measured from the top plane of the floor units.

C. **Spray-Applied Fire Resistive Material\*** — (Optional, Not Shown) - Prior to the installation of the joint system (Item 3) all surfaces of the steel floor units to be sprayed with the thickness of material specified in the individual D700 Series Design.

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — Type MK-6/HY, MK-6/HY ES, RG and MK-6S

**1A. Roof Assembly — (Not Shown)** — As an alternate to the floor assembly, a fire-rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 or P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The roof assembly shall include the following construction features:

**A. Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

**B. Roof Insulation** — For P900 Series Designs, min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck. For P700 Series Designs, roof insulation shall be as specified in the individual design.

**C. Spray-Applied Fire Resistive Material\*** — (Optional, Not Shown) - Prior to the installation of the joint system (Item 3) all surfaces of the roof deck to be sprayed with the thickness of material specified in the individual P700 Series Design.

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — Type MK-6/HY, MK-6/HY ES, RG and MK-6S

**The hourly fire rating of the floor or roof assembly shall be equal to or greater than the hourly fire rating of the wall assembly.**

**2. Wall Assembly** — The max separation between bottom of steel floor units, roof deck or spray-applied fire resistive material (if used) and top of wall (at time of installation of joint system) is dependent upon the type of floor or roof assembly, hourly rating of the wall and configuration of the joint system, as shown in table under Item 3. Wall may be perpendicular to direction of the fluted steel floor units or roof deck (Configuration A) or parallel to and centered under the valleys of the steel floor units or roof deck (Configuration B). The 1, 2, 3 or 4 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

**A. Steel Floor and Ceiling Runners** — Floor and ceiling runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with min 1-1/4 in. (32 mm) flanges. Studs and gypsum board must have a min 1/4 in. (6 mm) engagement onto the flanges of the ceiling runner at the furthest point of extension of the joint. When U shaped deflection channel is used, ceiling runner is installed within the U-shaped deflection channel (Item 3B) with 1 in. (25 mm) gap maintained between the top of ceiling runner and top of deflection channel. When deflection channel is not used, ceiling runner installed perpendicular to or parallel with direction of the fluted steel deck prior to the application of the spray-applied fire resistive material (if used). Ceiling runner secured to steel deck valleys with steel masonry anchors or welds spaced max 24 in. (610 mm) OC.

**A1. Light Gauge Framing\* — Slotted Ceiling Runner** — When the nom joint width is less than or equal to 1-3/4 in. (44 mm) or when the thickness of the spray-applied fire resistive material is less than 1 in. (25 mm), slotted ceiling runner may be used as an alternate to the ceiling runner in Item 2A. Slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner installed perpendicular to or parallel with direction of fluted steel deck prior to the application of the spray-applied fire resistive material (if used). Slotted ceiling runner secured to steel deck valleys with steel masonry anchors spaced max 24 in. (610 mm) OC. When slotted ceiling runner is used, deflection channel (Item 3a) shall not be used.

**METAL-LITE INC** — The System

**SLIPTRACK SYSTEMS INC** — SLP-TRK

**A2. Light Gauge Framing\* — Clipped Ceiling Runner** — As an alternate to the ceiling runner in Item 2A, clipped runner to consist of galv steel channel with clips preformed in track flanges which positively engage the inside flange of the steel studs (Item 2B). Track sized to accommodate steel studs (Item 2B). Track flanges to be min 3 in. (76 mm). Clipped ceiling runner installed perpendicular to or parallel with direction of fluted steel deck prior to the application of the spray-applied fire resistive material (if used). Clipped ceiling runner secured to steel deck valleys with steel masonry anchors spaced max 24 in. (610 mm) OC. When clipped ceiling runner is used, deflection channel (Item 3A) shall not be used.

**TOTAL STEEL SOLUTIONS L L C** — Snap Trak

**A3. Light Gauge Framing\* —Vertical Deflection Clip** — (Optional) Steel clips can be used in conjunction with steel studs (Item 2B), ceiling runner (Item 2A) or deflection channel (Item 3A). Clips installed over the top of studs and inserted within the ceiling runner or deflection channel. Clip shall be secured to the ceiling runner or deflection channel with No. 8 self drilling, self tapping steel fasteners through holes provided within the clip. Clip may be secured to the stud with No. 6 pan head steel screw through holes provided within the clip. As an alternate, the legs of the clip may be installed over the top of the stud without attachment in accordance with manufacturer's installation instructions.

**FLEX-ABILITY CONCEPTS L L C — Three Legged Dog Deflection Clip**

**A4. Light Gauge Framing\*- Notched Ceiling Runner** — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner installed perpendicular to or parallel with direction of fluted steel deck and secured to steel deck valleys with steel masonry anchors spaced max 24 in. (610 mm) OC. When notched ceiling runner is used, deflection channel (Item 3A) shall not be used.

**DENMAR STEEL INC — Type SCR**

**B. Studs** — Steel studs to be min 3-5/8 in. (92 mm) wide. Studs cut 3/4 in. (19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. Studs and gypsum board must have a min 1/4 in. (6 mm) engagement onto the flanges of the ceiling runner at the furthest point of extension of the joint. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC.

**C. Gypsum Board\*** — Gypsum board sheets installed to a min total thickness of 5/8 in., 1-1/4 in., 1-1/2 in. or 2 in. (16, 32, 38 or 51 mm) on each side of wall for 1, 2, 3 and 4 hr fire rated wall assemblies, respectively. Wall to be constructed as specified in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory, except that a max 1-1/2 or 2 in. (38 or 51 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the steel floor units or roof deck as specified in Item 3 below. The top row of screws shall be installed into the studs 4-3/4 in. (121 mm) below the valleys of the steel floor units, roof deck or spray-applied fire resistive material (if used).

**The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.**

**3. Joint System** — Max separation between bottom of floor and top of wall (at time of installation of joint system) is dependent upon the hourly rating of the wall, type of assembly, and configuration of joint system. The joint system is designed to accommodate a max 25 percent compression or extension from it's installed width. The hourly rating of the joint system is dependent upon the joint configuration, type of floor or roof assembly, max hourly rating of the wall assembly and max width of the joint as shown in the table below:

Type of Assembly	Rating of Wall Assembly, Hr	Joint Configuration	Max Joint Width, In (mm)	Hourly Rating, Hr
D900 or P900	1, 2, 3 & 4	A	1-1/2 or 2 (38 or 51)	1, 2, 3 & 4
D900 or P900	1 & 2	B	1-1/2 or 2 (38 or 51)	1 & 2
D700 or P700	1, 2 & 3	A	1 (25)	1, 2 & 3
D700 or P700	1 & 2	B	1 (25)	1 & 2

The joint system consists of a deflection channel, forming material and fill material, as follows:

**Joint Configuration A**



**For unprotected steel floors units or roof decks (D900 or P900 Series Designs), max separation between bottom of floor or roof and top of wall (at time of installation of joint system) is 1-1/2 in. (38 mm) for 1 hr fire rated assemblies and 2 in. (51 mm) for 2, 3 and 4 hr fire rated assemblies. For protected steel floors units or roof decks (D700 or P700 Series Designs), max separation between bottom of spray-applied fire resistive material and top of wall (at time of installation of joint system) is 1 in. (25 mm).**

**A. Deflection Channel** — (Optional) - Nom 3-3/4 in. (95 mm) wide by 3 in. (76 mm) deep U-shaped channel formed from min 25 gauge galv steel. Deflection channel installed perpendicular to direction of the fluted steel deck and secured to the steel deck valleys with steel masonry anchors or by welds spaced max 12 in. (305 mm) OC. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1 in. (25 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner is not fastened to the deflection channel.

**B. Forming Material\*** — Min 4-7/8 in., 6 in., 6-5/8 in. or 7-5/8 in. (124, 152, 168 or 194 mm) depth of 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation for 1, 2, 3 and 4 hr fire rated assemblies, respectively, cut to the shape of the fluted deck, approx 25 percent larger than the area of the flutes and compressed into the fluted area of the steel floor or roof deck above the ceiling channel. Additional strips of min 4 pcf (64 kg/m<sup>3</sup>) density- mineral wool batt insulation cut to a thickness equal to the overall thickness of the gypsum board, are compressed 50 percent in thickness and installed cut edge first to fill the gap between the top of the gypsum board and bottom of the steel floor units or roof deck. The forming material shall be installed flush with both surfaces of the wall.

The type and manufacturer of forming material used within the joint system is dependent upon the hourly rating of the wall assembly as shown in the table below:

<b>Rating of Wall, hr</b>	<b>Manufacturer of Mineral Wool</b>	<b>Type of Mineral Wool</b>
1, 2, & 3	Fibrex Insulation Inc	FBX Safing Insulation
1, 2, & 3	W. R. Grace	FlameSafe Mineral Wool
1, 2, 3, & 4	Roxul Inc	SAFE Mineral Wool
1 & 2	Rock Wool Manufacturing	Delta Safing Insulation
1, 2 & 3	Thermafiber Inc	SAF

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROXUL INC** — SAFE Mineral Wool Batts

**THERMAFIBER INC** — SAF

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — FlameSafe Mineral Wool

**B1. Spray-Applied Fire Resistive Material\* (Not Shown)** — As an alternate to the forming material (Item 3A) within the flutes, min 4-7/8 in., 6 in., 6-5/8 in., or 7-5/8 in. (124, 152, 168 or 194 mm) depth of spray-applied fire resistive material, for 1, 2, 3, and 4 hr fire rated assemblies, respectively, installed into the flutes of the steel floor or roof deck between the top of the wall and the bottom of the steel floor units or roof deck. Material shall be excluded from the joint immediately above the top of the gypsum board assemblies. The spray-applied fire resistive material is mixed with water in accordance with the mixing instructions on the bag and is sprayed and/or troweled to fill the flute above the wall. The min average density of the spray applied fire resistive material shall be 15 pcf (240 kg/m<sup>3</sup>) with a min individual density of 14 pcf. (224 kg/m<sup>3</sup>). See Design Information in Volume 1 of the Fire Resistance Directory for method of density determination.

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — Types MK-6/HY, MH-6/HY ES, RG, MK-6s, Z-106/G, Z-106, Z-106/HY and Z-146.

**B2. Forming Material\* - Plugs** — (Not Shown) As an alternate to the forming material and spray-applied fire resistive material (Items 3B and 3B1), mineral wool plugs preformed to the shape of the fluted floor units, may be used within the flutes. Plugs shall be friction fit to completely fill the flutes above the ceiling channel. The plugs shall project beyond each side of the ceiling runner, flush with wall surfaces. Additional forming material, described in Item 3B, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and bottom of steel floor units or roof deck. **Plugs to be used in max 2 hr fire rated wall assemblies.**

**ROCK WOOL MANUFACTURING CO** — Deck Plugs

**C. Fill, Void or Cavity Material\* — Sealant** — For assemblies incorporating mineral wool insulation within the flutes, min 1/8 in. (3 mm) wet thickness of fill material spray or brush applied on each side of the wall in the fluted area of the steel floor units or roof decks and between the top of the wall and the bottom of the steel floor units roof deck. Sealant shall overlap a min 1/2 in. (13 mm) onto wall and steel floor units or roof deck on both sides of wall or spray-applied fire resistive material, if used. For assemblies incorporating spray-applied fire resistive materials within the flutes, min 1/8 in. (3 mm) wet thickness of fill material spray or brush to cover the mineral wool insulation within the joint between the top of the wall and the bottom of the steel floor units roof decks. Sealant shall overlap a min 1/2 in. (13 mm) onto wall and a min 1/2 in. (13 mm) above the joint onto the spray-applied fire resistive material within the flutes on both sides of wall. When optional through penetrant (Item 4) is used, fill material to overlap a min of 1/2 in. (13 mm) onto conduit or EMT on both sides of wall.

**ACCUMETRIC L L C** — **Boss 137**

**Joint Configuration B**

**For unprotected steel floor units or roof decks (D900 or P900 Series Designs), max separation between bottom of floor or roof and top of wall (at time of installation of joint system) is 1-1/2 and 2 in. (38 and 51 mm) for 1 and 2 hr fire rated assemblies, respectively. For protected steel floor units or roof decks (D700 or P700 Series Designs), max separation between bottom of spray-applied fire resistive material and top of wall (at time of installation of joint system) is 1 in. (25 mm).**

**A. Deflection Channel** — Nom 3-3/4 in. (95 mm) wide by 3 in. (76 mm) deep U-shaped channel formed from min No. 22 ga galv steel. Deflection channel centered on valley of steel floor or roof deck and secured with steel fasteners or by welds spaced max 12 in. (305 mm) OC (prior to application of spray-applied fire resistive material, if used). The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1 in. (25 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner is not fastened to the deflection channel.

**B. Forming Material\*** — Strips of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation, cut to a thickness equal to the overall thickness of the gypsum board and compressed 50 percent in width. Mineral wool strips inserted into the gap between the top of the gypsum board and bottom of the steel floor units, roof deck or spray-applied fire resistive material, (if used), flush with both surfaces of the wall.

The type and manufacturer of forming material used within the joint system is dependent upon the hourly rating of the wall assembly as shown in the table below:

<b>Rating of Wall, hr</b>	<b>Manufacturer of Mineral Wool</b>	<b>Type of Mineral Wool</b>
1, 2 & 3	Fibrex Insulation Inc	FBX Safing Insulation
1, 2 & 3	W. R. Grace	FlameSafe Mineral Wool
1, 2 & 3	Roxul Inc.	SAFE Mineral Wool
1 & 2	Rock Wool Manufacturing	Delta Safing Insulation

1, 2 & 3	Thermafiber Inc	SAF
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**FIBREX INSULATIONS INC — FBX SAFING INSULATION**

**ROCK WOOL MANUFACTURING CO — Delta Safing Insulation**

**ROXUL INC — SAFE Mineral Wool Batts**

**THERMAFIBER INC — SAF**

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV — FlameSafe Mineral Wool**

**C. Fill, Void or Cavity Material\* -Sealant** — Min 1/8 in. (3 mm) wet thickness of fill material spray or brush applied on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel floor units, roof deck or spray-applied fire resistive material, if used on both sides of wall.

**ACCUMETRIC L L C — Boss 137**

4. **Through Penetrant** — (Optional, Not Shown) - Max 1-1/2 in. (38 mm) diam steel conduit or steel electrical metallic tubing (EMT) may be installed parallel with and within the flutes of the steel floor or roof deck when Joint Configuration A is used. The conduit or EMT shall be located near the mid-depth of the steel deck with a clearance of 1/2 to 1-1/2 in. (13 to 38 mm) between the conduit or EMT and the steel deck. Conduit or EMT to be rigidly supported on both sides of the wall assembly. A max of one conduit or EMT is permitted in an individual flute. When a conduit or EMT is installed in the flute of the steel deck, the max assembly rating of the joint system is 2 hr.

\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0410

October 31, 2008

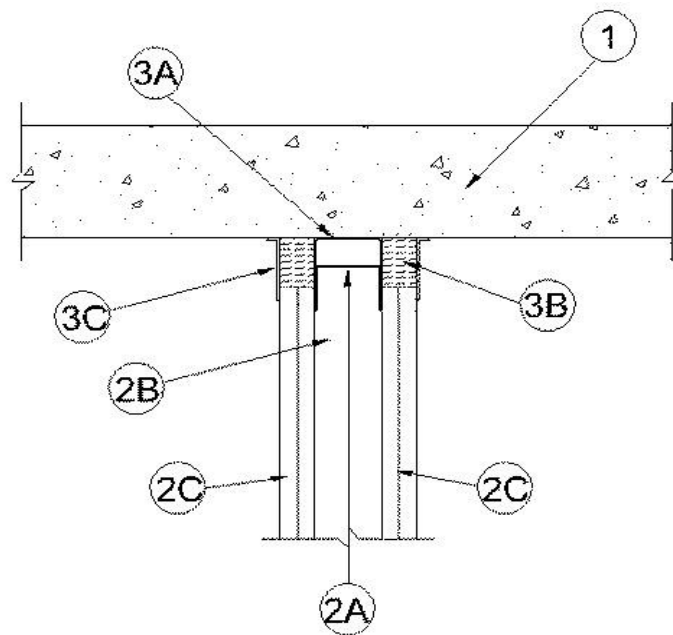
Assembly Rating — 1, 2, 3 and 4 Hr (See Item 2)

L Rating at Ambient — Less than 1 CFM/Lin Ft

L Rating at 400 F — Less than 1 CFM/Lin Ft

Nominal Joint Width — 1-1/2 and 2 In. (See Item 3)

Class II Movement Capabilities — 25% Compression & Extension



1. **Floor Assembly** — Min 4-1/2 in. (114 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Floor may also be constructed of any min 6 in. thick UL Classified hollow-core **Precast Concrete Units\***.

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

**The hourly fire rating of the floor assembly shall be equal or greater than the hourly fire rating of the wall assembly.**

2. **Wall Assembly** — The 1, 2, 3 or 4 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor and ceiling runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with 3 in. flanges. When U-shaped deflection channel is used, ceiling runner is installed within the U-shaped deflection channel (Item 3B) with 1 in. (25 mm) gap maintained between the top of ceiling runner and top of deflection channel. When deflection channel is not used, ceiling runner is secured to concrete floor slab with steel masonry anchors spaced a max 12 in. (305 mm) OC.

A1. **Light Gauge Framing\* - Slotted Ceiling Runner** — When the nom joint width is less than or equal to 1-3/4 in. ( mm ), slotted ceiling runner may be used as an alternate to the ceiling runner in Item 2A. Slotted ceiling

runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 12 in. (305 mm) OC. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used.

**METAL-LITE INC** — The System

**SLIPTRACK SYSTEMS INC** — SLP-TRK

**A2. Light Gauge Framing\* — Clipped Ceiling Runner** — As an alternate to the ceiling runner in Item 2A , clipped runner to consist of galv steel channel with clips preformed in track flanges which positively engage the inside flange of the steel studs (Item 2B). Track sized to accommodate steel studs (Item 2B). Track flanges to be min 3-1/4 in. Clipped ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 12 in. OC. When clipped ceiling runner is used, deflection channel (Item 3A) shall not be used.

**TOTAL STEEL SOLUTIONS L L C** — Snap Trak

**A3. Light Gauge Framing\* — Vertical Deflection Clip\*** — (Optional) Steel clips can be used in conjunction with steel studs (Item 2B), ceiling runner (Item 2A) or deflection channel (Item 3A). Clips installed over the top of studs and inserted within the ceiling runner or deflection channel. Clip shall be secured to the ceiling runner or deflection channel with No. 8 self drilling, self tapping steel fasteners through holes provided within the clip. Clip may be secured to the stud with No. 6 pan head steel screw through holes provided within the clip. As an alternate, the legs of the clip may be installed over the top of the stud without attachment in accordance with manufacturer's installation instructions.

**FLEX-ABILITY CONCEPTS L L C** — Three Legged Dog Deflection Clip

**A4. Light Gauge Framing\*- Notched Ceiling Runner** — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. OC. When notched ceiling runner is used, deflection channel (Item 3A) shall not be used.

**DENMAR STEEL INC** — Type SCR

**B. Studs** — Steel studs to be min 3-5/8 in. (92 mm) wide. Studs cut 3/4 in. (19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. OC.

**C. Gypsum Board\*** — Gypsum board sheets installed to a min total thickness of 5/8 in., 1-1/4 in., 1-1/2 in., or 2 in. (16, on each side of wall for 1, 2, 3 and 4 hr fire rated wall assemblies, respectively . Wall to be constructed as specified in the individual U400 Series Design in the UL Fire Resistance Directory, except that a nom 1-1/2 or 2 in. gap (see Item 3) shall be maintained between the top of the gypsum board and the bottom surface of the floor. The top row of screws shall be installed into the studs 4-3/4 in. below floor.

**The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.**

**3. Joint System** — **The max separation between bottom of floor and top of wall (at time of installation of joint system) is dependent upon the hourly rating of the wall. Max separation between bottom of floor and top of wall (at time of installation of joint system) is 1-1/2 in. for 1 hr fire rated assemblies and 2 in. for 2, 3 and 4 hr fire rated assemblies. The joint system is designed to accommodate a max 25 percent compression or extension from its installed width.** The joint system shall consist of an optional deflection channel , and forming and fill materials as follows:

**A. Deflection Channel** — (Optional) A nom 3-3/4 in. wide by min 3 in. deep min 25 gauge steel U-shaped channel. Deflection channel secured to concrete floor slab with steel masonry anchors spaced max 12 in. OC. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1 in. gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner is not fastened to the deflection channel.

**B. Forming Material\*** — Strips of min 4 pcf mineral wool batt insulation cut to a thickness equal to the overall thickness of the gypsum board and compressed 50 percent in thickness and installed cut edge first to fill the gap between the top of the wall and bottom of the floor. The forming material shall be flush with both surfaces of the wall.

The type and manufacturer of forming material used within the joint system is dependent upon the hourly rating of the wall assembly as shown in the table below:

<b>Rating of Wall, hr</b>	<b>Manufacturer of Mineral Wool</b>	<b>Type of Mineral Wool</b>
1, 2, & 3	Fibrex Insulation Inc	FBX Safing Insulation
1, 2, & 3	W. R. Grace	FlameSafe Mineral Wool
1, 2, 3, & 4	Roxul Inc	SAFE Mineral Wool
1 & 2	Rock Wool Manufacturing	Delta Safing Insulation

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROXUL INC** — Safe, SAF Mineral Wool

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — FlameSafe Mineral Wool

**C. Fill, Void or Cavity Material\* — Sealant** — Min 1/8 in. (3 mm) wet thickness of fill material spray or brush applied over mineral wool on each side of the wall between the top of the wall and the bottom of the concrete floor and overlapping a min 1/2 in. (13 mm) onto the concrete floor and gypsum board on both sides of wall.

**ACCUMETRIC L L C** — Boss 137

\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0411

October 31, 2008

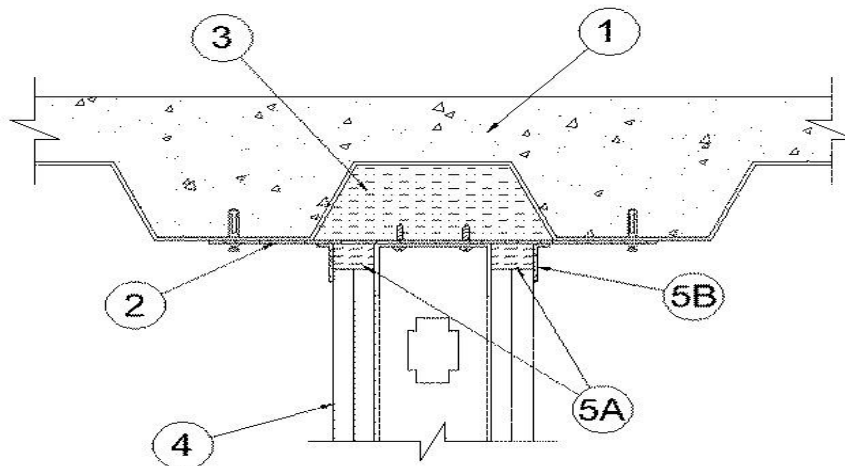
Assembly Rating — 1 and 2 Hr (See Item 1)

Nominal Joint Width — 1 In.

Class II Movement Capabilities — 25% Compression and Extension

L Rating At Ambient — Less Than 1 CFM/Lin Ft

L Rating At 400 F — Less Than 1 CFM/Lin Ft



1. **Floor Assembly** — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the Fire Resistance Directory and shall include the following construction features:

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

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) concrete, as measure from the top plane of the floor units.

2. **Steel Straps** — Min 2 in. (51 mm) wide 16 MSG galv steel straps cut to a length to span the flute and overlap the adjacent valleys of fluted floor units by 1-1/2 in. (38 mm). Straps spaced max 24 in. (610 mm) OC and fastened to floor assembly with 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete anchors.

3. **Forming Material\* - Plugs** — Preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the steel straps. Adjacent lengths of plugs to be tightly butted with butted seams spaced min 24 in. (610 mm) apart along the length of the plugs.

**ROCK WOOL MANUFACTURING CO** — Deck Plugs

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

A. **Steel Floor and Ceiling Runners** — Floor and ceiling runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with 2 in. (51 mm) flanges. Ceiling runner installed parallel to direction of fluted steel floor units, directly beneath steel straps and secured to straps with two No. 8 self-drilling, self-tapping steel screws per strap.

**B. Studs** — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 in. (13 mm) to 3/4 in. (19 mm) less in length than assembly height with bottom nesting in and resting on the floor runner and with top nesting in ceiling runner without attachment. Stud spacing not to exceed 24 in. (610 mm) OC.

**C. Gypsum Board\*** — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board are specified in the individual Wall and Partition Design. For both hourly ratings, a nom 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the steel floor units and the top row of screws shall be installed into the studs 3 in. (76 mm) below the valleys of the steel floor units.

**5. Joint System — Max separation between bottom of floor and top of wall is 1 in. (25 mm) The joint system is designed to accommodate a max 25 percent compression or extension from its installed width.** The joint system consists of a forming material and a fill material between the top of the gypsum board and the bottom of the floor, as follows:

**A. Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) density mineral wool batt insulation cut shall be cut into strips to fill the gap between the top of gypsum board and bottom of the floor units. The width of the strips shall be equal to the total thickness of the gypsum board. The strips of mineral wool are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the mineral wool plug or steel floor units.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Board

**ROXUL INC** — SAFE Mineral Wool Batts

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — FlameSafe Mineral Wool

**B. Fill, Void or Cavity Material\* - Sealant** — Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material sprayed or troweled on each side of the wall to completely cover the mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board, steel floor units and steel straps on both sides of the wall.

**ACCUMETRIC L L C** — Boss 137

\*Bearing the UL Classification Mark



## Joint Systems

System No. HW-D-0412

October 31, 2008

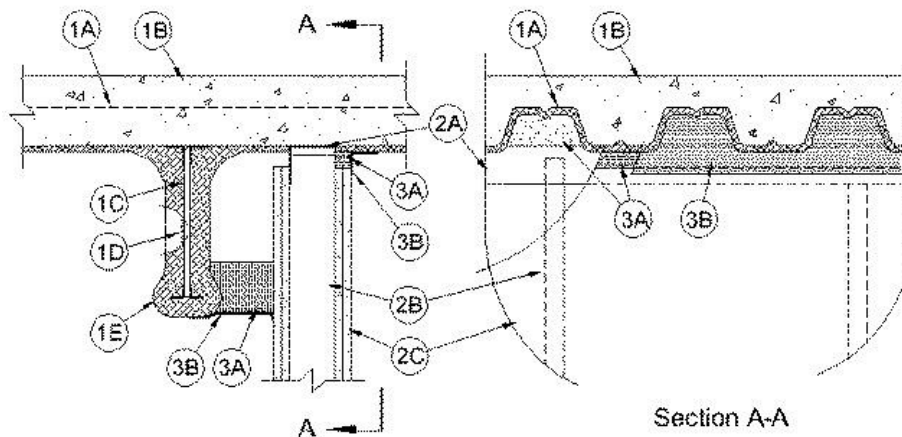
Assembly Ratings — 1 and 2 Hr (See Item 2)

Nominal Joint Width - 1 In.

Class II Movement Capabilities - 12.5% Compression or Extension

L Rating At Ambient - Less Than 1 CFM/Lin Ft

L Rating At 400 F - Less Than 1 CFM/Lin Ft



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory. The hourly fire rating of the floor assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The floor assembly shall include the following construction features:

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

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

C. **Structural Steel Support** — Steel beam or open-web steel joist, as specified in the individual D700 or D900 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and 1 to 6 in. (25 to 152 mm) from wall assembly.

D. **Steel Lath** — When structural steel support (Item 1C) consists of open-web steel joists, 3/8 in. (10 mm) diamond mesh expanded steel lath having a nom weight of 1.7 to 3.4 lb per sq yd (0.9 to 1.8 kg/m<sup>2</sup>) shall be installed to completely cover one side of each joist which is located within 6 in. (152 mm) of wall assembly. The lath shall be secured with steel tie wire and shall be fully covered with spray applied fire resistive material.

E. **Spray-Applied Fire Resistive Material\*** — After installation of the ceiling runner (Item 2A), steel floor units and structural steel supports to be sprayed with the thickness of material specified in the individual D700 or D900 Series Design. The flutes of the steel floor units above the structural steel supports and above the ceiling runner (Item 2A) shall be filled with spray-applied fire resistive material. As an alternate, the spray-applied fire resistive material in the flutes above the ceiling runner may be applied to follow the contour of the steel floor units. Excess material shall be removed from the flanges of the ceiling runner beyond the required thickness of spray-applied fire resistive material on the steel floor units.

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — Type MK-6/HY, MK-6/HY ES, MK-6s, RG

1A. **Roof Assembly** — (Not Shown) — As an alternate to the floor assembly (Item 1), a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 or P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly fire rating of the roof assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — For P700 Series Designs, min 3/4 in. (19 mm) thick **Mineral and Fiber Board\*** insulation applied in one or more layers directly over steel roof deck or over gypsum board sheathing laid atop steel roof deck as specified in the individual design. For P900 Series Designs, min 2-1/4 in. thick poured insulating concrete, as measured from the top plane of the roof deck as specified in the individual design.

C. **Roof Covering\*** — Hot-mopped or cold-application materials compatible with mineral and fiber board insulation.

D. **Structural Steel Support** — Steel beam or open-web steel joist, as specified in the individual P700 or P900 Series Roof-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and min 2 in. (51 mm) to max 6 in. (152 mm) from wall assembly.

E. **Steel Lath** — When structural steel support (Item 1D) consists of open-web steel joists, 3/8 in. (10 mm) diamond mesh expanded steel lath having a nom weight of 1.7 to 3.4 lb per sq yd (0.9 to 1.8 kg/m<sup>2</sup>) shall be installed to completely cover one side of each joist which is located within 6 in. (152 mm) of wall assembly. The lath shall be secured with steel tie wire and shall be fully covered with spray applied fire resistive material.

F. **Spray-Applied Fire Resistive Material\*** — After installation of the ceiling runner (Item 2A), steel roof deck and structural steel supports to be sprayed with a thickness of spray applied fire resistive material as specified in the individual P700 or P900 Series Roof-Ceiling design. The flutes of the steel deck above the structural steel supports and above the ceiling runner (Item 2A) shall be filled with spray-applied fire resistive material. As an alternate, the spray-applied fire resistive material in the flutes above the ceiling runner may be applied to follow the contour of the steel roof deck. Excess material shall be removed from the flanges of the ceiling runner beyond the required thickness of spray-applied fire resistive material on the steel roof deck.

#### W R GRACE & CO - CONN

**CONSTRUCTION PRODUCTS DIV** — Type MK-6/HY, MK-6/HY ES, MK-6s, RG

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

A. **Steel Floor and Ceiling Runners** — Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with min 1-1/4 in. (32 mm) to max 3 in. (76 mm) flanges. Ceiling runner is secured to steel floor units (Item 1A) with steel fasteners or welds spaced max 24 in. (610 mm) OC. Ceiling runner to be installed parallel with structural steel support and located such that a max clearance of 4 in. (102 mm) is present between the finished wall and the spray-applied fire resistive material at the lowest elevation of the structural steel support.

A1. **Light Gauge Framing\*** — **Slotted Ceiling Runner** — As an alternate to the ceiling runner in Item 2A, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Ceiling runner secured to valleys with steel fasteners spaced max 24 in. (610 mm) OC.

**SLIPTRACK SYSTEMS INC** — SLP-TRK

A2. **Light Gauge Framing\*** — **Clipped Ceiling Runner** — As an alternate to the ceiling runner in Items 2A and 2A1, clipped runner to consist of galv steel channel with clips preformed in track flanges which positively engage the inside flange of the steel studs (Item 2B). Track sized to accommodate steel studs (Item 2B). Track flanges to be min 2-1/2 in. (64 mm). Clipped ceiling runner secured with steel fasteners spaced max 24 in. (610 mm) OC.

**TOTAL STEEL SOLUTIONS L L C** — Snap Trak

B. **Studs** — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 in. to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and secured to floor runner. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Studs to nest in ceiling runner without attachment.

C. **Gypsum Board\*** — Gypsum board sheets installed to a min total 5/8 in. (16 mm) or 1-1/4 in. (32 mm) thickness on each side of wall for 1 and 2 hr fire rated assemblies, respectively. Wall to be constructed as

specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory except that a max 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom plane of the spray applied fire resistive material on the steel deck on both sides of the wall assembly. When no spray-applied fire resistive material is used on the steel deck, a max 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom plane of the steel deck. The screws attaching the gypsum board to the studs along the top of the wall shall be located 1 in. (25 mm) below the bottom of the ceiling runner. No gypsum board attachment screws shall be driven into the ceiling runner. Where the top of the wall assembly is inaccessible above the lowest elevation of the structural steel support, the gypsum board attachment screws may be omitted.

**The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.**

3. **Joint System** — Max separation between bottom plane of steel deck or spray-applied fire resistive material and top of gypsum board (at time of installation of joint system) is 1 in. (25 mm). Separation distance between spray applied fire resistive material on structural support member and surface of wall is min 1 in. (25 mm) to max 4 in. (102 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width as measured between the bottom plane of the steel deck or the spray-applied fire resistive material on the steel deck and the top of the gypsum board. The joint system shall consist of forming and fill materials, as follows:

A. **Forming Material\*** — Nom 4 pcf (64 kg/m<sup>3</sup>) density mineral wool batt insulation. Sections of mineral wool batt cut to a width of 4 in. (102 mm) and stacked to attain a thickness which is 50 percent greater than the width of the linear gap between the spray applied fire resistive material on the structural steel member and the surface of the wall assembly. Stacked sections of mineral wool compressed 33 percent in thickness and installed cut edge first into linear gap until the bottom edge is flush with the bottom surface of the spray applied fire resistive material on the structural steel member. When no spray-applied fire resistive material is used on the steel deck or when the spray-applied fire resistive material in the flutes above the wall follows the contour of the steel deck, sections of mineral wool batt cut to the shape of the fluted deck and stacked to a min 6 in. (152 mm) thickness shall be installed in the flutes of the steel floor or roof deck between the top of the ceiling runner and the steel deck or spray-applied fire resistive material. The mineral wool batt insulation is to be installed flush with the gypsum board surface on the side of the wall opposite the structural steel support. Additional sections of mineral wool batt insulation are compressed 50 percent in thickness and are installed cut edge first to completely fill the gap above the top of the gypsum board.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Board

**ROXUL INC** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — FlameSafe Mineral Wool

B. **Fill, Void or Cavity Material\*** — **Sealant** — Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material spray or brush applied over the forming material on each side of the wall. Fill material to overlap a min of 1/2 in. (13 mm) onto the gypsum board and a min of 2 in. (51 mm) onto the steel deck or the spray-applied fire resistive material on the steel deck and on the spray-applied fire resistive material on the structural steel support member on each side of the wall.

**ACCUMETRIC L L C** — Boss 137

\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0413

October 31, 2008

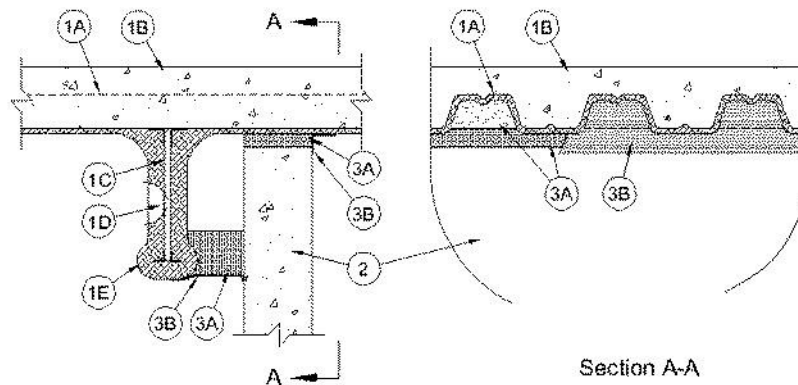
Assembly Rating — 2 Hr

Nominal Joint Width — 1 In.

Class II Movement Capabilities — 12.5% Compression or Extension

L Rating At Ambient — Less Than 1 CFM/Lin Ft

L Rating At 400 F — Less Than 1 CFM/Lin Ft



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory. The hourly fire rating of the floor assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The floor assembly shall include the following construction features:

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

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

C. **Structural Steel Support** — Steel beam or open-web steel joist, as specified in the individual D700 or D900 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and min 2 in. (51 mm) to max 6 in. (152 mm) from wall assembly.

D. **Steel Lath** — When structural steel support (Item 1C) consists of open-web steel joists, 3/8 in. (10 mm) diamond mesh expanded steel lath having a nom weight of 1.7 to 3.4 lb per sq yd (0.9 to 1.8 kg/m<sup>2</sup>) shall be installed to completely cover one side of each joist which is located within 6 in. (152 mm) of wall assembly.

E. **Spray-Applied Fire Resistive Material\*** — Steel floor units and structural steel supports to be sprayed with the thickness of material specified in the individual D700 or D900 Series Design. The flutes of the steel floor units above the structural steel supports shall be filled with spray-applied fire resistive material. The spray-applied fire resistive material in the flutes above the wall shall be applied to follow the contour of the steel floor units.

### W R GRACE & CO - CONN

**CONSTRUCTION PRODUCTS DIV** — Type MK-6/HY, MK-6/HY ES, MK-6s, RG

1A. **Roof Assembly** — (Not Shown) — As an alternate to the floor assembly (Item 1), a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 or P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly fire rating of the roof assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

**B. Roof Insulation** — For P700 Series Designs, min 3/4 in. (19 mm) thick **Mineral and Fiber Board\*** insulation applied in one or more layers directly over steel roof deck or over gypsum board sheathing laid atop steel roof deck as specified in the individual design. For P900 Series Designs, min 2-1/4 in. thick poured insulating concrete, as measured from the top plane of the roof deck as specified in the individual design.

**C. Roof Covering\*** — Hot-mopped or cold-application materials compatible with mineral and fiber board insulation.

**D. Structural Steel Support** — Steel beam or open-web steel joist, as specified in the individual P700 or P900 Series Roof-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and min 2 in. (51 mm) to max 6 in. (152 mm) from wall assembly.

**E. Steel Lath** — When structural steel support (Item 1D) consists of open-web steel joists, 3/8 in. (10 mm) diamond mesh expanded steel lath having a nom weight of 1.7 to 3.4 lb per sq yd (0.9 to 1.8 kg/m<sup>2</sup>) shall be installed to completely cover one side of each joist which is located within 6 in. (152 mm) of wall assembly. The lath shall be secured with steel tie wire and shall be fully covered with spray applied fire resistive material.

**F. Spray-Applied Fire Resistive Material\*** — Steel roof deck and structural steel supports to be sprayed with a thickness of spray applied fire resistive material as specified in the individual P700 Series Roof-Ceiling design. The flutes of the steel deck above the structural steel supports shall be filled with spray-applied fire resistive material. The spray-applied fire resistive material in the flutes above the wall shall be applied to follow the contour of the steel roof deck.

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — Type MK-6/HY, MK-6/HY ES, MK-6s, RG

2. **Wall Assembly** — Min 6 in. (152 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***.

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

3. **Joint System** — Max separation between bottom plane of steel deck or spray-applied fire resistive material on the steel deck and the top of the concrete or concrete block wall (at time of installation of joint system) is 1 in. (25 mm). Separation distance between spray applied fire resistive material on structural support member and surface of wall is min 1 in. (25 mm) to max 4 in. (102 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width as measured between the bottom plane of the steel deck or the spray-applied fire resistive material on the steel deck and the top of the concrete or concrete block wall. The joint system shall consist of forming and fill materials, as follows:

**A. Forming Material\*** — Nom 4 pcf (64 kg/m<sup>3</sup>) density mineral wool batt insulation. Sections of mineral wool batt cut to a width of 4 in. (102 mm) and stacked to attain a thickness which is 50 percent greater than the width of the linear gap between the spray applied fire resistive material on the structural steel member and the surface of the wall assembly. Stacked sections of mineral wool compressed 33 percent in thickness and installed cut edge first into linear gap until the bottom edge is flush with the bottom surface of the spray applied fire resistive material on the structural steel member. On the opposite side of the wall, sections of mineral wool batt insulation cut to the width of the wall inserted edge-first between the top of the wall and the steel deck or the spray-applied fire resistive material on the valleys of the steel deck, compressed approx 50 percent in thickness beneath each valley and flush with the wall surface. Additional pieces of mineral wool batt cut to the shape of the steel deck flute, stacked to a min 6 in. (152 mm) thickness and installed in the flutes above the wall flush with the wall surface.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Board

**ROXUL INC** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — FlameSafe Mineral Wool

**B. Fill, Void or Cavity Material\* — Sealant** — Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material spray or brush applied over the forming material on each side of the wall. Fill material to overlap a min of 1/2 in. (13 mm) onto the steel deck or the spray-applied fire resistive material on the steel deck and on the spray-applied fire resistive material on the structural steel support member on each side of the wall.

**ACCUMETRIC L L C** — Boss 137

\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0414

October 31, 2008

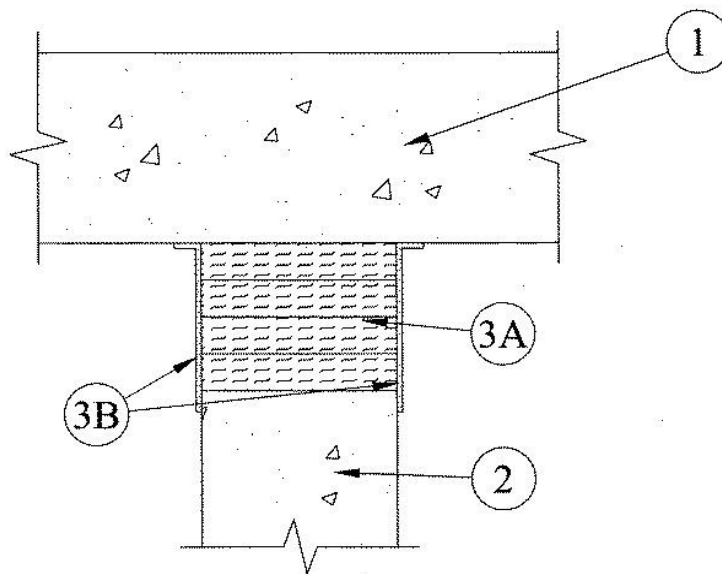
Assembly Rating — 2 and 3 Hr (See Item 3A)

Nominal Joint Width — 2 In.

Class II Movement Capabilities — 25% Compression or Extension

L Rating At Ambient — Less Than 1 CFM/Lin Ft

L Rating At 400 F — Less Than 1 CFM/Lin Ft



1. **Floor 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>) structural concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units**\*.

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

**The hourly fire rating of the floor assembly shall be equal or greater than the hourly fire rating of the wall assembly.**

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

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

**The hourly fire rating of the joint system is equal to the hourly fire rating of the wall assembly.**

3. **Joint System** — Max separation between bottom of floor and top of wall (at time of installation of joint system) is 2 in. (51 mm). The joint system is designed to accommodate a max 25 percent compression or extension from its installed width. The joint system shall consist of the following:

A. **Forming Material**\* — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 6 or 6-5/8 in. (152 or 168 mm) for 2 and 3 hr rated assemblies, respectively, and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and that the compressed batt sections are recessed from each surface of the wall as required to accommodate the required thickness of fill material.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Board.

**ROXUL INC** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — FlameSafe Mineral Wool

**B. Fill, Void or Cavity Material\*** — **Spray** — Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry wet thickness of fill material applied within the joint, flush with each surface of wall and lapping a min 1/2 in. (13 mm) onto the bottom surface of the floor and each surface of wall.

**ACCUMETRIC L L C** — Boss 137

\*Bearing the UL Classification Mark



## Joint Systems

System No. HW-D-0415

November 04, 2008

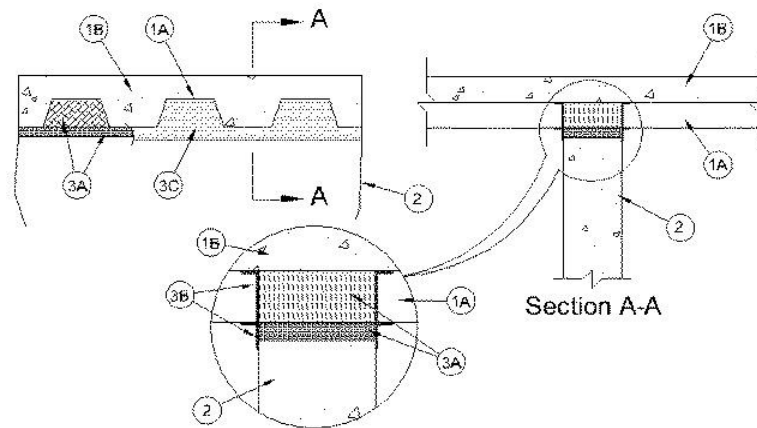
Assembly Ratings - 2 and 3 Hr (See Items 3 and 4)

Nominal Joint Width — 1 and 2 In. (See Item 3)

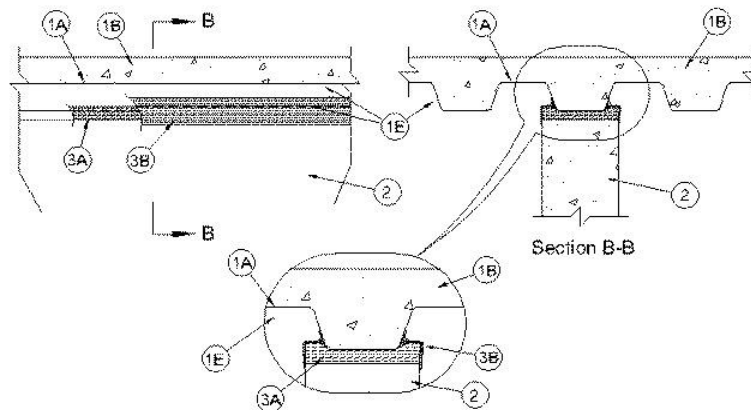
Class II Movement Capabilities — 25% Compression or Extension

L Rating At Ambient — Less Than 1 CFM/Lin Ft

L Rating At 400 F — Less Than 1 CFM/Lin Ft



Joint Configuration A



Joint Configuration B

1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

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

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete, as measured from the top plane of the floor units.

**The hourly fire rating of the floor assembly shall be equal or greater than the hourly fire rating of the wall assembly.**

**1A. Floor Assembly** — As an alternate to Item 1, the fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor and Floor Units\*** — Max 3 in. (76 mm) deep galv steel fluted floor units.
- B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete, as measured from the top plane of the floor units.
- C. **Spray-Applied Fire Resistive Material\*** — Prior to the installation of the joint system (Item 3) all surfaces of the steel floor units to be sprayed with the thickness of material specified in the individual D700 Series Design.

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — Type MK-6/HY, MK-6/HY ES, RG and MK-6S.

**1B. Roof Assembly — (Not Shown)** — As an alternate to Items 1 and 1A, a fire-rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

- A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.
- B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

**1C. Roof Assembly** — As an alternate to Items 1, 1A, and 1B, a fire rated protected fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

- A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.
- B. **Roof Insulation** — As specified in the individual P700 Series Design.
- C. **Spray - Applied Fire Resistive Materials\*** — (Not Shown)—Prior to the installation of the joint system (Item 3), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — Type MK-6/HY, MK-6/HY ES, RG and MK-6S.

**2. Wall Assembly** — Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. For Joint Configuration B, wall to be centered beneath valley of fluted steel floor or roof deck.

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

**For Joint Configuration A, the hourly assembly rating of the joint system is equal to the hourly fire rating of the wall assembly. For Joint Configuration B, the max assembly rating of the joint system is 2 hr.**

**3. Joint System** — For unprotected steel floors units or roof decks (D900 or P900 Series Designs), max separation between bottom of floor or roof and top of wall (at time of installation of joint system) is 2 in. (51 mm). For protected steel floors units or roof decks (D700 or P700 Series Designs), max separation between bottom of spray-applied fire resistive material and top of wall (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 25 percent compression or extension from it's installed width. The hourly assembly rating of the joint system is dependent upon the joint configuration and the max hourly fire

**rating of the wall assembly. When Joint Configuration B is used, max Assembly Rating of joint system is 2 hr.** The joint system shall consist of the following:

#### **Joint Configuration A**

**A. Forming Material\*** — Min 6 or 6-5/8 in. (152 or 168 mm) thickness of 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation, for 2 and 3 hr rated assemblies, respectively, cut to the shape of the fluted deck, approx 25 percent larger than the area of the flutes and compressed into the flutes of the steel floor units, roof deck or spray-applied fire resistive material. Additional min 6 or 6-5/8 in. (152 or 168 mm) wide sections of mineral wool batt insulation, for 2 and 3 hr rated assemblies, respectively, are compressed 50 percent in thickness and installed cut edge first to fill the gap between the top of the wall and bottom of the steel floor units, roof deck or spray-applied fire resistive material. The forming material shall be installed flush with both surfaces of the wall.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROXUL INC** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — FlameSafe Mineral Wool

**A1. Spray-Applied Fire Resistive Material\* (Not Shown)** — As an alternate to the forming material (Item 3A) within the flutes, min 6 or 6-5/8 in. (152 or 168 mm) depth of spray-applied fire resistive material, for 2 and 3 hr rated assemblies, respectively, installed into the flutes of the steel floor, roof deck or spray-applied fire resistive material. Material shall be excluded from the max 2 in. (51 mm) wide joint immediately above the top of the concrete wall. The spray-applied fire resistive material is mixed with water in accordance with the mixing instructions on the bag and is sprayed and/or troweled to completely fill the opening above the wall. The min average density of the spray applied fire resistive material shall be 15 pcf (240 kg/m<sup>3</sup>) with a min individual density of 14 pcf (224 kg/m<sup>3</sup>). See Design Information of Volume 1 of the Fire Resistance Directory for method of density determination.

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — Type MK-6/HY, MK-6/HY ES, RG, MK-6S, Z-106/G, Z106, Z106-HY and Z-146.

**A2. Forming Material\* - Plugs** — (Not Shown) As an alternate to the forming material and spray-applied fire resistive material (Items 3A and 3A1), mineral wool plugs preformed to the shape of the fluted floor units, may be used within the flutes. Plugs shall be friction fitted to completely fill the flutes, flush with wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of concrete wall and bottom of steel floor units, roof deck or spray-applied fire resistive material. **Plugs to be used in max 2 hr fire rated wall assemblies.**

**ROCK WOOL MANUFACTURING CO** — Deck Plugs

**B. Fill, Void or Cavity Material\* — Sealant** — Min 1/8 in. (3 mm) wet thickness of fill material spray or brush applied on each side of the wall in the flutes of the steel floor units or roof deck and between the top of the wall and the bottom of the steel floor units or roof deck and overlap a min 1/2 in. (13 mm) onto concrete wall and steel floor units, roof deck or spray-applied fire resistive material on both sides of wall. When optional through penetrant (Item 4) is used, fill material to overlap a min of 1/2 in. (13 mm) onto conduit or EMT on both sides of wall.

**ACCUMETRIC L L C** — Boss 137

#### **Joint Configuration B**

**A. Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) density mineral wool batt insulation cut into strips with a width equal to the overall thickness of the wall. Strips are compressed 50 percent in thickness and installed cut edge first to fill the gap

between the top of the wall and the bottom of the steel floor units, roof deck or spray-applied fire resistive material. The forming material shall be installed flush with both surfaces of the wall.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROXUL INC** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN**

**CONSTRUCTION PRODUCTS DIV** — FlameSafe Mineral Wool

**B. Fill, Void or Cavity Material\* — Sealant** — Min 1/8 in. (3 mm) wet thickness of fill material spray or brush applied on each side of the wall to completely cover the mineral wool forming material and to overlap a min 1/2 in. (13 mm) onto concrete wall and steel floor units, roof deck or spray-applied fire resistive material on both sides of wall.

**ACCUMETRIC L L C** — Boss 137

4. **Through Penetrant** — (Optional, Not Shown) — Max 1-1/2 in. (38 mm) diam steel conduit or steel electrical metallic tubing (EMT) may be installed parallel with and within the flutes of the steel floor or roof deck when Joint Configuration A is used. The conduit or EMT shall be located near the mid-depth of the steel deck with a clearance of 1/2 to 1-1/2 in. (13 to 38 mm) between the conduit or EMT and the steel deck. Conduit or EMT to be rigidly supported on both sides of the wall assembly. A max of one conduit or EMT is permitted in an individual flute. **When a conduit or EMT is installed in the flute of the steel deck, the max assembly rating of the joint system is 2 hr.**

\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0416

November 05, 2008

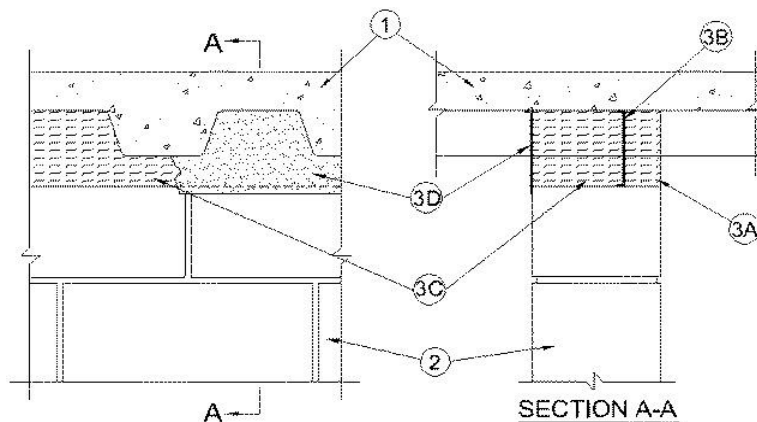
Assembly Rating — 3 Hr

Nominal Joint Width — 2 In.

Class II Movement Capabilities — 12.5% Compression or Extension

L Rating At Ambient — Less Than 1 CFM/Lin Ft

L Rating At 400 F — Less Than 1 CFM/Lin Ft



1. **Floor Assembly** — The fire rated fluted steel unit/concrete floor assembly shall be constructed of the materials and in a manner described in the individual D900 Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor and Form Units\*** — Max 3 in. (76 mm) deep galv steel fluted floor units.
- B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete as measured from top plane of the floor units.

1A. **Roof Assembly** — (**Not Shown**) — As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials in the manner describe in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

- A. **Steel Roof Deck** — Max 2 in. (51 mm) deep galv steel fluted roof deck.
- B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

2. **Wall Assembly** — Min 8 in. (203 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*.

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

3. **Joint System** — Max separation between bottom of floor or roof and top of wall at time of installation of joint system is 2 in. (51 mm) The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width. The joint system shall consist of the following:

A. **Forming Material** — Nom pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation, min 2 in. (51 mm) wide, compressed and firmly packed to fill the flutes and the gap between the top of the wall and bottom of the floor or roof as a permanent

form on one side of the wall. Batt insulation cut to the shape of the fluted steel deck, approx 33 percent larger than the flutes. Pieces compressed and installed cut edge first into the flutes above the top of the wall. Additional pieces of batt insulation, min 2 in. (51 mm) wide, installed edge-first into joint opening between bottom of fluted steel deck and top of wall, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness. Compressed batt sections are flush with one surfaces of wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. (1.22 m) apart along the length of the joint.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Board

**ROXUL ASIA SDN BHD** — SAFE Mineral Wool

**ROXUL INC** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN** — FlameSafe Mineral Wool

**B. Fill, Void or Cavity Material\*** — Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry wet thickness of fill material sprayed or troweled into the joint to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto wall and steel deck, within joint cavity.

**ACCUMETRIC L L C** — Boss 137

**C. Forming Material** — Nom pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation, min 6 in. (152 mm) wide, compressed and firmly packed to completely fill the flutes and the gap between the top of the wall and bottom of the floor or roof as a permanent form. Batt insulation cut to the shape of the fluted steel deck, approx 33 percent larger than the flutes. Pieces compressed and installed cut edge first into the flutes above the top of the wall. Additional pieces of batt insulation, min 6 in. (152 mm) wide, installed edge-first into joint opening between bottom of fluted steel deck and top of wall, parallel with joint direction, such that batt sections are compressed min 50 percent in. thickness. Compressed batt sections are flush with one surface of wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. (1.22 m) apart along the length of the joint.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Board

**ROXUL ASIA SDN BHD** — SAFE Mineral Wool

**ROXUL INC** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN** — FlameSafe Mineral Wool

**D. Fill, Void or Cavity Material\*** — Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material sprayed or troweled on one side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto wall and steel deck on accessible side of wall.

**ACCUMETRIC L L C** — Boss 137

\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0417

November 05, 2008

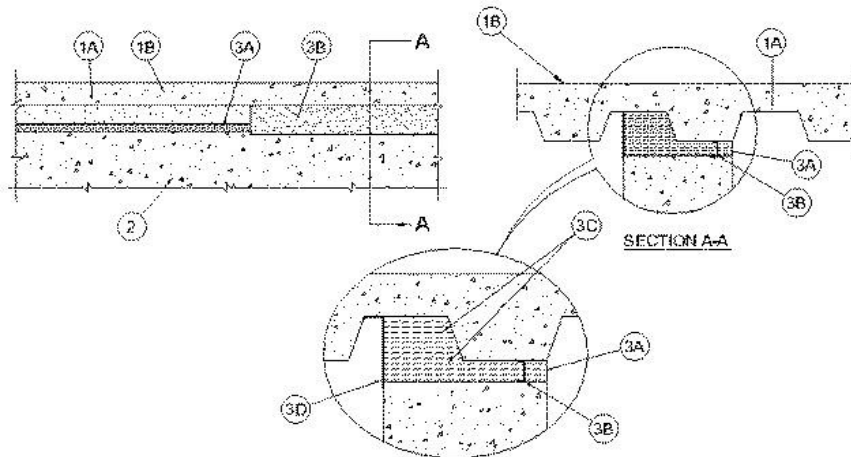
Assembly Rating — 3 Hr

Nominal Joint Width — 2 In.

Class II Movement Capabilities — 12.5% Compression or Extension

L Rating At Ambient — Less Than 1 CFM/Lin Ft

L Rating At 400 F — Less Than 1 CFM/Lin Ft



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D900 Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

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

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf of 1600-2400 kg/m<sup>3</sup>) concrete, as measured from the top plane of the floor units.

C. **Spray-Applied Fire Resistive Material\* (Optional, Not Shown)** — Prior to the installation of the Forming Material and Fill, Void or Cavity Materials (Items 3A through 3D), all surfaces of the steel floor units to be sprayed with the thickness of material specified in the individual D700 Series Design.

**W R GRACE & CO - CONN** — Types MK-6/HY, MK-6/HY ES, RG and MK-6S

1A. **Roof Assembly - (Not Shown)** — As an alternate to the floor assembly (Item 1), a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 2 in. (51 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

C. **Spray-Applied Fire Resistive Materials\* (Not Shown, Optional)** — Prior to the installation of Forming Material and Fill, Void or Cavity Material (Items 3A through 3D), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.

**W R GRACE & CO - CONN** — Types MK-6/HY, MK-6/HY ES, RG and MK-6S

2. **Wall Assembly** — Min 8 in. (203 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Wall shall be installed parallel with the flutes of the steel floor and roof deck units (Item 1A). Wall may also be constructed of any UL Classified 3 hr fire rated **Concrete Blocks\***. When wall is constructed of concrete blocks, the top course of block shall be filled with concrete, grout or mortar.

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

3. **Joint System** — **Max separation between bottom of steel floor units, roof deck or spray-applied fire resistive material (if used) and top of the wall at time of installation of joint system is 2 in. (51 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width.** The joint system consists of the following:

A. **Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation cut into strips min 2 in. (51 mm) wide compressed 50 percent in thickness and inserted into the gap between the top of the wall and the bottom of the steel floor units, roof deck or sprayed-applied fire resistive material (if used) flush with one surface of the wall.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Board

**ROXUL ASIA SDN BHD** — SAFE Mineral Wool

**ROXUL INC** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN** — FlameSafe Mineral Wool

B. **Fill, Void or Cavity Material\*** — Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material sprayed or troweled into joint to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto wall and steel deck, roof deck or sprayed-applied fire resistive material (if used) within joint cavity.

**ACCUMETRIC L L C** — Boss 137

C. **Forming Material** — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation cut into strips min 6 in. wide, compressed 50 percent in thickness and inserted into the gap between the top of the wall and the bottom of the steel floor units, roof deck or sprayed-applied fire resistive material (if used) butting edge of the installed forming material Item 3A. When the void beneath the steel floor unit or roof deck is located entirely above the wall, the void shall be completely filled with mineral wool insulation compressed 50 percent in thickness. When void beneath the steel deck is located in part above the wall, that portion of the void above the wall shall be packed with additional strips of mineral wool batt insulation compressed 50 percent in thickness flush with the surface of the wall.

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**IIG MINWOOL L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Board

**ROXUL ASIA SDN BHD** — SAFE Mineral Wool

**ROXUL INC** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**W R GRACE & CO - CONN** — FlameSafe mineral Wool

D. **Fill, Void or Cavity Material\*** — Min 1/8 in. (3.2 mm) thickness or 1/16 in. (1.6 mm) dry wet thickness of fill material sprayed or troweled to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto wall and steel floor unit, roof deck or sprayed-applied fire resistive material (if used) on accessible side of the wall.

**ACCUMETRIC L L C** — Boss 137

\*Bearing the UL Classification Mark

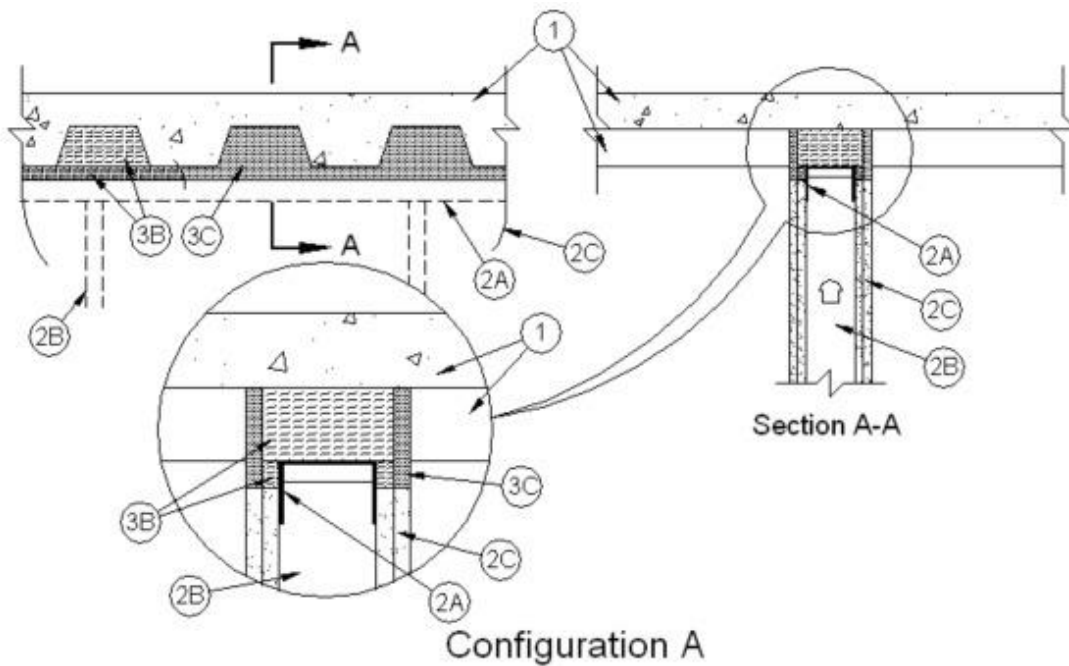


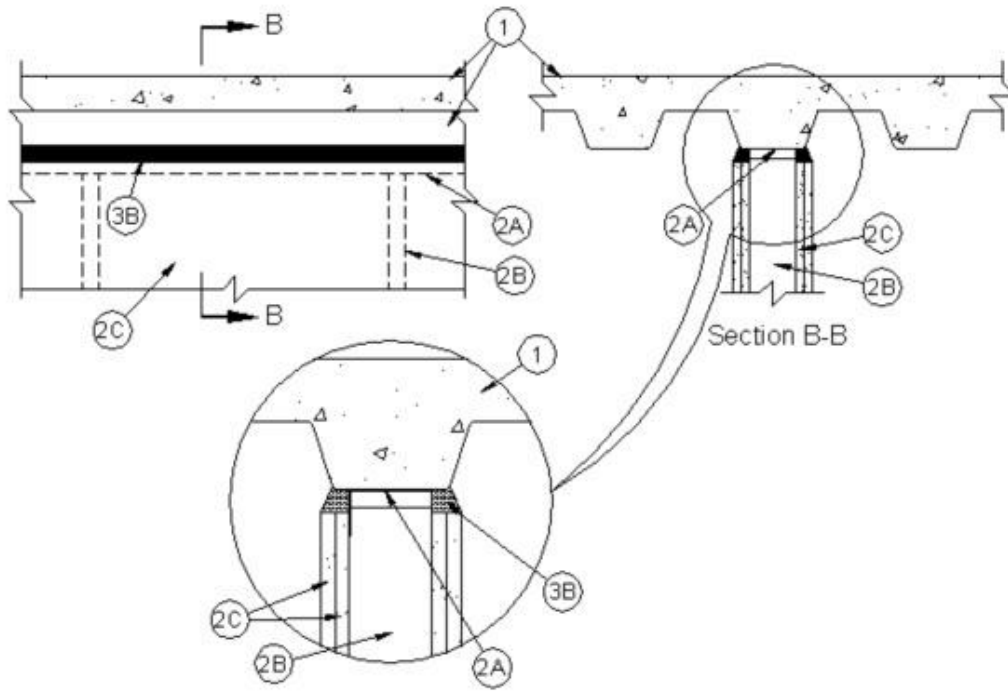
## Joint Systems

System No. HW-D-0507

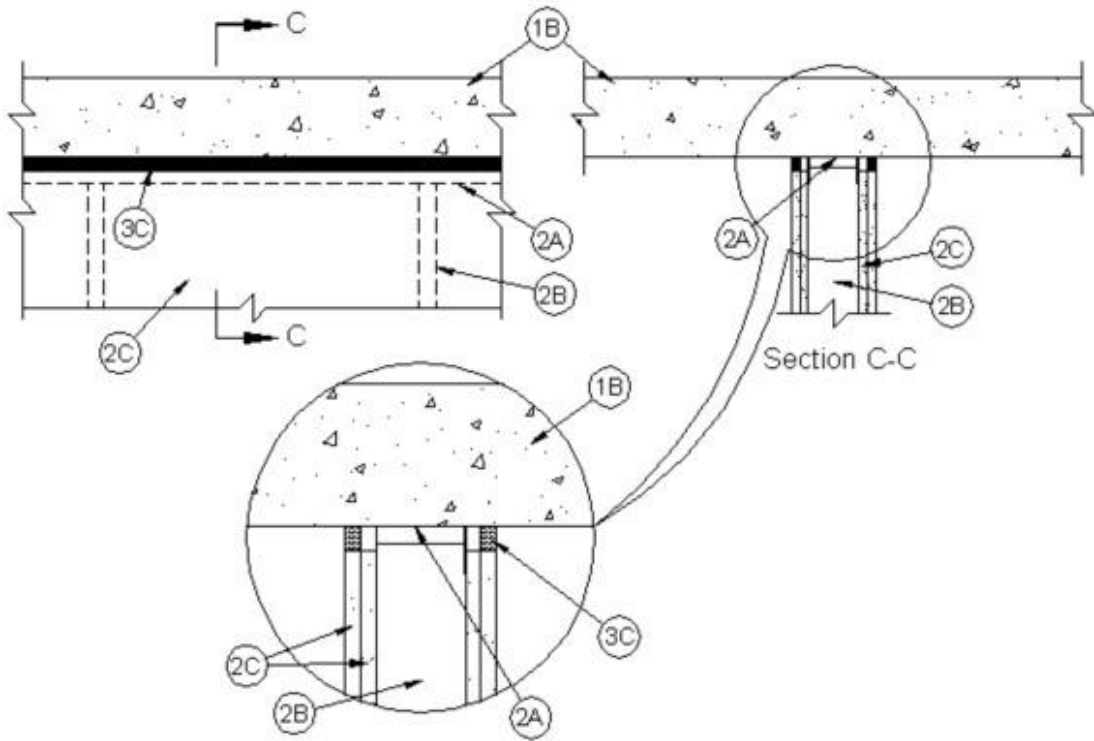
October 26, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	
F Ratings — 1 and 2 Hr (See Item 2)	FT Ratings —1 and 2 Hr (See Item 2)
	FH Ratings —1 and 2 Hr (See Item 2)
	FTH Ratings —1 and 2 Hr (See Item 2)
Joint Width — 1 In.	Joint Width —25 mm
Class II Movement Capabilities — 25% Compression	Class II Movement Capabilities — 25% Compression





Configuration B



Configuration C

1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Form Units\*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 3 in. (76 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600- 2400 kg/m<sup>3</sup>) concrete, as measured from the top plane of the floor units.

1A. **Roof Assembly** — (Not Shown) — As an alternate to the floor assembly, a fire-rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck Max** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

C. **Roof Covering** — Hot-mopped or cold application materials compatible with concrete.

1B. **Floor Assembly** — As an alternate to the floor and roof assemblies (Items 1 and 1A), the floor may consist of a 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 slab.

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

A. **Steel Floor And Ceiling Runners** — Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with min 1-1/4 in. (32 mm) flanges. Studs and gypsum board must have a min 1/4 in. (6 mm) engagement onto the flanges of the ceiling runner at the furthest point of extension of the joint. Ceiling runner installed perpendicular to steel deck (Configuration A) or centered on valleys of steel deck (Configuration B). When U shaped deflection channel (Item 3A) is used, ceiling runner is installed within the U-shaped deflection channel with 1 in. (25 mm) gap maintained between the top of ceiling runner and top of deflection channel. When deflection channel is not used, ceiling runner secured to valleys with steel masonry anchors or by welds spaced max 24 in. (610 mm) OC. When concrete slab floor assembly (Item 1B) is used and deflection channel is not used, ceiling runner secured to concrete floor slab (Configuration C) with steel masonry anchors spaced max 24 in. (610 mm) OC.

A1. **Light Gauge Framing\* — Clipped Ceiling Runner** — As an alternate to the ceiling runner in Item 2A, clipped runner to consist of galv steel channel with clips preformed in track flanges which positively engage the inside flange of the steel studs (Item 2B). Track sized to accommodate steel studs (Item 2B). Track flanges to be min 2-1/2 in. (64 mm). Clipped ceiling runner secured to valleys of steel deck with steel masonry anchors spaced max 24 in. (610 mm) OC. When concrete slab floor assembly (Item 1B) is used, slotted ceiling secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC. When clipped ceiling runner is used, deflection channel (Item 3A) shall not be used.

#### **TOTAL STEEL SOLUTIONS L L C — SnapTrak**

A2. **Light Gauge Framing\* — Slotted Ceiling Runner** — Slotted ceiling runner may be used as an alternate to the ceiling runner in Item 2A. Slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner secured to valleys of steel deck with steel masonry anchors spaced max 24 in. (610 mm) OC. When concrete slab floor assembly (Item 1B) is used, slotted ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used.

#### **SCAFCO STEEL STUD MANUFACTURING CO**

#### **BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLPTRK**

A3. **Light Gauge Framing\* — Vertical Deflection Clip\*** — (Optional) Steel clips can be used in conjunction with steel studs (Item 2B), ceiling runner (Item 2A) or deflection channel (Item 3A). Clips installed over the top of studs and inserted within the ceiling runner or deflection channel. Clip shall be secured to the ceiling runner or deflection channel with No. 8 self drilling, self tapping steel fasteners through holes provided within the clip.

Clip may be secured to the stud with No. 6 pan head steel screw through holes provided within the clip. As an alternate, the legs of the clip may be installed over the top of the stud without attachment in accordance with manufacturer's installation instructions.

**FLEX-ABILITY CONCEPTS L L C** — Three Legged Dog Deflection Clip

**A4. Light Gauge Framing\*- Notched Ceiling Runner** — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner secured to valleys of steel deck with steel masonry anchors spaced max 24 in. OC. When concrete slab floor assembly (Item 1B) is used, slotted ceiling runner secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC. When notched ceiling runner is used, deflection channel (Item 3A) shall not be used.

**OLMAR SUPPLY INC** — Type SCR

**B. Studs** — Steel studs to be min 3-5/8 in. (89 mm) wide. Studs cut 3/4 in. (19 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Studs and gypsum board must have a min 1/4 in. (6 mm) engagement onto the flanges of the ceiling runner at the furthest point of extension of the joint. When deflection channel (Item 3A) is used, steel studs attached to ceiling runner (Item 2A) with sheet metal screws located 1/2 in. (13 mm) below bottom of deflection channel. When deflection channel is not used, steel studs shall not be secured to ceiling runner. Stud spacing not to exceed 24 in. (610 mm) OC.

**C. Gypsum Board\*** — Gypsum board sheets installed to min total thickness of 5/8 in. (16 mm) and 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr fire-rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the lower surface of the floor or roof deck. The screws attaching the gypsum board to studs at the top of the wall shall be located 1 in. (25 mm) below the bottom of the edge of the ceiling runner.

**The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.**

**3. Joint System — Max separation between bottom of steel deck or concrete floor and top of wall (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 25 percent compression from its installed width.** The joint system shall consist of forming and fill materials, with or without a deflection channel (Item 3A), as follows:

**Joint Configuration A**

**A. Deflection Channel** — (Optional, Not Shown) — Nom 3 in. (76 mm) deep by min 25 gauge galv steel channel sized to accommodate ceiling runner (Item 2A). Deflection channel installed perpendicular to direction of fluted steel deck and secured to valleys of steel deck with steel masonry anchors or welds spaced max 24 in. (610 mm) OC. When concrete slab floor assembly (Item 1B) is used, deflection channel secured to concrete floor slab with steel masonry anchors spaced max 24 in. (610 mm) OC. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1 in. (25 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner nests inside the deflection channel without attachment.

**B. Forming Material\*** — Min 3-1/2 in. (89 mm) or 4-7/8 in. (124 mm) depth of 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation, for 1 and 2 hr rated wall assemblies, respectively, cut to the shape of the fluted deck, approx 20 percent larger than the area of the flutes and compressed into the flutes of the steel floor unit or roof deck flutes above the ceiling channel. For 2 hr assembly, an additional 2 in. (51mm) thick by 1 in. (25 mm) wide sections of mineral wool batt insulation compressed 50 percent in thickness and installed cut edge first to fill the 1 in. (25 mm) gap between the top of gypsum board and bottom of the steel floor units or roof deck. The forming material shall be recessed 5/8 in. (16 mm) from each side of the wall.

**INDUSTRIAL INSULATION GROUP L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROCKWOOL** — SAFE Mineral Wool

**THERMAFIBER INC — SAF Mineral Wool**

**B1. Forming Material\* - Plugs** — (Optional-Not Shown) As an alternate to the forming material (Item 3A), mineral wool plugs preformed to the shape of the fluted floor units or roof deck, may be used within the flutes. Plugs shall be friction fitted to completely fill the flutes above the ceiling channel. In the 2 hr fire rated wall assemblies, the plugs shall project beyond each side of the ceiling runner and recessed from each surface of wall to accommodate the required thickness of fill material. In the 1 hr fire rated wall assemblies, the plugs shall be flush with ceiling runner and recessed from each surface of wall to accommodate the required thickness of fill material. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and bottom of steel floor units or roof deck.

**ROCK WOOL MANUFACTURING CO — Deck Plugs**

**C. Fill, Void or Cavity Material\* — Sealant** — Min 5/8 in. thickness of fill material installed on each side of the wall in the flutes of the steel floor or roof deck and between the top of the wall and the bottom of the steel floor or roof deck flush with each surface of wall.

**SODAL ACCUMETRIC — Boss 816; Boss 816+**

**Joint Configuration B**

**A. Deflection Channel** — (Optional, Not Shown) - Nom 3 in. (76 mm) deep by min 25 ga steel Ushaped channel centered on valleys of steel floor units or roof deck. Deflection channel secured with steel fasteners or by welds spaced max 24 in. (610 mm) OC. Deflection channel installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners spaced max 24 in. (610 mm) OC. When floor assembly (Item 1B) is used, deflection channel secured to concrete floor slab with steel fasteners spaced max 24 in. (610 mm) OC. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1 in. (25 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner is not fastened to the deflection channel.

**B. Fill, Void or Cavity Material\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material installed on each side of the wall between the top of the wall and bottom of floor unit or roof deck, flush with both sides of the wall.

**SODAL ACCUMETRIC — Boss 816; Boss 816+**

**Joint Configuration C**

**A. Deflection Channel** — (Optional, Not Shown) — Nom 3 in. (76 mm) deep by min 25 gauge steel U-shaped channel. Deflection channel secured to concrete floor with steel fasteners spaced max 24 in. (610 mm) OC. Deflection channel secured to concrete floor with steel fasteners spaced max 24 in. (610 mm) OC. The ceiling runner is installed within the deflection channel to maintain a 1 in. (25 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner is not fastened to the deflection channel.

**B. Packing Material** — For optional use in 2 hr fire rated assemblies. Foam backer rod friction fitted into joint opening and recessed to accommodate the required thickness of fill material.

**C. Fill, Void or Cavity Material\* - Sealant** — Min 5/8 in. (16 mm) thickness of fill material installed on each side of the wall between the top of the wall and bottom of floor, flush with each surface of wall. The use of bond breaker tape is optional.

**SODAL ACCUMETRIC — Boss 816; BOSS 816+**

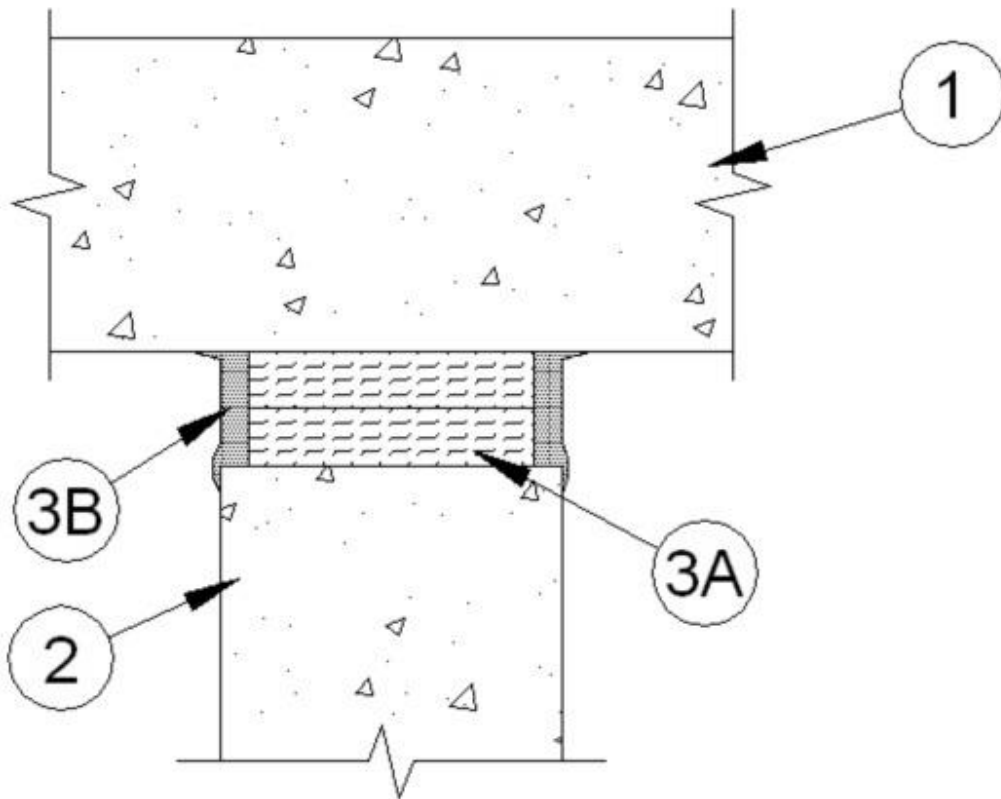
\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0508

October 26, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 4 Hr	
F Rating — 4 Hr	FT Rating —4 Hr
	FH Rating —4 Hr
	FTH Rating —4 Hr
Joint Width — 2 In.	Joint Width —51 mm
Class II Movement Capabilities — 13% Compression or Extension	Class II Movement Capabilities — 13% Compression or Extension



1. **Floor Assembly** — Min 5-1/2 in. (140 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete.

2. **Wall Assembly** — Min 6 in. (152 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

3. **Joint System** — Max width of joint (at time of installation of joint system) is 2 in. (51 mm). System is designed to accommodate a max 13 percent compression or extension from its installed width. The joint system shall consist of the following:

A. **Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 5 in. (127 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the

compressed batt sections are recessed from both surfaces of wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint.

**INDUSTRIAL INSULATION GROUP L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROCKWOOL** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**B. Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with both surfaces of wall. A min 1/8 in. (3 mm) thick crown of fill material shall be applied to lap a min of 1/2 in. (13 mm) onto the surface of the wall and onto the floor on each side of the wall assembly.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

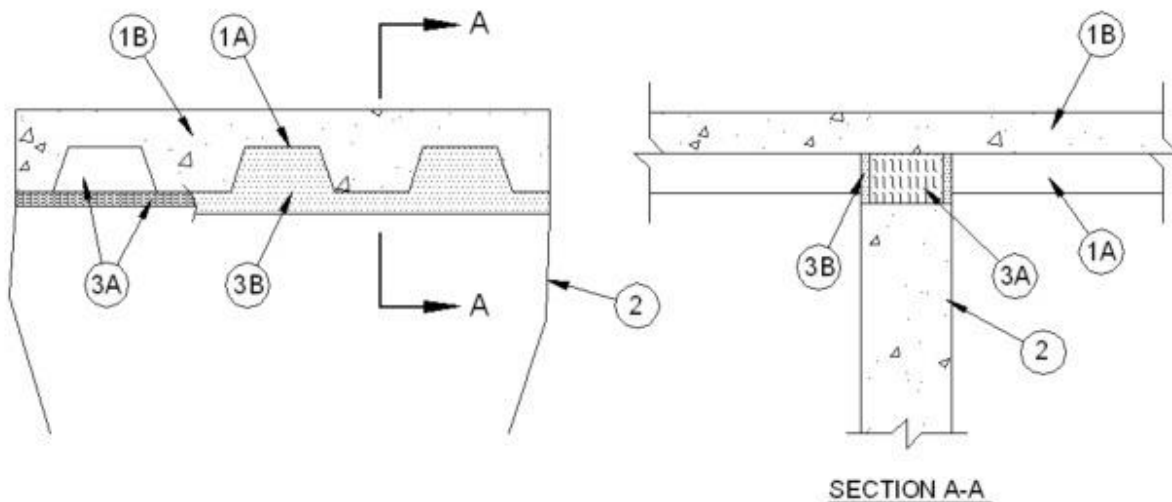
\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0509

October 26, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr	
F Rating — 2 Hr	FT Rating —2 Hr
	FH Rating —2 Hr
	FTH Rating —2 Hr
Joint Width — 1 In.	Joint Width —25 mm
Class II Movement Capabilities — 25% Compression	Class II Movement Capabilities — 25% Compression



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Form Units\*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 3 in. (76 mm) thick reinforced concrete, as measured from the top plane of the floor units.

1A. **Roof Assembly - (Not Shown)** — As an alternate to the floor assembly, a fire-rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL

Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck Max** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

C. **Roof Covering** — Hot-mopped or cold application materials compatible with concrete.

2. **Wall Assembly** — Min 6 in. (152 mm) thick reinforced light or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Wall to be perpendicular to (Joint Configuration A), or parallel to and centered under the valley (Joint Configuration B) of the steel floor units or roof deck. Wall may also be constructed of any UL Classified **Concrete Blocks\***. See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

3. **Joint System** — **Max separation between bottom of floor or roof and top of wall (at time of installation of joint system) is 1 in. (25 mm)**. The joint system is designed to accommodate a max 25 percent compression from it's installed width. The joint system shall consist of a forming material and fill material in the flutes of the steel floor unit or roof deck and between the top of the wall and bottom of the steel floor unit or roof deck as follows:



**Joint Configuration A**

**A. Forming Material\*** — Min 4-3/4 in. (121 mm) width of 4 pcf (64 mm) mineral wool batt insulation, cut to the shape of the fluted deck, approximately 20 percent larger than the area of the flutes and compressed into the flutes of the steel floor units or roof deck. Additional min 4-3/4 in. (121 mm) wide sections of mineral wool batt insulation are compressed 50 percent in thickness and installed cut edge first to fill the gap between the top of the wall and bottom of the steel floor units or roof deck. The forming material shall be recessed 5/8 in. (16 mm) from each side of the wall.

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROCKWOOL** — SAF Mineral Wool

**A1. Forming Material\*-Plugs** — (Not Shown) As an alternate to the forming material (Item 3A), mineral wool plugs preformed to the shape of the fluted floor units or roof deck, may be used within the flutes. Plugs shall be friction fitted to completely fill the flutes. The plugs shall be recessed from each surface of wall to accommodate the required thickness of fill material. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of concrete wall and bottom of steel floor units or roof deck.

**ROCK WOOL MANUFACTURING CO** — Deck Plugs

**B. Fill, Void or Cavity Material\* — Sealant** — Min 5/8 in. (16 mm) thickness of fill material installed on each side of the concrete wall in the flutes of the steel floor unit or roof deck and between the top of the wall and the bottom of the steel floor unit or roof deck flush with each surface of concrete wall.

**SUDAL ACCUMETRIC** — Boss 816; Boss 816+

**Joint Configuration B**

**A. Forming Material\*** — Min 4 pcf (64 mm) density mineral wool batt insulation compressed 50 percent in thickness and as necessary in width, and inserted into opening between the top of the wall and the steel floor unit or roof deck and recessed from both surfaces of wall to accommodate the required thickness of fill material.

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**B. Fill, Void or Cavity Material\* — Sealant** — Min 5/8 in. (16 mm) thickness of fill material installed flush with both sides of the wall.

**SUDAL ACCUMETRIC** — Boss 816; Boss816+

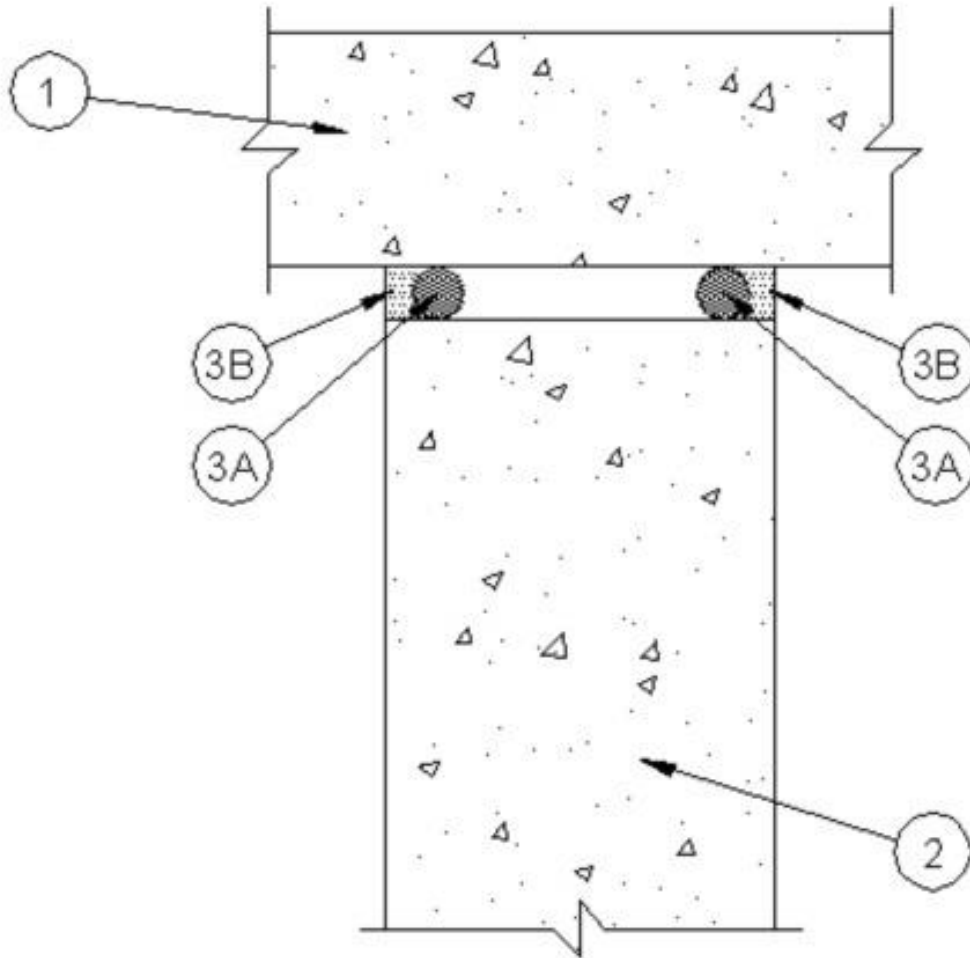
\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0510

October 26, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr	
F Rating — 2 Hr	FT Rating — 2 Hr
	FH Rating — 2 Hr
	FTH Rating — 2 Hr
Joint Width — 1 In.	Joint Width — 25 mm
Class II Movement Capabilities — 12.5% Compression or Extension	Class II Movement Capabilities — 12.5% Compression or Extension



1. **Floor 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>) structural concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units**\*. See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

2. **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>) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

3. **Joint System** — **Max separation between bottom of floor and top of wall (at time of installation of joint system) is 1 in. (25 mm) The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width.** The joint system shall consist of the following:

A. **Packing Material** — (Optional) Open or closed cell polyurethane foam backer rod used as a form to prevent the leakage of fill material. Packing material to be recessed from both surfaces of the wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* - Sealant** — Fill material applied within the joint, flush with both surfaces of wall. Min fill material thickness is 1/2 in. (13 mm).

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

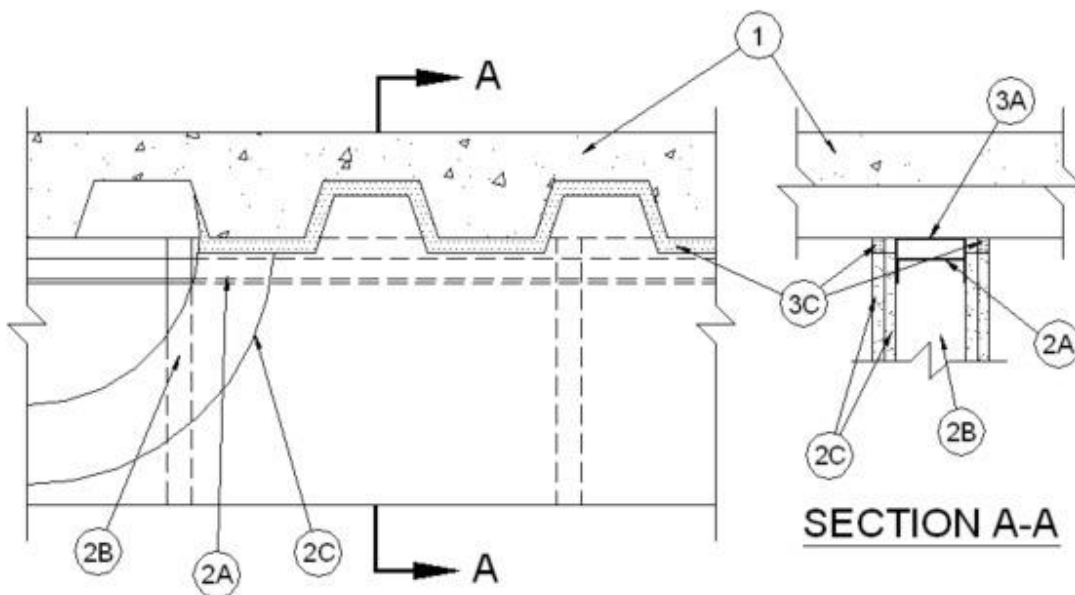
\*Bearing the UL Classification Mark

## Joint Systems

System No. HW-D-0511

October 26, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	
F Ratings — 1 and 2 Hr (See Item 2)	FT Ratings —1 and 2 Hr (See Item 2)
	FH Ratings —1 and 2 Hr (See Item 2)
	FTH Ratings —1 and 2 Hr (See Item 2)
Joint Width — 1 In.	Joint Width —25 mm
Class II Movement Capabilities — 25% Compression	Class II Movement Capabilities — 25% Compression



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Floor Units\*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

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

1A. **Roof Assembly** — (**Not Shown**) — As an alternate to the floor assembly, a fire-rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

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

**A. Steel Floor and Ceiling Runners** — Floor and ceiling runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with 3 in. (76 mm) flanges. When U shaped deflection channel (Item 3A) is used, ceiling runner is installed within the U-shaped deflection channel with 1 in. (25 mm) gap maintained between the top of ceiling runner and top of deflection channel. When deflection channel is not used, ceiling runner installed perpendicular to the direction of the fluted steel deck and secured to valleys with steel masonry anchors or weld spaced a max 12 in. (305 mm) OC.

**A1. Light Gauge Framing\* — Slotted Ceiling Runner** — Slotted ceiling runner may be used as an alternate to the ceiling runner in Item 2A. Slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner installed perpendicular to direction of fluted steel floor deck and secured to valleys with steel masonry anchors spaced max 12 in. (305 mm) OC. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used.

#### **SCAFCO STEEL STUD MANUFACTURING CO**

#### **BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLPTRK**

**A2. Light Gauge Framing\* — Clipped Ceiling Runner** — As an alternate to the ceiling runner in Item 2A, clipped runner to consist of galv steel channel with clips preformed in track flanges which positively engage the inside flange of the steel studs (Item 2B). Track sized to accommodate steel studs (Item 2B). Track flanges to be min 2-1/2 in. (64 mm) Clipped ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors spaced max 12 in. (305 mm) OC. When clipped ceiling runner is used, deflection channel (Item 3A) shall not be used.

#### **TOTAL STEEL SOLUTIONS L L C — Snap Trak**

**A3. Light Gauge Framing\* — Vertical Deflection Clip\*** — (Optional) Steel clips can be used in conjunction with steel studs (Item 2B), ceiling runner (Item 2A) or deflection channel (Item 3A). Clips installed over the top of studs and inserted within the ceiling runner or deflection channel. Clip shall be secured to the ceiling runner or deflection channel with No. 8 self drilling, self tapping steel fasteners through holes provided within the clip. Clip may be secured to the stud with No. 6 pan head steel screw through holes provided within the clip. As an alternate, the legs of the clip may be installed over the top of the stud without attachment in accordance with manufacturer's installation instructions.

#### **FLEX-ABILITY CONCEPTS L L C — Three Legged Dog Deflection Clip**

**A4. Light Gauge Framing\*- Notched Ceiling Runner** — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner installed perpendicular to direction of fluted steel floor deck and secured to valleys with steel masonry anchors spaced max 24 in. (610 mm) OC. When notched ceiling runner is used, deflection channel (Item 3A) shall not be used.

#### **OLMAR SUPPLY INC — Type SCR**

**B. Studs** — Steel studs to be min 3-5/8 in. (92 mm) wide. Studs cut 3/4 in. (19 mm) less in length than assembly height with bottom nesting in and secured to floor runner. When deflection channel (Item 3A) is used, steel studs attached to ceiling runner (Item 2A) with sheet metal screws located 1/2 in. (13 mm) below bottom of deflection channel. When deflection channel is not used, studs to nest in ceiling runners without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC.

**C. Gypsum Board\*** — Gypsum board sheets installed to a min total 5/8 or 1-1/4 in. (16 or 32 mm) thickness on each side of wall for a 1 or 2 hr fire-rated wall, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that the gypsum board is cut to fit the contour of the steel floor units with a nom 1 in. (25 mm) gap. In addition, the top row of screws shall be installed 1/2 to 1 in. (13 to 25 mm) below the bottom edge of the ceiling runner flange.

**The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.**

**3. Joint System — Max separation between bottom of floor and top of wall (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 25 percent compression from its installed width.** The joint system shall consist of a material with or without a deflection channel as follows:

**A. Deflection Channel** — (Optional) — Nom 3 in. (76 mm) deep by min 25 gauge galv steel U-shaped channel sized to accommodate ceiling runner (Item 2A). Deflection channel installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors or by welds spaced max 12 in. (305 mm) OC. The ceiling runner is installed within the deflection channel to maintain a 1 in. (25 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner is not fastened to the deflection channel.

**B. Packing Material** — (Not Shown) — Optional in 2 hr fire rated assemblies, foam backer rod friction fitted into joint opening and recessed to accommodate the required thickness of fill material.

**C. Fill, Void or Cavity Material\* — Sealant** — Min 5/8 in. (16 mm) thickness of fill material applied on each side of wall between the top of the gypsum board and all surfaces of the steel floor unit, flush with each surface of the wall.

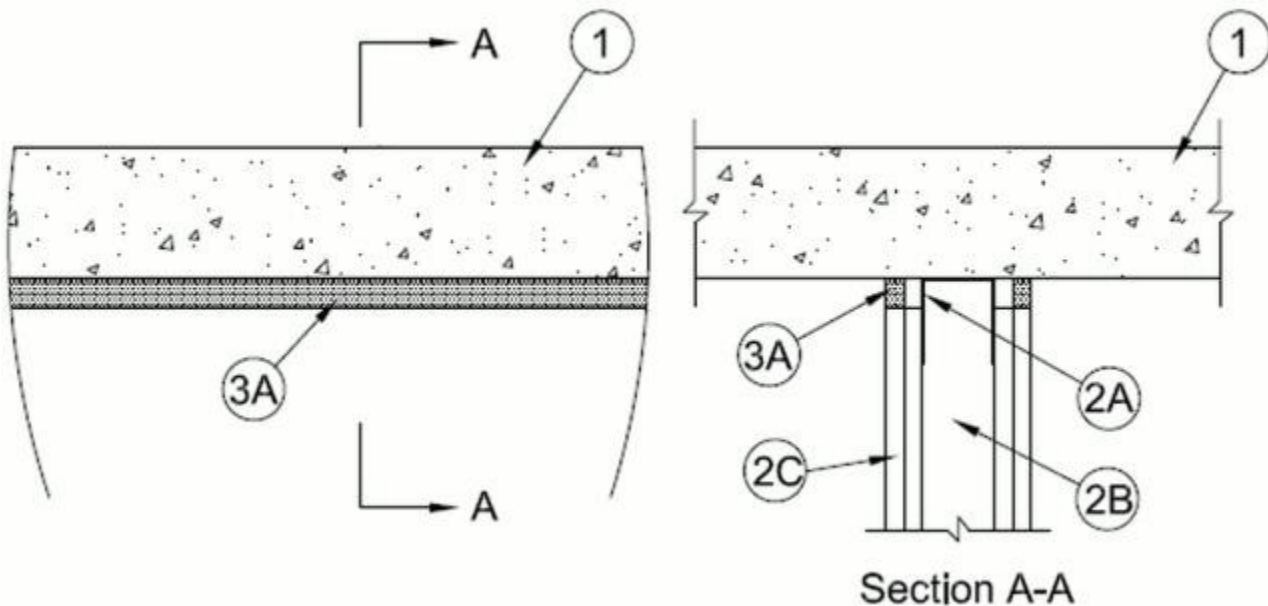
**SOUDAL ACCUMETRIC** — Boss 816 ; BOSS 816+

\*Bearing the UL Classification Mark

System No. HW-D-0921

November 20, 2020

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



1. **Floor 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>) structural concrete or any UL Classified **Concrete Blocks**\*. See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

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

- A. **Steel Floor And Ceiling Runners** — Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with min 1-1/4 in. (32 mm) flanges. Ceiling runner shall be secured to floor with steel fasteners spaced max 24 in. (610 mm) OC.
- B. **Studs** — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner. Studs secured only to floor runner with sheet metal screw. Stud spacing not to exceed 24 in. (610 mm) OC.
- C. **Gypsum Board\*** — Gypsum board sheets installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall, for 1 and 2 hr rated wall assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 3/4

in. (19 mm) gap shall be maintained between the top of the gypsum board and the bottom of the floor and the top row of screws shall be installed into the studs 2 in. (51 mm) below the lower surface the floor.

**The hourly assembly ratings of the joint system are equal to the fire rating of the wall.**

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

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

**SOUDAL ACCUMETRIC** — Boss 816+

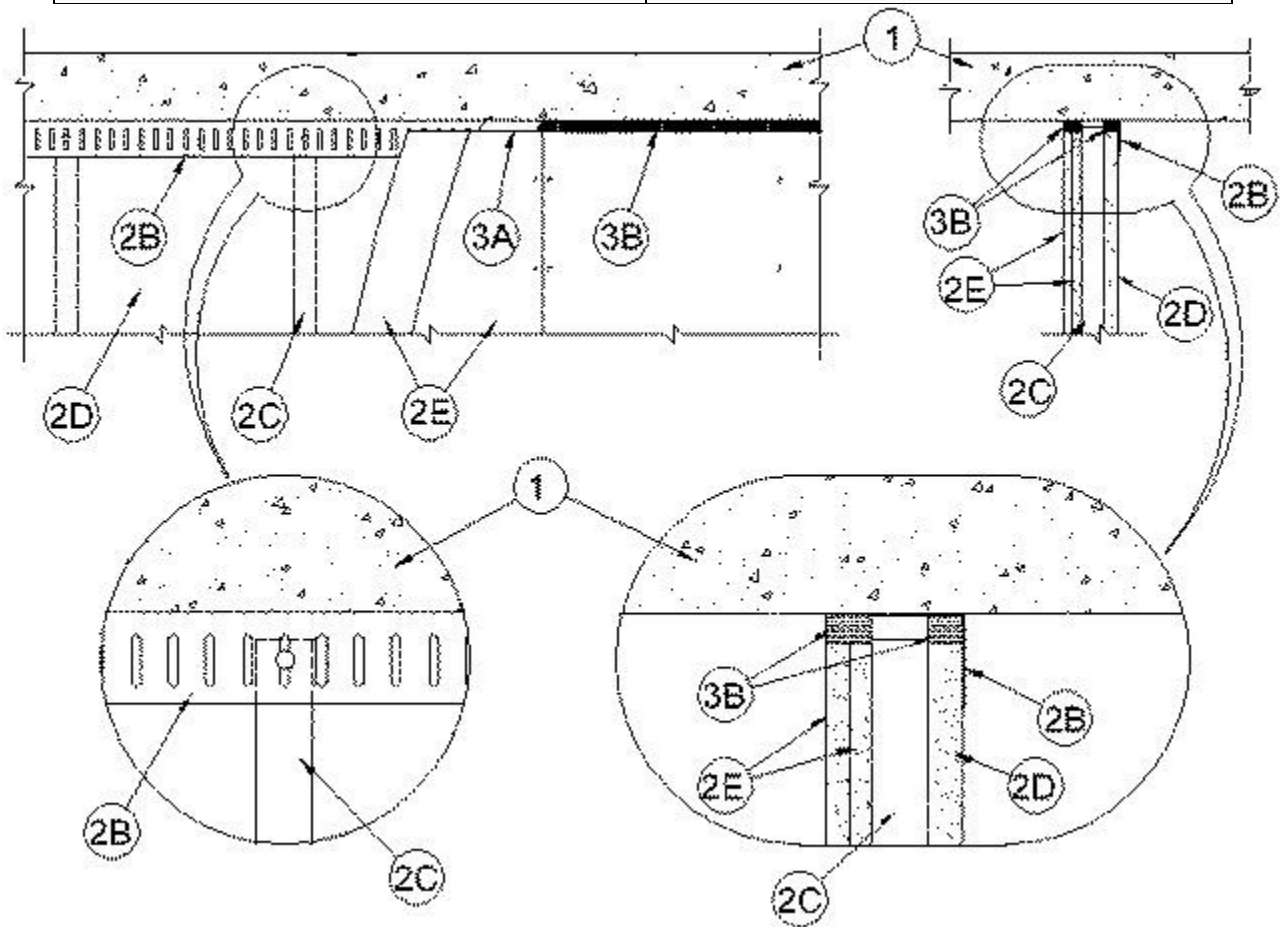
**\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**



System No. HW-D-0922

November 20, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr	F Rating — 2 Hr
Nominal Joint Width — 1 In.	FT Rating — 2 Hr
Class II or III Movement Capabilities — 25% Compression or Extension	FH Rating — 2 Hr
	FTH Rating — 2 Hr
	Nominal Joint Width — 25 mm
	Class II or III Movement Capabilities — 25% Compression or Extension



1. **Floor 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>) structural concrete.

2. **Shaft Wall Assembly** — With the exception of the ceiling runner, the 2 hr fire rated shaft wall assembly shall be constructed of the materials and in the manner described in System B of Design No. U415 in the UL Fire Resistance Directory. The wall shall include the following construction features:

A. **Floor Runners** — (Not Shown) - "J"-shaped runner, min 2-1/2 in. (64 mm) wide with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from min 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to walls and floor with steel fasteners spaced max 24 in. (610 mm) OC.

As an alternate to the "J"-shaped runner, a min 2-1/2 in. (64 mm) wide by 1 or 1-1/4 in. (25 or 32 mm) deep channel formed from min 24 MSG galv steel may be used for the floor runner.

**B. Light Gauge Framing\*** — Slotted Ceiling Track Slotted ceiling track shall consist of galv steel channels with slotted flanges. Slotted ceiling track sized to accommodate steel "C-H" studs (Items 2C). Attached to concrete at ceiling with steel fasteners spaced max 12 in. (305 mm) OC.

**BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK.**

**MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT**

**C. Steel Studs** — "C-H"-shaped steel studs to be min 2-1/2 in. (64 mm) wide and formed of min 24 MSG galv steel. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in slotted ceiling track. Studs spaced 24 in. (610 mm) OC. After installation of gypsum board liner panels (Item 2D), studs secured to flange of floor runner on finished side of wall only with No. 6 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws. Studs secured to flange of slotted ceiling track on finished side of wall only with No. 8 by 1/2 in. (13 mm) long self-drilling, self-tapping wafer head steel screws at slot mid-height.

**D. Gypsum Board\*** — 1 in. (25 mm) thick by 24 in. (610 mm) wide gypsum board liner panels as specified in Design No. U415. Panels cut 1 in. (25 mm) less in length than floor to ceiling height. Vertical edges inserted in "H"-shaped section of "C-H" studs. Free edge of end panels attached to long leg of "J" runner (Item 2A) with 1-5/8 in. (41 mm) long Type S steel screws spaced max 12 in. (305 mm) OC.

**E. Gypsum Board\*** — Gypsum board sheets, 1/2 or 5/8 in. (13 or 16 mm) thick, applied vertically or horizontally in two layers on finished side of wall as specified in System B of Design No. U415. A max 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the concrete floor. The screws attaching the gypsum board layers to the C-H studs shall be located 1 in. (25 mm) below the bottom of the slotted ceiling track (Item 2C). No gypsum board attachment screws are to penetrate the slotted ceiling track.

**3. Joint System** — Max separation between bottom of floor and top of liner panel (Item 2D) and between bottom of floor and top of gypsum board sheets (Item 2E) at time of installation of joint system is 3/4 in. (19 mm). The joint system is designed to accommodate a maximum 25 percent compression from its installed width. The joint system consists of bond breaker tape and sealant, as follows:

**A. Bond Breaker Tape** — Polyethylene tape supplied in rolls. Tape applied to flanges of slotted ceiling track (Item 2D) to prevent bonding of the sealant at points other than the top and bottom of the linear gap. The use of bond breaker tape is dependent upon the type of fill material used within the joint system.

**B. Fill, Void or Cavity Material\*** — Sealant Min 1 in. (25 mm) depth of sealant to be installed to fill linear gap between top of gypsum board liner panel (Item 2D) and top inside surface of slotted ceiling track (Item 2B) prior to installation of gypsum board sheets on finished side of wall. Min 1 in. (25 mm) depth of sealant to be installed to fill linear gap between top of gypsum board sheets (Item 2E) and bottom of concrete floor.

**SOULDAL ACCUMETRIC — Boss 816+**

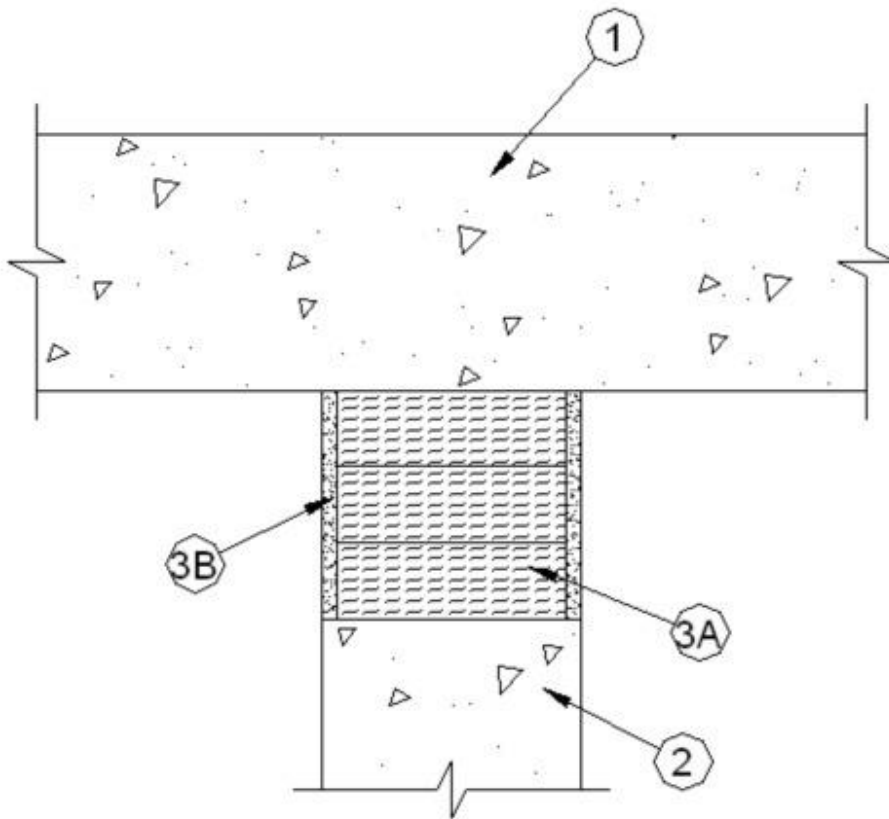
**\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

## Joint Systems

System No. HW-D-1071

October 26, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 3 Hr	
F Rating — 3 Hr	FT Rating —3 Hr
	FH Rating —3 Hr
	FTH Rating —3 Hr
Joint Width — 2 and 3-1/2 In. (See Item 3A)	Joint Width —51 and 89 mm (See Item 3A)
Class II Movement Capabilities—15% Compression or Extension	Class II Movement Capabilities—15% Compression or Extension



1. **Floor 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>) structural concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units\*** See **Precast Concrete Units (CFTV)** category in the Fire Resistance Directory for names of manufacturers.
2. **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>) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.
3. **Joint System** — **Max separation between bottom of floor and top of wall (at time of installation of joint system) is dependent upon the type of forming material used within the joint system as shown on Item 3A. The joint**

system is designed to accommodate a max 15 percent compression or extension from its installed width. The joint system shall consist of the following:

A. **Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from each surface of the wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint. Max width of joint (at time of installation of joint system) is dependent upon the manufacturer and type of forming used within the joint system as shown in the table below:

Manufacturer of Forming Material	Type of Forming Material	Width of Joint, In. (mm)
FBX Insulation	FBX Safing Insulation	3-1/2 (89)
Roxul	SAFE Mineral Wool	2 (51)

**ROCKWOOL** — SAFE Mineral Wool

B. **Fill, Void or Cavity Material\*—Sealant** — Min 1/4 in. (6 mm) thickness of fill material applied within the joint, flush with each surface of wall.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

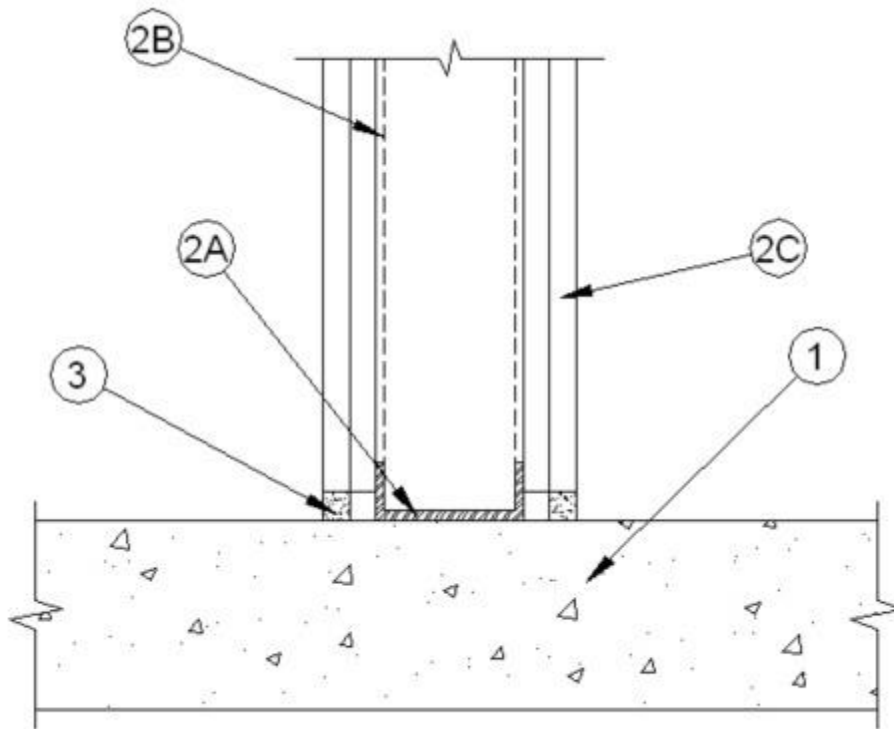
\*Bearing the UL Classification Mark

## Joint Systems

System No. BW-S-0018

November 20, 2020

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



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

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

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

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

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

**The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.**

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

**A. Packing Material** — (Optional, Not Shown) — Foam backer rod firmly packed into the gap between the bottom of the gypsum board and the top of the concrete floor and recessed from each surface of the wall to accommodate the required thickness of fill material.

**B. Fill, Void or Cavity Material\*-Sealant** — Min 5/8 in. (16 mm) thickness of fill material installed on each side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with each surface of the wall.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

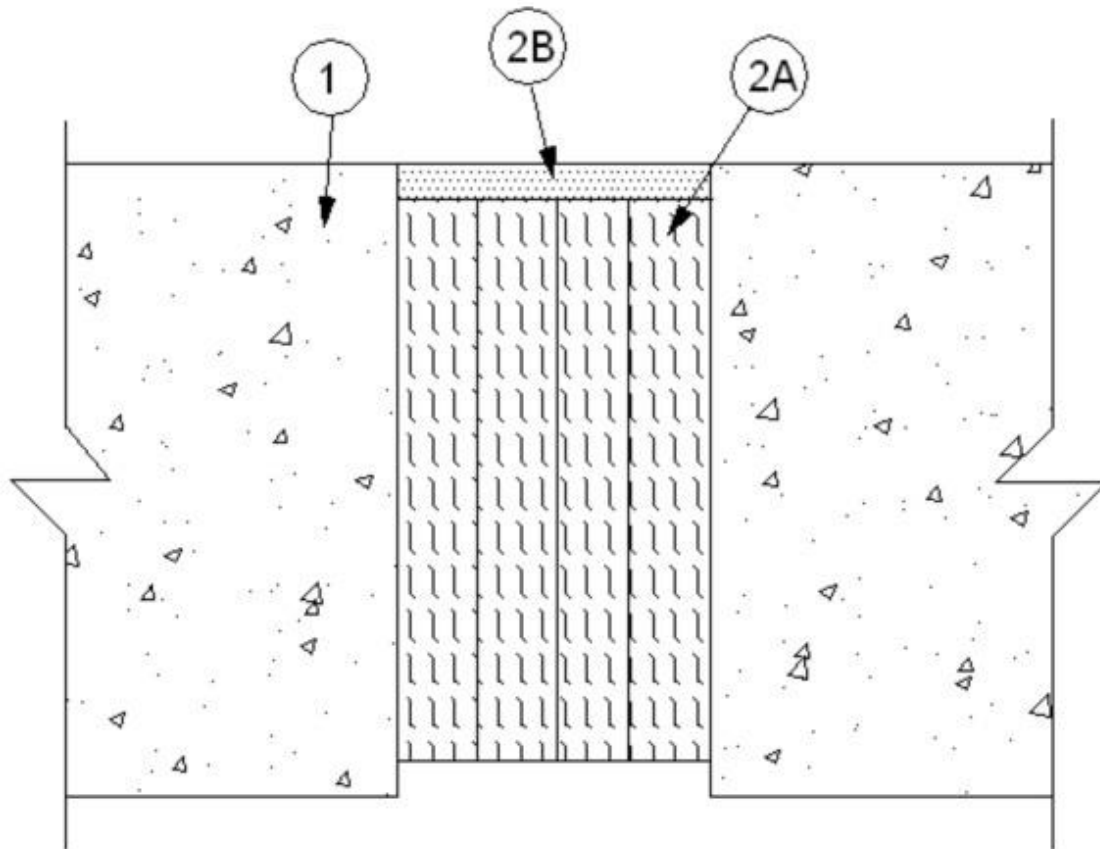
\*Bearing the UL Classification Mark

## Joint Systems

System No. FF-D-0067

October 23, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 4 Hr	
F Rating — 4 Hr	FT Rating — 4 Hr
	FH Rating — 4 Hr.
	FTH Rating — 4 Hr
Joint Width — 2 In.	Joint Width — 51 mm
Class II Movement Capabilities — 12.5% Compression or Extension	Class II Movement Capabilities — 12.5% Compression or Extension



1. **Floor Assembly** — Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete.

2. **Joint System** — Max width of joint (at time of installation of joint system) is 2 in. (51 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from it's installed width. The joint system shall consist of the following:

A. **Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 5-1/2 in. (140 mm) and installed edge first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the

required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint.

**INDUSTRIAL INSULATION GROUP L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROCKWOOL** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**B. Fill, Void or Cavity Material\* - Sealant** — Min 1/4 in. (6 mm) thickness of fill material applied within the joint, flush with top surface of floor.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

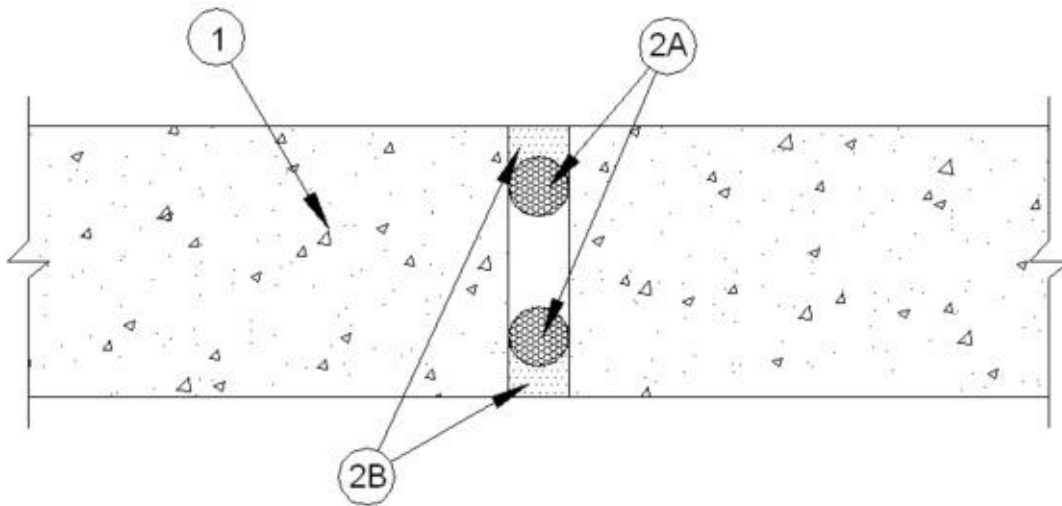


## Joint Systems

System No. FF-D-0068

October 23, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr	
F Rating — 2 Hr	FT Rating —2 Hr
	FH Rating —2 Hr
	FTH Rating —2 Hr
Joint Width — 1 in.	Joint Width — 25 mm
Class II Movement Capabilities - 25% Compression or Extension	Class II Movement Capabilities - 25% Compression or Extension



1. **Floor 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>) structural concrete.

2. **Joint System** — **Max width of joint (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 25 percent compression or extension from it's installed width.** The joint system shall consist of the following:

A. **Packing Material** — (Optional) Open or closed cell polyurethane foam backer rod used as a form to prevent the leakage of fill material. Packing material to be recessed from both surfaces of the floor to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with both surfaces of floor.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

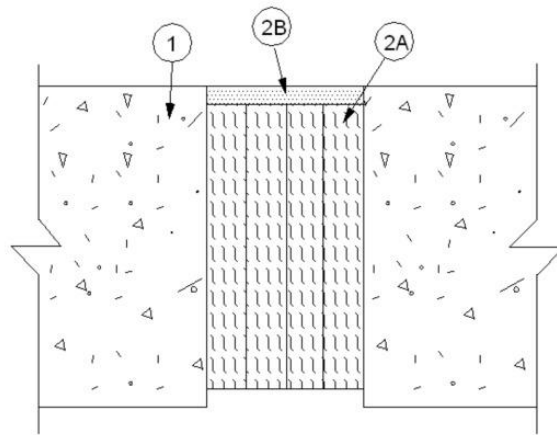
\*Bearing the UL Classification Mark

## Joint Systems

### System No. FF-D-1084

October 23, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 3 Hr	
F Rating — 3 Hr	FT Rating —3 Hr
	FH Rating —3 Hr
	FTH Rating —3 Hr
Joint Width — 2 and 3-1/2 In. (See Item 2A)	Joint Width —51 and 89 mm (See Item 2A)
Class II Movement Capabilities — 15% Compression or Extension	Class II Movement Capabilities — 15% Compression or Extension



1. **Floor Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf) (1600-2400 kg/m<sup>3</sup>) structural concrete.

2. **Joint System** — **Max width of joint (at time of installation of joint system) is dependent upon the type and manufacturer of the forming material as shown in Item 2A . The joint system is designed to accommodate a max 15 percent compression or extension from it's**

**installed width.** The joint system shall consist of the following:

A. **Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint. **Max width of joint (at time of installation of joint system) is dependent upon the manufacturer and type of forming used within the joint system as shown in the table below:**

Manufacturer of Forming Material	Type of Forming Material	Max width of Joint, In.
FBX Insulation	FBX Safing Insulation	3-1/2 (89 mm)
IIG Minwool L L C	MinWool-1200 Safing	2 (51 mm)
Rock Wool Manufacturing	Delta Safing	2 (51 mm)
Roxul	SAFE Mineral Wool	2 (51 mm)
Thermafiber	SAF Mineral Wool	2 (51 mm)

**INDUSTRIAL INSULATION GROUP L L C — MinWool-1200 Safing**

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROCKWOOL** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**B. Fill, Void or Cavity Material\*** — **Sealant** — Min 1/4 in. (6 mm) thickness of fill material applied within the joint, flush with top surface of floor.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

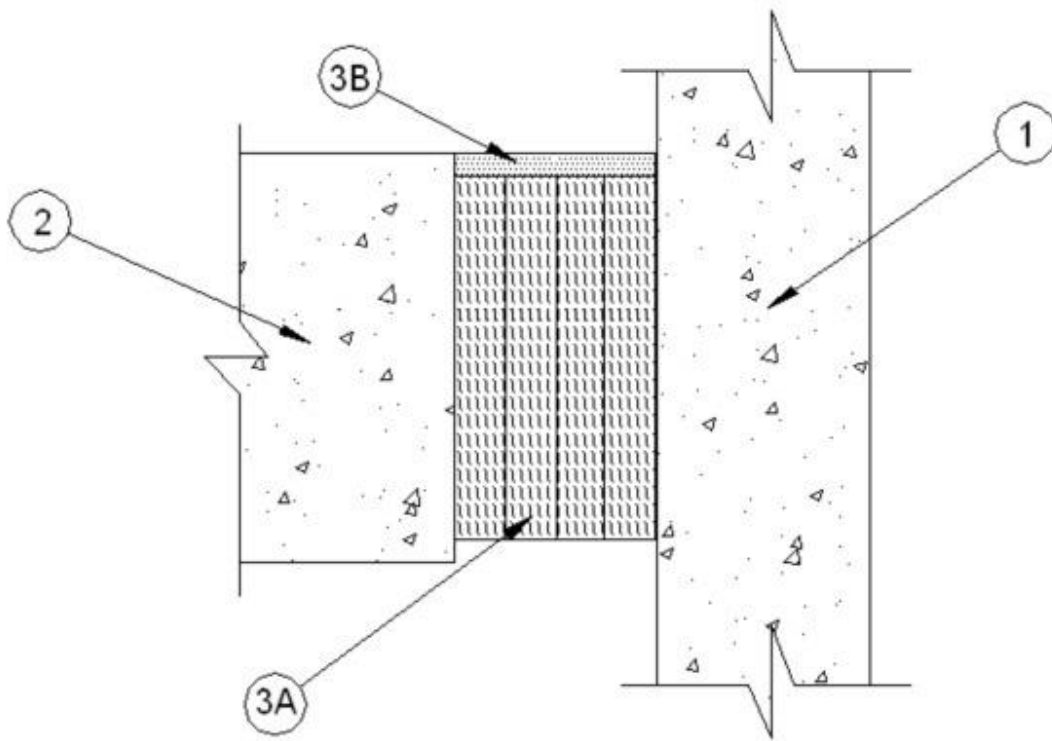
\*Bearing the UL Classification Mark

**Joint Systems**

**System No. FW-D-0044**

**October 23, 2020**

<b>ANSI/UL2079</b>	<b>CAN/ULC S115</b>
Assembly Rating — 4 Hr	
F Rating — 4 Hr	FT Rating —4 Hr
	FH Rating —4 Hr
	FTH Rating —4 Hr
Joint Width — 2 In.	Joint Width —51mm
Class II Movement Capabilities — 12.5% Compression or Extension	Class II Movement Capabilities — 12.5% Compression or Extension



1. **Wall Assembly** — Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks\*. See **Concrete Blocks (CAZT)** category in the Fire Resistance Directory for names of manufacturers.

2. **Floor Assembly** — Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete.

**INDUSTRIAL INSULATION GROUP L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROCKWOOL** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**3. Joint System — Max separation between edge of floor and face of wall (at time of installation of joint system) is 2 in. (51 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from it's installed width.** The joint system shall consist of the following:

**A. Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 5-1/2 in. (140 mm) and installed edge first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint.

**B. Fill, Void or Cavity Material\* - Sealant** — Min 1/4 in. (6 mm) thickness of fill material applied within the joint, flush with top surface of floor.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

## Joint Systems

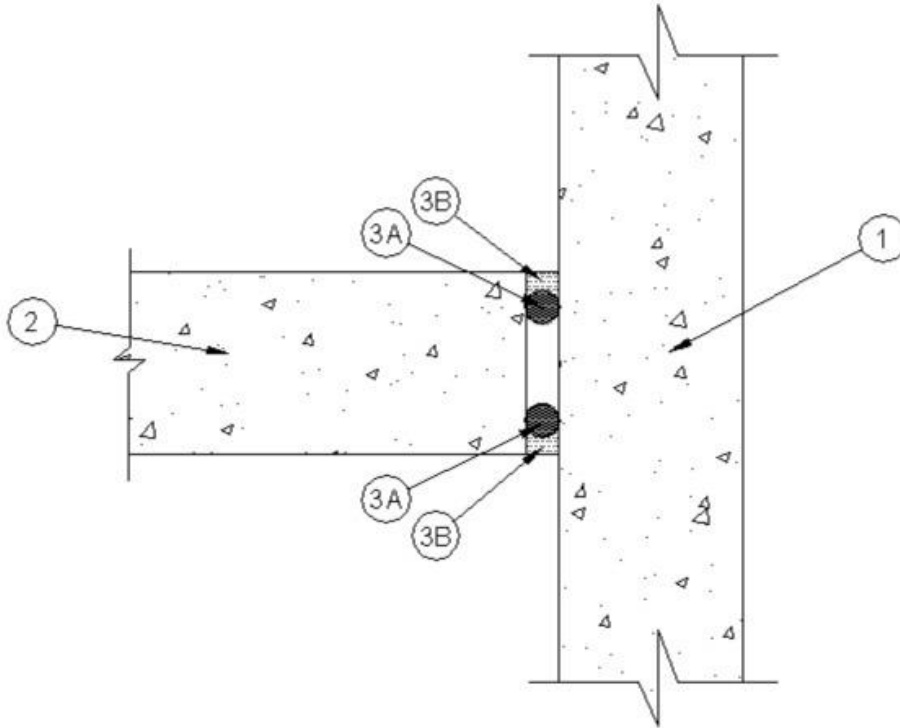
System No. FW-D-0045

October 23, 2020

Assembly Rating — 2 Hr

Nominal Joint Width — 1 in.

Class II Movement Capabilities — 25% Compression or Extension



1. **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>) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks\***. See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Floor Assembly** — Min 4-1/2 in. (114 m) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete.

3. **Joint System** — **Max separation between edge of floor and face of wall (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 25 percent compression or extension from it's installed width.** The joint system shall consist of the following:

A. **Packing Material** — (Optional) Open or closed cell polyurethane foam backer rod used as a form to prevent the leakage of fill material. Packing material to be recessed from both surfaces of the floor to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with both surfaces of floor.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

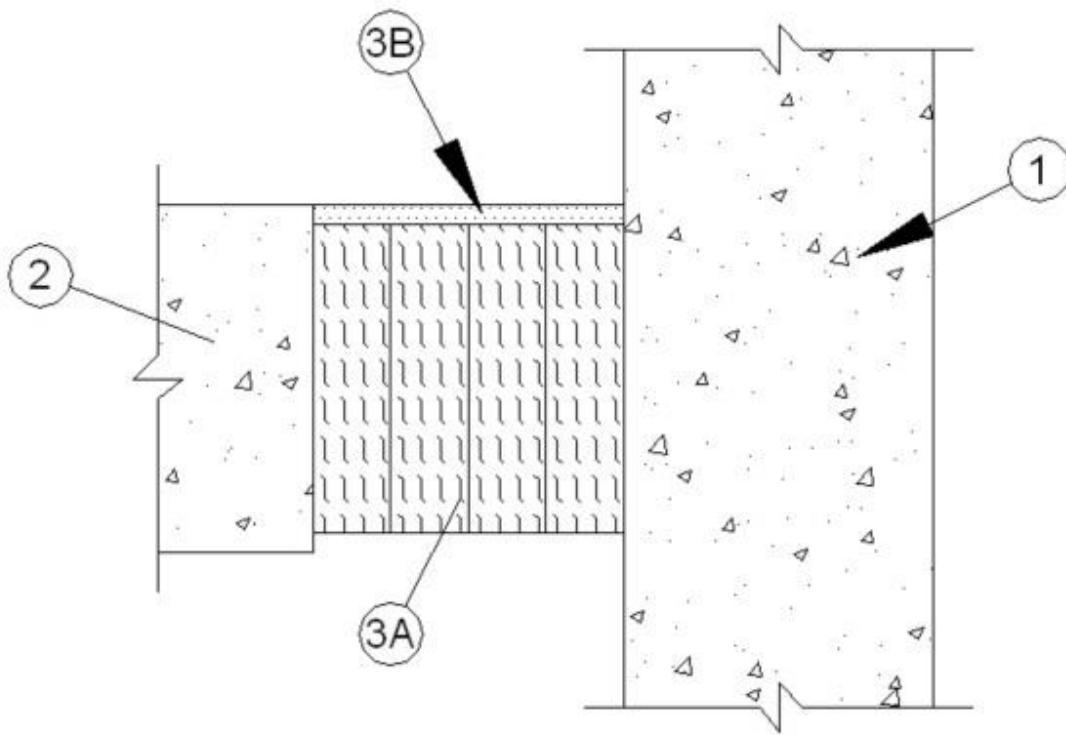
\*Bearing the UL Classification Mark

## Joint Systems

System No. FW-D-1068

October 23, 2020

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 3 Hr	
F Rating — 3 Hr	FT Rating — 3 Hr
	FH Rating — 3 Hr
	FTH Rating — 3 Hr
Joint Width — 2 and 3-1/2 In. (See Item 3A)	Joint Width — 51 and 89 mm (See Item 3A)
Class II or III Movement Capabilities — 15%	Class II or III Movement Capabilities — 15%



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

2. **Floor Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf) (1600-2400 kg/m<sup>3</sup>) structural concrete.

3. **Joint System** — **Max separation between edge of floor and face of wall (at time of installation of joint system) is dependent upon the type and manufacturer of the forming material as shown in Item 3A. The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width.** The joint system shall consist of the following:

A. **Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the

compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint. Max width of joint (at time of installation of joint system) is dependent upon the manufacturer and type of forming used within the joint system as shown in the table below:

<b>Manufacturer of Forming Material</b>	<b>Type of Forming Material</b>	<b>Max width of Joint, In.</b>
FBX Insulation	FBX Safing Insulation	3-1/2 (89 mm)
IIG Minwool L L C	MinWool-1200 Safing	2 (51 mm)
Rock Wool Manufacturing	Delta Safing	2 (51 mm)
Roxul	SAFE Mineral Wool	2 (51 mm)
Thermafiber	SAF Mineral Wool	2 (51 mm)

**INDUSTRIAL INSULATION GROUP L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROCKWOOL** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**B. Fill, Void or Cavity Material\*—Sealant** — Min 1/4 in. (6 mm) thickness of fill material applied within the joint, flush with top surface of floor.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

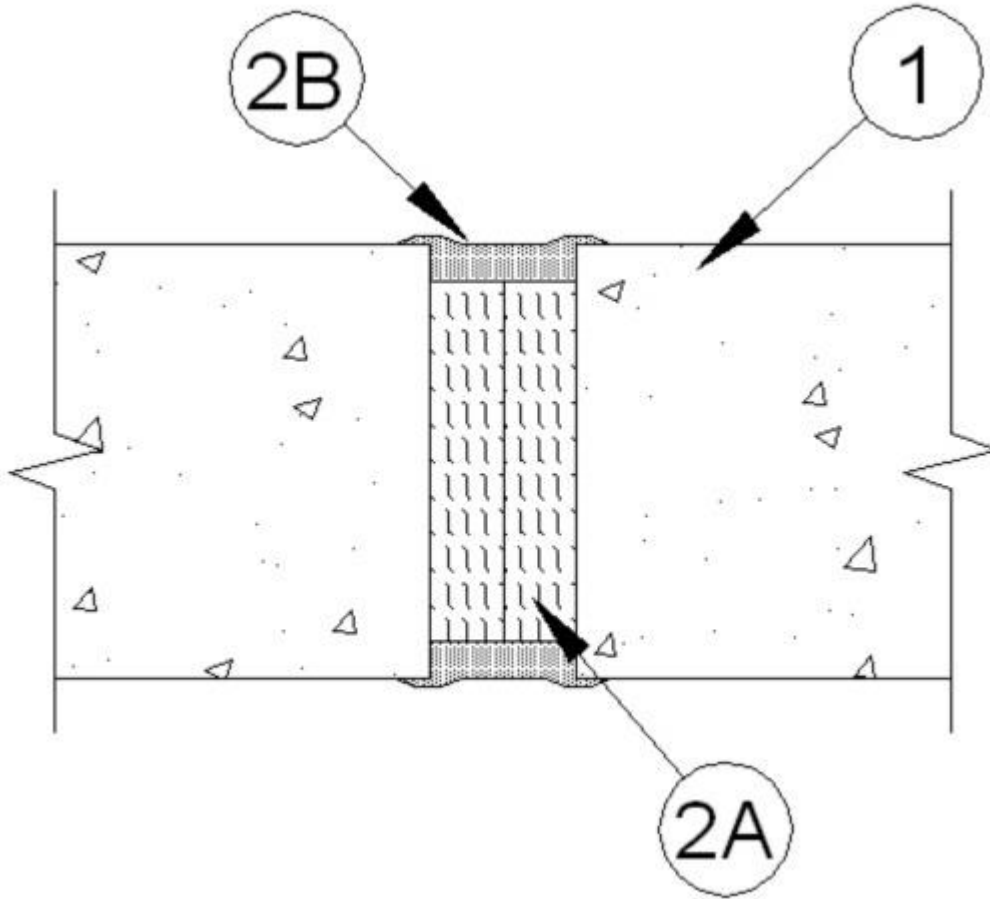


## Joint Systems

System No. WW-D-0075

November 20, 2020

ANSI/UL2079	CAN/ULC S115
F Rating — 4 Hr	F Rating — 4 Hr
	FT Rating — 4 Hr
FT Rating - 4 Hr	FH Rating — 4 Hr
	FTH Rating — 4 Hr
Nominal Joint Width — 2 In.	Nominal Joint Width — 51 mm
Class II Movement Capabilities — 13% Compression or Extension	Class II Movement Capabilities — 13% Compression or Extension



1. **Wall Assembly** — Min 6 in. (152 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m<sup>3</sup>) structural concrete. Wall may also be constructed of any 4 hr fire rated UL Classified **Concrete Blocks\***. See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Joint System** — **Max width of joint (at time of installation of joint system) is 2 in. (51 mm). System is designed to accommodate a max 13 percent compression or extension from its installed width.** The joint system shall consist of the following:

**A. Forming Material\*** — Min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 5 in. (127 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are recessed from both surfaces of wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint.

**INDUSTRIAL INSULATION GROUP L L C** — MinWool-1200 Safing

**ROCK WOOL MANUFACTURING CO** — Delta Safing Insulation

**ROCKWOOL** — SAFE Mineral Wool

**THERMAFIBER INC** — SAF Mineral Wool

**B. Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with both surfaces of wall. A min 1/8 in. (3 mm) thick crown of fill material shall be applied to lap a min of 1/2 in. (13 mm) onto the surface of the wall on each side of the joint on each side of the wall assembly.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

## Joint Systems

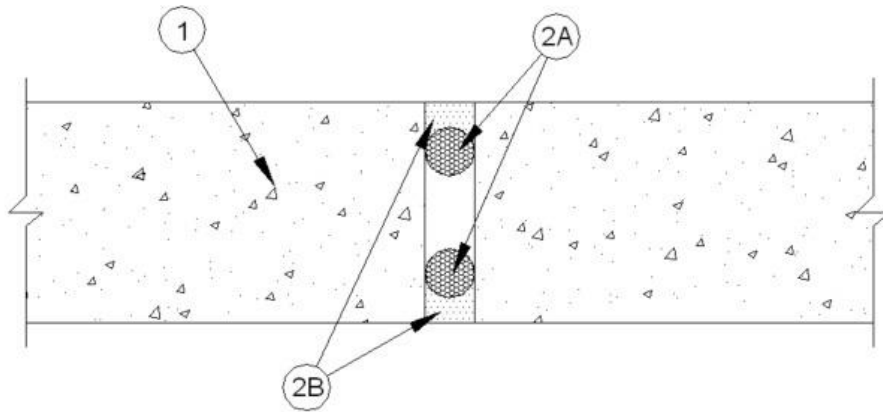
System No. WW-D-0081

November 20, 2020

Assembly Rating — 2 Hr

Nominal Joint Width - 1 In.

Class II Movement Capabilities - 12.5% Compression or Extension



1. **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>) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks**\*.

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

2. **Joint System** — Max width of joint (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from it's installed width. The joint system shall consist of the following:

A. **Packing Material** — (Optional) - Open or closed cell polyurethane foam backer rod used as a form to prevent the leakage of fill material. Packing material to be recessed from both surfaces of the wall as required to accommodate the required thickness of fill material.

B. **Fill, Void or Cavity Material\* - Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with both surfaces of wall.

**SODAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

**Joint Systems**

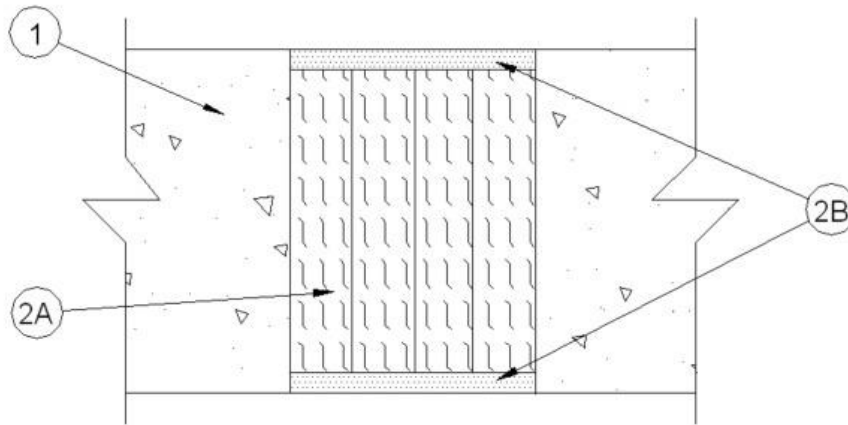
**System No. WW-D-1076**

**November 20, 2020**

**Assembly Rating—3 Hr**

**Nominal Joint Width— 2 and 3-1/2 In. (See Item 2A)**

**Class II Movement Capabilities—15% Compression or Extension**



1. **Wall Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100 - 150 pcf) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks**\*.

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

2. **Joint System** — Max width of joint (at time of installation of joint system) is dependent upon the type of mineral wool used within the joint system as shown in Item 2A. The joint system is designed to accommodate a max 15 percent compression or extension from it's installed width. The joint system shall consist of the following:

A. **Forming Material\*** — Min 4 pcf mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from each surface of the wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. apart along the length of the joint.

Max width of joint (at time of installation of joint system) is dependent upon the manufacturer and type of forming used within the joint system as shown in the table below:

<b>Manufacturer of Forming Material</b>	<b>Type of Forming Material</b>	<b>Width of Joint, In</b>
FBX Insulation	FBX Safing Insulation	3-1/2
W R Grace	FlameSafe Mineral Wool	3-1/2
Roxul	SAFE Mineral Wool	2

**FIBREX INSULATIONS INC** — FBX Safing Insulation

**ROXUL INC** — SAFE Mineral Wool

**W R GRACE & CO - CONN** — FlameSafe Mineral Wool

**B. Fill, Void or Cavity Material\*- Sealant** — Min 1/4 in. thickness of fill material applied within the joint, flush with each surface of wall.

**SOUDAL ACCUMETRIC** — Boss 816; BOSS 816+

\*Bearing the UL Classification Mark

# Appendix



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