54 Audia Court, Unit 2
Concord, ON L4K 3N5
(905)-738-1400

Submittal 24-277-011

PROJECT NAME	PROJECT ADDRESS	DATE SUBMITTED
YORK REGION VARIOUS PROJECTS 24-277	17250 Young Street Newmarket, ON	Feb 18, 2025

TO	FROM
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Title

Insulation & Firestopping

Description

Insulation & Firestopping

Package Items

SPEC	SUBSECTION	ITEM	TYPE

PD Insulation Inc.

SHOP DRAWING SUBMITTAL: 18/02/2025

PROJECT: YORK REGION
VARIOUS PROJECTS

DATA SHEET

Earthwool® 1000° Pipe Insulation

with ECOSE® Technology

DESCRIPTION

Earthwool 1000° Pipe Insulation is a molded, one-piece insulation made from highly resilient, inorganic glass fibers bonded with ECOSE Technology.

CONTRACTOR: _____

JOB: _____

DATE: _____

APPLICATION

- Iron, copper, stainless steel, PVC, and CPVC piping
- Hot, cold, concealed and exposed piping systems operating at temperatures 0° F-1000° F (-18° C to 538° C)
- Additional weather protection is needed for outdoors use

SPECIFICATION COMPLIANCE

U.S.

- ASTM C547; Type I, Type IV
- ASTM C585
- ASTM C1136 (jacket); Type I, II, III, IV, VII, VIII, X
- NFPA 90A and 90B
- Conformity for fit Marine Equipment IMO 1408
- MIL-DTL-32585; Type 1, Form 4, Facing A and D
- USCG 164.109/4/1
- UL/ULC Classified
- ASTM C795, MIL-I-24244, NRC Reg. Guide 1.36 (Certification needs to be specified at time of order)

Canada

- CAN/ULC S102
- CGSB 51-GP-9M
- CGSB 51-GP-52M (jacket)
- CAN/CGSB-51.9 (obsolete, replaced by ASTM C547)

DOING MORE FOR THE WORLD WE LIVE IN.

Knauf Insulation products with ECOSE® Technology are made using our patented, bio-based binder - a smarter alternative to the phenol/formaldehyde (PF) binder traditionally used in fiberglass products. The bio-based binder holds our product together and gives the product its unique appearance.

All of our products are formaldehyde-free and made from sustainable resources, such as recycled glass and sand. And we're proud to be putting glass bottles back to work rather than into landfills. Our products are made with a minimum of 50% recycled glass—totaling an average of 26 million bottles each month.

with ECOSE® TECHNOLOGY

TECHNICAL DATA		
Property (Unit)	**Test**	**Performance**
Corrosiveness	ASTM C665	Does not accelerate corrosion of steel
Corrosion	ASTM C1617	Pass
Maximum Service Temperature	ASTM C411 + ASTM C447	1000° F (538° C)
Water Vapor Permeance	ASTM E96, Procedure A	0.01 perms or less
Water Vapor Sorption (by weight)	ASTM C1104	Less than 5%
Shrinkage	ASTM C356	Negligible
Mold Growth	ASTM C1338	Pass
Surface Burning Characteristics (flame spread/smoke developed)	ASTM E84, UL 723, CAN/ULC S102	UL/ULC Classified FHC 25/50

INDOOR AIR QUALITY

- UL Environment
  - GREENGUARD Certified
  - GREENGUARD Gold Certified
  - Validated to be Formaldehyde-Free
- Does not contain polybrominated diphenyl ethers (PBDE) such as: Penta–BDE, Octa–BDE or Deca–BDE
- EUCEB Certified
- IgCC Section 806.6 compliant

PRODUCT FORMS AND SIZES

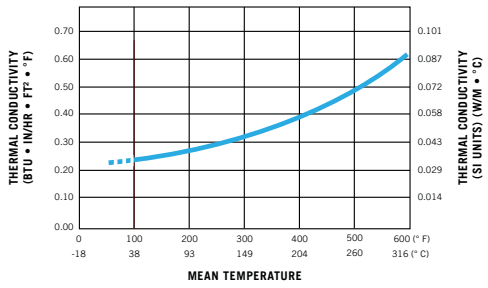
- Produced in 3' (914 mm) sections
- For iron pipe ½" – 24" (15 mm – 610 mm) nominal pipe size
- For copper tube ⅝" – 6⅛" (16 mm – 156 mm)
- All insulation inner and outer diameters comply with ASTM C585.
- Wall thicknesses from ½" to 6" (13 mm to 152 mm) in single layer for most sizes
- With or without a white, factory-applied jacket, ASJ+ (all-service jacket) is composed of aluminum foil, reinforced with a glass scrim bonded to a kraft paper interleaving with an outer flim layer leaving no paper exposed.
- A matching ASJ+ butt strip is supplied for each section
- The longitudinal lap of the jacket has the SSL+ self-sealing lap that creates a strong and lasting bond

Packaging

- Four carton sizes for easy ordering, inventory tracking and storage
- Reinforced carton handles for strength and easy lifting
- Bar-coded cartons for accurate shipments and tracking
- Full product range stocked at distributors for fast availability

THERMAL CONDUCTIVITY | ASTM C335

Mean Temperature	k	k (SI)
75° F (24° C)	0.23	0.033
100° F (38° C)	0.24	0.035
200° F (93° C)	0.28	0.040
300° F (149° C)	0.34	0.049
400° F (204° C)	0.42	0.061
500° F (260° C)	0.51	0.074
600° F (316° C)	0.62	0.089



ASHRAE 90.1-2016 REQUIREMENTS

MINIMUM PIPE INSULATION THICKNESS

Fluid Operating Temperature Range and Usage	Insulation Conductivity		Nominal Pipe or Tube Size				
	Conductivity Range BTU-in./(hr · ft² · °F)	Mean Temperature Rating	<1"	1"–<1½"	1½"–<4"	4"–<8"	≥8"
Heating and Hot Water Systems (Steam, Steam Condensate, Hot-Water Heating and Domestic Water Systems)[a, b, c, d]							
Above 350° F	0.32–0.34	250° F	4½"	5"	5"	5"	5"
251–350° F	0.29–0.31	200° F	3"	4"	4½"	4½"	4½"
201–250° F	0.27–0.30	150° F	2½"	2½"	2½"	3"	3"
141–200° F	0.25–0.29	125° F	1½"	1½"	2"	2"	2"
105–140° F	0.22–0.28	100° F	1"	1"	1½"	1½"	1½"
Cooling Systems (Chilled Water, Brine, Refrigerant)[a, b, c, d]							
40–60° F	0.21–0.27	75° F	½"	½"	1"	1"	1"
Below 40° F	0.20–0.26	50° F	½"	1"	1"	1"	1½"

a. For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows: $T=r\{(1+t/r)^{K/k}-1\}$, where T=minimum insulation thickness (in.), r=actual outside radius of pipe (in.), t=insulation thickness listed in this table for applicable fluid temperature and pipe size, K=conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature {Btu · in.(h · ft² · °F)}; and k=the upper value of the conductivity range listed in this table for the applicable fluid temperature.

b. These thicknesses are based on energy efficiency considerations only.

c. For piping smaller than 1½" and located in partitions within conditioned spaces, reduction of these thicknesses by 1" shall be permitted (before thickness adjustment required in footnote a) but not to thicknesses below 1". These thicknesses are based on energy efficiency considerations only. Issues such as water vapor permeability or surface condensation sometimes require vapor retarders or additional insulation.

d. The table is based on steel pipe. Non-metallic pipes schedule 80 thickness or less shall use the table values. For other non-metallic pipes having thermal resistance greater than that of steel pipe, reduced insulation thicknesses are permitted if documentation is provided showing that the pipe with the proposed insulation has no more heat transfer per foot than a steel pipe of the same size with the insulation thickness shown on the table.

PRECAUTIONS

Hot Pipe

- May be installed while the system is in operation, at all temperatures up to 1000° F (538° C).
- Knauf Insulation recommends, for insulation thicknesses greater than 6" (152 mm), the temperature must be increased from 500° F (260° C) to maximum temperature at a rate not exceeding 100° F (37.8° C) per hour.
- During initial heat-up to operating temperatures above 350° F (177° C), a slight odor and some smoke may be given off as a portion of the bonding material used in the insulation begins to undergo a controlled decomposition.
- If natural convection is not adequate in confined areas, forced ventilation should be provided in order to protect against any harmful fumes and vapors that might be generated.
- Care must also be taken when using sealants, solvents or flammable adhesive during installation.
- A maximum of 6" (152 mm) wall thickness is recommended.

Cold Pipe

- Use a continuous vapor retarder on piping operating below ambient temperatures.
- Seal all joints, surfaces, seams and fittings to prevent condensation.
- On below freezing applications, and in high-abuse areas, the ASJ+ jacket shall be protected with a PVC vapor retarding outer jacket. In addition, exposed ends of insulation shall be sealed with vapor barrier mastic installed per the mastic manufacturer's instructions. Vapor seals at butt joints shall be applied at 12' to 21' intervals; at the Engineer's discretion and at each fitting to isolate any water incursion.
- On chilled water systems operating in high humidity conditions, it is recommended that the same guidelines be followed as listed above for below freezing applications.
- Exterior hanger supports are recommended.

Outside Application

- Do not expose pipe insulation to weather. It must be covered with appropriate jacketing, mastic or vapor retardant coatings.
- All exposed surfaces must be protected. Proto® Indoor/Outdoor PVC Jacketing is recommended. See Knauf Insulation Guide Specifications for recommended PVC jacketing application guidelines.
- Apply jacketing, mastics or vapor retardant adhesives per manufacturer's instructions.
- For metallic jackets, factory-applied moisture retarders are recommended.

ASJ+ SSL+

- Keep adhesive and contact surfaces free from dirt and water. Seal immediately once adhesive is exposed.
- Apply when ambient and insulation temperatures are between 20° F and 130° F (-6.7° C and 54° C).
- If stored below 20° F or above 130° F, allow insulation cartons to stand within recommended temperature range for 24 hours prior to application.
- Do not store product below -20° F (-29° C) or above 150° F (66° C).
- When using Knauf Insulation's SSL+ Advanced Closure System, make sure the longitudinal and circumferential joints are properly sealed by rubbing the closure firmly with a squeegee. Use of staples is not recommended.
- When using Earthwool® 1000° pipe insulation, the surface temperature of the ASJ+ facing should not exceed 150° F (66° C).

Fittings and Hangers

- Use Proto 25/50 Rated (ASTM E84) PVC Fitting Covers, applying PVC fittings per Proto's Data Sheet.
- Fittings should be insulated to same thickness as the adjoining insulation.
- Apply fittings per manufacturer's instructions.
- When required by specification, a hard insert of sufficient length should be used to avoid compression of the insulation.

APPLICATION GUIDELINES

Storage

- Protect insulation from water damage or other abuse, welding sparks and open flame.
- Cartons are not designed for outside storage.

Preparation

- Apply only on clean, dry surfaces
- Pipe or vessel should be tested and released before insulation is applied.

General Guidelines

- All sections should be firmly butted.
- Seal circumferential joint with a minimum 3" (76 mm) wide butt strip.
- Jackets, coating and adhesives should have a comparable F.H.C. rating.
- ASJ+ may be painted. As with traditional ASJ, Knauf Insulation does not encourage the painting of ASJ+ because the application of any paint may change the surface burning characteristics and will void the UL Classification and Knauf Insulation Limited Warranty.

Insulation Limited Warranty

- Where painting is necessary, use common water, oil, or solvent-based paints. All paints should be tested for compatibility and adhesion before use.
- All piping should have continuous insulation.
- Position longitudinal lap downward to avoid dirt and moisture infiltration.
- Do not expose pipe insulation to excessive vibration or physical abuse.
- Faced insulation should not have a facing temperature above 150° F (66° C).

SSL+ Installation Instructions:

- To install SSL+, first remove the kraft release liner to expose adhesive.
- Carefully align the jacketing. Starting in the center of the insulation section, begin initial SSL+ tack using pressure in the direction of the overlap. Again, starting in the center of the insulation section, with a plastic squeegee begin to apply firm pressure to the bonded lap area swiping from the center of the insulation section toward each end.
- **Note:** After initial SSL+ adhesive tack, it is critical that the closure is not re-opened and repositioned on the facing. Doing so will delaminate the jacket and adhesive, diminishing the bond strength.

Butt Strip Installation Instructions:

- To install Butt Strips, remove the kraft release liner by separating the butt strip from the kraft using the convenient, easy release kiss cut.
- Simply wrap the butt strip, centered around the joint, and apply firm pressure with a squeegee.
- **Note:** After initial Butt Strip adhesive tack, it is critical that the closure is not re-opened and repositioned on the facing. Doing so will weaken the adhesive and diminish bond strength.

Recommended Thicknesses (ASHRAE 90.1-2016)

The minimum thicknesses are based on ASHRAE 90.1-2016 standards and do not necessarily represent the Economic Thickness of Insulation or the thickness required for proper condensation control. Rather, they serve as minimum recommendations for commercial applications. For recommended Economic Thickness, install according to Knauf Insulation or NAIMA 3E Plus programs or as specified.

FIBERGLASS AND MOLD

Fiberglass insulation will not sustain mold growth. However, mold can grow on almost any material when it becomes wet and contaminated. Carefully inspect any insulation that has been exposed to water. If it shows any sign of mold it must be discarded. If the material is wet but shows no evidence of mold, it should be dried rapidly and thoroughly. If it shows signs of facing degradation from wetting, it should be replaced.

CERTIFICATIONS

Check with your Knauf Insulation Territory Manager to ensure information is current.

The chemical and physical properties of this product represent average values determined in accordance with accepted test methods. The data is subject to normal manufacturing variations. The data is supplied as a technical service and is subject to change without notice. References to numerical flame spread ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.

This product is covered by one or more U.S. and/or other patents.
See patent www.knaufnorthamerica.com/patents

Visit **knaufnorthamerica.com** to learn more.

KNAUF INSULATION, INC.
One Knauf Drive
Shelbyville, IN 46176

Technical Support
(317) 398-4434 ext. 8727
info.us@knaufinsulation.com

05-20

DATA SHEET

Atmosphere™ Duct Wrap

with ECOSE® Technology

DESCRIPTION

Atmosphere Duct Wrap is a thermal and acoustical insulation blanket made from highly resilient, inorganic fiberglass bonded by ECOSE Technology. It is available unfaced, with a foil-scrim-kraft (FSK) jacket and with a white metalized polypropylene-scrim-kraft (PSK) jacket. Vapor retarders provide a 2" (51 mm) staple flange on one edge, and the factory-applied facing assures uniform quality.

APPLICATION

- External insulation on commercial or residential heating or air conditioning ducts
- Suitable for the exterior of rectangular or round sheet metal ducts and spaces or surfaces where temperature and condensation must be controlled

SPECIFICATION COMPLIANCE

U.S.

- ASTM C1139 - unfaced; Type I, Type II,
  - Grade 1 - 0.75 PCF (12 kg/m³)
  - Grade 2 - 1.0 PCF (16 kg/m³)
  - Grade 3 - 1.5 PCF (24 kg/m³)
- ASTM C553
  - Type I, Type II - 0.75 PCF (12 kg/m³)
  - Type I, Type II - 1.0 PCF (16 kg/m³)
  - Type I, II, III - 1.5 PCF (24 kg/m³)
- ASTM C1136; Type II
- ASTM C1290
- NFPA 90A and 90B
- California Title 24 (installed at 25% compression)
- UL/ULC Classified

Canada

- CAN/ULC S102

INDOOR AIR QUALITY

- UL Environment
  - GREENGUARD Certified
  - GREENGUARD Gold Certified
  - Validated to be Formaldehyde-Free
- Does not contain polybrominated diphenyl ethers (PBDE) such as: Penta–BDE, Octa–BDE or Deca–BDE
- EUCEB Certified

CONTRACTOR: _____

JOB: _____

DATE: _____

DOING MORE FOR THE WORLD WE LIVE IN.

Knauf Insulation products with ECOSE® Technology are made using our patented, bio-based binder - a smarter alternative to the phenol/formaldehyde (PF) binder traditionally used in fiberglass products. The bio-based binder holds our product together, gives the product its unique appearance and makes it formaldehyde-free.

All of our products are made from sustainable resources, such as recycled glass and sand. And we're proud to be putting glass bottles back to work rather than into landfills. Our products are made with a minimum of 50% recycled glass—totaling an average of 26 million bottles each month.

with ECOSE® TECHNOLOGY

FIBERGLASS AND MOLD

Fiberglass insulation will not sustain mold growth. However, mold can grow on almost any material when it becomes wet and contaminated. Carefully inspect any insulation that has been exposed to water. If it shows any sign of mold, it must be discarded. If the material is wet but shows no evidence of mold, it should be dried rapidly and thoroughly. If it shows signs of facing degradation from wetting, it should be replaced.

Air handling insulation used in the air stream must be discarded if exposed to water.

TECHNICAL DATA		
Property (Unit)	**Test**	**Performance**
Corrosiveness	ASTM C665	Does not accelerate corrosion of steel
Corrosion	ASTM C1617	Pass
Maximum Service Temperature	ASTM C411	Faced: 250° F (121° C), Unfaced: 350° F (177° C)
Water Vapor Permeance	ASTM E96, Procedure A	0.02 perms or less (FSK and PSK facings)
Water Vapor Sorption (by weight)	ASTM C1104	Less than 5%
Mold Growth	ASTM C1338	Pass
Surface Burning Characteristics (flame spread/smoke developed)	ASTM E84, UL 723, CAN/ULC S102	UL/ULC Classified FHC 25/50 (Unfaced and FSK facing)
	ASTM E84	25/50 (PSK facing)

FORMS AVAILABLE						
Density	**Thickness**	**Width**	**Length**	**Facing**	**R-Value (K Value) @ 75°F Mean Temperature**	
					Out-Of Package	**Installed [at 25% Compression]**
0.75 PCF (12 kg/m³)	1½" (38 mm)	48" (1,219 mm)	100' (30.48 m)	FSK, PSK, Unfaced	R-5.1 (0.29)	R-4.2 (0.27)
	2" (51 mm)		75' (22.86 m)		R-6.8 (0.29)	R-5.6 (0.27)
	2 3/16" (56 mm)		75' (22.86 m)		R-7.4 (0.29)	R-6.0 (0.27)
	3" (76 mm)		50' (15.24 m)		R-10.2 (0.29)	R-8.4 (0.27)
1.0 PCF (16 kg/m³)	1½" (38 mm)		100' (30.48 m)		R-5.6 (0.27)	R-4.5 (0.25)
	2" (51 mm)		75' (22.86 m)		R-7.4 (0.27)	R-6.0 (0.25)
1.5 PCF (24 kg/m³)	1½" (38 mm)		75' (22.86 m)		R-6.1 (0.24)	R-4.8 (0.23)
	2" (51 mm)		50' (15.24 m)		R-8.2 (0.24)	R-6.4 (0.23)

STRETCH-OUTS				
Labeled Thickness	**Installed Compressed Thickness**	**Round**	**Square**	**Rectangular**
1½" (38 mm)	1⅛" (29 mm)	P+9½" (241 mm)	P+8" (203 mm)	P+7" (178 mm)
2" (51 mm)	1½" (38 mm)	P+12" (305 mm)	P+10" (254 mm)	P+8" (203 mm)
2 3/16" (56 mm)	1⅝" (42 mm)	P+13" (330 mm)	P+11" (279 mm)	P+8½" (216 mm)
3" (76 mm)	2¼" (57 mm)	P+17" (432 mm)	P+14½" (368 mm)	P+11½" (292 mm)

P = Perimeter of duct to be installed.

INSERTION LOSS | (REDUCTION OF SOUND TRANSMITTED THROUGH DUCT WALL)
(SOUND AND VIBRATION DESIGN AND ANALYSIS, NATIONAL ENVIRONMENTAL BALANCING BUREAU, 1994)

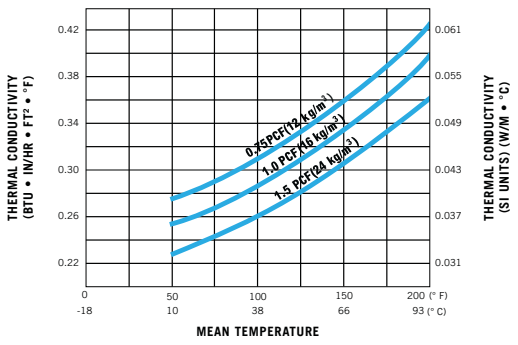
		Duct Wrap		Insertion Loss, dB/LF of Duct						
Duct Dimensions	Sheet Metal	Nominal Thickness	Nominal Density	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
12" x 12" (305 mm x 305 mm)	24 GA	1½" (38 mm)	0.75 PCF (12 kg/m³)	0.6	0.6	0.6	0.7	7.4	14.2	20.9
24" x 12" (610 mm x 305 mm)	24 GA	1½" (38 mm)		0.6	0.6	0.6	0.7	7.4	14.2	20.9
48" x 12" (1219 mm x 305 mm)	22 GA	1½" (38 mm)		0.5	0.5	0.5	0.6	7.4	14.1	20.9
24" x 24" (610 mm x 610 mm)	22 GA	1½" (38 mm)		0.5	0.5	0.5	0.6	7.4	14.1	20.9
24" x 12" (610 mm x 305 mm)	26 GA	1½" (38 mm)		0.8	0.8	0.8	0.8	7.5	14.2	21.0
24" x 8" (610 mm x 203 mm)	26 GA	2" (51 mm)		1.0	1.0	1.0	3.6	10.4	17.1	23.9

CONDENSATION CONTROL | RECOMMENDED MIN. INSTALL R-VALUES FOR CONDENSATION CONTROL ON FLAT SURFACES.
SURFACE EMITTANCE: 0.2 (AGED ALUMINUM FOIL OR GALVANIZED SHEET METAL)

RH	Operating Temperature														
	45° F (7° C) Ambient Temperature (° F)					55° F (13° C) Ambient Temperature (° F)					60° F (18° C) Ambient Temperature (° F)				
%	70	80	90	100	110	70	80	90	100	110	70	80	90	100	110
60	2.2[1]	3.3[1]	4.3[2]	4.3[2]	5.4[3]	1.1[1]	2.2[1]	3.3[1]	3.3[1]	4.3[2]	1.1[1]	1.1[1]	2.2[1]	3.3[1]	4.3[2]
70	3.3[1]	5.4[3]	6.5[4]	7.6[5]	—	1.1[1]	3.3[1]	4.3[2]	6.5[4]	6.5[4]	1.1[1]	1.1[1]	3.3[1]	5.4[3]	6.5[4]
80	7.0[4]	—	—	—	—	3.3[1]	6.5[4]	—	—	—	2.2[1]	3.3[1]	6.5[4]	—	—
90	—	—	—	—	—	—	—	—	—	—	6.5[4]	—	—	—	—

[1]All Duct Wrap products
[2]0.75 PCF (12 kg/m³), 2" and greater; 1.0 PCF (16 kg/m³), 1½" and greater; 1.5 PCF (24 kg/m³), 1½" and greater
[3]0.75 PCF (12 kg/m³), 2" and greater; 1.0 PCF (16 kg/m³), 2"; 1.5 PCF (24 kg/m³), 2"
[4]0.75 PCF (12 kg/m³)
[5]0.75 PCF (12 kg/m³), 3"

THERMAL EFFICIENCY | ASTM C177



Mean Temperature	0.75 PCF (12 kg/m³)		1.0 PCF (16 kg/m³)		1.5 PCF (24 kg/m³)	
	k	k (SI)	k	k (SI)	k	k (SI)
50° F (10° C)	0.28	0.040	0.26	0.037	0.23	0.033
75° F (24° C)	0.29	0.042	0.27	0.039	0.24	0.035
100° F (38° C)	0.31	0.045	0.29	0.042	0.26	0.037
125° F (52° C)	0.33	0.048	0.31	0.045	0.28	0.040
150° F (66° C)	0.36	0.052	0.34	0.049	0.31	0.042
175° F (80° C)	0.39	0.056	0.37	0.053	0.33	0.048
200° F (93° C)	0.43	0.063	0.40	0.058	0.36	0.052

APPLICATION & SPECIFICATION GUIDELINES

Storage

- Protect stored insulation from water damage, construction damage and other abuse.
- If stored outside, proper protection from weather conditions should be provided.

Preparation

- Install over clean, dry sheet metal ducts.
- All sheet metal joints and seams must be sealed to prevent air leakage from the duct.

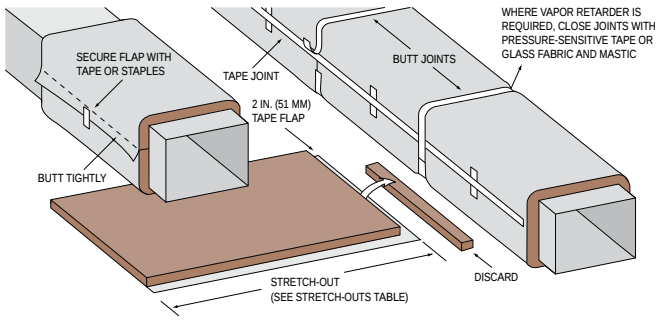
Application

- Install with facing to the outside to obtain specified R-value using a maximum of 25% compression.
- Butt all insulation joints firmly together. Longitudinal seam of the vapor retarder must be overlapped a minimum of 2" (51 mm). A 2" (51 mm) tab is provided for the circumferential seam and must be overlapped.
- Where vapor retarder performance is necessary, all penetrations, joints, seams and damage to the facing should be sealed with an FSK, PSK or foil tape or glass fabric and mastic prior to system startup.
- Pressure sensitive tapes should be a nominal 3" (76 mm) wide and be applied with moving pressure using an appropriate sealing tool. Staples should be outward clinch and placed approximately 6" (152 mm) on center.
- Closure systems should have a 25/50 F.H.C. per UL 723.
- For rectangular ducts over 24" (610 mm) wide, secure the insulation to the bottom side of the duct with mechanical fasteners spaced on 18" (457 mm) centers to reduce sag. Care should be taken to avoid over-compressing the insulation with the retaining washer.
- It is neither necessary nor desirable to adhere duct wrap to duct surfaces with adhesive.
- Unfaced Duct Wrap should be overlapped with a minimum of 2" (51 mm) and fastened with 4" (102 mm) to 6" (152 mm) nails or skewers placed 4" (102 mm) apart, or secured with a wire or banding system. Care must be taken to avoid damaging the duct wrap. Refer to diagram for staple stitching and butt-joint method.

Installation Procedures

- Use the Application graphic to determine stretch-outs required for the nominal thickness of insulation to limit average compression of the insulation 25% or less.

APPLICATION



CERTIFICATIONS

Check with your Knauf Insulation Territory Manager to ensure information is current.

The chemical and physical properties of this product represent average values determined in accordance with accepted test methods. The data is subject to normal manufacturing variations. The data is supplied as a technical service and is subject to change without notice. References to numerical flame spread ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.

This product is covered by one or more U.S. and/or other patents.
See patent www.knaufnorthamerica.com/patents

Visit **knaufnorthamerica.com** to learn more.

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05-20

SAFETY DATA SHEET
Glass Mineral Wool with ECOSE® Technology
According to Appendix D, OSHA Hazard Communication Standard 29 CFR §1910.1200

1. Identification

Product identifier

Product name Glass Mineral Wool with ECOSE® Technology

Product number KI_DP_101 (GHS)

Synonyms; trade names EcoBatt® (UnfacedandFaced) Building Insulation, EcoBatt® QuietTherm® (Unfaced and Faced) Building Insulation, Acoustical/IB Board, Acoustical Smooth Board, Air Duct Board (Atmosphere™), KB Blanket, Black Acoustical Board, Black Diffuser Board, Condensation Control Blanket, Duct Liner (Atmosphere™), Duct Wrap Faced and Unfaced (Atmosphere™), Earthwool® 1000º Pipe Insulation*, ET Batt*, ET HD Blanket, ET Blanket*, ET Board*, ET Panel*, Equipment Liner M, Everbilt (Unfaced and Faced) Building Insulation, Fabrication Board*, Flexible Duct Material, Guardian (Unfaced and Faced) Building Insulation, Hullboard*, Earthwool Insulation Board (Faced and Unfaced)*, KF_110*, KFR/ET Range Insulation*, KNSeries*, Manufactured Housing Duct Board, Manufactured Housing Insulation, Metal Building Insulation,Metal Building Cavity Insulation, Metal Building Filler Insulation, Earthwool Pipe & Tank Insulation*, Atmosphere Rigid Plenum Liner, Sill Sealer, Wall & Ceiling Liner M, Guardian by Knauf Insulation, Inner Safe™ Batt, EcoBatt® IRD, EcoRoll® Insulation, Basement Blanket Insulation

Revision date: 12/06/2019

Recommended use of the chemical and restrictions on use

Application Thermal and/or acoustic insulation for use in technical applications, industrial applications and in building construction.

Uses advised against None known.

Details of the supplier of the safety data sheet

Supplier
Knauf Insulation, Inc.
One Knauf Drive
Shelbyville
IN 46176-1496
Tel: 800 825 4434
www.knaufinsulation.us
sds@knaufinsulation.com

Region: United States, Central & South America

Emergency telephone number

Emergency telephone 24hrs: Chemtrec Tel: 800 424 9300

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2. Hazard(s) identification

Classification of the substance or mixture

OSHA Regulatory Status This product is regulated as a nuisance dust under OSHA criteria.

Physical hazards Not Classified

Health hazards Not Classified

Environmental hazards Not Classified

Label elements

Hazard statements NC Not Classified

Contains None.

Hazard pictogram None.

Signal word None.

Precautionary statements None.

Supplemental label information None.

The following sentences and pictograms are printed on packaging:

The mechanical effect of fibers in contact with skin may cause temporary itching.

http://www.knaufinsulation.com/comfort-and-handling

Other hazards

Physical Hazards None.

Health Hazards Mechanical irritation of the skin, eyes and upper respiratory system.

Environmental Hazards None.

Main symptoms Contact with skin, eyes and upper respiratory system may cause mechanical irritation. Biosoluble glass mineral wool is classified as a nuisance dust by OSHA.

***Heat-Up Precautions** When heated to temperatures above 400°F for the first time, release of binder components and binder decomposition products can occur which, in high concentrations, may irritate eyes and the respiratory system. See section 8 & 10

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3. Composition/information on ingredients

Mixtures

Biosoluble glass mineral wool	**82 - 100%**
CAS number: —	
Ingredient notes:(1)(2)	
Classification	
Not Classified	

Thermo set, inert polymer bonding agent derived from plant starches	**0 - 18%**
CAS number: —	
Classification	
Not Classified	

The full text for all hazard statements is displayed in Section 16.

Ingredient notes

(1) Man made vitreous (silicate) fibers with random orientation with alkaline oxide and alkali earth oxide ($Na_2O+K_2O+CaO+MgO+BaO$) content greater than 18% by weight meeting the requirements of Note Q of regulation n° 1272/2008 and therefore not classified carcinogenicity.
(2) All Knauf Insulation products covered by this SDS are independently certified by EUCEB to be manufactured using biosoluble glass formulations and thus exempt from labeling under NTP or California Prop 65 requirements.

Specific chemical identity and/or exact percent concentration is withheld as trade secret.

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4. First-aid measures

Description of first aid measures

General information Show this Safety Data Sheet to the medical professional in attendance. If symptoms occur, follow first aid measures as appropriate.

Notes to Physician: No specific recommendations.

Inhalation Remove from exposure. Rinse the throat and clear dust from airways.

Ingestion Drink plenty of water if accidentally ingested.

Skin Contact If mechanical irritation occurs, remove contaminated clothing and wash skin gently with cold water and soap.

Eye contact Rinse abundantly with water for at least 15 minutes.

Most important symptoms and effects, both acute and delayed

General information Contact with skin, eyes and upper respiratory system may cause mechanical irritation. Biosoluble glass mineral wool is classified as a nuisance dust by OSHA.

Indication of immediate medical attention and special treatment needed

General information If any adverse reaction or discomfort continues from any of the above exposures, seek professional medical advice.

Specific treatments No specific recommendations.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media Water, foam, carbon dioxide (CO_2), and dry powder.

Special hazards arising from the substance or mixture

General information Products do not pose a fire hazard in use; however, some packaging materials or facings may be combustible. Products of combustion from product and packaging - carbon dioxide, carbon monoxide and some trace gases such as ammonia, nitrogen oxides and volatile organic substances.

Advice for firefighters

General information In large fires in poorly ventilated areas involving packaging materials respiratory protection / breathing apparatus may be required.

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6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Minimize direct contact with skin in order to prevent mechanical itching. In dusty environments, use suitable respiratory protection such as 3M 8210, N95 or equivalent. Use glasses or goggles when working with mineral wool insulation above shoulder height or in dusty environments. Where possible, use natural ventilation during installation in order to minimize dust levels.

After contact with the product, rinse skin in cold water to reduce potential effects of mechanical itching. Dispose of surplus product in accordance with local regulations.

Use personal protection recommended in Section 8 of the SDS.

Environmental precautions

Environmental precautions Not relevant.

Methods and material for containment and cleaning up

Methods for cleaning up In dusty environments, use vacuum equipment where possible to minimize dust levels.

Reference to other sections For personal protection, see Section 8. For waste disposal, see Section 13.

7. Handling and storage

Precautions for safe handling

Usage precautions Assure proper respiratory protection if dust potential exceeds PEL/TLV.

Conditions for safe storage, including any incompatibilities

Storage precautions To ensure optimum product performance; when packaging is removed or opened; products should be stored inside or covered to protect them from ingress of rain water or snow. Storage arrangements should ensure stability of stacked products and use on a first in first out basis (FIFO) is recommended.

Specific end uses(s)

Specific end use(s) Thermal and/or acoustic insulation for use in technical applications, industrial applications and in building construction.

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8. Exposure controls/Personal protection

Control parameters

Occupational exposure limits

Biosoluble glass mineral wool

Long-term exposure limit (8-hour TWA): ACGIH, (Notes: (A3)) 1 f/cc Glass wool fibers
Long-term exposure limit (8-hour TWA): NIOSH 5 mg/m³ Mineral wool fiber, total particulate
Long-term exposure limit (8-hour TWA): OSHA 5 mg/m³ Particulates not otherwise regulated (PNOR), respirable fraction
Long-term exposure limit (8-hour TWA): OSHA 15 mg/m³ Particulates not otherwise regulated (PNOR), total dust
ACGIH = American Conference of Governmental Industrial Hygienists.
OSHA = Occupational Safety and Health Administration.

NIOSH = The National Institute for Occupational Safety and Health.

Ingredient comments
(A3) - Fibers longer than 5 µm; diameter less than 3 µm; aspect ratio greater than 5:1 as determined by the membrane filter method at 400-450X magnification (4-mm objective) phase contrast illumination.
Biosoluble glass mineral wool - See section 3.

Exposure controls

Appropriate engineering controls
Maintain sufficient mechanical or natural ventilation to assure fiber concentrations remain below PEL/TLV. Use local exhaust if necessary. Power equipment should be equipped with properly designed dust collection devices.

Eye/face protection
Use glasses or goggles when working with mineral wool insulation above shoulder height or in dusty environments.

Other skin and body protection
Minimize direct contact with skin in order to prevent mechanical itching.

Hygiene measures
After contact with the product, rinse skin in cold water to reduce potential effects of mechanical itching.

Respiratory protection
In dusty environments, use suitable respiratory protection.

Environmental exposure controls
Not relevant.

*** Heat-Up Precautions:**
When heated to temperatures above 400°F for the first time, release of binder components and binder decomposition products can occur which, in high concentrations, may irritate eyes and the respiratory system. The duration of release is dependant upon the thickness of the insulation, binder content and the temperature applied. Adequate ventilation should be provided. In confined spaces or where ventilation is not possible, occupants should wear appropriate self-contained breathing apparatus.

9. Physical and chemical properties

Information on basic physical and chemical properties

Appearance
Solid.
Rolls. Panel. Loose fiber.

Color
Brown.

Odor
Not relevant.

Odor threshold
No data available.

pH
Not relevant.

Melting point
Not relevant.

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Initial boiling point and range	Not relevant.
Flash point	Not relevant.
Evaporation rate	Not relevant.
Flammability (solid, gas)	Not relevant.
Upper/lower flammability or explosive limits	Not relevant.
Vapor pressure	Not relevant.
Vapor density	Not relevant.
Relative density	7 - 96 kg/m³
Solubility(ies)	Generally chemically inert and slightly soluble in water.
Partition coefficient	Not relevant.
Auto-ignition temperature	Not relevant.
Decomposition Temperature	Not relevant.
Viscosity	Not relevant.
Explosive properties	Not relevant.
Oxidizing properties	Not relevant.
Nominal diameter of fibers.	3 - 8µm
Length weight geometric mean diameter less 2 standard errors	< 6 µm
Orientation of fibers	Random

10. Stability and reactivity

Reactivity	None.
Stability	Binder will decompose above 400°F
Possibility of hazardous reactions	None.
Conditions to avoid	Heating above 400°F
Materials to avoid	Hydrofluoric acid will react with and dissolve glass.
Hazardous decomposition products	None in normal conditions of use. When heated to temperatures above 400°F for the first time, release of binder components and binder decomposition products can occur which, in high concentrations, may irritate eyes and the respiratory system. The duration of release is dependant upon the thickness of the insulation, binder content and the temperature applied. Adequate ventilation should be provided. In confined spaces or where ventilation is not possible, occupants should wear appropriate self-contained breathing apparatus.

11. Toxicological information

Information on toxicological effects

Acute toxicity - oral

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Notes (oral LD_{50}) No data were identified for the product as a whole. Data are for constituents:
Biosoluble glass mineral wool - Not applicable.
Thermo set, inert polymer bonding agent derived from plant starches. - Not applicable.

Acute toxicity - dermal

Notes (dermal LD_{50}) No data were identified for the product as a whole. Data are for constituents:
Biosoluble glass mineral wool - Not applicable.
Thermo set, inert polymer bonding agent derived from plant starches. - Not applicable.

Acute toxicity - inhalation

Notes (inhalation LC_{50}) No data were identified for the product as a whole. Data are for constituents:
Biosoluble glass mineral wool - Not applicable.
Thermo set, inert polymer bonding agent derived from plant starches. - Not applicable.

Skin corrosion/irritation

Skin corrosion/irritation May cause mechanical irritation to skin.

Serious eye damage/irritation

Serious eye damage/irritation May cause mechanical irritation to eyes.

Respiratory sensitization

Respiratory sensitization No data were identified for this product or its constituents.

Skin sensitization

Skin sensitization No data were identified for this product or its constituents.

Germ cell mutagenicity

Genotoxicity - in vitro No data were identified for this product or its constituents.

Genotoxicity - in vivo No data were identified for this product or its constituents.

Carcinogenicity

Carcinogenicity Results from a biopersistence test by intratracheal instillation has shown that fibers in this product longer than 20 µm have a weighted half-life less than 40 days, thus this product is not classified as a carcinogen. None of the components of this product are listed as a carcinogen by OSHA, IARC or NTP.

Reproductive toxicity

Reproductive toxicity - fertility No data available for this product or its constituents.

Reproductive toxicity - development No data available for this product or its constituents.

Specific target organ toxicity - single exposure

STOT - single exposure No data were identified for this product or its constituents.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure No data were identified for this product or its constituents.

Aspiration hazard

Aspiration hazard Not relevant.

Inhalation Mechanical irritation to upper respiratory tract.

Ingestion Non-hazardous when ingested.

Skin Contact Mechanical irritation to skin.

Eye contact Mechanical irritation to eyes.

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Medical Symptoms Contact with skin, eyes and upper respiratory system may cause mechanical irritation. Biosoluble glass mineral wool is classified as a nuisance dust by OSHA.

12. Ecological information

Toxicity This product is not ecotoxic to air, water or soil, by composition.

Persistence and degradability

Persistence and degradability Inert inorganic product with Thermo set, inert polymer bonding agent derived from plant starches; 0 - 18%

Bioaccumulative potential

Bio-Accumulative Potential Will not bioaccumulate.

Partition coefficient Not relevant.

Mobility in soil

Mobility Not considered mobile. Less than 1% leachable organic carbon if landfilled.

Other adverse effects

Other adverse effects None known.

13. Disposal considerations

Waste treatment methods

General information Dispose of in accordance with all applicable regulations. Empty containers should be taken to an approved waste handling site for recycling or disposal.

Disposal methods This product is not regulated under RCRA Hazardous Waste Regulations. May be disposed in landfill. If unsure, contact the local office of the USEPA, your local public health department or the local landfill regulators.

14. Transport information

General The product is not covered by international regulations on the transport of dangerous goods (IMDG, IATA, DOT).

UN Number

UN No. (International) Not applicable.

UN proper shipping name

Proper shipping name (International) Not applicable.

Transport hazard class(es)

Transport Labels (International) No transport warning sign required.

Packing group

Packing group (International) Not applicable.

Environmental hazards

Environmentally Hazardous Substance
No.

Special precautions for user

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Not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

Regulatory Status This product is regulated as a nuisance dust under OSHA criteria.
In accordance with industry practice, Knauf Insulation has decided to continue to provide its customers with the appropriate information for the purpose of assuring safe handling and use of mineral wool throughout the product life.

US Federal Regulations

SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities
Not regulated.

CERCLA/Superfund, Hazardous Substances/Reportable Quantities (EPA)
Not regulated.

SARA 313 Emission Reporting
Not listed.

SARA (311/312) Hazard Categories
Not regulated.

US State Regulations

California Proposition 65 Carcinogens and Reproductive Toxins
This product is exempt from labeling requirements under this Act.

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Inventories

US - TSCA

All the ingredients are listed or exempt.

16. Other information

Abbreviations and acronyms used in the safety data sheet

CAS: Chemical Abstracts Service.
IARC: International Agency for Research on Cancer.
IATA: International Air Transport Association.
IMDG: International Maritime Dangerous Goods.
NIOSH: The National Institute for Occupational Safety and Health.
OSHA: Occupational Safety and Health Administration.
PBT: Persistent, Bioaccumulative and Toxic substance.
PEL: Permissible Exposure Limit.
SARA: Superfund Amendments and Reauthorization Act.
TLV: Threshold Limit Value.
TSCA: Toxic Substances Control Act.
USEPA: United States Environmental Protection Agency.
vPvB: Very Persistent and Very Bioaccumulative.

General information

All products manufactured by Knauf Insulation are made of non-classified fibers and are certified by EUCEB. Products meeting EUCEB certification requirements can be recognised by the EUCEB logo printed on the packaging.

Further information can be obtained from:

www.euceb.org www.knaufinsulation.com

Revision comments §1

Supersedes date 9/13/2017

Revision date 12/6/2019

Revision 2.3

SDS No. 4662

Other information

In 2001, the International Agency for Research on Cancer (IARC) reclassified glass mineral wool fibres from Group 2B (possibly carcinogenic) to Group 3 «agent which cannot be classified as for their carcinogenicity to humans». (See Monograph Vol 81, http://monographs.iarc.fr/)

This Safety Data Sheet / Product Data Sheet does not constitute a workplace assessment.
Information contained in this document represents the state of our knowledge regarding this product as of the date of issue of the document. Attention of users is drawn to possible risks taken when the product is used for other applications than the ones it has been designed for.

ProRox® MA 960NA

ENERWRAP® MA 960NA

ProRox® MA 960NA is a rolled and faced mineral wool (stone wool) insulation wrap/mat designed for high temperature industrial applications where flexibility is required.
Product is ideal for large diameter piping, vessels, ducts and equipment subject to light mechanical loads.

Product properties in accordance with ASTM C553

Properties	Performance								Norms
Thermal conductivity	T_m (°F)	100	200	300	400	500	600	700	ASTM C177
	λ (BTU.in/hr.ft².°F)	0.25	0.30	0.34	0.40	0.48	0.58	0.68	
	T_m (°C)	38	93	150	204	260	316	371	
	λ (W/mK)	0.036	0.043	0.049	0.058	0.069	0.084	0.098	
Maximum Service Temperature	Hot Surface Performance: 1200°F- (650°C) Non-Combustible								ASTM C411 ASTM E136 / CAN4 S114
	Linear Shrinkage: ≤ 2 % at 1200°F- (650°C)								ASTM C356
Reaction to fire	Surface burning characteristics Flame spread index = 0 ; Smoke development index = 0								ASTM E84 (UL 723) CAN/ULC S102
Density	Actual Density = 5.68 lb/ft³ - (91 kg/m³) Nominal Density = 8.0 lb/ft³								ASTM 167
Corrosion resistance**	Stress Corrosion Cracking Tendency of Austenitic Stainless Steel = Passed Corrosion of Steel = Passed								ASTM C692 ASTM C665
Chemical Analysis**	(Salts: Cl^- , Fl^- , Na^+ , SiO_4^{4-}) Results fall within acceptability limits of ASTM C795								ASTM C795 (C871)
Thermal Resistance	R-Value / inch @ 75°F RSI value / 25.4mm @ 24°C				4.2 hr. ft².°F/BTU 0.74 m² K/W				ASTM C518 (C177)
Water Absorption/ Vapor Sorption	< 1 % Weight								ASTM C1104
Compliance	Complies with Type: VII								ASTM C553
ROCKWOOL Technical Insulation offers a wide range of facings, dimensions and thicknesses. Please contact us for further information.									

** Provisions for lot testing may be requried, consult manufacturer.

Surface Burning Characteristics: UL Listed to Canadian standard CAN/ULC S102 ; UL Classified to UL 723

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

Safety Use Instruction Sheet – ProRox & SeaRox products

Date of issue: 01/11/2017 Version: 1.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Article

Trade name : ProRox GR 900 – 990, ProRox LF 900 – 990, ProRox LM 900 – 990, ProRox MA 500 – 590, ProRox MA 900 – 990, ProRox PS 600 – 690, ProRox PS 900 – 990, ProRox PSM 900 – 990, ProRox QM 900 – 990, ProRox SL 500 – 590, ProRox SL 600 – 690, ProRox SL 900 – 990, ProRox WM 600 – 690, ProRox WM 900 – 990
SeaRox FB 6000 – 6090, SeaRox FM 6000 – 6090, SeaRox LM 900 – 990, SeaRox MA 700 – 790, SeaRox SL 300 – 390, SeaRox SL 400 – 490, SeaRox SL 600 – 690, SeaRox SL 700 – 790, SeaRox SL 900 – 990, SeaRox WM 600 – 690, SeaRox WM 900 – 990, Aquaduct, Aquaduct CL

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Use of the substance/mixture : ProRox: Thermal insulation of industrial installations.
SeaRox: Thermal insulation in marine and offshore installations

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Rockwool B.V.
Rockwool Technical Insulation
Industrieweg 15
6045 JH Roermond
Netherlands
T: +31 475 35 3915
www.rockwool-rti.com

Producing factories

- Norway (Trondheim and Moss)
- Denmark (Doense and Vamdrup)
- Germany (Neuburg, Flechtingen and Gladbeck)
- Netherlands (Roermond)
- United Kingdom (Pencoed)
- Poland (Cigacice and Malkinia)
- Czech Republic (Bohumin)
- Hungary (Tapolca)
- France (Saint Eloy les Mines)
- Spain (Caparroso)

Or imported by any of these manufacturers from the ROCKWOOL site in Russia (Vyborg)

1.4. Emergency telephone number

Emergency number : +31 475 35 3915
(business hours GMT+1)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Not classified

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

No labelling applicable

2.3. Other hazards not contributing to the classification

other hazards which do not result in classification : Dust can be generated during cutting or fabrication of the product. When heated to approximately 200 °C for the first time, release of binder components and binder decomposition products can occur which, in high concentrations, may irritate the eyes and respiratory system. Further information can be found in section 8.

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide (Na2O+K2O+CaO+MgO+BaO) content greater than 18% by weight and fulfilling one of the note Q conditions	(EC-No.) 926-099-9 (EC Index-No.) 650-016-00-2 (REACH-no) 01-2119472313-44	95 - 100	Not classified
Urea, polymer with formaldehyde and phenol	(CAS-No.) 25104-55-6	2 - 5	Not classified
Residual oils (petroleum), solvent-dewaxed (contains less than 3% DMSO extract)	(CAS-No.) 64742-62-7 (EC-No.) 265-166-0 (EC Index-No.) 649-471-00-X	0.5	Not classified

Full text of H-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : If exposure symptoms persist, seek medical attention.

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing.

First-aid measures after skin contact : After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water and soap. Rinse skin with water/shower.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Call a physician.

First-aid measures after ingestion : Rinse mouth immediately and drink plenty of water.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after eye contact : may cause physical irritation upon direct contact.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Water spray. carbon dioxide (CO2), dry chemical powder, foam.

Unsuitable extinguishing media : None known.

5.2. Special hazards arising from the substance or mixture

Fire hazard : The product itself does not burn.

Explosion hazard : not explosive.

5.3. Advice for firefighters

Firefighting instructions : Use self-contained breathing apparatus when in close proximity to fire. Wear proper protective equipment.

Protective equipment for firefighters : Wear a self contained breathing apparatus. Wear recommended personal protective equipment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment.

6.1.1. For non-emergency personnel

Protective equipment : Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Refer to chapter 8.

6.1.2. For emergency responders

Protective equipment : In case of inadequate ventilation wear respiratory protection. Refer to chapter 8.

Emergency procedures : Stop leak if safe to do so. Evacuate and limit access.

6.2. Environmental precautions

Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Refer to sections 8 and 13.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Spilled material should be removed immediately to avoid formation of dust from dried material. Sweep up or vacuum up the product.

6.4. Reference to other sections

Refer to sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Unpack material at application site to avoid unnecessary handling of product. Keep work area clean. Collect all waste in suitable and labelled containers and dispose according to local legislation. Wet dust with water before sweeping. Dust must be exhausted directly at the point of origin.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in original container. Store tightly closed in a dry, cool and well-ventilated place.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Residual oils (petroleum), solvent-dewaxed (contains less than 3% DMSO extract) (64742-62-7)		
Latvia	OEL TWA (mg/m³)	5 mg/m³
Poland	NDS (mg/m³)	5 mg/m³
Slovakia	NPHV (priemerná) (mg/m³)	1 mg/m³
Slovakia	NPHV (priemerná) (ppm)	5 ppm
Slovakia	OEL STEL (ppm)	15 ppm
Slovakia	NPHV (Hraničná) (mg/m³)	3 mg/m³
USA - ACGIH	ACGIH TWA (mg/m³)	5 mg/m³

Additional information : Workplace exposure limit (WEL) must not be exceeded. (total respirable, 8-hour time weighted averages).The dust concentration of inhalable fibres will be under normal working conditions less than 0,1 per cm^3.

8.2. Exposure controls

Appropriate engineering controls:

Ensure adequate ventilation.

Personal protective equipment:

Gloves. Protective clothing. Safety glasses.

Hand protection:

Wear suitable gloves tested to EN 374.

Eye protection:

tightly fitting safety goggles. DIN EN 166.

Skin and body protection:

Long sleeved protective clothing. Wear work clothes with long sleeves.

Respiratory protection:

In case of insufficient ventilation, wear suitable respiratory equipment. EN 149. (FFP1)

Further information by the manufacturer: all stone wool insulation products contain a small amount of organic matter which primarily consist of carbon, nitrogen and hydrogen. Depending on the product this can be up to 5 % by weight. During the first heating of the insulation material to temperatures above approx. 200°C this organic matter is decomposed (broken down). During this process some smoke development and / or an irritating smell can be noticed. Incomplete combustion of organic matter does not affect the quality or declared performances of installed products.
The composition of smoke will depend on the actual circumstances at location and will be influenced by the actual temperature, the speed of heating, presence of oxygen etc. The development of smoke and / or irritating smell during the “running in” of the installation can typically last for a period from a few hours up to approximately 4 days. Especially in newly insulated power plants, where temperature is increased gradually until full running conditions are met, this period of time needs to be taken into account. Ventilate the area well and to keep distance to the heated equipment until no further development of smoke or strong irritating smell is noticed.
If an enclosed area (room) where the heating takes place needs to be entered during the “running in” period wear a full face mask with fresh air supply for personal protection.

Other information:

Handle in accordance with good industrial hygiene and safety procedures.


Ventilate working area if possible


Waste should be disposed of according to local regulations


Cover exposed skin. When working in unventilated area wear disposable face mask


Clean area using vacuum equipment


Wear goggles when working overhead


Rinse in cold water before washing

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Solid
Appearance	:	Article. Stone wool.
Colour	:	Grey. green. Yellow.
Odour	:	Odourless.
Odour threshold	:	No data available
pH	:	Not applicable.
Relative evaporation rate (butylacetate=1)	:	No data available
Melting point	:	> 1000 °C
Freezing point	:	No data available
Boiling point	:	No data available
Flash point	:	Not applicable
Auto-ignition temperature	:	No data available
Decomposition temperature	:	200 °C
Flammability (solid, gas)	:	Not flammable
Vapour pressure	:	No data available
Relative vapour density at 20 °C	:	No data available
Relative density	:	No data available
Solubility	:	Chemically inert substance. Water: Insoluble in water
Log Pow	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosive properties	:	Not explosive.
Oxidising properties	:	Not applicable.
Explosive limits	:	Not explosive.

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Hazardous polymerisation does not occur.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None under normal conditions.

10.4. Conditions to avoid

None known.

10.5. Incompatible materials

Strong acids, bases.

10.6. Hazardous decomposition products

Carbon monoxide. Carbon dioxide (CO_2). When heated to approximately 200 °C for the first time, release of binder components and binder decomposition products can occur which, in high concentrations, may irritate the eyes and respiratory system.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Additional information : No acute toxicity even at high doses.

Urea, polymer with formaldehyde and phenol (25104-55-6)	
LD50 oral rat	7 g/kg

Residual oils (petroleum), solvent-dewaxed (contains less than 3% DMSO extract) (64742-62-7)	
LD50 dermal rabbit	> 2000 mg/kg

Skin corrosion/irritation : Not classified
pH: Not applicable.

Serious eye damage/irritation : Not classified
pH: Not applicable.

Additional information : Dust from this product may cause eye irritation

Respiratory or skin sensitisation : Not classified

Additional information : May cause slight irritation to the skin
Inhalation of dust may cause irritation of the respiratory system.
symptoms may include stinging, tearing, redness, swelling and blurred vision

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

STOT-single exposure : Not classified

STOT-repeated exposure : Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : This product is not hazardous.

12.2. Persistence and degradability

ProRox and SeaRox	
Persistence and degradability	Product is not easily biodegradable.

12.3. Bioaccumulative potential

ProRox and SeaRox	
Bioaccumulative potential	No bioaccumulation.

12.4. Mobility in soil

ProRox and SeaRox	
Ecology - soil	Not expected to adsorb on soil.

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Other adverse effects

Other adverse effects : No information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Comply with local regulations for disposal.

Additional information : Empty containers should be taken for recycling, recovery or waste in accordance with local regulation.

SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

ADR	IMDG	IATA	ADN	RID
14.1. UN number				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
14.2. UN proper shipping name				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
14.3. Transport hazard class(es)				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
14.4. Packing group				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
14.5. Environmental hazards				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
not applicable				

14.6. Special precautions for user

Special transport precautions : Not applicable.

- Overland transport

Not applicable

- Transport by sea

Not applicable

- Air transport

Not applicable

- Inland waterway transport

Not applicable

- Rail transport

Not applicable

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

IBC code : not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

Contains no substance on the REACH candidate list

15.1.2. National regulations

Germany

VwVwS Annex reference : Water hazard class (WGK) nwg, no hazard to waters (Classification according to VwVwS, Annex 4)

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands

SZW-lijst van kankerverwekkende stoffen : Residual oils (petroleum), solvent-dewaxed (contains less than 3% DMSO extract) is listed

SZW-lijst van mutagene stoffen : Residual oils (petroleum), solvent-dewaxed (contains less than 3% DMSO extract) is listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : None of the components are listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : None of the components are listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : None of the components are listed

15.2. Chemical safety assessment

No chemical safety assessment has been carried out
The substance is not hazardous

SECTION 16: Other information

Indication of changes:
CAS number has been changed.
Abbreviations and acronyms:

	ACGIH (American Conference of Governement Industrial Hygienists)
	ASTM - American Society for Testing and Materials
	CAS - Chemical Abstracts Service
	CLP - Classification, Labelling and Packaging
	CSR - Chemical Safety Report
	DIN - Deutsches Institut für Normung eV (German Institute for Standardization)
	EC - European Community
	EEC - European Economic Community
	GESTIS: Gefahrstoffdaten banken (Database on hazardous substances)
	GHS - Globally Harmonised System
	GPPS: general purpose polystyrenes
	HCS - Hazard Communication Standard
	HMIS - Hazardous Materials Identification System
	IARC (International Agency for Research on Cancer)
	MSDS - Material Safety Data Sheet
	Occupational Safety and Health Administration (OSHA) :
	OSHA - Occupational Safety and Health Administration
	Overland transport (ADR)
	REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals
	UP: Unsaturated polyester
	SDS - Safety Data Sheet
	VCI - volatile corrosion inhibitor

Other information : The CAS number under which the Note Q fibres fall is 65997-17-3. Under this number the fibres are registered in the chemical registry systems in most countries in the world. This CAS number however is very broad. The specific chemistry of the bio-soluble fibre has been laid down in the CAS number 287922-11-6 and 1010446-98-6 and can be tracked in the CAS Registry System only.

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

AP/Armaflex®
AP/Armaflex® FS

Sheet & Roll Insulation

Fiber Free

The original, fiber-free, flexible elastomeric pipe, valve and duct insulation for reliable protection against condensation, mold and energy loss. AP Armaflex FS is PVC free.

- Fiber-free, formaldehyde-free, low VOC and non-particulating formulation protects indoor air quality
- Closed-cell structure provides excellent condensation control
- Built-in vapor barrier eliminates need for additional vapor retarder
- Microban® antimicrobial product protection inhibits the growth of mold and mildew in the insulation
- 25/50 rated for use in air plenums up to 1" thickness in AP Armaflex and 1-1/2" and 2" thickness in AP Armaflex FS
- Thickness up to 2" with R-value up to R-8

armacell®

GREENGUARD GOLD
PRODUCT CERTIFIED FOR LOW CHEMICAL EMISSIONS
UL.COM/GG
UL 2818

U.S. GREEN BUILDING COUNCIL MEMBER

Microban® antimicrobial product protection

GREENGUARD Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage. For more information, visit ul.com/gg.

Microban antimicrobial product protection is limited to the product itself and is not designed to protect the users of these products from disease causing microorganisms, or as a substitute for normal cleaning and hygiene practices.*

Technical Data: AP Armaflex® and AP Armaflex® FS Sheet and Roll Insulation

Description:

Black flexible closed-cell elastomeric thermal insulation in sheet and roll form

Specifications Compliance:

ASTM C 534, Type II — Sheet Grade 1 ASTM C 1534 ASTM D 1056, 2B1	ASTM E 84, NFPA 255, UL723 ASTM G21/C1338 ASTM G22 CAN/ULC S102[1]	MEA 107-89M MIL-P-15280J, FORM S[2] MIL-C-3133C (MIL STD 670B) Grade SBE 3[2]	NFPA 90A, 90B UL 181 UL 94 5V-A, V-0, File E55798 City of LA – RR 7642

Approvals, Certifications, Compliances:

• GREENGUARD Gold Certified. • Manufactured without CFCs, HFCs, HCFCs, PBDEs, or Formaldehyde.	• Made with EPA registered Microban® antimicrobial product protection. • All Armacell facilities in North America are ISO 9001:2008 certified.

Typical Properties

Specifications:	Values			Test Method:
	AP Armaflex Through 1"	AP Armaflex FS 1-1/2" & 2"	AP Armaflex 1-1/2" & 2"	
Thermal Conductivity: Btu • in./h • ft² • °F (W/mK)				
75°F Mean Temperature (24°C) 90°F Mean Temperature (32°C)	0.25 (0.036) 0.256 (0.037)	0.28 (0.040) 0.286 (0.041)	0.25 (0.036) 0.256 (0.037)	ASTM C 177 or C 518
Water Vapor Permeability: Perm-in. [Kg/(s • m • Pa)]	0.05 (0.725 x 10^{-13})	0.08 (1.16 x 10^{-13})	0.05 (0.725 x 10^{-13})	ASTM E 96, Procedure A
Flame Spread and Smoke Developed Index:	25/50 rated	25/50 rated	Does not pass	ASTM E 84 CAN/ULC S102[1]
Water Absorption, % by Volume:	0.2%	0.2%	0.2%	ASTM C 209
Mold Growth: **Fungi Resistance:** **Bacterial Resistance:**	Passed	Passed	Passed	UL181 ASTM G21/C1338 ASTM G22
Upper Use Limit: [3]	220°F (105°C)	220°F (105°C)	220°F (105°C)	ASTM C534
Lower Use Limit: [4]	-297°F (-183°C) [5]	-297°F (-183°C) [5]	-297°F (-183°C) [5]	ASTM C534
Ozone Resistance:	GOOD	GOOD	GOOD	Ozone Chamber Test

R-Value:	R-1.6	R-2.1	R-3.1	R-4.2	R-6	R-8
Thickness:	3/8"	1/2"	3/4"	1"	1-1/2"	2"

Sizes:

Sheet: Width x Length Thickness (nominal)	36" x 48" (.915m x1.22m) 1/8", 1/4", 3/8", 1/2", 3/4", 1", 1-1/2" & 2" (3, 6,10, 13, 19, 25, 38 & 50mm)
Roll: Width Thickness (nominal) x Length	48" wide (1.22m) 3/8" x 100' (10mm x 30.5m) 1" x 35' (25mm x 10.7m) 1/2" x 70' (13mm x 21.4m) 1-1/2" x 25' (38mm x 7.6m) 3/4" x 50' (19mm x 15.2m) 2" x 18' (50mm x 5.4m)

[1] AP Armaflex meets CAN/ULC S102 through 1" thickness.

[2] AP Armaflex meets MIL-P-15280J, FORM S and MIL-C-3133C (MIL STD 670B) Grade SBE through 1" thickness.

[3] On the heating cycle, AP Armaflex Pipe Insulation will withstand temperatures as high as 220°F (105°C). 520, 520 Black or 520 BLV Adhesive may be used with pipe insulation applications up to 220°F (105°C).

[4] At temperatures below -20°F (-29°C), elastomeric insulation starts to become less flexible. However, this characteristic does not affect thermal efficiency and resistance to water vapor permeability of Armaflex insulation.

[5] For applications of -40°F to -297°F (-40°C to -183°C), contact Armacell.

ARMACELL LLC
TEL: 800.866.5638
FAX: 919.304.3847
info.us@armacell.com
www.armacell.us
7600 Oakwood Street Extension, Mebane, NC 27302

armacell®

Material Safety Data Sheet

AP Armaflex

Prepared 01/13– Replaces 03/10

Armacell LLC
7600 Oakwood Street Extension
Mebane, NC 27302
(919) 304-3846

I. PRODUCT IDENTIFICATION
Name: AP Armaflex Products: including AP Armaflex Tube, AP Armaflex SS Tube, AP Armaflex Sheet and Rolls, AP Armaflex SA Sheet and Rolls, AP Armaflex Tape, AP Armaflex W, AP Armaflex Coil, TU Armaflex Sheet and HD Armaflex Sheet, Armaflex Guard
Description: Expanded, closed-cell, sulfur-cured rubber type compound. Available in various sizes and in several forms; e.g., underlayment applications, pipe insulation, sheet insulation and insulating tape.

II. DEPARTMENT OF TRANSPORTATION INFORMATION
Shipping name: Not classified. Hazard Class: N/A ID # N/A

III. HMIS (0 = minimal hazard; 4 = severe hazard)
Health = 0 Flammability = 1 Reactivity = 0

IV. PRODUCT CONTENT
This product is classified as an "article" according to Title 29 of the Code of Federal Regulations, OSHA Part 1910.1200©. They are formed to a specific shape or design during manufacture, has end use functions dependent upon their shape and design, and does not release any hazardous chemical under normal conditions of use. This product does NOT contain asbestos or polychlorinated biphenyls.

V. HAZARDOUS INGREDIENTS

(Chemical Identity; Common Name)	C.A.S. No.	%	OSHA PEL	ACGIH TVL
None				

VI. PHYSICAL DATA
APPEARANCE AND COLOR: Black, dark gray or white. BOILING POINT (℉): N/A. VAPOR PRESSURE (mm Hg @ 20℃): N/A. VAPOR DENSITY (Air = 1); N/A. SOLUBILITY IN WATER: N/A. SPECIFIC GRAVITY (H_2O=1): N/A. PERCENT VOLATILE BY WEIGHT (30 min.@275℉): N/A. EVAPORATION RATE (Butyl Acetate=1) : N/A. pH: N/A VOC: N/A.

VII. FIRE AND EXPLOSION HAZARD DATA
FLASH POINT: N/A. RANGE: LEL = N/A. UEL = N/A. EXTINGUISHING MEDIA: Water. SPECIAL FIRE FIGHTING PROCEDURES: Protect fire fighters from toxic products of combustion by wearing self-contained breathing apparatus. UNUSUAL FIRE AND EXPLOSION HAZARDS: None.

VIII. HEALTH HAZARD DATA
PRIMARY ROUTE (S) OF ENTRY: N/A. TARGET ORGANS: N/A. EFFECTS OF OVEREXPOSURE: SKIN AND EYES: N/A. INHALATION: N/A. CARCINOGENICITY: NTP: No IARC Monographs: No OSHA Regulated: No. MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE N/A. FIRST AID PROCEDURES: SKIN AND EYES: N/A. INHALATION N/A. INGESTION N/A.

IX. REACTIVITY DATA
STABILITY N/A. INCOMPATIBILITY: N/A. HAZARDOUS DECOMPOSITION PRODUCTS: N/A. HAZARDOUS POLYMERIZATION: N/A.

X. SPILL OR LEAK PROCEDURES
STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED N/A. WASTE DISPOSAL METHOD: Dispose of container and any unused contents in accordance with Federal, State and Local Waste Disposal Regulations

XI. SPECIAL HANDLING AND USE INFORMATION
VENTILATION: N/A. RESPIRATORY PROTECTION N/A. SKIN AND EYE PROTECTION: N/A.

XII. SPECIAL PRECAUTIONS
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE N/A. OTHER PRECAUTIONS: N/A. WORK SITE ENVIRONMENT: N/A.

The information presented herein is supplied as a guide to those who handle or use this product. Safe work practices must be employed when working with any materials. It is important that the end user makes a determination regarding the adequacy of the safety procedures employed during the use of this product.

N/A -not applicable or not available
N/K – none known or not known

PROTO FITTING COVERS

25/50 RATED
PER ASTM E-84 — LoSMOKE® PVC

SUBMITTAL SHEET

Effective: 01/01/15

Submitted Date: _____

PROTO REGULAR PVC
LoSMOKE® PVC JACKETING

PROTO CORP.
10500 47th Street North
Clearwater, FL 33762-5017
Tel: (727) 573-4665
Fax: (727) 572-6823
Toll Free (800) 875-7768

PVC FITTING COVERS, PRE-MOLDED, INSULATED
WHITE GLOSS FINISH — INDOOR OUTDOOR GRADE

SUBMITTAL SHEET DOES NOT SUPERCEDE WRITTEN SPECIFICATIONS OR OWNER AGREEMENT.

DESCRIPTION

The Proto Fitting Cover System consists of one piece and two piece pre-molded high impact LoSMOKE® PVC fitting covers with fiberglass inserts and accessories, which include elbows, tee/valves, end caps, mechanical line couplings, specialty fittings, white and indoor color jacketing, Protop® Tank End Panels, tack fasteners, tapes and specialty items.

APPLICATIONS

The Proto Fitting Cover System is used to insulate mechanical piping systems at fitting locations and provide a PVC jacketing for straight run piping. Both give a quality appearance and have excellent durability.

FEATURES AND BENEFITS

25/50 Rated. All Proto PVC Fittings are made of LoSMOKE® grade PVC. Roll Jacketing is available in either 25/50 rated or regular PVC Grade (not 25/50 rated). The 25/50 products meet fire and smoke safety requirements of federal, state and local building codes.

Excellent Appearance. Bright high-gloss white coloring adds a distinct quality appearance to the system. The standard line of Proto Fitting Covers are made in LoSMOKE® PVC designed for indoor and outdoor use. Virtually all sizes pass 25/50 when made of LoSMOKE® PVC. Colored PVC is manufactured from a LoSMOKE® formula that is suitable for indoor use only.

Easy To Clean. Due to the smooth, high gloss finish on Proto PVC Fittings, the product cleans easily with soap and water. This makes the system ideal for food and drug facilities.

Low Cost Installation. Significant cost savings vs. conventional cement, molded sections, and mitered sections.

Fast and Easy. At fitting locations, wrap the fiberglass insert around the pipe fitting, apply the Proto PVC Fitting over the insert and tack or tape in place. Do not use tacks where a vapor retarder is applied.

Wide Temperature Range. May be used for mechanical piping systems operating from -20°F to +140°F surface temperature of insulation. Variety: LoSMOKE®, Indoor/Outdoor, Exod®, Exotuff®. Proto products are also available in LoSMOKE® Indoor colors. Exod® is CPVC, GOOD TO 225° F.

Long Lasting. Can be used more than once on retrofit projects, general maintenance.

Excellent Thermal Value. K value of .26 at 75°F (.037 W/m °C at 24°C) of fiberglass insert, mean temperature assures better thermal efficiency than conventional cement fittings.

Resistance To Fungi and Bacteria. (ASTM G 21, ASTM G 22) Does not promote growth of fungi or bacteria.

U.V. Resistant. Can be used on indoor or outdoor applications, for both (White) LoSMOKE® PVC and Regular PVC. Extra thick fitting covers should be used outdoors. (All Std. Proto Fitting covers are made of LoSMOKE® PVC.)

TECHNICAL PHYSICAL PROPERTIES OF PVC LoSMOKE® MATERIALS

Specific Gravity (ASTM D-792) 1.41
Tensile Modulus, PSI (ASTM D-638) . . . . . 361,000 (25,380 kg/cm²)
Tensile Strength, PSI (ASTM D-638) 6,011
Flexural Strength, PSI (ASTM D-790) 9,396
Izod Impact (1/4") ft. lb./in (ASTM D-256) 3.7
Heat Deflection Temp. (ASTM D-648) . . . . . 157°F (70°C)
at 264 PSI (8.95 kg/cm²), °F
VICAT Softening Temp. (ASTM D-1525) . . . . . 198°F (92°C)

Water Vapor Transmission
ASTM E 96-95
70°F & 50% Relative Humidity
.015" thick = .058
.020" thick = .047
.030" thick = .027

Surface Burning Characteristics of All Fitting Covers and Jacketing
LoSMOKE® PVC . . . . . passes 25/50 ASTM-E 84
Up to .035" Thk.
Puncture Resistance (ASTM D 781) . . . .006" thick = 178 Beach Units
.015" thick = 221 Beach Units

FEDERAL SPECIFICATIONS COMPLIANCE—

POLY VINYL CHLORIDE — ASTM 1784-92

LP-1035A Type II Grade GU and Type III

LP-535E Type II Grade GU and Type III

United States Department of Agriculture Authorized
Agriculture Canada Authorized
New York City MEA 243-84-M, Chicago, Los Angeles ASTM C-585-76 (sizes)
Canada CAN/CGSB - 51.53-95

TECHNICAL PROPERTIES OF FIBERGLASS INSERT MATERIAL

Thermal Conductivity (ASTM C 177)

Mean Temperature –	°F	"k" — BTU in/hr. Ft.2 °F
HH-I-558 Form B	75° 1(24°C)	.26 (.037 W/m. °C)
Type 1 Class B	150° 1(66°C)	.33 (.048 W/m. °C)
	250° (121°C)	.44 (.063 W/m. °C)

APPLICATION AND SPECIFICATION GUIDELINES

A. STORAGE

Protect cartons from water damage or other abuse. Proto Fitting Cover cartons are not designed for outside storage.

B. PREPARATION

Proto Fitting Covers should be applied on clean, dry surfaces.

C. APPLICATION

1. **General:** The matching fiberglass insert shall be wrapped completely around the metal fitting leaving no voids. Loose wrappings of twine is helpful in shaping difficult surfaces. The Proto Fitting Cover shall then be applied over the fitting and insert, and the throat secured by either tack fastening or taping.

2. **Cold Pipe:** Fitting systems below ambient temperature must have a continuous vapor retarder or vapor retardant mastic as specified by the engineer. When using Proto PVC Tape, a 2" (51mm) minimum downward overlap is recommended for optimum performance. Care should be taken not to stretch the last 2" (51mm) of Proto PVC Tape, to avoid stretching or creeping.

3. **Hot Pipe:** Insulate as per General Instructions given above. Due to PVC softening point at approximately 159°F (70.6°C), care should be taken to ensure sufficient insulation thicknesses are applied.

For hot piping which requires Pipe Insulation over 1 1/2" (38 mm) wall thickness, an extra fiberglass insert shall be applied for each additional inch of pipe insulation wall thickness. Proto recommends the surface temperature of the Pipe Insulation and PVC to be no higher than 125°F (52°C). To complete application of Proto PVC Fittings on hot piping, the throat seam shall be tack fastened or taped. Seal all laps outdoors and in wash down areas.

CAUTION: During initial heat-up to operating temperatures above 350°F, (177°C) an acrid odor and some smoke may be given off as a portion of the bonding material used in the insulation begins to undergo a controlled decomposition. If natural convection is not adequate in confined areas, forced ventilation should be provided in order to protect against any harmful fumes and vapors that might be generated.

4. **Outdoor Pipe:** Insulate as per above instructions.

Minimum Proto PVC Jacketing thickness for outdoor applications should be .030" (.7 mm). Over 15" O.D. through 48", .040 is recommended. Under 3 1/8" O.D., .020 is permitted. The PVC Jacketing shall be overlapped a minimum of 2" (51mm) on the down side so as to shed water. All long and round joints shall be completely weather sealed with chaulk adhesive.

On all piping, insulation shall be of sufficient thickness to keep the surface temperature below 125°F (52°C). Additionally, a slip type expansion joint of 8" (202 mm) minimum width shall be applied at least every 25 lineal feet (6.1 lineal meters) and between fittings.

Painting: Painting must be done only after priming the PVC surface with a suitable primer, such as X-1-M 400W Primer, or a similar, approved product.

Outdoor Painting: Only over White Exotuff® 195°F deflection temp. (modified PVC) or EXOD™225°F deflection temp. CPVC after X-1-M primer, or a similar, approved product. Use PVC compatible paints without strong solvents. Test paint a section before proceeding.

5. **CAUTION:** Fiberglass may cause temporary skin irritation. Wear long-sleeved, loose-fitting clothing, head covering, gloves and eye protection when handling and applying material. Wash with soap and warm water after handling. Wash work clothes separately and rinse washer. A disposable mask designed for nuisance type dusts should be used where sensitivity to dust and airborne particles may cause irritation to the nose or throat.

D. HEAVY INDUSTRIAL APPLICATIONS OUTDOORS

Use .030" or higher PVC Jacketing. Use "heavy duty" two piece fitting covers made from minimum .030" thick to .050" thick PVC sheet depending on size of fitting cover. Jacketing to be cut and oven precurled

E. FIRE TEST RESULTS: PROTO LoSMOKE® — PVC

USA: E-84 25/50 Rated up to .035" thick (The Best Rated PVC)

CANADA: Conforms to CAN 4-S102.2

LoSMOKE® fitting covers conform to virtually all city, state and federal codes, for use in hotel, commercial and industrial buildings.

LoSMOKE® fitting covers will be labeled on the box "Passes ASTM E-84." Flame spread 25; smoke developed 50".

All E-84 ratings shown here were tested on flat sheets from which fitting covers are made.

Virtually all Proto LoSMOKE® fitting covers will pass E-84 25/50 flame spread and smoke development rating requirements.

SUGGESTIONS

Slide Joints: Do not apply PVC Jacketing too tightly. Slide joints plus PVC thickness must work together to prevent cracks and puckering.

Caulk/Adhesives:
Use: Celulon® (Red Devil Inc.) water base "Clear". Service temp. 0°F to +180°F
Use: Celulon® (Red Devil Inc.) water base "White". Service temp. -25°F to +175°F

PVC Cement: Avoid use if possible. Heavy application can cause puckering and cracks. Learn how to use it sparingly.

Vapor Retarder: A vapor retarder is required under all fitting covers for systems operating below ambient temperatures, such as chilled water lines, and is recommended for all outdoor applications. The fitting vapor retarder should provide a continuous seal with the adjacent pipe vapor retarder.

Outdoor Fitting Covers: Use extra thick, plastic heavy duty covers.

Outdoor and Indoor Washdown Areas: Use EXOD™ (CPVC) by Proto, for its higher deflection temperature (225°F). It is light grey.

PVC Outdoor Thickness (Reg. PVC Jacketing): Use .030" thick cut and oven precurled jacketing. Use "heavy duty" plastic fitting covers formed from minimum .030" to .050" thick PVC sheet depending on size of fitting cover. On pipe insulation larger than 15" O.D. use .040" thick PVC.

PVC Indoor Thickness: Use white or indoor color LoSMOKE® on piping. Use .020" thick with standard one piece fitting cover, .030" jacketing can also be used.

Vessels and Tank Tops: Use .050" or .060" thick tank panels for outdoor applications and .030" or .040" for indoor tanks. Use .050" thick Protop® segments for tank heads. (Only Proto Corp. has them.) Made of LoSMOKE® PVC. Proto recommends purchasing Gore Extenders when insulation thickness is 4 inches or greater.

Pipe Insulation End Caps: Use on all outdoor, indoor washdown areas, and all vapor sealed systems. End caps will be PVC, metal, or gasket materials appropriate for the metal pipe temperatures. Silicone rubber (500°F) can be applied (min. 1/16" thick) as an end cap outdoors.

Indoor hot piping need not be sealed to the end cap. Cap will be sealed or taped to the jacket.

Two-Ply Waterproofing System: Use .010" thick PVC with self-sealing long lap tape, as the first waterproof layer. Overlap ends 3" and PVC tape over. Caulk all openings with Celulon® or similar, approved product. The finished jacketing material should employ staggered joints with at least a .010 mil thick first layer. Recaulk again over last layer. Install slide joints every 25', caulk shut all other seams, openings, or end overlaps with PVC tape or caulk. Use vapor seal jacketing (instead of .010" thick PVC first layer) where a vapor seal system is required.

CPVC-High Chemical Resistance and High Deflection Temperature: Use "Exod®" CPVC jacketing and fitting covers for 225°F deflection temperature and maximum chemical resistance. Offered only by Proto Corp. as a substitute for stainless steel.

Regular PVC Jacketing Outdoors: Use regular PVC jacketing outdoors. It is less expensive, does the same job as LoSMOKE® PVC. Regular PVC has very good fire (self-extinguishing) properties — not as good as the LoSMOKE® PVC used in confined people areas (buildings), however much better than common plastics used outdoors.

Vessels with ends 24" O.D. or larger: Use .040" thick jacketing up to 48" O.D. On sides of vessels larger than 48" O.D. See Protop® brochure for instructions requiring a suspended band system, to hang panels from, (Gerrard & Company or equal). Use thick PVC panels on Outdoor Tanks not PVC Roll Jacketing. See Tank Tops above for end segments.

Proto™ Engineered Thermoplastics corp.

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Toll Free (800) 875-7768

PROTO CORPORATION
Jacketing & Fitting Systems

May be used to comply with
OSHA's Hazard Communication Standard,
29 CFR 1910.1200. Standard must be
consulted for specific requirements.

OMB No. 1218-0072

Identity:
(As Used on Label and List)

PROTO JACKETING AND FITTING COVERS

Section I

Manufacturer's Name: PROTO CORP.
Address: 10500 47th Street North, Clearwater, Florida 33762
Emergency Telephone Number: (727) 573-4665
Telephone Number for Information: (727) 573-4665
Date Prepared: **March 26, 2012**

Section II
Hazardous Ingredients/ Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))
OSHA PEL ACGIH TLV Other Limits Recommended % (Optional):
PVC Insulation Jacketing - Rigid PVC (Homopolymer) Compound
Poly (Vinyl Chloride), PVC, Vinyl
Formula: Vinyl Resin* plus functional additives *$(CH_2CH\ CL)_n$
CAS Registry Number: N.A. to compounds
(Product manufactured with Homopolymer Polyvinyl Chloride Resin CAS Registry #9002-86-2)
Formula additives are bound within polymer matrix, similar to rigid PVC water pipe and PVC home siding and are not expected to create any hazard when handled or applied.

Section III
Physical/ Chemical Characteristics

Boiling Point: N.A.
Specific Gravity: (H_2O = 1) 1.42
Vapor Pressure: (mm Hg.): N.A.
Melting Point: N.A.
Vapor Density (AIR = 1): N.A.
Evaporation Rate (Butyl Acetate = 1): N.A.
Solubility in Water: None
Appearance & Odor: Smooth, Hard, No Appreciable Odor

Section IV
Fire and Explosion Hazard Data

Flash Point (Method Used): 753°F ASTM D 1929
Flammable Limits: N.A.
LEL: N.A. **UEL:** N.A.
Extinguishing Media: Water, Carbon Dioxide or Foam

Special Fire Fighting Procedures: Use self-contained breathing apparatus approved for acid vapors. In extreme emergencies where escape is essential, breathe and look through wet cloth covering face, in order to allow the water soaked cloth to absorb HCL generated from PVC burning and decomposing.

Unusual Fire and Explosion Hazards: No explosion hazards exist. HCl liberated during burning sulfuses into the environment as it is generated. Heavy dilution with water is recommended.

N.A. = Not Applicable

Proto corp.
Engineered Thermoplastics

LoSmoke® PVC Jacketing and Fittings
Submittal Sheet

protocorporation.com

DESCRIPTION

The Proto Fitting Cover System consists of one or two piece pre-molded high impact, UV resistant, LoSmoke® PVC fitting covers with or without formaldehyde free fiberglass inserts and accessories. This product line is designed to cover all standard and specialty fittings; which include elbows, tee/valves, end caps, mechanical line couplings, and many more. When combined with our PVC jacketing and solvent welding adhesive or tape, our PVC fitting covers form a completely sealed system that may be used for below ambient applications. Colored PVC is manufactured from a LoSmoke® formula that is suitable for indoor use only.

AVAILABLE FORMS

Thickness: Standard and Heavy Duty

Fitting Covers: 45° and 90° small and long radius, tees, valves, flanges, reducers, end caps, traps, mechanical groove - fittings and many more

Jacketing: PVC rolls and cut and curl are available in thickness ranging from 10 to 40 mil at a 35 1/2" and 48" width

OPERATING TEMPERATURE

PVC: -20° F (-29° C) to 150° F (66° C)
(exposed surface)
Inserts: - 20° F (-29° C) to 1000° F (538° C)

PHYSICAL PROPERTIES

Specific Gravity (ASTMD-792)	1.41	
Tensile Modulus, PSI (ASTMD-638)	361,000 (25,380kg/cm2)	
Tensile Strength, PSI (ASTMD-638)	6,011	
Flexural Strength, PSI (ASTMD-790)	9,396	
IZOD Impact (1/4") ft. lb./in(ASTMD-256)	3.7	
Heat Deflection Temp. (ASTMD-648) @ 264 PSI (8.95 kg/cm2)	157° F (70° C)	
VICAT Softening Temp. (ASTMD-1525)	198° F (92° C)	
Water Vapor Transmission		
ASTM E 96-95	0.015" thick	≤0.058
70°F & 50% Relative Humidity	0.020" thick	≤0.047
	0.030" thick	≤0.027
Tested over code compliant vapor barrier*	0.020" thick	≤0.02
***ASTM C1136@** ≤ 0.02 perms		
ASTM E 84 and CAN/ULC S102	Flame	≤25
Surface Burning Characteristics	Smoke	≤50
Puncture Resistance (ASTMD781)	0.006" thick	178 Beach Units
	0.015" thick	221 Beach Units
Electrical resistance	Non-conductor	

SPECIFICATION COMPLIANCE

ASTM E84	Surface burning characteristics
ASTM E136	Non-combustibility (insert only)
ASTM C-585	Standard dimensions for pipe
ASTM 1784	Specification for rigid PVC
ASTM C1338	Fungi test
ASTM G21 & G22	Fungi and bacteria test
Federal Specification	
LP-1035A	Federal standard PVC - Type II Grade GU
LP-535E	US Army standard PVC - Type II Grade GU
USDA	United States Department of Agriculture
New York City MEA	Toxicity
Canada	
CAN/CGSB – 51.53.95	PVC Jacketing
CAN/ULC S102	Surface burning characteristics
Agriculture Canada	
ICC	International code council
IBC	International building code
IMC	International mechanical code

GREEN BUILDING ATTRIBUTES

Manufacturing Location	Clearwater, FL
Recycled Content	Pre 55+%
CA 1350 - VOC	Pass office and School
Berkeley Analytical	Cert NO 160504 – 10
LEED Credits per V4	Contributes EA, MR, EQ (See Proto LEED credit guide)
RoHS	Heavy metal compliant
DecaBDE ≤0.01%	Pass State of Oregon
Rigid PVC	No plasticizers or phthalates

INSERTS

Formaldehyde free precut fiber glass inserts save time and labor and are an integral part of our LoSmoke PVC fitting system. This 1000° F rated, 1 pcf dense, insulation classified as noncombustible, meets all fungi and corrosion resistance criteria and design requirements of ASHRAE 90.1-10. The product is designed to be installed using one insert per each inch of installed pipe insulation thickness.

Specification compliance:

ASTM C553, ASTM C547, C665, C1338, C1617, C795, ASTM E84, ASTM E136
ASHRAE 90.1
ASTM E84 & CAN ULC S102
GREENGUARD: Gold
Recycled content: 53% pre and post consumer content
Decabrom free

INSERT COMPRESSED THERMAL CONDUCTIVITY

Mean Temperature		K value	
F°	**C°**	**BTU in/sq ft hr F**	**W/M C**
75	24	0.23	0.033
150	66	0.27	0.039
300	40	0.4	0.058

APPLICATION FOR USE

Storage:

Protect cartons from water damage or other abuse. Proto cartons are not designed for outside storage.

Preparation:

Proto fitting covers and inserts should be applied on a clean, dry surface.

Above ambient – General installation:

A Proto fiberglass insert shall be wrapped completely around the metal fitting leaving no voids or open spaces. A loose wrapping of twine or tape may be helpful to hold insulation in place. The Proto Fitting Cover shall then be applied over the insert, and secured by using serrated stainless steel tacks or by taping.

Cold pipe:

Fitting systems below ambient temperature must have a continuous vapor retarder or vapor retardant mastic as specified by the engineer. When using Proto PVC Tape, a 2" (51mm) minimum downward overlap is recommended for optimum performance. Care should be taken not to stretch the last 2" (51mm) of Proto PVC Tape, to avoid stretching or creeping.

Hot system:

Use proper insulation thickness to ensure PVC covers are kept below 150°F (66°C). PVC jackets and fitting covers should be kept away from direct contact or exposure to radiated heat. For conditions where operating temperatures exceed 250°F (121°C) or where pipe insulation thickness is greater than 1" (25.4mm), two or more layers of insulation inserts are required beneath the fitting cover.

Refrigerant Systems and/or Cold Systems In Severe Ambient Conditions:

An intermediate layer of low perm facing or vapor-compatible mastic with PVC is required to completely seal the insulation prior to installing the PVC fitting cover. Vapor barrier mastic should be applied between the pipe insulation and the insert, fitting cover, throat of the fitting cover, and overlap seam.

Totally Sealed Systems (USDA):

20 mil (0.5 mm) minimum LoSmoke PVC jacketing should be applied to pipe insulation in conjunction with LoSmoke PVC fitting covers. Circumferential and longitudinal jacketing and fitting cover seams should be sealed with solvent welding adhesive. Circumferential seams should be a minimum of 1 ½" - 2" (38mm to 51mm) overlap and longitudinal seams should be 1½"- 2" (38mm to 51mm) overlap (with 6-8 inches for expansion joints). All seams should visually be checked for seal and, if necessary, repaired. Slip joints will be required between fixed supports and on continuous long runs of straight piping.

Outdoors (for white only):

Proto PVC Jacketing thickness for outdoor applications should be a minimum of 0.030" (0.8 mm) and 0.040"(1.0 mm) for any O.D. over 15". The PVC Jacketing shall be overlapped a minimum of 2" (51 mm) on the down side so as to shed water. All longitudinal and circumferential joints shall be completely weather sealed with caulk adhesive. Additionally, a slip type expansion joint of 8" (202 mm) minimum width shall be applied at least every 25 lineal feet (6.1 lineal meters) and between fittings.

10500 47th Street North, Clearwater, FL 33762-5017
Toll Free: (800) 875-7768 | Office (727) 573-4665 | Fax: (727) 572-6823 | www.Protocorporation.com

ITW INSULATION SYSTEMS

ALUMINUM ROLL JACKETING (cladding)

DESCRIPTION

ITW Pabco/Childers Aluminum Jacketing is the premier protective outer surface for mechanical insulation systems including pipe, vessels, and equipment. It protects the insulation and underlying pipe/vessel from physical damage, UV exposure, corrosive atmospheres, and water.

ITW Aluminum jacketing (also called cladding) is available in smooth, stucco embossed, and 3/16 corrugated (cross-crimped) finishes. For larger surfaces, box-rib and deep corrugated sheets are also available.

ITW Aluminum Jacketing has a bare outer surface and comes standard with a 3-mil thick polyfilm moisture barrier heat-laminated to the interior surface to help prevent corrosion of the jacketing and the underlying metal pipe, vessel, or equipment.

COMPOSITION

Commercially pure aluminum is relatively soft and less suited for use in this application. Its strength can be greatly improved by alloying with small percentages of one or more other elements such as manganese, silicon, copper, zinc, and magnesium. Additional strength can be achieved by cold working. ITW Insulation Systems carefully screens all potential aluminum coil suppliers to assure our products have the highest quality, are corrosion resistant, and comply with all relevant standards.

ITW Aluminum Jacketing is typically manufactured using alloys 3105 or 3003 which have very similar composition and performance and are considered interchangeable for use as insulation jacketing. ITW reserves the right to ship whichever alloy is in stock at the time of order placement. One of these two specific alloys or an alternative alloy can be specified by purchaser at time of order placement but this may affect minimum quantity, lead-time, and price.

Composition Differences in Aluminum Alloys (%)

Alloy	Cu	Mn	Mg	Zn
3105	≤ 0.3	0.3-0.8	0.2-0.8	≤ 0.4
3003	0.05-0.2	1-1.5	---	≤ 0.1

COMPLIANCE TO STANDARDS

All bare and polyfilm lined Aluminum Jacketing from ITW Insulation Systems complies with the requirements of ASTM C1729 (Aluminum Jacketing Material Standard) which includes the strength and chemical composition requirements for compliance to ASTM B209 (Aluminum Alloy Standard).

RECOMMENDED USES

Aluminum Jacketing is recommended for use in all of the following insulation system applications:

- Standard outdoor use on all pipe, vertical tank insulation systems up to 8 ft outer diameter, and all horizontal tanks
- Indoor insulation system applications up to 8 ft outer diameter where increased damage resistance is desired

LIMITATIONS ON USE

Aluminum Jacketing is not appropriate for the following applications:

- For vertical tank insulation system applications where the outer diameter is larger than 8 ft, ITW deep corrugated aluminum sheets should be used
- Where increased emissivity is desired, painted aluminum jacketing should be considered
- For applications where a maximum resistance to fire is required, stainless steel jacketing should be used
- For applications where additional resistance to corrosion from the external environment is required, ITW painted aluminum jacketing may be used. Where maximum resistance to corrosion is required, ITW stainless steel jacketing (T304 or T316) should be used.

POLYFILM MOISTURE BARRIER

Polyfilm Moisture Barrier (PFMB) is an engineered three layer coextruded film of polyethylene and Surlyn* polymers with a total film thickness of 3 mils (76 µm) that is heat laminated in the factory to the interior surface of aluminum jacketing. ITW recommends the use of PFMB on all aluminum jacketing to help prevent pitting, crevice, and galvanic corrosion of the interior surface of the metal jacketing and the insulated pipe, tank, or equipment.

Due to its superior performance characteristics, PFMB replaces the old moisture barrier technology of 1 to 3 mil thick polykraft

*Trademark of DuPont

ALUMINUM ROLL JACKETING (cladding)

RECOMMENDED THICKNESS

ITW recommends that the thickness of aluminum jacketing used vary based on the outer diameter of the insulation system per the requirements of ASTM C1729. This recommended thickness is shown in the table below.

EMITTANCE

ITW Aluminum Jacketing has an outer surface emittance per ASTM C1371 and specified by ASTM C1729 of:

- Bare aluminum (oxidized in service) = 0.1

SURFACE FINISHES

Each of the three surface finishes available for ITW Aluminum Jacketing (smooth, stucco embossed, and 3/16" corrugated has applications where it is recommended. All of these can be supplied with a painted exterior. For more information on this, consult the ITW data sheet on painted aluminum jacketing.

Smooth (Plain Mill) Finish
This is a very popular finish and is the "default" for the many end-users/specifiers who prefer the clean look of this finish. This finish sheds rain water the best. However, this smooth surface readily shows damage such as from hail or other physical abuse. It is also shows the dirt more than the other finishes due to its smoothness. Lastly, it is highly reflective of sunlight and when located near roadways, some specifiers see this reflection as a possible safety hazard.

Stucco Embossed Finish
This is another popular finish used for aluminum jacketing. The stucco-like surface texture hides small imperfections and scratches caused by physical damage during or after installation. This finish also reduces reflectivity while still looking very professional. Lastly, the use of stucco embossed finish provides a small increase to the rigidity and strength of the aluminum jacketing.

3/16" Corrugated (Cross-Crimped) Finish
This finish consists of parallel grooves or crimps about 3/16" apart running in the length direction of the pipe. This finish also hides small damage and scratches to the jacketing and reduces sunlight reflection. In addition, the nature of this finish gives the aluminum jacket more ability to expand and contract to adapt to insulation movement caused by pipe or ambient temperature changes. Lastly, the rigidity and strength of 3/16" corrugated finish is substantially increased making it ideal for use as jacketing on large diameter pipe and vessels up to 8 ft diameter. This finish is available in a maximum thickness of 0.024 inches.

FLAMMABILITY

ITW Aluminum Jacketing with a 3 mil polysurlyn moisture barrier has been tested for flammability using the industry standard ASTM E84 test method. The results were:

ASTM E84 Flame Spread Index = 0
ASTM E84 Smoke Developed Index = 5

(Tested with exterior metal surface exposed to the flame)

Outer Insulation Diameter (in)	Minimum Aluminum Jacket Thickness, inches (mm)	
	Rigid Insulation	Non-Rigid Insulation
≤ 8	0.016 (0.41)	0.016 (0.41)
Over 8 thru 11	0.016 (0.41)	0.020 (0.51)
Over 11 thru 24	0.016 (0.41)	0.024 (0.61)
Over 24 thru 36	0.020 (0.51)	0.032 (0.81)
>36	0.024 (0.61)	0.040 (1.01)

ITW INSULATION SYSTEMS

ALUMINUM ELBOW COVERS

DESCRIPTION

ITW Insulation Systems Aluminum Elbow Covers are made in two precision formed matching halves to cover and weatherproof insulated 45° and 90° pipe elbows. These elbow covers are also known under the ITW Pabco and Childers brand names as Sure-Fit and Ell-Jacs, respectively.

Like ITW Aluminum Jacketing, Aluminum Elbow Covers are a premier protective outer surface for mechanical insulation systems on pipe and are an excellent performing and critical accessory to compliment the aluminum jacketing. ITW Aluminum Elbow Covers protect the insulation and underlying pipe/tank from physical damage, UV exposure, corrosive atmospheres, and water and reduce the labor necessary to install the metal jacketing system.

The ITW standard Aluminum Elbow Covers have a gold colored acrylic or polyester painted moisture barrier on the interior surface to help reduce interior surface corrosion. They also have a factory applied and baked on finish of highly durable hard film clear acrylic or polyester paint on the exterior surface to help resist external corrosion and to raise the emittance.

The special paints used on the interior and exterior of ITW Aluminum Elbow Covers are chalk and fade resistant. They exhibit better resistance to oxidation and to the effects of various corrosive environments than bare aluminum jacketing. This painted surface also resists water and fingerprint staining.

COMPOSITION

ITW Aluminum Elbow Covers are made from the commercially pure (>99% aluminum) and highly corrosion resistant 1100 aluminum alloy.

The performance of even commercially pure aluminum can be improved by alloying with small percentages of one or more other elements such as silicon, iron, copper, manganese, and zinc. ITW Insulation Systems carefully screens all potential aluminum coil suppliers to assure our products have the highest quality, are corrosion resistant, and comply with all relevant standards.

Composition of Aluminum 1100 Alloy (max %)

Alloy	Si + Fe	Cu	Mn	Zn
1100	0.95	0.05-0.20	0.05	0.1

SIZE SELECTION AND INSTALLATION

For details on ITW Aluminum Elbow Cover sizes, their fit on insulation, and installation, see the ITW data sheet on Aluminum Elbow Sizes and Installation.

FIT

ITW Aluminum Elbow Covers are available to fit:

- 45° and 90° pipe elbows
- Long or short radius pipe elbows
- Butt weld, socket weld, and screwed elbows
- Insulated pipe from ½" to 12" NPS*

*ITW Aluminum Elbow Covers are available for some insulation thicknesses at NPS > 12". Not all combinations of NPS, insulation thickness, radius, and elbow angle are available. See your ITW sales representative for details.

THICKNESS

ITW Aluminum Elbow Covers are 0.024" in thickness to allow the elbows to be formed in the press.

RECOMMENDED USES

ITW Aluminum Elbow Covers are recommended for use anywhere aluminum jacketing is used on the associated straight sections of pipe.

ITW INSULATION SYSTEMS

ALUMINUM ELBOW COVERS

LIMITATIONS ON USE

ITW Aluminum Elbow Covers are not appropriate for the following applications:

- For applications where a maximum resistance to fire is required, stainless steel elbow covers should be used
- Where maximum resistance to corrosion is required, ITW stainless steel elbow covers should be used.

MOISTURE BARRIER

ITW Aluminum Elbow Covers have a painted moisture barrier on the interior surface. When coupled with the ultrapure 1100 alloy used in these elbows, this moisture barrier helps to prevent pitting/crevice and galvanic corrosion of the interior surface of the elbow cover and the underlying pipe.

EMITTANCE OF ALUMINUM ELBOWS

ITW Aluminum Elbow Covers have an outer surface emittance as measured by ASTM C1371 and specified by ASTM C1729 of:

- Standard clear coated = 0.5
- White painted = 0.8
- Bare aluminum (oxidized in service) for comparison = 0.1

FLAMMABILITY

ITW Aluminum Jacketing with a 3 mil polysurlyn moisture barrier has been tested for flammability using the industry standard ASTM E84 test method. The results are shown below. ITW would expect Aluminum Elbow Covers to have flammability performance as good as or better than our aluminum jacketing since the elbows have no organic film present.

ASTM E84 Flame Spread Index = 0
ASTM E84 Smoke Developed Index = 5

(Tested with exterior metal surface exposed to the flame)

SURFACE FINISHES

Due to the pressing process during elbow formation, ITW Aluminum Elbow Covers have a smooth (mill) finish.

COMPLIANCE TO STANDARDS

All Aluminum Elbow Covers from ITW Insulation Systems comply with the applicable requirements of ASTM C1729 (Aluminum Jacketing Material Standard), Type III, Grade 3, Class D, which includes the strength and chemical composition requirements for compliance to ASTM B209 (Aluminum Alloy Standard).

EXTERIOR COLORS

The standard exterior color for ITW Aluminum Elbow Covers is a clear paint which reveals the natural aluminum color. ITW Aluminum Elbow Covers are also available via special order with a white or gray painted exterior surface to match the colors of our standard painted aluminum jacketing or other colors.

SEALING OF JOINTS

For best insulation system performance and resistance to water infiltration, ITW recommends that all joints in Aluminum Elbow Covers be sealed with an appropriate joint sealant. This should be applied between the overlapping pieces of metal in the joint and not as a caulking bead on the exterior lip of the joint.

ITW INSULATION SYSTEMS

August 10, 2015
Revised: August 08, 2018

Metal Jacketing Article Notification and SDS Policy

On November 25, 1985, the OSHA "Right-to-Know" law, section 29 CFR 1910.1200(c), took effect nationally. This law is intended to provide the industrial work force with information concerning "hazardous materials" on both product labels and Safety Data Sheets (SDS). Further, 29 CFR 1910.1200(b) (6) (v), provides that the regulation does not apply to articles.

Aluminum and stainless-steel jacketing, sheets, rolls, strapping, tie-wire, seals, springs, and fitting covers are considered "articles" under the law and, therefore, do not require an SDS. "Articles" are defined as a "manufactured item: (1) which is formed to a specific shape or design during manufacturing, (2) which has end use functions dependent in whole or in part upon its shape of design during end use, and (3) which does not release, or otherwise result in exposure to a hazardous chemical under normal conditions of sale."

The above listed ITW Insulation Systems aluminum and stainless-steel products present no health hazard in their natural state during use, storage, and transportation. OSHA only considers aluminum and stainless steel "hazardous" when in fume or dust form. Our aluminum and stainless-steel products have no fumes or dust associated with them since they are manufactured and used in roll/sheet or final part form.

Please keep this letter available, in lieu of an SDS, as evidence of the above exemption.

If you have any questions concerning our SDS policy, please feel free to contact us at (800) 231-1024 or (713) 691-7002.

Armaflex®
520 BLV Adhesive

Fiber Free

A black, low VOC air-drying contact adhesive that is excellent for joining seams and butt joints of Armaflex Pipe and Sheet Insulations

- Formulated for Armaflex Insulations
- Developed to meet SCAQMD RULE 1168
- Hexane-free, Toulene-free, contact adhesive
- Proven: no gapping, no tape needed

armacell
advanced insulation

U.S. GREEN BUILDING COUNCIL MEMBER

Technical Data: Armaflex 520 BLV Adhesive

Description:

A black, low VOC air-drying contact adhesive that is excellent for joining seams and butt joints of Armaflex Pipe and Sheet Insulations

Specifications Compliance:

Meets South Coast Air Quality Management District (SCAQMD) Rule 1168

Approvals, Certifications, Compliances:

• All Armacell facilities in North America are ISO 9001:2008 certified.

Typical Properties

Specifications:	Values	
Color:	Black	
Net Weight:	6.9 pounds per gallon (828 g/l)	
Composition:	Synthetic rubber base with synthetic resins and fillers added; hydrocarbon- and ketone-type solvents.	
Volatile Organic Compounds (VOC) Content:	Zero V.O.C. g/l calculated SCAQMD 1168	
Solids Content	Approximately 30% by weight	
Coverage	200 sq ft (5m2/l) per gallon max, single coat (depending upon porosity of materials bonded and air temperature)	
Shelf Life	2 years in original sealed container; storage temperature 60°F to 80°F (16°C to 27°C)	
Minimum Drying Time	3–5 minutes under normal conditions	
Temperature Limits	250°F (120°C) – Armaflex Pipe Insulation seams and joints	
Container Sizes	Pint brush-top cans and gallon containers	
Fire Performance	Wet: Flash point below -4°F (-20°C) (TOC) Dry: ASTM E 84 Method* Applied on steel plate Flame Spread Index: 5 Smoke Developed Index: 15	
Flame Spread and Smoke Developed Index:	25/50 rated	ASTM E 84
Application Temperature:	Recommended above 40°F (4°C); Not recommended below 32°F (0°C)	

ARMACELL LLC
TEL: 800.866.5638
FAX: 919.304.3847
info.us@armacell.com
www.armacell.us
7600 Oakwood Street Extension, Mebane, NC 27302

armacell
advanced insulation

SAFETY DATA SHEET

SECTION 1 – IDENTIFICATION

Manufacturer's name and address:

Armacell LLC
P.O. Box 839
7600 Oakwood Street Extension
Mebane, NC 27302
USA

Supplier's name and address:

Refer to Manufacturer

Information Telephone No.	:	(919) 304-3846
Website Address	:	http://www.armacell.us
24 Hr Emergency Telephone #	:	**CHEM-TEL: 1-800-255-3924 OR 1-813-248-0585 (call collect)**
Product Identifier	:	**Armaflex® 520 Adhesive**

Chemical Name	:	N/Ap	Chemical Family	:	Mixture
Chemical Formula`	:	N/Ap	Trade Name/Synonyms	:	Armaflex 520
Molecular Weight	:	N/Ap	Material Use	:	Solvent dispersed synthetic rubber and resin adhesive.
			Uses Advised Against	:	No information available.

HMIS Rating : * - Chronic Hazard 0 - Minimal 1 – Slight 2 – Moderate 3 – Serious 4 – Severe

Health: *2 *Flammability* 3 *Reactivity* 0

SECTION 2 – HAZARDS IDENTIFICATION

GHS Classification per 29 CFR 1910.1200 (OSHA HCS 2012) and HPR (WHMIS 2015)

Flammable liquids; Category 2
Skin corrosion/irritation; Category 2
Serious eye damage/eye irritation; Category 2A
Reproductive toxicity; Category 2
Specific target organ toxicity, single exposure; Narcotic effects; Category 3
Sensitization, Skin; Category 1
Specific target organ toxicity, repeated exposure; Category 2
Aspiration hazard; Category 1

GHS Pictograms

Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor.
Causes skin irritation.
Causes serious eye irritation.
Suspected of damaging fertility or the unborn child via inhalation.
May cause drowsiness or dizziness.
May cause an allergic skin reaction.
May be fatal if swallowed and enters airways.
May cause damage to organs <Central Nervous System, Peripheral Nervous System, Auditory System, and Eyes> through prolonged or repeated exposure.

Precautionary Statements

Obtain special instructions before use. (See Section 7.) Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. — No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/…/equipment. Use only non-sparking tools. Take precautionary measures against static discharge. In case of fire: Use fire extinguishers suitable for Classes B, C, or E for extinction. Do not breathe vapors. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection. Wash hands and exposed skin thoroughly after handling. Wash contaminated clothing before reuse. Store in a well-ventilated place. Keep cool. Store locked up. Dispose of contents / container in accordance with federal, state, and local laws. Do not allow product to enter drains.

Hazards Not Otherwise Classified

Vapor may cause flash fire! May be an aspiration hazard. Aspiration may occur during swallowing or vomiting, resulting in lung injury. In case of ingestion, do not induce vomiting.

% With Unknown Acute Toxicity : 5% by weight of this product is comprised of ingredients with unknown acute toxicity.

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	CAS #	% (by weight)
Acetone	67-64-1	30.00 – 60.00
Hexanes	110-54-3	10.00 – 30.00
Toluene	108-88-3	10.00 – 30.00
p-tert-Butylphenol formaldehyde resin	25085-50-1	5.00 – 10.00

The exact percentages of the ingredients have been withheld by the manufacturer as trade secrets.

SECTION 4 – FIRST AID MEASURES

General : IF exposed or concerned: Get medical advice/attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms: call a doctor/physician.

Skin contact : Remove/Take off immediately all contaminated clothing. Flush affected skin with gently flowing lukewarm water for at least 20 minutes. Seek immediate medical attention/advice.

Eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

Ingestion : Rinse mouth. Do NOT induce vomiting. Call a POISON CENTER or doctor/physician if you feel unwell.

Notes for Physician : Treat symptomatically.

Signs and symptoms of short-term (acute) exposure

Inhalation : May cause irritation to the nose, throat, and respiratory tract. Inhalation of high concentrations may cause CNS effects such as nausea, headache, dizziness, fatigue, unconsciousness, and coma. May cause motor incoordination and speech abnormalities. Breathing high concentrations of this material, for example in an enclosed space or by intentional abuse, can cause irregular heartbeats which can cause death.

Skin : May cause moderate skin irritation. Product may be absorbed through the skin, producing effects similar to inhalation or ingestion. Allergic skin reaction (non-

photo-induced): Symptoms may include redness, swelling, blistering, and itching.

Eyes : Direct contact will cause moderate to severe irritation to the eyes. Symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Ingestion : May cause irritation to the mouth, throat, and stomach. Symptoms may include abdominal pain, nausea, vomiting, and diarrhea. This material can get into the lungs (aspiration) during swallowing or vomiting. Small amounts in the lungs can cause chemical pneumonitis, possibly leading to chronic lung dysfunction or death.

Effects of long-term (chronic) exposure

: Chronic exposure may cause drying, cracking, and defatting of the skin. Chronic effects of ingestion and subsequent aspiration into the lungs may cause pneumatocele (lung cavity) formation and chronic lung dysfunction. Prolonged occupational overexposure to solvents may cause irreversible brain and nervous system damage (sometimes referred to as “Solvent or Painter’s Syndrome”). Intentional misuse by intentionally concentrating and inhaling the vapors from this product may be harmful or fatal. Toluene, a component of this product, may cause harm to the human fetus, based on tests with laboratory animals. Long term overexposure to Toluene has been associated with peripheral neuropathy (damage to the nerves of the hands and feet), liver effects, kidney effects, impaired color vision and hearing damage.

Indication of need for immediate medical attention or special treatment

: Difficulty breathing persists after removing the person to fresh air.
Any exposure to the eye which causes irritation.
Ingestion.

SECTION 5 – FIRE FIGHTING MEASURES

Suitable extinguishing media : Carbon dioxide, dry chemical powder, appropriate foam or water fog.

Unsuitable extinguishing media : water jet

Hazardous combustion products : Carbon oxides; Hydrocarbons; Aldehydes; Hydrogen chloride gas; other unidentified organic compounds.

Special fire-fighting procedures/equipment

: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. Move containers from fire area if safe to do so. Water spray may be useful in cooling equipment exposed to heat and flame. After fires have been extinguished, carefully clean all equipment and surfaces exposed to fumes.

Environmental precautions : Do not allow material to enter drains or contaminate ground water system.

Fire hazards/conditions of flammability

: Highly flammable liquid. Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure. Vapors may be heavier than air and may collect in confined and low-lying areas. Vapor can travel considerable distance and flashback to a source of ignition. Material will float on water and can be re-ignited at the water’s surface. Static discharge may ignite this product’s vapors.

Flammability classification (OSHA 29 CFR 1910.1200 and WHMIS 2015)

: Flammable Liquid, Category 2.

Flammability classification (NFPA)

: Flammable Liquid Class 1B.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal precautions : Restrict access to area until completion of clean-up. All persons dealing with clean-up should wear the appropriate chemically protective equipment. Refer to Section 8 on this Safety Data Sheet, EXPOSURE CONTROLS /

PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

Environmental precautions : Do not allow product to enter waterways. Do not allow material to contaminate ground water system.

Spill response / clean-up : Ventilate area of release. Eliminate all ignition sources. Stop spill or leak at source if safely possible. Use non-sparking tools to contain and absorb spilled liquid with non-combustible, inert absorbent material (e.g., sand), then place absorbent material into a container for later disposal (see Section 13.) Do not flush into surface water or sanitary sewer system. Notify the appropriate authorities as required.

Incompatible materials : See Section 10.

Special spill response procedures

: If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8002).

US CERCLA Reportable quantity (RQ):Hexane (5000 lbs / 2270 kg); Acetone (5000 lbs / 2270 kg); Toluene (1000 lbs / 454 kg).

SECTION 7 – HANDLING AND STORAGE

Special Instructions : HIGHLY FLAMMABLE LIQUID AND VAPOR. May cause flash fire. Keep away from fire, sources of heat, or sources of electrical discharges. Aspiration Hazard – may enter lungs and cause damage. If ingested, do not induce vomiting. Inhaling fumes may cause dizziness, drowsiness, nausea, headaches, and/or other Central Nervous System (CNS) symptoms. Contains a material that may cause peripheral nervous system damage. Breathing high concentrations can cause irregular heartbeats which may be fatal. Developmental hazard - Contains Toluene, which may cause birth defects or other reproductive harm. Avoid breathing vapors.

Safe handling procedures : Wear chemically resistant protective equipment during handling. Use in a well-ventilated area. Training the workers on the potential health hazards associated with product vapor is important. Do not breathe vapors. Avoid contact with skin, eyes and clothing. Keep away from heat and sources of ignition. Keep away from oxidizing materials. Keep containers tightly closed when not in use. Wash hands and exposed skin thoroughly after handling. Containers of this material may be hazardous when empty, since they retain product residues (vapors, liquid).

Storage requirements : Store in a cool, dry, well-ventilated area. No smoking in the area. Do not store near any incompatible materials (see Section 10). Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Protect against physical damage.

Incompatible materials : See Section 10.

Special packaging materials : Always keep in containers made of the same materials as the supply container.

SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

Permissible exposure levels : No exposure limits have been established for the product itself. Below are exposure limits for the components in the product.

Ingredients	CAS #	ACGIH TLV		OSHA PEL	
		TWA	STEL	PEL	STEL
Acetone	67-64-1	500 ppm	750 ppm	1000 ppm TWA 2400 mg/m^3 TWA	N/Av
Hexanes	110-54-3	50 ppm	N/Av	500 ppm 1800 mg/m^3	N/Av
Toluene	108-88-3	20 ppm	N/Av	200 ppm	300 ppm (10 min)

p-tert-Butylphenol formaldehyde resin	25085-50-1	N/Av	N/Av	N/Av	N/Av

Ventilation and engineering measures

: Use with adequate ventilation. Provide adequate cross air circulation. Use explosion-proof general or local exhaust ventilation to maintain air concentrations below recommended exposure limits.

Respiratory protection : Respiratory protection is required if the concentrations exceed the TLV. If the TLV is exceeded, wear a NIOSH/MSHA-approved organic vapor respirator.

Skin protection : Impervious gloves must be worn when using this product. Glove materials such as nitrile rubber or Viton (fluorocarbon rubber) are recommended. Advice should be sought from glove suppliers regarding the glove's breakthrough time for the ingredients listed in Section 3.

Eye / face protection : Chemical goggles are recommended. A full face shield may also be necessary.

Other protective equipment : Full chemical-resistant protective clothing should be used whenever splashing is anticipated. An eyewash station and safety shower should be made available in the immediate working area.

General hygiene considerations : Avoid contact with eyes, skin and clothing. Do not breathe vapors. Do not eat, drink or smoke when using this product. Clean all equipment and clothing, and shower with mild soap and water at end of each work shift.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Physical state	: liquid	**Appearance**	: yellow liquid.
Odor	: Characteristic solvent odor		
Odor threshold	: N/Av	**pH**	: N/Ap
Specific gravity	: approx. 0.83	**Boiling point**	: > 133°F (>56.5°C)
Coefficient of water/oil distribution	: N/Av	**Melting/Freezing point**	: N/Av
Solubility in water	: negligible	**Vapor pressure (mm Hg @ 20°C / 68°F)**	: 180
Evaporation rate (*n*-Butyl acetate = 1)	: N/Av	**Vapor density (Air = 1)**	: N/Av
Volatiles (% by weight)	: 80 – 82	**General information**	: N/Av
Volatile organic compounds (VOCs)	: 615 g/L (Calculated, SCAQMD Rule 1168)		
Particle size	: N/Av	**Flammability classification (GHS)**	: Flammable Liquid Cat. 2
Flash point	: -15°F (-26°C)	**Lower flammable limit (% by vol)**	: Not available
Flash point method	: Setaflash closed	**Upper flammable limit (% by vol)**	: Not available
Auto-ignition temperature	: N/Av	**Decomposition temperature**	: Not available
Viscosity	: Not available	**Oxidizing properties**	: Not available

Explosion data: Sensitivity to mechanical impact / static discharge

: Not expected to be sensitive to mechanical impact. Static discharge could ignite the vapors of this product.

SECTION 10 – REACTIVITY AND STABILITY INFORMATION

Stability and reactivity : Stable under the recommended storage and handling conditions prescribed.

Hazardous polymerization : Hazardous polymerization does not occur.

Conditions to avoid : Keep this product away from heat, sparks, flame, and other sources of ignition (e.g., pilot lights, electric motors, static electricity).

Materials to avoid and incompatability

: Strong oxidizing agents; Reducing agents; Acids, Bases.

Hazardous decomposition products

: None known, refer to hazardous combustion products in Section 5.

SECTION 11 – TOXICOLOGICAL INFORMATION

Target organs : Central Nervous System (CNS); Eyes; Skin; Kidneys; Lungs; Liver; Heart.

Routes of Exposure : *Inhalation:* YES *Skin Absorption:* YES *Skin and Eyes:* YES *Ingestion:* YES

Toxicological data : See below for individual ingredient acute toxicity data.

Ingredients		LC50 (4 hr) Inhalation, rat, mg/L	LD50 Oral, rat, mg/kg	LD50 Dermal, rabbit, mg/kg
Acetone	67-64-1	50.1	5800	20000
Hexane	110-54-3	31.86	16000	> 2000
Toluene	108-88-3	12.5	636	8390
p-tert-Butylphenol formaldehyde resin	25085-50-1	N/Av	N/Av	N/Av

Calculated Acute Toxicity Estimates for the Product

Inhalation : > 25 mg/L

Oral : > 2000 mg/kg

Dermal : > 4000 mg/kg

Carcinogenic status : No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.

Reproductive effects : Contains Toluene. Toluene may cause fetotoxic effects at doses which are not maternally toxic, based on animal data.

Germ Cell Mutagenicity : None known.

Epidemiology : Not available.

Sensitization to material : This product contains a component known to cause allergic skin sensitization reactions.

Synergistic materials : N/Av

Irritancy : Severe eye irritant. Moderate irritant for respiratory system and skin.

Other important hazards : See Section 2 for additional information.

SECTION 12 – ECOLOGICAL INFORMATION

Environmental effects : The product should not be allowed to enter drains or water courses, or be deposited where it can affect ground or surface waters.

Important environmental characteristics

: No data is available on the product itself.

Ecotoxicological : No data is available on the product itself.

Ecotoxicity : No data available.

Biodegradability : No data available.

Bioaccumulative potential : No data available.

Mobility in soil : No data available.

PBT and vPvB assessment : No data available.

Other adverse effects : No data available.

SECTION 13 – DISPOSAL CONSIDERATION

Handling for disposal : Handle waste according to recommendations in Section 7. Empty containers retain residue (liquid and/or vapor) and can be dangerous. Do not cut, weld, drill or grind on or near this container.

Methods of disposal : Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.

RCRA : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste

identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

SECTION 14 – TRANSPORTATION INFORMATION

Regulatory Information	UN Number	Shipping Name	Class	Packing Group	Label
TDG	**UN 1133**	**ADHESIVES containing flammable liquid (Acetone, Hexane)**	**3**	**II**	
TDG Additional Information	**May be shipped as Limited Quantity when transported in containers no larger than 5.0 Litres; in packages not exceeding 30 kg gross mass. Refer to TDG Part 1: 1.11, 1.17, 1.33; and Schedule 1.**				
49 CFR/DOT	**UN 1133**	**ADHESIVES containing flammable liquid (Acetone, Hexane)**	**3**	**II**	
49 CFR/DOT Additional Information	**May be shipped as Limited Quantity when transported in containers no larger than 5.0 Litres; in packages not exceeding 30 kg gross mass. Refer to 49 CFR 173.150(b) and Special Provision 149.**				

SECTION 15 – REGULATORY INFORMATION

Canadian Information:

This product has been classified according to the hazard criteria of the Hazardous Products Regulations (HPR). This SDS contains all of the information required by the HPR.

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

US Federal Information:

TSCA: All listed ingredients appear on the Toxic Substances Control Act (TSCA) inventory.

CERCLA Reportable Quantity (RQ) (40 CFR 117.302): Hexane (5000 lbs / 2270 kg); Acetone (5000 lbs / 2270 kg); Toluene (1000 lbs / 454 kg).

SARA TITLE III: Sec. 302, Extremely Hazardous Substances, 40 CFR 355: No Extremely Hazardous Substances are present in this material.

SARA TITLE III: Sec. 311 and 312, MSDS Requirements, 40 CFR 370 Hazard Classes:

Fire hazard

Acute hazard

Chronic hazard.

SARA TITLE III: Sec. 313, Toxic Chemicals Notification, 40 CFR 372: This product may be subject to SARA notification requirements, since it contains Toxic Chemical constituents above de minimus concentrations. This product contains: Hexane; Toluene.

U.S. State Right To Know Laws

California Proposition 65: Warning! This product contains a chemical known to the State of California to cause developmental harm. This product contains: Toluene.

Other State Right to Know Laws:

On State RTK List?	CAS No.	CA	MA	MN	NJ	NY	PA	RI
Acetone	67-64-1	YES	YES	YES	YES	YES	YES	YES
Hexane	110-54-3	YES	YES	YES	YES	YES	YES	YES
Toluene	108-88-3	YES	YES	YES	YES	YES	YES	YES

SECTION 16 – OTHER INFORMATION

HMIS Rating : * - Chronic Hazard 0 - Minimal 1 – Slight 2 – Moderate 3 – Serious 4 – Severe

Health: *2 *Flammability* 3 *Physical Hazard:* 0

Legend : ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Services
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
CNS: Central Nervous System
DOT: Department of Transportation
DSL: Domestic Substances List
EPA: Environmental Protection Agency
GHS: Globally Harmonized System
IARC: International Agency for Research on Cancer
Inh: Inhalation
N/Av: Not Available
N/Ap: Not Applicable
NIOSH: National Institute of Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PEL: Permissible exposure limit
RCRA: Resource Conservation and Recovery Act
SARA: Superfund Amendments and Reauthorization Act
STEL: Short Term Exposure Limit
TDG: Canadian Transportation of Dangerous Goods Act & Regulations
TLV: Threshold Limit Values
TSCA: Toxic Substance Control Act
TWA: Time Weighted Average
WHMIS: Workplace Hazardous Materials Identification System

Disclaimer of Liability

The Information presented herein is supplied as a guide to those who handle or use this product and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive. The manner and conditions of use and handling may involve other and additional considerations. Safe work practices must be employed when working with any materials. It is important that the end user makes a determination regarding the adequacy of the safety procedures employed during the use of this product.
No warranty of any kind is given or implied. Armacell LLC will not be liable for any damages, losses, injuries or consequential damages which may result from the use or reliance on any information contained herein. This Safety Data Sheet is valid for three (3) years.

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Revision date: : 10-May 2015

End of Document

Venture Tape™ Scrimless ASJ Facing Tape 1543CW

Technical Data **June, 2015**

Product Description

3M™ Venture Tape™ Scrimless ASJ Facing Tape 1543CW is a kraft/foil laminate (ASJ) coated with a cold weather acrylic pressure sensitive adhesive.

Product Construction

Backing	Adhesive	Color	Liner	Standard Roll Length
Kraft/Foil	Acrylic	White	Release Liner	50 yds (45.7 m)

Features

- Performs well in cold temperatures as well as high heat and humidity conditions
- Hand tearable

Typical Physical Properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Test	Typical Value	Typical Value (Metric)	Test Method
Product Thickness	5.8 mils	0.15 mm	PSTC-133
Peel Adhesion	50 oz/in	13.9 N/25 mm	PSTC-101
Shear Adhesion	>24 hrs @ 2.2 psi	>24 hrs @ 15.2 kPa	PSTC-107
Tensile Strength	25 lb/in	113 N/25 mm	PSTC-131
Elongation	5%	5%	PSTC-131
WVTR	0.03 perm	0.03 perm	ASTM E96
Service Temperature	-40° to 240°F	-40° to 116°C	

Application Ideas

- Vapor seal on ASJ faced duct board and pipe insulation
- Conforms well to fibrous ductboard and blankets

3M™ Venture Tape™ Scrimless ASJ Facing Tape 1543CW

Storage

Store in a clean, dry place. Temperature of 40-80°F (4-26°C) and 40 to 50% relative humidity are recommended.

Shelf Life

To obtain best performance, use this product within 12 months from date of manufacture

Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

Warranty, Limited Remedy, and Disclaimer

Unless an additional warranty is specifically stated on the applicable 3M product packaging or product literature, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

Limitation of Liability

Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

ISO 9001

This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001 standards.

3M

Industrial Adhesives and Tapes Division

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BUCKAROOS, Inc.
www.buckaroos.com

BUCKAROOS ROUNDUPS,
THE SAFEST SADDLES
IN THE WORLD

Safety 1st

NEW

Roundup Plus Saddles

Patent Numbers
8,038,105 and 8,763,960

Description

The Roundup Plus Saddle is an innovative pipe insulation support and protective metal shield, formed to 180° arc, incorporating the Peel & Stick Tape "Plus" feature designed to secure the saddle to the pipe insulation's jacket. This Saddle also features round corners for safety, and a partial bottom rib that helps the Saddle easily slide into place inside the clevis hanger

Features/Benefits

- **Round Corner Design** – No more cuts, scrapes or bruises while handling the Roundup Plus Saddle. Warehouse workers and insulation installers will love it.
- **Flared Edges** – Flared outside edges protect the Saddles insulation from cutting the pipe insulation jacketing and damaging the vapor retarder jacket.
- **New Peel & Stick Tape** – Very aggressive acrylic self-stick tape between the ribs to secure the Saddle to the pipe insulation, helping to prevent the Saddle from falling to the ground.
- **Partial Bottom Rib** –This partial bottom rib speeds installation time versus a full 180° rib saddle, and adds structure. Also, the partial rib eliminates side gaps that create a collection area for moisture, mold, mildew, and water infiltration.
- **Fast and Easy to Apply** – By reducing the full 180° rib exposure, the Roundup Plus partial rib feature removes the "speed bump" effect allowing for an efficient install at the clevis hanger location.
- **O.D. Size Marked on Each Saddle** – This provides easy Saddle identification in the warehouse and on the job site.
- **Plastic Square Bucket Packaging** – Easy to carry buckets offer space savings for maximum storage and snap-on lids. The buckets protect the Saddles in extreme weather conditions.

Materials of Construction

Buckaroos Roundup Plus Saddles are manufactured from carbon steel with a G90 galvanized finish and with Type 304-2b Stainless Steel. Roundup Plus Saddles are available in 22 to 18 Gauge thicknesses in carbon steel and in a 20 Gauge thickness in stainless steel.

Engineer Guide Specification

Wherever pipe insulation passes through a hanger location or on a strut system, Buckaroos Roundup Plus Saddles with a self seal tape, round corners, flared edges and a bottom partial rib shall be installed.

Applications

Roundup Plus Saddles are designed for use with medium and low compressive strength pipe insulations. These Saddles are used with fiber glass, rubber, polyethylene, rigid foam, cellular glass and mineral wool pipe insulations. They are ideal for use on plumbing, heating, chilled water and refrigeration piping.

Packaging

Roundup Plus Saddles are available in easy-to-stack space-saving square buckets. They feature snap-on lids for easy opening and resealing. Square bucket packaging also protects the Buckaroos Roundup Saddles from rain, snow or other severe climate conditions on jobsites. High strength corrugated boxes are also available.

Saddle Size Recommendations

Pipe insulation thicknesses may vary, so the radius of the selected Buckaroos Roundup Plus Saddle must be verified before installation to insure the proper size is used. For proper sizing, refer to the Buckaroos Saddle Size Selection Chart on the following page. Roundup Plus Size Chart Cards are available if you call Buckaroos Customer Service at 800-969-3113, or email us at info@buckaroos.com.

Cold Weather Self Seal Tape Information

- Specially formulated acrylic tape
- Easy lift release edges, with and 80 lb. Release Liner
- Polyester Carrier
- Minimum application temperature – 0°F, 98° C
- Maximum operating temperature – 210° F, 135° C

Roundup Plus Saddle Technical Data

PHYSICAL PROPERTY	VALUE/UNIT	SPECIFICATION COMPLIANCE
Galvanized Carbon Steel	Hot Dipped G90, 12ga – 22ga	ASTM 653
Service Temperature	-150°F to +500°F	Manufacturer Design Limits
Combustibility	Will not burn	ASTM E-136

Roundup Plus Saddles Sizing Table

To find the correct size Buckaroos Roundup Plus Saddles, refer to the pipe or tube size in the left-hand column. Then, select the corresponding insulation thickness column to find the correct actual saddle outside diameter (O.D.) for proper sizing to fit hanger and insulated pipe.

ROUNDUP PLUS SADDLE SIZE SELECTION TABLE

Iron Pipe Size	Insulation Thickness					
(Inches)	½"	1"	1 ½"	2"	2 ½"	3"
1/2	2	3	4	5	6.5	7.5
3/4	2.5	3	4	5	6.5	7.5
1	2.5	3.5	4.5	5.5	6.5	7.5
1 1/4	3	3.5	5	5.5	6.5	7.5
1 1/2	3	4	5	6.5	7.5	8.5
2	3.5	4.5	5.5	6.5	7.5	8.5
2 1/2	4	5	6.5	7.5	8.5	9.5
3	4.5	5.5	6.5	7.5	8.5	9.5
3 1/2	5	6.5	7.5	8.5	9.5	11
4	5.5	6.5	7.5	8.5	9.5	11
5	6.5	7.5	8.5	9.5	11	12
6	7.5	8.5	9.5	11	12	13
8	9.5	11	12	13	14	15
10	-	13	14	15	16	-
12	-	15	16	-	-	-
14	-	16	-	-	-	-
Copper Tube Size	Insulation Thickness					
(Inches)	½"	¾"	1"	1 ½"	2"	2 ½"
5/8	2	2	3	3.5	4.5	5.5
7/8	2	2	3	4.0	5.0	6.5
1 1/8	2.5	2.5	3	4	5	6.5
1 3/8	2.5	3	3.5	4.5	5.5	6.5
1 5/8	3	3	3.5	4.5	5.5	6.5
2 1/8	3.5	3.5	4	5	6.5	7.5
2 5/8	4	4	4.5	5.5	6.5	7.5
3 1/8	4.5	4.5	5	6.5	7.5	8.5
3 5/8	5	5	5.5	6.5	7.5	8.5
4 1/8	5.5	5.5	6.5	7.5	8.5	9.5
5 1/8	6.5	7	7.5	8.5	9.5	11

BUCKAROOS, Inc.
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Technical Data

Buckaroos Roundup Plus Saddles are ordered to meet individual project specifications. Consult your project specifications and contact Buckaroos for sizing considerations.

SIZES AVAILABLE

Product	Insulation O.D. Size Range (in.)	Gauges	Lengths (in.)
Galvanized Steel	2-5 ½	22	8,12
	6 - 16	20	12,15,18
	6 - 16	18	12, 15, 18
Stainless Steel	2 - 16	20	12, 15, 18

Buckaroos also manufactures saddles to comply with Manufacturers Standardization Society SP-58-2009. Contact us for more information.

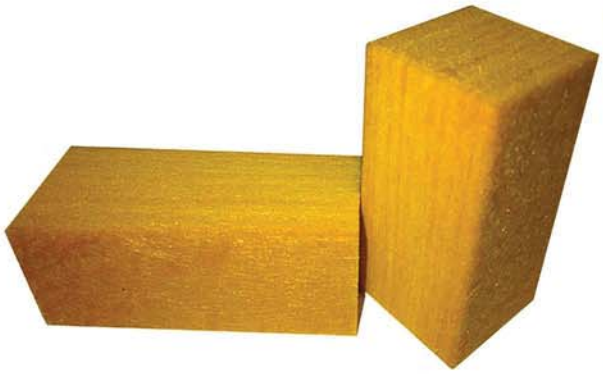
Notes:
1. Always refer to your project specification for saddle length and gauge requirements.
2. Individual project requirements may vary considerably from chart.
3. Buckaroos can provide virtually any saddle length and gauge combination upon request.

STANDARD INVENTORY

Saddle I.D.	Nominal Saddle O.D. (in.)	Standard Dimensions/Weights		
		Saddle Length	Gauge	Saddle Weight (lbs.)
1.9	2	12	22	0.36
2.38	2 1/2	12	22	0.42
2.88	3	12	22	0.52
3.5	3 1/2	12	22	0.52
4	4	12	22	0.63
4.5	4 1/2	12	22	0.73
5	5	12	22	0.83
5.56	5 1/2	12	22	0.94
6.13	6	12	20	1.13
6.62	6 1/2	12	20	1.13
7	7	12	20	1.25
7.62	7 1/2	12	20	1.5
8	8	12	20	1.5
8.62	8 1/2	12	20	1.63
9	9	12	20	1.63
9.62	9 1/2	12	20	1.88
10	10	12	20	1.88
10.75	10 1/2	12	20	2.13
11	11	12	20	2.13
11.76	11 1/2	12	20	2.25
12	12	12	20	2.25
12.5	12.5	12	20	2.71
13	13	12	20	2.82
13.5	13.5	12	20	3.10
14	14	12	18	3.95
15	15	12	18	4.23
16	16	12	18	4.51

MAP Of Easton, Inc.

M-Block



Shown are 1" Wide Blocks at 20 PCF

M-Block is made of inorganic fiberglass bonded with a thermosetting resin. By a heat and pressure process, the fibers are molded into a rigid M-Block of varied sizes, thicknesses and densities.

Benefits

- Low Thermal Conductivity
- Light Weight
- High Strength
- Dimensional Stability - Will Not Shrink, Swell, Rot or Oxidize.
- Non-Corrosive
- Chemically Inert

Physical Properties

Property	Specification
Density	Any Up to 20 PCF
Thickness	One Layer Up to 2 in Composites Up to 4 in
Service Temperature ASTM C411	-150° F to 450° F (-101° C to 232° C)
Thermal Conductivity ASTM C518	Stable k Factor (Non-Deteriorating) 0.23 Btu*in/hr*ft^2*F at 75° F (24° C) Mean
Flammability ASTM E84	Class A 25 Flame Spread / 50 Smoke Developed
Safety	Non-Combustible
Moisture Absorption ASTM C1104	0.2% by volume 96 hrs at 120° F (49° C) and 95% RH
Shrinkage/Expansion	None. Dimensionally Stable.
Corrosiveness ASTM C665	Does Not Cause or Accelerate Corrosion.
Alkalinity	pH 9
Compression Strength Deflection: **@ 30 psi** **@ 80 psi**	 Nominal 5% Nominal 10%

Environmental Consideration

M-Block products are made using a minimum of 50% Post-Consumer recycled material, making them an environmentally friendly choice.

For additional information or samples, please contact our Sales Department at 610-253-7135 or sales@mapeaston.com

Molded Acoustical Products of Easton, Inc. 3 Danforth Drive Easton, PA 18045

OMAP Of Easton, Inc.

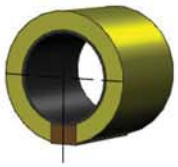
M-Block

Load Factors

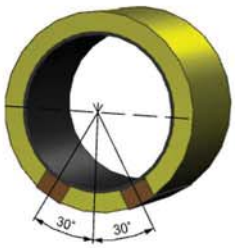
Pipe Size	Width of Block	Length of Block	# of Blocks Required	Max Support at 5% Deflection Formula: W x L x # x 30 psi	Max Support at 10% Deflection Formula: W x L x # x 80 psi
Up to 5"	1" 1-1/2" 2"	6"	1 1 1	180 lbs 270 lbs 360 lbs	480 lbs 720 lbs 960 lbs
6" to 8"	1" 1-1/2" 2"	6"	2 2 2	360 lbs 540 lbs 720 lbs	960 lbs 1440 lbs 1920 lbs
10" to 12"	1-1/2" 2" 2-1/2"	9"	3 3 3	1215 lbs 1620 lbs 2025 lbs	3240 lbs 4320 lbs 5400 lbs
14" to 16"	1-1/2" 2" 2-1/2"	12"	4 4 4	2160 lbs 2880 lbs 3600 lbs	5760 lbs 7680 lbs 9600 lbs
18" to 24"	2" 2-1/2" 3"	14"	5 5 5	4200 lbs 5250 lbs 6300 lbs	11200 lbs 14000 lbs 16800 lbs

Recommended Placement

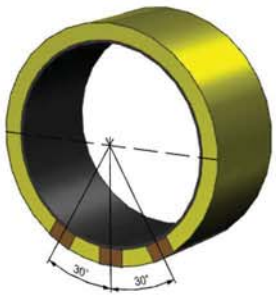
(not to scale)



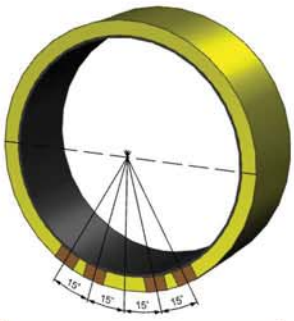
Up to 5" Pipe
(1) 6" Long Block



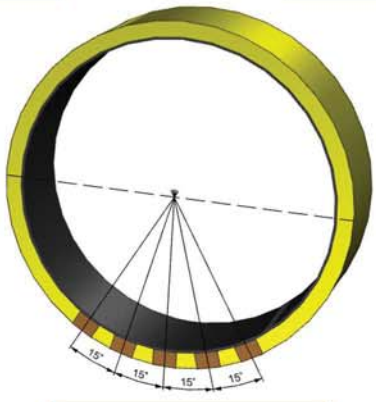
6" to 8" Pipe
(2) 6" Long Blocks



10" to 12" Pipe
(3) 9" Long Blocks



14" to 16" Pipe
(4) 12" Long Blocks



18" to 24" Pipe
(5) 14" Long Blocks

Firestop Submittal Package

Project: YORK REGION VARIOUS PROJECTS

Date: 18/02/2025

Submitted by: PD INSULATION INC

This submittal is auto-generated based on user-selected inputs.
Therefore, Hilti makes no representation as to the suitability of these systems for their intended use.

Hilti. Outperform. Outlast.

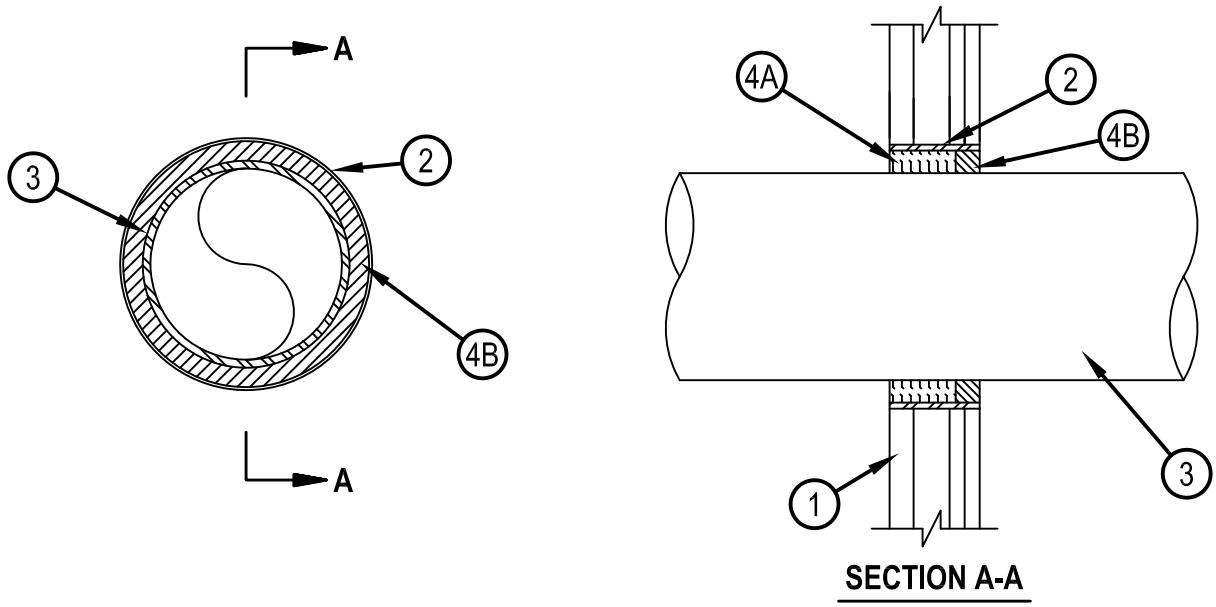
Hilti Firestop
Saving lives
through innovation
and education

Table Of Contents

System No. W-L-1205

Classified by
Underwriters Laboratories, Inc.
to UL 1479 and CAN/ULC-S115

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Items 1 and 4)	F Ratings — 1 and 2 Hr (See Items 1 and 4)
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Ratings — 1 and 2 Hr (See Items 1 and 4)
	FTH 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 described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — "C-T" shaped studs 1-5/8 in. (41 mm) wide by 2-1/2 in. (64 mm) deep, fabricated from 25 MSG galv steel, spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — One layer of nom 1 in. (25 mm) thick, 24 in. (610 mm) wide gypsum liner and one or two layers of 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide gypsum board with square or tapered edges. The gypsum board types, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 10-1/2 in. (267 mm).

1A. Wall Assembly — As an alternate to the above 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. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC.
   B. Gypsum Board* — Thickness, type, number of layers and fasteners as required in the individual Wall and Partition Design. Max diam of opening is 10-1/2 in. (267 mm).

The hourly F, FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

2. Metallic Sleeve — Max 10-1/2 in. (267 mm) diam cylindrical sleeve fabricated from min 0.016 in. (0.41 mm) thick galv sheet steel and having a min 1 in. (25 mm) lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of 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. Sleeve may also be formed of No. 8 steel wire mesh having a min 1 in. (25 mm) lap along the longitudinal seam.

3. Through-Penetrants — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. An annular space of min 1/4 in. (6 mm) to max 1-5/8 in. (41 mm) is required within firestop system. 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 8 in. (203 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 8 in. (203 mm) diam (or smaller) cast or ductile iron pipe.
   C. Conduit — Nom 4 in. (203 mm) diam (or smaller) steel electrical metallic tubing (EMT) or 6 in. diam steel conduit.
   D. Copper Tubing — Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe — Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.
   F. Flexible Steel Conduit+ — Nom 2 in. (51 mm) diam (or smaller) flexible steel conduit.

   See Flexible Metal Conduit (DXUZ) category in the Electrical Construction Equipment Directory for names of manufacturers.
4. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 2-1/8 in. (54 mm) or 2-3/4 in. (70 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening on the room side of the wall as permanent form for 1 and 2 hr fire rated walls, respectively. Packing material to be recessed from the room side of wall as required to accommodate the required thickness of fill material. In alternate wall assembly, packing material to be flush with either side of the wall and recessed from the other side of the 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 sleeve, flush with surface of wall.

   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

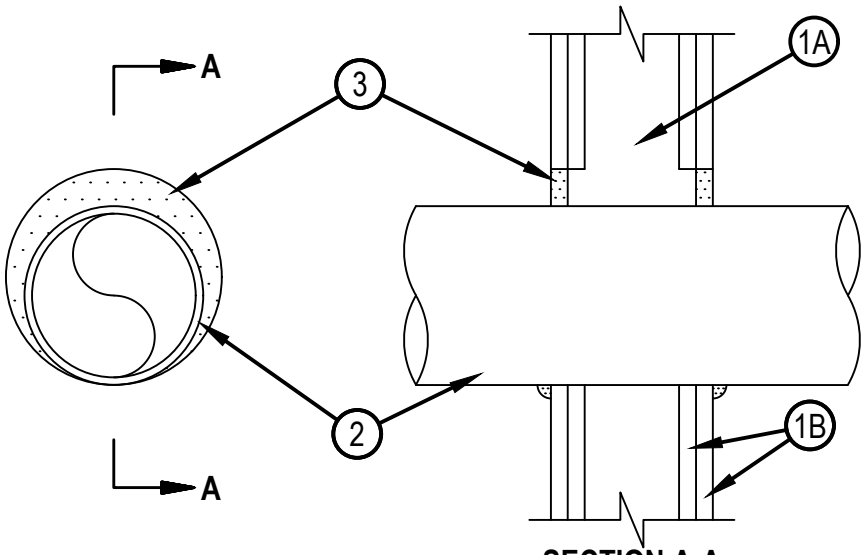
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

+Bearing the UL Listing Mark

Classified by
Underwriters Laboratories, Inc.
to UL 1479 and CAN/ULC-S115

System No. W-L-1054

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings —1 and 2 Hr (See Items 1 and 3)	F Ratings — 1 and 2 Hr (See Items 1 and 3)
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating (Without Movement) at Ambient — Less Than 1 CFM/sq ft	FH Ratings —1 and 2 Hr (See Items 1 and 3)
L Rating (Without Movement) at 400°F — Less Than 1 CFM/sq ft	FTH Rating — 0 Hr
M Rating (Movement) — See Table 1	FTH Rating — 0 Hr
	L Rating at Ambient — Less Than 5.1 L/s/m2
	L Rating at 204°C — Less Than 5.1 L/s/m2



SECTION A-A

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

   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC. For M Rating, steel studs to be min 3-5/8 in. (92 mm) wide. 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 on all four sides.

   B. Gypsum Board* — 5/8 in. (16 mm) thick, 4 ft (122 cm) 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 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. (819 mm) for steel stud walls. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls.

   The F and FH Ratings of the firestop system are equal to the fire rating of the wall assembly. The M Rating is applicable only to 1 hr rated walls.

System No. W-L-1054

2. Through-Penetrants — One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2-1/4 in. (57 mm). Pipe may be installed with continuous point contact. 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 30 in. (762 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 30 in. (762 mm) diam (or smaller) cast or ductile iron pipe.
   C. Conduit — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or 6 in. (152 mm) . diam 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. 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 or continuous contact locations between pipe and wall, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE MAX Intumescent Sealant

Movement Direction	Penetrant Item	Nominal Penetrant Diameter	Annular Space	Movement	Sealant Depth	F-Rating	L Rating with Movement
Y	2A, 2C*	2 in.	Max 2-1/4 in.	5%	5/8 in.	1 hr	N/A
Z	2A, 2C*	2 in.	2-1/4 in.	0.25 in.	5/8 in.	1 hr	N/A

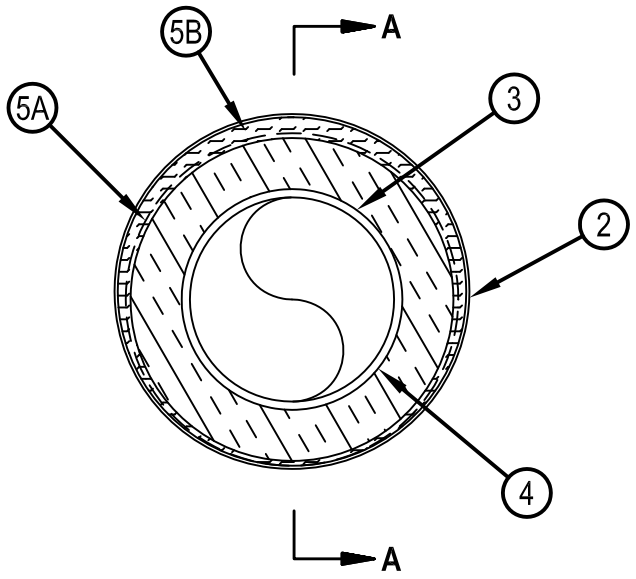
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

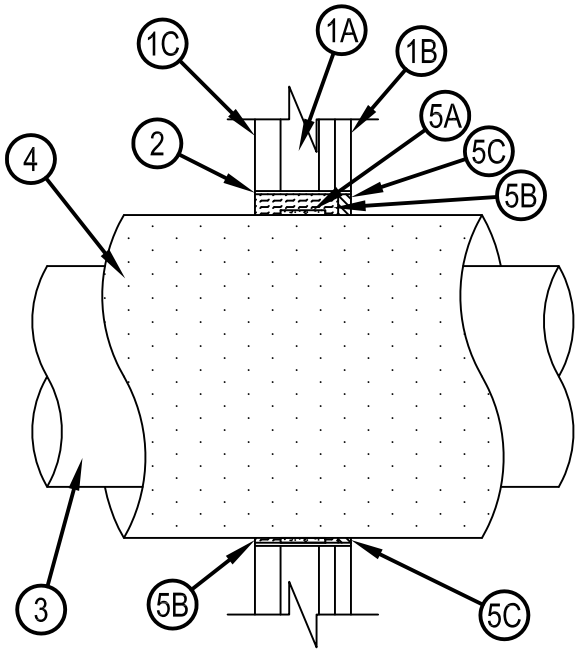
CANADA ONLY

Classified by
Underwriters Laboratories, Inc.
to CAN/ULC-S115

System No. W-L-5010

F Ratings — 1 and 2 Hr (See Item 1)
FT Ratings - 0 and 1 Hr (See Item 4)
FH Rating — 0 Hr
FTH Rating — 0 Hr





SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated 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 include the following construction features:
   A. Steel Studs — C-H or C-T shaped studs, 64 mm (2-1/2 in.) wide by 38 mm (1 1/2 in.) deep, spaced 610 mm (24 in.) OC.
   B. Gypsum Board* — 25 mm thick gypsum board liner panels, supplied in nom 610 mm widths and installed vertically as specified in the individual Wall and Partition Design. Max diam of opening is 356 mm (14 in.).
   C. Gypsum Board* — Min 13 mm (1/2 in.) thick, 1.22 m (4 ft) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be Wall and Partition Design. Max diam of opening is 356 mm (14 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 — Cylindrical sleeve fabricated from nom 0.49 mm (0.019 in.) thick (or lighter) galv sheet steel and having a min 25 mm (1 in.) lap along the longitudinal seam. Length of steel sleeve to be equal to thickness of wall such that, when installed, the ends of the sleeve will be flush with each wall surface. Sleeve installed by coiling the sheet steel to a diam smaller than the max diam 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 Penetrants — One metallic pipe or tube installed within the firestop system. Pipe or tube to be rigidly supported on both sides of wall assembly. The following types of metallic pipes or tubes may be used:
   A. Steel Pipe — Nom 203 mm (8 in.) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe — Nom 203 mm (8 in.)diam (or smaller) cast or ductile iron pipe.
   C. Copper Tubing — Nom 51 mm (2 in.) diam (or smaller) Type L (or heavier) copper tubing.
   D. Copper Pipe — Nom 51 mm (2 in.) diam (or smaller) Regular (or heavier) copper pipe.

4. Pipe Covering — Max 51 mm (2 in.) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m3) 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 product. Annular space between the pipe covering and sleeve shall be min 5 mm (3/16 in.) to max 21 mm (13/16 in.).

   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 Value of 25 or less and a smoke Developed Value of 50 or less may be used.

   The T Rating of the firestop system is dependent upon the thickness of the pipe covering. If the nom thickness of the pipe covering is 51 mm, (2 in.) the T Rating is 1 hr. If the nominal thickness of the pipe covering is less than 51 mm (2 in.), the T Rating is 0 hr.

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

   A. Fill, Void or Cavity Materials* — Wrap Strip — Nom 5 mm (3/16 in.) thick intumescent material supplied in 45 mm (1 3/4 in.) wide strips. One layer of wrap strip tightly wrapped around pipe covering and held in position using tape. Wrap strip to be recessed from finished surface of wall (Item 1C) approx 19 mm (3/4 in.) such that the leading edge of wrap strip is flush with inner surface of gypsum board liner panel (Item 1B).

   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 648E Wrap Strip

   B. Packing Material — Min 70 mm (2—3/4 in.) and 83 mm (3 1/4 in.) thickness of min 64 kg/m3 (4 pcf) mineral wool batt insulation for 1 and 2 hr fire rated wall assemblies, respectively. Packing material firmly packed into opening as a permanent form and to be recessed from finished surface of wall to accommodate the required thickness of fill material.

   C. Fill, Void or Cavity Materials* - Sealant — Min 13 mm (1/2 in.) thickness of caulk applied within annulus, flush with finished surface of wall assembly.

   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant.

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

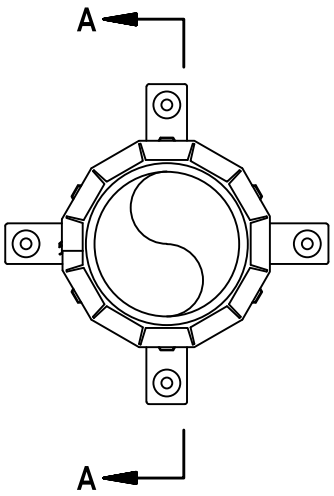
CANADA ONLY

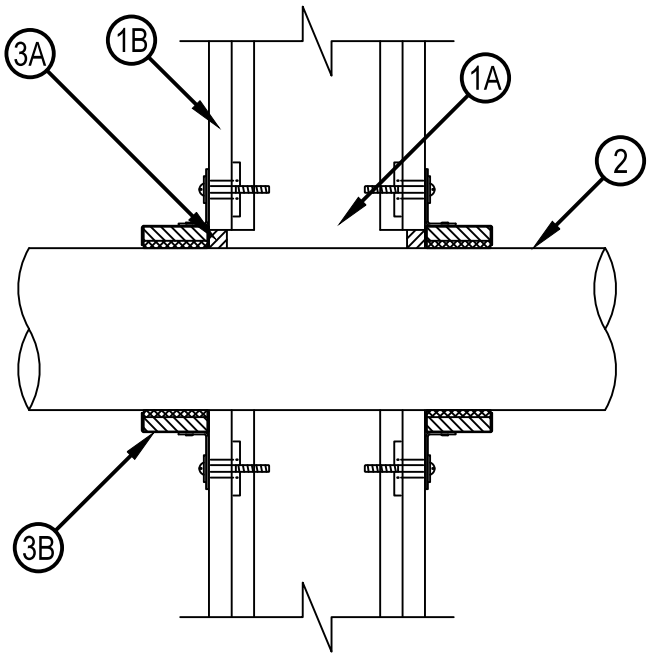
C CLASSIFIED UL

Classified by
Underwriters Laboratories, Inc.
CAN/ULC-S115

System No. W-L-2578

F Ratings — 1 and 2 Hr (See Item 1)
FT Ratings - 0 and 1 Hr (See Item 1)
FH Rating — 0 Hr
FTH Rating — 0 Hr





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

1. Wall Assembly — The 1 or 2 hr 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 construction features noted 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. The hourly FT Rating of the firestop system is 0 hr for 1 hr rated walls and 1 hr for 2 hr rated walls.
   A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 51 by 102 mm (2 by 4 in.) lumber spaced 406 mm (16 in.) OC. Steel studs to be min 89 mm (3-1/2 in.) wide and spaced max 610 mm (24 in.) OC.
   B. Gypsum Board* — Nom 16 mm (5/8 in.) thick gypsum board, as specified in the individual Wall and Partition Design. Max diam of opening is 127 mm (5 in.).
2. Through-Penetrants — One nonmetallic pipe to be installed within the firestop system. The annular space between pipe and periphery of opening shall be min 0 in. (point contact) to max 13 mm (1/2 in.). Pipe to be rigidly supported on both sides of the wall assembly. The following types and sizes of nonmetallic pipes may be used:
   A. XFR 15/50 Polyvinyl Chloride (PVC) Pipe — Nom 102 mm (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.
3. Firestop System — The firestop system shall consist of the following:
   A. Fill, Void or Cavity Material* — Sealant — Min 13 mm (1/2 in.) thickness of fill material applied within the annulus, flush with both sides of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant, or FS-ONE MAX Intumescent Sealant, CP 606 Sealant
   B. Firestop Device* — Galvanized steel collar lined with an intumescent material sized to fit the specific diam of through-penetrant. Device shall be installed around the through-penetrant in accordance with the accompanying installation instructions. Collar to be installed and latched around the pipe and secured to both sides of the wall using the anchor hooks provided with the collar. (Minimum 2 anchor hooks for 38 and 51 mm (1-1/2 and 2 in.) diam pipes and 3 anchor hooks for 76 and 102 mm (3 and 4 in.) diam pipes). The anchor hooks are to be secured to the surface of wall with 5 mm (3/16 in.) diam by 64 mm (2-1/2 in.) long toggle bolts along with min 32 mm (1-1/4 in.) steel washers.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 643 50/1.5"N, CP 643 63/2"N, CP 643 90/3"N, CP 643 110/4"N Firestop Collar

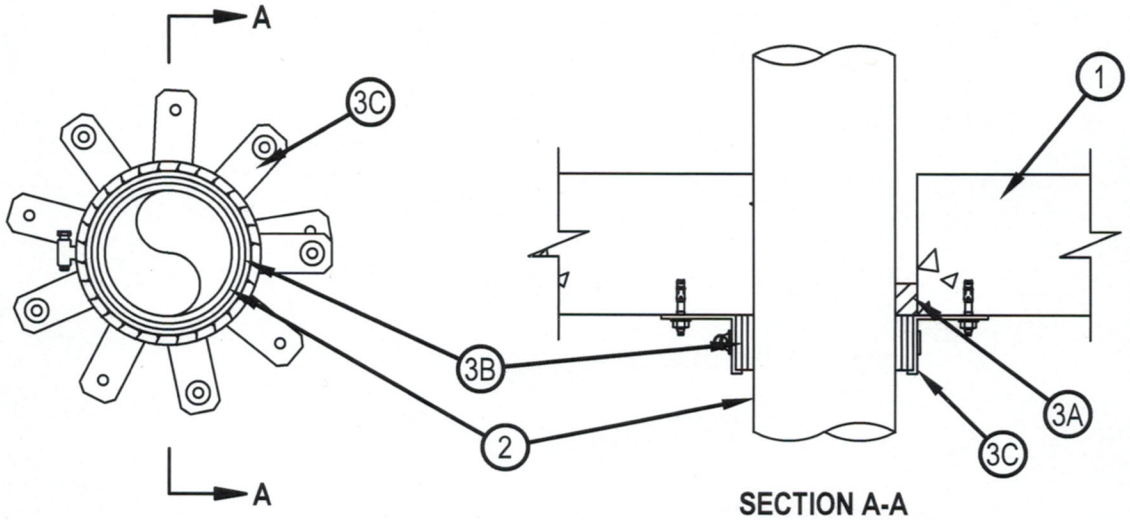
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

CANADA ONLY

Classified by
Underwriters Laboratories, Inc.
CAN/ULC-S115

System No. C-AJ-2678

F Rating — 2 Hr
FT Ratings — 1-3/4 and 2 Hr (See Item 2)
FH Rating — 2 Hr
FTH Ratings — 1-3/4 and 2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/sq ft
L Rating At 400 F — 4 CFM/sq ft



SECTION A-A

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

1. Floor or Wall Assembly — Min 114 mm (4-1/2 in.) thick reinforced lightweight or normal weight 1600-2400 kg/m3 (100-150 pcf) concrete. Floor may also be constructed of any min 152 mm (6 in.) thick UL Classified hollow core Precast Concrete Units*. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 127 mm (5 in.)

   See Concrete Blocks (CAZT) and Precast Concrete Units (CFTV) categories in the Fire Resistance Directory for names of manufacturers..
2. Through Penetrants — One nonmetallic pipe to be installed concentrically or eccentrically within the firestop system. Annular space between pipe and periphery of opening to be min 0 mm (point contact) to max 13 mm (1/2 in.) The following types and sizes of nonmetallic pipes may be used:

   A. XFR 15/50 Polyvinyl Chloride (PVC) Pipe —

   Nom 102 mm (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. Polyvinyl Chloride-HRS (PVC-HRS-2550) Pipe —

   Nom 102 mm (4 in.) diam (or smaller) Schedule 40 PVC-HRS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

   The FT and FTH Rating of the firestop system is 2 hr when penetrant Item 2A is used and 1-3/4 hr when penetrant Item 2B is used.
3. Firestop System — The firestop system shall consist of the following:

   A. Fill, Void or Cavity Material* — Sealant — Min 25 mm (1 in.) thickness of fill material applied within the annulus, flush with bottom surface of floor or both sides of wall.

   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

   B. Fill, Void or Cavity Material* — Wrap Strip - Layers of intumescent wrap strip are continuously wrapped around the pipe with ends held in place with tape. Wrap strip butted tightly against bottom surface of floor or both surfaces of wall. Number of layers of wrap strip for a given size penetrant are shown in table below.

   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP648-E W45/1-3/4" Wrap Strip

Max Pipe Size mm (in.)	Number of Layers	Nom. Wrap Strip Width (in.)
76 (3)	2	44 (1-3/4)
102 (4)	3	44 (1-3/4)

C. Steel Collar —

Steel collar fabricated from coils of precut min 0.41 mm (0.016 in.) thick (No. 28 gauge) galv steel available from fill material manufacturer. Collar shall be 44 mm (1-3/4 in.) deep with 25 mm (1 in.) wide by 51 mm (2 in.) long anchor tabs on 44 mm (1-3/4 in.) centers for securement to the underside of floor or both surfaces of wall. The opposite side incorporates retainer tabs, 13 mm (1/2 in.) wide by 4.8 mm (3/16 in.) long, prebent toward the pipe surface. Collar shall be tightly wrapped over the wrap strip, overlapping min 25 mm (1 in.) at seam. A nom 13 mm (1/2 in.) wide stainless steel hose clamp shall be secured to the collar at its mid-height. Every other anchor tab of collar secured to concrete slab with 6 mm (1/4 in.) diam by 44 mm (1-3/4 in.) long steel expansion type masonry fasteners, 38 mm (1-1/2 in.) long concrete screw anchors or 3.7 mm (0.145 in.) diam by 32 mm (1-1/4 in.) long powder actuated fasteners utilizing a 36.5 mm (1-7/16 in.) diam by 1.6 mm (1/16 in.) thick steel washer. In floor assemblies, one collar to be used at the bottom of the concrete floor. In wall assemblies, a collar is used on both surfaces.

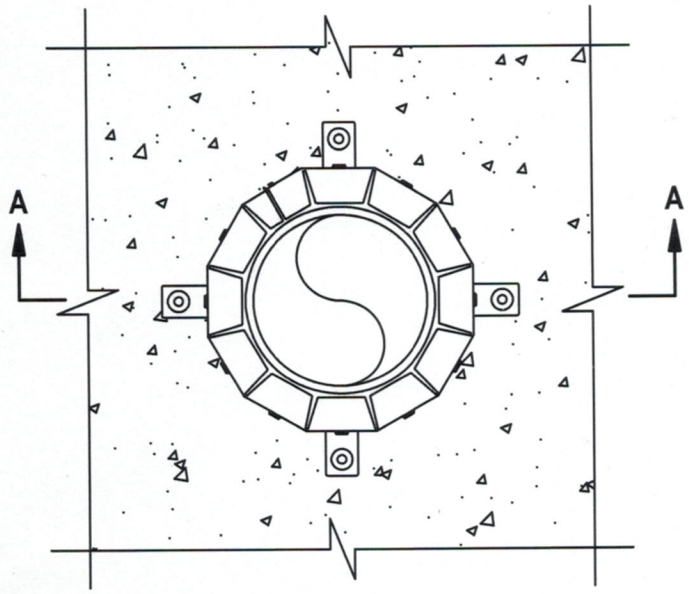
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

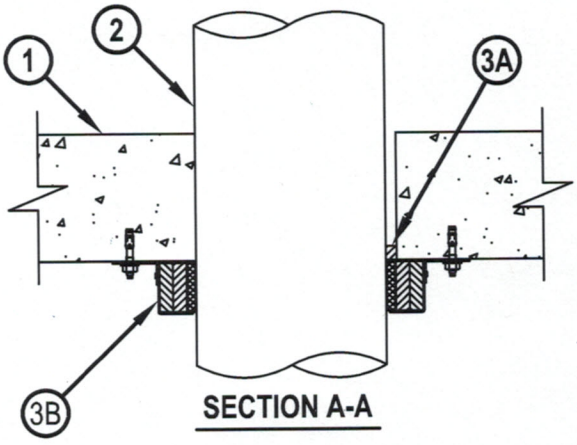
CANADA ONLY

Classified by
Underwriters Laboratories, Inc.
to CAN/ULC-S115

System No. C-AJ-2035

F Ratings — 2 and 3 Hr (See Item 1)
FT Ratings — 1 and 2 Hr (See Item 1)
FH Rating — 0 Hr
FTH Rating — 0 Hr
L Rating at Ambient — Less Than 1 CFM/sq ft
L Rating at 400 F — Less Than 1 CFM/sq ft





SECTION A-A

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

1. Floor or Wall Assembly — Min 64 mm (2-1/2 in.) or min 114 mm (4-1/2 in.) thick reinforced lightweight or normal weight (1600-2400 kg/ m3 or 100-150 pcf) concrete for 2 hr and 3 hr F Rated assemblies, respectively. Wall may also be constructed of any UL Classified Concrete Blocks*. Floor may also be constructed of any min 152 mm (6 in.) thick UL Classified hollow core Precast Concrete Units*. See Table under Item 2 for max diam of opening. The hourly FT Ratings are 1 hr and 2 hr for 2 hr and 3 hr F Rated assemblies, respectively.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufactures.
2. Through Penetrants — One nonmetallic pipe to be installed either concentrically or eccentrically within the firestop system. The annular space between pipe and periphery of opening shall be min 0 mm (point contact). See Table below for the max annular space required between pipe and periphery of opening. Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Nom 152 mm (6 in.) diam (or smaller) Schedule 40 solid core or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 152 mm (6 in.) diam (or smaller) SDR11 or SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   C. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 152 mm (6 in.) diam (or smaller) Schedule 40 solid-core or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.

D. Flame Retardant Polypropylene (FRPP) Pipe — Nom 152 mm (6 in.) diam (or smaller) Schedule 40 FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.

E. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 152 mm (6 in.) diam (or smaller) SDR 11 CPVC for use in closed (process or supply) piping systems.

IPEX INC — AquaRise

F. XFR 15/50 Polyvinyl Chloride (PVC) Pipe — Nom 152 mm (6 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.

G. Rigid Nonmetallic Conduit+ — Nom 102mm (4 in.) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).

Nom Pipe Diam, mm (in.)	Max Diam of Opening, mm (in.)	Max Annular Space, mm (in.)
38 (1-1/2)	54 (2-1/8)	5 (3/16)
51 (2)	67 (2-5/8)	6 (1/4)
76 (3)	102 (4)	13 (1/2)
102 (4)	127 (5)	13 (1/2)
152 (6)	178 (7)	13 (1/2)

3. FIRESTOP SYSTEM — THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:

A. FILL, VOID OR CAVITY MATERIAL* — MIN 13 MM (1/2 IN.) THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH BOTTOM SURFACE OF FLOOR OR BOTH SURFACES OF WALL. FOR SYSTEMS WITH L RATING, MIN 1/2 IN. (13 MM) THICKNESS OF FS-ONE SEALANT OR FS-ONE MAX INTUMESCENT SEALANT SHALL BE APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP OR BOTTOM SURFACE OF FLOOR.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE SEALANT OR FS-ONE MAX INTUMESCENT SEALANT

B. FIRESTOP DEVICE* — FIRESTOP COLLAR SHALL BE INSTALLED IN ACCORDANCE WITH THE ACCOMPANYING INSTALLATION INSTRUCTIONS. COLLAR TO BE INSTALLED AND LATCHED AROUND THE PIPE AND SECURED TO UNDERSIDE OF FLOOR OR BOTH SIDES OF WALL USING THE ANCHOR HOOKS PROVIDED WITH THE COLLAR. (MINIMUM 2 ANCHOR HOOKS FOR 38 AND 51 MM (1-1/2 AND 2 IN.) DIAM PIPES, 3 ANCHOR HOOKS FOR 76 AND 102 MM (3 AND 4 IN.) DIAM PIPES, AND 4 ANCHOR HOOKS FOR 152 MM (6 IN.) DIAM PIPES). THE ANCHOR HOOKS ARE TO BE SECURED WITH 6 MM (1/4 IN.) DIAM BY MIN 32 MM (1-1/ 4 IN.) LONG STEEL EXPANSION BOLTS, OR STEEL TAPCON® CONCRETE SCREW ANCHORS, IN CONJUNCTION WITH MIN 19 MM (3/4 IN.) DIAM STEEL WASHERS WITH ONE ANCHOR BOLT IN EACH ANCHOR HOOK. AS ALTERNATES TO THE ANCHORS SPECIFIED ABOVE, MIN 4 MM (0.145 IN.) DIAM BY 32 MM (1-1/4 IN.) LONG POWDER ACTUATED FASTENERS UTILIZING A 36 MM (1-7/16 IN.) DIAM BY 2 MM (1/16 IN.) THICK STEEL WASHER, HILTI 6 MM (1/4 IN.) DIAM BY32 MM (1-1/4 IN.) LONG KWIK-CON II+ CONCRETE SCREW ANCHOR, HILTI 6 MM (1/4 IN.) DIAM BY 44 MM (1-3/4 IN.) LONG KWIK-BOLT 3 STEEL EXPANSION ANCHOR OR HILTI X-DNI 27 P8 S15 POWDER ACTUATED FLOOR PIN WITH INTEGRAL NOM 15 MM (9/16 IN.) DIAM WASHER MAY BE USED.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 643N 50/1.5", CP 643N 63/2", CP 643N 90/3" CP 643N 110/" OR CP 643N 160/6" FIRESTOP COLLAR

* INDICATES SUCH PRODUCTS SHALL BEAR THE UL OR CUL CERTIFICATION MARK FOR JURISDICTIONS EMPLOYING THE UL OR CUL CERTIFICATION (SUCH AS CANADA), RESPECTIVELY.

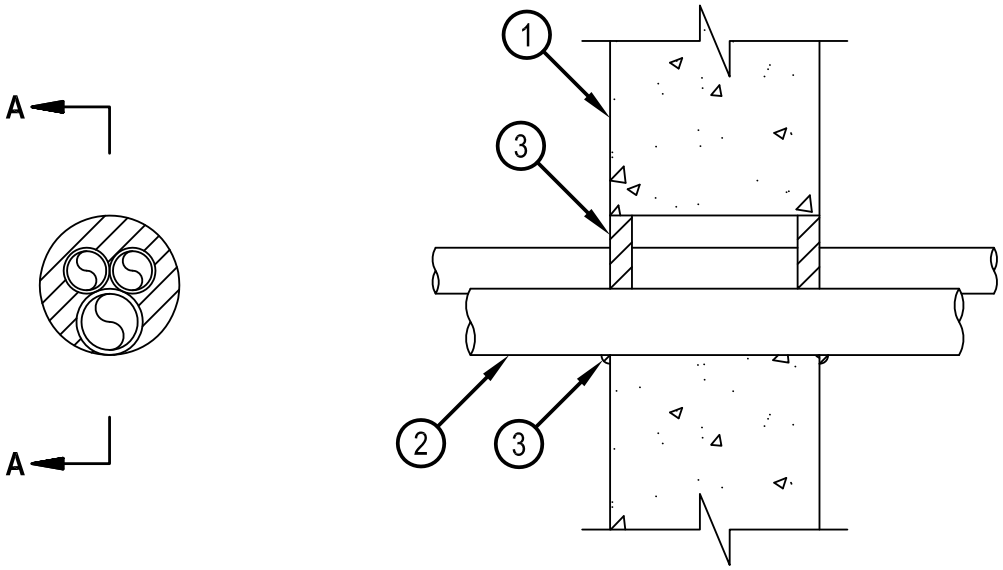
+BEARING THE UL LISTING MARK

CANADA ONLY

Classified by
Underwriters Laboratories, Inc.
to CAN/ULC-S115

System No. W-J-2016

F Rating — 2 Hr
FT Rating — 0 Hr
FH Rating — 0 Hr
FTH Rating — 0 Hr



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

1. Wall Assembly — Min 152 mm (6 in.) thick lightweight or normal weight (1600-2400 kg/m3 or 100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 102 mm (4 in.).
   See Concrete Blocks (CAZT) category in the UL Fire Resistance Directory for names of manufacturers.
2. Through Penetrants — One or more nonmetallic pipes, conduits or tubes installed concentrically or eccentrically within opening. Annular space between penetrants and periphery of opening to be min 0 mm (point contact) to max 25 mm (1 in.). Space between penetrants shall be min 0 mm (point contact) to max 25 mm (1 in.). Penetrants to be rigidly supported on both sides of wall. The following types and sizes of penetrants may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Nom 38 mm (1-1/2 in.) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) piping systems.
   B. Rigid Nonmetallic Conduit++ — Nom 38 mm (1-1/2 in.) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).
   C. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 38 mm (1-1/2 in.) diam (or smaller) SDR13.5 CPVC pipe for use in closed (process or supply) piping systems.
   D. Crosslinked Polyethylene (PEX) Tubing — Nom 25 mm (1 in.) diam (or smaller) SDR 9 PEX tubing for use in closed (process or supply) piping systems.
3. Fill, Void or Cavity Material* - Caulk or Sealant — Min 16 mm (5/8 in.) thickness of caulk applied within annulus, flush with both surfaces of wall. Min 6 mm (1/4 in.) diam bead of caulk applied to gypsum board/penetrant interface at point contact location on both sides of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant.

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

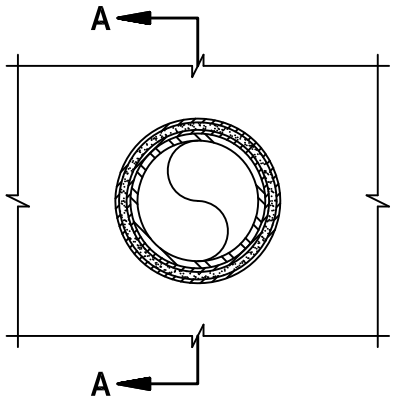
++ Bearing the UL Listing Mark

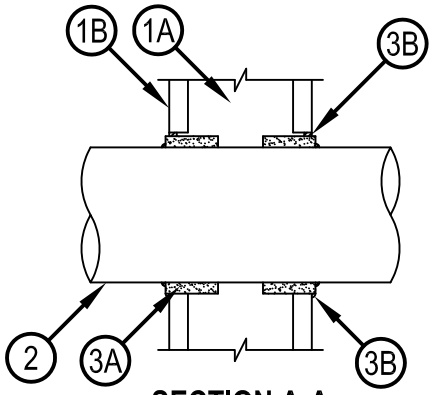
CANADA ONLY

Classified by
Underwriters Laboratories, Inc.
to CAN/ULC-S115

System No. W-L-2031

F Ratings -- 1 Hr (See Item 1)
FT Rating -- 0 Hr
FH Rating -- 0 Hr
FTH Rating -- 0 Hr





SECTION A-A

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

1. 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, 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 51 by 102 mm (2 by 4 in.)lumber spaced 406 mm (16 in. OC). Steel studs to be min 89 mm (3-1/2 in.) wide and spaced max 610 mm (24 in. OC).
   B. Gypsum Board* — One layer of nom 16 mm (5/8 in.) thick gypsum board, as specified in the individual Wall and Partition Design. See Table under Item 3B for max diam of opening.
2. Through-Penetrants — One nonmetallic pipe installed within the firestop system. See Table under Item 3B for annular space required in the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:
   A. Polyvinyl Chloride (PVC) Pipe — Nom 102 mm (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 system.
   B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 102 mm (4 in.) diam (or smaller) SDR11 or SDR 13.5 CPVC pipe for use in closed (process or supply) piping system.
   C. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 102 mm (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 system.
   D. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 102 mm (4 in.) diam (or smaller) SDR 11 CPVC for use in closed (process or supply) piping systems.
   IPEX INC — AquaRise
   E. Flame Retardant Polypropylene (FRPP) Pipe — Nom 102 mm (4 in.) diam (or smaller) Schedule 40 (or heavier) FRPP pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
   F. Rigid Nonmetallic Conduit+ — Nom 102mm (4 in.) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).

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

A. Fill, Void or Cavity Material* — Wrap Strip — See Table under Item 3B for min size of intumescent wrap strip. The wrap strip is continuously wrapped around the outer circumference of the pipe once and slid into the annular space such that approx 3 mm (1/8 in.) of the wrap strip protrudes from wall surface. Wrap strip is held in place with integral fastening tape. Wrap strip installed on both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 648S - 1.5", CP 648S - 2", CP 648S - 3", CP 648S - 4"

B. Fill, Void or Cavity Material* — Caulk — Min 6 mm (1/4 in.) thickness of fill material applied within the annulus, flush with both surfaces of wall. An additional min. 3 mm(1/8 in) bead of fill material also applied at wrap strip/gypsum wall interface and wrap strip/pipe interface.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant or FS-ONE MAX Intumescent Sealant.

Nom Pipe Diam, mm (in.)	Wrap Strip	Wrap Strip Size, thick. x width, mm (in.)	Max Diam of Opening, mm (in.)	Annular Space, mm (in.)	
				Min	Max
38 (1-1/2)	CP 648S - 1.5" US	5 x 25 (3/16 x 1)	60 (2-3/8)	5 (3/16)	8 (5/16)
51 (2)	CP 648S - 2" US	5 x 25 (3/16 x 1)	76 (3)	5 (3/16)	8 (5/16)
76 (3)	CP 648S - 3" US	5 x 44 (3/16 x 1-3/4)	102 (4)	5 (3/16)	8 (5/16)
102 (4)	CP 648S - 4" US	10 x 44 (3/8 x 1-3/4)	137 (5-3/8)	10 (3/8)	13 (1/2)

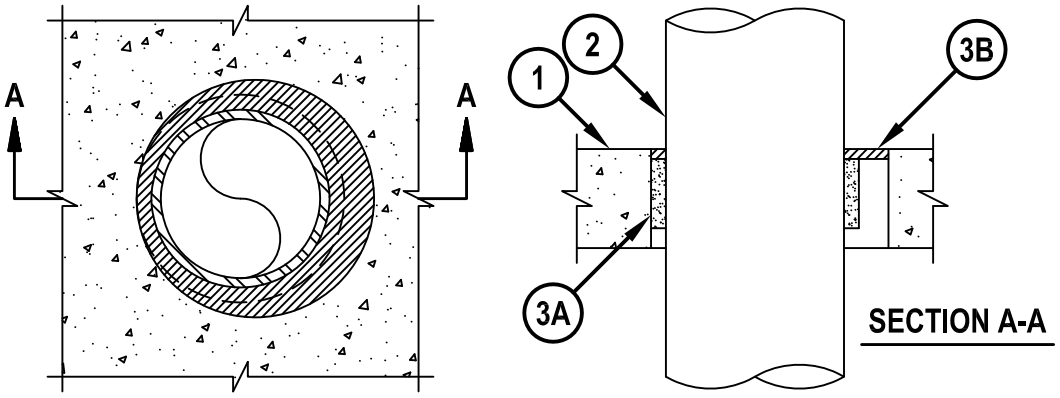
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

CANADA ONLY

Classified by
Underwriters Laboratories, Inc.
to CAN/ULC-S115

System No. C-AJ-2036

F Rating - 2 Hr
FT Rating - 0 Hr
FH Rating - 0 Hr
FTH Rating - 0 Hr



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

1. Floor or Wall Assembly — Min 64 mm (2-1/2 in.) thick reinforced lightweight or normal weight (1600-2400 kg/cu meter or 100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. See Table under Item 3B for max diam of opening. See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through-Penetrants — One nonmetallic pipe or conduit installed within the firestop system. See Table under Item 3B for annular space required in the firestop system. Pipe to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of nonmetallic pipes may be used:
   - A. Polyvinyl Chloride (PVC) Pipe — Nom 102 mm (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.
   - B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 102 mm (4 in.) diam (or smaller) SDR11 or SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.
   - C. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 102 mm (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 system.
   - D. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 102 mm (4 in.) diam (or smaller) SDR 11 CPVC for use in closed (process or supply) piping systems.
     IPEX INC — AquaRise
   - F. Rigid Nonmetallic Conduit+ — Nom 102mm (4 in.) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA No. 70).

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

A. Fill, Void or Cavity Material* - Wrap Strip — See Table under Item 3B for min size of intumescent wrap strip. The wrap strip is continuously wrapped around the outer circumference of the pipe once and slid into the annular space and held in place with integral fastening tape. The top edge of the wrap strip shall be recessed max 13 mm (1/2 in.) from the top surface of the concrete floor. In walls, the wrap shall be installed on both sides of the wall such that the exposed edge of the wrap strip is recessed 6 mm (1/4 in.) from each side of the wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 648S - 1.5" US, CP 648S - 2" US, CP 648S - 3" US and CP 648S - 4" US

B. Fill, Void or Cavity Material* - Caulk — Min 6 mm (1/4 in.) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-One Sealant or FS-ONE MAX Intumescent Sealant

Nom Pipe Diam, mm (in.)	Wrap Strip	Wrap Strip Size, thick. x width, mm (in.)	Max Diam of Opening, mm (in.)	Annular Space, mm (in.)	
				Min	Max
38(1-1/2)	CP648S -1.5" US	5 x 25 (3/16 x 1)	76 (3)	5(3/16)	19 (3/4)
51 (2)	CP 648S - 2" US	5 x 25 (3/16 x 1)	89(3-1/2)	5(3/16)	24(15/16)
76 (3)	CP 648S - 3" US	5 x 44(3/16 x 1-3/4)	102 (4)	5(3/16)	8(5/16)
102 (4)	CP 648S - 4" US	10x 44 (3/8 x 1-3/4)	152 (6)	10(3/8)	29(1-1/8)

* 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

High-performance intumescent firestop sealant FS-ONE MAX

Applications

- For effectively sealing most common through penetrations in a variety of base materials
- For use on concrete, masonry and drywall
- Mixed and multiple penetrations
- Metal pipe penetrations: copper, steel and EMT
- Insulated metal pipe penetrations: steel and copper
- Plastic pipe penetrations: closed or vented

Advantages

- US-produced: “Buy American” compliant
- One product for a variety of common through penetrations
- Cost-effective, easy-to-use solution
- Water-based and paintable
- Industry-leading VOC results
- Ethylene glycol-free

Chemical resistant

Mold and mildew resistant

W rated

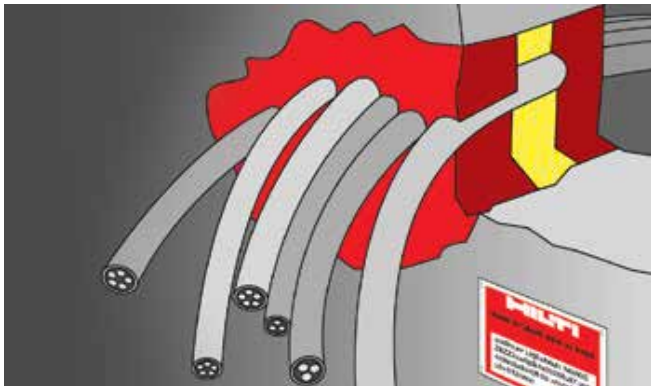
FBC SYSTEM COMPATIBLE

W US Intertek

FM APPROVED

CLASSIFIED C UL US

FILL, VOID OR CAVITY MATERIAL FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS SEE UL FIRE RESISTANCE DIRECTORY 66Y7



Technical data	
Chemical basis	Water-based acrylic dispersion
Approx. Density	84.3 lb/ft³
Color	Red
Application temperature range	41 - 104 °F
Approx. cure time[1)]	4 mm/3 days
Temperature resistance range	-4 to 212 °F
Mold and mildew performance	Class 0 (ASTM G21-96)
Mold and mildew resistance	Yes
Surface burning characteristics UL 723 (ASTM E84)	Flame spread: 0 Smoke development: 10
Tested in accordance with	UL 1479, ASTM E814, ASTM E84, CAN/ ULC-S115, ASTM G21, ASTM E90
California State fire marshal approval	CSFM Listing 4485-1200:0108 for FS-ONE MAX Intumescent Firestop Sealant
Expansion ratio (unrestricted, up to)	1:5

[1)] at 75°F/24°C, 50% relative humidity

Order Designation	Package Content	Item number
FS-ONE MAX 20oz foil (3 case + disp)	1x Foil pack dispenser manual CS 270-P1, 75x Firestop sealant FS-ONE MAX 20 oz foil	**3530252**
FS-ONE MAX 10oz tube (1 case)	12x Firestop sealant FS-ONE MAX 10 oz cartridge	**3530249**
FS-ONE MAX 5 gallon (18 pails)	18x Firestop sealant FS-ONE MAX 5 gallon pail	**3530263**
FS-ONE MAX 20oz foil (1 case)	25x Firestop sealant FS-ONE MAX 20 oz foil	**3530250**
FS-ONE MAX 20oz foil (3 cases)	75x Firestop sealant FS-ONE MAX 20 oz foil	**3530251**
FS-ONE MAX 20oz Foil-Pallet	600x FSONE-MAX 20 oz foil, 290x Bulk Shipping Condition	**3534713**
FS-ONE MAX 10 oz cartridge		**2101531**
FS-ONE MAX 5 gallon pail		**2101533**

12/16 DBS

CERTIFICATE OF COMPLIANCE

Certificate Number	20150108-R13240
Report Reference	R13240
Issue Date	2015-January-08

Issued to:	Hilti Construction Chemicals, Div of Hilti Inc. 5400 S 122nd East Ave Tulsa, OK 74146
This is to certify that representative samples of	Fill, Void or Cavity Materials Fill, Void or Cavity Materials Certified for Canada FS-ONE MAX Intumescent Sealant for use in Through-Penetration Firestop and Joint Systems in the UL Fire Resistance Directory and in the Products Certified for Canada Directory. Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	ANSI/UL 1479, "Fire Tests of Through-Penetration Firestops," – Edition 4 ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems," – Edition 4 – Revision Date 2014/12/17 CAN/ULC-S115, "Standard Method of Fire Tests of Firestop Systems." – Edition 4 – Issue Date 2011/06/01
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

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

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

Look for the UL Classification Mark on the product.

William R. Carney, Director, North American Certification Programs

UL LLC

FS-ONE MAX; CFS-FIL

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 02/06/2019 Revision date: 02/06/2019 Supersedes: 12/17/2015 Version: 1.3

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form	Mixture
Trade name	FS-ONE MAX; CFS-FIL
Product code	BU Fire Protection

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended uses and restrictions	For professional users only

1.3. Details of the supplier of the safety data sheet

Hilti (Canada) Corp.
2360 Meadowpine Boulevard
L5N 6S2 Mississauga, Ontario - Canada
T +1905 8139200
1-800-363-4458 toll free - F +1 905 813 9009

Supplier
Hilti (Canada) Corp.
2360 Meadowpine Boulevard
L5N 6S2 Mississauga, Ontario - Canada
T +1905 8139200
1-800-363-4458 toll free - F +1 905 813 9009

Department issuing data specification sheet
Hilti AG
Feldkircherstraße 100
9494 Schaan - Liechtenstein
T +423 234 2111
chemicals.hse@hilti.com

1.4. Emergency telephone number

Emergency number	Chem-Trec Tel.: 1 800 424 9300 (USA, PR, Virgin Islands, Canada) Tel.: 703 527 3887 (Other countries)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS CA)

Not classified

2.2. Label elements

GHS CA labelling

No labelling applicable

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation	Get medical advice/attention if you feel unwell.
First-aid measures after skin contact	Wash skin with plenty of water. If skin irritation occurs: Get medical advice/attention.
First-aid measures after eye contact	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
First-aid measures after ingestion	Get medical advice/attention if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media	Water spray. Dry powder. Foam. Carbon dioxide.

5.2. Unsuitable extinguishing media

No additional information available

5.3. Specific hazards arising from the hazardous product

No additional information available

5.4. Special protective equipment and precautions for fire-fighters

Protection during firefighting	Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

No additional information available

6.2. Methods and materials for containment and cleaning up

Methods for cleaning up	Mechanically recover the product.

6.3. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection"

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	Wear personal protective equipment.
Hygiene measures	Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions	Keep cool. Store in a dry place.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Additional information	The product has a pasty consistency. Exposure limit values for respirable dusts are not relevant for this product.

8.2. Appropriate engineering controls

No additional information available

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment	Protective clothing. Safety glasses. Gloves.

Hand protection	Protective gloves. EN 374.
Eye protection	Chemical goggles or safety glasses.
Skin and body protection	Wear suitable protective clothing.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Solid
Appearance	Pasty.
Molecular mass	Not determined
Colour	red.
Odour	characteristic.
Odour threshold	Not determined
pH	≈ 7.85
Relative evaporation rate (butylacetate=1)	No data available
Melting point	Not applicable
Freezing point	No data available
Boiling point	No data available
Flash point	Not applicable
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Flammability (solid, gas)	Not applicable
Vapour pressure	No data available
Relative vapour density at 20 °C	No data available

Relative density	No data available
Density	≈ 1.35 g/cm³
Solubility	No data available
Log Pow	No data available
Viscosity, kinematic	No data available
Viscosity, dynamic	No data available
Explosive properties	No data available
Oxidising properties	No data available
Explosive limits	No data available

9.2. Other information

VOC content	9 g/l

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable under normal conditions.
Possibility of hazardous reactions	No dangerous reactions known under normal conditions of use.
Conditions to avoid	None under recommended storage and handling conditions (see section 7).
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	Not classified
Acute toxicity (dermal)	Not classified
Acute toxicity (inhalation)	Not classified
Skin corrosion/irritation	Not classified pH: ≈ 7.85
Serious eye damage/irritation	Not classified pH: ≈ 7.85
Respiratory or skin sensitization	Not classified
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified
Reproductive toxicity	Not classified
STOT-single exposure	Not classified
STOT-repeated exposure	Not classified
Aspiration hazard	Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
No additional information available

12.4. Mobility in soil
No additional information available

12.5. Other adverse effects
No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods
Waste treatment methods: Dispose in a safe manner in accordance with local/national regulations.

Product/Packaging disposal recommendations: Dispose in a safe manner in accordance with local/national regulations.

SECTION 14: Transport information
In accordance with ADR / RID / IMDG / IATA / ADN

ADR	IMDG	IATA	RID
14.1. UN number			
Not applicable	Not applicable	Not applicable	Not applicable
14.2. UN proper shipping name			
Not applicable	Not applicable	Not applicable	Not applicable
14.3. Transport hazard class(es)			
Not applicable	Not applicable	Not applicable	Not applicable
14.4. Packing group			
Not applicable	Not applicable	Not applicable	Not applicable
14.5. Environmental hazards			
Dangerous for the environment : No	Dangerous for the environment : No Marine pollutant : No	Dangerous for the environment : No	Dangerous for the environment : No
No supplementary information available			

14.6. Special precautions for user

- Overland transport

- Transport by sea

No data available

- Air transport

No data available

- Rail transport

Carriage prohibited (RID): No

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

SECTION 15: Regulatory information

15.1. National regulations

No additional information available

15.2. International regulations

No additional information available

SECTION 16: Other information

SDS Major/Minor	None
Date of issue	02-06-2019
Revision date	02-06-2019
Supersedes	12-17-2015

Indication of changes:

Section	Changed item	Change	Comments
		Modified	Layout

SDS_CA_Hilti

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

June 17, 2019

To Whom It May Concern:

Re: **Hilti FS-ONE Max Firestop – LEED Info**.

Item Numbers:

2101531
2101532
2101533

The Hilti FS-ONE MAX Firestop is manufactured in the United States

There is no post-consumer or post-industrial recycled content in FS-ONE MAX and it cannot be recycled. The VOC content for FS-ONE MAX is 9 grams/liters.

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

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

Sincerely,

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

Rev. Date: 5/30/19

The manufacturing plant location on this certificate has been provided for LEED reporting purposes only. It should never be used for Country of Origin certification or a representation of compliance/non-compliance with Buy American or Buy America requirements, as those requirements differ.

The manufacturing plant location(s) identified on the certificate represent standard Hilti catalog products only. "Specially" produced non-catalog Hilti products may have differing manufacturing plant locations.

Contact your Hilti representative in cases of "specially" produced products for a custom LEED certificate.

Firestop Gun Grade Silicone Sealant CFS-S SIL GG

Product description

- A silicone based firestop sealant that provides maximum movement in fire-rated joints, and seals through-penetration applications

Product features

- Halogen and solvent free
- Asbestos free
- Simple to use and apply
- Good adhesion without use of a primer
- Smoke, fume, water and UV resistant
- Excellent movement capability, meets 500 cycle requirements (ASTM E 1966, UL 2079, and CAN/ULC-S115)
- Meets Class I W-rating requirements
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

- Sealing construction/expansion joints
- Top-of-wall joints
- Metal pipes
- Cable bundles
- HVAC penetrations

For use with

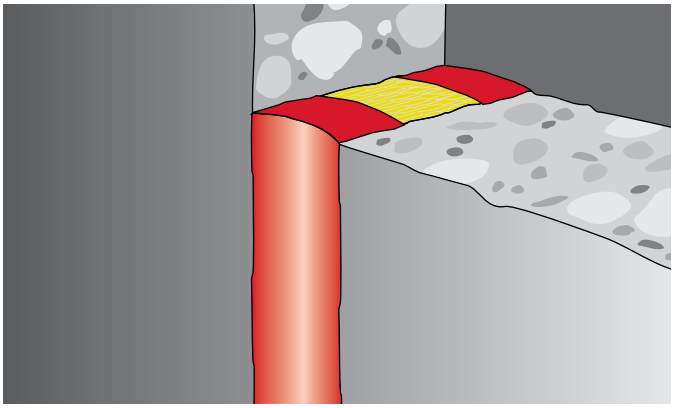
- Various base materials such as masonry, concrete, metal, etc.
- Wall and floor assemblies rated up to 4 hours

Examples

- Where a gypsum wall assembly meets the underside of a metal or concrete deck
- Sealing expansion joints to impede the passage of fire, smoke and toxic fumes
- Sealing around penetrations through fire-rated assemblies

Installation instructions

- Refer to what is included in the package, the MSDS, and the applicable listing.



Technical Data*	CFS-S SIL GG
Chemical basis	Neutral elastic silicone
Density	Approx. 1.4 g/cm³
Color	Available in red, white, and gray
Application temperature	40°F to 104°F (5°C to 40°C)
Skin-forming time	Approx. 15 min.
Curing time	Approx. 2 mm / 3 days
Volume shrinkage	Approx. 0 – 5%
Movement capability (CAN/ULC-S115)	Approx. 33%
Temperature resistance	–40°F to 300°F (–40°C to 149°C)
Surface burning characteristics (CAN S102)	Flame spread: 0 Smoke development: 35
Sound transmission classification (ASTM E 90-09)	59 (Relates to specific construction)
Tested in accordance with	UL 2079 ASTM E 814 ASTM E 1966 ASTM C 920 UL 1479 ASTM E 84 ASTM G21 CAN S102 CAN/ULC-S115

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

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEMS AND
JOINT SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY
5BP5

FM APPROVED

FBC SYSTEM COMPATIBLE
Visit fbcsystemcompatible.com.
FBC™ is a trademark of
the Lubrizol Corporation.

W rated SYSTEMS AVAILABLE

Hilti. Outperform. Outlast.

CERTIFICATE OF COMPLIANCE

Certificate Number	20131115-R13240
Report Reference	R13240
Issue Date	2013-November-15

Issued to:	Hilti Construction Chemicals, Div of Hilti Inc. 5400 S 122nd East Ave Tulsa, OK 74146
This is to certify that representative samples of	Fill, Void or Cavity Materials Fill, Void or Cavity Materials Certified for Canada CFS-S SIL GG and CFS-S SIL SL for use in Through-Penetration Firestop and Joint Systems in the UL Fire Resistance Directory and in the Products Certified for Canada Directory. Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	ANSI/UL 1479, "Fire Tests of Through-Penetration Firestops," – Edition 3 – Revision Date 2012/10/19 ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems," – Edition 4 – Revision Date 2012/12/12 CAN/ULC-S115, "Standard Method of Fire Tests of Firestop Systems." – Edition 4 – Issue Date 2011/06/01
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

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

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

Look for the UL Classification Mark on the product.

William R. Carney, Director, North American Certification Programs

UL LLC

Safety Data Sheet
acc. to ISO 11014

Printing date 05/19/2015 Version number 3 Reviewed on 05/19/2015

*

1 Identification

· **Product identifier**

· **Trade name:** **Hilti Firestop Sealant CFS-S SIL GG**
Hilti Firestop Sealant CFS-S SIL SL
· **Relevant identified uses of the substance or mixture and uses advised against**
· **Sector of Use** Building and construction work
· **Application of the substance / the mixture**
Assembly foam
Construction chemicals

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Hilti (Canada) Corp.
2360 Meadowpine Boulevard
Mississauga, Ontario L5N 6S2
Phone: (800) 363-4458
Fax: (800) 363-4459

· **Information department:**
chemicals.hse@hilti.com
see section 16
· **Emergency telephone number:**
Chem-Trec
Tel.: 1 800 424 9300
Tox Info Suisse - 24 h Service
Tel.: 0041 / 44 251 51 51 (international)
.

*

2 Hazard(s) identification

· **Classification of the substance or mixture**
Skin Sens. 1 H317 May cause an allergic skin reaction.
Repr. 2 H361 Suspected of damaging fertility or the unborn child.

· **Label elements**
· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS07 GHS08

· **Signal word** Warning

· **Hazard-determining components of labeling:**
Methyl-tris(methylethylketoximo)-silan
3-aminopropyltriethoxysilane
· **Hazard statements**
H317 May cause an allergic skin reaction.
H361 Suspected of damaging fertility or the unborn child.
· **Precautionary statements**
P261 Avoid breathing vapours.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with plenty of water.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
· **Hazard description:**
· **WHMIS classification**

D2A - Very toxic material causing other toxic effects

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

· **Additional information:**
In use the product releases 2-butanone oxime (methyl ethyl ketoxime; MEKO) (<4%) which vaporises.
In cases of prolonged exposure MEKO may damage nasal membranes. If MEKO is inhaled in large quantities over prolonged periods of time there may be irreversible damage to health:
H351: Suspected of causing cancer.

(Contd. on page 2)

Safety Data Sheet
acc. to ISO 11014

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(Contd. of page 1)

*
3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:**

Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**		
22984-54-9	Methyl-tris(methylethylketoximo)-silan	2.5-10%
919-30-2	3-aminopropyltriethoxysilane	<2.5%
556-67-2	octamethylcyclotetrasiloxane	0.1-1%

· **Additional information** For the wording of the listed risk phrases refer to section 16.

4 First-aid measures

· **Description of first aid measures**
· **General information** Immediately remove any clothing soiled by the product.
· **After inhalation** Take affected persons into fresh air and keep quiet.
· **After skin contact** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing** Do not induce vomiting; immediately call for medical help.
· **Information for doctor**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed** No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents** CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents** Water with full jet.
· **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Carbon monoxide (CO)
Carbondioxide (CO2)
In certain fire conditions, traces of other toxic gases cannot be excluded.
· **Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Ensure adequate ventilation

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Wear protective clothing.
Ensure adequate ventilation
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Pick up mechanically.
Dispose contaminated material as waste according to item 13.
· **Reference to other sections**
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling**
· **Precautions for safe handling**
The usual precautionary measures for handling chemicals should be followed.
Use only in well ventilated areas.
Do not inhale the vapours released during application.
Keep away from heat and direct sunlight.
· **Information about protection against explosions and fires:** Keep ignition sources away - Do not smoke.

· **Conditions for safe storage, including any incompatibilities**
· **Storage**
· **Requirements to be met by storerooms and receptacles:** Keep in a cool, dry and dark place; 41 °F / 5 °C to 77 °F / 25 °C.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** None.

· **Storage class** 11
· **Specific end use(s)** No further relevant information available.

(Contd. on page 3)

Safety Data Sheet
acc. to ISO 11014

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(Contd. of page 2)

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8 Exposure controls/personal protection

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
· **CAS No. Designation of material % Type Value Unit**

· **Additional Occupational Exposure Limit Values for possible hazards during processing:**	
96-29-7 Methylethylketoxime (MEKO) (<4%)	
WEEL Long-term value	10 ppm DSEN

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment**
· **General protective and hygienic measures**
The usual precautionary measures for handling chemicals should be followed.
Do not eat, drink, smoke or sniff while working.
Wash hands before breaks and at the end of work.
Immediately remove all soiled and contaminated clothing
Do not inhale gases / fumes / aerosols.
· **Breathing equipment:**
Use suitable respiratory protective device in case of insufficient ventilation.
Filter A
· **Recommended filter device for short term use:**
The use of an OSHA or NIOSH approved mask for dust and mist environment is recommended.
· **Protection of hands:**

Protective gloves.

EN 374
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
Nitrile rubber, NBR
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:**

Tightly sealed goggles.

EN 166 + EN 170
· **Body protection:**

Protective work clothing.

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Pasty
Color:	red / white
· **Odor:**	Odorless
· **Odour threshold:**	Not determined.
· **pH-value:**	Not determined
· **Change in condition**	
Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	Not determined
· **Flash point:**	211 °C (412 °F) (DIN 53213)
· **Flammability (solid, gaseous)**	Not determined.

(Contd. on page 4)

Safety Data Sheet
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(Contd. of page 3)

· **Ignition temperature:**	370 °C (698 °F)
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure:**	Not applicable.
· **Density at 20 °C (68 °F):**	1.38 g/cm³ (11.516 lbs/gal) (DIN 51757)
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water:	Insoluble
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
dynamic:	Not determined
kinematic:	Not determined
· **Other information**	CFS-S SIL GG - VOC Content: 48 g/l (EPA Method 24) CFS-S SIL SL - VOC Content: 50 g/l (EPA Method 24)

10 Stability and reactivity

· **Reactivity**
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known
· **Conditions to avoid** Protect from humidity and water.
· **Incompatible materials:**
strong oxidizing agents
acids
Alkaline hydroxides
water
· **Hazardous decomposition products:** No dangerous decomposition products known

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
22984-54-9 Methyl-tris(methylethylketoximo)-silan		
Oral	LD50	2000-3000 mg/kg (rat)

· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** Strong irritant with the danger of severe eye injury.
· **Sensitization:** Sensitization possible through skin contact.
· **Additional toxicological information:**
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
Irritant

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**
None of the ingredients is listed.

· **NTP (National Toxicology Program)**
None of the ingredients is listed

· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.

(Contd. on page 5)

(Contd. of page 4)

· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
Hand over to hazardous waste disposers.

· **European waste catalogue:**	
08 04 09*	waste adhesives and sealants containing organic solvents or other dangerous substances

· **Uncleaned packagings:**
· **Recommendation:**
Dispose of packaging according to regulations on the disposal of packagings.
Non contaminated packagings can be reused.

14 Transport information

· **UN-Number** · **DOT, TDG, ADN, IMDG, IATA**	Void
· **UN proper shipping name** · **DOT, TDG, ADN, IMDG, IATA**	Void
· **Transport hazard class(es)** · **DOT, TDG, ADN, IMDG, IATA** · **Class**	Void
· **Packing group** · **DOT, TDG, IMDG, IATA**	Void
· **Environmental hazards:** · **Marine pollutant:**	No
· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **UN "Model Regulation":**	-

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 313 (Specific toxic chemical listings):**
None of the ingredients are listed.

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65:**

· **Chemicals known to cause cancer:**
None of the ingredients are listed.

· **Cancerogenity categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients is listed.

· **MAK (German Maximum Workplace Concentration)**
None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **National regulations**

· **Information about limitation of use:** Employment restrictions concerning young persons must be observed.
· **Chemical safety assessment:** not required.

(Contd. on page 6)

Safety Data Sheet
acc. to ISO 11014

(Contd. of page 5)

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing MSDS:**
Hilti Corporation
Business Unit Chemicals
Quality/Safety/Environment
FL-9494 Schaan / Liechtenstein

chemicals.hse@hilti.com
Tel.: +423 234 3004
FAX.: +423 234 3462

· **Date of preparation / last revision** 05/19/2015 / 2

· **Abbreviations and acronyms:**
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
Repr. 2: Reproductive toxicity, Hazard Category 2

· *** Data compared to the previous version altered.**

August 26, 2015

To Whom It May Concern:

Re: **Hilti CFS-S SIL GG Firestop Sealant - LEED Information**

Item Numbers:

2076729
2076881
2076882
2076883
2077322

The Hilti CFS-S SIL GG Firestop Sealant is manufactured in Toronto, Ontario.

There is no post-consumer or post-industrial content in CFS-S SIL GG and it cannot be recycled. The CFS-S SIL GG does not contain any Rapidly Renewable Materials. The VOC content for CFS-S SIL GG is 48.0 grams/liter.

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

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

Sincerely,

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

Rev. Date: 8/14/15

The manufacturing plant location on this certificate has been provided for LEEDS reporting purposes only. It should never be used for Country of Origin certification or a representation of compliance/non-compliance with Buy American or Buy America requirements, as those requirements differ.

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Contact your Hilti representative in cases of “specially” produced products for a custom LEEDS certificates.

Firestop Self Leveling Silicone Sealant CFS-S SIL SL

Product description

- Self-leveling, single-component, silicone-based firestop sealant for use with through-penetrations as well as construction joints in floors.

Product features

- Self-leveling–requires no tooling
- Excellent elongation/compression properties
- Meets 500 cycle requirements (ASTM E 1966, UL 2079, and CAN/ULC-S115)
- Smoke, fume, water and UV resistant
- Meets Class I W-rating requirements
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

- Sealing construction/expansion joints
- Metal pipes
- Cable bundles
- Sealing multiple penetrations in small or large openings

For use with

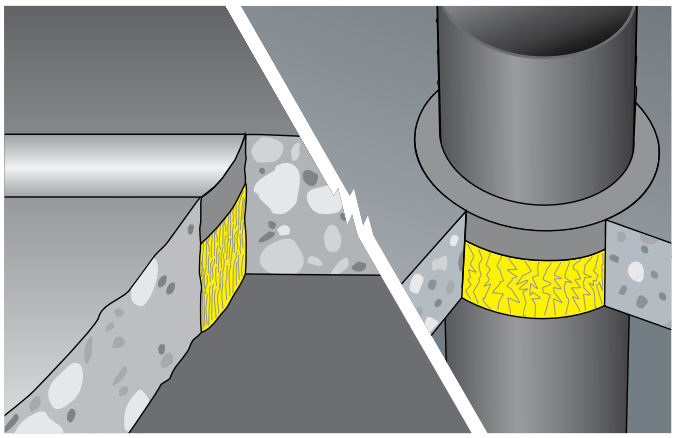
- Concrete floors rated up to 4 hours

Examples

- Penetrations for metal pipes between floor levels
- Construction joints and expansion joints in floors

Installation instructions

- Refer to what is included in the package, the MSDS, and the applicable listing.



Technical Data*	CFS-S SIL SL
Chemical basis	Neutral elastic silicone
Density	Approx. 1.4 g/cm³
Color	Gray
Application temperature	40°F to 104°F (5°C to 40°C)
Skin forming time	Approx. 15 min
Curing time	Approx. 2 mm/3 days
Volume shrinkage	Approx. 0 – 5%
Joint movement capability (CAN/ULC-S115)	Approx. 33%
Temperature resistance	–40°F to 300°F (–40°C to 149°C)
Surface burning characteristics (ASTM E 84-12)	Flame Spread: 0 Smoke Development: 50
Sound transmission classification (ASTM E 90-09)	53 (Relates to specific construction)
Tested in accordance with	UL 1479 ASTM E 1966 UL 2079 ASTM E 814 ASTM E 2307 ASTM E 84 ASTM G21 CAN/ULC-S115

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

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL FOR USE IN THROUGH-PENETRATION FIRESTOP SYSTEMS, JOINT SYSTEMS AND PERIMETER FIRE CONTAINMENT SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY 5BP5

FM APPROVED

W rated SYSTEMS AVAILABLE

FBC SYSTEM COMPATIBLE
Visit fbcsystemcompatible.com. FBC™ is a trademark of the Lubrizol Corporation.

Hilti Firestop
Saving lives through innovation and education

Hilti. Outperform. Outlast.

CERTIFICATE OF COMPLIANCE

Certificate Number	20131115-R13240
Report Reference	R13240
Issue Date	2013-November-15

Issued to:	Hilti Construction Chemicals, Div of Hilti Inc. 5400 S 122nd East Ave Tulsa, OK 74146
This is to certify that representative samples of	Fill, Void or Cavity Materials Fill, Void or Cavity Materials Certified for Canada CFS-S SIL GG and CFS-S SIL SL for use in Through-Penetration Firestop and Joint Systems in the UL Fire Resistance Directory and in the Products Certified for Canada Directory. Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	ANSI/UL 1479, "Fire Tests of Through-Penetration Firestops," – Edition 3 – Revision Date 2012/10/19 ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems," – Edition 4 – Revision Date 2012/12/12 CAN/ULC-S115, "Standard Method of Fire Tests of Firestop Systems." – Edition 4 – Issue Date 2011/06/01
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

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

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

Look for the UL Classification Mark on the product.

William R. Carney, Director, North American Certification Programs

UL LLC

Safety Data Sheet
acc. to ISO 11014

Printing date 05/19/2015 Version number 3 Reviewed on 05/19/2015

*

1 Identification

· **Product identifier**

· **Trade name:** **Hilti Firestop Sealant CFS-S SIL GG**
Hilti Firestop Sealant CFS-S SIL SL
· **Relevant identified uses of the substance or mixture and uses advised against**
· **Sector of Use** Building and construction work
· **Application of the substance / the mixture**
Assembly foam
Construction chemicals

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Hilti (Canada) Corp.
2360 Meadowpine Boulevard
Mississauga, Ontario L5N 6S2
Phone: (800) 363-4458
Fax: (800) 363-4459

· **Information department:**
chemicals.hse@hilti.com
see section 16
· **Emergency telephone number:**
Chem-Trec
Tel.: 1 800 424 9300
Tox Info Suisse - 24 h Service
Tel.: 0041 / 44 251 51 51 (international)
.

*

2 Hazard(s) identification

· **Classification of the substance or mixture**
Skin Sens. 1 H317 May cause an allergic skin reaction.
Repr. 2 H361 Suspected of damaging fertility or the unborn child.

· **Label elements**
· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS07 GHS08

· **Signal word** Warning

· **Hazard-determining components of labeling:**
Methyl-tris(methylethylketoximo)-silan
3-aminopropyltriethoxysilane
· **Hazard statements**
H317 May cause an allergic skin reaction.
H361 Suspected of damaging fertility or the unborn child.
· **Precautionary statements**
P261 Avoid breathing vapours.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with plenty of water.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
· **Hazard description:**
· **WHMIS classification**

D2A - Very toxic material causing other toxic effects

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

· **Additional information:**
In use the product releases 2-butanone oxime (methyl ethyl ketoxime; MEKO) (<4%) which vaporises.
In cases of prolonged exposure MEKO may damage nasal membranes. If MEKO is inhaled in large quantities over prolonged periods of time there may be irreversible damage to health:
H351: Suspected of causing cancer.

(Contd. on page 2)

Safety Data Sheet
acc. to ISO 11014

Printing date 05/19/2015 **Version number 3** **Reviewed on 05/19/2015**

(Contd. of page 1)

*
3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:**

Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**		
22984-54-9	Methyl-tris(methylethylketoximo)-silan	2.5-10%
919-30-2	3-aminopropyltriethoxysilane	<2.5%
556-67-2	octamethylcyclotetrasiloxane	0.1-1%

· **Additional information** For the wording of the listed risk phrases refer to section 16.

4 First-aid measures

· **Description of first aid measures**
· **General information** Immediately remove any clothing soiled by the product.
· **After inhalation** Take affected persons into fresh air and keep quiet.
· **After skin contact** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing** Do not induce vomiting; immediately call for medical help.
· **Information for doctor**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed** No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents** CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents** Water with full jet.
· **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
Carbon monoxide (CO)
Carbondioxide (CO2)
In certain fire conditions, traces of other toxic gases cannot be excluded.
· **Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Ensure adequate ventilation

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Wear protective clothing.
Ensure adequate ventilation
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Pick up mechanically.
Dispose contaminated material as waste according to item 13.
· **Reference to other sections**
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling**
· **Precautions for safe handling**
The usual precautionary measures for handling chemicals should be followed.
Use only in well ventilated areas.
Do not inhale the vapours released during application.
Keep away from heat and direct sunlight.
· **Information about protection against explosions and fires:** Keep ignition sources away - Do not smoke.

· **Conditions for safe storage, including any incompatibilities**
· **Storage**
· **Requirements to be met by storerooms and receptacles:** Keep in a cool, dry and dark place; 41 °F / 5 °C to 77 °F / 25 °C.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** None.

· **Storage class** 11
· **Specific end use(s)** No further relevant information available.

(Contd. on page 3)

Safety Data Sheet
acc. to ISO 11014

Printing date 05/19/2015 **Version number 3** **Reviewed on 05/19/2015**

(Contd. of page 2)

*
8 Exposure controls/personal protection

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
· **CAS No. Designation of material % Type Value Unit**

· **Additional Occupational Exposure Limit Values for possible hazards during processing:**	
96-29-7 Methylethylketoxime (MEKO) (<4%)	
WEEL Long-term value	10 ppm DSEN

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment**
· **General protective and hygienic measures**
The usual precautionary measures for handling chemicals should be followed.
Do not eat, drink, smoke or sniff while working.
Wash hands before breaks and at the end of work.
Immediately remove all soiled and contaminated clothing
Do not inhale gases / fumes / aerosols.
· **Breathing equipment:**
Use suitable respiratory protective device in case of insufficient ventilation.
Filter A
· **Recommended filter device for short term use:**
The use of an OSHA or NIOSH approved mask for dust and mist environment is recommended.
· **Protection of hands:**

Protective gloves.

EN 374
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
Nitrile rubber, NBR
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:**

Tightly sealed goggles.

EN 166 + EN 170
· **Body protection:**

Protective work clothing.

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Pasty
Color:	red / white
· **Odor:**	Odorless
· **Odour threshold:**	Not determined.
· **pH-value:**	Not determined
· **Change in condition**	
Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	Not determined
· **Flash point:**	211 °C (412 °F) (DIN 53213)
· **Flammability (solid, gaseous)**	Not determined.

(Contd. on page 4)

Safety Data Sheet
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(Contd. of page 3)

· **Ignition temperature:**	370 °C (698 °F)
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure:**	Not applicable.
· **Density at 20 °C (68 °F):**	1.38 g/cm³ (11.516 lbs/gal) (DIN 51757)
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water:	Insoluble
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
dynamic:	Not determined
kinematic:	Not determined
· **Other information**	CFS-S SIL GG - VOC Content: 48 g/l (EPA Method 24) CFS-S SIL SL - VOC Content: 50 g/l (EPA Method 24)

10 Stability and reactivity

· **Reactivity**
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known
· **Conditions to avoid** Protect from humidity and water.
· **Incompatible materials:**
strong oxidizing agents
acids
Alkaline hydroxides
water
· **Hazardous decomposition products:** No dangerous decomposition products known

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
22984-54-9 Methyl-tris(methylethylketoximo)-silan		
Oral	LD50	2000-3000 mg/kg (rat)

· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** Strong irritant with the danger of severe eye injury.
· **Sensitization:** Sensitization possible through skin contact.
· **Additional toxicological information:**
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
Irritant

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**
None of the ingredients is listed.

· **NTP (National Toxicology Program)**
None of the ingredients is listed

· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.

(Contd. on page 5)

(Contd. of page 4)

· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
Hand over to hazardous waste disposers.

· **European waste catalogue:**	
08 04 09*	waste adhesives and sealants containing organic solvents or other dangerous substances

· **Uncleaned packagings:**
· **Recommendation:**
Dispose of packaging according to regulations on the disposal of packagings.
Non contaminated packagings can be reused.

14 Transport information

· **UN-Number** · **DOT, TDG, ADN, IMDG, IATA**	Void
· **UN proper shipping name** · **DOT, TDG, ADN, IMDG, IATA**	Void
· **Transport hazard class(es)** · **DOT, TDG, ADN, IMDG, IATA** · **Class**	Void
· **Packing group** · **DOT, TDG, IMDG, IATA**	Void
· **Environmental hazards:** · **Marine pollutant:**	No
· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **UN "Model Regulation":**	-

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 313 (Specific toxic chemical listings):**
None of the ingredients are listed.

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65:**

· **Chemicals known to cause cancer:**
None of the ingredients are listed.

· **Cancerogenity categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients is listed.

· **MAK (German Maximum Workplace Concentration)**
None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **National regulations**

· **Information about limitation of use:** Employment restrictions concerning young persons must be observed.
· **Chemical safety assessment:** not required.

(Contd. on page 6)

Safety Data Sheet
acc. to ISO 11014

(Contd. of page 5)

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing MSDS:**
Hilti Corporation
Business Unit Chemicals
Quality/Safety/Environment
FL-9494 Schaan / Liechtenstein

chemicals.hse@hilti.com
Tel.: +423 234 3004
FAX.: +423 234 3462

· **Date of preparation / last revision** 05/19/2015 / 2

· **Abbreviations and acronyms:**
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
Skin Sens. 1: Sensitisation - Skin, Hazard Category 1
Repr. 2: Reproductive toxicity, Hazard Category 2

· *** Data compared to the previous version altered.**

June 17, 2019

To Whom It May Concern:

Re: **Hilti CFS-S SIL SL Firestop Sealant – LEED Information**

Item Numbers:

2076884
2076885

The Hilti CFS-S SIL SL Firestop Sealant is manufactured in Toronto, Ontario.

There is no post-consumer or post-industrial content in CFS-S SIL SL and it cannot be recycled. The CFS-S SIL SL does not contain any Rapidly Renewable Materials. The VOC content for CFS-S SIL SL is 50 grams/liters.

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

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

Sincerely,

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

Rev. Date: 5/30/19

The manufacturing plant location on this certificate has been provided for LEED reporting purposes only. It should never be used for Country of Origin certification or a representation of compliance/non-compliance with Buy American or Buy America requirements, as those requirements differ.

The manufacturing plant location(s) identified on the certificate represent standard Hilti catalog products only. “Specially” produced non-catalog Hilti products may have differing manufacturing plant locations.

Contact your Hilti representative in cases of “specially” produced products for a custom LEED certificate.

Firestop Wrap Strip (CP 648-E)

Product description

- An intumescent, flexible firestop wrap strip for plastic and insulated pipe penetrations

Product features

- Highly Intumescent
- Long length avoids waste
- Can be continuously wrapped
- Cost effective
- Quick and easy closure without tools
- Ideal for very tight installations

Areas of application

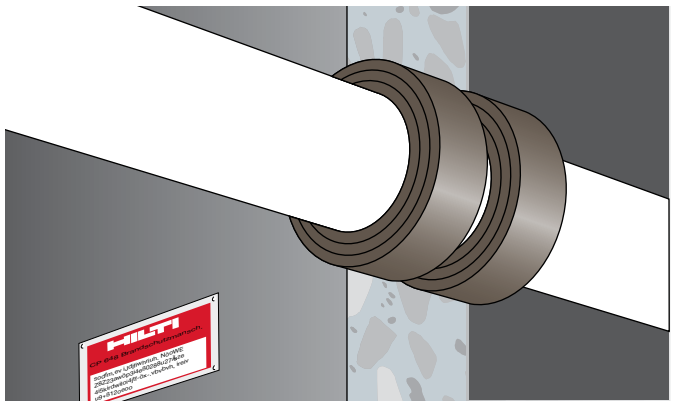
- Firestopping combustible pipe penetrations
- Difficult applications where space is limited
- Penetrations through concrete over metal deck
- Plastic and insulated penetrations using PVC, CPVC, ABS, FRPP and PEX

For use with

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

Examples

- Waste water pipes
- Fresh water pipes
- Decking penetrations



Technical Data*	CP 648-E
Density	Approx. 1.35 g/cm³
Dimensions (approximate)	3/16" x 1" x 33 ft or 3/16" x 1-3/4" x 33 ft
Color	Black with foil backing
Temperature resistance	–40°F to 212°F (–40°C to 100°C)
Intumescent activation	Approx. 320°F (160°C)
Expansion ratio (unrestricted)	1:40

Tested in accordance with
• UL 1479 • ASTM E 814 • ASTM G21 • CAN/ULC-S115

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

CLASSIFIED C UL US
FILL, VOID OR CAVITY MATERIAL
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY
66Y7

FM APPROVED

FBC SYSTEM COMPATIBLE
Visit fbcsystemcompatible.com.
FBC™ is a trademark of the Lubrizol Corporation.

Installation instructions for CP 648-E

Notice

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

Opening

1. Clean the plastic or insulated pipe penetration. Expansion of the intumescent material during a fire closes the plastic or insulated pipe penetration. Very dirty pipes (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes or insulated pipe penetrations should, therefore, be cleaned in the area where the CP 648-E Firestop Wrap Strip is to be installed.

Application of firestop system

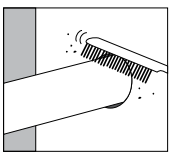
2. Tightly wrap the required number of strips continuously around the penetrant, and hold in place with tape.
3. Push the Hilti Wrap Strip into the opening until it is flush with the substrate surface unless otherwise required by the UL system. It may be required by the UL system to clamp, wire or use a Hilti Retaining Collar to secure the wrap strip in place for some applications.
4. If the UL system requires a cold smoke seal, then apply the proper amount of Hilti FS-ONE sealant in the opening over the wrap strip.
5. For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

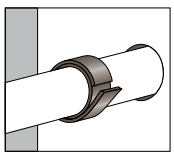
- In highly corrosive surroundings
- With unapproved retaining collars, anchors/fasteners
- Outdoors

Storage

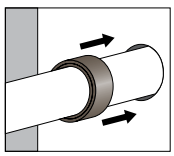
- Store only in the original packaging in a location protected from moisture at temperatures between 23°F and 86°F (–5°C and 30°C).



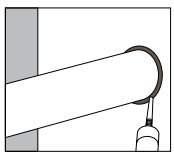
1. Clean penetration



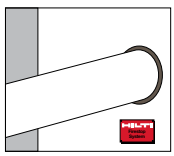
2. Wrap strips around pipe the specified number of times



3. Push Wrap Strips into hole



4. Seal penetration against smoke with FS-ONE



5. Fasten installation plate (If required)

Hilti Firestop
Saving lives through innovation and education

Hilti. Outperform. Outlast.

CERTIFICATE OF COMPLIANCE

Certificate Number	R13240
Report Reference	R13240-20040518
Issue Date	2020-JANUARY-22
Issued to:	HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC 7250 Dallas Pky, Legacy Tower Suite 1000 Plano TX 75024
This certificate confirms that representative samples of	FILL, VOID OR CAVITY MATERIALS The product covered by this Section of the Procedure is a one-part wrap strip designated as CP648-E or CP648-S. (The CP 648-S may include an optional “US” suffix.) The material is for use in through-penetration firestop systems in its final form as field installation.. Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	ANSI/UL 1479, Fire Tests of Penetration Firestops CAN/ULC-S115, Standard Method of Fire Tests of Firestop Systems
Additional Information:	See the UL Online Certifications Directory at https://iq.ulprospector.com for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL’s Follow-Up Services.

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program

UL LLC

Safety Data Sheet
acc. to ISO 11014

Printing date 05/18/2015 Version number 3 Reviewed on 08/18/2014

*
1 Identification

· **Product identifier**

· **Trade name:**
Hilti Firestop Collar CFS-C
Hilti Firestop Collar Plus CFS-C P
Hilti Firestop Bandage CFS-B
Hilti Firestop Wrap Strip Endless CFS-W EL
Hilti Firestop Wrap Strip Single CFS-W SG
Hilti Firestop Collar Endless CFS-C EL
Hilti Firestop Back Pan Strip CFS-BPS
CP 643
CP 644
CP 646
CP 648
· **Relevant identified uses of the substance or mixture and uses advised against** No further relevant information available.
· **Application of the substance / the mixture** Construction chemicals

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Hilti, Inc.
5400 South 122nd East Ave.
US-Tulsa, OK 74146
Phone: (800) 879-8000
Fax: (800) 879-7000
Español: (800) 879-5000

· **Information department:**
see section 16
chemicals.hse@hilti.com
· **Emergency telephone number:**
Tox Info Suisse - 24 h Service
Tel.: 0041 / 44 251 51 51 (international)
.
Chem-Trec
Tel.: 1 800 424 9300

2 Hazard(s) identification

· **Classification of the substance or mixture** The product is not classified according to the Globally Harmonized System (GHS).

· **Classification according to Directive 67/548/EEC or Directive 1999/45/EC** not applicable
· **Information concerning particular hazards for human and environment:**
The product does not have to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
· **Classification system:**
The classification was made according to the latest editions of the EU-lists, and expanded upon from company and literature data.

· **Label elements**
· **GHS label elements** Void
· **Hazard pictograms** Void
· **Signal word** Void
· **Hazard statements** Void
· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

*
3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:** Polymer-bonded intumescent material (in the metal or plastic housing)

· **Dangerous components:** Void

4 First-aid measures

· **Description of first aid measures**
· **General information** No special measures required.
· **After inhalation** Not applicable
· **After skin contact** Not applicable
· **After eye contact** Not applicable
· **After swallowing** Not applicable
· **Information for doctor**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed** No further relevant information available.

(Contd. on page 2)

Safety Data Sheet
acc. to ISO 11014

Printing date 05/18/2015 **Version number 3** **Reviewed on 08/18/2014**

(Contd. of page 1)

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents** CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **Special hazards arising from the substance or mixture** No further relevant information available.
· **Advice for firefighters**
· **Protective equipment:** No special measures required.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures** Not required.
· **Environmental precautions:** No special measures required.
· **Methods and material for containment and cleaning up:** Pick up mechanically.
· **Reference to other sections**
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling**
· **Precautions for safe handling** No special measures required.
· **Information about protection against explosions and fires:** No special measures required.

· **Conditions for safe storage, including any incompatibilities**
· **Storage**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** None.

· **Storage class** 13
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment**
· **Breathing equipment:** Not required.
· **Protection of hands:**

Protective gloves.

To avoid skin problems reduce the wearing of gloves to the required minimum.
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Penetration time of glove material** Not required.
· **Body protection:**

Protective work clothing.

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Solid.
Color:	Various colors
· **Odor:**	Odorless
· **pH-value:**	Not determined.
· **Change in condition**	
Melting point/Melting range:	Not determined.

(Contd. on page 3)

Safety Data Sheet
acc. to ISO 11014

(Contd. of page 2)

Boiling point/Boiling range:	undetermined
· **Flash point:**	Not applicable
· **Flammability (solid, gaseous)**	Product is not flammable.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Vapor pressure:**	Not applicable.
· **Density at 20 °C (68 °F):**	1.3-1.4 g/cm³ (10.849-11.68 lbs/gal)
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with Water:**	Insoluble
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
dynamic:	Not applicable.
kinematic:	Not applicable.
· **Solvent content:**	
Solids content:	100 %
· **Other information**	CP 643, CP 644 - VOC Content: 7.6 g/l (EPA Method 24) CP 648, CFS-BPS - VOC Content: 3.1 g/l (EPA Method 24)

10 Stability and reactivity

· **Reactivity**
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.

· **IARC (International Agency for Research on Cancer)**
None of the ingredients is listed.

· **NTP (National Toxicology Program)**
None of the ingredients is listed

· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Ecotoxical effects:** Not determined
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

(Contd. on page 4)

Safety Data Sheet
acc. to ISO 11014

(Contd. of page 3)

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation** Smaller quantities can be disposed of with household waste.

· **European waste catalogue:**	
17 02 03	plastic
17 04 05	iron and steel

· **Uncleaned packagings:**
· **Recommendation:**
Disposal must be made according to official regulations.
Dispose of packaging according to regulations on the disposal of packagings.
Empty packs: May be disposed via the local Green Dot collecting system or EAK waste material code 150102 (plastic packaging materials)

14 Transport information

· **UN-Number** · **DOT, ADR, ADN, IMDG, IATA**	Void
· **UN proper shipping name** · **DOT, ADR, ADN, IMDG, IATA**	Void
· **Transport hazard class(es)** · **DOT, ADR, ADN, IMDG, IATA** · **Class**	Void
· **Packing group** · **DOT, ADR, IMDG, IATA**	Void
· **Environmental hazards:** · **Marine pollutant:**	No
· **Special precautions for user**	Not applicable
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	Not dangerous according to the above specifications.
· **UN "Model Regulation":**	-

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 355 (Extremely hazardous substances):**
None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**
None of the ingredients are listed.

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65:**

· **Chemicals known to cause cancer:**
None of the ingredients are listed.

· **Cancerogenity categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients is listed.

· **MAK (German Maximum Workplace Concentration)**
None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **Chemical safety assessment:** not required.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:**
Hilti Corporation
Business Unit Chemicals
Quality/Safety/Environment

(Contd. on page 5)

Safety Data Sheet
acc. to ISO 11014

(Contd. of page 4)

FL-9494 Schaan / Liechtenstein

chemicals.hse@hilti.com
Tel.: +423 234 3004
FAX.: +423 234 3462

· **Date of preparation / last revision** 05/18/2015 / 2

· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)

· *** Data compared to the previous version altered.**

September 24, 2015

To Whom It May Concern:

Re: **CP 648 E&S Firestop Wrap Strips – LEED Information**

Item Numbers:

304303	304307
304304	304308
304305	304309
304306	

The Hilti CP 648 E & S Firestop Wrap Strips are manufactured in Germany.

The Hilti CP 648 E & S Firestop Wrap Strips have a VOC content of 3.1 grams/liter.

The amount of post-consumer or post-industrial content in CP 648 E & S Firestop Wrap Strips is not known. The packaging is recyclable. The CP 648 E & S Firestop Wrap Strips do not contain any Rapidly Renewable Materials.

The CP 648 E & S Firestop Wrap Strips are not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

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

Sincerely,

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

Rev. Date: 8/14/15

The manufacturing plant location on this certificate has been provided for LEEDS reporting purposes only. It should never be used for Country of Origin certification or a representation of compliance/non-compliance with Buy American or Buy America requirements, as those requirements differ.

The manufacturing plant location(s) identified on the certificate represent standard Hilti catalog products only. “Specially” produced non-catalog Hilti products may have differing manufacturing plant locations.

Contact your Hilti representative in cases of “specially” produced products for a custom LEEDS certificates.

Firestop Collar (CP 643N)

Product description
- A ready-to-use firestop collar, made of a galvanized steel housing and intumescent inserts for firestopping combustible pipes

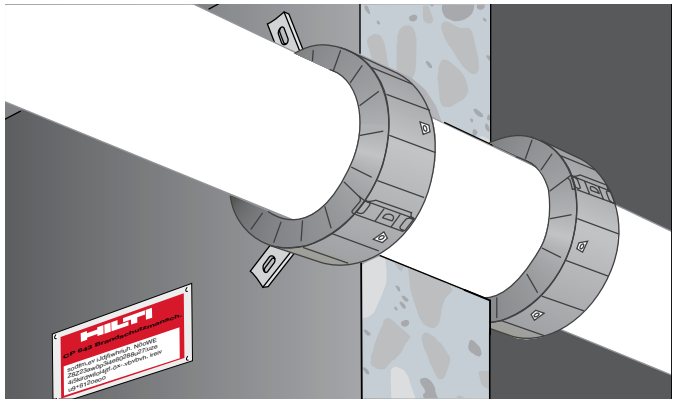
Product features
- Ready-to-use collar
- No construction required
- Fast installation time
- Adjustable mounting tabs
- Low profile for tight installations

Areas of application
- Firestopping combustible pipes up to 6" diameter in penetrations through fire walls and floors
- Suitable for the following pipe materials:
- PVC, CPVC, ABS, PVDF, PP and FRPP

For use with
- Concrete, masonry, wood floor and gypsum wall assemblies
- Wall and floor assemblies rated up to 4 hours

Types of installation
- Wall: two collars, one on each side
- Floor: one collar on underside (bottom)

Example
- Waste water pipes
- Fresh water pipes



Technical Data	CP 643N		
Description	Pipe outside dia (in.)	Collar outside dia. (in.)	Collar Height (in.)	No. of hooks and fasteners
CP 643-50/1.5"N	1.4–2.0	2.8	0.9	2
CP 643-63/2"N	2.0–2.5	3.4	1.3	2
CP 643-90/3"N	2.6–3.6	4.9	1.7	3
CP 643-110/4"N	3.6–4.5	6.0	1.9	3
CP 643-160/6"N	6.6	9.8	1.9	4
Temperature resistance		-40°F to 140°F (–40°C to 60°C)		
Intumescent activation		Approx. 392°F (200°C)		
Expansion ratio (unrestricted)		Up to 1:10		

Tested in accordance with
• UL 1479 • ASTM E 814 • ASTM G21 • CAN/ULC-S115

FIRESTOP DEVICE
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEMS
SEE UL FIRE RESISTANCE DIRECTORY
5N76

FM APPROVED

FBC SYSTEM COMPATIBLE
Visit fbcsystemcompatible.com.
FBC™ is a trademark of the Lubrizol Corporation.

Installation instructions for CP 643N

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

Opening
1. Clean the plastic pipes. Expansion of the intumescent material during a fire acts to close the plastic pipe. Very dirty pipes (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes should, therefore, be cleaned in the area where the CP 643N Firestop Collar is to be installed.

Application of firestop system
2. Seal the opening if required. Gaps may be closed with FS-ONE. The approved methods vary and are given in the specific UL system.
3. Close the CP 643N Firestop Collar. Place the CP 643N Firestop Collar around the plastic pipe and lock the closure by applying firm pressure until it latches.
4. Attach fastening hooks. The fastening hooks can be attached to various points on the metal housing. This allows the fastening points to be made to suit the space available in each case. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated on the packaging.
5. Fastening the CP 643N Firestop Collar. Only when fastened properly can CP 643N offer protection against fire.

a. Mark the fastening points.

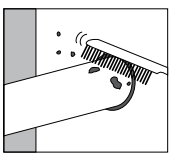
b. Drill holes with a Hilti rotary hammer drill (i.e. TE 4-A18) or, depending on base material, fasten using Hilti powder-actuated tool.

c. To secure the CP 643N Firestop Collar, use Hilti anchors/fasteners.

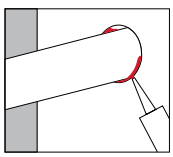
d. For maintenance reasons, a penetration can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use
- With metal pipes
- In highly corrosive surroundings
- With unapproved anchors/fasteners

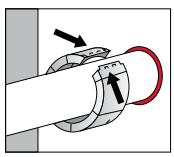
Storage
- Store only in the original packaging in a location protected from moisture



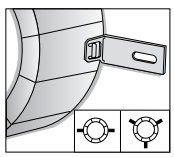
1. Clean plastic pipe.



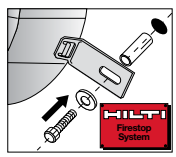
2. Close remaining gap to provide smoke and gas resistant seal.



3. Close collar.



4. Attach fastening hooks.



5. Fasten collar and identification plate (if required).

Hilti Firestop
Saving lives through innovation and education

Hilti. Outperform. Outlast.

CERTIFICATE OF COMPLIANCE

Certificate Number	20160125-R15431
Report Reference	R15431-19980323
Issue Date	2016-JANUARY-25
Issued to:	HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC 5400 S 122ND EAST AVE TULSA OK 74146
This is to certify that representative samples of	FIRESTOP DEVICES Firestop devices designated CP 643 50/1.5" N, CP 643 63/2" N, CP 643 75/2.5" N, CP 643 90/3" N, CP 643 110/4" N, CP 643 125/5" N, CP 643 160/6" N, CP 644 200/8" and CP 644 250/10" for use in specific through-penetration firestop systems. The various suffixes for the designations of the firestop devices indicates the nominal outside diameter of the pipe (mm/in.) on which the device is intended to be installed. Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	UL 1479 STANDARD FOR FIRE TESTS OF PENETRATION FIRESTOPS. CAN/ULC S115 STANDARD METHOD OF FIRE TESTS OF FIRESTOP SYSTEMS
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

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

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program

UL LLC

August 26, 2015

To Whom It May Concern:

Re: **CP 643N/644 Firestop Collars – LEED Information**

Item Numbers:

304325	304331
304326	304341
304328	304344
304329	

The Hilti CP 643N/644 Firestop Collars are manufactured in Germany.

The Hilti CP 643N/644 Firestop Collars have a VOC content of 7.6 grams/liter.

The amount of post-consumer or post-industrial content in CP 643N/644 Firestop Collars is not known. The metal portions of the collars are recyclable. The CP 643N/644 Firestop Collars do not contain any Rapidly Renewable Materials.

The CP 643N/644 Firestop Collars are not regulated as a hazardous waste by the Federal EPA Standards. The regulations for the disposal of non-regulated industrial waste can vary from state to state and even city to city. For this reason, you should consult your local and state regulatory agencies for direction on disposal.

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

Sincerely,

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

Rev. Date: 8/14/15

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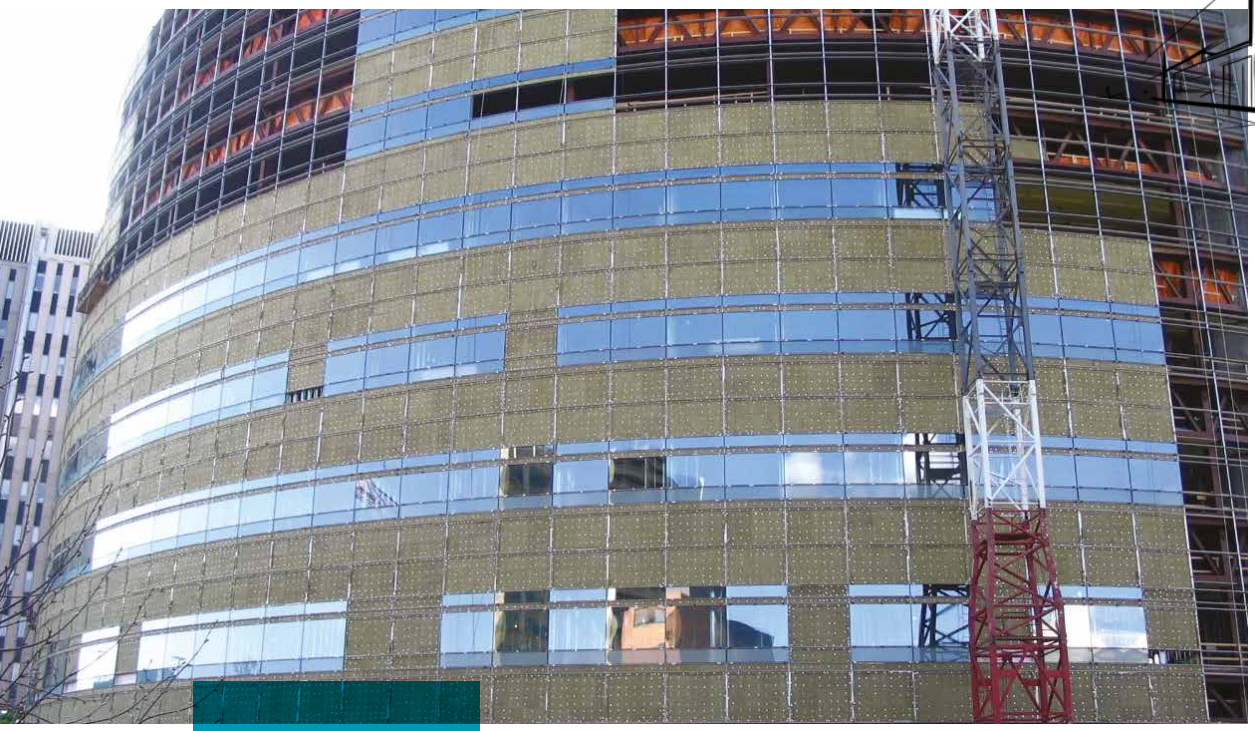
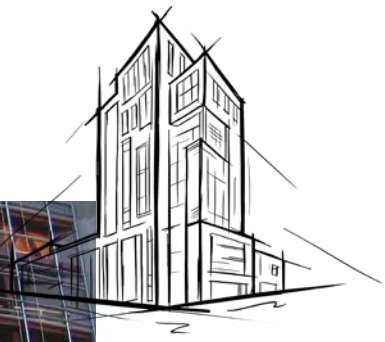
ROXUL SAFE™

Fire Safing Insulation





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

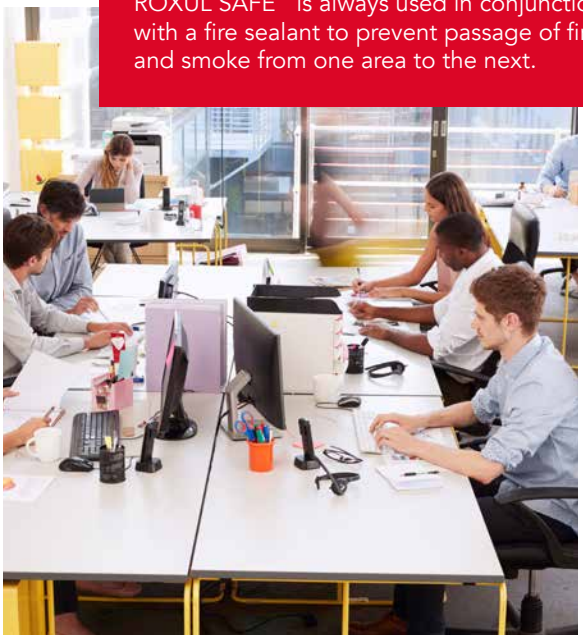
It is non-combustible and fire resistant, and will not develop toxic smoke or promote flame spread, even when exposed directly to a fire. When ROXUL SAFE™ is used with CURTAINROCK® 40/80, it provides a comprehensive fire-stopping system that has been UL/ULC/Intertek tested and approved for perimeter fire containment systems.

ROXUL SAFE™ also helps to increase energy efficiency, improve thermal stability and reduce noise transmission into and out of the building for overall occupant comfort.

Learn more at rockwool.com

Fire-stopping Material

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



ROCKWOOL™

ROXUL SAFE™
Fire Safing Insulation

Technical Data Sheet

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

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

	Performance	Test Standard
Compliance	Mineral Fiber Block and Board Thermal Insulation - Type IVA Compliant MEA Approval, New York City Approval	ASTM C612 339-97-M
Reaction to Fire	Flame spread index = 0; Smoke developed index = 0 Flame spread index = 0; Smoke developed index = 0 Determination of Non Combustibility of Building Materials - Non Combustible Test for Non-Combustibility - Non Combustible Fire Tests of Firestop Systems Fire Tests of Penetration Firestop Systems Tests for Fire Resistance of Building Joint Systems Perimeter Fire Barrier Systems Smoulder Resistance - 0.01% Consult UL, ULC and Intertek Directories for fire rated designs	ASTM E84 (UL 723) CAN/ULC S102 CAN/ULC S114 ASTM E136 CAN/ULC S115 ASTM E814 (UL 1479) UL 2079 ASTM E2307/E119 CAN/ULC S129
Density	Actual Density - 4.5 lbs/ft³ (72 kg/m³)	ASTM C303
Corrosion Resistance	Stress Corrosion Cracking Tendency of Austenitic Stainless Steel - Passed Corrosion of Steel - Passed	ASTM C795 ASTM C665
Reaction to Moisture	Moisture Sorption by weight - 0.04% Determination of Fungi Resistance - Passed	ASTM C1104 ASTM C1338
Thickness Dimensions	Product is available in 2", 3" and 4" (50.8 mm, 76.2 mm and 101.6 mm) 24" x 48" (610 mm x 1219 mm)	

Intertek ULC LISTED CLASSIFIED UL

Issued 01-01-18
Supersedes 08-23-17

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

ROCKWOOL™

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

Safe Use Instruction Sheet

This ROCKWOOL Safe Use Instruction Sheet [SUIS] is provided for manufactured articles either regulated by OSHA Hazard Communication Standard, 29 CFR 1910.1200 nor by the Canada Hazardous Products Regulation SOR/2015-17 [WHMIS 2015].

ROCKWOOL provides this SUIS for safe handling and use instructions.

1. Identification of the article

Product Name Resin-Bonded Stone Wool Insulation

Product Family	Product Identification	Intended Use
I.	AFB evo™	Interior Wall and Floor Applications
II.	Comfortboard™, Comfortbatt®, Safe'n'Sound®, AFB®, Cavityrock®, CURTAINROCK®, ROCKBOARD®, ROXUL Plus®, ROXUL SAFE™, Frontrock™	Interior and Exterior Applications
III.	MONOBOARD® PLUS, TOPROCK® DD Plus, MULTIFIX	Roof Insulation or Insulating Cover Board over Other Insulations
IV.	MONOBOARD®, TOPROCK® DD	Low-Slope Roof Applications
V.	CONROCK®, FABROCK™	OEM
VI.	ProRox® NA, SeaRox® NA	Industrial Piping and Equipment Applications

Manufacturer ROCKWOOL

Address

Canada
8024 Esquesing Line
Milton, Ontario
Canada
L9T 6W3

USA
4594 Cayce Rd
Byhalia
MS 38611
USA

Company Phone Number 1-800-265-6878
1-877-823-9790 (8:30 am to 5:00 pm ET)

Email contactus@rockwool.com

2. Hazards identification

OSHA

This product is considered an article as per OSHA 29 CFR 1910.1200.

29 CFR 1910.1200(c) defines an article as follows: "Article" means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.

Articles meeting the above definition are not regulated by OSHA 29 CFR 1910.1200 and are exempt from SDS and label requirements.

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

2. Hazards identification - Continued

WHMIS

This product is considered an article per the Canadian Hazardous Products Regulation SOR/2015-17. Manufactured articles that meet the definition of the Canadian Hazardous Products Act (any article that is formed to a specific shape or design during manufacture, the intended use of which when in that form is dependent in whole or in part on its shape or design, and that, when being installed, if the intended use of the article requires it to be installed, and under normal conditions of use, will not release or otherwise cause an individual to be exposed to a hazardous product) are not regulated by the Canadian Hazardous Products Regulation SOR/2015-17 and are exempt from SDS and label requirements.

Adverse physiochemical, human health and environmental effects

This product may cause temporary mechanical irritation to the eyes and skin. Temporary irritation of the upper respiratory tract (scratchy throat, coughing, congestion) may result from exposure to dusts and fibers in excess of applicable exposure limits. Pre-existing chronic eye, skin and respiratory conditions may temporarily worsen due to exposure to dusts and fibers (see section 8 for safe handling instructions).

3. Composition / information on ingredients

Product Family	Stone wool (a, b)	Non added formaldehyde binder	Phenol Formaldehyde Binder	Syrups, hydrolysed starch	Mineral Oil
I.	97%	<3%	-	<1%	<0.2%
II.	97%	-	<3%	<1%	<0.2%
III.	94-96%	-	<6%	<1%	<0.2%
IV.	94-96%	-	<6%	<1%	<0.2%
V.	97%	-	<3%	<1%	<0.2%
VI.	97%	-	<3%	<1%	<0.2%

a: Man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide (Na2O+K2O+CaO+ MgO+BaO) content greater than 18 % by weight and fulfilling Note Q conditions
b: Man Made Vitreous Wool Fibres are IARC classified as Group 3 (not classifiable as to their carcinogenicity to humans)

Possible facing materials: Mineral fleece. Aluminium foil, Aluminium foil reinforced mineral fiber grid, PE craft paper, Wired mesh, PP film, Plaster board, Mineral cloth, Bitumen.

4. First aid measures

Eye contact

Rinse immediately with water for at least 15 minutes.

Skin contact (if itching occurs)

Remove contaminated clothing and wash skin gently with cold water and a mild soap. Never use compressed air to remove fibers from skin or clothing.

Inhalation

If affected, remove from exposure.

Ingestion

Rinse mouth and drink plenty of water.

If any irritation persists, seek immediate medical attention.

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5. Fire fighting measures

Suitable extinguishing media

Water, Foam, Carbon Dioxide or dry powder (No unsuitable extinguishing firefighting media known.

Protective equipment for firefighters

Do not enter fire area without proper protective equipment, including NIOSH-approved self-contained breathing apparatus (SCBA). Observe normal fire-fighting procedures.

6. Accidental release

Personal precautions

In case of high concentrations of dust: Ventilate and/or use same protective equipment as mentioned in section 8

Methods for cleaning up

Use personal protective equipment as required. Clean contaminated surface with vacuum or dampen with water spray prior to sweeping up. Place waste in appropriate containers for disposal.

7. Handling and storage

Precautions and safe handling

No specific measures required. A serrated knife for cutting is preferred. Minimize dust creation and ensure adequate ventilation of workplace.

Storage conditions

Keep product dry and in original packaging until use.

Incompatible materials

None known.

8. Exposure controls / personal protection

Exposure guidelines

Follow all applicable exposure limits. Local regulations may apply. ROCKWOOL recommends that users of the products adhere to the OSHA-recommended PEL of 1 f/cc TWA (fibers longer than 5 µm with diameters less than 3µm). This recommended PEL, together with recommended work practices and personal protective equipment, were adopted in a Health and Safety Partnership Program (HSPP) agreement in 1999 between OSHA and the North American Insulation Manufacturers Association (NAIMA), of which ROCKWOOL is a member. Adherence to the OSHA-recommended PEL, work practices and protective equipment in the HSPP is expected to provide appropriate protection against all inhalation-related health risks that may be associated with exposures to mineral wool fibers (ACGIH, 1997; NAIMA, 1999; OSHA, 1999; National Research Council, 2000; IARC, 2001), and to minimize eye and skin irritation.

Reference	Exposure	Legal or Recommended Exposure Limit
OSHA	Synthetic Vitreous Fibers, > 5 µm length, < 3 µm diameter	1 f/cc TWA (recommended)
	Inert dust and particulates not otherwise regulated	15 mg/m3 TWA-PEL (total particulate) 5 mg/m3 TWA-PEL (respirable particulate)
ACGIH	Synthetic Vitreous Fibers, > 5 µm length, < 3 µm diameter	1 f/cc TWA (threshold limit value TLV)
	Particulates not otherwise classified, containing no asbestos and < 1% crystalline silica	10 mg/m3 TWA-PEL (inhalable particulate) 3 mg/m3 TWA-PEL (respirable particulate)

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8. Exposure controls / personal protection (cont'd)

Engineering Controls

Provide local exhaust and/or general ventilation to main exposure below regulatory and recommended limits. Vacuum or wet cleaning methods recommended.

Individual protection measures, including personal protection

Eyes	Wear safety glasses with side shielding or similar
Skin/body	Wear protective gloves Wear long sleeve shirt and long trousers
Respiratory	Ensure proper ventilation
	Use appropriate certified respirator when airborne particulates are above exposure limits (properly fitted NIOSH disposable N95 type dust respirator or better is recommended)
General hygiene	Wash hands with cold water after handling products Remove and wash clothes worn during working with product.

Further Information applicable to Product Family VI only (ProRox® NA, SeaRox® NA)

Hot equipment – operating at temperatures above 150°C (run in period):

During initial run-in, a thermal decomposition of organic matter can be observed starting around 150 – 200°C. This can be observed as a release of small amounts of potentially irritating and harmful fumes.

This does not affect the quality or declared performances of installed products.

The amount and composition of the fumes will depend on several variables including the amount of insulation installed, service temperature, temperature run in gradient, ventilation rate, jacketing materials.

The run-in period can last for a period from a few hours and up to several days. Ventilate the area well and keep a distance to the heated equipment.

For high concentrations in enclosed spaces use a supplied air respirator. For lower concentrations an approved mask with particle filter type N95 or better is adequate.

Selection of specific respirator type shall be made by a qualified person and all equipment should be appropriately fitted, used and maintained.

9. Physical and chemical properties

Physical State Solid

Color Grey, green, brown

Odor May have slight resin odor

Melting Point Approximately 2150ºF (1177ºC)

Water solubility Insoluble in water

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10. Stability and reactivity

Reactivity and Stability Stable under normal conditions of use

Decomposition products Primary combustion products of the cured urea extended phenolic formaldehyde binder, when heated above 390°F (200°C), are carbon monoxide, carbon dioxide, ammonia, water and trace amounts of formaldehyde. Other undetermined compounds could be released in trace quantities. Emission usually only occurs during the first heating. The released gases may be irritating to the eyes, nose and throat during initial heat-up. Use appropriate respirators (air supplied) particularly in tightly confined or poorly ventilated areas during initial heat-up.

11. Toxicological information

Stone wool fibers are not classifiable as OSHA irritants. Coarse fibers and dust from mineral wool products can cause emporary and reversible irritation (itching, redness) of the skin and eyes. The itching and possible inflammation are a mechanical reaction to dust and coarse fibers (more than about 5 µm in diameter) and are not damaging in the way chemical irritants may be. The symptoms generally abate within a short time after the end of exposure. When products are handled continually, the skin itching generally diminishes.

Man Made Vitreous Wool Fibers are IARC classified as Group 3 (not classifiable as to their carcinogenicity to humans)

12. Ecological information

The products are stable, not expected to cause harm to animals, plants or fish, and have no known adverse environmental effects.

13. Disposal considerations

The products, as supplied, are not expected to be a characteristic hazardous waste under RCRA if discarded. Products are not considered to be a hazardous waste. Dispose of waste material according to federal, state, provincial and Local environmental regulations. Comply with relevant regulations with regards to disposal, recycling, treatment, transportation and storage of contents and containers.

14. Transport information

No special precautions. This product is not considered to be a hazardous material for transport.

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15. Regulatory information

International Inventories

Articles are exempt from registration or listing chemicals inventories like TSCA (USA), DSL/NDSL (CAN), REACH (EU), ENCS (JP), IECSC (CN), KECL (KR), PICCS (PH), AICS (AUS). Per Section 2. These products are considered an article.

Product Family	California Proposition 65 Status
I.	This product does not contain any Proposition 65 chemicals.
II. - V.	These products contain formaldehyde, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm.

16. Other information

Date of preparation 16-AUG-2018

Date of revision 21-OCT-2020

Comments to revision Inclusion of Frontrock™, addition of further exposure controls for Product Family VI

Disclaimer

Disclaimer: The information contained herein is based upon data considered to be accurate. However, no warranty is expressed or implied regarding the accuracy of these data, the results to be obtained from the use thereof, or that any such use will not infringe upon any patent. This information is furnished as a guide only and upon the condition that the person receiving it shall make tests to determine the accuracy and suitability for his or her own purpose. No responsibility is assumed for injury or damage from the use of the products described herein.

ROCKWOOL reserves the right, at its discretion, to change and modify this Safe Use Instruction Sheet. This version supersedes any Safety Data Sheets and older versions. ROCKWOOL will not take responsibility for documents downloaded from any website except those downloaded directly from www.rockwool.com. ROCKWOOL takes no responsibility for documentation supplied by a third party as ROCKWOOL cannot control the content of such documentation to ensure accuracy.

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ISSUED: 18/02/21

LEED Submittal Guide

All LEED information and supporting documentation can be found at Rockwool.com on the Certifications and Listings page.

To generate a project specific LEED Letter, please use the ROCKWOOL LEED Calculator. Simply create a free account, select the ROCKWOOL product being used, and add the project site zip code/postal code. The LEED Calculator will automatically generate a letter for the following LEED Credits:

Credit MRc4 – Recycled Content:	**Credit MRc5 – Regional Content:**
– Pre-Consumer Recycled Content – Post-Consumer Recycled Content	– Distance from Manufacturing Location to Project Site – Distance from Extraction locations to Project Site – Distance from Extraction Location to Manufacturing location

In order to assist you in completing a LEED Submittal Form, please refer to the common questions below. A list of links to sustainability documentation can be found at the end of this document.

Common Questions for LEED Forms

Inherently Non-Emitting Source:	**No**
Compliance with CDPH Standard Method v1.2-2017:	**Yes**
– Classroom:	AFB®, AFB® evo, Comfortbatt®, Safe'n'Sound®, Curtainrock®, Curtainrock® 40, Curtainrock® 80, Roxul Safe™
– Office:	AFB® evo
Total VOCs after 14 days (336 hours):	**0.5 mg/m3 or less**
– Third Party Certificate:	GREENGUARD Gold Certificate
– Manufacturer Declaration:	VOC Emissions Technical Bulletin
Environmental Product Declaration (EPD):	**Yes**
– Life Cycle Assessment:	Yes
– Product-Specific:	Yes
– Third-Party Verified:	Yes
– Program Operator:	UL Environment

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Sourcing of Raw Materials	
– Recycled Content	Yes
– Post-consumer	0%
– Pre-consumer	**16%** or **40%** dependent on product and manufacturing location. Refer to ROCKWOOL LEED Calculator
– Material Reuse (% salvage, refurbished, reused):	No
– Extended producer responsibility program:	No
Material Ingredients Reporting	
– Health Product Declaration (HPD):	Yes Disclosure Level: 100ppm
– Declare Labels:	Yes Disclosure Level: 100ppm
– Product Transparency Report:	Yes
– Safe Use Instruction Sheet:	Yes
Cradle to Cradle:	No
GreenScreen v1.2 Benchmark:	No
Bio-Based Materials:	N/A
FSC Wood Products:	N/A
Rapidly Renewable Materials:	N/A

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Sustainability Links

ROCKWOOL Certifications and Listings page	https://www.rockwool.com/north-america/about-us/sustainability/certifications-and-listings/
LEED v4 Solutions Guide	https://www.rockwool.com/north-america/about-us/sustainability/leed-solutions-guide/
GREENGUARD Gold Certificates	https://www.rockwool.com/north-america/about-us/sustainability/certifications-and-listings/#greenguardgold
VOC Emissions Technical Bulletin	https://www.rockwool.com/north-america/about-us/sustainability/certifications-and-listings/#voc
Environmental Product Declaration (EPD)	https://www.rockwool.com/north-america/about-us/sustainability/certifications-and-listings/#epd
Health Product Declaration (HPD): *Link can be found under the Declare section of the Certifications and Listings page*	https://www.rockwool.com/north-america/about-us/sustainability/certifications-and-listings/#declare
Transparency Bulletin: *Designed to fulfil LEED v4, Building product disclosure and optimization - material ingredients requirements, Option 1: material*	https://www.rockwool.com/north-america/about-us/sustainability/certifications-and-listings/#transparency
Declare Labels	https://www.rockwool.com/north-america/about-us/sustainability/certifications-and-listings/#declare
Safe Use Instruction Sheet: *Contains health and safety information typically found on a Material Safety Data Sheet*	https://www.rockwool.com/north-america/about-us/sustainability/certifications-and-listings/#suis

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