Quality People. Building Solutions.

Comfort Systems USA (Arkansas), Inc.
P.O. Box 16620
Little Rock, AR 72231
Phone 501-834-3320
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Date: 2/4/2025
Return Request: 2/14/2025
Project: City Of Sherwood Public Works (Maintenance Building)
Supplier: Pro Insulation
Manufacturer: Various
Submittal: Plumbing Piping Insulation
Submittal Number: 22 07 19-01
Drawing # and Installation: Plumbing Drawings

ARCHITECT
Cromwell
1300 East 6th Street
Little Rock, AR 72202
501-372-2900

ENGINEER
Cromwell
1300 East 6th Street
Little Rock, AR 72202
501-372-2900

GENERAL CONTRACTOR
Baldwin & Shell
1000 W. Capitol Ave.
Little Rock, AR 72201
501-374-8677

MECHANICAL SUBCONTRACTOR
Comfort Systems USA (Arkansas), Inc.
9924 Landers Rd.
N. Little Rock, AR 72117
501-834-3320

Notes:

CSUSA PROJECT NO.
24-6084
sean@comfortar.com

Pro Insulation

4414 South 16th Street
Ft. Smith, AR 72901
Ph. 479-646-5644
Fax 479-646-5654

January 21, 2025

Comfort Systems USA, Inc.
P.O. Box 16620
Little Rock, AR 72231

Mr. Sean Cross

Re: Mechanical Insulation Submittals for Sherwood Public Works, Sherwood, Arkansas.

Spec section 22 07 19.

The following items will be insulated with Knauf Earthwool pipe insulation with ASJ + vapor barrier jacket. All fittings will receive an additional PVC fitting cover.

- Exposed will receive an additional .20 mil white PVC Jacket.

Item #1 Domestic Cold Water---------- 1" Thick

Item #2 Domestic Hot Water---------- 1" Thick

Thank You,

Mike Galatzer

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.

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
- Listed and Labeled Pipe Insulation by Underwriter Laboratories (UL) File No. R8583, Category: Insulated Plastic Pipe Assemblies (BSMP) for installation over PVC, Polypropylene, and CPVC meeting “FHC 25/50” with minimum 1 inch insulation thickness.
- 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)

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 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

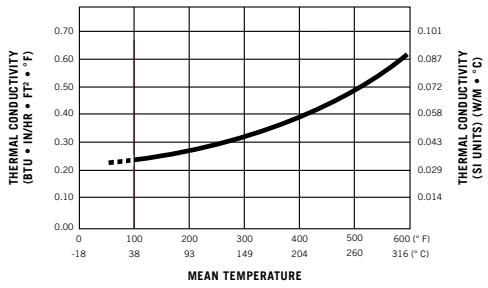
- Produced in 3' (914 mm) sections
- For iron pipe ½" – 24" (15 mm – 610 mm) nominal pipe size
- For copper tube ⅝" – 6⅛" (16 mm – 156 mm)
- All insulation inner and outer diameters comply with ASTM C585
- Wall thicknesses from ½" to 6" (13 mm to 152 mm) in single layer for most sizes
- With or without 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 film 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

Insulated Plastic Pipe Assemblies BSMP.R8583

FHC 25/50

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

12-21

FASSON® 0838

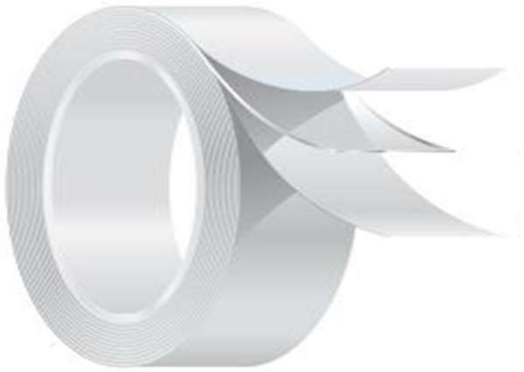
Avery Dennison FASSON® 0838 is a closure system tape with Lamtec ASJ 30J insulation facing.

FEATURES

- Specially formulated antimicrobial, extreme weather,COLD TOUGH® all weather acrylic adhesive
- Excellent initial tack and long-term adhesion
- Meets ASTM C-1136 Type I, Type II, Type III and Type IV
- PSA complies with CDPH Standard Method V1.2
- UL 723 Recognition under File No. BVYS.R7078
- UL ULC S102 Recognition under File No. BVYS7.R7078

BENEFITS

- Excellent bond to Lamtec ASJ 30J insulation facing
- High-strength reinforced facestock reinforces seal and is decaBDE free
- CDPH V1.2 recognized by USGBC LEED, WELL building standard, ANSI/GBI 01-2019, and more
- For use with ASJ+ faced pipe insulation
- Application temperature as low as -18ºC / 0ºF
- Made in the USA



CONSTRUCTION:

Liner:
60# White Kraft

Adhesive:
COLD TOUGH® Acrylic

Carrier:
Foil Laminate

General Use Tape Surface Burning Characteristcs to

UL 723	**Flame Spread**	**20**
722S	**Smoke Developed**	**10**

FASSON® 0838

Adhesive Properties:		Typical Values		
Thickness	ASTM D3652	**US Mils**	**MM's**	**Micron's (µm)**
Liner		3.5	0.09	89
Adhesive		1.7	0.04	43
Carrier		9.0	0.23	229
Total Caliper without Liner:		10.7	0.27	272
Total Caliper:		14.2	0.36	361

Peel Adhesion	ASTM D3330		
180° 12 in (300 mm) min @ Room Temp			
Substrate		**Lbf / in**	**N / Meter**
SS	INITIAL	4.8	845

Loop Tack	ASTM D6195		
180° 20 in (508 mm) / min @ Room Temp			
Substrate		**Lbf / in**	**N / Meter**
SS	INITIAL	6.0	1,057

Tensile	ASTM D882		
180° 2 in (50.8 mm) / min @ Break @ Room Temp			
Substrate		**Lbf / in**	**N / Meter**
Product	MD	55	9,686
Product	CD	50.0	8,805

TLMI Release			
		Gf / 2 in w	
Product	INITIAL	50.0	

VOC			
VOC		**mg / m³**	
Product		< 0.5	

TEMPERATURES	**° F**	**° C**
Minimum Application Temperature	0° F	-18° C
Maximum Continuous Operating Temperature	200° F	93° C
Maximum Intermittent Operating Temperature	275° F	135° C

THE LISTED VALUES ARE TYPICAL AND NOT INTENDED TO SERVE AS PRODUCT SPECIFICATIONS

APPLICATION TECHNIQUES

- It is essential, as with all pressure-sensitive tapes, that the surface to which the tape is applied be clean, dry, and free of grease or oil
- Bond strength is dependent upon the amount of adhesive-to-surface contact developed
- Note that different pressure, time and temperature on different (film / rigid) surface achieves different performance

STORAGE / SHELF LIFE

- One year when stored at 64-72ºF (18-22ºC) / 30-70% relative humidity, out of direct sunlight and in original packaging.

Please refer to Tapes.AveryDennison.com for complete terms and conditions, including warranty terms, relating to this product. You should periodically review the site as terms and conditions are subject to change without notice.

AVERY DENNISON | Performance Tapes

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25/50 Smoke-Safe™ PVC

specification data

The Speedline® Smoke Safe™ PVC Insulated Fitting Covering System consists of preformed gloss white outdoor weatherable and gloss colored insulated covers for piping fittings. Their unique shapes fit screwed, Victaulic®, welded and flanged elbows, tees, valves, couplings, laterals, reducers and endcaps.

The Speedline® Smoke Safe™ PVC Jacketing System consists of gloss white outdoor weatherable and colored PVC sheet in either bulk rolls or precurled cut-to-fit pipe sizes. The White Jacketing is available in .010", .015", .020", and .030" thicknesses.

The Jacketing and Fitting Covering Systems include solvent weld adhesives, stainless steel tack fasteners, silicone caulking and adhesive tapes. A die-cut multi-temperature fiberglass insulation insert is available and sized for a full insulation over the exposed pipe fitting and under the overlay of the PVC Fitting Cover.

Specification Compliance

ASTM D 1784, Cell Class 16354,
Federal Specification HH-I-558, Form B,
Type 1 Class B (Insert Insulation)
USDA and FDA for use in food processing,
beverage, and pharmaceutical facilities
Military Spec LP-1035A, Type II Grade GU
Military Spec LP-535E, Type II Grade GU
New York City MEA 402-07-M,
Agriculture Canada, Canada: CGSB 51.53-95

Applications

Speedline® Smoke Safe™ PVC Insulated Fitting Covers and Jacketing are designed for indoor and outdoor* applications in commercial, institutional and industrial facilities.

- Speedline® Smoke Safe™ PVC Fitting Covers are designed to cover pipe fittings and other mechanical equipment with an outside diameter of 1-5/8" up to 24" in accordance with ASTM C-585. For outdoor use and in high abuse areas, .030 is recommended. For straight runs of piping, expansion joints should always be used to prevent product failure.
- Speedline® Smoke Safe™ PVC jacketing is suitable for covering all flat and round surfaces such as ductwork, tanks and other mechanical equipment. On vessels larger than 24" OD a minimum of .040 Jacketing should be used. For OD's larger than 48", Speedline flat jacketing is not recommended. Due to the expansion and contraction of tanks and vessels, expansion joints should always be used to prevent product failure.
- The Speedline® Smoke Safe™ PVC Jacketing System has an application temperature range of -35°F to 500°F (-37°C to 260°C). The PVC surface should remain below 150°F (66°C) through the installation of sufficient insulation on higher temperature applications.

- **Easy Installation - the unique shapes make an easy seal over an entire mechanical system**
- **Clean, neat and attractive appearance due to the high gloss PVC surface**
- **Low maintenance**
- **Corrosion resistance**
- **Outdoor weatherability* (UV stable)**
- **The 25/50 fire class of all Speedline® Smoke Safe™ products provides greater universal building code acceptance**
- **Provides a natural barrier to moisture, bacteria and mold**

**** Colored fitting covers and jacketing are NOT recommended for outdoor use.***

SPEEDLINE

Cleveland: 1 800 551 9759 | Greensboro: 1 800 551 9760
Stockton: 1 800 833 4500 | La Porte: 713 670 9700
www.speedlinepvc.com

25/50 Smoke-Safe™ PVC

specification data

Physical Properties

Property	Test Method	Value
Speedline® Smoke Safe™ PVC		
Flame Spread	ASTM E84	25 or less
Smoke Developed	ASTM E84	50 or less
Specific Gravity	ASTM 792	1.46
Tensile Strength @ yield lb./in.^{2}	ASTM D638	7,000
Tensile Modulus PSI	ASTM D638	400,000
Izod Impact- ft.lb./in.	ASTM D256	15.0
Permeance @ .030"	ASTM E96	.03
WVTR @ .030"	ASTM E96	.014
Permeance @ .020"	ASTM E96	.05
WVTR @ .020"	ASTM E96	.021
Electrical Conductance	ASTM D257	None
Fiberglass Insulation		
Flame Spread	ASTM E84	25 or less
Smoke Developed	ASTM E84	50 or less
Thermal Conductivity (75°F/24°C)	ASTM C177	0.26

Specification Data

Hot Systems

All piping fittings shall be insulated by filling the total void over all fittings, between straight runs of pipe insulation, with Speedline® die-cut fiberglass insulation, forming a uniform insulation thickness equal to or exceeding the adjacent pipe insulation. Finish all insulated pipe fittings by applying Speedline® Smoke Safe™ PVC Fitting Covers overlapping the adjacent pipe insulation outer covering. Secure the Speedline® Fitting Covers with Speedline® Stainless Steel Tack Fasteners, Speedline® PVC Tape or by welding PVC overlaps with Speedline® Solvent Weld Adhesive. Caution should be exercised to be sure that the insulation surface temperature is maintained below 150°F (66°C) through the application of sufficient insulation under all PVC Covering.

Cold Systems

All piping fittings shall be insulated by filling the total void over all pipe fittings between straight runs of pipe insulation with Speedline® die-cut fiberglass insulation, forming a uniform insulation thickness equal to, or exceeding, the adjacent pipe insulation. Finish all insulated pipe fittings by applying Speedline® Smoke Safe™ PVC Fitting Covers overlapping the adjacent pipe insulation outer covering. The overlap of the throat of the PVC Fitting Cover and the ends of the Fitting Cover overlapping the adjacent pipe insulation vapor barrier jacketing shall be vapor sealed with compatible vapor barrier mastic. The ends of the PVC Fitting Cover overlapping the adjacent pipe insulation shall be further sealed by an outer wrapping of Speedline® PVC Tape extending over the adjacent pipe insulation vapor barrier jacketing and overlapping its own circumferential juncture by at least two inches in the downward direction on the downward side.

Chemical Resistance

Inorganic Acids	
Sulfuric, nitric, hydrochloric, hydrofluoric (diluted or concentrated):	Excellent
Organic Acids	
Formic, acetic and propionic	Poor
Alkalies	
Sodium and potassium hydroxides	Excellent
Ammonium hydroxide	Excellent
Caustic Soda	Excellent
Soda Ash	Excellent
Miscellaneous Corrosive Chemicals	
Phenol, resorcinol and creosol	Poor
Iodine, crystals	Fair
Iodine, tincture	Excellent
Chlorine and bromine water	Excellent
Potassium dichromate	Excellent
Silver nitrate	Excellent
Tannic acid	Excellent
Solvent and Dilutents	
Alcohol and polyalcohols, including ethyl methanol, butanol and isopropyl alcohol	Excellent
Ketones	
Lower boiling ketones	Dissolves
Higher boiling ketones	Swells
Ethers	
Ethyl	Softens
Dichlorethyl ether	Swells
Diethyl cellosolve	Swells
Dioxane	Dissolves
Propylene oxide	Dissolves
Hydrocarbons	
Aromatics as gasoline, kerosene and petroleum oils	Excellent
Oils, Fats and Waxes	
Animal, mineral and vegetable	Excellent