INSUL-LOCK® DS

Flexible, Closed Cell Pipe Insulation (6')
Factory-Applied DoubleSeal Closure System:
Insulation Seam Tape With Flexible PVC Overlap Tape

DESCRIPTION

INSUL-LOCK® DS (*DoubleSeal*) is environmentally-friendly, CFC-free, flexible elastomeric thermal insulation. It is pre-slit with a factory-applied pressure sensitive modified-acrylic adhesive with scrim reinforcement on the seam surface and a flexible PVC overlap tape with acrylic adhesive for *doubled* seam security. It is black in color and is available in 1/2" up to 2" wall thickness and 4" IPS*. INSUL-LOCK® DS key physical properties are approved through supervision by Factory Mutual Research Corporation.

INSUL-LOCK® DS is non-porous, fiber-free and resists mold growth. An EPA-registered antimicrobial agent is incorporated into the product to provide additional protection against mold, fungal and bacterial growth. INSUL-LOCK® DS is GREENGUARD® certified as a low VOC material, meeting the requirements of the *"Children & Schools"* and *"Indoor Air Quality"* classifications.

APPLICATIONS

INSUL-LOCK® DS is used to retard heat flow and prevent condensation on refrigerant lines, cold water plumbing, roof drains and chilled water systems. INSUL-LOCK® DS is recommended for applications ranging from -70°F to +220°F (-57°C to +104°C) for both new and existing applications and can be used with heat tracing/heat tapes. For best results, store and install INSUL-LOCK® DS at temperatures between 40°F and 100°F.

INSTALLATION

INSUL-LOCK® DS is designed for quick and easy installation: slip on the tube, pull the built-in release liner, pinch the tube shut, apply pressure at the seams, and apply the overlap seam using pressure. The seam should be positioned on the bottom of the pipe. *See the K-FLEX Installation Manual for installation instructions in cold temperatures.*

All butt joints must be sealed with an approved contact adhesive. Fittings, covers, flanges, etc can be field-fabricated from sections of INSUL-TUBE® and INSUL-SHEET®. K-FIT® factory-fabricated fittings are also available. INSUL-LOCK® DS's closure system is designed to save on labor costs, particularly on straight runs. It greatly reduces the use of contact adhesives, allowing for improved working conditions and compliance with OSHA requirements.

OUTDOOR APPLICATIONS

INSUL-LOCK® DS is made from a UV-resistant elastomeric blend. For moderate UV exposure (residential applications), no additional protection is needed. For severe UV exposure (rooftop applications) or for optimum performance, K-FLEX® 374 Protective Coating, approved jacketing or K-FLEX CLAD® is required. Similar to indoor applications, the seam should be positioned on the bottom of the pipe.

FEATURES & BENEFITS

- Faster installation
- Easier handling
- Ideal for straight runs and retrofits
- Less use of contact adhesives

RESISTANCE TO MOISTURE VAPOR FLOW

The closed cell structure of INSUL-LOCK® DS effectively retards the flow of moisture vapor and is considered a low transmittance vapor retarder. For most indoor applications, INSUL-LOCK® DS needs no additional protection. Additional vapor barrier protection may be necessary for INSUL-LOCK® DS when installed on low temperature surfaces that are exposed to continuous high humidity.

FLAME AND SMOKE RATING

INSUL-LOCK® DS has a flame spread rating of 25 or less and a smoke development rating of 50 or less as tested by ASTM E 84, *"Surface Burning Characteristics of Building Materials"*. INSUL-LOCK® DS is acceptable for use in duct/plenum applications meeting the requirements of NFPA 90A/B.

Numerical flammability ratings alone may not define the performance of products under actual fire conditions. They are provided only for use in the selection of products to meet limits specified, when compared to a known standard.

*3/8" thick product is available and consists of just hot melt adhesive on both seams for sealing purposes. 3/8" product does not include overlap tape.

SPECIFICATION COMPLIANCE

- ASTM C 534 Type 1 (Tubing), Grade 1
- ASTM D 1056-00-2B1
- New York City MEA 186-86-M Vol. V
- USDA Compliant
- RoHS Compliant
- UL 94-5V Flammability Classification (Recognition No. E300774)
- ASTM E 84 25/50-tested according to UL 723 and NFPA 255
- Complies with requirements of CAN/ULC S102-03 FMRC Approval Guide Chapter 14 Pipe Insulation
- Meets requirements of NFPA 90A Sect. 2.3.3 for Supplementary Materials for Air Distribution Systems
- Meets requirements of ASTM C 411 (Test Method for Hot Surface Performance of High Temperature Thermal Insulation)
- Meets requirements of UL 181 sections 11.0 and 16.0 (Mold Growth/Air Erosion)
- Meets residential and non-residential requirements for California Energy Commission Building Energy Efficient Standards Title 24
- GREENGUARD certified under "Children & Schools" and "Indoor Air Quality" classifications

PHYSICAL PROPERTIES		INSUL-LOCK® DS	TEST METHODS
Thermal Conductivity (K) BTU - in/hr - Ft^2 - °F (W/mK)	90°F (32°C) Mean Temp 75°F (24°C) Mean Temp 32°F (0°C) Mean Temp	0.258 (0.0372) 0.245 (0.0353) 0.235 (0.0339)	ASTM C 177/C 518 ASTM C 177/C 518 ASTM C 177/C 518
Density		3-6 PCF	ASTM D 1622/D 3575
Operating Temperature Range (Flexible to -40°F (-40°C))		-70°F (-57°C) to +220°F (104°C)	
Water Vapor Permeability Dry Cup (Elastomeric Insulation)		0.03 perm-in	ASTM E 96
Water Vapor Permeability Wet Cup (Glued Seam with Overlap)		0.10 perm-in	ASTM E 96
Water Absorption % (Volume Change)		0	ASTM C 209
Flame Spread / Smoke Developed (up to 2" wall)		<25/50	ASTM E 84
Ozone Resistance		Pass	ASTM D 1171
Chemical/Solvent Resistance		Good	
Mildew Resistance/Air Erosion		Pass	UL 181

SEALING PROPERTIES	
Seam Adhesive	High-tack, modified-acrylic pressure sensitive adhesive (foam-tearing bond) with polymeric scrim reinforcement that provides excellent adhesive/composite reinforcement, dimensional stability and conformability while maintaining maximum adhesion properties.
Overlap Tape	Factory-applied tape comprised of flexible PVC strip, aggressive acrylic pressure sensitive adhesive (foam-tearing bond) and a polyethylene teraphthalate (PET) release liner.

THICKNESS RECOMMENDATIONS - TO CONTROL CONDENSATION

PIPE SIZE	50°F (10°C)	35°F (2°C)	0°F (-18°C)	-20°F (-29°C)
Normal Conditions (Max 85°F, 29°C - 70% R.H.)				
3/8" I.D. thru 1-3/8" I.D.	3/8" (10 mm)	1/2" (13 mm)	3/4" (19 mm)	1" (25 mm)
Over 1-3/8" thru 3" IPS	3/8" (10 mm)	1/2" (13 mm)	1" (25 mm)	1" (25 mm)
Over 3" IPS thru 4" IPS	1/2" (13 mm)	1/2" (13 mm)	1" (25 mm)	1-1/2" (38 mm)
Mild Conditions (Max 80°F, 26°C - 50% R.H.)				
3/8" I.D. thru 2-1/8" I.D.	3/8" (10 mm)	3/8" (10 mm)	1/2" (13 mm)	1/2" (13 mm)
Over 2-1/8" thru 3" IPS	3/8" (10 mm)	3/8" (10 mm)	1/2" (13 mm)	3/4" (19 mm)
Over 3" IPS thru 4" IPS	1/2" (13 mm)	1/2" (13 mm)	3/4" (19 mm)	3/4" (19 mm)
Severe Conditions (Max 90°F, 32°C - 80% RH)				
3/8" I.D. thru 1-1/8" I.D.	3/4" (19 mm)	3/4" (19 mm)	1-1/2" (38 mm)	1-1/2" (38 mm)
Over 1-1/8" I.D. thru 4" IPS	3/4" (19 mm)	1" (25 mm)	1-1/2" (38 mm)	1-1/2" (38 mm)

INSUL-LOCK® DS in thickness noted within the specified temperature ranges will prevent condensation on indoor piping under design conditions defined below. Thickness recommendations above 1" can be sleeved to achieve thickness desired.Normal: Maximum severity of indoor conditions rarely exceed 85°F (29°C) and 70% R.H. in United States. Mild: Typical conditions are most air-conditioned spaces and arid climates. Severe: Generally found in areas where excessive moisture is introduced or in poorly ventilated areas where the temperature may be depressed below the ambient. Under conditions of high humidity, additional thickness of insulation may be required. NOTE: Thickness recommendations calculated using 0.2575 K-factor (0.245 plus 5% test error allowance).

PIPE "R" VALUES PER SQUARE FOOT

NOMINAL INSULATION I.D.	3/8" WALL*	1/2" WALL	3/4" WALL	1" WALL	1-1/2" WALL	2" WALL
3/8"	2.7	3.6	5.6	8.5	14.6	20.4
1/2"	2.5	3.4	5.4	7.9	13.5	18.9
5/8"	2.5	3.3	5.4	7.5	12.8	17.8
3/4"	2.3	3.1	5.4	7.5	12.1	16.8
7/8"	2.3	3.2	5.4	7.2	11.6	16.1
1-1/8"	2.3	3.1	5.5	7.1	10.8	15.8
1-3/8"	2.2	3.2	5.3	7.3	10.2	14.9
1-5/8"	2.4	3.1	5.1	7.1	9.8	14.6
1-1/2" IPS	2.3	3.0	4.9	6.7	9.3	13.8
2-1/8"	2.3	3.0	4.9	6.8	9.2	13.6
2" IPS	2.3	2.9	4.8	6.5	9.0	13.3
2-1/2" IPS	2.3	3.0	4.6	6.3	8.6	12.6
2-5/8"	2.3	3.1	4.7	6.4	8.8	12.9
3-1/8"	2.3	3.0	4.6	6.2	8.5	12.4
3" IPS	2.3	3.2	4.6	6.1	8.3	12.2
3-5/8"	2.3	3.2	4.6	6.1	8.3	12.1
4-1/8"	2.3	3.1	4.6	6.0	8.1	11.7
4" IPS	2.3	3.2	4.7	6.0	8.1	11.6

Note: "R" factors were calculated using a K factor of 0.245 (at 75°F, 24°C mean temp.) and nominal wall thickness is each case. Lower operating temperatures will result in improved R values. Contact Technical Services for specific recommendations.
***3/8" thick product construction does not include overlap tape. Hot melt adhesive on both seams is used for sealing purposes.**

K-FLEX USA
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