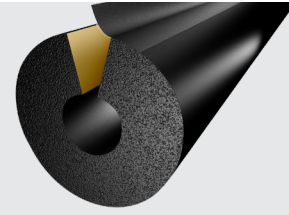


# INSUL-LOCK® DS

CLOSED CELL FLEXIBLE ELASTOMERIC FOAM INSULATION FACTORY-APPLIED DOUBLESEAL CLOSURE SYSTEM



## DESCRIPTION

K-FLEX® INSUL-LOCK® DS (DoubleSeal) is an NBR/PVC-based closed cell, flexible elastomeric foam 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 environmentally-friendly as it is free of CFCs, HFCs, HCFCs, PBDEs, formaldehyde and fibers. An EPA-registered antimicrobial agent is incorporated into the product providing additional protection against mold, fungal and bacterial growth. It is UL GREENGUARD® Gold Certified for low VOC emissions. The product's key physical properties are approved by Factory Mutual. The product is made in K-FLEX® USA's ISO 9001:2008-certified manufacturing facility in North Carolina.

## AVAILABILITY

K-FLEX® INSUL-LOCK® DS is black in color and is available in 6' length tube form in wall thicknesses of 1/2" up to 2" in diameter sizes ranging from 3/8" I.D. to 8" IPS. (ID range is subject to variation depending on wall thickness). \*3/8" thick product is available and consists of only hot melt adhesive on both seams for sealing purposes.

## APPLICATION

K-FLEX® INSUL-LOCK® DS is recommended for applications with service temperatures ranging from -40°F (-40°C) to +220°F (+104°C). The product is used to retard heat gain and prevent condensation or frost formation on below ambient applications, including refrigerant, cold water plumbing, chilled water, and industrial process lines, among others. It can be used with heat tracing tapes. It also retards heat loss from medium hot systems, including hot water plumbing, liquid heating, dual temperature, and solar thermal piping, among others. K-FLEX® USA NBR/PVC elastomeric insulation products can withstand temperature "spikes" up to 250°F (121°C). Because these spikes can vary in temperature and duration, long term effects may vary. Refer to technical bulletin TA36 for additional information.

The K-FLEX® USA website contains the most recent version of all K-FLEX® USA literature. Please refer to the website for current versions of K-FLEX® USA literature at [www.kflexusa.com](http://www.kflexusa.com)

## OUTDOOR APPLICATION

K-FLEX® INSUL-LOCK® DS is made from a UV-retardant elastomeric blend. For severe UV exposure (rooftop applications), reduction of surface defects, or for optimum performance, K-FLEX® 374 Protective Coating, approved jacketing or K-FLEX® Clad® is recommended.

## UNDERGROUND APPLICATIONS

K-FLEX® INSUL-LOCK® DS is acceptable for use in buried applications with maximum service temperatures of 160°F (71°C) using the same installation principles as above ground applications. For lines above the water table, use a clean fill such as sand (3"-5" layer) to protect the insulation before backfilling. For optimum performance, the lines should be encased in a conduit to protect them from problems associated with ground water intrusion and compaction. If a conduit is not used, the insulation thickness should be increased by one thickness size to compensate for compaction.

## INSTALLATIONS

K-FLEX® INSUL-LOCK® DS is flexible (even at low temperatures), durable (non-fracturing and skin is resistant to tearing from handling and environment), safe to handle (non-dusting and non-abrasive), and lightweight for an efficient installation. K-FLEX® INSUL-LOCK® DS is designed to save on labor costs, particularly on straight runs, and reduce the use of contact adhesives, allowing for improved working conditions and compliance with OSHA requirements. K-FLEX® recommends that insulation is installed on non-operational systems with clean, dry surfaces in ambient conditions between 40°F and 100°F. For cold weather installations, it is critical that sufficient pressure levels be applied for proper seam sealing. For properly sized insulation tubing, slip the tube on the pipe, pull the built-in release liner, pinch the tube shut, apply pressure at the seams, and apply the overlap seam using pressure. All butt joints, termination points and open ends should be sealed with an approved contact adhesive, making sure both surfaces to be joined are coated. Longitudinal seams should face downward and vapor stops should be installed as needed. Fittings (elbows, tees,

p-traps) and special parts (flanges, valves, etc.) can be fieldfabricated from insulation tubes and sheets or K-Fit® factory-fabricated fittings can be used. ASTM C1710, Installation Guide for Flexible Closed Cell Foams, and the K-FLEX® Installation Manual should be used as comprehensive installation guides.

## RESISTANCE TO MOISTURE VAPOR FLOW

The expanded closed cell structure and unique formulation inherently resists moisture vapor intrusion and is considered a Class 1 vapor retarder per ASHRAE. For most indoor applications, K-FLEX® INSUL-LOCK® DS needs no additional protection. Additional vapor barrier protection may be necessary when installed on cold surfaces that are exposed to continuous high humidity.

## FLAME AND SMOKE RATING

K-FLEX® INSUL-LOCK® DS in wall thicknesses of 2" (50 mm) and below has a flame spread rating of 25 or less and a smoke development rating of 50 or less as tested to ASTM E84, "Surface Burning Characteristics of Building Materials". It is acceptable for 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.

## SPECIFICATION COMPLIANCE

- ▶ ASTM C534 Type 1, Grade 1
- ▶ ASTM D1056-00-2B1
- ▶ New York City MEA 186-86-M Vol. V
- ▶ USDA Compliant
- ▶ CFIA Compliant
- ▶ RoHS Compliant
- ▶ UL 94-5V Flammability Classification (#E300774)
- ▶ ASTM E84 25/50-rated (to 2") - tested to UL 723, NFPA 255 and CAN/ULC S102-03
- ▶ NFPA No. 101 Class A Rating
- ▶ NFPA 90A, 90B
- ▶ Meets requirements of California ECB Title 24
- ▶ UL GREENGUARD® Gold Certified
- ▶ Meets energy code requirements of ASHRAE 90.1 and 189.1

**K-FLEX® INSUL-LOCK® DS ► TECHNICAL DATA**

▼ Physical properties ▼		▼ K-FLEX® INSUL-LOCK® DS ▼		▼ Test methods ▼	
Main Composition		Flame-retarded NBR/PVC-based elastomeric foam			
Thermal Conductivity (K)	90°F (32°C) Mean Temp	0.258 (0.0372)			
Btu-in/hr-Ft²-°F (W/mk)	75°F (24°C) Mean Temp	0.245 (0.0353)		ASTM C177	
	32°F (0°C) Mean Temp	0.235 (0.0339)			
Density		3-6 lb/ft³		ASTM D1667	
Operating Temperature Range		-40°F (-40°C) to +220°F (104°C)**		ASTM C534	
Water Vapor Permeability (Dry Cup: Elastomeric Insulation)		<0.01 perm-in		ASTM E96	
Water Vapor Permeability (Wet Cup: Glued Seam with Overlap)		0.10 perm-in		ASTM E96	
Seam Tape: 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 terephthalate (PET) release liner.					
Water Absorption (Volume Change)		0%		ASTM C209	
Flame Spread / Smoke Development (up to 2" wall)		<25/50		ASTM E84	
Flammability		Self-Extinguishing		ASTM D635	
Dimensional Stability		<7% Linear Shrinkage		ASTM C534	
Hot Surface Performance (250°F for 96 hours)		No Cracking or Delamination		ASTM C411	
Ozone Resistance		Pass		ASTM D1171	
Odor Emissions		No Objectionable Odor		ASTM C1304	
Chemical/Solvent/Oil/Grease Resistance		Good		Compatibility Data Available on Request	
Flexibility		Excellent Pass: Cold Crack Test at -40°F (-40°C)		ASTM C534 ASTM D1056	
Mildew Growth Resistance/Air Erosion		Pass		UL 181, ASTM G21	
Corrosion Risk		pH neutral: 6.6±0.04		DIN 1988	
Leachable Chlorides		<0.05% water-soluble chloride ions		DIN 1988	
UV / Weather Resistance¹		Good		ASTM G90	
Sound Transmission Class (1")		13		ASTM E90	

¹ Outdoor applications should be protected with an approved K-FLEX® coating or cladding for optimum performance. \*\*Intermittent temperature "spikes" to 250°F (121°C)

**K-FLEX® INSUL-LOCK® DS ► THICKNESS RECOMMENDATIONS (TO PREVENT CONDENSATION)**

SERVICE TEMPERATURE	50°F (10°C)			35°F (2°C)			0°F (-18°C)			-20°F (-29°C)		
▼ Pipe Size ▼	▼ Mild ▼	▼ Normal ▼	▼ Severe ▼	▼ Mild ▼	▼ Normal ▼	▼ Severe ▼	▼ Mild ▼	▼ Normal ▼	▼ Severe ▼	▼ Mild ▼	▼ Normal ▼	▼ Severe ▼
3/8" ID to 1-1/8" ID	3/8"	3/8"	3/4"	3/8"	1/2"	3/4"	1/2"	3/4"	1-1/2"	1/2"	1"	1-1/2"
1-3/8" ID to 3" IPS	3/8"	3/8"	3/4"	3/8"	3/4"	1"	1/2"	1"	1-1/2"	3/4"	1-1/2"	1-1/2"
4" IPS	1/2"	1/2"	3/4"	1/2"	3/4"	1"	3/4"	1"	2"	3/4"	1-1/2"	2"

Thickness listed for the specified ranges will prevent condensation on indoor piping under the defined design conditions. Normal: 85°F and 70% R.H. Mild: Most air conditioned spaces and arid climates: 80°F and 50% R.H. Severe: Areas where excessive moisture is introduced or in poorly ventilated areas where the temperature may be depressed below the ambient: 90°F and 80% R.H. Contact K-FLEX® technical support for additional information.

**K-FLEX® INSUL-LOCK® DS ► PIPE "R" VALUES PER SQUARE FOOT (ALL SIZES ARE NOMINAL)**

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	12.4	16.8
7/8"	2.3	3.2	5.4	7.2	11.6	16.1
1-1/8"	2.2	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	2.0	2.6	4.4	6.2	9.9	13.8
2-1/8"	2.3	3.0	4.9	6.6	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	2.2	3.2	4.6	5.5	8.0	11.6
5" IPS	-	3.0	4.5	5.7	7.7	11.1
6" IPS	-	3.0	4.4	5.6	7.5	10.9
8" IPS	-	2.9	4.2	5.3	7.2	-

Note: \*3/8" thick product construction does not include overlap tape. Hot melt adhesive on both seams is used for sealing purposes.

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