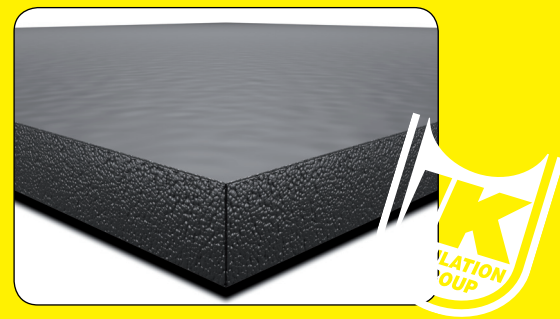


K-FLEX DUCT® LINER GRAY

Closed Cell Flexible Elastomeric Foam Insulation
Fiber-Free Solution for Lining Ductwork



DESCRIPTION

K-FLEX Duct® Liner Gray is an NBR/PVC-based closed cell, flexible elastomeric foam thermal and acoustic insulation. 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 is made in K-FLEX USA's ISO 9001:2008-certified manufacturing facility in North Carolina.

AVAILABILITY

K-FLEX Duct® Liner Gray is gray in color and is available in flat sheet (3' x 4') or roll (up to 60" wide) form in thicknesses of 1/2" up to 2". The product is supplied either as skin-two-sides or with a factory-applied scrim-reinforced acrylic adhesive on one side.

APPLICATIONS

K-FLEX Duct® Liner Gray is suitable for applications with service temperatures ranging from -297°F (-182°C) to +220°F (+104°C). When using factory-applied PSA, the low temperature limit is -40°F (-40°C). When the product is installed fully adhered to the insulated surface (via contact adhesive or PSA), the high temperature limit is +200°F (+93°C). For applications below -40°F (-40°C), contact K-FLEX technical support. The product is used to reduce sound transmission and/or retard heat gain/loss and prevent condensation when used as an internal liner on square, rectangular, round or oval ductwork or equipment.

INSTALLATION

K-FLEX Duct® Liner Gray 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. The product can be cut manually or on automated equipment. K-FLEX Duct® Liner Gray with PSA is designed to speed up installation time and reduce the use of contact adhesives, allowing for improved working conditions and compliance with OSHA requirements. The adhesive's scrim reinforcement reduces the tendency to stretch the sheet insulation during installation and improves the peel strength of the material.

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 square or rectangular ducts, properly sized insulation sheets should have 100% coverage of an approved contact adhesive applied to both surfaces. Compression joints should be used on all butt edges. Mechanical fasteners should be used in accordance with SMACNA guidelines. K-FLEX Duct® Liner Gray can also be installed in double-wall and single-wall round or oval ducts. Note that double-wall construction is not mandatory when using the product in round ductwork. When air stream velocities exceed 4,000 FPM (20.3m/second), metal nosing is recommended to be applied to every leading edge. Nosing may be formed, channeled or zee-attached on duct by screws, rivets or welds.

ASTM C1710, *Installation Guide for Flexible Closed Cell Foams*, and the *K-FLEX Installation Manual* should be used as comprehensive installation guides.

ACOUSTICS

K-FLEX Duct® Liner Gray provides excellent noise reduction performance. The product's structure mechanically responds to sound energy by converting it into cell movement and heat. Refer to page 2 for sound absorption and sound insertion loss data.

RESISTANCE TO MOISTURE VAPOR FLOW

The expanded closed cell structure and unique formulation inherently resists moisture vapor intrusion. For most applications, K-FLEX Duct® Liner Gray needs no additional protection.

FLAME AND SMOKE RATING

K-FLEX Duct® Liner Gray in 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 2, Grade 1
- ASTM C1534
- New York City MEA 186-86-M Vol. V
- USDA Compliant
- CFIA Compliant
- RoHS Compliant
- 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
- Code Compliant R-values: R-4.2 (1"), R-8 (2")
- UL 94: V-0, 5VA
- UL GREENGUARD® Gold Certified

PHYSICAL PROPERTIES		K-FLEX DUCT® LINER GRAY	TEST METHODS
Main Composition		Flame-retarded NBR/PVC-based elastomeric foam	
Thermal Conductivity (K)	90°F (32°C) Mean Temp	0.27 (0.039)	ASTM C177
Btu-in/hr-Ft ² -°F (W/mK)	75°F (24°C) Mean Temp	0.25 (0.036)	
Density		3-6 lb/ft ³	ASTM D1667
Operating Temperature Range		-297°F* (-183°C) TO +220°F (+104°C) PSA: -40°F (-40°C) TO +200°F (93°C)	ASTM C534
Water Vapor Permeability (Dry Cup)		<0.06 perm-in	ASTM E96
Water Absorption (Volume Change)		<0.20%	ASTM C209
Flame Spread / Smoke Development (up to 2" wall)		<25/50	ASTM E84
Pressure Sensitive Adhesive (PSA): Solvent-free, acrylic dispersion adhesive with high tack, high peel resistance (≥20 N / 25 mm per DIN EN 1939), high shear adhesion (500 g / 625 mm ² per DIN EN 1943), and resistance to humidity and aging. Adhesive: 0.07 mm thickness; Support: Scrim; Liner: Poly film release liner, moisture and tear resistant, easy release.			
Dimensional Stability		<7% Linear Shrinkage	ASTM C534
Hot Surface Performance (220°F)		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 / Fungi Resistance		Pass	UL 181, ASTM G21, ASTM C1338
Air Erosion		4,000 FPM Rating	ASTM C1071 (tested to 10,000 FPM)
Corrosion Risk		pH neutral: 6.6±0.04	DIN 1988
Leachable Chlorides		<0.05% water-soluble chloride ions	DIN 1988
UV / Weather Resistance ¹		Pass	QUV Chamber Test
Sound Transmission Class (1")		12 (insulation only) 27 (insulation adhered to 22-gauge steel duct)	ASTM E90

*For applications below -40°F (-40°C), contact K-FLEX technical support.

¹ Where UV sterilizing equipment is used within the air handling system, protect K-FLEX Duct® Liner Gray with K-FLEX® 374 Protective Coating. Refer to K-FLEX® 374 technical data sheet for more information.

THICKNESS RECOMMENDATIONS (TO PREVENT CONDENSATION)

SERVICE TEMPERATURE	50°F (10°C)			35°F (2°C)			0°F (-18°C)			-20°F (-29°C)		
	Mild	Normal	Severe	Mild	Normal	Severe	Mild	Normal	Severe	Mild	Normal	Severe
Flat Surface	1/8"	1/2"	3/4"	1/4"	3/4"	1-1/2"	1/2"	1"	2"	3/4"	1-1/2"	2-1/2"

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.

SOUND ABSORPTION COEFFICIENTS AT FREQUENCY (Hz) (ASTM C423)

THICKNESS	125	250	500	1000	2000	4000	NRC
1/2" (12mm)	0.01	0.03	0.06	0.13	0.33	0.23	0.15
1" (25mm)	0.06	0.17	1.06	0.32	0.67	0.54	0.55
2" (50mm)	0.23	0.84	0.32	0.60	0.39	0.31	0.55

SOUND INSERTION LOSS (dB) AT FREQUENCY (Hz) (ASTM E477)

THICKNESS	125	250	500	1000	2000	4000	8000
1" (25mm)	1	3	20	7	12	12	12

"R" VALUES (ALL SIZES ARE NOMINAL)

3/8"	1/2"	3/4"	1"	1-1/2"	2"
1.5	2	3	4.2	6	8