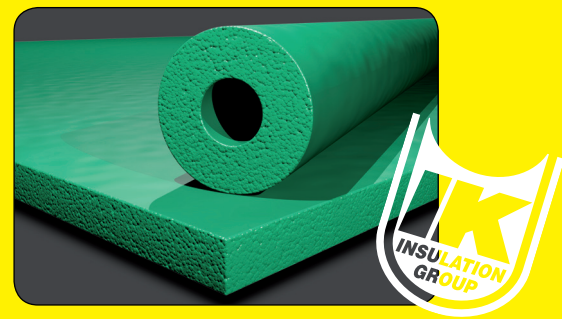


K-FLEX ECO®

Closed Cell Flexible Elastomeric Foam Insulation Halogen-Free



DESCRIPTION

K-FLEX ECO® is a halogen-free, NBR-based closed cell, flexible elastomeric foam 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. K-FLEX ECO® does not contain carbon black or PVC in accordance with United States Navy Environmental Department standards. The product is made in K-FLEX USA's ISO 9001:2008-certified manufacturing facility in North Carolina.

AVAILABILITY

K-FLEX ECO® is green in color and is available in 1/2", 3/4" and 1" wall thickness in non-slit, 6' length tube form in diameter sizes ranging from 3/8" I.D. to 8" IPS (ID range is subject to variation depending on wall thickness), sheet (3' x 4') and roll (4' wide) form with or without PSA, and fitting form (elbows and tees) in diameter sizes ranging from 3/8" I.D. to 6" IPS (ID range is subject to variation depending on wall thickness).

APPLICATIONS

K-FLEX ECO® is recommended for applications with service temperatures ranging from -297°F (-182°C) to +250°F (+120°C). For applications below -40°F (-40°C), contact K-FLEX technical support. 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). 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 ECO® is designed for applications where corrosive smoke and environmental issues (toxicity) are critical, including US Naval Ship and other general maritime applications. It is well-suited for stainless steel applications, notably those with service temperatures above 90°F, as it does not contain halogens that are known to contribute to corrosion. Under high operating temperature conditions (i.e. 250°F), a thin layer of discolored hardened material in the inner wall will form. This constitutes a normal reaction and does not in any way adversely affect the insulation properties of the foam.

OUTDOOR APPLICATIONS

K-FLEX ECO® is made from a UV-resistant elastomeric blend. For severe UV exposure (topside applications) or for optimum performance, K-FLEX® 374 Protective Coating, approved jacketing or K-FLEX Clad® is recommended.

INSTALLATION

K-FLEX ECO® 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 recommends that insulation is installed on non-operational systems with clean, dry surfaces in ambient conditions between 40°F and 100°F. Properly sized insulation tubing can be slid over piping (tubing should be pushed, not pulled) or, when applied to existing lines, can be slit lengthwise (using a sharp, non-serrated knife) and fitted into place. All seams, butt joints, termination points and open ends should be sealed with an approved contact adhesive, making sure both surfaces to be joined are coated (K-FLEX® 720 LVOC Contact Adhesive is a halogen-free contact adhesive). Longitudinal seams should face downward and vapor stops should be installed as needed. Properly sized insulation sheets can be installed onto large OD round surfaces or flat surfaces. For round surfaces (piping

or ductwork), the sheet should be wrapped (without stretching the insulation) around the pipe and sealed at the longitudinal seam with an approved contact adhesive. For ductwork and equipment, 100% coverage of an approved contact adhesive should be used, making sure to coat both surfaces. Compression joints should be used on all butt edges. Fittings (elbows, tees) and special parts (flanges, valves, etc.) can be field-fabricated 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. For most indoor applications, K-FLEX ECO® 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 ECO® in wall thicknesses of 3/4" 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".

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 & 2, Grade 3
- EB 4013 (US Navy)
- IMO SOLAS
- Lloyd's Register
- ABS
- Transport Canada Board of Steamship Inspection
- UL 94-5V Flammability Classification (#E362979)
- ASTM E84 25/50-rated (to 3/4") - tested to UL 723
- ASTM C795

| PHYSICAL PROPERTIES | | K-FLEX ECO® | TEST METHODS |
|--|-----------------------|---|---|
| Main Composition | | Flame-retarded NBR-based, halogen-free elastomeric foam | |
| Thermal Conductivity (K) | 90°F (32°C) MEAN TEMP | 0.282 (.041) | ASTM C177 |
| Btu-in/hr-Ft ² -°F (W/mK) | 75°F (24°C) MEAN TEMP | 0.270 (.039) | |
| | 50°F (10°C) MEAN TEMP | 0.263 (.038) | |
| Density | | 3-5 lb/ft ³ | ASTM D1667 |
| Operating Temperature Range | | -297°F* (-183°C) TO +250°F (+120°C) PSA: -40°F (-40°C) TO +200°F (+93°C) | ASTM C534 |
| Water Vapor Permeability (Dry Cup) | | <0.10 perm-in | ASTM E96 |
| Flame and Smoke | | <25/50 (up to 3/4") Pass Pass | ASTM E84 EB 4013 IMO RES. A 653 (16), MSC 61 (67) |
| Optical Smoke Density | | <150 | ASTM E662 |
| Dimensional Stability | | <7% Linear Shrinkage | ASTM C534 |
| Hot Surface Performance (220°F) | | No Cracking or Delamination | ASTM C411 |
| Ozone Resistance | | Excellent | ASTM D1149 |
| Odor Emissions | | No Objectionable Odor | EB 4013 |
| Toxicity | | Free of Halogens, Dioxin, CFCs, Carbon Black | EB 4013 |
| Chemical/Solvent/Grease Resistance | | Good | Compatibility Data Available on Request |
| Oil Resistance | | No change in apparent softness or color, no swelling | ASTM D471 |
| Flexibility | | Excellent (No cracking at 28°F) | EB 4013 |
| Mildew Growth Resistance/Air Erosion | | Pass | UL 181, ASTM G21 |
| Corrosion Risk | | pH neutral: 7.2±0.02 | DIN 1988 |
| Leachable Chlorides (Use on Stainless Steel) | | Cl (<.001%); F (<.001%); Na (<.005%); Si (<.005%) | ASTM C795 |
| UV / Weather Resistance ¹ | | Pass | QUV Chamber Test |
| Sound Transmission Class (1") | | 13 | ASTM E90 |

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

¹ Outdoor applications should be protected with an approved K-FLEX® coating or cladding.

| PIPE "R" VALUES PER SQUARE FOOT (ALL SIZES ARE NOMINAL) | | | |
|---|-----------|-----------|---------|
| NOMINAL INSULATION I.D. | 1/2" WALL | 3/4" WALL | 1" WALL |
| 3/8" | 3.2 | 5.0 | 7.6 |
| 1/2" | 2.9 | 4.7 | 7.0 |
| 5/8" | 2.7 | 4.6 | 6.5 |
| 3/4" | 2.5 | 4.6 | 6.4 |
| 7/8" | 2.6 | 4.6 | 6.2 |
| 1-1/8" | 2.5 | 4.7 | 6.1 |
| 1-3/8" | 2.6 | 4.5 | 5.8 |
| 1-5/8" | 2.5 | 4.3 | 5.5 |
| 1-1/2" IPS | -- | 3.8 | 5.0 |
| 2-1/8" | 1.8 | 4.1 | 5.2 |
| 2" IPS | 1.7 | 4.2 | 5.3 |
| 2-1/2" IPS | 1.5 | 4.1 | 5.1 |
| 2-5/8" | -- | 4.2 | 5.8 |
| 3" IPS | 1.3 | 4.4 | 5.4 |
| 3-1/2" IPS | 1.9 | 4.0 | 4.9 |
| 4" IPS | 1.5 | 3.9 | 4.7 |
| 5" IPS | 2.6 | 3.8 | 4.9 |
| 6" IPS | 2.6 | 3.8 | 4.8 |
| 8" IPS | 2.5 | 3.7 | 4.7 |