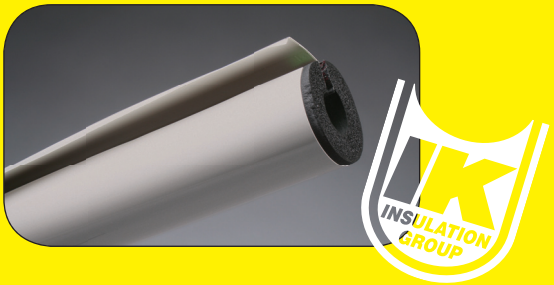
K-FLEX CLAD® IN

Flexible, Non-Metallic, Polymeric Jacketing Factory-Adhered to Closed Cell FEF Insulation



DESCRIPTION

K-FLEX CLAD® IN is a composite product comprised of a flexible, non-metallic, polymeric (CPE/PVC) protective jacketing that is factory-adhered to an NBR/PVC-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 insulation providing additional protection against mold, fungal and bacterial growth. The product is made in K-FLEX USA's ISO 9001:2008-certified manufacturing facility in North Carolina.

AVAILABILITY

K-FLEX CLAD® IN is gray in color and is available in 1", 1-1/2" and 2" wall thickness in pre-slit, 3' length tube form in diameter sizes ranging from 1/2" I.D. to 4" IPS (ID range is subject to variation depending on wall thickness), as well as sheet (3' x 4') and roll (4' wide) form with or without PSA. Matching fitting covers (segmented and thermoformable) and jacketing rolls for use on all insulation types are also available.

APPLICATIONS

K-FLEX CLAD® IN is recommended for applications with service temperatures ranging from -297°F (-182°C) to +220°F (+104°C). For applications below -40°F (-40°C), contact K-FLEX technical support when using K-FLEX® FEF insulation. 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). K-FLEX CLAD® IN is resistant to UV, ozone, high humidity, salt spray, weather, oil and grease, agressive chemicals, impact and mechanical abuse, corrosion under insulation (CUI), and moisture vapor intrusion. It is also well-suited for temperature cycling applications due to the ability of the polymeric covering to expand and contract with rapid temperature cycles. For these reasons, K-FLEX CLAD® IN is ideal for utility and process pipes, ducts, vessels and tanks in industrial plants, operating mills (pulp and paper), offshore platforms, FPSOs, LNG Terminals and marine applications. 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.

INSTALLATION

K-FLEX CLAD® IN is durable (non-fracturing and resistant to corrosion, deformation, punctures, dents and tearing from traffic, handling and environment), safe to handle (non-dusting and free of sharp edges), easy to transport and store, and lightweight for an efficient installation. Factory-jacketed insulation is designed to provide installed cost savings over traditional jacket systems. It requires little to no maintenance and allows for removal and reapplication for pipe inspection. 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 properly sized factory-jacketed, pre-slit tubes, slip the tube on the pipe and seal the insulation seams and jacket overlap section with K-FLEX® 420 Contact Adhesive. The jacket surface does not require preparation or activation for it to accept the adhesive. 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. K-Fit® factory-fabricated fittings, K-FLEX CLAD® IN Fitting Covers and K-FLEX CLAD® IN Tape (requires contact adhesive) for sealing adjacent tube butt joints and covering edges complete the installation. Special parts (flanges, valves, etc.) can be field-fabricated from insulation tubes / sheets and jacketing, which is flexible and easily cut with a sharp, non-serrated knife. Properly sized factory-jacketed insulation sheets can be used for large pipes or flat surfaces. For large pipe applications, a 2" strip of insulation should be removed for the factory-applied sheet to allow for proper longitudinal overlap. All seams and overlap sections should be sealed with K-FLEX® 420 Contact Adhesive. All seams (horizontal and vertical) should be sealed with a marine-grade sealant (Bostik® 70-03A). The *K-FLEX Installation Manual* should be used as a comprehensive installation guide.

PROTECTION AGAINST CUI

K-FLEX CLAD® IN has a high water vapor diffusion resistance factor and practically eliminates the problems of progressive insulation deterioration and corrosion under insulation (CUI). The installed system is 100% sealable with moisture-tight seams, eliminates gaps between the insulation surface and cladding layer, has a high emissivity value, and is resistant to puncture.

FLAME AND SMOKE RATING

K-FLEX CLAD® IN has an appropriate response to fire, achieving a Class A flammability rating (<25/450) when tested to ASTM E84 and meeting the requirements of IMO 61/67 part 2&5.

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.

Technical Data is based on K-FLEX black NBR/PVC-based elastomeric insulation. For technical information on other K-FLEX® FEF substrates and other insulation material types, contact K-FLEX Technical Support.

SPECIFICATION COMPLIANCE

- CE Marine Mark Approved (MED, module B)
- RoHS Compliant
- ABS (American Bureau of Shipping)
- DNV (Det Norske Veritas)
- Lloyd's Register
- Norsok Standard R-004 ed 3 (par. 5.9 non-metallic jacket)
- ASTM E84 25/450-rated (Class A) - tested to UL 723

PHYSICAL PROPERTIES	K-FLEX CLAD® IN JACKET	TEST METHODS
Material Type	Flexible, Polymeric (Chlorinated Polyethylene (CPE) / PVC) Barrier	
Color	Gray (RAL 7001) or Black (RAL 9011)	
Thickness	.045" (1.2 ± 0.2mm)	
Water Vapor Permeance	0.08 perms μ > 90,000 (moisture resistance factor)	ASTM E96 EN 12086
Specific Weight	1.8 ± 0.1g/cm^3	
Hardness	≥80 ShA	ISO 7619, ASTM D2240
Tensile Strength	≥6.9 MPa (Typical value 7.5 MPa)	ISO 37
Modulus 10%	>1.5 MPa	ISO 37
Elongation to Break	>100% (Typical values: elongation @ 70%, elongation to break 300%)	ISO 37
Peel Adhesion	>50 Kpa	ISO 2411
Shear Strength	>20 N/25mm	ISO 34-1
Ozone Resistance	Extremely Good: No oxidation after 72 hours of 50pphm and 20% elongation	ASTM D1171
UV Resistance	Extremely Good: No change in color, pitting, cracking or blistering after 2 years exposure in Arizona	ASTM G7
Salt Spray (Sea Water) Resistance	Extremely Good: No color shade change, scaling or blistering after 480 hours	ISO 3768, ASTM B117
Aging Resistance	Extremely Good: Elongation to break and modulus conformance to specification after 360 hours of 72 MJ	ISO 4982
Oil Resistance	Extremely Good: Elongation to break and modulus conformance to specification after 72 hours of immersion in oil IRM 903	ISO 1817
Chemical Resistance	Excellent resistance to broad spectrum of chemicals (hydrocarbons, alcohols, acids, oils, etc.). Full compatibility data, including chemicals to avoid, is available on request.	
Impact Resistance	Extremely Good: Resistant to 20mm diameter puncher of 1 Kg mass	EN 12691
High Surface Temperature Limit (continuous temperature of ambient air & insulation surface)	175°F (80°C)	
Flexibility (for installation)	Excellent: Flexible to -4°F (-20°C)	ISO 812
Emissivity	0.90	
Corrosion Risk (CUI)	Protects against corrosion under insulation: 100% sealable, high emissivity, resistant to moisture vapor intrusion, puncture and tear	
Fire Performance	Pass Pass <25/450 (Class A) Pass	BS 476 pt 6 & 7 NF 92501 ASTM E84 IMO 61/67 part 2&5
	K-FLEX® PRE-SLIT INSULATION	
Main Composition	Flame-retarded NBR/PVC-based elastomeric foam	
Thermal Conductivity (K) Btu-in/hr-Ft^2-°F (W/mK)	90°F (32°C) Mean Temp: 0.258 (0.0372) 75°F (24°C) Mean Temp: 0.245 (0.0353) 32°F (0°C) Mean Temp: 0.235 (0.0339)	ASTM C177
Density	3-5 lb/ft^3	ASTM D1667
Operating Temperature Range	-297°F (-182°C)* to +220°F (104°C)	ASTM C534
Water Vapor Permeability (Dry Cup)	<0.01 perm-in	ASTM E96
Water Absorption (Volume Change)	0%	ASTM C209
Flame Spread / Smoke Development (up to 2" wall)	<25/50	ASTM E84
Dimensional Stability	<7% Linear Shrinkage	ASTM C534
Hot Surface Performance (220°F)	No Cracking or Delamination	ASTM C411
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	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
Sound Transmission Class (1")	13	ASTM E90

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

K-FLEX USA
INNOVATION IN INSULATION

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