# K-FLEX CLAD® AL

## Multi-Layer Laminate Protective Jacketing Factory-Adhered to Closed Cell FEF Insulation

## DESCRIPTION

K-FLEX CLAD® AL is a composite product comprised of a multi-ply laminate jacketing (PVC backing and aluminum foil coated with a transparent protective polyester film) 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. 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 CLAD® AL is silver in color and is available in 1/2" to 2" wall thickness in pre-slit/pre-glued or non-slit (K-FLEX CLAD® AL NS), 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. Segmented elbow covers are available for fittings. Jacketing is also available in roll form for use on all insulation types.

## APPLICATIONS

K-FLEX CLAD® AL is recommended for applications with service temperatures ranging from -40°F (-40°C) to +220°F (+104°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). K-FLEX CLAD® AL is an ideal choice for outdoor applications as it is resistant to UV, weather, dirt, oxidation, staining and a broad range of chemicals, salts and oils. 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® AL is durable (resistant to punctures, dents and tearing), safe to handle (non-dusting and free of sharp edges), 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. The jacket can be cleaned with a cloth free of detergents and can be painted for aesthetic purposes using a paint suitable for painting furniture, such as rustoleum plastic spray paint.

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 factory-jacketed pre-slit/pre-glued tubes, 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. K-FLEX® Rivets and K-FLEX CLAD® AL Tape are included and should be applied along the longitudinal seam during installation. 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® AL Fitting Covers and K-FLEX CLAD® AL Tape for sealing 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 are recommended for use on flat surfaces, using either factory-applied adhesive or 100% coverage on both surfaces of an approved contact adhesive. For large diameter round applications (duct or pipe), jacketing should be field-applied to the insulation for optimum performance against expansion-contraction from process and ambient temperature fluctuations. For applications subject to heavy moisture, K-FLEX recommends caulking seams. The *K-FLEX Installation Manual* should be used as a comprehensive installation guide.

## PROTECTION AGAINST CUI

K-FLEX CLAD® AL's low permeance jacket provides a secondary moisture vapor and gas barrier to the inherently moisture-resistant closed cell foam core, which is considered a Class 1 vapor retarder per ASHRAE. The installed system is 100% sealable with moisture-tight seams, has a high emissivity value, and is resistant to puncture. Factory-jacketed tubes have a unique overlap closure system to eliminate moisture penetration through seams.

## FLAME AND SMOKE RATING

K-FLEX Clad® AL in wall thicknesses of 2" (50 mm) and below has a flame spread rating of 25 or less and a smoke development rating of 450 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.

***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

- ASTM C534 Type 1 & 2, Grade 1
- USDA Compliant
- RoHS Compliant
- ASTM E84 25/450-rated (Class A) - tested to UL 723, NFPA 255 and CAN/ULC S102-03
- UL GREENGUARD® Gold Certified
- Meets energy code requirements of ASHRAE 90.1 and 189.1

| PHYSICAL PROPERTIES | K-FLEX CLAD® AL JACKET | TEST METHODS |
|---|---|---|
| Main Composition | Multi-ply laminate (PVC backing and aluminum foil coated with a transparent polyester film) | |
| Thickness | 0.012” | |
| Weight | 0.1 lb/ft$^2$ | |
| Flame Spread / Smoke Development | <25/450 (Class A) | ASTM E84 |
| Water Vapor Permeance | 0.001 perms | ASTM E96 |
| Water Resistance | Pass: No Unforced Delamination | ASTM C1775 |
| UV Resistance | Excellent (Sunlight & Rain / Dew)<br>UV Stability: >10 years<br>Artificial Aging: >2000 hours (320 MJ/m$^2$)<br>Solar Radiation: >3,600,000 kJ/m$^2$ | ASTM G53<br>Internal Weatherometer Test<br>EN 13859-1 |
| Corrosion Risk | Protects against corrosion under insulation: 100% sealable, high emissivity, resistant to moisture vapor intrusion, puncture and tear | |
| Chemical Resistance | Resistant to Acids (Acetic, 50% Formic, 10% hydrochloric, 35%hydrofluoric, 10% nitric, 85% phosphoric), Aldehydes (acetaldehyde, formaldehyde), Alcohols (cyclohexanol, ethyl, glycerine, glycol, isopropyl, methyl), Esters (ethyl acetate), Hydrocarbons (aliphatic, benzene, petroleum, mineral oil, toluene, xylene), Acetone, Ether, Salt Solutions (bichromates, cyanides, fluorides). Partial resistance to Alkaline solutions, Chlorinate solvents, and select Alcohols and Acids. Additional Compatibility Data Available On Request. | |
| Fungi / Bacteria Resistance | Excellent | ASTM G21 |
| Impact / Puncture Resistance | No Failure: 20mm diameter punch from 1 kg mass<br>100 N | UNI EN 12691<br>prEN 14 477 |
| Emissivity | 0.80 | ASTM C1371 |
| Tensile Strength | 90 lbf/in | ASTM D828 |
| Burst Strength | 200 psi | ASTM D774 |
| Dimensional Stability | -1% (length change) | ASTM D1204 |
| Surface Temperature Exposure | Pass: No Cracks or Delamination (-20°F to +150°F) | ASTM C1263 |
| Peel Adhesion (180° peel) | >46 oz/in | ASTM D3330 |
| Color | Silver | |
| | **K-FLEX® SELF-SEAL INSULATION** | |
| Main Composition | Flame-retarded NBR/PVC-based elastomeric foam | |
| Thermal Conductivity (K)<br>Btu-in/hr-Ft$^2$-°F (W/mK) | 90°F (32°C) Mean Temp: 0.258 (0.0372)<br>75°F (24°C) Mean Temp: 0.245 (0.0353)<br>32°F (0°C) Mean Temp: 0.235 (0.0339) | ASTM C177 |
| Density | 3-5 lb/ft$^3$ | ASTM D1667 |
| Operating Temperature Range | -40°F (-40°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<br>Pass: Cold Crack Test at -40°F (-40°C) | ASTM C534<br>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 |
| | **COMPOSITE SYSTEM** | |
| Water Vapor Permeability | 0.001 perm-in | ASTM E96 |
| Water Vapor Permeance at PSA Overlap Seam | <0.004 perms | ASTM E96 |

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K-FLEX USA
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