



Storage Tanks

Product performance for insulation of large storage tanks





ABOUT K-FLEX USA



Youngsville, NC Headquarters

K-FLEX USA IS A LEADING MANUFACTURER of closed cell flexible elastomeric foam insulation products for mechanical piping, air handling units and vessels.

Designed for ease of installation and reliable performance, K-FLEX products provide excellent thermal and acoustical performance, including inherent resistance to moisture intrusion.

K-FLEX USA prides itself on being responsive to the market, providing dependable service to customers throughout North America, bringing an innovative approach to product offerings, and having products that are 3rd party tested and certified.

In April 2012, K-FLEX USA was awarded with ISO 9001:2008 certification by FM Approvals. The independent certification demonstrates the company's commitment to quality.

K-FLEX products have proven performance in the Plumbing, HVAC/R, Commercial/Industrial, Marine, Oil & Gas, Acoustic and OEM Markets.

As a member of the IK Insulation Group, K-Flex USA delivers state-of-the-art levels of technical knowledge and customer support to the global mechanical insulation market.



COMPANY HISTORY

1965
Rubatex was formed.

1975
Halstead was formed and INSUL-TUBE® became a well-known product brand.

1989
L'Isolante K-FLEX was formed.

1999
Rubatex acquires Halstead to form RBX Industries.

2001
Nomaco Insulation and L'Isolante K-FLEX join to form Nomaco K-FLEX (NKF).



2004
NKF acquires RBX's mechanical insulation business.



2002
NKF enters into a Sales and Marketing Agreement with RBX Industries.



2008
Jan. 10, 2008 L'Isolante K-FLEX redeems Nomaco shares in NKF and goes to market as K-FLEX USA.



K-FLEX USA BENEFITS

- Designed for lasting performance:
K-Value: 0.245 @ 75°F & Permeability: 0.03 perm-in
- Responsive to market
- Industry & Product expertise
- 3rd Party Certified Products
- Broad size range: 25/50-rated up to 2" thick
- Systems Approach
- Factory-applied PSA & Cladding
- Full line of accessories



GLOBAL PRESENCE

L'ISOLANTE K-FLEX:

- 11 production facilities worldwide
- Commercial distribution in 43 countries
- Headquartered in Italy

STORAGE TANK APPLICATION CONSIDERATIONS

Conditions

- Energy-intensive, demands strict adherence to extreme temperature control.
- Margin for error is very small.
- If moisture enters system, thermal efficiency & value of insulation are severely compromised.
- Insulation failure = loss of financial & natural resources.
- Proper Insulation Material & Installation =
 - Energy Savings
 - Stabilization of process temperatures
 - Prevention of freezing/condensation/vaporization
 - Personnel protection

Insulation Options

INSULATION MATERIAL	UNITS	MINERAL WOOL	ELASTOMERIC
Thermal (at 75°F mean)	k	0.24	0.245
Permeability (unjacketed)	Perm-in	75.00	0.03
Flammability ASTM E84 Rating	25/50	Yes 25/50	Yes 25/50 2" and below
Service Temp. Range		0°F to +1200°F	-297°F to +220°F
Density	pcf	6 - 8	3 - 4
Structure		Fibrous Open Cell	Flexible Closed Cell





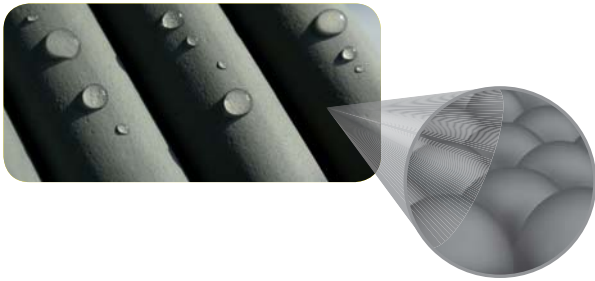
K-FLEX CLAD® IN SYSTEM

- Elastomeric insulation adhered to chlorinated polyethylene (CPE) cladding.
- Ability of insulation and jacket to withstand expansion/contraction from thermal cycling.
- Abuse, UV, chemical resistant.
- Preformed sections available to match installation.
- Minimal seams, no through seams.
- Minimizes inventory items on job site.
- Thermal performance at cryogenic temperatures.
- Lower installation time & costs.
- Constant performance for the life of the tank.



K-FLEX® ELASTOMERIC INSULATION

- Flexible, closed-cell elastomeric insulation (-297°F to +220°F)
- Excellent thermal conductivity: k-value 0.245
- Inherently high resistance to moisture vapor intrusion: 0.03 perm-in
- 25/50-rated up to 2" thickness
- Available as tubes, sheets / rolls, & fittings



K-FLEX CLAD® IN JACKETING

- Flexible, Non-metallic, Polymeric (CPE) Protective Jacketing
- High Resistance to oils, acids, chemicals & salt water
- Protects against UV, high humidity, other weather conditions
- Withstands impact & mechanical abuse (does not dent)
- Extra moisture vapor intrusion resistance: 0.08 perms
- Polymeric cover expands & contracts with extreme temperature cycles
- Approved by DNV (Det Norske Veritas) for use on LNG vessels / installations
- Prevents Moisture Intrusion & Corrosion under Insulation (CUI)
- Easily field-fabricated & competitively priced for cost-effective installation
- High Temperature Limit (insulation surface & ambient): +176°F
- Conveniently-sized 39" wide x 75' long rolls (.045" thick)



K-FLEX CLAD® IN Jacket		TEST METHODS	
Material Type	Chlorinated Polyethylene (CPE)		
Color	Gray or Black		
Thickness	.045" (1.2 mm)		
Water Vapor Permeance	0.08 perms	ASTM E 96	
Flammability	15/250 (ASTM E 84 Grade A)	ASTM E 84	
Specific Weight	1.8 +/- 0.1 g/cc		
Hardness	>=80 shA	ISO 7619, ASTM D 2240	
Tensile Strength	>=6.9 MPa	ISO 37 (Typical value 7.5 MPa)	
Elastic Modulus	>=60 MPa	ISO 37 (Typical value 70 MPa)	
Modulus 10%	>1.5 MPa	ISO 37	
Elongation to Break	>100%	ISO 37 (Typical values: elongation @ 70%, elongation to break 300%)	
Peel Adhesion	>50 Kpa	ISO 2411	
Shear Strength	>20 N/25mm	ISO 34-1	
Ozone Resistance	Extremely Good	ASTM D 1171 (72hr 50ppm 20%, no oxidation)	
UV Resistance	Extremely Good	ASTM G 7-97 (2 years of exposure in New River, AZ: no pitting, no cracking, no blistering)	
Salt Spray Resistance	Extremely Good	ISO 3768, ASTM B 117-73 (480 hrs: no color shade, no scaling, no blistering)	
Aging Resistance	Extremely Good	ISO 4982 (after 360 hr, 72 MJ, elongation to break and modulus conform to specification)	
Oil Resistance	Extremely Good	ISO 1817 (after 72 hr immersion in oil IRM 903, elongation to break and modulus conform to specification)	
Chemical Resistance (Acids, Alcohols, etc)	Extremely Good		
Impact Resistance	Extremely Good	EN12691; 1Kg, 20mm, 600mm	
High Surface Temperature Limit (continuous)	176°F (80°C)	temperature of ambient air & insulation surface	
Cold Temperature Flexibility (for installation)	-4°F (-20°C)	ISO 812:2006	
Emissivity	0.90		
Corrosion Risk	Provides protection against corrosion under insulation (CUI)		
Combustibility	Pass	BS 476 pt 6 / BS 476 pt 7 / NF 92501	
Fire Requirements for Building Construction	15/250 Class A	ASTM E 84	
Fire Requirements for Shipbuilding	Pass	IMO 61/67 part 2&5	
Approvals and Supervisions	CE marine approval Type approvals	CSI ABS / DNV / Lloyds Register	
K-FLEX® ELASTOMERIC INSULATION	STANDARD INSULATION	ECO™	
Temperature Range	-297°F to +220°F -70°F to +200°F with PSA	-297°F to +300°F -70°F to +200°F with PSA	ASTM C 411
Color	Black	green	
Thermal Conductivity (75°F Mean temp)	0.245 BTU-in/hr-ft ² -°F	0.270 BTU-in/hr-ft ² -°F	ASTM C 177, ASTM C 518
Water Vapor Permeability	0.03 perm-in	0.03 perm-in	ASTM E 96
Water Absorption % (volume change)	0	--	ASTM C 209
Resistance to Oil & Greases	Good	Good	
Density (lbs pcf)	3 - 6	4.5	ASTM D 1622, ASTM D 3575
Resistance to U.V. & weather	Good	Good	
Ozone Resistance	Good	Good	ASTM D1171
Dimensional Stability	<4.0 @ 220°F	--	ASTM C 534
Flame Spread / Smoke Development	<25/50 --	<25/50 (up to 3/8") US Navy bbn (25 lbs steam)	ASTM E 84 EB 4013
Optical Smoke Density	--	<150	ASTM E 662
Use on Austenitic Stainless Steel	--	Cl (<.001%); F (<.001%); Na (<.005%); Si (<.005%)	ASTM C 795
IMO, ABS & Lloyds Register Standards	--	Yes	MSC 61 (67), A 653, SOLAS
Toxicity	--	Halogen/Dioxin/CFC-Free	EB 4013
COMPOSITE SYSTEM			
Normal Climatic Condition (24 weeks)	Non-corrosive, no breakage/blistering		ASTM G7



PERFORMANCE ADVANTAGES

- High water vapor diffusion resistance.
- Double layer of moisture protection (jacket & foam core).
- Thermal conductivity is low and constant throughout the life of the vessel.
- Environmental Durability: No degradation due to diffusion of humidity within the insulation system.
- Prevents Corrosion Under Insulation.

INSTALLATION ADVANTAGES

- Flexible: easily conforms to contours / uneven surfaces.
- No protective clothing required.
- Non-dusting, non-abrasive, fiber-free.
- Low maintenance.
- Faster installation time with cutting done onsite.
- Does not require easily damaged & complex vapor barriers.
- No metal support struts or elaborate platforms required --> resistant to foot traffic, hail & weight of snow/ice.



K-FLEX ADVANTAGES

- Responsive to market, world leader (11 Production Plants worldwide)
- Strong technical support
- 3rd Party Certified Products & Installation
- Wide size range & product offering (tubes, sheets/rolls, fittings, jacketing)
- Proven Performance



EXPERIENCE

- Vysotsky RPK Oil Terminal, Lukoil, Russia, Fluor Daniel USA
- Sangachal Gas Plant, BP, Azerbaijan, KBR - Tekfen
- LNG Q-Max, ExxonMobil, Korea, Samsung H.I. - Cryostar
- LNG Test at Montoire Bretagne, Gaz de France, Technip
- LNG Plant, Shanghai Municipality, China, Saipem – Sofregaz
- LNG Terminal Arzew, Sonatrach, Algeria
- LNG Carrier, Shell, Brunei, DSME
- Marevo Vasilevski Oil Tankers, NOVOSHIP, Russia
- Yadana Gas Field, Total, Myanmar, Hyundai H.I.

PROJECT: CONOCO PHILIPS / LOUKOIL OIL REFINERY

- Narian-Mar, Russia: -76°F to 55°F climate.
- Tank Sizes: 700,000 ft³; 175,000 ft³; 350,000 ft³.
- Oil pipeline: 40 miles.
- Tank operating temperature: 135°F.
- Design life: 50 years.



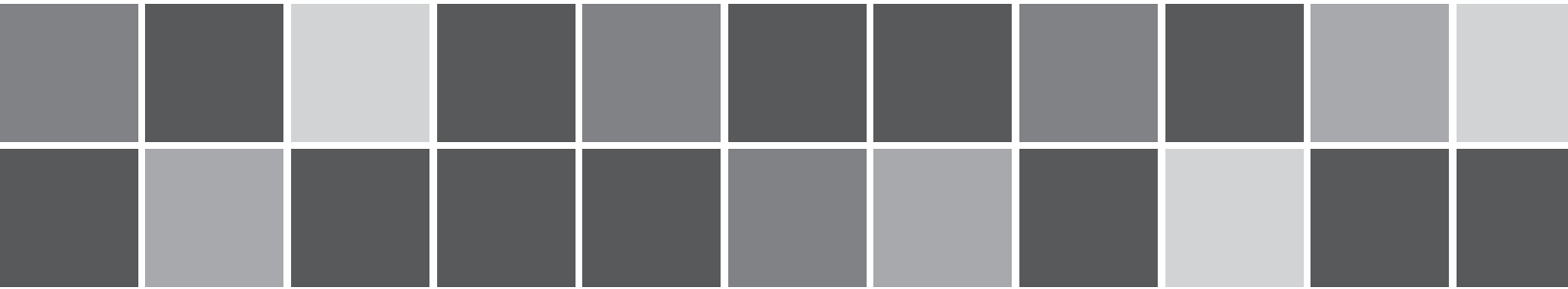
- K-FLEX® Insul-Sheet® bonded directly to tank using K-FLEX® Contact Adhesive.



- K-FLEX Clad® IN is post-applied to K-FLEX® Insul-Sheet® with K-FLEX® Contact Adhesive.



K-FLEX USA
INNOVATION IN INSULATION



ISO 9001 Certified

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