



# Storage Tanks

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Product performance for insulation of large storage tanks





## ABOUT K-FLEX USA



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

Designed for ease of installation and reliable performance, K-FLEX USA products provide excellent thermal and acoustical properties, including mold resistance (GREENGUARD® certified) and energy conservation.

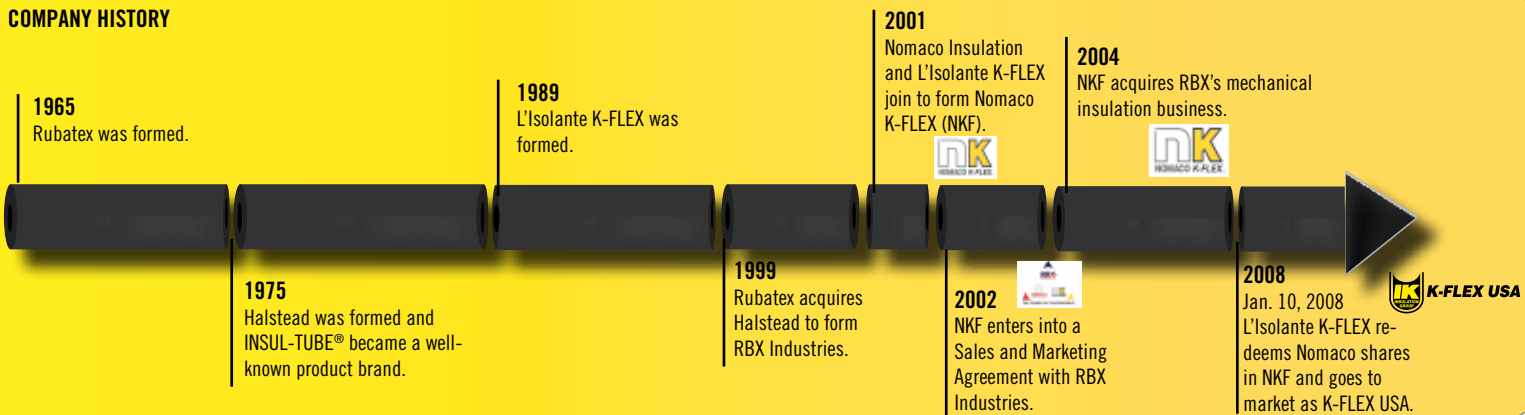
K-FLEX USA prides itself on being responsive to the market, providing dependable service to customers throughout North America, bringing an innovative approach to product offerings, and having products that are 3rd party certified.

**K-FLEX USA PRODUCTS HAVE DELIVERED EXCELLENT PERFORMANCE** in many applications, including: HVAC/R, Commercial/Industrial, Oil & Gas, Plumbing, Marine, Solar, and OEM Equipment/Appliances.

**AS A MEMBER OF THE IK INSULATION GROUP, K-FLEX USA** has global access to strong fundamental research programs and state-of-the-art levels of technical knowledge and customer support specifically related to thermal and acoustical elastomeric insulation.



### COMPANY HISTORY



### K-FLEX USA BENEFITS

- Designed for lasting performance:  
K-Value: 0.245 at 75°F & WVT: 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, demand 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
wvt (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



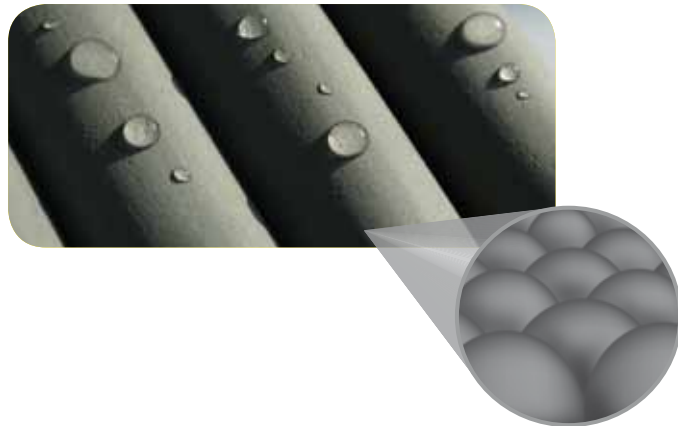
## K-FLEX CLAD® IN SYSTEM ADVANTAGES

- Elastomeric insulation adhered to chlorosulfonated polyethylene 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® LS

- Flexible, closed cell elastomeric insulation.
- Excellent thermal conductivity: k-value 0.245.
- Inherently high resistance to wvt: 0.03 perm-in.
- 25/50-rated up to 2”.



## K-FLEX CLAD® IN

- High Resistance to impact, chemicals, salt water & UV damage.
- Extra wvt resistance: <0.001 perm-in.
- Polymeric cover expands & contracts with extreme temperature cycles.
- Approved by DNV (Det Norske Veritas) for use on LNG vessels / installations.



### PHYSICAL PROPERTIES OF K-FLEX CLAD® IN POLYMERIC SHEET

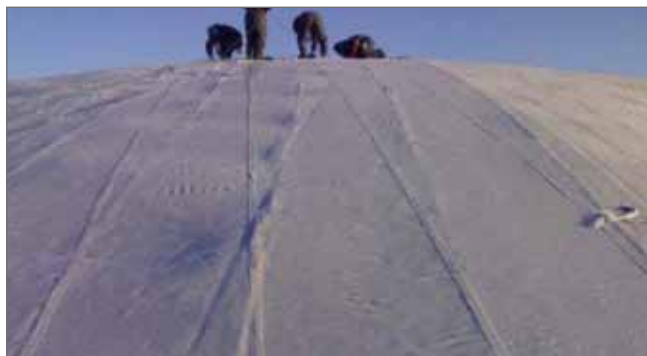
ATTRIBUTES	K-FLEX CLAD® IN	TEST METHODS
Material Type	Chlorosulfonated Polyethylene	
Thickness	0.30"	
Reaction to Fire	25/350	ASTM E 84
Water Vapor Diffusion	0.001	ASTM E 96
Weather, UV Resistance	Excellent	ASTM G 53
Corrosion Risk	The system provides protection for corrosion under insulation	
Salt Spray Resistance	Excellent	BS 903 F12
Wear Resistance	Excellent	BS 903 A2
Ozone Resistance	Excellent	BS 903 A43, ASTM D1171
Chemical Resistance	Excellent	Acids, Alcohols, Alkalies, Oils
Tensile Elongation	>100%	BS 903 A2
Color	Gray	

### PHYSICAL PROPERTIES OF ELASTOMERIC CORE MATERIAL (STANDARD)

Temperature Range/Sheet	-297°F to +220°F (-182°C to + 104°C)	ASTM C 411
Color	Black	
Thermal Conductivity (75°F Mean temp)	0.245 BTU-in/hr-ft <sup>2</sup> -°F	ASTM C 177, ASTM C 518
Water vapor permeability	0.03 perm-in	ASTM E 96
Water absorption % (volume change)	0	ASTM C 209
Resistance to oil & greases	Good	
Density	3 - 6 lbs. pcf	ASTM D 1622, ASTM D 3575
Resistance to U.V. & weather	Good	
Odor	Negligible	
Ozone resistance	Good	ASTM D1171
Dimensional Stability	<4.0 @ 220°F	ASTM C 534
Flame Spread (up to 1-1/2" thickness)	Not greater than 25	ASTM E 84
Smoke Developed (up to 1-1/2" thickness)	Not greater than 50	ASTM E 84

### PHYSICAL PROPERTIES OF COMPOSITE SYSTEM

Reaction to Fire	25/350	ASTM E 84, BS 476 Part 7 Cl. 1, IMO RES. A653 (16), Lloyds Register
Normal Climatic Condition (24 weeks)	Non-corrosive, no breakage/blistering	ASTM G7/97





## PERFORMANCE ADVANTAGES

- High water vapor diffusion resistance (0.001).
- 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.

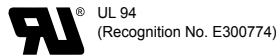


## WHY K-FLEX USA?

- Responsive to market, world leader (14 Production Plants worldwide)
- Strong technical support
- 3rd Party Certified Products & Installation
- Wide size range & product offering
- Proven Performance



\*Subject to the conditions of Approval as a Pipe Insulation when installed as shown in the current edition of the FMRC Approval Guide.\*



**UV resistant** Refer to K-Flex USA L.L.C. Technical Bulletin (Outdoor Applications) For More Information



## EXPERIENCE

- Vysotsky RPK Oil Terminal, Lukoil, Russia, Fluor Daniel USA
- Sangachal Gas Plant, BP, Azerbaijan, KBR - Tekfen
- Ammonia Plant, PIDEC/NIOC, Iran, Chiyoda - Toyo
- 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.
- Nitrogen Plant, NIOC, Iran
- Oxygen Plant, Farj Petrochemicals, Iran, NIOC

# PROJECT: CONOCO PHILIPS / LOUKOIL OIL REFINERY

- Narian-Mar, Russia: -76°F to 55°F climate.
- Tank Sizes: 700,000 ft<sup>3</sup>; 175,000 ft<sup>3</sup>; 350,000 ft<sup>3</sup>.
- Oil pipeline: 40 miles.
- Tank operating temperature: 135°F.
- Design life: 50 years.



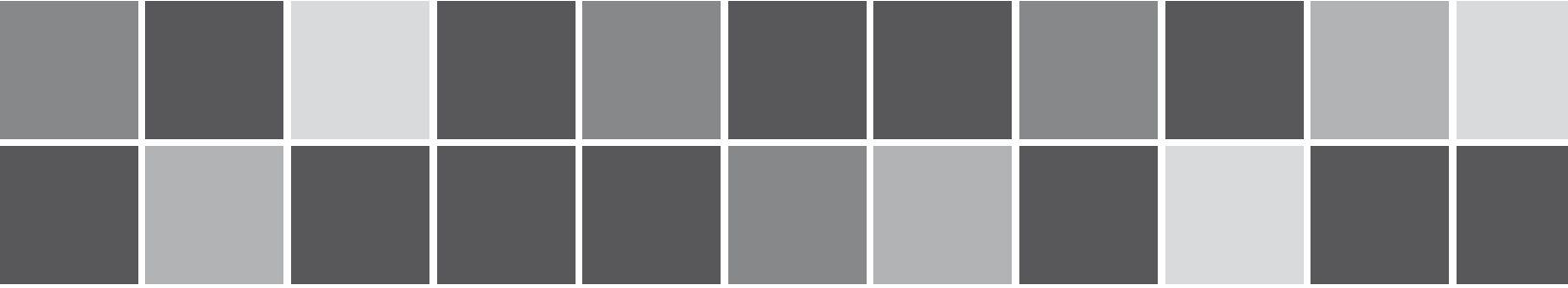
- K-FLEX® LS bonded directly to tank using K-FLEX® 320 Contact Adhesive.



- K-FLEX Clad® IN is post-applied to K-FLEX® LS with K-FLEX® 320 Contact Adhesive.



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INNOVATION IN INSULATION



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