

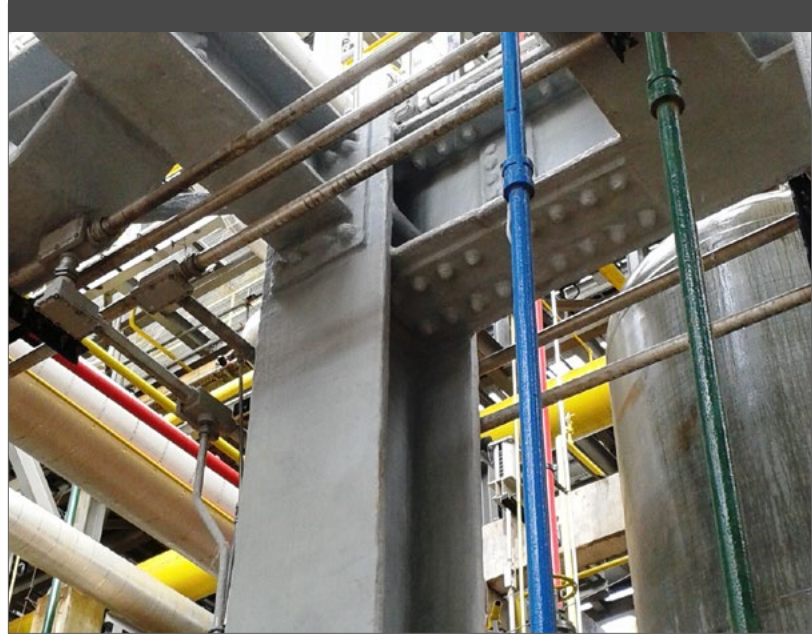
# Thermo-Lag<sup>®</sup> 3000

Epoxy Intumescent Fireproofing



# Thermo-Lag 3000 is an Advanced Flexible Epoxy Intumescent Fireproofing System

It's the most efficient epoxy intumescent passive fire protection material in the industry based on Underwriter's Laboratories, Inc. (UL) & offshore certification. Specifically designed to provide 1-4 hour hydrocarbon fire protection for structural steel in petrochemical environments.



### Benefits of Thermo-Lag 3000

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- › Inherent flexibility & elongation based on advanced polysulfide technology
- › Crack resistant during construction and in service
- › High flexural and tensile strength
- › Lowest thickness and applied weight per fire rating of any exterior rated epoxy intumescent
- › Best application characteristics of any epoxy intumescent: 1:1 mix ratio and easy batch-mix for single component and trowel application
- › Listed & certified to UL 1709
- › Offshore certification by Lloyd's Register (LR) & Det Norske Veritas (DNV)
- › Resistant to torch / hose stream impingement per NFPA, Annex H
- › Explosion resistant

### Applications

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- › Refineries
- › Petrochemical plants
- › Gas plants
- › LNG facilities
- › Power plants
- › Commercial buildings, 4-hour ratings





## Thermo-Lag 3000 Material and Weight Savings

PROPERTIES	THERMO-LAG 3000	COMPETITOR 1	COMPETITOR 2	COMPETITOR 3
Design	XR618	XR625	XR647	XR612
Fire Rating	2 Hour	2 Hour	2 Hour	2 Hour
Thickness	310 mils	416 mils	424 mils	480 mils
Applied Weight	2.02 lb/ft <sup>2</sup>	2.48 lb/ft <sup>2</sup>	2.53 lb/ft <sup>2</sup>	2.87 lb/ft <sup>2</sup>
*Weight Savings	Lowest	+18%	+20%	+29%

All thicknesses are shown in inches and are based on a W10X49 column size

\*Thermo-Lag 3000 based on 1.25 g/cm<sup>3</sup> density

\*Competitive products based on 1.15 g/cm<sup>3</sup> (typical applied density)

Plural component application only

NOTE: All competitive epoxy intumescent products that are applied by single component application, have similar spray applied densities approximately 1.25 g/cm<sup>3</sup>.



### Off-site Speed and Durability

- › Fast application and shop throughput
- › Hard, durable, highly flexible material resistant to damage
- › High quality finish in less time
- › Connections and block-outs are easily fireproofed on-site

SHOP APPLICATION OF THERMO-LAG 3000.  
INSTALLATION OF FIBERGLASS MESH  
REINFORCEMENT



THERMO-LAG 3000 SYSTEM INSTALLED,  
READY FOR TRANSPORT TO SITE



FIELD CONNECTIONS (BLOCK-OUTS)  
INSTALLED ON-SITE



## Thermo-Lag 3000 – Advanced High Flexibility Polysulfide Technology

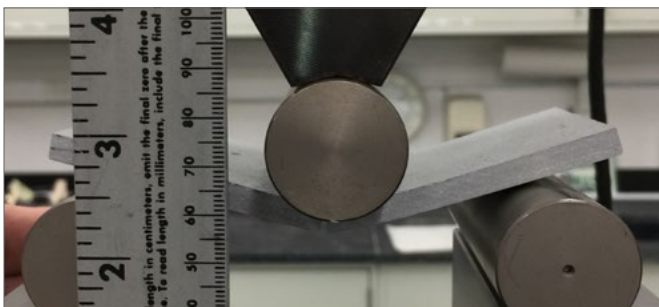
Thermo-Lag 3000's unique combination of inherent flexibility, high tensile strength, and high adhesion strength can outperform competitive rigid epoxy systems in severe climatic conditions. Rigid epoxy systems are prone to embrittlement and cracking when exposed to severe cold conditions.

Thermo-Lag 3000 can resist severe cold climate cracking based on its advanced, highly flexible polysulfide technology. The flexible properties of Thermo-Lag 3000 make it a more resilient epoxy intumescent passive fire protection system able to withstand:

- › Severe temperature swings & climatic extremes
- › Vibration damage during transport from application site to project site
- › Explosions and steel deformation
- › Impact damage

### Flexibility

Thermo-Lag 3000 is a tough, durable, highly flexible material that can deliver lasting physical performance. It is the ideal solution for both on-site and off-site application, providing the ultimate in design flexibility and enhanced project scheduling.



**19 MM FLEX OVER 127 MM SPAN**  
**FLEXURAL STRENGTH: 2,253 PSI (15.5 MPA)**

**INTRODUCED IN 1999**  
**NO COLD WEATHER CRACKING OR**  
**DISBONDMENT IN PRODUCT HISTORY**

### Performance Testing

Thermo-Lag 3000 has been successfully tested and is in compliance with the following third party test programs:



**HOSE STREAM ENDURANCE (NFPA 58, ANNEX H)**



**EXPLOSION RESISTANCE**

## Thermo-Lag 3000 Severe Cold Cyclic Temperature Testing

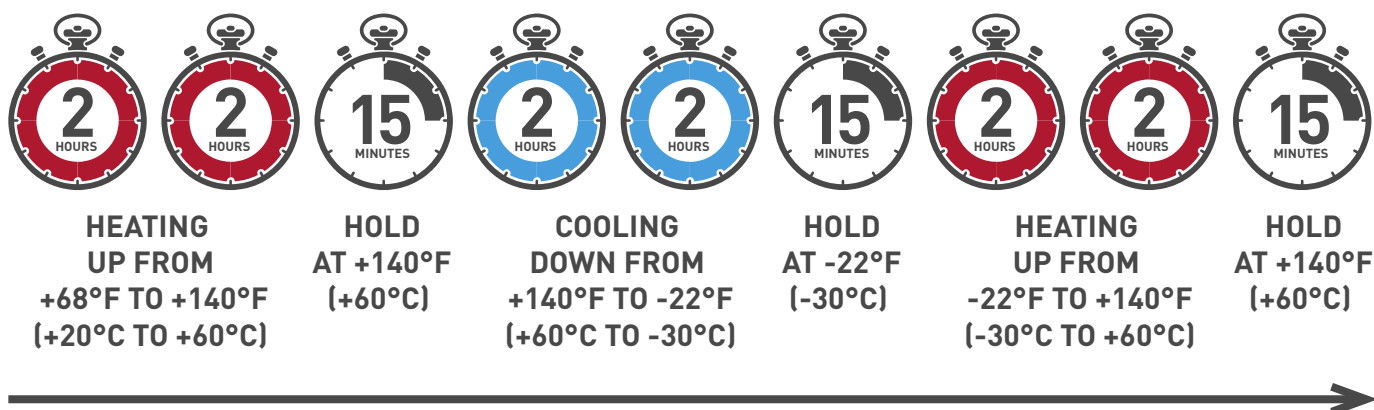
Thermo-Lag 3000 has passed the most rigorous thermal cyclic testing program in the industry based on NACE TM0304 Section 9. This testing was conducted to establish performance of epoxy PFP materials at extreme temperature ranges.

- Testing performed with t-bar panel configuration (modified) NACE TM0304 - worse case
- Severe thermal shock per cycle (90°C temperature swing)



### (Modified) NACE TM0304 Section 9 Test Procedure

225 Cycles / Cycle Duration: < 7 Hours | Test Duration: 3 Weeks



- ✓ Modified to include T-bar test sample to evaluate worst case configuration
- ✓ All products were tested with both mesh and mesh-free samples
- ✓ Evaluation included Thermo-Lag 3000 and rigid epoxy PFP systems

#### Thermo-Lag 3000 Results

- Thermo-Lag 3000 has sufficient elongation, flexibility, and adhesion to withstand thermal cycling
- No cracking or disbondment after 225 cycles due to advanced polysulfide technology
- Thermo-Lag 3000 exhibited no cracking or disbondment at extreme cold temperatures due to the inherent flexibility of the product
- Thermo-Lag 3000 exhibited no cracking or disbondment at extreme cold temperatures due to the inherent flexibility of the product (in the both meshed and un-meshed samples)

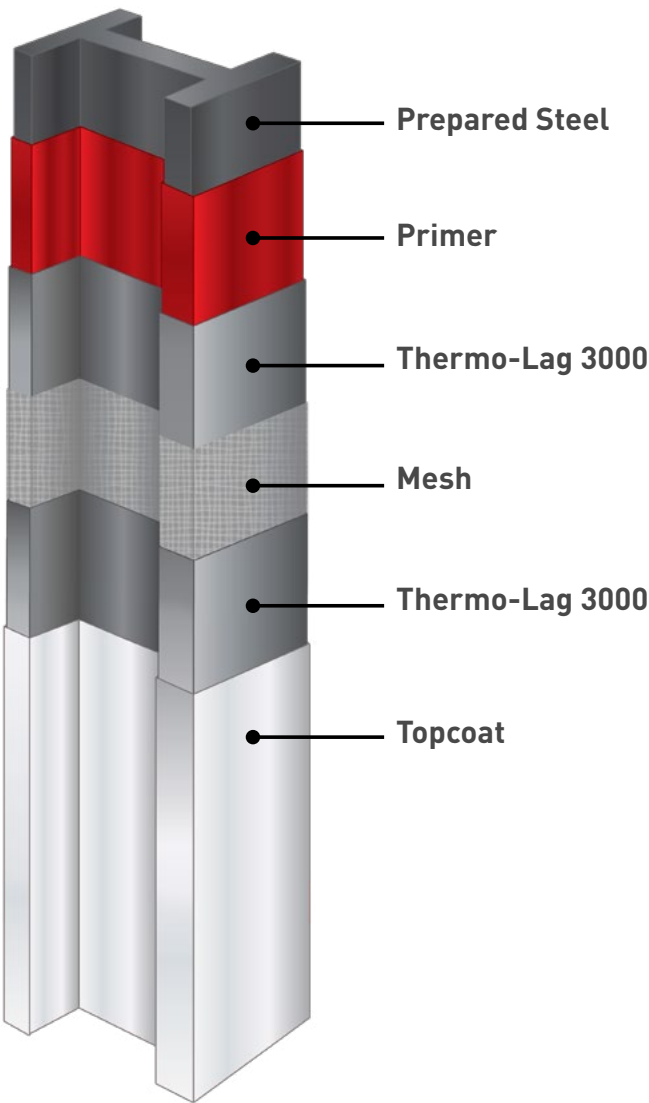
#### Rigid Epoxy Intumescent System Results

- Exhibited cracking after first few cycles
- Cracked at leading edge
- Disbonded from primer at leading edge
- Cracked at web/flange radius (with both mesh and mesh-free samples)



Thermo-Lag 3000 System is an Easy-to-Apply Epoxy Intumescent Fireproofing System

Thermo-Lag 3000 has the best spray and trowel attributes of any passive fire protection material. It incorporates our proprietary fiberglass or carbon fiber reinforcing mesh (depending on design). Our Thermo-Lag 3000 mesh reinforced system resists cracking and provides maximum durability and resilience in extreme environments.



APPLICATION PROPERTIES		
	THERMO-LAG 3000 P	THERMO-LAG 3000 P (THINNED 5%)
Construction Phase	Off-site	On-site
Recoat Time	30 Min.	4 Hours
Volume Solids	100%	95%
Film Build (Per Coat)	160-200 mils (4-5 mm)	80-160 mils (2-4 mm)
Application Method	Plural Component / Trowel	Single Component / Trowel

PERFORMANCE DATA		
Hardness	ASTM D2240	Shore D 50
Impact Resistance	ASTM D2794	288 inch-lb (3.31 kg-m)
Bond Strength	ASTM D4541	950 psi (6.55 MPa)
Compressive Strength	ASTM D695	2,190 psi (15.1 MPa)
Flexural Strength	ASTM D790	2,253 psi (15.5 MPa)
Surface Burning	ASTM E84	Class A

## Thermo-Lag 3000 Saves Lives and Assets

When exposed to a fire, Thermo-Lag 3000 intumesces or swells producing a heat blocking char which insulates the steel from exposure to high temperatures. This technology provides protection for assets against structural collapse and allows time for egress of personnel and firefighting measures.



## Fire Resistance Certifications

Thermo-Lag 3000 has undergone extensive third-party fire performance testing and is certified to:

### Underwriter's Laboratories (UL)

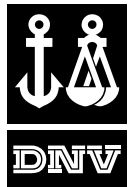
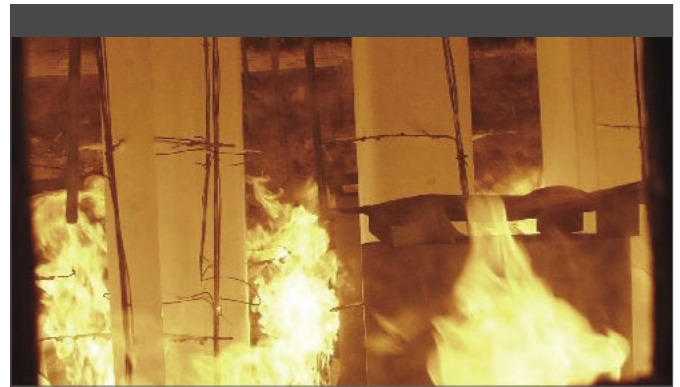
UL 1709

### Intertek

ASTM E119 / UL 263 / CAN/ULC S101-07

### Lloyds Register (LR) / Det Norske Veritas (DNV)

IMO FTP Code Part 3 / IMO Res.A.754(18) hydrocarbon curve according to ISO 834-3



## UL 1709 Environmental Testing

Thermo-Lag 3000 is in full compliance with the acceptance criteria for the UL Environmental Test Program which is the basis for exterior fireproofing product evaluation. Thermo-Lag 3000 is rated by UL and Intertek for both exterior and interior use.



INDUSTRIAL ATMOSPHERE	HIGH HUMIDITY	WET/FREEZING/THAW CYCLING	UV EXPOSURE	SALT SPRAY
<ul style="list-style-type: none"> <li>Sulfur dioxide &amp; carbon dioxide exposure for 30 days</li> </ul>	<ul style="list-style-type: none"> <li>Subjected to high humidity exposure for 180 days</li> </ul>	<ul style="list-style-type: none"> <li>Wet, freeze, thaw cycling</li> <li>12 cycles:                             <ul style="list-style-type: none"> <li>72 hours rain</li> <li>24 hours at -40°F (-40°C)</li> <li>72 hours dry at 140°F (60°C)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Subjected to accelerated UV aging for 270 days at 158°F (70°C)</li> </ul>	<ul style="list-style-type: none"> <li>Subjected to salt spray for 90 days</li> </ul>

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