

Grace Construction Products

Monokote®

Tunnel, Severe Environmental
and Petrochemical Fireproofing

GRACE

Industrial Strength Fireproofing that Meets the Challenge.

The Monokote Z-family of products provides the fire resistance and in-place performance that meets the stringent building codes and insurance industry specifications of today's building structures, and—the even more demanding needs of petrochemical and tunnel complexes.

Its exceptional bond strength means Monokote fireproofing stays securely attached to the structure, providing optimal resistance to impact, and supply superior durability which maximizes long-term fire protection integrity.

All Monokote fireproofing products are formulated to facilitate fast application, with pumping and thickness build-up characteristics that are unmatched in the industry. Moreover, their ability to be sprayed directly to steel for fast-track construction projects eliminates the need for lath installation, where lath is not required, resulting in faster application and lower construction cost.

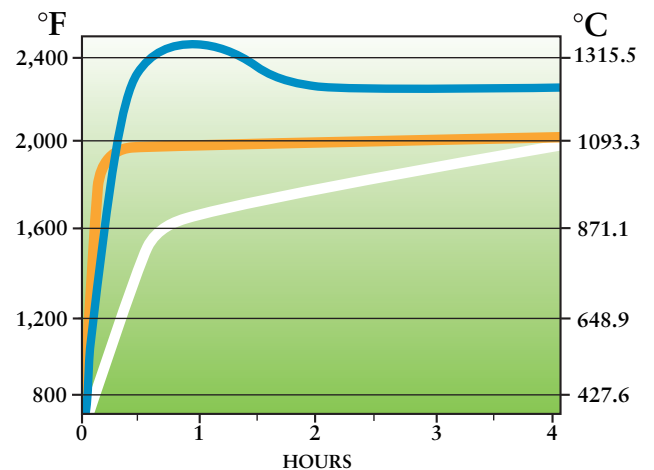
Grace fireproofing consultants, at your service.

Fireproofing is an increasingly complex endeavor. Especially as new products come to market, manufacturing and utility plants become more complicated, and designers cope with a growing maze of code requirements.

For these reasons, Grace Construction Products' team approach in working with our customers puts Grace's highly experienced fireproofing sales and technical experts at your service throughout the design and installation process—from initial design and detailing of the specification, to on-site application and inspection, to final sign off.

Years of experience and ongoing training make Grace Industrial Fireproofing representatives a unique industry resource with an unsurpassed understanding of fire resistance classifications, fireproofing applications—and in-place performance.

Tested to Withstand Extreme Challenges



■ **RWS** — Rijkswaterstaat Hydrocarbon Curve

■ **UL 1709 (ASTM 1529)** — Rapid Rise Time Temperature Curve

□ **UL 263 (ASTM E 119)** — Standard Time Temperature Curve

As this chart illustrates, not all fires are the same! RWS and UL 1709 show the rapid temperature acceleration that occurs in fires fueled by hydrocarbons. Fuel load in typical office or light industrial occupancies produce a much slower rise in fire temperature (UL 263). Monokote Petrochemical and Tunnel Grade products are rated to meet the hydrocarbon rapid rise temperatures of RWS and UL 1709 fire exposures.



Monokote®

Use Monokote Z-146PC and Z-156PC in Interior or Exterior Applications on:

- Petrochemical Plants
- Chemical Processing Plants
- Gas Processing Facilities
- Specialty Utility Applications
- Refinery Facilities
- Pipe Rack Beams and Columns
- Vessel Skirts and Supports
- Tank Saddles
- Direct Trowel Applications



Exterior pipe racks protected with Monokote Z-146PC

Monokote® Z-146PC & Z-156PC

Very few products can stand up to the environments experienced in petrochemical facilities and then withstand a hydrocarbon “rapid-rise” fire. Monokote Z-146PC and Z-156PC petrochemical grade cementitious fireproofing attains bond strength in excess of 10,000 PSF, a fine-tuned chemistry that provides the ultimate in user-friendly application, damage resistance, fire protection and resistance to weather and freeze/thaw cycling.

Monokote Z-146PC and Z-156PC meet all UL requirements for exterior use and are fire rated in accordance with UL 1709 (ASTM E1529) and UL 263 (ASTM E119). Tested in accordance with HSE Standard OTI 95 634, Monokote Z-146PC and Z-156PC have also been proven to protect structures that experience horizontal pressurized jet fires. Tests for Coefficient of Thermal Expansion, Compressive Strength, Hardness and other properties, as recommended in API Guidelines, mean that engineers can specify Monokote Z-146PC and Z-156PC with complete confidence and economy.

Grace's Monokote Z-146PC and Z-156PC can build to higher thicknesses per pass than competing products for greater applicator efficiency reducing installation time and labor costs.

Monokote Z-146PC and Z-156PC can be spray applied with a wide range of conventional plaster pumping equipment. They can also be used with paddle mixers and most continuous mixers. When a smooth finished look is desired, Monokote's consistency allows engineers the option of specifying trowel application to achieve a lightly textured appearance.



Z-156PC delivers optimum protection from accidental impact and abrasion, helping to preserve the fire rating of the column.

Grace Construction Products has focused its leadership position in cementitious fireproofing on research and development efforts of products specifically engineered for the petrochemical industry's unique requirements. Monokote Z-146PC and Z-156PC neither prevent nor promote the corrosion of steel. However, the inclusion of calcium nitrite as a corrosion inhibitor has been shown to delay the onset of corrosion due to salt and other aggressive environmental conditions typically found at petrochemical facilities.

Monokote petrochemical grade products are specially formulated to withstand the extreme temperatures characteristic of petrochemical conflagrations. This advanced chemistry allows Monokote Z-146PC and Z-156PC to provide reliable protection for the enormous investment petrochemical facilities represent.



Petrochemical and Tunnel Fireproofing Products

	Z-146PC	Z-156PC	Z-146T	Z-156T
Fire Ratings	1–4 hours	1–4 hours	1–4 hours	1–4 hours
Hydrocarbon Approval	UL 1709	UL 1709	RWS/UL 1709	RWS/UL 1709
Density ASTM E 605 (pcf nom.)	40–45	50–55	40–45	50–55
Corrosion ASTM E 937	Does not Contribute	Does not Contribute	Does not Contribute	Does not Contribute
Integral Corrosion Inhibitor	Yes	Yes	Yes	Yes
Chemical Tolerance Resistance	Similar to Concrete	Similar to Concrete	Similar to Concrete	Similar to Concrete
Number of Spray Passes for a 2 Hour Rating	1	1	1	1
Trowelability	Yes	Yes	Yes	Yes

***Petrochemical and Tunnel Grade
Fireproofing Engineered
for the Harshest Environments.***

Monokote® Z-146T & Z-156T

Recent fires in tunnels and subways around the world has brought attention to the need for increased fire protection to these high risk infrastructures. The ignition of trucks carrying heavy fuel loads has sparked the spread of fire to other vehicles traveling through tunnels resulting in heavy structural damage and explosive spalling of the concrete covering the steel reinforcement in tunnel walls. As the number of tunnels and tunnel traffic continues to grow, the potential risk continues to grow.

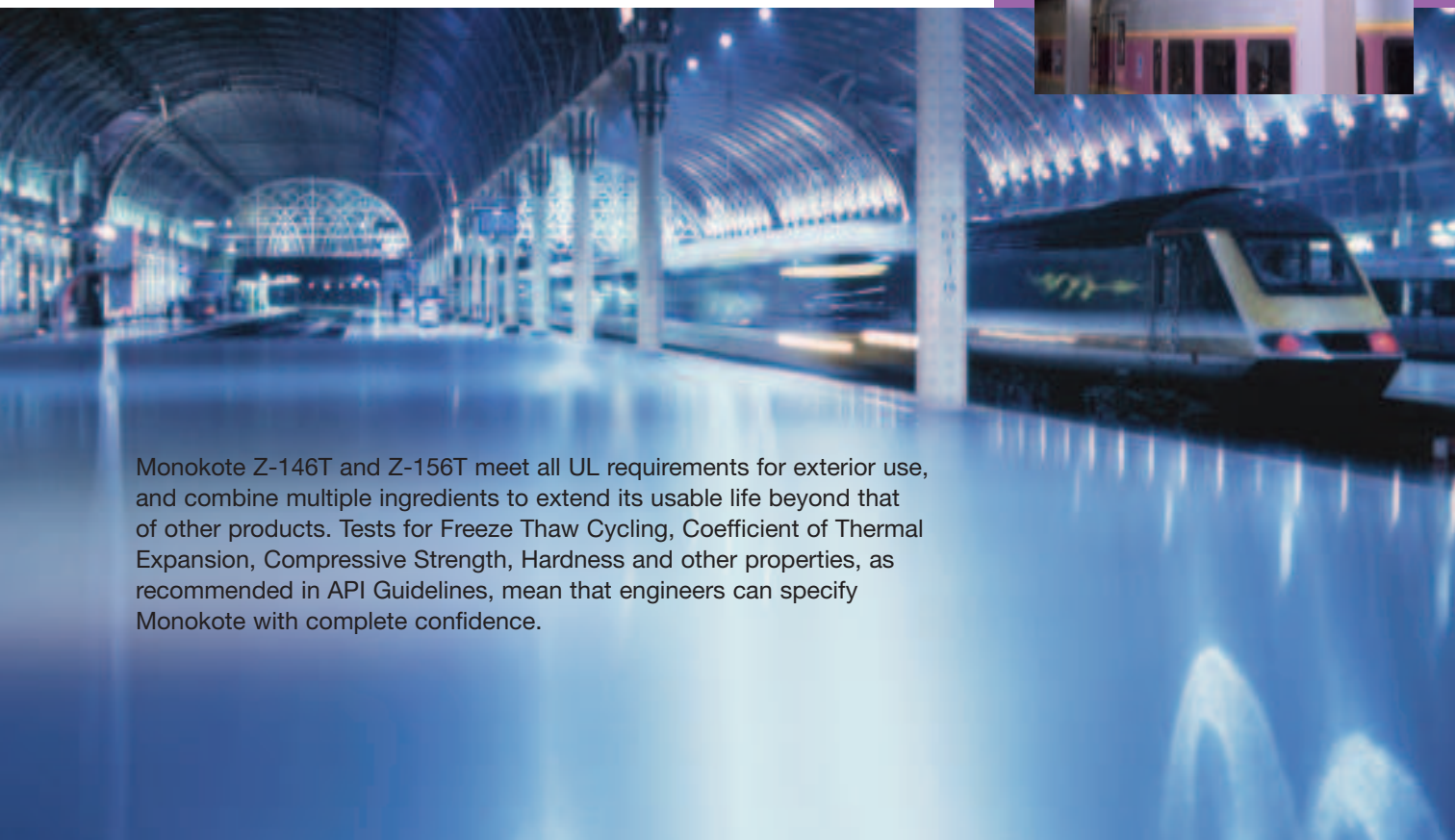
The Rijkswaterstaat (RWS) fire curve developed in the Netherlands and the UL 1709 "Rapid Rise" hydrocarbon fire curve are most commonly used to evaluate products and systems exposed to some of the most severe fire exposures possible. Monokote Z-146T and Z-156T have been formulated and tested to withstand both the RWS and UL 1709 hydrocarbon time-temperature fire curves in addition to the standard UL 263 (ASTM E119) cellulosic fire curve. As a result, Grace can provide an economical fireproofing solution for bored and immersed tunnels subjected to hydrocarbon fire temperature exposures over a range of hourly ratings.

In addition to infrastructure projects, Monokote Z-146T and Z-156T may be used in commercial applications requiring exceptional weatherability such as coastal projects that inherently experience salt exposure, parking garages that require both weathering and impact durability, and harsh exterior environments where there is extreme temperature variation.

Monokote Z-146T and Z-156T neither prevent nor promote the corrosion of steel. However, the inclusion of calcium nitrite as a corrosion inhibitor has been shown to delay the onset of corrosion due to salt and other aggressive environmental conditions.

Use Monokote Type Z-146T and Z-156T in Interior or Exterior Applications on:

- Roadway Tunnels
- Bridges
- Pulp and Paper Plants
- Water Treatment Plants
- Swimming Pools
- Structures Exposed to Salt



Monokote Z-146T and Z-156T meet all UL requirements for exterior use, and combine multiple ingredients to extend its usable life beyond that of other products. Tests for Freeze Thaw Cycling, Coefficient of Thermal Expansion, Compressive Strength, Hardness and other properties, as recommended in API Guidelines, mean that engineers can specify Monokote with complete confidence.

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