

Monokote® Z-146T

High Density, Cementitious Fireproofing for Tunnels and Severe Environmental Exposure

Description

Monokote® Z-146T high density cementitious fireproofing has been developed by Grace Construction Products to meet speciality and industrial fireproofing requirements requiring greater resistance to harsh environmental conditions.

Z-146T is a Portland cement-based, factory-mixed material requiring only the addition of water on the job for applications. It is spray applied, providing up to 4 hours of fire resistance. Its physical characteristics are excellent for areas exposed to environmental or climatic conditions.

Z-146T may be used in areas where high durability and corrosion resistance is required such as substrates subjected to exterior exposure.

Approvals

- Up to 4 hours in accordance with the Rijkswaterstaat (RWS) fire curve
- Up to 4 hours in accordance with UL 1709 hydrocarbon test
- Jet fire testing in accordance with HSE standard OTI 95 634
- Up to 4 hours in accordance with UL 263 (ASTM E119)
- Investigated by UL for exterior use

Features & Benefits

Z-146T offers the following advantages to architects, engineers, and applicators:

- **Factory pre-mixed** – Ready to use. No job site proportioning required. Simply add water in a standard paddle-type plaster mixer and apply with conventional plastering equipment.
- **Non-toxic** – The factory-mixed blend of common Portland cement and other inert materials requires only the addition of water for mixing and application.
- **Attractive finishes** – Z-146T may be sprayed or hand troweled after spraying to achieve a lightly textured appearance.
- **Equipment versatility** – Z-146T can be mixed in a standard plaster mixers. After mixing, Z-146T may be spray-applied with commonly available pumping and spraying equipment.
- **Corrosion inhibition** – Z-146T neither prevents nor promotes the corrosion of steel, however, the inclusion of calcium nitrite as a corrosion inhibitor has been shown to retard the rate of corrosion due to salt and other aggressive environment conditions.

- **Moisture resistant** – The Portland cement base affords excellent fire protection characteristics in areas subjected to high humidity.
- **Durable** – hardness and durability help resist accidental physical damage.
- **Weatherable** – Able to withstand freeze/thaw, wind, rain and other climatic conditions.

Chemical Action

Z-146T may be used in roadway tunnels and in exterior environments where a highly durable fireproofing is required and a threat of steel corrosion is present.

Delivery & Storage

- a. All material to be used for fireproofing shall be delivered in original unopened packages bearing the name of the manufacturer, the brand and proper Underwriters' Laboratories, Inc. labels for fire hazard and fire resistance classifications.
- b. The material should be kept dry until ready for use. Keep packages of material off the ground, under cover and away from sweating walls and other damp surfaces. All bags that have been exposed to water before use should be discarded. Stock of material is to be rotated and used before its expiration date.

Steel & Concrete Surfaces

- a. Prior to the application of Z-146T, an inspection should be made to determine that all steel surfaces are acceptable to receive fireproofing. The steel to be fireproofed should be free of oil, grease, excess rolling compounds or lubricants, loose mill scale, excess rust, non compatible primer, lock down agent or any other substance that will impair proper adhesion. Where necessary, the cleaning of steel surfaces to receive fireproofing will be the responsibility of the general contractor.
- b. Prior to application of Z-146T, a bonding agent, approved by the fireproofing manufacturer, should be applied to all concrete substrates to receive Z-146T.
- c. The project architect will determine if the painted/ primed steel to receive fireproofing has been tested to provide the required fire resistance rating.

Performance Characteristics

Physical Properties	Recommended Specifications	Test Method/Notes**	Laboratory Tested* Value
Dry density	Min. 40 pcf (640 kg/m ³)	ASTM E605	See note below ***
Bond strength	Min. 10,000 psf (478 kN/m ²)	ASTM E736	17,967 psf (857 kN/m ²)
Compressive strength @ 10% deformation	500 psi (3.45 MPa)	ASTM E761	541 psi (3.73 MPa)
Hardness	40	ASTM D2240	49
Yield	–	Theoretical maximum	16.7 board feet (1.55 m ² at 25mm) per bag
Colour	–	Natural concrete grey	
Volatile Organic Content (off gassing) at 50°C organic compounds C6-C28	Less than 1 PPMW (part per million by weight)	Dynamic headspace (Thermal desorption gas chromatography) – mass spectrometry)	Less than 1 PPMW (Below detectable limits)
Leachable ammonia	Less than 50 PPB 50 nanograms/mg	Leachable ion by ion chromatography	Less than 50 PPB (Below detectable limits)

* Independent laboratory tested value. Report available upon request.

** ASTM International test methods modified for bond strength and compressive strength, where required, for high density, high performance products.

*** All in-place performance tests should be conducted at or below the minimum recommended specification density. Test reports here were conducted at 39.6 pcf (635 kg/m³)

Mixing

- Z-146T should be mixed by machine in a conventional, plaster-type mixer or a continuous mixer specifically modified for cementitious fireproofing. The mixer should be kept clean and free of all previously mixed material. Adjust the mixer speed in a conventional mixer to the lowest speed which gives adequate blending of the material and a mixer density of 52 to 59 pcf (833 to 945 kg/m³) of material.
- Using a suitable metering device and a conventional mixer, add all water to the mixer as the blades turn. Mixing should continue until the mix is lump-free, with a creamy texture. All material is to be thoroughly wet. Over mixing Z-146T will reduce pumping rate and will negatively effect in-place density and mechanical properties.

Application

- Z-146T material should not be used if it contains partially set, frozen or caked material.
- Z-146T should have a minimum average dry, in-place density of 640 kg/m³.
- Z-146T is formulated to be mixed with water at the job site.
- Z-146T is applied directly to the substrate, at various rates of application which will be job dependent, using standard plastering type equipment or continuous mixer/pump units. A spray gun, with a properly sized orifice and spray shield and air pressure at the nozzle of approximately 20 psi (0.138 MPa), will provide the correct hangability, density and appearance.

Note: If freshly sprayed Z-146T does not adhere properly, it is most likely due to a too wet mix, poor thickness control, or an improperly cleaned substrate.

Temperature

An air and substrate temperature of 4.5°C minimum should be maintained for 24 hours prior to application, during application and for a minimum of 72 hours after application of Z-146T.

Field Tests

The architect will select an independent testing laboratory (for which the owner will pay) to sample and verify the thickness and density of the fireproofing in accordance with the provisions of ASTM E605-77, *Standard Test Method for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members* or Uniform Building Code Standard No. 43-8, *Thickness and Density Determination for Spray Applied Fireproofing*.

Note: No recognised field bond strength test procedure exists for sprayed fireproofing materials with bond strengths greater than 1,000 psf (4,882 kg/m²) such as Monokote Z-146T. Where bond strength specifications exceed 1,000 psf (4,883 kg/m²) it is recommended that independent laboratory test data based upon a modified version of ASTM E736 be submitted to verify specification compliance.

Safety

- Z-146T is slippery when wet. Signs reading "SLIPPERY WHEN WET" should be posted in all areas in contact with wet fireproofing material. Anti-slip surfaces should be used on all working surfaces.
- A Material Safety Data Sheet for Monokote Z-146T is available. Please contact a Grace representative.

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