MONOKOTE® Z-146T Product Data Sheet

High density, cementitious fireproofing for tunnels and severe environmental exposure

Product Description

MONOKOTE®Z-146T high density cementitious fireproofing has been developed by GCP Applied Technologies to meet specialty and industrial fireproofing requirements requiring greater resistance to harsh environmental conditions.

MONOKOTE®Z-146T is a Portland cement-based, factory-mixed material requiring only the addition of water on the job site for application. 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.

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

Features & Benefits

MONOKOTE®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** - MONOKOTE® Z-146T may be sprayed or hand troweled after spraying to achieve a lightly textured appearance.
- **Equipment versatility** - MONOKOTE® Z-146T can be mixed in a standard plaster mixer. After mixing, MONOKOTE® Z-146T may be spray-applied with commonly available pumping and spraying equipment.
- **Corrosion inhibition** - MONOKOTE® 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 environmental 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.
- **Transparent** - Complete Life Cycle Assessment and Environmental Product Declaration

Uses

MONOKOTE®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

- All material to be used for fireproofing should 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.
- The material should be kept dry until ready for use. Keep packages of material off of 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.

Performance Characteristics

PHYSICAL PROPERTIES	RECOMMENDED SPECIFICATION	LABORATORY TESTED* VALUES	TEST METHOD **
Dry density, minimum average	Min. 40 pcf (640 kg/m^3)	See note below***	ASTM E605
Global Warming Potential (GWP)[1]	Max 750 Kg (1,653 lbs) kgCO_2e	610 Kgs (1,369 lbs) kgCO_2e	ASTM Product Category Rule for SPFM
Bond strength	Min. 10,000 psf (478 kN/m^2)	16,727 psf (800 kPa)	ASTM E736
Compression, 10% deformation	500 psi (3.45 MPa)	561 psi (3.87 MPa)	ASTM E761
Air erosion	Max 0.000 g/ft^2 (0.00 g/m^2)	0.000 g/ft^2 (0.00 g/m^2)	ASTM E859
High velocity air erosion	No continued erosion after 4 hours	No continued erosion after 4 hours	ASTM E859
Hardness	40	49	ASTM D2240
Bond impact	No cracking, spalling or delamination	No cracking, spalling or delamination	ASTM E760
Deflection	No cracking, spalling or delamination	No cracking, spalling or delamination	ASTM E759
Resistance to mold growth	No growth after 28 days	No growth after 28 days	ASTM G21
Surface burning characteristics	Flame spread = 0 Smoke developed = 0	Flame spread = 0 Smoke developed = 0	ASTM E84
Combustibility	Less than 5 MJ/m^2 total, 20 kw/m^2 peak heat release	Less than 5 MJ/m^2 total, 20 kw/m^2 peak heat release	ASTM E1354

* 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.

1 Product Category Rule for SFRM defines measurable unit as 1000 kgs of product.

Steel & Concrete Surfaces

- Prior to the application of MONOKOTE® 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, noncompatible 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.
- Prior to application of MONOKOTE® Z-146T, a bonding agent, approved by the fireproofing manufacturer, should be applied to all concrete substrates to receive MONOKOTE® Z-146T.
- The project architect will determine if the painted/primed steel to receive fireproofing has been tested in accordance with ASTM E119, to provide the required fire resistance rating.

Mixing

- MONOKOTE® 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 50 to 60 pcf (800 to 961 kg/m^3) 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. Overmixing MONOKOTE® Z-146T will reduce pumping rate and will negatively affect in place density and mechanical properties.

Application

- MONOKOTE® Z-146T material should not be used if it contains partially set, frozen or caked material.
- MONOKOTE® Z-146T should have a minimum average dry, in-place density of 40 lbs/ft^3 (640 kg/m^3).
- MONOKOTE® Z-146T is formulated to be mixed with water at the job site.
- MONOKOTE® Z-146T is applied directly to the steel, 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.
- Reinforcement - Most fire tests conducted have been carried out without lath or mesh reinforcement. For maximum long-term service durability in exterior conditions, the use of lath or mesh is recommended.

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 & Ventilation

- The substrate temperature shall be a minimum of 40 °F (4.5 °C) for at least 1-hour prior to the application of the MONOKOTE® . Additionally, the air and substrate temperature during application and for a minimum or 72 hours after application shall be no less than 40 °F (4.5 °C).
- Provisions shall be made for ventilation to properly dry the fireproofing after application. In enclosed areas lacking natural ventilation, air circulation and ventilation must be provided to achieve a minimum total fresh air exchange rate of 4 times per hour until the material is substantially dry.

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 the applicable building code.
- The architect will select an independent testing laboratory (for which the owner will pay) to randomly sample and verify the bond strength of the fireproofing. Note: No recognized field bond strength test procedure exists for sprayed fireproofing materials with bond strengths greater than 1,000 psf (4,882 kg/m^2) such as MONOKOTE® Z-146. Where bond strength specifications exceed 1,000 psf (4,882 kg/m^2) it is recommended that independent laboratory test data based upon a modified version of ASTM E736 be submitted to verify specification compliance.
- Results of the above tests will be made available to all parties at the completion of pre-designated areas which shall have been determined at a pre-job conference.

Safety

- MONOKOTE® 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.
- SDS (Safety Data Sheet) for MONOKOTE® Z-146T are available on our web site or call toll free at 866-333-3SBM.

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GCP Applied Technologies Inc., 2325 Lakeview Parkway, Suite 400, Alpharetta, GA 30009, USA

GCP Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6

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Last Updated: 2024-09-02
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