

D A T A S U B M I T T A L

Monokote® Z-146

High Density, Cementitious Fireproofing

Product Information/Description

Monokote® Z-146 High Density Cementitious Fireproofing has been developed by Grace Construction Products to meet specialty, commercial and industrial fireproofing requirements. Z-146 is a portland cement-based, factory-mixed material requiring only the addition of water on the job for application. It is spray applied directly to structural steel (beams and columns), providing up to 4 hours of fire resistance. Its physical characteristics are excellent for areas exposed to environmental or climatic conditions. Z-146 may be used in areas where high durability is required such as parking garages. This product is ideal for use in clean room environments where issues such as particle emissions and off gassing are critical to the interior environment within the building.

Features

Z-146 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-146 may be sprayed and/or trowelled to various textures.
- Versatility – Z-146 has been applied using equipment ranging from rotor-stator pumps to large hydraulic pumps. Please refer to your local Grace sales representative for details.

- 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.

Applications

Z-146 may be used in parking garages, exterior exposure, mechanical rooms and other areas where a highly durable product is required.

Delivery and 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.

Performance Characteristics

Physical Properties	Recommended Specifications	Test Method/Notes**	Laboratory Tested* Value
Dry density	min. 640 kg/m ³ (40 pcf)	ASTM E605	See note below***
Bond strength	min. 478 kN/m ² (10,000 psf)	ASTM E736	609 kN/m ² (12,765 psf)
Compressive strength @ 10% deformation	3.79 MPa (550 psi)	ASTM E761	4.08 MPa (592 psi)
Hardness	40	ASTM D2240	41
Yield	—	Theoretical maximum	1.55 m ² at 25 mm (16.7 board feet) per bag
Color	—	Natural concrete gray	
Volatile Organic Content (off gassing) at 50°C organic compounds C6-C28	Less than 1 PPMW (part per million by weight)	Dynamic headspace (Thermal desorbition gas chromatography – mass spectrometry)	Less than 1 PPMW (Below detectable limits)
Leachable ammonia	Less than 50 PPB (50 parts per billion, 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. Tests reported here were conducted at 632 kg/m³ (39.4 pcf).

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 and Concrete Surfaces

- a. Prior to the application of Z-146, 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.
- b. Prior to application of Monokote Z-146, a bonding agent, approved by the fireproofing manufacturer, should be applied to all concrete substrates to receive Z-146.
- c. 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

- a. Z-146 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 833 to 945 kg/m³ (52 to 59 pcf) of material.
- b. 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. Target density of 833 to 945 kg/m³ (52 to 59 pcf) is most desirable. Overmixing Z-146 will reduce pumping rate and will negatively effect in-place density and mechanical properties.

Application

- a. Application of Z-146 can be made in the following sequence:
1. For thicknesses of approximately 22 mm (7/8 in.) or less, apply in one pass.
 2. For thicknesses of 25 mm (1 in.) or greater, apply subsequent passes after the first coat has set.
- b. Z-146 material should not be used if it contains partially set, frozen or caked material.
- c. Z-146 should have a minimum average dry, in-place density of 640 kg/m³ (40 lbs/ft³).
- d. Z-146 is formulated to be mixed with water at the job site.
- e. Z-146 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 0.138 MPa (20 psi), will provide the correct hangability, density and appearance.

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

Temperature and Ventilation

- a. An air and substrate temperature of 4.5°C (40°F) minimum should be maintained for 24 hours prior to application, during application and for a minimum of 24 hours after application of Z-146.

b. Provisions should 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 air exchange rate of 4 times per hour until material is substantially dry.

Field Tests

- a. 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 recognized field bond strength test procedure exists for sprayed fireproofing materials with bond strengths greater than 4,882 kg/m² (1,000 psf) such as Monokote Z-146. Where bond strength specifications exceed 4,882 kg/m² (1,000 psf) it is recommended that independent laboratory test data based upon a modified version of ASTM E736 be submitted to verify specification compliance.

Safety

- a. Z-146 is slippery when wet. The general contractor and applicator are responsible for posting appropriate cautionary "SLIPPERY WHEN WET" signs. Signs should be posted in all areas in contact with wet fireproofing material. Anti-slip surfaces should be used on all working surfaces.
- b. A Material Safety Data Sheet for Monokote Z-146 is available on our web site at www.graceconstruction.com or call toll free at 866-333-3SBM.

For Technical Assistance call toll free at 866-333-3SBM (3726).



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