



Monokote[®] Fireproofing

Type Z-146

High Density Cementitious Fireproofing

Product Information/Description

Monokote[®] Type Z-146 High Density Cementitious Fireproofing has been developed by Grace Construction Products to meet specific commercial and industrial fire protection requirements. Type 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 & columns), providing up to 4 hours of fire resistance. Its physical characteristics are excellent for areas exposed to environmental and of extreme climatic conditions. Type Z-146 may also be used in areas where high durability is required such as parking garages. Type Z-146 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

Monokote[®] Type Z-146 offers the following significant advantages to the 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 inert materials require only the addition of water for mixing and application.
- Attractive Finishes: Monokote[®] Type Z-146 may be sprayed and/or trowelled to various textures. Monokote[®] Type Z-146 may also be integrally colored to meet job needs.
- Versatility: Monokote[®] Type Z-146 has been applied using equipment ranging from rotor-stator pumps to large hydraulic pumps. Please refer to your local AVI representative for details.
- Moisture Resistant: The Portland cement base affords excellent fire protection characteristics in areas subjected to high humidity.
- Durable: Its hardness and durability help resist accidental physical damage.
- Weatherable: Able to withstand freeze-thaw, wind, rain and other extremes of climatic conditions.
- Economical: Low material cost per square foot combined with spray-on application saves time and money.

Applications

Monokote[®] Type Z-146 may be used in parking garages, exterior exposure, mechanical rooms and other areas where a high durable product is required.

Performance Characteristics

Physical Properties	Recommended Specifications	Test Method	Laboratory Test* Value
Dry Density	640 kg/m ³ (40 pcf)	ASTM E 605	See Note Below***
Bond Strength	478 kN/m ² (10,000 psf)	ASTM E 736 (Modified)**	609 kN/m ² (12,765 psf)
Compressive Strength @ 10% Deformation	3.79 MPa (550 psi)	ASTM E 761	4.08 MPa (592 psi)
Hardness	40	ASTM D 2240	41
Yield	-	Theoretical	1.39 m ² at 25mm (15 Bft) per bag
Standard Color	-	-	Natural Concrete Grey
Volatile Organic Content (off-gassing) at 50 °C <i>organic compounds C6-C28</i>	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 (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.

** Modified to allow for high-density, high-strength materials.

*** 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).

Delivery and Storage

1. 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.
2. The material shall be kept dry until ready for use. Packages of material shall be kept off the ground, under cover and away from sweating walls and other damp surfaces. All bags that have been exposed to water before use shall be discarded. Stock of material is to be rotated and used before its expiration date.

Steel and Concrete Surfaces

1. Prior to the application of Monokote[®] Type Z-146 fireproofing, an inspection shall be made to determine that all steel surfaces are acceptable to receive fireproofing. The steel to be fireproofed shall 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. When necessary, the cleaning of steel surfaces to receive fireproofing shall be the responsibility of the general contractor.
2. The project architect shall determine if the painted/primed structural steel to receive fireproofing has the material tested in accordance with ASTM E119, to provide the required fire resistance rating.
3. Prior to the application of Monokote[®] Type Z-146, a bonding agent, approved by the fireproofing manufacturer, shall be applied to all concrete surfaces to receive Monokote[®] Type MK-6/HY.

Mixing

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

Application

1. Application of Monokote[®] Type Z-146 Fireproofing can be made in the following sequence:
 - a. For thicknesses of approximately 22mm (7/8 in.) or less, material can be applied in one pass.

- b. For thicknesses of approximately 25mm (1 in.) or greater, material should be applied in multiple passes. Subsequent passes will be applied once the first coat has set.
2. Monokote[®] Type Z-146 fireproofing material shall not be used if it contains partially set, frozen or caked material.
 3. Monokote[®] Type Z-146 shall have a minimum average dry, in-place density of 640 kg/m³ (40 lb/ft³).
 4. Monokote[®] Type Z-146 is formulated to be mixed with water at the job site.
 5. Monokote[®] Type 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 38 kPa (20 psi) will provide the correct hangability, density and appearance.

NOTE: If freshly sprayed Monokote[®] Type 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

1. An air and substrate temperature above 4.4 °C (40 °F) shall be maintained for 24 hours prior to application, during application and for a minimum of 24 hours after application of Monokote[®] Type Z-146.
2. Provisions shall be made for ventilation to properly dry the fireproofing after application. In enclosed areas lacking natural ventilation must be provided to achieve a minimum total air exchange rate of 4 times per hour until the material is substantially dry.

Field Tests

1. The architect will select, and the owner will pay for an independent testing laboratory to sample and verify the thickness and density of the fireproofing in accordance with the provisions of ASTM E 605, "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".

Safety:

1. Monokote[®] Type Z-146 is slippery when wet. The general contractor and applicator shall be 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.
2. Material Safety Data Sheets for Monokote[®] Type Z-146 is available upon request.



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This is a Generic Document.

**METHOD STATEMENT FOR THE
CORRECT APPLICATION OF
MONOKOTE Z-146
(DOCUMENT NUMBER
SCT/MS/MONOKOTE Z-146- 001)**

1.0 MATERIALS.

Material shall be MONOKOTE Type Z-146 as manufactured and supplied by Arabian Vermiculite Industries (AVI) Dammam, Saudi Arabia.

2.0 THICKNESSES MONOKOTE.

Materials shall be applied in dry film thicknesses as recommended by AVI to meet the desired fire rating requirements of the project specification. No thickness shall be less than 9.0mm as per the site requirements / specifications.

3.0 DELIVERY AND STORAGE.

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. The material shall be kept dry until ready for use. Packages of material shall be kept off the ground, under cover and away from sweating walls and other damp surfaces. All bags that have been exposed to water before use shall be discarded. Stock of material is to be rotated and used before its expiration date.

4.0 APPLICATION.

4.1.a It shall be ensured by Main Contractor that all roofing works and concrete flooring works on profiled metal deck are completed prior to the start of MONOKOTE application.

b. All Fire proofing works must and will commence before erection of any all MEP Services.

4.2 Surfaces not requiring fireproofing will be protected against over-spray by providing masking by Main Contractor.

4.3 Steel surface temperature shall be above dew point.

- 4.4 0°C and rising. It should however be below 50 °C prior to the application of MONOKOTE. In case of higher substrate temperature the steel surface shall be cooled down with water to ensure that same is below 50 °C.
- 4.5 The steel surface to receive fireproofing will be free of oil, grease, excess rolling compounds, loose mill scale or any other substance that will impair the adhesion of MONOKOTE to the steel surface. Applicator will ensure that the steel surface to receive Monokote is acceptable for this application.
- 4.6 Steel members where the sizes of Flange or Web exceed the following limits specified by UL will have mechanical breaks provided with expanded diamond metal lath fixed to these surfaces with Hilti fired/welded pins so that the clear spans do not exceed the following limits. Expanded metal lath will be 0.9 kg/m² with the width of lath on steel member not to be less than 89mm:
- Beam flange width is in excess of 305mm
 - Column flange width is in excess of 406mm
 - Beam or Column depth is in excess of 406mm
 - Pipe outer diameter or Tube width is in excess of 305mm
- 4.7 MONOKOTE Z-146 shall be applied by spray on to clean steel as per the procedure delineated in the material data sheet. Thicknesses will be applied in single coat so long the material hangs well on to the steel substrate. Higher thicknesses will be applied in multi-coats. As a general rule apply thicknesses in excess of 16mm in multi-coats. Wet thickness measurements shall be taken during and after the application to ensure application of recommended thicknesses.
- 4.8 Crest areas of the profiled metal deck (areas between Beam Flange and the Metal Deck Profile) were the metal deck sits right on top of the beam flange, shall be filled with Monokote as per the UL Design requirement. (If Applicable)

4.9 Provision shall be made for ventilation to properly dry the fireproofing after application.

5.0 FIELD QUALITY CONTROL.

Field checks will be carried out for Applied Thickness, Material Bond and In-Place dry density of the applied Monokote Z-146.

6.0 CLEANING.

Post application all areas around that have been affected by material over-spray, will be cleaned and empty bags/waste materials shall be moved away from the work place.

7.0 SAFETY.

Monokote is slippery when wet. The general contractor and applicator shall be responsible for posting appropriate cautionary "SLIPPERY WHEN WET" signs. Signs should be posted in all areas in contact with wet fireproofing material.

8.0 REPAIR PROCEDURE.

8.1 CRACKS REPAIR.

- Cut V-groove going right up to the depth of the crack.
- Clean the surface of any loose material.
- Fill up the V-groove with freshly mixed Monokote to finish level with the existing thickness around.
- Hand patching is accepted for an area of 144 square inch. Any larger surface will be spray repaired.

8.2 DAMAGE REPAIR.

- Cut off and remove the damaged portion of applied Monokote right up to the sound adhering Monokote all around.
- Clean the surface of any loose Monokote.
- In case the steel is primed, ensure that the primer has not got damaged. If damaged, repair the primer.
- Apply one coat of Firebond wherever it is existing.
- Spray or Hand apply Monokote material prepared fresh to fill up the opened area of steel to make it level with the existing sound Monokote coating all around.
- Hand patching is accepted for an area not exceeding 144 square inch. Larger surface than this will be spray applied only.