

MS-D1 STEEL FIBRE SHOTCRETE

Accelerated, silica fume enhanced, steel fibre reinforced, pre-packaged shotcrete material for dry process applications.

MS-D1 Steel Fibre Shotcrete is a pre-blended, pre-packaged dry process shotcrete material containing Portland cement, silica fume, steel fibres, blended aggregates and other carefully selected components.

MS-D1 Steel Fibre Shotcrete has greatly enhanced post crack capacity and other physical properties.

FEATURES & BENEFITS:

- Significantly increased load carrying capacity.
- Significantly increased energy absorbing capacity (toughness).
- Significantly increased impact resistance.
- Rapid early age strength development.
- Improved adhesive and cohesive plastic properties.
- Improved ability to build greater thicknesses in a single pass in both vertical and overhead orientations.
- Improved resistance to water washout.
- Low permeability.
- Reduction of cracking due to drying shrinkage.
- Can be air-entrained to provide improved durability.
- Blended to meet ACI 506 "Guide to Shotcrete", Table 2.1, Gradation #2.
- Pre-packaged under international quality standards of ISO 9001:2000.

USES:

- Ground support applications for mining, tunnelling and other underground openings.
- Rehabilitation of marine structures.
- Lining and rehabilitation of sewers and other tunnels.
- Slope stabilization, soil-nailing, shaft and tunnel linings.

PROCEDURES:

Surface Preparation – Rock Surfaces:

All surfaces to be in contact with **MS-D1 Steel Fibre Shotcrete** must be free from dust, oil, grease or any other foreign substances that may interfere with the bond of the material. Remove all loose or delaminated rock. Clean the area with potable water, leaving the substrate saturated but free of standing water (SSD).

Surface Preparation (Repair or Rehabilitation):

All surfaces to be in contact with **MS-D1 Steel Fibre Shotcrete** must be free from dust, oil, grease or any other foreign substances that may interfere with the

bond of the material. Remove all loose or delaminated concrete providing a roughened surface and a minimum of 25 mm (1 inch) clearance behind the reinforcing steel. The perimeter of the repair area should be sawcut a minimum of 20 mm (3/4 inch). Clean the area to be repaired with potable water, leaving the concrete saturated but free of standing water (SSD).

Application:

Apply **MS-D1 Steel Fibre Shotcrete** in accordance with the ACI 506 "Guide to Shotcrete" publication.

Curing:

Good curing conditions are beneficial to optimizing physical properties of **MS-D1 Steel Fibre Shotcrete**. Although the high relative humidity commonly found in underground environments provides for good curing conditions, additional curing is often appropriate and should be performed in accordance with ACI 308 "Standard Practice for Curing Concrete".

For rehabilitation applications, shotcrete should be cured immediately after material has reached initial set in accordance with ACI 308 "Standard Practice for Curing Concrete". Continuously moist cure for a minimum period of 7 days. Alternatively, moist cure for a minimum period of 24 hours and apply a curing compound which complies with ASTM C 309. Curing is particularly critical in rapid moisture loss conditions such as high temperatures, high winds and low humidity.

TECHNICAL DATA:

The following data is representative of typical values achievable using proper application techniques as outlined in ACI 506 "Guide to Shotcrete" publication. The data was obtained during project field tests and in-house shotcrete studies.

Compressive Strength

ASTM C 1116

(adapted)

8 Hr

7 MPa (1015 psi)

24 Hr

20 MPa (2900 psi)

ASTM C 42

28 Day

45 MPa (6525 psi)

Flexural Strength

ASTM C 78

28 Day

8.0 MPa (1160 psi)

Mixing Strength With Satisfaction

KING PACKAGED MATERIALS COMPANY
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BURLINGTON, ONTARIO
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FAX: 905-333-3730
E-MAIL: industrial@kpmindustries.com
WEBSITE: www.kingshotcrete.com

TECHNICAL DATA (Con't):
Flexural Toughness
EFNARC 10.4
28 Day
(plate test)
Load at first crack
Peak load
Cumulative energy

	62 KN
	80 KN
0-5 mm	278 J
0-10 mm	587 J
0-15 mm	814 J
0-20 mm	986 J
0-25 mm	1115 J

Boiled Absorption
ASTM C 642

6.0%

Maximum Volume of Permeable Voids
ASTM C 642

14.0%

SHELF LIFE:

Unopened bags have a shelf life of 12 months when stored as recommended.

SAFETY PROCEDURES:

MS-DI Steel Fibre Shotcrete contains Portland cement. Normal safety-wear such as rubber gloves, dust mask and safety glasses used to handle conventional cement based products should be worn. Material Safety Data Sheets are available upon request.

OPTIMUM PERFORMANCE:

- **MS-DI Steel Fibre Shotcrete** should not be applied when ambient, substrate and material temperatures are below 5 °C (40 °F) or above 35 °C (95 °F).
- Performance of in-place shotcrete relies heavily upon application techniques. To ensure optimum quality of in-place shotcrete, the material, equipment and key personnel should be pre-qualified prior to project start-up.
- Material should be stored in a dry covered area protected from the elements. Physical properties of **MS-DI Steel Fibre Shotcrete** may be adversely affected if material is stored in temperatures below 0 °C (32 °F). Material stored below these temperatures should be allowed to warm to ambient underground temperatures before shooting. Material should be stored in a dry covered area protected from the elements.

YIELD:

1,000 kg (2,205 lb.) bag contains approximately 0.45 m³ (16.5 ft³).

PACKAGING:

MS-DI Steel Fibre Shotcrete is normally packaged in 1,000 kg (2,205 lb.) re-useable bulk bags and poly wrapped on wooden pallets. All **KING** products can be custom packaged to suit specific job requirements.

This product is designed to meet the performance specifications outlined in this product data sheet. If the product is used in conditions for which it was not intended, or applied in a manner contrary to the written recommendations contained in the product data sheet, the product may not reach such performance specifications. The foregoing is in lieu of any other warranties, representations or conditions, expressed or implied, including, but not limited to, implied warranties or conditions of merchantable quality or fitness for particular purposes, and those arising by statute or otherwise in law or from a course of dealing or usage of trade.