

MS-D1 SHOTCRETE

Silica fume enhanced, pre-packaged shotcrete material for dry-process applications. MS-D1 Shotcrete is a pre-blended, pre-packaged, dry-process shotcrete material containing Portland cement, silica fume, air-entraining admixture, blended aggregates and other carefully selected components. MS-D1 Shotcrete has greatly enhanced shooting characteristics and physical properties.

FEATURES & BENEFITS

- Air-entrainment provides superior resistance to freeze-thaw cycling and salt-scaling resistance.
- Improved adhesive and cohesive plastic properties.
- Significantly reduced rebound, resulting in lower material usage.
- Improved ability to build greater thicknesses in a single pass in both vertical and overhead orientations.
- Improved resistance to water washout.
- Improved resistance to sulphate attack.
- Very low permeability.
- Low shrinkage.
- Designed with natural normal-density non-reactive aggregates to eliminate potential alkali-aggregate reactivity (AAR).
- Can be blended to meet ACI 506 "Guide to Shotcrete", Table 1.1, Gradation No. 1 or 2.
- All KING products are manufactured using ISO 9001:2008 Certified Processes.

OPTIONAL FEATURES & BENEFITS

SYNTHETIC FIBER

- Synthetic fibers reduce cracking caused by intrinsic stresses.
- Type III synthetic fiber in accordance with ASTM C 1116.
- Grade FR Class I shotcrete in accordance with ASTM C 1480.

USES

- Rehabilitation of concrete bridges, dams, reservoirs, subway tunnels, marine structures and parking ramps.
- Lining and rehabilitation of sewers and watermain.
- New construction including slope stabilization, soil-nailing, shaft and tunnel linings, pools and other concrete structures.

PROCEDURES

Surface Preparation (Repair or Rehabilitation):

All surfaces to be in contact with MS-D1 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 any corroded reinforcing steel. The perimeter of the repair area should be sawcut a minimum of 20 mm (¾ inch). Clean the area to be repaired with potable water, leaving the concrete saturated but free of standing water (SSD).

Application:

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

Curing:

Curing is essential to optimize physical properties of the shotcrete and minimize plastic shrinkage. MS-D1 Shotcrete should be cured immediately after material has reached initial set in accordance with ACI 308 "Guide to 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 that 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 the ACI 506 "Guide to Shotcrete" publication. The data was obtained during project field tests and in-house shotcrete studies.

COMPRESSIVE STRENGTH

ASTM C 1604

| | |
|--------|-------------------|
| 1 Day | 15 MPa (2175 psi) |
| 3 Day | 30 MPa (4350 psi) |
| 28 Day | 42 MPa (6000 psi) |

FLEXURAL STRENGTH

ASTM C 78

| | |
|--------|-------------------|
| 28 Day | 6.5 MPa (940 psi) |
|--------|-------------------|

AIR CONTENT

| | |
|------------|--------|
| ASTM C 457 | 6 ± 2% |
|------------|--------|

MAXIMUM AIR VOID SPACING FACTOR

| | |
|------------|--------|
| ASTM C 457 | 300 µm |
|------------|--------|

FREEZE-THAW RESISTANCE

ASTM C 666

| | |
|------|-------------------------------|
| 100% | (Excellent durability factor) |
|------|-------------------------------|

SALT-SCALING RESISTANCE

ASTM C 672

| |
|---|
| 0.2 kg/m ² (0.04 lb./ft ²) |
|---|

UNIAXIAL DRYING SHRINKAGE

ASTM C 157

| |
|----------|
| 650 µm/m |
|----------|

BOILED ABSORPTION

ASTM C 642

| |
|------|
| 6.0% |
|------|

MAXIMUM VOLUME OF PERMEABLE VOIDS

ASTM C 642

| |
|-------|
| 15.0% |
|-------|

RAPID CHLORIDE PERMEABILITY

ASTM C 1202

| |
|--------------|
| 700 Coulombs |
|--------------|

MS-D1 SHOTCRETE

OPTIMUM PERFORMANCE

- MS-D1 Shotcrete should not be applied when ambient, substrate and material temperatures are below 5°C (40°F) or above 35°C (95°F).
- For adverse temperatures, follow ACI recommendations for Cold/Hot Weather Concreting.
- For cold temperature applications, see MS-D3 Accelerated Shotcrete.
- 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.

YIELD

- 30 kg (66 lb.) bag contains approximately 0.014 m³ (0.5 ft³).
- 1,000 kg (2,205 lb.) bag contains approximately 0.45 m³ (16.5 ft³).

PACKAGING

MS-D1 Shotcrete is normally packaged in 30 kg (66 lb.) triple lined bags or 1,000 kg (2,205 lb.) bulk bags and polywrapped on wooden pallets. All KING products can be custom packaged to suit specific job requirements.

STORAGE AND SHELF LIFE

Material should be stored in a dry covered area protected from the elements. Unopened bags have a shelf life of 12 months.

SAFETY PROCEDURES

MS-D1 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.

Warranty: 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. [REV.0001_08/01/2014]



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