

RS-D1 is a rapid hardening shotcrete material, for dry-process applications. This product is a pre-blended, pre-packaged, dry-process shotcrete material powered by Rapid Set® technology, containing controlled blended aggregates and other carefully selected components. It has greatly enhanced shooting characteristics, providing greatly reduced setting times and very rapid strength development.

FEATURES & BENEFITS

- Very high early strength for a reduced construction schedule
- Improved performance in presence of running water
- Air-entrainment provides superior resistance to freeze-thaw cycling and salt-scaling resistance
- Allows earlier re-opening of traffic lanes on bridges, and earlier re-entry times in tunnels and parking garages
- Low modulus of elasticity and low drying shrinkage, reducing cracking potential
- Simplified curing method to accelerate construction schedule
- Significantly reduced rebound, resulting in lower material usage
- Superior ability to build greater thicknesses in a single pass, in both vertical and overhead orientations
- Improved resistance to water washout
- Improved resistance to sulfate attack
- Very low permeability
- Compatible with integral, pre-applied and/or post-applied corrosion inhibitors*
- Designed with natural normal-density non-reactive aggregates to eliminate potential alkali-aggregate reactivity (AAR)
- All KING products are manufactured using ISO 9001:2015 Certified Processes.

*For more information regarding the use of a corrosion inhibitor in conjunction with RS-D1, please contact your KING Technical Representative.

OPTIONAL FEATURES & BENEFITS

SYNTHETIC FIBER

RS-D1 SY

- 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

CORROSION INHIBITOR

RS-D1 CI

- Corrosion inhibitor protects steel reinforcing and other metals embedded in concrete from corrosion induced by carbonation or chlorides
- Pre-blended corrosion inhibitor provides the correct dosage to enhance corrosion protection

GRADATION

- By default RS-D1 is blended to meet ACI 506 "Guide to Shotcrete", Table 1.1, Gradation No. 1
- RS-D1 G2 is blended to meet ACI 506 "Guide to Shotcrete", Table 1.1, Gradation No. 2

EXAMPLE:

For RS-D1 with synthetic fibers and Gradation No. 2, the name of the product would be RS-D1 SY G2.

USES

- Rehabilitation of concrete bridges, dams, reservoirs, subway tunnels, marine structures and parking ramps.
- Lining and rehabilitation of sewers and water pipes.
- New construction including slope stabilization, soil-nailing, shaft and tunnel lining.
- Use of a predampener in conjunction with dry-process, accelerated shotcrete is not recommended. Contact your local KING Technical Representative for more information.

PROCEDURES

[For temperatures above 5 °C (40 °F)]

Surface Preparation (Rock Surfaces): All surfaces to be in contact with RS-D1 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 RS-D1 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 20 mm (¾ inch) clearance behind any corroded reinforcing steel. The perimeter of the repair area should be saw-cut 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 RS-D1 in accordance with the ACI 506 "Guide to Shotcrete" publication.

CURING

In order to reduce the construction schedule, RS-D1 was developed and tested using a simplified curing method consisting of applying two coats of a water-based curing compound that complies with ASTM C 309.

[For temperatures below 5 °C (40 °F)]

Surface Preparation (Rock Surfaces): All surfaces to be in contact with RS-D1 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. To avoid freezing of the interface between the shotcrete and the parent concrete, do not pre-wet the receiving surface. Pneumatically remove any free standing or other fine particles that may interfere with the bond between RS-D1 and the substrate.

Surface Preparation (Repair or Rehabilitation): All surfaces to be in contact with RS-D1 must be free from 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 (¾ inch). To avoid freezing of the interface between the shotcrete and the parent concrete, do not pre-wet the receiving surface. Pneumatically remove any free standing or other fine particles that may interfere with the bond between RS-D1 and the substrate. Do not apply RS-D1 when ambient temperature is below or is expected to fall below -5°C (20°F) within 6 hours following the application of shotcrete. Do not apply when temperature of receiving surface is below -5°C (20°F). Material and mixing water temperature must be maintained between 20° – 30°C (70° – 86°F).

Application: Apply RS-D1 in accordance with the ACI 506 "Guide to Shotcrete" publication.

CURING

Immediately after shotcrete reaches final set, apply two coats of a resin based liquid membrane curing compound approved for use in cold weather conditions.

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.

SET TIME*

ASTM C 1117	
Initial	5-10 minutes
Final	10-20 minutes

COMPRESSIVE STRENGTH*

ASTM C 116	50% HUMIDITY CURE
1 Hour	10 MPa (1500 psi)
2 Hour	15 MPa (2175 psi)
3 Hour	21 MPa (3000 psi)
1 Day	25 MPa (3625 psi)

ASTM C 1604	50% HUMIDITY CURE
7 Day	32 MPa (4640 psi)
28 Day	38 MPa (5500 psi)

FLEXURAL STRENGTH

ASTM C 78	
28 Day	5.4 MPa (785 psi)

AIR CONTENT

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

MODULUS OF ELASTICITY

ASTM C 469	
28 Day	25.3 GPa

UNIAXIAL DRYING SHRINKAGE

ASTM C 157	
28 Day	400 µm/m

MAXIMUM AIR VOID SPACING FACTOR

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

BOILED ABSORPTION

ASTM C 642	
28 Day	6.0%

MAXIMUM VOLUME OF PERMEABLE VOIDS

ASTM C 642	
28 Day	15.0%

FREEZE-THAW RESISTANCE

ASTM C 666	
28 Day	100% (Excellent durability factor)

SALT-SCALING RESISTANCE

ASTM C 672	0.6 kg/m ² (0.12 lb/ft ²)
-------------------	--

CHLORIDE ION PENETRABILITY

ASTM C 1202	
28 Day	1200 Coulombs (Low permeability)

*The following data was obtained under controlled conditions with material and ambient temperatures of 21 °C (70 °F). Higher or lower temperatures can respectively accelerate or delay setting time and early-age compressive strength gain.

OPTIMUM PERFORMANCE

- RS-D1 should not be applied when ambient and substrate temperatures are below -5 °C (20 °F) or when ambient, substrate and material temperatures are above 35°C (95 °F).
- For adverse temperatures, follow ACI recommendations for Cold/ Hot Weather Concreting.
- 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

RS-D1 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

RS-D1 contains rapidset cement. Normal safety-wear such as rubber gloves, dust mask and safety glasses used to handle conventional cement based products should be worn. 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.0011_2458745.5]

Head Office

601, avenue Delmar
Pointe-Claire (Québec) H9R 4A9

Other Sites:

Boisbriand, Qc
Brantford; Cambridge; Sudbury; Toronto(ON)

Edmonton (Alberta)
Surrey (British Columbia)