

PRODUCT DATA SHEET

King® MS-W1

SHOTCRETE MATERIAL FOR WET-MIX PROCESS APPLICATIONS

PRODUCT DESCRIPTION

King® MS-W1 is a pre-blended, prepackaged, wet-process shotcrete material containing Portland cement, silica fume, blended aggregates and other carefully selected components. It has greatly enhanced shooting characteristics and physical properties.

WHERE TO USE

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

CHARACTERISTICS / ADVANTAGES

- Air-entrainment provides superior resistance to freeze-thaw cycling and salt-scaling resistance
- Improved pumpability and shootability
- 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 wash-out
- Improved resistance to sulphate attack
- Very low permeability
- Low dust levels
- Low shrinkage
- 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)

OPTIONAL FEATURES & BENEFITS

SET-TIME/STRENGTH GAIN

Liquid accelerator can be added at the nozzle to reduce set time and increase early age strength gain. Contact your Sika Technical Representative for more information.

MICRO-SYNTHETIC FIBRE (SY)

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

CORROSION INHIBITOR (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

*For more information regarding the use of a corrosion inhibitor in conjunction with King® MS-W1, please contact your Sika Technical Representative.

EXAMPLE:

For King® MS-W1 with synthetic fibres and Gradation No. 2, the name of the product would be King® MS-W1 SY G2.

APPROVALS / CERTIFICATES

GRADATION

- By default King® MS-W1 is blended to meet ACI 506 "Guide to Shotcrete", Table 1.1, Gradation No. 1
- King® MS-W1 G2 is blended to meet ACI 506 "Guide to Shotcrete", Table 1.1, Gradation No. 2.

PRODUCT INFORMATION

Packaging	<ul style="list-style-type: none">▪ 30 kg (66 lb) triple-lined bags▪ 1000 kg (2 205 lb) FIBC▪ Products containing macro-synthetic fibres (MF) or steel fibres (ST) can only be packaged in bulk bags (FIBC). <p><small>*Custom packaging is available to suit specific project requirements</small></p>
Shelf Life	12 months in original, unopened packaging
Storage Conditions	Material should be stored in a dry, covered area, protected from the elements.

TECHNICAL INFORMATION

Compressive Strength			ASTM C 1604
	1 day	15 MPa (2175 psi)	
	3 days	28 MPa (4060 psi)	
	7 days	32 MPa (4640 psi)	
	28 days	42 MPa (6000 psi)	
Tensile Strength in Flexure	28 Days	6.5 MPa (940 psi)	ASTM C 78
Splitting Tensile Strength	7 Days	4.5 MPa (650 psi)	ASTM C 496
	28 Days	5.8 MPa (840 psi)	
	<small>**Data was obtained under laboratory conditions using specimens cast in accordance with the indicated test method.</small>		
Shrinkage	UNIAXIAL DRYING SHRINKAGE		ASTM C 157
	650 µm/m		
Chloride Ion Diffusion Resistance	CHLORIDE ION PENETRABILITY		ASTM C 1202
	700 Coulombs		
Porosity	AIR CONTENT		ASTM C 457
	6% ± 2%		
	BOILED ABSORPTION		ASTM C 642
	6.0%		
	MAXIMUM AIR VOID SPACING FACTOR		ASTM C 457
	230µm		
	MAXIMUM VOLUME OF PERMEABLE VOIDS		ASTM C 642
	15.0%		
Freeze thaw resistance	100% (Excellent durability factor)		ASTM C 666
Salt Resistance	SALT-SCALING RESISTANCE		ASTM C 672
	0.2 kg/m ² (0.04 lb/ft ²)		
Yield	Approx. 0.014 m ³ (0.5 ft ³) / 30 kg (66 lb) bag		
	<small>* Yield in service may slightly vary according to projects conditions</small>		
Curing Time	Curing is essential to optimize physical properties of the shotcrete and minimize plastic shrinkage. King® MS-W1 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.		

BASIS OF PRODUCT DATA

All technical data stated in this Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

*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

OTHER DOCUMENTS

Each of the following descriptors / features have the possibility of being included in a specific mix design; Either on their own, or combined with any other descriptor / feature:

Corrosion inhibitor (CI)	Anti-microbial(AM)
Crystalline Waterproofing (CW)	Not Air Entrained (NE)
Gradation 2 (G2)	Micro Synthetic Fibre (SY)

LIMITATIONS

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.

ENVIRONMENT, HEALTH & SAFETY

User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains physical, ecological, toxicological and other safety-related data.

SURFACE PREPARATION

Rock Surfaces:All surfaces to be in contact with King® MS-W1 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).

Repair or Rehabilitation:All surfaces to be in contact with King® MS-W1 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 stand-

ing water (SSD).

MIXING

Place 75% of required water into mixer and slowly introduce entire bag of King® MS-W1 while the mixer is running. Allow King® MS-W1 to mix for a minimum of five minutes. Slowly add balance of required water until desired slump has been obtained, not exceeding maximum recommended volume of water.

Maximum recommended volume of water is 3.4 L (0.9 US gallon) per 30 KG (66 lb) bag. Continue mixing and stop only after material has reached a consistent, homogeneous mix.

APPLICATION

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

OPTIMUM PERFORMANCE

- King® MS-W1 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.

CLEAN UP

Clean all tools and equipment after use with water. Once hardened, the product can only be removed mechanically.

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for exact product data and uses.

LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always

refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

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