**SHOTCRETE MS**

**PRODUCT NO.** 1229-80, 1229-82, 1229-86, 1229-83

**PRODUCT DESCRIPTION**
QUICKRETE® Shotcrete MS mixes are specially designed for machine applications to repair above- or below-grade concrete and mortar.

**PRODUCT NAMES**
QUICKRETE® Shotcrete MS #1229-80
QUICKRETE® Shotcrete MS Coarse #1229-82
QUICKRETE® Shotcrete MS w/ Polypropylene Fibers #1229-86
QUICKRETE® Shotcrete MS w/ AR Fiberglass Reinforced #1229-83

**PRODUCT USE**
QUICKRETE® Shotcrete MS mixes are structural repair materials for bridges, tunnels, parking garages, ramps, beams, piers, sewer pipes and dams. They can be used for structural concrete in vertical, horizontal and overhead surfaces. QUICKRETE® Shotcrete MS is a 1-component, well-proportioned blend of Portland cement, concrete sand (and gravel for the Coarse version) and microsilica suitable for general-use construction. Advantages include high strength, improved sulphate resistance, high adhesion, low permeability, low rebound and low sag. Shotcrete MS can be placed at a greater single pass thickness than conventional shotcrete. Other performance levels are also available to meet specific jobsite requirements, including coarse aggregate versions.

**SIZES**
QUICKRETE® Shotcrete products are packaged in 3000 lb (1362 kg) bulk bags and in 50 lb (22.7 kg) and 80 lb (36.3 kg) bags.

**YIELD**
- A 50 lb bag will yield approximately 0.38 cubic feet.
- An 80 lb bag will yield approximately 0.61 cubic feet.
- A 3,000 lb bulk bag will yield approximately 22.8 cubic feet.
Unit weight ~ 140 pounds/ft³

**TECHNICAL DATA**

**APPLICABLE STANDARDS**
- ASTM C42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete (AASHTO T24)
- ASTM C78 Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
- ASTM C469 Standard Test Method for Static Modulus of Elasticity and Poisson’s Ratio of Concrete in Compression
- ASTM C496 Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
- ASTM C642 Standard Test Method for Density, Absorption, and Voids in Hardened Concrete
- ASTM C666 Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
- ASTM C882 Standard Test Method for Bond Strength of Epoxy Resin Systems Used with Concrete By Slant Shear

**PHYSICAL/CHEMICAL PROPERTIES**
The performance of dry process shotcrete cannot be duplicated in the laboratory. In spite of that fact, laboratory data are important for quality control purposes and for making comparisons between formulations. QUICKRETE® Shotcrete MS products have been extensively tested both in the laboratory and in the field. The greatly enhanced performance in the field shows the benefits of low water/cement ratio and high compaction. The field test data are offered only as an example of what can be achieved with qualified operators using proper techniques. The quality of dry process shotcreting is very dependent on the skills of the operator. Table 1 shows typical laboratory data for shotcretes with and without fibers. Typical field results for QUICKRETE® Shotcrete MS are shown in Table 2. All of the QUICKRETE® Shotcrete MS products in Tables 1 and 2 comply with the requirements of ASTM C1480 Type FA (Fine Aggregate), Grade GU (General Utility). Additionally, Shotcrete MS complies with Grades SR (Sulfate-Resistant) and LP (Low Permeability). Consult a local QUICKRETE® representative for details.
INSTALLATION

**EQUIPMENT**

QUIKRETE® Shotcrete MS is normally applied using dry process shotcrete machinery. Dry process shotcrete is a very efficient method for making repairs to horizontal, vertical and overhead surfaces. The process allows for the placement of the repair material at a very low water/cement ratio with a high degree of compaction. The result is a repair that is superior to other methods of placement of repair material. The performance will be enhanced by the appropriate choice of admixtures. Consult a local QUIKRETE® representative for details.

**SURFACE PREPARATION**

**PREPARATORY WORK**

QUIKRETE® recommends that job mock-ups be prepared by the contractor and tested prior to beginning a project.

**METHODS**

QUIKRETE® recommends that American Concrete Institute (ACI) Committee 506 procedures be followed for surface preparation, equipment, nozzleman certification and shotcrete placement and curing procedures. Refer to the current revisions of the following publications:

- ACI 506R Guide to Shotcrete
- ACI 506.2 Specifications for Shotcrete
- ACI 506.1R Committee Report on Fiber Reinforced Shotcrete
- ACI CP-60 Craftsman Workbook for ACI Certification of Shotcrete Nozzleman

**APPLICATION**

APPLICATION OVER CONCRETE SURFACES

Remove all spalled, severely cracked, deteriorated, loose and unsound concrete from existing concrete surface by chipping, water blasting or other mechanical methods. Adequate pre-wetting of the concrete substrates should be done prior to shotcreting. Surfaces receiving the Shotcrete material should be saturated surface-dry (SSD).

**WARRANTY**

NOTICE: Obtain the applicable LIMITED WARRANTY: at www.quikrete.com/product-warranty or send a written request to The QUIKRETE® Companies, LLC, Five Concourse Parkway, Atlanta, GA 30328, USA. Manufactured under the authority of The QUIKRETE® Companies, LLC. © 2018 QUIKRETE® International, Inc.

THIS WARRANTY IS ISSUED AND ACCEPTED IN LIEU OF ALL OTHER EXPRESS WARRANTIES AND EXPRESSLY EXCLUDES LIABILITY FOR CONSEQUENTIAL DAMAGE

TYPICAL LABORATORY AND FIELD PROPERTIES

<table>
<thead>
<tr>
<th>Table 1. Dry Process Typical Laboratory Test Results</th>
<th>Property</th>
<th>ASTM</th>
<th>Shotcrete MS Fine</th>
<th>Shotcrete MS Coarse</th>
<th>Shotcrete MS Fine with Fibers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive Strength C 109</td>
<td>1 Day</td>
<td>1,750 psi</td>
<td>1,850 psi</td>
<td>1,750 psi</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 Days</td>
<td>3,500 psi</td>
<td>3,700 psi</td>
<td>3,500 psi</td>
<td></td>
</tr>
<tr>
<td></td>
<td>28 Days</td>
<td>5,500 psi</td>
<td>5,800 psi</td>
<td>5,500 psi</td>
<td></td>
</tr>
<tr>
<td>Flexural Strength C 78</td>
<td>7 Days</td>
<td>900 psi</td>
<td>900 psi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>28 Days</td>
<td>1,100 psi</td>
<td>1,100 psi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length Change C 157</td>
<td>7 Days</td>
<td>&lt;0.015%</td>
<td>&lt;0.015%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>28 Days</td>
<td>&lt;0.045%</td>
<td>&lt;0.045%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modulus of Elasticity C 469</td>
<td>28 Days</td>
<td>30 GPa</td>
<td>30 GPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Splitting Tensile Strength C 496</td>
<td>28 Days</td>
<td>1,100 psi</td>
<td>1,100 psi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of Permeable Voids C 642</td>
<td>28 Days</td>
<td>5.3%</td>
<td>11.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freeze/Thaw Resistance C 666</td>
<td>98%</td>
<td>99%</td>
<td>99%</td>
<td>0.003%</td>
<td></td>
</tr>
<tr>
<td>Durability Factor of 28 Day Sample 300 Cycles</td>
<td>0.003%</td>
<td>0.007%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slant Shear Bond Strength C 882</td>
<td>28 Days</td>
<td>2,000 psi</td>
<td>2,000 psi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfate Resistance C 1012</td>
<td>Δ% at 8 weeks</td>
<td>0.026%</td>
<td>0.029%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid Chloride Penetration Resistance C 1202</td>
<td>28 Days</td>
<td>&lt;600 coulombs</td>
<td>&lt;600 coulombs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid Chloride Penetrability Rating</td>
<td>very low</td>
<td>very low</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* * Refer to www.quikrete.com for the most current technical data, SDS, and guide specifications*