SHOTCRETE WET PROCESS

PRODUCT DESCRIPTION
QUIKRETE® Shotcrete Wet Process products are high performing, pneumatically applied concrete products designed for new construction and large rehabilitation projects. They are ideal products for jobs requiring high quality, wet process shotcrete placement and for applications where relatively low dust levels are imperative.

PRODUCT NAMES
50# QUIKRETE® Shotcrete Wet Process Coarse 1228-56
50# QUIKRETE® Shotcrete Wet Process MS Coarse 1228-57
50# QUIKRETE® Shotcrete Wet Process Fine 1228-58
50# QUIKRETE® Shotcrete Wet Process MS Fine 1228-59

PRODUCT USE
QUIKRETE® Shotcrete Wet Process products are designed to be used in the construction of highway tunnels, rail tunnels, retaining walls, etc. They may be used in rehabilitation projects requiring structural repair of bridges, tunnels, parking garages, ramps, beams, piers, sewer pipes and dams. They can be used for structural concrete on vertical, horizontal, and overhead surfaces. QUIKRETE® Shotcrete Wet Process products are well proportioned blends of Portland cement, aggregates, and proprietary additives. The QUIKRETE® Shotcrete Wet Process MS products are modified with micro silica allowing for high strength, improved sulphate resistance, high adhesion, low permeability, low rebound, and low sag. QUIKRETE® offers both Type FA and Type CA versions as well as a variety of fibered versions (steel, glass, and polypropylene) upon request to help ensure customers are able to meet their specific job requirements. QUIKRETE® Shotcrete Wet Process products are available in bulk bags. QUIKRETE® also offers dry process shotcrete products (#1228 & #1229).

SIZES
- QUIKRETE® Shotcrete Wet Process products are packaged in 3000 lb (1362 kg) bulk bags, 50 lb (22.7 kg) bags, and 80 lb (36.3 kg) bags.

YIELD
- Applied at ½" (13 mm) thickness, each 50 lb (22.7 kg) bag will cover approximately 9 ft² (0.84 m²).

TECHNICAL DATA
APPLICABLE STANDARDS
- ASTM C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- 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 C1202, Standard Test Method for Electrical Indication of Concrete’s Ability to Resist Chloride Ion Penetration
- ASTM C1399, Standard Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete
- ASTM C1480, Standard Specification for Packaged, Pre-Blended, Dry, Combined Materials for Use in Wet or Dry Shotcrete Applications

PHYSICAL/CHEMICAL PROPERTIES
The performance of field applied wet process shotcrete cannot be duplicated in the laboratory. Still, laboratory data is important for quality control purposes and for making comparisons between formulations. QUIKRETE® Shotcrete Wet Process 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 as an example of what can be achieved with qualified operators using proper techniques. The quality of wet process shotcrete is heavily dependent on the skills of the operator. Table 1 shows typical laboratory data for wet process shotcretes with and without fibers. Typical, field results for QUIKRETE® Shotcrete Wet Process MS – Coarse are shown in Tables 2 & 3. Similar field results can be expected for other QUIKRETE® Shotcrete Wet Process products. All of the QUIKRETE® Shotcrete Wet Process products in Tables 1 through 3 comply with the requirements of ASTM C1480 Grade GU (General Utility). Additionally, Shotcrete Wet Process MS - Coarse complies with ASTM C1480 LP (Low Permeability) and steel fibered versions comply with Grade FR (Fiber Reinforced), Class II. QUIKRETE® also offers custom designs to meet other types and grades of ASTM C1480, as well as job specific specifications. Consult a local QUIKRETE® representative for details.

INSTALLATION
EQUIPMENT
QUIKRETE® Shotcrete Wet Process products are applied using wet process shotcrete machinery. Wet 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.

SURFACE PREPARATION
PREPARATORY WORK
QUIKRETE® recommends that job mock-ups be prepared by the contractor and tested prior to beginning a project. Ensure the mix time utilized allows for the activation of the proprietary additives.

METHODS
QUIKRETE recommends that American Concrete Institute (ACI) Committee 506 procedures be followed for surface preparation, equipment, nozzleman certification, shotcrete placement, and curing procedures. Refer to the following publications:
- ACI 506R-05 Guide to Shotcrete
- ACI 506.2-95 Specifications for Shotcrete
- ACI 506.1R-08 Guide to Fiber-Reinforced Shotcrete
- ACI CCS-4(08) Shotcrete for the Craftsman

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 should be damp with no glistening water.

APPLICATION OVER MASONRY SURFACES
Prepare as required for concrete surfaces. However, prevention of water absorption from the shotcrete into the masonry surface is critical. Surface should be pre-dampened with no glistening water.

CURING
Shotcrete, like concrete, must be properly cured so that its potential strength and durability are fully developed. This is particularly true for the thin sections, textured surfaces, and low water cement ratios associated with shotcrete. The best method for curing is keeping the shotcrete wet continuously for 7 days while maintaining a temperature over 40° F (4° C). Curing compounds are satisfactory for curing if drying conditions are not severe and where no additional shotcrete or paint is to be applied and the appearance is acceptable. Where the surface has a natural gun or flash finish, the liquid membrane curing compound should be applied heavier than on surfaces with a finer finish.

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.

### Table 1: Typical Laboratory Test Results for QUIKRETE® Shotcrete Wet Process Products

<table>
<thead>
<tr>
<th></th>
<th>Shotcrete Fine</th>
<th>Shotcrete MS Fine</th>
<th>Shotcrete MS Coarse</th>
<th>Shotcrete MS Fine w polypropylene fibers</th>
<th>Shotcrete MS Coarse w steel fibers</th>
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<tbody>
<tr>
<td>Compressive strength, ASTM C109 / ASTM C39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 day</td>
<td>1500 psi (10.3 MPa)</td>
<td>1750 psi (12.1 MPa)</td>
<td>1750 psi (12.1 MPa)</td>
<td>1750 psi (12.1 MPa)</td>
<td>2500 psi (17.2 MPa)</td>
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<tr>
<td>7 days</td>
<td>3050 psi (21.0 MPa)</td>
<td>3500 psi (24.1 MPa)</td>
<td>3500 psi (24.1 MPa)</td>
<td>3500 psi (24.1 MPa)</td>
<td>4000 psi (27.6 MPa)</td>
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<tr>
<td>28 days</td>
<td>5075 psi (35.0 MPa)</td>
<td>5500 psi (37.9 MPa)</td>
<td>5500 psi (37.9 MPa)</td>
<td>5500 psi (37.9 MPa)</td>
<td>7000 psi (48.3 MPa)</td>
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<td>Flexural strength, ASTM C78</td>
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<tr>
<td>1 day</td>
<td>250 psi (1.7 MPa)</td>
<td>350 psi (2.4 MPa)</td>
<td>350 psi (2.4 MPa)</td>
<td>350 psi (2.4 MPa)</td>
<td>450 psi (3.1 MPa)</td>
</tr>
<tr>
<td>7 days</td>
<td>500 psi (3.4 MPa)</td>
<td>600 psi (4.1 MPa)</td>
<td>600 psi (4.1 MPa)</td>
<td>600 psi (4.1 MPa)</td>
<td>700 psi (4.8 MPa)</td>
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<tr>
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<td>700 psi (4.8 MPa)</td>
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<td>700 psi (4.8 MPa)</td>
<td>1000 psi (6.9 MPa)</td>
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<td>Residual Strength, ASTM C1399</td>
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<tr>
<td>7 days</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>500 psi (3.4 MPa)</td>
</tr>
</tbody>
</table>

1Laboratory testing is conducted in accordance with ASTM C1480.