

SHOTCRETE WET PROCESS MS

PRODUCT No. 1228-57, -59

PRODUCT DESCRIPTION

QUIKRETE® Shotcrete Wet Process MS products are high performing, pneumatically applied concrete products designed for rehabilitation and new construction 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 MS Coarse 1228-57

50# QUIKRETE® Shotcrete Wet Process MS Fine 1228-59

PRODUCT USE

QUIKRETE® Shotcrete Wet Process MS products are designed for use as repair materials for bridges, tunnels, parking garages, ramps, beams, piers, sewer pipes and dams. They may be used in new construction projects as well. QUIKRETE® Shotcrete Wet Process MS products are well-proportioned blends of Portland cement, concrete sand (and gravel for the Coarse version), proprietary additives, and microsilica suitable for general-use construction. Advantages include high strength, improved sulfate resistance, high adhesion, low permeability, low rebound and low sag. Other performance levels are also available to meet specific jobsite requirements, including the addition of various fibers and/or integral corrosion inhibitors. Also available without microsilica.

SIZES

QUIKRETE® Shotcrete Wet Process MS products are packaged in 50 lb (22.6 kg) bags as well as 80 lb (36.2 kg) bags and 3000 lb (1361 kg) bulk 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: ~ 125 to 145 lb/ft³

TECHNICAL DATA

APPLICABLE STANDARDS

- ASTM C 39 *Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens*
- ASTM C 42 *Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete (AASHTO T24)*
- ASTM C 78 *Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)*
- ASTM C 109 *Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens)*
- ASTM C 157 *Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete*

DIVISION 3

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- ASTM C 231 *Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method*
- ASTM C 469 *Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression*
- ASTM C 496 *Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens*
- ASTM C 642 *Standard Test Method for Density, Absorption, and Voids in Hardened Concrete*
- ASTM C 666 *Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing*
- ASTM C 882 *Standard Test Method for Bond Strength of Epoxy Resin Systems Used with Concrete by Slant Shear*
- ASTM C 1012 *Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution*
- ASTM C 1202 *Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration*
- ASTM C 1399 *Standard Test Method for Obtaining Average Residual-Strength of Fiber Reinforced Concrete*
- ASTM C 1480 *Standard Specification for Packaged, Pre-Blended, Dry, Combined Materials for Use in Wet or Dry Shotcrete Applications*
- ASTM C 1583 *Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)*
- ASTM C 1604 *Standard Test Method for Obtaining and Testing Drilled Cores of Shotcrete*

PHYSICAL /CHEMICAL PROPERTIES

The performance of QUIKRETE® Shotcrete Wet Process MS products in the laboratory are not representative of field results. However, laboratory data is important for quality control purposes and for making comparisons between formulations. QUIKRETE® Shotcrete Wet Process MS products have been extensively tested both in the laboratory and in the field. The field test data are offered only as an example of what can be achieved with qualified operators using proper techniques. The quality of wet process shotcreting is very dependent on the skills of the operator. Table 1 shows typical laboratory data for QUIKRETE® Shotcrete Wet Process MS products. Typical field results for QUIKRETE® Shotcrete Wet Process MS products are shown in

Table 2. The QUIKRETE® Shotcrete Wet Process MS products in Tables 1 and 2 comply with either the requirements of ASTM C 1480 Type FA (Fine Aggregate) or Type CA (Coarse Aggregate). Additionally, QUIKRETE® Shotcrete Wet Process MS products comply with Grades GU (General Utility), SR (Sulfate-Resistant), and LP (Low Permeability). Consult a local QUIKRETE® representative for details.

MIXING

WEAR IMPERVIOUS GLOVES, such as nitrile when handling product. Mechanically mix QUIKRETE® Shotcrete Wet Process MS for 4 to 5 minutes using a mixer appropriate for shotcrete operations. Use approximately 3 to 3.5 quarts (2.8 – 3.3 L) of clean potable water per 50 lb (22.6 kg) bag of QUIKRETE® Shotcrete Wet Process MS Fine. Use approximately 2-1/2 to 3 quarts (2.3 – 2.8 L) of clean potable water per 50 lb (22.6 kg) bag of QUIKRETE® Shotcrete Wet Process MS Coarse. Adjust water, if needed, to achieve a place-able consistency. An excessive amount of water may cause reduction in performance of the product.

INSTALLATION

PREPARATORY WORK / SURFACE PREPARATION

QUIKRETE® recommends that job mock-ups be prepared by the contractor and tested prior to beginning a project. QUIKRETE® recommends that American Concrete Institute (ACI) Committee 506 procedures and recommendations be followed for surface preparation. This typically includes but is not limited to removing 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. Concrete surfaces receiving the Shotcrete material should be saturated surface-dry (SSD).

EQUIPMENT / METHODS / APPLICATION

QUIKRETE® recommends that American Concrete Institute (ACI) Committee 506 procedures and recommendations be followed for equipment selection, nozzleman certification, 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

Ensure the mix time utilized allows for the activation of the proprietary additives.

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. © 2020 Quikrete International, Inc.

TABLE 1: TYPICAL LABORATORY PROPERTIES

	Wet Process Shotcrete MS	Wet Process Shotcrete MS Coarse
Compressive Strength, ASTM C 109 (Modified) / C 39 (Modified)		
Age	PSI (MPa)	PSI (MPa)
1 Day	1750 (12.0)	1750 (12.0)
7 Days	3500 (24.1)	3500 (24.1)
28 Days	5500 (37.9)	5500 (37.9)

TABLE 2: TYPICAL FIELD APPLIED PROPERTIES

	Wet Process Shotcrete MS	Wet Process Shotcrete MS Coarse
Air Content, ASTM C 231 (Modified)		
Before Placement	12.5%	12.0%
After Placement	5.5%	5.5%
Compressive Strength, ASTM C 39		
Age	PSI (MPa)	PSI (MPa)
1 Day	4000 (27.5)	4000 (27.5)
3 Days	6000 (41.3)	6000 (41.3)
7 Days	7000 (48.2)	7000 (48.2)
28 Days	8000 (55.1)	8000 (55.1)
Flexural Strength, ASTM C 78		
Age	PSI (MPa)	PSI (MPa)
7 Days	900 (6.2)	900 (6.2)
28 Days	1000 (6.8)	1000 (6.8)
Length Change, ASTM C 157		
Age, Condition		
7 Days (Air)	≥ -0.02%	≥ -0.02%
28 Days (Air)	≥ -0.05%	≥ -0.05%
Modulus of Elasticity, ASTM C 469		
Age	PSI (GPa)	PSI (GPa)
28 Days	3.84 x 10 ⁶ (26.5)	3.84 x 10 ⁶ (26.5)
Split Tensile Strength, ASTM C 496		
Age	PSI (MPa)	PSI (MPa)
28 Days	900 (6.2)	900 (6.2)
Volume of Permeable Voids, ASTM C 642		
Age		
28 Days	10.5%	11.0%
Freeze Thaw Resistance, ASTM C 666		
After 300 cycles	≥ 95% DF	≥ 95% DF
Slant Shear Bond Strength, ASTM C 882 (Modified)		
Age	PSI (MPa)	PSI (MPa)
28 Days	≥ 2000 (13.7)	≥ 2000 (13.7)
Sulfate Resistance, ASTM C 1012 (Modified)		
ΔL% @ 26 Weeks	< 0.04%	< 0.04%
Rapid Chloride Ion Penetration, ASTM C 1202		
Age	coulombs	coulombs
28 Days	< 1000	< 1000