

3 | 03 62 13
Non-Metallic
Non-Shrink Grouting

MasterFlow[®] 928

Low dust, high-precision mineral-aggregate grout with extended working time

PACKAGING

55 lb (25 kg) polyethylene-lined bags
600 lb (272 kg) bulk bag
3,300 lb (1,500 kg) bulk bags

YIELD

One 55 lb (25 kg) bag of MasterFlow 928 grout mixed with 10.5 lbs (4.8 kg) or 1.26 gallons (4.8 L) of water (fluid consistency) provides approximately 0.50 ft³ (0.014 m³) of grout.

Note: The water requirement may vary due to mixing efficiency, temperature, and other variables.

STORAGE

Store in unopened containers in cool, clean, dry conditions

SHELF LIFE

55 LB BAG: 1 year when properly stored
600 LB BULK BAG: 3 months when properly stored.
3,300 LB BULK BAG: 3 months when properly stored

VOC CONTENT

0 g/L less water and exempt solvents

DESCRIPTION

MasterFlow 928 grout is a hydraulic cement-based mineral aggregate non-shrink grout with extended working time. It is ideally suited for grouting machines or plates requiring precision load-bearing support. It can be placed from fluid to damp pack over a temperature range of 45 to 90 °F (7 to 32 °C).

PRODUCT HIGHLIGHTS

- Meets the requirements of ASTM C1107 and US Army Corps of Engineers CRD C621 (Grades B and C), at a fluid consistency over a 30-minute working time
- 50% reduction of airborne dust for added worker comfort and safety
- NSF/ANSI 61 Std for use with potable water
- Pumpable
- Extended working time
- Can be mixed at a wide range of consistencies
- Freeze/thaw resistant making it suitable for exterior applications
- Hardens free of bleeding, segregation, or settlement shrinkage to provide maximum effective bearing area for optimum load transfer
- Contains high-quality, well-graded quartz aggregate for optimum strength and workability
- Sulfate resistant for marine, wastewater and other sulfate-containing environments

APPLICATIONS

- Grouting of equipment, such as compressors and generators, pump bases and drive motors, tank bases, conveyors, etc.
- Grouting anchor bolts, rebar and dowel rods
- Grouting of precast wall panels, beams, columns, curtain walls, concrete systems and other structural and non-structural building components
- Repairing concrete, including grouting voids and rock pockets
- Applications requiring a pump-able grout

SUBSTRATES

- Concrete

Technical Data

Composition

MasterFlow 928 is a hydraulic cement-based mineral-aggregate grout.

Compliances

- ASTM C 1107 and CRD 621, Grades B and C, requirements at a fluid consistency over a temperature range of 40–90 °F (4–32 °C)
- NSF/ANSI 61 Std for use with potable water

Test Data

PROPERTY	RESULTS	TEST METHOD
Compressive strengths, psi (MPa)		ASTM C 942, according to ASTM C 1107 of ASTM C 109
	Plastic¹	Consistency
		Flowable²
		Fluid³
1 day	4,500 (31)	4,000 (28) 3,500 (24)
3 days	6,000 (41)	5,000 (34) 4,500 (31)
7 days	7,500 (52)	6,700 (46) 6,500 (45)
28 days	9,000 (62)	8,000 (55) 7,500 (52)
Volume change		ASTM C 1090
	% Change	% Requirement of ASTM C 1107
1 day	> 0	0.0 – 0.30
3 days	0.04	0.0 – 0.30
14 days	0.05	0.0 – 0.30
28 days	0.06	0.0 – 0.30
Setting time, hr:min		ASTM C 191
	Plastic¹	Consistency
		Flowable²
		Fluid³
Initial set	2:30	3:00 4:30
Final set	4:00	5:00 6:00
Flexural strength,* psi (MPa)		ASTM C 78
3 days		1,000 (6.9)
7 days		1,050 (7.2)
28 days		1,150 (7.9)
Modulus of elasticity,* psi (MPa)		ASTM C 469, modified
3 days		2.82 x 10 ⁶ (1.94 x 10 ⁴)
7 days		3.02 x 10 ⁶ (2.08 x 10 ⁴)
28 days		3.24 x 10 ⁶ (2.23 x 10 ⁴)
Coefficient of thermal expansion,* in/in/°F (cm/cm/°C)		ASTM C 531
		6.5 x 10 ⁻⁶ (11.7 x 10 ⁻⁶)
Split tensile and tensile strength,* psi (MPa)		ASTM C 496 (splitting tensile) ASTM C 190 (tensile)
		Splitting Tensile
		Tensile
3 days		575 (4.0) 490 (3.4)
7 days		630 (4.3) 500 (3.4)
28 days		675 (4.7) 500 (3.4)
Resistance to rapid freezing and thawing, 300 Cycles		ASTM C 666, Procedure A
	Durability Factor > 90%	
Dust Reduction, %		DIN55992-2
MasterFlow 928 vs. Control	50%	

¹100–125% flow on flow table per ASTM C 230

²125–145% flow on flow table per ASTM C 230

³25 to 30 seconds through flow cone per ASTM C 939

*Test conducted at a fluid consistency

This data was developed under controlled laboratory conditions. Expect reasonable variations

Test Data (continued)

PROPERTY		RESULTS		TEST METHOD
Ultimate tensile strength and bond stress				ASTM E 488, tests*
Diameter in (mm)	Depth in (mm)	Tensile strength lbs (kg)	Bond stress psi (MPa)	
5/8 (15.9)	4 (101.6)	23,500 (10,575)	2,991 (20.3)	
3/4 (19.1)	5 (127.0)	30,900 (13,905)	2,623 (18.1)	
1 (25.4)	6.75 (171.5)	65,500 (29,475)	3,090 (21.3)	

*Average of 5 tests in ≥ 4,000 psi (27.6 MPa) concrete, using 125 ksi threaded rod in 2" (51 mm) diameter, damp, core-drilled holes.

- Notes
1. Grout was mixed to a fluid consistency.
 2. Recommended design stress: 2,275 psi (15.7 MPa).
 3. For more detailed information regarding anchor bolt applications, contact Technical Service.
 4. Tensile tests with headed fasteners were governed by concrete failure.

Jobsite Testing

If strength tests must be made at the jobsite, use 2" (51 mm) metal cube molds as specified by ASTM C 942 and the ASTM C 1107 modification of ASTM C 109. DO NOT use cylinder molds. Control field and laboratory tests on the basis of desired placement consistency rather than strictly on water content.

HOW TO APPLY

SURFACE PREPARATION

1. Steel surfaces must be free of dirt, oil, grease, or other contaminants.
2. Cure the foundation until design strength of the concrete is achieved and foundation is dry. Cure the foundation until design strength of the concrete is achieved and foundation is dry.
3. The surface to be grouted must be clean, SSD, strong, and roughened to a CSP of 5–10 following ICRI Guideline 310.2 to permit proper bond.
4. When dynamic, shear or tensile forces are anticipated, concrete surfaces should be chipped with a "chisel-point" hammer, to a roughness of (plus or minus) 3/8" (10 mm). Verify the absence of bruising following ICRI Guideline 210.3.
5. In lieu of mechanical surface preparation, MasterFinish EA 48 Deep surface retarder may be used on freshly placed concrete. Remove surface retarder after 24 hours by use of pressure washing to achieve an exposed aggregate finish. After pressure washing, regular curing practices should continue until design strength is reached.
6. Concrete surfaces should be saturated (ponded) with clean water for 8 hours or more depending on site conditions, prior to grouting.
7. All freestanding water must be removed from the foundation and bolt holes immediately before grouting.

8. Anchor bolt holes must be grouted and sufficiently set before the major portion of the grout is placed.
9. Shade the foundation from sunlight 24 hours before and 24 hours after grouting.

FORMING

1. Forms should be constructed to include a 1" chamfer strip at the top of the forms, be watertight, and non-absorbent. Seal forms with putty, sealant, caulk or polyurethane foam. Use sufficient bracing to prevent the grout from leaking or moving.
2. Moderately sized equipment should utilize a head box to enhance the grout placement.
3. Side and end forms should be a minimum 1" (25 mm) distant horizontally from the equipment to be grouted to permit expulsion of air and any remaining saturation water as the grout is placed.
4. Leave a minimum of 2" between the bearing plate and the form to allow for ease of placement.
5. Eliminate large, non-supported grout areas wherever possible.
6. Extend forms a minimum of 1" (25 mm) higher than the bottom of the equipment being grouted.
7. Expansion joints may be necessary. Consult your local Master Builders Solutions field representative for suggestions and recommendations.

TEMPERATURE

1. The ambient and initial temperature of the grout should be in the range of 45 to 90 °F (7 to 32 °C) for both mixing and placing. For precision grouting, store and mix grout to produce the desired mixed-grout temperature. If bagged material is hot, use cold water, and if bagged material is cold, use warm water to achieve a mixed-product temperature as close to 70 °F (21 °C) as possible.
2. If temperature extremes are anticipated or special placement procedures are planned, contact your local Master Builders Solutions representative for assistance.
3. When grouting at minimum temperatures, see that the foundation, plate, and grout temperatures do not fall below 40 °F (7 °C) until after final set. Protect the grout from freezing (32 °F or 0 °C) until it has attained a compressive strength of 3,000 psi (21 MPa) in accordance with ASTM C 109.

Recommended Temperature Guidelines for Precision Grouting

	MINIMUM °F (°C)	PREFERRED °F (°C)	MAXIMUM °F (°C)
Foundation and plates	45 (7)	50–80 (10–27)	90 (32)
Mixing water	45 (7)	50–80 (10–27)	90 (32)
Grout at mixed and placed temp.	45 (7)	50–90 (10–27)	90 (32)

MIXING

By using the minimum amount of water to provide the desired workability, maximum strength will be achieved. Mix the grout with a mortar mixer or an electric drill with a paddle such as ICRI 320.5 type A, D, E, F, G or H. Put the measured amount of potable water into the mixer, add grout, then mix till a uniform consistency is attained. Do not use water in an amount or a temperature that will cause bleeding or segregation. Note: The water requirement may vary due to mixing efficiency, temperature, and other variables.

1. Place estimated water (use potable water only) into the mixer, then slowly add the grout. For a fluid consistency, start with 9 lbs (4 kg) (1.1 gallon [4.2L]) per 55 lb bag.
2. The water demand will depend on mixing efficiency, material, and ambient-temperature conditions. Adjust the water to achieve the desired flow. Recommended flow is 25–30 seconds using the ASTM C 939 Flow-Cone Method. Use the minimum amount of water required to achieve the necessary placement consistency.
3. Moderately sized batches of grout are best mixed in one or more clean mortar mixers. For large batches, use ready-mix trucks and 3,300 lb (1,500 kg) bags for maximum efficiency and economy.
4. Mix grout between 3 and 5 minutes after all material and water is in the mixer until a homogenous consistency is achieved. Use mechanical mixer only.
5. Do not mix more grout than can be placed in approximately 30 minutes.
6. Transport by wheelbarrow or buckets or pump to the equipment being grouted. Minimize the transporting distance.
7. Do not retemper grout by adding water and remixing after it stiffens.
8. Do not add plasticizers, accelerators, retarders, or other additives.
9. For placements greater than 6" (152 mm) in depth, product should be extended with aggregate. Aggregate extension is dependent upon the grout type, placement, application requirements, and is typically required for placement depths beyond the limitation of the neat material. The aggregate should be washed, graded, saturated, surface-dry (SSD),

high-density, free from deleterious materials, and comply with the requirements of ASTM C 33. Consult Master Builders Solutions Technical Service for additional guidance.

PLACEMENT

1. Always place grout from only one side of the equipment to prevent air or water entrapment beneath the equipment. Place MasterFlow 928 in a continuous pour by use of a headbox or grouting pump. Discard grout that becomes unworkable. Make sure that the material fills the entire space being grouted and that it remains in contact with plate throughout the grouting process..
2. Immediately after placement, trim the surfaces with a trowel and cover the exposed grout with clean wet rags (not burlap). Keep rags moist until grout surface is ready for finishing or until final set.
3. The grout should offer stiff resistance to penetration with a pointed mason's trowel before the grout forms are removed or excessive grout is cut back. After removing the damp rags, immediately coat with a recommended curing compound compliant with ASTM C 309 or preferably ASTM C 1315.
4. Do not vibrate grout. Use steel straps inserted under the plate to help move the grout.
5. Minimum placement thickness is 1" (25 mm). Consult your Master Builders Solutions representative before placing lifts more than 6" (152 mm) in depth.

CURING

Cure all exposed grout with an approved membrane curing compound compliant with ASTM C 309 or preferably ASTM C 1315. Apply curing compound immediately after the wet rags are removed to minimize potential moisture loss.

WASTE DISPOSAL METHOD

This product when discarded or disposed of, is not listed as a hazardous waste in federal regulations. Dispose of in a landfill in accordance with local regulations. For additional information on personal protective equipment, first aid, and emergency procedures, refer to the product Safety Data Sheet (SDS) on the job site or contact the company at the address or phone numbers given below.

HEALTH, SAFETY AND ENVIRONMENTAL

Read, understand and follow all Safety Data Sheets and product label information for this product prior to use. The SDS can be obtained by visiting www.master-builders-solutions.com/en-us, e-mailing your request to mbsbscst@mbcc-group.com or calling 1(800)433-9517. Use only as directed. **IN CASE OF EMERGENCY: Call CHEMTEL +1 (800) 255-3924 or if outside the US or Canada, +1 (813) 248-0585.**

LIMITED WARRANTY NOTICE

Master Builders Solutions Construction Systems US, LLC (“Master Builders”) warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. MASTER BUILDERS MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of Master Builders. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. MASTER BUILDERS WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on Master Builders’ present knowledge and experience. However, Master Builders assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. Master Builders reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

FOR PROFESSIONAL USE ONLY. NOT FOR SALE TO OR USE BY THE GENERAL PUBLIC.

