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Epoxy
Grouting

MasterFlow[®] 678

Deep-pour multiple-use epoxy grout

FORMERLY MASTERFLOW 678 DP PLUS

PACKAGING

MasterFlow 678 is packaged in convenient premeasured units.

1 Unit consists of the following:

- 16.0 lb (7.257 kg) pail Part A
- 8.0 lb (3.629 kg) bottle Part B
- 4 x 54 lb (24.5 kg) bags Part C

YIELD

1.8 ft³ (0.05 m³)

STORAGE

Store in unopened containers at 60 to 80 °F (16 to 27 °C) in clean, dry conditions

SHELF LIFE

2 years (for both resin and hardener) when properly stored

VOC CONTENT

0 g/L less water and exempt solvents

DESCRIPTION

MasterFlow 678 is a low-exotherm, three-component epoxy grout for use where deep sections of epoxy grout must be placed with low heat generation.

PRODUCT HIGHLIGHTS

- Long working time helping to facilitate proper placement
- Low-dusting for added worker comfort and safety
- Excellent creep resistance, even at high temperatures increasing product performance over a wider temperature range
- Low exotherm resulting in minimal heat generation
- Superior adhesion for positive bonding characteristics to concrete and steel
- Can be placed in lifts of up to 18" thick without reinforcement making it ideal for deep pours

APPLICATIONS

- Deep-pour baseplate grouting
- Grouting of pump bases
- Setting of baseplates
- Grouting of compressors and drive motors
- Grouting of anchors, bars and dowels
- Rebuilding deteriorated curbs, bases and columns
- Repair of spalled concrete

Technical Data

Composition

MasterFlow 678 is a low-exotherm three-component epoxy.

PROPERTY	VALUE
Resin/hardener ratio, by weight	2 to 1
Density, lbs/ft ³ (kg/m ³)	125 (2,000)
Working time, min, 70 °F (21 °C)	90

Test Data

PROPERTY	RESULTS	TEST METHOD	
Initial set, hrs	10	Vicat, ASTM C 953	
Final set, hrs	11	Vicat, ASTM C 953	
Flow Times and Bearing Area (1" clearance)			
ASTM C 1339			
Back of Box 10 min.	Full Contact 11 min.	Bearing Area High (>85%)	
Compressive strength, psi (MPa)	77 °F (25 °C)	ASTM C 579, Method B, Load Rate II	
1 day	8,000 (55)		
7 days	13,000 (89)		
28 days	14,000 (96)		
Adhesion to concrete, psi (MPa)	2,000 (14)	Michigan DOT	
Adhesion to steel, psi (MPa)	4,000 (28)	Michigan DOT	
Coefficient of thermal expansion, in/in/°F	2.2 x 10 ⁻⁵	ASTM C 531	
Tensile strength, psi (MPa)	1,800 (12)	ASTM C 307	
Flexural strength, psi (MPa)	3,900 (27)	ASTM C 580	
Creep, in/in/° F	@ 140 °F (60 °C)	@140 °F (60 °C)	ASTM 1181
	400 psi (2.8 MPa)	600 psi (4.1 MPa)	
28 days	4.5 x 10 ⁻³	5.3 x 10 ⁻³	
Peak exotherm, °F (°C)	85 (29)		
1 Gal, 6 depth			

Test results are averages obtained under laboratory conditions. Expect reasonable variations. Unless otherwise noted, test samples were cured 7 days at 73 °F (23 °C) and 50% relative humidity.

HOW TO APPLY

SURFACE PREPARATION

FOUNDATION

1. Cure the foundation until design strength of the concrete is achieved and foundation is dry. Use the recommended procedure according to ACI 351.1R, Grouting Between Foundations and Bases for Support of Equipment and Machinery.
2. The surface to be grouted must be clean, strong, and roughened to a CSP of 5–9, following ICRI Technical Guideline No. 310.2

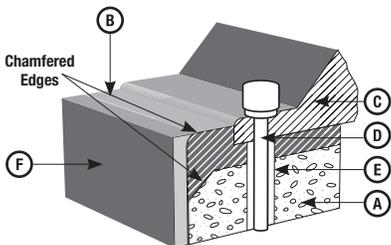
to permit proper bond. Do not use a bushing hammer.

3. Chamfer the edge of the concrete 45 degrees about a 2" (51mm) width.
4. If an anchor bolt sleeve is to be filled, be sure all water is removed. Use a siphon, vacuum pump, or rubber hose and bulb. Remove the residual moisture by either forced air or evaporation.
5. Seal the anchor bolt hole with felt, foam rubber, or other means.
6. Cover all shims and leveling screws with putty or clay to keep the grout from adhering. Use model clay, glazing putty, or anything with a putty consistency that will stick but not harden. Shims or jack pockets may be formed with wood, and forms filled with damp sand.
7. Remove shims or jack screws after the grout cures.
8. Shade the foundation from direct sunlight for at least 24 hours before and 48 hours after grouting.

surfaces of the base to be grouted; it must be free of coatings, wax, grease, or scale. Mechanical methods, such as grinding or sanding, will suffice, but do not produce as high a bond strength as sandblasting.

2. Primer should be used ONLY when a long delay between cleaning and grouting could allow excessive rusting or contamination. If the base must be primed, use MasterEmaco ADH 1090 RS. If the primer has been on the surface for more than 1 month, abrade and solvent wipe it so that no residue remains.
3. The grout should come up at least ¾" (19 mm) onto the equipment. Protect the area above it with masking tape.
4. To facilitate cleanup, wax or cover all surfaces where the grout may splash or spill.

Typical Installation



Key:

- A. Concrete Foundation
- B. MasterFlow 678
- C. Equipment Base
- D. Anchor Bolt
- E. Anchor Bolt Sleeve Seal
- F. Form (inside surface waxed)

EQUIPMENT

1. If rust scale is present, abrade the bonding

FORMING

1. Protect the foundation and equipment from rain or moisture. Water will prevent grout bond and inhibit cure.
2. Seal off areas that will not be grouted.
3. Place forms no greater than 6" (152 mm) away from the edge of the individual base rail or

sole-plate on the sides where the grout is not being poured. Excessive edges create thermal stress and result in excessive cracking. On the pouring side forms are typically 2–6" (51–152 mm) from the edge of the supporting area. However, this may vary depending on the application. Moderate to large-size equipment and difficult or narrow placement applications should utilize an extended head form (headbox) to create additional head pressure and to enhance placement. Consult your Master Builders Solutions representative for specific recommendations.

4. Before erecting the forms, cover them with extra-heavy coats of paste wax. Forms can be shellacked before waxing to improve release. Keep wax off concrete and steel surfaces. As an alternative to waxing, a polyethylene or other non-bondable film may be used as a release agent. The top of the form should extend at least ¾" (19 mm) above the bottom of the rail or plate.
5. Forms must be liquid tight. Seal forms to vertical concrete surface by applying putty, foam, or caulk below top of concrete and then press form into place.
6. Expansion joints will reduce the possibility of cracking. On multiple soleplate installations, each soleplate may be isolated. Expansion joints can be made with any material that is resistant to oils and chemicals in the environment and will not allow penetration to the concrete foundation. Oil resistant, closed-cell foam works best. For more information contact your Master Builders Solutions representative or Technical Service.

MIXING

1. Aggregate must be completely dry.
2. Precondition all components to 70 °F (21 °C) for 24 hours before using.
3. Pour the hardener (Part B) into a pail of grout resin (Part A) and stir by hand with a spatula or paint stir paddle until well mixed to a uniform amber color.
4. Pour the mixture into a horizontal shaft mortar mixer or a Kol type mixer without delay.
5. Add the grout aggregate, one bag at a time, and mix only until aggregate is completely wetted out to avoid air entrapment. The first batch may be slightly less fluid than later batches because some of the resin is retained on the walls of the mixer. Withholding ½–1 bag of aggregate from the first batch of a full unit will compensate for lost resin. Note: always add aggregate to the mixer after the premixed liquids have been poured in.

PLACEMENT

1. Pour the grout into a wheelbarrow or buckets for transporting to pour-site. Remove it from the wheelbarrow within 15 minutes.
2. For flat bottom plates and bases, pour the grout from one side through to the other across the short dimension.
3. When grouting closed areas, prevent air entrapment by starting at one end of the form and filling the cavity completely while advancing toward the other end.
4. Masterflow 678 grout will flow, but it can be aided with pushing tools like banding straps or plywood strips. Push with long, slow strokes rather than short jabs until no air pockets remain under the frames. DO NOT VIBRATE.
5. Where grout cannot be adequately worked to fill the cavity (because of large size or limited space), a head box will greatly assist flow. Use a sturdy wooden box or sheet metal funnel about 1–2 ft (0.3–0.6 m).
6. Check frequently for leaks. Leaks do not self-seal. If not stopped, they will cause voids.
7. If a multi-pour installation is necessary, sprinkle a small amount of MasterFlow 678 aggregate on the first pour's surface as the grout solidifies. Before placement of the second pour, brush the loose aggregate from the first pour's surface. Another method is to sandblast and brush clean the first pour's surface.

PUMPING MASTERFLOW 678

1. Condition all grouting materials as close to 70 °F (21.1 °C) as possible. If an accelerator is used, a grout temperature of 60–65 °F (15.6–18.3 °C) is acceptable.
2. Proper equipment is critical to successful pumping of epoxy grouts. Peristaltic and piston pumps are recommended.
3. Grout should be pumped through the shortest distance possible. The maximum distance should be limited to 50 ft (15.2 m)
4. For pumping distances greater than 10 ft (3 m), a 1-1/2 in (38 mm) diameter, PVC pipe should be used to convey grout from the pump outlet to the base of the equipment being grouted. A flexible, seamless, clear vinyl hose should be attached to the end of the PVC pipe to manipulate the grout into the grouting holes or around the forms.
5. Prime the pump and pump lines with the neat epoxy resin or vegetable oil. Never prime the pump and hose with water or any other material that can contaminate the epoxy grout. Purge the pump, pipe and hose of all priming material prior to pumping the grout.

6. Begin pumping with a three-bag mix, to ensure wet-out of the pump and lines. The aggregate loading should be increased on subsequent mixes in half bag increments until 4 bags of aggregate are being mixed for every unit of resin and hardener.
7. Once the grouting operation begins do not allow the pump to run out of material until the piece of equipment is completely grouted.
8. Install the tip of the pump line through the grout holes in the equipment or between the formwork and the baseplate. Try to keep the tip of the grout line in sight whenever possible. Keep the pump line submerged in the grout and slowly withdraw it as the grout fills up under the application area. Avoid creating air pockets at all times.
9. As the grout fills the space beneath the baseplate, and can be seen at the next grout hole or at the edge of the formwork on the opposite side, move the pump line to the next grout hole or down the length of the form and continue pumping.
10. The pump and hose should be cleaned every 1-1/2 to 2 hours. If cleaned more frequently, soap and water will be effective; otherwise, a citrus degreaser should be used and followed with a final flush using vegetable oil.
11. When the installation is complete, immediately clean the pump and lines. Contact the pump equipment manufacturer for additional information on the use and operation of their pumps.

CLEANUP

After the pour is complete, remove uncured epoxy from the mixer, wheelbarrow and tools with soap and water or a citrus degreaser. Cured material must be removed mechanically.

WORKING TIME

The following chart shows the working time for a fresh grout mix at various ambient temperatures. The working time begins when the hardener is added to the resin.

Working Time

TEMPERATURE, °F (°C)	MINUTES
90 (32)	50–60
70 (21)	90–120
50 (10)	120–150

Do not let resin and hardener stand without adding aggregate. This material produces an exothermic. If the material exotherms without aggregate, the temperature can cause decomposition or gassing, releasing potentially hazardous fumes. If the catalyzed resin cannot be used immediately, spread the material over a large open surface, which will allow the heat to dissipate normally. These working times assume product has been properly preconditioned for cold or hot weather use

COLD-WEATHER CURING

For cold weather grouting use Masterflow 640 Accelerator. Refer to the Masterflow 640 Accelerator data sheet.

1. The foundation and the equipment base will probably be cooler than room temperature unless room temperature has been constant for some time. Use the foundation and engine temperature, therefore, in estimating cure time.
2. Temperatures vary so radically, day vs. night, atmospheric vs. metal surface, that field judgment must still be used as the final measure. Cured grout should have a solid, almost metallic feel when struck with a hammer. Be sure to check as close to the base of the equipment as possible.

HOT-WEATHER GROUTING

1. Special care must be exercised when grouting at elevated temperatures, to reduce risks of premature hardening and subsequent cracking.
2. If the packaged grout is above 90 °F (32 °C), chill the sealed pails of grout resin in a tub of ice or cover the pails with water-soaked burlap to cool the grout to 70 °F (21 °C)
3. Provide shade from direct sunlight for at least 24 hours before and 48 hours after grouting.

COLD-WEATHER GROUTING

1. Temperatures below 60 °F (16 °C) make the grout stiff and hard to handle and significantly increase the cure time. The baseplate and foundation may be much cooler than room temperature. In cold weather, store materials in a warm place. For best handling, the temperature of the grout components and mixing equipment should be at least 70 °F (21 °C).
2. When baseplate and foundation temperatures (measured by a contact thermometer) are less

than 50 °F (10 °C), heating of the area may be necessary.

3. If heating is required, erect an enclosure around the equipment and foundation to be grouted. Forced air or infrared heaters may be used to obtain the necessary heat to increase the baseplate and foundation temperatures to 50 to 70 °F (10 to 21 °C). Avoid local hot spots. Apply heat 1–2 days in advance of grouting to achieve uniform baseplate and foundation temperatures. Avoid exposure to exhaust from heating equipment. Remove heat during grout placement.
4. For temperatures from 40 to 50 °F (4 to 10 °C), consider using Masterflow 640 Grout Accelerator to accelerate strength development.

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 mbsbcst@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.

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.

FOR BEST PERFORMANCE

- Do not add solvent, water, or any other material to the grout.
- Do not alter the resin or hardener proportions.
- Contact your local representative for a pre-job conference to plan the installation.
- For guidelines on specific anchor-bolt applications, contact Technical Service.
- Substrate temperature must be greater than

50 °F (10 °C).

- Cold material will exhibit decreased flowability and reduced strength development.
- Minimum placement thickness is 1" (25 mm). Consult your Master Builders Solutions representative before placing lifts more than 6" (152 mm) in depth.
- Chamfering the concrete edge helps reduce thermal cracking. Following proper installation procedures also reduces the potential for cracking.
- For professional use only; not for sale to or use by the general public.
- Make certain the most current versions of product data sheet and SDS are being used; visit www.master-builders-solutions.com/en-us to verify the most current versions.
- Proper application is the responsibility of the user. Field visits by Master Builders Solutions personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

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