



The Chemical Company

PRODUCT DATA

3 03 01 23 Maintenance of Stressing Tendons

MASTERFLOW® 816

Aggregate-free cable and duct grout

Description

Masterflow® 816 cable grout is a hydraulic, cement-based aggregate-free grout. It produces a fluid, pumpable, nonshrink, nonbleeding, high-strength product with extended working time. It provides corrosion protection for highly stressed steel cables, anchorages, and rods, and has a wide range of other applications. Masterflow® 816 cable grout meets the compressive strength and nonshrink requirements of CRD C 621 and ASTM C 1107 at a fluid consistency.

Yield

One 55 lb (25 kg) bag of Masterflow® 816 mixed at 72° F (22° C) with 16.7 lbs or 2 gallons (7.6 kg or 7.58 L) of water produces approximately 0.60 ft³ (0.017 m³) of fluid grout at a 20 – 30 second flow (Corps of Engineers Flow Cone Method, CRD C 611 or ASTM C 939).

Packaging

55 lb (25 kg) multi-wall paper bags

Shelf Life

6 months when properly stored

Storage

Store in unopened packaging in a clean, dry, cool environment (70° F [21° C]) away from heat or sunlight.

Features

- Pumpable
- Hardens without bleeding
- Hydraulic, cementitious materials
- Free of fine aggregate
- Long working time and recirculation possible at temperatures up to 90° F (32° C)
- Hardens without settlement shrinkage or voids

Benefits

- For rapid installation
- Eliminates voids that often cause post-tensioned failures
- Surrounds and protects tendons from corrosion
- Maximum penetration into small spaces, between wire strands
- Reduces jobsite and grouting delays
- Ensures maximum bond and protection against water and corrosion

Where to Use

APPLICATION

- Pumping around pre-tensioned or post-tensioned cables and rods
- Placing around end sections of unanchored cables and rods
- Nonshrink grouting in restricted spaces between precast wall panels, beams, and columns
- Grouting cable anchor plates where grout contacts highly stressed anchorages
- Conventional grouting applications with clearances over 1/4" (6 mm) but under 1" (25 mm)
- Vacuum grouting for repair of voids in previously grouted post-tensioned tendons
- Inclined and horizontal post-tensioned tendons

How to Apply

Surface Preparation

1. Clean cables and strands of all oxidation, dirt, oil, or any loose materials. Ducts should be clean and free of any defects or leaking.
2. Check proposed method of mixing and pumping to ensure continuous placement once pumping starts. Have a source of high-pressure water with connections for flushing grout hoses or partially grouted ducts in case the pumping must be interrupted.
3. Test the pump and grout lines with water or pressurized oil-free air to confirm they are capable of providing and withstanding the required pressure. Verify that all connections are tight, without leaks. Loss of water from slow or nonmoving grout can result in a blocked line.



Technical Data

Composition

Masterflow® 816 cable grout is a hydraulic, cement-based aggregate-free grout.

Test Data

PROPERTY	RESULTS	TEST METHODS
Compressive strengths, psi (MPa), 2 by 2" (51 by 51 mm) cubes, cured at 72° F [22° C], 25 second flow		Fluid consistency specified by ASTM C 942, according to ASTM C 1107*
1 day	3,300 (22)	
3 days	6,000 (41)	
7 days	7,000 (48)	
28 days	8,500 (58)	

* 25 – 30 second flow by Corps of engineers Flow cone Method CRD-C 611

The data shown are based on controlled laboratory tests. Compressive strength cubes were cured in sealed molds until tested. Expect reasonable variations from the results shown. Control field and laboratory tests on the basis of the desired placing consistency rather than strictly on water content.

If the work requires that strength tests be made at the jobsite or in the laboratory, do not use cylinder molds. Use 2" (51 mm) metal cube molds as specified by ASTM C 942 or ASTM C 1107.

4. Provide plug, ball, or gate valves at the pump outlet, at the inlet ends of vertical cable ducts, and at both ends of the horizontal ducts. Draped tendons typically also require venting at the crests and troughs as well as slightly uphill of crests. Also use a valved by-pass hose or pipe from the pump discharge line back to its hopper. This will ensure uninterrupted recirculation from pump to hopper during connection changes and other pumping delays. See the Post-Tensioning Institute "Guide Specification for Post-Tensioned Grouting" for more complete information.

5. The inside diameter of the pipe, hose, and valves through which Masterflow® 816 is pumped should be at least 1/4" – 2" (6 – 51 mm) consistently throughout the system. Avoid connector elbows if possible.

6. The pump lines, ducts, and grout lines should be flushed with high pH lime-saturated water to lubricate and create a temperature equilibrium in the ducts. Blow out the water before grouting. The oncoming grout will displace and discharge any remaining water at the outlet end before accessing the air-free mixed grout. Collect the lime-saturated water and use as mix water, if needed. Discard the transitional grout.

Temperature

The recommended temperature range of the mixed grout should be 40 to 90° F (4 to 32° C). The duct temperatures should also be within the same temperature range. Follow special precautions for hot or cold weather. Higher temperatures increase the amount of mixing water needed for a given fluidity and limit working time. Lower temperatures induce bleeding, retard set, and impede early strength gain, but permit reducing the mixing-water content for a given fluidity and increase ultimate strength.

HOT-WEATHER GROUTING

When duct temperatures are above 90° F (32° C), employ techniques to produce a lower mixed-grout temperature. Cool bags of Masterflow® 816 by storing them in a shaded or cool area. Use cold potable water to obtain the proper temperature for the mixed grout. If ice chips are used to cool the mixing water, it is essential that a 1/8" mesh screen be placed over the pump hopper to remove any unmelted ice. Do not cool the grout temperature below 50° F (4° C). Circulating cold water can also cool ducts. Lime (Ca OH₂) can be added to the circulating water to increase pH; this will help passivate the steel and reduce the potential for steel oxidation before grouting.

COLD-WEATHER GROUTING

When duct temperatures are 40° F (4° C), the temperature of the mixed grout should be increased by mixing in warm potable water. Ducts can be heated by circulating warm water throughout ducts. Lime (Ca OH₂) may be added to the mixing water to increase pH and lubricate duct. Do not exceed 90° F (32° C) temperatures when warming both the mixed grout and the duct.

Mixing

1. Masterflow® 816 cable grout is a ready-to-use product requiring only the addition of potable water. Normal mixing water content is determined by the standard ASTM C 939 Grout Efflux Time of 20 – 30 seconds immediately after mixing and attaining "0" bleeding in the Post-Tensioning Institute modified ASTM C 940-based Wick Induced Bleeding Test, using the specified mixer for mixing the grout at the job. Consult your BASF representative for special mixing instructions.

2. Do not use water in an amount or at a temperature that will produce a flow of less than 20 seconds on the flow cone (ASTM C 939) or cause mixed grout to bleed or segregate. Jobsite conditions such as the size and complexity of the grouted space, pumping line diameters, height, mixing and pumping methods, and temperatures are all factors that determine the actual amount of water needed.

3. Have one or more mixers available with the capacity to allow mixing and pumping to proceed simultaneously and continuously.

4. Place water in the mixer first, then steadily add the grout with mixer operating. Mix until the grout is homogeneous and free of lumps, approximately 1 – 2 minutes, scraping all of the dry material from the mixer sides. Convey the mixed grout into the pump surge hopper and pass through a screen with 0.125 – 0.188" (3 – 5 mm) openings to catch possible lumps; then start pumping grout, after verifying grout efflux, into the duct.

NOTE: Do not mix more grout than can be placed through a pump in 30 – 45 minutes, depending on temperature.

Application

Place Masterflow® 816 cable grout in accordance with section C5.6.3 Grouting Operations, as stated in the "Guide Specification for Grouting of Post-Tension Structures" prepared by the PTI Committee on Grouting Specifications.

Curing

Cure all exposed grout areas by wet curing for 24 hours with clean, wet rags (do not use burlap), followed by the application of an ASTM C 309 or preferably ASTM C 1315-compliant curing compound. In cold weather, keep grout temperature above 40° F (4° C) until final set. Thereafter, keep temperature above freezing until the grout attains a compressive strength of 1,500 psi.

For Best Performance

- The water demand depends on mixing efficiency and material and ambient temperatures. Use the minimum amount of water required to achieve the necessary placement consistency.
- Do not add plasticizers, accelerators, retarders, or other additives unless advised in writing by BASF Technical Service.
- Hold a pre-job conference with your local representative to plan the installation. Hold conferences as early as possible. Conferences are important for applying the recommendations in this product data sheet to a given project, and they help ensure a placement of highest quality and lowest cost.
- The walls of the space being grouted should be between 40 and 90° F (4 and 32° C) and should be saturated for optimum results.
- Do not use mixing water in an amount or at a temperature that will produce a flow of less than 20 seconds (CRD C 611 or ASTM C 939) or cause the mixed grout to bleed or segregate. For temperatures outside this range, consult your local BASF representative.
- BASF is not responsible for corrosion caused by ingredients in the flushout, saturation, or mixing water or by contaminants in the space being grouted or in other materials used in the system.
- Make certain the most current versions of product data sheet and MSDS are being used; call Customer Service (1-800-433-9517) to verify the most current versions.
- Proper application is the responsibility of the user. Field visits by BASF personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

Health and Safety

MASTERFLOW® 816

WARNING!

Masterflow® 816 contains silica, crystalline quartz; portland cement; anhydrite; limestone; calcium oxide; silica, amorphous; iron oxide; magnesium oxide.

Risks

Product is alkaline on contact with water and may cause injury to skin or eyes. Ingestion or inhalation of dust may cause irritation. Contains small amount of free respirable quartz which has been listed as a suspected human carcinogen by NTP and IARC. Repeated or prolonged overexposure to free respirable quartz may cause silicosis or other serious and delayed lung injury.

Precautions

Avoid contact with skin, eyes and clothing. Prevent inhalation of dust. Wash thoroughly after handling. Keep container closed when not in use. DO NOT take internally. Use only with adequate ventilation. Use impervious gloves, eye protection and if the TLV is exceeded or used in a poorly ventilated area, use NIOSH/MSHA approved respiratory protection in accordance with applicable Federal, state and local regulations.

First Aid

In case of eye contact, flush thoroughly with water for at least 15 minutes. In case of skin contact, wash affected areas with soap and water. If irritation persists, SEEK MEDICAL ATTENTION. Remove and wash contaminated clothing. If inhalation causes physical discomfort, remove to fresh air. If discomfort persists or any breathing difficulty occurs or if swallowed, SEEK IMMEDIATE MEDICAL ATTENTION.

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 Material Safety Data Sheet (MSDS) on the job site or contact the company at the address or phone numbers given below.

Proposition 65

This product contains material listed by the State of California as known to cause cancer, birth defects or other reproductive harm.

VOC Content

0 g/L or 0 lbs/gal less water and exempt solvents.

**For medical emergencies only,
call ChemTrec (1-800-424-9300).**

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