

## Aggregate free grout

### DESCRIPTION

**Masterflow 816** is a ready-to-use aggregate free grout specially formulated for applications that require a fluid, shrinkage compensating grout where clearances are shallow, and the grouting of tensioned cables and rods stressed above 550MPa.

### RECOMMENDED FOR

- shrinkage compensated grouting in restricted spaces between precast wall panels, beams and columns where grout will be in contact with highly stressed steel
- grouting of anchor bolts, rods and pipes where the annular space is too small for conventional aggregate containing grouts (clearances of 6 to 25mm)
- repairs to concrete, such as cracks and honeycombing, filling small voids
- pumping into areas around pre-tensioned or post-tensioned cables and rods to encapsulate the steel and protect it against corrosion, and to provide maximum anchorage
- placing around end sections of unanchored cables and rods to provide anchorage for subsequent tensioning
- grouting cable anchor plates or other types of plates where grout will be in contact with highly stressed anchorages

### FEATURES & BENEFITS

- ***an aggregate free grout that can be pumped into areas inaccessible to conventional grouts or grouting methods***
- ***an easy to pump or pour grout that hardens without bleeding or settlement shrinkage***
- ***a grout that can be pumped and/or recirculated for relatively long periods of time***
- ***a grout that develops high strength at fluid consistency and meets the compressive strength and non shrink requirement of CRD-C 621 and ASTM C-1107***
- ***a formulation of specially selected, hydraulic, cementitious, shrinkage-compensating materials that enhances flow and protects stressed tendons, bolts or bars from the threat of corrosion, a grout that hardens without shrinkage within the sheath or hole ensuring maximum bond and protection against ingress of water while in service***

### PERFORMANCE DATA

Typical Compressive Strengths of 50mm cubes cured at 22°C, 25 second flow, high fluidity per CRD-C 621 or ASTM C-1090.

Age	Strength (MPa)
1 day	22
3 days	41
7 days	48
28 days	58

**NOTE:** The data shown is based on controlled laboratory tests. Compressive strength cubes were cured in sealed moulds until tested. Reasonable variations from the results shown above can be expected. Field and laboratory tests should be controlled on the basis of the desired placing consistency rather than strictly on water content.

### APPLICATION DIRECTIONS

These suggestions represent generally accepted procedures for successful installations. They may be followed, modified or rejected by the owner, engineer, contractor or their representatives since they, and not Master Builders Technologies are responsible for planning and executing procedures appropriate to a specific application under the prevailing site conditions.

### Preparation

Clean cables and ducts of all oil, grease, dirt, loose particles or coatings that may interfere with grout contact or bond, react unfavourably with portland cement or attack the steel after stressing. Cables should be free of oxidation.

Check proposed method of mixing and pumping grout to ensure continuous placement occurs once pumping starts. It is recommended to have a source of high pressure wash water with connections for flushing out grout hoses or partially grouted cable ducts in the event the pumping is interrupted.

Test the pump and grout lines with water to make sure they are capable of providing and withstanding the required pressure, and to see that all connections are drip-tight. Loss of water from slow or non-moving grout can result in a blocked line.

Ball or gate valves, or plugs, should be provided at the pump outlet, at the inlet ends of vertical cable ducts and at both ends of the horizontal ducts. Also, a valved by-pass hose or pipe from the pump discharge line back to its hopper is strongly recommended. This is so that grout recirculation from pump to hopper can be maintained during connection changes and other pumping delays.



The inside diameter of pipe, hose and valves through which **Masterflow 816** is to be pumped should be at least 19mm to 50mm I.D. Piping should be designed to meet the requirement of the proposed pumping rate, height and distance. The grout line should be the same size or larger than the opening at the end of the duct. Reductions at connections should be discouraged but, if made, should be made smoothly through tapered fittings without abrupt changes or sharp edges. Avoid elbows and any line restrictions where grout is to be pumped through a hose, pipe or placed along with wires, rods or stands.

## Temperature

The recommended temperature range of the grout as mixed and of the hole or duct into which the grout is to be pumped is 10°C to 24°C. Higher temperatures increase the amount of mixing water needed for a given fluidity of the grout and limit working time. Lower temperatures retard set and early strength gain but permit reduced mixing water content for a given fluidity and, thus, increase ultimate strength.

When ambient and/or duct temperatures are above 38°C, consider mixing the grout at as cool a temperature as possible, but not below 10°C. Ducts should be cooled by circulating cold water. Cool the bags of **Masterflow 816** by storing them in a shaded area or a cool place, and use cold or iced water for mixing the grout.

## Water Demand

Actual amount of water required will depend on desired consistency for the job and temperature (both ambient and grout). **Masterflow 816** is designed to be placed at fluid consistency (20 to 30 seconds on the flow cone, CRD-C 611 or ASTM C 939). As a guide, 20kg of **Masterflow 816** placed at 23°C requires approximately 6.6 litres of water to provide a fluid grout.

DO NOT USE WATER IN AN AMOUNT OR AT A TEMPERATURE THAT WILL CAUSE THE MIXED GROUT TO BLEED OR SEGREGATE.

## Mixing

Jobsite conditions such as the size and complexity of the space to be grouted, pumping line diameters, height, mixing and pumping methods, and temperatures are factors which determine the actual amount of water needed. It is advisable to make the initial batch more fluid than required in order to lubricate the pump and grout lines, but do not continue with the more fluid grout for longer than necessary.

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

Place water in the mixer first, then, with the mixer operating, steadily add **Masterflow 816**. Mix for 2 to 3 minutes until the grout is uniform and essentially free of lumps. Pour grout into pump hopper through a screen with 3mm openings to catch lumps and start pumping.

**CAUTION:** Some high-speed, shear mixers require only 20 to 30 seconds to mix the grout, after which the grout must be immediately transferred to a slow speed agitator for holding until it is pumped. Failure to do so will cause the grout to overheat and cause loss of flow.

Do not mix more grout than can be put through the pump in 10 to 15 minutes. Grout that becomes unworkable should be discarded.

## Pumping

Before mixing grout, fill pump hopper with water and pump through grout lines to wet the pump, hose and pipe. Close valve at the end of the line, run pressure to above expected level and check for leaks. Then pump water out until pump hopper is empty. Make sure free water from pump lines has been removed before grout placement.

Pour mixed grout into pump hopper through a screen with 3mm openings. Start pump, then catch and dispose of discharge until proper grout mixture flows out.

For vertically drilled anchor holes: pre-saturate holes for 24 hours prior to grouting. Then remove free water just before grouting.

## ESTIMATING DATA

20kg of **Masterflow 816** when mixed to fluid consistency produces approximately 13.6 litres (0.0136m<sup>3</sup>) of grout.

## CURING

Cover any exposed grout with wet rags for 24 hours. Coat with **Masterkure 402** curing compound after removal of wet rags. In cold weather, keep grout temperatures above 4°C until after final set. Thereafter keep grout temperature above freezing until a compressive strength of 28MPa is achieved.

## STORAGE LIFE

**Masterflow 816** has a shelf life of approximately 18 months when stored in a cool dry environment.

## PACKAGING

**Masterflow 816** is packaged in 20kg moisture resistant bags.



## PRECAUTIONS

- 1) Do not use:
  - where concrete or rock surfaces with which the grout will be in contact cannot be presaturated.
  - for the precision grouting of heavy operating machinery, crane rails, structural plates and column bases, except for repairs where grout will be pumped into small clearances, i.e., less than 25mm.
- 2) Master Builders Technologies is not responsible for stress corrosion caused by contaminants in the water, in the space to be grouted or by other materials in the system.
- 3) **Masterflow 816** is not toxic, but as with other materials containing Portland cement it has an alkaline nature and thus can be irritating to skin and eyes. Wear simple dust mask and gloves when handling. Keep out of reach of children. Wash off splashes of grout with clean water. If irritation persists, seek medical advice. For safety directions refer to material safety data sheet.

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### STATEMENT OF RESPONSIBILITY

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### NOTE

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