MasterFlow® 980

High strength, shrinkage compensated cementitious micro concrete

DESCRIPTION

MasterFlow 980 is a ready to use product in powder form, which requires only the on-site addition of water to produce a shrinkage compensated micro concrete of predictable performance.

The larger size aggregate of **MasterFlow 980** permits precision grouting of thicknesses >80mm between bedplate and foundation and is especially suitable in high ambient temperatures.

TYPICAL APPLICATIONS

MasterFlow 980 is formulated for use at any consistency from fluid to damp-pack, and may be used with confidence for bedding, grouting and precision bearing operations such as:

- Gas or steam turbines
- Generators
- Presses
- Crane rails
- Milling machines
- Precast elements
- Anchor bolts
- Repair and reprofiling of bored piles

ADVANTAGES

- Shrinkage compensated.
- Formulated for deep section grouting.
- Proven and predictable performance.
- Excellent workability retention even at high ambient temperatures.
- High bond strength to steel and concrete.
- Early strength development even at fluid consistency.
- Good fatigue and impact resistance.
- Micro silica content enhances strength and durability.
- Low heat gain.

PACKAGING

MasterFlow 980 is supplied in 25kg bags.

APPLICATION PROCEDURE

PREPARATION:

The surface onto which the grout is to be applied should be scabbled to remove laitance and expose aggregate. Do not use bush hammers or similar preparation equipment that can crush the aggregate but leave it in place. The surface must be free of oil, dust, dirt, paint, curing compounds, etc. Soak area to be grouted with water for 24 hours prior to grouting to minimise localised absorption and to assist in the free flow of the grout. Surfaces should be damp but free of standing water. Particular attention should be paid to bolt holes to ensure that these are water-free. Use oil free compressed air to blow out bolt holes and pockets as necessary.

Base plates, bolts, etc. must be clean and free of oil, grease, paint, residual curing compound or other contaminants that could impair adhesion. Set and align equipment. If shims are to be removed after the grout has set, then lightly grease them for easy removal.

Ensure formwork is secure and watertight to prevent movement and leaking during the placing and curing of the grout. The area should be free of excessive vibration. Shut down adjacent machinery until the grout has hardened.

MIXING:

Damp down the inside of the grout mixer with water prior to mixing the initial batch of **MasterFlow 980.** Ensure the mixer is damp but free of standing water. Add 90% of the pre-measured quantity of water. Slowly add the **MasterFlow 980** mixing continuously. Mix for two minutes until a smooth, uniform, lump free consistency is achieved, then add the remaining water and mix for a further 3 minutes.

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PLACING:

Lengths of metal strapping laid in the formwork prior to placing may be necessary to assist grout flow over large areas and in compacting and eliminating air pockets. Pour the grout continuously. Maintain a constant hydrostatic head, of at least 15 cm.

On the side where the grout is to be poured, allow 10 cm clearance between the side of the form and the base plate of the machine.

On the opposite side allow at least 10cm clearance between the formwork and the base plate to allow the grout to flow through without entrapping air.
MasterFlow grouts are suitable for use with most types of pumping equipment.
Immediately after placing **MasterFlow 980** grout, cover all exposed grout with clean damp hessian and keep moist until grout is firm enough to accept a curing membrane. We recommend the use of a curing membrane from our **MasterKure** range.

SHOULDERS

Due to differences in temperature between the grout under the base plate, and exposed shoulders that are subject to more rapid temperature changes, debonding and / or cracking can occur. Avoid shoulders wherever possible.
If shoulders are required they should be firmly anchored with reinforcing to the substrate to prevent debonding.

TYPICAL WATER REQUIREMENTS

Application	Consistency	Flow Table$	Mix Water litres/ 25kg min	max
Grouting machinery	Fluid	-	3.25	3.5
Grouting machinery	Flowable	130	2.8	3.25
Bedding Precast	Plastic	60	2.0	2.5
Filling Tie bar voids	Dry pack	-	1.5	1.75

$:ASTMC230/ASTMC827

FLOWABLE GROUTING TECHNIQUES

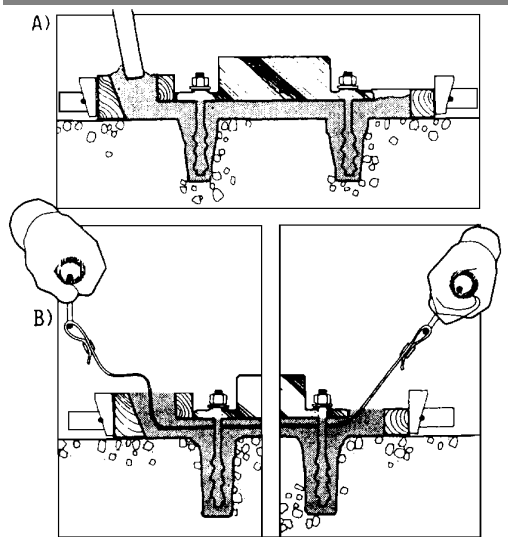

Diagram A illustrates the use of grout surcharge to ensure complete filling under a base.
Diagram B shows that straps can be used to aid grout flow under a wider base. A gentle “sawing” action with the strap allows the grout to flow without segregation for greater distances.

TYPICAL PROPERTIES

STRENGTH DEVELOPMENT:

The strength of grout is dependent on many factors which include mixing, water addition, curing, temperature and humidity. The table below gives typical average strengths of **MasterFlow 980** at 25°C, when mixed with 2.8 ltrs (flowable) & 3.5 litres (fluid) per 25kg bag.

	Compressive Strength Flowable N/mm2	Fluid N/mm²	Flexural Strength Fluid N/mm²
Time			
1 day	40	25	-
3 days	55	35	-
7 days	65	45	7
28 days	80	60	9

BLEED WATER:

No bleed water is apparent (ASTM C-232) at recommended water addition rates.

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EXPANSION:

Tests were made following both ASTM Standard C-878, on the use of expansive cements and Corps of Engineers Standard for grout. Tests made as prescribed by ASTM Standard C-878 show an expansion value of about 0.05%. Tests in conformity with Corps of Engineers show an expansion value of 0.3% that is lower than the maximum value (0.4%) fixed by the same standards. Moreover, **MasterFlow 980** expansion occurs both in the plastic and in the early hardened state. However, the expansion action of **MasterFlow 980** exhausts mainly during the first 12 hours of curing.

MODULUS OF ELASTICITY

The static modulus of elasticity, measured by applying a load corresponding to $^1/_3$ of the strength, is approximately 30,000 N/mm² at 28 days.

FATIGUE RESISTANCE:

Cube samples, produced with **MasterFlow 980** and cured 28 days, underwent fatigue tests of 2,000,000 pulsing stresses ranging between 20 and 50 N/mm² at a frequency of 500 cycles/min. Tested specimens were undamaged and their compressive strength was higher than that of similar specimens that were not subjected to fatigue tests.

BOND TO CONCRETE

Typical direct tensile “pull off” testing indicates a bond to concrete in the region of 2-4Mpa.

WORKABILITY

Tests were made using ASTM C-230 apparatus and compliance with CRD-C-611 was exceeded within recommended water addition rates for plastic and flowable consistencies.

CAPILLARY PORES AND PERMEABILITY

Even under a pressure of 20 atm, water does not penetrate **MasterFlow 980** specimens. The permeability factor is calculated to be therefore lower than 1.10^{-12} cm/sec.

RESISTANCE TO CHEMICAL ATTACK

Due to its watertightness, **MasterFlow 980** grout is protected against environmental aggressive agents in solution.

RESISTANCE TO HIGH TEMPERATURE:

MasterFlow 980 grouts can withstand high temperature (+400°C) for very long periods without substantial deterioration.

RESISTANCE TO LOW TEMPERATURE:

After 300 freezing and thawing cycles, the modulus of elasticity decreases only 5%. This indicates that **MasterFlow 980** is highly resistant to the disrupting action of frost.

STORAGE

Store out of direct sunlight, clear of the ground on pallets protected from rainfall. Avoid excessive compaction. Shelf life is 12 months when stored as above.
Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice consult BASF's Technical Services Department.

PRECAUTIONS

The temperature of both the mixed grout and elements coming into contact with the grout should be in the range of +5°C to <35°C. Do not use water in an amount or at a temperature that will produce a consistency more than fluid or cause mixed grout to bleed or segregate.

MasterFlow 980 is formulated for thicknesses above 80mm, however it is suitable for use at a minimum thickness of 15mm. For applications below 80mm consider the use of **MasterFlow 928** and for applications below 10mm consult BASF's Technical Services Department for advice.
To simulate on-site conditions it is necessary to restrain cubes for the first 24 hours immediately after casting.
DO NOT OVERWORK AND AVOID USING MECHANICAL VIBRATION.

UNDER NO CIRCUMSTANCES SHOULD MASTERFLOW® 980 T BE RETEMPERED BY THE LATER ADDITION OF WATER.

It is essential that a mechanically powered grout mixer is used to obtain the optimum properties.

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YIELD / CONSUMPTION

12.6 litres / 25kg bag at 3.5 litres water addition.
79 x 25kg bags / m³.

NOTE

The fatigue and impact resistance of **MasterFlow 980** grout is exceeded only by the metallic reinforced, non-catalysed **MasterFlow 4800** grout. The specially prepared metallic aggregate in this product contributes to impact resistance, a desirable property of grout to be subjected to severe dynamic operating forces and repetitive loading such as found in steel and aluminium rolling mills, crane rails, heavy presses, etc.
When a very rapid set is required in areas subject to chemical spillage or contamination, use epoxy grouts **MasterFlow 400** or **MasterFlow 648**.

For additional information on **MasterFlow 980** grout or other shrinkage compensated grouting materials, contact your BASF representative.

SAFETY PRECAUTIONS

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs (which may also be tainted with vapour until product is fully cured). Treat splashes to eyes and skin immediately. If accidentally ingested, seek immediate medical attention. For further information, refer to material safety data sheet.

NOTE

Field service, where provided, does not constitute supervisory responsibility. For additional information contact your local BASF representative.
BASF reserves the right to have the true cause of any difficulty determined by accepted test methods.

QUALITY AND CARE

All BASF Products are manufactured under a management system independently certified to conform to the requirements of the quality, environmental and occupational health and safety standards of ISO 9001 and BASF ESHQ recommendations.

REQUEST AND REFER TO RECOMMENDED INSTALLATION PROCEDURES FOR **MASTERFLOW®** GROUTS PRIOR TO USE

* Properties listed are based on laboratory controlled tests.

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