MasterFlow 9400

Ultra high strength, cement-based grout for onshore wind turbine installations

MATERIAL DESCRIPTION

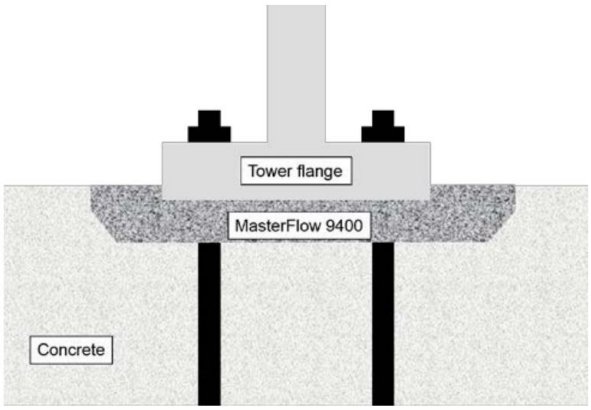
MasterFlow 9400 is a shrinkage compensated, cement-based grout which when mixed with water, produces a homogeneous, flowable and pumpable grout with exceptionally high early and final strength and modulus. The product exhibits increased fatigue. Latest best binder packing models and applied nanotechnology produces a grout with superior technical performance, exceptional rheological properties, and uniquely, extended open times.

FIELDS OF APPLICATION

MasterFlow 9400 has been especially formulated for:

- Grouting of wind turbine installations, that are installed using pre-stressing techniques e.g. base plate grouting of onshore wind turbines.
- Installations where excellent fatigue resistance is required.
- Onshore turbines where ultra-high final strengths are required.
- Grouting in a wide temperature range.
- Anchoring anchor bolts of wind turbine towers.
- All void filling from 25mm to 300mm (under tower flange) where high strength, high modulus, high ductility is important.

Contact the Technical Department of your local Master Builders Solutions office regarding any application or dimensions required not mentioned here.



FEATURES AND BENEFITS

- Ultra high compressive strength: above highest class of EN206, i.e. > C100/115.
- Ultra high modulus for exceptional stiffening properties.
- Excellent fatigue resistance.
- Quick return to service and removal of temporary supports due to high early strength build-up. ≥ 50 MPa @ 24hrs at 20°C.
- No segregation or bleeding to ensure consistent final physical performance and to prevent pump blockages.
- Extended pot life of ≥ 2 hours.
- Can be pumped into complex areas or areas inaccessible to conventional grouting methods.
- Dust reduced for ease of handling.
- Cement based.
- Low chromate.

APPLICATION METHOD

MasterFlow 9400 has been especially formulated for use in specific applications. As such **MasterFlow 9400** should be installed by experienced fully trained contractors. Full application procedures are available on request.

Mixing:

Do not add cement, sand or other materials that affect the properties of this quality-controlled product. Mix full bags only. Use one or more mixers (forced action pan mixers are advised) to permit mixing and placing operations to proceed simultaneously without interruption. Mix with potable water only. Put most of the water required in the mixer and add slowly the grout material. Mix until a homogeneous mortar (3 to 4 minutes), add the remaining water and continue mixing for at least another 2 minutes until the required fluid or flowable consistency is obtained.

Preparation of the concrete substrate:

Remove all formwork, formwork release agents and other materials that can prevent good adhesion of **MasterFlow 9400** to the concrete foundation. Thoroughly clean out the foundation area to be grouted back to a clean and structurally sound concrete. Saturate the cleaned foundation with plenty of water. Remove all free-standing water just prior to grouting.

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Placement of grout:

Mix and place the grout as close as possible to the area to be grouted. Have sufficient manpower, materials and tools to make mixing and placing rapid and continuous. **MasterFlow 9400** should be pumped into the area to be grouted.

The grout shall be placed continuously and from one side only, to avoid air entrapment while grouting. Make sure grout fills the entire space to be filled and remains in contact with the base plate and foundation throughout the entire grouting process.

DO NOT VIBRATE **MasterFlow 9400.**

CLEANING OF TOOLS

Tools and spillages can be cleaned with water while **MasterFlow 9400** is still uncured. Once hardened, the material can only be removed mechanically.

CONSUMPTION

ca. 2.2 kg powder for 1 litre of mixed mortar.

PACKAGING

MasterFlow 9400 is supplied in 25 kg bags or 500 kg big bags.

STORAGE

Store in cool and dry conditions. Shelf life under these conditions is 12 months in unopened original bags.

NOTES

- Sands or other products that could affect the products properties must not be added.
- **MasterFlow 9400** which will be exposed to strong drying conditions, e.g. mortar which is directly exposed to heavy wind and/or direct sunlight, should be protected with moist cloth or plastic foil, or by using appropriate MasterKure curing agents.
- The temperature of the grout material, mixing water and elements coming in contact with the mixed grout should be in the range of +2°C to +35°C.
- Grouting in environments below +2°C or above +30°C are possible, but contact the Technical Department of your local Master Builders Solutions office for additional information.

HEALTH AND SAFETY

Usual preventive measures for the handling of chemical products should be observed when using this product, for example do not eat or drink while working and wash hands when taking a break or when the job is completed.

MasterFlow 9400 contains cement. Avoid contact with eyes and prolonged contact with skin. In case of contact with eyes, immediately flush with plenty of water for at least 15 minutes. Call a physician. In case of contact with skin, wash skin thoroughly. Specific safety information referring to the handling and transport of this product can be found in the Material Safety Data Sheet.

Disposal of product should be carried out according to the local legislation in force. Responsibility for this lies with the final owner of the product.

Hazards Identification:

Symbol:

Possible hazards:
Irritating to respiratory system and skin.
Risk of serious damage to eyes.

Hazard Statement:
H318 Causes serious eye damage.
H315 Causes Skin irritation.
H335 May cause respiratory irritation.

Precautionary Statements:
P102 Keep out of reach of children.
P280 Wear protective gloves and eye/face protection.
P261 Avoid breathing dust.
P264 Wash with plenty of water and soap thoroughly after handling.
P305/P351/P338 If in eyes: rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do.
Continue rinsing.
P315 Get immediate medical advise/attention.
P304/P340 If inhaled: remove victim to fresh air and keep at rest in a position comfortable for breathing.

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P302/P352 If on skin: wash with plenty of soap and water
P332/P313 If skin irritation occurs get medical advise/attention.
P362 Take off contaminated clothing and wash before reuse.

MAL-kode (1993): 00-4

NOTE

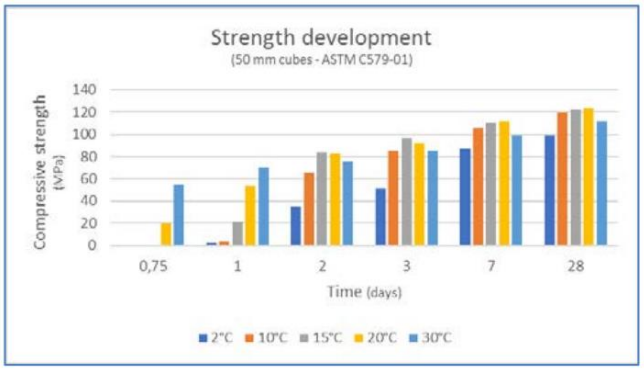
Technical support, where provided, does not constitute supervisory responsibility. For additional information contact your local MB Construction Chemicals Solutions South Africa (Pty) Ltd representative. MB Construction Chemicals Solutions South Africa (Pty) Ltd shall not be liable for technical advice provided.

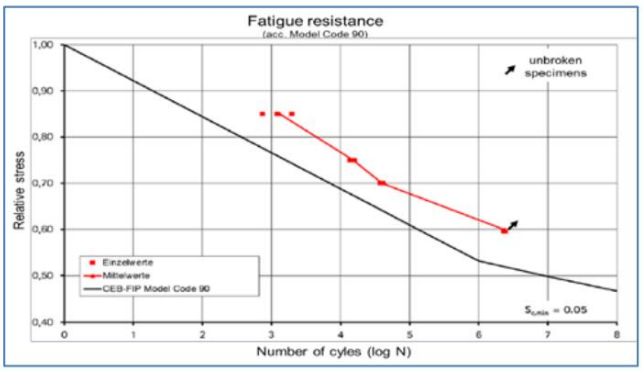
MB Construction Chemicals Solutions South Africa (Pty) Ltd reserves the right to have the true cause of any difficulty determined by accepted test methods. Undertaking such tests is not, and shall not be deemed to be, an admission of liability or an assumption of any risk, loss, damage or liability.

QUALITY AND RESPONSIBLE CARE

All products originating from MB Construction Chemicals Solutions South Africa (Pty) Ltd are manufactured under a management system independently certified to conform to the requirements of the quality standards ISO 9001, environmental and occupational health and safety standards.

* Properties listed are based on laboratory controlled tests.





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TECHNICAL DATA	Unit	Values
Density of mixture (DIN18555-2)	g/cm^3	Approx. 2.4
Mixing water demand	litres	Approx. 1.75 / 25 kg powder at 20°C
Pot life of mixed material	hours	≥ 3
Setting time	hours	≤ 7
Air content (EN 1015-7)	%	≤ 4
Application temperature (substrate and material):	ºC	From +2 to +35
Application thickness	mm	25 - 300
Mechanical properties:		
Compressive strength (40 x 40 x 160 mm prisms - EN 12190) - after 1 day - after 7 days - after 28 days	N/mm²	 20°C 30°C 2°C ≥ 50 ≥ 70 ≥ 3 ≥ 100 ≥ 95 ≥ 75 ≥ 120 ≥ 110 ≥ 95
Characteristic compressive strength – 28 days (150 x 300 mm cylinders – EN 12390-3)	N/mm²	117
Flexural strength (40 x 40 x 160 mm prisms – EN196-1)	N/mm²	≥ 13
Static modulus of elasticity (EN 13412)	GPa	Approx. 48
Poisson ratio		0.18
Capillary water absorption (EN 13057)	kg / m².h$^{-0.5}$	≤ 0.05
Drying shrinkage (EN 12617-4)	mm/m	≤ 0.3
Crack resistance - Coutinho-ring		no cracking after 180 days
Adhesion strength to concrete (EN 1542)	N/mm²	≥ 2
Pull-out strength of rebar (EN 1881) displacement at 75kN load	mm	≤ 0.6
Installation / Additional information:		
Maximum grain size	mm	4
Mixing time	minutes	Approximately 5
Mixer type		e.g. pan mixer
Application method		One continuous pour, from one side only
Fire resistance (EN13501-1)	class	A1 (fl)

Data are given for conditions of 20ºC and 65% R.H. unless otherwise stated. The technical data provided do not represent guaranteed minima.

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