

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.

AREAS 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 500mm (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.

CHARACTERISTICS 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. $\geq 50 \text{ MPa @ 24hrs at } 20^{\circ}\text{C}$
- 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

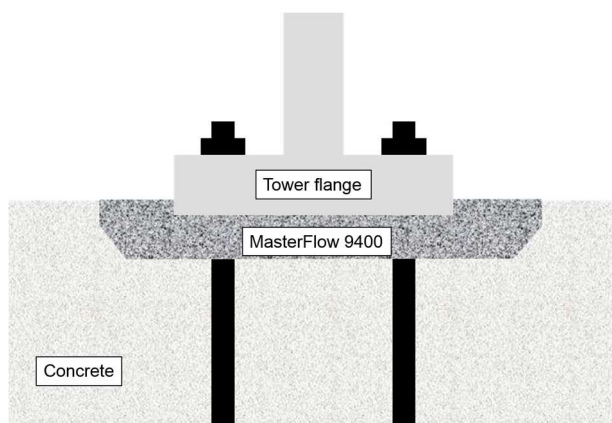
MasterFlow 9400 has been especially formulated for use in specific applications. As such MasterFlow 9400 should be installed by experienced fully trained contractors. Full application procedures are available on request.

(A) 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.



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(B) 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.

(C) 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 +35°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 advice/attention.
P304/P340 If inhaled: remove victim to fresh air and keep at rest in a position comfortable for breathing
P302/P352 If on skin: wash with plenty of soap and water
P332/P313 If skin irritation occurs: get medical advice/attention
P362 Take off contaminated clothing and wash before reuse

MAL-kode (1993): 00-4

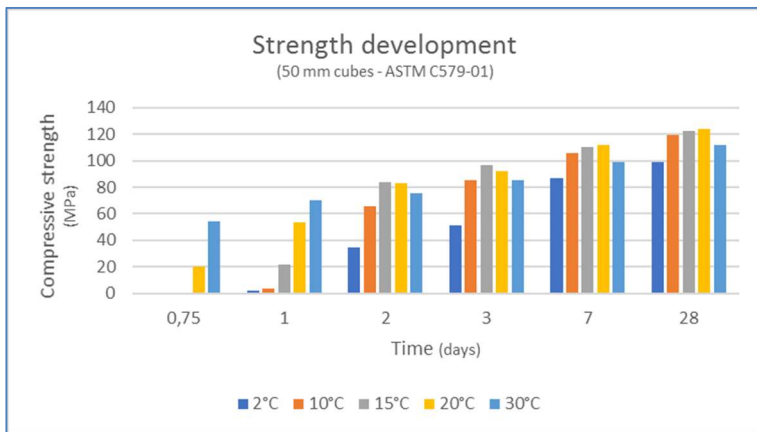
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TECHNICAL DATA	Unit	Values		
Density of mixture (DIN18555-2)	g/cm ³	Approx. 2.4		
Mixing water demand	litres	Approx. 1.85 / 25 kg powder at 20°C (Depending on temperature: 1.70 to 2.30)		
Pot life of mixed material	hours	≥ 2		
Setting time	hours	≤ 9		
Air content (EN 1015-7)	%	≤ 4		
Application temperature (substrate and material):	°C	From +2 to +35		
Application thickness	mm	25 - 500		
Mechanical properties:				
Compressive strength (40 x 40 x 160 mm prisms – EN 12190) (50 x 50 x 50 mm cubes – ASTM 579-01)	N/mm ²	<u>20°C</u>	<u>30°C</u>	<u>2°C</u>
- after 1 day		≥ 50	≥ 70	≥ 2
- after 7 days		≥ 100	≥ 95	≥ 75
- after 28 days		≥ 120	≥ 115	≥ 95
Characteristic compressive strength – 28 days (150 x 300 mm cylinders – EN 12390-3)	N/mm ²	117		
Equivalent to concrete strength class (EN 206-1)	Class	C100/115		
Flexural strength (40 x 40 x 160 mm prisms – EN196-1)	N/mm ²	≥ 15		
Static modulus of elasticity (EN 1048-5)	GPa	Approx. 48		
Poisson ratio		0.18		
Drying shrinkage (EN 12617-4)	mm/m	≤ 0.3		
Resistance to fatigue loading		Verification by test report		
Adhesion strength to concrete (EN 1542)	N/mm ²	≥ 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			
Fire resistance (EN13501-1)	class	A1 (fl)		
Exposure classes (EN 206-1, DIN 1045-2)	XO, XC1-4, XD1-3, XS3, XF1-4, XA1-2, WF			

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CE	
0749	
Master Builders Solutions Belgium nv Nijverheidsweg 89, B-3945 Ham	
18	
BE0105/02	
EN 1504-6 Cement based grout	
EN 1504-6 Principles 4.2	
Pull-out strength	Displacement ≤ 0,6 mm at 75 kN load
Chloride ion content	≤ 0,05 %
Reaction to fire	Euroclass A1
Dangerous substances	Complies with 5.3

CE	
1073	
Master Builders Solutions Denmark A/S Hallandsvej 1, DK-6230 Rødekro	
21	
DoP DK0094/01	
1073-CPR-269-02	
EN 1504-6:2006 Cement based grout - Anchoring Product	
Pull-out strength	Displacement ≤ 0,6mm at 175 kN load
Chloride ion content	≤ 0,05 %
Reaction to fire	Euroclass A1
Dangerous substances	Comply with 5.3

Master Builders Solutions

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DISCLAIMER

Similar to all the other recommendations and technical information, this technical data sheet serves only as a description of the product characteristics, mode of use and applications. The data and information given are based on our technical knowledge obtained in the bibliography, laboratory tests and in practice. The data on consumption and dosage contained in this data sheet are based on our own experience and are therefore subject to variations due to different work conditions. Real consumption and dosage should be determined on the job by means of prior tests and are the liability of the client. Our Technical Service is at your disposal for any additional advice.

Master Builders Solutions reserves the right to modify the composition of the products provided these continue to comply with the characteristics described in the data sheet. Other applications of the product not covered by those indicated shall not be our liability. In the case of defects in the manufacturing quality of our products we provide a guarantee, any additional claims being exempt and our liability being only to return the value of the goods supplied. The possible reservations with respect to patents or third-party rights should be noted.

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The present data sheet becomes null and void on issuance of a new edition.

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