

# MasterFlow<sup>®</sup> 9400

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

## PRODUCT DESCRIPTION

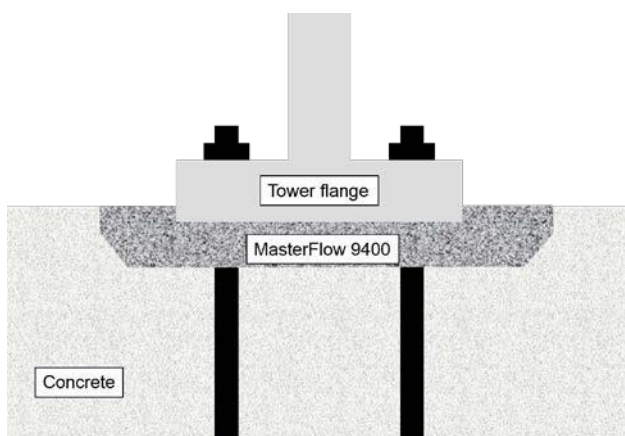
MasterFlow 9400 is a shrinkage compensated, cement based grout which when mixed with water, produces a homogeneous, flowable and pumpable grout with exceptionally high early and final strength and modulus. The product exhibits increased fatigue. Latest best binder packing models and applied nanotechnology 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 MBCC Group Construction Chemicals 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.  $\geq 50$  MPa @ 24hrs at 20°C
- No segregation or bleeding to ensure consistent final physical performance and to prevent pump blockages.
- Extended pot life of  $\geq 2$  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 bigbags.

## 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 MBCC Group Construction Chemicals 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:

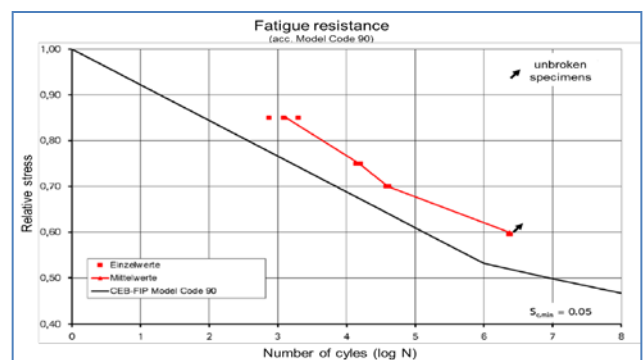
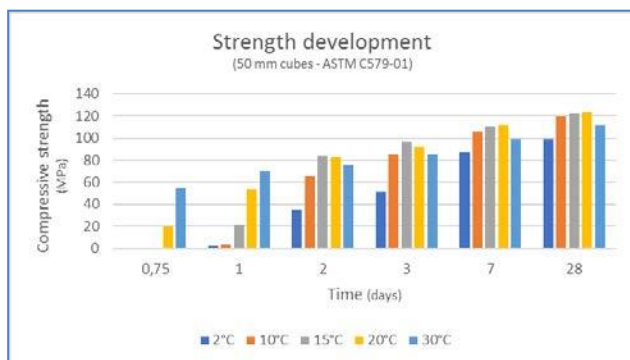
P102 Keep out of reach of children  
P280 Wear protective gloves and eye/face protection  
P261 Avoid breathing dust  
P264 Wash with plenty of water and soap thoroughly after handling  
P305/P351/P338 If in eyes: rinse cautiously with water for several minutes. Remove contact lenses, if present and 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 <sup>3</sup>                      | Approx. 2.4  |             |            |
| Mixing water demand   | litres                                 | Approx. 1.75 / 25 kg powder at 20°C<br>(Depending on temperature: 6.8 to 9.3%) |             |            |
| Pot life of mixed material  | hours                                  | ≥ 3  |             |            |
| Setting time  | hours                                  | ≤ 7  |             |            |
| Air content (EN 1015-7)   | %                                      | ≤ 4  |             |            |
| Application temperature (substrate and material):   | °C                                     | From +2 to +35   |             |            |
| Application thickness   | mm                                     | 25 - 300   |             |            |
| <b>Mechanical properties:</b>   |  |  |             |            |
| Compressive strength (40 x 40 x 160 mm prisms – EN 12190)<br>- after 1 day<br>- after 7 days<br>- after 28 days | N/mm <sup>2</sup>                      | <u>20°C</u>  | <u>30°C</u> | <u>2°C</u> |
|   |  | ≥ 50   | ≥ 70        | ≥ 3        |
|   |  | ≥ 100  | ≥ 95        | ≥ 75       |
|   |  | ≥ 120  | ≥ 110       | ≥ 95       |
| Characteristic compressive strength – 28 days<br>(150 x 300 mm cylinders – EN 12390-3)                          | N/mm <sup>2</sup>                      | 117  |             |            |
| Flexural strength (40 x 40 x 160 mm prisms – EN196-1)   | N/mm <sup>2</sup>                      | ≥ 13   |             |            |
| Static modulus of elasticity (EN 13412)   | GPa                                    | Approx. 48   |             |            |
| Poisson ratio   |  | 0.18   |             |            |
| Capillary water absorption (EN 13057)   | kg / m <sup>2</sup> .h <sup>-0.5</sup> | ≤ 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/mm <sup>2</sup>                      | ≥ 2  |             |            |
| Pull-out strength of rebar (EN 1881)<br>displacement at 75kN load   | mm                                     | ≤ 0.6  |             |            |
| <b>Installation / Additional information</b>  |  |  |             |            |
| 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)  |             |            |



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## NOTA:

La presente ficha técnica sirve, al igual que todas las demás recomendaciones e información técnica, únicamente para la descripción de las características del producto, forma de empleo y sus aplicaciones. Los datos e informaciones reproducidos se basan en nuestros conocimientos técnicos obtenidos en la bibliografía, en ensayos de laboratorio y en la práctica.

Los datos sobre consumo y dosificación que figuran en esta ficha técnica, se basan en nuestra propia experiencia, por lo que estos son susceptibles de variaciones debido a las diferentes condiciones de las obras. Los consumos y dosificaciones reales, deberán determinarse en la obra, mediante ensayos previos y son responsabilidad del cliente. Para un asesoramiento adicional, nuestro Servicio Técnico, está a su disposición.

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La presente ficha técnica pierde su validez con la aparición de una nueva edición.

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