

Masterflow[®] 940

Cementitious non-shrink grouting and anchoring mortar.

Description

MASTERFLOW[®] 940 is a ready-to-use, one komponent, non-shrink, high-strength grouting and anchoring mortar, based on cement with natural aggregates. It is formulated for use especially in flowable consistency for

precision grouting of equipment, structural building members, curtain walls, precast wall panels, beams and columns. As needed can be used also in the form of a damp mixture.

MASTERFLOW 940 is low in chromate (CR-VI) < 2 ppm.

Applications - range of uses

MASTERFLOW[®] 940 is recommended for:

- Grouting precision equipment, baseplates and columns with a minimal thickness of 2,5 cm. MASTERFLOW 940 contains max. 4 mm silicon quartz.
- If more than 8 cm thickness is required, we recommend the use of MASTERFLOW 940 with specific - silica filler Dmax 8 mm from BASF in maximum quantity 30% by weight (for example on 25 kg MASTERFLOW[®] 940 up to 8 kg filler Dmax 8 mm)
- Grouting application where shrinkage must be eliminated and where high-strength is required or desired.
- For anchoring bolts and reinforcing bars in concrete
- Non-shrink grouts of precast structural elements, walls, beams and columns
- Applications at temperatures from +5 °C to +30 °C


Advantages

MASTERFLOW[®] 940 provides:


- A ready-to-use grout that under conditioned circumstances hardens free of bleeding, settlement of drying shrinkage.
- A grout that can be used at any consistency: flowable, plastic or damp pack.
- A grout that retains good workability even after 45 minutes at +20 °C.
- A non-shrink grout that can be pumped into intricate areas or areas inaccessible to conventional grouting.
- A non-shrink, dense grout which contains no gas-generating or air-release agents such as aluminium powder, fluid coke, etc.
- MASTERFLOW[®] 940 is certified as an anchoring mortar according to EN 1504-6 and as a high-

strength grouting mortar with static function in accordance with EN 1504-3.

- excellent resistance against chemical and thawing agents (waste approximately 250 g/m² after 150 cycles, method C according to ČSN 731326).

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BASF Stavební hmoty Česká republika s.r.o. K májovu 1244, 537 01 Chrudim 09 1020 – CPD - 050017668	
EN 1504-3 Non-shrink, high-strength grouting mortar, CC mortar (based on hydraulic cement)	
Compressive strength	class R4
Chloride ion content	≤ 0,05 %
Adhesive bond	≥ 2,0 MPa
Restrained shrinkage	≥ 2,0 MPa
Carbonation resistance	passes
Elastic modulus	≥ 25 GPa
Capillary Absorption	≤ 0,5 kg.m ⁻² .h ^{-0,5}
Reaction to fire	A1
Dangerous substances	complies with 5.4

Certificated according EN 1504-3

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BASF Stavební hmoty Česká republika s.r.o. K májovu 1244, 537 01 Chrudim 11 1020 – CPD - 050017668	
EN 1504-6 Cementitious grouting and anchoring mortar	
Pull - out	Displacement ≤ 0.6 mm at load of 75 kN
Chloride ion content	≤ 0,05 %
Reaction to fire	A1
Dangerous substances	complies with 5.3

Certificated according EN 1504-6

The table B below gives the typical average strengths of 25 kg MASTERFLOW® 940 at +20 °C, mixed with 3 litres of potable water.

Technical datas

A. Material - technological specification

Material base	specially selected cements, natural fillers, additives	
Components	single component mortar	
Grain size	max. 4 mm	
Density of fresh mortar	≥ 2,15 kg/ dm ³	
Consistence	powder	
Colour	grey	
Marking according regulation: - transport regulations - dangerous substances See MSDS for next information	- not dangerous product - irritation, contain cement	
Conservation, storage	6 months	
Packaging	25 kg in moisture resistant bag	

B. Processing specification

Thickness in one layer - minimum - maximum - recommended maximum with silica filler Dmax 8 mm (max. 30% by weight of grout)	25 mm 80 mm cca 180 mm	
Application temperature	+5 °C to +30 °C	
Mixing water per - maximum	1 kg powder 120 ml	25 kg bag 3,0 l
Time of mixing	3 min. pause and mix again max. 2 min.	
Working time - at +5 °C - at +20 °C - at +30 °C	cca 60 min. cca 45 min. cca 20 min.	
Consumption	cca 2,0 kg /m ² dry powder/mm of thickness	
Coverage of 25 kg bag	12,1 dm ³ (with 3 litres of water)	
Thickness of layer 25 mm 80 mm	Consumption of dry powder 50 kg/m ² 160 kg/m ²	
Days	Compressive strength (N/mm ²)*	Flexural strength (N/mm ²)*
1	≥ 35	≥ 5
3	≥ 50	≥ 6
7	≥ 65	≥ 8
28	≥ 82	≥ 9
Bond strength (28 d)	≥ 2,0 N/mm ²	
Flow trough - flow channel	fresh 60 mm	after 30 min. 45 mm
Plasticity	28 cm	
Resistance against water and de-icing salts	aprox. 250 g/m ² after 150 cycles acc. ČSN 731326 C	
Pull out of reinforcement bar Ø 16 mm, hole Ø 30 mm, depth 150 mm acc. EN 1504-6, EN 1881	characteristic tensile strength 85 kN	

* Compressive and flexural strength tested according EN 1504-3.

The data were measured in laboratory conditions. Therefore, in practice, expect slight variations from those values. If circumstances require the testing of materials on site is due to grain up to 4 mm required for manufacture of test specimens used forms of 4x4x16 cm.

Strength development

The strength of the grout is often the determining factor in deciding when loads can be put on structural

members or machinery that where grouted. The strength of the grout depends on:

- the amount of mixing water
- the temperature of the object grouted
- curing
- age of the hardened grout.
- ambient temperature and humidity.

* Compressive and flexural strength tested according EN 1504-3.

The data were measured in laboratory conditions. Therefore, in practice, expect slight variations from those values. If circumstances require the testing of materials on site is due to grain up to 4 mm required for manufacture of test specimens used forms of 4x4x16 cm.



Preparation of the grout

Do not add cement, sand or other materials to this quality-controlled product. Do not use the contents of packages that are damaged or broken.

DO NOT MIX BY HAND.

Mix with potable water only. Put 90% of mixing water to the mixer first, then slowly and steadily add the powder of MASTERFLOW® 940. Mix until homogeneous mortar (3–4 minutes). To adjust consistency during mixing add the rest of the mixing water. After a short pause, again briefly to mix up 2 more minutes.

Be aware that no bleeding or granular segregation appearance. Less water may be used to meet consistency requirements, thus decreasing the yield.

Use of ice water to produce mixed grout temperatures of +5 °C to +30 °C will reduce water required for a given consistency and increase strength and working time accordingly.

When mixing, use mainly forced circulation units, small quantities can be mixed with suitable mixer

on low speed drill (400 rpm) in container with a capacity of 20–30 liters.

Mix and place grout as close as possible to the plate being grouted. To ensure the continuous process of grouting in the case of high volume of work is recommended to use multiple mixers for grouting without interruption.

Do not retemper grout by adding water or remixing after it stiffens.

Directions for precision grouting

Grouting should be performed only by trained and experienced professionals possessing the appropriate equipment and tools for professional application.

1. Preparation of the foundation and machine

The surface of the base must be clean, strong enough and free of dust, loose particles, without the layers of old paint, grease, oil, rust and other impurities. The surface of the base must be sufficiently rugged. Preparation of concrete base should be done sanding, blasting water pressure when necessary / breaker. Screws should be anchored well in advance and the bottom surface of the steel plate storage / technology should be already cleaned, seated in the desired position and securely anchored before making grouting.

Thickness of layer

The minimum grouting thickness is 2,5 cm. Each meter of length of flow also increases its size by a further 2,5 cm, necessary for proper function of flow of cement grout. Eg. grouting machine with length of flow about 2 m is recommended to make in a layer 5 cm etc. If this can not be guaranteed, it is recommended to apply a more finer type of grouting mortar such as MASTERFLOW 928 or PCI Vergussmörtel with grain size to 1 mm.

2. Forming

Build strong, tight, well-braced forms with any leaks in the formwork or between the form and foundation. The side forms should be erected 25 to 50 mm horizontally away from the plate so that air being displaced is not trapped below the plate and vertically at least 25 mm above the underside of the bedplate surface to prevent overflowing.

On the longer side of the basement (the grout-placing side), slant the form at approximately 45° outward and extend this form suitably high to provide a head of grout during placement. Grout should be poured directly on the sloped form to minimize entrapment of air during placement. Use methods of forming that will allow the grout to flow by gravity between the plate and the foundation and keep the grout in full contact with these surfaces until it has hardened.

Pouring over the inclined plane is necessary for grouting on a large scale, when the length of the flow is relatively large compared to the layer of grouting. A portable "head box" with a sloped pouring surface which can be moved along the length of the plate as the grouting proceeds may be used.

More contoured edges out of the plate are prone to damage if not properly designed.

Using of a form release agents is recommended.

Forming shall not be removed before sufficient curing. In necessary cases can be carefully removed after 24 hours (+20 °C).

3. Water saturation

Thoroughly saturate the cleaned foundation and any bolt holes with water for at least 2 hours, preferably 24 hours before grouting. Just before grouting, remove all free water.

4. Placement of the grout

After MASTERFLOW® 940 has been mixed following the suggested procedure (see "Preparation of the grout"), the placing operation can be started as follows:

Consider shutting down every nearby source of vibration until after the newly-placed grout has taken final set. Excessive vibration can cause settlement and bleeding and disturb the set.

Have sufficient manpower, materials and tools to make mixing and placing rapid and continuous.

The grout shall be poured continuously and from one side only, to avoid entrapment of air while grouting. It is necessary to monitor the level of the grout on the opposite side of the base and moving along the longer side of the formwork smoothly fill the space. Appropriate aid, such as steel strip or a hook, you can move back and forth to assist in watering the larger lengths to correct grouting leaking. Make sure grout fills the entire space to be grouted and remains in contact with the plate throughout all of the grouting placement.

DO NOT VIBRATE.

5. Precautions

The temperature of both the grout and elements coming into contact with the grout should be in the range of +5 °C to +30 °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.

6. Curing

After the initial setting of the grout MASTERFLOW® 940 is recommended to cover all the exposed surfaces with clean dump cloth and treat at least 3–4 days moistening.

After removal of the formwork can be surface treated with a protective coating range MASTERTOP C. Grout is recommended at least 5 days to protect against rain.

Note

- At high impulsive load is recommended to use special grouting mortar containing metallic fibers MASTERFLOW® 885. The metallic ingredients in this product contributes to higher toughness.
- When applied in multiple layers, it is recommended to carry out subsequent layer after at least 3 days/+20 °C. Properly selected reinforcement anchored into the underlying concrete basement has increased consistency with base and is recommended in case of larger units. Surface of the first layer of grout should be appropriately roughened before applying the next layer and again thoroughly cleaned and saturated with water.

MASTERFLOW® 940 as anchoring mortar

For anchoring bolts or reinforcing bars into concrete the hole diameter should be approximately twice the diameter of the anchore element.

Recommended hole diameter and depth of drilling:
C35/C45

bar (screw)	Ø hole diameter	min.depth
Ø10 mm	26 - 30 mm	150 mm
Ø16 mm	32 - 40 mm	150 mm
Ø20 mm	40 - 50 mm	200 mm
Ø32 mm	50 - 60 mm	300 mm
Ø50 mm	80 -100 mm	500 mm

Characteristic strength – pull out (approximate values)

bar (screw)	Ø hole	depth	pull out
Ø10 mm	26 mm	150 mm	70 kN
Ø16 mm - tested	30 mm	150 mm	85 kN
Ø20 mm	40 mm	200 mm	150 kN
Ø32 mm	60 mm	300 mm	340 kN

Holes for reinforcement or the bolts, but for railings or columns properly cleaned, vacuumed free of dust particles and moisten with water. Prior to the application without free standing water.

When anchoring bars / screws, fill the hole first half of mortar MASTERFLOW® 940, reinforcing rod or bolt a few times insert and pull again, in order to eliminate trapped air. Mortar to fill the upper edge of the hole. Apply mortar from one side only. It is necessary to prevent movement anchor element to the beginning of hardening for about 90 minutes/+20 °C. Full load is expected soon after 7 days/+20 °C. Railings, columns, etc. placed into position using props. Anchoring mortar MASTERFLOW® 940 poured from one side. Remove excess mortar and wipe gently.

Moistening is recommended. Protect against rain.

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