MasterFlow® 928
(EMACO S55)

Shrinkage-Compensated, Quick-Hardening, Dry Concrete Mix of Pourable Type Designed for Highly-Precise Cementation of Industrial Equipment, Grouting Under Column Supports, Joint Grouting in Reinforced Concrete Structures and Anchor Installation. Grout Thickness is from 20 up to 200 mm.

DESCRIPTION
MasterFlow 928 is a ready-to-use substance in the form of dry concrete mix. Upon mixing with water, it forms rheoplastic, floated, non-segregated, shrinkage-compensated, high-strength compound. Maximum aggregate fineness of MasterFlow 928 is 3 mm. The compound does not contain metal aggregates and chlorides.

APPLICATION AREA
MasterFlow 928 is applied for highly-precise cementation (grouting) under support parts of columns and industrial equipment, such as:
- gas or steam turbines;
- generators, diesel engines;
- various machine tools, pressure machines;
- hot rolling mills and cold rolling mills;
- pumps, compressors, crushers;
- lifting and transporting equipment;
- grouting under support parts of superstructures of bridges, overpasses;
- installation of cap elements;
- installation of barrier railings for roads, etc.

PACKAGING
MasterFlow 928 material is available in 30 kg moistureproof bags.

CONSUMPTION
To prepare 1 m³ of the compound, you need 2100 kg of dry MasterFlow 928 mix.

SHELF LIFE AND STORAGE CONDITIONS
The guaranteed shelf life in a closed, dry room at the temperature no lower than +5°C in intact factory package is 12 months. Do not use the material from a damaged package.

TEMPERATURE EFFECT
MasterFlow 928 can be applied, if the temperature is from +5°C to +50°C during performance of work.

When environmental temperature is low (from +5°C to +10°C), strength grows more slowly.
If you need a high early strength of the compound, it is recommended:
- to store MasterFlow 928 bags in places, protected from cold;
- to use hot water for gauging (from +30°C to +40°C);
- to protect the laid compound from cold.
If temperature is lower than +5°C, then MasterEmaco T 1200 PG material should be applied.
If environmental temperature is very high (above +35°C), then the only problem is fast slump loss of the compound. Usually, when the temperature is from +15°C to +25°C, average life of ready-mixed MasterFlow 928 compound is 45-60 minutes, but when temperatures are higher, processibility duration is significantly reduced.
When temperatures are high, the following measures are recommended:
- to store MasterFlow 928 bags in a cold place;
- to use cold water for gauging;
- to prepare the compound at the coldest time of a day.

WATER CONSUMPTION TO PREPARE MasterFlow 928
(Table 1)

<table>
<thead>
<tr>
<th>Work type</th>
<th>Consistence</th>
<th>Water quantity in litres per 30 kg of the dry mix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liquid</td>
<td>Minimum: 3.9</td>
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</tbody>
</table>

The exact quantity of gauged water is specified in the quality document, attached to every material batch.
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(EMACO S55)

**RECOMMENDATIONS FOR HIGHLY-PRECISE CEMENTATION WORK**

The following recommendations and proposals are based on real-life experience of MasterFlow 928 usage for highly-precise cementation. Clause numbering corresponds to the item numbers at Figure 1.

![Figure 1. MasterFlow 928 application diagram for highly-precise cementation of equipment.](image)

**PREPARATION OF FOUNDATION AND EQUIPMENT TO BE CEMENTED (CONCRETED)**

1. Before installing an equipment, demolished concrete should be removed using a light perforator, needle scaler or water sandblast machine, as well as surface should be made scored.

2. It is necessary to clean carefully bolts and supporting surface of bed foundation (equipment foundation plate) from grease and oil spots, dust and other contaminations, which can hinder the cement hydration. Make sure that the bed foundation has holes for air release. Install, align and level the equipment, make sure that a final installation spot will not be changed at the later work phases. If, upon completion of grouting, it is necessary to remove wedges (see clause 11), then the wedges should be oiled to make the removal easier.

**FORMWORK**

3. Upon installation and alignment of the equipment and before MasterFlow 928 grouting, it is necessary to soak foundation concrete with water. The remainder of the water has to be removed using compressed air.

4. In order to prevent compound outflow, the formwork shall be made from a solid waterproof material and reliably anchored and supported to withstand the compound pressure after grouting. From the side, where MasterFlow 928 will be poured, it is necessary to provide for 150 mm clearance between the formwork (see Fig. 1) and equipment bed foundation. From other sides, it is necessary to provide for 50 mm clearance between the formwork and bed side faces. Other equipment, different from specified at the Figure 1, can be used to grout MasterFlow 928, for example, mortar pumps, funnels, etc. When grouting a foundation for large-size equipment and if it is necessary to ensure free pouring of MasterFlow 928 compound, it may be useful to mix a more fluid compound for priming (water content is higher by approximately 5-10% than the maximum value, specified in Table 2), i.e. initially to prime a concrete base using a more fluid compound, and then to mix MasterFlow 928 of normal consistency.

5. It is necessary to hermetically seal the formwork to prevent MasterFlow 928 leakage. Polystyrene foam, the material itself of harsh consistency or other appropriate materials can be used.

**PREPARATION OF MasterFlow 928 COMPOUND**

Before mixing MasterFlow 928 with water, it is necessary:

- to check that available material quantity will be sufficient, taking into account its consumption (2100 kg of dry MasterFlow 928 mix to prepare 1 \( \text{m}^3 \) of the compound);
- to ensure that all required materials and equipment (mixers, carts, buckets, trowels, etc.) are readily available;
- to check the completion of the preliminary works, specified in subsections “Preparation of foundation and equipment to be cemented (concreted)” and “Formwork”.

To prepare the compound correctly, use the following direction:

a) open bags with dry MasterFlow 928 mix, required for the work, shortly before mixing start;
b) pour the minimum quantity of water, specified in the quality document (provisional requirement is specified in Table 2), into a mixer;
c) turn on the mixer and slowly fill in a dry MasterFlow 928 mix with constant stirring;
d) upon the all mix pouring, continue stirring for 3-4 minutes until a homogeneous compound is obtained;
e) if necessary, add water (within limits specified in the material quality document), until a
required consistency will be achieved and stir 2-3 minutes once more. Water content depends on environmental temperature and relative humidity. When weather is dry and hot, more quantity of water can be required, when weather is cold and humid – less. For moderate-size batches, a mixer with spiral header can be used (no more than 300-400 revolutions). It is not recommended to mix the material using gravity type mixers, as well as manually.

**PLACEMENT OF MasterFlow 928**

Upon mixing MasterFlow 928 material with water, grouting should be made by the following way:

6. Watch for equipment installation accuracy using a level, placed at the bed foundation. If the surface vibrates, check whether the vibration is passed from machine tools operating nearby. If such vibration passing happens, then turn off the machine tools at least for the time until poured MasterFlow 928 has been set and strength gain has begun (at least 10-12 hours at a temperature + 20°C), because vibration can reduce MasterFlow 928 adhesion power with a base plate.

7. **MasterFlow 928 should be poured continuously and from one side only to prevent air capture.** Avoid MasterFlow 928 pouring from two opposite sides. Captured air should be released through holes, made in the base plate earlier (see clause 2).

8. The guaranteed work quality provides a steel-wire rope or a flexible bar, placed preliminarily between foundation and base plate. Back-and-forth motion of the rope during the pouring allows to distribute the material uniformly and to exclude air capture.

**FINISHING OPERATIONS UPON MasterFlow 928 PLACEMENT**

9. All open surfaces of placed MasterFlow 928 should be immediately protected from moisture loss for at least 24 hours. The protection can be performed using water spray, placing damp sackcloth or applying MasterKure film-forming compound.

10. If, in order to remove a formwork, it is necessary to take away edges or to change their form, then it can be done using a mortar applicator or a hammer upon hardening and solidification beginning.

11. When using MasterFlow 928, it is not obligatory to remove sole-plates, unless such activity is recommended by equipment manufacturer. Temporary wedges can be removed in two days, if they were oiled (see clause 2).

12. Upon equipment commissioning, there is a well-established service method, specifying bolt and screw tightening. To tighten nuts uniformly using the recommended tension, a torque-limiting wrench should be applied.
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**SPECIFICATIONS**

* The tests were made in accordance with STO 70386662–011–2014 “Assembly Mixes (pourable compounds) MasterFlow (EMACO)”

Those characteristics are based on laboratory tests. Insignificant deviations from the results are possible.

<table>
<thead>
<tr>
<th>Index name</th>
<th>Index</th>
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<tbody>
<tr>
<td>Maximum size of a filler, mm</td>
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<td>Mortar agility by flow cone, mm</td>
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<td>Agility persistence, min.</td>
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<td>Enlargement in limited state, %</td>
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<td>and airfield pavements used in mineralized</td>
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<td>Ratio of sulfate resistance (1 year), %</td>
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