

MasterEmaco[®] S 550 FR

(EMACO S150 CFR)

Shrinkage compensated, fast-hardening, pourable dry mortar reinforced with a flexible chrome-nickel and polymer fiber, intended for structural repair of concrete and reinforced concrete. Application thickness is 20 to 60 mm.

DESCRIPTION

MasterEmaco S 550 FR is a ready-to-use dry mortar reinforced with a flexible chrome-nickel and polymer fiber, which is not oxidized and is chloride-resistant. Maximum filler size in MasterEmaco S 550 FR is 2.5 mm.

MasterEmaco S 550 FR is a shrinkage-compensated product. Expansion takes place both in the plastic state (before setting) and during hardening. Expansion is constrained by the adhesion between the rough surface, being repaired, and the concrete, as well as due to constraining effect of the metal fiber. The stress, emerging in the MasterEmaco S 550 FR matrix due to a restrained expansion, may be compared with the stress in the prestressed concrete, when the reinforcement transfers the force onto concrete and causes compressive stresses. This allows MasterEmaco S 550 FR to be applied in 20-60 mm-thick layers, without using rebars or reinforcing mesh for expansion restraint. If a MasterEmaco S 550 FR layer with a thickness of more than 60mm is required, 30% of clean (washed) and thoroughly sifted gravel (5-10mm fraction) is recommended to be added to the mix to reduce hydration heat.

MasterEmaco S 550 FR is a sulfate-resistant product that does not contain chlorides and metal powders. This product is also available in the thixotropic option (MasterEmaco S 560 FR).

RECOMMENDED USE

MasterEmaco S 550 FR is used for a durable and reliable repair of all concrete items of various geometric shapes at the reinforcement corrosion rate of up to 15%, without installation of additional reinforcement:

- Columns and beams;
- Arched structures;
- Bridge plates;
- Foundations, dams;
- Retaining walls;
- Silos and containers;
- Channels;
- Cooling towers;

- Structures in seismic areas, etc.

MasterEmaco S 550 FR is not recommended to be used without additional protection in case of contact with the medium with pH < 5.5.

PACKAGING

MasterEmaco S 550 FR is packed in 30kg moisture proof sacks.

COVERAGE

2150 kg of the MasterEmaco S 550 FR dry mortar are required to produce 1 m³ of the repair compound.

SHELF LIFE AND STORAGE CONDITIONS

Guaranteed shelf life of MasterEmaco S 550 FR, stored in a closed undamaged package, is 12 months.

Store in an enclosed dry room at a maximum humidity of 70% and a room temperature not lower than 5°C. Do not use the product from a damaged packaging.

TEMPERATURE CONSIDERATIONS

MasterEmaco S 550 FR may be used at the ambient temperatures of +5°C to +50°C. At low ambient temperatures (+5°C to +10°C), the strength tends to build-up more slowly. If high early strength is required, the following is recommended:

- 1) Store sacks with MasterEmaco S 550 FR in cold-protected areas;
- 2) Use hot water for mixing (+30°C to +40°C);
- 3) After pouring, cover MasterEmaco S 550 FR with heat insulating materials to protect it from cold.

If the ambient temperature is below +5°C, use the MasterEmaco T 1000 series materials.

If the ambient temperature is very high (above +30°C), a rapid loss of fluidity by the repair compound is the only problem to be faced with.

In this case, the following is recommended:

- 1) Store sacks with MasterEmaco S 550 FR in a cool place;
- 2) Use cold water for mixing;

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- 3) Mix the repair mortar in the coolest period of the day.

WATER CONSUMPTION* FOR MIXING MasterEmaco S 550 FR (Table 1)

Amount of water, liters per 30kg sack	
Minimum	Maximum
4.6	4.9

*Approximate water consumption. Actual mixing water consumption is specified in the product quality datasheet

REPAIR NOTES

The following recommendations and suggestions are based on the practical experience of using MasterEmaco S 550 FR.

REPAIR SURFACE PREPARATION

Edges of the defective area shall be cut with a diamond tool to a minimum depth of 20 mm, in perpendicular to the surface. Use a light perforator, needle gun or water/ sand blasting machine to remove concrete debris. Make the surface rough. This operation is very important, since a well-prepared rough surface is required for providing good adhesion of MasterEmaco S 550 FR.

Furthermore, the following is required:

- 1) Remove rust from rebars and install additional reinforcement, if required. If the structure to be repaired is used in concrete and steel corrosive environments, treat the reinforcement with MasterEmaco P 5000 AP;
- 2) Using MasterSeal 590, remove all active leaks on the surface being repaired.
- 3) Clean the surface from grease, paint, lime, dirt or dust.

ANCHOR INSTALLATION

If a 60mm-plus thick layer is required, use anchors for providing combined operation of MasterEmaco S 550 FR with the surface under repair.

SURFACE IMPREGNATION WITH WATER

Prior to pouring MasterEmaco S 550 FR, thoroughly impregnate the surface, being repaired, with water. Proceed with wetting every

10-15 minutes for at least 3 hours. Use compressed air or rags to remove excess water. Prior to pouring MasterEmaco S 550 FR, the surface should be made damp, but not wet.

FORMWORK

The formwork should be made of a durable material; it should be leak proof and securely fastened to withstand the repair compound pressure after pouring. A special opening, located atop, if vertical structural members are considered (e.g., support side), or only on one side, if horizontal structural members are considered (the bottom of the beam), should be provided in the formwork. Before pouring, the formwork shall be impregnated with water so that it would not absorb water from the repair mortar, thus dehydrating it. The formwork should be sealed to prevent the repair mortar leakage. For this purpose, thick-consistency MasterEmaco S 550 FR or other suitable materials may be used. Do not use any fabric for formwork sealing, since it will be difficult to remove it after MasterEmaco S 550 FR has set or started hardening.

MIXING

Prior to mixing MasterEmaco S 550 FR with water, the following is required:

- Check whether the available amount of MasterEmaco S 550 FR is sufficient enough for work completion, considering the coverage (2150 kg of the MasterEmaco S 550 FR dry mortar for mixing 1m³ of the repair mortar);
- Make sure that all necessary materials (mixers, trucks, buckets, trowels, etc.) are close at hand;
- Verify the performance of the preliminary activities described in the Repair Notes section.

For correct mixing, follow the instructions below:

- 1) Open the sacks with the MasterEmaco S 550 FR dry mortar, required for work performance, shortly before mixing;
- 2) Pour minimum amount of water specified in Table 1 into the mixer;
- 3) Turn the mixer on, and quickly and continuously add MasterEmaco S 550 FR. Use the entire sack with MasterEmaco S 550 FR for mixing;

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- 4) Once all required amount of the MasterEmaco S 550 FR dry mortar has been added, continue mixing for at least 4 minutes, until lumps disappear and the mix becomes homogenous;
- 5) Add water, if required (within the amounts indicated in Table 1), until the desired consistency is reached, and stir again for 2-3 minutes.

Water content may slightly differ from the one indicated in Table 1, dependent on the ambient temperature and relative humidity. More or less water may be required during hot & dry weather or cold & wet weather, respectively.

A mixer (max 300-400 rpm) with a spiral nozzle may be used for mixing small batches. Mixing MasterEmaco S550 FR by hand is not recommended.

APPLICATION

The prepared repair mortar should be poured continuously, without vibration. Pour the mortar from one side to avoid air entrapment. Make sure that MasterEmaco S550 FR has completely filled the space between the formwork and the old

structure. For this purpose, a mild steel strip may be used.

TREATMENT

If MasterEmaco S 550 FR was poured into formwork, the formwork should be removed not earlier than 24 hours from the pouring completion time.

If horizontal surfaces (e.g., floors) were repaired, a proper water treatment regime should be provided for the repaired areas for at least 24 hours, to be extended up to 2 days in case of hot, dry, windy weather. For this purpose, use standard cement-bearing material treatment methods (cover the surface with a film or wet burlap; spray water) or apply special film-forming compositions such as MasterKure[®] (MasterTop[®] C).

PRECAUTIONS

This product contains cement, irritating the skin and mucous membranes. Avoid eye and skin contact. In case of irritation, thoroughly wash the affected area with water and consult a doctor, providing information about the product.

SPECIFICATIONS*

(Table 2)

Index name	Index	
Maximum size of a filler, mm	2,5	
Fibre filler	Polymer + flexible metal	
Mortar agility by flow cone, mm	225-245	
Agility persistence, min.	minimum 30	
Enlargement in limited state, %	0,05-0,09	
Compressive strength, MPa, minimum		
	1 day	25
	28 days	60
Tensile strength at bending, MPa, minimum		
	1 day	8
	28 days	12
Bond strength to concrete, MPa, minimum	2,5	
Freeze resistance grade for concretes as roads and airfield pavements used in mineralized environment, minimum	F ₂ 300	



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Freeze resistance grade for all types of concretes, except concretes as roads and airfield pavements, used in mineralized environment, minimum	F ₁ 1000
Grade of water resistance, minimum	W16
Ratio of sulfate resistance (1 year), %	minimum 0,9

* Tests were performed according to STO 70386662-010-2014 "MasterEmaco dry repair mortars (Emaco)"

Products are certified. Production conditions and features of application can differ in every case. In technical description we can provide only general instructions of application. These instructions correspond to the current level of knowledge and experience. Client takes responsibility on his own for incorrect use of the material. For additional information please contact advisor from Limited company "BASF Stroitelnye Sistemy".

Limited company "BASF Stroitelnye Sistemy"

Office in Moscow: +7 495 225 6436

Office in St. Petersburg: +7 812 332 0412

Office in Kazan: +7 843 212 5506

Office in Krasnodar: +7 861 202 22 99

Office in Minsk: +375 17 202 2471

Office in Kiev BASF T.O.V.: +380 44 5915595

E-mail: stroysist@basf.com www.master-builders-solutions.basf.ru

July 2015

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