

MasterEmaco[®] S 540 FR

(EMACO SFR)

Shrinkage compensated, fast-hardening dry mortar reinforced with polymer and brass-plated steel fiber, intended for structural repair of concrete and reinforced concrete structures. The application thickness is 20 to 60 mm.

DESCRIPTION

MasterEmaco S 540 FR is a ready-to-use dry mortar. Maximum filler size in MasterEmaco S 540 FR is 2.5 mm. When mixed with water, it forms a rheoplastic, pourable and non-laminating mortar with good adhesion to steel and concrete.

MasterEmaco S 540 FR may be applied in a layer with a thickness of up to 60 mm without additional reinforcement. The inclusion of brass-plated steel fiber, constraining crack propagation, is another feature of the mortar. Due to this feature, the product processes high flexural strength, high resistance to dynamic impacts, and high fatigue strength. MasterEmaco S 540 FR is a sulphate resistant concrete.

RECOMMENDED USE

MasterEmaco S 540 FR is used without additional reinforcement in constructing special civil elements, which require multidirectional reinforcement. It may be used in the following cases:

- Repair of surfaces exposed to high loads, highways or airports (while leaving existing joints);
- In all structures exposed to impact and live loads (bunkers and bomb shelters), since it provides bearing capacity of the structure even after cracking;
- During the construction of structural, earthquake-resistant elements (such as columns and beam connections), due to its residual post-cracking strength.

Placing MasterEmaco S 540 FR onto fresh concrete is not allowed.

PACKAGING

MasterEmaco S 540 FR is packed in 30kg moisture proof sacks.

COVERAGE

2000 kg of the MasterEmaco S 540 FR dry mortar are required to produce 1 m³ of the repair compound.

SHELF LIFE AND STORAGE CONDITIONS

Guaranteed shelf life of MasterEmaco S 540 FR, stored in a closed undamaged package, is 12 months.

Store in a dry place with humidity not more than 70% and a temperature not lower than +5°C. Do not use material from a damaged packaging.

TEMPERATURE CONSIDERATION

Material MasterEmaco S 540 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 540 FR in cold-protected places;
- 2) Use hot water for mixing (+30°C to +40°C);
- 3) Cover poured MasterEmaco S 540 FR with heat insulating materials to protect it from cold. If the ambient temperature is below +5°C, use MasterEmaco T 1400 FR.

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 540 FR in a cool place;
- 2) Use cold water for mixing;
- 3) Mix the repair mortar in the coolest period of the day.

WATER CONSUMPTION for mixing MasterEmaco S 540FR (Table 1)

Water amount, liters per 30kg sack	
Minimum	Maximum
4.4	4.7

*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 540 FR.

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REPAIR SURFACE PREPARATION

Use a light perforator, needle gun or water/ sand blasting machine to remove concrete debris, grout or laitance. Make the surface rough and durable. Cut off edges, notches or cracks vertically to a depth of at least 20 mm. This operation is very important, since a rough surface is required for providing good adhesion of MasterEmaco S 540 FR. Thereafter:

- 1) Eliminate all active leaks on the surface to be repaired, using MasterSeal[®] 590.
- 2) Clean the surface from grease, paint, lime, dirt or dust;
- 3) Before placing MasterEmaco S 540 FR, thoroughly soak the substructure under repair with water. Proceed with wetting every 10-15 minutes for at least 3 hours;
- 4) Use compressed air or rags to remove excess water.

MIXING

Prior to mixing MasterEmaco S 540 FR with water, the following is required:

- Check whether the available amount of MasterEmaco S 540 FR is sufficient enough for work completion, considering the coverage, indicated in Table 1;
- 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 540 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 540 FR;
- 4) Once all required amount of MasterEmaco S 540 FR has been added, continue mixing for 3-4 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.

The 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 S 540 FR by hand is not recommended. While mixing, use the entire content of the sack.

APPLICATION

Dependent on the consistency received after mixing MasterEmaco S 540 FR with water, placing procedure is as follows:

- 1) In a plastic consistency (see Table 1 for minimum amount of water), MasterEmaco S 540 FR is applied with a float. Final finishing is reached through smoothing with a wood, plastic or synthetic trowel. The post-application treatment with a trowel may be started only when the concrete has set, i.e. when fingers, pressing the concrete, do not draw into it, but leave only a light footprint.
- 2) In a fluid consistency (see Table 1 for maximum amount of water), MasterEmaco S 540 FR shall be poured into formwork, continuously, without vibrations, and only from one side to prevent air entrapment.
- 3) While repairing horizontal surfaces, MasterEmaco S 540 FR shall be placed in a fluid consistency; a leveling rail is used for finishing and, if required, a trowel is used for smoothing the surface.

TREATMENT

Keep the surface of the placed concrete damp for 24 hours from the mortar placement time, using wet burlap or film-forming compounds MasterKure[®] (MasterTop[®] C) for this purpose.

PRECAUTIONS

MasterEmaco S540 FR contains cement, irritating the skin and mucous membranes. Thus, avoid eye and skin contact. In case of irritation, thoroughly wash the affected area with water and consult a doctor, providing the information about the product.



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SPECIFICATIONS* (Table 2)

Index name	Index	
Maximum size of a filler, mm	2,5	
Fibre filler	Polymer + rigid metal	
Mortar agility by flow cone, mm	190-210	
Agility persistence, min.	minimum 30	
Enlargement in limited state, %	0,05-0,09	
Compressive strength, MPa, minimum		
	1 day	30
	28 days	60
Tensile strength at bending, MPa, minimum		
	1 day	10
	28 days	15
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	
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)"

Represented information is based on our current experience. In case of various factors affecting the result, information does not mean legal responsibility. For additional information, please contact your local advisor.

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