

# MasterEmaco<sup>®</sup> S 5400 (formerly Known as Emaco Nanocrete R4)

High-strength, shrinkage compensated, fibre reinforced, structural repair mortar

## DESCRIPTION

**MasterEmaco S 5400** is a single component, extra high-strength, high modulus, shrinkage compensated structural repair mortar that meets the requirements of the new European Norm EN 1504 part 3 class R4. **MasterEmaco S 5400** contains Portland cement, graded sands, selected polymer fibres and special additives to significantly reduce the risk and incidence of shrinkage cracking. When mixed with water, it forms a highly thixotropic mortar that can easily be spray or trowel applied.

## RECOMMENDED USES

**MasterEmaco S 5400** is used for the structural repair of concrete elements such as:

- Columns, piers and cross beams of all bridges
- Cooling towers and chimneys and other industrial environments
- Water treatment and sewerage facilities
- Tunnels, pipes, outfalls and all below ground construction especially in harsh ground conditions
- Marine structures

## FEATURES AND BENEFITS

- **Versatile** – Can be applied inside and outside, on vertical and overhead surfaces, in dry and wet environments
- **Shrinkage compensation systems and fibre reinforcement** – Minimise crack tendency
- **Highly thixotropic** – Can be applied up to 50 mm without the need of secondary reinforcement
- **High early and ultimate strengths** – Matches high strength concrete found in structures
- **Outstanding workability** – Easy placing and finishing for applicators
- **High modulus and excellent adhesion** – Ensuring load transfer in structural repair
- **Excellent freeze/thaw resistance** – Suitable for all climates
- **High carbonation resistance** – Suitable for exposed repairs in urban environments
- **Sulphate resistant** – Suitable for contact with ground waters

- **Very low permeability to water and chlorides** – Protection of reinforcing steel
- **Low chromate (Cr[VI] < 2 ppm )** – Low risk of skin irritation
- **Chloride-free** – Does add to the chloride load in contaminated structures.

## PROPERTIES

Appearance	Grey powder	
Layer thickness	Min. 5mm Max. 50mm	
Density	Approx. 2.2 g/cm <sup>3</sup>	
Mixing water per 20kg bag	Approx. 3.8 – 4.2 litres	
Working time	45 – 60 minutes	
Application Temperature (support and material)	Between +5 and +35°C	
Compressive strength - after 1 day - after 7 days - after 28 days AS 1478.2 Appendix A (Restrained)	≥16 MPa ≥ 45 MPa ≥ 70 MPa	
E-Modulus (28 days) EN13412	≥ 1.9 GPa	
Adhesion (28 days) EN 1542	≥ 2 MPa	
Adhesion after Freeze/Thaw (50 cycles with salt) EN 13687-1	≥ 2 MPa	
Adhesion after Thunder/Shower (50 cycles) EN 13687-2	≥ 2 MPa	
Adhesion after dry cycling (50 cycles) EN 13687-4	≥ 2 MPa	
Carbonation resistance EN 13295	≤ reference concrete	
Capillary absorption EN 13057	≤ 0.5 kg/m <sup>2</sup> h <sup>0.5</sup>	
Cracking tendency (I) Coutinho type ring	No cracking after 180 days	
Cracking tendency (II) DIN type V-channel	No cracking after 180 days	
VOC Content SCAQMD Test method 304-91	8g/L	

## APPLICATION

### Surface preparation

Concrete must be fully cured with a minimum direct tensile strength of 1.5 MPa. All loose traces of concrete or mortar, dust, grease oil, etc. must be removed. Damaged or contaminated concrete shall be removed to obtain a keyed aggregate exposed



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surface. Non-impact/ vibrating cleaning methods, e.g. grit or high pressure water blasting are recommended. Cut the edges of the repair vertically to a minimum depth of 5 mm. Clean all exposed reinforcement to a minimum grade of Sa 2 according to ISO 8501-1 / ISO 2944-4. Ensure back of rebar is also clean. In case of chloride contamination of the concrete, or when depth of cover is less than 5 mm should the reinforcement be protected by using **MasterEmaco N 5000 CI**

## Mixing

Only full bags are mixed. Damaged or opened bags should not be used. Mix **MasterEmaco S 5400** in a forced action pan mixer, or with a helical paddle attached to a low speed (300-600rpm) mixer for 3 minutes until a lump free, plastic consistency is achieved. Only use clean water. Mixing water needed: 3.8 to 4.2 litres per 25kg bag depending upon consistency required. Allow the mortar to rest for 2 - 3 minutes and then remix briefly, adjusting the consistency when required, without exceeding the maximum water demand.

## Priming Concrete

No special primer is required. To obtain extra strong bonding, the damp substrate can be primed with a slurry brush coat of **MasterEmaco S 5400** (2 parts powder to 1 part water).

## Mortar application

The minimum temperatures must be maintained during application and for at least 24 hours thereafter for optimum curing of the product. The prepared substrate should be pre-soaked, preferably for 24 hours, but at least 2 hours before applying **MasterEmaco S 5400**. The surface must be saturated surface dry, but without standing water. **MasterEmaco S 5400** can be spray or hand applied. Apply mixed product directly to the prepared damp substrate, or wet in wet onto the primed surface. Spraying the material with the

necessary pressure will ensure good adhesion of the material. A thin scrape coat or contact layer before building up to the required thickness, wet on wet, will improve adhesion especially in case of hand application. Apply to the desired layer thickness of 5 to max 50 mm and level using a screeding bar, trowel or wooden board. Can be applied in thicker layers in smaller patches or where additional reinforcement is present. Smoothing with a trowel or finishing by float or sponge can be done as soon as the mortar has begun to stiffen.

## CURING

The following curing methods are recommended - polyethylene film, damp cloths, **Masterkure** curing agents.

## ESTIMATING DATA

One 25kg bag will yield approximately 13 litres of mortar. Approx. 2.2 kg of mixed product per m<sup>2</sup> per mm layer thickness (approx. 2 kg of dry powder per m<sup>2</sup> and mm layer thickness). This consumption is theoretical and depends on the roughness of the support amount of rebar, wastage etc, for which reason it should be verified in each particular job by means of "in situ" tests.

## PACKAGING

**MasterEmaco S 5400** is available in 25kg bags.

## SHELF LIFE

Store in cool and dry warehouse conditions. Shelf life in these conditions is 12 months in unopened original bags.

## PRECAUTIONS

For the full health and safety hazard information and how to safely handle and use this product, please make sure that you obtain a copy of the BASF Material Safety Data Sheet (MSDS) from our office or our website.

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## STATEMENT OF RESPONSIBILITY

The technical information and application advice given in this BASF Construction Chemicals publication are based on the present state of our best scientific and practical knowledge. As the information herein is of a general nature, no assumption can be made as to a product's suitability for a particular use or application and no warranty as to its accuracy, reliability or completeness either expressed or implied is given other than those required by law. The user is responsible for checking the suitability of products for their intended use.

## NOTE

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