

MasterEmaco[®] S 5400 CI (formerly Known as Emaco Nanocrete R4)

High-strength, shrinkage compensated, fibre reinforced, structural repair mortar with active corrosion inhibition

DESCRIPTION

MasterEmaco S 5400 CI 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 CI** 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 CI 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
- Marine structures, water treatment and sewerage facilities
- Tunnels, pipes, outfalls and all below ground construction especially in harsh ground conditions

FEATURES AND BENEFITS

- **Versatile** – Can be applied in extreme environments where active corrosion inhibition is required.
- **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

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| Appearance | Grey powder |
| Layer thickness | Min. 5mm Max. 50mm |
| Density | Approx. 2.2 g/cm ³ |
| Mixing water per 20kg bag | Approx. 3.0 – 3.4 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 ² h ^{0.5} |
| 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 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



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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 CI** 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: 3.0 to 3.4 litres per 20kg 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 CI** (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 CI**. The surface must be saturated surface dry, but without standing water. **MasterEmaco S 5400 CI** 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

Following curing methods are advised - polyethylene film, damp cloths, **Masterkure** curing agents.

ESTIMATING DATA

One 20kg bag will yield approximately 10.5 litres of mortar. Approx. 2.2 kg of mixed product per m² per mm layer thickness (approx. 2 kg of dry powder per m² 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 CI is available in 20kg 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 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

Field service where provided does not constitute supervisory responsibility. Suggestions made by BASF either orally or in writing may be followed, modified or rejected by the owner, engineer or contractor since they, and not BASF, are responsible for carrying out procedures appropriate to a specific application.

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