



The Chemical Company

EMACO[®] NANOCRETE R4

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

DESCRIPTION

Emaco Nanocrete R4 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. **Emaco Nanocrete R4** is a ready-to-use material that contains Portland cement, well graded sands, specially 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 FOR

Emaco Nanocrete R4 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

- Can be applied inside and outside, on vertical and overhead surfaces, in dry and wet environments
- Formulated with shrinkage compensation systems and fibre reinforcement to minimise crack tendency by controlling the Nanostructures in the matrix
- Highly thixotropic - can be applied up to 50 mm without the need of secondary reinforcement
- High early and ultimate strengths
- Outstanding workability for easy placing and finishing
- High modulus and excellent adhesion to host concrete ensuring load transfer
- Excellent freeze/thaw resistance
- High carbonation resistance
- Sulphate resistant
- Very low permeability to water and chlorides
- Low chromate (Cr[VI] < 2 ppm)
- Chloride-free.

PROPERTIES

Property	Value
Appearance	Grey powder
Grain size	Max 1.5 mm
Layer thickness	Min. 5mm Max. 50mm
Density	Approx. 2.2 g/cm ³
Mixing water per 25kg bag	Approx. 3.8 – 4.2 litres
Working time	45 – 60 minutes
Temperature for application (support and material)	Between +5 and +35°C

APPLICATION

Surface preparation - Concrete must be fully cured with a minimum direct tensile strength of 1.5 MPa. All surfaces must be clean and sound to ensure good adhesion. 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 surface. Non-impact/vibrating cleaning methods, e.g. grit or high pressure water blasting are recommended. The aggregate should be clearly visible on the surface of the concrete after preparation. 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. Only 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 **Emaco Nanocrete AP** (see technical data sheet).

Priming Concrete - No special primer is required. To obtain extra strong bonding, the damp substrate can be primed with a slurry brush coat of **Emaco Nanocrete R4** (2 parts powder to 1 part water).

Mixing - It is strongly recommended that only full bags are mixed. Damaged or opened bags should not be used. Mix **Emaco Nanocrete R4** in a forced action pan mixer, or with a suitable paddle attached to a powerful electric drill for 3 minutes until a lump-free, plastic consistency is achieved. Only use drinking quality 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.

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 **Emaco Nanocrete R4**. The surface must be mat-damp, but without standing water. **Emaco Nanocrete R4** 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.



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NOTE

- Do not add cement, sand or other substances that could affect the properties of the material.
- Never add water or fresh mortar to a mortar mix which has already begun to set.

CURING

Following curing methods are advised - 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 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.

CLEANING

While still wet clean with water. Once dry/cured the material can only be removed mechanically.

TECHNICAL DATA

Compressive strength	AS 1478.2	
- after 1 day	Appendix A (Restrained)	≥ 18 MPa
- after 7 days		≥ 40 MPa
- after 28 days		≥ 60 MPa
E-Modulus (28 days)	prEN13412	≥ 19 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	prEN 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

Hardening times are measured at 21°C ± 2°C and 60% ± 10% relative humidity. Higher temperatures will reduce these times and lower temperatures will extend them. Technical data shown are statistical results and do not correspond to guaranteed minima. Tolerances are those described in appropriate performance standards

SENcreteR4/6/1210

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. **BASF Construction Chemicals data sheets are updated on a regular basis and it is the user's responsibility to obtain the most recent issue.**

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 Construction Chemicals**, are responsible for carrying out procedures appropriate to a specific application.

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