

MAPEMORTAR HB R3 ZERO

A medium strength, high build, shrinkage compensated repair mortar for repairing concrete



CO₂ FULLY OFFSET PRODUCTS

Mapemortar HB R3 Zero is part of the CO₂ Fully Offset in the Entire Life Cycle line of products. CO₂ emissions measured throughout the life cycle of products from the Zero line in 2024 using Life Cycle Assessment (LCA) methodology, verified and certified with EPDs, have been offset through the acquisition of certified carbon credits in support of forestry protection projects. A commitment to the planet, to people and to biodiversity. For more details on how emissions are calculated and on climate mitigation projects financed through certified carbon credits, visit the webpage zero.mapei.com.

DESCRIPTION

A medium strength high build repair mortar meets EN 1504-3 R3 classification.

WHERE TO USE

Repairing damaged concrete surfaces in overhead, vertical and horizontal situations, where a medium strength high build mortar is required.

APPLICATION EXAMPLES

- Repair of damaged concrete surfaces, corners of beams, columns and other concrete members damaged by corroded steel.
- Repairs to bridges, culverts and diaphragms etc.
- Repairs to concrete walls and tunnel linings.
- Repairs to concrete segments.
- Repairs to balconies and soffits.

TECHNICAL CHARACTERISTICS

Mapemortar HB R3 Zero is a premixed powder mortar composed of cement, graded aggregates and special additives from a formula developed in the Mapei research laboratories.

When mixed with water **Mapemortar HB R3 Zero** forms an easy to apply high build mortar that can be applied without slumping even in substantial thicknesses on vertical surfaces without the aid of formwork.

When fully cured **Mapemortar HB R3 Zero**:

- has moderate flexural and compressive strength;
- has a modulus of elasticity, thermal expansion coefficient and permeability coefficient similar to medium strength concrete;

- has excellent adhesion to existing concrete surfaces providing they have been pre-soaked and still damp with clean water;
- reinforcing bars should be treated with **Mapefer** or **Mapefer 1K Zero**.

If **Mapemortar HB R3 Zero** is prepared by only adding water, it should be cured under damp conditions in order to guarantee that the products expansive properties develop correctly and completely.

Mapemortar HB R3 Zero meets the requirements defined by EN 1504-9 (*"Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - General principles for the use of products and systems"*) and the minimum requirements claimed by EN 1504-3 (*"Structural and non-structural repair"*) for structural mortars of class R3.

RECOMMENDATIONS

- Do not use **Mapemortar HB R3 Zero** to repair structures subject to high compressive loads, high impact or abrasion: use **Mapegrout T60** or **Mapegrout Thixotropic Zero** instead.
- Do not use **Mapemortar HB R3 Zero** on smooth concrete surfaces. Roughen the surface thoroughly and add reinforcing steel if required.
- Do not use **Mapemortar HB R3 Zero** for anchoring (use **Mapefill GP Zero**).
- Do not add water once the mix has started to set.
- Do not add cement or admixtures to the **Mapemortar HB R3 Zero**.
- Do not use **Mapemortar HB R3 Zero** at temperatures below +5°C.
- Do not use **Mapemortar HB R3 Zero** if the bag is damaged or has been previously used.
- Always use full bag mixes.

HOW TO USE

Preparation of the substrate

Remove degraded and damaged concrete until the substrate is solid, resistant and rough. Any previous repair work that is no longer thoroughly bonded should be removed.

Gritblast the concrete and reinforcing bars to ensure any corrosion is removed as well as any dirt, concrete laitance, grease, oils or coatings.

Saturate the substrate with clean water. Before repairing with **Mapemortar HB R3 Zero**, wait until the excess water has evaporated. To facilitate this the use of compressed air may be required. A slurry made from **Mapemortar HB R3 Zero** could be used if it is not possible to pre-soak the substrate.

PREPARING THE MORTAR

Measure the amount of clean water needed into the mixer to obtain the required consistency for the application.

APPLICATION	LITRES OF WATER PER 25 KG BAG
Trowel application	3.4 litres
Hand application	3.6 litres

Start the mixer and slowly add the **Mapemortar HB R3 Zero** to the water in a continuous way.

Mix for 1-2 minutes, then make sure that the mix is well blended. Scrape any unblended powder from the bottom and sides of the mixing drum, and then mix for a further 3 minutes.

Either a forced action mixer or a suitable drill and paddle may be used according to the amount of mortar required. Mixing must be carried out at low speeds to avoid air being entrapped in the mix.

Avoid mixing manually unless absolutely necessary. If so, mix small amounts at a time for at least 5 to 6 minutes until a completely homogeneous mix is achieved.

It is important, to keep in mind if mixing by hand more water will be required. This will affect the mortars characteristics including its mechanical strength, shrinkage and impermeability.

Mapemortar HB R3 Zero remains workable for approximately 40 mins at +20°C.

The expansion of **Mapemortar HB R3 Zero** is calculated to compensate for plastic shrinkage. For it to be effective the substrate needs to be adequately reinforced with rebars or forms. The expansion phase ends



during the first days of curing.

Instructions for the preparation of mortar for Lab testing samples can be found in the "TECHNICAL DATA" section.

APPLICATION PROCEDURE

The **Mapemortar HB R3 Zero** can be applied by trowel or by gloved hand on vertical surfaces or overhead situations with or without formwork to a depth of 70mm per layer.

Reinforcing bars should be treated with **Mapefer** or **Mapefer 1K Zero** before applying the **Mapemortar HB R3 Zero**.

Where required apply a second layer of **Mapemortar HB R3 Zero** before the previous layer has cured.

The complete system calls for smoothing with **Planitop 200**, **Monofinish** or **Mapelastic** and then protecting with **Elastocolor Pittura Zero**.

TECHNICAL INFORMATION FOR APPLICATION

Composition of mix:	100 kg of Mapemortar HB R3 Zero 13.5-14.5 kg of water
Coat thickness:	up to 70 mm
Application temperature range:	surrounding temperature and substrate temperature from +5°C to +35°C
Pot life of mix:	approx. 40 min. (at +20°C)

PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

Only use bags of **Mapemortar HB R3 Zero** which have been stored on their original pallets and covered and stored in a dry place. In warm weather do not expose the material to direct sunlight. Use clean cold water to prepare the mix. Store in a cool place. At low temperatures prepare the mix with water that has been heated to approx. +20°C.

After applying **Mapemortar HB R3 Zero**, we recommend that it is cured carefully, especially in hot and windy conditions, to avoid the water evaporating too quickly and causing the formation of surface cracks due to plastic shrinkage. Spray water on the surface 8-12 hours after applying the mortar, and repeat the operation every 3-4 hours for at least the first 48 hours. As an alternative after smoothing the mortar apply a coating of either **Mapecure E** or **Mapecure S**.

If a coating is to be applied to the repair areas then the **Mapecure** should be removed by a light Gritblast, alternatively a coat of **Elastocolor Primer** can be used as the curing membrane followed by the final protective layer of **Elastocolor Pittura Zero** or **Elastocolor Rasante** without removing the primer coat.

CLEANING

Mortar that has not yet hardened can be removed from tools with water. If the mortar has set then mechanical methods of cleaning will need to be adopted.

CONSUMPTION

Approx. 16.5 kg/m² per cm of thickness.

PACKAGING

25 kg bags.

STORAGE

12 months, if stored in a dry, sheltered place.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Instructions for the safe use of our products can be found on the latest version of the Safety Data Sheet, available from our website www.mapei.co.uk.
PRODUCT FOR PROFESSIONAL USE.

TECHNICAL DATA (typical values)

PRODUCT IDENTITY

Class according to EN 1504-3:	R3
Type according to EN 1504-1:	PCC
Consistency:	powder
Colour:	grey
Maximum size of aggregate:	1.0 mm
Ion-chloride content according to EN 1015-17: (minimum requirement according to EN 1504 $\leq 0.05\%$)	$\leq 0.05\%$

TECHNICAL INFORMATION FOR THE PREPARATION OF PRODUCT

Composition of mix:	100 parts by weight of Mapemortar HB R3 Zero with 14 % water
Preparation of mix:	mixing according to EN 196-1

CHARACTERISTICS OF FRESH MIX (at +20°C - 50% R.H.)

Colour of mix:	grey
Consistency of mix:	Thixotropic
Density of mix:	1850 kg/m ³

FINAL PERFORMANCE

According to curing defined in test methods

Performance characteristic	Test method	Requirements EN 1504-3 R3	Product performance
Compressive strength: - 1 day - 7 days - 28 days	EN 12190	- - ≥ 25 Mpa	12 MPa 30 MPa 36 MPa
Flexural strength: - 1 day - 7 days - 28 days	EN 196-1	Not required	2 MPa 4 MPa 7 MPa
Compressive modulus of elasticity:	EN 13412	≥ 15 GPa	> 15 GPa
Bond strength by pull-off:	EN 1542	≥ 1.5 MPa	2.0 MPa
Capillary absorption:	EN 13057	≤ 0.5 kg/m ² ·h ^{0.5}	< 0.5 kg/m ² ·h ^{0.5}
Thermal compatibility - freeze-thaw cycles using de-icing salts (50 cycles):	EN 13687-1	≥ 1.5 MPa	> 2.0 MPa
Reaction to fire:	EN 13501-1	Euroclass	E / E _{FL}

NOTES:

Preparation of samples: compaction according to EN 196-1

WARNING

Although the technical details and recommendations contained in this product data sheet correspond to the best of our knowledge and experience, all the above information must, in every case, be taken as merely indicative and subject to confirmation after long-term practical application; for this reason, anyone who intends to use the product must ensure beforehand that it is suitable for the envisaged application. In every case, the user alone is fully responsible for any consequences deriving from the use of the product.

"The values declared in the TECHNICAL DATA table (typical values) were obtained in compliance with test methods and curing cycles defined in the technical standards referenced therein. Therefore, please note that the use of test procedures or methods other than those indicated in the table could lead to different values and that, in such cases, any liability of our company is excluded."

Please refer to the current version of the Technical Data Sheet, available from our website www.mapei.co.uk

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