PLANITOP RASA & RIPARA R4 ZERO

PLANITOP SMOOTH & REPAIR R4 ZERO

Structural R4-class, quick-setting, shrinkage compensated, thixotropic, fibre-reinforced, cementitious mortar, applied in a single layer from 3 to 40 mm thick, for repairing and skimming concrete

BENEFITS AND FEATURES

- Structural repair
- Quick-setting
- Can also be applied at low thickness
- Natural fine-grained finish
- High crack resistance
- Can be painted directly

CO_2 FULLY OFFSET PRODUCTS

Planitop Rasa & Ripara R4 Extra Zero is part of the CO_2 Fully Offset in the Entire Life Cycle line of products.CO_2 emissions measured throughout the life cycle of products from the Zero line in 2025 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.

WHERE TO USE

Structural repair and skimming of horizontal and vertical concrete surfaces, both indoors and outdoors. It is suitable for repairing structures exposed to the elements or in permanent contact with water.

Some application examples

MAPEI

- Rapid repair of damaged concrete in beams, columns, infill walls, cornices, balcony edges, and other structural elements where a high-performance mortar is required.
- Rapid smoothing of defects in cast concrete, such as deep honeycombing areas, spacer holes, and construction joints, before subsequent painting.
- Repair and structural reinforcement of concrete by adding mortar.
- Repair of precast concrete elements.
- Repair of concrete damaged by oxidation of reinforcing bars due to carbonation.

TECHNICAL CHARACTERISTICS

Planitop Rasa & Ripara R4 Zero is a one-component, thixotropic mortar composed of special, highly reactive hydraulic binders, selected fine aggregates, synthetic polyacrylonitrile fibres, synthetic polymers, and special additives according to a formula developed in the MAPEI Research Laboratories.
Thanks to its formulation, the mortar features excellent fatigue performance, withstanding at least 300,000 cycles, providing the restored elements with high crack resistance even under dynamic stresses induced by normal service conditions.
This particular characteristic, in addition to the requirements set by EN 1504, helps to enhance the durability of the elements restored using **Planitop Rasa & Ripara R4 Zero**.
After mixing, the product produces a mortar with good workability, with setting and hardening times that can be adjusted by adding **Mapetard ES**. It is applied with a gauging trowel or spatula in a single layer, from 3 to 40 mm thick, for repairing and skimming concrete surfaces.
Planitop Rasa & Ripara R4 Zero cures without shrinkage and has excellent adhesion on concrete substrates.
Once hardened, **Planitop Rasa & Ripara R4 Zero** features the following characteristics:

- excellent adhesion to both existing concrete (≥ 2 MPa), if pre-wetted with water, and to steel reinforcement, particularly when treated with **Mapefer** or **Mapefer 1K Zero** anti-corrosion and re-alkalising cementitious mortars, certified EN 1504-7 *"Reinforcement corrosion protection"*;
- high dimensional stability, and therefore a low risk of cracking and crazing both during the plastic phase and after hardening;
- thermal compatibility with freeze/thaw cycles, measured as bond strength according to EN 1542;
- high resistance to carbonation;
- impermeability to water.

Planitop Rasa & Ripara Zero has very low emissions of VOC to protect the health of both applicators and end users, and is certified EC1 Plus by the German association GEV.
Planitop Rasa & Ripara R4 Zero contributes to the achievement of important LEED credits.
Planitop Rasa & Ripara R4 Zero complies with the principles defined in 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 use of products and systems*"), and the minimum requirements of EN 1504-3 (*"Structural and non-structural repair"*)for R2-class non-structural mortars and with the requirements of EN 1504-2 standard coating (C), according to principles MC and IR (*"Concrete surface protection systems"*).

RECOMMENDATIONS

- Do not add water to the mix once it has started to set in an attempt to make it workable again.
- Do not add cement or admixtures, with the exception of **Mapetard ES**.
- Do not apply **Planitop Rasa & Ripara R4 Zero** on smooth substrates: the surface must be roughened.
- Do not apply **Planitop Rasa & Ripara R4 Zero** on dry substrates.
- Do not use **Planitop Rasa & Ripara R4 Zero** for precision anchoring (use **Mapefill Zero** or **Mapefill R**).
- Do not leave bags of **Planitop Rasa & Ripara R4 Zero** exposed to direct sunlight before use.
- Do apply **Planitop Rasa & Ripara R4 Zero** if the temperature is lower than +5°C.
- Do not use **Planitop Rasa & Ripara R4 Zero** if the bag is damaged or has been previously opened.

APPLICATION PROCEDURE

TECHNICAL INFORMATION FOR THE APPLICATION	
Composition of the mix:	100 kg of **Planitop Rasa & Repair R4Zero** 17.5-18.5 kg of water *If the **Planitop Rasa & Ripara R4 Zero** mixture is admixed with **Mapetard ES** (1 kg per 100 kg of product), the amount of mixing water should be reduced by 0.2-0.3 kg.*
Thickness applied:	from 3 to 40 mm
Recommended application temperature:	surrounding and substrate temperature from +5°C to +35°C
Pot life of mix:	about 10 min (at +20°C). *The addition of **Mapetard ES** extends the workability of **Planitop Rasa & Ripara R4 Zero** by 15-20 minutes.*
Waiting time before floating:	approx. 20 min.
Setting time:	approx. 30 min.

Preparation of the substrate

- Remove all damaged or detached concrete areas until a sound, strong and rough substrate is obtained. Any previous repair work and any other coatings that are not fully bonded must be removed using appropriate equipment (mechanical breakers, hydro-demolition, etc.).
- Clean concrete from previous scarifying works and clean reinforcing rods from dust, cement laitance, rust, grease, oil, paint and other contaminants through sandblasting and high-pressure water jets.
- After preparation, the concrete surface to be repaired must be rough, with irregularities at least 5 mm deep and the aggregates exposed to allow correct adhesion of the mortar to the substrate.
- Treat any exposed rebar with **Mapefer** or **Mapefer 1K Zero** according to the procedure illustrated in the respective Technical Data Sheet for each product. Before applying **Planitop Rasa & Ripara R4 Zero**, allow **Mapefer** or **Mapefer 1K Zero** to dry completely.
- Saturate the substrate with water.
- Wait until any excess water has evaporated before applying **Planitop Rasa & Ripara R4 Zero**. If necessary, use compressed air to facilitate the removal of free water. The substrate must be saturated with water but surface-dry (SSD).

Preparation of the mortar

Pour approximately 4.4 L of clean water into a container and gradually add one 25 kg bag of **Planitop Rasa & Ripara R4 Zero** while mixing.
Stir the mixture thoroughly for a few minutes, ensuring all traces of dust are removed from the sides and bottom of the container.
Add additional water to achieve the desired consistency without exceeding the recommended amount (4.4-4.65).
Continue mixing for a few minutes until a lump-free, homogeneous mix with a plastic consistency is obtained. To facilitate a homogeneous mix, it is recommended to use an immersion mixer or a spiral mixing attachment mounted on a low-speed drill to avoid air entrainment. Preparing the mix by hand is not recommended, as it would require more water than the recommended amount. If this type of preparation is unavoidable, use a trowel to press the mortar against the sides of the container to break up any lumps.
Planitop Rasa & Ripara R4 Zero remains workable for approximately 10 minutes at temperatures between +10°C and +25°C.
If, due to specific jobsite requirements or high temperatures, the workability of **Planitop Rasa & Ripara R4 Zero** needs to be extended, add **Mapetard ES**, retarding admixture for rapid-setting cementitious mortars, to the mix. The admixture, added in a maximum amount of one 0.25-kg bottle per 25-kg bag of **Planitop Rasa & Ripara R4 Zero**, allows the already excellent workability of the mortar to be extended by an additional 15 to 20 minutes.
The addition of **Mapetard ES** to **Planitop Rasa & Ripara R4 Zero** produces a slight plasticizing effect, reducing the required mixing water by 0.2-0.3 L. In this case, pour approximately 4.1 L of clean water and one bottle of

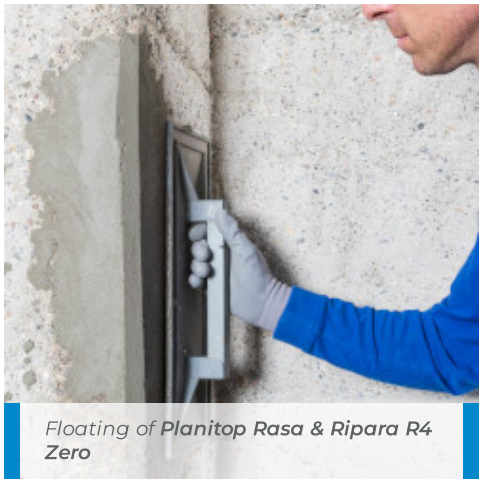
Mapetard ES into a container, then gradually add one 25 kg bag of **Planitop Rasa & Ripara R4 Zero** while mixing.
Stir the mixture thoroughly for a few minutes, ensuring all traces of dust are removed from the sides and bottom of the container.
Add additional water to achieve the desired consistency without exceeding the recommended amount (4.35 L).
The instructions for preparing the mortar for the creation of concrete samples for laboratory testing are provided in the TECHNICAL DATA table.

Application of the mortar

Apply the mortar with a gauging trowel or flat trowel, without the need for formwork, at a thickness of 3–40 mm. Finish the surface with a sponge float as soon as the mortar begins to set. The waiting time before performing this operation varies depending on weather conditions. Apply a colored, protective finish using an elastomeric product from the **Elastocolor** range or an acrylic product from the **Colorite** range. Finishes are available according to the colour chart or in a wide range of shades provided by **ColorMap**® automatic tinting system.
If the structures to be repaired are subject to high dynamic stresses, it is recommended to apply a 2 mm elastic skim coat made with **Mapelastic Zero**, **Mapelastic Guard Zero** or **Mapelastic Smart** before applying the coloured finish. In this case, **Elastocolor Pittura Zero** is the only finish to be used.
The product is not compatible with rendering machines.

*Mixing of **Planitop Rasa & Ripara R4 Zero***

*Application of **Planitop Rasa & Ripara R4 Zero***



*Floating of **Planitop Rasa & Ripara R4 Zero***

PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

- To prepare the mortar, use only **Planitop Rasa & Ripara R4 Zero** bags that have been stored on their original pallets, in a covered area.
- In hot weather, store the product in a cool area and use cold water to prepare the mix.
- In cold weather, store the product in a frost-protected area and use lukewarm water to prepare the mortar.
- After applying and floating the mortar, it is recommended to carefully cure **Planitop Rasa & Ripara R4 Zero**, especially in hot or windy conditions, to prevent rapid evaporation of the mixing water, which could cause surface cracking due to plastic shrinkage. Spray water on the surface for at least 24 hours after application, or use a curing agent from the **Mapecure** range. In this case, before applying any other product, it is important to clean the surface by sandblasting or hydroblasting, as the curing agent can prevent adhesion of subsequent finish coats.

CLEANING

Remove the mortar from tools with water before it hardens. After setting, cleaning becomes very difficult and can only be carried out mechanically.

CONSUMPTION

Approx. 17 kg/m² per cm of thickness.

PACKAGING

25 kg bags.

STORAGE

Planitop Rasa & Ripara R4 Zero can be stored for 12 months in its original packaging.
The special packaging, in 25 kg vacuum-sealed polyethylene bags, provides greater protection of the product against accidental rain.
Some characteristics of the product are particularly sensitive to storage conditions. Store the product in a dry, covered area, at a temperature between +5°C and +35°C in its original, well-sealed packaging.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Instructions for the safe use of our products can be found on the latest version of the SDS available from our website www.mapei.com.
PRODUCT FOR PROFESSIONAL USE.

TECHNICAL DATA (typical values)

PRODUCT IDENTITY	
Class according to EN 1504-3:	R4
Type according to EN 1504-1:	CC
Classification according to EN 1504-2 (methods and principles):	Coating (C) – principles MC and IR
Consistency:	powder
Colour:	grey
Maximum size of aggregate:	0.4 mm
Chloride ion content according to EN 1015-17: (minimum requirements according to EN 1015 ≤ 0.05%)	≤ 0.05 %

TECHNICAL INFORMATION FOR PRODUCT PREPARATION	
Mixing ratio:	100 parts by weight of **Planitop Rasa & Ripara R4 Zero** with 18% of water
Preparation of mix:	Mix the product in accordance with EN 196-1

CHARACTERISTICS OF FRESH MIX (at +20°C - 50% R.H.)	
Colour of the mix:	grey
Consistency of mix:	thixotropic spreadable
Density of the mix:	2,000 kg/m³

FINAL PERFORMANCE *According to the curing times defined in the test methods*

Performance characteristic	Test method	Requirements according to EN 1504-2 (C) MC and IR	Requirements according to EN 1504-3 R4	Product performance
Compressive strength:	EN 12190	not required	≥ 45 MPa	
- **4 hours**				**12 MPa**
- **24 hours**				**22 MPa**
- **7 days**				**32 MPa**
- **28 days**				**50 MPa**
Flexural strength:	EN 196-1	not required	not required	
- **24 hours**				**3 MPa**
- **7 days**				**6 MPa**
- **28 days**				**8 MPa**
Compressive modulus of elasticity:	EN 13412	not required	≥ 20 GPa	**24 GPa**
Bond strength to concrete by pull-off:	EN 1542	for flexible systems without traffic ≥ 1.0 MPa	≥ 2.0 MPa	**≥ 2.0 MPa**
Thermal compatibility – freeze-thaw cycling with de-icing salt (50 cycles):	EN 13687-1	not required	≥ 2.0 MPa	**≥ 2.0 MPa**
Capillary absorption:	EN 13057	not required	≤ 0.5 kg/m^2·h^{05}	**≤ 0.5 kg/m^2·h^{05}**
Impermeability expressed as coefficient of permeability to free water*W*:	EN 1062-3	W < 0.1 kg/m^2·h$^{0.5}$	not required	***W*** **< 0.1 kg/m^2-h$^{0.5}$ Class W_3** ***(low water permeability) according to EN 1062-1***
Permeability to water vapour (wet-cup - method B) expressed as equivalent air thickness S_d:	EN ISO 7783	Class I S_d < 5 m Class II 5 m ≤ S_d ≤ 50 m Class III S_d > 50 m	not required	**S_d < 5 m Class I** ***(ermeable to water vapour)***
Resistance to accelerated carbonation:	EN 13295	not required	Depth of carbonation ≤ to reference concrete	**meets specifications**
Resistance to cracking:	"O Ring test"	not required	not required	**no cracks after 180 days**
Reaction to fire:	EN 13501-1	Euroclass	Euroclass	**A1**

NOTES:

Specimens preparation: compaction in compliance with EN 196-1.

*The final performance characteristics of **Planitop Rasa & Ripara R4 Zero**, when mixed with **Mapetard ES**, do not differ from those of the non-admixed product.*

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.
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.com

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The contents of this Technical Data Sheet ("TDS") may be copied into another project-related document, but the resulting document shall not supplement or replace requirements per the TDS in force at the time of the MAPEI product installation.
The most up-to-date TDS can be downloaded from our website www.mapei.com.

ANY ALTERATION TO THE WORDING OR REQUIREMENTS CONTAINED OR DERIVED FROM THIS TDS EXCLUDES THE RESPONSIBILITY OF MAPEI.

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