



# Planitop Smooth & Repair R2



**R2-class, rapid-setting shrinkage-compensated, thixotropic, fibre-reinforced, cementitious mortar applied in a single layer from 3 to 40 mm thick, for repairing and smoothing concrete**



## WHERE TO USE

Non-structural repairs and smoothing layers on internal and external, horizontal and vertical concrete surfaces, suitable for repairing structures exposed to the open air and in permanent contact with water.

### Some typical application examples

- Quick repairs to deteriorated parts in concrete, the corners of beams, pillars, buffer walls, cornices and the front edges of balconies.
- Quickly smoothing over surface defects in cast concrete, such as honeycombs, spacer holes, construction joints, etc., before painting the surface.
- Repairing and smoothing over concrete mouldings on civil buildings, such as skirt roofs and protruding decorative elements.
- Repairing pre-cast concrete structures.

## TECHNICAL CHARACTERISTICS

**Planitop Smooth & Repair R2** is a one-component, thixotropic mortar with very low emission of volatile organic compounds (EMICODE EC1 R Plus) made from special hydraulic binders, fine selected aggregates, synthetic polyacrylonitrile fibres, synthetic polymers and special admixtures, according to a formula developed in the MAPEI Research & Development Laboratories. After mixing, the product forms mortar with good workability and with setting and hardening times that can be modulated by adding **Mapetard ES**. It is applied by trowel in a single layer from 3 to 40 mm thick to repair and smooth over concrete.

**Planitop Smooth & Repair R2** hardens without shrinking and is characterised by its excellent adhesion to concrete substrates.

After hardening, **Planitop Smooth & Repair R2** has the following characteristics:

- excellent bond strength to both old concrete ( $\geq 1.5$  MPa) if wetted beforehand with water, and steel reinforcement, especially when treated with **Mapefer** or **Mapefer 1K** anti-corrosion and re-alkalising cementitious mortars, certified EN 1504-7 "Corrosion protection of reinforcement";
- high dimensional stability and, therefore, low risk of cracking during the plastic phase and when hardened;
- thermal compatibility to freeze/thaw cycles, measured as adhesion according to EN 1542;
- low permeability to water.

**Planitop Smooth & Repair R2** meets the requirements of EN 1504-9 ("Products and systems for protecting and repairing concrete structures: definitions, requirements, quality control and conformity assessment. General principles for the use of products and systems") and the minimum requirements of EN 1504-3 ("Structural and non-structural repairs") for non-structural R2-class mortars and the requirements of EN 1504-2 coating (C) according to principles MC and IR ("Concrete surface protection systems").

## RECOMMENDATIONS

- Do not apply **Planitop Smooth & Repair R2** on smooth substrates: roughen surfaces beforehand.
- Do not apply **Planitop Smooth & Repair R2** on dry substrates.
- Do not add cement or admixtures, except **Mapetard ES**.

## Planitop Smooth & Repair R2



Application of Planitop Smooth & Repair R2 by trowel



Application of Planitop Smooth & Repair R2 with a spatula

- Do not add water to the mix to make it more workable once it starts to set.
- Do not leave bags of **Planitop Smooth & Repair R2** exposed to the sun before use.
- Do not use **Planitop Smooth & Repair R2** if the temperature is lower than +5°C.
- Do not use **Planitop Smooth & Repair R2** if the bag is damaged or if it has been opened previously.
- Do not use **Planitop Smooth & Repair R2** for fixing elements accurately in place (use **Mapefill** or **Mapefill R**).

### APPLICATION PROCEDURE

#### Preparation of the substrate

- Remove all deteriorated and loose concrete to form a solid, rough and strong substrate. Any areas previously repaired and which are not perfectly bonded must also be removed.
- Remove all dust, rust, cement laitance, grease, oil and paint from the concrete and reinforcement rods by sandblasting or hydro-sandblasting.
- Treat reinforcement rods with **Mapefer** or **Mapefer 1K**, according to the procedure illustrated in the relative Technical Data Sheet for each product.
- Wait until **Mapefer** or **Mapefer 1K** has dried.
- Saturate the substrate with water.
- Before carrying out repairs with **Planitop Smooth & Repair R2**, wait until excess water has evaporated off. If necessary, use compressed air to help remove excess water. The substrate must be saturated with water but with a dry surface.

#### Preparation of the mortar

Pour approximately 4.2 litres of clean water into a container and slowly add a 25 kg bag of **Planitop Smooth & Repair R2** while mixing.

Carefully mix the blend for several minutes then remove any powder which has stuck to the sides and bottom of the container. Add more water to obtain the consistency required without exceeding the recommended amount (approximately 4.3-4.8 litres). Mix again for several minutes to form a well-blended, plastic consistency, lump-free mix.

To make it easier to form a smooth, even paste, use an immersion mixer or a low-speed drill with a spiral mixing attachment to avoid dragging air into the mix. Mixing by hand is not recommended, more than the recommended amount of water would be required. If manual mixing is unavoidable, use a trowel and press the mortar against the sides of the container to break down all the lumps.

**Planitop Smooth & Repair R2** remains workable for around 15 minutes at +10°C to +25°C. If the workability time of **Planitop Smooth & Repair R2** needs to be increased due to specific site requirements or if the weather is particularly hot, the set-retarding admixture **Mapetard ES** for rapid-setting cementitious mortar may be added to the product.

This special additive, which may be added at a rate of up to one 0.25 kg canister every

25 kg bag of **Planitop Smooth & Repair R2**, allows the already excellent workability time of the mortar to be extended by a further 15-20 minutes.

Thanks to its slight plasticising effect, adding **Mapetard ES** to **Planitop Smooth & Repair R2** allows the amount of mixing water to be reduced by 0.2-0.3 litres. In this case, pour approximately 4 litres of clean water and a canister of **Mapetard ES** into a container and slowly add a 25 kg bag of **Planitop Smooth & Repair R2** while mixing. Carefully mix the blend for several minutes then remove any powder which has stuck to the sides and bottom of the container. Add more water to obtain the consistency required without exceeding the recommended maximum amount of approximately 4.5 litres.

#### Application of the mortar

Apply a layer of mortar from 3 to 40 mm thick with a trowel or putty knife; no formwork is required.

As soon as the mortar starts to set, tamp the surface with a sponge float. The waiting time required before carrying out this operation depends on surrounding weather conditions. To paint and protect the surface, apply a coat of an elastomeric product from the **Elastocolor** line or an acrylic product from the **Colorite** line. The finishes available may be chosen from product's relative colour chart or from a much wider range of shades available using the **ColorMap®** automatic colouring system. If the structures to be repaired are subject to high dynamic stress, it may be advantageous to apply a 2 mm thick layer of flexible smoothing and levelling compound such as **Mapelast**, **Mapelast Guard** or **Mapelast Smart** before applying the coloured finish. In such cases, **Elastocolor Paint** must be used for the coloured finishing coat.

### PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION

- Only use bags of **Planitop Smooth & Repair R2** which have been stored on their original, covered pallets.
- 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 closed area at a temperature of +20°C and protect from frost. Use tepid water to prepare the mortar.
- After applying and tamping the mortar, particularly in hot or windy weather, we recommend curing **Planitop Smooth & Repair R2** carefully to avoid the mixing water evaporating too quickly, otherwise surface cracks may appear due to plastic shrinkage. Spray water on the surface for at least 24 hours after applying the mortar or use a curing agent from the **Mapecure** range. If a curing agent is applied, make sure that it is removed from the surface by sand-blasting or hydro-blasting before applying any other product, since the curing agent may impede a good bond of successive coating layers.

#### Cleaning

Mortar which has not yet hardened may



**Planitop Smooth & Repair R2: thixotropic, fibre-reinforced, rapid-setting, shrinkage-compensated cementitious mortar for repairing and smoothing concrete conforming to the requirements of EN 1504-3 class R2 and EN 1504-2 coating (C), principles MC and IR**

## TECHNICAL DATA (typical values)

### PRODUCT IDENTITY

Class according to EN 1504-3:	R2
Type:	PCC
Consistency:	powder
Colour:	grey
Maximum diameter of aggregate (EN 1015-1) (mm):	0.4
Bulk density (kg/m³):	1,200
Dry solids content (%):	100
Ion chloride content: – minimum requirement $\leq 0.05\%$ - according to EN 1015-17 (%):	$\leq 0.05$
EMICODE:	EC1 R Plus - very low emission

### APPLICATION DATA OF PRODUCT (+20°C – 50% R.H.)

Colour of mix:	grey
Mixing ratio:	100 parts of <b>Planitop Smooth &amp; Repair R2</b> with 17-19 parts of water (4.3-4.8 litres of water per 25 kg bag) (*)
Consistency of mix:	thixotropic – trowellable
Density of mix (EN 1015-6) (kg/m³):	1,800
pH of mix:	12
Application temperature range:	from +5°C to +35°C
Pot life of mix:	approx. 15 minutes (**)
Waiting time before finishing with float:	approx. 30 minutes
Setting time:	approx. 30 minutes

### FINAL PERFORMANCE (18% mixing water)

Performance characteristic	Test method	Requirements according to EN 1504-2 coating (C) principles MC and IR	Requirements according to EN 1504-3 for R2-class mortar	Performance of product
Compressive strength (MPa):	EN 12190	not required	$\geq 15$ (after 28 days)	$\geq 5$ (after 1 day) $\geq 15$ (after 7 days) $\geq 18$ (after 28 days)
Flexural strength (MPa):	EN 196/1	not required	not required	$\geq 2$ (after 1 day) $\geq 3$ (after 7 days) $\geq 4$ (after 28 days)
Compressive modulus of elasticity (GPa):	EN 13412	not required	not required	13 (after 28 days)
Bond strength on concrete (substrate type MC 0.40) according to EN 1766 (MPa):	EN 1542	for rigid systems with no traffic: $\geq 1.0$	$\geq 0.8$ (after 28 days)	$\geq 1.5$ (after 28 days)
Thermal compatibility measured as bond strength according to EN 1542 (MPa): – freeze-thaw cycles with de-icing salts:	EN 13687/1	for rigid systems with no traffic: $\geq 1.0$	$\geq 0.8$ (after 50 cycles)	$\geq 1.5$
Capillary absorption (kg/m²·h <sup>0.5</sup> ):	EN 13057	not required	$\leq 0.5$	$\leq 0.4$
Impermeability expressed as coefficient of permeability to free water (kg/m²·h <sup>0.5</sup> ):	EN 1062-3	$W < 0.1$	not required	$W < 0.1$ Class III (low permeability to water) according to EN 1062-1
Permeability to water vapour – equivalent air thickness $S_D$ (m):	EN ISO 7783-1	Class I $S_D < 5$ m Class II $5 \text{ m} \leq S_D \leq 50$ m Class III $S_D > 50$ m	not required	$S_D < 5$ Class I (permeable to water vapour)
Reaction to fire:	EN 13501-1	Euroclass		A1



**Smoothing of Planitop Smooth & Repair R2 with a straight edge**



**Tamping Planitop Smooth & Repair R2**

(\*) If **Planitop Smooth & Repair R2** is admixed with **Mapetard ES** (one 0.25 kg canister per 25 kg bag) the mixing water must be reduced by 0.2-0.3 l.

(\*\*) Adding **Mapetard ES** extends the workability time of **Planitop Smooth & Repair R2** by a further 15-20 minutes.

N.B. The performance characteristics of **Planitop Smooth & Repair R2** admixed with **Mapetard ES** are the same as the product without admixture.

## Planitop Smooth & Repair R2



be washed from tools using water. Once hardened, cleaning is much more difficult, and it must be removed mechanically.

### CONSUMPTION

Approximately 15 kg/m<sup>2</sup> per cm of thickness.

### PACKAGING

25 kg bags.

### STORAGE

Planitop Smooth & Repair R2 may be stored for up to 12 months in its original packaging.

The product complies with the conditions of Annex XVII to Regulation (EC) N° 1907/2006 (REACH), item 47.

The product is available in special 25 kg vacuum-packed polyethylene bags which may be stored outside for the entire construction phase of the site. Rain has no effect on its characteristics.

### SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Planitop Smooth & Repair R2 contains cement that when in contact with sweat or other body fluids causes irritant alkaline reaction and allergic reactions to those predisposed. It can cause damage to eyes. During use wear protective gloves and goggles and take the usual precautions for handling chemical products.

In case of contact with eyes or skin wash immediately with plenty of water and seek medical attention.

For further and complete information about the safe use of our product please refer to the latest version of our Material Safety Data Sheet.

PRODUCT FOR PROFESSIONAL USE.

### N.B.

*Whilst we try to ensure that any advice, recommendations or information given in our literature is accurate and correct, we have no control over the circumstances in which our product is used. It is therefore important*

*that the end users satisfy themselves that the product and conditions are suitable for the envisaged application.*

*No warranty can be given or responsibility accepted other than, that the product supplied by us will meet our written specification.*

*End users should ensure that our latest product data and safety information sheets have been consulted prior to use.*

Please refer to the current version of the Technical Data Sheet, available from our website [www.mapei.com](http://www.mapei.com)

### LEGAL NOTICE

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This symbol is used to identify Mapei products which give off a low level of volatile organic compounds (VOC) as certified by GEV (Gemeinschaft Emissionskontrollierte Verlegewerkstoffe, Klebstoffe und Bauprodukte e.V.), an international organisation for controlling the level of emissions from products used for floors.



**Our Commitment To The Environment**  
MAPEI products assist Project Designers and Contractors create innovative LEED (The Leadership in Energy and Environmental Design) certified projects, in compliance with the U.S. Green Building Council.

**All relevant references for the product are available upon request and from [www.mapei.com](http://www.mapei.com)**



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