

PLANIGROUT 350

Three-component free-flowing high-strength rapid-hardening epoxy grout applied in layers up to 50 cm thick for anchoring and grouting structures



WHERE TO USE

Planigrout 350 is a three-component, high-strength, rapid-hardening epoxy mortar specifically developed for application in thick layers and is used to anchor, repair and grout structures, including those exposed to dynamic loads and vibrations.

Some application examples

- Anchoring and grouting support bases for presses, compressors and heavy industrial machinery in general, including those exposed to high levels of mechanical stress, in areas where thick layers of grout are required.
- Fastening and repairing rails for overhead cranes and bridge cranes.
- Levelling the surface of bearing elements used to support floor beams.
- Anchoring structural tie-rods, bolts and metal rods, including in areas exposed to vibrations and aggressive chemicals.

TECHNICAL CHARACTERISTICS

Planigrout 350 is a three-component mortar made from epoxy resin and selected aggregates in a granulometric curve according to a formula developed in the MAPEI Research Laboratories. The innovative **Low Dust** technology that characterises this product considerably reduces the amount of dust given off during mixing compared with conventional cementitious-based products, thereby helping to make work easier and safer.

After mixing **Planigrout 350** component A with its relative catalyser (component B) and fillers (component C), it forms a free-flowing, solvent-free mortar with the capacity to flow into tight areas. The product is applied in layers from 10 cm to 50 cm thick.

After mixing, **Planigrout 350** hardens by means of a chemical curing process and forms a compound characterised by its excellent adhesion and resistance to chemicals, as well as a high level of strength within just a few hours of application.

The mortar's rapid hardening properties allow industrial machinery and equipment to be put into service very quickly to help reduce down times.

The main characteristics of hardened **Planigrout 350** may be summarised as follows:

- impermeable to water and oil;
- high resistivity;
- resistant to attack from chemicals;
- high mechanical performance properties;
- resistant to vibrations;
- resistant to freeze/thaw cycles;
- excellent adhesion to concrete and steel;

- rapid polymerisation;
- easy to apply thanks to its highly fluid consistency.

Planigrout 350 remains workable for around 45 minutes at +23°C and may be applied at temperatures of +10°C to +35°C. The product is slightly more viscous and less fluid at lower temperatures. When used in hot conditions the workability time of **Planigrout 350** is considerably lower. When applying the product in cold or hot conditions, we recommend heating or cooling it to around +23°C (in a temperature-controlled container for example) prior to application.

If the surrounding temperature and, therefore, the temperature of the substrate are less than +10°C, apart from heating the product as described above, we also recommend applying the product in confined areas that have been heated to create suitable application conditions.

Planigrout 350 meets all the main requirements for 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 for EN 1504-6 (*"Anchoring of reinforcing steel bar"*).

RECOMMENDATIONS

- Do not use **Planigrout 350** to seal elastic joints or joints subject to movement (use products from the **Mapesil** or **Mapeflex** range).
- Do not use **Planigrout 350** to fill or repair areas less than 10 cm or more than 50 cm thick.
- Do not use **Planigrout 350** for second pours between hardened and fresh concrete (use **Eporip**).
- Do not apply **Planigrout 350** on wet surfaces.
- Do not apply **Planigrout 350** on dirty or crumbling surfaces.
- Do not leave packs of **Planigrout 350** exposed to direct sunlight prior to use.
- Do not use **Planigrout 350** if the temperature is lower than +10°C or higher than +35°C.

APPLICATION PROCEDURE

Substrate preparation

Concrete substrates must be sound, clean and dry.

Use hand tools or power tools to remove any loose or detached areas, efflorescence, oil, cement laitance and form-release compound and remove all traces of dust from the substrate with compressed air and/or an industrial vacuum cleaner.

For a perfect bond between **Planigrout 350** and metal, we recommend removing all traces of dust, loose material, paint and greasy or oily substances, preferably by sandblasting down to a bare metal finish (grade SA 2½).

Concrete structures cast on site must be cured for at least 4 weeks before applying **Planigrout 350** to avoid stresses induced by hygrometric shrinkage in the cementitious conglomerate being concentrated at the interface between the two different materials.

Preparation of the mix

The three components which make up **Planigrout 350** must be mixed together. Pour component B into component A, making sure that all the catalyser (component B) is added, and blend together with a drill at low-speed with a mixing attachment until it forms an even mix; avoid entraining air into the product during mixing. After mixing components A and B, the material reacts and generates heat. We recommend applying the product as soon as possible after preparing the mix and to never leave the container with the resin unattended until it is completely empty.

Pour a small amount of component C into a mortar mixer (we strongly recommend using a vertical mixer at low-speed) and add the mix with components A and B in an even, constant flow. Then add the rest of component C while mixing and keep mixing for 3 or 4 minutes until an even, lump-free mix is formed. Each component is supplied in pre-dosed quantities. Do not use partial quantities to avoid accidental errors in the mixing ratio, otherwise **Planigrout 350** may not harden correctly. If only partial quantities of the components need to be used, weigh them out with high-precision electronic scales to maintain the mixing ratio indicated in the Technical Data table.

Application of the mortar

Planigrout 350 hardens very quickly so must be applied immediately after mixing. Apply the product by pouring it in a constant flow into one side of tightly sealed formwork in layers from a minimum of 10 cm up to a maximum of 50 cm thick. If the product is used to fill or repair large surfaces, we recommend inserting expansion joints between each pour. Any joints present in the substrate must be traced in the same pattern in the **Planigrout 350**.

When applying the product over large areas that are difficult to reach (under machine support beds or foundations, for example), we recommend preparing a sufficient head of mix or applying the product with a suitable mortar pump (such as a Putzmeister S5 with a D8-2 hopper and 50 mm diameter PVC feed pipes). Also, make sure escape routes for the air are created so that the mortar is able to completely fill all the area evenly. The surrounding temperature has an effect on the hardening time of the product. At +23°C **Planigrout 350** remains workable for approximately 45 minutes.

Apply **Planigrout 350** within this period and organise work schedules so that the application cycle may be completed within the time mentioned above.

CLEANING

Planigrout 350 forms a strong bond, including on metal, and we recommend cleaning tools with solvent (such as ethanol, toluene, etc.) before it hardens.

CONSUMPTION

Approximately 2.38 kg/l of cavities to be filled.

PACKAGING

94.4 kg kits (A + B + C):

- component A = 7.0 kg;
- component B = 3.4 kg;
- component C = 84 kg (4 bags weighing 21 kg each).

STORAGE

24 months in a dry area in its original, unopened packaging.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

After mixing components A and B, the material reacts and generates considerable heat. We recommend applying the product as soon as possible after preparing the mix and never leaving the container with the resins unattended until it is completely empty.

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.com.

PRODUCT FOR PROFESSIONAL USE.

TECHNICAL DATA (typical values)

PRODUCT IDENTITY

	comp. A	comp. B	comp. C
Consistency:	liquid	liquid	powder
Colour:	off-white	straw-yellow	grey
Maximum size of aggregate:	–	–	6 mm

Density:	1.12 kg/l	1.00 kg/l	–
Viscosity:	3,100 mPa·s (rotor 3 - 10 rpm)	400 mPa·s (rotor 2 - 20 rpm)	–

PRODUCT APPLICATION DATA (at +23°C - 50% R.H.)

Mixing ratio:	A : B : C = 7.0 : 3.4 : 84 by weight
Colour of mix:	dark grey
Consistency of mix:	fluid
Density of mix:	2.38 kg/l
Brookfield viscosity:	120,000 mPa·s (rotor 6 - 5 rpm)
Slump after mixing (EN 13395-2):	> 10 cm
Application temperature:	+10°C to +35°C
Pot life of mix:	approx. 45 mins.
Setting time:	approx. 4 hours
Complete hardening time:	7 days
Minimum applicable thickness:	10 cm
Maximum applicable thickness:	50 cm
Maximum service temperature:	+60°C

FINAL PERFORMANCE (at +23°C)

Performance characteristic	Test method	Requirements according to EN 1504-6	Performance of product
Compressive strength:	ASTM C 579 (test method B)	not required	60 MPa (after 1 day) 90 MPa (after 3 days) 100 MPa (after 7 days)
Tensile strength:	ASTM C 307	not required	10 MPa (after 7 days)
Flexural strength:	ASTM C 580	not required	25 MPa (after 7 days)
Tangential modulus of elasticity:	ASTM C 580	not required	17 GPa
Slant shear bonding strength:	ASTM C 882	not required	23 MPa
Creep: – at +23°C with tension of 2.75 MPa: – at +60°C with tension of 2.75 MPa: – at +23°C with tension of 4.13 MPa: – at +60°C with tension of 4.13 MPa:	ASTM C 1181	not required	0.05% 0.51% 0.10% 0.61%

Coefficient of thermal expansion (1/°C):	ASTM C 531	not required	4.1×10^{-5}
Linear shrinkage:	ASTM C 531	not required	0.032%
Impact strength:	ACI Impact	not required	no failure after 100 cycles
Peak exothermic temperature (415 ml of product):	ASTM D 2471	not required	+29°C
Compressive strength:	EN 12190	> 80% of value declared by manufacturer after 7 days	60 MPa (after 1 day) 90 MPa (after 3 days) 100 MPa (after 7 days)
Creep – movement with a load of 50 kN for 3 months:	EN 1544	≤ 0.6 mm	≤ 0.20 mm
Slip-resistance of steel reinforcement rods – movement with a load of 75 kN:	EN 1881	≤ 0.6 mm	≤ 0.36 mm
Glass transition temperature:	EN 12614	≥ +45°C	≥ +45°C
Adhesion to concrete:	EN 1542	not required	> 3 MPa
Adherence tension of rods anchored with Planigrout 350 on concrete substrate:	EN 1881	not required	15 MPa
Reaction to fire:	EN 13501-1	Euroclass	E

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.

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

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The most up-to-date TDS can be downloaded from our website www.mapei.com.

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