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# PLANIGROUT 310

Three-component free-flowing high-strength rapid-hardening epoxy grout applied in layers up to 10 cm thick for anchoring and grouting structures



## WHERE TO USE

**Planigrout 310** is a three-component, high-strength, rapid-hardening epoxy grout specifically developed for anchoring, repairing and grouting structures, including those subjected to dynamic loads and vibrations.

### Some application examples

- Anchoring and grouting support bases for presses, compressors and heavy industrial machinery in general, including those subjected to high levels of mechanical stress.
- Fastening and repairing rails for cranes, bridge cranes, tramway and rail tracks.
- Levelling off the surface of bearing elements used to support floor beams.
- Anchoring structural tie-rods, bolts and metal rods, including in areas subjected to vibrations and aggressive chemicals.

## TECHNICAL CHARACTERISTICS

**Planigrout 310** 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 310** 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 2.5 cm to 10 cm thick.

After mixing, **Planigrout 310** 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 and help reduce down times.

The main characteristics of hardened **Planigrout 310** 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 310** remains workable for around 30 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, whereas at higher temperatures the workability time of **Planigrout 310** is considerably lower. When applying the product in particularly cold or hot weather it will need to be cooled down or warmed up 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 warming the product as described above, it is necessary to apply the product in confined areas that have been warmed up to

create suitable application conditions.

**Planigrout 310** 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 310** to seal elastic joints or joints subject to movement (use products from the **Mapesil** or **Mapeflex** range).
- Do not use **Planigrout 310** to fill or repair areas less than 2.5 cm or more than 10 cm thick.
- Do not use **Planigrout 310** for construction joints between old and fresh concrete (use **Eporip**).
- Do not apply **Planigrout 310** on wet surfaces.
- Do not apply **Planigrout 310** on dirty or crumbling surfaces.
- Do not leave packs of **Planigrout 310** exposed to direct sunlight prior to use.
- Do not use **Planigrout 310** 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, cement laitance and form-release oil and compound and remove all traces of dust from the substrate with compressed air and/or an industrial vacuum cleaner.

For perfect adhesion between **Planigrout 310** 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 before applying **Planigrout 310** must be cured for at least 4 weeks 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 310** 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 (make up of 4 bags weighing 21 kg) 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 310** 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 310** 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 2.5 cm up to a maximum of 10 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 **Planigrout 310**.

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 310** remains workable for approximately 30 minutes.

**Planigrout 310** must be applied within its workability time; schedule work in order to complete application within the time mentioned above.



Assembling and mounting formwork before pouring mortar



A detail of filling the gap under a support bed



Anchoring a rail for an overhead crane

## CLEANING

**Planigrout 310** adheres very strongly, including to metal, and we recommend cleaning tools with solvent (such as ethanol, toluene, etc.) before it hardens.

## CONSUMPTION

Approximately 2.20 kg/l of cavities to be filled.

## PACKAGING

96.1 kg kits (A + B + C):  
· component A = 10.5 kg;  
· component B = 1.6 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

**Planigrout 310** component A irritates the skin and eyes. Components A and B may cause sensitisation in those predisposed if it comes in contact with the skin. **Planigrout 310** component B is corrosive and may cause burns. It is also harmful if swallowed or if it comes in contact with the skin. **Planigrout 310** component C is not considered hazardous according to current norms and guidelines regarding the classification of mixtures.

The product contains low molecular weight epoxy resins that may cause sensitisation if cross-contamination occurs with other epoxy compounds.

During use, wear protective gloves and goggles and take the usual precautions for handling chemicals. If the product comes in contact with the eyes or skin, wash immediately with plenty of water and seek medical attention.

After mixing components A and B, the material reacts and generates a high amount of 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.

**Planigrout 310** components A and B are also hazardous for aquatic life. Do not dispose of these products in the environment.

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

RESTRICTED TO PROFESSIONAL USERS.

## 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](http://www.mapei.com)**

## LEGAL NOTICE

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](http://www.mapei.com).

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

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 (mm):	–	–	6 mm
Density (kg/l):	1.10	1.04	–
Viscosity (mPa·s):	4,000 (rotor 2 - 10 rpm)	70 (rotor 2 - 10 rpm)	–
APPLICATION DATA (at +23°C - 50% R.H.)			
Mixing ratio:	A : B : C = 10.5 : 1.6 : 84 by weight		
Colour of mix:	dark grey		
Consistency of mix:	fluid		
Density of mix (kg/l):	2.20		
Brookfield viscosity (mPa·s):	80,000 (rotor 6 - 10 rpm)		
Slump after mixing (EN 13395-2) (cm):	> 10		
Application temperature:	from +10°C to +35°C		
Pot life of mix:	approx. 30 mins.		
Setting time:	4 hours		
Complete hardening time:	7 days		
Minimum applicable thickness (cm):	2.5		
Maximum applicable thickness (cm):	10		
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 (MPa):	ASTM C 579 (test method B)	not required	105 (after 1 day) 109 (after 3 days) 111 (after 7 days)
Tensile strength (MPa):	ASTM C 307	not required	13 (after 7 days)
Flexural strength (MPa):	ASTM C 580	not required	27 (after 7 days)
Tangential modulus of elasticity (GPa):	ASTM C 580	not required	18

<b>Slant shear bonding strength (MPa):</b>	ASTM C 882	not required	30
<b>Creep (%):</b> – 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	0.08 0.18 0.15 0.25
<b>Coefficient of thermal expansion (1/°C):</b>	ASTM C 531	not required	$2.5 \times 10^{-5}$
<b>Linear shrinkage (%):</b>	ASTM C 531	not required	0.02
<b>Impact strength:</b>	ACI Impact	not required	No failure after 100 cycles
<b>Peak exothermic temperature (415 ml of product) (°C):</b>	ASTM D 2471	not required	43
<b>Compressive strength (MPa):</b>	EN 12190	> 80% of value declared by manufacturer after 7 days	100 (after 1 day) 110 (after 3 days) 120 (after 7 days)
<b>Creep – movement with a load of 50 kN for 3 months (mm):</b>	EN 1544	≤ 0.6	≤ 0.10
<b>Slip-resistance of steel reinforcement rods – movement with a load of 75 kN (mm):</b>	EN 1881	≤ 0.6	≤ 0.36
<b>Glass transition temperature:</b>	EN 12614	≥ +45°C	≥ +45°C
<b>Adhesion to concrete (MPa):</b>	EN 1542	not required	> 3
<b>Adherence tension of rods anchored with Planigrout 310 on concrete substrate (MPa):</b>	EN 1881	not required	15
<b>Reaction to fire:</b>	EN 13501-1	Euroclass	E

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