

MAPELASTIC ZERO

Two-component cementitious mortar, flexible down to -20°C, for waterproofing balconies, terraces, bathrooms and swimming pools with CO₂ fully offset in the entire life cycle



CO₂ FULLY OFFSET PRODUCTS

Mapelastic 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 2023 using Life Cycle Assessment (LCA) methodology, verified and certified with EPDs, have been offset through the acquisition of certified carbon credits in support of renewable energy and 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

Waterproofing and protection of concrete structures, renders and cementitious screeds.

Some application examples

- Waterproofing of concrete basins used for containing water.
- Waterproofing bathrooms, showers, balconies, terraces, swimming pools, etc. before laying ceramic tile finishes.
- Waterproofing of plasterboard, render or cementitious surfaces, lightweight cement blocks and marine-grade plywood.
- Flexible smoothing layer for light-sectioned concrete structures, including those subjected to minor deformation when under load (e.g. pre-cast panels).
- Protection of renders or concrete with cracks caused by shrinkage, against the infiltration of water and aggressive atmospheric elements.
- Protection, against the penetration of carbon dioxide, of concrete pillars beams, road and railway viaducts repaired with products from the **Mapegrout Zero** range, and structures with an insufficient layer of concrete covering on the reinforcement rods.
- Protection of concrete surfaces which may come into contact with seawater, de-icing salts, such as sodium or calcium chloride, and sulphates.

ADVANTAGES

- Remains flexible at very low temperatures (-20°C).
- 30 years experience and more than 300 million m² of surfaces successfully waterproofed.
- CE-certified product in compliance with EN 1504-2 and EN 14891.
- Protects the surface of concrete from CO₂ penetration (carbonation) for more than 50 years.
- Resistant to UV rays.
- 2.5 mm of **Mapelastik Zero** represents the equivalent of 30 mm of concrete against the aggressive action of chlorides (w/c ratio 0.45).
- May also be applied on existing coverings.
- Compatible with ceramic, mosaic and natural stone coverings.
- Product certified EC1 Plus by the GEV Institute (Gemeinschaft Emissions-kontrollierte Verlegewerkstoffe, e.V.) as a product with very low emission of volatile organic compounds.

TECHNICAL CHARACTERISTICS

Mapelastik Zero is a two-component mortar based on cementitious binders, fine-grained selected aggregates, special admixtures and synthetic polymers dispersed in water, blended according to a formula developed in MAPEI's research laboratories. When the two components are mixed together, a free-flowing mix is obtained which may be easily applied, even on vertical surfaces, at a thickness of up to 2 mm in one single coat.

Thanks to the high content and quality of the synthetic resins, the cured layer of **Mapelastik Zero** remains constantly flexible under all environmental conditions and resistant to the chemical attack of de-icing salts, sulphates, chlorides and carbon dioxide.

Mapelastik Zero has excellent bonding properties to all concrete, masonry, ceramic and marble surfaces, as long as they are sound and sufficiently clean.

This property, together with its resistance to the deteriorating effect of UV rays, a characteristic of this product, ensures that structures protected and waterproofed with **Mapelastik Zero** have a long service life, even if they are located in areas with particularly difficult climatic conditions, in coastal areas with a saline rich atmosphere or industrial areas where the air is particularly polluted.

Mapelastik Zero meets the requirements 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 the use of products and systems"*) and the requirements of EN 1504-2 coating (C) according to the PI, MC and IR principles (*"Surface protection systems for concrete"*).

RECOMMENDATIONS

- Do not use **Mapelastik Zero** for thick coatings (more than 2 mm per coat).
- Do not apply **Mapelastik Zero** at temperatures below +8°C.
- Do not add cement, aggregates or water to **Mapelastik Zero**.
- Do not apply on substrates not up to the required standard.
- Do not apply on lightweight substrates.
- Protect from rain and water spillage for the first 24 hours after application.
- Do not apply **Mapelastik Zero** on unprotected surfaces in swimming pools.
- During hot weather, it is advisable to keep the product out of direct sunlight (powder and liquid).
- After application, and in particularly dry, hot or windy weather, it is recommended to protect the surface from rapid evaporation by covering it with sheets.

APPLICATION PROCEDURE

Preparation of the substrate

A) Protection and waterproofing of concrete structures and pre-cast units

(e.g. pillars and beams for road and railway viaducts, cooling towers, chimneys, underpasses, retaining walls, applications in coastal areas, basins, canals, faces of dams, columns, balcony fronts).

The surface to be treated must be sound and perfectly clean.

Remove all cement laitance, flaky parts and traces of powder, grease, oil and form release agents by sand-blasting, or wash down with high-pressure water jets.

If the structure to be waterproofed and protected with **Mapelastic Zero** is in poor condition, remove the damaged parts by hand or mechanical abrasion or by using a hydro-demolition system or a hydro-scarifier. The last two techniques, which use high-pressure water, are particularly recommended because the reinforcement rods are not damaged and the structures are not subject to vibration which could cause the onset of small cracks in adjacent concrete.

Once the rust has been completely removed by sandblasting, carry out the repair with a pre-blended mortar from the **Mapecrout** or **Planitop** range from the Zero line.

Absorbent surfaces to be treated with **Mapelastic Zero** must be slightly dampened beforehand with water.

B) Waterproofing terraces, balconies and swimming pools

▪ CEMENTITIOUS SCREEDS:

- setting cracks or cracks caused by plastic or hygrometric shrinkage must be filled beforehand with **Eporip**;
- if thicknesses of up to 30 mm have to be levelled out (to create slopes, fill in dips, etc.) use **Planitop Fast 330** or **Adesilex P4**.

▪ EXISTING FLOORS:

- existing floors and coverings in ceramic, porcelain tiles, clinker or terracotta, etc. must be well bonded to the substrate and free of substances which could compromise the bonding, such as grease, oil, wax, paint, etc. To remove material that could affect the adhesion of **Mapelastic Zero**, clean the floor with **UltraCare HD Cleaner**, then thoroughly rinse the floor with clean water to eliminate all traces of caustic soda.

▪ RENDERS:

- cementitious renders must be sufficiently cured (7 days per mm of thickness in good weather conditions), well bonded to the substrate, resistant and free from all dust and paint;
- dampen absorbent surfaces to be treated beforehand with water.

Close up of the waterproofing layer

In the waterproofing sector, more than in any other sector, it is essential that particular attention is paid to details, which alone are capable of making a difference.

This is why it is essential to use products from the **Mapeband** and **Drain** lines in combination with **Mapelastic Zero**.

Mapeband TPE is used to seal structural joints and joints subject to high dynamic stress, **Mapeband**, **Mapeband Easy** and **Mapeband SA** are used to waterproof check joints, fillet joints between horizontal and vertical elements and special kits from the **Drain** range are used to seal drain holes.

It is imperative that special care is in these critical areas after levelling and cleaning the substrate and before applying the cementitious waterproofing mortar.

Preparation of the mortar

Pour component B (liquid) into a suitable, clean container, then slowly add component A (powder) while stirring with a mechanical mixer.

Carefully mix **Mapelastic Zero** for a few minutes, making sure that no powder remains stuck to the sides or the bottom of the container.

Keep stirring until a perfectly homogenous mix is obtained.

Use a low-speed mechanical mixer for this operation to avoid too much air being dragged into the mix.

Do not prepare the mix by hand.

Preparation of **Mapelastick Zero** may also be carried out with a mortar mixer, which is usually supplied with mortar sprayers.

If this technique is used, make sure that the mix is homogenous and has no lumps before it is poured into the hopper of the pump.

Manual application of the mortar

Apply **Mapelastick Zero** within 60 minutes of mixing.

Skim the prepared surface to a feather edge with a thin layer of **Mapelastick Zero** with a smooth trowel then, while the first coat is still fresh, apply a second coat to form a final thickness at least 2 mm thick.

When waterproofing terraces, balconies, basins and swimming pools, we recommend embedding **Mapenet 150** alkali-resistant reinforcement mesh in the first coat of **Mapelastick Zero** while it is still wet.

The mesh must also be used in areas with either small cracks or in areas which are under particular stress. After the mesh has been laid, finish off the surface with a flat trowel and apply a second layer of **Mapelastick Zero** when the first one has set (after 4-5 hours).

After applying **Mapelastick Zero**, wait 5 days for curing before laying ceramic tiles.

In favourable climatic conditions and with good temperatures this period may be reduced to 24 hours on dry substrates.

Laying ceramic tiles on Mapelastick

▪ BALCONIES AND TERRACES:

- bond in place using a C2 class cementitious adhesive such as **Keraflex** or **Keraflex Maxi S1 Zero**, **Ultraflex S1 2K**, **Ultralite S1 Flex Zero** or, for more rapid setting, a C2F class adhesive such as **Ultralite S1 Flex Quick**, **Ultralite S2 Flex Quick**, **Keraquick Maxi S1** or **Elastorapid**;
- grout the joints with a CG2 class cementitious product such as **Keracolor FF** or **Keracolor GG** mixed with **Fugolastic** or **Ultracolor Plus**;
- seal the movement joints with a special MAPEI elastic sealant (such as **Mapeflex PU 45 FT**, **Mapesil AC**, **Mapesil AC Eco** or **Mapesil LM**. Other types of sealant may be required for specific service conditions: please refer to the MAPEI Technical Services Department).

▪ SWIMMING POOLS:

- bond ceramic tiles in place using a C2 class cementitious adhesive to be selected depending on the format and size of the tiles, such as **Keraflex**, **Keraflex Maxi S1 Zero** or **Ultralite S1 Flex Zero** or a minimum C2F class rapid adhesive (**Ultralite S1 Flex Quick**, **Ultralite S2 Flex Quick**, **Keraquick Maxi S1** or **Elastorapid**). For mosaic, on the other hand, use **Ultralite S1 Flex Zero** white or **Adesilex P10** + **Isolastic** mixed with 50% water (class C2E S1).
- grout the joints with a CG2 class cementitious product (**Keracolor FF/Keracolor GG** mixed with **Fugolastic** or **Ultracolor Plus**) or with an RG class epoxy product (of the **Kerapoxy** range of product);
- seal the joints with **Mapesil AC** or **Mapesil AC Eco** silicone sealant.

Application of the mortar by spray

After preparing the surface (see paragraph on "Preparation of the substrate"), apply **Mapelastick Zero** with a spray gun with a lance fitting suitable for use with smoothing mortars, at a minimum thickness not less than 2 mm per layer.

If a thicker layer is required, **Mapelastick Zero** must be applied in several coats.

Successive coats must only be applied when the previous one is dry (after 4-5 hours).

In areas with small cracks or which are highly stressed, insertion of **Mapenet 150** in the first layer of fresh **Mapelastick Zero** is recommended.

Immediately after laying the mesh, **Mapelastick Zero** must be smoothed off with a flat trowel.

If the mesh needs to be encapsulated, a further layer of **Mapelastick Zero** may be applied with a spray gun.

When **Mapelastick Zero** is used for protecting beams and columns on bridges, railway underpasses and façades on buildings etc., the product may be painted using products from the **Elastocolor** range, which are acrylic resin-based water dispersions and are available in a wide range of colours which may be obtained using the **ColorMap®** automatic colouring system.

If **Mapelastick Zero** is used, on the other hand, to protect horizontal surfaces not used for foot traffic such as flat roofs, it may be painted over with **Elastocolor Waterproof** acrylic resin-based flexible paint in water dispersion. **Elastocolor Waterproof** is available in a wide range of colours obtained using the **ColorMap®** automatic colouring system and must be applied at least 20 days after applying **Mapelastick Zero**.



Waterproofing screeds with Mapelastico Zero and Mapeband



Installing ceramic with Kerabond + Isolastic



Private terrace, Cereseto (Alessandria) - Italy



Application of Drain Vertical on Mapelastico Zero



Laying Mapelastico Zero on Mapenet 150



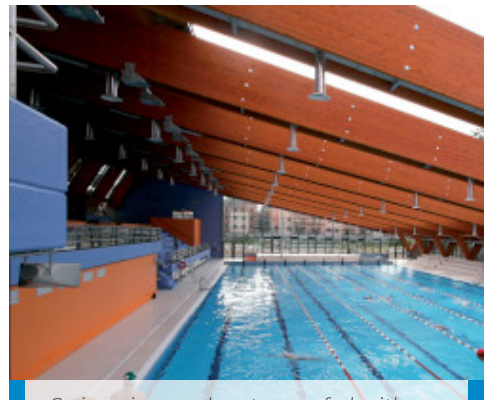
Laying Granirapid on a terrace waterproofed with Mapelastico Zero



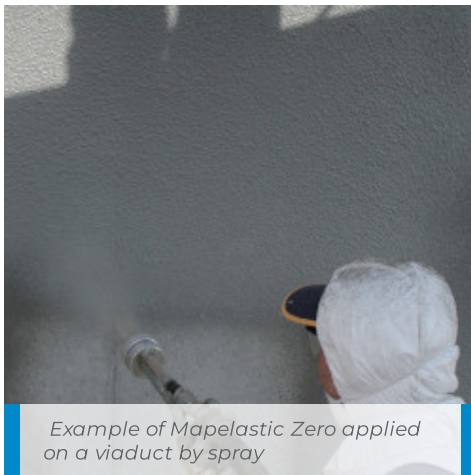
Waterproofing a swimming pool with Mapelastico Zero



Laying ceramic tiles on Mapelastico Zero in a swimming pool

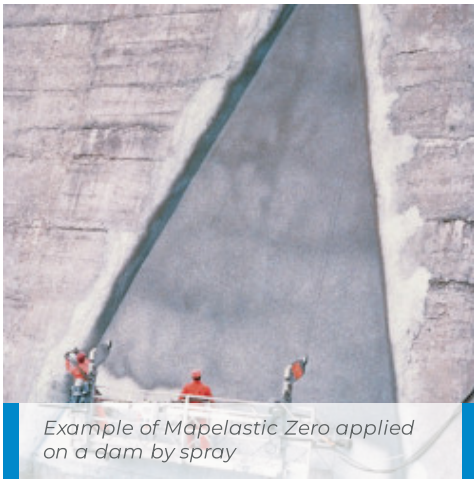


Swimming pool waterproofed with Mapelastico: Scarioni Leisure Centre - Milan - Italy



Example of Mapelastico Zero applied on a viaduct by spray





Example of Mapelastic Zero applied on a dam by spray

TECHNICAL PERFORMANCE DATA

The technical data table contains the identification and application data for the product. Figures 1, 2, 3 and 4 illustrate some of **Mapelastic Zero**'s characteristics.

Figure 1 shows the load diagram for evaluating the product's crack-bridging capacity. The sample to which **Mapelastic Zero** was applied, on the underside of the beam, is subject to increasing loads in the middle. The crack-bridging capacity of **Mapelastic Zero** is determined by measuring the maximum width of the crack in the concrete at the moment **Mapelastic Zero** fractures.

The degree of protection offered by **Mapelastic Zero** to the concrete substrate is not limited to a simple "covering" of subsequent cracks provoked by heavy loads, shrinkage, temperature variations, etc. **Mapelastic Zero** itself is also very resistant to chemical attack, as illustrated by the results of the following tests, and offers good protection for the concrete against carbonation and, therefore, subsequent corrosion of the reinforcing rods.

Figure 2 is a graph which compares accelerated carbonation (in an atmosphere of air enriched with 30% of CO_2), and shows how **Mapelastic Zero** is completely impermeable to this aggressive substance. **Mapelastic Zero** membrane also protects the concrete from the action of sodium chloride (for example seawater).

Figure 3 shows how **Mapelastic Zero** completely blocks infiltration of salt into the concrete which is in itself very porous and may be easily penetrated. **Mapelastic Zero** also provides an impenetrable barrier against calcium chloride (CaCl_2) based de-icing salts, which have a destructive action on even the highest quality concrete.

Figure 4 shows the reduction in mechanical resistance (initially 65 N/mm^2) of concrete permanently immersed in a solution of 30% CaCl_2 . In this case, too, **Mapelastic Zero** offers efficient protection of the concrete, and prevents the salt from carrying out its aggressive and destructive action on the concrete.

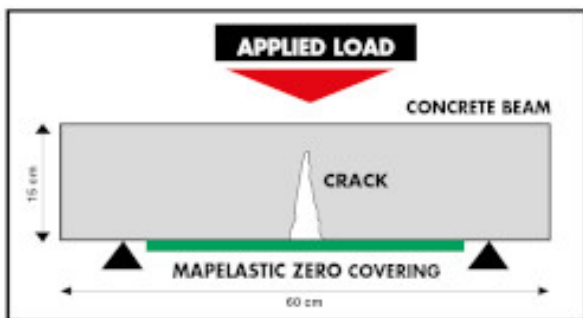


Fig.1: Protection of a hairline crack with **Mapelastic Zero** on the outside of a concrete beam subject to flexural stress

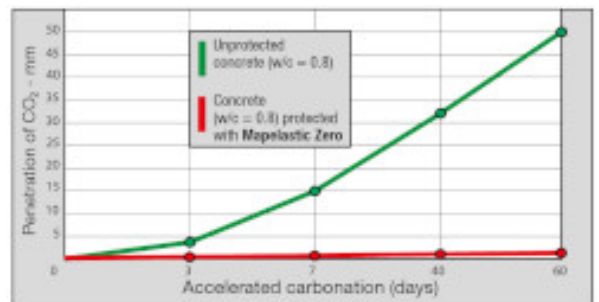


Fig. 2: Protection of **Mapelastic Zero** against accelerated carbonation (30% of CO_2) on porous concrete

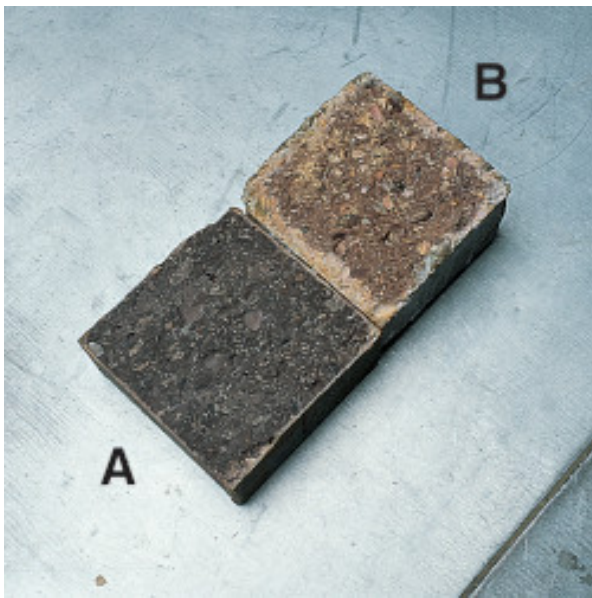


Fig. 2 B - Penetration test of chloride ions (UNI 9944). Sample A covered with **Mapelastik Zero** is not penetrated; sample B, left uncoated, shows an advanced penetration of many mm

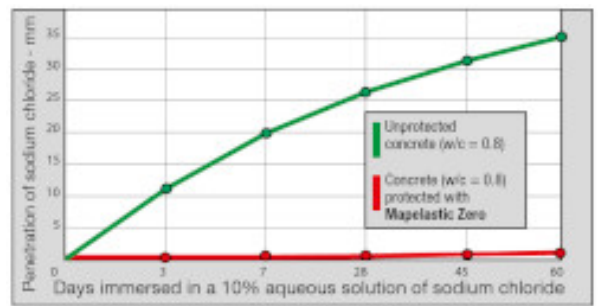


Fig.3: Protection of **Mapelastik Zero** against penetration of sodium chloride on porous concrete

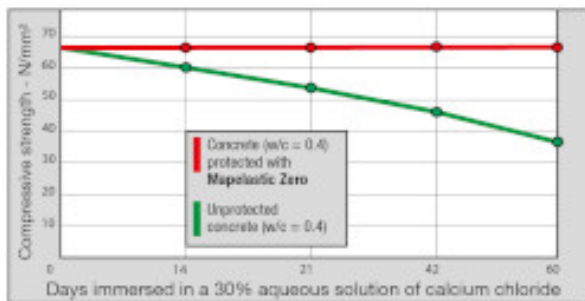


Fig.4: Protection of **Mapelastik Zero** against the decrease in mechanical strength of concrete caused by calcium chloride-based de-icing salts

CLEANING

Due to the high bonding strength of **Mapelastik Zero**, even on metals, it is recommended to wash work tools with water before the mortar sets. Once it has set, cleaning may only be carried out by mechanical means.

CONSUMPTION

Manual application:

approx. 1.7 kg/m² per mm of thickness.

Spray gun application:

approx. 2.2 kg/m² per mm of thickness.

NB: the consumption figures indicated are for a seamless film applied on a flat surface and will be higher on uneven surfaces.

PACKAGING

Units of 32 kg:

- component A: 24 kg bags:
- component B: 8 kg tanks.

Upon request, component B may also be supplied in 1000 kg tanks and component A in 24 kg light colour bags.

Units of 16 kg:

2x6 kg bags and 1x4 kg drum.

STORAGE

Mapelastic Zero component A may be stored for up to 12 months in its original packaging.

Mapelastic Zero component B may be stored up to 24 months.

Store Mapelastic Zero in a dry place and at a temperature of at least +5°C.

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.com.

PRODUCT FOR PROFESSIONAL USE.

TECHNICAL DATA (typical values)

Mapelastic Zero: two-component flexible cementitious membrane for waterproofing balconies, terraces, bathrooms, swimming pools and for protecting concrete in compliance with the requirements of EN 14891 and EN 1504-2, EN 1504-9 coating (C) principles PI, MC and IR

PRODUCT IDENTITY

	comp. A	comp. B
Consistency:	powder	liquid
Colour:	grey	white
Bulk density:	1.4 g/cm ³	–
Density:	–	1.1 g/cm ³
Dry solids content:	100%	50%

PRODUCT APPLICATION DATA (at +20°C - 50% R.H.)

Colour of mix:	grey
Mixing ratio:	component A : component B = 3 : 1
Consistency of mix:	plastic, trowelable
Density of mix:	1,700 kg/m ³
Density after application by spray:	2,200 kg/m ³
Application temperature range:	from +8°C to +35°C
Pot life of mix:	1 hour
EMICODE:	EC1 Plus - very low emission

FINAL PERFORMANCE (thickness 2.0 mm)

Performance characteristic	Test method	Requirements according to EN 1504-2 coating (C) principles PI, MC and IR	Performance figures for Mapelastick Zero
Adhesion to concrete - after 28 days at +20°C and 50% R.H.: Thermal compatibility to freeze/thaw cycles with de-icing salts, measured as adhesion: Adhesion to concrete - after 7 days at +20°C and 50% R.H. + 21 days in water:	EN 1542	For flexible systems with no traffic: ≥ 0.8 with traffic: ≥ 1.5	1.0 N/mm ² 0.8 N/mm ² 0.6 N/mm ²
Elasticity expressed as elongation - after 28 days at +20°C and 50% R.H.:	DIN 53504 modified	not required	30%
Static crack-bridging at -20°C expressed as maximum crack width (mm):	EN 1062-7	from class A1 (0.1 mm) to class A5 (2.5 mm)	class A3 (-20°C) (> 0.5 mm)
Dynamic crack-bridging at +23°C of a film of Mapelastick Zero, expressed as resistance to cracking cycles:		from class B1 to class B4.2	class B3.1 (+23°C) No failure of the test piece after 1,000 crack cycles with movement of crack from 0.10 to 0.30 mm
Permeability to water vapour - equivalent thickness of air S_D :	EN ISO 7783-1	class I: $S_D < 5$ m (permeable to vapour)	$S_D = 2.4$ $\mu = 1200$ m
Impermeability to water, expressed as capillary absorption:	EN 1062-3	$< 0.1 \text{ kg/m}^2 \cdot \text{h}^{0.5}$	$< 0.05 \text{ kg/m}^2 \cdot \text{h}^{0.5}$
Permeability to carbon dioxide (CO ₂) - diffusion in equivalent air layer thickness S_{DCO_2} :	EN 1062-6	> 50 m	> 50 m
Reaction to fire:	EN 13501-1	Euroclass	C, s1-d0

Performance characteristics	Test method	Requirements according to EN 14891	Performance figures for Mapelastick Zero
Impermeability to water under pressure (1.5 bar for 7 days of positive lift):	EN 14891-A.7	no penetration	no penetration
Crack-bridging ability at +23°C:	EN 14891-A.8.2	≥ 0.75 mm	0.9 mm
Crack-bridging ability at -20°C:	EN 14891-A.8.3	≥ 0.75 mm	0.8 mm
Initial adhesion:	EN 14891-A.6.2	$\geq 0.5 \text{ N/mm}^2$	0.8 N/mm ²
Adhesion after immersion in water:	EN 14891-A.6.3	$\geq 0.5 \text{ N/mm}^2$	0.55 N/mm ²
Adhesion after application of heat source:	EN 14891-A.6.5	$\geq 0.5 \text{ N/mm}^2$	1.2 N/mm ²
Adhesion after freeze-thaw cycles:	EN 14891-A.6.6	$\geq 0.5 \text{ N/mm}^2$	0.6 N/mm ²
Adhesion after immersion in basic water:	EN 14891-A.6.9	$\geq 0.5 \text{ N/mm}^2$	0.6 N/mm ²
Adhesion after immersion in chlorinated water:	EN 14891-A.6.8	$\geq 0.5 \text{ N/mm}^2$	0.55 N/mm ²



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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