MAPELASTIC ZERO

Two-component cementitious mortar, flexible down to -20°C, for waterproofing balconies, terraces, bathrooms, and swimming pools with CO_2 fully offset in the entire life cycle

BENEFITS AND FEATURES

- Perfect adhesion to substrates
- Complete waterproofing system
- Remains flexible at low temperatures
- Easy to prepare and apply
- Waterproofing with just 2 mm thickness
- Resistant to UV rays
- Suitable for new or existing substrates
- EC1 Plus-certified by the GEV Institute. Very low emissions of volatile organic compounds (VOCs).

CO2 FULLY OFFSET PRODUCTS

Mapelastic Zero is part of the *CO_2 Fully Offset in the Entire Life Cycle*. 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.it.

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.
- Creating flexible skimming layers on concrete structures with thin sections, including those subjected to small deformations when under load (for example prefabricated elements).
- Protecting render or concrete with cracks caused by shrinkage to block the penetration of water and aggressive agents present in the atmosphere.
- Protecting against the penetration of carbon dioxide, of concrete pillars adn road and railway viaducts decks repaired with products from the **Mapegrout Zero** range, and structures with an insufficient layer of concrete covering on the reinforcement rods.
- Protecting concrete surfaces that come into contact with seawater, de-icing salts such as sodium chloride and calcium chloride, and sulfate salts.

TECHNICAL CHARACTERISTICS

Mapelastic Zero is a two-component mortar made of cementitious binders, fine-grained selected aggregates, special additives and synthetic polymers in water dispersion according to a formula developed in the MAPEI Research & Development Laboratories. When the two components are mixed together, a free-flowing mix is obtained, which is easy to apply also on vertical surfaces in layer up to 2 mm thick per coat.
Due to its high content of quality synthetic resins, the hardened layer of **Mapelastic Zero** maintains its flexibility under all environmental conditions, and is resistant to chemical attacks of de-icing salts, sulphates, chlorides and carbon dioxide.
Mapelastic Zero also has excellent adhesion on all concrete, brickworks, 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 **Mapelastic 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.
Mapelasic 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 the use of products and systems*") and the minimum requirements of EN 1504-2 coating (C) according to principles PI, MC and IR ("*Surface protection systems for concrete*").

RECOMMENDATIONS

- Do not use **Mapelastic Zero** for thick coatings (greater than 2 mm per coat).
- Do not apply **Mapelastic Zero** if the temperature Is lower than +8°C.
- Do not add cement, aggregates or water to **Mapelastic Zero**.
- Do not apply on lightweight substrates.
- Do not apply to cementitious substrates that have not been properly cured.
- Protect from rain and accidental spillages of water for the first 24 hours after application.
- Do not use **Mapelastic Zero** exposed in a swimming pool.
- In hot weather, do not expose the product to the sun before use (powder and liquid).
- In particularly dry, warm or windy weather, protect the surface with sheets after applying the product to prevent rapid evaporation.

APPLICATION PROCEDURE

TECHNICAL INFORMATION FOR THE APPLICATION	
Mixing ratio:	component A : component B = 3 : 1
Thickness applied:	final thickness at least 2 mm
Recommended application temperature:	Surrounding and substrate temperature from +8°C to +35°C

Pot life of mix:	approx. 60 min. (at +20°C)

Preparation of the substrate

A) Protection and waterproong of concrete structures and pre-cast elements

(e.g., piers and road and rail viaducts decks, cooling towers, chimneys, underpasses, retaining walls, applications in coastal areas, tanks, canals, dam faces, pillars, balcony fronts, string courses, etc.).
The surface to be treated must be sound and perfectly clean.
Remove cement laitance, loose parts, and any traces of dust, grease, and form release oils by sandblasting or washing 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 demolition or by using a hydro-demolition system or a hydro-scarifier. The last two techniques require the use of high pressure water. They are particularly recommended because they do not damage the reinforcing steel and structures are not subjected to vibrations that could provoke the formation of micro-cracking in the surrounding concrete.
Once the rust has been completely removed by sandblasting, carry out the repair with a pre-blended mortar from the **Mapegrout** or **Planitop** range from the Zero line.
Absorbent surfaces to be treated with **Mapelastic Zero** must be slightly dampened beforehand with water.

B) Waterproong 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 Zero**.

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 that 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 rinse thoroughly with water only to eliminate any residue.

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.

Waterproofing details

In the waterproofing industry, more than in any other industry, it is essential to pay attention to the details, which alone can make the difference. For this reason, 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 fillet joints between horizontal and vertical elements and control joints. The special kits from the **Drain** range are used to seal drain holes.
Special care must be taken 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) in a suitable clean container, then slowly add component A (powder) while mixing. Accurately stir **Mapelastic Zero** for a few minutes, carefully removing all traces of dust from the sides and the bottom of the container.
Keep mixing until a completely blended mix is obtained.
A mechanical mixer at low speed is recommended for this operation, to prevent entraining too much air into the mix.
Avoid mixing the product manually.
Mapelastic Zero may also be prepared with a paddle mixer, which is usually supplied with rendering machines. It is recommended to check the mortar is evenly mixed and that there are no lumps before pouring it into the hopper of the pump.

Appliying the mortar by hand

Apply **Mapelastic Zero** within 60 minutes of mixing.
Skim the prepared surface to a feather-edge with a layer of **Mapelastic Zero** with a straight trowel then, while still fresh, apply a second layer to form a total thickness of at least 2 mm.
When waterproong terraces, balconies, basins and swimming pools, it is always recommended that the alkali-resistant fiberglass mesh **Mapenet 150** be embedded on the first fresh layer of **Mapelastic Zero**as reinforcement.
The mesh should also be used in micro-cracked or particularly stressed areas.
After embedding the mesh, finish off the surface with a flat trowel and apply the second layer of **Mapelastic Zero** when the first layer has hardened (after 4-5 hours).
After the application of **Mapelastic Zero** wait at least 5 days of curing before laying ceramics.
In good weather and temperature, conditions, and if the product is applied over a dry substrate, this period may be reduced to 24 days.

Laying ceramic tiles on Mapelastic Zero

BALCONIES AND TERRACES:

- bond in place the tiles with C2 cement adhesive, such as **Keraflex** or **Keraflex Maxi S1 Zero**, **Ultraflex S1 2K**, **Ultralite S1 Flex Zero** or, alternatively, for more rapid setting, a C2F adhesive, such as **Ultralite S1 Flex Quick**, **Ultralite S2 Flex Quick**, **Keraquick Maxi S1** or **Elastorapid**;
- grout the joints with a CG2 cementitious products, such as **Keracolor FF**, **Keracolor GG** mixed with **Fugolastic** or **UltracolorPlus**;
- seal the joints with the appropriate MAPEI elastic sealants (such as **Mapeflex PU 45 FT**, **Mapesil AC**, **Mapesil AC Eco** or **Mapesil LM**. Depending on the specific operating condition, different types of sealants may be recommended: consult MAPEI Technical Service).

SWIMMING POOLS:

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

Applying the mortar by spray

After preparing the surface (see paragraph on “Preparation of the substrate”), apply **MapelasticZero** by spraying with a rendering machine equipped with a skimming lance ensuring a minimum thickness of at least 2 mm.
If a greater thickness is required, **MapelasticZero** should be applied in several coats.
Apply additional layers when the previous layer has dried (after 4-5 hours).
In areas with micro-cracks or under significant stress, it is recommended to embed **Mapenet 150** into the first layer of **Mapelastic Zero** while still fresh.
Smooth over **Mapelastic Zero** with a flat trowel immediately after embedding the mesh.
If the mesh needs additional coverage, apply another layer of **Mapelastic Zero** by spraying.
In cases where **MapelasticZero** is used for the protection of piers and bridge decks, railway underpasses, building facades, etc., the product can be painted with products from the **Elastocolor** range based on acrylic resins in water dispersion, available in a wide range of colours through with the **ColorMap**®colouring system.
When **MapelasticZero** is used for the protection of horizontal surfaces that are not subject to foot traffic, such as flat roofs, the product can be painted with **Elastocolor Waterproof**, elastic paint based on acrylic resins in water dispersion. **Elastocolor Waterproof**, which is available in a wide range of colours through the **ColorMap**®coloring system, should be applied at least 20 days after the application of **Mapelastic Zero**.

Waterproofing screeds with ***Mapelastic Zero*** *and* ***Mapeband***

Laying ceramic tiles with ***Kerabond*** *+* ***Isolastic***

Private terrace in Cereseto (Alessandria) - Italy

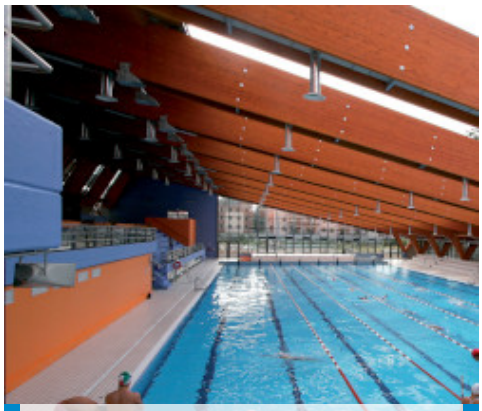
Application of ***Drain Vertical*** *on* ***Mapelastic Zero***

Application of ***Mapelastic Zero*** *on* ***Mapenet 150***

Application of ***Granirapid*** *on terrace waterproofed with* ***Mapelastic Zero***

Waterproofing a swimming pool with ***Mapelastic Zero***

Application of ceramic coating on ***Mapelastic Zero***



Pool waterproofed with ***Mapelastic Zero*** *- Piscina Scarioni - Milan - Italy*

Example of spray application of ***Mapelastic Zero*** *in a viaduct*

*Example of spray application of **Mapelastic Zero** in a dam*

DURABILITY

Figures 1, 2, 3 and 4 show some features of **Mapelastic Zero**.
Fig. 1 shows the loading scheme to assess crack-bridging capabilities. The specimen on which **MapelasticZero** has been applied on the underside of the beam, is subject to increasing loads in the centerline. The crack-bridging of **MapelasticZero** is assessed by determining the maximum crack width of the concrete at the point where **Mapelastic Zero** fractures. The protection offered by **MapelasticZero** to the concrete substrate is not limited to a simple "covering" of cracks caused by dynamic loads, shrinkage, thermal variations, etc. **Mapelastic Zero** is very resistant to chemical aggression, as demonstrated by the tests outlined below, and effectively protects the concrete from carbonation and thus the reinforcing bars from the resulting corrosion.
Fig. 2 comparatively shows the accelerated carbonation curve (in 30% CO_2-enriched air environment) and highlights the absolute impermeability of **MapelasticZero** to this aggressive agent. The membrane of **MapelasticZero** protects concrete from the action of sodium chloride (found, for example, in seawater).
Fig. 3 shows how **MapelasticZero** completely blocks salt penetration into a very porous concrete, which is otherwise easily penetrable. Even against calcium chloride-based de-icing salts ($CaCl_2$), which are destructive to even the highest quality concrete, **MapelasticZero** offers an impenetrable barrier.
Fig. 4 shows the reduction in mechanical strength (originally 65 N/mm²) in a concrete permanently immersed in a 30% $CaCl_2$solution. Also in this case **MapelasticZero** effectively protects the concrete by preventing the salt from attacking and deteriorating the concrete structure.

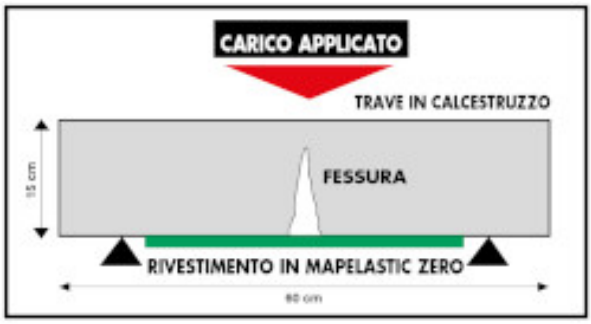


*Fig.1: Protection with **Mapelastic Zero** of a crack at the underside of a concrete beam subjected to a flexural stress*

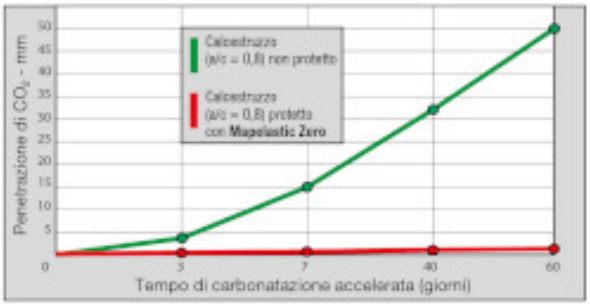


*Fig. 2: Effect of **Mapelastic Zero** on accelerated carbonation (30% CO_2) in a porous concrete*

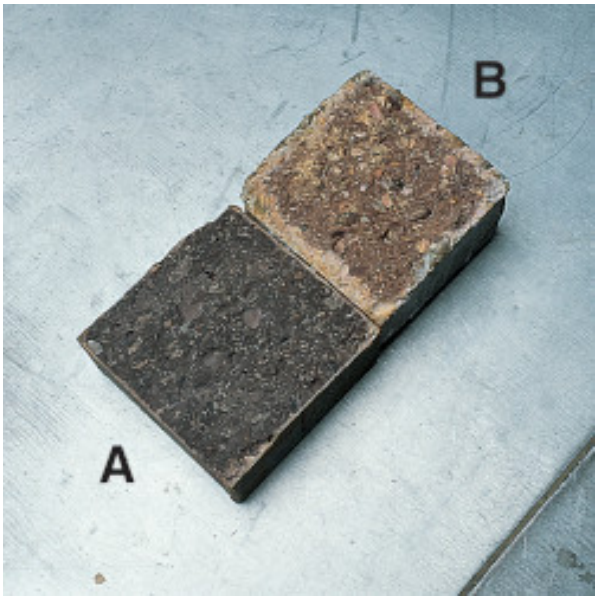


*Fig. 2 B - Chloride ion penetration tests (UNI 9944). Specimen A, coated with **Mapelastic Zero**, appears to be unpenetrated; specimen B, as-is, shows an advanced penetration of several millimetres*

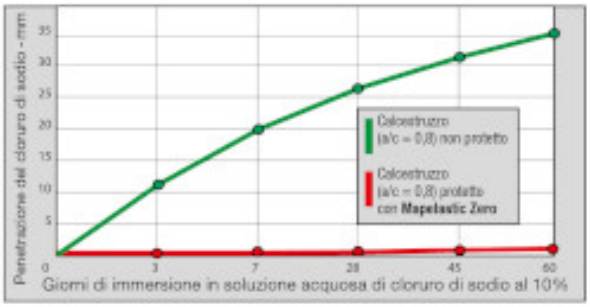


*Fig.3: Effect of **Mapelastic Zero** on the penetration of sodium chloride into a porous concrete*

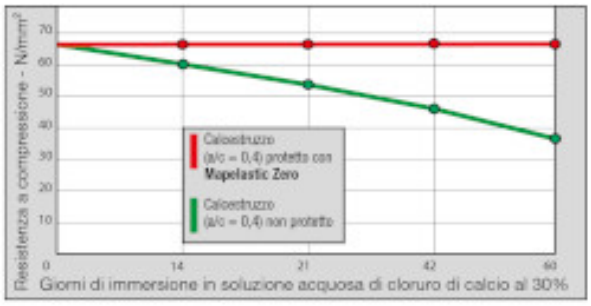


*Fig.4: Effect **Mapelastic Zero** on the reduction in mechanical strength of concrete due to calcium chloride de-icing salts*

CLEANING

Due to high adhesion of **Mapelastic Zero** even on metal, it is advisable to wash working tools with water before the mortar starts to set. Once hardened cleaning can be carried out only mechanically.

CONSUMPTION

- Manual application:
  - about 1.7 kg/m² per mm thickness.
- Spray application with rendering machine:
  - approximately 1.85 kg/m² per mm of thickness on flat surface.
  - approximately 2.2 kg/m² per mm thickness on rough surface with irregularities.

PACKAGING

32 kg unit:

- component A: 24 kg bags;
- component B: 8 kg jerrycans.

Upon request, component B can also be supplied in 1,000 kg IBC and component A in 24 kg bags in light colour.
16 kg unit:
Two 6 kg bags and one 4 kg jerrycan.

STORAGE

Mapelastic Zero component A can be stored for 12 months in its original packaging in a dry area.
Mapelastic Zero component B can be stored for 24 months.
Store **Mapelastic Zero** in a dry place 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)

PRODUCT IDENTITY		
Identity according to EN 1504-2: (methods and principles)	**Coating (C) – principles PI, MC and IR**	
	comp. A	**comp. B**
Consistency:	powder	liquid
Colour:	grey	white
EMICODE:	EC1 Plus - very low emission	

PRODUCT PREPARATION FOR LABORATORY SAMPLES	
Mixing ratio:	component A : component B = 3 : 1
Preparation of mix:	Mix with a paddle mixer for around 1 minute and 30 seconds to form a smooth, even paste with the required density

CHARACTERISTICS OF FRESH MIX (at +20°C - 50% R.H.)	
Colour of the mix:	grey
Consistency of mix:	plastic-trowellable
Density of the mix:	1700 kg/m³

FINAL PERFORMANCE
Curing at +23°C – 50% R.H. unless otherwise specified by the test methods (thickness applied 2.0 mm)

Performance characteristic	Test method	Requirements according to EN 1504-2 (C) PI, MC and IR	Product performance
Bond strength to concrete by pull-off:	EN 1542	for flexible systems without traffic ≥ 0.8 MPa	**1.0 MPa**

Thermal compatibility - freeze/thaw cycles with de-icing salts (50 cycles) following storm cycles (10 cycles):	EN 13687-1 EN 13687-2	for flexible systems without traffic ≥ 0.8 MPa	**0.8 MPa**
Bond strength by pull-off (after 7 days at +20°C and 50% R.H. and 21 days in water):	EN 1542	not required	**0.6 MPa**
Flexibility expressed as elongation (after 28 days at +20°C and 50% RH):	DIN 53504 mod.	not required	**30%**
Static crack-bridging at -20°C after conditioning according to EN 1062-11:	EN 1062-7 Method A	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 after conditioning according to EN 1062-11:	EN 1062-7 Method B	from class B1 to class B4.2	**class B3.1 (+23°C)** **no failure of test sample after 1,000 cracking cycles with movements in the crack from 0.2 to 0.30 mm**
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	**S_d = 2.4 m** **Class I** *(permeable to water vapour)*
Impermeability expressed as coefficient of permeability to free water (W):	EN 1062-3	W < 0,1 kg/m²·$h^{0.5}$	***W* < 0.05 kg/m²·$h^{0.5}$** Class W_3 *(low water permeability) according to EN 1062-1*
Carbon dioxide (CO_2) permeability - diffusion expressed as equivalent air thickness S_D:	EN 1062-6 method B	$S_D > 50$ m	**S_D> 50 m**
Reaction to fire:	EN 13501-1	Euroclass	**C, s1-d0**

Performance characteristic	Test method	Requirements according to EN 14891 CM O2 P	Product performance
Impermeability to water in pressure:	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 low temperature -20°C:	EN 14891-A.8.3	≥ 0.75 mm	**0.8 mm**
Initial tensile adhesion strength*:	EN 14891-A.6.2	≥ 0.5 N/mm²	**0.8 N/mm²**
Tensile adhesion strength after water contact*:	EN 14891-A.6.4	≥ 0.5 N/mm²	**0.55 N/mm²**
Tensile adhesion strength after heat ageing*:	EN 14891-A.6.5	≥ 0.5 N/mm²	**1.2 N/mm²**
Tensile adhesion strength after freeze–thaw cycle*:	EN 14891-A.6.6	≥ 0.5 N/mm²	**0.6 N/mm²**
Tensile adhesion strength after contact with lime water*:	EN 14891-A.6.9	≥ 0.5 N/mm²	**0.6 N/mm²**
Tensile adhesion strength after contact with chlorinated water*:	EN 14891-A.6.8	≥ 0.5 N/mm²	**0.55 N/mm²**

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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7587-9-2025-I-en

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