



Mapeshield™ I

Pure Zinc Galvanic Anodes for Preventing Corrosion of Reinforcing Steel

FOR PROFESSIONAL USE ONLY

DESCRIPTION

Mapeshield I is a pure zinc anode for cathodic protection of reinforcing steel against corrosion in new, reinforced structures as well as structures requiring repair. Composed with a zinc core, *Mapeshield I* has its surface area covered by a special conductive paste; once connected to steel reinforcement rods, the paste stops corrosion, impedes its formation and keeps the system active for many years.

When *Mapeshield I* is attached to the reinforcement rods, the two dissimilar metals (zinc and steel) are connected together in a suitable electrolyte (the concrete). The metal with the most negative potential (zinc) will corrode, and the metal with the least negative potential (steel) remains protected against corrosion. The current generated by the installation of *Mapeshield I* starts to push the pH level higher, making the concrete more alkaline, and begins pushing chloride ions away.

FEATURES AND BENEFITS

- Available in two lengths and four configurations for use in most structures
- Engineered to provide a superior, long-lasting service life to concrete patch repairs
- Extremely effective in aggressive environments, such as chloride-contaminated and carbonated concrete
- Long-lasting: Delivers protective current for 10 to 20 years
- Surrounded by a special conductive paste, *Mapeshield I* anodes provide higher current output and lower electric resistance than other anodes, having a solid, thick cementitious shell.

- Comprises much more surface area of zinc, which is needed for polarization of steel
- Compliance with international standard ISO 12696, "Cathodic Protection of Steel in Concrete"
- Quick and easy installation with no special tools needed
- Can be used for conventionally reinforced, prestressed and post-tensioned concrete

WHERE TO USE

- Patch repairs on parking and bridge decks
- Repair of piles and abutments on marine and bridge structures
- Repair of ceilings and balconies in condominiums and apartments
- Renovation of precast reinforced concrete structures, such as beams and retaining walls
- Floor slab replacement
- Repair of foundations and basins

LIMITATIONS

- Do not install *Mapeshield I* where there is structural damage to the steel reinforcement. For section loss to reinforcement, replace with additional reinforcing steel as directed by an engineer.
- When the use of *Mapeshield I* is planned, do not apply *Planibond® 3C*, *Mapefer™ 1K* or any other type of corrosion protection on the reinforcing steel.



- Do not use an epoxy or polyurethane mortar for repair work.
- Store in a dry, cool area in sealed packaging.
- Temperature should be maintained between 41°F and 95°F (5°C and 35°C) during application.

SUITABLE SUBSTRATES

- Properly prepared masonry and concrete at least 28 days old, stable and free of hydrostatic pressure

Consult MAPEI's Technical Services Department for installation recommendations regarding substrates and conditions not listed.

SURFACE PREPARATION

- Ensure that substrates are structurally sound, stable and solid, with all loose materials and corrosion removed from both the reinforcement rods and the area behind the steel reinforcement.
 - Mechanically profile and prepare concrete surfaces by shotblasting, abrasive blasting, water-jetting, scarifying or other engineered-approved methods to obtain a profile amplitude of 1/4" (6 mm). Reference ICRI CSP Standards 7 to 9 for acceptable profile height.
 - Remove any areas that have been previously repaired and are not perfectly bonded.
 - Verify continuity of reinforcement rods with an appropriate ohmmeter before installing *Mapeshield I*. Resistance of up to 1 ohm is acceptable.
 - Sufficient clearance of at least 3/4" (19 mm) should be provided between the anode and the concrete substrate, or 1/4" (6 mm) larger than the largest size aggregate in the repair material – whichever is greater.
 - Clean reinforcing steel to bright metal in order to facilitate a good electrical connection.
3. Ensure that anodes are positioned and fastened in place to the reinforcing steel so that they do not move during repair and casting operations.
 4. Attach anodes to the reinforcement steel bars using the special clips. Place them as close as practical to the edge of the repair area, ensuring that enough space is provided to completely surround the anodes with the repair material.
 5. When applying mortars, follow good concrete repair procedures and leave no gaps around the anodes.
 6. Concrete repair materials must have electrical resistivity in the range of 50% to 100% of the original concrete and a maximum of 100 kΩ, as specified by EN 12696 standards.
 7. The location and spacing of the anodes should be as designed by the designer. But generally, the number and spacing of the anodes are dependent on whether the structure is new or old, and whether the structure is highly reinforced or carries only a small amount of reinforcement. The number of anodes per 10.76 sq. ft. (1 m²) increases when the amount of steel per 10.76 sq. ft. (1 m²) of concrete is increasing.

Mapeshield I 10/10

| Density of reinforcing steel* | Maximum spacing** between <i>Mapeshield I 10/10</i> units in. (cm) |
|-------------------------------|--|
| < 0.3 | 30" (76,2 cm) |
| 0.31 to 0.6 | 24" (61,0 cm) |
| 0.61 to 0.9 | 20" (50,8 cm) |
| 0.91 to 1.2 | 17" (43,2 cm) |

* Actual surface area of reinforcing steel rods per square foot (0,09 m²) of concrete

** Maximum spacing is based on typical conditions.

Fewer anodes are required in new structures compared with repaired structures and have a much higher duration. In new structures, the reinforcing steel is passive and, thus, less current is required to protect them. For example, in a new, highly reinforced structure (steel/concrete ratio = 0.8 : 1), two *Mapeshield I 10/10* anodes spaced apart every 10.76 sq. ft. (1 m²) will offer corrosion protection for 40 years.

PRODUCT APPLICATION

1. Choosing the most suitable anode is dependent upon three factors: the shape of the structure, the size of the structure, and the duration of the passivity of the reinforcing steel (guaranteed under all conditions, including the presence of chlorides or cracks).
2. *Mapeshield I* is available in four configurations. The first number in the product names above indicates the product's length, and the second number indicates its duration with reference to the mass of the anode:
 - *Mapeshield I 10/10* – 3.9" (10 cm) length and 10-year duration
 - *Mapeshield I 10/20* – 3.9" (10 cm) length and 20-year duration
 - *Mapeshield I 30/10* – 11.8" (30 cm) length and 10-year duration
 - *Mapeshield I 30/20* – 11.8" (30 cm) length and 20-year duration

Product Performance Properties

Mapeshield I 30 products

| | Mapeshield I 30/10 | Mapeshield I 30/20 |
|------------------|-----------------------------|-----------------------------|
| External surface | 11.8" x 2" (30 x 5 cm) ± 5% | 11.8" x 2" (30 x 5 cm) ± 5% |
| Height | 3/8" (10 mm) ± 10% | 1/2" (12 mm) ± 10% |
| Weight | 16 U.S. oz. (450 g) ± 10% | 20 U.S. oz. (570 g) ± 10% |
| Outside color | Light blue | Light blue |
| Customs class | 7905 00 00 | 7905 00 00 |

Mapeshield I 10 products

| | Mapeshield I 10/10 | Mapeshield I 10/20 |
|------------------|-----------------------------|-----------------------------|
| External surface | 3.9" x 2" (10 x 5 cm) ± 10% | 3.9" x 2" (10 x 5 cm) ± 10% |
| Height | 1/2" (12 mm) ± 10% | 9/16" (15 mm) ± 10% |
| Weight | 8 U.S. oz. (230 g) ± 10% | 11 U.S. oz. (320 g) ± 10% |
| Outside color | Light blue | Light blue |
| Customs class | 7905 00 00 | 7905 00 00 |

Shelf Life and Application Properties

| | |
|--------------------|---|
| Shelf life | 1 year in original sealed, vacuum-packed packaging in a dry place |
| Storage conditions | Keep in a dry, cool area in sealed packaging. |

Packaging

| Product Code | Size |
|---------------------|---|
| 2099024 | <i>Mapeshield I 10/10</i> , 24 per carton |
| 2099124 | <i>Mapeshield I 10/20</i> , 24 per carton |
| 2099212 | <i>Mapeshield I 30/10</i> , 12 per carton |
| 2099312 | <i>Mapeshield I 30/20</i> , 12 per carton |

Mapeshield™ I



RELATED DOCUMENTS

| | |
|--|--------------------------------------|
| "Vertical and Overhead Spall Repair by Hand Application" | ACI RAP Bulletin 6 |
| "Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion" | Guide #310.1R-2008 (formerly #03730) |

* At www.mapei.com.

Refer to MAPEI's Material Safety Data Sheet (MSDS) for specific data related to VOCs, health and safety, and handling of product.

STATEMENT OF RESPONSIBILITY

Before using, user shall determine the suitability of the product for its intended use and user alone assumes all risks and liability whatsoever in connection therewith. **ANY CLAIM SHALL BE DEEMED WAIVED UNLESS MADE IN WRITING TO US WITHIN FIFTEEN (15) DAYS FROM DATE IT WAS, OR REASONABLY SHOULD HAVE BEEN, DISCOVERED.**

We proudly support the following industry organizations:



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For the most current BEST-BACKED™ product data and warranty information, visit www.mapei.com.