



# Mapeshield E 25

**Self-adhesive zinc plate applied directly on the surface of structures for galvanic cathodic protection against the corrosion of reinforcement rods in concrete**



## WHERE TO USE

**Mapeshield E 25** is particularly recommended for protecting reinforcement rods against corrosion in works of art which do not require repair work and to reduce or block oxidation in works of art requiring repair.

### Some application examples

- Piles and abutments on bridges and viaducts.
- Floor slabs.
- Car parks.
- Pre-fabricated reinforced concrete structures.
- Beams and columns.
- Front edges of balconies.

## TECHNICAL CHARACTERISTICS

**Mapeshield E 25** is composed of a 250 µm thick plate of 99.9% pure zinc, coupled with an adhesive gel which is also an excellent ionic conductor. After connecting **Mapeshield E 25** to the reinforcement rods with metallic stays, a difference in potential is created between the steel and the zinc which stops corrosion and impedes its formation, even if the surrounding environment is particularly aggressive, due to the presence of chlorides for example. In fact, when two different metals are connected together in a suitable electrolyte (in this case the concrete), the metal with the most negative potential (the zinc) will corrode, while the metal with the least negative potential (steel reinforcement rods) remains protected against

corrosion. Also, the current generated provokes an increase in the pH level which leads to a slow re-alkalisation of the concrete and, if chloride ions are present, pushes them away. The degree of protection depends on the density of the reinforcement in the structure. On heavily reinforced structures, **Mapeshield E 25** must be applied on all the surface requiring protection. If the density of the reinforcement is low, on the other hand, the distance between the plates may be increased up to a maximum of 50 cm. Carry out this calculation using the attached graph. **Mapeshield E 25** ensures that the steel reinforcement is depolarised in compliance with the prescriptions in the EN 12696 European standard "Cathodic protection of steel in concrete".

## RECOMMENDATIONS

- **Mapeshield E 25** may not be applied where there is structural damage to the reinforcement. In such cases, the reinforcement must be integrated or replaced according to calculations carried out by a specialised technician.
- Do not use epoxy or polyurethane mortar, or mortar reinforced with metal fibres, to carry out repair work.
- When the use of **Mapeshield E 25** is planned, do not apply **Mapefer**, **Mapefer 1K** or any other type of anti-rust protection on the reinforcement rods.
- If repair work is required, we recommend the use of a compensated-shrinkage mortar according to EN 1504-3 standards with a maximum resistivity of 100 kΩ\*cm.

# Mapeshield E 25



Roll of Mapeshield E 25



Unrolling and cutting the sheet



Removal of protective backing from the self-bonding gel

- Do not use the product if water percolates inside the structure. In such cases, use **Mapeshield I**.

## APPLICATION PROCEDURE

### Preparation of the substrate

#### Structures which require repairing

The substrate must be prepared correctly, by removing the deteriorated and detached concrete, including from below the reinforcement rods, until a solid, strong substrate with a rough surface is obtained. Any areas previously repaired and which are not perfectly bonded must also be removed. All corrosion and loose particles must be removed from the reinforcement rods to guarantee that there is good contact between the steel and the repair material. Once the concrete has been removed, attach pieces of electric cable or a zinc threaded bar welded to the reinforcement rods which will then be connected to the anodes after the repair work has been completed. Each structural element (column, beam, etc.) must have at least two connections. The continuity of the reinforcement rods must be checked with an ohmmeter before installing the protection. Resistance of up to 1 ohm is acceptable.

#### New structures and structures which do not require repairing

Remove all dust, rust, cement laitance, grease, oil, old paint and any other foreign body from the concrete. After having cleaned it the substrate must be perfectly smooth and even. Create connections between the rebar in the concrete and the sacrificial anodes on the surface of the structure by attaching a piece of wire or welding a piece of threaded galvanized bar to the rebar. Remove a small amount of concrete from around the reinforcement rods to connect the pieces of electric cable or the threaded bar. Each structural element (column, beam, etc.) must have at least two connections. The continuity of the reinforcement rods must be checked with an ohmmeter before installing the protection. Resistance of up to 1 ohm is acceptable.

#### Application of the repair mortar

The electrical resistivity of the repair mortar must be in a range of between 50% and 200% of the original concrete and up to a maximum of 100 k $\Omega$ , as specified in EN 12696 standards. Mortars from the **Mapegrout** and **Planitop** ranges comply with the requirements and are therefore recommended for repairing structures protected with galvanic cathodic systems. Finish off repairs following normal application guidelines, assuring that the substrate is even and smooth after repair, so that the plate is bonded perfectly to the surface, and according to the product chosen and the indications on the data sheet of the mortar used for the repairs.

#### Application of the anodes

Apply **Mapeshield E 25** on the surface of the repaired or new structure or the structure which does not require repairing by removing the protective film from the conductive gel. Press the plate onto the substrate so that

it forms a perfect bond. Apply the sheet of zinc along the structure. Make sure there are no gaps, which may cause weak spots in the whole system. Press **Mapeshield E 25** firmly onto the surface using a rubber roller or similar instrument to guarantee a good bond. Connect the previously connections to the anode sheet by welding or with a mechanical fastener. Continuity between adjacent panels must be guaranteed by inserting the galvanized rawplugs in correspondence with the overlaps. Plates not inter-connected with other plates must have their own direct connection with the reinforcement rods, or a connection must be made between the other plates.

If **Mapeshield E 25** is applied on the inner face of structures, such as beams or floor slabs for example, also use expansion plugs to fasten it to the structure to further guarantee a good bond.

#### Sealing external plates

After applying the anode, the exposed ends and joints must be sealed with **Mapeflex MS40** or **Mapeflex MS45** after treating the edges with **Primer FD** to avoid the ingress of water between the plate and substrate.

#### Smoothing and finishing layers

Smooth over the plates and even out the substrate with **Mapelastick** or **Mapelastick Smart** without applying a primer beforehand. The protection system may then be completed by applying a coat of **Elastocolor Paint** acrylic resin-based finish in water dispersion, available in a wide range of colours using the **ColorMap**<sup>®</sup> automatic colouring system.

#### Functional checks

In order to check the system, one or two reference electrodes (in Ag/AgCl for example) must be installed in the area to be protected by the plates. The electric cables used for the connections between the anodes and the reinforcement rods must have an on/off switch and be connected to a switchbox together with the reference anodes. The procedure for the functional checks is described in the EN 12696 standard which states:

- depolarisation during the 24 hours after switching off of at least 100 mV compared to the potential measured between 0.1 and 1 second after disconnecting the anode (instant off);
- depolarisation over a longer period (> 24 hours) of at least 150 mV after instant off.

**Mapeshield E 25** complies with the above criteria.

#### Precautions to be taken during and after application

No special precautions need to be taken if the temperature is between +5°C and +35°C.

#### CONSUMPTION

See attached graph.

## TECHNICAL DATA (typical values)

### COMPOSITION

Thickness of zinc plate:	250 µm
Thickness of adhesive:	800 µm ± 200
Protective liner:	100 µm
Total weight (kg/m <sup>2</sup> ):	3.15 ± 5%

### CHARACTERISTICS

Zinc plate purity (%):	99.9
Colour:	metallic grey
Longitudinal yield strength (N/mm <sup>2</sup> ):	> 130
Transversal yield strength (N/mm <sup>2</sup> ):	> 150

### ADHESIVE

Colour:	transparent
Minimum application temperature:	+ 4°C
Ideal temperature for application:	> 10°C
In service temperature range:	from -10°C to +60°C



Electric cable previously connected to the reinforcement rods



Connecting the electric cable to Mapeshield E 25 by welding

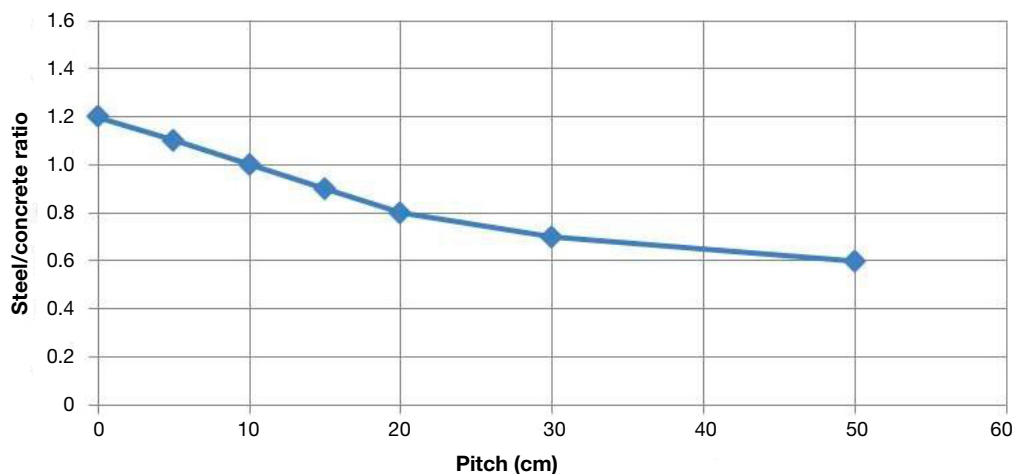


Connecting the electric cable to Mapeshield E 25 with a fastener



Smoothing over and protecting Mapeshield E 25 with Mapelastik Smart applied with a roller

### The pitch of Mapeshield E 25



# Mapeshield E 25

## PACKAGING

Wooden boxes with 1 roll 25 metres long and 25 cm wide.

## STORAGE

The product may be stored for up to 12 months in its original packaging in a dry place.

## SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION

Mapeshield E 25 is an article and referring to the current European regulations (Reg. 1906/2007/CE - REACH) does not require the preparation of the material Safety Data Sheet. During use it is recommended to wear protective gloves and goggles and follow the safety requirements of the workplace. For further and complete information about the safe use of our product please refer to the latest version of our Material Safety Data Sheet.

PRODUCT FOR PROFESSIONAL USE.

## 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.**

**All relevant references for the product are available upon request and from [www.mapei.com](http://www.mapei.com)**



Smoothing over and protecting Mapeshield E 25 with Mapelastic Smart applied with a brush



Smoothing over and protecting Mapeshield E 25 with Mapelastic applied with a trowel