



SECTION 03 70 00 EMBEDDED GALVANIC ANODES

Note to Specifier: This section covers MAPEI's Mapeshield I galvanic anodes, which are designed to mitigate the corrosion of reinforcing steel in concrete.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Provide an embedded galvanic anode in concrete repairs to mitigate corrosion of reinforcing steel in concrete.

1.3 REFERENCES

- A. ACI/ICRI 2008 Concrete Repair Manual.
- B. ACI Guideline No. 222 – Corrosion of Metals in Concrete.
- C. ICRI Guideline 310.1R-2008 – Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.
- D. ASTM B418-12, Type II – Standard Specification for Cast and Wrought Galvanic Zinc Anodes.

1.4 SUBMITTALS

- A. Make submittals in accordance with the requirements of Division 01 and as specified in this Section.
- B. Product Data:
- C. Submit manufacturer's product data, including surface preparation and placement instructions.

1.5 QUALITY ASSURANCE

- A. Installer:
 - 1. Installer shall coordinate anode installation training with the manufacturer to confirm proper procedure for electrically connecting anodes to reinforcing steel.
 - 2. Manufacturer shall provide technical oversight (in person or via video call). Technical oversight shall be provided by a manufacturer representative with NACE CP2 Cathodic Protection Technician certification or higher.

- B. All galvanic anodes, accessory parts and materials shall originate from a single manufacturer.
- C. All repair mortars used in repairs containing galvanic anodes shall originate from the same source manufacturer as the galvanic anodes.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials to the site in the manufacturer's original, unopened containers and packaging, with labels clearly identifying the product name and manufacturer.
- B. Storage: Mapeshield I galvanic anodes may be stored for up to 24 months in its original packaging in a cool, dry area with sealed packaging.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Basis of Design Manufacturer:
MAPEI Corporation
Address: 1144 E. Newport Center Dr., Deerfield Beach, FL 33442
Toll-Free Technical Services: 888-365-0614
- B. Pure Zinc Anodes: Mapeshield I 70, Mapeshield I 105, Mapeshield I 10/10, Mapeshield I 10/20, Mapeshield I 30/10, Mapeshield I 30/20.
- C. Description: Mapeshield I consists of multilayer pure zinc anodes coupled with a special conductive paste for galvanic cathodic protection of reinforcement rods against corrosion in new structures or structures requiring repair.

2.2 DESIGN

- A. The design of the galvanic cathodic protection system is based on factors such as: Type of structure (new or existing), Geometry of the structure, Density of reinforcement, Expected durability and Exposure class.
- B. The anode size and spacing shall deliver a minimum current density based on exposure class and average ambient temperature for the design life, accounting for an anode aging factor.

Corrosion Risk Category	Chloride Level at the rebar	Minimum Current Density
Low	< 0.8%	0.4 mA/m ² (0.04 mA/ft ²)
Medium	0.8% - 1.5%	0.8 mA/m ² (0.07 mA/ft ²)
High	> 1.5%	1.6 mA/m ² (0.15 mA/ft ²)

The minimum current density assumes average annual temperatures of 50°F (10°C). Adjustments should be made for warmer or colder conditions.

2.3 EMBEDDED GALVANIC ANODE SPECIFICATIONS

- A. Mapeshield I 70:
 - 1. Dimensions: 3.94" x 1.97" x 0.2" (100 x 50 x 5 mm).
 - 2. Mass of zinc: 70 grams.
- B. Mapeshield I 105:
 - 1. Dimensions: 5.91" x 1.97" x 0.2" (150 x 50 x 5 mm).
 - 2. Mass of zinc: 105 grams.
- C. Mapeshield I 10/10:
 - 1. Dimensions: 3.94" x 1.97" x 0.47" (100 x 50 x 12 mm).
 - 2. Mass of zinc: 168 grams.
- D. Mapeshield I 10/20:
 - 1. Dimensions: 3.94" x 1.97" x 0.59" (100 x 50 x 15 mm).
 - 2. Mass of zinc: 245 grams.
- E. Mapeshield I 30/10:
 - 1. Dimensions: 11.81" x 1.97" x 0.39" (300 x 50 x 10 mm).
 - 2. Mass of zinc: 340 grams.
- F. Mapeshield I 30/20:
 - 1. Dimensions: 11.81" x 1.97" x 0.47" (300 x 50 x 12 mm).
 - 2. Mass of zinc: 450 grams.

2.4 REPAIR MORTARS

- A. Repair mortars shall have a resistivity below 50,000 ohm-cm.
- B. Acceptable horizontal repair mortars: Planitop 18, Planitop 18 ES.
- C. Acceptable form and pour/pump repair material: Planitop 11, Planitop 11 SCC.
- D. Acceptable vertical and overhead repair mortars: Planitop X, Planitop XS, Planitop 12 SR.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Remove all deteriorated concrete to expose a solid, compact and rough surface.
- B. Undercut exposed reinforcing steel to create a minimum clearance of 3/4" (19 mm) or 1/4" (6 mm) larger than the maximum aggregate size in the repair material.
- C. Remove all corrosion and loose particles from reinforcement rods to ensure proper contact with repair mortar or concrete.
- D. Leave sufficient space for anodes to be fully embedded in repair material while maintaining required concrete cover (minimum 1.5" or 38 mm).
- E. Verify continuity of reinforcement rods and anode with a multimeter. Connections are acceptable if DC resistance is 1 ohm or less, or DC

potential is 1 mV or less.

3.2 ANODE INSTALLATION IN REPAIR APPLICATIONS

- A. Place anodes as close as practical to the repair area edge (within 4" or 100 mm).
- B. Securely fasten anodes to reinforcing steel using steel rebar ties, welding or hose clamps.
- C. Verify continuity between anodes and reinforcement rods post-installation.
- D. Ensure that no gaps exist around anodes during repair material application.

3.3 NEW STRUCTURES ANODE INSTALLATION

- A. Position and fasten anodes securely to reinforcement steel.
- B. Follow specified spacing and placement per the design.
- C. Verify continuity with a multimeter. Connections are acceptable if DC resistance is 1 ohm or less, or DC potential is 1 mV or less.
- D. Proceed with concrete casting per the design guidelines.

END OF SECTION