



SENTINEL : E SERIES

SELF-GENERATING CATHODIC PROTECTION

PACKAGING

Sentinel E⁶⁵

Code: 008E 65 30 (30 unit case)

Sentinel E¹⁰⁵

Code: 008E 105 24 (24 unit case)

Sentinel E¹⁶⁰

Code: 008E 160 24 (24 unit case)

Sentinel E³³⁰

Code: 008E 330 18 (18 unit case)

SHELF LIFE

5 years in original, unopened package

SPECIFICATIONS AND COMPLIANCES

- ASTM B418 Type II (Previously ASTM B418-95a), ASTM A82 (Previously ASTM A82-97a), and ASTM B6/B69

DESCRIPTION

E SERIES GALVANIC ANODES are designed to mitigate the corrosion of reinforcing steel in concrete. Their principal function is to counteract the “anode ring effect” (see CORROSION PREVENTION brochure) and significantly extend the service life of concrete repairs. **E SERIES** anodes are used where new concrete or concrete repair materials are placed adjacent to existing chloride-contaminated concrete. **E SERIES** anodes generate an effective current to the surrounding reinforcing steel, thus protecting the steel from corrosion. **E⁶⁵** contains 65 grams of zinc. For projects where more zinc is required, **E¹⁰⁵** contains 105 grams of zinc, **E¹⁶⁰** contains 160 grams of zinc, and **E³³⁰** contains a massive 330 grams of zinc.

PRODUCT CHARACTERISTICS

FEATURES/BENEFITS

- Offers self-generating protective current output of any cathodic protection device on the market ensuring long service life and large coverage area
- Allows the use of repair materials with resistivity values up to 50,000 ohm-cm
- Engineered to provide long lasting service that maximizes the life of the repair and delivers an excellent cost benefit advantage. **E SERIES** anodes are designed to deliver beneficial protective current for 10+ years*, thus allowing the owner to skip repair cycles
- Galvanized tie wire will not rust and mounts tightly to rebar forming a secure connection
- Moderate PH (approx. 11.5), maintenance free and easy to install

**Current required to completely prevent corrosion of steel in concrete will vary with conditions, as will effective service life*

TECHNICAL INFORMATION

E SERIES anodes deliver a protective current more negative than -850 mV, CSE (water saturated)

DIRECTIONS FOR USE

Spacing Requirements:

E SERIES anodes should be placed as close as practical to the edge of the repair area (within 4-6 in. [10-15 cm]). Provide sufficient clearance for the anode to be completely surrounded by the repair material. Cover over the E SERIES anodes should be a minimum of 2" (5 cm).

Anode spacing shall be as specified by the designer, but anode spacing must not exceed 30 in. (75 cm) on center. Spacing is dependent on steel density (see E SERIES STEEL DENSITY CHART), the corrosive nature of the environment, and electrical resistivity of the repair materials.

The density of the reinforcing steel is the total surface area of the bar within a given area of concrete:

$ft^2 (m^2)$ of steel / $ft^2 (m^2)$ of concrete surface area (regardless of depth)

Corrosion levels in the concrete can be broken into three measurable categories based on ASTM C1152 Standard Test Method for Acid-Soluble Chloride of Mortar and Concrete:

Low Corrosion Levels	Moderate Corrosion Levels	High Corrosion Levels
< 4 lb/yd ³ (< 2.4 kg/m ³)	4 - 8 lb/yd ³ (2.4 - 4.7 kg/m ³)	> 8 lb/yd ³ (> 4.7 kg/m ³)

In the event the surface resistivity of the repair material is higher than 15,000 ohm-cm, a spacing correction factor must be used. If the resistivity is higher than 15,000 ohm-cm and equal to or less than 25,000 ohm-cm, a correction factor of 0.9 must be used. If the repair material is greater than 25,000 ohm-cm and equal to or less than 50,000 ohm-cm, a correction factor of 0.7 must be used. For example: the anode spacing has been determined to be 24 in. (61 cm) due to the corrosive environment and the steel density within the concrete. However the resistivity of the repair material is 25,000 ohm-cm. Therefore, the spacing would be 24 x 0.7 = 17 in (43cm) anode spacing.

Preparation:

Prepare concrete repair area in accordance with industry (ICRI & ACI) guidelines. Remove concrete from around and behind the steel reinforcement inside the repair area. Provide sufficient clearance between the anode and the substrate concrete (minimum of 3/4 in. (19 mm) or 1/4 in. (6 mm) larger than the top size aggregate in the repair material, whichever is greater). Where anodes will be attached, clean exposed rebar to bright metal to facilitate electrical connection. Confirm electrical continuity of the reinforcing steel within the repair area through the use of a high impedance multimeter. Electrical discontinuity (a resistance reading greater than 3.0 Ohms) can be resolved by wiring discontinuous bars to adjacent bars using steel tie wire until proper continuity readings are obtained. Ensure that cover over the E SERIES anodes should be a minimum of 2" (5 cm).

Installation:

Note: Prior to install see E SERIES GALVANIC ANODES INSTALLATION PROCEDURE GUIDE

Complete the repair following proper concrete repair procedures, taking care not to create any voids around the anode. Repair material must have a surface resistivity below 50,000 ohm-cm when tested at 28 days and maintained at 70 °F (21 °C) and 80% relative humidity. For optimal performance, The Euclid Chemical Company recommends that its specially formulated line of repair materials be used with E SERIES anodes as a complete corrosion prevention system.

Caution: Repair materials with significant polymer modification and/or silica fume content may require a bridging mortar. If you are unsure of the resistivity of the cover material, please contact Euclid Chemical Technical Services.

Rebar Coating:

Although not required, the use of insulating rebar coatings (such as epoxy coatings) in the repair area will increase the effectiveness and service life of E SERIES anodes by directing protective current to reinforcing steel outside the patch. If such coatings are used, coat reinforcing steel after installation of the anodes, taking care not to apply any coating to the anode itself. In this case, electrical continuity between the anode wires and the rebar must be checked thoroughly.

PRECAUTIONS/LIMITATIONS

- E SERIES anodes should be installed and covered as soon as possible after removal from the original sealed packaging. Any anodes removed from the original packaging must be protected from excessive moisture and/or contaminants until time of repair material placement.
- DO NOT allow E SERIES anodes to freeze.
- Do not apply bonding agents or corrosion inhibitors directly onto the surface of E SERIES anodes
- If using a repair mortar with an ohm-cm resistivity greater than 50,000 or a repair mortar with extremely high polymer/pozzolan content, encase the anodes in a low-resistivity bridging mortar (under 15,000 ohm-cm) in a fashion where the bridging mortar is touching the anode and base concrete.
- Do not add any external current to E SERIES anodes

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