

# SENTINEL GALVANIC ANODES

## SELF-GENERATING CATHODIC PROTECTION

### DESCRIPTION

**SENTINEL GALVANIC ANODES** are designed to mitigate the corrosion of reinforcing steel in concrete. Their principal function is to counteract the “anode ring effect” and significantly extend the service life of concrete repairs. They can also be used in locations where new concrete is placed adjacent to existing chloride-contaminated or carbonated concrete. In either case, SENTINEL anodes generate an effective current to the surrounding reinforcing steel, thus protecting the steel from corrosion. SENTINEL GL is the backbone of the Sentinel family. At 38 grams of pure zinc, SENTINEL GL has provided corrosion protection across the globe for many years. For projects where more zinc is requested, SENTINEL SILVER provides 100 grams of zinc protection. For projects requiring the ultimate protection, SENTINEL GOLD contains a massive 200 grams of zinc.

### PRIMARY APPLICATIONS

- Parking decks
- Bridge structures
- Pier & dock supports
- Balconies

### FEATURES/BENEFITS

- Offers the highest self-generating protective current output of any cathodic protection devices on the market ensuring long service life and large coverage area
- Unique v-notch design minimizes chipping of concrete assuring easy, efficient placement, reduced labor requirements and lower installation costs
- Exclusive insulating barrier design will not “dump” current into attachment bar extending the coverage area and service life of the cathodic protection device
- Snugly fits against any size rebar, requires no special training and is easily installed with standard tools
- Engineered to provide long lasting service that maximizes the life of the repair and delivers an excellent cost benefit advantage. SENTINEL anodes are designed to deliver beneficial protective current for 10 to 20 years\*, thus allowing the owner to skip a repair cycle or two
- Galvanized tie wire will not rust and mounts tightly to rebar forming a secure connection

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

### TECHNICAL INFORMATION

**Typical Engineering Data** - The following results were developed under laboratory conditions:

**Current Output:** SENTINEL anodes deliver a protective current equal to or greater than 1.0 milliamps after 90 days. Test performed in an environment that is maintained at room temperature and about 55% relative humidity, and conducted in a concrete test block containing not more than 0.7 ft<sup>2</sup> (0.065 m<sup>2</sup>) of reinforcing steel.

### PACKAGING

SENTINEL GL are packaged 20 units per box. SENTINEL SILVER and SENTINEL GOLD are packaged 10 units per box.

### SHELF LIFE

18 months in original, unopened package.

### SPECIFICATIONS/COMPLIANCES

- Test values of the SENTINEL anodes in repair areas indicate complete cathodic protection of the steel rebar adjacent to the repair based upon standards set by NACE RPO290-90.
- ASTM B 418-01 (Previously ASTM B418-95a) and ASTM A 82 -02 (Previously ASTM A 82-97a).
- Listed under US Patents 6,217,742, 6,958,116, 7,160,443, and 7,488,410.



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## INSTALLATION PREPARATION

The area to be repaired should be prepared in accordance with industry (ICRI & ACI) guidelines. All unsound concrete should be removed from around and behind the steel reinforcement inside the repair area. Sufficient clearance should be provided between the anode and the substrate concrete (minimum of 3/4" (19 mm) or 1/4" (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 a good electrical connection. Electrical continuity of the rebar within the repair area should be confirmed with the use of a high-impedance multimeter. When placed on the mV scale, a reading of 1.0 mV or less on the voltmeter indicates good continuity between reinforcing bars. Electrical discontinuity can be resolved by wiring discontinuous bars to adjacent bars using steel tie wire.

## SPACING REQUIREMENTS

When using SENTINEL anodes to extend the life of repairs, the anodes should be placed as close as practical to the edge of the repair area (within 6" or 15cm) while still providing sufficient clearance for the anode to be completely surrounded by the repair material.

**Anode spacing shall be as specified by the designer, but anode spacing must not exceed 30" (75cm) on center. Spacing is dependent on steel density and the corrosive nature of the environment.**

The density of the reinforcing steel is the total surface area of the bar (ft<sup>2</sup>) within a square foot of concrete (regardless of depth). **Heavy density:** > 1.0 ft<sup>2</sup>/ft<sup>2</sup> **Moderate density:** .5 to 1.0 ft<sup>2</sup>/ft<sup>2</sup> **Light density:** < 0.5 ft<sup>2</sup>/ft<sup>2</sup>

Corrosion levels in the environment effecting the concrete can be broken into two measurable categories: **Light to moderate corrosion levels:** < 5 lb/yd<sup>3</sup> **High corrosion levels:** > 5 lb/yd<sup>3</sup>

For further information on spacing requirements, please contact the Euclid Chemical Technical Services Department for additional spacing and specification information.

## INSTALLATION PROCEDURE

Complete the repair following good concrete repair procedures, taking care not to create any voids around the anode. Repair material must have a volumetric resistivity below 15,000 ohm/cm after 28 days when maintained at room temperature and 80% relative humidity. The Euclid Chemical Company recommends that its specially formulated line of repair materials: EUCOCRETE, EUCOPATCH, CONCRETE-TOP SUPREME, VERTICOAT, EXPRESS REPAIR, TAMMS FORM & POUR, SPEED CRETE PM, SPEED CRETE RED LINE, TAMMS STRUCTURAL MORTAR, NS GROUT (fluid) and EUCOSHOT be used with SENTINEL anodes as a complete corrosion prevention system. For other acceptable product recommendations, contact your local area Euclid Chemical representative. **Caution:** Repair materials with significant polymer modification and/or silica fume content may not be suitable for use with Sentinel anodes. If you are unsure of the volumetric resistivity of the cover material, please contact Euclid Chemical Technical Services for instructions on creating an allowable "safe zone" between the anode and the surrounding cementitious material.

**Note:** See installation procedures included in each box of the SENTINEL anodes.

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 SENTINEL anodes by directing protective current to reinforcing steel outside the patch. If such coatings are used, coating of rebar should be done after installation of the anodes, and care must be taken 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.

**Special Condition:** SENTINEL anodes can be used in certain circumstances on structural steel. Please consult the Euclid Chemical Technical Service Department for further information on this type of installation.

## PRECAUTIONS/LIMITATIONS

SENTINEL anodes should be installed and covered within 48 hours of removal from their original sealed packaging. Any anodes removed from their original packaging should be protected by temporarily sealing in plastic (e.g. Ziploc® bags).

DO NOT allow the Sentinel anodes to freeze.

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