Special Specification 4036
Embedded Galvanic Anodes

1. DESCRIPTION

Furnish and install embedded zinc anodes for the purpose of corrosion mitigation of reinforcing steel located adjacent to the concrete repair or extension.

2. MATERIALS

Embedded galvanic anodes will be puck-shaped approximately 2-1/2 in. in diameter by 1 in. high, pre-manufactured, and consists of electrolytic high-grade zinc in compliance with ASTM B418 Type II cast around a pair of steel tie wires and encased in a highly alkaline cementitious shell with a pH of 14 or greater.

Repair mortars, concrete and bonding agents used to encase the anode in the concrete member will be Portland cement-based materials with suitable electrical conductivity. Non-conductive repair materials such as epoxy, urethane, or magnesium phosphate will not be permitted. Repair materials used in conjunction with the galvanic anodes will be as approved.

3. CONSTRUCTION

Remove and repair the delaminated concrete in accordance with the plans, the following Items and the requirements within:

- Item 420, “Concrete Substructures,” and
- Item 429, “Concrete Structure Repair”

Undercut all exposed reinforcing steel by removing concrete from the full circumference of the steel. The clearance between the concrete substrate and reinforcing steel will be 3/4 in. or 1/4 in. greater than the largest size of aggregate in the repair material, whichever is greater.

Continue concrete removal along the reinforcing steel until there are no visible signs of corrosion and as directed.

Clean exposed reinforcing steel to an SSPC-SP 10 surface to provide sufficient electrical connection and mechanical bond. If significant reduction in the cross section of the reinforcing steel has occurred, replace or install supplemental reinforcement as directed. Secure loose reinforcing steel by tying tightly to other bars with steel tie wire.

Install Galvanic Anodes along the perimeter of the repair at spacing not to exceed 12 in. When the repair crosses through multiple bars, attach one anode to every two bars crossed. Attach the lead wire to each bar. Tighten lead wires so that there is no movement between wire and bar.

Install Galvanic Anodes in a position that allows the repair mortar to totally encase the anode.

If the anode is to be tied onto a single bar, or if less than 1 in. of concrete cover is expected, place anode beneath the bar. Tie the anode lead wires to the clean steel reinforcing bars in accordance with the manufacturer’s specifications.

Verify the electrical connection between the anode tie wire and the reinforcing bar by measuring DC resistance (ohms,Ω) with a multi-meter. Electrical continuity is acceptable if the DC resistance measured

with the steel tie wire is less than 5Ω. Verify the electrical continuity of all the exposed reinforcing steel in the repair area. Use non-coated steel tie wire to establish continuity if any bar is found not being connected.

Perform concrete repair operations after installation of the galvanic anode has been approved in accordance with the plans and the other items of work of this contract. Prevent air voids from forming in the concrete repair.

4. MEASUREMENT

This Item will be measured by each galvanic anode properly installed.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Embedded Galvanic Anodes." This price will be full compensation for any extra preparation of concrete substrate to receive the anodes; for extra cleaning the reinforcing steel at the connection locations; for furnishing and installing anodes; for testing continuity of anodes with reinforcing steel and the continuity of all reinforcing steel within the repair area; and for all labor, tools, equipment and incidentals necessary to complete the work.