

## REVISION OF SECTION 601 GALVANIC ANODES

Revise Section 601 of the Standard Specifications for this project to include the following:

### DESCRIPTION

This work consists of furnishing and installing galvanic anodes, tying existing steel reinforcing mats for electrical continuity, and testing for electrical continuity in concrete repair locations as shown on the plans or as directed by the Engineer.

### MATERIALS

Galvanic anodes shall be one of the following:

- (1) "Galvashield XP2" as manufactured by Vector Corrosion Technologies,  
1330 Bellaire Street  
Broomfield, CO 80020  
303-465-5806
- (2) "MasterProtect 8105 CP" as supplied by BASF Corporation,  
889 Valley Park Drive,  
Shakopee, MN 55379  
800-433-9517
- (3) "Sentinel Silver" as manufactured by Euclid Chemical  
19218 Redwood Rd.  
Cleveland, OH 44110  
800-321-7628
- (4) "Galvashield XP+" as supplied by Sika Corporation  
201 Polito Ave.  
Lyndhurst, NJ 07071  
248-577-0980

Galvanic anodes shall be pre-manufactured and consist of a minimum of 100 grams of zinc conforming to ASTM B6 Special High Grade, cast around a pair of steel tie wires conforming to bright annealed ASTM A82.

At least 10 working days before the start of repair work, the Contractor shall submit documentation of the anode manufacturer's approval of the patching materials compatibility with their anode system and any special treatment requirements and installation instructions. The Contractor shall contact the manufacturer of the anodes to gain a full understanding of any special treatments that will be required and the process to properly install the anodes. The concrete patching material shall be as shown on the plans or as

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approved by the Engineer. Any grout used for grout beds or encapsulation of anodes shall have compressive strength equivalent to the original deck concrete per as-built drawings.

### CONSTRUCTION REQUIREMENTS

Anodes shall be installed the same day as preparation and cleaning of steel reinforcement to bright metal at the anode tie wire connection. The anode units, in cementitious patching material, shall be pre-wet to achieve a saturated surface dry condition, and the repair shall be completed while the anodes are in this condition.

Anodes used with patching material having resistivity greater than 15,000 Ohm-Centimeters (Ohm-cm) or not meeting compatibility requirements shall be specially treated and installed per manufacturer recommendations.

Galvanic anodes shall be installed per manufacturer's recommendations. Anodes shall be placed in each patch, 18 to 24 inches apart on the perimeter, based on rebar spacing. A minimum of one anode shall be placed in each patch and may be placed in the middle of the patching material area if the spacing requirement cannot be met. Each anode shall have a minimum 1.5 inch top cover to the surface of the new concrete deck patch and a 1 inch minimum side and bottom clear cover.

Galvanic anodes shall be secured with anode tie wires as close as possible to the patch edge while achieving minimum cover requirements. The tie wires shall be wrapped around the cleaned reinforcing steel and twisted tight to allow little or no free movement.

Before placing new concrete, galvanic anodes shall be installed per the manufacturer's recommendations and inspected for proper connection and continuity to reinforcing steel.

#### *(a) Electrical Connection and Continuity.*

Electrical connection and continuity between anode tie wire and reinforcing steel shall be confirmed by measuring DC resistance (ohm) or potential with a multi-meter. Electrical connection and continuity is acceptable if the DC resistance measured with a multimeter is less than 1 ohm or the DC potential is less than 1 mV.

All intersections of reinforcing steel shall provide electrical continuity. The Contractor shall confirm continuity of at least three intersections per repair area on each structure or as directed by the Engineer. Intersections with visible separation or lack of continuity shall be cleaned and/or tied with bare steel tie wire to achieve continuity. Additional continuity testing will be required as directed by the Engineer. Electrical continuity within a repair area is acceptable if the DC resistance measured with a multimeter is less than 1 ohm or the potential is less than 1 mV.

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The Contractor shall furnish the Department with a multimeter to independently check the electrical connection. The multimeter shall become the property of the Department.

**METHOD OF MEASUREMENT**

Galvanic Anodes will be measured as the actual quantity installed and accepted. The Contractor may stockpile material at their own risk. All unused galvanic anodes shall remain property of the Contractor. CDOT will not purchase leftover materials or pay any restocking fees.

**BASIS OF PAYMENT**

The accepted quantities of Galvanic Anodes will be paid for at the contract unit price.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Galvanic Anodes	Each

Payment for Galvanic Anodes will be full compensation for all labor, equipment, materials, and incidentals required to complete the item.

Electrical continuity tie wiring and testing will not be measured and paid for separately but shall be included in the work.

The multimeter will not be measured and paid for separately but shall be included in the work.

If additional anodes are required during construction, the additional anodes will be paid for at the original Contract unit price.

Any special treatment or installation of the anodes that is required by anode supplier due to the type of patching material used, including but not limited to, grout beds between substrate and anode, or grout encapsulation of the anodes, will not be measured and paid for separately, but shall be included in the work.

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**INSTRUCTIONS TO DESIGNERS (delete instructions and symbols from final draft):**

Use this project special provision when doing bridge deck and approach slab repair or other concrete repairs that expose existing non-epoxy coated reinforcing on bridges.

**PERMANENT CHANGES TO PROJECT DATED SPECIAL PROVISIONS**

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<u>DATE</u>	<u>AUTHOR</u>	<u>DESCRIPTION OF CHANGE</u>
1/14/19	BPM Cons.	Initial Website Issue
04.11.2023	M. Kayen	Revisions to make spec online ADA-compliant. 5.22.23 Additional ADA.