

**Revision Of Sections 602 and 709
Galvanic Anodes**

Revise Sections 602 and 709 of the Standard Specifications for this project as follows:

Add the following to Section 602:

Description

602.09 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 shown on the plans or as directed by the Engineer.

Materials

602.10 Materials shall meet the requirements shown on the plans and in the following subsections:

Galvanic Anodes shall be on the Department's Approved Products List and meet the requirements of Subsection 709.04.

Concrete shall meet the requirements of Section 601

Patching material shall have a minimum compressive strength of 4500 psi no later than 28 days or as designated on the plans and be on the Department's Approved Products List.

Construction Requirements

602.11 Placing Anodes. 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 concrete compatibility with their anode system and any special treatment requirements and installation requirements.

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 such as grout encapsulation or bedding.

Galvanic anodes shall be installed per manufacturer's requirements. Anodes shall be placed in each patch, 18 to 24 inches apart on the perimeter, based on rebar spacing as per Manufacturer's requirements. 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

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the surface of the new concrete deck patch and a minimum cover of 1" with adequate vibration to insure sufficient concrete flow. Clear covers less than the aforementioned criteria will require grout beds as shown in the drawings.

The steel reinforcement shall be cleaned to bright metal where the anode tie wire connection will be installed. Anodes and encapsulation grout (if necessary) shall be installed within 8 hours after the preparation and cleaning of steel reinforcement. Repair any damaged epoxy coating.

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.

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 are 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 at all patch locations 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 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.

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

602.12 Galvanic Anodes will be measured as the actual quantity installed and accepted.

Basis of Payment

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

Payment will be made under:

Pay Item	Pay Unit
602-51010 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 the 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.

Add the following new Section 709.04:

709.04 Galvanic Anodes. Galvanic anodes shall meet the requirements of ASTM B418, Type II, and consist of a minimum of 100 grams of zinc.

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

This specification should be added to all plans requiring the use of anodes for concrete repairs where non-epoxy rebar is exposed.

PERMANENT CHANGES TO PROJECT DATED SPECIAL PROVISIONS

REVISION OF SECTION 602 GALVANIC ANODES

<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.
09.20.2024	A. Harajli	Revision to rename the existing 601 spec to a new 602 Spec version.