

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
**EMBEDDED GALVANIC ANODES, HIGH PERFORMING FOR CORROSION
CONTROL**

BRG:KCK

1 of 2

APPR:JAB:TEB:08-22-25

FHWA:APPR:08-26-25

a. Description. This work includes furnishing and properly installing embedded galvanic anodes in concrete. The embedded galvanic anodes serve to provide corrosion protection to existing steel reinforcement. When placed at the specified spacing along the perimeter of concrete patches or along the interface between the new and existing concrete, the anodes mitigate the formation of new corrosion sites in the existing concrete.

b. Materials. Embedded galvanic anodes should be approximately 4 to 5 inches in length and 1½ inches high, pre-manufactured, and must consist of 100 grams (3.5 ounces) minimum of electrolytic high-grade zinc in compliance with *ASTM B418* cast around a pair of steel tie wires. Furnish embedded galvanic anodes from Vector Corrosion Technologies (Galvashield XP2), phone number (813) 830-7566, or from Euclid Chemical Company (Euclid SENTINEL Silver), phone number (800) 321-7628, or an Engineer approved equal. The approved equal anode must supply the calculated amount of zinc in pounds/foot (lb/ft) in Table 1. Furnish the anodes with a general certification provided by the manufacturers. Deliver, store, and handle all materials in accordance with the manufacturer's instructions.

Ensure repair mortars, concrete, and bonding agents are Portland cement-based materials. Non-conductive repair materials such as epoxy, urethane, or magnesium phosphate are prohibited.

c. Construction. Perform the concrete work in accordance with sections 706 and 712 of the Standard Specifications for Construction.

1. Galvanic Anode Installation.

A. Install galvanic anodes along the perimeter of the repair. Determine the maximum spacing of the galvanic anode selected based on Table 1 and the steel density specified on the plans. Do not mix anode types.

Table 1. Anode spacing based on steel density for 100 grams (0.22 lb) of zinc per anode(a).

Steel Density	Maximum Anode Spacing (inches)	Zinc (lb/ft)
< 0.3	22	0.12
0.31 to 0.6	20	0.13
0.61 to 0.9	18	0.15
0.91 to 1.2	16	0.17
1.21 to 1.5	15	0.18

1.51 to 1.8	14	0.19
1.81 to 2.1	13	0.20
a. For anodes with a zinc content greater than 100 grams, use the formula Spacing (in) = (anode zinc content, grams) / [(1.7 x steel density + 4)], to determine the spacing in inches.		

B. If the existing reinforcement is epoxy coated remove the existing coating to expose bare metal. Secure the galvanic anodes to the bare metal.

C. Provide 3/4-inch clearance between anodes and substrate to allow repair material to encase anode.

D. Secure the galvanic anodes as close as possible to the patch edge using the anode tie wires. Ensure the tie wires are tightened to allow little or no free movement.

E. If the anode is to be tied to a single bar, or if less than 1½ inch of concrete cover is expected, place anode beneath the bar and secure to reinforcing steel.

F. If 1½ inch concrete cover will exist over the anode, the anode may be placed at the intersection between two bars and secured to each bar.

G. The Engineer must verify proper installation of the galvanic anodes prior to placement of the concrete.

2. Electrical Continuity.

A. Confirm electrical connection between anode tie wire and reinforcing steel with a multi-meter. Ensure the maximum DC resistance is 1.0 Ohm.

B. Confirm electrical continuity of the exposed reinforcing steel within the repair area. Steel reinforcement is considered continuous when the DC resistance is 1 Ohm or less. If necessary, ensure electrical continuity is established with uncoated steel tie wire.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	Pay Unit
Embedded Galvanic Anode, High Performing.....	Each

Embedded Galvanic Anode, High Performing includes determining the maximum spacing of the galvanic anode selected based on the requirements outlined in this special provision, furnishing the anodes, and properly installing the anodes in concrete. Payment will be made only when the Engineer has verified proper installation.

Concrete and steel reinforcement work will be paid for separately.