

## SECTION 26 42 00 - CATHODIC PROTECTION

### 1.01 <sup>A7</sup>SUMMARY:<sup>A7</sup>

<sup>A17</sup>A. **Scope:** This section contains the performance and prescriptive specifications for the control of ferrous-metal corrosion by means of galvanic cathodic protection afforded by sacrificial anodes. Cathodic protection is required on all underground and underwater ferrous metal, including buried steel tanks, potable water pipes, raw-water fire-fighting pipes, compressed-air pipes, fuel pipes, oily-water pipes, ventilation pipes, underwater steel piles, and underwater and buried sheet piles. All hydraulic structures such as lock gates, trackways, culvert valves, conduit valves, bulkheads, closures for culverts and gate Recesses, and other underwater metals, coated in accordance with Section 09 96 00 (*Corrosion Control Coatings*) shall be provided with cathodic protection in accordance with this section. Impressed-current cathodic protection shall not be used. Cathodic protection is not required for hydraulic structures that are metallized and coated in accordance with Section 05 50 13.13 (Metallizing and Coating Hydraulic Structures).<sup>A17</sup>

B. **Related Sections:**

09 96 00	Corrosion Control Coatings
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### 1.02 <sup>A16</sup>REFERENCES:<sup>A16</sup>

A. **American Society for Testing and Materials (ASTM) International Standards:**

B 418-2006	Standard Specification for Cast and Wrought Galvanic Zinc Anodes
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B. **Military Specification:**

MIL-A-18001K (Am2)	Anodes Sacrificial Zinc Alloy
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C. **National Association of Corrosion Engineers (NACE) Standards:**

RP 01.69-2002	Control of External Corrosion in Underground or Submerged Metallic Piping Systems
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RP 0188-1990	Discontinuity (Holiday) Testing of Protective Coatings
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### 1.03 <sup>A7</sup>REQUIREMENTS:<sup>A7</sup>

A. **Requirements for Surfaces to be Cathodically Protected:** Design and install cathodic protection using galvanic anodes, on ferrous metal surfaces that have been protected by means of corrosion control coatings in accordance with Section 09 96 00 (*Corrosion Control Coatings*). Use a coating system with chemical resistance and cathodic<sup>A17</sup> disbonding<sup>A17</sup> properties, suitable for use in conjunction with cathodic protection. Inspect and repair the coating for discontinuities and holidays (an area left uncovered during the application of paint) in accordance with NACE 0188.

- C. <sup>A17</sup>**Durability Requirements:** Design and install a cathodic protection system that will protect buried metallic structures for a minimum of 30 years; hydraulic structures for a minimum of 20 years; and all other structures for a minimum of 10 years, without anode replacement.<sup>A17</sup>
- D. **Uniformity Requirements:** Design and install galvanic anodes in such a manner as to produce a continuous and uniform protection on the entire structure to be protected, without blind or missed areas.
- E. **Maintenance Requirements:** Design and install testing stations for underground cathodic protection, for testing anodes, anode electrical cables and connections, and the potential of the least protected surface, with respect to a standard reference half/cell.

**1.04 <sup>A7</sup>DESIGN CRITERIA/SYSTEM DESCRIPTION AND PERFORMANCE:<sup>A7</sup>**

**A. Cathodic Protection Design:**

- 1. Design and install the galvanic anodes to protect all surfaces of the submerged or buried ferrous metal structures, in accordance with current industry practices and NACE RP 01.69.
  - a. For protection of buried structures, design the cathodic protection taking **into account** the resistivity of the soil or backfill where the structure to be protected will be buried.
  - b. For protection of submerged structures, design the cathodic protection taking **into account** the resistivity of the water that will be in contact with the metal structures. Protect the anodes against damage by debris carried by the water, and against loosening produced by vibration or turbulent flow.
- 2. Design and install the galvanic anodes to avoid ionic stray currents or interference **that could** cause undesired corrosion of other buried metal structures in the vicinity of the structure being protected.

**B. Galvanic Anodes:**

- 1. Underwater galvanic anodes shall be standard manufactured anodes suitable for the water environment around the structure to be protected.
  - a. Zinc anodes shall be high purity zinc conforming to Military Specification A-18001-H. Zinc shall conform to ASTM B-418.
  - b. Magnesium anodes shall be **the** H-1 Type I magnesium alloy, suitable for use in fresh water, with an efficiency of minimum 550 **Ah/lb**.
  - c. Aluminum anodes shall be an aluminum-indium alloy such as Galvalum III, with an efficiency of minimum 1,150 **Ah/lb**.

2. Underground galvanic anodes shall be standard manufactured pre-packaged anodes with selected backfill, suitable for the soil around the structure to be protected.
  - a. Magnesium anodes shall be of Galvomag magnesium alloy, with an efficiency of minimum 550 Ah/lb.

#### 1.05 <sup>A7</sup>SUBMITTALS:<sup>A7</sup>

##### A. <sup>A17</sup>Intermediate Design:<sup>A17</sup>

1. **Cathodic Protection Systems:** For each different type of cathodic protection system to be used, the Contractor shall submit design drawings and specifications indicating the location, connection and installation details.
2. <sup>A7</sup>**Documentation:**<sup>A7</sup> The Contractor shall submit descriptive literature and technical data and application instructions for each type of anode, including shop drawings, dimensional data of the anodes proposed for use on the project, with its batch number and date of manufacture, and an updated copy of its "MATERIAL SAFETY DATA SHEET" (OSHA Form-174). Technical data shall include the ASTM laboratory test methods and corresponding results.
3. <sup>A7</sup>**Certifications:**<sup>A7</sup> The Contractor shall submit certifications of the cathodic protection specialist or corrosion engineer who will be performing the design.

##### B **Before Issuance of the Taking-Over Certificate:**

1. **Maintenance Manuals:** The Contractor shall submit maintenance and testing manuals for each type of cathodic protection system that has been supplied and installed, indicating detailed procedures for repair and maintenance of the cathodic protection for that system system.
2. **Inspection and Test Reports:** The Contractor shall submit a certified copy of inspection and test reports demonstrating that the cathodic protection systems have been properly installed in accordance with the drawings and specifications, and the manufacturer instructions.

#### 1.06 <sup>A7</sup>QUALITY ASSURANCE:<sup>A7</sup>

- A. Designs and quality control inspections shall be performed by a NACE certified cathodic protection specialist or corrosion engineer.

**END OF SECTION**

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