

PART 1 - GENERAL

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| <u>1.1 Related Sections</u> | .1 | Section 05 50 00 - Metal Fabrications. |
| <u>1.2 References</u> | .1 | Canadian Standards Association (CSA)
.1 CSA C22.3 No.4-1974 (R1999) Control of Electrochemical Corrosion of Underground Metallic Structures. |
| | .2 | National Association of Corrosion Engineers (NACE). |
| <u>1.3 Shop Drawings</u> | .1 | Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | Indicate location of anodes, installation procedures, hardware and accessories. |
| <u>1.4 Waste Management and Disposal</u> | .1 | Remove from site and dispose of all packaging materials at appropriate recycling facilities. |
| | .2 | Collect and separate for disposal, paper, plastic, polystyrene and corrugated cardboard packaging material for recycling in accordance with provincial standards. |
| <u>1.5 Warranty</u> | .1 | The contractor hereby warrants that all products used for the cathodic protection installation will be effective in accordance with the General Conditions, for five years. |
| <u>1.6 Measurement For Payment</u> | .1 | See Section 01 29 00-Payment Procedures for payment details |

PART 2 - PRODUCTS

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| <u>2.1 Sacrificial Anodes</u> | .1 | Provide complete cathodic protection system |
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(including all connection hardware) as indicated on the drawings, comprising of: Aluminum Indium alloy sacrificial anodes complete with mounting plate/brackets. All anodes must have the following properties: A total mass as per the contract drawings. The anodes shall have a negative potential of -1.150 V (to a Copper-copper sulfate reference electrode at 25 degree Celsius), a current capacity of 2600 A-hrs/kg and a consumption rate of 3.3 kg/A-yr. The Aluminum Indium alloy shall have the following composition: Zn(3.0%), Si(0.1%), Hg(0.0%), In(0.015%), Al(Remainder) or approved alternate. The alloy shall be designed for use in a seawater environment.

All pipe pile bar anodes shall have a net weight of 148 kg. These anodes shall have a trapezoid shape with the following tentative dimensions: Length=1.6 m, width=0.18-0.225 m, height=0.184 m.

All box pile bar anodes shall have a net weight of 320 kg. These anodes shall have a trapezoid shape with the following tentative dimensions: Length=2.5 m, width=0.22-0.265 m, height=0.238 m.

All fender panels shall have galvanic sacrificial anodes installed to protect the fender panels for a 20 year design life. The fender panel anodes shall be designed and sealed by a Professional Engineer licensed to practice in the province of New Brunswick.

All anode dimensions shall be reviewed by a Departmental Representative.

2.2 Steel Pipe Pile and .1 Round HSS Coatings

All new round HSS and steel pipe piles shall be pre-coated prior to installation (609.6 mm and 914.4 mm diameter pipe piles).

.2 After installation, the coating shall extend

from the top of the pile down to elevation -7.5 meters.

- .3 All new steel (connection plates, torsion beams, pipes, pad-eyes, etc...) which will be part of the final fender system shall also be coated. This includes the mooring line rail at Breasting Dolphin #1.
- .4 The steel shall be coated with a 3+ layered coating system including: a zinc rich primer, epoxy and polyurethane top coat. The coating system must meet ISO EN 12944-5:2007, C5GM for a marine environment.
- .5 The coating system shall have a warranty for 5 years.
- .6 The coating system shall meet the following standards based on lab testing or approved equivalent test method: No corrosion or blistering after 5000 hours based on the ASTM D870 immersion test in ocean water. In addition, the coating system shall have no blistering after 5000 hours based on the ASTM B117 salt fog test.
- .7 The coating system shall have a minimum NDFT of 320 μ m.

2.3 Steel Box Pile Coatings

- .1 All existing steel box piles and cushioning frames shall be field coated after demolition of the existing fendering system and the installation of the new reinforcement plate.
- .2 The box pile coating shall extend from the top of the pile down to elevation +3.0 meters.
- .3 The entire surface area of the existing cushioning frames shall be coated.
- .4 All new steel (i.e. connection plates) which will be part of the final fender system shall also be coated.

- .5 The steel shall be coated with a 3+ layered coating system including: a zinc rich primer, epoxy and polyurethane top coat. The coating system must meet ISO EN 12944-5:2007, C5GM for a marine environment.
- .6 The coating system shall have a warranty of 5 years.
- .7 The coating system shall meet the following standards based on lab testing or approved equivalent test method: No corrosion or blistering after 5000 hours based on the ASTM D870 immersion test in ocean water. In addition, the coating system shall have no blistering after 5000 hours based on the ASTM B117 salt fog test.
- .8 The coating system shall have a minimum NDFT of 320 μ m.

3.1 Installation

- .1 Install all products of the cathodic protection system as per the contract drawings and to the manufacturer's specification.
- .2 Surface preparation of all coated steel surfaces to meet or exceed SA 2.5 in accordance with ISO 8501.1.
- .3 Field touch ups must be completed on all damaged coatings. Touch ups shall consist of a full 3+ coating system as outlined in Part 2.2 and 2.3.