

PART 1 - GENERAL

- 1.1 Related Requirements .1 Section 05 50 00 Metal Fabrications.
- 1.2 References .1 American Society for Testing and Materials International (ASTM):  
.1 ASTM A536-84(R2014) Standard Specification for Ductile Iron Castings.  
.2 ASTM A123/A123M-13, Standard Specification for Zinc(hot-dipped galvanized) Coatings on Iron and Steel Products.  
.2 Canadian Standards Association (CSA):  
.1 CSA G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- 1.3 Description .1 Design Requirements:  
.1 Design bollards and anchor bolts with a minimum factor of safety of 3.0 against failure and to conform to an internationally accepted Standard.
- 1.4 Submittals .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.  
.2 Product data: submit manufacturer's printed product literature, specifications and datasheet.  
.3 Submit shop drawings, indicating following items:  
.1 Bollard assemblies, with dimensions as installed on structures.  
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PART 2 - PRODUCTS

- 2.1 Materials
- .1 Bollards: ductile iron casting (spheroidal graphite cast iron) to ASTM A536-84(R2014).
    - .1 35tonne:
      - .1 Safe working load: 343 kN.
      - .2 Bollard fixing hardware: hot dip galvanized as per ASTM A123.
    - .2 Grout: shrinkage compensating non-metallic.
    - .3 Paint:
      - .1 Supply the bollards with a high performance protective coating system. Protective coating system to consist of blast cleaning, supply and application of an inorganic zinc primer coat, and two (2) or more coats of immersion grade epoxy and the proper curing of the coatings.
      - .2 Surface preparation, application and the dry film thickness (DFT) of each coat to be as recommended by the paint manufacturer. The total DFT of the coating system shall, however, not be less than 350µm (14mils).
      - .3 Supply the complete coating system from the same paint manufacturer and each component of the system must be compatible with the rest of the systems.
      - .4 Colours:
        - .1 Departmental Representative to confirm.

PART 3 - EXECUTION

- 3.1 Application
- .1 Install bollards in accordance with manufacturer's instructions.
- 3.2 Setting and Grouting
- .1 Set bollards at locations and elevations as indicated on Project Drawings.
    - .1 After tightening of anchor bolts or positioning wedges, grout under base.
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- .2 Confirm temperatures of concrete, air, base and grout are within range specified by grout manufacturer.
  
- .2 Do not grout until location of anchor bolts and bollards have been approved by the Departmental Representative.