

## **PART 1        GENERAL**

### **1.1            REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A240-11, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .2 ASTM A276-10, Standard Specification for Stainless Steel Bars and Shapes
  - .3 ASTM F593-08, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
  - .4 ASTM D2000-08, Standard Classification System for Rubber Products in Automotive Applications
  - .5 ASTM D4020 - 05 Standard Specification for Ultra-High-Molecular-Weight Polyethylene Molding and Extrusion Materials
  - .6 ASTM A269-08, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - .7 ASTM A666 - 10 Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
- .2 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-G40.20/G40.21-09, General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CAN/CSA-S16.1-01, Limit States Design of Steel Structures.
  - .3 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding
  - .4 CSA W59-08, Welded Steel Construction (Metal Arc Welding) (Imperial Version).

### **1.2            SUBMITTALS**

- .1 Product Data:
  - .1 Submit for approval shop drawings showing the principal dimensions, general construction and materials for the gate and lift mechanism. Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

### **1.3            SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate principal dimensions, general construction and materials for the gate and lift mechanism.
- .3 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

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#### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

#### **1.5 PERFORMANCE**

- .1 LEAKAGE. Sluice gates shall be substantially watertight under design head conditions.
  - .1 Under the design seating head, the leakage shall not exceed 0.60 l/min per meter (0.05 U.S. gallons per minute per foot) of seating perimeter.
  - .2 Under the design unseating head, the leakage for heads of 6m (20 feet) or less shall not exceed 1.25 l/min per meter (0.1 U.S. gallon per minute per foot) of perimeter.
  - .3 For unseating heads greater than 6m (20 feet), the allowable leakage shall not exceed the rate per meter (foot) of perimeter specified by the following equations:
  - .4 Maximum allowable leakage: Liters per minute per meter of perimeter:  
$$= 1.25 + (0.1025 \times (\text{unseating head in meters} - 6.1))$$
  - .5 Example: If a gate has 10 m of head, the leakage for the unseating head will be:  $= 1.25 + (0.1025 \times (10.0 - 6.1)) = 1.650 \text{ lpm/m of perimeter}$

#### **1.6 DESIGN HEAD**

- .1 The sluice gates shall be designed to withstand the design head shown below:
  - .1 Seating Head: 9.0 m
  - .2 Unseating Head: 9.0 m

#### **1.7 SEAL PERFORMANCE TEST**

- .1 The gate's sealing system to be tested through a cycle test in an abrasive environment and show that the leakage requirements are still obtained after 25,000 cycles with minimum deterioration.

#### **1.8 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Protection:
  - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.

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## **PART 2 PRODUCTS**

### **2.1 MATERIALS**

- .1 Frame, yoke, stem guides, slide, stem extension: Stainless Steel to ASTM A-240 Type 304 or 316L.
- .2 Side seals, stem guide liner: Ultra high molecular weight polyethylene (UHMWPE), to ASTM D-4020
- .3 Compression cord: Nitrile ASTM D2000 M6BG 708, A14, B14, E014, E034
- .4 Bottom seal: Neoprene ASTM D2000 Grade 2 BC 510
- .5 Threaded stem: Stainless steel ASTM A-276 type 303 MX or 316
- .6 Fasteners: ASTM F593 and F594 GR1 for type 304 and GR2 for type 316
- .7 Pedestal, handwheel and crank: Tenzaloy aluminum
- .8 Gasket (between frame and wall): EPDM ASTM 1056
- .9 Stem cover: Polycarbonate ASTM D-3935
- .10 Lift nut, couplings: Manganese bronze ASTM B584 UNS-C86500.
- .11 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION**

- .1 Gates and appurtenances shall be handled and installed in accordance with the manufacturer's recommendations.

### **3.2 FIELD TESTS**

- .1 Following the completion of each gate installation, the gates shall be operated through at least two complete open/close cycles.
- .2 Gates may be checked for leakage by the Departmental Representative

### **3.3 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof round headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.

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- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
  - .5 Do welding work in accordance with CSA W59 unless specified otherwise.
  - .6 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
  - .7 Exposed fastening devices to match finish and be compatible with material through which they pass.
  - .8 Provide components for building by other sections in accordance with shop drawings and schedule.
  - .9 Make field connections with bolts to CAN/CSA-S16.1.
  - .10 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
  - .11 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

### **3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

**END OF SECTION**