

## SECTION 11280

### SLIDE GATES

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

###### A. Scope

1. Furnish and install all slide gates indicated on the Drawings or specified herein complete with manual operators, wall castings, stems, stem guides, wall brackets, seals and all appurtenances

###### B. Additional Requirements Specified Elsewhere

1. Section 01340: Shop Drawings and Product Data
2. Section 01400: Quality Control and Manufacturer's Field Services
3. Section 01600: Materials and Equipment
4. Section 01730: Operating and Maintenance Data

###### C. Related Requirements Specified Elsewhere

1. Section 03300: Cast-in-Place Concrete
2. Section 03600: Grout
3. Section 05501: Anchor Bolts and Drilled-In Anchors
4. Section 09900: Painting

##### 1.2 QUALITY ASSURANCE

###### A. Suppliers Qualifications

1. All equipment supplied by a single manufacturer or supplier experienced in the manufacture of this equipment

###### B. Design Basis

1. Whipps, Inc.
2. Rodney-Hunt
3. Or equivalent
4. Equivalent products of other manufacturers may be accepted subject to compliance with design, function, materials, and performance of the specified items

###### C. Reference Standards

1. Unless otherwise provided herein, all slide gates shall comply with AWWA C513 – Open Channel, Fabricated Metal Slide Gates and AWWA C561 – Fabricated Stainless Steel Slide Gates, as appropriate

### 1.3 SUBMITTALS

- A. Catalog Data: Submit manufacturer's literature and illustrations sufficient to verify compliance with the specifications
- B. Shop Drawings
  - 1. Dimensions
  - 2. Construction details
  - 3. Materials
  - 4. Assembled weight
- C. Installation Instructions: Complete manufacturer's installation instructions
- D. Certification of Compliance
  - 1. Manufacturer's affidavit of compliance certifying
    - a. All equipment and material comply with these specifications
    - b. Equipment has been properly installed and is operating within specification tolerances
- E. Operating and Maintenance Manuals in accordance with Section 01730

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. General
  - 1. Locations with corrosive environments require corrosion-proof or resistant materials as specified
    - a. Headworks Building is a corrosive environment
- B. Shop Painting
  - 1. Utilize liberal factors of safety throughout design especially in the design of parts subject to intermittent or alternating stresses
  - 2. Working stresses not to exceed one-third of the yield point or one-fifth of the ultimate strength of each material, whichever is less
- C. Slide Gates
  - 1. Refer to Slide Gate Schedule at end of this specification section
  - 2. Maximum allowable leakage under specified design head, seating or unseating = 0.10 gpm/ft of seating perimeter

## 2.2 MATERIALS AND FABRICATION

### A. Shop Painting

1. Coat all metal surfaces of each gate, except bronze, aluminum and stainless steel with rust inhibitive primer
  - a. Shop prime with Mobil "13-R-50 Chromox Q.D. Primer", Tnemec "77 Chem-Prime", or equivalent
2. All polished or machined surfaces coated with rust preventative compound, Dearborne Chemical "No-Ox-Id 2W", Houghton "Rust Veto 344", Rust-Oleum "R-9", or equivalent

### B. Slide Gates

1. Rising stems, self-contained pattern with a lift supported by a cross member at the top of the frame
2. Frames
  - a. Designed for installation on face of concrete walls or embedded in concrete walls as shown on the Drawings
  - b. Guides to support entire height of slide when in fully raised position, or in the lowered position for downward opening gates
    - 1) Provide replaceable UHMW polymer bearing surfaces against slide
  - c. Yoke at top of guides to support operator
    - 1) Fabricated from pair of rolled sections
    - 2) Deflection not more than 1/600 of span when subjected to thrust developed by 100 pound pull on the operator
    - 3) Shop welded to vertical members of frame
    - 4) Permit vertical removal of the slide
    - 5) Top of yokes approximately the same elevation as top of adjacent handrails, unless otherwise noted or required
3. Closures
  - a. Gates will be raised above the top of the opening for upward opening gates, or lowered below the bottom of the opening for downward opening gates
  - b. Provide horizontal frame member across wall opening to seal space between the slide and adjacent concrete
    - 1) Position at top of opening for upward opening gate
    - 2) Position at bottom of opening for downward opening gate
  - c. Extend side guides beyond wall opening
    - 1) Extend above top of opening and above top of slide in the open position for upward opening gates
    - 2) Extend below bottom of opening and below bottom of slide in the open position for downward opening gates
  - d. Replaceable UHMW polyethylene or resilient hollow bulb seals provided at the vertical side frame members and horizontal frame members of the openings
  - e. Replaceable, resilient, flush-bottom, frame- or slide-mounted invert seal at bottom of opening for upward opening gates
4. Slides
  - a. ¼-inch thick minimum with welded stiffeners

- 1) Deflection under specified differential pressure does not exceed 1/360
  - b. Reinforced pocket for connection of the stem
    - 1) Withstand thrust developed by 100 pound pull on the operator
- 5. Stems
  - a. Sized to safely withstand, without buckling or permanent distortion, the stresses induced by operation, including the thrust developed by a 100 pound pull on the gate operator
  - b. Stem threads
    - 1) Cold-rolled or machine cut
    - 2) Square or acme pattern
  - c. Adjustable stop collars to limit upward and downward travel
  - d. Thrust nut
    - 1) Material similar to stem
    - 2) Transmit thrust to slide
    - 3) Threaded and keyed or pinned to stem
    - 4) Shall not turn in pocket
  - e. Provide dual stems where required for operation
  - f. Provide stem guide supports and bushings at the manufacturer's recommended spacing
    - 1) Maximum L/R ratio of unsupported stem: 200
- 6. Stem covers
  - a. Enclose portion of stem extending above the operator
  - b. Close top of cover with suitable cap
  - c. Provide adhesive backed mylar strip
    - 1) Permanently marked and calibrated
    - 2) With each stem cover
    - 3) Travel distance of gate opening indicated by reference to top of stem
- 7. Manual operators
  - a. Operate gate under specified differential pressure with a handwheel pull of no more than 40 pounds
  - b. Mechanism to withstand a pull of 100 pounds without damage
  - c. Radius not more than 15 inches or less than 6 inches
  - d. Ball or roller bearings provided above and below lift nut flange to carry maximum thrust developed in opening and closing the gate
  - e. Gears and bearings
    - 1) Totally enclosed in weatherproof housings
    - 2) Seals at all points where rotating members extend through the housing
    - 3) Lubrication fittings
  - f. Counterclockwise (to the left) to open
    - 1) Directional arrow and word "open" cast on case of operating mechanism
  - g. Connect dual stems by a cross shaft so both stems move at the same rate
    - 1) Cover with suitable housing
- 8. Materials
  - a. Frames, guides, grooves, slides, and reinforcing members as indicated on Drawings
    - 1) Aluminum: ASTM B209, B221, or B308, alloy 6061
    - 2) Stainless steel: ASTM A276 Type 304 or ASTM A240 Type 304L
  - b. Stems and shafts: ASTM A276 Type 304 stainless steel
  - c. Seals/seats

- 1) UHMW polyethylene
- 2) Fabric reinforced neoprene
- d. Gear and bearing housings
  - 1) Cast iron, ASTM A48
  - 2) Cast aluminum in corrosive environments
- e. Floorstands
  - 1) Cast iron or fabricated steel
  - 2) Stainless steel in corrosive environments
- f. Stem covers: Transparent plastic butyrate or lexan pipe
- g. Assembly fasteners: ASTM A276 Type 304 stainless steel with hardness differential to prevent galling
- h. All aluminum materials that will be embedded or in contact with concrete or grout shall have a heavy bituminous coating applied to protect areas of embedment or contact

C. Anchor Bolts: Stainless steel per Section 05501

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install square, plumb and level and in a true vertical plane according to manufacturer's recommendations
- B. Set anchor bolts for each gate carefully and in accordance with manufacturer's instructions and templates
- C. Carefully install and adjust gates so they do not leak or bind
- D. Install extension stems in perfect alignment
- E. Accurately set and plumb each manual operator to perfect alignment with gate and stem before grouting in place
- F. For face-mounted assemblies, grout between gate frame and wall in accordance with installation drawings and manufacturer's recommendations
- G. After gate has been adjusted, place concrete fill in pit in front of gates, where indicated on drawings
- H. Tighten all bolts and lubricate all items requiring lubrication
- I. Leave gate in perfect operating condition
- J. Ensure all bituminous coatings of aluminum parts are sound prior to installation; touch up or repair all unsound coatings

### 3.2 FIELD QUALITY CONTROL

- A. Provide Manufacturer's Field Services

### 3.3 SCHEDULE

#### A. Corrosive Environments

1. Headworks Building
2. All locations upstream of aeration basins

SLIDE GATE SCHEDULE\*

Gate No.	Nominal Size (WxH)	Location *(4.)	Function	Type of Mounting	Type of Operator	Seating (+) or Unseating (-) Pressure (ft. of water)	Invert Elev.	Oper. Floor Elev.	Oper. Elev.	Accessories
SG-1	36"x56"	1	Screen Channel No. 1 Isolation	Embedded and Surface	HW	-4.7	5416.67	5421.33	5424.83	Self-contained
SG-2	36"x56"	1	Grit Chamber Outlet Channel No. 1 Isolation	Embedded	HW	+3.3	5416.67	5421.33	5424.83	Self-contained
SG-3	24"x56"	1	Bypass Channel Upstream Isolation	Embedded	HW	-4.7	5416.67	5421.33	5424.83	Self-contained
SG-4	36"x56"	1	Bypass Channel Downstream Isolation	Embedded	HW	+4.7	5416.67	5421.33	5424.83	Self-contained
SG-5	36"x56"	1	Screen Channel No. 2 Isolation	Embedded and Surface	HW	-4.7	5416.67	5421.33	5424.83	Self-contained
SG-6	36"x56"	1	Grit Chamber Outlet Channel No. 2 Isolation	Embedded	HW	+3.3	5416.67	5421.33	5424.83	Self-contained

**\*NOTES**

1. NOMINAL SIZE INDICATED IS THE SIZE OF OPENING IN THE WALL AND DOES NOT ACCOUNT FOR ANY PROJECTION OF THE GATE INTO THE FRAME GROOVES OR TOP OF GATE ELEVATIONS INDICATED ON THE DRAWINGS
2. THE INDICATED SEATING OR UNSEATING PRESSURE IS THE MAXIMUM DIFFERENTIAL HEAD TO WHICH THE GATE WILL BE SUBJECTED
3. TYPE OF OPERATOR: HC - HANDCRANK, HW - HANDWHEEL
4. LOCATION 1 = HEADWORKS BUILDING
5. HEADWORKS BUILDING IS A CORROSIVE ENVIRONMENT

END OF SECTION

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