

Suggested Specifications - Series 800

Aluminum Slide and Weir Gates

Part 1 - General

1. DESCRIPTION

A. Scope:

1. Furnish all labor, materials, equipment and incidentals required to provide aluminum gates complete and operational with all appurtenances as shown and specified.
2. CONTRACTOR shall furnish all labor, materials, equipment and incidentals required to install these gates as shown on the Drawings and specified herein.

B. Coordination: Review installation procedures under other Sections and other Contracts and coordinate the work which is related to this Section.

C. Related Work Specified Elsewhere:

1. Section _____.
2. Section _____.
3. Section _____.

2. QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer shall have a minimum of ten years experience in producing similar type equipment, and shall show evidence of ten installations in satisfactory operation upon request.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM A276, stainless and heat-resisting steel bars and shapes.
2. ASTM B209, aluminum sheet and plate.
3. ASTM B221 and B308, aluminum extruded shapes.
4. ASTM B584, copper alloy and sand castings for general application.
5. ASTM D4020, U.H.M.W. polyethylene molding and extrusion material.
6. ASTM D2000, standard classification system for rubber products in automotive applications.
7. ASTM B26, aluminum alloy sand castings.

3. SUBMITTALS

A. Shop Drawings and Product Data:

1. Comply with the requirements of Section _____.
2. Submit Shop Drawings showing the following:
 - a. Complete description in sufficient detail to permit item by item comparison with the Specifications.
 - b. Dimensions.
 - c. Weights.
 - d. Capacity.
 - e. Maximum support reactions.
 - f. Performance characteristics.
 - g. Layout drawing for all equipment showing installation details.
 - h. Wiring diagrams for all electrical items.
 - i. Deviations from Drawings and Specifications.
 - j. Manufacturer's installation and testing instructions.
 - k. Affidavits of compliance with referenced standards and codes.
 - l. Manufacturer's standard guarantee.
3. Submit Manufacturer's installation report as specified in Part 3.

B. Operation and Maintenance Manuals:

1. Comply with the Requirements of Section _____ and the Supplemental Requirements Below.
2. Required Operation Data:
 - a. Complete, detailed operating instructions for each piece of equipment.
 - b. Explanations of all safety considerations relating to operation.
3. Required Maintenance Data:
 - a. Include all information and instructions required to keep equipment properly lubricated and adjusted so that it functions economically throughout its full design life.
 - b. Explanation with illustrations as necessary for each maintenance task.
 - c. Recommended spare parts lists.
 - d. Recommended schedule of maintenance tasks.
 - e. Lubrication charts and table of alternate lubricants.

- f. Troubleshooting instructions.
- g. List of special maintenance tools and equipment.
- h. Name, address and phone number of manufacturer and manufacturer's local service.
- i. Include copies of all approved Shop Drawings.

4. PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Comply with the requirements in Section _____.
- B. Deliver materials to the site to ensure uninterrupted progress of work.
- C. Handle all sluice gates and appurtenances with care.
- D. Any aluminum gates which are damaged will not be acceptable.
- E. Protect all operating mechanisms, stem threads and gate seals from on-site damage.
- F. Store material to permit easy access for inspection and identification.
- G. Store all sluice gates and appurtenances on timbers or planks, on a flat, even surface to prevent distortion.
- H. All equipment should be covered to prevent damage.

5. GUARANTEE

- A. Comply with the requirements of Section _____.

Part 2

1. MANUFACTURER'S REQUIREMENTS

- A. Acceptable Manufacturers:
 - 1. Whipps, Inc.
 - 2. or equal.
- B. Comply with the requirements of Section _____ if substituting gates manufactured by a firm other than those named above.

2. ALUMINUM GATES

A. GENERAL:

- 1. Gate Assemblies:
 - a. Type: self-contained, rising stem unless otherwise specified.
 - b. Leakage not to exceed AWWA C501 Standard..
 - c. Unless otherwise specified, all stainless steel parts, including fasteners shall be type 304 stainless steel (316 at customer's option).
- 2. Actuators:

- a. Indicate the direction of operation.
- b. Operating effort shall not exceed 40 lbs. when opening or closing the gate at maximum head.

B. FRAMES:

1. Extruded aluminum construction consisting of guides, an invert member and a top member where top closure is required. Suitable reinforcements will be provided to resist all operating loads.
2. Minimum material thickness shall be 1/4" (3/8" when conditions require Models 820-839)
3. Self-contained frames shall be provided with a support yoke for mounting the actuator.
 - a. The support yoke shall consist of structural members welded or bolted to the extended guide members.
 - b. The support yoke shall be located as required to provide full travel of the slide unless otherwise specified.
 - c. The yoke shall be designed so that the maximum deflection is limited to 1/360th of the span when operating at maximum specified head.
 - d. For gates with powered actuators, the yoke shall be designed to limit the maximum yoke stress to 11,400 PSI at operator stall, and 7,600 PSI at maximum operating load.
4. Frames which are attached with epoxy anchor bolts shall be provided with bolts conforming with ICBO report 4285 regarding number of bolts, size, and placement.

C. SEALS:

1. The frames shall be equipped with seats/seals to prevent metal-to-metal contact and restrict leakage.
 - a. The guides of all gates shall incorporate ultra high molecular weight polyethylene (UHMW) seat/seals on both the upstream and downstream sides of the slide. Each seat/seal will be shaped to act as both a bearing surface and a seal. The top seal, where required on upward opening gates, shall be mounted on the frame and be of low friction polymer construction.

- b. All upward opening gates shall contain a replaceable, flush bottom neoprene invert seal, mounted on the slide, or in the frame.
- c. All downward opening gates (weir gates) shall have low friction polymer seals mounted on the frame member at the invert of the waterway.
- d. All seals shall be attached to the frame with stainless steel retainers and/or stainless steel bolts.

D. SLIDES:

1. Aluminum construction, reinforced with angle, channel, or plate stiffeners as required to limit the deflection at maximum specified head to 1/8" and the maximum stress to 7,600 PSI.
2. Minimum material thickness will be 1/4" (3/8" when conditions require Models 820-839).
3. Stem connectors shall consist of two vertical members welded to the slide. Each stem shall be bolted to the stem connector with two stainless steel attachment bolts.
4. Edge of slide shall be 1/2" thick minimum when 1/4" is the specified minimum material thickness and 3/4" thick minimum when 3/8" is the minimum material thickness.

E. STEMS:

1. The entire stem shall be from solid stainless steel rod.
2. The stem shall have a minimum diameter of 1-1/2".
3. The threaded portion of the stem shall have rolled or machine cut acme threads polished to a 63 micro inch finish.
4. The stem shall be of a size to safely withstand without buckling or permanent distortion the stresses induced by normal operating forces.
5. The stem shall be designed to transmit in compression at least 2.5 times the output of the manual actuator with an 80 lb. effort or 1.43 times the stall thrust on electric motor actuators.
6. A field adjusted aluminum stop collar shall be provided on all stems with manual actuators to limit downward travel of the slide.
7. A field adjusted aluminum upstop shall be provided on all submerged gates and weir gates to limit the upward travel of the slide.

F. STEM GUIDES:

1. Provide integral frame mounted stem guides to limit the L/r ratio of the operating stem to 200 or less.
2. Stem guides shall be _____, bushed and adjustable in two directions.

G. STEM COVERS:

1. All rising stem gates shall be provided with clear lexan or butyrate stem covers.
2. The stem covers shall be properly vented and closed at the top with a plastic cap.

3. The stem covers shall be provided with field mounted mylar travel indicator strips.

H. ANCHOR BOLTS:

1. Provide adhesive anchors equal to Ramset/Red Head Epcon System or Hilti HIT System.
2. Provide anchor bolts of no less than 1/2" diameter.
3. Provide all anchor bolts with ample cross section to withstand the force created by operation of the gate.
4. Install anchor bolts per manufacturer's instructions.

I. PAINTING:

1. All steel or iron parts shall be shop coated with a high grade primer that conforms with the finish paint specified in Section _____.

J. MANUAL ACTUATORS:

1. General

- a. The actuator shall be as specified in the gate schedule or as shown in the Contract Drawings, provided that the effort to operate does not exceed a 40 lb. pull when the gate is subjected to the maximum unbalanced head.
- b. All manual actuators will be enclosed in a high strength cast aluminum or cast iron housing with a bronze operating nut.

2. Non-Geared Handwheel Actuators

- a. Roller-type bearings shall be provided above and below the operating nut.
- b. Mechanical seals shall be provided above and below the operating nut.
- c. The handwheel shall have a minimum diameter of 15" and a maximum diameter of 24".

3. Geared Crank Actuators

- a. Gearboxes shall have a 1" minimum diameter stainless steel pinion shaft.
- b. Roller-type bearings shall be provided above and below the operating nut.
- c. Mechanical seals shall be provided on the top and bottom of the actuator housing and around the pinion shaft.
- d. All gears are to be steel or bronze.
- e. The crank shall have a minimum radius of 12" and a maximum radius of 15".

4. Interconnected Actuators

- a. All gates 72" wide or larger or those with widths greater than twice their height shall be provided with two stems and two gearboxes connected by an aluminum or stainless steel interconnecting shaft for simultaneous operation via crank.
- b. Gates shall also be equipped with dual actuators if deemed necessary for proper operation by the gate manufacturer.

5. Remote Actuator Drives

- a. Remote actuator drives shall be used where necessary to provide a crank or handwheel positioned between a minimum of 36" to a maximum of 48" above the operating floor.
- b. Remote drives shall be of the chain and sprocket type with an aluminum cover.
- c. Remote drives shall be used in conjunction with geared crank actuators.
- d. ELECTRIC MOTOR ACTUATORS

6. See Section _____.

ACTUATOR MOUNTING: The actuator shall be mounted to the gate yoke on self-contained gates. The yoke shall consist of two channel members that are welded or bolted to the top of the gate frame. The yoke shall be designed so that the maximum deflection is limited to 1/360th of the span. The actuator shall be pedestal mounted on non self-contained gates. Pedestals shall be concentric, offset, or wall bracket mounted as shown in the contract drawings. Pedestal assemblies shall be fabricated stainless or carbon steel.

PAINTING: Carbon steel pedestals shall be shop coated with a high grade primer.