



SPECIFICATION: CREST GATES

PART 1 SCOPE

This specification covers the design, manufacture, and supply of the hinged crest gate system.

The system shall include the gate leaf, hinges and brackets, sealing system, anchorages, hydraulic cylinders, cylinder supports, seal heaters, air vent piping (when necessary), water level sensors, hydraulic power unit, automatic controller, local control panel, gate position indicators, transportation to the site, drawings, installation procedures, and Operation & Maintenance manuals.

PART 2 DESCRIPTION OF OPERATION

A. Automatic - The operating system shall automatically monitor the upstream water level and position the gate leaf to maintain a constant level under varying flow conditions.

B. Manual - Provisions shall be made to raise or lower the gate via manually actuated controls located on the local control panel.

PART 3 GENERAL DESCRIPTION OF GATE

The gate shall be of the Bascule or Pelican type and arranged to lower to open. Each gate shall have a clear waterway opening of ___ ft. The effective height of the leaf in the raised position shall be ___ ft.

When in the fully raised position, the leaf shall lean downstream approximately 20 degrees. The gate will rotate approximately 75 degrees from the fully raised to the fully lowered position.

PART 4 DESIGN REQUIREMENTS

A. The gate hoisting system shall have sufficient thrust capacity to raise the leaf from the fully lowered position to the fully raised position when the upstream water level is ___ ft. above the fixed crest.

B. The gate shall be structurally designed to withstand the worst combination of static and dynamic loadings at any position with the upstream water surface at a fixed elevation of ____. When subjected to the flood head, it shall be possible to lower the leaf from the fully raised position to the fully lowered position by manually opening by-pass valving at the hydraulic power unit.

PART 5 GATE COMPONENTS

A. Leaf

The gate leaf for Pelican gates shall consist of curved upstream and downstream skin plates and flat vertical diaphragm plates arranged to form a rigid cellular type construction. For Bascule gates, the



leaf shall consist of a flat plate and vertical diaphragm plates. The curved plates shall be pressure vessel quality conforming to ASTM A516, Class 60 or 70. The remainder of the leaf structure will be ASTM A36 and/or A992 structural steel. A curved Type 304 or 316 stainless steel surface shall be provided directly above the gate hinges to mate with the horizontal J-seals. The top edge of the u stream skin plate shall form a discharge lip of a design to minimize flow induced vibrations.

B. Bearings

The standard Bascule gate will be supported by a series of intermediate saddle bearings with submersible self-lubricating bearings. The torque tube will extend into the operating chamber through a suitable packing box.

The Pelican gate leaf shall rotate on pin type hinges. The hinge pins shall be Type 304 stainless steel and fixed to the gate leaf. The pins will rotate in permanently lubricated bronze bushings which shall be retained in fabricated or cast steel bearing brackets. The brackets shall be anchored to the concrete structure in a manner to allow adjustment in all three plates during erection of the leaf sections.

C. Seal Support Members

The side seals shall be designed to seal in all the leaf positions. The J –seal shall be attached to the ends of the leaf. The side seals shall be fluoro-carbon clad neoprene. The seal attachments shall allow for replacement of the seal without removal of the leaf. The side seal plates shall consist of a stainless steel plate with steel reinforcing on the backside.

D. Erection and Maintenance Supports

Erection struts and associated brackets shall be provided to support the leaf in the full up position with the operator detached from the leaf.

E. Leaf Supports

When the leaf is in the fully lowered position, the weight of the leaf shall be supported by adjustable gate stops contacting pads on the down-stream surface of the spillway.

F. Air Vent Piping

It shall be the responsibility of the gate manufacturer to determine the necessity of air vent piping and to determine the size, location, and shape of the air vent piping system. The air vent piping shall be galvanized steel or equivalent and have protective screens on both the inlets and outlets. Air vent piping is used to reduce nappe-generated vibration and shall be designed by the gate manufacturer. The air vent system shall be manufactured using corrosion-resistant materials and adequately drained to insure a source of air during freezing conditions. The air vents shall have protective screens on the inlets and outlets, and the system shall not be a significant source of noise.

PART 6 ELECTRICAL CONTROL AND HYDRAULIC POWER SYSTEM

It shall be the responsibility of the gate manufacturer to design, manufacture, test, certify the installation start-up, field test, and train operating personnel in proper operation of a complete control and hydraulic operating system to meet the performance requirements of the owner.

Rodney Hunt

46 Mill Street

Orange, MA 01364

Phone: 978-633-4362

www.RodneyHunt.com



PART 7 MANUFACTURE

The gates and associated components shall be fabricated in sections that are convenient for shipment and field erection. All major components shall have lifting ears, eyes, and/or lugs arranged to facilitate handling during site off-loading and erection.

All welding and welding procedures and qualifications, and welder qualifications shall be in accordance with the most recent revision of AWS D1.1 for carbon steel and ASME Section 9 for stainless steel.

Each gate leaf shall be completely assembled in the manufacturer's facility. The gate pivot bores shall be sighted to assure correct alignment of the centers. Each hinge bracket shall be assembled to the leaf at its respective location and the bracket rotated through its full range of operating swing. All mating parts shall be trial fitted. During shop assembly, the gates shall be checked for dimensions for tolerances, accuracy of alignment, and squareness. An operation test of the hydraulic and electric control system shall be made to demonstrate proper functioning of the system, including functioning and sequencing of all control and alarm devices. The hydraulic cylinder shall be hydrostatically tested in the cylinder manufacturer's facility, at a pressure of 150% of the hydraulic power unit design pressure.

PART 8 PAINTING

The gate disc and all exposed steel surfaces shall be blasted to SSPC SP-10.

Prime: One (1) coat of a two-component high solids/high build epoxy coating system

Finish: One (1) coat of a two-component high solids/high build epoxy coating system