bulkhead gates

1. General
	1. scope of work

This section covers stainless steel bulkhead gates designed for operation with independent lifting equipment. The contractor shall furnish all labor, materials, equipment and incidentals required to install and field test the gates shown on the Contract Drawings and specified herein.

* 1. References
		1. Definitions

Design Head: The maximum differential head that will be applied on the gate under worst case conditions, measured from the gate invert. Design head shall be equal to the height of the gate installed in the frame.

Seating Head: Head applied on a wall mounted gate, in the direction that pushes the gate against the wall it is installed on.

Unseating Head: Head applied on a wall mounted gate in the direction pulling the gate away from the wall it is installed on.

* + 1. Reference Standards

ASTM A240/A240M – Standard Specification for Chromium and Chromium Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications.

ASTM A276 – Standard Specification for Stainless Steel Bars and Shapes.

ASTM A582/A582M - Standard Specification for Free-Machining Stainless Steel Bars.

ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.

ASTM D4020 - Standard Specification for Ultra-High-Molecular-Weight Polyethylene Molding and Extrusion Materials.

ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

* 1. Submittals
		1. Drawings

The gate manufacturer shall submit, for acceptance by the purchaser, general arrangement drawings of the equipment supplied under this section. Drawings must indicate all dimensions that will allow the contractor to ensure coordination with dimensions of the installation environment. Drawings will also show sufficient details to determine compliance with the requirements, including the plate thickness used for all components.

* + 1. Installation, Operation and Maintenance Manual

The gate manufacturer shall provide a manual containing the instructions for installation, operation and maintenance of the gates. The manual shall also contain the detailed information on the terms of the 5 year warranty on the products.

* 1. Quality assurance
		1. Qualifications

The gates supplied under this section shall be standard products of a manufacturer regularly engaged in the design and manufacturing of water control gates. The specifications are based on FONTAINE-AQUANOX Series 23 Bulkhead Gates manufactured by ISE Metal Inc.

* + 1. Standards and Certifications

The slide gate manufacturer must maintain an ISO-9001 certification and also a company certification for its welding operations from the CWB or AWS.

* 1. Delivery

The manufacturer shall use due and customary care in preparing the gates and accessories for shipment. When shipping several kits together, every item shipped separately must be clearly marked to the kit it belongs to.

* 1. Warranty

The stop logs and accessories shall be covered by a five (5) year warranty from the manufacturer against defects in materials, design and workmanship. The warranty period will start from the date of delivery of the equipment to the installation site.

1. Products
	1. Equipment
		1. Manufacturers

Logs supplied shall be FONTAINE-AQUANOX Series 23 Bulkhead gates, as manufactured by ISE Metal Inc. or approved equal.

* + 1. Description

The gates shall be designed for channel or reservoir isolation in water or wastewater applications.

* + 1. Performance and Design
			1. Bulkhead (Slide)

The slide consisting of a flat plate with welded reinforcing ribs shall be designed to withstand the design head specified in the gate schedule with a maximum deflection of 1/360 of the free opening width and with stresses in the slide limited to 25% of the ultimate tensile, compressive, and shear strength and 50% of the yield strength, whichever is less. Minimum material thickness of all members of the slide shall be ¼ in (6mm).

* + - 1. Frame

The stainless steel frame having a U-shaped form is acting as a guide for the logs. The frame shall be constructed of structural members or formed plate. The frame shall be suitable for mounting on a concrete wall (CW) at the end of a channel, embedded inside a channel (FE) or mounted on a channel surface (EC). The frame configuration shall be of the flush-bottom type. The bottom of the frame will be of the flush invert type. Minimum material thickness of all members of the frame shall be ¼ in (6mm).

* + - 1. Guiding, Seating and Sealing

Side P-seals shall limit leakage. The side seals shall be retained to the slide using bolted UHMWPE guide bars. The guide bars acts as gliding seats in order to ease the positioning of the slide in the frame and to reduce friction. Seals shall limit the leakage rate below the maximum specified. The bottom lip seal is attached along the bottom of the bulkhead with a stainless steel retainer and provides sealing against the top of the bottom section of the frame.

* + - 1. Leakage

The Series 23 bulkhead gate shall be substantially watertight under the design head conditions. Leakage shall not exceed 0.2 U.S. gallon per minute per foot (2,5 l/min per meter) of seal periphery under the design head.

* + 1. Anchor Bolts
			1. The quantity, size and location of anchor bolts shall be determined by the gate manufacturer and shown on the submittal drawings.
		2. Materials

|  |  |  |
| --- | --- | --- |
| Frame | Stainless Steel | ASTM A240, grade 316L or 304L |
| Bulkhead | Stainless Steel  | ASTM A240, grade 316L or 304L  |
| Guide Bars | Ultra High Molecular Weight Polyethylene (UHMWPE) | ASTM D4020 |
| Side P-Seals | Ethylene Propylene (EPDM) | ASTM D2000 |
| Bottom Lip Seal | Ethylene Propylene (EPDM) | ASTM D2000 |
| Wall Gasket (if CW mount) | Ethylene Propylene (EPDM) | ASTM D2000 |
| Bolts and Hardware | Stainless Steel | ASTM F593, grade 316 |

1. Execution
	1. InstallATION
		1. It is the responsibility of the Contractor to handle, store and install the gates in strict accordance with the manufacturer’s instructions and recommendations. The Contractor shall review the installation drawings and instructions before proceeding to the installation of the gates.
		2. The frame must be installed on a true vertical plane, square and plumb.
	2. FIELD TESTING
		1. After installation, the gates must be field tested by the Contractor, in the presence of the Engineer and Owner, to ensure compliance with the requirements of these specifications. Each gate shall be operated on its complete open-close cycle to confirm proper operability.
		2. The bulkhead gates shall be water tested by the Contractor and sealing performance shall be observed.

**bulkhead gates SCHEDULE**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | ID TAG | Nb of Frames | OPENING WIDTH(inches) | FRAME HEIGHT (inches) | SLIDE HEIGHT (inches) | Nb of slides | DESIGN HEAD (ft)(Single Direction) | FRAMEMOUNTING |
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**Abbreviations:**

FRAME MOUNTINGS:

 CW: Mounted on a concrete wall at the end of the channel

 FE: Embedded inside the channel side walls (grouted in box-outs)

 EC: Surface mounted onto the channel side walls (grouted)

End of Section