inlet flap gates

1. General
	1. scope of work

This section covers stainless steel Inlet Flap Gates, designed for installation on effluent walls of reservoirs or manholes in water or wastewater applications. 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 worse case conditions, measured from the gate invert. Design head shall be equal to the maximum backflow pressure that can occur in the effluent pipe in front of which the flap gate is located.

* + 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 Flap Gates 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 Flap 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 61 Inlet Flap Gates manufactured by ISE Metal Inc.

* + 1. Standards and Certifications

The flap gates 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 Flap Gates and accessories for shipment.

* 1. Warranty

The Flap Gates 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

Inlet Flap Gates supplied shall be FONTAINE-AQUANOX Series 61, as manufactured by ISE Metal Inc. or approved equal.

* + 1. Operation

Inlet Flap Gates shall be designed to allow flow to exit a manhole or a reservoir and prevent flow from entering. They are installed in front of the effluent pipe of the structure and contained in a stainless steel closed box. Backflow from the effluent pipe shall remain contained in the closed box, trapped by a circular flap gate.

* + 1. Performance and Design
			1. Closed Box

The closed box shall consist of a stainless steel weldment, designed to resist the maximum backflow pressure (Design head) specified, with conservative safety factors. Walls of the box shall be reinforced with stiffeners, as required. The front of the box shall be closed by the rectangular flange of the flap gates frame bolted to the flanged side walls, allowing access to the flap gate mechanism located inside. The box shall be of the flange back design suitable for mounting on a concrete wall (CWX) or a curved concrete wall (RMX). Minimum material thickness of all members of the box shall be ¼ in (6mm).

* + - 1. Flap (Cover)

The cover of the flap gate consisting of a flat plate shall be reinforced with welded ribs adequately to withstand the maximum design head without distortion. Minimum material thickness of all members of the covers shall be ¼ in (6mm).

* + - 1. Frame

The frame shall be made of structural members or formed plate welded to form a rigid one-piece frame. The frame shall incorporate a rectangular flange suitable for sealed-mounting to the side walls of the closed box. Minimum material thickness of all members of the frame shall be ¼ in (6mm).

* + - 1. Sealing

A resilient Lip Seal shall be supplied all around the perimeter of the flap gate frame opening. The side seals shall be bolted around the frame opening using a longitudinal stainless steel seal retainer.

* + - 1. Hinges

Hinges shall consist of stainless steel pins, pivoting in UHMWPE bushing generously sized for extra robustness.

* + - 1. Hinge Arms

Hinge arms shall be made of structural members or formed plates. For sizes exceeding 24” (610 mm) the gate shall incorporate a 2-hinge arm arrangement, with 2 pivot joints per arm, an adjustable lower pivot with limited rotation and an adjustable upper hinge lug arrangement to permit adjustment of the gate opening sensitivity to unseating head.

Anchor Bolts

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

|  |  |  |
| --- | --- | --- |
| Frame and box | Stainless Steel | ASTM A240, grade 316L or 304L |
| Cover (Flap), Arms, Hinges | Stainless Steel  | ASTM A240, grade 316L or 304L  |
| Hinge Bushing | Ultra High Molecular Weight Polyethylene (UHMWPE) | ASTM D4020 |
| Lip Seals | Ethylene Propylene (EPDM) | ASTM D2000 |
| Wall Gasket | 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 flap gates shall be installed on a true vertical plane.

**FLAP GATES SCHEDULE**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | ID TAG | Qty | DIAMETER(inches) | BOXMOUNTING | DESIGN HEAD (ft) |  |  |  |
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**Abbreviations:**

FRAME MOUNTINGS:

 CWX: Mounted on the face of a concrete wall.

 RMX: Mounted on the face of a curved wall (Circular Manhole)

End of Section