

**SECTION 11286
CAST IRON SLIDE (SLUICE) GATES**

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall provide all labor, materials, equipment, and incidentals required to furnish and install slide gates, wall thimbles, operating stems, and operating floor stands, complete and operational with all necessary accessories as shown on the Contract Drawings, as specified herein, or as required for complete operation.

B. The Contractor shall obtain all equipment specified in this Section from one manufacturer to ensure proper coordination and functionality. The manufacturer shall have responsibility for performance and compatibility of the entire system. This in no way relieves the Contractor of ultimate responsibility under this Contract for equipment, coordination, installation, operation and guarantee.

C. The Contract Drawings are for purpose of guidance and to show functional features and required external connections. They do not necessarily show all components necessary to accomplish the desired results nor do they necessarily show all components required to interface with the equipment. The Contractor shall provide all parts, equipment, and devices necessary to meet the functional requirements of the system.

1.02 REFERENCES

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

1. American Water Works Association (AWWA)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)

1.03 SYSTEM DESCRIPTION

A. Design Requirements:

1. The slide gates shall be manufactured in accordance with the latest version of AWWA C560, Cast Iron Slide Gates, shall be constructed of cast iron, fully bronze equipped, and will have side wedges for seating head conditions.
2. Liberal safety factors will be used in the design of all equipment. Working stresses will not exceed the lower value of, one half of the yield strength, or one fifth of the ultimate strength of the material. The slide gates and appurtenances shall be designed for installation in the structures as shown on the plans.
3. Slide gates shall be provided in accordance with the Schedule below:

Number	Operating Head (Seating/Unseating)-feet	Operator Type	Size	Mounting
2	0/30	Nut Manual	18 x 18	Flange Pipe Extending from Wall

1.04 EQUIPMENT LIST

- 2 – Sluice Gates
- 1 – Tee bar nut operator

1.05 ENVIRONMENTAL CONDITIONS

The equipment supplied under this section will be located in a manhole as shown on the drawings. The supplier shall be responsible for assuring that the equipment supplied is suitable for its location. The expected extreme temperature range is 15°F to 110°F. The normal rainfall is 16” per year.

1.06 SUBMITTALS

- A. For approval: Submit the following shop drawings for approval:
 1. Manufacturer’s information, specifications, and data showing dimensions, materials of construction, and weight of all major items of equipment.
 2. Installation diagrams showing location, arrangement, and size of all fasteners required for the equipment.
 3. Setting drawings, templates, and instructions for installation of frames, thimbles, etc.
 4. Certification that all components were designed based upon the maximum seating and unseating heads described herein.
- B. Upon completion of installation, submit the Operation and Maintenance Manual for this equipment:
 1. Operational and maintenance manuals shall include all approved shop drawings associated with this Section, complete instructions for installation, and parts list for all components.
 2. Include a list and frequency of specific maintenance activities.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide slide gates as manufactured by the following:
 1. Hydro Gate (HG560).
 2. Waterman

3. Rodney Hunt
4. Approved equal

2.02 EQUIPMENT MATERIALS

A. All slide gates shown on the plans and listed in the specifications shall conform in all respects to the latest version of AWWA C560, with the noted changes and additions: Materials used in construction of slide gates and appurtenances will be best suited for the application and will conform to the following specifications:

1. Iron castings for wall thimbles, frame, disc and guides, stem guides, floorstands, and other miscellaneous items: A-126, Class-B.
2. Bronze castings for wedges, thrust nut, lift nut: ASTM B-584, Alloy C86500 Bronze.
3. Bronze for seat facings in frame and disc: B-21 C46400 Bronze.
4. Stainless Steel for stems: A-276, Type 304.
5. Stainless Steel for fasteners: A-276, Type 304
6. Flush Bottom seal: Neoprene, ASTM D2000, 60 Durometer, with a stainless steel ASTM A276, Type 316 retainer bar.

B. The frames shall be of cast iron, one-piece construction with a mounting flange that has a rectangular or circular opening as indicated on the plans. All contact surfaces of the frame shall be machined with guide grooves. Length of guide grooves shall be capable of supporting half of slide when in the open position. The back of the frame shall be machined to bolt directly to the machined face of a wall thimble, pipe flange, or anchor bolt pattern.

C. The disc shall be of cast iron, one-piece construction, rectangular with integrally cast vertical and horizontal reinforcing ribs. A reinforcing rib along each side will be provided to insure rigidity between the side wedges. A tongue on each side, extending the full length of the disc, will be machined. Wedge pads for side, top, and bottom wedges, when required, shall be cast integrally on the disc and machined to receive adjustable bronze wedges. A heavily reinforced nut pocket will be cast integrally on the vertical centerline and above the horizontal center, and is of such shape to receive the square-backed traveling thrust nut.

D. The guides will be cast iron, one-piece, designed to withstand the total thrust due to water pressure and the wedging action. The guides will be machined on all contact surfaces, and a groove shall be machined the entire length of the guide. The guides will be of such length as to retain and support at least one half of the disc in the full open position. The guides will be integrally cast with the frame.

E. For self-contained gates, a heavy yoke shall be mounted on the machined pads provided on the upper ends of the guide rails. The yoke shall have a machined bearing surface for the lift or pedestal mounting plate. For non-rising stem gates, the nut pocket shall be cast on top of the slide so that the stem does not project into the waterway when the gate is fully opened. The thrust generated by gate operation shall be transferred to the yoke by the lift.

F. All seat facing shall be corrosion resistant silicon bronze in composition. The extruded seat facings shall be of special shape to fill and permanently lock in the machined, dovetail grooves when driven into place. The installed seat facings will be machined to a 63 micro-inch finish or better. Maximum clearance between seating faces shall not exceed 0.004 inches when slide is fully closed and wedged in position against the frame.

G. Wall thimbles shall be furnished for all slide gates that are not attached to pipe flanges or concrete headwalls with anchor bolts. They shall be cast iron, one-piece construction of adequate section to withstand all operational and reasonable installation stresses. Wall thimbles shall be internally braced during concrete placement. A center ring or water stop shall be cast around the periphery of the thimble. The front flange shall be machined and have tapped holes for the slide gate attaching studs, and metal stamped vertical centerlines with the word “top” for correct alignment. Large square wall thimbles shall be provided with holes in the invert to allow air to escape during concrete placement beneath the thimble. Suitable mastic will be provided between the back of the slide gate and the front of the wall thimble. Gates mounted directly to the headwall shall be sealed between the gate back and wall with non-shrink grout.

H. The wedges shall be corrosion resistant material machined on all contact surfaces. They shall be attached to the disc with studs and nuts and will have adjusting screws with lock nuts. The Top and Bottom Wedges shall be mounted within a recessed boss in the slide wedge pads to prevent rotation and misalignment.

I. The operating stem shall be of a size to safely withstand, without buckling or permanent distortion, the stresses induced by normal operating forces. In addition, the stem shall be designed to transmit in compression at least 2 times the rated output of the floor stand or bench stand with a 40-pound effort on the crank or handwheel. The threaded portion of the stem will have cold rolled threads of the double lead Acme type. Stainless Steel couplings, threaded and keyed to the stems, will join stems of more than one section. All threaded and keyed couplings of the same size will be interchangeable. Manually operated, rising stem type gates will be provided with an adjustable stop collar on the stem to prevent over-opening of the gate.

J. Stem guides will be split collar bronze type, mounted on cast iron brackets to allow for installation after the stem is placed. They will be adjustable in two directions and will be spaced at sufficient intervals to adequately support the stem. Stem guide spacing will not exceed an L/r ratio of 200.

K. Manual operation shall be with a hand wheel or a nut. If hand wheel operated the hand wheel shall be 30-inches above finished floor with an arrow with the word “open” permanently attached on the operator indicating the direction of the rotation to open the gate. For nut operated gates a 30” tee bar will be provided.

L. A clear, polycarbonate plastic stem cover and indicator shall be provided on each slide gate operator. Stem indication shall be provided to denote gate level in one inch graduations. A cast aluminum adaptor shall be used to mount the cover to the floor stand or the bench stand. The covers shall be capped, vented, and of sufficient length to allow full travel of the gate.

M. Flush Bottom seals shall be a solid neoprene bulb mounted to the frame invert with a 316 stainless steel mounting angle and retainer bar. The entire length of the bottom of the slide shall be machined to make uniform contact with the seal when it is in the seated position.

2.03 FINISHES

A. The gate manufacturer shall be responsible for shop prime and finish painting of all gates and appurtenances supplied under this contract. All coatings shall conform to VOC Emission Regulations in effect at the manufacturing location and at the project site to allow touch up or recoating to be performed with the same products.

B. Submerged surfaces shall be cleaned to SSPC SP10, dry, and grease-free prior to painting in conformance with the paint manufacturer’s instructions. Non-submerged surfaces shall be cleaned to SSPC SP6.

C. All surfaces shall receive a primer and finished coat with a high solids epoxy coat or approved equal. Primer and finished coats shall be applied in the manufacturer's shop.

D. Coating shall be Ameron Amerlock 400, medium gray color.

2.04 SHOP TESTING

A. The completely assembled gate will be shop inspected for proper seating. Seat facings shall be machined and wedges adjusted to exclude a 0.004 inch thickness gauge between the frame and disc seating surfaces.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The slide gate equipment and appurtenances shall be installed in accordance with the Installation Manual furnished by the gate manufacturer. Extreme care should be used in handling, storage, and installation of this equipment to prevent damage or distortion of the equipment and to insure proper performance.

3.02 FIELD QUALITY CONTROL

A. Field testing shall be performed after installation of the equipment. The field testing shall demonstrate the following:

1. The equipment has been properly installed in accordance with manufacturer's instructions and recommendations.
2. The equipment has been installed in the specified location and orientation or as shown on the Contract Drawings.
3. The equipment has been aligned.
4. There are no mechanical defects in any of the parts.
5. The slide gates shall undergo a leakage test following installation. The leakage test shall be in accordance with the latest version of AWWA C560.

3.03 WARRANTY

The equipment furnished under this specification shall be new, unused, of the latest design, and covered by a manufacturer's warranty for a duration of one (1) year from acceptance by the County, acceptance shall be when the County issues the Notice of Completion. For the basis of the bid the Contractor shall assume 18 months from shipment until the Notice of Completion is issued. The equipment shall be furnished with a 30 month warranty from the date of shipment of the equipment, this includes the 18 months until the Notice of Completion plus the 12 month warranty required by the County.

END OF SECTION 11286