SRT SELF-REGULATING TIDEGATE

FOR TIDAL WETLANDS PRESERVATION & RESTORATION

- Restores tidal flushing of marshes without flooding of upland property behind dikes and levees
- Restoration of estuarine plants, fish, shellfish, waterfowl & wildlife
- Reduces mosquito breeding through natural control
- Helps eliminate marsh fires (both peat and phragmites or tall reed grass)
- Reduces sheet flooding of the marsh
- Deepening of downstream channels resulting in improved navigation
- Proven by 35 years experience

The SRT is usually attached to an end wall or crossculvert on the tidal side of a causeway or dike. The buoyant SRT is hinged on the top of the culvert so that it floats on the surface of the water until it is closed by counterfloats extending above and behind the hinge point. The position of the counterfloats on the arms is adjusted to meet the required gate closure water levels on a site-specific basis. Once the predetermined high water level is achieved, the SRT automatically closes and stays closed during the flood event, thereby protecting the flood prone area. Once the tide recedes on the outside of the dike the hydraulic head reverses in the culvert and the SRT automatically reopens thereby allowing any water to flow out of the flood protection drainage system. The SRT stays open, floating on the rising and falling tide as the water flows in and out, until such time as the elevation of the tide water reaches the user set gate closure level. Depending on the float settings, the SRT could close with every daily tide or it could just rise and fall with the tide for months or even years closing only during hurricane flood events. It all depends on the goals of the water management agency which adjusts the float settings.

The SRT always allows upland stormwater runoff and creek water to discharge when the tide is low. The conventional one-way gate closes when the tide rises, thereby preventing saltwater from returning to the diked watercourse or wetland. In contrast, the SRT can be adjusted to allow tide water to flow into the culvert thereby feeding the channel or marsh behind the dike. Because the SRT is located on the outfall or tidal side of the dike's culvert, its float system responds to any tidal threat by closing the gate to incoming water when the tide reaches the design high water level. Sensing the storm tide water elevation, the SRT closes "early" thereby preserving a relatively large volume of potential water storage capacity behind the dike should it be needed for detention of upland runoff associated with the coastal storm. In this way the SRT simultaneously maintains flood protection to the upland area while allowing tidal flushing of the low-lying wetlands.

Restored tidal flushing of the wetlands will help restore the estuarine ecosystem; eliminate marsh fires (both dry peat fires, phragmites or tall reed grass fires), greatly reduce mosquito breeding, reduce sheet-flooding of the marsh; and restore upland drainage through re-scoured marsh channels. Because of the increased tidal prism to the restored wetland, deepening of the downstream channel and improved navigation will result as well.

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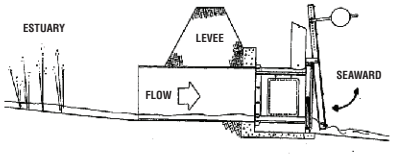
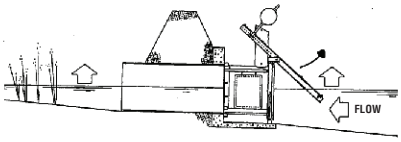
SRT SELF-REGULATING TIDEGATE

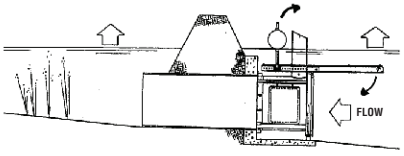
SRT IN NORMAL TIDE SEQUENCE



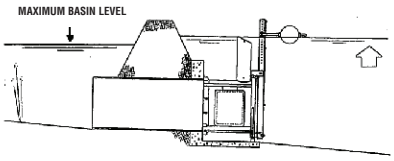
1. SRT acting as normal flap gate allowing estuary drainage



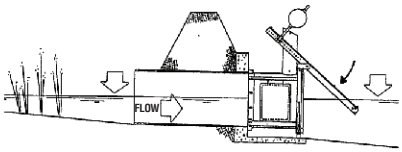
2. Rising tide floats gate up allowing incoming tide to flood estuary basin



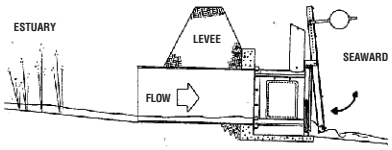
3. Tide begins to close gate limiting estuary flood level



4. Normal high tide gate fully closed

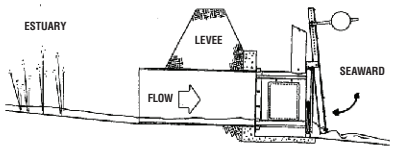


5. Cover floating on falling tide lowers estuary flood level

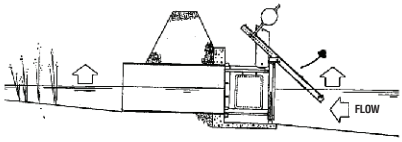


6. Gate acting as normal flap estuary drainage resumes

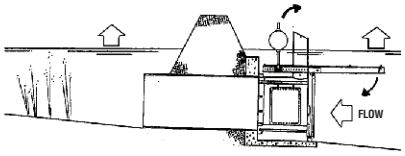
SRT IN STORM TIDE SEQUENCE*



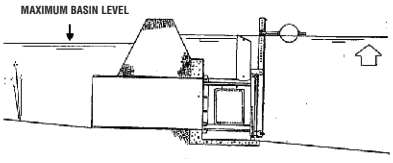
1. Gate acting as normal flap gate allowing estuary drainage



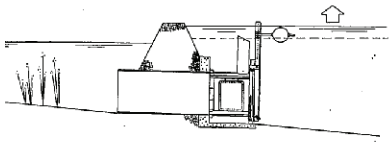
2. Rising tide floats gate up flooding estuary basin



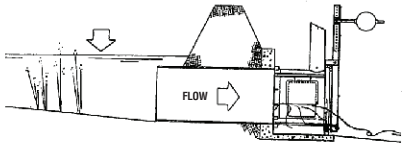
3. Tide starts to close gate limiting estuary flood level



4. At normal tide level gate is closed

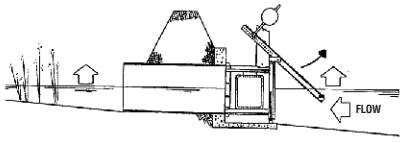


5. When tide exceeds normal high tide level, gate locks in closed position to prevent gate action due to surges



6. Receding tide-side flaps open to allow drainage of estuary-main gate cover restricted to partially open until next tide

7. Next incoming tide - gate unlocks & resumes normal tide sequence



*Note that a maximum level is not exceeded on the estuary side of SRT during any phase or condition

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SRT SELF-REGULATING TIDEGATE

SPECIFICATIONS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. Publications are referred to in the text by their basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 276	(2008a) Standard Specification for Stainless Steel Bars and Shapes
ASTM B 209	(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 221	(2008) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rod, Wires, Profiles and Tubes
ASTM B 308/M	(2002) Standard Specifications for Aluminum-Alloy 6061-T6 Standard Structural Profiles
ASTM F 593	(2008) Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 594	(2008) Standard Specification for Stainless Steel Nuts

PART 2 PRODUCTS

2.1 SELF-REGULATING TIDE GATES

Self-regulating tide gates shall be manufactured by Waterman Valve, Exeter, California, telephone number 559-562-4000, and no other will be acceptable.

2.1.1 GENERAL

Self-regulating tide gates shall be manufactured by Waterman Valve. The intent of the self-regulating tide gate is to allow tidal flushing of the salt marsh during normal tidal cycles, while providing flood protection for upland areas. Traditional flapper-style tide gates, electrically operated sluice gates or other electrically powered devices will not be accepted.

Each self-regulating tide gate shall be installed such that the tide gate flap floats on the surface of the rising and falling tidal water, allowing flow through the existing culverts during normal tidal cycles. Each tide gate shall be constructed such that the tide gate flap automatically closes at the pre-designated high water elevation. The tide gate shall be provided with an appropriately sized vacuum relief vent and bypass doors to relieve air and water trapped behind the gate when the main tide gate flap closes. During storm tide, the tide gate shall remain in the closed position after automatically closing on the high set point until the tide recedes, at which point the tide gate shall automatically reopen to allow free passage of water into and out of the salt marsh area.

Each gate shall be designed with adjustable floats and float support arms to allow field adjustment of the high water closing elevation through the maximum feasible range. Each self-regulating tide gate shall be fabricated such that one person can adjust the closing elevation using readily available hand tools. They shall be designed such that one person can convert the operation mode of the gate to that of a standard flap-type gate.

The Contractor shall provide shop drawings of the self-regulating tide gates for review and approval prior to fabrication of the tide gates. Copies of manufacturer's recommended installation practices, gate adjustment procedures, and maintenance instructions shall also be furnished with the shop drawings.

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2.1.2 MATERIALS AND FINISH

The Contractor shall furnish and install Waterman self-regulating tide gates of the size indicated on the plans, at the locations indicated on the plans.

If provided, the body of the self-regulating tide gate shall be fabricated from tubular segment(s) of aluminum conforming to ASTM B 209 alloy 6061-T6, of rectangular or round cross-section, with external reinforcement of like material as required to provide structural rigidity. The bottom interior segment of the tubular body shall be reinforced with an aluminum wear plate conforming to ASTM B 209 alloy 6061-T6, formed to match the bottom of the tubular body. The wear plate shall be permanently attached to the interior main body of the tide gate structure.

The rear body of the tide gate shall comprise a mounting flange, with factory drilled bolt holes. The tide gate shall be provided with a neoprene or urethane rubber gasket with factory drilled holes corresponding to the rear mounting flange.

The main flap cover of the tide gate shall be fabricated of aluminum with a frame fabricated of aluminum channels conforming to ASTM B 308 alloy 6061-T6.

The tide gate shall be provided with a urethane molded door gasket.

The lateral bypass doors shall be hinged to open outward from the body of the tide gate, and shall be fabricated of aluminum conforming to ASTM B 209 alloy 6061-T6.

Floats shall be fabricated of fiberglass or aluminum, except the high-water closure floats which shall consist of a polyurethane foam ball float (foam density to be determined by manufacturer, sufficient to ensure proper operation of the tide gate closure mechanism) enclosed in linear low-density polyethylene or polyvinyl chloride outer casing.

The vacuum relief vent shall be fabricated from a segment of high density polyethylene tubing of circular crosssection, or aluminum conforming to ASTM B209 alloy 6061-T6, and shall be securely bolted to the main body of the tide gate structure.

The tide gates shall be provided with stainless steel mounting bolts conforming to ASTM F 593 AISI 304 and shall be provided with a non-conductive (nylon) sleeve to prevent potential electrical continuity and corrosion.

Miscellaneous hardware shall conform to ASTM F593 AISI 304 SS, ASTM F-594 AISI 304 SS, or other approved materials suitable for use in salt water.

All dissimilar metals shall be electrically isolated from one another with non-conductive washers, gaskets, spacers, or other suitable means to prevent the occurrence of galvanic action.

Metallic portions of the self-regulating tide gate which may be subject to corrosion shall have a factory applied coating of primer and anti-fouling paint which is compatible with the tide gate materials of construction.

Other components and hardware materials not specifically designated above shall be suitable for use in salt water.

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PART 3 EXECUTION

3.1 SELF-REGULATING TIDE GATE INSTALLATION

The self-regulating tide gates shall be securely mounted as indicated on the drawings, utilizing the mounting flange, flange gasket and mounting hardware provided by the tide gate manufacturer. The self-regulating tide gates shall be installed such that the invert of the self-regulating tide gate body corresponds to the invert shown on the plans. The self-regulating tide gates shall be installed in strict accordance with the manufacturer's specifications.

The Contractor shall ensure that the self-regulating tide gates are installed plumb and level within the tolerances specified by the manufacturer, to ensure proper operation of the tide gates.

The Contractor shall take special care to ensure that dissimilar metals of the tide gate, the mounting hardware and the concrete reinforcing rods are isolated from one another using non-conductive sleeves, washers, gaskets, spacers, or other devices as prescribed by the manufacturer.

The Contractor shall provide an authorized representative of the manufacturer on-site to adjust and fine-tune operation of the self-regulating tide gates. The manufacturer's representative shall observe and adjust the tide gate through several tidal cycles (no less that three cycles, unless otherwise directed by the Engineer) to ensure proper operation of the self-regulating tide gate. The tide gate manufacturer's representative shall certify that the final gate installation is correct and in accordance with the manufacturer's requirements.

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