



## **HYDROVEX® FLAP Spring Loaded Weir Technical Specifications**

### **1.0 GENERAL INFORMATION**

The Contractor shall supply \_\_\_\_\_ ( ) *HYDROVEX® Flap Spring Loaded Weir(s)* as manufactured by Veolia Water Technologies Canada Inc.

Each *HYDROVEX® Flap Spring Loaded Weir* consists essentially of a bending plate, back anchor plate, spring assembly, side plates, and gaskets. As an option, an upper seal may be added to prevent backwater from entering the sewer system.

### **1.1 OPERATION DESCRIPTION**

The *HYDROVEX® Flap Spring Loaded Weir* shall operate as follows:

1. Under normal conditions, the system is inoperative. The spring loaded weir rests in an upright position.
2. During a storm event, when the upstream water level reaches the activation elevation of the unit ( $W_o$ ), the spring loaded weir will start to bend downwards under the weight of the water.
3. The compression of the springs allows for a large overflow that is linearly proportional to the upstream water level. The bending effect compensates for an increase in water height upstream. For a large increase in flow rate, the water level in the sewer system will remain almost constant.
4. Once the springs reach maximum compression, the spring loaded weir acts as a static overflow weir (no longer linearly proportional).
5. As the overflow rate decreases at the end of a storm event, the bending plate will begin to rise until it reaches its upright position.
6. The *HYDROVEX® Flap Spring Loaded Weir* requires that, under normal conditions, the outfall have enough capacity to evacuate the overflowing water quickly enough to prevent submergence.

If the downstream water level exceeds the critical downstream water elevation ( $W_{u,krit}$ ), the unit will act as a submerged weir. If this occurrence is frequent, a backflow prevention device can be supplied.



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**1.2 OPERATING CONDITIONS**

Reference	
Type of HYDROVEX® Spring-loaded weir	FSK-XXX x XX ft or m
Number of units required	
Design flow rate ( $Q_b$ ) (per unit)	cfs or L/s
Design water head ( $W_b-W_o$ )	in or mm
Effective weir length (per unit)	ft or m
Weir elevation (S)	ft or m
Water elevation at beginning of overflow ( $W_o$ )	ft or m
Water elevation at design flow ( $W_b$ )	ft or m
Critical downstream water elevation ( $W_{u, krit}$ )	ft or m
Backflow prevention device	included or optional
Overflow recording device	included or optional
Level detection	included or optional

**1.3 STANDARDS**

The equipment included in this specification will comply with the latest edition of the applicable North American codes and regulations.

**1.4 DOCUMENTS, APPROBATION, AND WARRANTY**

For approval, the manufacturer shall provide the following documents:

- Overall dimension drawing;
- Discharge curve, certified by the manufacturer.

In addition, before or at the delivery date, the manufacturer shall provide an installation, operation, and maintenance manual. The manufacturer shall warrant the equipment for a 5-year period, against workmanship and material defects and failure when installed and used in conditions for which it has been originally designed. Spring assemblies and electronic devices (limit switches, level detectors, overflow meters, etc.) are warranted under the same guarantee conditions for a one-year period.

The *HYDROVEX® Flap Spring Loaded Weir* is shop assembled and delivered ready for installation.

The manufacturer shall warrant that the actual flow as measured in the original installation conditions will not exceed plus or minus 10% of the flow shown on the certified curve provided with the regulating weir.



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Should the unit fail to satisfy any of the above conditions, Veolia Water Technologies Canada Inc. will be responsible to repair and/or replace only the equipment supplied by Veolia Water Technologies Canada Inc. (any other equipment coming from other suppliers requiring modifications or replacement is not under Veolia Water Technologies Canada Inc.'s responsibility). All labor must be undertaken by Veolia Water Technologies Canada Inc.'s personnel or an authorized representative.

### **1.5 ACCEPTABLE PRODUCTS AND MANUFACTURER**

*HYDROVEX® Flap Spring Loaded Weir* shall be as manufactured by Veolia Water Technologies Canada Inc., Montreal, Quebec, Canada.

Tel.: (514) 334-7230  
Fax: (514) 334-5070  
E-mail: [csso@veolia.com](mailto:csso@veolia.com).

Any equipment requiring electricity, controls, or instruments in order to perform the overflow function shall not be acceptable. Instrumentation and control shall be acceptable on the project only to monitor the operation of the Spring-loaded weir device. Units requiring cables, counterweights, pulleys, levers, or any kind of moving or pivoting parts to bend the weir shall not be acceptable. Only those units relying on the bending or compression of integral parts of the equipment shall be acceptable.

Any alternate shall be submitted to the consultant at least 2 weeks before bid date. Any alternate technology proposed after that date shall not be acceptable for the project.

### **1.6 INSTALLATION AND OPERATING INSTRUCTIONS**

Installation and operation must be performed in accordance with instructions supplied by Veolia Water Technologies Canada Inc.



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### **2.0 PRODUCT**

#### **2.1 BENDING PLATE**

Each *HYDROVEX® Flap Spring Loaded Weir* shall be constructed from a single bending plate. The bending plate thickness shall be of sufficient thickness for the application, but never less than 1/8". The plate shall be profiled to withstand the applicable loads experienced under normal operating conditions. A rubber seal fixed to each end of the bending plate will close the gap between the bending plate and the side plates.

The bending plate will be attached to the unit using a pivot system. The pivot system consists of a stainless steel shaft rotating within brass bushing and held in place using retaining rings. There shall be a minimum of two pivot systems per unit.

#### **2.2 SPRING ASSEMBLY**

The spring assembly consists of stainless steel springs, two anodized aluminum holding blocks and stainless steel guiding rods. Each spring assembly is attached to the bending plate and the back anchor plate using bolts within a brass bushing. The spring assembly shall be installed behind the bending plate, so as to be protected from the overflowing water and debris during an overflow event. The number and exact position of each spring assembly will be calculated for each application to insure a perfect bending motion and an adequate pressure distribution on the bending plate.

#### **2.3 ANCHOR PLATE AND ANCHORING SYSTEM**

The anchor plate of the spring loaded weir shall be located on the outfall side of the concrete base weir and secured using "HILTI" type expansion anchors.

#### **2.4 SIDE PLATES**

The spring loaded weir side plates shall be made of PVC with a minimum thickness of 3/4" (19mm). The side plates do not act as supports; all the loads acting on the *HYDROVEX® Flap Spring Loaded Weir* during operation are taken by the anchor plate and anchoring system. The aeration holes and the proximity switch are located on the side plates. The side plates shall be anchored to the sidewalls of the concrete overflow weir with "HILTI" type expansion anchors (or equivalent).



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### **2.5 CENTER CONSOLE**

For installations with two or more *HYDROVEX® Flap Spring Loaded Weirs* in series, a center console will be supplied between each unit. The side plate of each spring loaded weir will be bolted to the center console using countersink type cap screws. The center console consists of a stainless steel C-channel, covering the entire perimeter of the side plates, and anchored into the concrete weir.

### **2.6 BACK FLOW PREVENTOR (Option, not included)**

The spring loaded weir can be supplied with a watertight upper seal to prevent backwater in the overflow chamber from entering the sewer system. The upper seal is made of 304 stainless steel elements that are reinforced to act as an upper structural element for the bending plate. A rubber gasket along the entire length of the back flow preventer ensures a water tight seal when the spring loaded weir is in the upright position.

### **2.7 OVERFLOW MEASUREMENT (Option, not included)**

The spring loaded weir can be supplied with an inclinometer, an ultrasonic level detector and an autonomous event recorder to detect and record overflow frequency and volume.

The inclinometer shall be a Rieker Incorporated single axis sensor pack, model SB1i, or equivalent. The ultrasonic level sensor and event recorder will be wall mounted upstream of the Spring Loaded Weir and shall be an Ijinus system, or equivalent. Both the inclinometer and the level sensor shall be watertight and submersible.



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**3.0 CONSTRUCTION**

Below is a list of the material used to build the *HYDROVEX® Flap Spring Loaded Weir*:

Bending plate	:	304 stainless steel
Back support	:	304 stainless steel
Side plates	:	PVC
Side seals	:	Neoprene rubber
Spring Assembly	:	301 stainless steel springs, c/w 304 stainless steel guide rods, anodized aluminum blocks
Backflow seal	:	304 stainless steel
Inclinometer	:	Rieker, model SB1i
Level detector	:	Ijinus
Event recorder	:	Ijinus
Hardware	:	304 stainless steel
Anchors	:	304 stainless steel