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Water management systems

ACU-BEND
Selection Criteria:

Design Data:

Weir Overflow Capacity (Qd):	_____	(indicate L/s, cfs, gpm, etc...)
Maximum Head (H) at Qd:	_____	(indicate ft or m)
Existing Structure:	_____	(yes/no)
Overflow Weir Elevation:	_____	
Overflow Weir Length:	_____	
Maximum Upstream Water Level (Max USWL):	_____	
Preferred number of Weir Modules:	_____	
Sealed on all Four Sides:	_____	(yes/no)

Preferred Counterweight Option:

Concrete Weights:	_____
Galvanized Steel Weights:	_____
Stainless Steel Weights:	_____

Material of Construction Preference:

SS 304:	_____
SS 316:	_____

Weir Monitoring Option:

Discharge Monitoring:	_____	(yes/no)
Installation Assistance Required:	_____	(yes/no)
Start-Up Required:	_____	(yes/no)
Personnel Training Required:	_____	(yes/no)

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ACU-BEND Bending Weir Type “U”

The Clear Solution

Application

Once a combined sewer overflow (CSO) tank (or sewer) or a stormwater overflow tank (or sewer) is full, any additional influent water must be able to reach the receiving stream. In the past this was usually accomplished with the use of fixed weirs. However fixed weirs have inherent disadvantages including: increased water pollution, lower usable tank and sewer storage volumes and no backflow protection. To avoid the disadvantages of fixed weirs increasing use is made of overflow bending weirs such as the unique and patented **ACU-BEND**.

The **ACU-BEND** is designed to ensure that a constant maximum storage level is maintained upstream of the weir so that full utilization is made of all the available upstream storage volume. The **ACU-BEND** is designed to open just enough to allow the additional influent water to overflow the weir while maintaining the upstream water level. This ensures that the frequency of overflow events is reduced which results in reducing the discharge of highly polluted water to the receiving stream.

The entire overflow weir length can be utilized for overflow level control. The compact design makes the system particularly suitable for structures with limited space and for installation in existing structures. The special weir construction makes virtually constant maximum storage levels possible, even under backflow conditions.

Features

- Lower storage tank construction costs owing to smaller tank volumes (the **ACU-BEND** allows for 100 % utilization of storage tank volume as opposed to only 70 to 80% for conventional weirs).
- Increased water pollution protection since discharge from the storage tank to receiving stream commences only after complete filling of the available storage volume or after reaching maximum storage level.
- Stainless steel 316 construction ensures reliable trouble free operation.
- The maximum storage level setting may be easily modified after installation of the device.
- Hydraulically ideal shape of the weir flap ensures blockage free discharge
- Integrated counterweight design eliminates need for separate counterweight chamber.
- Easy retrofitting of existing basin overflows possible (additional storage volume gain).
- The **ACU-BEND** is available with seals on all four sides, so that it can act as a backflow prevention device for flood protection.

Printed in Canada

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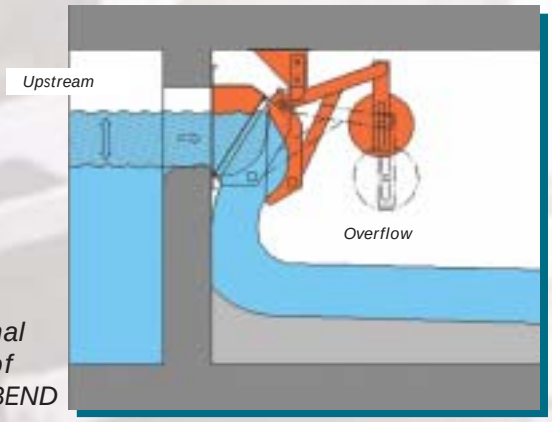
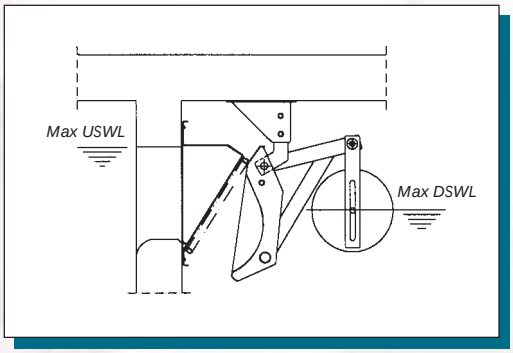


Operational diagram of the ACU-BEND

***ACU-BEND** Installation*



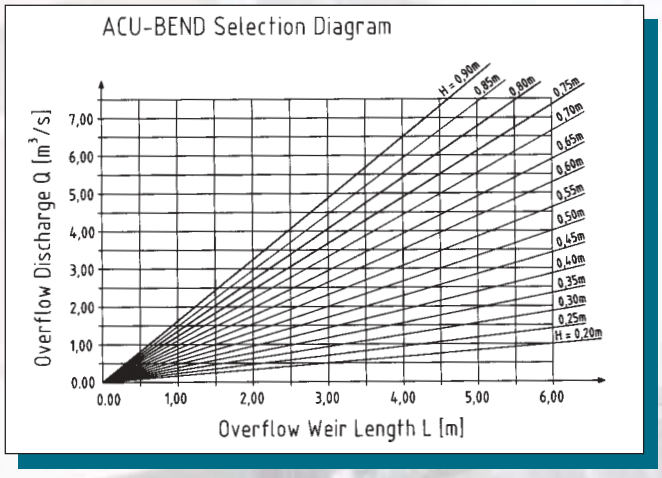
Operation

The **ACU-BEND** is installed on the existing fixed overflow weir, with its pivot points attached to the structure's ceiling, sidewall or crossbeam. The pivot balances the forces produced by the hydrodynamic loading on the overflow weir flap with those of the counterweight. This ensures equilibrium in any weir position, resulting in a highly sensitive response to the slightest change in the upstream water level. The **ACU-BEND** remains in the rest position (closed) until the maximum design storage level is reached. Upon reaching this level, the **ACU-BEND** immediately responds and swings away from the sill, allowing the excess water to overflow while maintaining a constant upstream water level.

The patented special shape of the weir body and the arrangement of the hinged flap and counterweights are the result of extensive calculations and hydraulic testing. The relationship between the static and dynamic hydraulic forces, as well as the passive forces of the counterweights (and weir), have been optimized. This results in a high discharge coefficient for the **ACU-BEND** which ensures that a constant upstream water level is maintained without negatively impacting the upstream hydraulic grade line.

If required, the maximum storage level setting may be adjusted on site by removing or adding counterweights.

Selection diagram



The calculation of the overflow discharge Q is based on the Poleni weir formula

$$Q = 2/3 * \mu * L * H^{1,5} * \sqrt{2 * g}$$

The overflow coefficient $\mu = 0,64$

According to the Poleni formula, the hydraulic capacity of the **ACU-BEND** is at least equal to that of a standard overflow weir. This means that the upstream water level is not adversely affected by the presence of the **ACU-BEND** overflow bending weir type U.

Overflow weir sizes not shown or beyond the diagram limits may be obtained by special request.

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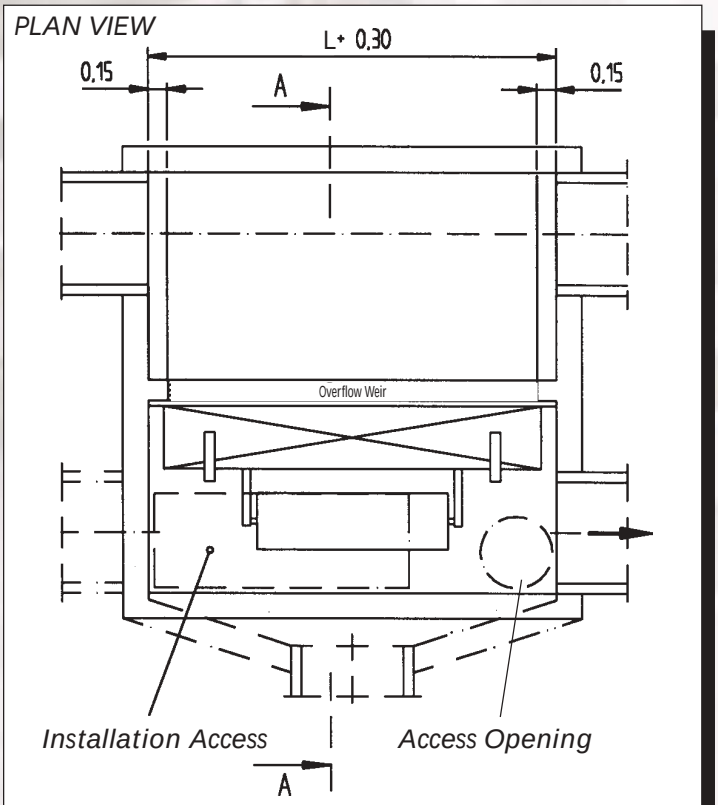
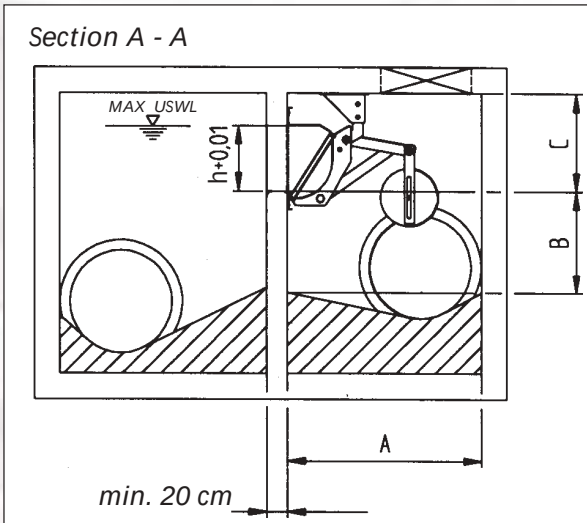
Installation Data for ACU-BEND Weir

Backflow protection design (sealed on four sides)

Detailed installation drawings will be prepared by GWMS for specific project application





Installation and anchoring on ceiling, crossbeam or sidewalls are optional, depending on site constraints

If a floatables baffle wall is to be installed upstream of the ACU-BEND, insure adequate clearance of approximately 1.5 x h between the baffle and the overflow weir.

Dimensions:

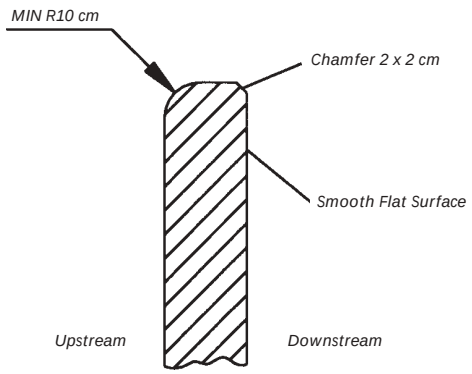
h [m]	0.20 - 0.30	0.30 - 0.40	0.40 - 0.50	0.50 - 0.60	0.60 - 0.70	0.70 - 0.80	0.80 - 0.90
L [m]			up to 10.00				
A [m]	≥0.85	≥1.00	≥1.20	≥1.40	≥1.60	≥1.85	≥2.20
B [m]	≥0.30	≥0.38	≥0.46	≥0.53	≥0.63	≥0.70	≥0.80
C [m]	≥0.50	≥0.60	≥0.70	≥0.80	≥0.90	≥1.10	≥1.30

Other dimensions available upon request

Install secondary concrete only after overflow weir installation is complete.

Size of installation opening depends on specific project requirements and site constraints as well as ACU-BEND dimensions.

Recommended Shape of Overflow Weir



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