## ULTRAVIOLET DISINFECTION

Open Channel Systems

# LEVEL CONTROL SYSTEMS

LEVEL CONTROL

### OVERVIEW

Ultraviolet disinfection of wastewater is an accepted method for reducing microoganisms.

Wastewater enters the system. Once inside, it is exposed to UV light. The UV lamp used for germicidal disinfection produces a portion of its light in the 254-nm wavelength. At this wavelength, UV light destroys bacteria, protozoa, viruses, molds, algae and other microbes. This includes fecal coliform and such waterborne diseases as: E-coli, hepatitis, cholera, as well as many others.

There are many ways to put UV lamps into wastewater. The primary methods are using them in an open channel environment. This is where the water moves in open troughs around the plant. The actual UV system will have its own concrete or stainless trough. The lamps can be installed vertically or horizontally.

In order for the UV lamps to work at optimum performance, they need to be totally submerged in the effluent. The actual filaments on each end of the lamps need to be covered in water.

Since wastewater flows are not constant, a device needs to be used to keep the lamps submerged regardless of the flow rate.

### DEVICES

There are a few ways to accomplish this task:

- Finger weirs
- Flap gates
- Downward opening gates

### CONSEQUENCES OF NO LEVEL CONTROL

- Water races by and does not see UV light
- Lamp heat causes quartz fouling
- Lamps burn out because they are not cooled
- Wastewater leaks out of the channel exposing and burning out the lamps.
- Permit violations
- Lamps overheat causing damage to ballast

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## WEIR

A weir is a structure placed into an open channel with the intent to alter the flow characteristics of the water / fluid in the channel. They are used when a depth of water needs to be maintained upstream of the structure to perform some sort of function, in this case, keep the lamps submerged even under conditions of low or no flow.

## SERPENTINE WEIR

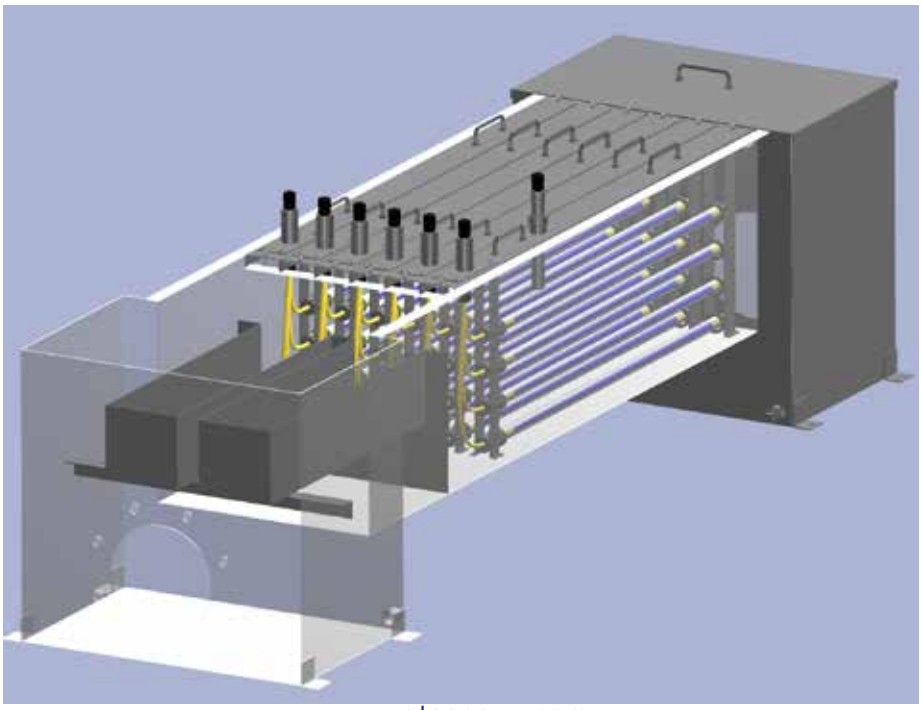
Many wastewater plants use open channel horizontal package systems. A package system comes with a stainless steel channel with inlet and outlet boxes.

The discharege end of the channel has a built in stainless steel serpentine weir. The weir will have been designed to keep the lamps submerged regardless of flow.

- Stainless steel construction
- Built into channel and has a drain port
- Designed with enough surface area to keep lamps properly submerged at zero and peak flows.

Serpentine Weir for 50,000 GPD

LEVEL CONTROL





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## FINGER WEIR

For larger flows and systems being directly inserted into concrete channels, Glasco offers fixed finger weirs.

A fixed finger weir installation is comprised of the following parts:

- Dam plate that extends across the width of the weir
- Stainless steel fingers
- Adjustable hanging mounting brackets
- Stainless steel support beam to hold fingers

## INSTALLATION

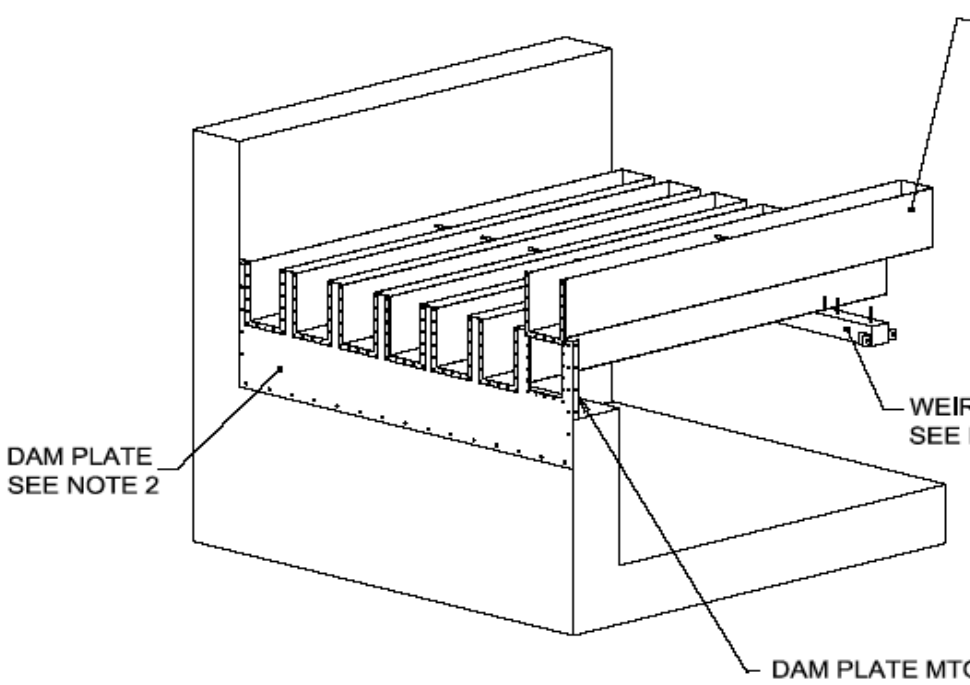
The installation shows a single finger (1.0 MGD) is attached to a dam plate which is located near the UV lamps. The finger is bolted on and then suspended above the flow by adustable mounting brackets and a support beam.

Water flows into the finger and then crests over the sides. This allows the water elevation to be controlled and maintained within a range of +/- a couple of inches.

Since the systems are custom fabricated, different size dam plates and fingers can be manufactured to fit each particular installation.



# LEVEL CONTROL




NOTES:

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## FLAP GATES

Flap gates or counter balanced gates are used for large constant flow projects.

Constructed of stainless steel and originally engineered for agriculture projects, these gates are ideal for plants treating large flows that have limited installation space.

The water flows freely on the sides when the gate is opened. A counterweight on the top compensates for the hydraulic pressure exerted by the water. When the water level increases, the pressure also increases and the movement exerted by the water tends to open the gate. When the water level decreases, the pressure diminishes and the movement exerted by the counterweight tends to close the gate.

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