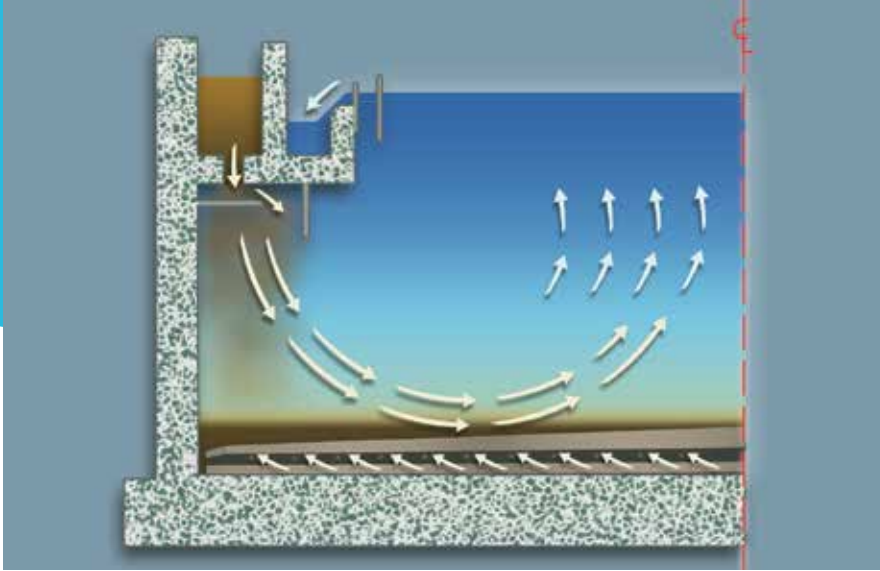




**evoqua**  
WATER TECHNOLOGIES



## **RIM-FLO® SECONDARY CLARIFIER WITH TOW-BRO® UNITUBE SLUDGE REMOVAL SYSTEM**



Flow distribution of mixed liquor is uniform around the basin circumference, density flow pattern is away from the effluent weir, the effluent flow is upward to the basin water surface. The settled solids are hydraulically removed uniformly from the entire basin floor area.

## PROVEN OPTIMUM HYDRAULIC EFFICIENCY PROVIDES 50% TO 100% MORE CAPACITY

### High Performance

The Rim-Flo® system (influent/effluent) promotes movement of mixed liquor "away" from the effluent take-off. The flocculation of sludge is enhanced by a large inlet area and low entrance velocities. A SOR (Surface Overflow Rate) of 800 to 1000 gal/day/ft<sup>2</sup> is achievable.

The Tow-Bro® hydraulic sludge removal device removes settled solids rapidly within 30 to 40 minutes and uniformly over the entire basin floor area without re-suspending the settled solids. It ensures complete and positive control of the sludge blanket. A Mass loading of 50 to 60 lbs/day/ft<sup>2</sup> is achievable.

The combination of Rim-Flo systems and Tow-Bro sludge removers provides:

- A 50 to 100% more efficient clarifier when compared to conventional center feed units.
- Less clarifier area results in:
  - Same number of units but smaller diameter.
  - Less units of the same size.
  - Future plant capacity.
- Significant capital cost savings for equipment and civil infrastructure

- Rapid removal of sludge results in less oxygen needed in the Bio Aeration system, no denitrification, and no bio P re-release.
- A more concentrated RAS results in less RAS flow pumping.

### Uniform Distribution

Influent is introduced into a channel surrounding the periphery on the tank. The channel has a varied cross section that helps maintain a constant velocity in the channel to prevent settling out of solids. The confined influent provides a positive uniform distribution around the periphery.

Orifices in the feed channel floor are computer sized and spaced to provide a controlled headloss that assures an equalized flow distribution into the tank around the entire periphery. Orifice spacing also helps prevent deposition of solids on channel floor.



Rim-Flo® system influent and effluent channels

## PERIPHERAL INFLUENT AND EFFLUENT CHANNELS

### Complete, Rapid Diffusion

As the controlled flow enters the tank through the orifices it is deflected by a baffle on the underside of the feed channel. This baffle, and the orifice length (never greater than the channel floor thickness), eliminates "jetting" action into the basin. The flow is diffused rapidly and completely in the large area between the tank wall and the influent skirt baffle. The skirt baffle defines a clear liquid zone and its cross sectional area such that the inlet velocities are controlled at not greater than 1.5m (5 feet) per minute at maximum flow.

Flow enters the tank near the bottom, below the skirt baffle, uniformly and at low velocities. The flow moves outward, up and back to the peripheral effluent channel in a gentle upward flow. In this manner, full tank volume is efficiently utilized. Eddies that cause short-circuiting are eliminated and solids uniformly drop out of suspension.

### Effective Surface and Channel Skimming

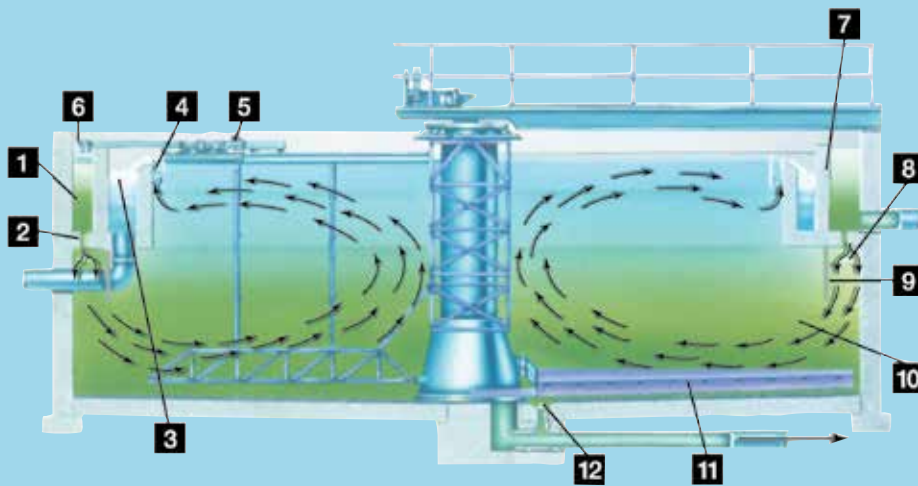
The Rim-Flo® system design, with both influent and effluent channels located on the tank periphery, permits effective skimming of the entire tank surface as well as the influent raceway. This is an absolute necessity in final clarifier design—as scum and grease particles are released in the aeration process and appear in final clarifiers. They must be removed for efficient treatment.

Influent channel skimming is provided by a blade mounted on an extension of the skimmer arm that directs scum in the channel to a weir gate for removal. This skimmer design prevents scum from bridging the channel.

The main tank surface scum is prevented from entering the effluent channel by a scum baffle attached to the effluent launder. A pivoted hinged wiper assembly and blade assures constant contact between blade, scum baffle and beach as the blade travels up the beach.

Collected scum is directed by the flow and skimmer arm to the scum box area. The gate is lowered when the scum is to be removed from the channel. Type and volume of floatable material dictates the operating time cycle.

The gate is available in a number of options—manual or motorized, time clock, limit switch or sensing probe.



## RIM-FLO® SYSTEM ADVANTAGES

### 1. Influent Channel

(varying width to suit flow requirements). Varied cross section controls flow and prevents solids drop out in channel. Can be provided in unidirectional or split-flow styles.

### 2. Inlet Orifice

Computer sized and spaced to provide controlled headloss for equal flow distribution into tank around entire periphery. Eliminates “jetting” action into basin and spiral flow vectors. Spacing also prevents solids drop out.

### 3. Effluent Channel

(varying width) Hydraulically designed for wide range of flows. Effluent at the periphery reduces short circuiting. Helps make cleaning of weirs and channel easier.

### 4. Effluent Weir and Scum

Adjustable V-notched weir. Scum baffle, attached to effluent launder, effectively prevents scum from entering the effluent channel.

### 5. Full Surface Skimming

Surface skimmer with attached inlet channel skimmer mounted on vertical arms attached to truss.

### 6. Scum Removal

Raceway scum is concentrated in a small area easily accessible from outside the basin. Weir gate skimmer provides complete, effective removal.

### 7. Common Channel Wall

Assures substantial savings in construction costs.

### 8. Deflector Baffled

Located under orifice. Eliminates “jetting” and spiral flow vectors. Assures rapid, complete flow dispersion.

### 9. Influent Skirt Baffle

Extends five feet below water surface. Helps direct flow into distribution zone. Defines inlet completely around the periphery for uniform flow distribution and acts as a flocculation zone. Controls velocity to not more than 5 FPM at maximum flow. Steel plate (3/16”) will not be damaged during construction or wash down.

### 10. Large Inlet Area

Assures low entrance velocities and aids flocculation.

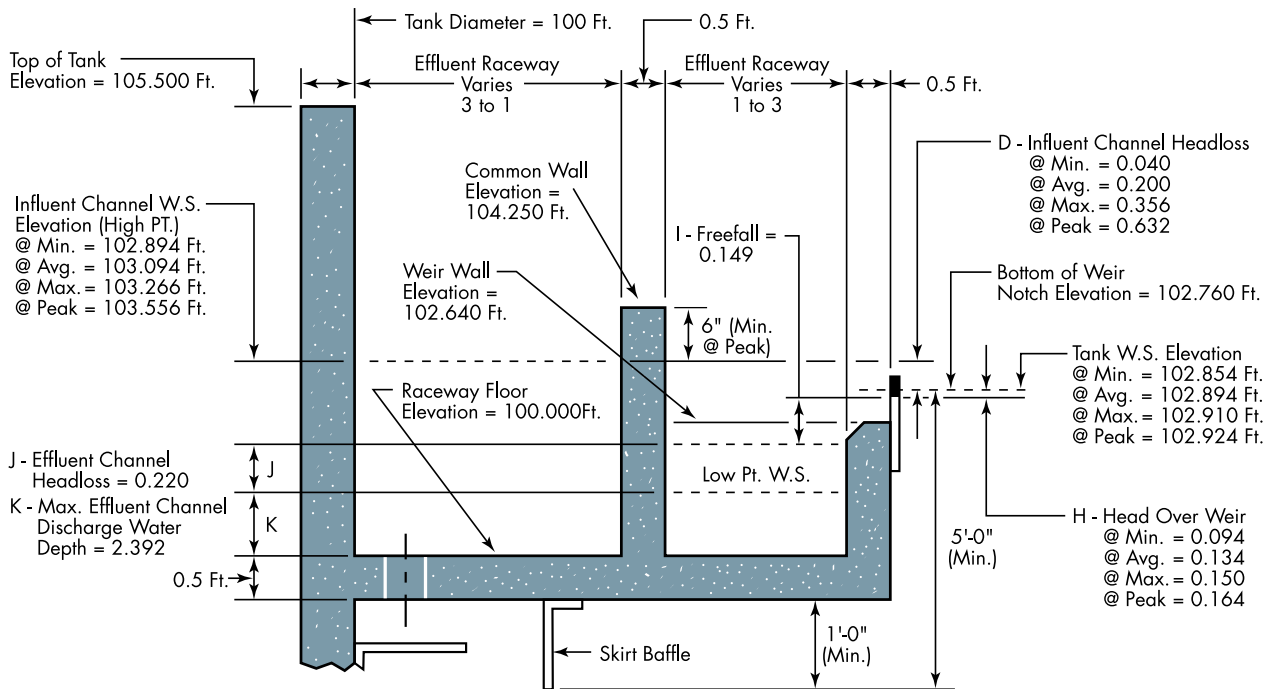
### 11 Tow-Bro® SludgeRemover

For most effective removal of activated sludge.

### 12. Tank Drain

# DESIGN SUPPORT FROM THE EXPERTS

## RIM-FLO® CLARIFIER HYDRAULIC PROFILE



	Min.	Avg.	Max.	Peak
Effluent Flow (MGD)	2.500	6.000	8.000	10.000
Return Flow (MGD)	1.500	3.000	4.000	6.000
Mixed Liquor Flow (MGD)	4.000	9.000	12.000	16.000

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Total headloss through tank is the sum of D, H, I & J = 1.165 Ft.  
 @ Max. Submerged Discharge

A hydraulic profile furnished for your application.

Since hydraulic loadings vary widely it is mandatory that the precise relationship of channel profile to orifice size and locations, tank size and overflow rates be accurately determined. With the Rim-Flo® Clarifier all these calculations are determined by a computer model which has been validated by years of successful field experience. A sample hydraulic profile is shown here to indicate those design criteria. A Rim-Flo Clarifier hydraulic profile is provided for your specific application..



Four 110-foot diameter tanks in this wastewater treatment plant operate at an average raw flow of 400 GPD per square foot of overflow. Effluent BOD ranges from 4 to 6 ppm.

## IMPROVED SKIMMING AND SCUM CAPTURE

Rim-Flo® Clarifier design, with both influent and effluent channels located on the tank periphery, permits effective skimming of the entire tank surface as well as the influent raceway.

In the Rim-Flo® Clarifier, collected surface scum is prevented from entering the effluent channel by a scum baffle attached to the effluent launder. As the blade travels up the beach, a hinged wiper assembly assures constant contact between blade, scum baffle and beach.

Influent channel skimming is provided by a blade mounted on an extension of the skimmer arm that directs scum in the channel to a weir gate for removal. This skimmer design prevents scum from bridging in the channel.

The weir gate is an economical standard design. Collected scum is directed by the flow and skimmer arm to the scum box area. The gate is lowered when the scum is to be removed from the channel. Type and volume of floatable material dictates the operating time cycle.

The gate is available in a number of options-manual or motorized, time clock, limit switch or sensing probe.

Evoqua Water Technologies can also supply other scum removal devices including telescopic sludge valves, scum pipes, water sprays and flushers.



Four 120-foot diameter Rim-Flo® Clarifier tanks operate at 700 GPD per square foot of overflow in this installation. Effluent quality is 3 to 7 ppm BOD and SS.



## THE TOW-BRO® SLUDGE REMOVAL SYSTEM

### Fast, Uniform Sludge Removal

The Tow-Bro® sludge removal system offers the ultimate in rapid, uniform sludge removal and complete positive control of the sludge blanket. A gentle suction action removes biological sludge in one pass (typically 30 to 40 minutes) of the header arm. Sludge is fresher, thus reducing the chance for septicity. The Tow-Bro® sludge removal system provides maximum concentration of solids with minimum sludge agitation. Scraper collectors, on the other hand, require continual resuspension of settled solids and must rely on a slow migration of all solids to a central open hopper subject to decreasing floor area, limiting sludge loading rates and short-circuiting of the clarified zone directly into the RAS piping.

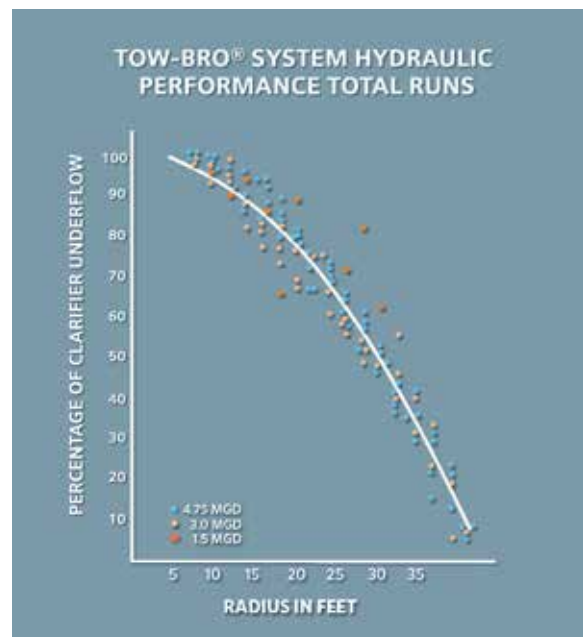
### Proven Performance To Match Objectives

The computer-designed Tow-Bro sludge removal system header has proven that its actual operating performance matches optimum theoretical design objectives. The adjacent chart shows actual test results in an operating installation—compares the actual versus the ideal flow withdrawal. Copies of this test are available upon request.

### Flat Tank Floors And Economy

The Tow-Bro sludge removal system is economical and, for example, allows tank floors to be flat so excavation and forming are simpler. Torque requirements are lower because there is no scraping or ploughing needed. Less energy is needed to move the system. Plus, better and more positive sludge removal means less aeration and solids handling volume—another power-saver. The Tow-Bro sludge removal system is simplicity itself. Only one valve controls complete sludge withdrawal. Clogging is nonexistent. Maintenance is minimal.

The complete story of the Tow-Bro sludge removal system advantages are covered in Bulletin No. EN-TOWBROSEC-BR. Ask for it.





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