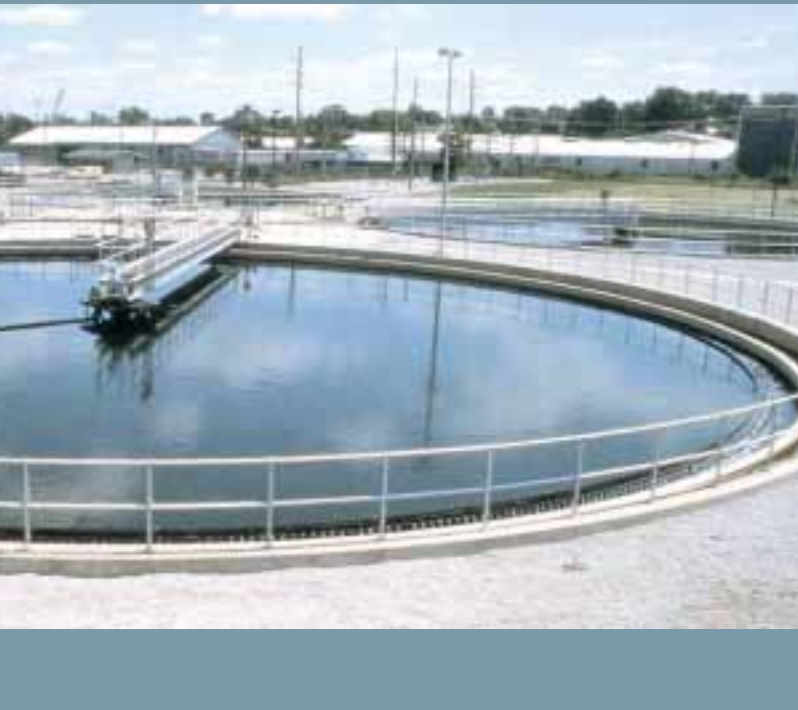




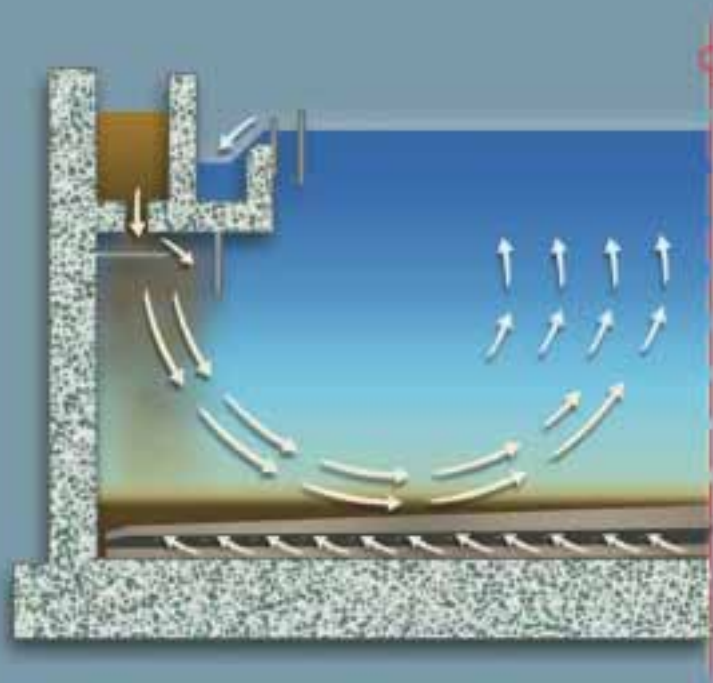
Envirex[®] High Performance Clarifiers

Water Technologies

SIEMENS



Peripheral Feed - Peripheral Take-Off Clarifier—Middle East Project was able to reduce the number of clarifier units from ten to six, providing a significant savings in capital cost.



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

High Performance

■ The Rim-Flo® system (influent/effluent) design promotes the mixed liquor density currents movement "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 0.8 to 2.2 m/h is achievable.

■ The Tow-Bro® hydraulic sludge removal device removes settled solids rapidly (within 30 to 40 minutes); uniformly over the entire basin floor area; without re-suspending the settled solids; and ensures complete and positive control of the sludge blanket. A Mass loading of 10 to 12 kg/m²/h is achievable.

This combined optimum hydraulic efficiency provides:

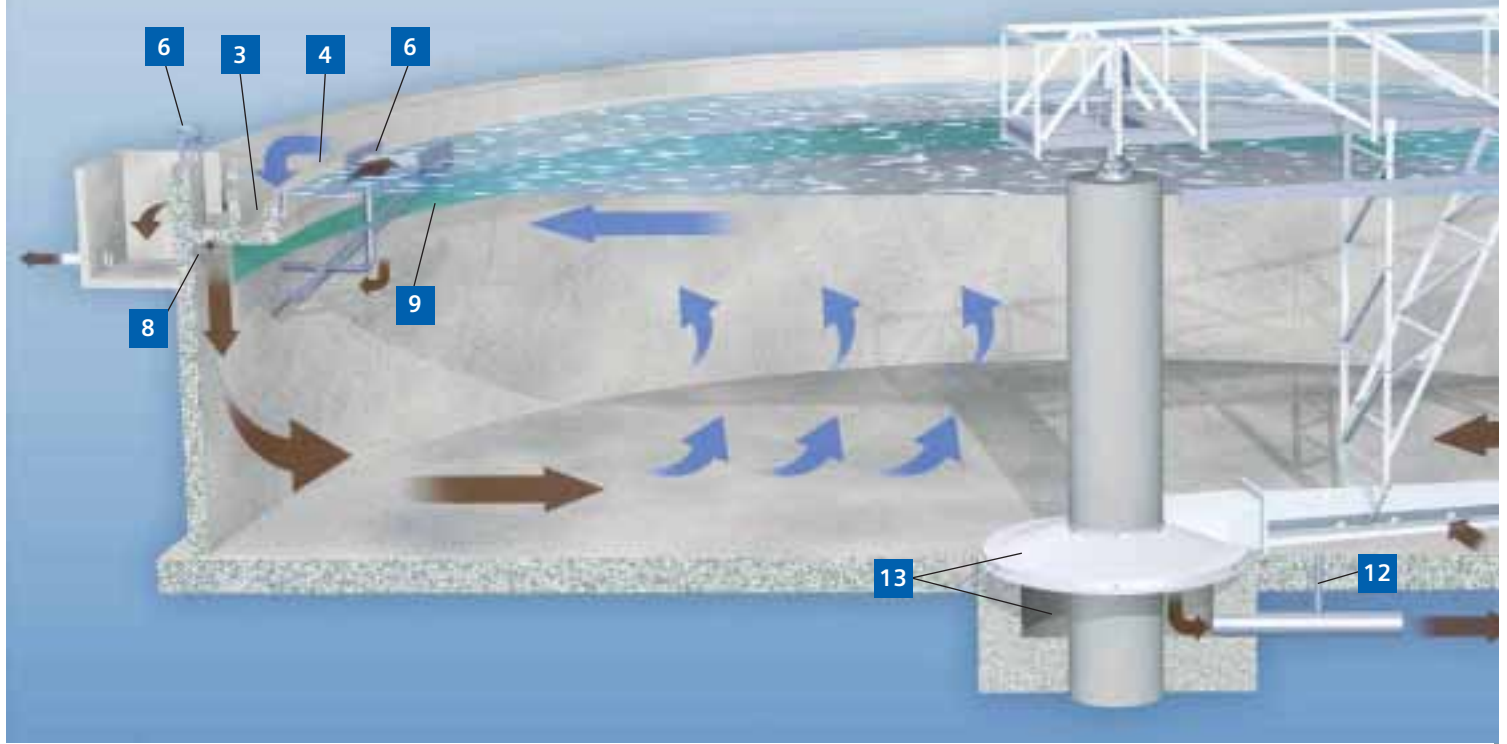
- A 50 to 100% more efficient clarifier when compared to conventional center feed units.
- Less clarifier area results in:
 - Same number of units but smaller diameter.
 - Less units of the same size.
 - Future plant capacity.

- 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.



100% More Capacity

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

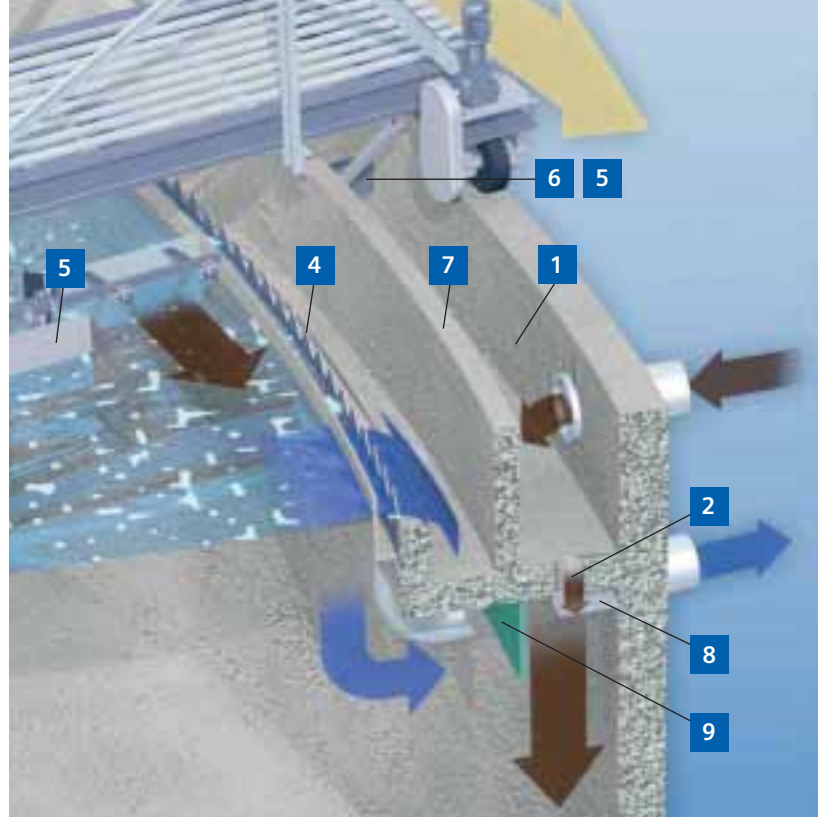
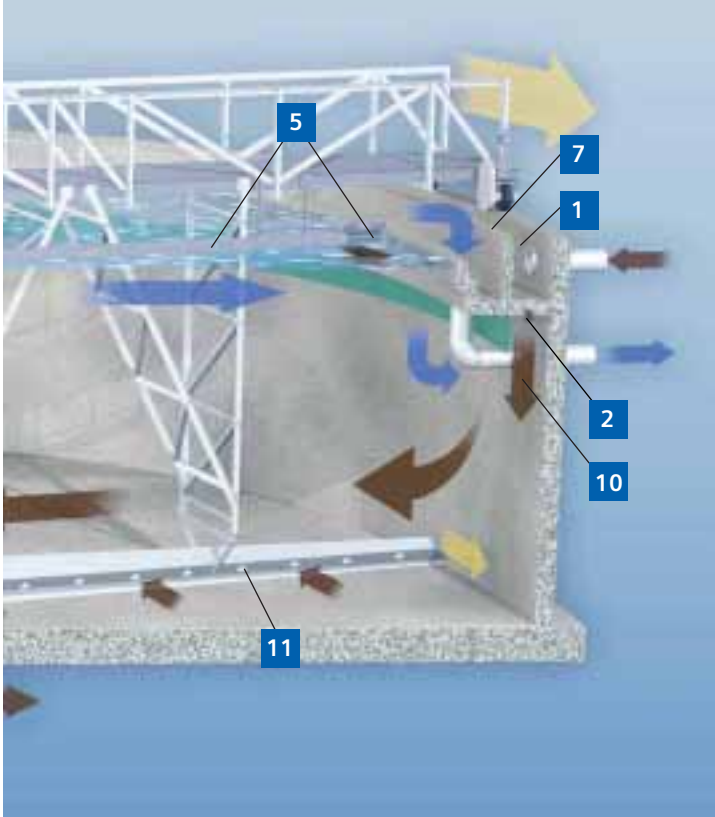
the influent raceway. This is an absolute necessity in final clarifier design—as scum and grease particles are released in the aeration process and appear in final clarifiers. They must be removed for efficient treatment.

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.

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.



Value Added Clarification

1. Influent Channel

(Varying width to suit flow requirements.) Varied cross section controls flow and prevents solids deposition in channel; eliminates influent pipe beneath basin floor; and 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 deposition.

3. Effluent Channel

(Varying width to suit flow requirements.) 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 Baffle

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 bridge.

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

Separates effluent from influent in a common channel construction.

8. Deflector Baffle

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

9. Influent Skirt Baffle

Helps direct flow into distribution zone. Defines inlet completely around the periphery for uniform flow distribution and acts as a flocculation zone. Controls inlet velocity and defines the clear water zone.

10. Large Inlet Area

Assures extremely low entrance velocities and aids flocculation.

11. Tow-Bro® Hydraulic Sludge Removal System

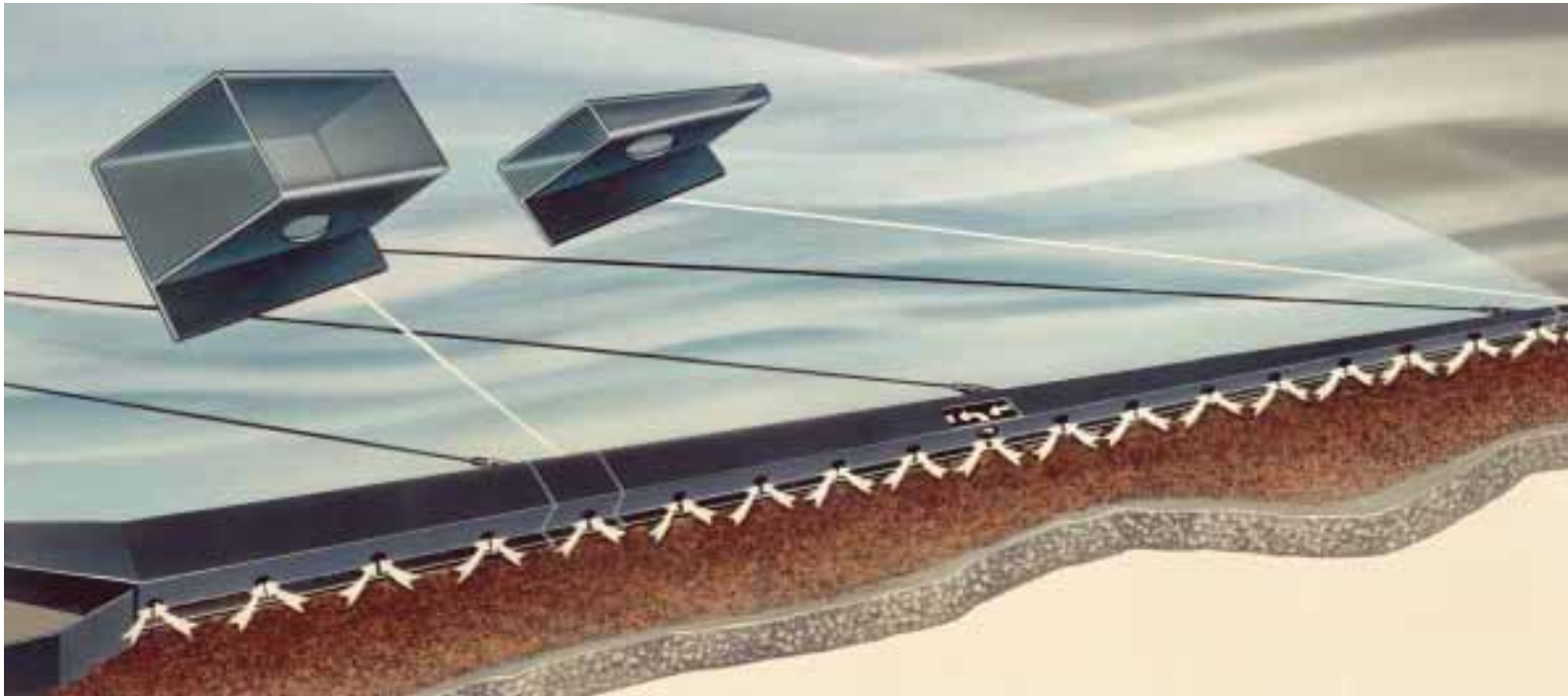
Uniform hydraulic removal allows for use of a flat basin floor. The Tow-Bro® system header allows the settled solids to exit the total floor area of the basin without interruption. Allows complete and positive control of the sludge blanket over a wide range of flow (4:1 common up to 8:1 ratio).

12. Tank Drain

Allows complete basin dewatering.

13. Tow-Bro® System Manifold With Seals

Allows for the uninterrupted RAS flow as the Tow-Bro® system header rotates around the center column. Simple and easily replaceable seals have a life of 5 to 10 years.



The Tow-Bro® Sludge Removal System

Fast, Uniform Sludge Removal

The Tow-Bro® Unitube 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® Unitube 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

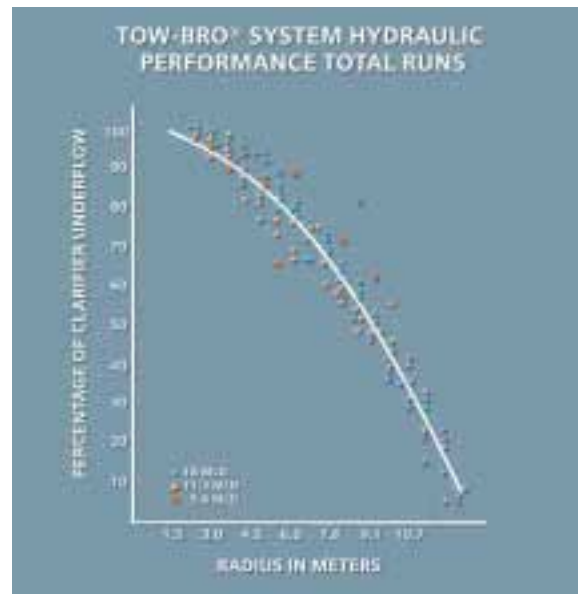
The computer-designed Tow-Bro® System header has proven that its actual operating performance matches optimum theoretical design objectives. The adjacent chart shows actual test results in an operating installation—compares the actual versus the ideal flow withdrawal. Copies of this test are available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

Flat Tank Floors And Economy

The Tow-Bro® Unitube 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® Unitube System is simplicity itself. Only one valve controls complete sludge withdrawal. Clogging is nonexistent. Maintenance is minimal.

The complete story of the Tow-Bro® Unitube System advantages are covered in Bulletin No. EN-TOWBRO-BR. Ask for it.



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