Water & Wastewater
Treatment Solutions
Municipal & Industrial

20+ YEARS ClearStream

Sedimentation / Separation Equipment

Quality Equipment: Competitive Price

American Water Works Association

Water Environment Federation
the water quality people

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Sandy, UT 84070

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Segmented Blade Clarifiers

The segmented rake blade design has long been considered the workhorse of water and wastewater treatment.

Raking blades turned at a near 45-degree angle are supported from two structural support arms. The settled sludge is plowed inward from one blade to another until it is deposited into a sludge pit.

This rake design can be used with either cage drives or shaft drives.

ADVANTAGES:

1. Simple design.
2. Nothing to "plug up" under water.
3. Settled sludge will be transported to the sludge pit regardless of solids loading.
4. Simple inspection and squeegee

VARIATIONS:

1. Change the blade angle of attach, to the radius of the tank.
2. Increase the depth of all the blades.
3. Increase the depth of each blade as it gets nearer to center sludge sump.
4. Add two more half–radius arms to aid in solids transport for clarifiers larger than 100' diameter.
5. May be provided with a wide variety of skimming mechanisms.

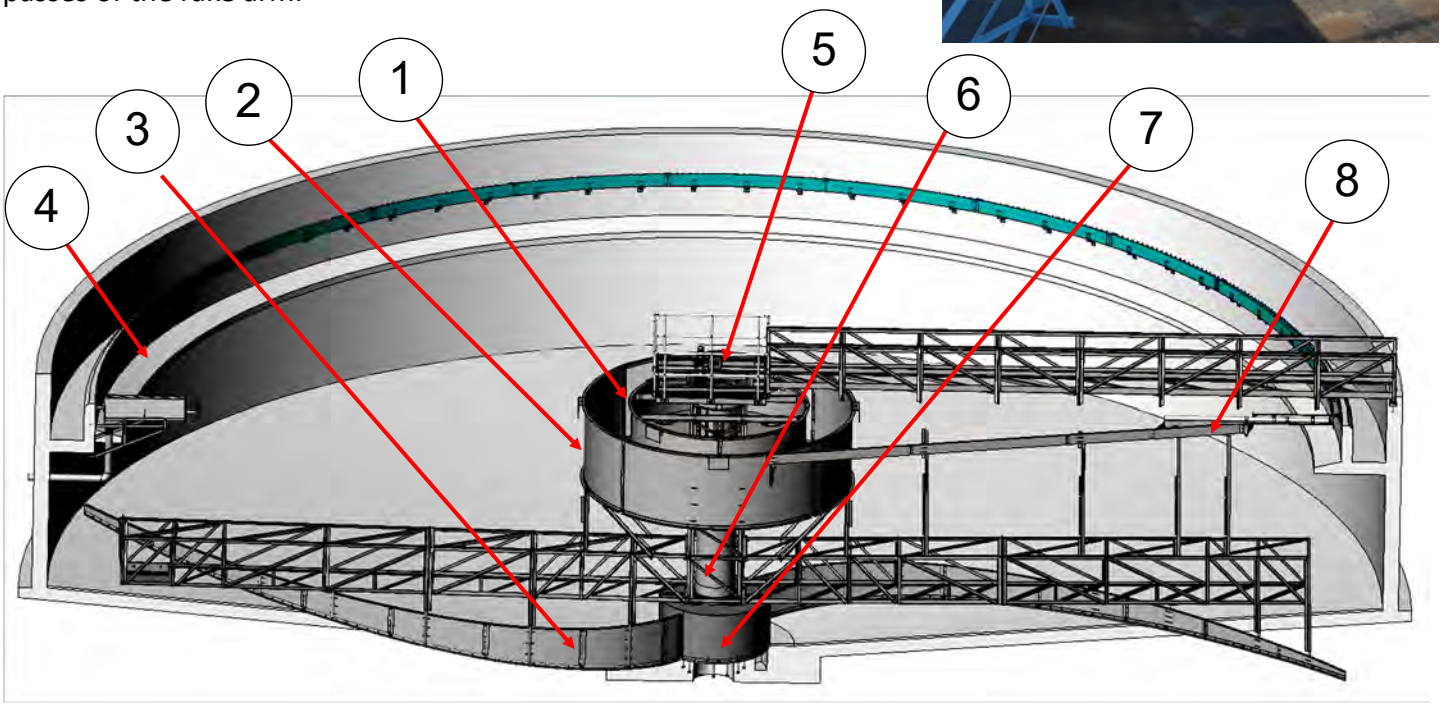
Nautilus™ Spiral Blade Clarifiers

Because of the high rate of sludge removal with spiral blades, there is minimal risk of denitrification or secondary phosphorus release due to sludge age. In addition, if the rakes are run at the proper speed, there is little or no plume formation which could impact the effluent solids level.

Spiral blades have the added advantage of not requiring seals or having the risk of plugged suction pipes. Suction sludge removal techniques demand more maintenance than spiral rake blades. Debris or particles accumulating in the horizontal runs of suction pipes can readily clog them.

The spiral scraper blade has a logarithmic attack angle of 30 to 35 degrees and generally increases in depth towards the center of the clarifier.

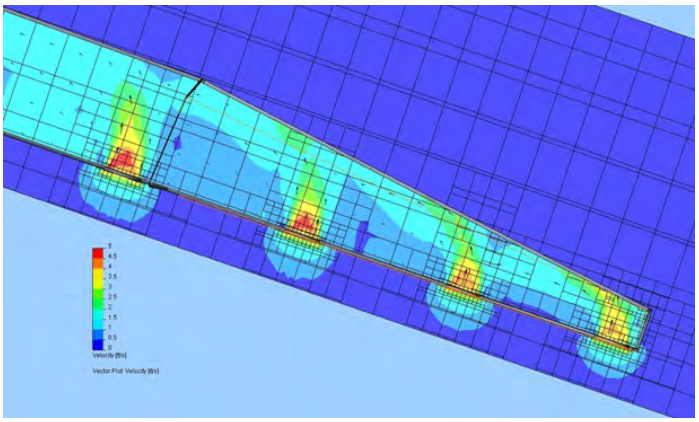
Settled sludge is rapidly collected continuously along the spiral rake blade, pushing it towards the center with one or two passes of the rake arm.



1. **Influent Dispersion Well™** (IDW) The unique IDW design has demonstrated, in side-by-side testing, substantial improvements in lowered TSS over other EDI designs.
2. **Flocculating Feedwell:** Allows the solids a low energy area in which they may form larger flocs.
3. **Spiral Blades:** Segmented blades and Stub Arm additional blades are other options.
4. **Density Current Baffle:** The primary function is to eliminate wall currents and minimize clarifier short circuiting.
5. **Precision Bearing Drives:** A proven design which does not require a lower bearing; maximizes drive life and minimizes drive maintenance.
6. **Center Column Inlet:** This feed configuration maximizes the effectiveness of the IDW.
7. **Optional Sludge Drum™** The Sludge Drum rotates with the blades and therefore always receives the highest concentration of sludge.
8. **Skimmers:** Standard Skimmers, Full Radius Skimmers, and Ducking Skimmers are all available.

Suction Header Clarifiers

One or two rectangular tapered headers stretch radially from a manifold across the bottom of the clarifier.
Engineered sized and spaced orifices, located in the leading edge of the suction header, are designed to draw settled sludge at a balanced removal rate across the entire basin floor. Through pumping and / or head differential, settled solids are drawn through the header into the manifold and out of the clarifier.



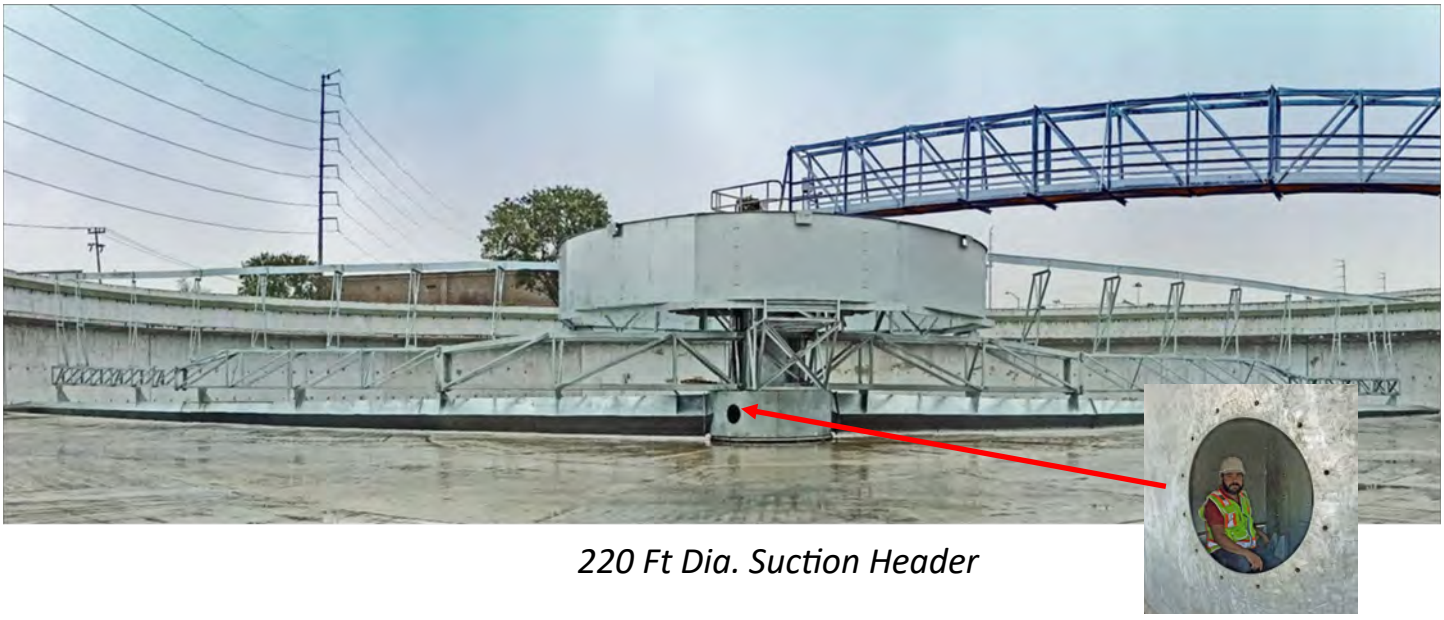
Header dimension and orifice size / spacing are designed using an iterative process with ClearStream's Verified CFD software to achieve flow balance without exceeding the minimum / maximum flow velocity throughout the header.

ADVANTAGE:

Rapid removal of solids across the entire clarifier floor.

VARIATION:

Option to install a segmented rake as one arm opposite the suction header to aid in redistribution of the sludge on the bottom.



220 Ft Dia. Suction Header

Suction Pipe Clarifiers

Suction or draw-off pipes are equally spaced along the rake arm to draw off settled sludge across the clarifier. Blades on the rake arm are arranged in a "V" pattern to direct the collected sludge towards the Suction Pipe. A RAS valve, located in the RAS Box, on each individual suction pipe, allows the flow from each pipe to be adjusted to optimize the solids removal from the clarifier, leading to potentially higher RAS concentrations.

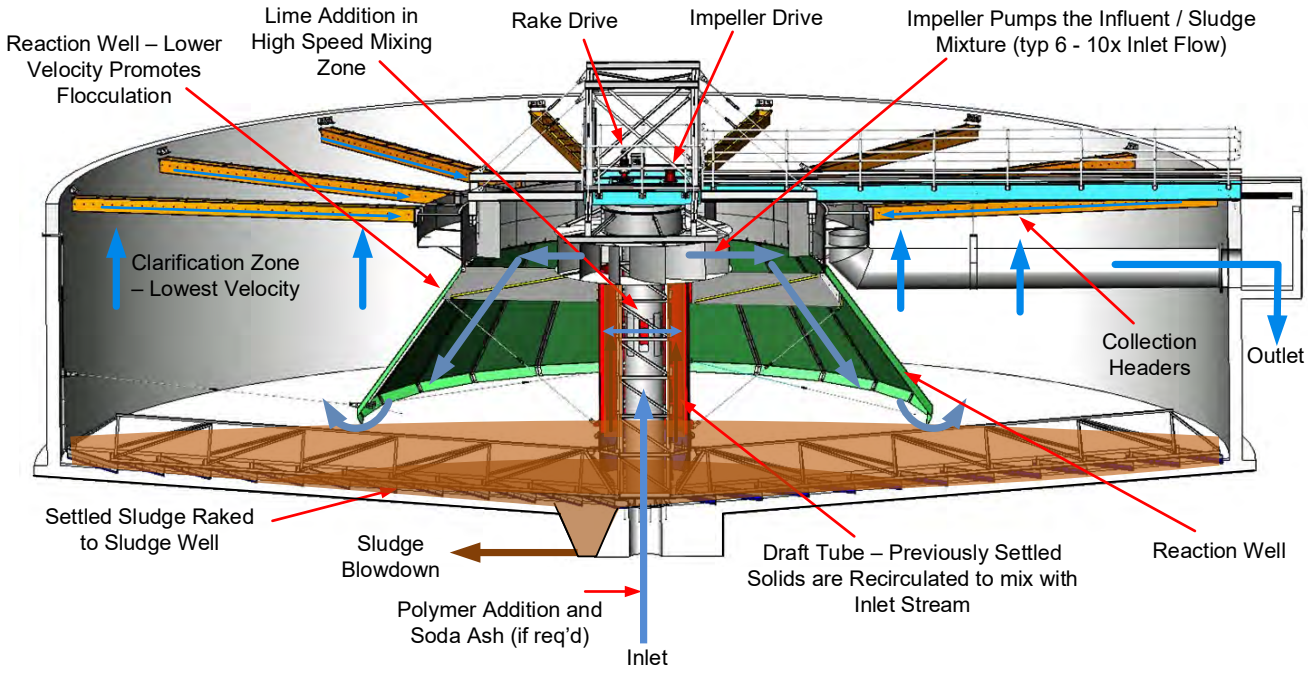
Pictured below is a RAS valve box with each individual valve, marked with a percent opening, to allow custom withdrawal rates for each suction pipe. This also provides the operator visual indication of the setting of each individual RAS valve.

Suction or Riser Pipe design works by lowering the water level in the RAS box, creating a head differential between the water level in the tank and the RAS box. This causes settled solids to be drawn up from the tank floor into the RAS box. Pictured lower right, are the "V" blades which direct the sludge to the suction pipes.

"V" Pattern Blades

Solids Contact Clarifiers

ClearStream's Solids Contact Clarifier combines a number of operations in a single unit. As the influent stream enters into the draft tube, it experiences fast mix with a recycled sludge stream of 6 to 10 times the inlet flow rate. Once passing through the impeller, which is a high flow, low shear, low head pump, the mixed streams pass into the reaction well, which is a slow mix area promoting flocculation. The flocculated solids are then directed to the clarification zone of the unit, where the low velocity area allows them to settle. Once these solids are settled, they are scraped to the center of the unit where the majority are again recirculated through the process, thus promoting increased particulate size and a thicker sludge. A portion of this sludge is discharged for dewatering.



Thickeners

The ClearStream sludge thickener is designed to be among the most robust and reliable in the industry.

In applications ranging from municipal water to minerals, food, power, and /or pulp and paper processing; ClearStream will deliver a product to meet the most stringent performance requirements.

There are many design innovations which can enhance thickener performance. These can vary depending on the application.

Rakes with Pickets

Elevated Tanks

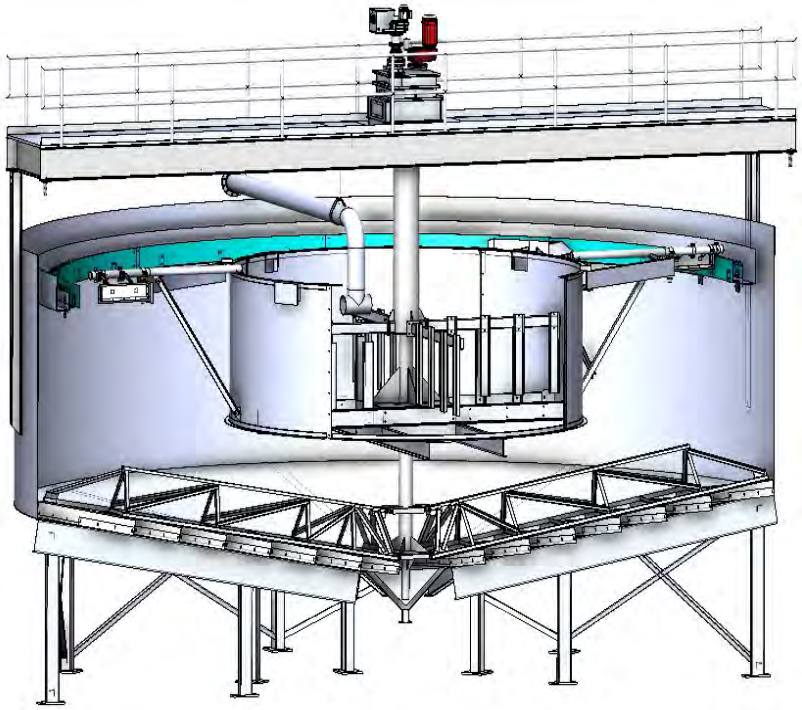
Low Profile Rakes

Blades on Posts

Flocculating Clarifiers

ClearStream can custom design a unit to meet your needs. The photo to the right shows a Dual Drive with a lift at a major power producer in the southeast United States. This was for a flocculating clarifier with a heavy sludge load. The design allows the flocculator to continue to operate while the Rakes are lifted in high torque conditions.

ClearStream's design expertise can meet your application, no matter how challenging.

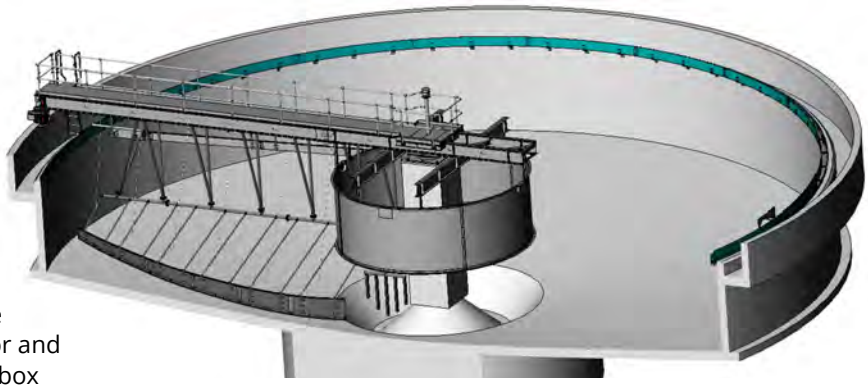


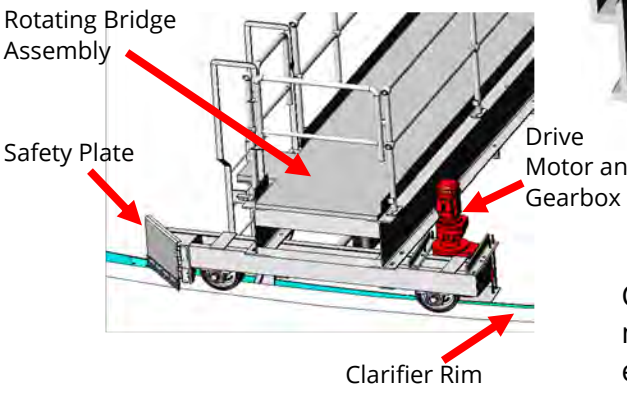
These clarifiers can include either low-speed flocculators or high-speed mixers depending upon the needs of the particular application. In some cases, satellite mixers are used outside the feedwell.

Rim Drive Clarifier

For many applications Rim drives can offer a cost-effective alternative. PRE's Rim drives use the same robust upper reducer as their precision main gear/bearing drives. In addition, these units may also be powered by hydraulic power units.

ClearStream manufacturers rim drive clarifier mechanisms where the bridge rotates with the drive. The simple but sturdy design of these rim drives provide excellent performance and low maintenance. These options and our expertise allow ClearStream to custom design clarifiers, drives, and other components to meet your specific application.





3D Models of Every Project

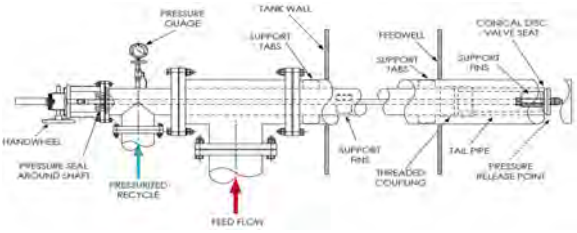
ClearStream produces a 3D model of every unit which we manufacture. These models are extremely valuable to ensure proper fit up. In addition, these models can be a useful tool for operators training.

Dissolved Air Flotation (DAF)

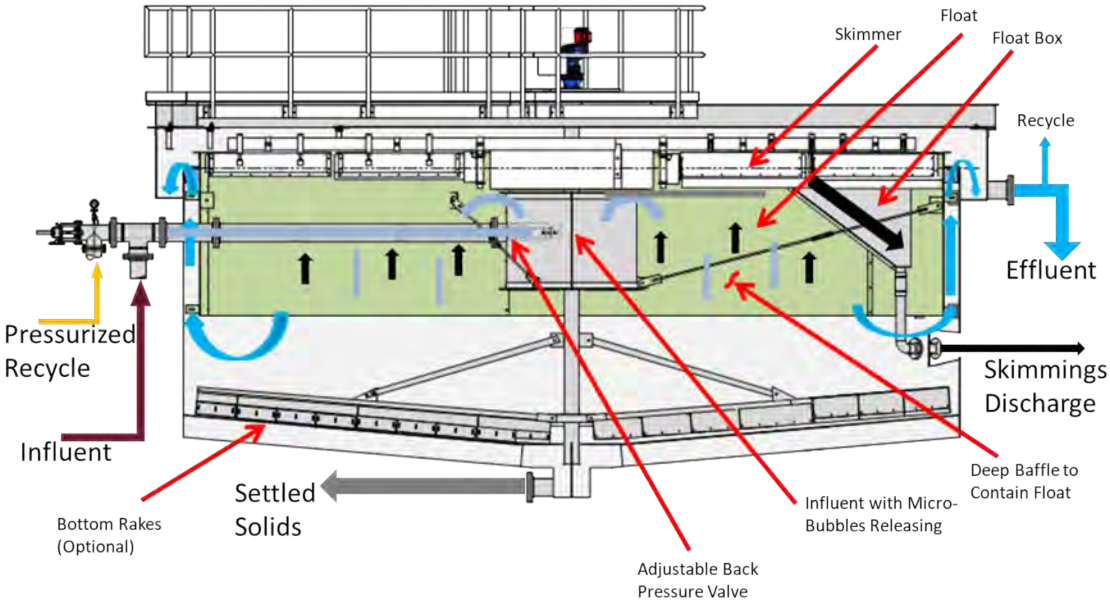
Dissolved Air Flotation units can be used in water and wastewater applications to clarify lighter solids with a SG close to that of water, as well as thicken solids from other processes prior to further dewatering and / or digestion. The drive is mounted on the walkway or column. The drive turns a structural torque tube or shaft, which in turn rotates the solids removal mechanism.

ClearStream Dissolved Air Flotation units can be installed in a variety of tanks including concrete, anchor channel, or elevated tanks. This makes our design well suited for retrofit or upgrade installations.

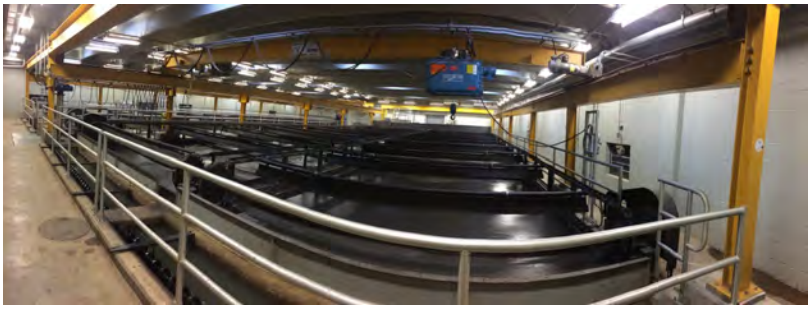
All units are 3D modeled to ensure proper fit up.



Pressure Release Valve Detail

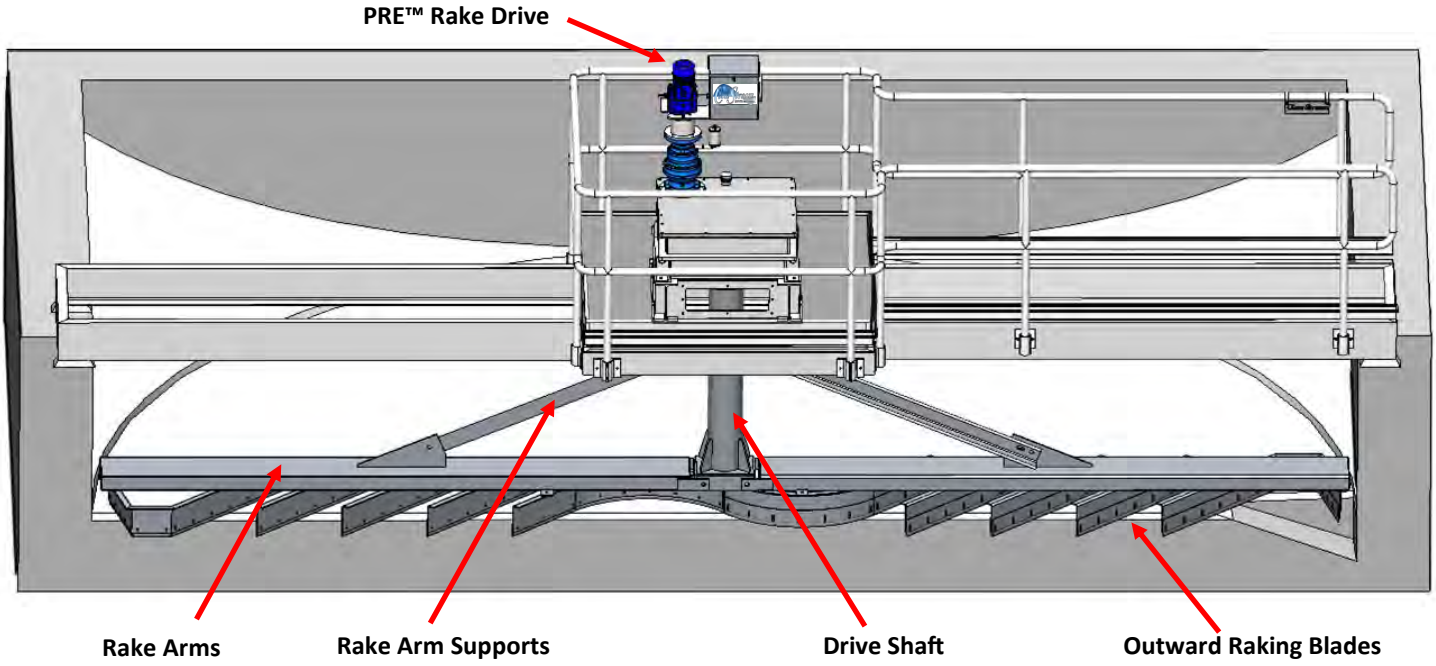


Rectangular DAF Units



1. Typically ship fully shop-assembled.
2. Can include integral coagulation and flocculation chambers.
3. Lower installed costs.
4. Can fit in narrow space i.e., between buildings / other equipment.
5. Internals can be installed in a rectangular concrete basin.

Titan Detritor™



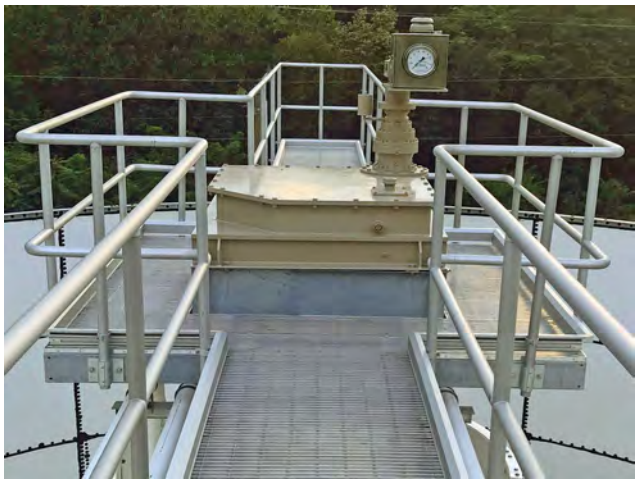
The ClearStream Titan Detritor™ Grit Chamber is a continuous flow unit for the removal of sand, grit, etc. which settles due to its specific gravity the water overflows through the outlet weirs.

The settled solids are scraped by means of an outward scraping rake mechanism towards the openings in the bottom of the sidewall.

The collection chamber works on velocity principle and is so designed that only grit settles while the organic matter overflows.

The classifier mechanism consists of a rake drive and heavy-duty rake arms.

The collected grit is thoroughly washed and is delivered for disposal.



New and Replacement Drives

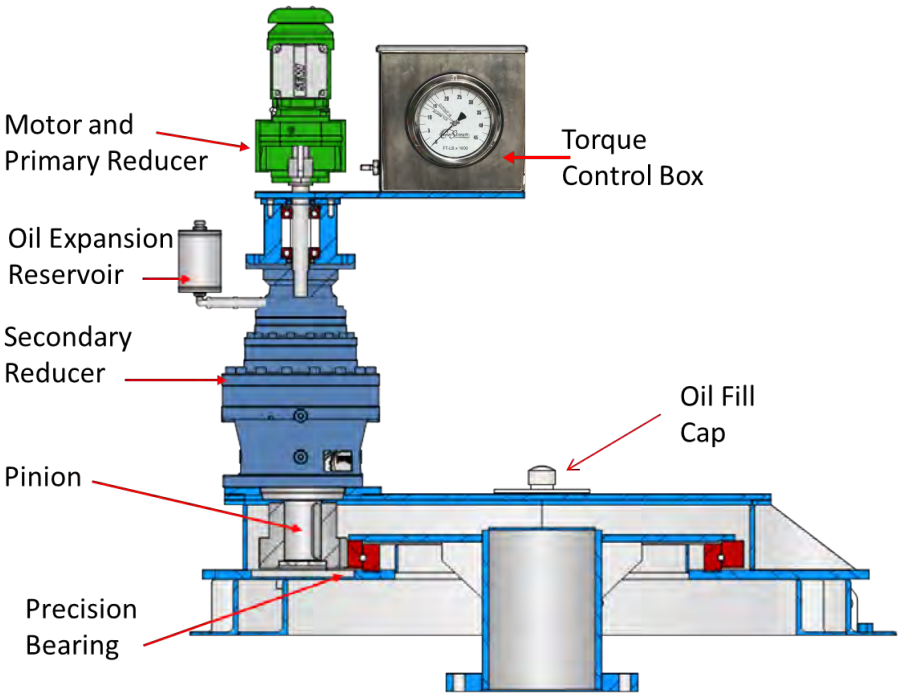
ClearStream Environmental specializes in retrofit, replacement, and repair of existing drives and equipment. Replace outdated technologies with new and improved designs.

Equipment Retrofits

Drive Replacement

New Equipment Installation

OVER 500 DRIVES INSTALLED FOR NEW AND RETROFIT APPLICATIONS



- Four-point contact precision main bearing evenly distributes overturning loads.
- Steel housing / Designed to bolt-up to any existing unit for retrofit.
- Designed per AGMA and ABMA standards for minimum 100 year bearing life.
- Standard Drives do not require lower pinion bearing.
- Primary parallel helical gearmotor with shear pin.
- Secondary planetary speed reducer with pinion mounted to the output shaft.
- Precision gear, grease or oil lubricated.
- Hydraulic Torque Box with Dial Indication.
- 5-year Drive Warranty (less motors and paint)
- 10-year Main Gear Warranty
- Optional Stainless Steel or Cast Iron Drive Housings available.

PRE a Division of