

SOLIDS CONTACT AND FLOCCULATING CLARIFIERS FOR WATER & WASTEWATER TREATMENT

Large diameter turbine producing high internal recycling rates

Slow moving turbine minimizing floc shear

High efficiency turbine for reduced energy input and optimized chemical usage

Proven designs with hundreds of installations

Adaptable designs to fit various customer needs



Innovative designs combine rapid mixing, flocculation and clarification in a single tank for efficiency & land savings!

REACTOR CLARIFIER™ SOLIDS CONTACT CLARIFIERS



IMPROVED PRECIPITATION AND CLARIFICATION

Backed by extensive experience in water and wastewater treatment, Ovivo can help you determine the most cost-effective mechanism for your application, without compromising quality or dependability.

Working with you to address the specific process challenges that affect your clarifier selection, we ensure that your Reactor Clarifier™ solids contact unit functions as required. Our trained sales engineers can assist you with equipment sizing and selection, ensuring a margin of safety for process upsets and allowing you the greatest operational flexibility. This will include determining the settling rates and detention times for clarification.

This brochure describes the various types of units that are available and explains the features that make Ovivo's Reactor Clarifier solids contact units the best value for your plant.

Flocculation and Clarification Combined in a Single Tank Reactor Clarifier solids contact units are designed and built to provide the most economical solution to precipitation and clarification requirements. The simple design provides for coagulation, flocculation, solids recirculation, clarification and positive sludge removal in a single basin. This eliminates the need for multiple tanks and additional pipework. All units are backed by over 60 years of experience in engineering and manufacturing, ensuring the best fit for your unique plant requirements.

APPLICATIONS AND OPERATIONS

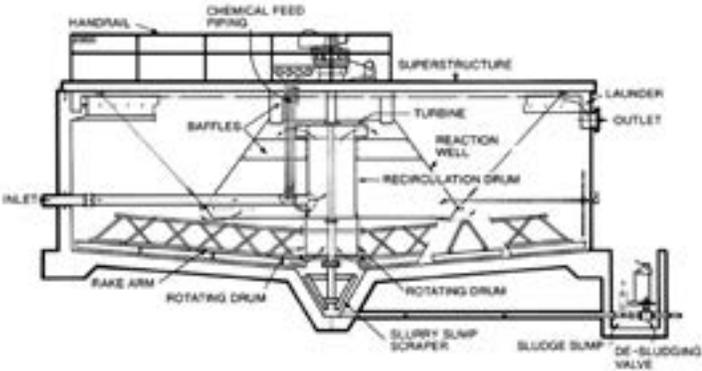
A wide range of clarification applications require the removal of suspended solids from the feed stream. These include removing turbidity, algae, color, iron and metals; wastewater treatment; water softening and brine clarification.

Reactor Clarifier solids contact units allow several different design configurations (varying flocculation distribution, recirculation rates and rake torques) meeting even the most exacting standards for quality.

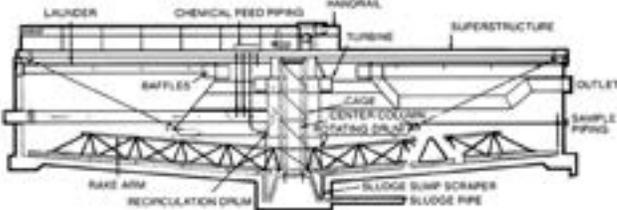
Since we recognize that the true cost of a machine includes not only the purchase price of the equipment but also its operating costs, Reactor Clarifier solids contact units are built with the same heavy-duty features as mechanisms for mining and industry, to ensure that your plant stays online and operational.



SOLIDS CONTACT DESIGNS



**REACTOR CLARIFIER™ TYPE HRB
(BRIDGE MOUNTED)**



**REACTOR CLARIFIER™ TYPE HRC
(COLUMN MOUNTED)**

PRINCIPLES OF OPERATION

Reactor Clarifier solids contact units combine slow turbine speeds and high volume internal recirculation to promote mixing, flocculation and solids-contact. The recirculation system is designed to promote particle growth and improve the removal of suspended solids.

As influent enters the recirculation drum it is pumped upwards by a large diameter slow-speed turbine, where it comes into contact with a large volume of dense floc from previously precipitated solids (6 to 15 times the maximum influent rate is recirculated to increase solids contact with the new incoming feed). The resulting effluent is passed under the reaction cone to the clarification zone, with the heaviest particles settling to the floor. These are then raked to the center for recirculation or discharge.

TYPE HRB

For mechanisms up to 100 feet in diameter. This mechanism is supported by a bridge, which spans the tank.

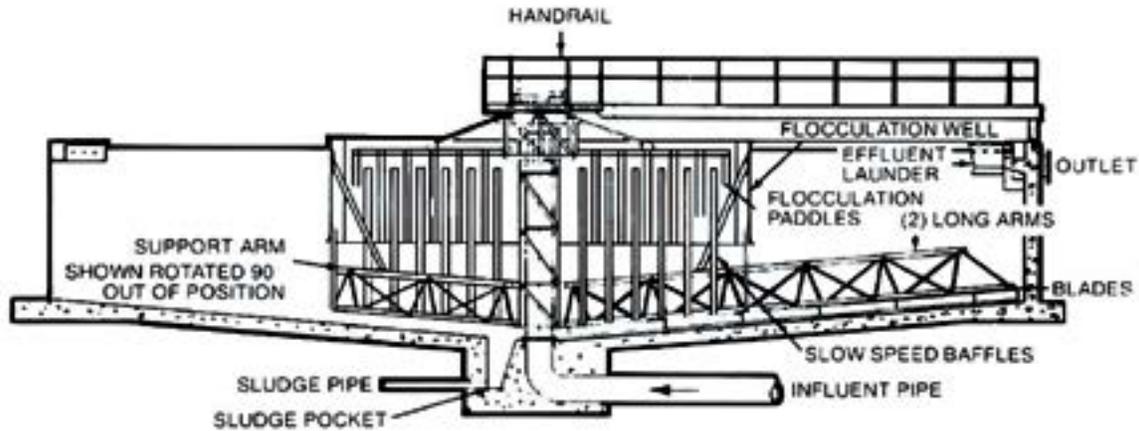
TYPE HRC

For mechanisms from 50 to 200 feet in diameter or larger, our HRC Reactor Clarifier solids contact units are supported by a stationary center column mounted to the tank bottom.

On all our solids contact mechanisms, the influent can be introduced through side, top, or a bottom feed pipe. Our solids contact units use the same drives as heavy-duty industrial thickeners. Proven in service, these drives are equal to any duty demanded of them.



FLOCCULATING DESIGNS



REACTOR CLARIFIER™ TYPE CF

In some applications, cost-effective treatment can be accomplished without using a solids contact process to promote settling. In such cases, making the best use of chemicals to encourage optimum flocculation and settling is key.

We offer three basic designs of flocculating units for these applications. Each is designed to provide symmetrical mixing and flocculation with low tip speeds for minimal floc shear.

TYPE BFR

Our BFR Type Reactor Clarifier solids contact units feature an oversized baffled feedwell and concentric turbine. Flocculant is mixed with the feed stream and allowed to pass under the well into the clarification zone of the tank. This turbine flocculator configuration is especially suited for medium to high strength flocs, which require more intense mixing.

BF AND CF TYPES

Our BF and CF Type units feature specially designed counter rotating paddles that gently and thoroughly mix flocculant with feed streams. Similar in operation to the BFR Type units, BF and CF Types have the added advantage of multiple paddles which create eddies or vortexing on their trailing edge. This enables complete energy distribution without localized shear. These units are particularly well suited to bioflocculation and for light-to medium-strength flocs.



CLARIFIER DRIVE MECHANISMS

THE HEART OF THE REACTOR CLARIFIER SOLIDS CONTACT UNIT IS THE DRIVEHEAD, WHICH ROTATES THE RAKES AND TURBINES.

SUPERIOR DESIGNS

With every one of our Reactor Clarifier solids contact units you are assured of receiving a drive specifically designed to meet your application needs. The main bearing for high torque rake drives and turbine drives was developed by our pioneering engineers for use on large diameter, heavy-duty industrial thickening applications over 50 years ago. The design of this bearing protects against overturning loads and assures extended, trouble-free operation.

DUAL DRIVE DESIGNS

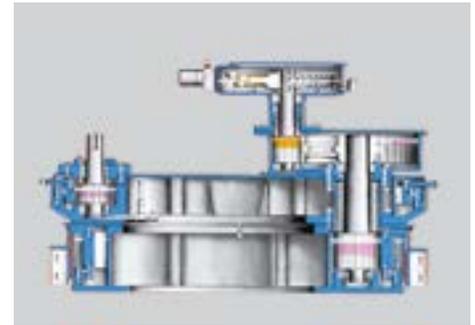
Drives used on Reactor Clarifier solids contact units are made up of two concentric drives: a rake drive and a turbine drive. This allows for large diameter turbines to be mounted concentrically in the reaction well for symmetrical mixing and flocculation. Torque requirements vary by installation, so we offer several types and styles to suit the application.

BRIDGE-MOUNTED DRIVE DESIGNS

Combination W/W series drives provide up to 100,000 ft-lbs torque. These drives consist of a single reduction worm gear train that uses a high-strength, centrifugally cast bronze alloy work gear and a hardened steel alloy worm. Supported by a 4-point contact precision bearing, this drive is ideal for long life and reliable duty on bridge-supported designs.

COLUMN-MOUNTED DRIVE DESIGNS

For larger, center column-mounted machines, combination C/C series drives provide up to 400,000 ft-lbs torque. These drives utilize heat treated steel alloy spur gears and pinions, along with 4-point contact precision main bearings.



Type C60P/C72PH
Reactor Clarifier™ Drive



Type W/W Reactor Clarifier™ Drive



DRIVE CONTROL

An integral electro-mechanical drive control unit is provided on every drive unit. The control mechanism is unaffected by temperature or other ambient conditions and gives a clear indication of operating loads from a weatherproof enclosure built to NEMA 4 standards. Remote torque indication is also available.

DRIVE PERFORMANCE

Depends Upon:

- Proper support for the mechanism and operational loads
- Selecting correct output torque
- Providing maximum service life
- Reliable overload protection
- Predictable, long gear and bearing life

IMPROVED PRECIPITATION AND CLARIFICATION



REACTOR CLARIFIER™ SOLIDS CONTACT UNITS

High rate solids contact units are generally used for water treatment softening, turbidity and color removal.

In wastewater treatment, these units are used for heavy metal removal and biological tertiary treatment.

FLOCCULATING UNITS

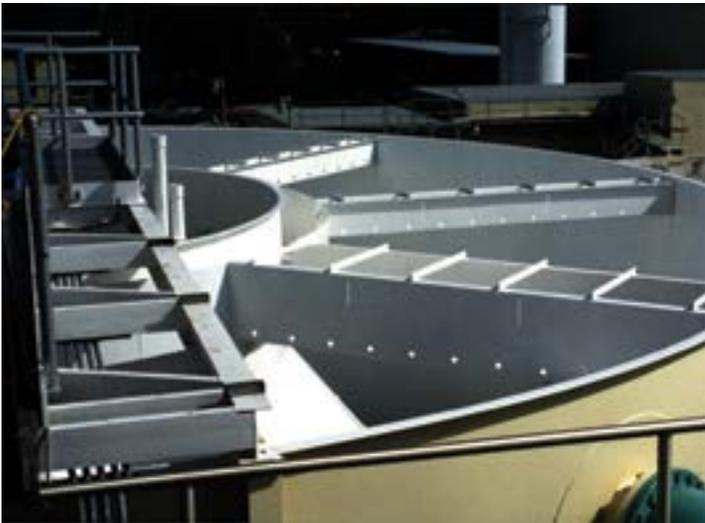
Flocculating units are applied to many of the same applications as the solids-contact designs, except those associated with chemical precipitation. Additionally, CF Type units can be used for primary and secondary municipal wastewater treatment where improved flocculation is desired.

NORMAL TREATMENT OBJECTIVE

APPLICATION	SUPENDED SOLIDS	TURBIDITY	COLOUR	CA & MG HARNESS	SILICA	HEAVY METALS	PROPHATE	OIL	NON SOLID BOD & COD
Water Softening	X	X	X	X	X				
Surface Water	X O	X O	X O	X	X	X			
Municipal Wastewater	X O				X	X	X O	X	X O
Primary Pulp & Paper Wastewater	X O		X O						X O
Metal Finishing						X O		X O	
Steel Mill						X O		X O	
Suspended Solids	X O			X					X O
Brine Conditioning	X O			X	X				

X - SOLID CONTACT REACTOR CLARIFIER™
 O - FLOCCULATING REACTOR CLARIFIER™

SOLIDS CONTACT DESIGNS



TOP LEFT: 42ft diameter HRB Type Reactor Clarifier™ Unit with steel launders, in Florida, USA

TOP RIGHT: Fiberglass Reinforced Plastic (FRP) launders provide for flexibility in your process application needs

ABOVE LEFT: Available in sizes over 200 feet in diameter

ABOVE: HRC Type Reactor Clarifier™ solids contact unit, showing installation of torque cage over center column

LEFT: HRC Type Reactor Clarifier™ solids contact unit installed in Thailand

REACTOR CLARIFIER™ SOLIDS CONTACT CLARIFIERS

SERVICES

As well as a complete range of process equipment, Ovivo is your source for everything necessary to meet the total needs of a project, from inception to start-up and beyond.

FLWSHEET CAPABILITIES

Ovivo can help you with the design of your total flowsheet, ensuring that all your equipment will work together for optimal performance and ease of operation.

TANKAGE AND ERECTION

Ovivo can take the hassle out of project management and coordinating independent contractors, who might not be familiar with all the details necessary for the installation of your thickener or clarifier. Our experienced tankage and erection crews can save you time and money by doing all the field work to deliver you a trouble-free machine.

UPGRADES AND RETROFITS

Sedimentation technology is constantly advancing. We can show you how to incorporate state-of-the-art design improvements into your existing thickener or clarifier. Many upgrades can pay for themselves in a matter of months and help increase capacity as well as improve performance.

SERVICING

Our team of skilled mechanical and process engineers can keep your equipment in top condition and help you to avoid costly, unscheduled interruptions.



**ALL OF YOUR MANUALS,
ALL OF YOUR KNOWLEDGE,
ALL IN ONE PLACE.**

Get your team on the same page.
Upload and share documents & media.
Create and manage service logs and
maintenance schedules.

Learn more at WaterExpert.com



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