

Reactor Clarifier™ Solids-Contact Units

Solids-Contact and Flocculating Clarifiers for Water & Wastewater Treatment



Improved Precipitation and Clarification

Eimco Water Technologies brings extensive experience to your process needs and can help determine the most cost-effective mechanism for your application, without compromising quality or dependability. Correct clarifier sizing will assure a margin of safety for process upsets and allow greatest operational flexibility.

Our trained sales engineers are ready to help you with equipment sizing and selection. We will work with you to address your specific process challenges that affect your thickener and clarifier selection. This will include determining settling rates, detention times required for clarification, and the unit area and solids-retention time required for thickening.

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

Flocculation and Clarification Combined in a Single Tank

The Reactor-Clarifier solids-contact units are designed and built to provide the most economical solution to precipitation and clarification requirements. The basic machine design provides for coagulation, flocculation, solids recirculation, clarification and positive sludge removal in a single basin-eliminating the need for multiple tanks and associated piping. All units are backed by over 40 years experience in the engineering and manufacturing assuring the best fit to unique plant requirements.

Applications and Operation

Typical clarification applications include the removal of turbidity, algae, color, iron, and metals; wastewater treatment; water softening; brine clarification, and many others, which involve removing suspended solids from feed stream.

The Reactor Clarifier units are available in several design configurations allowing variations of flocculation distribution or recirculation rates, and rake torques to meet even the most conservative standards.

Since we recognize that the true cost of a machine includes not only the purchase price of the equipment, but also operating costs, the Reactor Clarifier units are built with the same features used in heavy-duty mechanisms for mining and industrial applications to keep them online. Let us help you with your application needs. Skilled engineers can help you find the best solution. Write or contact our office nearest you.



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Solids-Contact Designs

Principles of Operation

The Reactor Clarifier Solids-Contact units combine slow speed turbine flocculation 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. Influent immediately contracts a large volume of dense floc from previously precipitated solids in the recirculation drum and is pumped upward by a large diameter, slow-speed

turbine. A volume of 8 to 15 times the maximum influent rate is recirculated for increased solids contact to mix with the new incoming feed, while the final effluent is passed under the reaction cone to the clarification zone. Heaviest particles settle to the floor where they are raked to the center for recirculation or discharge.

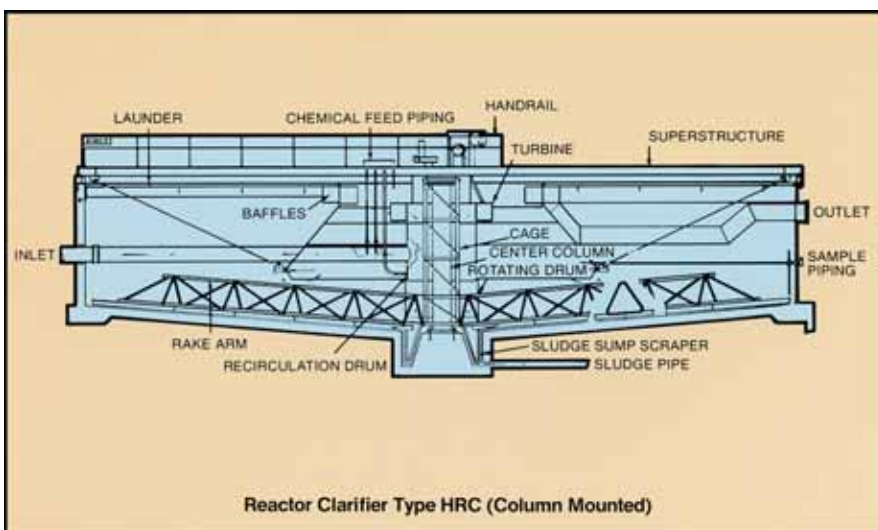
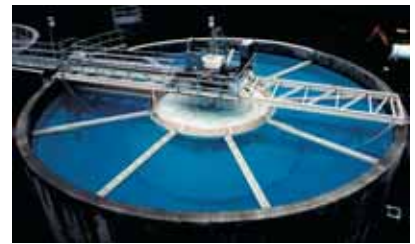
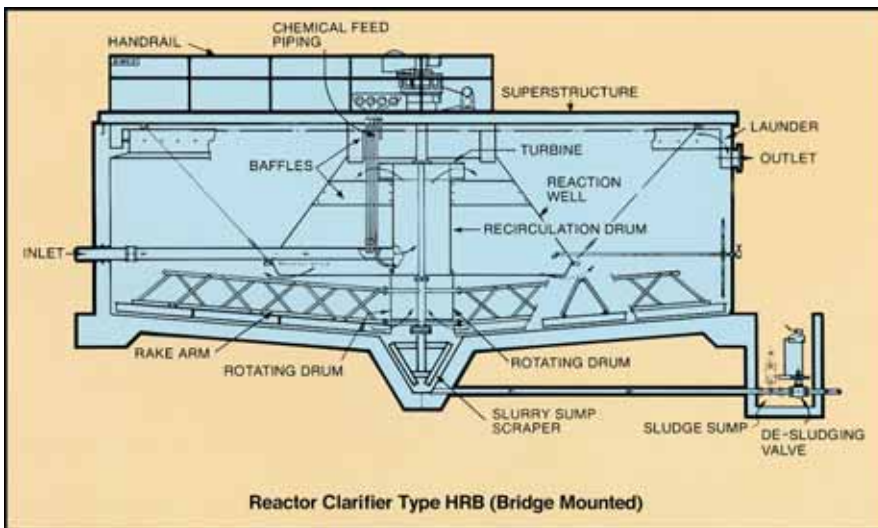
Type HRB

For mechanisms up to 110 feet in diameter, this mechanism is supported by a bridge, which spans the tank.

Type HRC

For mechanisms from 50-200 feet in diameter and 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. Also, it is notable that we utilize the same drives as used on heavy-duty industrial thickeners. Drives proven in service equal to any duty demanded of them.



Flocculating Designs

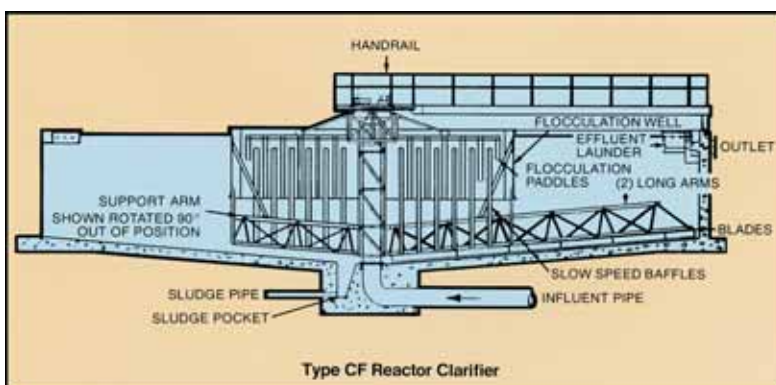
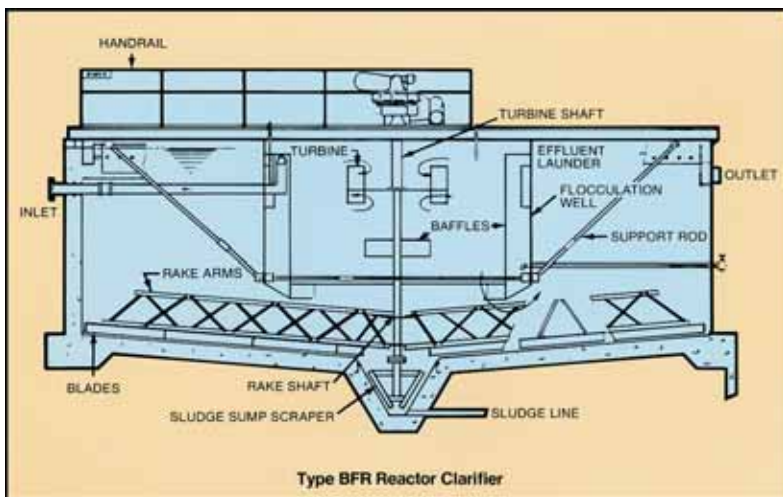
In some applications cost-effective treatment can be accomplished without using a solids-contact process to promote settling. For these process streams, the key is to obtain the complete use of chemicals and encourage optimum flocculation and settling. We offer three basic designs of flocculating units for these applications. Each is designed to provide symmetrical mixing and flocculation with low tip speeds for minimal floc shear.

Type BFR

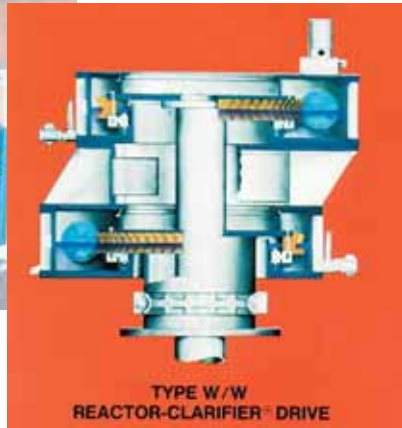
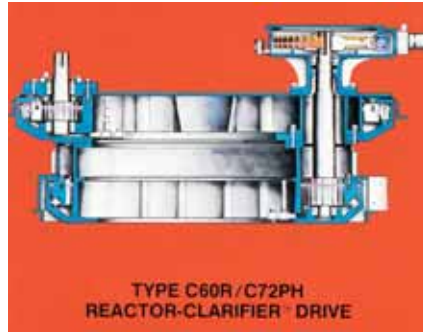
Our Type BFR Reactor-Clarifier solids-contact units utilize an oversized baffled feedwell and concentric turbine, flocculant is mixed with the feed stream and allowed to exit under the well into the clarification zone of the tank. This turbine flocculator configuration is specially suited for medium-strength to high-strength flocs, requiring high mixing intensity.

Types BF and CF

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



Clarifier Drive Mechanisms



Superior Designs

The heart of the Reactor-Clarifier Solids-Contact unit is the drive-head which rotates the rakes and turbines. Many manufacturers build or field assemble their drives from components purchased from outside suppliers. We design, engineer, and manufacture drive-heads in our own factory to maintain control over the quality, materials of construction, and production of the drive. With every one of our Reactor Clarifier solids-contact unit you are assured of receiving a drive specifically designed to meet your application needs. The main bearing for high-torque rake drives, and all turbine drives, was pioneered by our company for use on large diameter, heavy duty industrial thickening applications over 30 years ago.

Design of this bearing protects against overturning loads, side loads, as well as vertical loads, and assures extended trouble-free operations.

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 best 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 alloy bronze worm gear and a hardened alloy steel 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 alloy steel spur gears and pinions, along with 4-point contact precision main bearings.

Drive Control

An integral electro-mechanical drive control unit is provided on every drive unit. This control provides a reliable protection unaffected by temperature or other ambient conditions and clearly indicated operating loads in a weatherproof enclosure built to NEMA 4 standards. Remote torque indication is available as an option.



Drives Assure

- Proper support for the mechanism and operational loads
- Optimum output torque
- Maximum service life
- Reliable overload protection
- Predictable, long gear and bearing life

Applications

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, Type CF units can be used for primary and secondary municipal wastewater treatment where improved flocculation is desired.



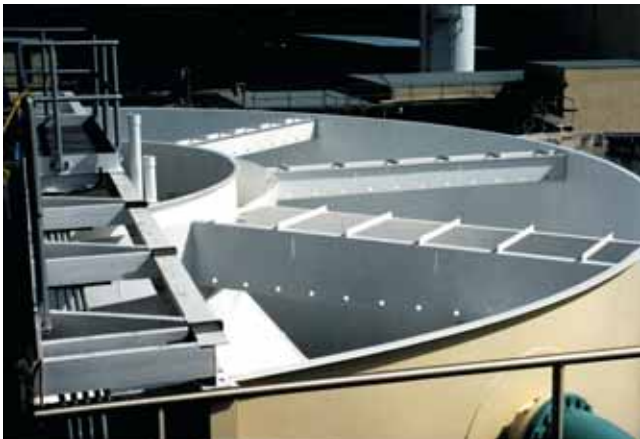
HRC Mechanism used in municipal softening



APPLICATION CHART									
NORMAL TREATMENT OBJECTIVE									
APPLICATION	SUSPENDED SOLIDS	TURBIDITY	COLOR	CA & MG HARNESS	SILICA	HEAVY METALS	PROSPHATE	OIL	NON SOLID BOD & COD
WATER SOFTENING	X	X	X	X	X				
SURFACE WATER	XO	XO	XO	X	X	X			
MUNICIPAL WASTEWATER	XO				X	X	XO	X	XO
PRIMARY PULP & PAPER WASTEWATER	XO		XO						XO
METAL FINISHING						XO		XO	
STEEL MILL						XO		XO	
SUSPENDED SOLIDS	XO			X					XO
BRINE CONDITIONING	XO			X	X				

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

Installations



42-ft diameter HRB-Type Reactor Clarifier Solids Contact Unit with steel launders, in Florida, USA



Fiberglass Refined Plastic (FRP) launders provide for flexibility in your process application needs



Sizes available up to 260 feet in diameter



Type HRC Reactor Clarifier, showing installation of torque case over center column



Reactor Clarifier, Type HRC in a power plant application

Capabilities

In addition to providing a complete line of process equipment, Eimco Water Technologies is your source for everything necessary to meet the total needs of a project from inception to start-up and beyond.

Flowsheet Capabilities

Eimco Water Technologies engineers 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

Eimco Water Technologies can take the stress out of coordinating an independent contractor who may not be familiar with all the details necessary to install your thickener or clarifier. Our experienced tankage and erection crews can save you money and stress by doing all your field work and turning over to you a trouble-free machine.

Upgrades and Retrofits

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

Service

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

