



ROYTEC
Global Separation Solutions

Johannesburg | Perth | Toronto | Yantai

ROYTEC DYNAMIC BED CLARIFIER (DBC)



**MARKET LEADERS IN
LIQUID / SOLID SEPARATION**

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ROYTEC GLOBAL is an International Company specializing in Liquid / Solid and mineral Separation technologies for the Mining and Industrial sectors.

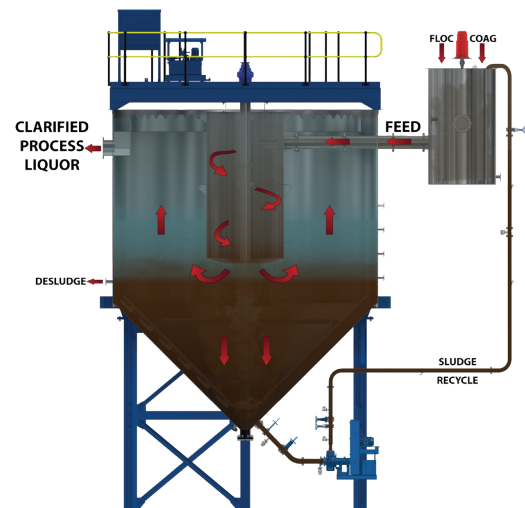
Roytec is privately owned by Directors and Managers. We are passionate about excellence in our services and we pride ourselves in delivery to our promises. Our equipment is fully supported by Roytec Specialists based in Johannesburg, South Africa; Perth, Australia; Toronto, Canada; and Yantai, China.

DYNAMIC BED CLARIFIERS

The Dynamic Bed Clarifier (DBC) offered by Roytec Global was developed based on the technology used in the highly efficient Pin Bed Clarifier (PBC).

In the Roytec PBC, the solids in the feed are reduced from as high as 5000 ppm down to 10-20 ppm. The high solids handling capabilities and high overflow clarities are achieved in the Roytec PBC by using the highly efficient Radflow™ feedwell to pass the feed through the fluidized bed of sludge in the primary solids removal zone while minimising bed perturbation to prevent breakthrough. The fluidized bed acts as a filtration medium, as well as promoting further coagulation and flocculation.

Following extensive pilot testing and on-site operation, it was found that this primary separation zone performed the bulk of the solids removal. In most cases the solids were reduced to less than 50ppm. The floating media bed above the sludge blanket further reduced the solids to less than 20ppm.



Due to the high solids removal efficiency of the primary separation zone, Roytec now offers the DBC, where the TSS requirements in the supernatant of the liquor being treated is not as stringent and a slightly higher overflow TSS specification can be tolerated. The design and operation of the **DBC** is based on the primary separation zone of the PBC and excludes the media filtration section.

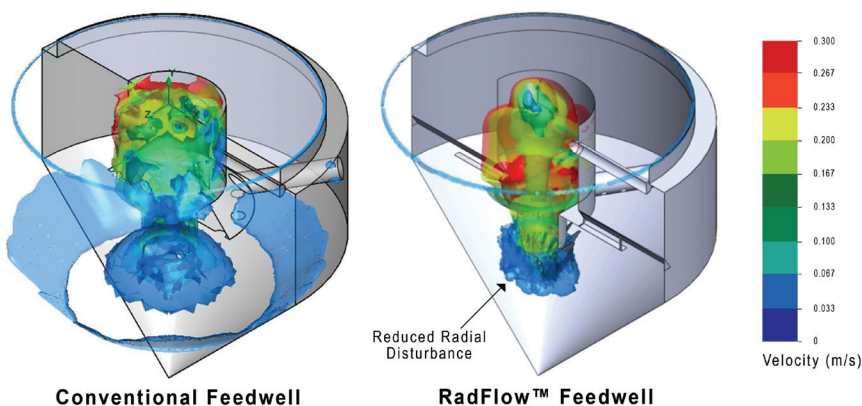
This has a number of advantages:

- **Significant reduction in capital and operating costs** due to exclusion of media section.
- **Reduced downtime** to clean media retaining screen and replace the media.
- No backwashing required
 - Increased capacity of the clarifier plant
 - Reduced feed tank size
 - No interruption to process flow.

DESIGN FEATURES

The high solids removal efficiencies obtained in the Roytec DBC are achieved through a number of unique design features:

- Utilization of a coagulation and flocculation mixing system.
- Use of an inorganic coagulant to coagulate the ultrafine and colloidal material, and a flocculant is added to ensure fast sludge settling.
- Simple and effective sludge level control without the requirements for instrumentation.
- Installation of an underflow **sludge raking system**. To prevent hang up of sludge in the cone area and rat-holing in the sludge bed for consistent underflow density
- The installation of the world leading **RadFlow™ feedwell technology** developed for the Roytec Thickeners. This feedwell effectively dissipates the energy in the feed and gives highly uniform radial distribution, allow for 30-50% higher feed flows than conventional feed distribution systems. Fluxes of up to 15 m³/hr/m² are achievable using the RadFlow™ feedwell technology.

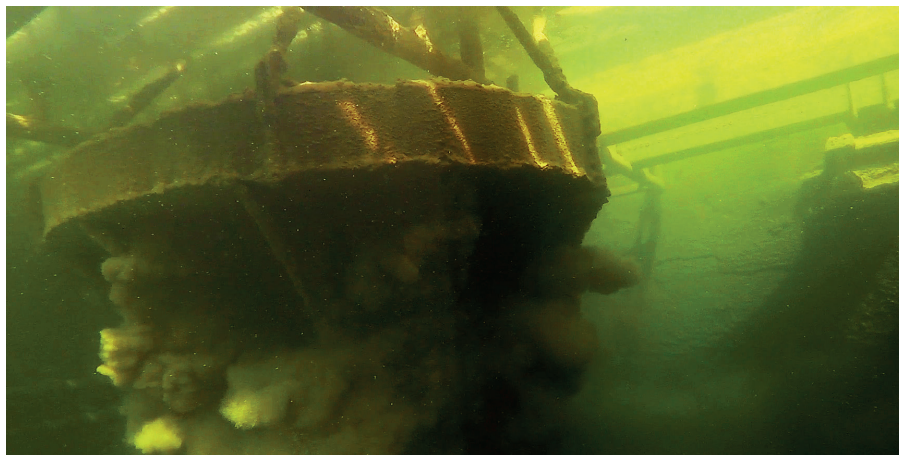


The CFD schematic (image to the left) indicates velocity isoprofiles for a conventional feedwell installed in a clarifier versus a RadFlow™ feedwell.

The improvement in energy dissipation of the RadFlow™ is translated into a significantly reduced velocity profile from the feedwell.

The image to the right shows the undisturbed, uniform column of sludge from a RadFlow™ feedwell installed in a retrofit clarifier at the Inco-Vale Goro Nickel plant. The clarifier was operating at 8 m³/hr/ m², and the picture demonstrates the almost complete energy dissipation brought about by the RadFlow™.

The full scale operation indicates the accuracy of the modeling carried out in designing the system.



POTENTIAL APPLICATIONS

Some of the potential applications of the DBC in the mining, mineral processing and hydrometallurgical industries are as follows:

1. Raw water clarification
2. Process water clarification
3. PLS solutions clarification
4. Thickener overflow polishing



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Other ROYTEC equipment

- Vacuum Belt Filters & Vacuum Disc Filters
- Thickeners using RadFlow Feedwell Technology
- Dual Media Filters
- BGRIMM Flotation Cells, Magnetic Separators and Attritioning Mills
- Filter Presses & Tower Presses
- Ceramic Disc Filters
- Ion Exchange Systems
- Flocculant/Coagulant Preparation and Dosing Plants
- Linear Screens
- Pin Bed Clarifier



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