



ROYTEC
Global Separation Solutions

Johannesburg | Perth | Toronto | Yantai | Santiago

ROYTEC RADFLOW™ THICKENER FEEDWELL

**IMPROVING THICKENER
PERFORMANCE**

THE REVOLUTIONARY RADFLOW™ THICKENER FEEDWELL

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; Yantai, China and Santiago, Chile.

Addressing an industry wide problem of poor thickener performance, over the past 10 years Roytec identified significant shortcomings in thickener design that often prevent thickeners operating efficiently. Roytec launched the Nexgen™ thickener program which addresses many of the problems experienced by thickener operators. The primary developments resulting from the Nexgen™ program were the introduction of the revolutionary **Radflow™** feedwell and the associated **ETAQ™** feed dilution system.



Above: **Radflow™** feedwell (left) installed in a 50mØ thickener showing the **ETAQ™** (right) dilution unit.

Front Page: **Radflow™** feedwell installed in 25mØ thickener.

The historical industry standard feedwell, used by all major suppliers in the industry, is a cylindrical shaped centre well with either tangential inflow, vertical off-centre feed or a piggy-back drop box. Some later feedwells had a flat bottom deflector plate which evolved into a conical deflector. These feedwells are sized on residence time, inlet and theoretical discharge velocities.

Site reports often indicated feedwell blockages, feed short-circuiting, excess turbulence and visible tangential & radial swirl causing thickener sliming. Excess flocculant usage is common in efforts to stabilise the thickener. All of these problems point directly to sub-optimal feedwell design.

Roytec's investigation into these problems and research into solutions culminated in the testing & commercial launch of the **Radflow™** feedwell.

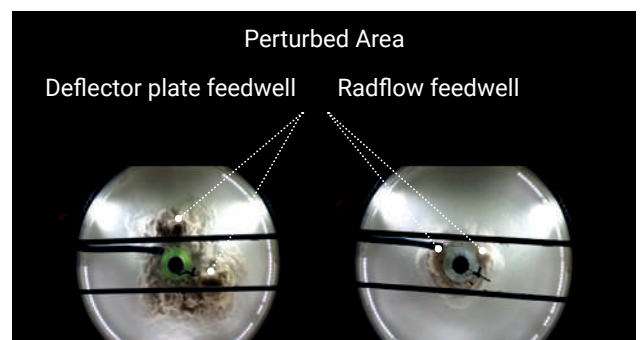


Figure 1:
Feedwell type comparison
in scale model thickeners both running at 3m/hr rise rate. Note the significantly smaller & uniform perturbed area produced by the Radflow™ feedwell

RADFLOW™ THICKENER FEEDWELL DEVELOPMENT

The **Radflow™** feedwell has now been installed in many large scale thickeners (both new and retrofits) and is demonstrating significant improvement in overall thickener performance together with reduced flocculant dosages.

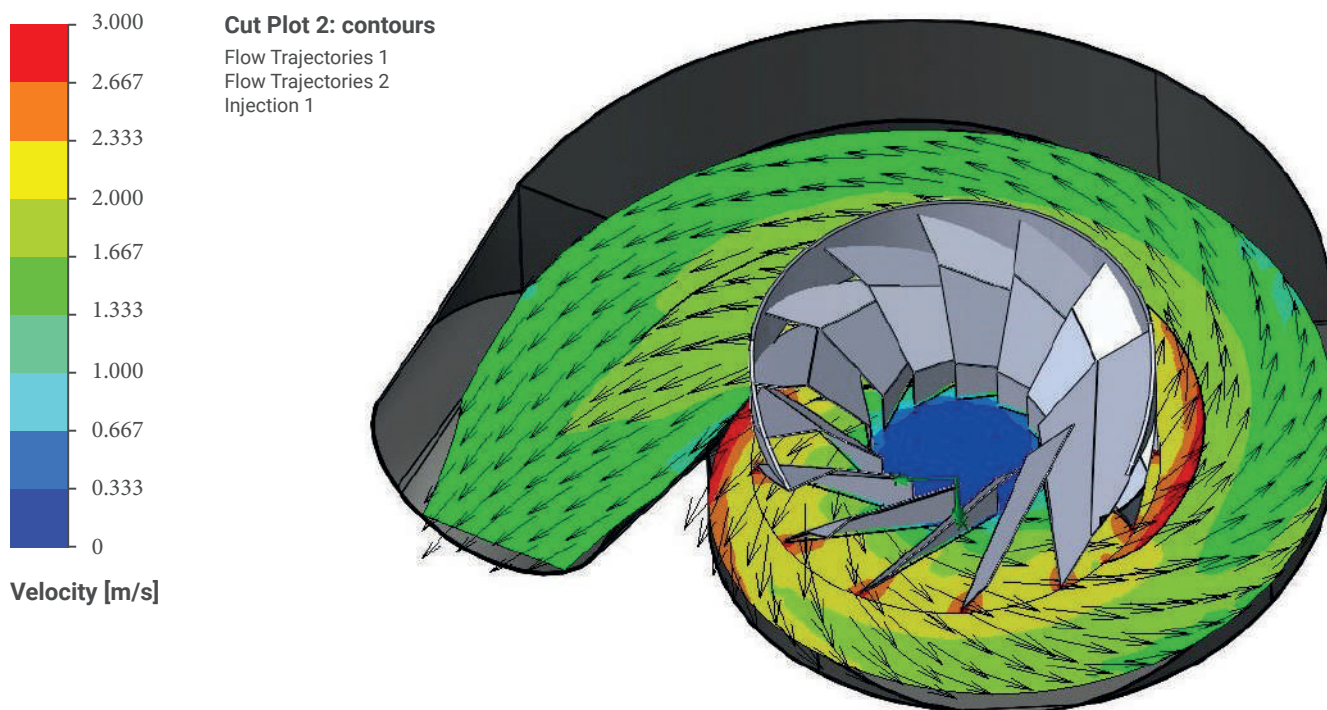
The **Radflow™** feedwell is fundamentally different from conventional feedwells in that the design focuses on energy dissipation. The **Radflow™** feedwell introduces the incoming feed-stream into an upper tangential zone before discharging downwards into the vertical vane zone. In the vertical vane zone, eddy currents form on the leeward side of the vanes and clash with incoming flows, leading to effective energy destruction in a controlled and symmetrical pattern. The turbulence is excellent for blending of feed, dilution streams and flocculant solution, resulting in superior floccule growth. The flocculated feed slurry exits the feedwell vanes in a uniform, balanced and quiescent flow characterized by a restricted radial throw of solids.

An advantage of the **Radflow™** feedwell is that it is insensitive to fluctuating mud bed level and is not prone to blockage or overflow. The geometry of the upper tangential zone encourages de-aeration, with agglomerated bubbles rising in the centre of the feedwell and not migrating into the body of the thickener.

Radflow™ feedwells are characterized by:

- Extremely efficient energy dissipation resulting in even flow distribution exiting the feedwell and minimized perturbed area surrounding the feedwell (see Figure 1)
- Reduced thickener torque due to the reduced radial throw of solids.
- Reduced tangential & radial swirl giving the thickener surface a uniform, quiescent appearance.
- Improved flocculation efficiency.
- Provable contribution to increased thickener fluxes & rise rates, without compromising performance.

ETAQ™ DILUTION PUMP



The **ETAQ™** feed dilution system, comprises an axial inflow/radial outflow pump specially designed for high volume low head operation.

The **ETAQ™** draws supernatant from the thickener surface and pumps into the Radflow™ feed stream to achieve the perfect level of feed dilution for optimal flocculation.

RADFLOW™ THICKENER FEEDWELL PERFORMANCE

When comparing feedwells on an equal feed volume / rise rate basis, the Radflow™ feedwell demonstrates radically improved performance in terms of:

- **Distribution:** The favourable energy dissipation and feed distribution patterns at the feedwell exit, result in a reduced radial throw of solids and elevated concentration of solids in the centre of the tank. This reduces operating torque while increasing underflow density. Short-circuiting and mal-distribution of feed is completely eliminated.
- **Residence times:** Radflow™ feedwells have both longer residence times and enhanced contact mixing sites within the feedwell. This significantly improves mixing within the feedwell which in turn allows for improved floccule formation and flocculant utility. Some clients have reported a decrease in flocculant consumption as high as 30%.
- **Choke resistant:** Due to the vertically positioned vane design, it is impossible to choke the Radflow™ feedwell. Larger, coarse particles simply fall out of the bottom of the feedwell, close to the discharge cone.
- **Dilution:** The feedwell is suited to both feed dilution and undiluted applications.
- **Reduced Sliming:** Thickeners with Radflow™ feedwells display dramatically reduced sliming.

Roytec is continuously conducting quantitative and qualitative assessments of the Radflow™ feedwell against variants provided by our competitors.

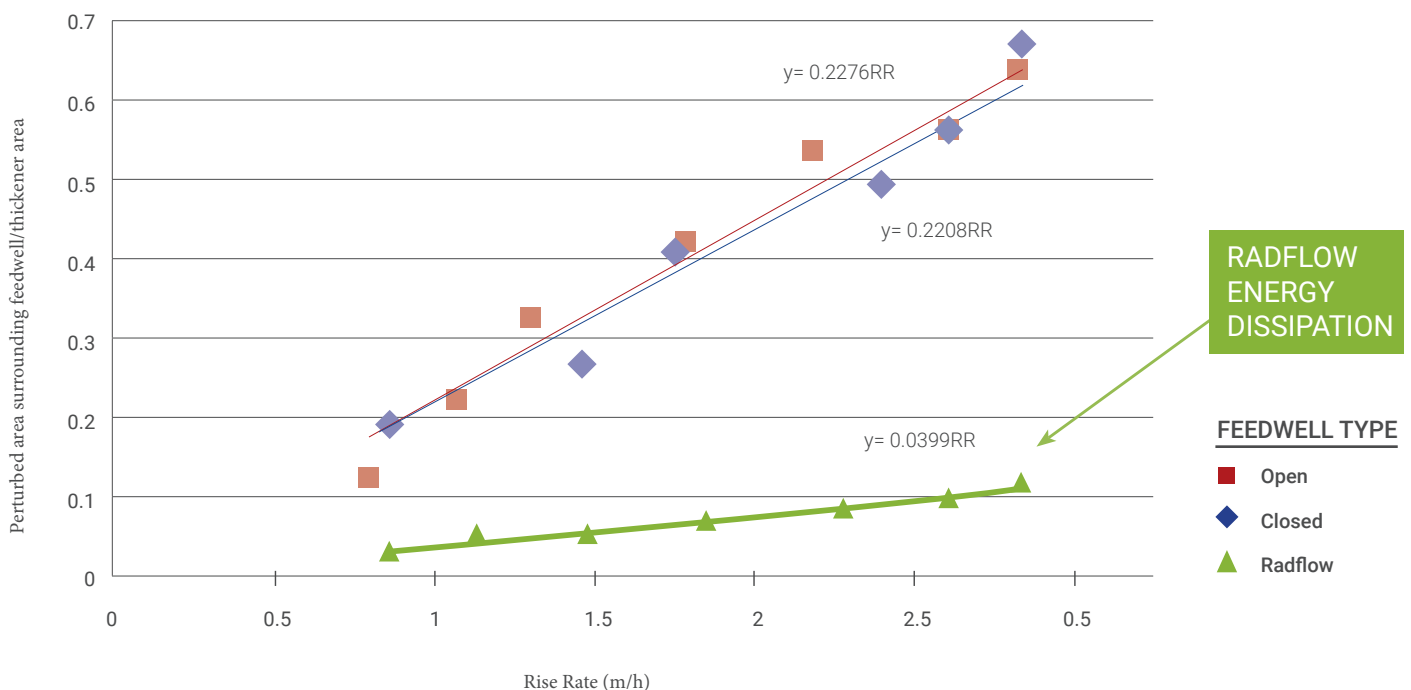


Figure 2: Typical report data - comparative assessment of areas of disturbance for different feedwells with a clear indication of the superior performance of the **Radflow™** unit



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Other ROYTEC equipment

- Vacuum Belt Filters & Vacuum Disc Filters
- Dual Media Filters
- BGRIMM Flotation Cells, Magnetic Separators and Attritioning Mills
- Filter Presses & Tower Presses
- Ceramic Disc Filters
- Ion Exchange Systems
- Flocculant / Coagulant Preparation Dosing Plants
- Linear Screens
- Dynamic Bed & Pin Bed Clarifiers
- Vibrating Screens



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