

# Mining Solutions

RHEOMAX<sup>®</sup> DR Mineral Sands  
Case study

 **BASF**

We create chemistry

# BASF's Mining Solutions at a glance

BASF's Mining Solutions business offers a diverse range of mineral processing chemicals and technologies to improve process efficiencies and aid the economic extraction of valuable resources.

We offer our products and technology solutions to the global mineral processing industry along with expert advice and technical support. Our global team is driven by a common goal to provide the best sustainable solution to meet our customers' processing needs. With technical representation in over 100 countries, BASF's technical support is provided on a global, regional and local basis.

Our chemical and process expertise includes reagents, equipment, process technologies and know-how. All of which are focused on hydrometallurgy, solid liquid separation, tailings management, materials handling, flotation and grinding.



# RHEOMAX®

## Density and Rheology technology

The RHEOMAX® DR range delivers higher density and more robust flocculant particles than conventional flocculants, and are effective for many different mineral ore types. This change to aggregate shape means that flocs are more tolerant to solids concentration and shear variations in the feedwell, and the dense particle shape also allows for faster consolidation, high underflow densities and low underflow yield stress.

### Process Description

In this case the customer is processing mineral sands where ore is recovered using scrapers/heavy machinery. After removal of oversize, the material is sent to a concentrator which utilizes a series of spirals and cyclones to remove the heavy mineral concentrate from the sand (tails) and the slimes (fine clay material).

Typically the sand tails are disposed of through a cyclone stacker at around 70–80% solids, whilst the slimes are fed to the thickener at 2–5% solids with further dilution occurring in the feedwell. The overflow from the thickener is returned to the concentrator and since the total process water demand is high a plentiful and clean supply of water is critical to the continuous operation of the plant to ensure optimal processing capability.

### Issue

Normal thickener operations send slimes underflow to the tailings area at an average concentration of 16% wt/wt, which means a significant volume of water is sent to the tailings ponds. Some of the water is recoverable but separation from the solids is slow and evaporation rates are high. During the drier summer months a lack of water is a persistent threat, which can force plant closure, reducing annual production capacity.

In addition, variable process operation (i. e. periodical processing of high slimes content) regularly results in the by-pass of the thickener or a complete shut down. The consequence of this being excessive water loss and decreased production output.





## Solution

The thickener flocculant was changed from a conventional product to RHEOMAX® 1030. This produced a tighter floc aggregate which allowed the underflow density to compact from 16% wt/wt to 20% wt/wt, thereby freeing up additional water for recycle back to the process.

The most beneficial impact of the RHEOMAX® 1030 application was its stabilizing effect on thickener operation, giving less fluctuations of operating parameters. This resulted in a steady increase in throughput from 1,206 tpd to 1,533 tpd with a corresponding dosage drop from 404 g/t to 267 g/t. In addition the requirement for emergency by-pass during periods of high slimes was removed.

## Results – thickener

Fig. 1: Underflow density

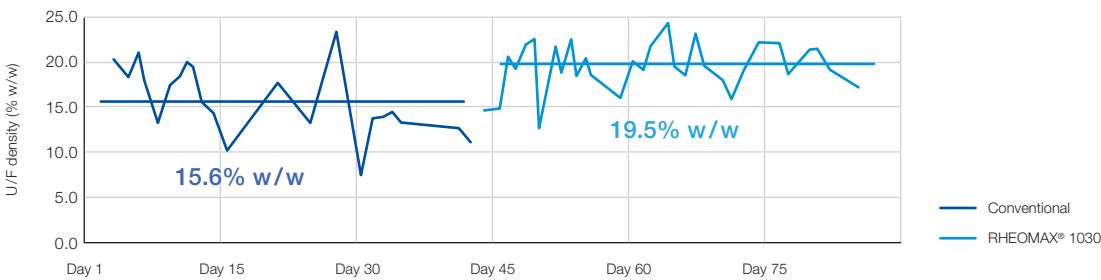


Fig. 2: Thickener throughput

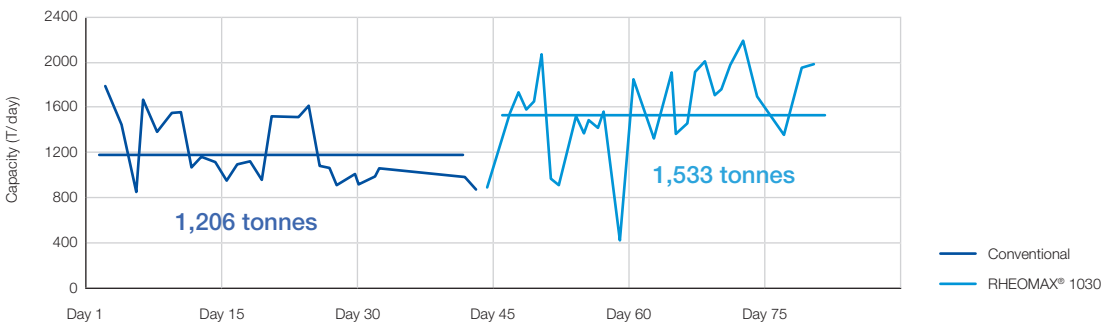
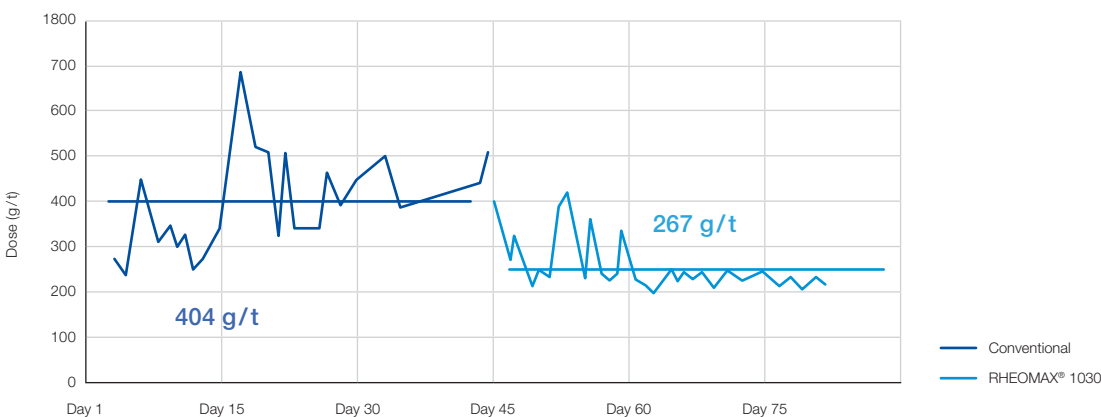


Fig. 3: Flocculant dose





## Highlights of RHEOMAX® 1030 performance

### From Graphs

- ◆ Improved underflow density: 25.0% increase (additional water recovery)
- ◆ Increased thickener throughput: 27.1% improvement
- ◆ Reduced dose rate: 33.9% decrease (major reagent savings)

### Customer confirmed

- ◆ Disposal benefits: Higher density, improved pumping, lower footprint
- ◆ Reduced down time
- ◆ No reprocessing of waste solids
- ◆ Extra water recovery: 2,400 m<sup>3</sup>/day
- ◆ Extra concentrate produced: 60 tonne/day

## RHEOMAX® benefits

<b>Operational</b>	<ul style="list-style-type: none"> <li>◆ Higher underflow density</li> <li>◆ Greater plant throughput</li> <li>◆ Increased recovery of quality water/leach reagent</li> <li>◆ More consistent dose response to fluctuations in feed solids</li> <li>◆ Reduced shear degradation due to fluctuations in feed well turbulence</li> </ul>
<b>Economical</b>	<ul style="list-style-type: none"> <li>◆ Reduced requirement for fresh plant water from external sources</li> <li>◆ Lower reagent consumption</li> <li>◆ Improved leach efficiency</li> <li>◆ More consistent plant performance</li> <li>◆ Lower pump energy consumption</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>◆ Reduced fresh water replenishment</li> <li>◆ Reduced water loss to tailings</li> <li>◆ Reduced water loss to evaporation</li> <li>◆ Lower energy consumption</li> <li>◆ Reduced land requirement for tailings disposal</li> </ul>

## Technical Service

Full technical service and advice in all aspects of product selection, laboratory tests and plant trials will be provided.

## Health & Safety

Detailed information on handling and any precautions to be observed in the use of the product(s) described in this leaflet can be found in our relevant Health and Safety information sheet.



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