



Complete Solution For Mining Industry

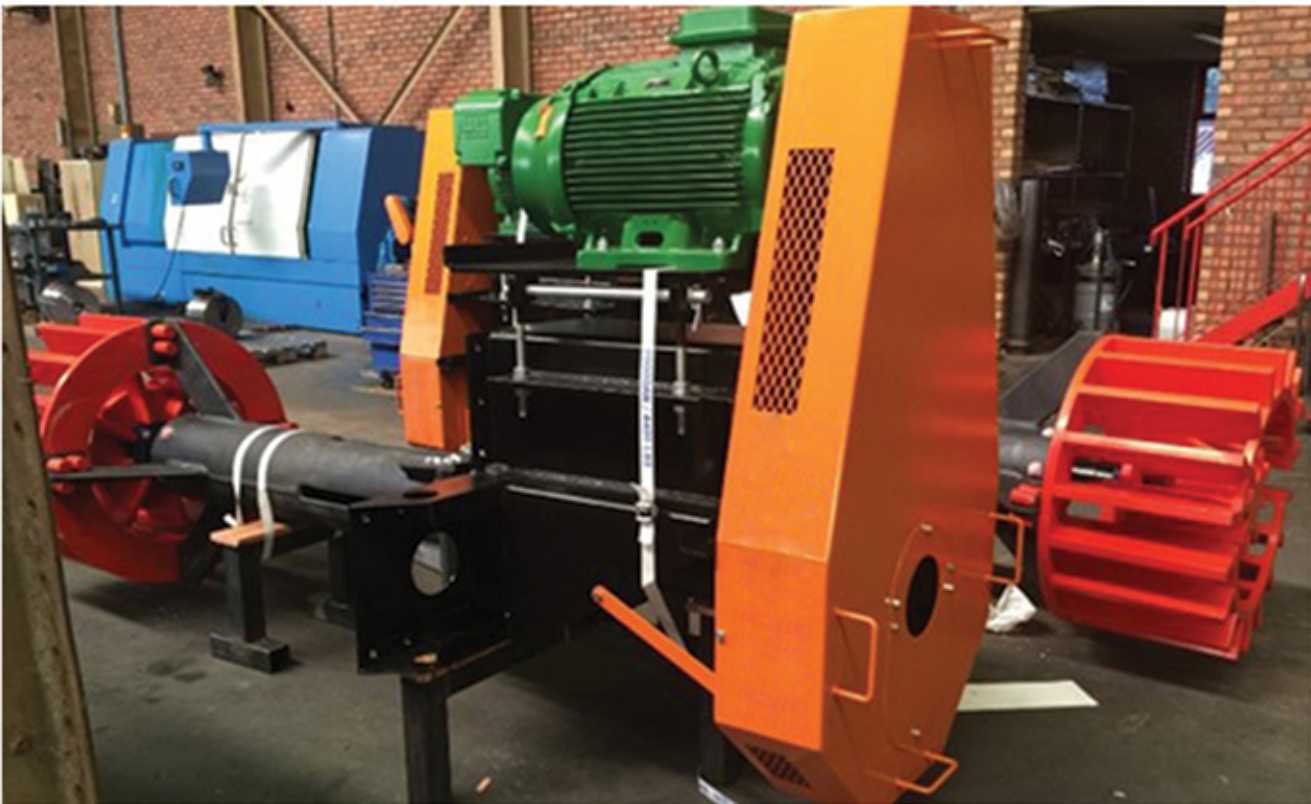
Flotation Solution





ABOUT US

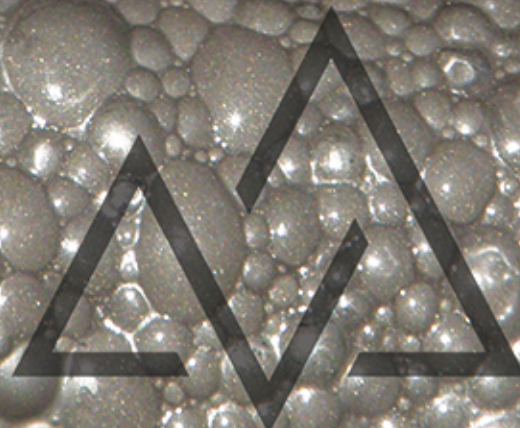
We gathered a team with over 100 years combined experience in the Operation, EPCM and Construction of mineral processing plants, well known in developing and making perfect High Energy Flotation equipment in order to increase recovery and reduce downtime. During the life time of company, we were honored to named the Pioneer company in Pelatinum group metals flotation while Cooperating with the best mining companies in the business





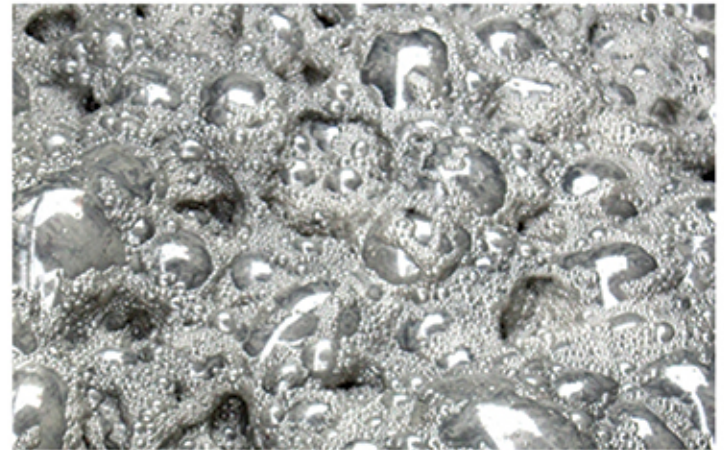
WE ARE EXPERTS

- Each project being specific, we analyze all the aspects and requirements of your project
- We have seen overall recovery improvements in previous retrofit installations from 0.5%-10%+
- We are honored to mention that we have continuous working with Noted mining companies such as **Glencore, Impala, Anglo American, Xtrata** and etc.
- As pioneer in PGM flotation (as one the toughest elements to be treated), we are capable of achieving highest recovery possible in any other elements' flotation with ease.
- 20 years of continuous development
- More than 93 recovery rate for coarse to ultrafine particles



FIELDS OF EXPERTISE

- Supply of high-energy flotation cell with outstanding performance and recovery.
- Tailings re-treatment operation, maintenance and management of mineral processing plants.
- Operation, EPCM and Construction of mineral processing plants.
- Metallurgical and engineering consultation services for process plants.
- Design of process plants.
- Retrofit older flotation plants with high-energy flotation mechanisms and turnkey solutions increase recovery and improve environmental conditions.
- Plant maintenance, monitoring and planning.
- Health and safety management.
- Sub-contractor management.
- Stores control and inventory.



MINESER
FLOTATION
SOLUTION

WHY OUR **HIGH ENERGY** FLOTATION CELL IS THE BEST?

We have developed a product that we believe is superior to current floatation equipment on the market from both a metallurgical, maintenance and operational perspective:

Metallurgical:

- High selectivity regarding the particle size.
- Optimal bubble particle contact caused by dispersed air forced into bubble by our mechanism.
- Highest recovery outcome in the market.

Maintenance:

- Extended life of parts and reduced downtime for maintenance relying on the results of the tests performed on our equipment.
- Using high quality materials such as poly-urethane, rubber, quality bearings, etc.
- Effective use of air which reduces wear on the wet ends with enhanced hydro-dynamics of our cells.
- Easy replace and maintenance while plant is running as our units are not fixed to the base of the cell.

Operational:

- Easy to operate as our individual cell's mass pull and grade can be controlled by effective level and air control.
- No silt up phenomena Due to the high energy and effective air circulation.

KEY BENEFITS

Higher Recovery

We are proud to say that, always we have sold recovery to our clients, not the flotation cell itself.



Vast Sizing Range

5 to 150 m³ sizing range with the ability to provide bigger sizes due to plant needs.

High Controllability

Highly controllable and automated.

High Applicability

High compatibility due to the tailored design according to the requested performance for each specific ore type.

Service

Full technical, pre-sale and after sales services.

HIGH ENERGY FLOTATION SYSTEM

1. Mechanism

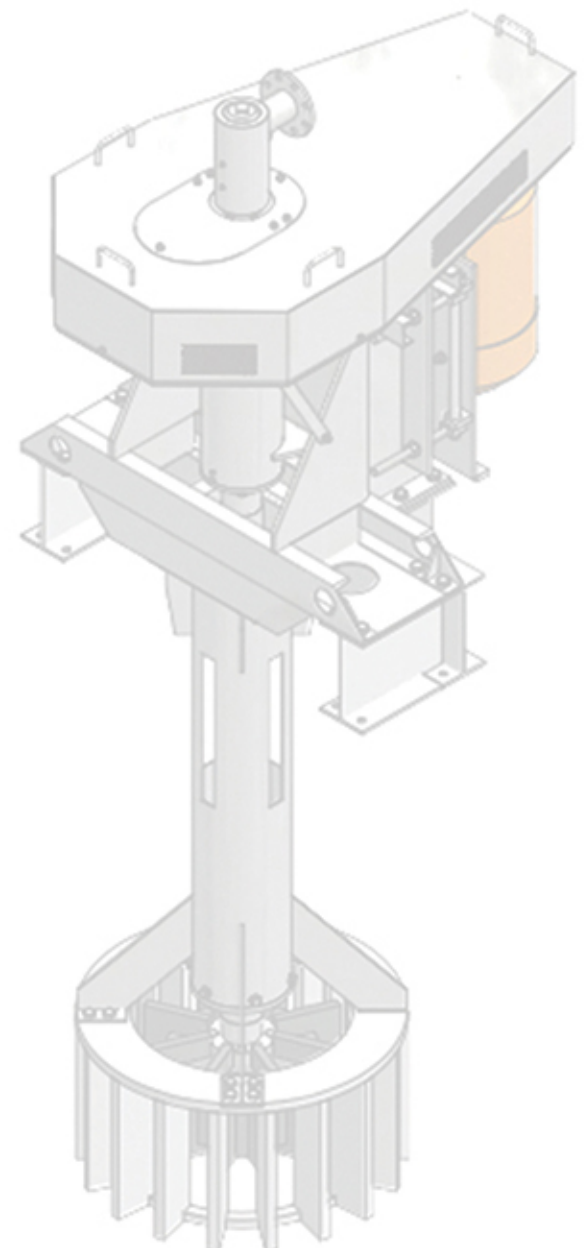
Each mechanism is a High Energy type which is designed and tailored to the customer's needs, suspended in the cell by a project specific adaptor frame and includes a fabricated steel spindle bearing housing with sealed upper and lower ball bearings, which supports a hollow steel drive shaft rotating in a mild steel standpipe including froth dispersing slots. Drive is through V-belts and a vertically mounted drive motor. The wet end consists of:

- The Stator, which is cast in high-grade polyurethane around a fabricated steel skeleton, and is bolted to the lower end of the standpipe.
- The Rotor, with curved lower edge and uniform upper edge controlling flow directions and recirculation within the Cell.

2. Concept

To make our mechanisms more efficient at processing low grade PGM material we design each mechanism specifically for each retrofit/new installation using higher energy where it is required, this involves increasing the energy output as well as the size of the mechanism in the existing cell, or developed as a new High Energy cell.

Being the pioneers in the flotation of low grade PGM material, the combination of our expertise in applying high energy to flotation and custom design along with our tried and tested equipment produces significant results and has allowed us to grow into the company that we are today and gain the trust of many large mining houses.



DESIGN FEATURES

The High Energy Mechanism is specifically designed in an existing or new tank to enhance the following three ideal conditions in order to promote flotation recovery:

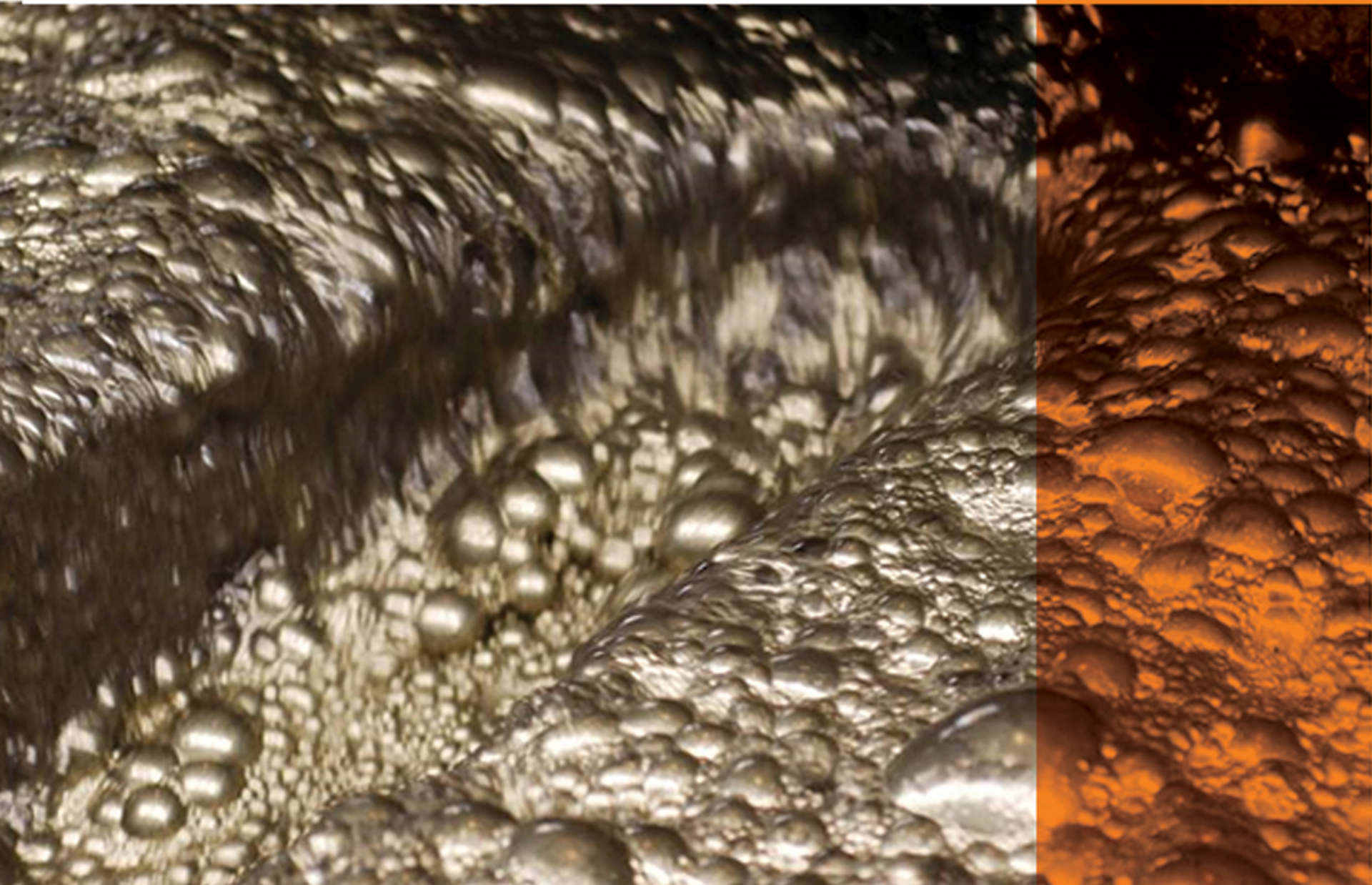
1- A passive cell surface to prevent particles being drawn back into the cell.

2- An upper zone with reduced turbulence to prevent particle bubble separation created by flow patterns of the rotor and stator.

3- An active lower zone providing a good suspension of solids and transport of these solids, through efficient dispersion of bubbles.

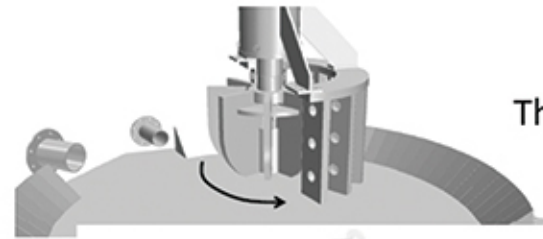
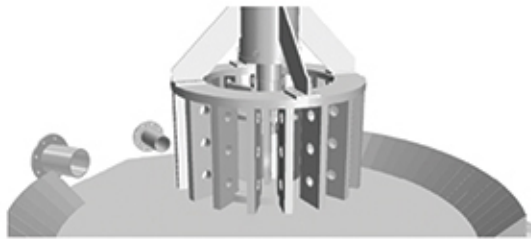
Wear protection is also offered to prevent wear beneath the wet end. A mild steel plate with rubber lining creates a false bottom to prevent wear to the bottom of the tank cell surface.

All frames, bearing housings, assemblies, rotors and wet ends are designed for the required application, focusing on the details of existing infrastructure.

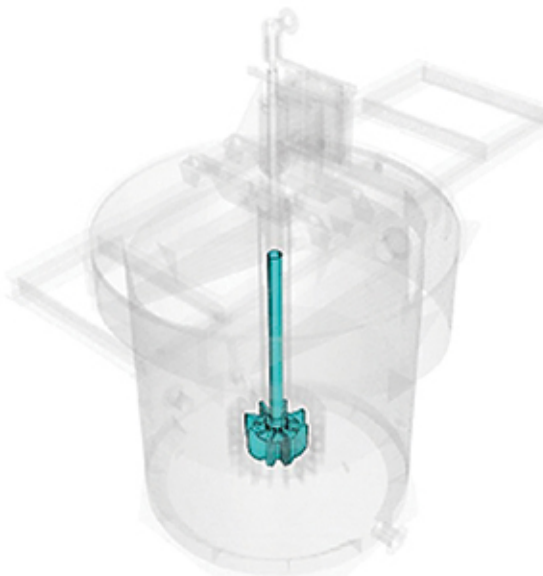


DESIGN FEATURES

Rotor and stator, are the parts of a flotation cell which have the responsibility of solid materials dispersion in a cell. The 3D figures, portray stator framework in High energy flotation cells



The stator layout



surface set of rotating components

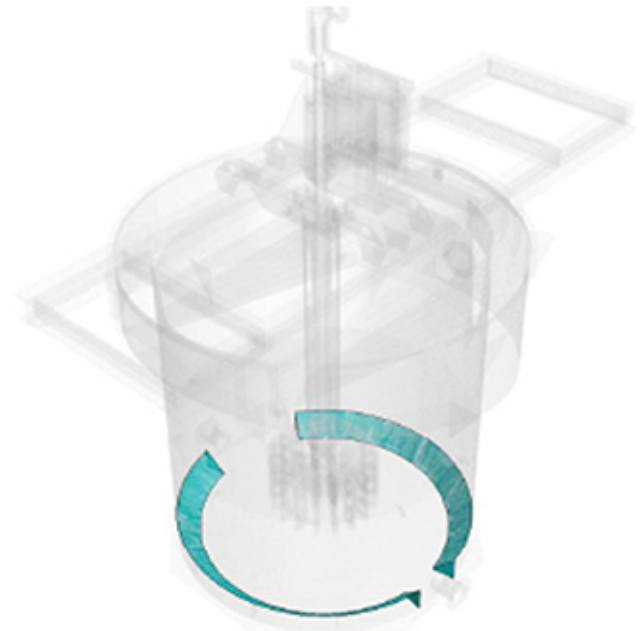


surface set of stator/shroud

3D model of internal structure of High energy flotation cells

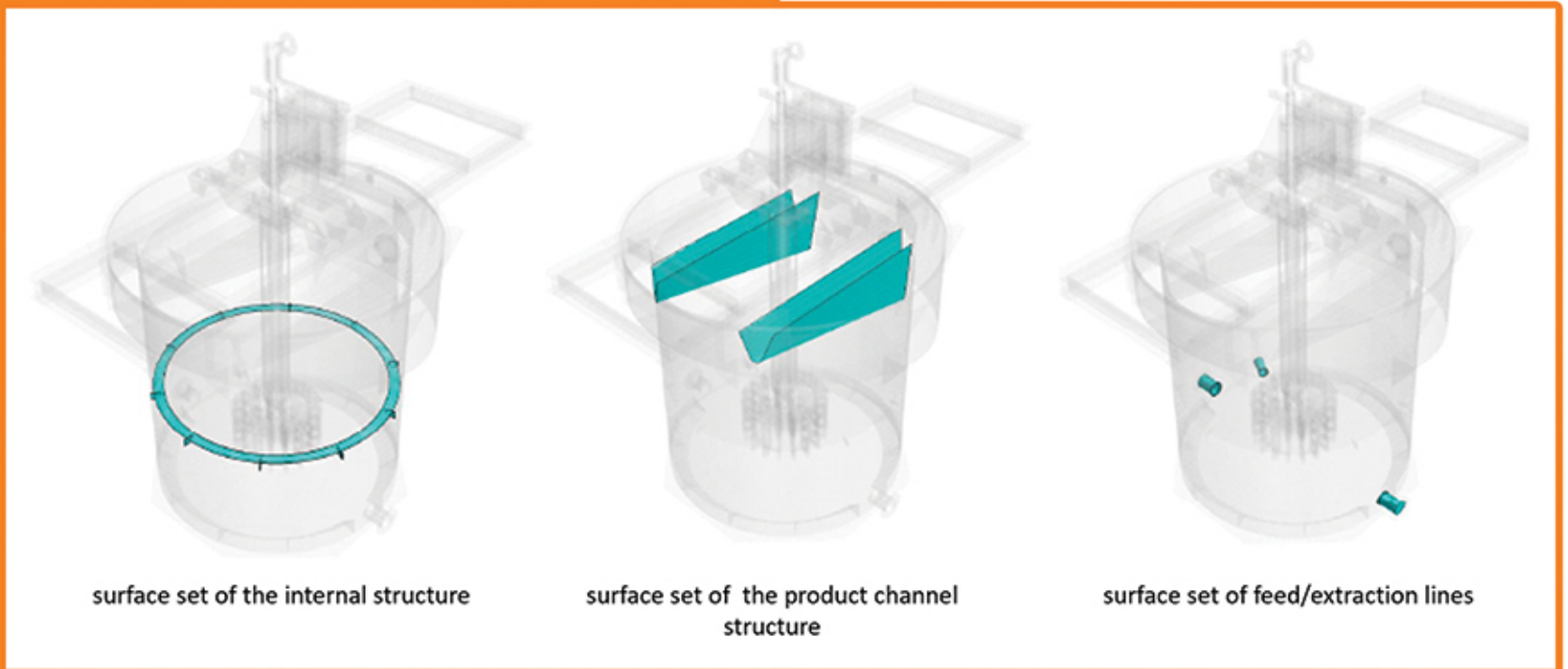


surface set of vessel sides

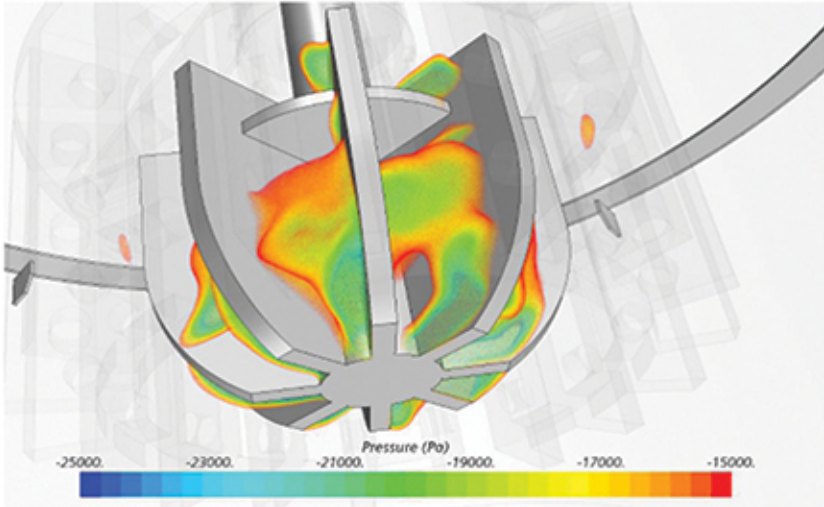


surface set for bottom sloped edge structure

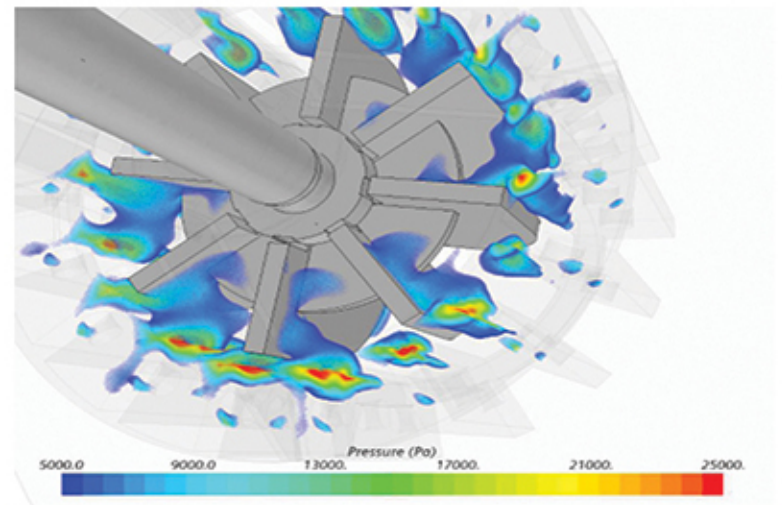
Feeder line, tailing discharge line, internal structure, baffles and launder discharge are shown in the 3D figures below



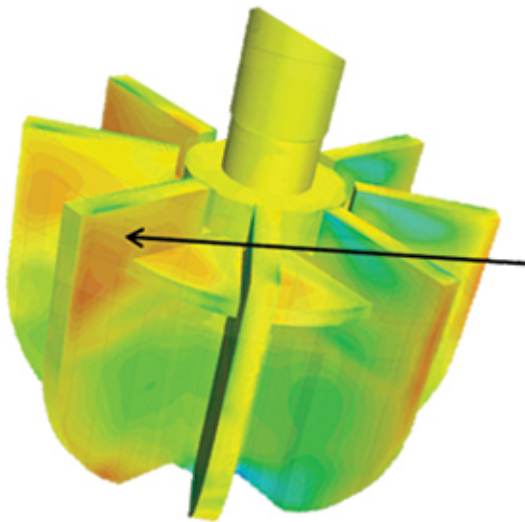
CFD ANALYSIS



Current pressure range highlight the low pressure region between the impeller blades, in the region below the partition



Pressure range highlight the effective portion of the impeller.



The top part of the impeller, above the partition plate, effectively transferred momentum to the slurry.

MINESER FLOTATION
CFD ANALYSIS
HIGH ENERGY

TT'S HIGH ENERGY – CFD ANALYSIS

Based on the simulations that have been performed it could be shown that in the full floatation tank, continuously perturbed by an impeller rotating, two distinct recirculating regions were created in the lower regions of the cylindrical vessel. The radially outward projected flow emanating from the rotor/stator set separating these two distinct flow structures.

The upper recirculating region featured flow entering axially into the impeller from above from where it was projected radially outward. After impinging against the casing, a portion of the flow moves vertically upward along the casing walls, turning radially inward after interacting with the centrally mounted annular ring, from where it returned to the impeller flowing axially down along the shaft. A large degree of swirl was shown to be present above the impeller increasing the resistance the flow entering axially from the above needed to overcome.

The lower recirculating region was shown to be located below the impingement point against the casing walls. The flow moved radially inward along the casing floor before re-entering the impeller axially from below. A large degree of rotation was visible between the rotor and the vessel floor. The pressure distribution evaluated on the rotating impeller surface revealed that the available impeller vane surface was not optimally utilized. This was largely attributed to the influence of the horizontal partition plate located roughly 20% along the vane height, from the top edge. The momentum transferred to the slurry through the effective top portion of the impeller, predominantly drove the upper recirculating flow. The momentum transferred to the slurry using the rounded bottom section of the impeller vanes, pushed the flow radially outward.

The resultant forces acting on each of the mount points due to the net total moment were calculated acting using levers unique to the individual mount. The mount point predictions considered the net forces transferred to the entire internal wetted surfaces.

TECHNICAL FEATURES



1. Air control system

Due to the non linearity of the income feed composition of the cell, controlling the amount of air for the process can be critical. There are two types of control systems that introduce air into the mechanisms hollow shaft:

- Automatic airflow control, this system would generally consist of an automatic butterfly valve, insertion type thermal mass flow meter and a manually operated butterfly valve. Airflow is controlled and adjusted for each cell in the level control cabinet
- Manually controlled systems, this involves adjusting manually operated butterfly valves until the required froth characteristics are achieved.

The choice of one of the two systems is project specific and is tailored to the client's needs. The amount of air pressure required is calculated according to the size of the cell based on the cell depth and specific gravity of the slurry. This is essential as the floatation mechanism does not overcome the hydrostatic head as the impeller rotates. High Energy mechanisms have also been proven to use air more efficiently than older mechanisms as the air is directed exactly where it is needed the most.



2. Stand pipes

Slots built into stand pipe to help prevent froth material from making its way up and entering the bearing housing preventing wear and damage. Better dissipation of froth along the top of the cell into the concentrate launders.

HIGH ENERGY

WHAT MAKES US DIFFERENT

Wear protection, bolt Protection and quality rubber lining

Our equipment are built to **withstand** the tough mining environmental conditions present when processing high chrome content ores, using only the best materials to ensure that our mechanisms and agitators are built to last saving you money in the long term.

Easy Removal

Agitator spares are design to be easily removed if they need to be replaced. Our mechanism allows for easy complete removal from Tank Cell as well as easy access to Tank Cell with mechanism inside.

Precision

Thanks to 3D modelling and good design from the largest support structure down to the smallest piece of mentis grating, our plants are accurate and precise.

Tank Cell Design

We have improved designs of our High Energy Floatation Cells to improve circulation of material and to prevent "dead zones".

WHAT MAKES US DIFFERENT



HIGH ENERGY

WHAT MAKES US DIFFERENT

Circumferential & Cross Launderers

Our new design, increased launder lip length resulted in improve recovery

Safety First

All potential safety hazards large and small are looked at and rectified to ensure completely safe operation using our safety protocols.

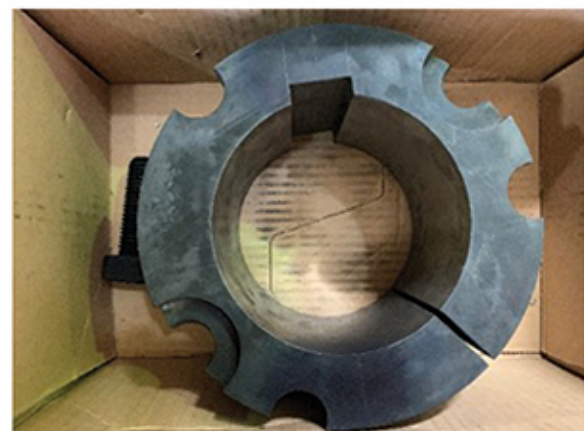
High Quality Parts

Tested equipment from previous and current operations, ensuring that only the best equipment and instrumentation is used whilst at the same time keeping in mind affordability and longevity.

Customisation

We provide a tailored approach when building plants and manufacturing our equipment, which is why no two of our plants are similar! We work closely with the client to ensure that the product and service that we offer completely meets their needs in everyway possible, this determination to provide the best possible service sets us aside from our competitors.

WHAT MAKES US DIFFERENT



HIGH ENERGY

WHAT MAKES US DIFFERENT

Preassembly & Transport solutions

Our Processing plants are quickly and safely preassembled offsite. So that the plant and equipment can be thoroughly checked and signed off saving the client time and money that would be wasted on doing modifications on site.

The entire plant is then shipped to the client with assembly drawings and erected by the appointed construction crew. The modular design of our plants allow for easy installation once on site.

Handling Solutions

Custom Lifting Lugs can be designed to ensure safe and easy lifting of mechanism.

3D Modelling

3D MODEL

ACCURACY AND
PRECISION
IMPROVEMENT

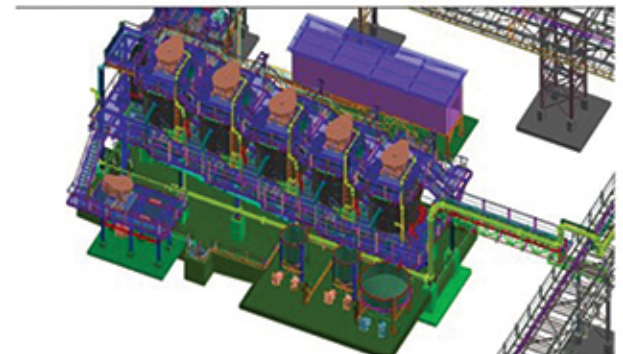
WALK THROUGH
THE PLANT
WITH RENDERED
3D MODEL

CHANGES TO
MADE PRIOR TO
MANUFACTURING
REGARDING THE
COSTUMER
SATISFACTION

WHAT MAKES US DIFFERENT



THORNCLIFFE - PGM EXPANSION



HIGH ENERGY WHAT MAKES US DIFFERENT

Wet End Design

Our new rotor design incorporates a more rounded edge design increasing absorbed energy within the cell. The additional surface area improves downward movement of the slurry assisting in the circulation of material within the bottom half of the cell. The stator has been modified to reduce the weight and stresses on the standpipe as well as increase the aeration of the material as it passes.

WHAT MAKES US DIFFERENT

Circumferential & Cross Launderers = Increased Lip Length

All of our tank cell designs aim to increase launder lip length as much as possible to improve recovery. This is why in most of our designs we include circumferential as well as cross launderers to achieve this providing almost double the lip length than the conventional Flotation cell.



HIGH ENERGY WHAT MAKES US DIFFERENT

High Quality Components

At Mineser we realise that a chain is only as strong as its weakest link and therefore we source only the best quality parts where we are unable to manufacture them ourselves. We base this on tried and tested equipment from previous and current operations ensuring that only the best equipment and instrumentation is used whilst at the same time keeping in mind affordability and longevity.

WHAT MAKES US DIFFERENT

High Quality Urethane

Mineser high wearing Wet ends make use of a higher quality urethane Notedome 132S Vs Elasturan which is commonly used in the industry, by making this change the longevity and resistance to wear of our wet Ends was improved. The wet ends are thoroughly checked for quality, balanced, Heat treated, NDT tested and released to our client once they have passed our quality checks.



WE WERE PART OF BIG PROJECTS

RECENT PROJECTS

2021

TWO RIVERS: Flotation Mechanism & Tank Supply

IMPALA: Flotation mechanisms, Supply Tailored design

THARISA MINERALS: Feasibility Study for Karo Concentrator, Complete Pilot Plant

2020

GLENCORE Thornecliffe: EPM, Complete expansion plant design & Equipment Supply

GLENCORE Kroondal: EPM, Complete plant design & Equipment Supply

2019

Northam Platinum: Zondereinde Slag Plant

Northam Platinum: High Energy retrofit, Eland Concentrator

LONMIN BTT: Equipment Supply

LONMIN EPL: Equipment Supply

2018

AFARAK Ilitha Tailings: Scavenger Plant, EPCM/Operation

SYLVANIA MF2: Plant and supply equipment

BRPM - Maseve: Concentrator Plant

Northam Platinum: Eland Concentrator Plant

2017

Tharisa Genesis: EPCM upgrade plant

Northam Platinum: High Energy retrofit, Zondereinde Concentrator

GLENCORE



tharisa



WE WERE PART OF BIG PROJECTS SINCE 2002



- 2020: Construction and design of complete PGM expansion plant & Equipment Supply, **Glencore**
- 2019: Operating contract NORTHAM PLATINUM– Zondereinde Smelter slag plant
- 2018: Operating contract AFARAK MINING– ILITHA Tailings plant
- 2018: EPCM Ilitha Tailings Scavenger Plant, Design Sylvania MF2 Plant and supply equipment
- 2018: Operating contract BRPM – Maseve Concentrator
- 2018: Operating contract NORTHAM PLATINUM – Eland Concentrator
- 2017: EPCM Upgrade THARISA GENESIS plant
- 2017: High Energy retrofit for NORTHAM PLATINUM Zondereinde Concentrator – 3 x cells
- 2016: High Energy retrofit for Pan African Resources PHEONIX
- 2015: High Energy Test Rig for ANGLO PLATINUM Boabab
- 2015: Operation, management, maintenance. Maseve Concentrator, Platinum Group Metals (PGM)
- 2014: Flotation Retrofit at THARISA VOYAGER
- 2012: Design, Construction and operation of a full scale TSP plant for TWO RIVERS
- 2011: Detail design & construction management for the Marula Platinum, Zim Plats TSP plant
- 2010: Detail process and engineering design for the XTRATA THORNCLIFFE TSP plant.
- 2009: Fine grinding of concentrate regrind R&D projects on behalf of IMPALA
- 2008: Design & Construction Management of IMPALA & KILKEN IMBANI JV Expansion Projects
- 2007: Construction and Operation of tailings plant at EASTPLATS
- 2006: Cr₂O₃ and PGM recovery from Cr₂O₃ tailings on behalf of SYLVANIA METALS
- 2005: Flotation retrofit at IMPALA MF2 PLANT - 150 forced air mechanisms. Entire section.
- 2004: Flotation retrofit at IMPALA UG2
- 2003: Construction and Operation of full scale plant at IMPALA
- 2002: TSP Pilot Plant at IMPALA

Mineser is in the business of solutions for mining industry. Our comprehensive services and optimization solutions in mining and mineral processing industry which are gained by many experiences all over the world, brings the best value for mines and processing plants. Mineser's goal is to provide a high quality outcome to drive improvements in performance and profitability in our clients' businesses.



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