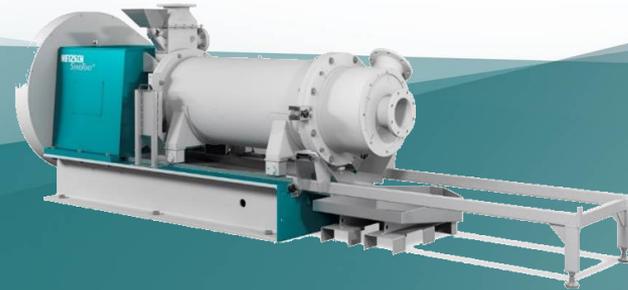


our technology  
**YOUR SUCCESS**



# New Grinding Technology for Ultrafine Oilfield Minerals

A.J. DeCenso



Centrifuging



Screening



Milling



Sorting



**Preferred**  
Process Solutions



Air Classifying



Analyzing



Plant Design



Coating



# Companies Represented



- ✓ Screening Equipment
- ✓ Centrifuges
- ✓ Vibratory Mills



ecutec  
**NETZSCH**

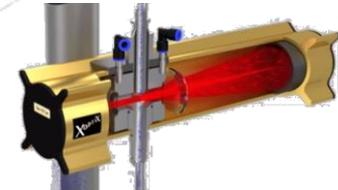
- ✓ Air Classifiers
- ✓ Grinding Mills
- ✓ Coating Systems
- ✓ Plant Design

 **TOMRA**  
SORTING SOLUTIONS



- ✓ Sensor Based Sorters

**XoptiX**



- ✓ In-Process Particle Size Analyzers



# SWECO Round Separators

## Most Versatile Screening Device Ever Designed

- Wet or dry processes
- Coarse or fine separations
- High or low density materials

## Wide Product Line

- 1, 2, 3 or 4 decks
- 18", 24", 30", 40", 48", 60" or 72" diameter

## Market Leader



***We Put Technology In Motion™***



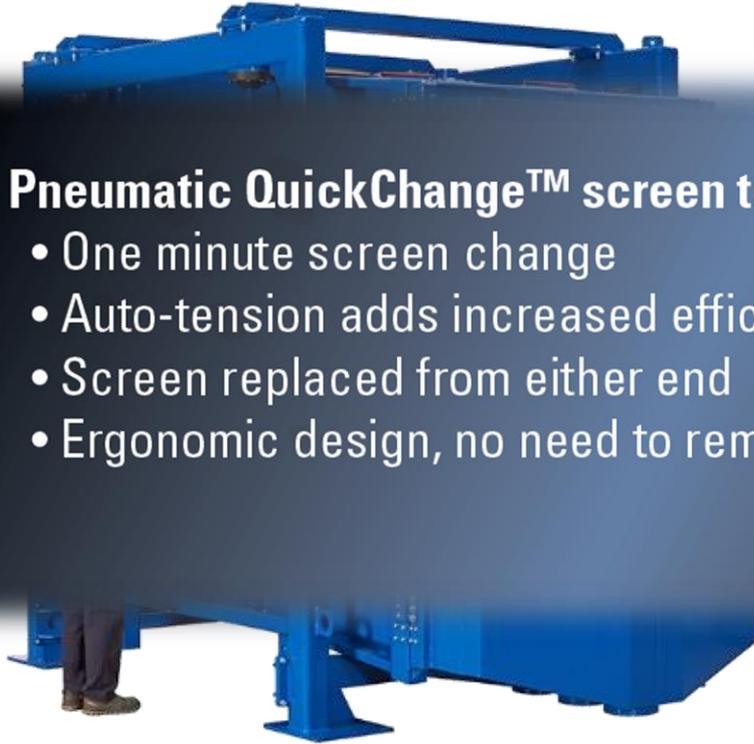
# SWECO ATLAS Frac Sand Screeners – 100 tph Capacity



# SWECO ATLAS Frac Sand Screeners – 100 tph Capacity

## Pneumatic QuickChange™ screen technology\*

- One minute screen change
- Auto-tension adds increased efficiency /screen life
- Screen replaced from either end
- Ergonomic design, no need to remove ball boxes





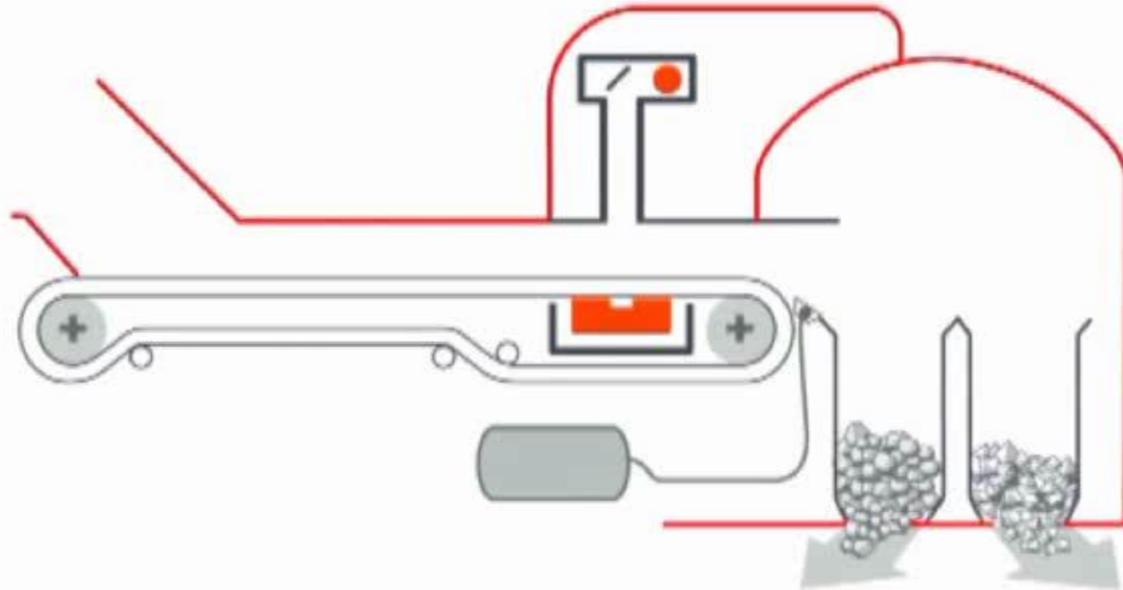
# Sorter Video

To run video go to: <https://youtu.be/haQPHHsu2yY>

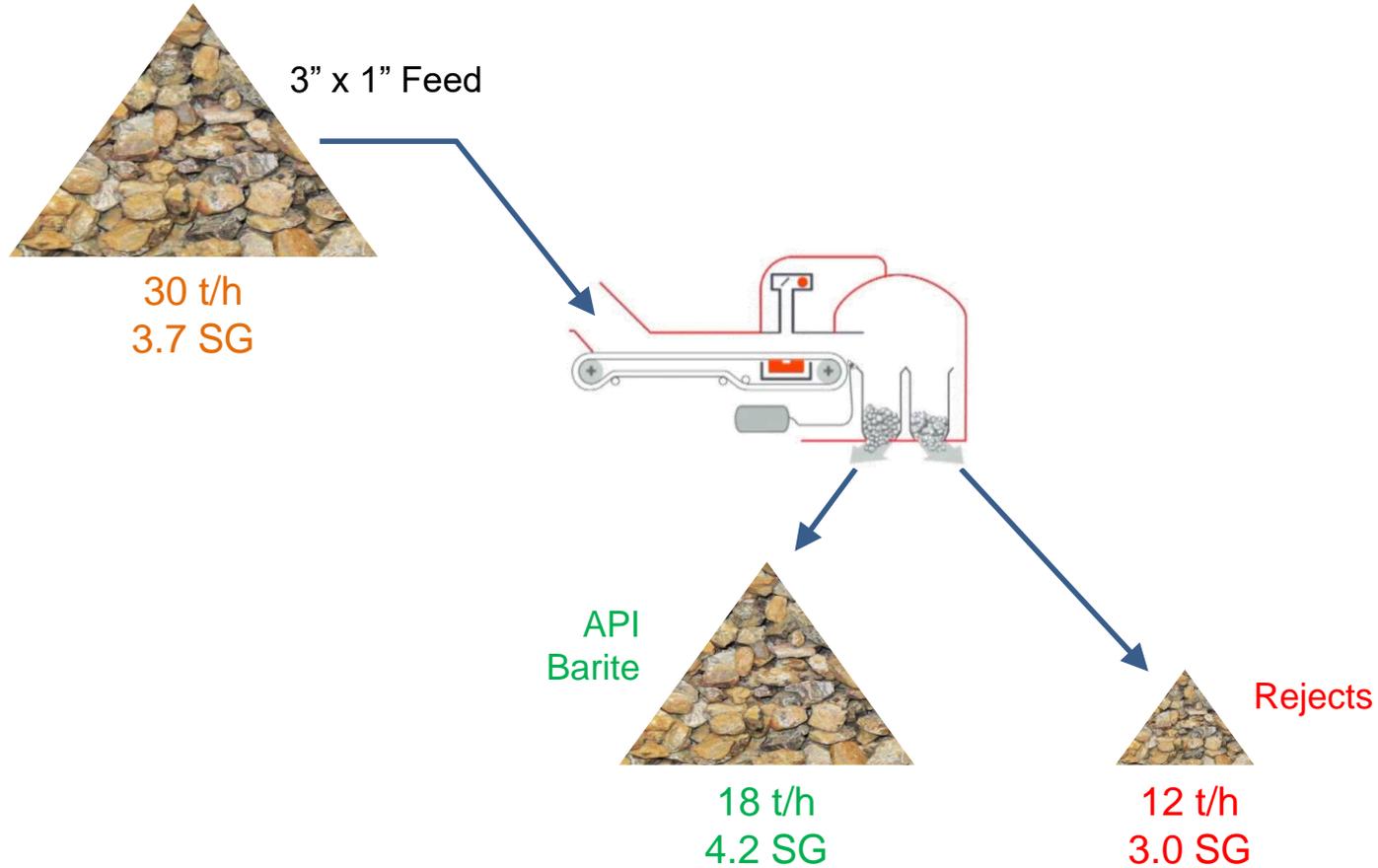


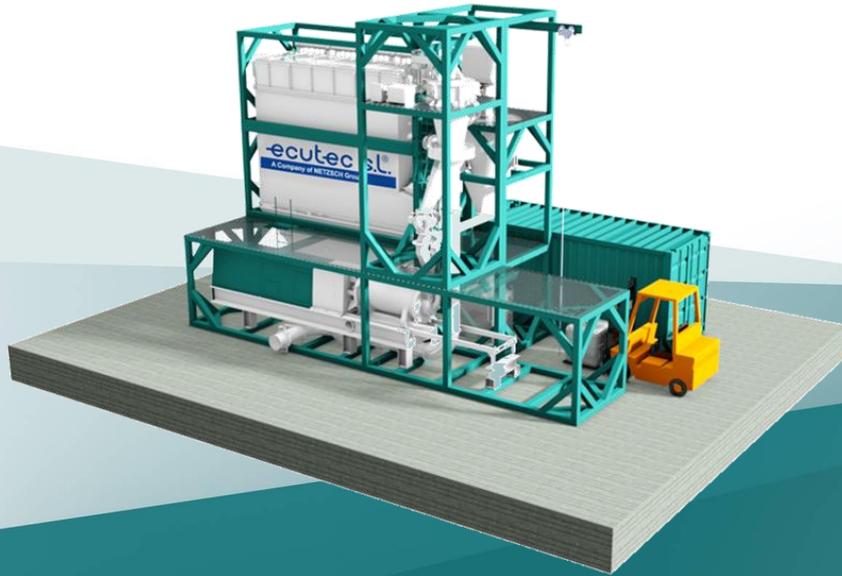
# How a Belt Sorter Works...

To run animation go to: <https://youtu.be/hroFszmxgFU>

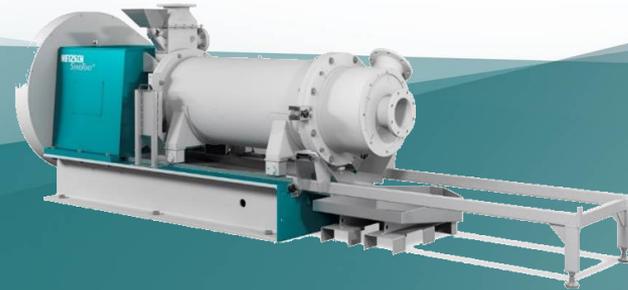


# Barite Sorting with TOMRA XRT Sorter





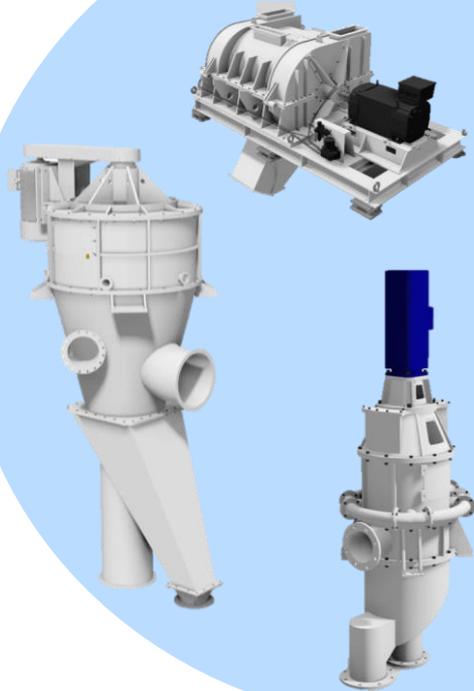
our technology  
**YOUR SUCCESS**



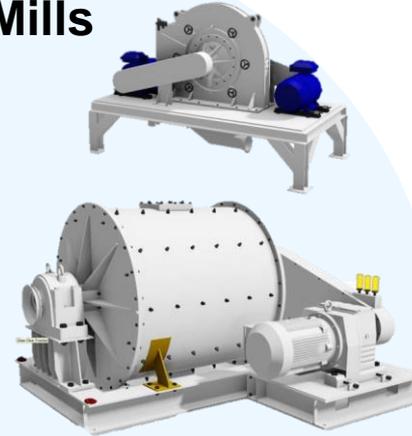
# New Grinding Technology for Ultrafine Oilfield Minerals

A.J. DeCenso

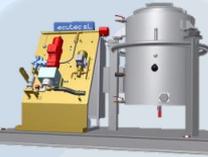
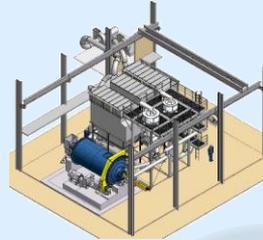
**Classifiers**



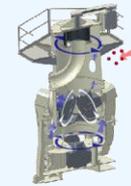
**Mills**



**Systems**



**Coatings**



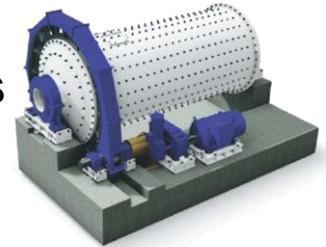


**Altai & Atlas**

*Altai* pendular roller mill:  $d_{98}$  as fine as  $30\mu$   
*Atlas* vertical roller mill:  $d_{98}$  as fine as  $6\mu$   
Both can include hot air drying

Ball mill  
Peripheral or grate discharge  
Up to 3000 HP (2MW)

**Taurus**

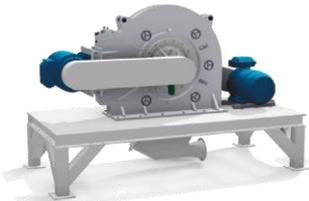


**Ural**

Impact mill with integral air classifier  
Soft to medium hard minerals  
Can include hot air drying

Jet mill  
Integral *Bora* classifier  
Top cuts as fine as  $2\mu$

**Jura**



**Sierra**

Pin mill  
For milling and coating of  
medium & soft minerals



**Scirocco**

Turbo classifier  
Suitable for all minerals  
 $d_{98} \leq 6$  to  $150 \mu\text{m}$

Turbo classifier  
Abrasives & special products  
 $d_{98} \leq 2$  to  $50 \mu\text{m}$

**Bora**



**Mistral**

Horizontal turbo classifier  
Soft minerals  
High capacity at  $d_{98} \leq 2 \mu\text{m}$

Dynamic (“whizzer”) classifier  
De-dusting w/o peripheral equipment  
 $d_{98} \leq 45$  to  $300 \mu\text{m}$

**Monsoon**



# Business Unit - Grinding & Dispersing



**146M €**

Sales volume



**10**

Laboratories worldwide



**966**

Employees worldwide



**60**

Sales and service  
locations worldwide



**8**

Production facilities  
worldwide



# NETZSCH Premier Technologies – Exton, PA



10

Laboratories worldwide





10

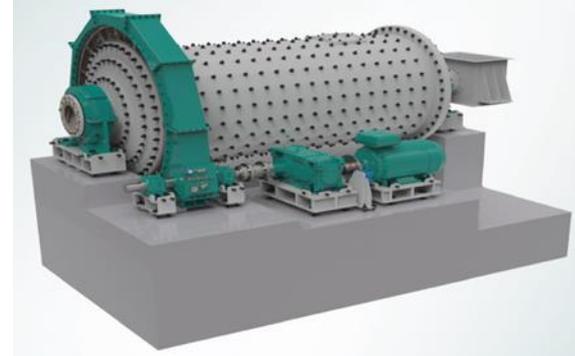
Laboratories worldwide





## Air Classifier Mill

- Moving parts in milling zone
- Not suitable for abrasive minerals
- Fineness limit of  $\sim 45\mu$  (325 mesh)
- Moderate installed cost



## Ball Mill

- No moving parts in milling zone
- Suitable for abrasive minerals
- Fineness limit of  $\sim 5\mu$
- High installed cost

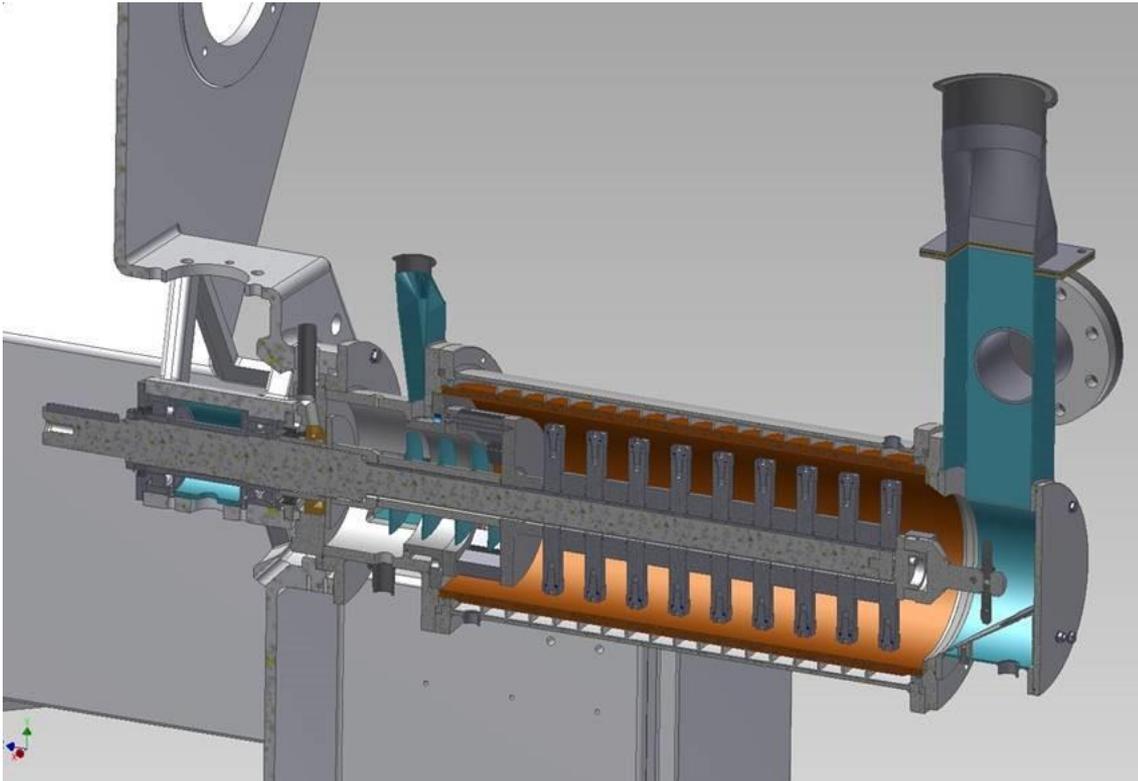
# PAMIR Agitated Media Mill

- Horizontal agitated media mill
- High energy density → small footprint
- Small grinding media → ultrafine PSD
- Easy and fast maintenance
- Steep PSD (low fines production)
- Single pass or in closed loop with classifier
- Steel or ceramic version (lining & grinding beads)
- Vessel sizes from 30l – 3000l (7 gal – 700 gal)
- Installed power from 22kW – 630kW (30 HP – 850 HP)



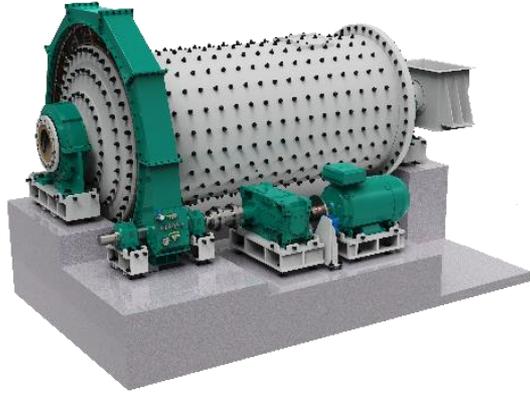
**NEW  
PRODUCT**

# PAMIR Agitated Media Mill



**NEW  
PRODUCT**

# Fine Ground Barite: $d_{98} < 6\mu$



## Ball Mill

Mill Size	8' $\Phi$ x 16'
Installed Power	500 HP
Production Rate	4.5 t/h
CAPEX	550,000 €



## Pamir Mill \*

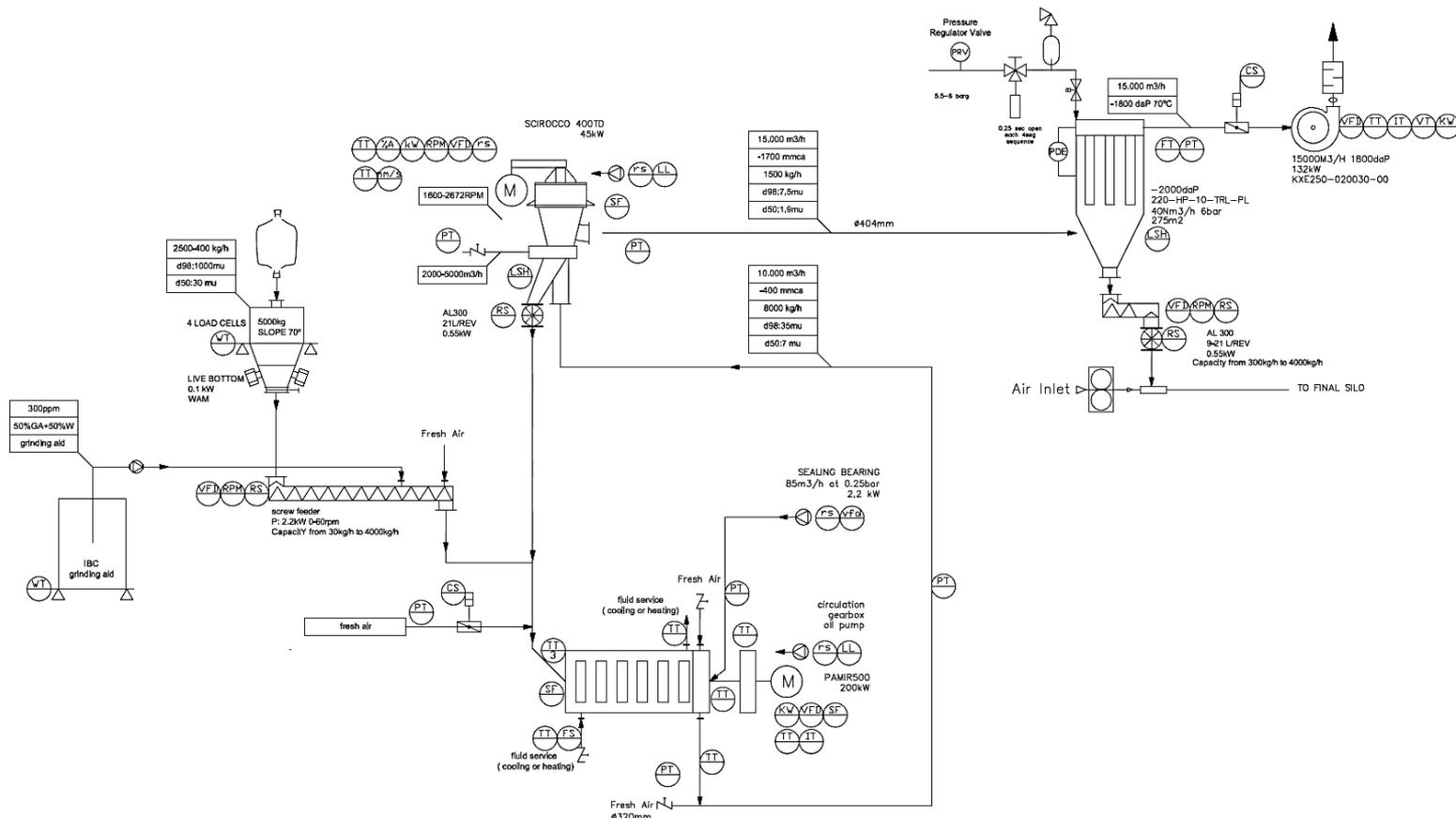
Mill Size	1000l
Installed Power	400 HP
Production Rate	4.5 t/h
CAPEX	480,000 €

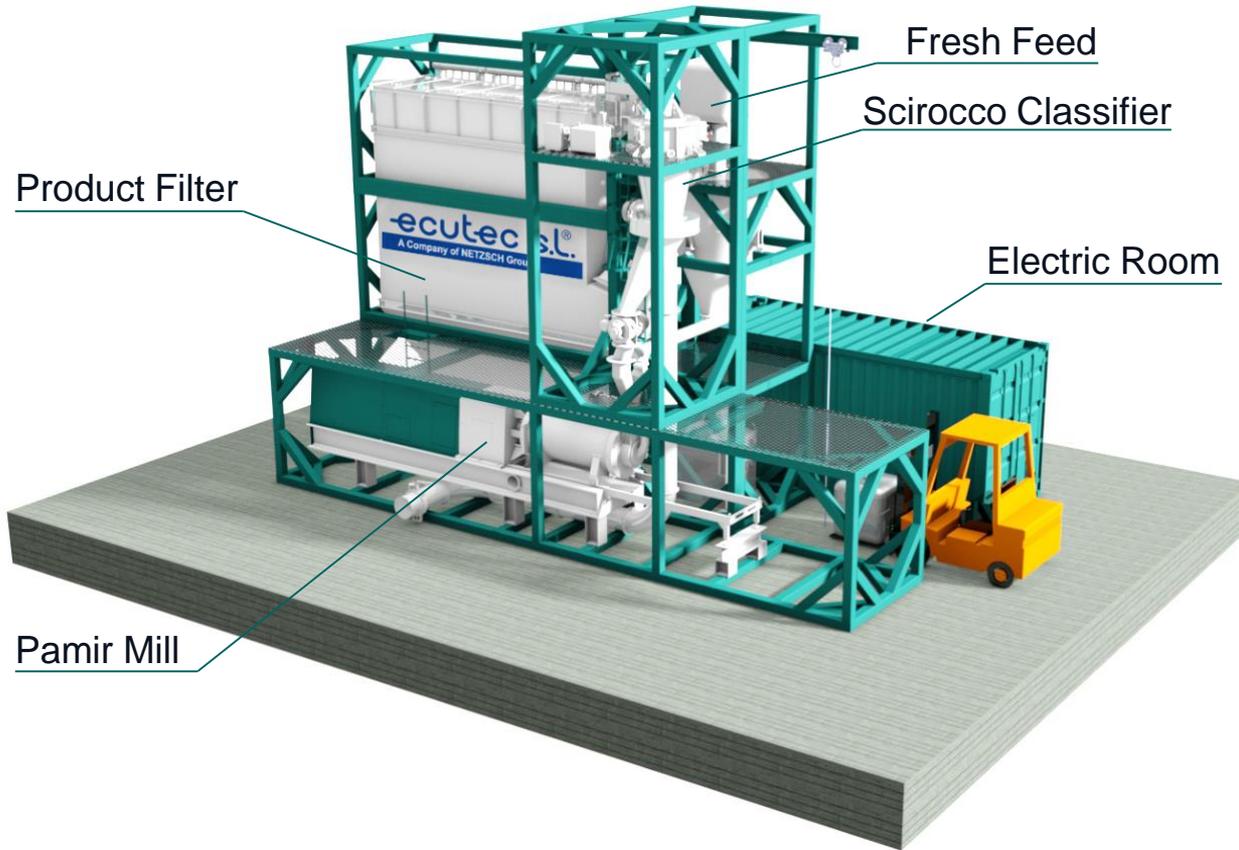
\* Values estimated pending confirmation by lab trials

- **Grinding & classifying plant**
- **All equipment mounted in containers**
- **All containers are pre-wired**
- **Rapid deployment**



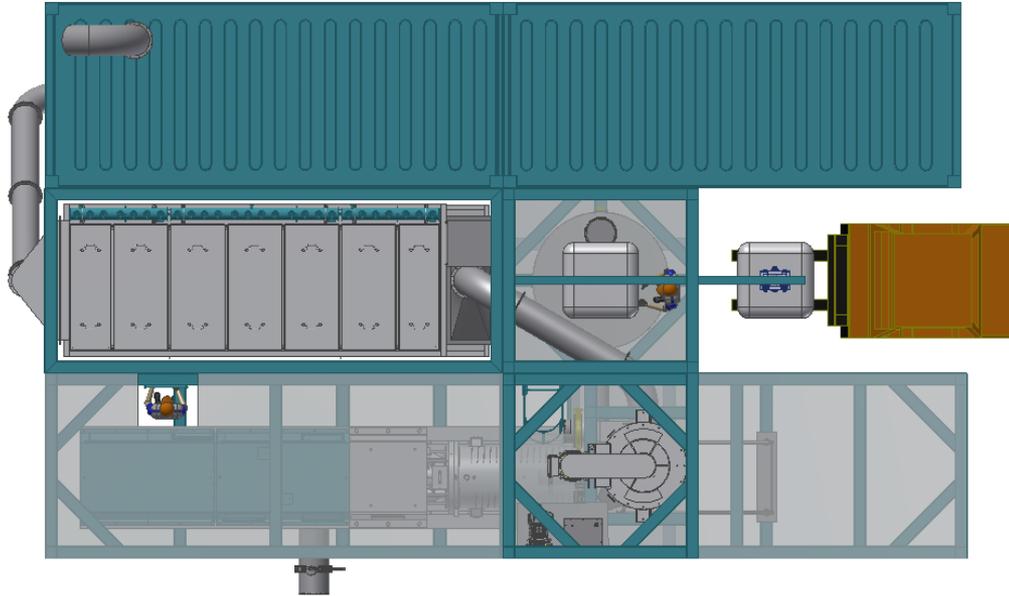
# System Flowsheet





## Module List

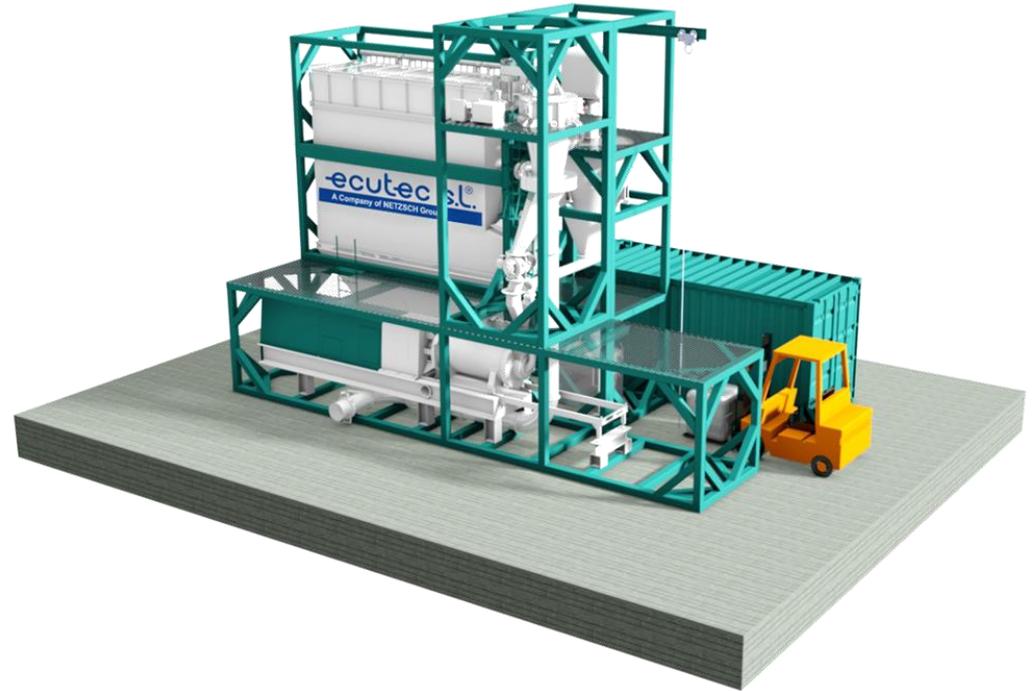
- 1 x 20 ft HC: Feed Hopper
- 1 x 40 ft HC: Pamir
- 1 x 20 ft HC: Scirocco
- 3 x 20 ft HC: Filter
- 1 x 20 ft HC: System Fan
- 1 x 20 ft HC: Electrical Room



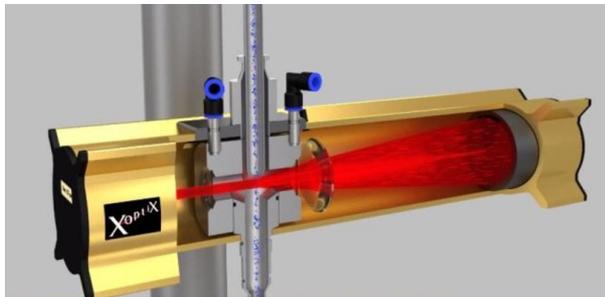
## Technical Data

- Plant Size: 12m x 8m x 9m  
(40' x 26' x 30')
- Installed Power: 350 kW (500 HP)
- Feed material: barite
- Feeding size:  $\leq 1$  mm (18 mesh)
- Product fineness:  $d_{98} = 6\mu$
- Production: 3 t/h

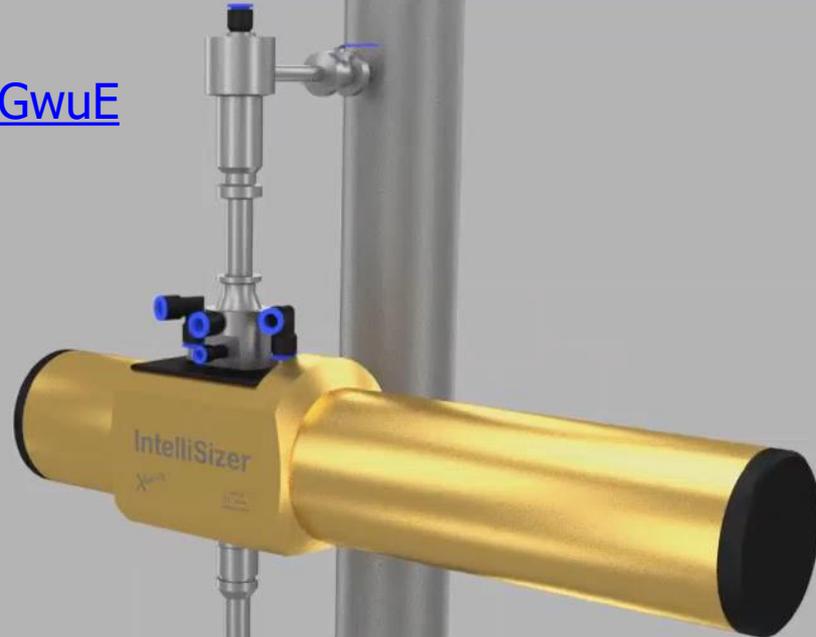
CAPEX	
Equipment Cost	450,000 €
Switch Cabinets	60,000 €
Design & Structural	70,000 €
Electrical Assembly	45,000 €
<i>Overall Cost</i>	<i>625,000 €</i>



# Xoptix In-Process Particle Size Analyzer



To run video go to...  
<https://youtu.be/USCmPrQGwuE>



The system is attached directly to the main process



# Frac Sand Demo

To run video go to: <https://youtu.be/-WjAo5dkn3g>





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