



Case Study: A Performance Turnaround at a Ground Calcium Carbonate Plant



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- Dry & Wet Screening
- Liquid / Solid Separation

- Oilfield Services
- Resource Management Services
- Imaging & Surveying

- Drilling & Completion Fluids
- Solids & Pressure Control
- Treatment Services



- Ultrafine Milling and classification
- Engineering services



Ecutec Core Competencies



- Ultrafine classification



- Particle coating

- Ultrafine milling



- System development



Ecotec & Sweco Clients (partial list)



ATLAS RESIN
PROPPANTS

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FAIRMOUNT
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ActiveMinerals
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 **Pattison Sand Company**

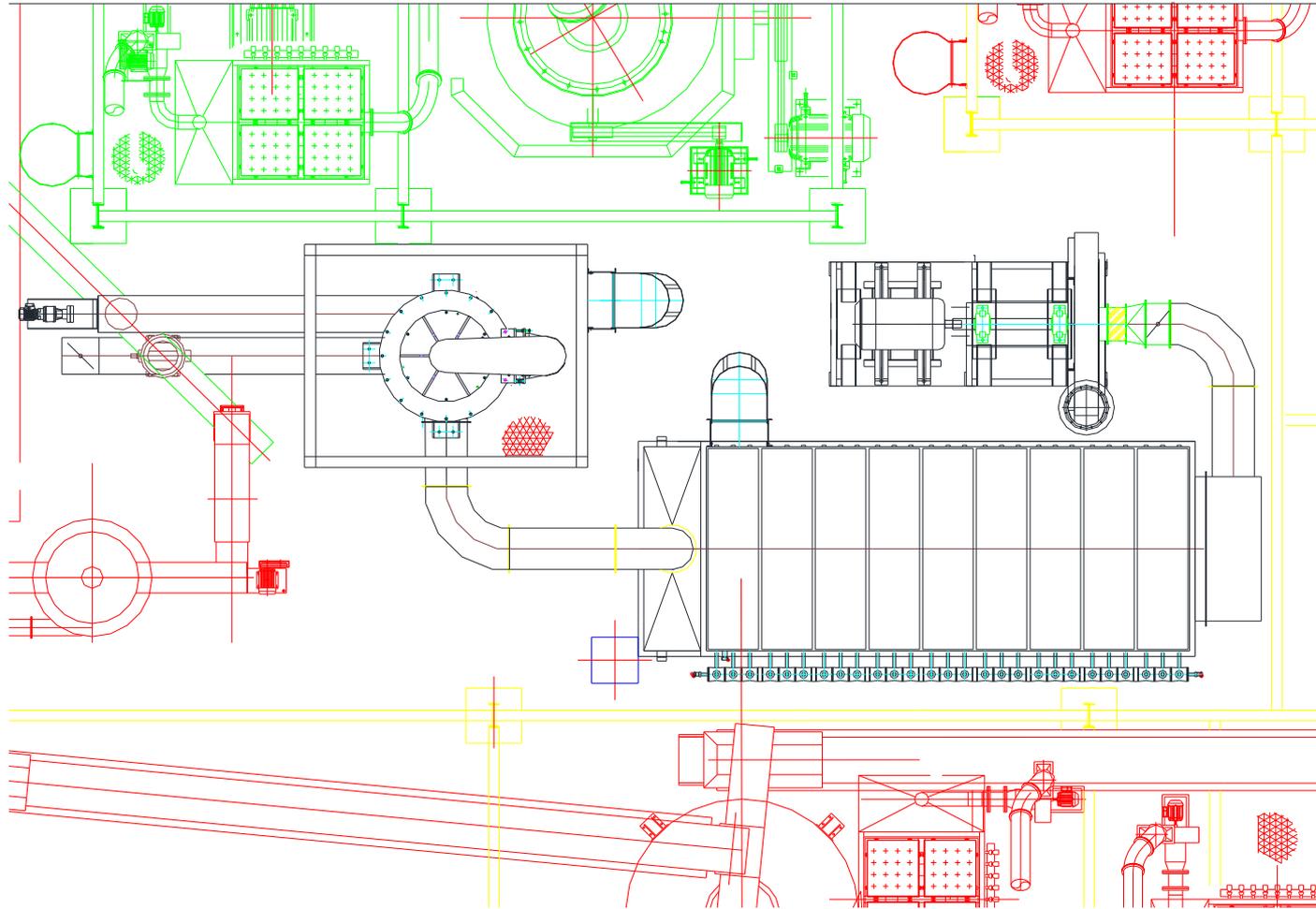


Project History

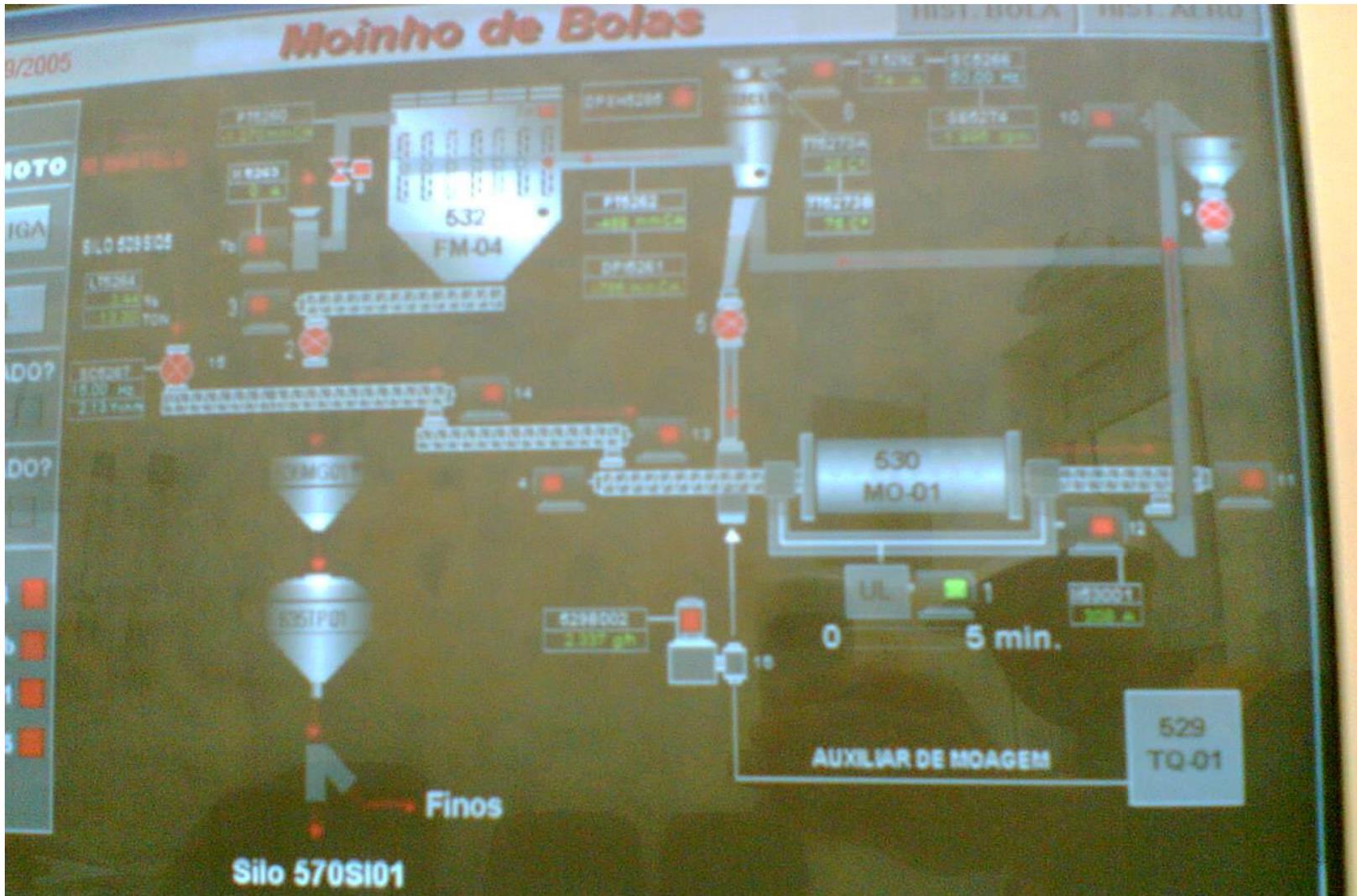
- In 2005 a system was installed to produce fillers for the plastics industry.
- An available ball mill was combined with a new classifier from ECUTECH.
- Target product finenesses were
 - a. $d_{50} = 4.5\mu\text{m}$
 - b. $d_{50} = 3.0\mu\text{m}$
 - c. $d_{50} = 2.8\mu\text{m}$
- Engineering was done by customer and peripheral equipment (filter, radial fan, rotary valves etc.) was sourced locally.
- After commissioning, the system produced the fineness and capacity required to open up new markets for the customer.
- Unfortunately, in 2009 the system was shut down due to uneconomical production.



Proposed Installation



Flowchart of installed system (2005)





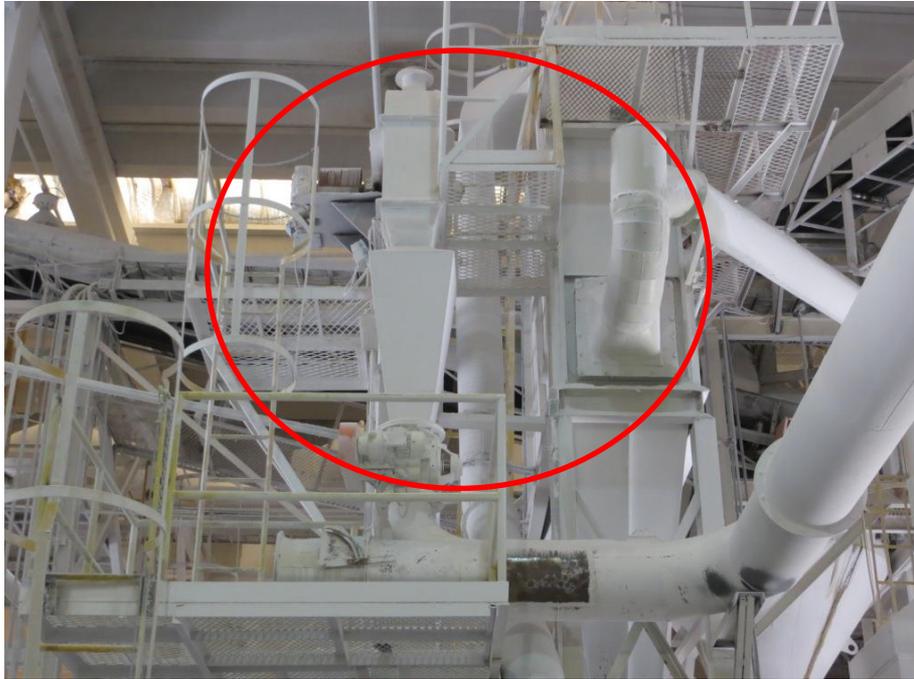
System Audit Findings (2013)

- In 2013 customer asked ECUTEC for a visit to audit the process and determine how to increase efficiency and reduce production costs.
- Existing production rates
 - a. 4.0t/h @ $d_{50} = 4.5\mu\text{m}$
 - b. 2.3t/h @ $d_{50} = 3.0\mu\text{m}$
 - c. 1.5t/h @ $d_{50} = 2.8\mu\text{m}$
- Existing grinding media blend
 - 30% of 16mm
 - 15% of 24mm
 - 39% of 32mm
 - 15% of 40mm
- No grinding aid being used.
- Product is accumulating in duct to classifier.



System Audit Findings (2013)

Feed to classifier / BE with surge hopper



Feed to classifier / Sharp Elbow





System Audit Findings (2013)

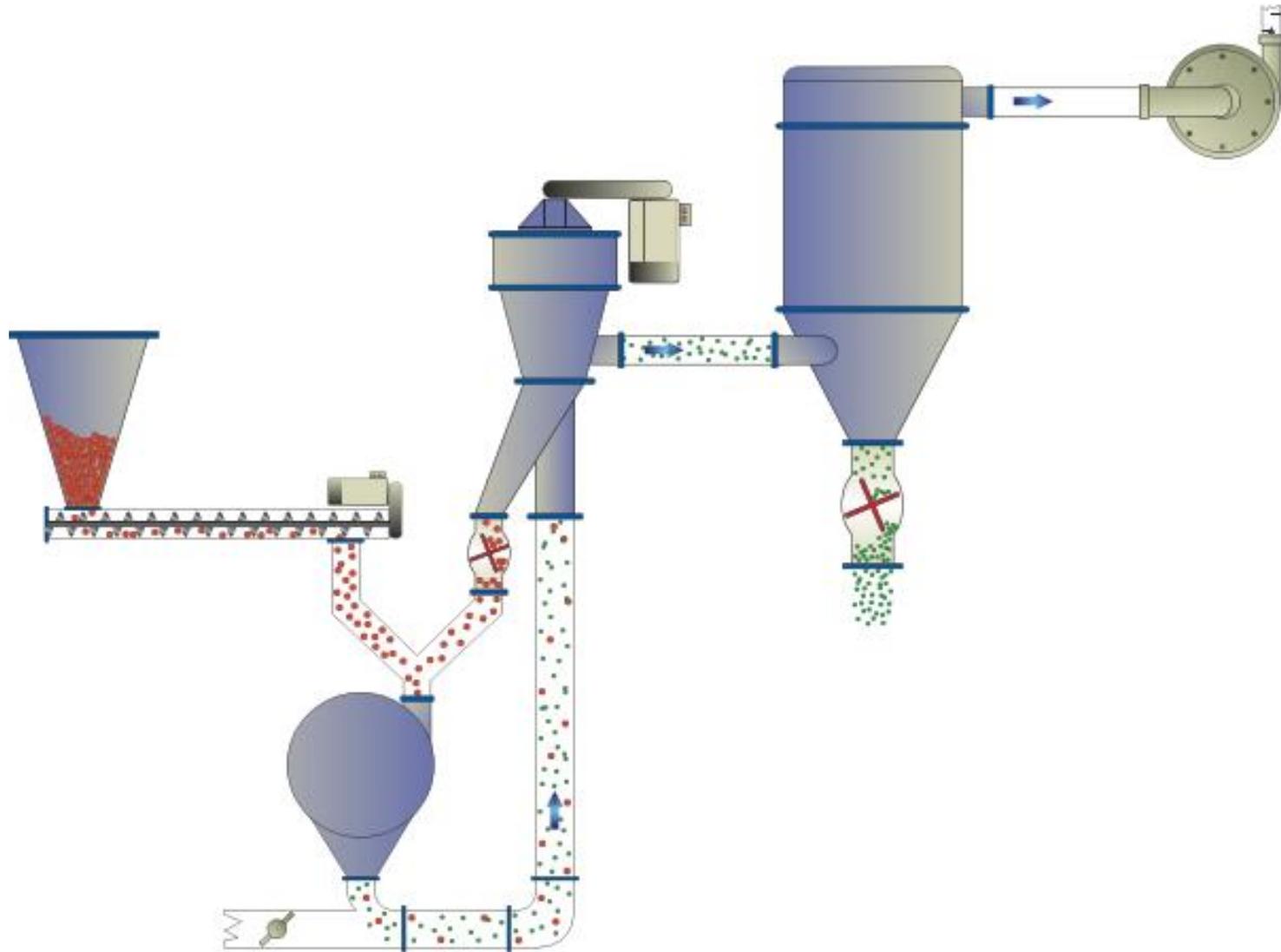
Fines outlet / Filter Inlet



Partially blocked Grate Wall

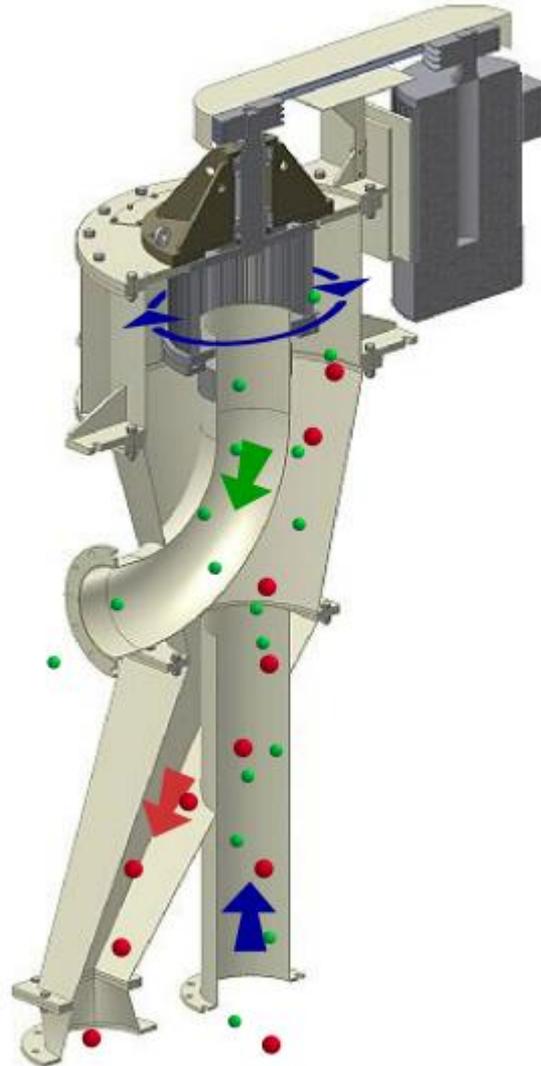


Turbo Classifier System with Ball Mill





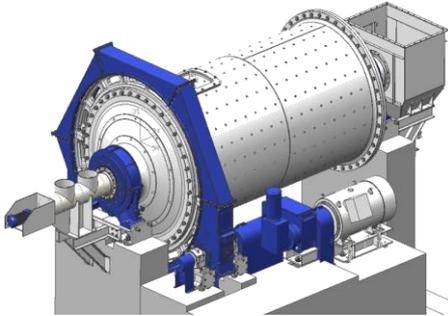
ALPHA series



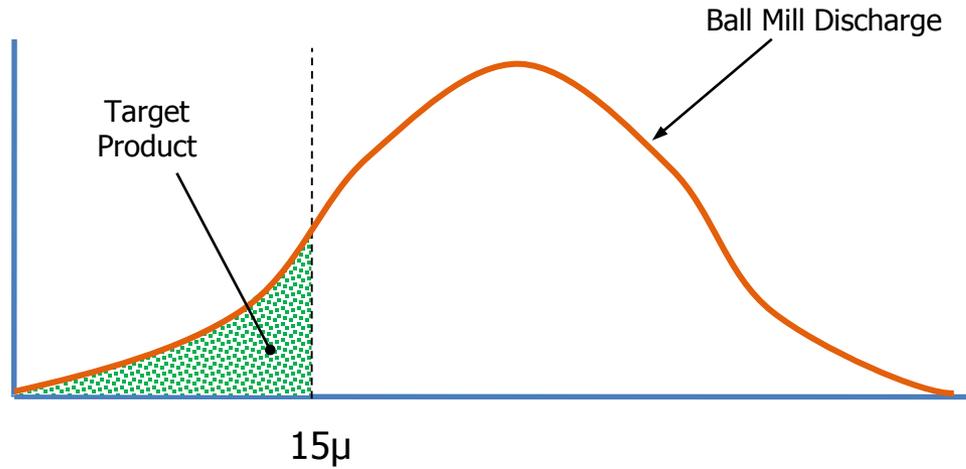
- Material Inlet
- Coarse
- Fines



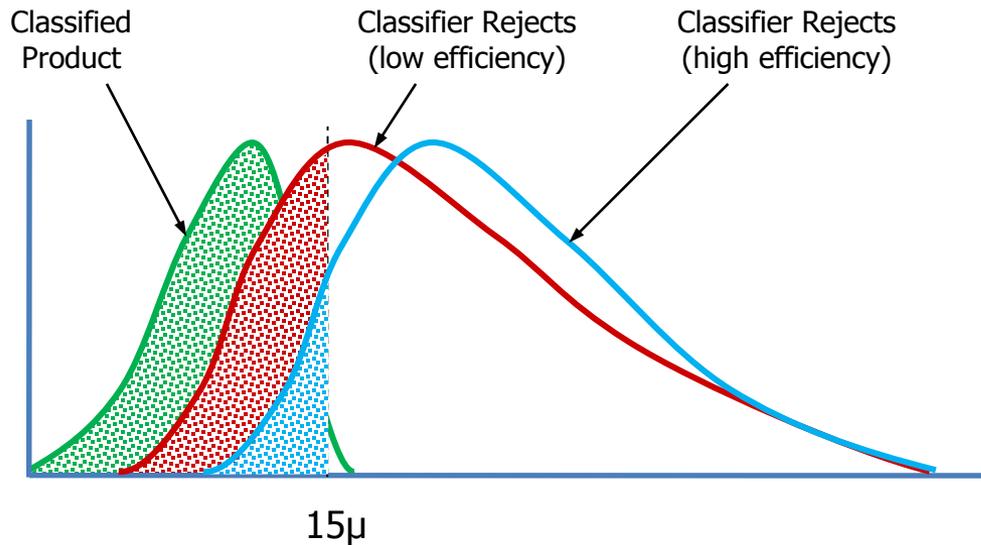
Importance of Classifier Efficiency



Ball Mill



Air Classifier



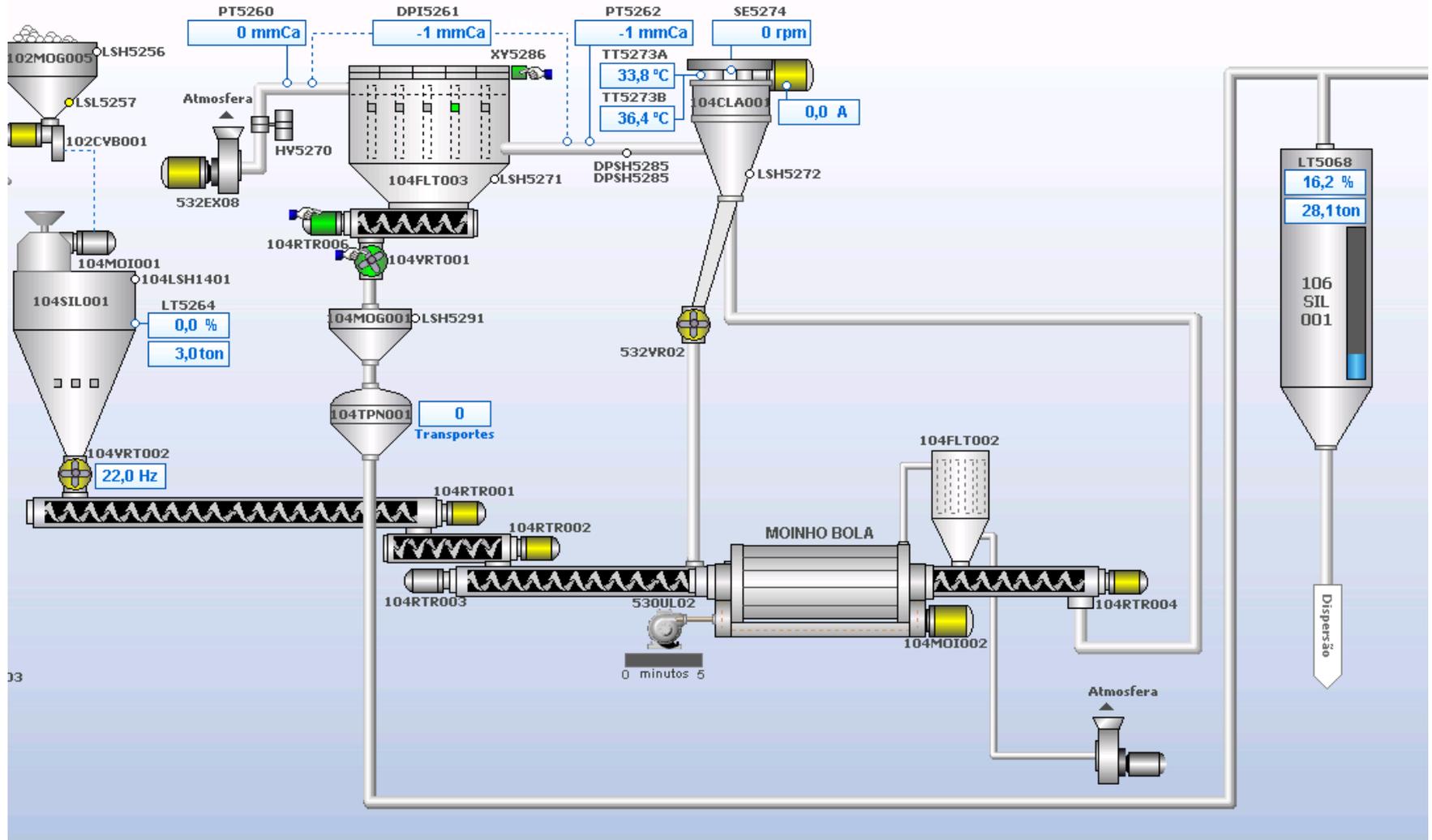


ECUTEC recommendations

- Eliminate bucket elevator and surge hopper. Use classifier system fan to pneumatically convey material from the ball mill discharge screw up to the classifier.
- Add grinding aid to the ball mill when producing the finest products (grinding aid sourced from Tecnochem).
- Modify pipe to classifier to include a nice sweep elbow with minimum radius of 2.5 pipe diameters.
- Since feed particle size is relatively fine (<3mm), mix of grinding media sizes should be changed. Reduce the percentage of 32mm and 40mm grinding media and use more 16mm.
- Change fines outlet and filter inlet to utilize the full filter area and reduce pressure drop due to turbulences.



Modified Flowchart by customer





Modifications done by customer

Feed to classifier





Modifications done by customer

Fines outlet / Filter inlet



➤ Observations

- ✓ Use of grinding aid → better grinding and classification.
- ✓ No grate wall plugging → better BM discharge.
- ✓ Less pressure drop over whole system → more air available.

➤ Outcomes

- ✓ 36% increase in capacity with all products.
- ✓ 50% reduction in energy consumption.

➤ Next Steps

- ✓ Plan to install additional classifier.
- ✓ Plan to install coating system.



Contact Information

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