Application Note
Sector : All

POUDRES DURABLES

PRODUCTION STABILISATION THROUGH PARTICLE SIZE CONTROL

Context

To meet strict particle size specifications, the product undergoes milling and classification. A dynamic classifier integrated into the upper part of the mill separates the desired fine material from the coarser material. The fines pass through the classification turbine, while the coarse particles are rejected and returned to the milling chamber. How can we ensure the correct cut size of the classifier and maintain specifications at all times?

Customer Installation : Mill-Classifier

Objective : Continuous production within specifications (95% of the product < 52 µm)

Methodology

Automated milling control based on real-time particle size measurements is a method used to regulate the size of the produced particles.
Particle size measurements are provided by an Insitec sensor integrated into the milling line. A control loop is then developed to adjust the classification turbine speed according to the deviation between the measured and target particle size (Dv95 < 52µm). This automated control reduces size deviations during production.

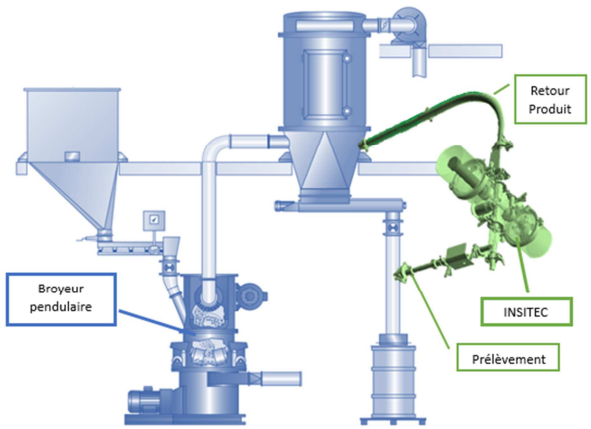

Fig. 1 : Layout of the Insitec (Malvern Panalytical) implantation on the mill-classifier line

Results

Production without control

Oscillations in particle size over time can be observed through continuous monitoring using the Insitec.

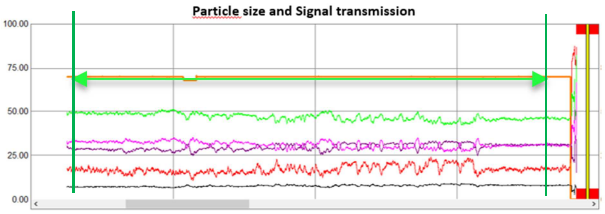

Fig. 2 : Visualisation in RT Sizer software of size indicators (Dv95 in green) and classifier speed (in orange).

These fluctuations are quantified over a defined production period (green arrow) using the RTSizer software supplied with the Insitec. The Dv95 varies between 42µm and 51 µm with a relative standard deviation of 4%. A significant portion of the product is grinded finer than necessary, leading to excessive energy consumption and quality variations.

Production with control

Granulometric monitoring curves are significantly smoothed after implementing automatic classifier speed regulation. The classifier speed

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continuously adjusts to reduce deviations between the measurement and the target value.

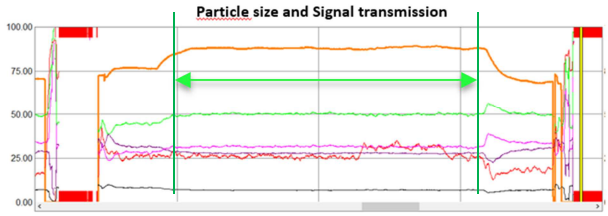

Fig. 2 : Visualisation in RT Sizer software of size indicators (Dv95 in green) and classifier speed (in orange) when speed is automatically controlled.

Over the defined period, the Dv95 varies between 49µm and 51 µm with a relative standard deviation of 0.8%.

Conclusion

Implementing classifier control via online particle size measurement enables particle size regulation with relative variations < 1%.
Overgrinding has been eliminated, ensuring stable product quality.