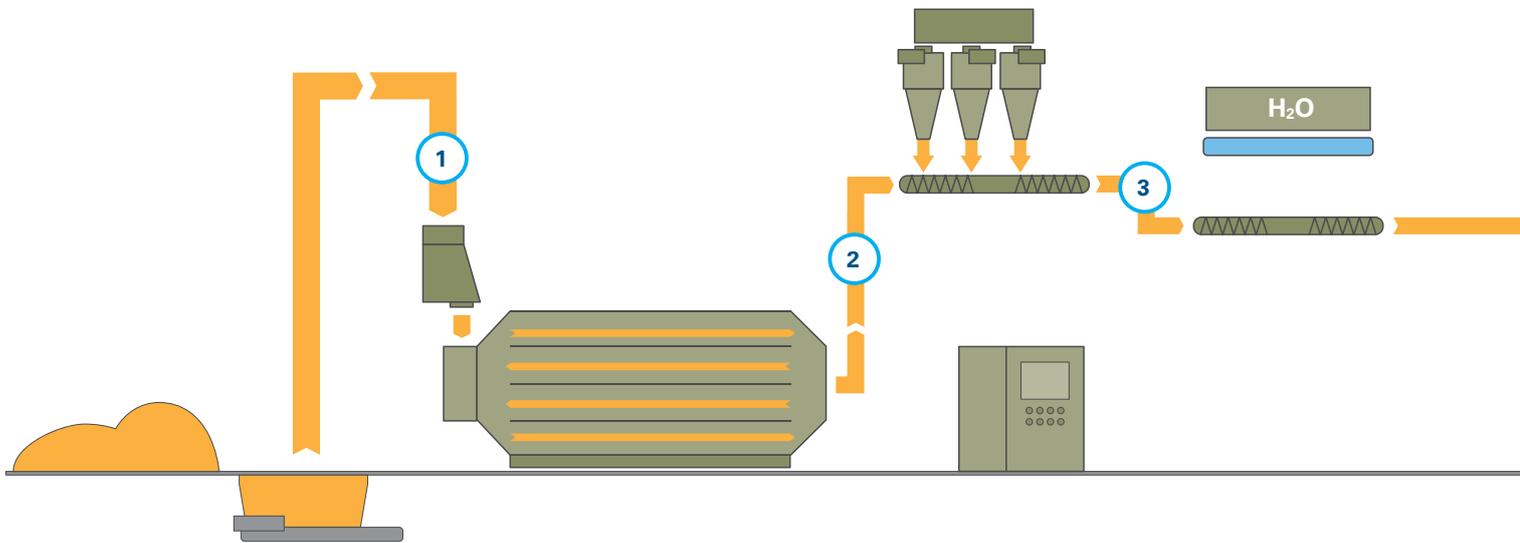


Microwave Technology

Inline Integrated Moisture and Density Measurements of Wood Pellets



Enhances throughput, quality and economy



Optimized Processes With Accurate Moisture Measurement

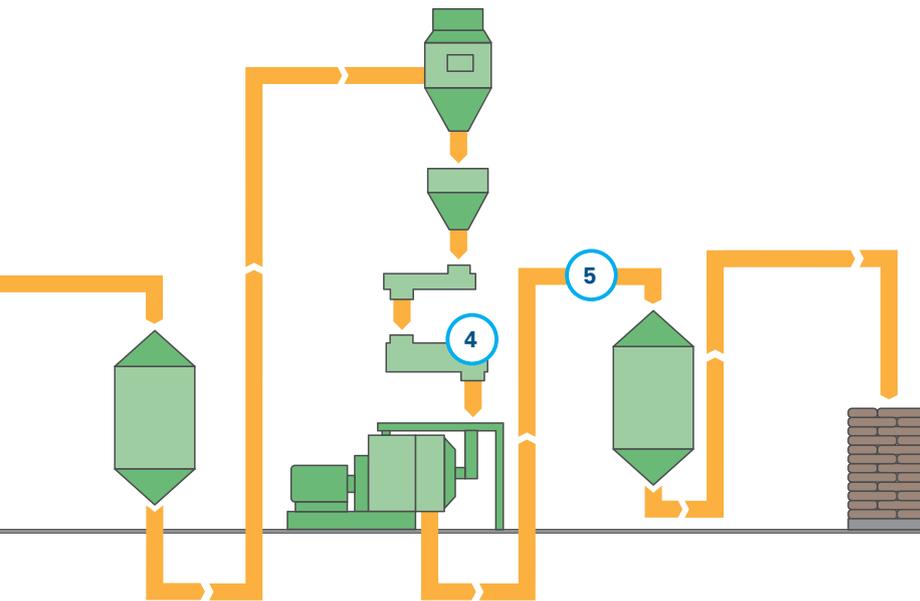
At each production stage, the processing of wood pellets depends on such factors as product homogeneity, particle size, bulk density, and foremost the product moisture content. The inline systems are designed to operate seamlessly with any processing or manufacturing installation or hardware. Moisture sensors can be deployed along the entire process line from the raw material intake through the final inspection station.

THE ADVANTAGES

- Continuous accurate moisture measurements at all key stages of the pellet processing line.
- Only one calibration for pine wood.
- Moisture values are independent of density, temperature and color.
- Due to absence of moving mechanical parts, and the fact that sensors are fabricated with high quality ceramic and stainless steel components, the systems are robust and free of maintenance and wear.
- Easy mechanical incorporation into the process flow can be accomplished regardless of the age of the installations. Integration in process control systems is fully featured.

IN-LINE MOISURE MEASURMENT WITH MICROWAVE RESONANCE - FUNCTIONALITY AND ADVANTAGE

The technology of microwave resonance is designed for all production phases of wood pellets. When products pass through the microwave resonator field, the resonance characteristics change, depending on the water content. The microwave penetrating the material entirely, however, without affecting it. This is the most accurate moisture measuring method for industry – impervious to such factors as product density and surface structure. The systems require a one-time configuration and operate thereafter continuously and reliably - free of maintenance and wear.



Measuring Points

- | | |
|-------------------------------------|--|
| <p>1 Dryer entry</p> | <p>The inline systems allow the automated control of dryers via analogue outputs or dedicated interfaces, when sensors are deployed at the dryer intake point. This key attribute of the TEWS systems provides optimization of both raw material and energy uses. The measuring accuracies are typically 0.5% and 1.0% for the 0–18% and the 30–60% moisture ranges, respectively.</p> |
| <p>2 Dryer exit</p> | <p>At this point, the residual moisture resulting from the drying cycle is continually monitored. The data are useful for the optimization of the drying process as well as for controlling the subsequent conditioning. Here, the measuring accuracy is 0.5% in the moisture range of 0–25%.</p> |
| <p>3 Before conditioning</p> | <p>At the completion of conditioning phase, products are usually combined and re-humidified. Here again the moisture is measured, providing outputs that allow the accurate control of the humidification parameters.</p> |
| <p>4 Pelletization</p> | <p>The pellet press is the most important station in the process, relative to pellet quality, throughput, wear, and energy consumption. At this point the intake product moisture tolerance is low, typically around 12% +/- 0.5%. Thus, reliable control of the moisture at the entry point of the pelletization phase is critical for the overall pelletizing process.</p> |
| <p>5 End product</p> | <p>Continuous acquisition of moisture data of the final product permits the full and verifiable data recording of all production batches. It also allows full verification of adherence to product specifications, and compliance with industry and regulatory standards. The measuring accuracy for finished pellets is typically 0.2% within the moisture range of 0–12%.</p> |

Accurate Moisture Measurement Optimization of Pellet Production

Improving productivity and profitability through optimized process control

Reduced energy use due to highly accurate drying

- Accurate, continuous and direct measurement of water content allows dryer control optimization
- Prevents over-drying
- Only the required energy is used

Process control results in increased productivity

- Reduced drying duration resulting in higher throughput
- Precise verification of product moisture reduces wear and prevents damage to machinery
- Lower maintenance costs and reduced downtime

Enhanced quality

- Waste reduction due to ability of the system to control the dryer
- Lower product variability allowing easy adherence to quality standards

Optimized process control contributes to business success

- Reduction of waste lowers raw material use and contributes to improved productivity and profitability
- Aids in achieving corporate objectives

Innovative Technology – High Efficiency

Easy to use

- One-time system configuration
- Continuous and reliable operation – low maintenance and wear-free
- Measurements do not require production stoppages
- Non-destructive measurement

Accurate measurements

- Core moisture is measured
- Moisture measurement is independent of both product mass/density and surface structure
- Measurements are impervious to color and ambient light

Fast results

- For both inline and laboratory devices, measurements are completed within milliseconds and results are available instantaneously
- Measurement frequency exceeds 3000/second

Applications

- Inline, at-line and laboratory



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