Food Processing Instrumentation & Efficiency

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The Food Manufacturing Brainstorm features industry experts sharing their perspectives on issues critical to the overall food industry marketplace. In this issue, we ask: How can accurate instrumentation increase efficiency in food processing plants?

The accuracy of any measured data is clearly important when considering its value. However, equally important when assessing the potential of any analytical system is the relevance of the data it provides. Focusing on our area of expertise, the in-process behavior and flow of powder, there are many different techniques used routinely to measure flow properties. Some are relatively accurate, but many fail to provide information relevant to the process environment and are, therefore, less suitable for process optimisation.

Shear testing produces information that can be used, for example, to assess the likely behavior of powder in a hopper, where the powder is stored under its own weight and in a relatively high stress state. However, when optimizing a pneumatic conveying line, for example, where the powder is under much lower stress and subjected to a much higher dynamic regime, shear data is far less relevant.

Dynamic powder characterization is considerably more informative for situations where the powder is flowing in a more dynamic or an unconsolidated state. This technique can be applied to aerated and even fluidized powders, to directly measure the powder’s flow properties when in a low stress state.

Further measurements of bulk properties, such as compressibility, permeability and density should also be considered to complement dynamic and shear measurements.

Used together, dynamic, shear and bulk powder testing can provide useful information that, amongst other possibilities, enables food processors to ensure reliable, consistent flow through the plant; understand blending performance and achieve optimized blend uniformity; assess alternative feed supplies in a meaningful way; investigate fill weight variability; and control the impact of humidity.

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