



MOISTURE MEASUREMENT IN DETERGENT

The Requirement: A major European detergent manufacturer, Kortman of The Netherlands, requires a constant and accurate indication of product moisture, for dryer control. Kortman produces several low-phosphate detergents, with phosphate content reduction necessary to minimize environmental impact. Historically, free water content varies from 4% to 10%. but quality control staff wants it controllable in the +/- 0.5% range. Such tight measurement is complicated by the speed at which free water converts to "bound" water, distorting measurement of free water. The customer needs online -measurement, preferably while the detergent moves through a pneumatically conveyed discharge chute. Current practice for moisture control is manual adjustment of the dryer based on frequent laboratory sampling, resulting in moisture adjustment too late to satisfy quality control.

The Solution: Plant management utilized a Berthold LB 354 Micro-Moist on-line moisture analyzer (**Now LB 456 MicroMoist**). Initial use of MicroMoist was for laboratory testing with Berthold's wave guide (see attachment), with later installation planned on a chute at dryer discharge. Installed, Micro-Moist provides a continuous reading of product moisture. Berthold technology relies on numerous microwave frequencies penetrating the product every half-second, with the instrument basing its moisture reading on changes in microwave attenuation and/or phase shift. Micro-Moist readings are independent of variation in product size. Output signal for use by the dryer operator, provided as a 4-20 mAmp signal feeding a strip recorder and high-moisture alarm, with LED and kS-232 printer/computer outputs also available.

Testing Results:-Two different detergents were tested in the wave guide. Test 1 measured detergent with 5.0% moisture by weight, and Test 2 measured detergent with 6.1% moisture by weight. Micro-Moist readings were taken over a period beginning as the material was taken directly from the dryer (time zero) up to about 12 minutes. The results from test these two detergents are plotted on the attached graph. Inspection of test data led Berthold and plant engineers agree that:

- Free moisture varies with time, up to a least 15 minutes after removal from the drier.
- Thereafter, free moisture is expected to become relatively constant, with the remaining moisture having become chemically bound. No data supports this conclusion, but plant experience does.

Implementation: Management concluded that a measurement could be performed accurately within the first 15 minutes after detergents exit from the dryer, so long as a fixed point of measurement is selected.

Online installation will utilize chute mounting, as shown in the attachment, with chute cross-section between 10 to 15 inches. Belt mounting is also under consideration.

Expected Benefits:

1. Reduced downstream packaging scrap by several percent age points, increasing boxed product availability by an equal amount.
2. Eliminated the need for regular laboratory sampling. freeing up technical staff for other work.

As a result, pre-tax payback is justified at well under one year.