

Moisture in Powders

PROZESS
TECHNOLOGIE



APPLICATION NOTES

Detector: Reveal NIR process analyzer
(Near Infrared spectrometer
1550–1950 nm)

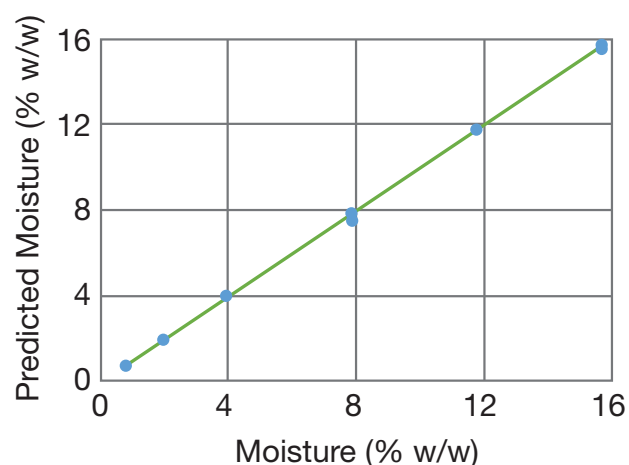


HIGHLIGHTS

- Millisecond measurement times
- Internal referencing, wavelength and linearity validation for stable, continuous operation
- WiFi, Ethernet, OPC, ModBus, Ethernet/IP communications standard
- Hazardous area enclosure options
- Various sampling options



REGRESSION ANALYSIS



Summary

Noninvasive, real-time measurement of moisture content provides significant advantage to off-line moisture measurement methods. Prozess Technologie's Reveal platform is ideally suited for moisture measurement in a variety of products, with millisecond measurements, a variety of sample interfaces, and rugged system designs for the manufacturing environment.

Moisture Content

The necessity to accurately determine moisture content in manufacturing processes is omnipresent. From the granulation and drying of pharmaceutical powders to the dehydration of powdered milk products, measuring addition or removal of moisture is critical to many

industries and products. Numerous off-line approaches are available, such as Karl Fisher titration or loss-on-drying, but these methods require manual sampling, require several minutes to express a result, and are highly subject to operator error. Because the water molecule has distinct optical properties, moisture detection using optical techniques allows a new method of on-line measurement. This approach is non-intrusive to the product, capable of real-time measurement, and automatic.

The optical absorption of water occurs at distinct wavelengths, with very high absorption in the infrared (IR) and a slightly reduced absorption in the near-infrared (NIR). Depending on the moisture range of interest and the substance in which it is being measured, each wavelength region can be utilized with the same net benefits; typical IR measurement for moisture less than ~1%, NIR measurement for moisture greater than ~1%.

The Reveal was engineered from the ground up for industrial installations that utilize these optical advantages, and combine a variety of available sample interfaces for rapid installation and trouble-free operation.

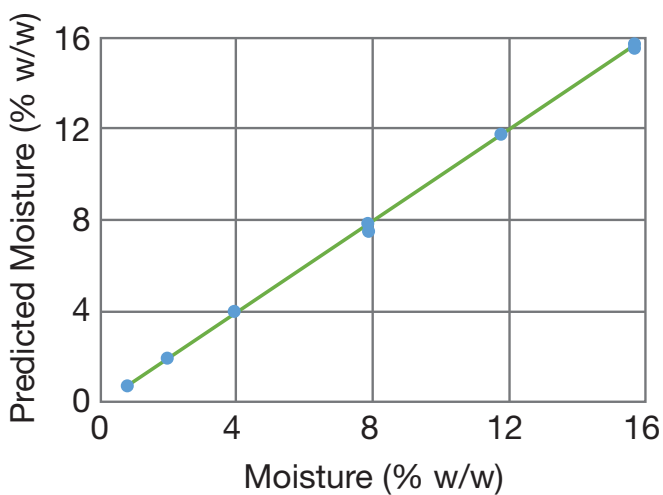


Figure 1: Prediction of low- and trace-level moisture using the Reveal shows high accuracy, with average error less than 0.1% across the range.

Reveal

The Reveal contains integrated light sources and dispersive spectrometers utilizing linear diode array detectors, with no moving parts for high throughput and maximum stability. The Reveal contains automated internal hardware for lamp referencing and for wavelength and photometric linearity validation, all of which can be performed at user-defined intervals. Standard communications in the system include WiFi, Ethernet, OPC, ModBus and Ethernet/IP for upstream and downstream interface with distributed control systems, computers, or tablets. Sampling options range from flow cells with selectable path lengths, to measuring heads that mate to sight glasses in vessels, to fiber probes for contact or non-contact measurement in various insertion points.

Prozess provides a myriad of engineering solutions to integrate into customers' process streams. Hazardous area enclosures, additional analog and digital inputs and outputs, and sample head integration are just a few of Prozess' competencies to ensure a turnkey and trouble-free implementation. With high stability and genuine real-time measurement, the Reveal is a dependable device for monitoring moisture content in both continuous and batch processes.

PROCESS MEASUREMENT
made simple

Please contact us at revealyourapps@prozesstech.com,
call (314) 932-2920 or visit our website
at www.prozesstech.com

PROZESS
TECHNOLOGIE