



ON-LINE MOISTURE MEASUREMENT IN COKING COAL

REQUIREMENT: A one million tons/year metallurgical coking facility needed to automatically adjust moisture addition, as part of bulk density optimization prior to pulverizing. Moisture of incoming coal ranged in the 4% to 7.5% range, with 6% moisture the desired level. Coal is transported on a 30-inch belt at about 275 tons/hour into a coal silo, prior to entering a hammermill, sized under two inches and at about a 4-inch bed depth. Management required a highly repeatable on-line measurement of coal moisture in combination with an on-line bulk density measurement. These data would be inputted to a PLC. The resultant signal would provide for constant coal bulk density, through upstream water addition adjustment. This control of moisture content, in conjunction with a fixed feed of light weight oil to the coal, would allow management to operate at the maximum allowable bulk density with only a small addition of expensive oil.

Plant management purchased and installed a Berthold LB 354 Micro-Moist on-line moisture analyzer (**Now LB 456 MicroMoist**), in combination with a Berthold LB 386-lc density meter (**Now LB 491 Integrated Density gauge**). These instruments are mounted across the belt and provide a continuous reading of product moisture and bulk density. A simple plow provided for constant bed depth, prerequisite for the bulk density measurement. Berthold's Micro-Moist 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 phase shift. The LB 386-lc density meter relies on scintillation counter detection of a low-level radiometric field. Instrument readings are independent of variations in product size, temperature and other ambient conditions. Output signals are 4-20 mA, an LED display, and RS-232 printer/computer outputs,

Initial calibration was performed in a matter of hours, using several product samples covering the full range of expected moisture and density. Follow-up or dynamic calibrations were performed over the following weeks, drawing samples from the stream for comparison with LB 354 (moisture) and LB 386-lc (density) readings. Plant management reports excellent accuracy and repeatability.

For additional data or references, contact Berthold Technologies.