Application Note #025
Moisture Measuring Applications for On-Line Meter AK50

Keywords: paper moisture meter, infrared moisture meter, industrial installations, laboratory measurements, field measurements, glue control

Introduction

Moisture can be measured with our NIR based (near infrared radiation) AK40/AK50 series meters from most fiber products, minerals, wood chips, sawdust, textiles, paper coating chemicals, powders, wires and ropes. Measurement from opaque liquids is not recommended. Find in the following suggestions for different applications with the on-line models available. In many applications the support software is of extremely good value facilitating the user's tasks both in measurement and analysis. For cost-sensitive applications, consider the new economy model AK40.

AK50 moisture meters' penetration depth of the infrared radiation is 150 microns in most papers and fiber materials. Penetration can be much deeper in some sparse fiber felts and textiles. Coating diminishes it and very heavy coating may lead to penetration depths of 50 microns or less. This fact should be taken into account in field, laboratory and temporary on-line measurements and in designing new applications. Powdered products can be measured too and mixing of the material right before measurement gives a representative moisture reading on the surface. We have Technical Notes about these details.

General Applications

❍ use in on-line quality control, research and troubleshooting in all kinds of fast webs

❍ target materials: Paper, board, felts, textiles, wood chip lines, sawdust lines, most fibre materials, organic and inorganic, powders, coating chemical lines, light coloured minerals, recycled paper, special papers, filter papers

❍ use the **IRMA7Basic** or **Advanced** software for continuously acquiring moisture and web temperature readings for archiving and further analysis. Now also **Profiler** program is available for scanner use.

❍ small size and low weight plus good data acquisition features make this instrument an indispensable tool for all laboratories. Full mobility and small size of the optical head open up quite new possibilities

❍ use the Advanced program for continuously displaying on a monitor with large high-contrast numbers visible at 25 meters and more of the selected moisture or temperature signal acquired in real-time. Just turn the display of your PC to become visible in the machine hall in the control room or use a separate add-on display connected to your PC

Cut Products

❍ packing carton machines before printing and folding

❍ sheet cutters: Moisture level before packing line or printing. Can be measured best at a stacking position where there is always a pile of incoming paper. Use the BURST mode for simplest and cleanest retrieval of averaged data of each sheet or piece

❍ paper strips running in off-line paper analyzers

❍ sampling of separate sheets whose values are saved as a trend to the PC or mill automation system

❍ if you accept a display cluttered by the gaps between items, you can collect data series with the

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Autotimer for downloading or use the voltage output for a separate data acquisition module or use Profibus DP fieldbus for fast data sampling from the meter. You can also use an optical trigger and the Conditional Acquisition in the PC program. These are usually the second best choices after the BURST mode

Powdered Products

❍ various light coloured minerals, sawdust, wood chips, fiber materials, bio fuel processing at many positions

❍ measurement of a continuous flow of materials or batches in tubes, over conveyor belts and in screws. Use the BURST mode for batches to skip the gaps and to get the average reading of each batch

❍ measure manually taken samples in cups or containers. This can be automated if no other alternative is possible

Felts and Textiles

❍ measure in textile manufacturing machines to get the level after dying and drying of the fibers. Typical penetration is 5000 microns, depending on fiber and colour

❍ research studies of special felts and textiles for dryers and press nips for optimizing water removal

❍ control outgoing level of moisture content in felt packages, sold by weight

❍ Hint for thicker materials: Use two meters and measure moisture on both sides. Then calculate the average (the software does this for you if you use the Advanced). The average gives usually a very reliable value for total moisture

Fabrication of Paper, Board and Liners

❍ use as an everyday mobile tool around the paper machine

❍ production and research calenders, before and after the nip

❍ make reliable measurements with very thin or perforated grades

❍ make reliable measurements with the low-to medium BW grades to get the total moisture. After some 110 g/m2 the two surfaces's moistures can be different

❍ make reliable measurements with the highest BW grades to get the surface moisture. Typical penetration some 150 microns

❍ study rewetting, calendering and coating, before and after the nip

❍ use in pilot machines to study effects of drying, running speed etc. AK50 is an indispensable tool for this

❍ field measurements: Collect data from several sources and get the data to a PC or to mill automation system

❍ Hint for boards and liners: Measure moisture on both sides and then calculate the average . The average gives usually a very reliable value for total moisture. You might use two meters to do this and let the software do the averaging.

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❍ use as a front-end for special process data acquisition systems, movable around the paper machine

❍ production and research calenders, before and after the nip

❍ use several meters to control moisture after the press section. Use Profibus DP for very fast polling of data from each meter or use our LAN232 for up to eight meters if sampling rate is not the issue

❍ fixed positions for smaller budget: Get MD moisture and web temperature profiles

❍ scanners for more serious budgets: Get MD and CD moisture and web temperature profiles

Printing

❍ moisture is the most important single process variable in printing

❍ detect early too dry web in your printing machine to maintain runnability, else immediate printing problems or too high static electricity

❍ detect early too moist web in your printing machine to maintain runnability, else immediate printing and registering problems or a skewed web is resulted causing repeated breaks

❍ immune to most ink jet toners, you can reliably measure printed sheets. Other colours must be checked before application.

❍ note papers and other very expensive grades: Control incoming moisture, save money by rejecting too moist rolls and making a complaint to the mill

❍ you can get the cross profile of the web

❍ use an optical sensor and the new BURST mode for acquiring data from selected unprinted areas of each sheet ignoring all other parts entirely.

❍ sticker laminates are very sensitive to moisture before printing. Now you have a tool for preventing customer complaints.

Glueing

❍ moisture is the most important single process variable in glueing with water-based media

❍ various types of glue can be directly measured, like PVA, Silicone, Polyurethane, Dextrine-based with water as diluent. With AK50, one can observe the process continuously, measure profiles across the web with a scanner and control glue consumption. AK50 will pay back its price in a few months.

Laboratory

❍ with the meter in a stand, place sample sheets under the meter, for quality control and research

❍ laboratory hot nips: Get the incoming and outgoing moisture levels, use two meters for optimum results

❍ paper strips running in laboratory paper analyzers

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- coating experiments: Study drying rates and coating behavior in real-time
- use in special research instruments, like paper wetting and stretching devices, test printers
- study drying in hot nips, use two meters to reliably detect the water removed for each sheet.
- lab calenders: Get the important variable of incoming moisture to your data and equations.
- mobility means you can move the meter in a lightweight stand
- study single sheets in lab
- specially manufactured papers: Study the drying process and perform quality inspection

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