Application Note #024
Moisture Measuring Applications for Portable Meters AK30 AND MK30R

Keywords: paper moisture meter, biofuel 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) AK30 meters of most fiber products, minerals, wood chips, sawdust, textiles, paper coating chemicals, water-based glues, powders, wires and ropes. Measurement from opaque liquids is not recommended. Find in the following suggestions for different applications with the portable models available. In many applications the support software is of extremely good value facilitating the user's tasks both in measurement and analysis. MK30R uses microwaves tro measure the water amount.

AK30 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 penetration 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.

MK30R penetration depth is typically 30 mm in all fibre materials.This gives a great advantage when measuring thick materials.

General Applications

- ❍ use in laboratory, field and on-line while troubleshooting slow webs and measuring paper rolls for QC

- ❍ 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 AK30, AK30Mini, ATOM, IRMA7Basic or Advanced software for downloading collected data for archiving and further analysis. One can also successfully do limited on-line measuring with the software acquiring moisture readings with the meter temporarily placed over the web or conveyor belt

- ❍ 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 meter open up quite new possibilities

Cut Products

- ❍ paper strips running in laboratory paper analyzers are a good target

- ❍ manual sampling of separate sheets whose values are saved with key presses or with the Autotimer (a time series) to anyof the memory banks. The banks's contents can be evaluated statistically in the field and the data can be downloaded afterwards to a PC. A great number of banks (820 of them) is available each capable of holding up to 500 points.

- ❍ 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

Powdered Products

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

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❍ measurement of a continuous flow of materials in tubes, over conveyor belts and in screws

❍ material batches in tubes and over conveyor belts. Use the Autotimer to finally get the average reading of each batch

❍ measure samples in cups or containers or big piles in the yard.

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, 30 mm for MK30R

❍ 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: Measure moisture on both sides and then calculate the average (the meter does this for you if you use the Autotimer). 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 for AK30 and 30 mm for MK30R

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

❍ use in pilot machines to study effects of drying, running speed etc. IRMA-7 model A is an indispensable mobile tool for this

❍ measurement from a rotating paper roll with a slightly touching bearing foot. We have two options of feet available

❍ field measurements: Collect data from several sources and download data to PC

❍ field measurements: Collect data series with the Autotimer from a moving web, download to PC

❍ Hint for boards and liners: Measure moisture on both sides and then calculate the average (the meter does this for you if you use the Autotimer). The average gives usually a very reliable value for total moisture

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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 in rolls, save money by rejecting too moist rolls and making a complaint to the mill

❍ you can manually get the cross profile of the web

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 AK30, one can observe the process, measure profiles across the web and control glue consumption. AK30 and MK30R will pay back its price in a few months.

Laboratory

❍ study various drying/wetting phenomena. Model A is not slow, it can deliver 5 high quality data points per second with no additional filtering required.

❍ small size and mobility means you can pinpoint your target with the 10 mm in diameter spot

❍ study single sheets in lab

❍ paper strips running in off-line paper analyzers

❍ coating experiments: Study drying rates and coating behavior

❍ specially manufactured papers: Study the drying process and perform quality inspection

❍ laboratory hot nips: Get the incoming and outgoing moisture levels

❍ paper strips running in laboratory paper analyzers

❍ use in special research instruments, like paper wetting and stretching devices, test printers

❍ lab calanders: Get the important variable of incoming moisture to your data and equations

❍ study small-scale profile issues

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