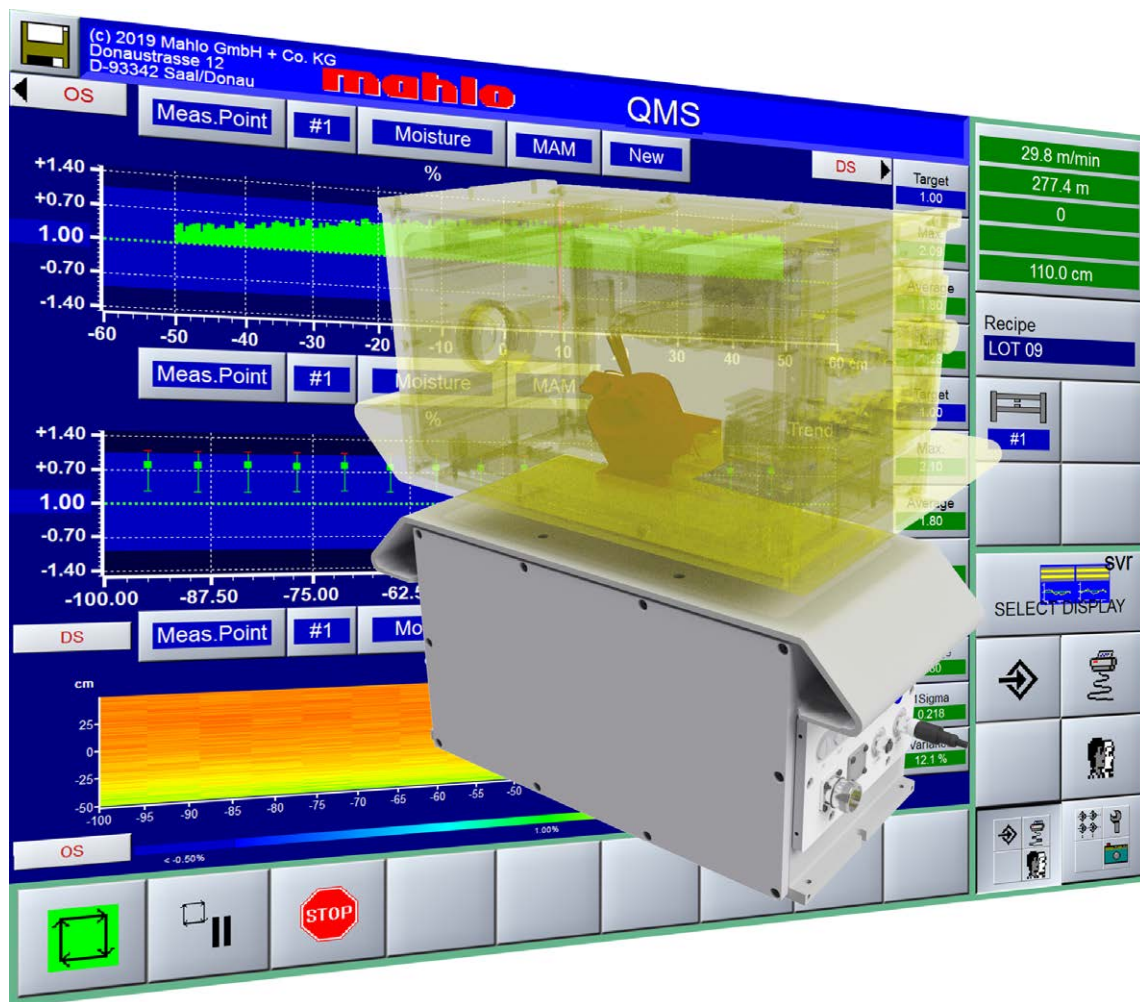


Infralot IMF-R / IMF-T

New moisture & basis weight infrared sensor for Qualiscan QMS



Infralot IMF-R / IMF-T



Quality made
in Germany



TEXTILE



NONWOVEN



COATING &
CONVERTING



PAPER



EXTRUSION

INFRALOT IMF

**IR-Reflection, IR-Transmission:
Moisture, Basis weight**

Infrared sensor (transmission and reflection) for moisture and basis weight for the Qualiscan QMS quality control system

Device versions

IMF-R (Reflection): For one-sided measurement of coatings and light-weight products

IMF-T (Transmission): For measurement of the product's overall thickness and composition

Area of application



Important product-specific parameters such as moisture (material moisture), coating weights or the organic components in nonwovens can be measured during the production process by analysing light energy in the near-infrared (NIR) range. This is done non-destructively and without adversely affecting the product's characteristics.

NIR sensors of the Infralot IMF are based on the classic filter measuring principle. However, this is updated with the very latest optical components and in accordance with the most recent trends in optical measuring technology.

No filter wheel – Same-spot measurement

With filter wheel systems, the wavelengths for dry (reference) and wet conditions are measured with a time delay. This can lead to measurement inaccuracies, which are particularly disadvantageous for inhomogeneous products such as thin nonwovens.

Mahlo's new simultaneous filter measures all wavelengths simultaneously and at the same spot. This eliminates measurement inaccuracies and allows a same-spot measurement of reference and absorption resonances.



Customer benefits

- ✓ *Non-destructive, continuous determination of various parameters of product webs*
- ✓ *Same-spot measurement dry/wet – optimized measuring accuracy*
- ✓ *No moving parts - wear-free and low-maintenance*
- ✓ *Broad range of applications through use of various measuring wavelengths*

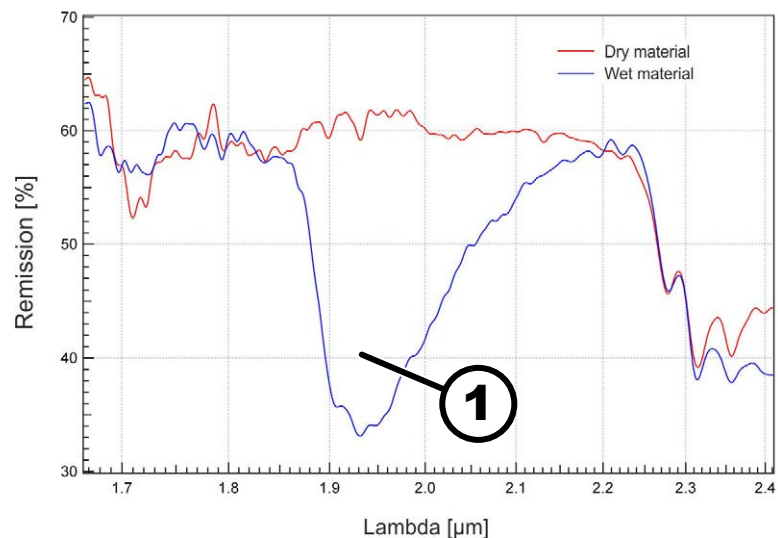
Principle of operation

Light-specific wavelengths can excite the atomic bonds of certain molecules to oscillate. These amount to a multiple of the basic resonance of the molecules. A large part of the incident light energy is absorbed by the material being measured.

If the light energy reflected or transmitted by the material to be measured is examined separately for each wavelength, a relationship is established between the degree of absorption of this resonance wavelength and the number of absorbing molecules. Dependent on the moisture content in the product, the light energy absorbed alters significantly at the resonance wavelength of the water molecule

For stable measurements in practice, the measured light energy of the resonance wavelength is compared with other reference wavelengths at which no absorption occurs.

Diagrams



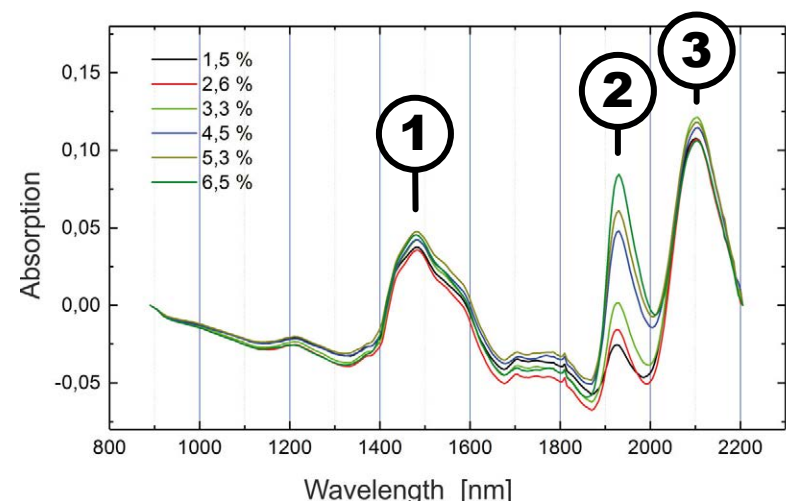
Absorption of IR energy through water

1 Representative absorption



Product highlights

- ✓ Non-radioactive
- ✓ Static simultaneous filter – simultaneous measurement of all wavelengths
- ✓ Smart sensor with microprocessor
- ✓ High spectral resolution
- ✓ Insensitive to product flutter and soiling

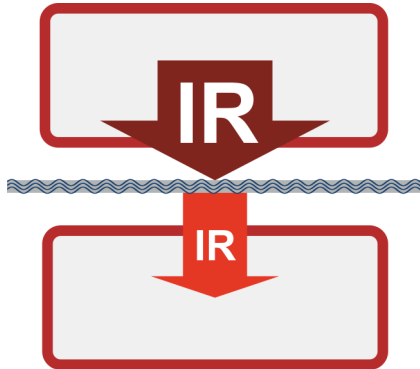


Determination of paper moisture by absorption of IR energy (here the absorption spectra of paper at different moisture levels can be seen)

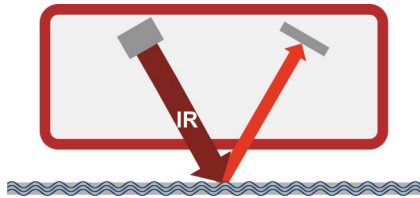
- ① Water + cellulose
- ② Water
- ③ Cellulose

MEASURING METHOD

Infrared transmission / reflection



IR transmission principle



IR reflection principle

Moisture, Basis weight

Water and other materials absorb light in the infrared range. Water and other materials can be differentiated through different spectral ranges. The moisture content and basis weight of different materials can be determined by measuring the weakened radiation.

IR measurement is especially suitable for the area of residual moisture and all materials that exhibit an absorption spectrum in the infrared range. The complete product thickness can be measured with a transmission measurement. This is necessary when the total composition of the material is of interest.

Measurement of the IR reflection is used primarily to determine the top layer or coating without measuring the underlying substrate material.

TYPICAL APPLICATIONS

Transmission measurement of moisture and basis weight



With the double-sided transmission sensor Infralot IMF-T products can be measured with penetrating infrared radiation. This is necessary when the total composition of the material is of interest.

Mahlo's double-sided measuring frame can accommodate up to 5 sensors. A commonly used combination is the simultaneous measurement of basis weight and moisture.

Installation at Selcuk Iplik , Turkey

The nonwoven manufacturer controls basis weight and moisture in its Spunlace lines with Qualiscan QMS from Mahlo.

All images with courtesy of Selcuk Iplik



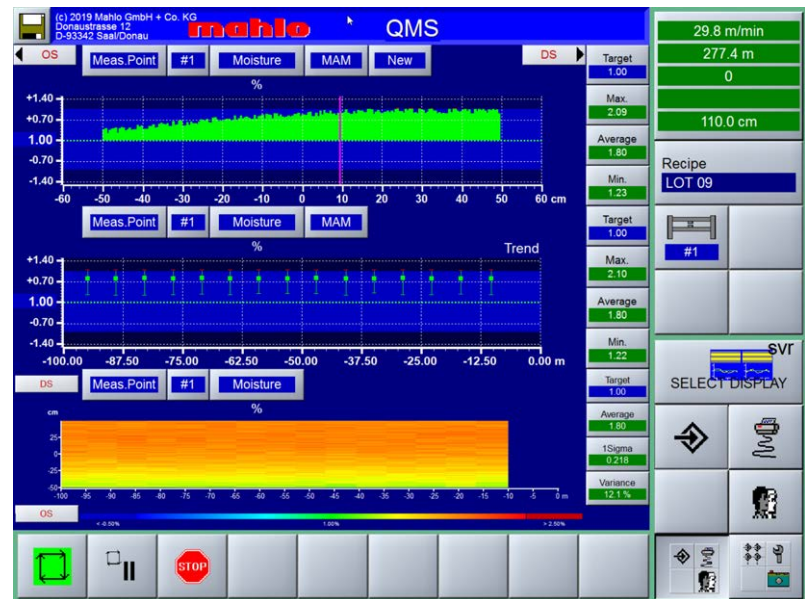
A Qualiscan QMS with a Webpro M scanner measures basis weight with beta sensor and moisture with an infrared sensor.

Reflective moisture measurement

The reflecting Infralot IMF-R infrared sensor can be used for the measurement of one-sided coatings or light-weight products. It is installed in a one-sided measuring frame of the type Uniscan M or Uniscan S. Measurement of the IR reflection is used primarily to determine the top layer or coating without measuring the underlying substrate material.



Because of the single-sided design, the traversing frame easily finds space on existing lines. The measuring sensors can hereby be positioned above, below or to the side of the scanner. Possible applications include foil calendering, nonwoven applications and pulp drying, extrusion coating and coating or impregnating of paper, cardboard, films/foils or textile.



Main screen of the Qualiscan software with an overview of the moisture measurement by lateral profile (top), trend (middle) and 2D trend (bottom)

TECHNICAL DATA

Infralot IMF

Specification		Value		Unit
Measurements		Basis weight & Moisture		
Type		IMF-R	IMF-T	
Measuring principle		Reflection of infrared light	Transmission of infrared light	
Measuring range Basis weight ¹	Paper	~ 10 - 30	~ 10 - 200	g/m ²
	Nonwoven	~ 10 - 60	~ 10 - 500	
Measuring range Moisture ¹		~ 0,2 - 15	~ 0,2 - 15	% H ₂ O
		~ 0,2 - 10	~ 0,2 - 30	g/m ²
Measuring range Coating ¹		0,2 - 200	-	g/m ²
Repeatability		depending on calibration		
Measuring gap		10 / 15 / 30	10 / 15 / 30 / 60	mm
Temperature range without cooling		10 - 50		°C

1) Measuring range and measuring accuracy depending on the material (analysis of material sample necessary)

Monitoring and control systems, automation

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