

## Description



### Measurement of fiber weight and moisture at Tissue papers MRP BW-MOI IRT 2008

#### Fiber weight and moisture measurement according to the infrared absorption principle

The continuous and non-contact measurement of fiber weight and moisture on Tissue papers is an essential tool for assessing the quality of the product. It is important to measure the fiber weight and moisture during the production process with a sufficiently high accuracy under extreme environmental conditions. In the past, radiometric sensors were used to measure the weight per square meter. Today these measurements can be integrated into the equally necessary moisture sensor.

These two measured values therefore help to ensure product quality and to minimize rejects.

#### Indicator / Characteristics

The infrared measurement for fibre weight and moisture measurement is characterised by the following features:

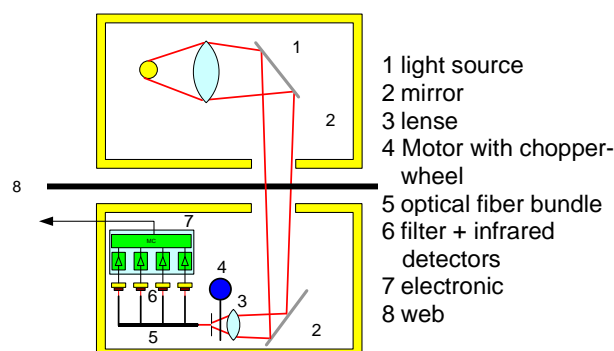
- no radiometric sensor - approval-free
- contactless
- online usable
- applicable in industrial environment
- same spot
- Ash, or filler content must be known

#### Physical principle

The infrared sensor works according to the infrared absorption principle and evaluates the effect that water molecules (moisture) and pulp molecules (fiber weight) have the property of absorbing light at a certain wavelength (the water or cellulose wavelength). The absorption of light in these wavelength ranges is a measure of the number of water or cellulose molecules and thus directly affects the moisture

content of the paper or the fiber weight. If one now compares the absorption at this water wavelength with the absorption at a reference wavelength (which does not react to the number of molecules sought), one obtains a calibratable measure of paper moisture. At a further wavelength, the basis weight (cellulose absorption) of the paper is determined according to the same principle, so that the absolute moisture in % or the fiber weight in  $g/m^2$  is available as the measured value. Filler and ash contents are now added to this via recipe setpoints in order to conclude on the total basis weight of the paper. A further wavelength is used for adaptation to the paper properties. At this point, for example, the influence of the paper surface should be mentioned.

#### Electrical - optical principle



The material web is illuminated by a light beam from a broadband infrared light source (1). Depending on the different measuring tasks, this illumination can be designed in reflection or transmission geometry. The illuminated material web is viewed via an optical imaging system consisting of components (2) and (3). In the image plane of this imaging system there is the entrance surface of a collective bundle of optical fibers. This is divided into several partial bundles, each of which is terminated with a combination of spectral filter and infrared detector (6).

This results in a true "same spot" measurement. The spectral information is recorded both at the same time and from the same location on the material web. Up to six spectral channels can be installed depending on the task. The light-intensive, optical imaging system constricts the measuring spot on the material web to a size of 5 mm in transverse direction and 20 mm in longitudinal direction. The complete signal processing takes place inside the sensor housing, only a 24V supply voltage is required from the outside. The sensor output signal is available as Profibus DP signal.

## Measurement accuracy

Typ	MRP-BW IRT-2008
Design	Transmission / beidseitig
Measuring range moisture	2 - 20 % H <sub>2</sub> O
Resolution	0,01 % H <sub>2</sub> O 0,01 gsm
Accuracy - 2 Sigma bei 1 sec	±0,1 % H <sub>2</sub> O abs. ±0,1 gsm H <sub>2</sub> O
Measuring range fibre weight	5 - 100 gsm
Resolution	0,02 gsm
Accuracy - 2 Sigma bei 1 sec	±0,35 % but not better than ±0,2 gsm
Operating temperature	10°C-70°C

High temperature sensors are also available.

According to this physical principle, pure moisture sensors or line weight and layer density sensors as well as binder measurements on different polymers are also available.