

# Nonwovens Applications

Web gauging solutions for the nonwovens industry

## Qualiscan QMS-12



Nonwovens Applications

## MEASURING SYSTEMS AND PROCESS CONTROL FOR NON-WOVENS



### Customer benefits

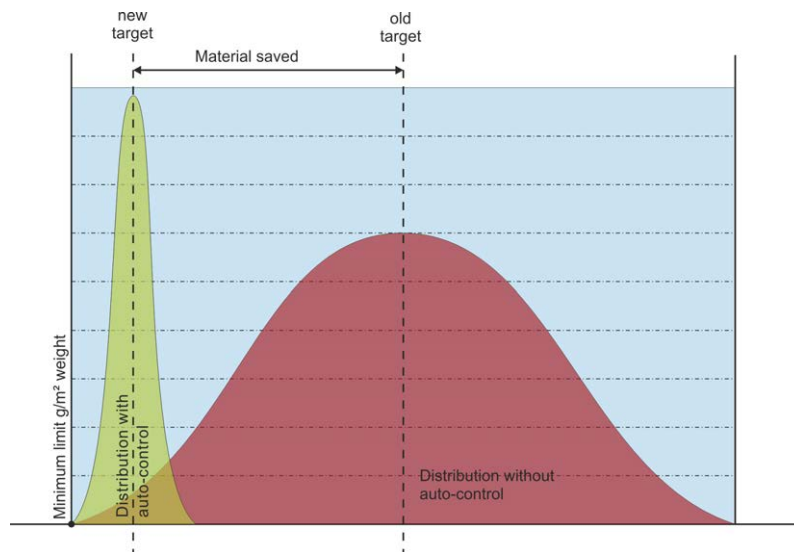
- ✓ Savings in raw materials and improved economy of production process
- ✓ Uninterrupted monitoring and logging of actual product quality
- ✓ Improvement of product quality, especially in connection with control on the plant side
- ✓ Very short amortization times for high profit potential
- ✓ Less rejects and material loss when changing products

### Precision measuring technology for the entire nonwovens process

Mahlo supplies a quality control system tailored to your respective application and for your specific measurement needs for the entire nonwoven area – whether wet wipes, diaper components, floor coverings or geotextile sheets. Systems are available from the fixed measuring point to traversing measuring systems for single and double-sided measurements with several synchronised scanners.

Qualiscan QMS records many critical parameters of your production line in real time and transmits them to the supervisory process control system or host computer. The control system uses this data for the control and process optimization of the plant.

The automatic control reduces the spread for the measured parameters and thus guarantees a more uniform end product. This enables optimised target value specifications and, in addition to better product quality, leads to significant savings in raw materials and energy costs. In addition, process reliability and production throughput are increased.



### Reduction of the spread – minimisation of the safety buffer

Many well-known manufacturers of nonwovens rely on Mahlo's many years of experience with technologies for online process monitoring and control. Our expertise in the nonwoven sector and corresponding understanding of process control enables Mahlo to tailor systems especially for the following processes:

- Airlaid and Dry Laid
- Carded
- Hydroentangled
- Meltblown
- Needlepunched
- Spunbond / SMS
- Spunlaced Wetlaid

### 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.*

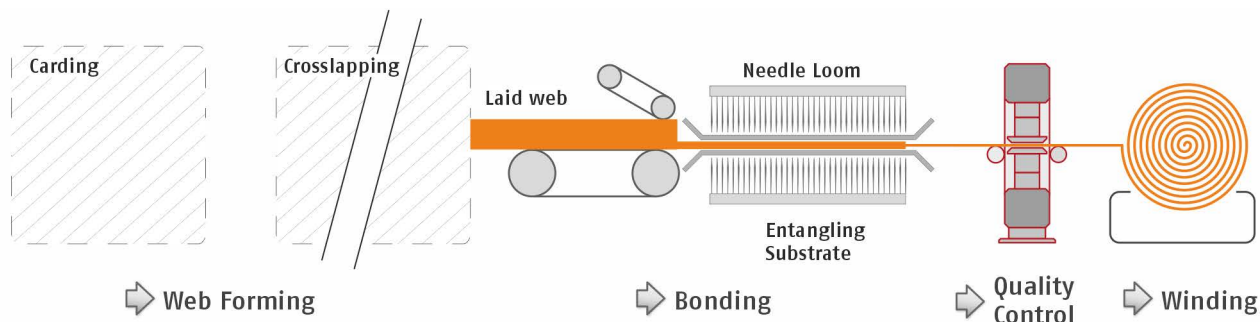


*The traversing scanner of the Qualiscan QMS allows generating precise lateral (CD) and longitudinal (MD) profiles of parameters such as basis weight, thickness or moisture. They are presented clearly arranged in the operating software of the Mahlo system on a touchscreen (in the foreground).*

## Needlepunch

### APPLICATIONS

#### Needlepunch



#### *Needlepunch production principle*

In the needlepunch process, the fibres of the pile are intertwined with each other by pricking needles. This gives the nonwoven fabric high strength in the longitudinal and transverse directions. Nowadays, needlepunch is mainly used as a floor covering with a textile character and in voluminous versions for sound and heat insulation in construction, industry, automotive and also in the home textile sector.

#### **Basis weight**

Control of fibre distribution in the longitudinal and transverse profile, regulation of pile laydown.

#### **Residual moisture**

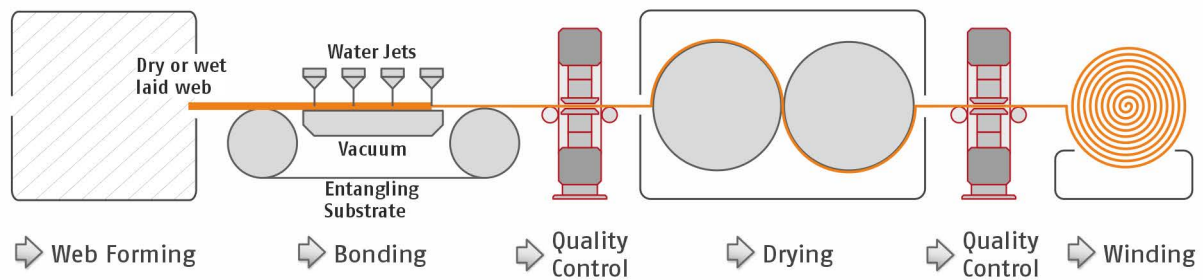
For natural fibres in the hygiene sector, the residual moisture must be monitored.

#### **Thickness**

In combination with the basis weight, a statement on the nonwoven density is obtained.

## Spunlace

### Spunlace



#### *Spunlace production principle*

Here, jets of water are shot at high pressure onto the fibre pile to consolidate the fleece. This is how soft nonwovens are produced in particular, such as skin-friendly cosmetic wipes or cleaning cloths with high absorbency.

#### **Basis weight**

Fibre distribution in longitudinal and transverse direction, optimisation of raw material use.

#### **Residual moisture**

High moisture after water jet consolidation. Residual moisture after the dryer, optimisation of the drying process.

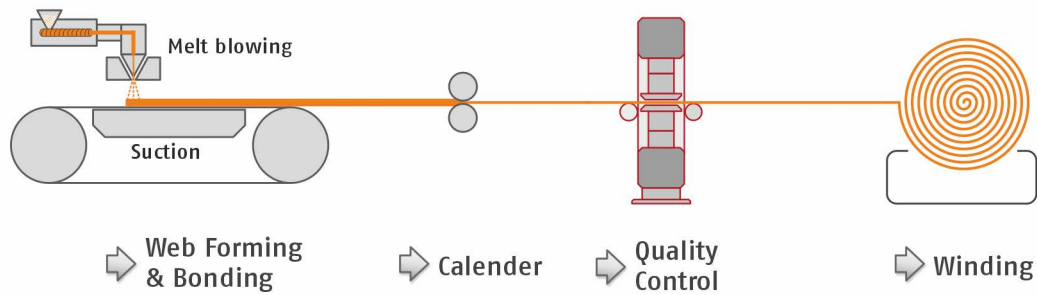
#### **Thickness**

In combination with the basis weight, a statement on the nonwoven density is obtained.



## Meltblown

### Meltblown



#### *Meltblown production principle*

The starting materials here are not fibres but granulates. These are melted and then spun out into the finest fibres using pressure and hot air. Cooled and placed on a conveyor belt, these so-called filaments form nonwovens with extremely small fibre diameters. Optimal for high-performance and long-lasting filter media.

#### **Basis weight**

Fibre distribution in longitudinal and transverse direction, optimisation of raw material use.

#### **Thickness**

Monitoring the accuracy of fit of the final product.

#### **Permeability**

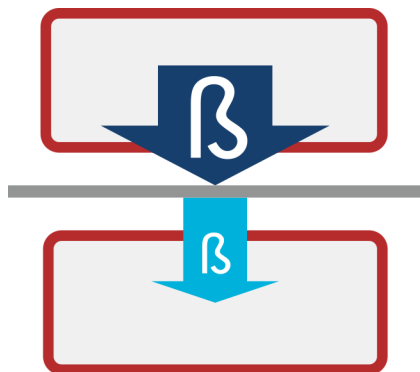
Important quality parameter for all filter products.

## MEASUREMENTS

### Basis weight

The weight of nonwovens is usually determined by beta transmission (Gravimat FMI/DFI), X-Ray transmission (Gravimat FMX-T) or infrared transmission (Infralot IMF-T). These methods have long been proven because of their reliable and easy manageability.

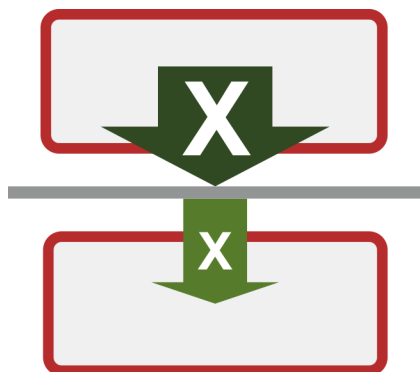
#### Gravimat FMI/DFI



*Beta transmission principle*

With beta transmission, the radiation intensity is weakened by the product in the measuring gap. The weight can be determined this way. For products with a weight between 10 and 1400 g/m<sup>2</sup>, Krypton-85 is used, for 100 to 6000 g/m<sup>2</sup> Strontium-90 is used. The advantages of beta sensors are the low calibration effort and the wide range of measurable materials.

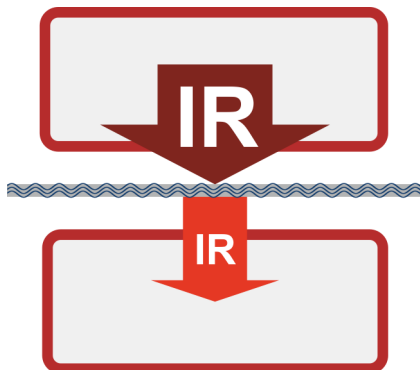
#### Gravimat FMX-T



*X-ray transmission principle*

X-ray transmission also determines the weight per unit area by attenuating the radiation. X-Ray transmission is very suitable for materials consisting only of a single component. The advantage compared to beta emitters is the emission of the X-ray tube that can be shut off. In addition, radiation protection precautions are usually not necessary below 5 kV.

#### Infralot IMF



*Infrared transmission principle*

Infrared technology offers another alternative to basis weight measurement. The light absorption at the wavelengths specific to the fibre type is ascertained and thus the basis weight is determined. This method also does not require special safety requirements.



#### **Multichannel-Measurement**

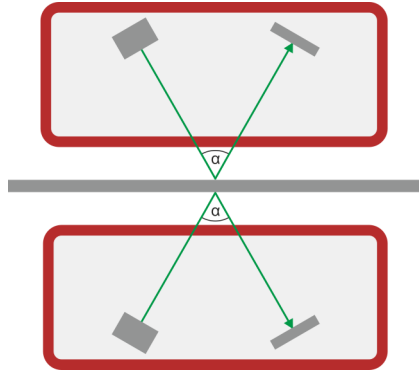
*With the multi-channel evaluation of the infrared sensors different fibre contents and the material moisture can be determined **simultaneously with only one sensor.***

## Residual moisture

### Thickness

The material thickness can be reliably determined with Mahlo's laser sensors or shading sensors.

#### Calipro DML



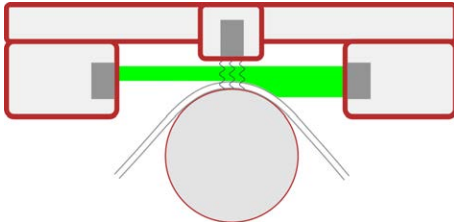
*Laser measurement principle*

For most applications, laser triangulation is used with the Calipro DML. Material thicknesses of up to 100 mm are possible.

#### Calipro DML-S-L

For porous, voluminous products, the laser line sensor Calipro DML-S-L is suitable. Regardless of the surface condition, the open structures are correctly detected and evaluated by the laser line. Material thicknesses up to 400 mm can be measured.

#### Calipro DMS



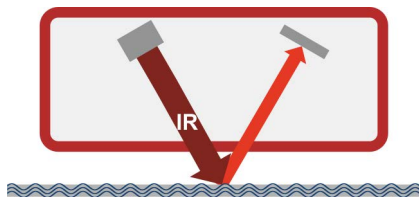
*Light shading measurement principle*

If the material surface is structured, rough, very smooth, shiny or even multi-coloured, transparent or opaque, laser triangulation is not suitable. This is where the Calipro DMS LED shading sensor comes into play. The combination of eddy current sensor and shading sensor makes the measurement insensitive against material surface, colour, transparency, opacity and temperature variations.

### Residual moisture

With natural fibres, the residual moisture at the end of the process plays a major role. It is determined with infrared or microwave sensors.

#### Infralot IMF



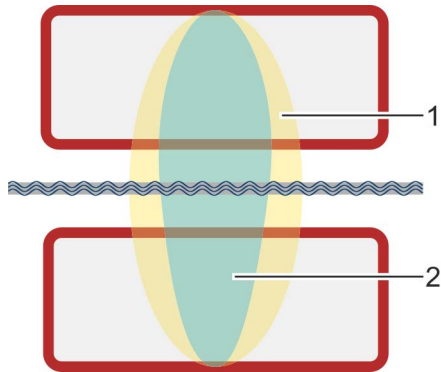
*Infrared reflection principle*

Infralot IMF IMF-T in the transmission process is used for thick materials. The measurement with IR reflection with the Infralot IMF-R is primarily used to determine the top layer or coating without measuring the underlying substrate material as well. Mahlo's new filter array measures all wavelengths simultaneously and at the same spot without rotating filter wheel. This enables true same-spot measurement for a moisture content of approx. 0.2 – 15 % H<sub>2</sub>O.



## Permeability

### Aqualot AMF



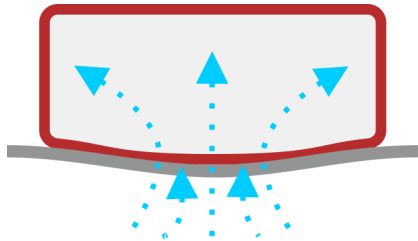
- 1 Reference resonance
- 2 Measuring resonance

The microwave sensor is able to measure high moisture values of up to 2.000 g H<sub>2</sub>O/m<sup>2</sup> without contact and independent of material thickness, structure and colour

*Microwave measurement principle*

## Permeability

### Airpro APM



For all filter products, whether air or liquid filters, permeability is a decisive quality parameter that must be determined independently of the basis weight. This ultimately determines the performance of the product.

*Air flow measurement principle*

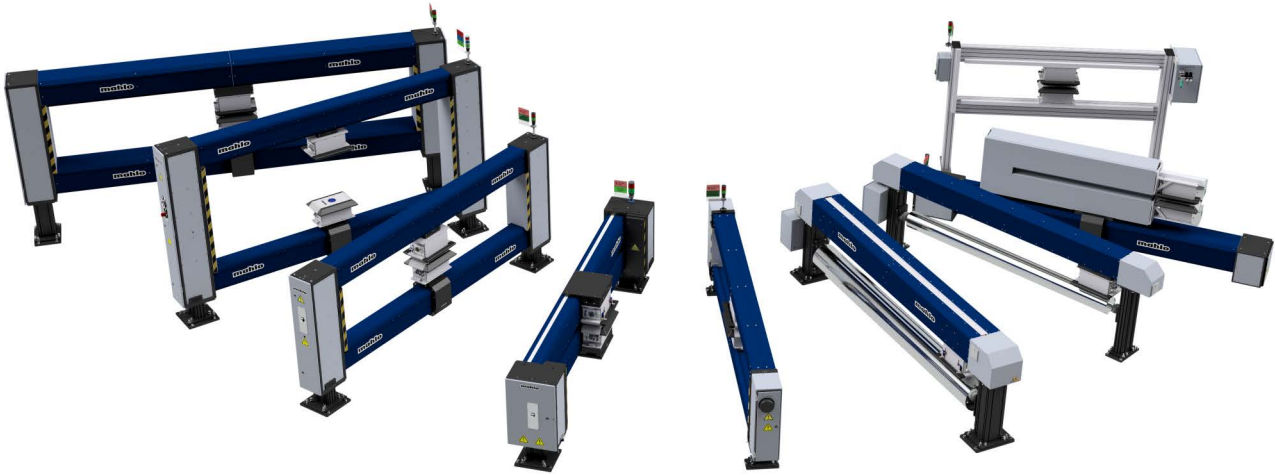
## SELECTION OF SENSORS

Application	Sensors	Basis Weight					Thickness			Moisture			Permeability
		Beta Transmission Gravimat FMI/DFI	X-Ray Transmission Gravimat FMX-T	NIR Infrascope IMF	NIR Spectrometer Infrascope NIR	Gamma Transmission Ashpro FMA	Laser Caliper Calipro DML	Laser Caliper (Line) Calipro DML-S-L	LED Array Shadow Caliper Calipro DMS	NIR Infrascope IMF	Microwave Resonance Aqualot HMF/AMF	NIR Spectrometer Infrascope NIR	Air Permeability Airpro APM
Nonwovens													
Weight/Thickness/Density Nonwovens		●	●	●	●		●	●	●				
Moisture in Nonwovens									●	●	●		
Permeability Nonwovens												●	
Needle punch / fibre bonded													
Weight end product		●	●										
Thickness end product							●	●	●				
Density calculated from weight and thickness		●	●				●	●	●				
Residual moisture in natural fibers									●	●			
Spunlace													
Weight end product		●	●	●	●								
Thickness								●					
Density calculated from weight and thickness		●	●	●	●			●					
Moisture after hydroentanglement									●	●			
Moisture of final product									●		●		
Fiber blend									●		●		
Meltblown													
Weight end product		●	●	●	●				●		●		
Thickness end product								●					
Density calculated from weight and thickness		●	●	●	●			●					
Moisture of final product									●		●		
Fiber blend									●		●		
Air permeability end product												●	
Fiberglass with Binder													
Weight preliminary and final product		●											
Thickness end product							●	●	●				
Binder content			●	●		●			●				
Air permeability												●	

For an exact selection of sensors, please contact our sales team.

## SCANNER TYPES

### Scanner



Mahlo offers a variety of scanners. The Qualiscan QMS is therefore optimally equipped for all tasks and requirements.

#### Basic components

- One Mahlo control and display station as a minimum
- Central control cabinet with I/O for linking the machine signals
- At least one Mahlo scanner, or permanently installed measuring devices

#### Key operating functions

- Access to all functions via a rugged, industrial touchscreen
- Simultaneous representation of up to nine lateral or longitudinal profiles of all measured values
- Powerful recipe management for type-specific measuring tasks
- System access through up to five control and display stations linked per network
- Generous sizing of all symbols for ease of operation
- Incorporation and display of important machine functions

## Monitoring and control systems, automation

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- ✓ Remote diagnostic system
- ✓ Service Hotline: +49-180-5062456
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