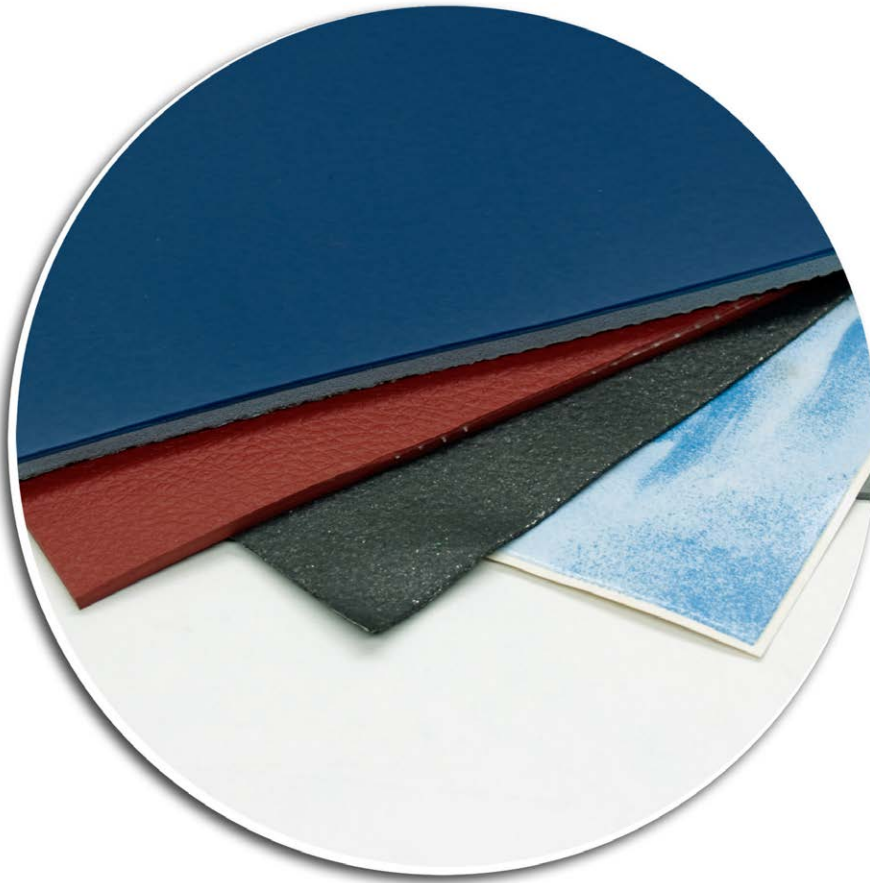


Application Report Calendering

Calender Solutions on continuous web processes



Application Report
Calendering

Table of contents

1 **Calendering of continuous webs..... 3**

 1.1 Durable and easy to maintain..... 4

 1.2 Sensors & Measurements..... 5

 1.3 Scanners..... 6

 1.4 Operator stations & Options..... 7

2 **Mahlo at a glance..... 9**

3 **Notes..... 10**

1 CALENDERING OF CONTINUOUS WEBS

Calendering



The Calendering market requires a Quality Control System that is both flexible and configurable. Measurements must often be performed right on the calender roll for fast accurate control. In addition, this industry has become increasingly more competitive resulting in tighter product specifications and more challenging profit margins.

Mahlo has responded to these market pressures by providing coating and converting measurement and control solutions for over 25 years.

Mahlo's experience and understanding of the calendering industry has allowed us to tailor web gauging systems for the following processes:

- Rubber Calendering
- Vinyl Calendering
- Embossing Calendering
- Laminating



Manufacturers using Mahlo systems supply to the following calendering industries:

- Automotive Tires, Belts & Hoses
- Agricultural Belts
- Exterior Siding
- Printing Blankets / Pads
- Floor Products
- Gasketing
- Health / Personal Care / Hygiene
- Pressure Sensitive Foam Tape



Among the calendered products manufactured using Mahlo systems are:

- Vinyl Siding
- Tire Inner Liners
- Neoprene Padding and Insulation
- Vinyl Sheeting
- Weatherstripping
- Adhesive Foam Tape
- Gaskets
- Vinyl Flooring
- Matting
- Countertops and Wallcoverings

Durable and easy to maintain

1.1 Durable and easy to maintain

Built to last



For the entire range of calendered products, Mahlo makes a quality control system tailored to your specific application, for your specific measurement and control needs. Fixed, single-sided and dual-sided scanning platforms are available

The systems measure coatings, basis weight, moisture and thickness plus a myriad of combined calculations either directly on the calender stack or downstream. Multiple synchronized scanners are available as standard for coating & laminating lines.

Automated control integration is possible with our coat weight control capabilities for roll gap, roll skewing, applicator roll speed/ratio, die pump, linespeed and APC (automatic die profile control) to name a few.



With intelligent sensor and scanner technologies, quality management systems (QMS) from Mahlo measure continuously with extreme precision and sensitivity. The Windows-based data interface is open and complies with the industry standards for communication. Usability and configurability set standards. The menus and functions are designed intuitively and ensure quick success.



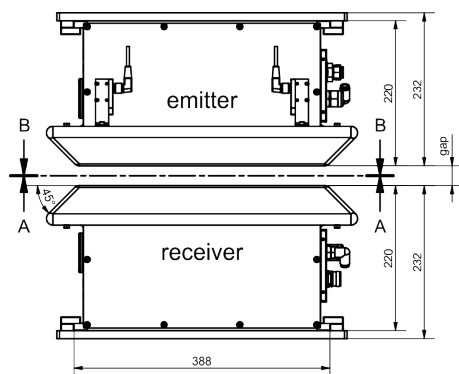
One of the outstanding features is the range of robust, traversing scanners. We know exactly that these scanners traverse reliably 24 hours a day, 365 days a year - for many for many years. The construction of robust industrial machines in German quality workmanship is one of Mahlo's strengths. The company grew out of the manufacture of large systems for the textile and carpet industry and continues this development today.

Whether scanners for single-sided infrared, laser or X-ray sensor applications, whether compact measuring frames for cramped conditions or large WebPro-L measuring frames for applications with broad wide webs and more than five sensors - all Mahlo systems are designed for long, trouble-free and uninterrupted operation. At the same time, they consist of commercially components and are therefore very easy to maintain.



1.2 Sensors & Measurements

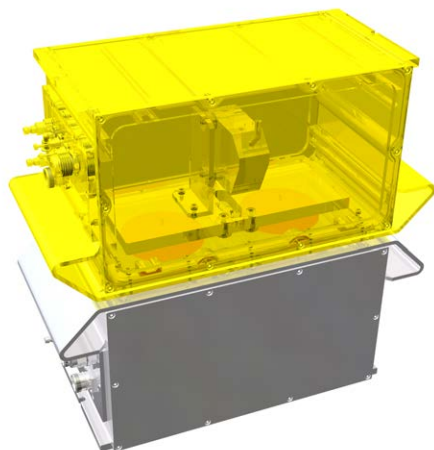
Measurements



Basis weight	
	Beta Transmission Sensor, Model DFI
1 – 200 g/m ²	■ Promethium-147
20 – 1 300 g/m ²	■ Krypton-85
150 – 6 000 g/m ²	■ Strontium-90
50 – 20 000 g/m ²	X-Ray Backscatter Sensor, Model FMX
5 – 1 000 g/m ²	X-Ray Low Voltage Sensor, Model FMX-T

Thickness / Caliper	
<0,2 - 80 mm	Single-Sided and Dual-Sided Laser Caliper Sensor, Model DML
0,3 – 100 µm	White Light Interference Sensor, Modell WLI

Scanners



Moisture	
0,1 – 90 %	Infrared Absorption Sensor, Model IMF or Model NIR - depending on application -
2 – 1 500 g/m ²	Microwave Sensors, Model HMF and AMF
Selective Coatings, e.g. adhesive, lacquer, silicone...	
approx. 0,1 – 200 g/m ²	Infrared Absorption Sensor, Model IMF or Model NIR - depending on application -

1.3 Scanners

Traversing Platforms



O-Frame Scanners	
Up to 2 meters	WebPro XS
Up to 3 meters	WebPro S
Up to 4.5 meters	WebPro M
Up to 8 meters	WebPro L
Single-Beam Scanners	
Up to 3 meters	UniScan S
Up to 6 meters	UniScan L
C-Frame Scanners	
Up to 2 meters	WebPro C

1.4 Operator stations & Options

Operator stations



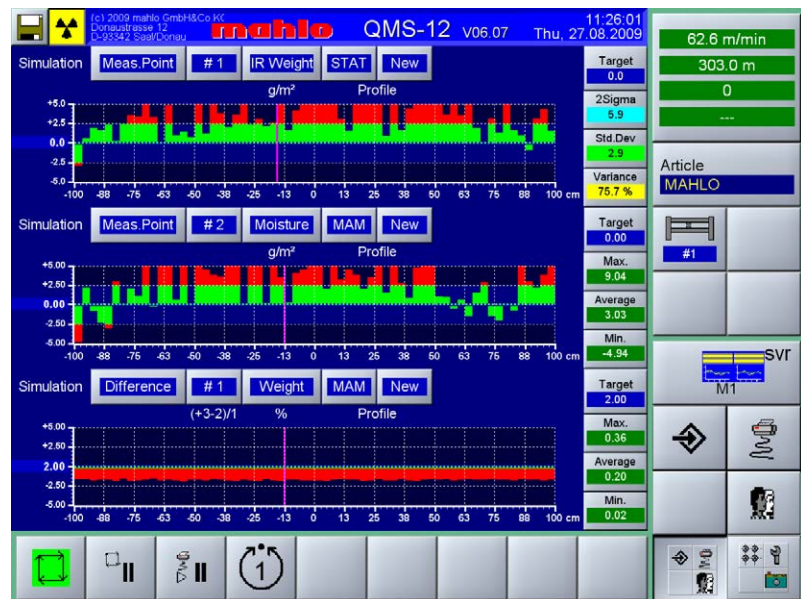
Stand-Alone	Standard Operator Station
IP Desktop	QMS Visualization IP Desktop
Line Control Station	Integrated into Line Operator Station

Options

Auto-Die-Control

SPC/QC Packages

Hazardous Ambient Applications



Operator stations & Options



2 MAHLO AT A GLANCE



Mahlo GmbH + Co. KG is one of the leading manufacturers worldwide of monitoring, control, and automation systems, not only for the textile and related finishing industries, but also for the paper, film and coating divisions. The long-established Bavarian company was founded in 1945 by Dr. Heinz Mahlo and has remained a family business that has maintained its position on the world market to this day. Through a worldwide network of service centers and a high quality standard combined with strong customer relationships, the special requirements of Mahlo's clientele are fully satisfied.



Due to the exorbitantly rising costs of raw materials, energy and water, and the high costs of environmental protection, it is more important than ever to keep an eye on these issues. The products from Mahlo set new standards in terms of quality assurance and process optimization. The goal is to work with the customer to determine the most competitive and cost-effective production solutions. The ultimate purpose of this strategy is to maximize profitability (ROI) by reducing the need for energy, raw materials and personnel while optimizing quality, equipment utilization and work processes.

Mahlo products and solutions

The portfolio of products and plant-related solutions is comprehensive. For more detailed information, please direct your inquiries to Mahlo. Please call us today at +49-9441-601-0 or visit us at www.mahlo.com.

Mahlo - Close to you worldwide

Best possible technical support and know-how transfer are written in capital letters at Mahlo. Thanks to an international network of and service centers, competent support is available to our customers worldwide. We are here for you 365 days a year. Simply contact us!

- Over 40 service centers worldwide
- Immediate service and spare parts delivery within 24 hours
- Remote diagnostic system
- Service-Hotline: +49-180-5062456

3

[illegible]

[illegible]

Monitoring and control systems, automation

MAHLO GUARANTEES QUALITY. WORLDWIDE, IN YOUR VICINITY.

Best-possible technical support and know-how transfer are written in capital letters at Mahlo. Thanks to an international network of agencies and service centres, customers have at their disposal competent support worldwide. We are there for you 365 days a year, 24 hours a day. Just get in touch with us!

- ✓ Service partners in over 100 countries
- ✓ Direct service and spare parts delivery within 24 hours
- ✓ Remote diagnostic system
- ✓ Service Hotline: +49-180-5062456
- ✓ WWW.MAHLO.COM



Mahlo GmbH + Co. KG - Germany

Donaustr. 12
93342 Saal / Donau
Telephone: +49-9441-601-0
Fax: +49-9441-601-102
Email: info@mahlo.com

Mahlo Italia S.R.L. - Italy

Via Fiume 62
21020 Daverio
Telephone: +39-0332-94-95-58
Fax: +39-0332-94-85-86
Email: mahlo.italia@mahlo.com

Mahlo America Inc. - USA

575 Simuel Road
Spartanburg S.C. 29304
Telephone: +1-864-576-6288
Fax: -
Email: mahlo.america@mahlo.com

Mahlo Ouest S.R.L. - Belgium

Quantum Center
Hütte 79 - Bte 10
4700 Eupen
Telephone: +32-87-59-69-00
Fax: +32-87-59-69-09
Email: mahlo.ouest@mahlo.com

Mahlo España S.L. - Spain

Calle Luxemburgo nº 4
08303 Mataró (Barcelona)
Telephone: +34-938-640-549
Email: mahlo.espana@mahlo.com

Mahlo Shanghai Rep. Office - China

Bldg 2, 569 Hua Xu Road
Xu Jing Town
Shanghai 201702
Telephone: +86-1390-1804736
Email: frank.fei@mahlo.com