

Microwave Measurement Technology for Coating

VDMA Textile Webtalk

Latest Coating Technology supported by Special Measuring Systems

Johannes Lutz

Since 1969 | family business. values. innovation.

- Development and production of sensors and controls in Germany
- Focus on systems for on-line controls and monitoring of industrial processes
- Family-owned company with around 60 employees
- Represented in all relevant industrial countries
- Worldwide service bases



Basics of microwave measurement

Measurement principle

Coating measurement

Versions

MW Box series 700

Use of measurement

AF120 | Center

AF310 | Side-Center-Side

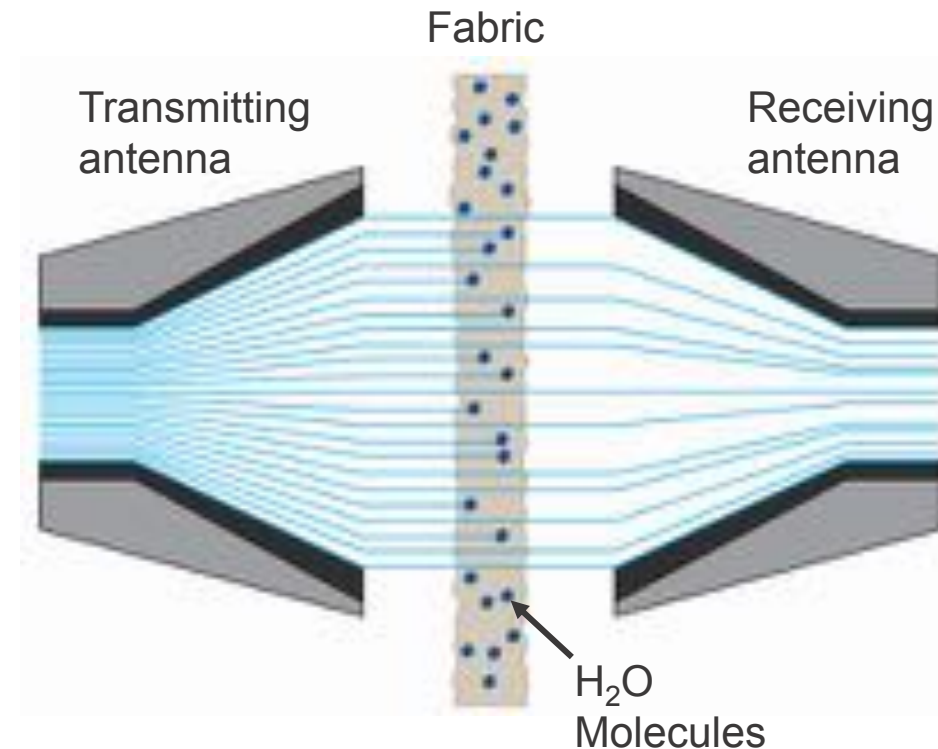
MP120 | Traversing measurement

Advantages of coating measurement

Sustainable SuccessStory

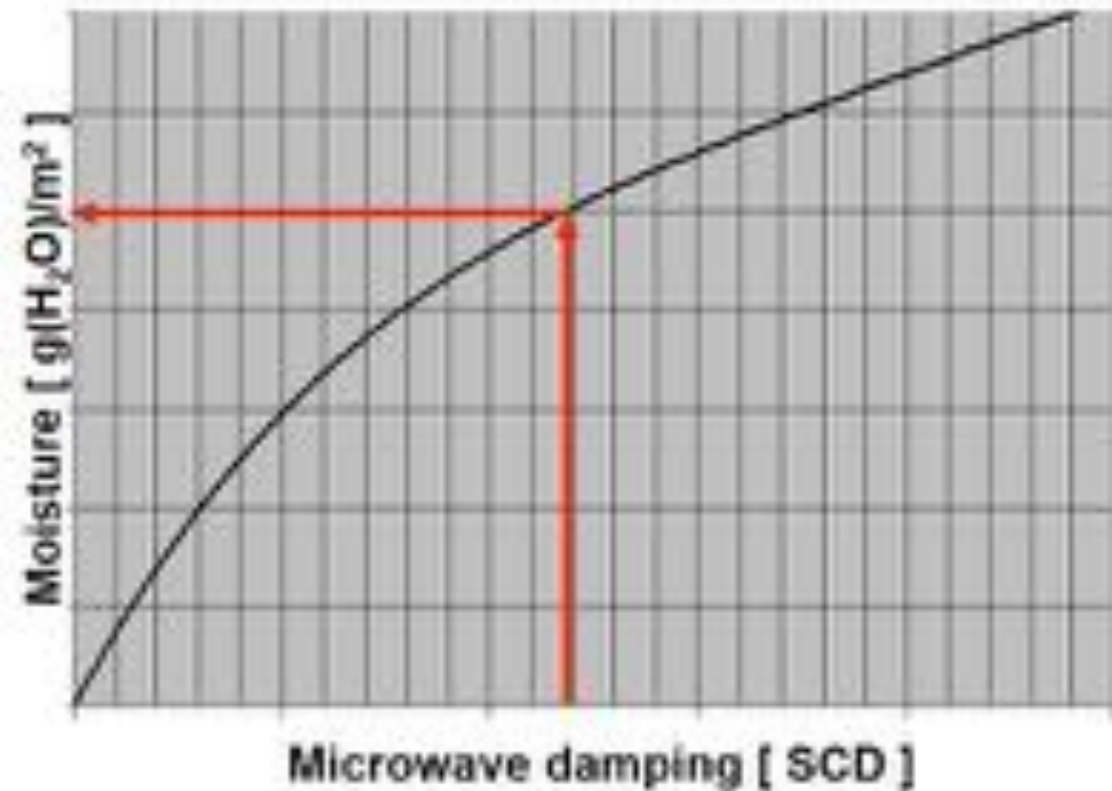
Measurement principle

- Measurement is contact-free
- 2 measuring heads, transmitting and receiving
- Microwaves are absorbed by water content of fabric
- More water in the fabric means less signal at receiving antenna
- Measurement is non-hazardous
- Measurement is continuous and inertia-free



Coating measurement

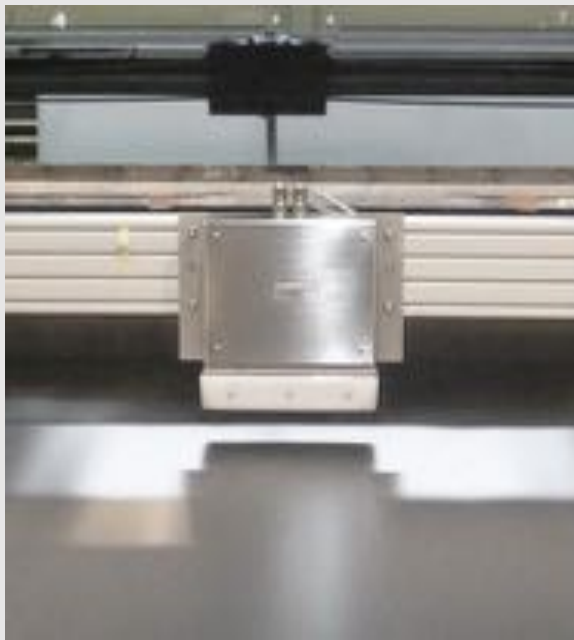
- Defined ratio: water \leftrightarrow solids
- Microwave absorption in scale division (SCD)
- Determine application moisture in $\text{g}(\text{H}_2\text{O})/\text{m}^2$ using a calibration curve and via mix ratio the add-on in $\text{g}(\text{solids})/\text{m}^2$



Versions

AF 120 / RF 120

Center Measurement



AF 310

Side-Center-Side Measurement



MP 120

Traversing Measurement



MW Box series 700

- Connection of up to 2 sensors: AF120 or AS120 or RF120
- Or connection of 1 AF310
- Adjustable frequency range
- Improved sensitivity and accuracy by more than 30 %
- Quick and easy commissioning and maintenance
- Interfaces: analog (0/4...20 mA), RS485
- New Interface: CAN
- Operation without tools



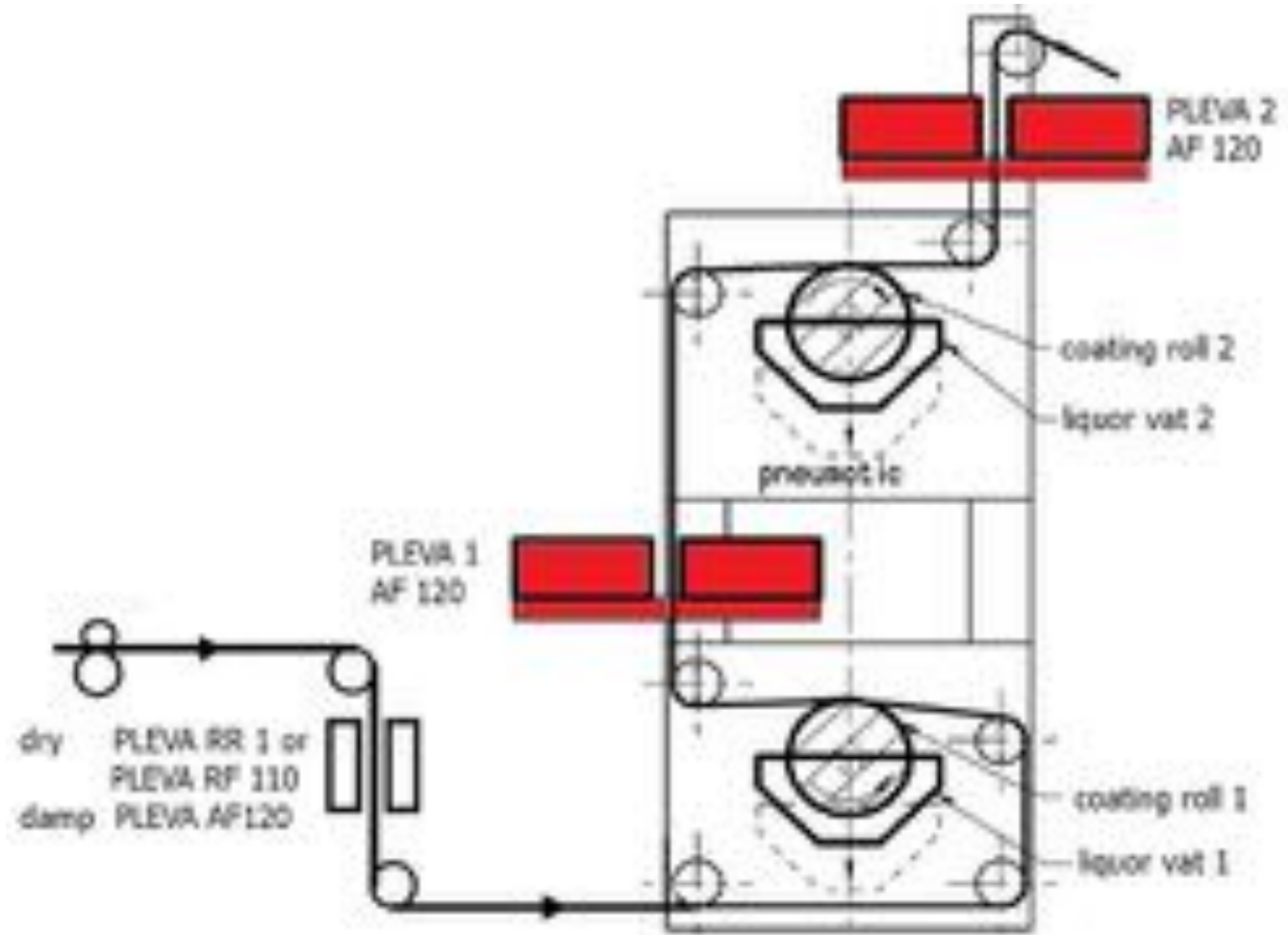
AF120 | Center measurement

- Wide-spread sensor head (250 mm wide)
- Large distance between sensor heads (up to 110 mm)
- Measurement up to 2000 g(H₂O)/m²
- Robust measuring frame



AF120 | Center measurement

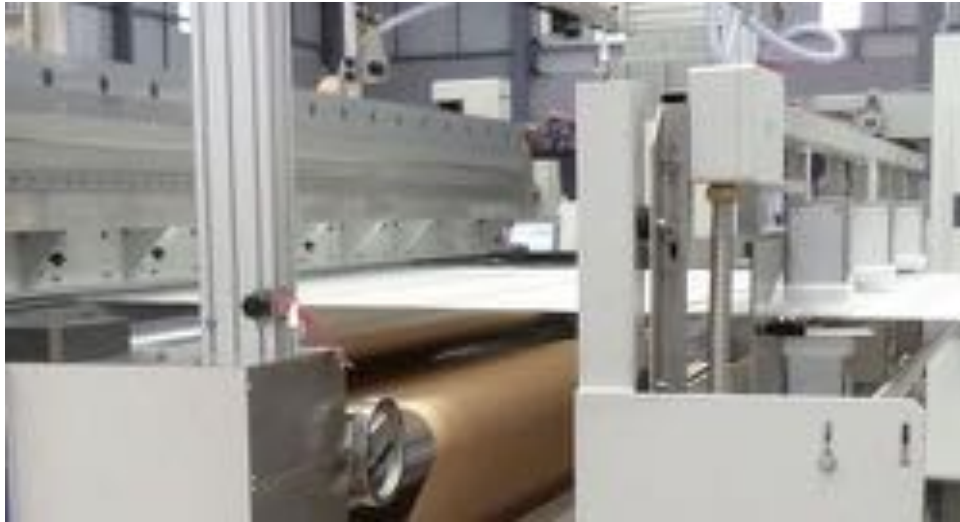
- Minimal application via controlling the speed of coating roll
- One or two-sided application with different add-ons



Example: Monforts Eco Applicator

AF310 | Side-Center-Side measurement

- Continuous control of coating application
- Smallest adjustments visible



Coating add-on:

- Permanent monitoring over the width (side/center/side)
→ **Evenness**
- Direct check in front of dryer:
 - Fabric tension
 - Fabric quality
 - Coating knife
- Constant
- Reproducible



MP120 | Traversing measurement

- For fabric width from 2000 mm up to 5200 mm
- Large distance between sensor heads (60 mm)
- Moisture measurement of running fabric up to 2000 g(H₂O)/m²



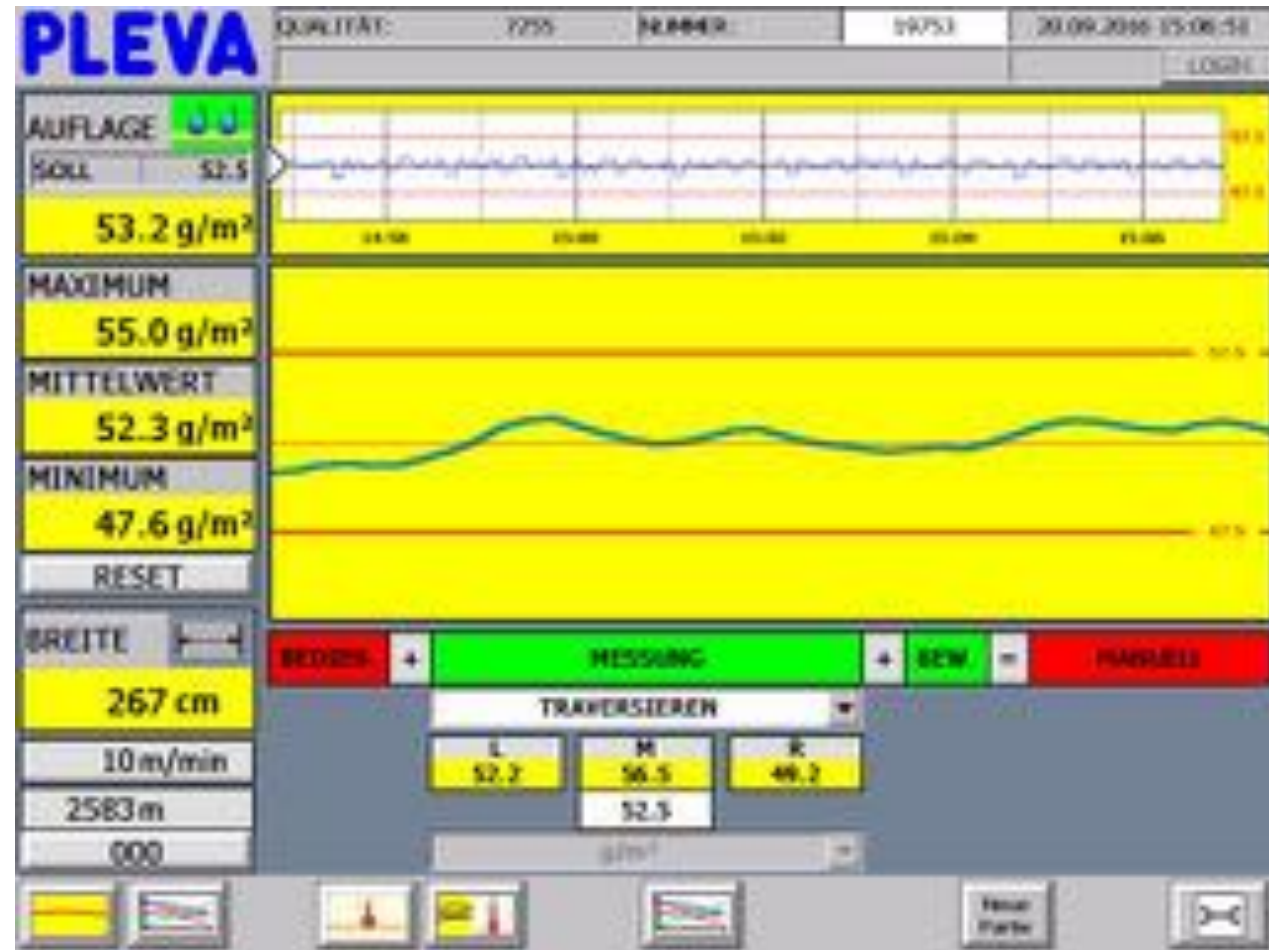
MP120 | Traversing measurement

- For vertically or horizontally running fabric
- Automatic adaption to the product width
- Adjustable traversing speed
- Continuously traversing or positioning mode possible



MP120 | Traversing measurement

- Online measurement of add-on over time and width of the fabric
- Continuous moisture monitoring in vertical and horizontal direction from edge to edge



Advantages of coating measurement

- Drastically saving of add-on chemicals to minimum
- Even dispersion of add-on over the whole width
- Permanent control of absolute amount of add-on application over length and width

→ constancy

→ reproducibility



- Water based coatings
- Size pick-up
- Application moisture after padder (side/center/side)
- Minimal applications
- Residual moisture
- Moisture contents from 5 – 5000 g/m²

Textile materials

- Wovens, carpets, tyre cord, nonwovens, warps



Coating is the essential part of functionalizing textiles, e.g. for sun protection, blackout curtains...
Thereby, chemical pastes or foams are added to the textile.

Often, two challenges occur in production, which have a **high impact on sustainability** and **cost-efficiency**:

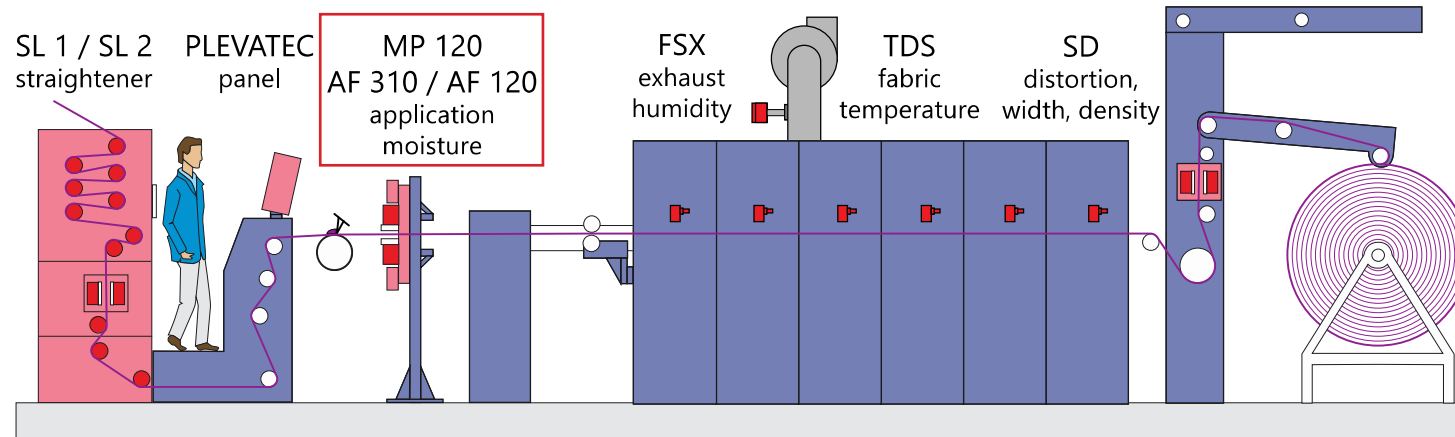
1. Too much coating is added.

This implicates **unnecessary consumption of pastes and foams**, as well as increased **energy consumption for drying**. Or in some cases it means the good is second choice or even rejected (as it is e.g. too thick).

2. Too little coating is added.

This leads to **second choice or rejects**, which in turn also means unnecessary consumption of resources.

To save valuable resources and prevent rejected goods, the contactless measurement and control of the add-on is required.



The microwave measurement systems **AF 120**, **AF 310** or **MP 120** are placed directly after the coating knife. This enables a permanent monitoring and control of the coating application. Even the smallest changes of the coating application become visible, and the add-on chemicals can be reduced to minimum.

➡ **The result is: more constancy, reproducibility and evenness.**

Exemplary calculation of resource and cost savings

with data from one of our customers with a coating production in the Netherlands

Production data	1.500.000 m ² foam coatings per year	and	1.500.000 m ² paste coatings per year
Costs of chemicals	foam = 1.6 €/kg	and	paste = 3.5 €/kg

Exemplary, experienced saving of chemicals due to usage of microwave sensor: 5 g/m²

Savings of costs

Foam: $1.500.000\text{m}^2 \cdot 5 \text{ g/m}^2 \cdot 1.6 \text{ €/kg} = 12.000 \text{ €}$
Paste: $1.500.000\text{m}^2 \cdot 5 \text{ g/m}^2 \cdot 3.5 \text{ €/kg} = 26.250 \text{ €}$

38.250 €



Our impact as your **HEROES FOR SUSTAINABILITY**

- Only required chemicals are used, which saves resources (up to some tons per year).
- Energy consumption for drying can be reduced to a minimum.
- Less rejected/second choice goods are produced.
- No need for cut-outs of fabrics for checking the coating.

Heroes for your process.

Stable and controlled processes

Higher quality of final product

Energy efficiency | CO₂ reduction

Increased productivity

For more information visit our website
www.pleva.org or follow us on **LinkedIn**:

