Total Consistency Measurement

Metso Microwave Consistency Transmitter
The Metso MCA-FT flow through transmitter is available for pipe sizes from 50 mm up to 300 mm. The new, rugged, light weight construction is designed to survive harsh process conditions.

**Metso Microwave Consistency Transmitter**

**Experience is the key**

Metso MCA is a third generation microwave consistency transmitter. All latest electronics and redesigned mechanical construction provide even better reliability, easier installation and the tremendous accuracy of the microwave measurement principle. The Metso MCA measures total consistency independent of pulp grade, recipe or production speed – for optimized paper production and quality.

In certain applications, consistency transmitters can be difficult to calibrate, suffer from contamination and shives that cause plugging and coating, or be affected by flow changes, be insensitive to fillers and are difficult or expensive to install and maintain. This is where the Metso MCA microwave consistency transmitter is the best solution. The all new design is both lighter and stronger. New technology encompasses Hart, Profinet PA and Foundation Fieldbus communications. The device has comprehensive self diagnostics and supports online condition monitoring with FieldCare.

This transmitter measures total consistency of the pulp process stream independent of fiber length, freeness, wood species or blend. The measurement is not affected by flow rate, brightness or color, providing better control of the furnish, fewer process upsets and less off grade product. The Metso MCA is part of the Metso’s family of consistency measuring solutions including mechanical and optical methods developed in close cooperation with users for optimal results in a wide range of applications.

**Better Results**

Metso MCA uses a patented measurement principle based on the linear correlation between consistency and microwave time of flight. Low power microwaves are passed through the pulp slurry from antennas on opposite sides of the pipe (FT model). The mechanical design features one piece cast body, full bore flow through sensor and ceramic windows. Solids, such as fibers and
filers, conduct the microwaves faster than water so that shorter transmission times are seen with higher consistencies. The relationship is linear, making it easy to calibrate the device irrespective of what is being measured. Broke, recycled fiber or other difficult pulps do not present any problems.

**No Regular Maintenance Required**
Regular maintenance is not needed, so commissioning and running costs are reduced to a minimum. One point calibration is all that is needed to get the maximum benefit of the excellent accuracy and repeatability. Metso MCA is the ultimate device for the measurement and control of total consistency in pulp and paper processes.
Specifications and Process conditions

Measuring range 0 – 16 %Cs (if > 16 %Cs or outside Pulp and Paper applications, consult with Metso)

Repeatability ±0.01 %Cs
Sensitivity 0.001 %Cs
Damping 1 to 99 s
Ambient temperature -20...+70 °C (-4...+158 °F), protect from direct heat radiation

Metso MCA Sensors
Enclosure class IP-65 (NEMA 4)

Wetted materials
MCA FT sensors AISI 316, AISI 316L, Ceramic
gasket Viton, Simrit 483
MCA F sensor AISI 316L, Ceramic
(options for MCA F sensor) AISI 316L replaced with Titanium GR2 or Hastelloy C276
gasket Viton, Simrit 483
Process coupling materials AISI 316L
(options for MCA F sensor) Titanium GR2 or Hastelloy C276
Mounting clamps and screws AISI 316

Conductivity maximum limits in different process temperatures and sensors weights:

<table>
<thead>
<tr>
<th>Sensor</th>
<th>30 °C / 86 °F</th>
<th>50 °C / 122 °F</th>
<th>70 °C / 158 °F</th>
<th>weight (kg/lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCA F</td>
<td>18</td>
<td>15</td>
<td>13</td>
<td>5.2 / 11.5</td>
</tr>
<tr>
<td>MCA-FT 50 /2”</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>8.5 / 18.7</td>
</tr>
<tr>
<td>MCA-FT 100 /4”</td>
<td>18</td>
<td>15</td>
<td>13</td>
<td>10.0 / 22.0</td>
</tr>
<tr>
<td>MCA-FT 150 /6”</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>13.5 / 30.0</td>
</tr>
<tr>
<td>MCA-FT 200 /8”</td>
<td>12</td>
<td>11</td>
<td>9</td>
<td>17.0 / 37.5</td>
</tr>
<tr>
<td>MCA-FT 250 /10”</td>
<td>12</td>
<td>11</td>
<td>9</td>
<td>24.5 / 54.0</td>
</tr>
<tr>
<td>MCA-FT 300 /12”</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>29.0 / 64.0</td>
</tr>
</tbody>
</table>

Operating unit, TCU
Enclosure class IP 65 (NEMA 4)
Operating voltage 90…260 VAC / 0,1 A
Outputs:
- Current output 1: Total consistency 4–0 mA + HART®
  18 to 35 VDC
- Current output 2: Process temperature/Process conductivity
  4–20 mA 18–35 VDC
Inputs:
2 binary inputs, isolated 12 – 48 VDC
Communication Profibus PA, PC connection: RS-232, Support for FieldCare

Process conditions
pH-range 2.5 – 11.5
Process temperature 0…+100 °C (+32…+212 °F)
Process pressure
  Minimum recommend >1.5 bar (22 psi), No entrained air
  Maximum 16 bar (232 psi) FT-models /
  25 bar (363 psi) F-model
Vibration Max. 20 m/s², 10 – 200 Hz

Metso MCA is provided with HART® communication and it can be connected to a FieldCare condition monitoring system. HART® is a registered trademark of Hart Communication Foundation. Foundation™ Fieldbus is a trademark of Fieldbus Foundation.
The measurement is not affected by fiber length (birch at 1.3 mm and pine at 3.5 mm), freeness (unbleached pine at 650 CSF and ground wood at 50 CSF), Kappa (mechanical vs. fully bleached pine), brightness and color (unbleached vs. bleached pine) and pulping process (chemical pulp vs. mechanical pulp).

**Stock Preparation Optimization**

Total consistency measurement before and after the machine chest ensures accurate machine direction basis weight control. Feed-forward control eliminates disturbances before they reach the headbox; it is rapid and accurate. Accurate measurement of the total consistency of pulp components entering the mixing chest is a prerequisite for good blending – particularly with broke and deinked pulp lines where variations in ash content occur.

**Efficient DIP Line Operation**

In deinking the most important goals are the removal of impurities and minimizing quality variations, fiber losses, and chemical consumption. The process conditions must be optimized to reduce chemical demand and to achieve maximum efficiency of all process stages. This requires accurate control of the pulp flows despite vast quality variations in the raw material. In these extremely demanding conditions, the best result is always achieved with the Metso MCA.

**Stock recovery systems**

The stock recovered from disc filter contains a large amount of fines and fillers therefore its total consistency must be controlled accurately. Metso MCA measures the total consistency, unlike mechanical transmitters that only react to fibers. Failure to control total consistency will cause basis weight and ash content variations in machine direction. In addition, Metso MCA is independent of pulp quality or fiber length variations – a clear benefit in this application.

The fork model, Metso MCA-F can be installed in the same process coupling as Metso's shear force transmitters including Metso SP and earlier SmartPulp and Pulp-El types.
Basic delivery includes:

**Metso MCA F**
- Sensor
- Installation Kit
  (process coupling, mounting clamps, blind flange & gasket)
- Operating Unit
- 10 m connecting cable

**Metso MCA FT**
- Sensor
- Operating Unit
- 10 m connecting cable