Market leader in consistency control

Metso Blade Consistency Transmitter
Our experience shows

With over fifty years experience and more than 65,000 blade consistency transmitters installed, Metso is the leading consistency solution supplier worldwide. The driving force has been, and continues to be, obtaining better measurements and controls for improving the pulp and papermaking processes. This would not have been possible without close cooperation in product development and applications with our customers.

Among shear force, and specifically, blade type consistency transmitters, the names of Pulp-AIR, Pulp-EL and SMART-PULP are well recognized among papermakers. Today, this heritage is continued with the Metso SP employing the latest technology and materials. Metso SP is easy to start up and fast to calibrate taking full advantage of Hart, Profibus PA and Foundation Fieldbus technologies. Online condition monitoring with FieldCare or AMS systems is supported.

And it gets better

Obtaining a truly representative measurement signal means measuring in the main stock line and requires a full understanding of the pulp flow profile. Intensive research with different pulp grades in a variety of conditions has provided a unique insight to the requirements for the inline transmitter. Improvements to the Metso SP focus on durability in demanding process environments while retaining excellent measurement accuracy; A proven metal-to-metal construction to our patented process seal ensures high resistance against chemicals and pressure shocks. The taper pin assembly has been recorded to achieve a 40% increase in strength against “hit-in-line” cases.

Superior performance

Too often it is claimed that one blade fits all pulp grades, but experience shows significant sensitivity problems with shorter fiber pulps, mechanical pulps and recycled fiber as well as poor flow compensation. There are no shortcuts if a repeatable consistency measurement is needed and the selection of our blades guarantees optimum results. This has been proven in several independent tests by international institutes including API, WIP and Norske Skogindustri.
Small details make the difference
The robust design makes Metso SP a long lasting transmitter for harsh process environments. Metso SP requires no regular maintenance. Performance can be easily evaluated if mill standards so require. Long-term stability, sensitivity and repeatability can be verified quickly in the instrument shop. Separate temperature compensation for the electronics, shear force sensor and process temperature may sound unnecessary, but machine start-up requires accurate and immediate consistency control. Water viscosity and fiber stiffness change due to temperature variations, and these changes can cause significant error in the measurement signal if not compensated.

Exhaustive laboratory research is the basis for our sensor (blade) development. The growing demands for recycled fiber have changed the requirements for shear force measurement in this arena. There is lower shear to measure, better accuracy needed, debris that causes fouling and mechanical damage, etc. We have developed two sensors specifically to cover these ONP and OCC applications. This speaks for our commitment to finding better solutions for stock preparation and papermaking.

Some of the sensors available:
The RL sensor was made for short fibers such as ONP, TMP and GW, and in a very short time it has taken the market leader position in these process lines. This would not have been possible without proven performance in real processes all over the world.

The WS sensor was developed for unscreened recycled fibers where string, metal wires, plastics, sand and stones can cause contamination problems or, worse still, severe mechanical damage to the transmitter. Sensor design, the special protective plate and the process coupling prevent contamination or fouling of the blade and maximize mechanical damage protection.

The HL sensor was designed for consistencies from 6 %Cs and up. Blowline and blow tank pulp contain large hard particles (knots etc.) which can disturb the measurement signal. Our target is therefore a blade with the smallest possible impact area without losing sensitivity. The HL sensor meets these challenging requirements.

Quick installation and start up
To ensure our customers’ maximum value and to assure the highest level of applications integrity, we have developed software tools such as the Cs-Advisor. Cs-Advisor has made transmitter selection easier than ever before, and clear installation instructions for each specific application guarantee the best possible performance based on the actual process conditions.

Calibration can be accomplished before or after installation. In most cases the fine-tuning can be done using single point calibration, “First day calibration is the final calibration” and “the first transmitter that is capable of measuring wide consistency ranges instead of one point” are familiar comments among Metso SP users. Metso SP has a library of over 50 ready-made calibration curves for different pulp grades and sensor types. This library can be used to set up the calibration for each application separately. When running different grades in the same process line, up to 8 recipes can be contained within the unit. The recipes can be selected using our operator terminal, HART®-communicator, binary inputs or fieldbus depending on the type installed.
Mixing chests, machine chests
Metso SP is suited for consistency measurements from the mixing chest when the quality of the pulp components is rather stable. The Metso SP transmitter is also used on chemical pulp and DIP lines, for example after storage chests and to measure the consistency of pulp fed into refiners.

Broke processing
On paper and board machines the furnish consistency is measured with Metso SP. Possible installation points are in the screen feed line after the storage chest, and in the pipeline to the mixing chest.

Laboratory samples can be taken with the optional Metso Nove H sampling valve close to the sensor. Pressing the tuning button during sampling automatically stores the measurement data in the sensor.
Specifications and Application Ranges

**Consistency range** ................................................................. 0.7 to 16 %Cs
**Span** .................................................................................... Min. 0.8 %Cs
...................................................................................... Max. 30 N – zero elevation
**Damping time constant** ................................................................. 1 to 60 s
...................................................................................... Factory setting 2 s (type HL: 20 s)
**Process pressure** ................................................................................... max. 25 bar

**Environmental conditions**
Ambient ........................................–20 to 60 °C (–4 to 140 °F), 0-100 % RH (no condensate)
Process ................................................................................ 0 to 120 °C (32 to 248 °F)
Storage ................................................................................ –50 to 80 °C (–58 to 176 °F)
Tested in reference conditions in accordance with IEC60770.

**Materials**
Wetted materials ............................................................................. See type specification chart
Electronics housing .............................................................................. PBT-plastic
Mounting clamps and screws .................................................................... AISI316
Wetted gaskets .................................................................................. PTFE and special rubber material
Operator unit .......................................................................................... Poly Carbonate

Enclosure class
Transmitter ........................................................................................... IP66 (NEMA 4X)
Operator unit ........................................................................................... IP65

**Metso SP mA**
Output signal .................................................................................. Two-wire transmitter (2W):
.................................................................................. 4–20 mA + HART®
Power supply ........................................................................................ 18 to 35 VDC

**Metso SP PA**
Communications ................................................................................ Profibus PA
...................................................................................... IEC 61158-2
Conformance function blocks ...................................................................... AI
Current ................................................................................................. 22 mA +/- 2 mA

**Metso SP FF**
Communications ................................................................................ Foundation™ Fieldbus
...................................................................................... IEC 61158-2
Conformance function blocks ...................................................................... AI, PID
Current ................................................................................................. 22 mA +/- 2 mA

**Application Ranges of sensor types (%Cs)**

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<th>UL</th>
<th>LL</th>
<th>LS</th>
<th>GL</th>
<th>RL</th>
<th>WS</th>
<th>HL</th>
<th>JL</th>
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<tbody>
<tr>
<td>SW unbleached</td>
<td>0.7-3</td>
<td>1.5-6</td>
<td>1.7-7*</td>
<td>1.5-6*</td>
<td>4-16</td>
<td>1.5-6</td>
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<td>4-16</td>
<td>1.5-6</td>
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<tr>
<td>HW unbleached</td>
<td>1-3</td>
<td>1.8-5*</td>
<td>1.8-7.5</td>
<td>1.7-6.5</td>
<td>5-16</td>
<td>1.8-6</td>
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<td>1-3</td>
<td>1.8-5*</td>
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<td>1.7-6.5</td>
<td>5-16</td>
<td>1.8-6</td>
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<td>Groundwood</td>
<td>1-4</td>
<td>1.8-7.5</td>
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<tr>
<td>RMP, TMP, CSF &lt; 200ml (SR&gt;52)</td>
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<td>1.5-6.5</td>
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<tr>
<td>CTMP</td>
<td>0.7-3</td>
<td>1.5-5.5</td>
<td>3-6</td>
<td>1.5-5.5*</td>
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<td>Recycled fiber, OCC, screened</td>
<td>1-3</td>
<td>1.7-8</td>
<td>1.5-7</td>
<td>4-16</td>
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<td>1.8-8</td>
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* possible second choice

Metso SP is provided with HART™ communication and it can be connected to a FieldCare condition monitoring system. The transmitter is also AMS-compatible (AMS = Asset Management Solutions). HART™ is a registered trademark of Hart Communication Foundation. Foundation™ Fieldbus is a trademark of Fieldbus Foundation.
Metso SP basic delivery includes:

- transmitter with sensor blade,
- operating unit with 10 meter transmitter cable,
- process coupling,
- mounting clamp assy,
- gasket PTFE and
- deflector or protector plate.