

# Market Leader in Consistency Control

Valmet Blade Consistency Measurement





## The 4<sup>th</sup> generation Valmet SP blade consistency measurement

Valmet Blade Consistency Measurement (Valmet SP) is the most sold consistency sensor worldwide. Now in its 4th generation, Valmet SP has a long history; with the method patented already in 1954, it is still the most used measuring principle on the market. There are many reasons for the continued success of Valmet SP: its high accuracy, cost efficiency, reliability and virtually maintenance free operation, together with meeting the requirements of many different applications have gained Valmet SP a well deserved reputation in the pulp & paper industry.

### Improvements that count

The development of the 4th generation of Valmet SP focused on retaining the well proven solutions of earlier generations and employing new technology to further improve both the measurement and user experience. A new, more accurate shear force detector (patented) is contained within a redesigned modular sen-

sor for even better reliability with improved sealing, higher temperature capabilities and noise immunity.

Commissioning and user operation has been further enhanced with a new user interface unit, Valmet Link, with graphical display featuring a simplified self instructive menu structure for easier calibration, detailed self diagnostics and prepared

for remote access/IoT capabilities. Together with installation exchangeability and fully compatible sensing element options to earlier generations, the modularity also reduces the need for many different spare parts at customer site.

## Reliable

Valmet has a long experience in developing and manufacturing long lifetime sensors, with Valmet SP being no exception. Valmet SP has a robust design, without jeopardizing the high sensitivity. Requiring no preventive maintenance, SP will operate for a long time in different process conditions. However nothing is so good that it can't be better, so to ensure optimum reliability Valmet offers advice of how to install the sensor and associated equipment to protect components from adverse process conditions. The heritage from previous sensor models is strong, and successful solutions have been reused in the new 4th generation Valmet SP.

## High performance

For good performance, sensing element selection is very important as fiber characteristics are very different for different fiber types. Recycled fibers for instance have a lower shear force compared to kraft softwood fibers.

Valmet's comprehensive sensing element selection and pre-programmed calibration curves make it easy to get the best performance from Valmet SP.



## Advanced compensation

To fine tune the performance even further Valmet SP has separate temperature compensations for electronics, shear force detector and process temperature. With normal process conditions the temperature is normally very stable but the benefit of compensation is best seen at machine start ups and with season variations of process temperature.

Water viscosity and fiber stiffness can have a noticeable effect to the measurement result.



### Installation and start up

Valmet SP is dependent on laminar flow condition to operate optimally. The correct selection of the sensing element (blade) and installation position is ensured with a Valmet developed software tool called Measurement Advisor. The tool will find the best possible installation position and also give options if needed. The software is free to use by our end customers, or Valmet can of course assist and make installation recommendations during the purchase phase. Installation instructions are specific for each installation and ensure the best possible performance for the actual process conditions.

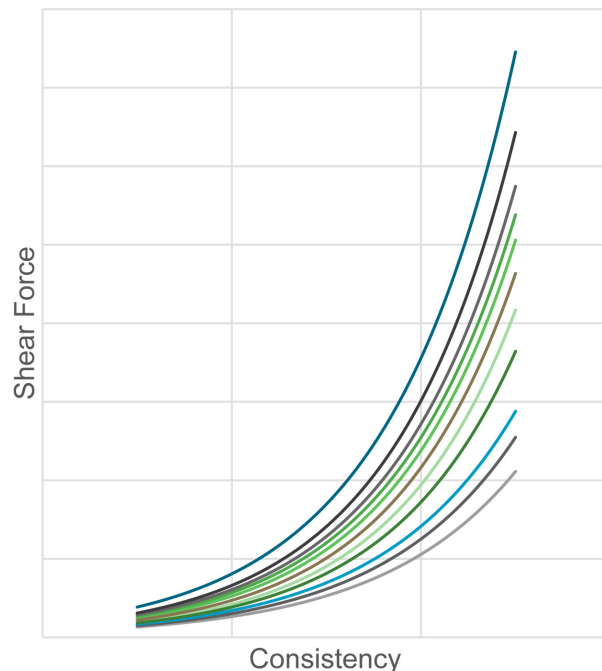
### Easy and fast calibration

Based on thousands of installed sensors and extensive development work, Valmet has developed calibration curves for all blades in the portfolio and in a variety of pulp types. Commissioning could not be easier; a suitable pre-programmed calibration curve is selected, and one pulp sample is collected for laboratory determination. The laboratory result is then

entered in the Link operator panel and the calibration is complete. This easy and fast method is suitable for the majority of applications, however two point and multipoint calibration can be also made just as easily with the sensor automatically calculating the correct curve.

### Remote control

When running different pulp grades in the same process, up to eight calibration curves can be stored in different recipes, to be selected by binary inputs from the control system, or manually at the operator display.



## Future safe

The shear force detector (patented) in the 4th generation Valmet SP employs new technology widely used in aerospace and robotic design. Unlike other shear force measurements, this new technique with several suppliers for the different components will be available and supported for many years forward. Future process changes or measurement requirements are easily handled as the Valmet SP measurement module can easily be repurposed with different sensing elements and protection fins. The Link user interface platform, to be also used with other Valmet products, allows for future communication concepts ensuring that the entire system is secured for years to come.



## All new design

### Digital electronics

- High resolution components
- Unaffected by temperature changes
- Future safe

### Diagnostics

- Electronics temp measurement
- Moisture measurement inside sensor
- Vibration measurement
- Process temp measurement

### Shear force detection

- Patented principle
- Contactless detection
- High accuracy
- High repeatability

### New operating terminal

The new Valmet platform called Link has lifted the user experience to a new higher level. It has an intuitive menu structure that's easy to use and learn. The expanded keypad with operation keys, like sample collecting key, helps the user make the correct selection. It has a display light for the best possible visibility in dark installations.



The box itself has easy access to mill connections and has a very robust design. Commissioning and operation has never been easier, with the new Link user interface built for use with Valmet measurement products.

- Large graphical display
- Display with back-light
- Full numeric keypad plus operation keys
- Remote access
- Industrial Internet ready

## The universal sensor

### From blow line to machine chest

Valmet SP is a really universal sensor. With a portfolio of components that fits the sensor it can be configured to perform in almost all consistency measurement applications in the pulp process. Find the correct set-up and location and you get a stable and accurate measurement from Valmet SP.

It can be installed just to monitor the consistency variations or be used in an automatic consistency control loop. Valmet SP is used in all kind of processes; chemical kraft pulp, groundwood, TMP, CTMP, recycled pulp, DIP, etc. And in all kind of process steps, blow line, screening, washing, bleaching, refining, stock preparation, mixing, machine chest. For consistency levels ranging from 0,7 to 16%



#### Valmet SP basic delivery includes:

- Sensor with sensing element (Blade)
- LINK operating unit with 10 meter sensor cable
- Process coupling
- Mounting clamp assembly
- Gasket PTFE
- Protection plates (for some models only one plate)

# Technical specification

## Sensor

- Valmet Blade Consistency Sensor, Valmet SP, is a shear force based consistency sensor used for consistency measurement in the pulp and paper industry.
- The sensor is mounted directly on the process pipe.
- Selection of process coupling / Flow TR (option) based on process pipe diameter and pressure rating

### Measurement

Consistency range .....	0.7–16 % Cs
Span	
- minimum .....	0.8 % Cs
- maximum .....	30 N – zero elevation
Zero elevation .....	max. 30 N – Span

### Performance

Tested in reference conditions in accordance with IEC60770.	
Linearity of force measurement .....	± 0.5 % of span
Hysteresis .....	0.025 N
Repeatability .....	0.01 N
Static pressure effect .....	0.02 N per 1 bar
Process temperature effect .....	1% of reading per 10 °C
Vibration effect	
2 G per 10–2000 Hz .....	less than ±0.03 N

### Examples:

- 0.01 N corresponds to 0.005% consistency variation in bleached soft-wood chemical pulp (e.g. spruce sulphate) at 3.0% consistency when using the LL sensor.
- 0.01 N corresponds to 0.01% consistency variation in screened recycled fiber pulp at 3% consistency when using the RL sensor.

Allowed flow velocity (m/s)	Min.	Max.
Valmet SP UL .....	0.1	1–3
Valmet SP HL .....	0.4	8
Valmet SP WS .....	0.4	4
Other types .....	0.4	5

### Materials

Wetted parts .....	AISI316 or SMO
Wetted gaskets .....	PTFE & special rubber material
Electronics housing .....	Aluminum
Mounting clamps & screws .....	AISI316
Operator unit .....	Aluminum

### Process conditions

Process temperature .....	0...+120 °C
Process pressure .....	max. 25 bar
- If process pressure > 10 bar the mounting hole for process coupling may have to be reinforced. More detailed information in Installation & Operating Manual.	

### Environment

Ambient temperature .....	-20...+60 °C
Storage temperature .....	-50...+80 °C
Relative humidity .....	0–100 % (no condensation)

### Enclosure class

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

### EMC test standards

Radiated emissions .....	EN 61000-6-3/CISPR 16-2-3
Conducted emissions .....	EN 61000-6-3/CISPR 16-2-3
Radiated, RF,	
EMF immunity .....	EN 61000-6-2/ -4-3; Class A
Conducted immunity .....	EN 61000-6-2/ -4-6; Class A
Electrical fast transient/	
Burst immunity .....	EN 61000-6-2/ -4-4; Class A
Surge immunity .....	EN 61000-6-2/ -4-5; Class A
ESD immunity .....	EN 61000-6-2/ -4-2; Class B

Patents .....	FI20165830 SE1751313
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Patents pending .....	CN108061562
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### Weight

Valmet SP HL .....	2.6 kg
Valmet SP UL .....	3.0 kg
Other transmitter types .....	2.9 kg

## Valmet SP MA

Output signal .....	Two-wire transmitter (2W): 4–20 mA + HART*
Power supply .....	18–35 VDC
Load capacity .....	18 V / 250 Ω

**NOTE: Hart\* requires min. 250 Ω load resistance!**

## Valmet LINK

### Connections

Cable to sensor .....	length 10 m (33 ft)
- Option .....	extension cable 10 m (33 ft)
Operating voltage .....	supplied from two-wire transmitter

### Connections to mill systems

Analog outputs .....	2 passive current outputs, 4–20 mA, not isolated
- Damping .....	0–60 s
- HART* .....	12–36 VDC, at Current output 1
Binary inputs .....	4 x 12–28 VDC / 10 mA, isolated

### Connection options

USB .....	SW update
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### Operating environment

Temperature .....	5–50 °C (+41...122 °F)
Housing class .....	IP66 (NEMA 4X)

### EMC test standards

Radiated emissions .....	EN 61000-6-3/CISPR 16-2-3
Conducted emissions .....	EN 61000-6-3/CISPR 16-2-3
Radiated, RF,	
EMF immunity .....	EN 61000-6-2/ -4-3; Class A

Conducted immunity .....	EN 61000-6-2/ -4-6; Class A
Electrical fast transient/	
Burst immunity .....	EN 61000-6-2/ -4-4; Class A
Surge immunity .....	EN 61000-6-2/ -4-5; Class A
ESD immunity .....	EN 61000-6-2/ -4-2; Class B

### Materials

Housing .....	Cast aluminum
Display cover .....	Polycarbonate

### Dimensions & weight

w x h x d .....	258 x 316 x 172 mm (10.2" x 12.4" x 6.8")
Weight .....	5.4 kg (11.9 lbs)
Valmet LINK with optional Power assembly:	
Operating voltage .....	90–260 VAC, 50 W
Analog outputs .....	2 current outputs, 4–20 mA; selectable active/passive mode
Relay outputs .....	2 relay outputs, max. 250 VAC, 220 VDC / 2 A



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