ProcessMonitoringSystem

Series 2000 PMS

In line – In real time

2D ORM

Size Measurement of Particle Systems

Fig. 01: PMS in use in MTS application centre

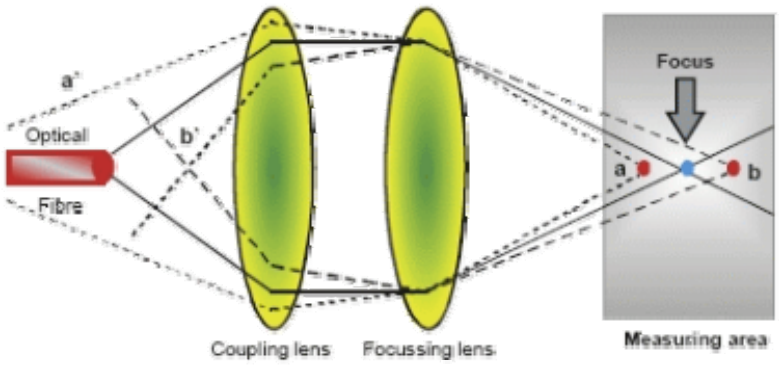
Benefits

- PMS systems offer a favourably priced and reliable source of information in 'real time' process monitoring of particle size dependent systems in production.
- Changes of process are recorded continuously. Measurement readings are available in 'real time' as trend signals.
- Measurement is possible in original concentrations – particle size fractions are shown in 284 size ranges.

Measurement principle

The light of a laser diode is coupled into an optical fibre. Then it is routed to a sensor via a beam splitter and passed to a lens. Then it is focussed into the particle system according to the 2D-technique. In turn, the light reflected by the particles is directed to the photo detector via the beam splitter and the signal is evaluated by the MTS-WinORM software. Particles outside the focus are not detected. This differentiates between PMS systems and turbidimeters.

PMS is a measurement system for monitoring particle systems under production conditions.



Technical Data

Measuring ranges:	<10 –300 µm and < 30 – 600 µm
Concentration:	< 40 %
Temperature:	5° - 220 °C
Pressure:	up to 16 bar

Range of application

Suspensions:

- e.g. aluminium oxide, sulphur (polymers), nephroliths, pentaerythritol, water-based paints, lactose, glucose, sugar, calcium chloride crystals, magnesium chloride crystalls, soda, micro capsules, kalium chloride, magnesium chloride, epsomite

Dry products:

- e.g.. silica gel, cement, color pigments

Bio products:

- e.g. bio flakes, digested sludges, fermentations, vitamine flakes, yeast forms, insulin, carotene, brewer's yeasts

Presentation of results

The signals retrieved from the sensor are displayed by the software as distribution data. The presentation of distribution per class, frequency of sum distribution or trend graph are user selectable.

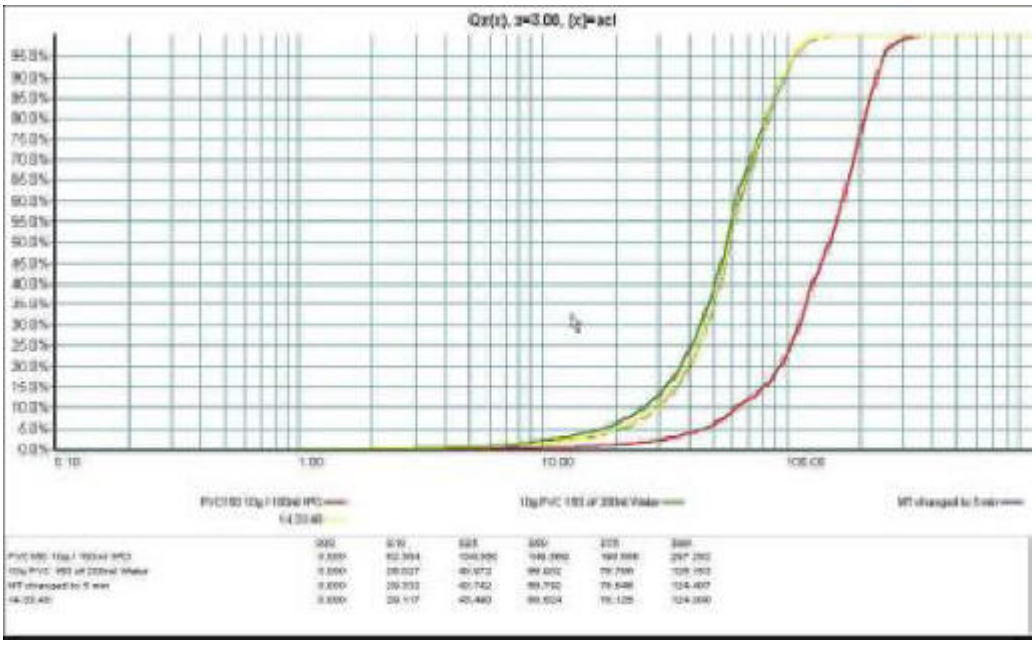


Fig. 02: Measurement of PVC as volume distribution: The red sum curve displays the target size of crystallisation. The yellow, green an blue curves show the last measured values.

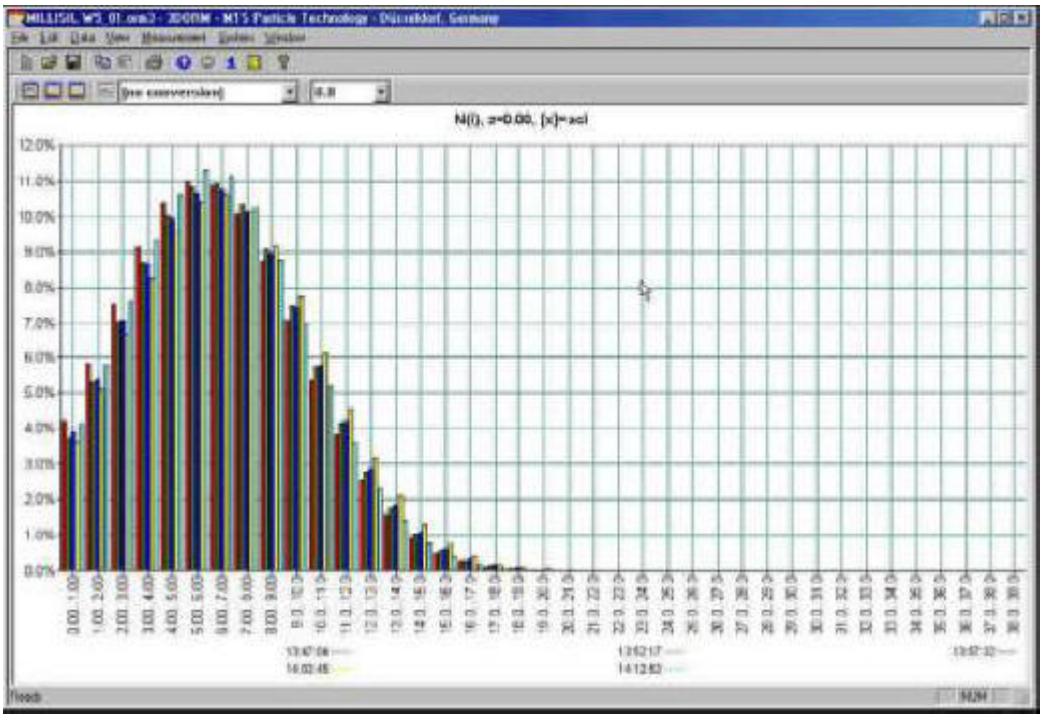


Fig. 03: Histogram display as comparison of 5 measuring values

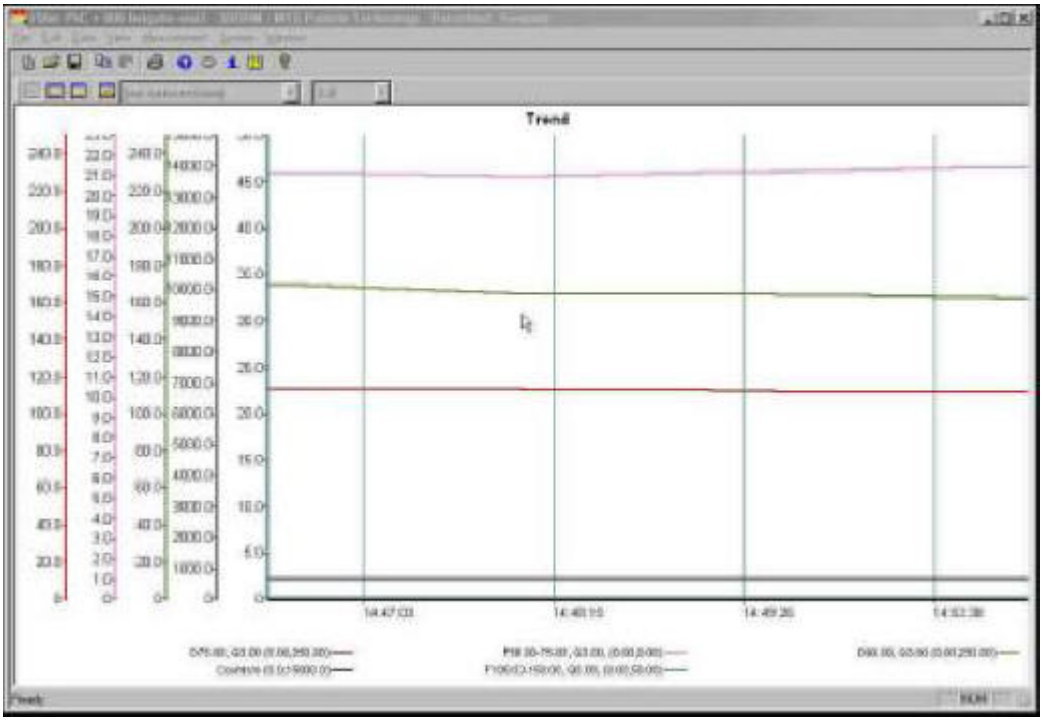


Fig.04: When the appropriate actualized sum curve is displayed as d20, d75, d90 over time, the trend graph results. The trend graph shows changes of the medium over the period x. On demand these values can be passed to process control systems as A/D signals in 'real time'.

Prices

The prices depend on the measuring range selected as well as on additional options.

Please contact us for a non-binding offer.

Examples for applications in process:

Fig. 05 and Fig. 06

PMS sensors measuring cement (left) and emulsion (below)

Fig 7a: Measurement in a Homogenizer

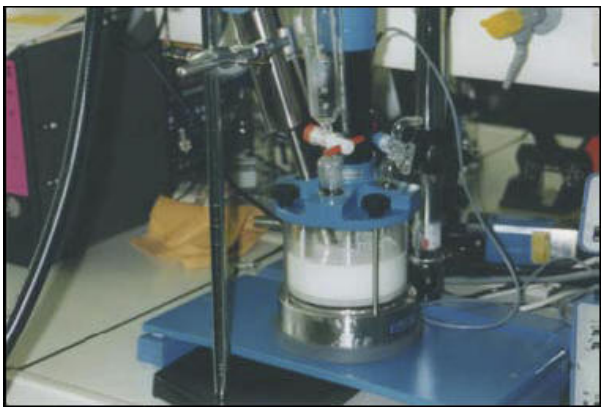
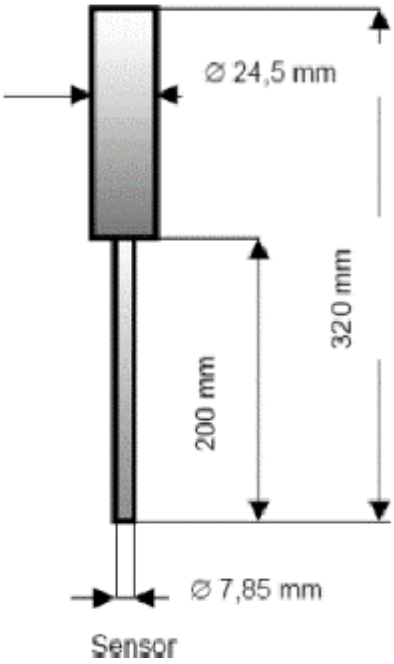
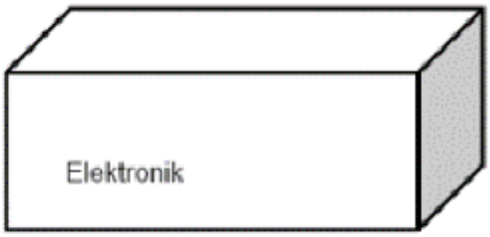


Fig. 7b: Measurement of emulsions

Technical dimensions of sensors and signal processing electronics





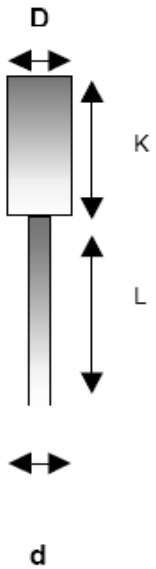
H 250 x B 300 x T 170 mm

Further sensor extensions are available:

Technical data of sensors

d / mm	L / mm	K* / mm	D / mm	Material	Kg
7.85	200	120	24.5	Titan	0.25
19	180	195	53	VA	2.4
24.5	180	195	53	VA	2.75
24.5	200	-	24.5	VA	1
24.5	360	-	24.5	VA	1.3
24.5	520	-	24.5	VA	1.6
30	332	408	60	VA	7.5
30	230	210	60	VA	3.9

* Sensor extension is available



Comments about Fingerprint Technology for measurement of particle systems

Particle sizes are commonly measured in diluted and discrete samples available in laboratory.
Therefore, agglomerates which are present under process conditions may be dispersed. The possibilities of errors in sample taking are also not generally taken into consideration.

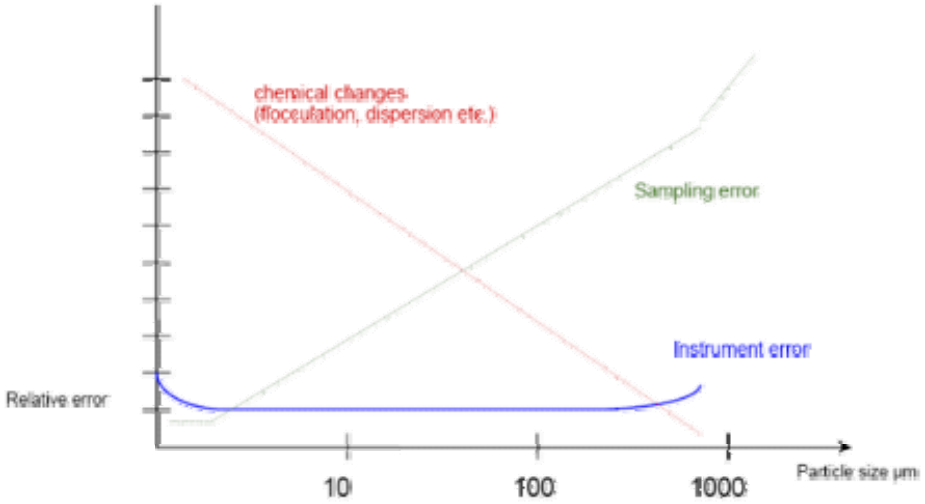


Fig. 08: Typical measuring error during particle size measurement according to Dr. Reg. Davis Dupont (1990)

So it leads to the challenge of monitoring particle size parameters continuously 'in line', in 'real time' and 24/7. Samples need only be taken when the PMS sensor registers irregularities. So, the laboratory is relieved from monitoring samples that are within the specification range.

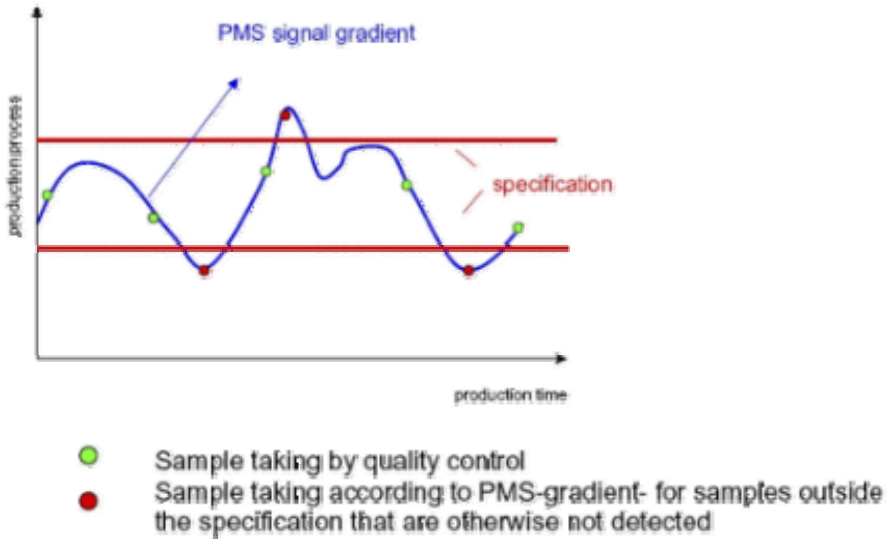


Fig. 09: PMS signal gradient in production process (as blue line) Thereby, only samples which are possibly outside the specification are measured .in the laboratory

2D ORM is measuring particles inside focus only!

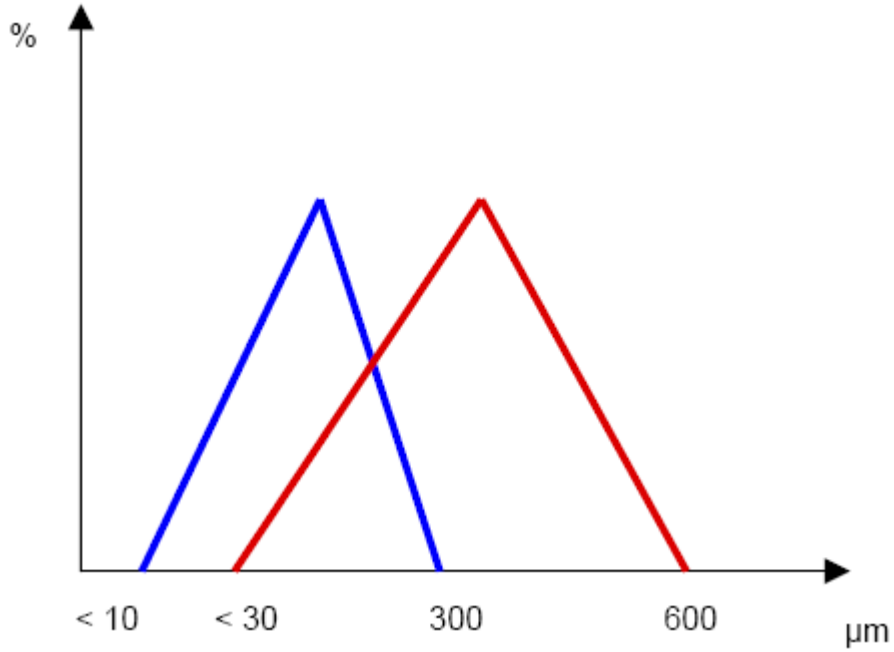


Fig. 10: Measuring range with the 2D ORM

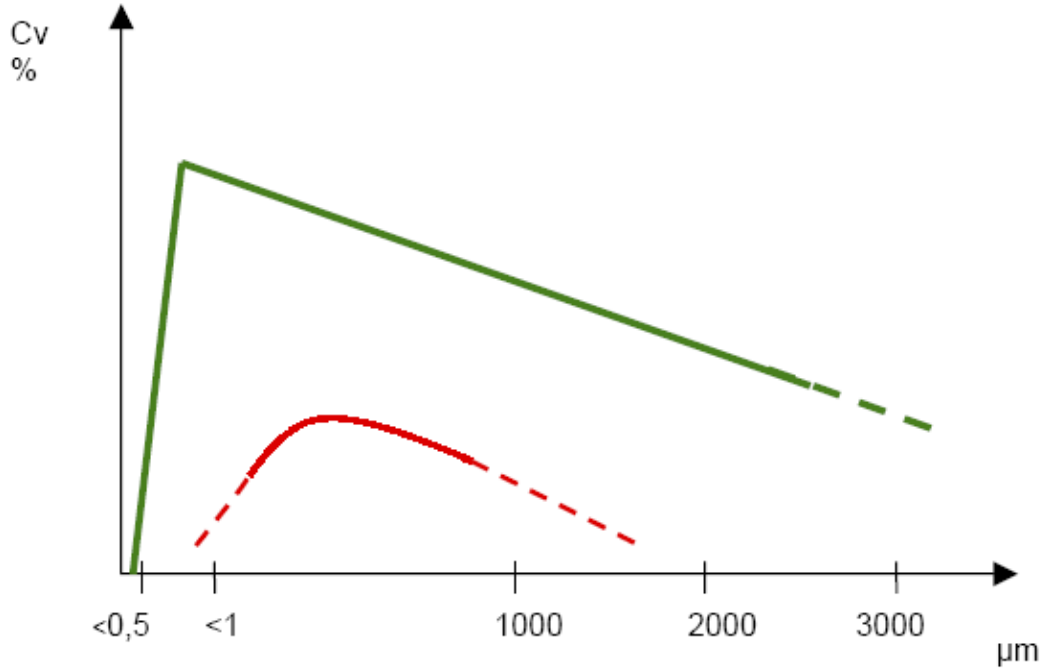


Fig. 11: Dynamic measuring range with the 3D ORM

The Multi Selective Focus 3D ORM System allows an extremely high resolution in fine ranges of < 0,5 micron and in particle systems up to > 3000 micron.
These systems are measured in-line, in real time and in process and supplement other particle characterization systems if required by application tasks.

Thus, a broad MTS program for Process Analytical Technology (P.A.T.) based upon particle size for suspensions, emulsions and dry products is available!