

# Inline Particle Measurement



Valuable Insight in your Process

**parsum**<sup>®</sup>  
Gesellschaft für Partikel-, Strömungs-  
und Umweltmeßtechnik mbH



## Our offer

Just under three quarters of all materials processed in the chemical industry, the pharmaceutical industry or the food industries are present as powders, in granular form or as solids respectively. In many processing steps, the particle size distribution is thus the most important characteristic of these materials.

Whereas conventional laboratory analysis is designed to determine the particle size in order to obtain information regarding the quality of the end products or intermediate products respectively, in-line particle measurement provides information on the manufacturing process that is often decisive. Based on this information, you will be able:

- to better understand and more efficiently operate your processes,
- to make more economic use of your resources and to reduce your process times,
- to quickly detect defects, and to react to them accordingly,
- to minimize your risks and enhance your safety,
- to apply closer specifications and to increase the capacity utilization rate of your facilities,
- to enhance your reproducibility and improve your batch-to-batch consistency, and
- to expedite your developments and to reduce your upscaling times.

So, why not learn about our measuring probes and find out from our process engineering specialists what benefits in-line particle measurement can bring about for your production processes. We will contribute our experience from 20 years of process measurement and from more than 350 measurement systems we have installed to date.

Each process is something special – that is why field trial is indispensable. Flexible trial options, from single-day testing to one full week of testing to renting equipment for testing over several weeks plus supervision by one of our specialists will help you make the right purchase decision. Just tell us what you need.

## The principle

The core of the measurement principle is the fiber-optic spatial filter technique developed, patented by Parsum.

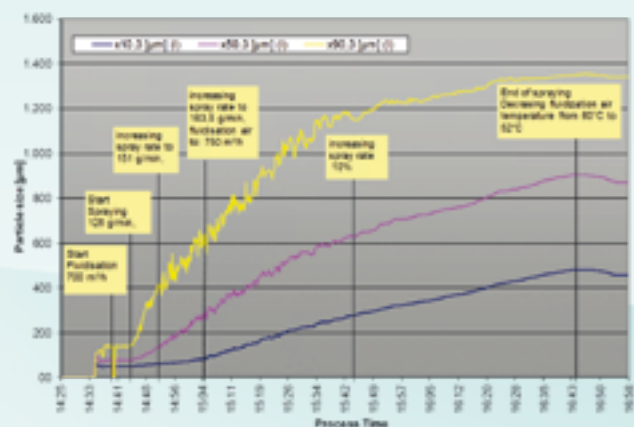
The array (spatial filter) illuminated by a laser detects optical signals from single particles.

A circular buffer is provided to continually convert the individual measurements into a „sliding“ particle size distribution.

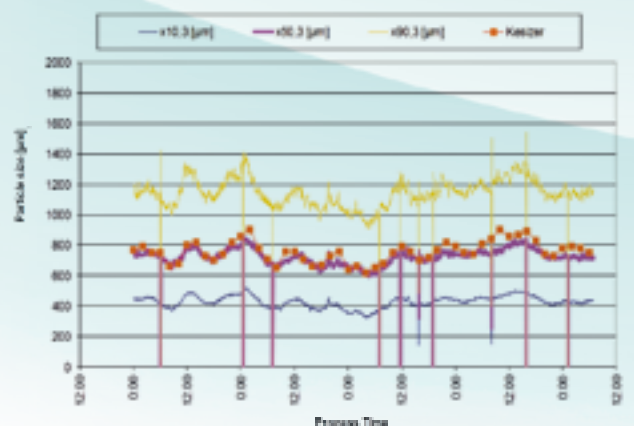
Sampling rates of up to several thousand particles per second will guarantee a high confidence level.

## Applications

**Fluid bed batch granulation** – The monitoring of granulate growth give operators a better understanding of processes. It helps to design them more efficiently and to optimise parameters. Fewer tests and laboratory analyses when upscaling means that development time is reduced.



**Continuous agglomeration** – Measurement after a rotary valve in the continuous agglomeration of detergent. In-line particle measurement shortens the start-up phase and helps the operator keep the process stable.





## Types of probes

### IPP 80-P



This probe has been designed to measure the particle size distribution of powders, pellets or granules respectively in pharmaceutical processes. This probe is a valuable PAT tool wherever especially high requirements are made on cleanliness, cleanability or hygiene, be it the conventional batch operation or continuous production. ATEX certified for Zone 0/20.



### IPP 70-S



This universal in-line particle probe is designed for direct use in dense particle flows, in fluidized beds or similar processes. The IPP 70 is self-monitoring during the measurement. LEDs on site or signals to the process control system respectively will always enable the user to monitor the safe operation of all major components.

### IPP 70-Se



This ATEX certified and intrinsically safe probe is designed to provide reliable particle measurements in explosive atmospheres. Direct measurements can be made in Zones 0 and 20.



### IPP 75-S



Owing to its customized length from 38 cm to more than 1 m, this probe is ideally suited for large process vessels or customized solutions.



## Process interface

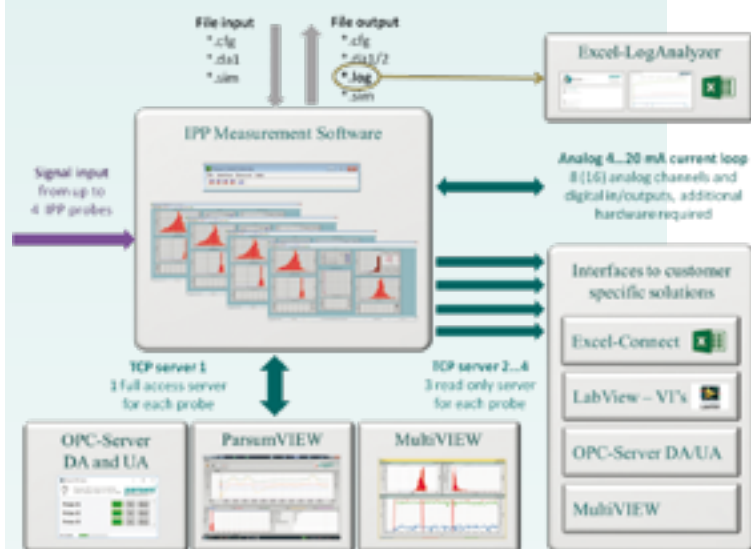
A wide range of accessories for process adjustment such as in-line dispersers or purge cells, used as process interfaces, will facilitate adjustment to a variety of conditions.

It is the ability to disperse the particle flow in the process vessel that sets the Parsum probes apart from other in-line measurement systems. It is only through in-line dispersion that it will be feasible to reliably determine the particle size in moist or sticky materials in a manner comparable to laboratory techniques.



## Software

The Parsum measurement software is a flexible system composed of programs and interfaces.



**IPP** – This is the measurement program proper that is the core of the software. It is designed to control the measurement and to provide a clear presentation of the results.

**Analog Output** – Current loop interface (4 to 20 mA) including 8 or 16 channels respectively for the transmission of measured values to distributed control systems

**ParsumVIEW** – Purposefully developed for use in the pharmaceutical industry or for applications with increased safety requirements respectively (meets the requirements according to 21 CFR 11)

**OPC-Server** – Facilitates data transfer and remote control for up to 24 Parsum probes via the standard protocols OPC-DA 3.0. and OPC-UA

**LabView-VIs** – To tie the Parsum probes in to your own LabView programs

**LogAnalyzer** – Macro for the fast analysis and evaluation and graphical representation of the progression of measured values in Excel

**ExcelConnect** – For online tie-in of the Parsum measurement results into your own dynamic Excel charts

**MultiVIEW** – To display the measurement results from multiple probes in a network

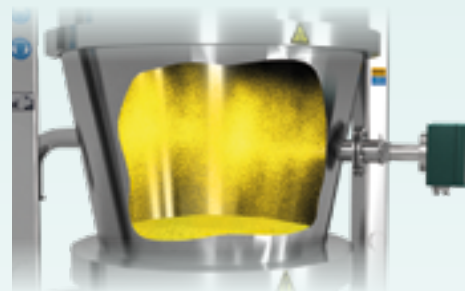


## Examples of application

- To continually determine the layer thickness and the agglomerate fraction of pharmaceutical pellet coating in the fluidized bed.
- To identify single large particles to detect screen breakage in mills for the production of cellulose fibers.
- To determine the granulation end point in high-shear granulation or pelletizing.
- To monitor fluidized bed granulation to guarantee batch-to-batch consistency.
- For tie-in into PAT-system for the development and optimization of fluidized bed processes.
- For continuous particle size measurement as an assistance system to reduce the loop volume in the grinding/screening loop for continuous washing powder granulation.
- To monitor the grain size in the grinding of coffee, plastic materials, silicon or similar to adjust the milling gap and for wear monitoring at roller mills.
- To measure the particle size underneath a three-deck screening machine to control the amount of mineral material fed with a view to avoid overflow or spillage.
- To monitor the particle size to control the amount of material fed and the height of fluidized bed of layer for drying processes in the fluidized bed.
- To monitor segregation or contamination at the silo discharge.

## Technical data:

- **Measurement range:**  
particle size: 50 µm ... 6,000 µm  
velocity: 0.01 m/s ... 50 m/s
- **Maximum concentration:**  
depends on particle properties,  
up to 30 % (vol.)
- **Temperature range:**  
up to +100 °C at measurement volume  
and up to +60 °C at electronics enclosure
- **Contact materials:**  
stainless steel 316 L (DIN 1.4435, 1.4404)  
sapphire windows
- **Maximum cable length:**  
100 m signal cable probe to PC (enhancement  
possible up to 100 m with cable amplifier)



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