

# Inline Particle Measurement



## Valuable Insight in your Process

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Gesellschaft für Partikel-, Strömungs-  
und Umweltmeßtechnik mbH

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## Our offer

Just under three quarters of all materials processed in the chemical, pharmaceutical and food industries are present as dry powders or granules. As a result, in many processing steps the particle size and size distribution is one of the most important material characteristics.

Whereas conventional laboratory analysis is designed to determine the particle size in order to obtain information regarding the quality of end products and intermediates, in-line particle size measurement provides the direct, real time data on the performance of a manufacturing process that is often decisive in achieving robust process control. The information provided by in-line analysis will enable you:

- to better understand and more efficiently operate your processes,
- to make more economic use of your resources by reducing processing times and waste of product,
- to quickly detect when a process is not in control and to react accordingly,
- to minimize your risks and enhance your safety,
- to run your process closer to the limits required to meet product specifications, increasing process utilization without risking product quality,
- to enhance your product reproducibility and batch-to-batch consistency, and...
- to reduce the time required to achieve process scale-up, reducing the time to market for new product developments.

So, why not learn about our particle size measurement probes and find out from our process engineering specialists the benefits in-line particle size distribution measurements can bring to your company? We will contribute our experience gained from 15 years of process measurements and the installation of more than 250 measurement systems worldwide.

Each process is unique – that is why field trials are indispensable. Flexible trial options are available: from simple single-day tests through to the ability to rent equipment for testing over several weeks. Each trial is supported by one of our specialists who will help you make the right purchase decision. Just tell us what you need.

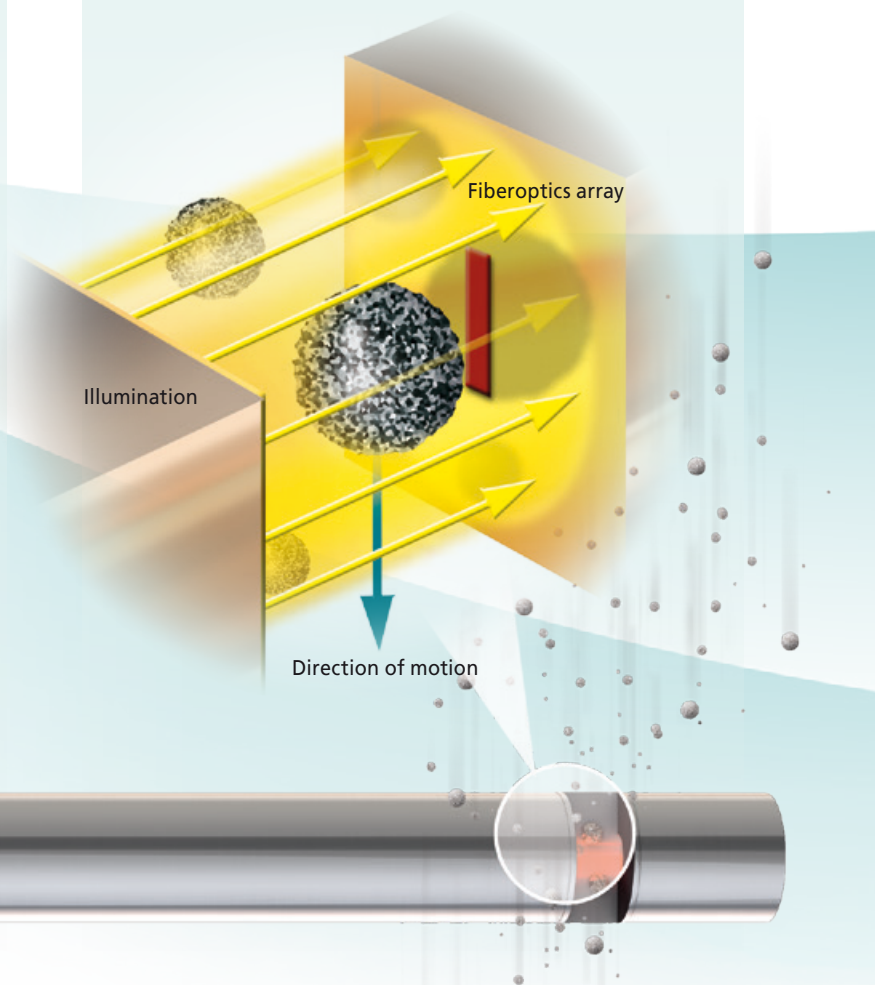
## The principle

The Parsum probe measures particle size distributions using a patented spatial filter technique which has been developed and enhanced by Parsum.

The Parsum probe contains an array of light-sensitive detectors which are illuminated by a laser. This array can detect single particles as they pass through the laser beam within the probe measurement zone. The shadow produced by each particle can be used to calculate the particle velocity and its chord length (particle size).

The detector signals are sampled very rapidly, with sampling rates reaching several thousand particles per second. This ensures that a realistic number of particles is measured, giving confidence that the results reported are representative of the material within the process. The results from each particle are collected into a first-in-first-out buffer and are used for calculating a particle size distribution.

The particle size distribution data is continuously updated during operation of the probe, providing a real time particle size trend. This provides direct insight into the performance of the process. Comparisons with standard laboratory measurements, such as laser diffraction or sieving, can be done at any time.





## Types of probes

### IPP 80-P



This probe has been designed to measure the particle size and size distribution of powders, pellets or granules in pharmaceutical and food processes. It is a valuable PAT tool that can be easily installed in areas where cleanliness, cleanability and hygiene are important requirements. The probe can be used for conventional batch processes or for monitoring continuous production processes and includes enhanced self-diagnostic features. It is ATEX certified for Zone 0/20 operation.



### IPP 70-S



This universal in-line particle sizing probe is designed for direct use in dense particle flows such as those found in fluidized bed processes. The IPP 70 constantly monitors its own performance during measurements, ensuring that data quality is maintained. The instrument and measurement status is reported using LEDs located on the instrument and through direct communication to the process control system. This enables users to monitor the safe operation of the unit.

### IPP 70-Se



This ATEX certified and intrinsically safe version of the IPP 70 probe is designed to provide reliable particle size and size distribution measurements in explosive atmospheres. Certified for operation in ATEX Zone 0 and Zone 20.



### IPP 70-SL IPP 70-SLe



The IPP 70-SL family of probes can be customized in length, providing the ability to measure in large process spaces. Probe lengths from 600mm to 4m can be produced. ATEX certified versions are also available for operation in explosive atmospheres.



## Process interface

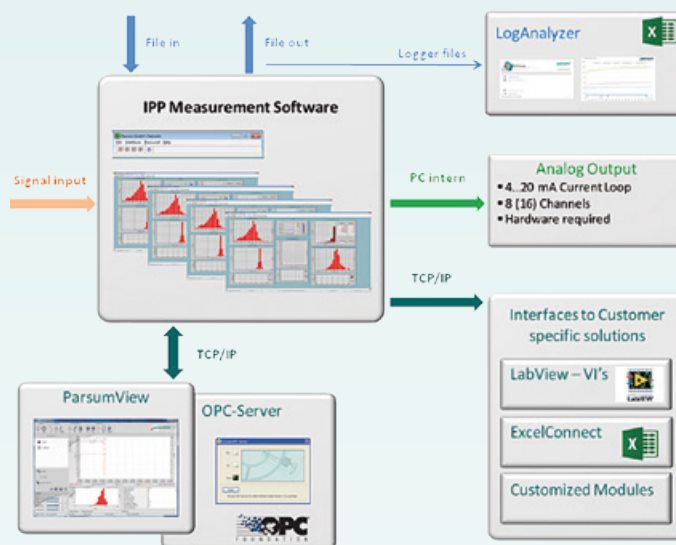
A wide range of accessories is available for the Parsum probe in order to ensure that robust measurements can be achieved. This includes air purge units, designed to keep the optics clean during continuous operation, and sample dispersers.

The ability to disperse materials directly within the particle flow in the process vessel sets the Parsum probe apart from other in-line measurement systems. A range of in-line dispersers are available to achieve full sample dispersion even when measuring moist or sticky materials. This ensures that the particle size distributions reported by the system provide a realistic assessment of the material properties. It also aids comparisons with laboratory techniques.



## Software

The Parsum measurement software provides a flexible interface for both measurement control and result reporting. The software includes the following components:



**IPP** – This is the core measurement interface, designed to control the Parsum probe measurement process and provide a clear presentation of the results.

**Analog Output** – Provides a 8 or 16 channel 4-20mA interface for the transmission of particle size results to distributed control systems..

**ParsumView** – Developed for use in the pharmaceutical industry or in applications where data security is vital, this module provides the ability to achieve technical compliance to the FDA's 21CFR Part 11 ruling relating to electronic records and signatures. This software also provides an enhanced graphical user interface and data processing features..

**OPC-Server** – Facilitates data transfer and remote control for up to 24 Parsum probes using the standard OPC DA v3.0 protocol.

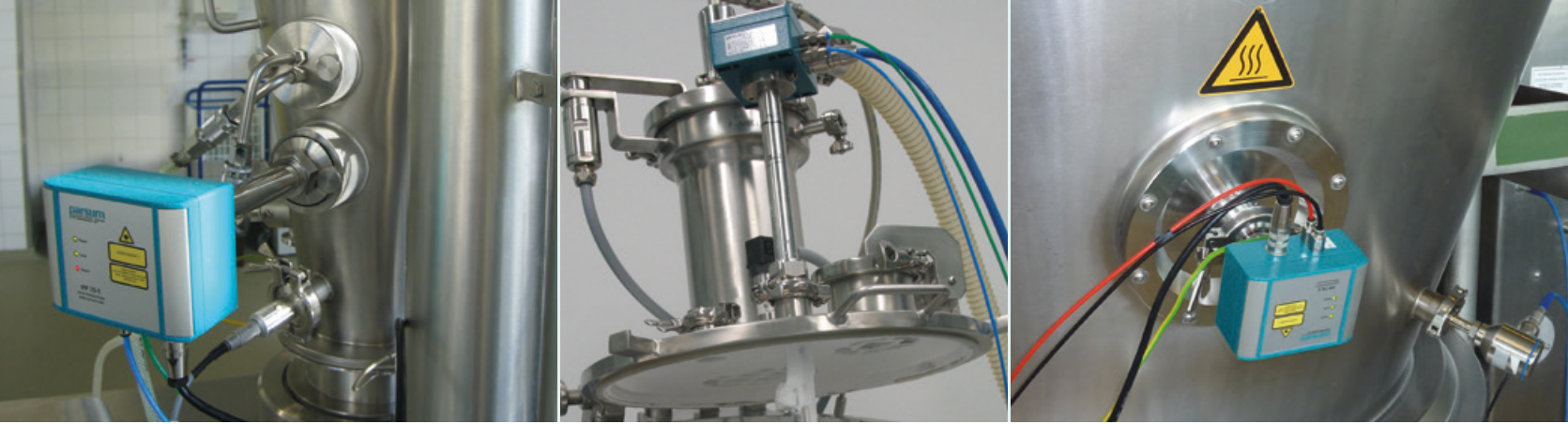
**LabView-VIs** – Enables users to develop LabView interfaces which can access the data generated by the Parsum probe.

**LogAnalyzer** – Macro interface to enable easy transfer of measurement data logs into Excel for analysis.

**ExcelConnect** – Provides a direct, real-time interface to enable Parsum measurement data to be plotted within dynamic Excel charts.

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## Examples of application

- Continually determine the layer thickness and the agglomerate fraction in pharmaceutical fluidized bed pellet coating processes.
- Detect screen breakage in milling processes for the production of cellulose fibers by identifying the presence of single large particles.
- Track progress and determine the granulation end point in high-shear mixing processes, in order to enable faster process scale-up.
- Monitor fluidized bed granulation to guarantee batch-to-batch consistency.
- Apply as a PAT system for the development and optimization of fluidized bed processes.
- Continuous particle size measurement within washing powder granulation processes, enabling a reduction of the rework volume in the grinding / screening loop.
- Monitor the grain size distribution during the grinding of materials such as coffee, plastics and silicon, enabling adjustment the milling gap and detection of wear within roller mills.
- Measure the particle size underneath a three-deck screening machine to control the amount of mineral material fed into the process and avoid overflow or spillage.
- Monitor the particle size within continuous fluid bed dryers in order to allow control of the material feed and the height of bed.
- Monitor material segregation or contamination during silo discharge.

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**Malvern Instruments Limited**  
 Grovewood Road, Malvern,  
 Worcestershire, UK, WR14 1XZ

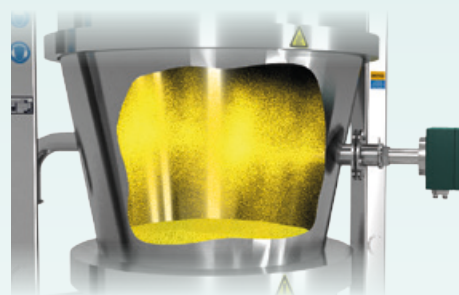
Tel +44 1684 892456  
 Fax +44 1684 892789  
[www.malvern.com](http://www.malvern.com)

### Distributor details:

Particular Sciences Ltd.  
 2 Birch House, Ballycoolin Road  
 Rosemount Business Park  
 Dublin, D11 T327, Ireland  
 phone: +353 (1) 8205395  
 e-mail: [info@particular.ie](mailto:info@particular.ie)  
[www.particularsciences.ie](http://www.particularsciences.ie)

## Technical Data:

- **Measurement Range:**  
 particle size: 50 µm ... 6000 µm  
 velocity: 0,01 m/s ... 50 m/s
- **Maximum Concentration:**  
 depends from 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 100m with cable amplifier)



### Sales Contact:

- Germany, Austria and Switzerland:  
 Parsum GmbH, Germany  
[www.parsum.de](http://www.parsum.de) [info@parsum.de](mailto:info@parsum.de)
- All other countries:  
 Malvern Instruments Worldwide  
 Sales and service centers in over  
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