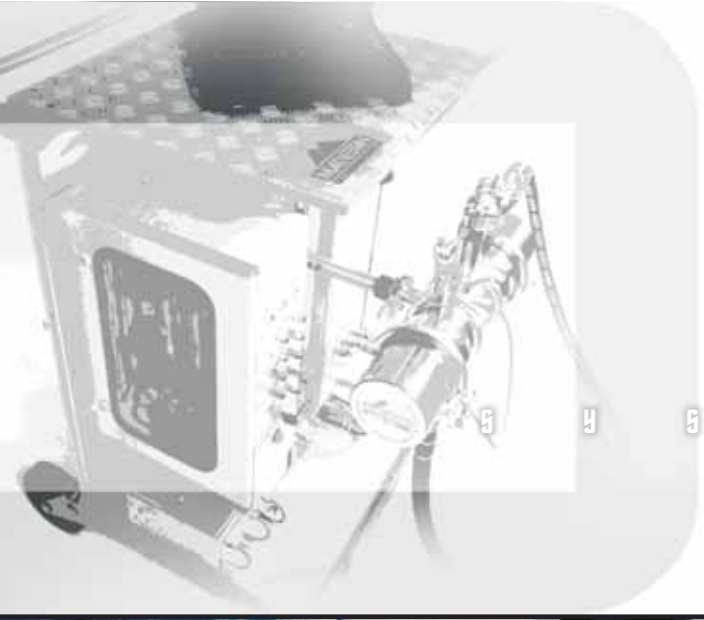


S Y S T E M S

INSITEC VOYAGER

MOBILE PARTICLE SIZER FOR DRY POWDERS

APPLICATIONS

Minerals
Powder metals
Chemicals
Process diagnostics
Multiple mills

"Insitec is the perfect tool for increasing process yield, saving up to a ton of silica on each product changeover"

Torsten Krause, Process Engineer,
Grace-Davidson GmbH, Germany

WWW.MALPS.COM

Award winning technology

Asia Pacific Coatings Show 2003
"Most Innovative New Product"

Processing Magazine
"Breakthrough Product of 2003"

MALVERN
PROCESS SYSTEMS

WHY RUN BLIND?

ON-LINE/AT-LINE PARTICLE SIZING - WHEREVER YOU NEED IT

Insitec technology for dry powder applications is now available as a neatly packaged mobile unit that can be moved easily around the plant for on-line real-time particle sizing, or for automated at-line measurement. Voyager is especially useful for sites with multiple unit operations such as mills, spray driers and classifiers.

- **On-line real-time data**
  Move the analyzer to multiple locations in the process plant for real-time process optimization and process verification with continuous sampling
- **At-line analysis**
  Measure different samples manually with all the analytical power of the QC laboratory available on the plant floor

Insitec Voyager can be used throughout manufacturing, on mills, classifiers, spray driers and atomizers, for:

- Process diagnostics and troubleshooting
- Real-time process optimization
- Quality control of processes
- Multiple sampling ports readily available for measurement on different production lines

System options

Available in two versions - Voyager and Voyager Plus

- **Voyager**
  Combines an Insitec T dry powder analyzer, all the necessary measurement electronics and a process interface in a single compact system. Use of tri-clamping and 316L stainless steel allows easy cleaning to pharmaceutical standards.
- **Voyager Plus**
  Voyager Plus additionally incorporates an automation interface (PLC plus SCADA application software) for complete stand-alone operation and automated data reporting.

Validation and 21 CFR part 11 options are available allowing use in regulated environments. Voyager units can be configured with sample feeders for at-line operation. Protective sides ensure safe transport.

Designed for intensive use

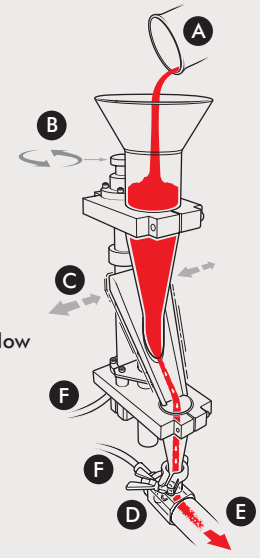
Insitec Voyager meets the specific needs of users in the process industries:

- Simple-to-clean cell and flow path, facilitated by triclamping and the use of 316L stainless steel in the manufacture of all metallic parts
- Sample path and optical head easily and quickly assembled and disassembled by hand without tools
- Parts that are easy to clean and visually inspect
- Uniform and highly polished surfaces to eliminate powder build-up in the sample path

Automated At-line Feeder

This option allows easy, automated off-line measurement, effectively providing a laboratory configuration close to the process line. It offers highly flexible operation within the process plant, giving the facility to measure sample volumes from gram to kilogram amounts. A simple air valve drives the full operation of the feeder. The results are self-archiving and can be automatically reported into the plant DCS/SCADA using industrial protocols, thereby eliminating delays and errors associated with manual data reporting.

- A Sample added manually
- B Coarse adjustment for feeder flow
- C Vibrating tray
- D Air Venturi
- E Delivery to analyzer
- F Compressed air supply



Intended for measurement in process of particles from 0.5 to 1000 μm suspended in a gas stream, Voyager offers:

- Model independent analysis
- First principle measurement using rigorous Mie theory and needing no calibration
- Patented high concentration sizing method using multiple scattering correction
- Measurement of the complete particle size distribution (based on thousands to millions of particles) up to 4 times every second
- Rigorous measurement technique validated for pharmaceutical use
- Configuration of instrument resolution to meet individual process needs using changeable lenses in the sensor

As you would expect from an industrial instrument, Insitec Voyager is:

- CE badged
- Watertight and dustproof to industrial protection rating IP65 (optical head to IP66)
- Optical head and sample path certified to Pressure Shock Resistance of 11bar(a) (PSR11)
- Compliant with industrial-grade electromagnetic compatibility (EMC) requirements for safe, reliable operation.

Process interface

Robust, repeatable and representative sampling is the key to good measurement, making the process interface a critical part of the Insitec Voyager unit. A range of interfaces allows continuous sampling: directly in-line; on-line using an eductor; or using special samplers such as screw augers.

- Eductor interface contains no moving parts and continuously delivers correctly dispersed powder to the sensor
- Easily automated to minimize operator intervention
- Customized applications, including for abrasive, fragile and cohesive materials
- Dry flow cell technology has 10 year track record in industrial processes and offers a range of flow cell path lengths
- Purge keeps windows clean from dust, minimizing routine maintenance
- 10 bar max operating pressure capability

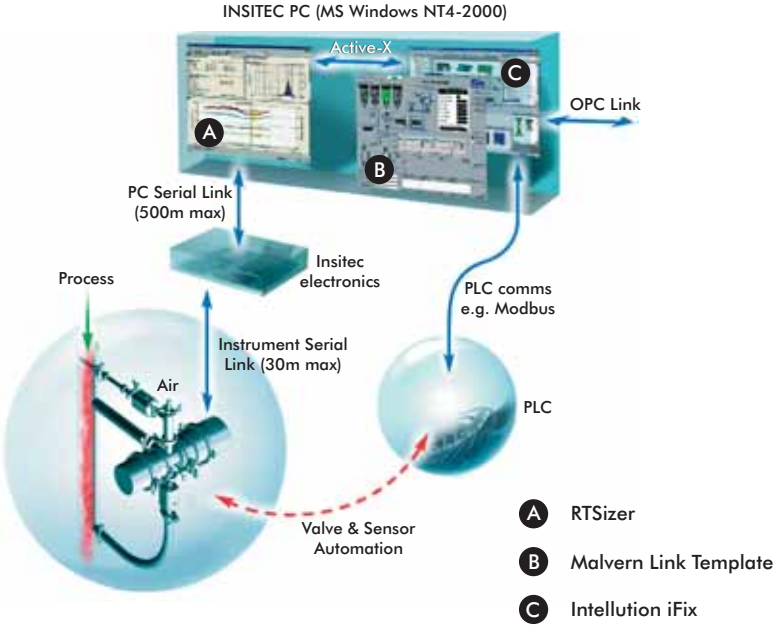
Automation interface

Instrument control is achieved using RTSizer real-time sizing software running on a MS-Windows PC. This interfaces with most plant distributed control systems (DCS) through the intermediary of Malvern Link, an application based on the award-winning Intellution iFix SCADA. An iFix licence is delivered with every system. This package can deliver real-time measurements to the DCS, drive automatic sampling systems and present the operator with a simple custom user interface.

Laser diffraction

Established sensor technology

The proven laser diffraction technology at the heart of the Insitec system is now the standard in most particulate processing industries and has been pioneered and developed by Malvern for more than 30 years. Its robustness has allowed implementation in the Insitec sensor in such a way that it copes easily with the rigors and demands of an industrial process environment.







MRK515-01
DESIGNED AND PRODUCED BY STEELRIB DESIGN CONSULTANCY WWW.STEELRIB.COM
PHOTOGRAPHY BY ESTER SEGARRA WWW.ESTERSEGARRA.COM

Specifications

Lens focal length (mm)	Size range (µm)
100	0.5 - 200
200	1.0 - 400
300	1.5 - 600
450	2.25 - 1000

Specifications	Details
Materials	316L for all metallic parts, with high grade finish Glass windows (for measurement zone) Viton O-rings and EPDM triclamp gaskets (other seal materials can be supplied)
Fittings	Triclamped for simplified cleaning
Transmission	5 - 98 %
Accuracy	±2% on Dv(50) reported using the verification reticle
Air requirements	Dry, oil-free air containing no particulates 6 bar g (90 psi g) with a flowrate of 30 m^3/h (1000 ft^3/h) required as motive gas for eductor and for window purge Note: other gases (e.g. nitrogen) can be used instead of air as appropriate
Maximum operating pressure	10 bar (g)
Industrial protection	Dust-tight and waterproof: Optical head IP66, cabinets IP65
Maximum distance from instrument to PC	500 m
Software	RTSizer (for instrument control) Malvern Link (for system automation and data link) All software runs on MS-Windows 2000 / XP
Automation	Voyager Plus option contains: PLC in cabinet 2-off analogue outputs (optional 4-off analogue inputs for logging extra process parameters) Valve sequencing for automatic background, sample path cleaning, start/stop 8-off digital I/O (for valve switching and alarms) Optional OPC server to plant DCS
Regulatory compliance	Validation and 21 CFR part 11options
Dimensions (fully closed)	H 1.3m x W 0.9m x D 0.7m
Max. weight	165kg

Due to our policy of continuous improvement, please note that all specifications detailed in this document are subject to change

Malvern Instruments Limited
Enigma Business Park
Grovewood Road, Malvern
Worcs
WR14 1XZ
U.K.
Tel: +44 (0)1684 892456
Fax: +44 (0)1684 892789

Malvern Instruments Inc
10 Southville Road
Southborough
MA 01772
U.S.A.
Tel: +1 (508) 480-0200
Fax: +1 (508) 460-9692

Malvern Instruments Japan
459 Kobe International Business Center
5-5-2 Minatojimaminami-machi, Chuo-ku
Kobe-shi, Hyogo 650-0047 Japan
Tel:+81 (0)78 306 3806
Fax:+81 (0)78 306 3807

Malvern Instruments GmbH
Rigipsstraße 19
71083 Herrenberg
Germany
Tel: +49 (0) 7032 97770
Fax: +49 (0) 7032 77854

Malvern Instruments S.A.
Parc Club de L'Université
30, Rue Jean Rostand
91893 Orsay Cedex
France
Tél: +33 (1) 69 35 18 00
Fax: +33 (1) 60 19 13 26

Malvern Instruments Nordic AB
Box 15045, Vallongatan 1
750 15 UPPSALA
Sweden
Tel: +46 (0) 18 55 24 55
Fax: +46 (0) 18 55 11 14