



S Y S T E M S



INSITEC X ON-LINE SIZER

A GMP/IS SOLUTION MADE TO MEASURE

APPLICATIONS

Pharmaceutical

Foodgrade

Powder paints

Zones 0, 1, 2 and 20, 21

"Each gram saved is a real gain and we can now perform much better in a sector where high quality is crucial."

Hubert Müller, Process Engineer,
Siemens Axiva GmbH & Co KG

www.malvern.co.uk



Achieving your **PROCESS VISION**

ON-LINE SIZERS MADE TO MEASURE

Having access to high quality, real-time information is fundamental to making informed processing decisions and improving operational efficiency. Malvern Process Systems deliver continuous on-line particle sizing data for full integration into wet or dry processes. Malvern Insitac's dry powder flowcell technology enables the customized application of laser diffraction based sizing to dry processes, allowing the measurement of particles from 0.5 to 1000 μm .



Laser diffraction

Established sensor technology

The proven laser diffraction technology at the heart of the Insitac system is now the standard in most particulate processing industries and has been pioneered and developed by Malvern for more than 20 years. Its robustness has allowed implementation in the Insitac sensor in such a way that it copes easily with the rigours and demands of an industrial process environment. The sensor's changeable lenses allow the tuning of the instrument resolution to the needs of the process. The instrument is watertight and dustproof, and certified to industrial protection rating IP65. It is CE badged and meets industrial-grade electromagnetic compatibility (EMC) requirements for safe, reliable operation.

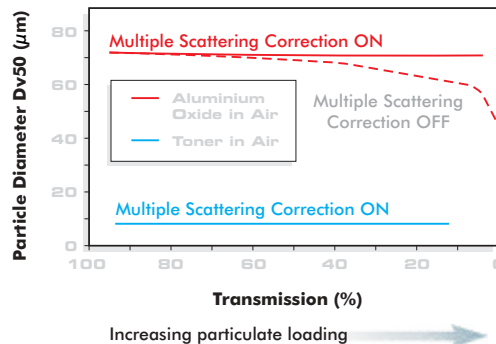


Figure 1. Correcting for multiple scattering effects at high concentration.

Unique to the Malvern Insitac range of process instruments, is a patented (US 5,619,324) multiple scattering algorithm that enables accurate measurement at high concentration (see Figure 1). The use of this algorithm is crucial to ensuring that particle size measurements are accurate regardless of the instantaneous process loading. This is particularly important during plant start-up, shutdown, and process changes.

Malvern Insitac

A rugged industrial solution

Malvern Insitac systems are designed from the outset for industrial use. Their rugged construction and robust technology reflect the exacting demands placed on analytical instrumentation that is in continuous use in a process environment. Capable of taking scattering patterns every second and delivering the particle size distribution in real-time, an Insitac can make more than a million measurements every year. The instrument, the process interface, analysis software, automation and data reporting can all be customized to the unique needs of individual clients.

GMP option

New applications of a proven design

The Insitac Dry Cell has been employed in on-line laser diffraction based systems for over more than 10 years. It is used extensively across a wide range of industrial applications and materials. The Dry Cell can be used directly in-line for dilute process streams, or on-line with an eductor by-pass for more concentrated suspensions:

- Designed to operate in GMP-regulated environments with simple-to-clean cell and flow path facilitated by triclamping and the use of high grade 316L stainless steel in the manufacture of all metallic parts. The sample path and optical head can be easily and quickly assembled and disassembled by hand (no tools required). Screws on all user serviceable parts have been eliminated
- Purge that keeps windows clean from dust to minimize routine maintenance
- A range of available flowcell path lengths (line i.d. of 25 - 50mm standard, >50mm special projects) for direct in-line applications
- Clean In Place (CIP) and Sterilize In Place (SIP) options
- Monobloc design





- Each user-servicable part of the sample path and instrument can be easily cleaned, and visually inspected after cleaning
- A high surface finish (mechanically- and electro- polished) and regular uniform surfaces in contact with the product eliminates powder build up in the sample path
- Validation and 21 CFR part 11 options



Pharmaceutical milling at Siemens Axiva GmbH & Co. KG, Frankfurt, Germany

Intrinsic Safety

In many processes, including fine chemicals and pharmaceutical production, explosive gases, vapours and dusts can be present. It is for these situations that Insitex X has been developed, the world's first intrinsically safe (IS) particle size analyzer. The Insitex is currently approved for Intrinsic Safety to European Standard EN50020:1994 and IEC standard IEC60079-11:1999. The levels achieved are EEx ia IIC T4. The IS approval for the Insitex enables its use in zones 0, 1 and 2 gas environments and zones 20, 21, 22 dust environments. Malvern Instruments Ltd. fully meets the requirements of the ATEX directive 94/9/EC (annexes IV and VII).

Ruggedized optics

The Insitex's flow cell acts as a rigid optical bridge that holds together the transmitter (laser diode) and receiver (photodetector) windows. Made from 316L stainless steel, it is especially resistant to the effects of vibration and flexing, which would otherwise have the potential to affect alignment and measurements. The instrument is rated to 10 bar max operating pressure. The optical head is connectorized, allowing easy removal for cleaning.

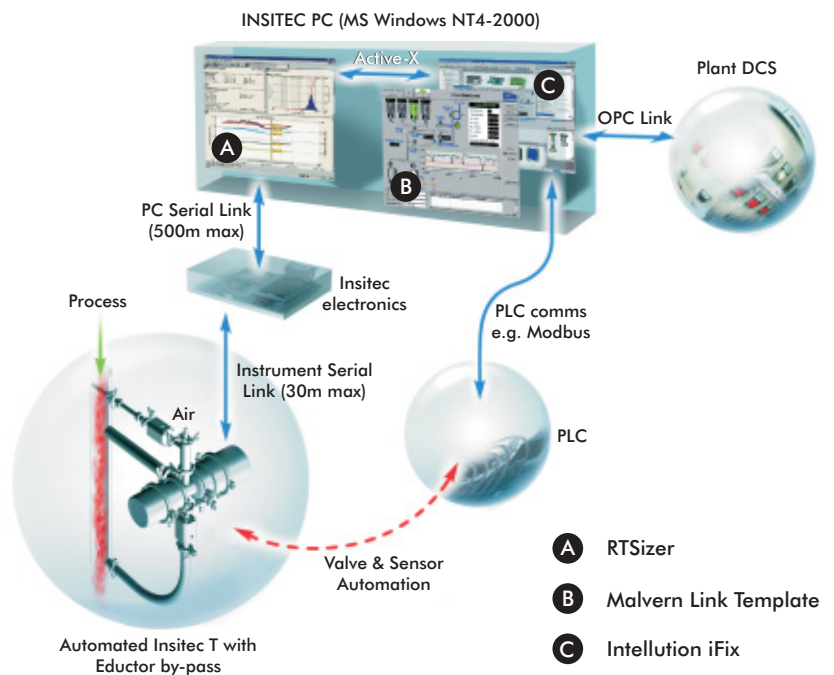
Automation

Instrument control and automation is achieved through the use of RTSizer real-time sizing software. RTSizer interfaces with most plant control packages directly through the intermediary of Malvern Link, which can deliver real-time measurements to the plant control system, drive automatic sampling systems and present the operator with a simplified,

custom user interface. The instrument can be easily connected to the PC via a serial port. Up to 4 instruments can be connected to one PC, and the PC can be placed at up to 500m from each instrument.

Process interface

Robust, repeatable, representative sampling is the key to a good measurement. Malvern achieves this with a range of process interfaces that can be tailored to meet the needs of different applications, to suit powder mass flows from 1 to 500,000 kg/h. The most widely adopted sampler uses an air venturi to aspirate powder from the process line and to disperse the sample for accurate measurement. Such an interface, which has no moving parts, is possible only because of Malvern's patented high concentration measurement technique. Dynamic samplers are available for high tonnage abrasive solid streams and in-line flow cells can be used for very dilute processes.





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
Intrinsic Safety	EEx ia IIC T4. Approved for use in zones 0, 1 and 2 (gas environments) and zones 20, 21, 22 (dust environments)
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	Triclampped 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 m³/h (1000 ft³/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	IP65 (dust-tight and waterproof)
Maximum distance from instrument to PC	500 m
Maximum number of instruments connected to one PC	4
Software	RTSizer (for instrument control) Malvern Link (for system automation and data link) All software runs on MS-Windows 2000 or above
Regulatory compliance	Validation and 21 CFR part 11 options

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
 SORIO-3, 6th Floor, 2-2-1 Sakaemachi,
 Takarazuka,
 Hyogo 665-0845
 Japan
 Tel: +81 (0) 797 85 5060
 Fax: +81 (0) 797 85 5657

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