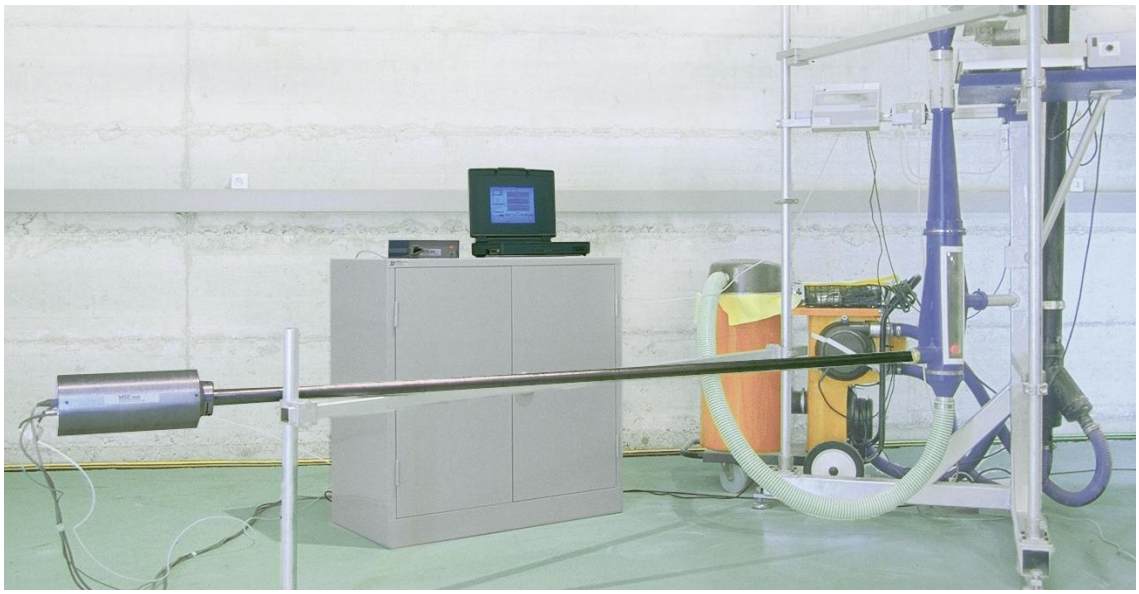
MSE Meili AG
Multiphase Systems Engineering

LABASYS® 100

Measuring System for Concentration & Velocity



Description

The measuring system LABASYS® 100 is a flexible instrument for the **simultaneous determination of concentration and velocity** in multiphase flows. It consists of the measuring probe, which integrates all optical and electronic components and protects them against environmental harms, the power supply and the personal computer based data evaluation unit. LABASYS® 100 finds application in research and production.

Measuring Principle

Glass fibers guide the light of laser diodes to a specially designed optic, which defines a from the application depending **measuring volume** and allows an **unambiguous calibration** for high concentrations too. The by solids particles or bubbles backscattered light is directed to photodiodes by additional fibers and converted into a voltage signal, from which the local solids concentration can be determined. The comparison of several signals allows the correlative calculation of the solids or bubble velocity respectively.

Calibration

Generally for the quantitative concentration determination a calibration curve has to be determined for each material. The calibration curve depends on the **optical properties** (colour, surface) and the **particle size**. MSE Meili assists its customers obtaining accurate calibration data through its unique calibration service.

For many applications as i. e. classification of flow conditions or relative concentration determination **proportionality** between signal and concentration may be assumed making a calibration obsolete.

Design Characteristics

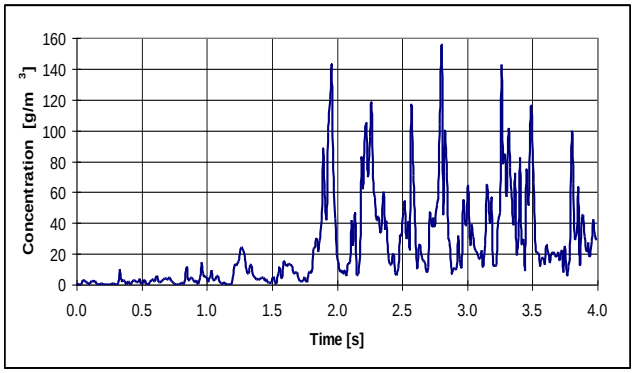
Superior design characteristics make LABASYS® 100 to a top quality measuring system suited for measurement tasks under rough industrial conditions:

- all optic and electronic components fully integrated in an easy to operate and **handy instrument**.
- **modular design** allows flexible adaptation to varying measuring conditions & tasks as well as an easy exchange of all components.
- **high sensitivity and accuracy** with low flow disturbance.
- simultaneous determination of concentration and 1 or 2 velocity components (corresponding to 2 or 3 measuring channels, patent pending).
- thanks to the constant probe shaft diameter the introduction into pressurized facilities is possible without interrupting the operation.
- **efficient cleaning unit** allows for reliable measuring results even with sticky or moist products (patent pending).

Data Analysis

The user friendly and powerful data acquisition and analysis software **LABASOFT** is Windows™ based (98/NT/2000) and allows:

- **off-line** or **on-line** determination of concentration and velocity including statistical numbers as i. e. turbulence velocity (RMS).
- calculation of power density spectra for **flow classification** or for the determination of **cluster or bubble sizes.**
- **data export** for further processing & visualization.
- adaptation to existing customer's data acquisition hardware possible.
- additional modules may be implemented upon request.



Blast-in of maize starch in a silo.

Service & Training

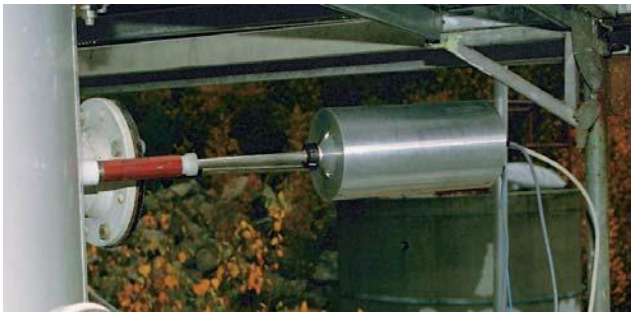
MSE Meili conducts complete measuring campaigns at customers plants – from planning to data analysis and interpretation. Personal training will be held at customers site.

Applications

LABASYS® 100 allows an efficient characterization of the complex multiphase flows in pilot and production plants. The simultaneous measurement of concentration and velocity allows a direct determination of important sizes for modeling such as mass- or momentum fluxes. Also the in the **safety engineering** important figures of dust concentration and turbulence velocity (RMS) are obtained easily.

- **Particles in gas flows (g/s):** fluidization (incl. CFB's), fluid catalyst cracking, cyclones, mixers, mills, pneumatic transport, spray dryers, etc.
- **Particles in liquids (l/s):** Stirred tanks, crystallizors, slurry-handling, e.g. pulp processing.
- **Bubbles in liquids or droplets in gases (g/l):** atomization, bubbling bed, separation columns (only phase and velocity determination).
- **…?**

Suited for **in-line process & quality control!**



Specifications

- **concentration:** Measuring range depending on optics and solid material (directional quantities):

Measuring range		Measuring volume
Vol.-Concentration [vol.]	Concentration* [kg/m^3]	Length [mm]
0.1 – 60%	1 - 1'500	2 - 8
0.0001 - 1%	0.001 – 10	10 - 150

* solids density: 1000 kg/m^3

- **velocity:** 0.05 - 200 m/s
- **sampling frequency** (hardware depending)**:**
  - concentration: 1 – 100 kHz
  - velocity: 10 - 5000 Hz (moving average)
- **probe tip:**
  - 2 or 3 measuring tips (∅ 6.2 mm)
  - shaft-∅: 16.0 mm, 40.0 mm with cleaning unit
  - length: 200 - 4000 mm (according to specs.)
  - material: stainless steel
- **temperature:** ≤ 110 °C / 230 °F (probe tip)
- **pressure:** ≤ 10 bar / 145 psi absolute

Upon request models with special geometry, for higher pressures or temperatures and corrosive media are available.

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