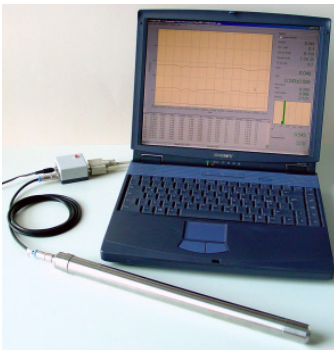


in-situ finger probe - **Aello 1500**

Description:

The in-situ probes of the **Aello 1000** series are in-line sensors for the characterisation of liquid concentrated disperse systems. The experience of many years research and development work of optical sensors resulted in this device group of very compact in-situ probes with an excellent handling and user friendliness. The **Aello 1500** was designed for measurements in high concentrations (up to 50 vol.%) and can detect particle concentration from app. 60 nm to 100 µm diameter. Generally the probe utilizes the spectral backscattering of light as a measuring principle. It allows you to work in a higher concentration range in which ordinary extinction probes are unable to detect proper signals. This type of sensor is suitable for in-line process monitoring and control of complex and high concentrated multi-phase systems. Depending on the used calibration parameters you will be able to measure the concentration. For selected particle systems particle size information or colour intensity of a medium can be found too.

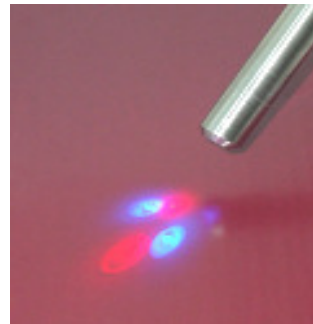


General:

The design of the **Aello 1500** probes considers an easy cleaning for applications in various industries. A direct connection (adapter) to a PC via a standard RS-232 interface minimises the hardware requirements (the digital signal processing is integrated). Additional special accessories, like flow cell adapters, special fittings for the use in high-pressure pipes and fittings for sterile application complete the **Aello 1000** series.

Applications:

- characterization of high concentrated particle systems
- calculation of the concentration (based on material specific properties)
- observation of process kinetics
- quality control of dispersed systems, control of filters
- monitoring of multi phase-processes:
 - flocculation and precipitation
 - crystallisation
 - emulsifying, homogenisation
 - waste water treatment, aeration
 - grinding and polishing processes



Special features:

- wet parts made of CrNi (VA4)
- direct PC connectable via RS 232 (RS 485 optional)
- diameter Ø 25 mm (industrial standard fitting size)
- various fittings and adapter for process integration (e.g. flow cell adapter)
- Aello stand alone unit (right) for mobile applications or rough measurement conditions (no PC required)
- alternatively the Aello 1520 with integrated data processing can be used



Measurement range:

Particle size: ~ 50 nm ... 100 µm*
 Concentration: ~ 0,1 ... 50 Vol.-%*

* depending on the optical properties of the particle material

Measuring principle:

Losses of light propagating through any suspensions can be attributed to two primary causes: scattering and absorption. By projecting a collimated light beam on or in a suspension and placing a receiver at the sensor, one can quantify these losses. The spectral backscattering technology of the Aello 1500 evaluates the backscattered intensity of different wavelengths (e.g. blue, red, infrared light). The light source and the detector are accommodated in the sensor head. The functional relation between the sent and measured light intensities contains information about the concentration and type of a dispersion (e.g. particle sizes) as well as information about the colour intensity. It is particular useful to determine particles in the sub-micron range (nano meter). However, accurate measurements in the nano-scaled range require knowledge about the optical properties of the suspension. Optical backscattering coefficient is a fundamental parameter in studies of suspended particulate material. Changes in suspended particle concentration, composition (shape and/or refractive index), and size distribution all affect optical backscatter. The Aello 1500 measurement system operates with a relational function of the materials optical behaviour. Out of it the device calculates the related concentration.

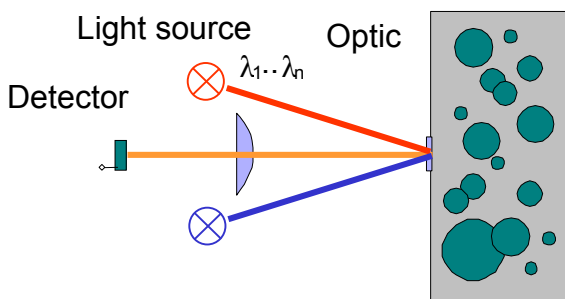


Fig. 1: measuring principle spectral backscattering

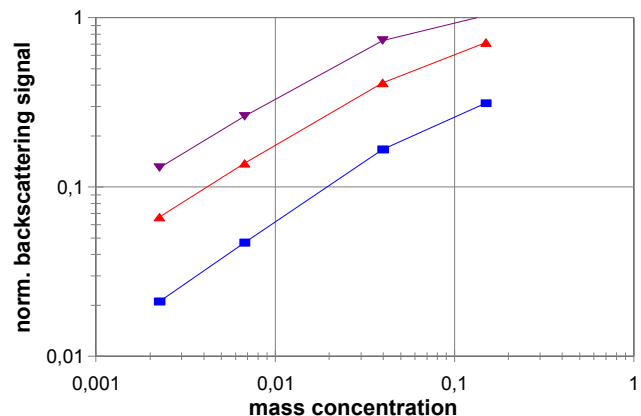


Fig. 2: typical course of the detected signal

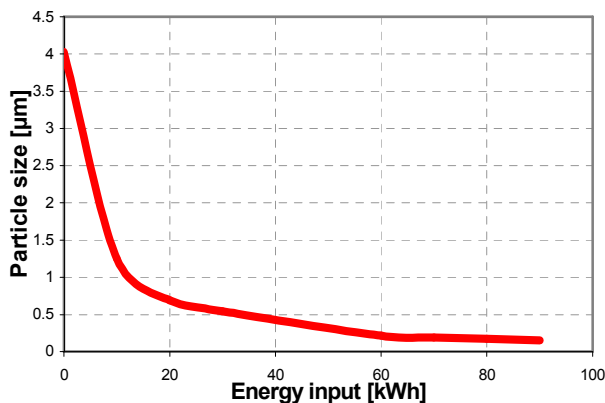


Fig. 3: example of use for pigment sizes in refining and milling processes

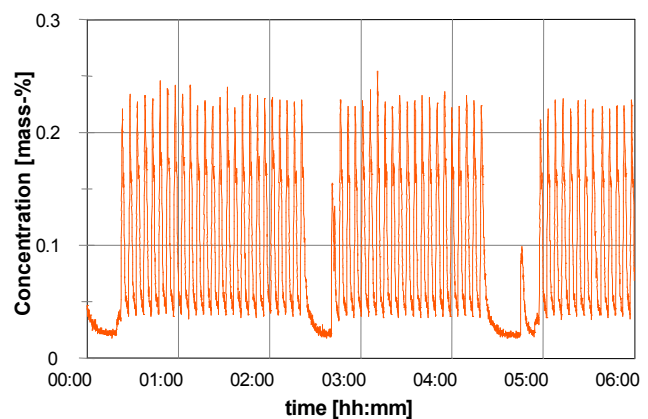


Fig. 4: Concentration measurement in industrial sewages after grinding