

IN FOCUS

glass analysis
particle size
laser diffractometry

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Particle size distribution with laser diffractometry

**Method description**

When particles of different sizes pass a laser beam they cause the laser light to be scattered at angles that are inversely proportional to the particle size. The powder from which the size distribution must be determined is suspended in an appropriate liquid. This suspension is pumped through a measuring cell and illuminated by a laser beam. The scattered light is collected by a detector and the size distribution of the particles can be calculated from the diffraction pattern. There are several techniques based on different principles to determine the particle size distribution, each giving its own results.

Measured Quantity

Light intensities.

Derived Quantity

Volume distributions.

Measuring Range

Particle size 0.05 - 870 μm .

Precision

For well-defined samples $\sigma = 2\%$.

Accuracy

Particle sizes are obtained by mathematical algorithms. Shape and irregularity effects are ignored.

Detection Limit

Depends on the d_{50} value.

At $d_{50} = 1\ \mu\text{m}$ approx. 20 mg is required.

At $d_{50} = 200\ \mu\text{m}$ approx. 4 g is required.

Possible Errors

Inhomogeneity of the sample. Agglomeration effects. Large differences in particle size and particle shape. The technique should not be applied to highly magnetic materials.

Sampling

1 g.

Calibration

No calibration.

Measuring Time

0.5 day.

Cost Aspect

1 man hour.