OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

WORKGROUP FOR MULTIPHAS FLOWS

Laser diffraction

The particle size analysis using laser diffraction after Fraunhofer has been accepted more and more during the last years. Tl measuring method is very efficient and has specific advantages regarding its operation.

The phenomenon of diffraction of laser light at microscopic objects is well-known. If the particles are monodispers, a characteris diffraction image could be observed on a screen, which can be used for determination of the particle size. A polydispers mate does not produce such an easy to analyse diffraction image. However, also in this case one can measure an intensity distributi (figure on the right) using a specially structured sensor (ring detector). From this intensity distribution the particle size distributi can be calculated.

The measurement is carried out in a way, that the entire particle ensemble will be analysed simultaneously. Therefore, the ti needed for a single analysis is markedly low. In general, a laser diffraction measuring device is designed for a particle size ran between 0.2 and 1500 µm. The particles can be available as well in a liquid phase (suspension, emulsion, bubbles) as in an loaden state (free jet, spray).

If the sample is a suspension, it must be guaranteed that there is enough pure suspension liquid (about 1l) available fo reference measurement and for washing the measuring cell. The solid content of the suspension depends on the particle size a normally lies below 1%. If a dry dispersion (free jet) is carried out, a much higher amount (about 100 g) will be necessary.

Examples of use:

particle size analysis of:

- sediments and sludges
- filter dusts and dust precipitation
- dusts at the working place
- agricultural dusts
- bulk materials

in-house devices:

- laser diffraction measuring device SYMPATEC (0.2 ... 1600 µm)
- suspension cell
- dry dispersing device RODOS