

Comprehensive Particle Characterization Beyond Size

Information about particle size, distribution as well as morphology

Eurofins Qualitech AG delivers comprehensive solutions for quality control and troubleshooting across all areas of materials science and engineering. We support our customers with deep expertise in non-destructive and mechanical testing, materials and failure analysis, industrial computed tomography, as well as metrology and calibration.

Fundamentals of Conventional Particle Size Analysis with Laser Diffraction

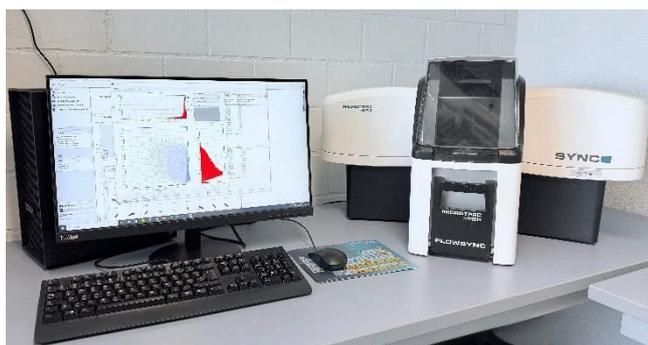
Laser diffraction is one of the most widely used methods for determining particle size in both scientific research and industrial applications. In this technique, a particle sample is exposed to a laser beam. As the beam interacts with the particles, it scatters light at angles that depend on their size; smaller particles scatter light at wider angles, while larger particles scatter at narrower ones. By analyzing the resulting scattering pattern, a detailed particle size distribution can be accurately derived.

Despite its widespread use, laser diffraction comes with several limitations:

- Poor resolution to measure large particles,
- inability to distinguish oversized particles,
- low sensitivity to detect multimodal particle size distribution,
- best suited only for spherical and transparent materials,
- most importantly, laser diffraction lacks morphological information about particles.

Hybrid Approach: Laser Diffraction with Dynamic Image Analysis

To overcome the limitations of classical laser diffraction, the SYNC equipment available in the Eurofins Qualitech facilities combines this conventional technology with an integrated dynamic image analysis. In this approach, the sample is illuminated by a laser beam to generate a scattered light pattern for size determination. Simultaneously, high-resolution images of the particles are captured using integrated camera technology. These visual data provide critical information about the physical properties of the particles, including their shape and morphology, which traditional laser diffraction alone cannot reveal.



SYNC Equipment in the Eurofins Qualitech facilities

Key Benefits

- Size, distribution and/or shape information,
- more than 30 morphological information *i.e.* length, width, aspect ratio etc. for each particle,
- measurement range of 0.02 μm to 2000 μm ,
- analysis of spherical, non-spherical, transparent as well as absorbent powders,
- excellent sub-micron detection,

- improved overall accuracy and repeatability,
- reduced trouble shooting time,
- possibility to examine single and/or group of particles,
- detection of over- and undersize particle fractions.

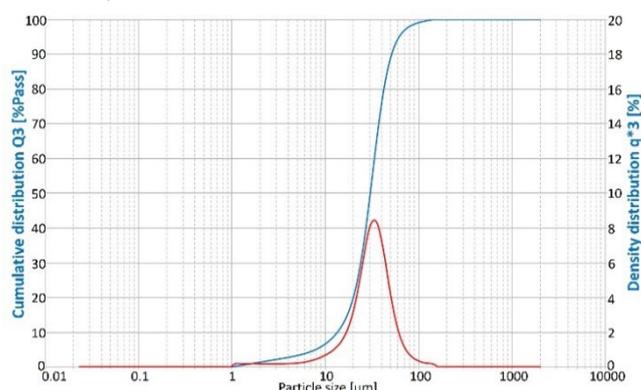
Sample Preparation

Samples need to be dissolved in a carrier fluid like water or alcohol. Thanks to the integrated ultrasonic probe, samples can be dispersed well, and agglomeration is prevented, which helps to increase accuracy and repeatability. Samples up to 200 mL volume can be examined.

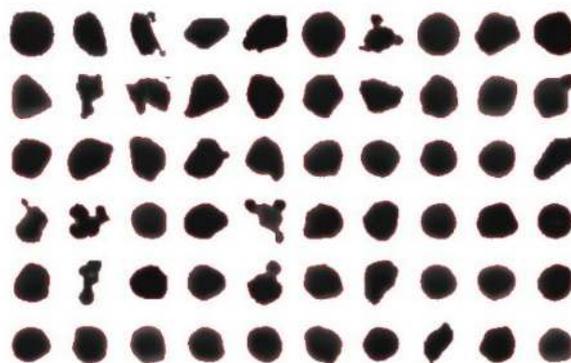
Applications

Ideal for research, quality control and process optimization purposes in the fields of:

- Pharmaceuticals,
- additive manufacturing,
- chemicals,
- battery materials etc.



Exemplary particle size and distribution result obtained with SYNC



Exemplary particle images acquired using SYNC

Want to Learn More?

Contact us to get more information about the technique, discuss your specific samples and cases. We are here to help you!

