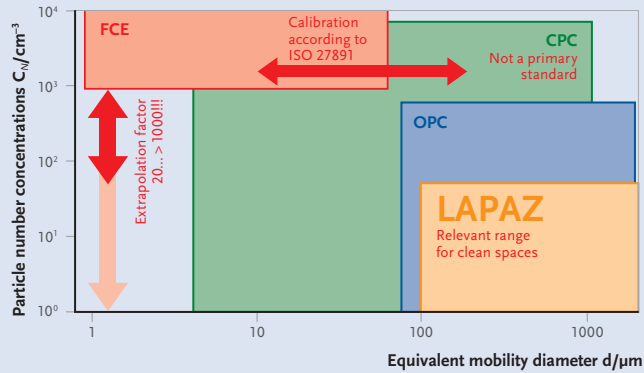


The national primary standard at METAS is directly traceable to SI-units and stands therefore at the cutting edge of the measurement pyramid.

Particle number concentrations as low as  $0.5 \text{ cm}^{-3}$  can be generated and measured with an expanded relative uncertainty between 5% and 10%.



Optical particle counters (OPC) are often calibrated with condensation particle counters (CPC). CPC's are not a primary standard. To fulfill traceability they need to be calibrated with a farraday cup electrometer (FCE) according to ISO 27891. FCE's cannot measure particle concentrations below  $1000 \text{ cm}^{-3}$ . To reach a traceable calibration of the OPC with a CPC, the calibration of the CPC needs to be extrapolated by factor up to 1000. On the contrary, LAPAZ is a primary standard and is able to calibrate OPC's in the relevant ranges of clean spaces.

## METAS: The National Metrology Institute of Switzerland

The Federal Institute of Metrology METAS is the National Metrology Institute of Switzerland. It represents the state of the art of measuring accuracy in Switzerland. Through its activities in research and development and its range of services, METAS is instrumental in ensuring that measurements can be performed in Switzerland at the level of accuracy demanded by industry, research, administration and society.

METAS realises the Swiss reference standards, ensures their international recognition and disseminates them with the requisite degree of accuracy in each case. METAS oversees the market launch process, use and control of measuring equipment in the retail trade, traffic, public safety, health and environmental protection. It makes sure that the measurements required for the protection of people and the environment can be carried out correctly and in the prescribed manner.

METAS keeps up with scientific and technological developments in order to maintain its place at the cutting edge.



Laboratory of Particles and Aerosols at METAS  
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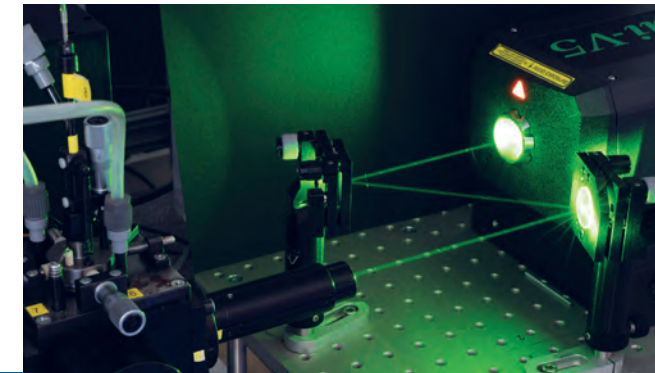


Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Federal Institute of Metrology METAS

Swiss Confederation

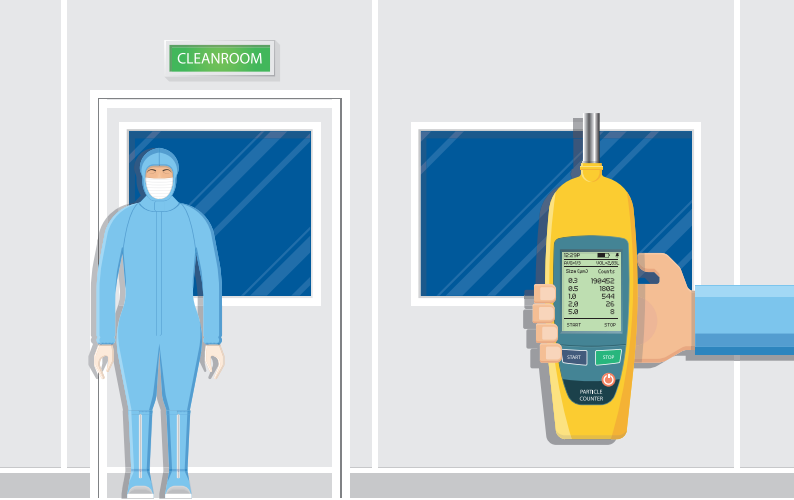
## Calibration of optical particle counters



Traceable calibration of counting efficiency according to ISO 21501-4

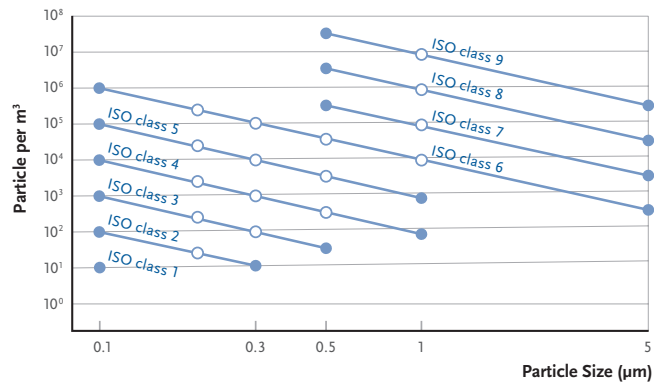


Interested in the testing and measurement capabilities of these METAS facilities? Contact us with questions or a visit request.



The progress in research and development, the miniaturization of high-tech processes and furthermore the strict safety regulations in comestible sectors, in health sectors and in the pharmaceutical industry lead towards more and more processes in clean rooms. An accurate monitoring of the clean rooms' air quality is therefore mandatory. To fulfill air quality regulations in clean rooms, calibrated and traceable devices, such as optical particle counters, are required.

According ISO 14644-1 the air quality in clean rooms and similar environments is defined by the number of smallest particles per cubic meter of air. Clean rooms are categorized into nine classes based on the particle number concentration and particle size. Here, it must be noted that even the lowest particle number concentrations can be crucial in clean rooms.



METAS is the first metrology institute worldwide to provide calibration of optical particle counters in the range from 0.1 µm to 10.0µm, traceable to SI-units.

The home-built calibration facility at METAS is able to simulate clean room conditions and allows comparisons with the national primary standard for optical particle counting called LAPAZ.

