



## Performance & evaluation criteria for calibration workshops & ACTRIS compatibility

ACTRIS aerosol in-situ variable: Particle number size distribution 10-800nm

Responsible CAIS-ECAC units: WCCAP; PACC

Instrument type: CEN Mobility Particle Size Spectrometer (MPSS)

Manufacturers & instrument models:

Technical checks & calibration:

- ACTRIS compatible CEN CPC
- determination of the MPSS status values
- check if the ACTRIS & CEN recommendations are fulfilled (bipolar charger, sensors - RH/T&p in aerosol and sheath flow, positive polarity of High Voltage power supply, flow ratio, etc.)
- latex size calibration (203nm) (up & down scan for scanning MPSS; overlapping for correct plumbing time)
- adjustment of the sheath air (if necessary & possible)
- export of ACTRIS level-0 electrical particle mobility distribution
- Comparison of the particle number size distribution against reference MPSS on atmospheric aerosol

Criteria for evaluation:

- target uncertainties for particle number size distribution against reference MPSS; for 10-20 nm <50%, 20-200 nm <10%, and 200-800 nm <20%
- closure of particle number concentration to reference CEN CPC <15%
- is the latex sizing (203 nm) within 3% (197-209nm)
- Is the size range of 10-800 nm measured?
- are the ACTRIS recommendations fulfilled (bipolar charger, size range, sensors, flow ratio, etc.)

Information for the user:

- are the regular checks of sizing, flows (aerosol and sheath)
- how to clean the DMA regularly

Literature:

- CEN/TS 17434 - Ambient air - Determination of the particle number size distribution of atmospheric aerosol using a Mobility Particle Size Spectrometer (MPSS)
- Wiedensohler, A., et al. (2018). "Mobility Particle Size Spectrometers: Calibration Procedures and Measurement Uncertainties." *Aerosol Science & Technology* 52(2): 146–164.
- Wiedensohler, A., et al. (2012). "Mobility Particle Size Spectrometers: Harmonization of Technical Standards and Data Structure to Facilitate High Quality Long-term Observations of Atmospheric Particle Number Size Distributions." *AMT* 5: 657–685.