Performance & evaluation criteria for calibration workshops & ACTRIS compatibility

ACTRIS aerosol in-situ variable: Particle number concentration D_{P50} =10nm

Responsible CAIS-ECAC units: WCCAP; PACC

Instrument type: CEN Condensation Particle Counter (CPC)

Technical checks & calibration:

determination of the status values such as temperatures, flow rate
measurement of the counting efficiency curve against reference electrometer 7-40 nm (7, 9, 10, 11, 14, 20, 30, and 40 nm; low number concentration range with a coincidence <1%)
determination or application of a model-specific calibration factor and the unit-to-unit variability (1000, 2000, 4000, 8000, 12000, 25000, and 50000 cm^{-3} all at 40 nm)
determination of D_{P50}=10nm +/-10% and adjustment if needed
measurement of the coincidence up to 50000 cm^{-3}; number concentration derived from counting of the CPC versus reference electrometer
determination or application of a model-specific correction function for coincidence after calibration factor correction

Criteria for evaluation:

must be able to set the D_{P50} to 10 nm +/-10%.
the plateau counting efficiency at 40 nm must be within 5% to the electrometer after application of the model-specific calibration factor
the slope of the linearity must be within 5% from the 1:1 line after calibration factor and coincidence correction.

Information for the user:

are the internal corrections for the calibration factor and coincidence included in the CPC software for Ethernet or USB output? Y/N
what should be cleaned must be cleaned/replaced during frequent technical checks of the user.

Literature:

- Draft: EN 16976 Ambient air — Determination of the particle number concentration of atmospheric aerosol
- Wiedensohler, A., et al. (2018). "Mobility Particle Size Spectrometers: Calibration Procedures and Measurement Uncertainties." Aerosol Science & Technology 52(2): 146–164.