# 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 5000 $cm^{-3}$; 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: prEN 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.