Performance & evaluation criteria for calibration workshops & ACTRIS compatibility

ACTRIS aerosol in-situ variable: Particle number concentration 2 < D_{P50} < 4 nm:

Responsible CAIS-ECAC units: WCCAP; PACC,; CCC

Instrument type: Nano Condensation Particle Counter (Nano CPC)

Technical checks & calibration:

- Determination of the CPC status values such a temperature, flow rate
- measurement of the counting efficiency curve against electrometer 3-40 nm 3, 4, 5, 7, 9, 10, 11, 14, 20, 30, and 40 nm; low number concentration range with a coincidence <1%)
- model-specific calibration factor and the unit-to-unit variability if applicable. (e.g., for full flow Nano CPC)
- determination of the manufacturer defined D_{P50} & adjustment (if possible)
- determination or application of a model-specific correction function for coincidence after calibration factor correction

Criteria for evaluation:

- the plateau counting efficiency at 40 nm must be within 5% to the electrometer after the model-specific calibration factor (if applicable)
- the slope of the linearity must be within 5% from the 1:1 line after coincidence correction
- can the D_{P50} be set to the manufacturer default diameter

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 can be cleaned must be cleaned/replaced during frequent technical checks of the user

Literature:

- Wiedensohler, A., et al. (2018). "Mobility Particle Size Spectrometers: Calibration Procedures and Measurement Uncertainties." Aerosol Science & Technology 52(2): 146–164.