World Calibration Centre for Aerosol Physics

Leibniz Institute for Tropospheric Research

Intercomparison of Condensation Particle Counter

Project No.: CPC-2020-1-5

CPC Model: Airmodus

CPC Serial Number: 2331645306

Principal Investigator: Dr. Joonas Vanhanen

Home Institution: Airmodus, Finland

Participant: -

Description: Calibration of a Condensation Particle Counter (CPC, Model Airmodus)

Date of Calibration: March 18, 2020

Summary of Intercomparison:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp50 is at 8.70 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Certificate / Reference: WCCAP

Date of issue: March 20, 2020 Signature:

Reviewed by: **TROPOS** Name: **Kay Weinhold**

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Date of arrival of instrument in calibration lab:	*March 10, 2020*
Instrument:	*Condensation Particle Counter*
Model and serial number of instrument:	*CPC Airmodus SN2331645306*
Result of physical inspection:	*no damages*
Result of functional test:	*functional test successful, no problems*
Internal parameters of instrument	*nominal flow rate 1.0 l/min*
Model and identification number of aerosol electrometer:	*TSI Electrometer Model 3068, S/N 70838596*
Electrometer calibration certificate:	*September 5, 2018, calibrated at PTB Braunschweig*
Corrections of electrometer, for instance, differing flow rate:	*Within tolerance range (+/-2%); reference: 4.0 l/min, measured: 4.000 l/min*
Software for recording:	*LabView 2010; National Instruments; Program „LabCount.vi“*
Date of calibration:	*March 18, 2020*
Lab temperature and pressure:	*23.0°C, 1008 mbar*
Measured aerosol flow rate of CPC:	*1.035 l/min*
Uncertainty in measured flow rate:	*3%*
Flowmeter used:	*Gilian Gilibrator V; S/N 1711008-S, January, 2018*
Particles and gases used for calibration:	*silver particles and nitrogen*
Method of particle generation:	*tube furnace generator*
Zero measurement of instrument:	*0 particles/cm³ in 5 minutes*

Results (using pulse output and logging via TROPOS LabVIEW software):

Particle size (nm)	***40***	***30***	***20***	***15***	***10***	***09***
Number concentration (cm-3)	1337	1506	995	1172	1360	991
Counting efficiency η	*0.99*	*1.00*	*1.00*	*0.97*	*0.74*	*0.52*
Particle size (nm)	***08***	***07***	***06***	***05***	***40***	
Number concentration (cm-3)	621	249	13	0	1088	
Counting efficiency η	*0.33*	*0.11*	*0.01*	*0*	*1.00*	

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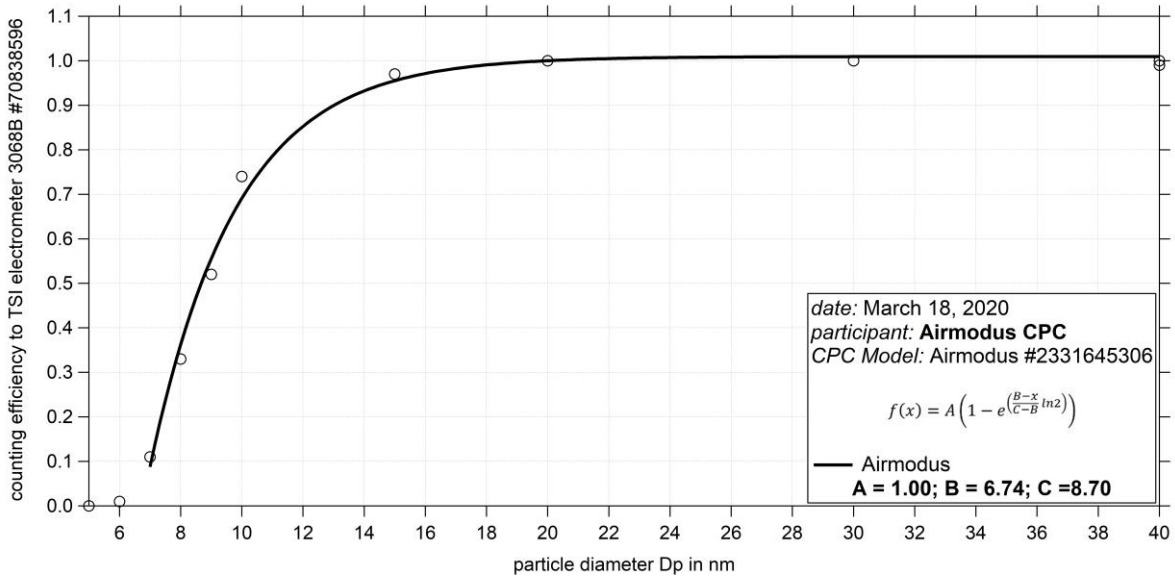

Fig. 1: Counting efficiency for CPC Airmodus S/N 2331645306 against aerosol electrometer 3068 S/N 70838596; silver particles between 5 and 40 nm were used for calibration; the calculated Dp50 is 8.70 nm.

Status information:

Status	***T SAT***	***T CON***	***T OPT***	***T CAB***	***P AMB***	***P VAC***
from display	35	20	36		102	-
Status	***P OR***	***P NO***	***Laser***	***LV***	***flow***	***P INLET***
from display	81	1	53	full	1.035	-

Date of issue: *March 20, 2019*

Reference: TSI electrometer, model 3068, SN *70838596*
Reviewed: TROPOS / Kay Weinhold

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