Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

Intercomparison of Condensation Particle Counter

Project No.:	*CPC-2019-4-11*
Principal Investigator:	Prof. Alfred Wiedensohler
Home Institution:	Leibniz Institute for Tropospheric Research Permoserstraße 15 04318 Leipzig, Germany
Participant:	–
Candidate:	TROPOS
Counter (SN):	TSI CPC Model 3010 #2124
Location of the quality assurance:	TROPOS Leipzig, lab 130
Comparison period:	September 11, 2019
Last Intercomparison (with Project No.):	
TROPOS Reference Instrument:	Electrometer: TSI model 3068B #70838596, Last calibration in September 2018
Additional Equipment:	Bubble flow meter 'Gilibrator', Gilian (Sensidyne) #1711008-S, Last calibration in January 2018

Summary of Intercomparison

Status:
The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp50 is at 11.64 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

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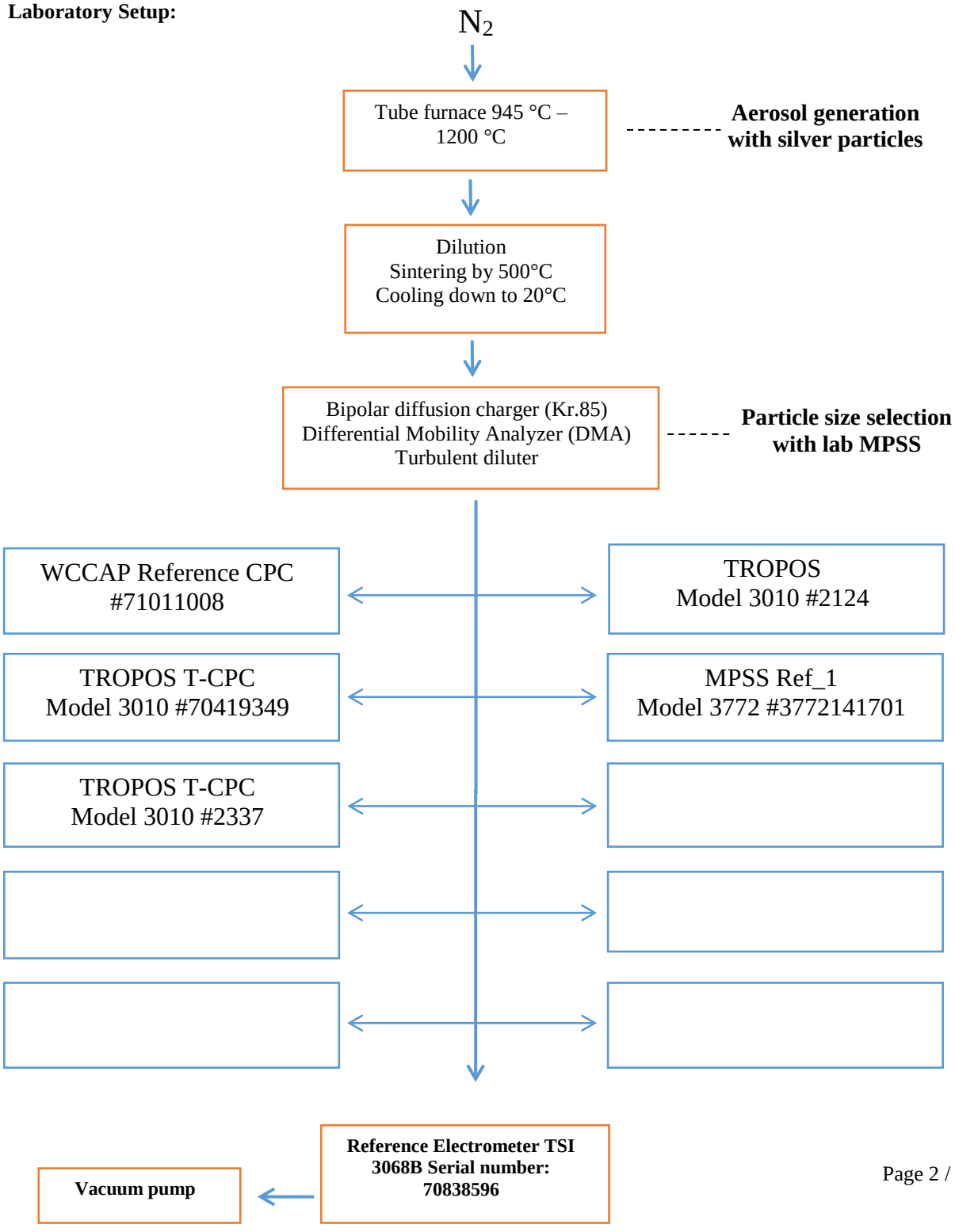
Laboratory Setup:



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Date of arrival of instrument in calibration lab:	*September 11, 2019*
Instrument:	*Condensation Particle Counter*
Model and serial number of instrument:	*CPC 3010 S/N 2124*
Result of physical inspection:	*no damages*
Result of functional test:	*maintenance by TROPOS*
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 05, 2018, calibrated at PTB Braunschweig*
Corrections of electrometer, for instance, differing flow rate:	*Within tolerance range (+/-2%); reference: 4.0 l/min, measured: 4.00 l/min*
Software for recording:	*LabView 2010; National Instruments; Program „LabCount.vi“*
Date of calibration:	*September 11, 2019*
Lab temperature and pressure:	*23°C, 1004 mbar*
Measured aerosol flow rate of CPC:	*1.014 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):

Particle size (nm)	***40***	***30***	***20***	***15***	***12***
Number concentration (cm-3)	919	1358	1505	987	959
Counting efficiency η	*0.98*	*1.00*	*0.99*	*0.90*	*0.58*
Particle size (nm)	***10***	***09***	***08***	***07***	***06***
Number concentration (cm-3)	553	198	74	8	0
Counting efficiency η	*0.29*	*0.14*	*0.04*	*0.00*	*0.00*
Particle size (nm)	***40***				
Number concentration (cm-3)	1129				
Counting efficiency η	*1.01*				

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Special Information regarding to the Candidate:

Was it necessary to:	yes/no	information
do a second run	no	-
clean the optics	no	Checked by TROPOS
clean the nozzle	no	Checked by TROPOS
clean the saturator	no	Checked by TROPOS
change the wick	no	Checked by TROPOS
change the laser	no	Checked by TROPOS
change internal settings	no	-

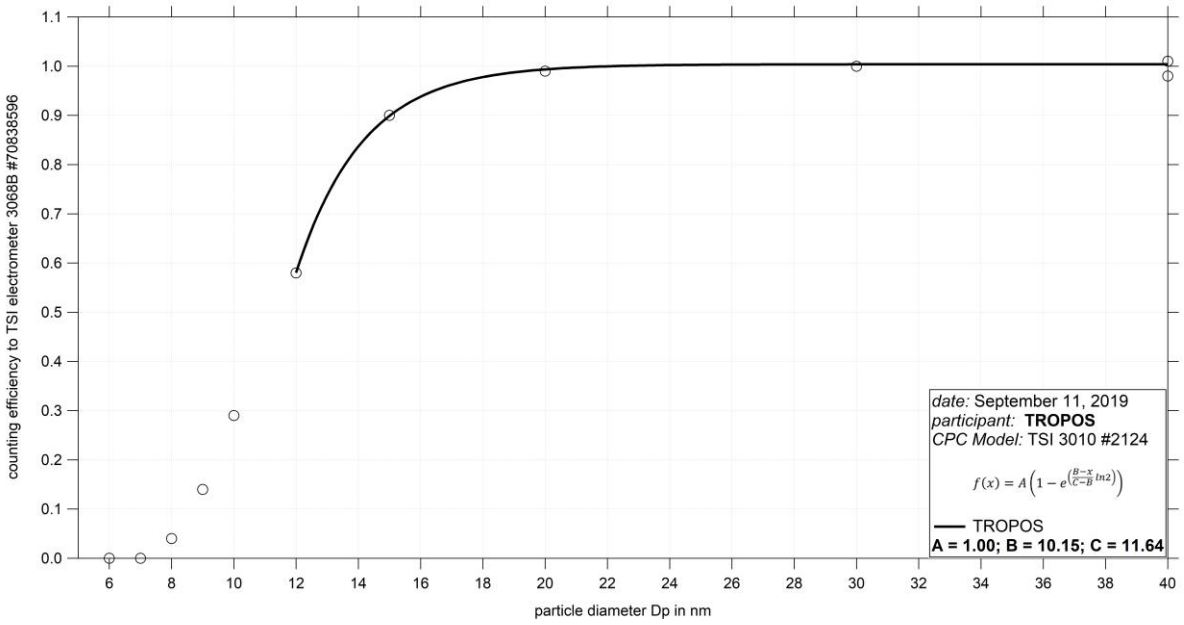

Fig. 1: Counting efficiency for TROPOS CPC 3010 S/N 2124 against aerosol electrometer 3068 S/N 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated Dp50 is 11.64 nm.

Status information:

Status	*T SAT*	*T CON*	*T OPT*	*T CAB*	*P AMB*
from display	-	-	-	-	-
Status	***P OR***	***P NO***	***Laser***	***LV***	***flow***
from display	-	-	-	full	1.014

Date of issue: *September 11, 2019*
Reviewed: TROPOS / Kay Weinhold

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