Intercomparison of Condensation Particle Counter

Project No.:	*CPC-2019-3-2*
Principal Investigator:	TROPOS
Home Institution:	*JRC*
Participant:	*Sebastiao Martins dos Santos*
Candidate:	**CPC JRC**
Counter (SN):	*TSI CPC Model 3772 SN70847419*
Location of the quality assurance:	TROPOS Leipzig, lab 130
Comparison period:	June 04, 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 7.93 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Leibniz-Institut für Troposphärenforschung e.V.
Telefon: +49 341 2717-7060
Telefax: +49 341 2717-99-7060
info@tropos.de
http://www.tropos.de

Commerzbank Leipzig
KTO 102 14 50
BLZ 860 400 00
IBAN: DE77 8604 0000 0102 1450 00
SWIFT CODE: COBADEFF 860

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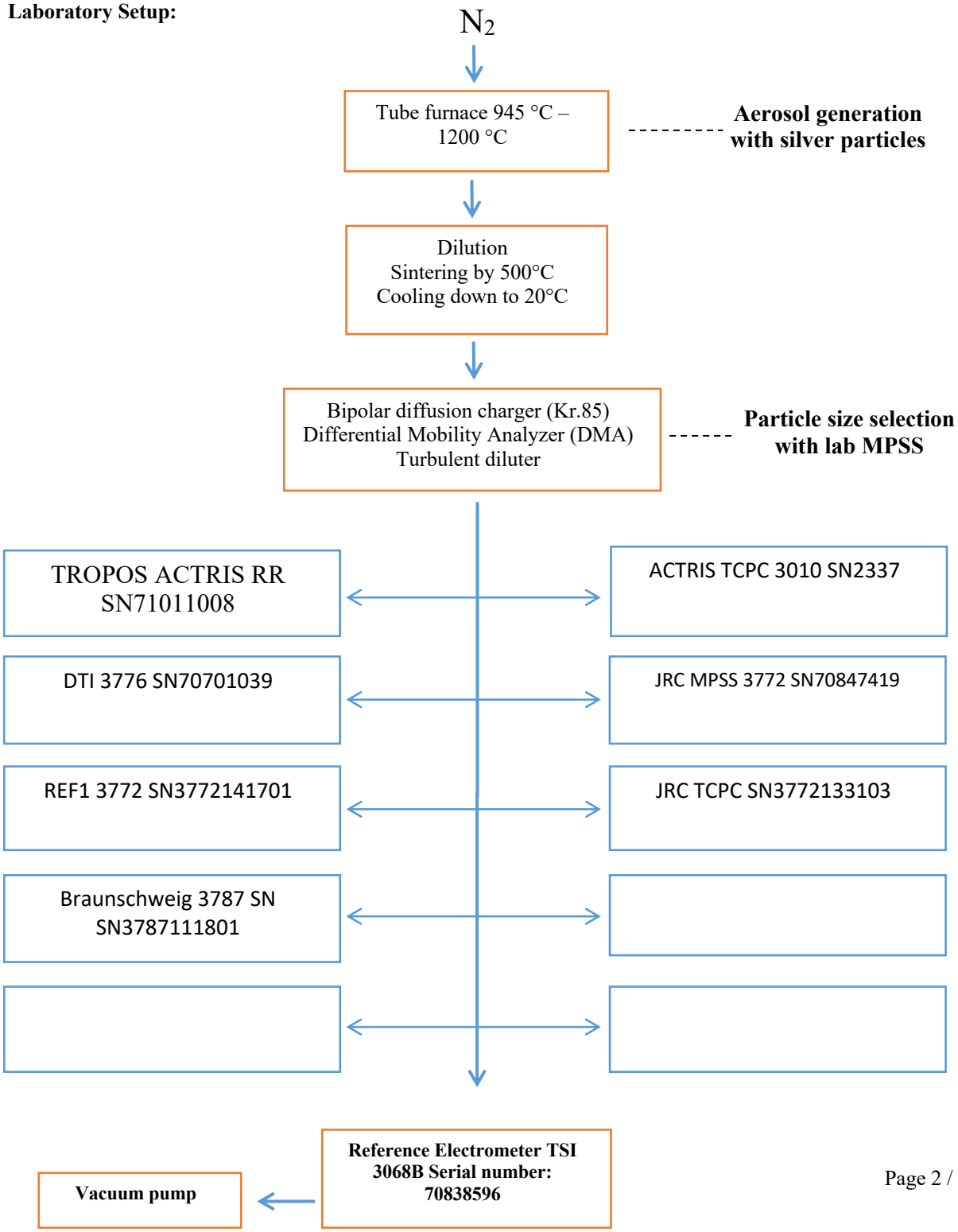
Laboratory Setup:



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Date of arrival of instrument in calibration lab:	*June 04, 2019*
Instrument:	*Condensation Particle Counter*
Model and serial number of instrument:	*CPC 3772 S/N* 70847419
Result of physical inspection:	*no damages*
Result of functional test:	*functional test successful*
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: 3.970 l/min*
Software for recording:	*LabView 2010; National Instruments; Program „LabCount.vi“*
Date of calibration:	*June 04, 2019*
Lab temperature and pressure:	*23°C, 983.82 mbar*
Measured aerosol flow rate of CPC:	*0.997 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)	1189	1072	1272	1151	931
Counting efficiency η	*1.02*	*1.03*	*1.02*	*0.96*	*0.90*
Particle size (nm)	***10***	***09***	***08***	***07***	***06***
Number concentration (cm-3)	1182	932	1153	788	169
Counting efficiency η	*0.75*	*0.76*	*0.53*	*0.35*	*0.12*
Particle size (nm)	***05***	***40***			
Number concentration (cm-3)	1	1082			
Counting efficiency η	*0.00*	*1.03*			

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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	-
clean the nozzle	no	-
clean the saturator	no	-
change the wick	no	-
change the laser	no	-
change internal settings	no	-

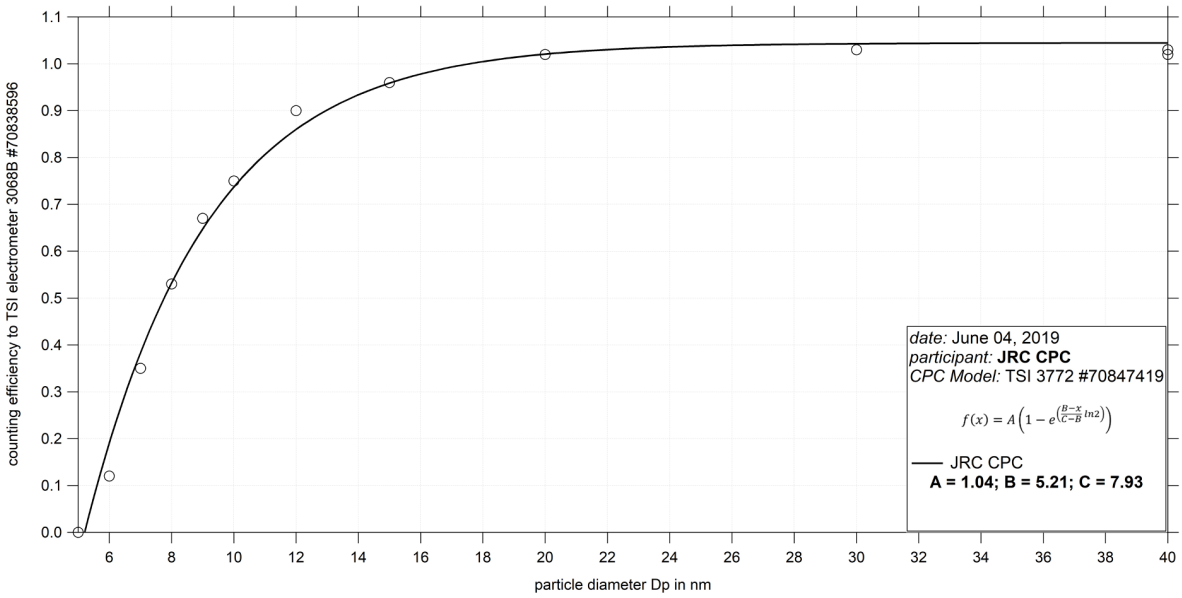

Fig. 1: Counting efficiency for JRC CPC TSI 3772 SN SN70847419 against aerosol electrometer 3068 SN 70838596; silver particles between 5 and 40 nm were used for calibration; the calculated Dp50 is 7.93 nm.

Status information:

Status	*T SAT*	*T CON*	*T OPT*	*T CAB*	*P AMB*
from display	39.0	22	40.0	32.3	99.5
Status	***P OR***	***P NO***	***Laser***	***LV***	***flow***
from display	82.8	2.5	52	full	0.997

Date of issue: *June 04, 2019*
Reviewed: TROPOS / Kay Weinhold

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