



Leibniz Institute for
Tropospheric Research

Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

Intercomparison of Condensation Particle Counter

Project No.: CPC-2019-3-18

Principal Investigator: Kay Weinhold

Home Institution: TROPOS

Participant:
Candidate: TROPOS T-CPC
Counter (SN): TSI CPC Model 3010 SN2339

Location of the quality assurance: TROPOS Leipzig, lab 130

Comparison period: July 12, 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

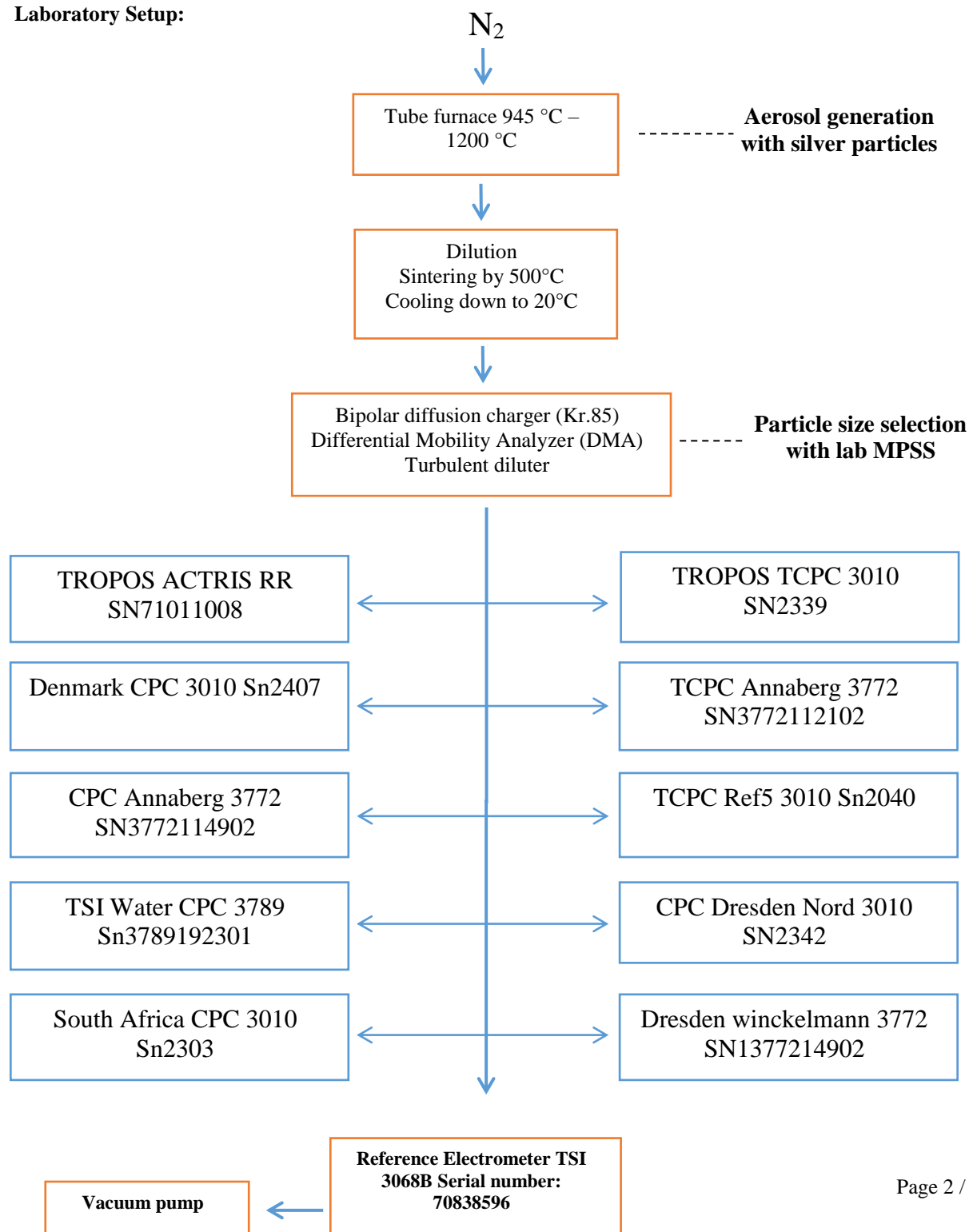
Summary of Intercomparison

Status:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp50 is at 9.8 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:

July 12, 2019

Instrument:

Condensation Particle Counter

Model and serial number of instrument:

CPC 3010 S/N 2339

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:

July 12, 2019

Lab temperature and pressure:

23°C, 996.08mbar

Measured aerosol flow rate of CPC:

1.006 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)	1131	1562	1604	1470	799
Counting efficiency η	1.00	1.00	0.99	0.93	0.74
Particle size (nm)	10	09	08	07	06
Number concentration (cm-3)	668	548	265	94	5
Counting efficiency η	0.52	0.35	0.21	0.07	0.00
Particle size (nm)	40				
Number concentration (cm-3)	1109				
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	-
clean the nozzle	no	-
clean the saturator	no	-
change the wick	no	-
change the laser	no	-
change internal settings	no	-

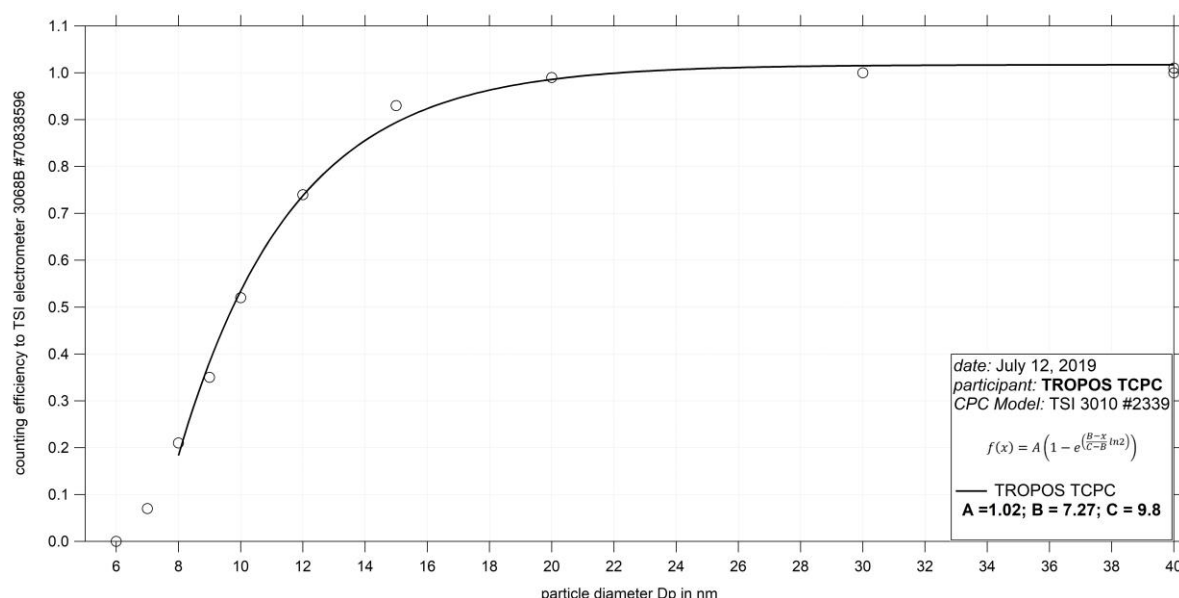


Fig. 1: Counting efficiency for TROPOS TCPC 3010 SN2339 against aerosol electrometer 3068 SN 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated D_{p50} is 9.8 nm.

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	1.006

Date of issue: July 12, 2019

Reviewed: TROPOS / Kay Weinhold

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