



Leibniz Institute for  
Tropospheric Research

Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

## Intercomparison of Condensation Particle Counter

*Project No.:* CPC-2019-3-8

*Principal Investigator:* Kay Weinhold

*Home Institution:* TROPOS

*Participant:* –

*Candidate:* **ACTRIS T-CPC**

*Counter (SN):* TSI CPC Model 3010 SN2337

*Location of the quality assurance:* TROPOS Leipzig, lab 130

*Comparison period:* July 10, 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

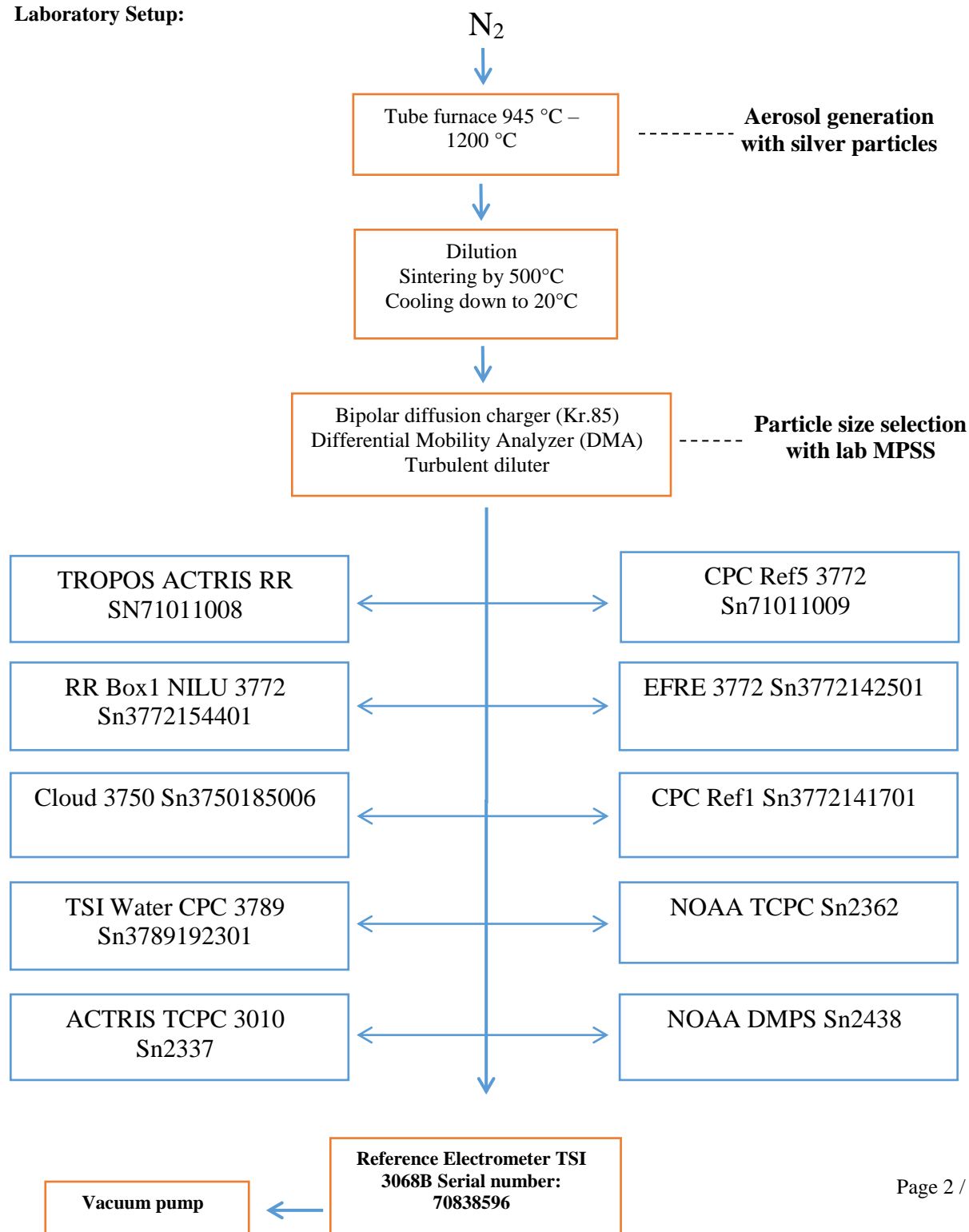
### Summary of Intercomparison

*Status:*

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp50 is at 10.7 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 10, 2019*

**Instrument:**

*Condensation Particle Counter*

**Model and serial number of instrument:**

*CPC 3010 S/N 2337*

**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 10, 2019*

**Lab temperature and pressure:**

*23°C, 983.82mbar*

**Measured aerosol flow rate of CPC:**

*1.001 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/cm<sup>3</sup> in 5 minutes*

**Results (using pulse output):**

Particle size (nm)	40	30	20	15	12
Number concentration (cm-3)	1236	1345	1389	1423	846
Counting efficiency $\eta$	1.02	1.02	1.01	0.88	0.66
Particle size (nm)	10	09	08	07	06
Number concentration (cm-3)	518	290	103	5	0
Counting efficiency $\eta$	0.40	0.21	0.06	0.00	0.00
Particle size (nm)	40				
Number concentration (cm-3)	1206				
Counting efficiency $\eta$	1.02				

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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	-

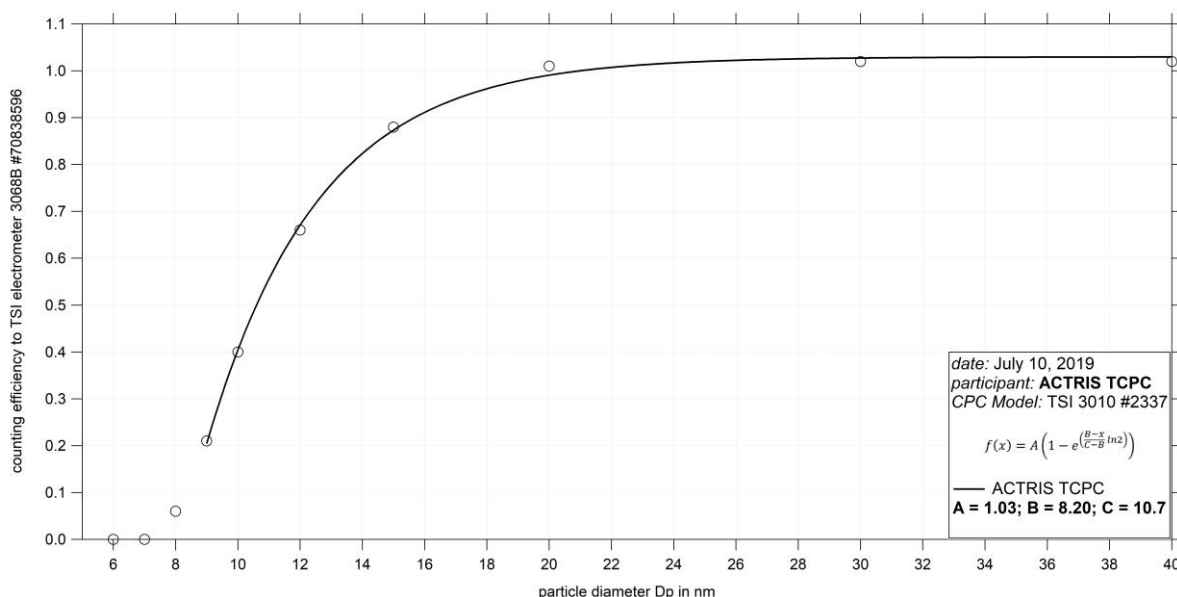


Fig. 1: Counting efficiency for ACTRIS TCPC 3010 SN2337 against aerosol electrometer 3068 SN 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated  $D_{p50}$  is 10.7 nm.

### 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	1.001

Date of issue: July 10, 2019

Reviewed: TROPOS / Kay Weinhold

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