



Leibniz Institute for  
Tropospheric Research

Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

## Intercomparison of Condensation Particle Counter

*Project No.:* CPC-2019-4-9

*Principal Investigator:* Prof. Alfred Wiedensohler

*Home Institution:* Leibniz Institute for Tropospheric Research  
Permoserstraße 15  
04318 Leipzig, Germany

*Participant:* -

*Candidate:* WCCAP Reference MPSS No.1

*Counter (SN):* TSI CPC Model 3772 #3772141701

*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

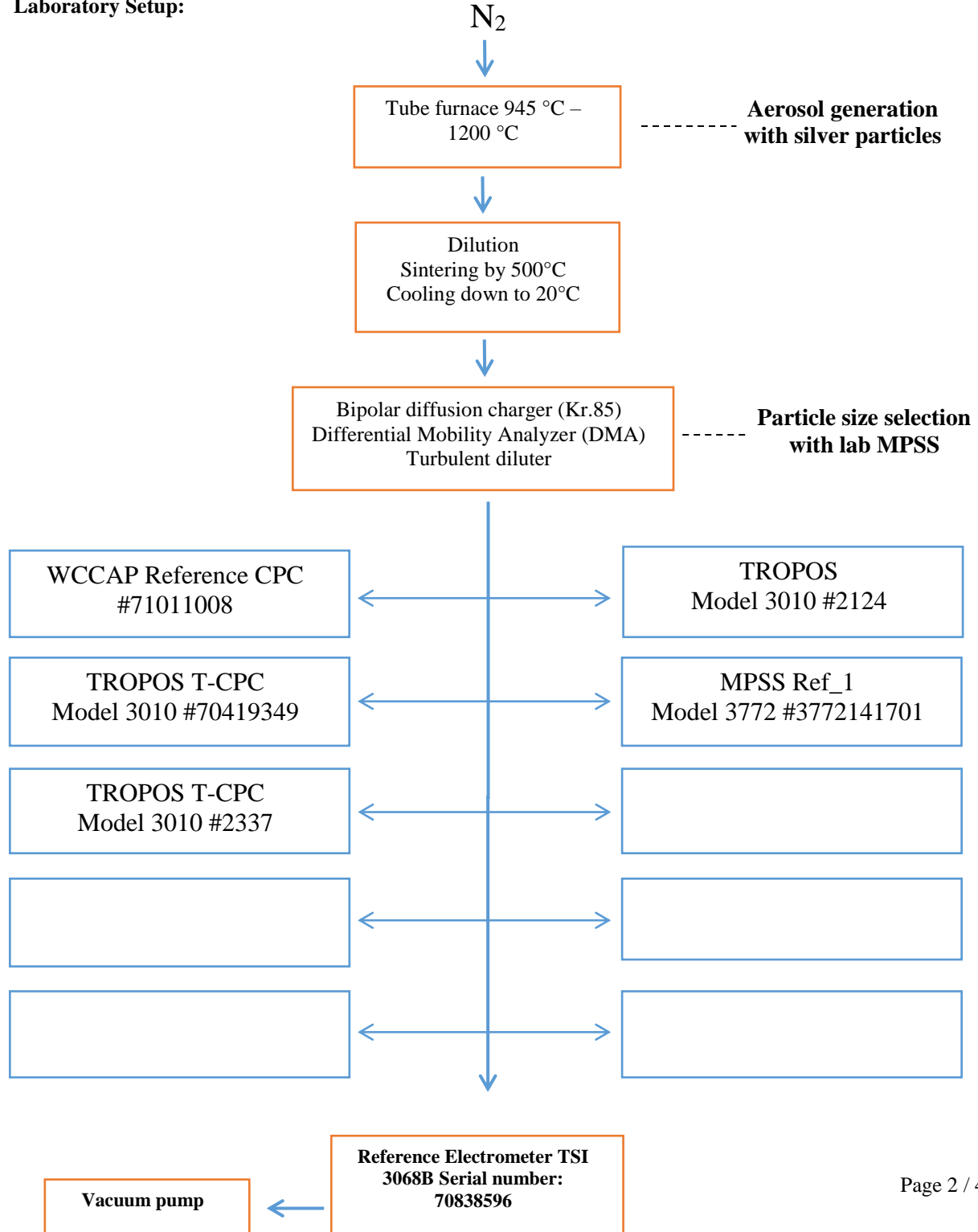
### Summary of Intercomparison

*Status:*

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp50 is at 8.34 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 3772 S/N 3772141701*

**Result of physical inspection:** *no damages*  
**Result of functional test:** *no repair*

**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:** *1.006 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/cm<sup>3</sup> in 5 minutes*

**Results (using pulse output):**

Particle size (nm)	40	30	20	15	12
Number concentration (cm-3)	924	1372	1521	1047	1411
Counting efficiency $\eta$	0.99	1.01	1.01	0.96	0.86
Particle size (nm)	10	09	08	07	06
Number concentration (cm-3)	1357	836	937	519	42
Counting efficiency $\eta$	0.72	0.60	0.45	0.23	0.02
Particle size (nm)	40				
Number concentration (cm-3)	1137				
Counting efficiency $\eta$	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	-

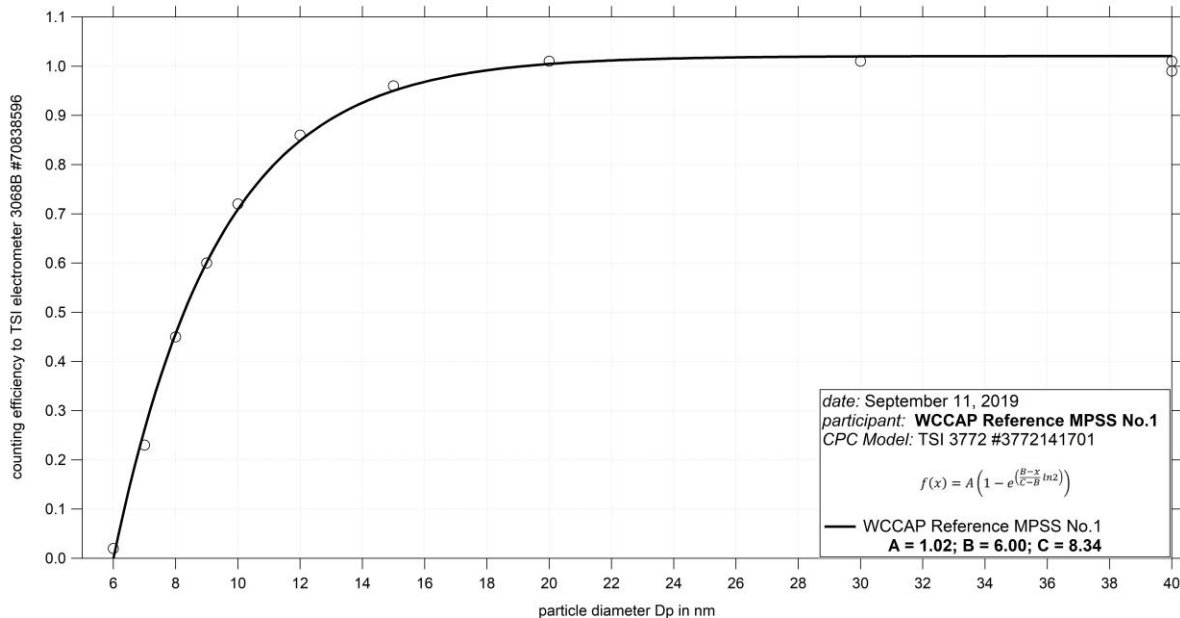


Fig. 1: Counting efficiency for WCCAP Reference MPSS No.1 S/N 3772141701 against aerosol electrometer 3068 S/N 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated  $Dp50$  is 8.34 nm.

**Status information:**

<b>Status</b>	<b>T SAT</b>	<b>T CON</b>	<b>T OPT</b>	<b>T CAB</b>	<b>P AMB</b>
from display	39	22	40	29.7	100.2
<b>Status</b>	<b>P OR</b>	<b>P NO</b>	<b>Laser</b>	<b>LV</b>	<b>flow</b>
from display	83.5	2.8	50	full	1.006

**Date of issue:** September 11, 2019

Reviewed: TROPOS / Kay Weinhold

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