



World Calibration Centre
for Aerosol Physics

Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig



Leibniz Institute for
Tropospheric Research

CPC Model: TSI CPC 3750

CPC Serial Number: 3750193902

Customer: TSI Instruments Ltd.

Description: Calibration of a Condensation Particle Counter (CPC, Model 3750)

Date of Calibration: November 13, 2019

Summary of Intercomparison:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 99% efficiency at 40 nm. The Dp50 is at 6.57 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Certificate / Reference: WCCAP

Date of issue: November 13, 2019 Signature:

Reviewed by: **TROPOS** Name: **Kay Weinhold**

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Date of arrival of instrument in calibration lab:

November 11, 2019

Instrument:

Condensation Particle Counter

Model and serial number of instrument:

CPC 3750 S/N 3750193902

Result of physical inspection:

no damages

Result of functional test:

functional test successful, no problems

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 5, 2018, calibrated at PTB
Braunschweig*

**Corrections of electrometer, for instance,
differing flow rate:**

*Within tolerance range (+/-2%); reference: 4.0
l/min, measured: 4.000 l/min*

Software for recording:

*LabView 2010; National Instruments; Program
„LabCount.vi“*

Date of calibration:

November 13, 2019

Lab temperature and pressure:

24.5°C, 982.5 mbar

Measured aerosol flow rate of CPC:

1.007 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	10
Number concentration (cm-3)	1277	1270	1512	1275	1290
Counting efficiency η	0.99	0.99	1.00	1.00	0.90
Particle size (nm)	09	08	07	06	
Number concentration (cm-3)	1371	876	814	510	
Counting efficiency η	0.82	0.72	0.57	0.37	



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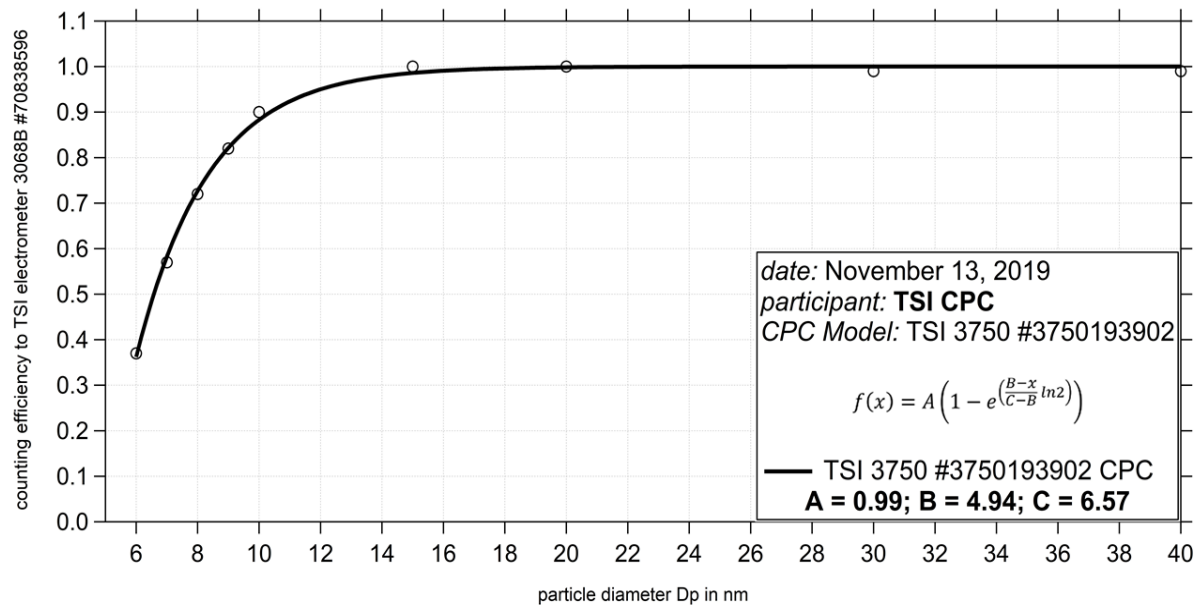


Fig. 1: Counting efficiency for CPC 3750 S/N 3750193902 against aerosol electrometer 3068 S/N 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated D_{p50} is 6.57 nm.

Status information:

Status	T SAT	T CON	T OPT	T CAB	P AMB	P VAC
from display	39.0	18.0	40.0	24.3	99.0	79.2
Status	P OR	P NO	Laser	LV	flow	P INLET
from display	76.4	2.33	39	full	1.007	-0.4

Results (using pulse output):

without coincidence correction					
Concentration EM in #/cm ³	66849	58164	50013	43197	32294
Number concentration without coincidence correction (cm-3)	52691	46903	41157	36249	28000
Counting efficiency η	0.79	0.80	0.82	0.84	0.86
Concentration EM in #/cm ³	19887	11244	5127	1177	
Number concentration without coincidence correction (cm-3)	17978	10519	4956	1159	
Counting efficiency η	0.90	0.93	0.96	0.98	



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with coincidence correction					
Concentration EM in $\#/cm^3$	66849	58164	50013	43197	32294
Number concentration with coincidence correction (cm^{-3})	68566	59332	50627	43542	32326
Counting efficiency η	1.02	1.02	1.01	1.00	1.00
Concentration EM in $\#/cm^3$	19887	11244	5127	1177	
Number concentration with coincidence correction (cm^{-3})	19907	11349	5265	1235	
Counting efficiency η	1.00	1.00	1.02	1.04	

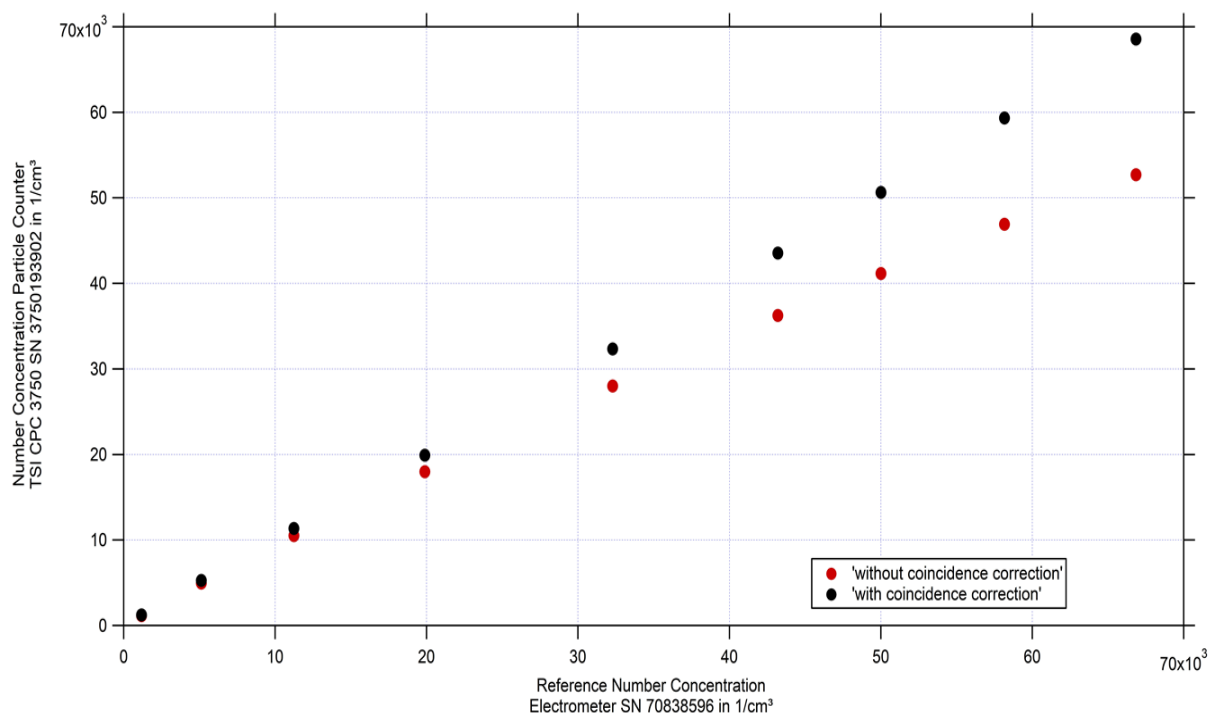


Fig. 2: Linearity test for TSI CPC 3750 SN 3750193902 against aerosol electrometer 3068 SN 70838596; silver particles with a diameter of 30 nm were used for number concentrations between 1000 and 70000 particles per cm^3 .

Date of issue: November 13, 2019

Reference: TSI electrometer, model 3068, SN 70838596

Reviewed: TROPOS / Kay Weinhold