



**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: 3750193601

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 97% efficiency at 40 nm. The Dp50 is at 7.1 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 3750193601

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

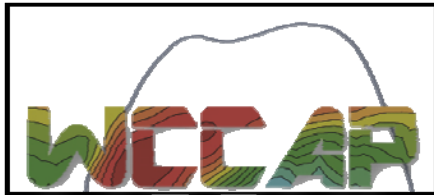
Software for recording: LabView 2010; National Instruments; Program „LabCount.vi“

Date of calibration: November 13, 2019
Lab temperature and pressure: 24.5°C, 982.5 mbar
Measured aerosol flow rate of CPC: 0.988 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)	1258	1243	1465	1214	1165
Counting efficiency η	0.97	0.97	0.97	0.95	0.81
Particle size (nm)	09	08	07	06	
Number concentration (cm-3)	1214	745	655	362	
Counting efficiency η	0.73	0.61	0.46	0.26	



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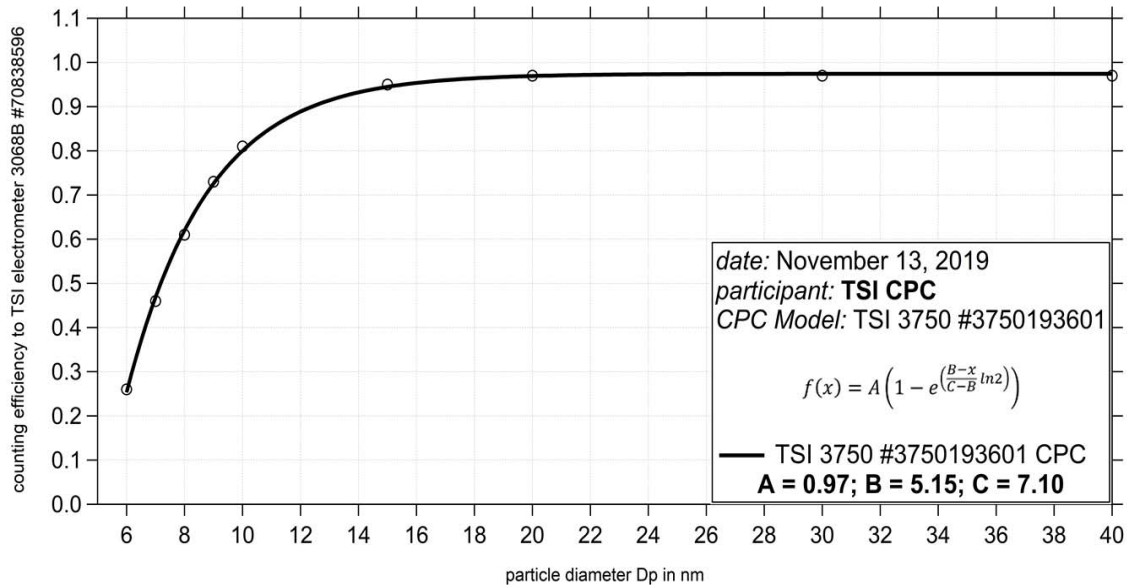


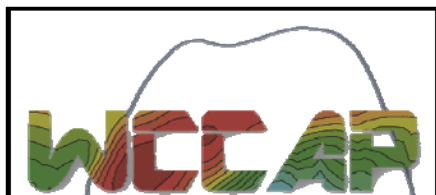
Fig. 1: Counting efficiency for CPC 3750 S/N 3750193601 against aerosol electrometer 3068 S/N 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated D_{p50} is 7.10 nm.

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	75.4
Status	P OR	P NO	Laser	LV	flow	P INLET
from display	72.4	2.44	41	full	0.988	-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)	51580	46149	40692	35813	27615
Counting efficiency η	0.77	0.79	0.81	0.83	0.85
Concentration EM in #/cm ³	19887	11244	5127	1177	
Number concentration without coincidence correction (cm-3)	17688	10327	4853	1132	
Counting efficiency η	0.89	0.92	0.94	0.96	



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with coincidence correction					
Concentration EM in $\#/cm^3$	66849	58164	50013	43197	32294
Number concentration with coincidence correction (cm^{-3})	66482	58023	49860	42923	31929
Counting efficiency η	1.00	1.00	0.99	0.99	0.99
Concentration EM in $\#/cm^3$	19887	11244	5127	1177	
Number concentration with coincidence correction (cm^{-3})	19586	11167	5181	1231	
Counting efficiency η	0.98	0.99	1.01	1.04	

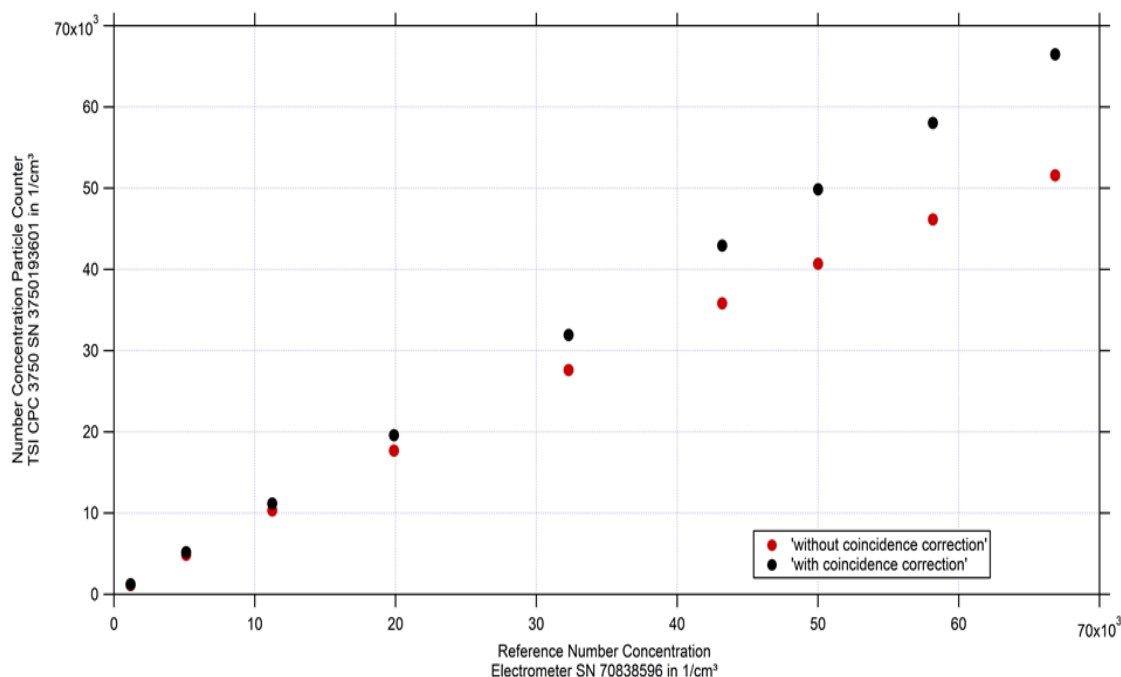


Fig. 2: Linearity test for TSI CPC 3750 SN 3750193601 against aerosol electrometer 3068 SN 70838596; silver particles with a diameter of 30 nm were used for number concentrations between 1000 and 70000 particles per cm^3 .

Date of issue: November 13, 2019

Reference: TSI electrometer, model 3068, SN 70838596

Reviewed: TROPOS / Kay Weinhold

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