



**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: 3750201202

Customer: TSI Instruments Ltd.

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

Date of Calibration: September 16, 2020

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 6.92 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Certificate / Reference: WCCAP

Date of issue: September 16, 2020 Signature:

Reviewed by: **TROPOS**

Name: **Kay Weinhold**

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Date of arrival of instrument in calibration lab: *September, 2020*
Instrument: *Condensation Particle Counter*
Model and serial number of instrument: *CPC 3750 S/N 3750201202*

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: *September 16, 2020*
Lab temperature and pressure: *23.0°C, 1001 mbar*
Measured aerosol flow rate of CPC: *0.992 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 and logging via TROPOS Labview software):

Particle size (nm)	40	30	20	15	14	11	10
Number concentration (cm-3)	1288	1360	1770	1071	1459	826	1467
Counting efficiency η	0.99	1.00	0.99	0.96	0.95	0.90	0.84
Particle size (nm)	09	08	07	06	05	40	
Number concentration (cm-3)	1399	799	1090	604	23	1345	
Counting efficiency η	0.77	0.66	0.50	0.28	0.02	0.99	



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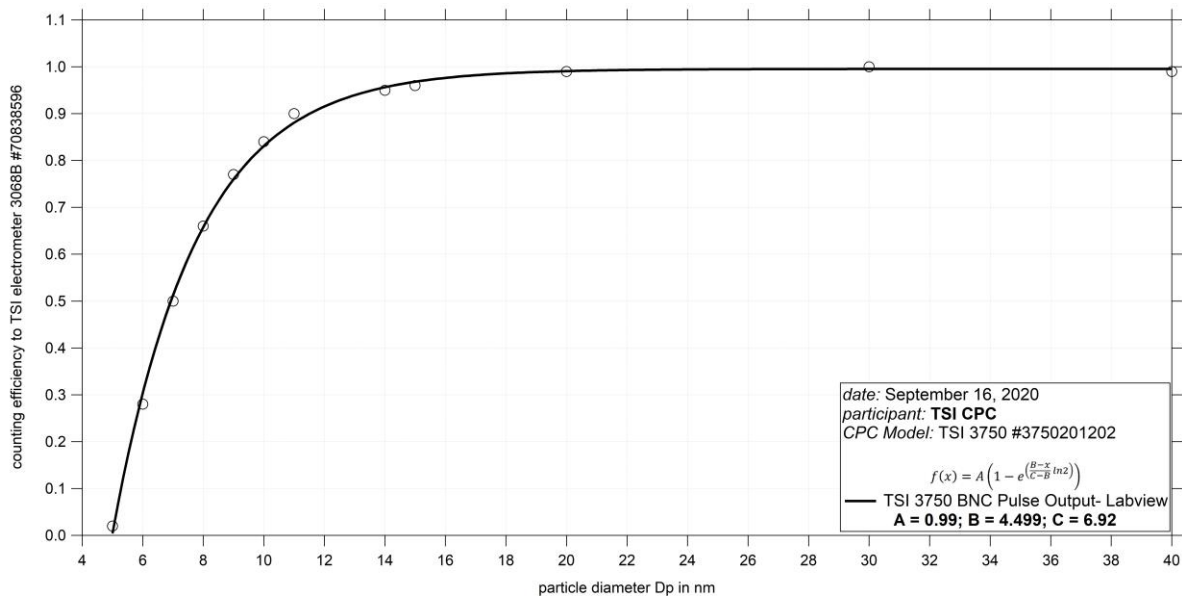


Fig. 1: Counting efficiency for CPC 3750 S/N 3750201202 against aerosol electrometer 3068 S/N 70838596; silver particles between 5 and 40 nm were used for calibration; the calculated D_{p50} by the BNC Pulse Output on Labview is 6.92 nm.

Status information:

Status	T SAT	T CON	T OPT	T CAB	P AMB	P VAC
from display	39.0	19.8	40.0	22.4	100.9	82.8
Status	P OR	P NO	Laser	LV	flow	P INLET
from display	81.9	2.45	41	full	0.992	-0.3

Results:

using pulse output and logging via TROPOS Labview software: without coincidence correction					
Concentration EM in #/cm³	61792	50032	32548	28098	17937
Number concentration without coincidence correction (cm-3)	47550	40065	27719	24300	16225
Counting efficiency η	0.77	0.80	0.85	0.86	0.90
Concentration EM in #/cm³	12485	5332	1436		
Number concentration without coincidence correction (cm-3)	11536	5046	1401		
Counting efficiency η	0.92	0.95	0.98		



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Results:

using USB-C connection and logging via TSI software: with coincidence correction					
Concentration EM in #/cm ³	61792	50032	32548	28098	17937
Number concentration with coincidence correction (cm-3)	60128	48849	31927	27558	17820
Counting efficiency η	0.97	0.98	0.98	0.98	0.99
Concentration EM in #/cm ³	12485	5332	1436		
Number concentration with coincidence correction (cm-3)	12497	5345	1463		
Counting efficiency η	1.00	1.00	1.02		

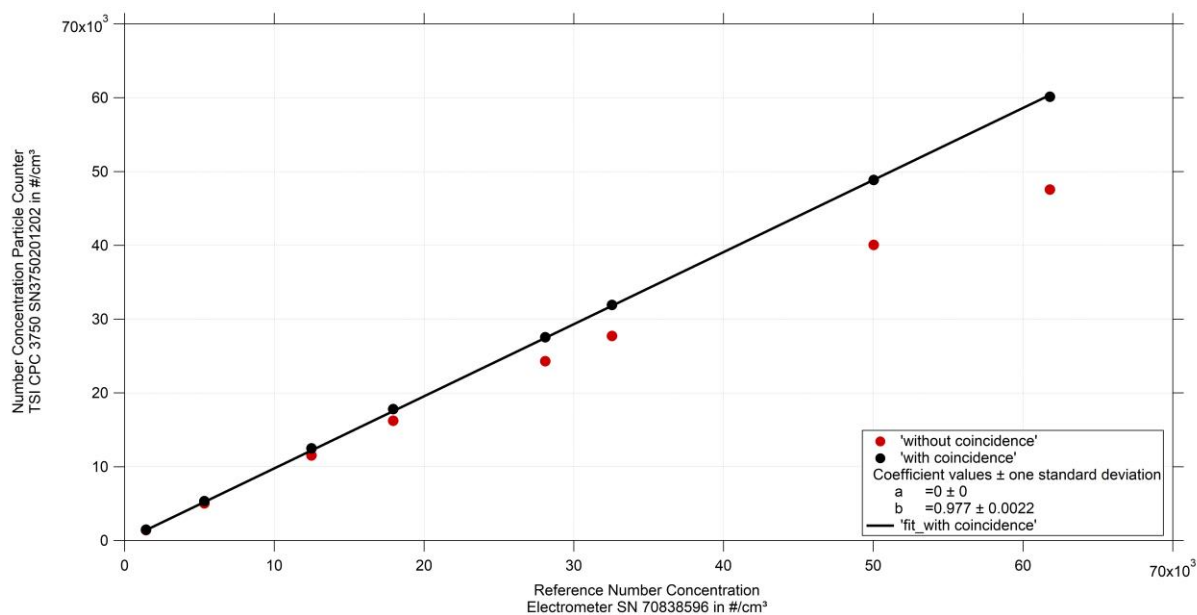


Fig. 2: Linearity test for TSI CPC 3750 SN 3750201202 against aerosol electrometer 3068 SN 70838596; silver particles with a diameter of 30 nm were used for number concentrations between 1000 and 60000 particles per cm³.

Date of issue: September 16, 2020

Reference: TSI electrometer, model 3068, SN 70838596

Reviewed: TROPOS / Kay Weinhold