



**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: 3750200904

Customer: TSI Instruments Ltd.

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

Date of Calibration: May 08, 2020

Summary of Intercomparison:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp50 is at 5.97nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Certificate / Reference: WCCAP

Date of issue: May 11, 2020 Signature:

Reviewed by: **TROPOS**

Name: **Kay Weinhold**

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Date of arrival of instrument in calibration lab: *April 30, 2020*
Instrument: *Condensation Particle Counter*
Model and serial number of instrument: *CPC 3750 S/N 3750200904*

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: *May 08, 2020*
Lab temperature and pressure: *25.35°C, 999 mbar*
Measured aerosol flow rate of CPC: *0.985 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	10	09
Number concentration (cm-3)	998	1384	1185	1456	1663	1578
Counting efficiency η	1.00	1.00	1.02	1.01	0.94	0.90
Particle size (nm)	08	07	06	05		
Number concentration (cm-3)	964	806	624	208		
Counting efficiency η	0.82	0.70	0.51	0.21		



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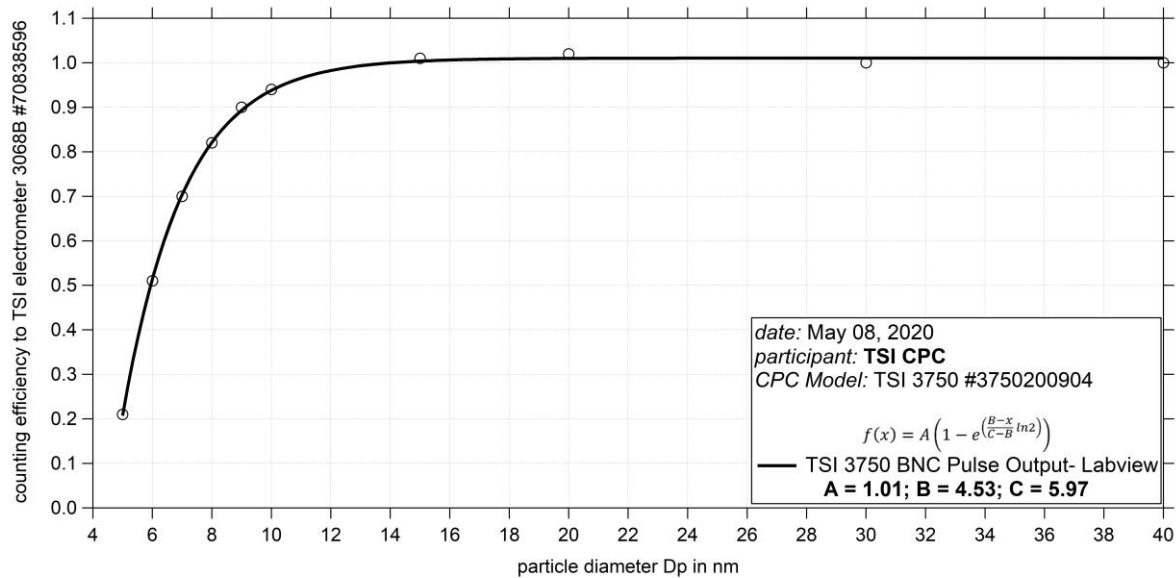


Fig. 1: Counting efficiency for CPC 3750 S/N 3750200904 against aerosol electrometer 3068 S/N 70838596; silver particles between 5 and 40 nm were used for calibration; the calculated Dp50 by the BNC Pulse Output on Labview is 5.97 nm.

Status information:

Status	T SAT	T CON	T OPT	T CAB	P AMB	P VAC
from display	39.0	18	40.0	24.0	100.6	84.4
Status	P OR	P NO	Laser	LV	flow	P INLET
from display	81.5	2.38	40	full	0.985	-0.4

Results:

using pulse output and logging via TROPOS Labview software: without coincidence correction					
Concentration EM in #/cm ³	63148	50591	39465	28761	19905
Number concentration without coincidence correction (cm-3)	51925	43158	34794	26215	18706
Counting efficiency η	0.82	0.85	0.88	0.91	0.94
Concentration EM in #/cm ³	11054	5392	1825		
Number concentration without coincidence correction (cm-3)	10766	5400	1866		
Counting efficiency η	0.97	1.00	1.02		



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Results:

using USB-C connection and logging via TSI software: with coincidence correction					
Concentration EM in #/cm ³	63148	50591	39465	28761	19905
Number concentration with coincidence correction (cm-3)	66279	52784	40868	29512	20405
Counting efficiency η	1.04	1.04	1.03	1.02	1.02
Concentration EM in #/cm ³	11054	5392	1825		
Number concentration with coincidence correction (cm-3)	11450	5636	1922		
Counting efficiency η	1.04	1.05	1.05		

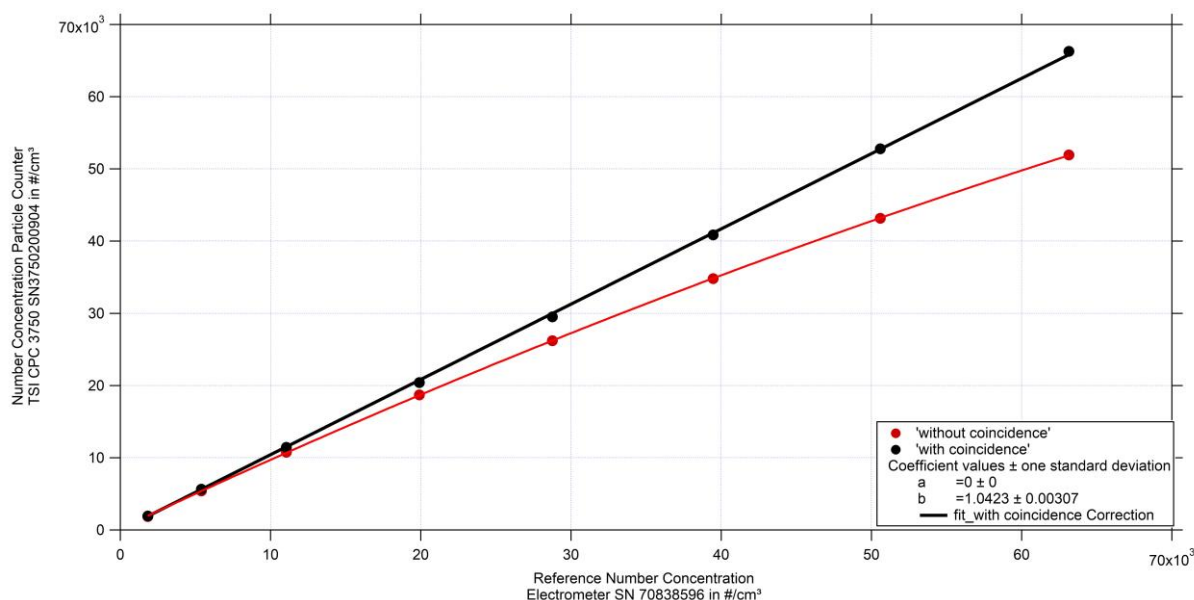


Fig. 2: Linearity test for TSI CPC 3750 SN 3750200904 against aerosol electrometer 3068 SN 70838596; silver particles with a diameter of 30 nm were used for number concentrations between 2000 and 60000 particles per cm³.

Date of issue: May 11, 2020

Reference: TSI electrometer, model 3068, SN 70838596

Reviewed: TROPOS / Kay Weinhold