



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: 3750203602

Customer: TSI Instruments Ltd.

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

Date of Calibration: November 04, 2020

Summary of Intercomparison:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The D_{p50} is at 6.8 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Certificate / Reference: WCCAP

Date of issue: November 04, 2020 Signature:

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

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Date of arrival of instrument in calibration lab:	<i>October 29, 2020</i>
Instrument:	<i>Condensation Particle Counter</i>
Model and serial number of instrument:	<i>CPC 3750 SN 3750203602</i>
Result of physical inspection:	<i>no damages</i>
Result of functional test:	<i>functional test successful, no problems</i>
Internal parameters of instrument	<i>nominal flow rate 1.0 l/min</i>
Model and identification number of aerosol electrometer:	<i>TSI Electrometer Model 3068, SN 70838596</i>
Electrometer calibration certificate:	<i>September 5, 2018, calibrated at PTB Braunschweig</i>
Corrections of electrometer, for instance, differing flow rate:	<i>Within tolerance range (+/-2%); reference: 4.0 l/min, measured: 4.000 l/min</i>
Software for recording:	<i>LabView 2010; National Instruments; Program „LabCount.vi“</i>
Date of calibration:	<i>November 04, 2020</i>
Lab temperature and pressure:	<i>23.0°C, 1004 mbar</i>
Measured aerosol flow rate of CPC:	<i>0.988 l/min</i>
Uncertainty in measured flow rate:	<i>3%</i>
Flowmeter used:	<i>Gilian Gilibrator V; SN 1711008-S, January, 2018</i>
Particles and gases used for calibration:	<i>silver particles and nitrogen</i>
Method of particle generation:	<i>tube furnace generator</i>
Zero measurement of instrument:	<i>0 particles/cm³ in 10 minutes</i>



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	Unit	Status
Model	-	TSI 3750
SN	-	3750203602
Firmware	-	2.3.0
Date	-	August 2020
TSI Software Version	-	11.4.0
Saturator Temperature	°C	39.00
Condenser Temperature	°C	19.90
Optics Temperature	°C	40.00
Cabinet Temperature	°C	23.80
Ambient Pressure	kPa	100.90
Vacuum Pressure	kPa	81.80
Inlet Pressure	kPa	-0.20
Critical Orifice Pressure	kPa	78.60
Aerosol Nozzle Pressure	kPa	2.33
Laser Current	mA	38.00
Liquid Level	-	full
Aerosol Flow	l/min	0.988
Zero	avg 10 min	0

Diameter	EL 3068B (#/cm ³)	BNC (pulse output)		USB-C (direct output)		USB-C / BNC
		Concentration (#/cm ³)	Efficiency (μ)	Concentration (#/cm ³)	Efficiency (μ)	
40	1076	1073	1.00	1098	1.02	1.02
40	1289	1306	1.01	1337	1.04	1.02
30	1538	1542	1.00	1579	1.03	1.02
20	1335	1344	1.01	1375	1.03	1.02
15	1766	1735	0.98	1779	1.01	1.03
14	1871	1819	0.97	1865	1.00	1.03
12	1168	1110	0.95	1135	0.97	1.02
11	1489	1361	0.91	1392	0.94	1.02
10	1660	1450	0.87	1484	0.89	1.02
9	1673	1341	0.80	1371	0.82	1.02
8	1660	1151	0.69	1176	0.71	1.02
7	2100	1113	0.53	1138	0.54	1.02
6	2206	653	0.30	665	0.30	1.02
5	1742	55	0.03	56	0.03	1.02



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EL 3068B (#/cm ³)	BNC (pulse output)		USB-C (direct output)		USB-C / BNC
	Concentration (#/cm ³)	Efficiency (μ)	Concentration (#/cm ³)	Efficiency (μ)	
977	967	0.99	988	1.01	1.02
3000	2954	0.98	3042	1.01	1.03
8023	7728	0.96	8099	1.01	1.05
13583	12889	0.95	13731	1.01	1.07
22595	20772	0.92	22693	1.00	1.09
29639	26323	0.89	29470	0.99	1.12
38419	33226	0.86	38440	1.00	1.16
47735	40140	0.84	47962	1.00	1.19
62616	50169	0.80	62915	1.00	1.25

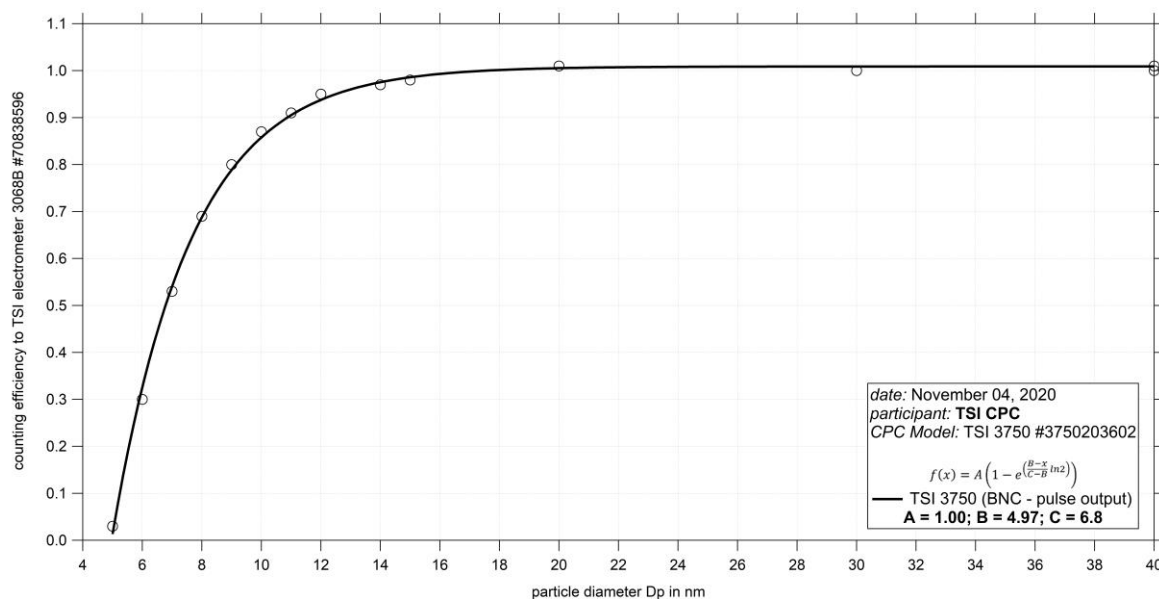


Fig. 1: Counting efficiency for TSI-CPC 3750 SN 3750203602 against aerosol electrometer 3068 SN 70838596; silver particles between 5 nm and 40 nm were used for calibration; the calculated Dp_{50} from the BNC (pulse output) is 6.8 nm.



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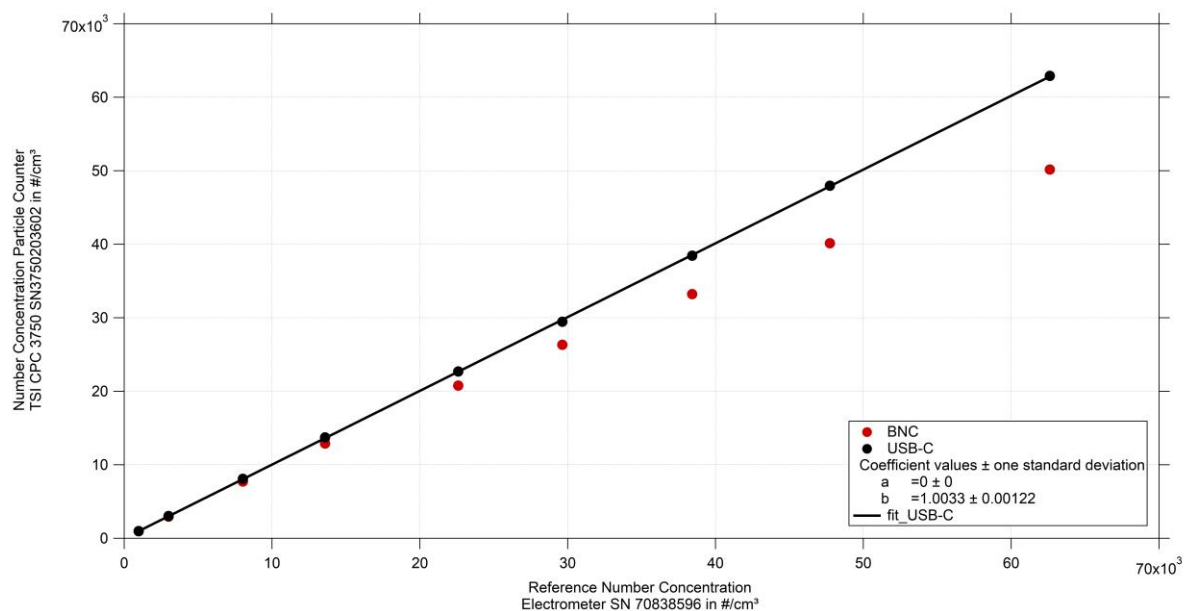


Fig. 2: Linearity for TSI CPC 3750 SN 3750203602 against aerosol electrometer 3068 SN 70838596; silver particles with a diameter of 30 nm were used for number concentrations between 1000 particles per cm³ and 60000 particles per cm³.

Date of issue: November 04, 2020

Reference: TSI electrometer, model 3068, SN 70838596

Reviewed: TROPOS / Kay Weinhold