World Calibration Centre
for Aerosol Physics

Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

TROPOS
Leibniz Institute for
Tropospheric Research

CPC Model: TSI CPC 3750

CPC Serial Number: 3750222903

Customer: TSI

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

Date of Calibration: September 29, 2022

Summary of Intercomparison:

The candidate reached 95% efficiency at 40 nm. The Dp_{50} is at 9.10 nm.

Certificate / Reference: WCCAP

Date of issue: October 04, 2022

Reviewed by: WCCAP

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Date of arrival of instrument in calibration lab:	*September 23, 2022*
Instrument:	*Condensation Particle Counter*
Model and serial number of instrument:	*TSI-CPC 3750 SN 3750222903*
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, SN 70838596*
Electrometer calibration certificate:	*April 20-26, 2022, calibrated at PTB Braunschweig*
Corrections of electrometer, for instance, differing flow rate:	*Within tolerance range (+/-2%); reference: 4.0 l/min, measured: 4.037 l/min*
Software for recording:	*LabView 2021; National Instruments; Program „LabCount.vi“*
Date of calibration:	*September 29, 2022*
Lab temperature and pressure:	*22.0°C, 1003 mbar*
Measured aerosol flow rate of CPC:	*0.958 l/min*
Uncertainty in measured flow rate:	*3%*
Flowmeter used:	*Gilian Gilibrator 3; SN 21181001005, 2021*
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*

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	Unit	Status
Model	-	TSI-CPC 3750
SN	-	3750222903
Firmware	-	2.4.1
Date	-	July 2022
last service date	-	-
TSI Software Version	-	-
Saturator Temperature	°C	39
Condenser Temperature	°C	23.0
Optics Temperature	°C	40
Cabinet Temperature	°C	22.3
Ambient Pressure	kPa	99.1
Vaccuum Pressure	kPa	73.4
Inlet Pressure	kPa	-0.4
Critical Orifice Pressure	kPa	70.4
Aerosol Nozzle Pressure	kPa	2.61
Laser Current	mA	44
Liquid Level	-	Full
Aerosol Flow	l/min	0.958
Zero	avg 5 min	0

		BNC (pulse output)		USB (direct output)		
Diameter	**EL 3068B (#/cm³)**	**Concentration (#/cm³)**	**Efficiency (µ)**	**Concentration (#/cm³)**	**Efficiency (µ)**	**USB-C / BNC**
40	1995	1876	0.94	1931	0.97	1.03
30	1208	1133	0.94	1163	0.96	1.03
20	1477	1341	0.91	1376	0.93	1.03
14	1283	1036	0.81	1061	0.83	1.02
11	1184	774	0.65	792	0.67	1.02
10	1780	918	0.52	938	0.53	1.02
9	1870	878	0.47	898	0.48	1.02
8	1647	570	0.35	582	0.35	1.02
7	1639	318	0.19	324	0.20	1.02
6	1081	22	0.02	22	0.02	1.00
5	1422	0	0.00	0	0.00	-

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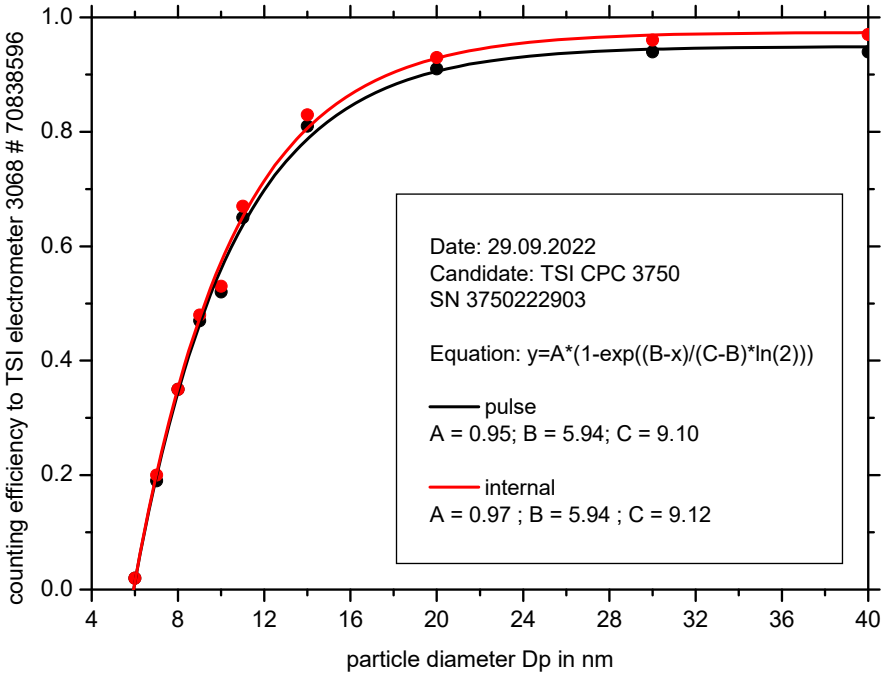

Fig. 1: Counting efficiency for TSI-CPC 3750 SN 3750222903 against aerosol electrometer 3068 SN 70838596; silver particles between 5 nm and 40 nm were used for calibration; the calculated Dp_{50} is 9.10 nm.

	BNC (pulse output)		USB (direct output)		
EL 3068B (#/cm³)	Concentration (#/cm³)	Efficiency (µ)	Concentration (#/cm³)	Efficiency (µ)	USB-C / BNC
2383	2197	0.92	2264	0.95	1.03
4318	3945	0.91	4106	0.95	1.04
8403	7587	0.90	8079	0.96	1.06
12453	11096	0.89	12092	0.97	1.09
19496	16913	0.87	19131	0.98	1.13
29491	24672	0.84	29293	0.99	1.19
40850	32814	0.80	40996	1.00	1.25
51341	39718	0.77	51605	1.01	1.30
62436	46436	0.74	62595	1.00	1.35

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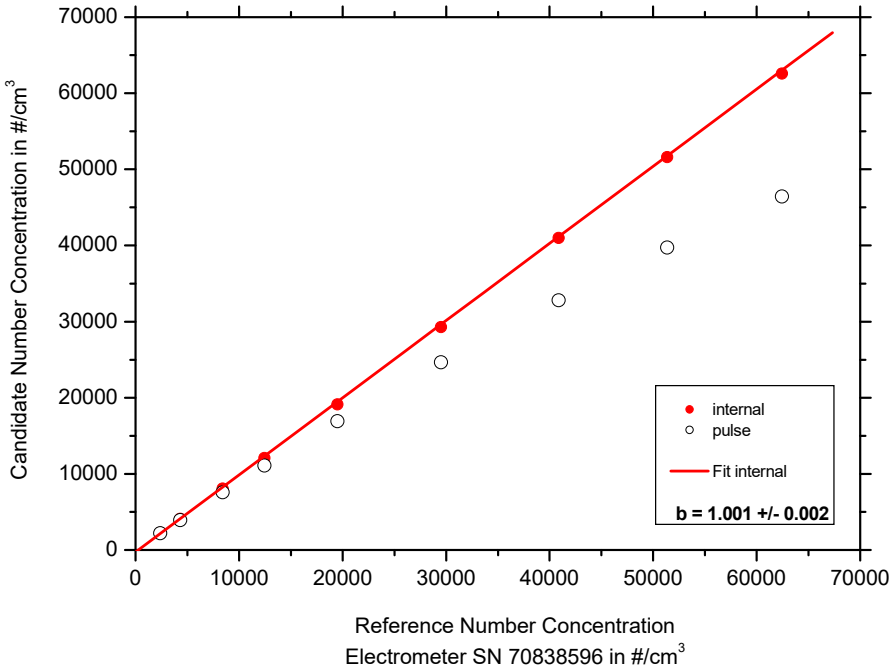

Fig. 2: Linearity for candidate CPC against aerosol electrometer 3068 SN 70838596; silver particles with a diameter of 30 nm were used for number concentrations between 2000 particles per cm3 and 60000 particles per cm3.

Date of issue: *October 04, 2022*

Reference: TSI electrometer, model 3068, SN *70838596*

Reviewed: WCCAP / M. Merkel

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