World Calibration Centre
for Aerosol Physics

TROPOS
Leibniz Institute for
Tropospheric Research

Project No.	**CPC-2022-WCCAP-136**
CPC Model:	TSI CPC 3772
CPC Serial Number	154301
Customer:	TROPOS internal
Description:	Calibration of a Condensation Particle Counter
Date of Calibration:	April 5, 2022

Summary of Intercomparison:

The candidate reached 95% efficiency at 40 nm. The Dp50 is at 3.7 nm.

Certificate / Reference: WCCAP

Date of issue: April 8, 2022 Signature

Reviewed by: TROPOS Name: Dr. Thomas Tuch

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	Unit	Status
Participant		Radon Dual-SMPS
CPC Model		TSI 3772 SN 154301
Firmware		
Manufacture date		2016
Last service date		
Arrival date		
Software Version		Labcount 2021
Saturator Temperature	°C	39
Condenser Temperature	°C	15
Optics Temperature	°C	40
Cabinet Temperature	°C	34.8
Ambient Pressure	mbar	1004
Vaccuum Pressure	kPa	
Inlet Pressure	kPa	99.7
Critical Orifice Pressure	kPa	71.6
Aerosol Nozzle Pressure	kPa	2.6
Laser Current	mA	52
Liquid Level		full
Aerosol Flow	L/min	0.98
Zero	avg 10 min	0
Physical inspection		ok
Functional test		ok

Table 1. Diagnostic information of candidate

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Aerosol electrometer	TSI Electrometer Model 3068, SN 70838596
Particles and gases used for calibration	silver particles and nitrogen
Method of particle generation	tube furnace generator
Electrometer calibration certificate	September, 2021, calibrated at PTB Braunschweig
Corrections of electrometer (i.e. differing flow rate)	Within tolerance range (+/-2%); reference: 4.0 l/min, measured: 4.0 l/min
Logging software	LabView 2021; National Instruments; Program „LabCount.vi“
Uncertainty in measured flow rate	3%
Flowmeter used	Gilian Gilibrator 3; SN 21181001005, 2021
Lab Tempreature and Pressure	23.0°C, 1013 mbar

Table 2. Calibration and laboratory conditions

Diameter	EL 3068B (#/cm3)	Pulse Output	
		Concentration (#/cm3)	Efficiency (µ)
5	1016.48	804.64	0.79
6	1901.96	1669.31	0.88
7	1534.03	1399.53	0.91
8	2064.56	1920.63	0.93
9	2006.74	1880.55	0.94
10	1542.44	1454.53	0.94
11	1776.06	1672.10	0.94
14	1125.34	1057.81	0.94
20	1913.54	1803.48	0.94
30	1180.45	1110.41	0.94
30	1238.15	1156.72	0.93
40	1065.45	1000.21	0.94

Table 3. Efficiency of candidate CPC per diameter against the Electrometer

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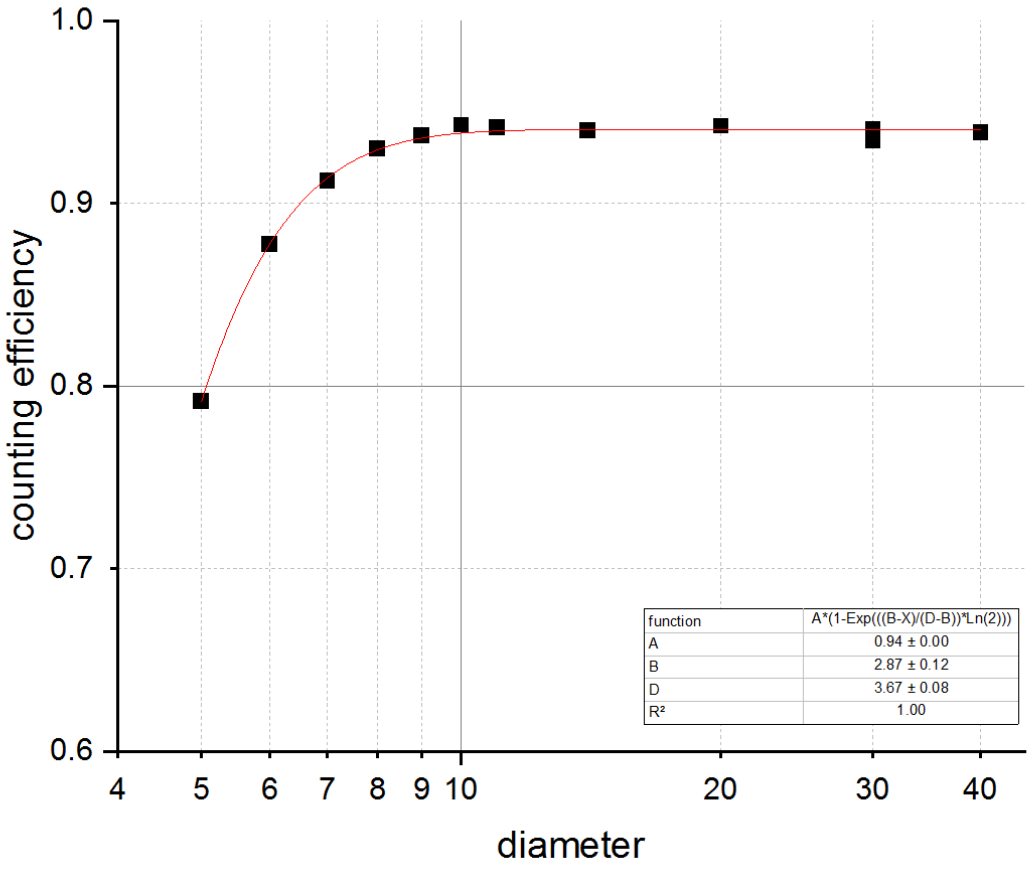

Fig. 1. Counting efficiency of candidate CPC against aerosol electrometer 3068 SN 70838596; silver particles between 5 nm and 40 nm were used for calibration. Dp50 = 3.67 nm.

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Reference:	TSI electrometer, model 3068, SN 70838596
Reviewed:	TROPOS/Dr. Thomas Tuch

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