



World Calibration Centre  
for Aerosol Physics



Leibniz Institute for  
Tropospheric Research

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<b>Project No.</b>	<b>CPC-2022-WCCAP-135</b>
<b>CPC Model:</b>	TSI CPC 3010
<b>CPC Serial Number</b>	SN2426
<b>Customer:</b>	TROPOS internal
<b>Description:</b>	Calibration of a Condensation Particle Counter
<b>Date of Calibration:</b>	April 8, 2022

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**Summary of Intercomparison:**

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 95% efficiency at 40 nm. The Dp50 is at 9.6 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Certificate / Reference: WCCAP

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Date of issue: April 8, 2022

Reviewed by: TROPOS

Signature

Name:

Dr. Thomas Tuch

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	Unit	Status
Participant		RadonTSMPS
CPC Model		TSI 3010 SN 2426
Firmware		
Manufacture date		
Last service date		
Arrival date		
Software Version		Labcount 2021
Saturator Temperature	°C	
Condenser Temperature	°C	
Optics Temperature	°C	
Cabinet Temperature	°C	
Ambient Pressure	mbar	998
Vacuum Pressure	kPa	
Inlet Pressure	kPa	
Critical Orifice Pressure	kPa	Needle valve
Aerosol Nozzle Pressure	kPa	
Laser Current	mA	
Liquid Level		full
Aerosol Flow	L/min	0.988
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 Temperature and Pressure	23.0°C, 1013 mbar

Table 2. Calibration and laboratory conditions

Diameter	EL 3068B (#/cm <sup>3</sup> )	Pulse Output	
		Concentration (#/cm <sup>3</sup> )	Efficiency (μ)
5	1366.33	0.17	0.00
6	1364.67	29.78	0.02
7	1435.94	178.72	0.12
8	1655.43	443.33	0.27
9	1807.45	745.76	0.41
10	1517.04	801.73	0.53
11	1272.63	801.95	0.63
14	1931.86	1670.29	0.86
20	1734.68	1646.04	0.95
30	1791.19	1706.47	0.95
40	1639.75	1568.70	0.96

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

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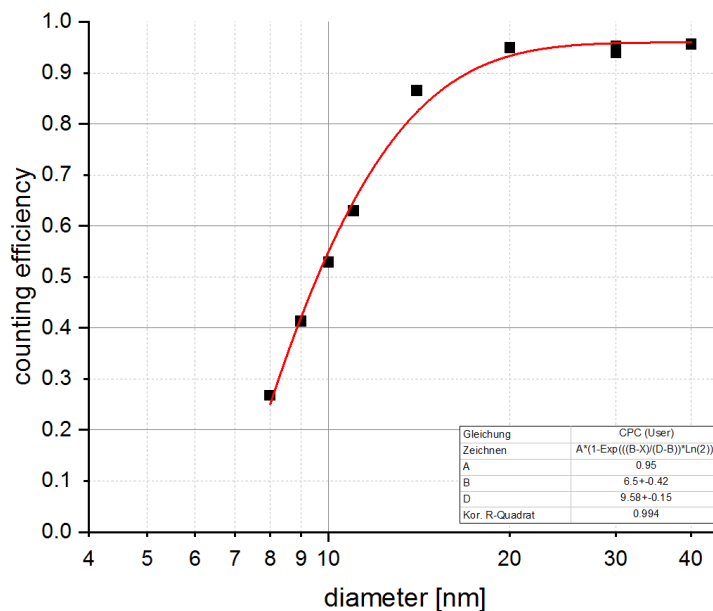


Fig. 1. Counting efficiency of candidate CPC against aerosol electrometer 3068 SN 70838596; silver particles between 5 nm and 40 nm were used for calibration.  $D_{p50} = 9.6$  nm

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

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