



Leibniz Institute for Tropospheric Research

World Calibration Centre for Aerosol Physics

Leibniz-Institut für Tropospharenforschung. Permoserstraße 15. 04318 Leipzig

CPC Model:	ENVI-CPC 100
CPC Serial Number:	12693
Customer:	Palas GmbH
Description:	Calibration of a Conde (CPC, Model ENVI-CP

Calibration of a Condensation Particle Counter (CPC, Model ENVI-CPC 100)

Date of Calibration: Dec 12, 2022

Summary of Intercomparison:

The candidate reached 91% efficiency at 40 nm. The Dp_{50} is at 9.7 nm. For the linearity check the CPC performance was 74% compared to the reference electrometer. Note: After the calibration yellow Butanol was leaking out of the aerosol inlet!

Certificate / Reference: WCCAP

Date of issue: Dec 14, 2022

Reviewed by: WCCAP

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Date of arrival of instrument in calibration lab: Instrument: Model and serial number of instrument:

Result of physical inspection: Result of functional test:

Internal parameters of instrument

Model and identification number of aerosol electrometer:

Electrometer calibration certificate:

Corrections of electrometer, for instance, differing flow rate:

Software for recording:

Date of calibration: Lab temperature and pressure: Measured aerosol flow rate of CPC: Uncertainty in measured flow rate: Flowmeter used:

Particles and gases used for calibration: Method of particle generation: Zero measurement of instrument: Dec 9, 2022 Condensation Particle Counter ENVI-CPC 100 SN 12693

no damages functional test successful, no problems

nominal flow rate 0.9 l/min

TSI Electrometer Model 3068, SN 70838596

April 20-26, 2022, calibrated at PTB Braunschweig

Within tolerance range (+/-2%); reference: 4.0 l/min, measured: 4.131 l/min LabView 2010; National Instruments; Program "LabCount.vi"

August 16, 2022 23.0°C, 1005 mbar 0.882 l/min 3% Gilian Gilibrator 3; SN 21181001005, 2021 silver particles and nitrogen tube furnace generator 0 particles/cm³ in 5 minutes

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	Unit	Status		
Model	-	ENVI-CPC 100		
SN	- 12693			
Firmware	-	100534		
Date	-	Dec 2022		
last service date	-	-		
TSI Software Version	-	-		
Saturator Temperature	°C	35		
Condenser Temperature	°C	21		
Optics Temperature	°C	47		
Cabinet Temperature	°C	-		
Ambient Pressure	kPa	1000		
Vaccuum Pressure	kPa	-		
Inlet Pressure	kPa	-		
Critical Orifice Pressure	kPa	-		
Aerosol Nozzle Pressure	kPa	-		
Laser Current	mA	-		
Liquid Level	-	Full		
Aerosol Flow	l/min	0.882		
Zero	avg 5 min	0		

		BNC (pulse output)		USB (direct output)		
Diameter	EL 3068B	Concentration	Efficiency	Concentration	Efficiency	USB-C / BNC
	(#/cm³)	(#/cm³)	(µ)	(#/cm³)	(μ)	
7	1773.22			491.68	0.28	
8	1761.29			770.79	0.44	
10	2610.88			1481.41	0.57	
14	1476.52			1125.30	0.76	
20	2879.43			2325.34	0.81	
30	3077.44			2684.34	0.87	
40	4132.33			3775.34	0.91	

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Fig. 1: Counting efficiency for ENVI-CPC 100 SN 12693 against aerosol electrometer 3068 SN 70838596; silver particles between 7 nm and 40 nm were used for calibration; the calculated Dp₅₀ is 9.63 nm.

	BNC (pulse output)		USB (direct output)		
EL 3068B (#/cm³)	Concentration (#/cm ³)	Efficiency (μ)	Concentration (#/cm ³)	Efficiency (μ)	USB-C / BNC
66739.24			50224.60	0.75	
54677.93			42293.55	0.77	
41691.62			29931.08	0.72	
33151.76			22785.69	0.69	
22729.73			14705.39	0.65	
10371.14			6648.56	0.64	
6527.88			3697.57	0.57	
1066.90			634.59	0.59	

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0 10000 20000 30000 40000 50000 60000 70000

Reference Number Concentration [Electrometer SN 70838596 in #/cm3]

Fig. 2: Linearity for ENVI-CPC 100 SN 12693 against aerosol electrometer 3068 SN 70838596; silver particles with a diameter of 40 nm were used for number concentrations between 1000 particles per cm³ and 65000 particles per cm³. Note: After the calibration yellow Butanol was leaking out of the aerosol inlet!

Date of issue: Dec 14, 2022

Reference: TSI electrometer, model 3068, SN 70838596 Reviewed: WCCAP

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