



**World Calibration Centre
for Aerosol Physics**

Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig



**Leibniz Institute for
Tropospheric Research**

CPC Model: TSI CPC 3772

CPC Serial Number: 70835060 (Total CPC)

Customer: Umweltbundesamt - Waldhof

Description: Calibration of a Condensation Particle Counter (CPC, Model 3772)

Date of Calibration: June 04, 2020

Summary of Intercomparison:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp50 is at 9.89 nm. The candidate was calibrated to Dp50 of 10nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Certificate / Reference: WCCAP

Date of issue: June 04, 2020 Signature:

Reviewed by: **TROPOS**

Name: **Kay Weinhold**

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Date of arrival of instrument in calibration lab:

February 11, 2020

Instrument:

Condensation Particle Counter

Model and serial number of instrument:

CPC 3772 S/N 70835060

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, S/N 70838596

Electrometer calibration certificate:

*September 5, 2018, calibrated at PTB
Braunschweig*

**Corrections of electrometer, for instance,
differing flow rate:**

*Within tolerance range (+/-2%); reference: 4.0
l/min, measured: 4.000 l/min*

Software for recording:

*LabView 2010; National Instruments; Program
„LabCount.vi“*

Date of calibration:

June 04, 2020

Lab temperature and pressure:

23.0°C, 982.0 mbar

Measured aerosol flow rate of CPC:

1.020 l/min

Uncertainty in measured flow rate:

3%

Flowmeter used:

*Gilian Gilibrator V; S/N 1711008-S,
January, 2018*

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

Results (using pulse output): Pre-Status

Particle size (nm)	40	30	20	15	10
Number concentration (cm ⁻³)	1040	1380	1137	1280	786
Counting efficiency η	1.02	1.01	0.97	0.88	0.54
Particle size (nm)	09				
Number concentration (cm ⁻³)	587				
Counting efficiency η	0.42				

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Results (using pulse output): After calibrating

Particle size (nm)	40	30	20	15	10
Number concentration (cm-3)	1432	1242	1673	1307	779
Counting efficiency η	1.01	1.01	0.97	0.87	0.52
Particle size (nm)	09	08	07		
Number concentration (cm-3)	586	249	17		
Counting efficiency η	0.38	0.18	0.01		

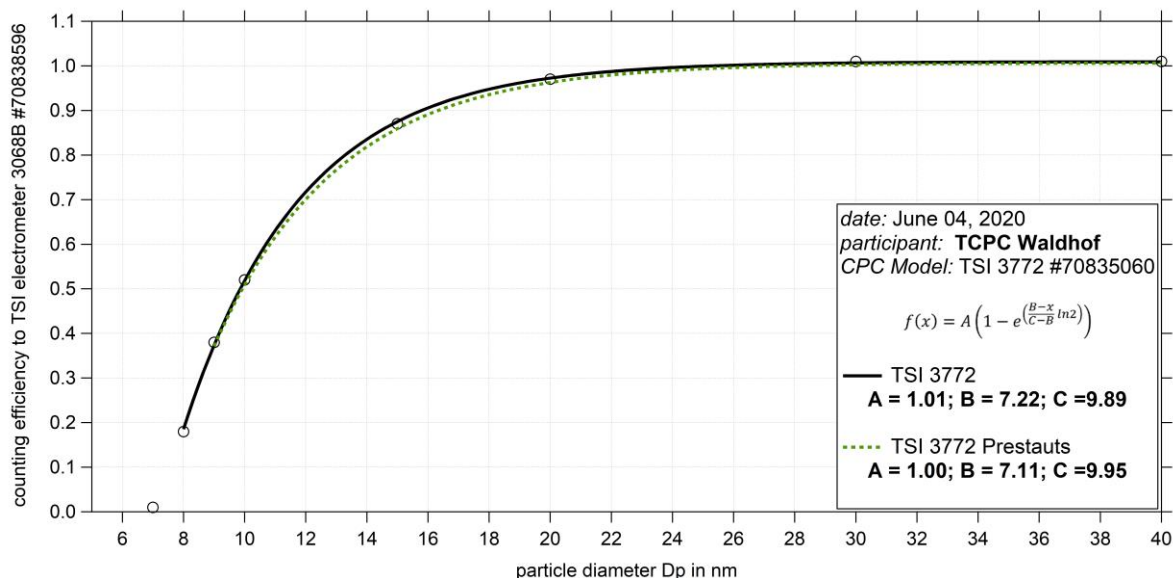


Fig. 1: Counting efficiency for Total CPC 3772 S/N 70835060 against aerosol electrometer 3068 S/N 70838596; silver particles between 7 and 40 nm were used for calibration; The instrument was calibrated to Dp50 of 10nm and resulted in a Dp50 of 9.89nm. The graph shows the counting efficiency before the calibration and after.



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Status information:

Status	<i>T SAT</i>	<i>T CON</i>	<i>T OPT</i>	<i>T CAB</i>	<i>P AMB</i>	<i>P VAC</i>
from display	39.0	23.9	40	31.8	97.8	-
Status	<i>P OR</i>	<i>P NO</i>	<i>Laser</i>	<i>LV</i>	<i>flow</i>	<i>P INLET</i>
from display	77.1	2.2	52	full	1.020	-

Date of issue: *June 04, 2020*

Reference: TSI electrometer, model 3068, SN 70838596

Reviewed: TROPOS / Kay Weinhold

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