



World Calibration Centre
for Aerosol Physics



Leibniz Institute for
Tropospheric Research

Intercomparison of Condensation Particle Counter

Project No.: CPC-2020-1-6

CPC Model: TSI CPC 3772 (Reference Instrument)

CPC Serial Number: 71011008

Principal Investigator: Kay Weinhold

Home Institution: TROPOS

Participant: -

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

Date of Calibration: March 17, 2020

Summary of Intercomparison:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 99% efficiency at 40 nm. The D_{p50} is at 7.03 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Certificate / Reference: WCCAP

Date of issue: March 18, 2020 Signature:

Reviewed by: **TROPOS** Name: **Kay Weinhold**



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Date of arrival of instrument in calibration lab: -
Instrument: *Condensation Particle Counter*
Model and serial number of instrument: *CPC 3772 S/N 71011008*

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: *March 17, 2020*
Lab temperature and pressure: *23.0°C, 1008 mbar*
Measured aerosol flow rate of CPC: *1.006 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 and logging via TROPOS LabVIEW software):

| | | | | | |
|--|-----------|-----------|-----------|-----------|-----------|
| Particle size (nm) | 40 | 30 | 20 | 15 | 10 |
| Number concentration (cm-3) | 1140 | 1332 | 1186 | 999 | 1540 |
| Counting efficiency η | 0.98 | 0.98 | 0.99 | 0.96 | 0.81 |
| Particle size (nm) | 09 | 08 | 07 | 06 | 05 |
| Number concentration (cm-3) | 1252 | 1187 | 956 | 571 | 83 |
| Counting efficiency η | 0.73 | 0.63 | 0.49 | 0.29 | 0.05 |



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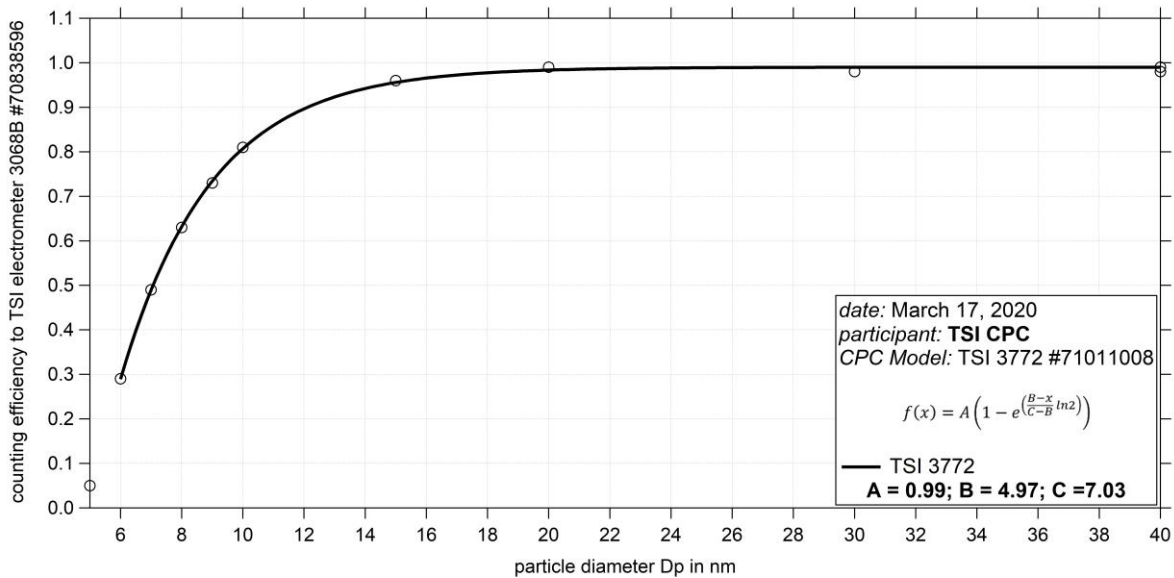


Fig. 1: Counting efficiency for CPC 3772S/N 7101008 against aerosol electrometer 3068 S/N 70838596; silver particles between 5 and 40 nm were used for calibration; the calculated Dp50 is 7.03 nm.

Status information:

| Status | T SAT | T CON | T OPT | T CAB | P AMB | P VAC |
|--------------|-------|-------|-------|-------|-------|---------|
| from display | 39.0 | 22 | 40.0 | 30.9 | 101.5 | - |
| Status | P OR | P NO | Laser | LV | flow | P INLET |
| from display | 76.2 | 2.6 | 55 | full | 1.006 | - |

Date of issue: March 17, 2019

Reference: TSI electrometer, model 3068, SN 70838596

Reviewed: TROPOS / Kay Weinhold