



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: 3772174001

Customer: IUTA

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

Date of Calibration: October 27, 2020

Summary of Intercomparison:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp_{50} is at 8.28 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

Certificate / Reference: WCCAP

Date of issue: October 27, 2020

Signature:

Reviewed by: **TROPOS**

Name: **Kay Weinhold**

Page 1 / 4



World Calibration Centre
for Aerosol Physics



Leibniz Institute for
Tropospheric Research

| | |
|--|--|
| Date of arrival of instrument in calibration lab: | <i>October 23, 2020</i> |
| Instrument: | <i>Condensation Particle Counter</i> |
| Model and serial number of instrument: | <i>CPC 3772 SN 3772174001</i> |
| Result of physical inspection: | <i>no damages</i> |
| Result of functional test: | <i>functional test successful, no problems</i> |
| Internal parameters of instrument | <i>nominal flow rate 1.0 l/min</i> |
| Model and identification number of aerosol electrometer: | <i>TSI Electrometer Model 3068, SN 70838596</i> |
| Electrometer calibration certificate: | <i>September 5, 2018, calibrated at PTB Braunschweig</i> |
| Corrections of electrometer, for instance, differing flow rate: | <i>Within tolerance range (+/-2%); reference: 4.0 l/min, measured: 4.000 l/min</i> |
| Software for recording: | <i>LabView 2010; National Instruments; Program „LabCount.vi“</i> |
| Date of calibration: | <i>October 27, 2020</i> |
| Lab temperature and pressure: | <i>23.0°C, 988 mbar</i> |
| Measured aerosol flow rate of CPC: | <i>1.032 l/min</i> |
| Uncertainty in measured flow rate: | <i>3%</i> |
| Flowmeter used: | <i>Gilian Gilibrator V; SN 1711008-S, January, 2018</i> |
| Particles and gases used for calibration: | <i>silver particles and nitrogen</i> |
| Method of particle generation: | <i>tube furnace generator</i> |
| Zero measurement of instrument: | <i>0 particles/cm³ in 10 minutes</i> |



World Calibration Centre
for Aerosol Physics



Leibniz Institute for
Tropospheric Research

| | Unit | Status |
|---------------------------|------------|------------|
| Model | - | TSI 3772 |
| SN | - | 3772174001 |
| Firmware | - | 2.16 |
| Date | - | - |
| TSI Software Version | - | - |
| Saturator Temperature | °C | 39.00 |
| Condenser Temperature | °C | 22.00 |
| Optics Temperature | °C | 40.00 |
| Cabinet Temperature | °C | 30.80 |
| Ambient Pressure | kPa | 99.20 |
| Vacuum Pressure | kPa | - |
| Inlet Pressure | kPa | - |
| Critical Orifice Pressure | kPa | 83.30 |
| Aerosol Nozzle Pressure | kPa | 2.50 |
| Laser Current | mA | 39.00 |
| Liquid Level | - | full |
| Aerosol Flow | l/min | 1.032 |
| Zero | avg 10 min | 0 |

| Diameter | EL 3068B (#/cm ³) | BNC (pulse output) | |
|----------|----------------------------------|---------------------------------------|-------------------|
| | | Concentration (#/cm ³) | Efficiency (μ) |
| 40 | 1054 | 1059 | 1.00 |
| 40 | 1273 | 1283 | 1.01 |
| 30 | 1085 | 1092 | 1.01 |
| 20 | 1008 | 1030 | 1.02 |
| 15 | 1187 | 1161 | 0.98 |
| 14 | - | - | - |
| 12 | 983 | 878 | 0.89 |
| 11 | - | - | - |
| 10 | 1765 | 1320 | 0.75 |
| 9 | 1045 | 655 | 0.63 |
| 8 | 1331 | 580 | 0.44 |
| 7 | 1170 | 221 | 0.19 |
| 6 | 1257 | 6 | 0.00 |
| 5 | 1030 | 0 | 0.00 |



World Calibration Centre
for Aerosol Physics



Leibniz Institute for
Tropospheric Research

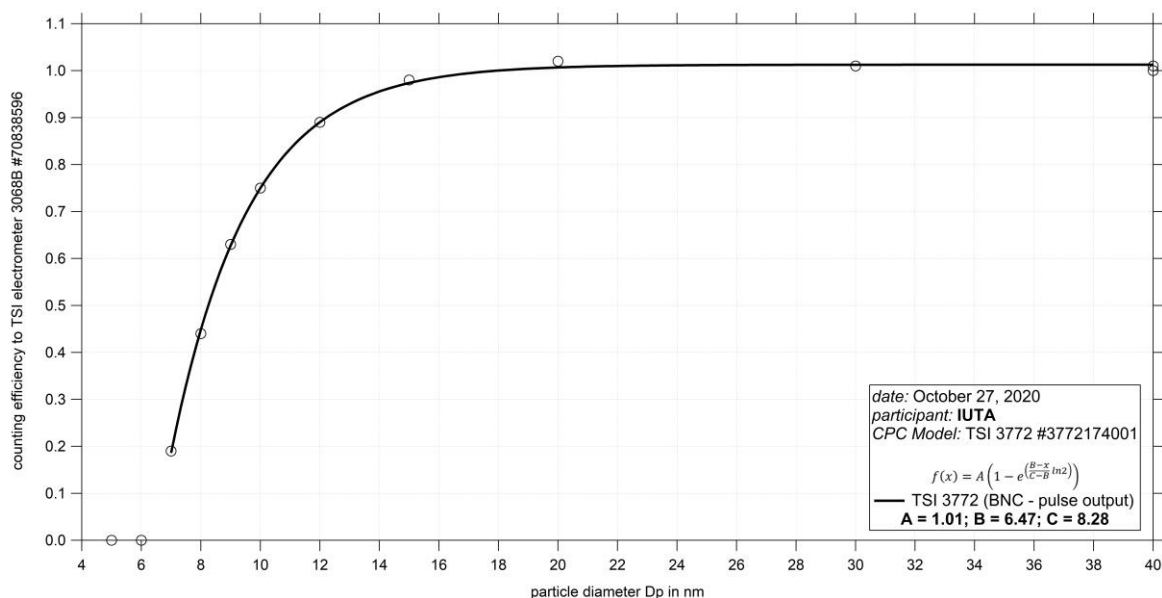


Fig. 1: Counting efficiency for TSI-CPC 3772 SN 3772174001 against aerosol electrometer 3068 SN 70838596; silver particles between 5 nm and 40 nm were used for calibration; the calculated D_{p50} from the BNC (pulse output) is 8.28 nm.

Date of issue: October 27, 2020

Reference: TSI electrometer, model 3068, SN 70838596

Reviewed: TROPOS / Kay Weinhold