



Leibniz Institute for
Tropospheric Research

Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

Intercomparison of Condensation Particle Counter

Project No.: CPC-2019-4-7

Principal Investigator: Konstantina Vasilatou, Dr. sc. ETH

Home Institution: Federal Institute of Metrology METAS
Laboratory Particles and Aerosols
Lindenweg 50, 3003 Bern-Wabern, Switzerland

Participant: –

Candidate: TSI MPSS CPC
Counter (SN): TSI CPC Model 3775 #70701277

Location of the quality assurance: TROPOS Leipzig, lab 130

Comparison period: September 02, 2019

Last Intercomparison (with Project No.):

TROPOS Reference Instrument: Electrometer: TSI model 3068B
#70838596, Last calibration in September 2018

Additional Equipment: Bubble flow meter 'Gilibrator', Gilian (Sensidyne)
#1711008-S, Last calibration in January 2018

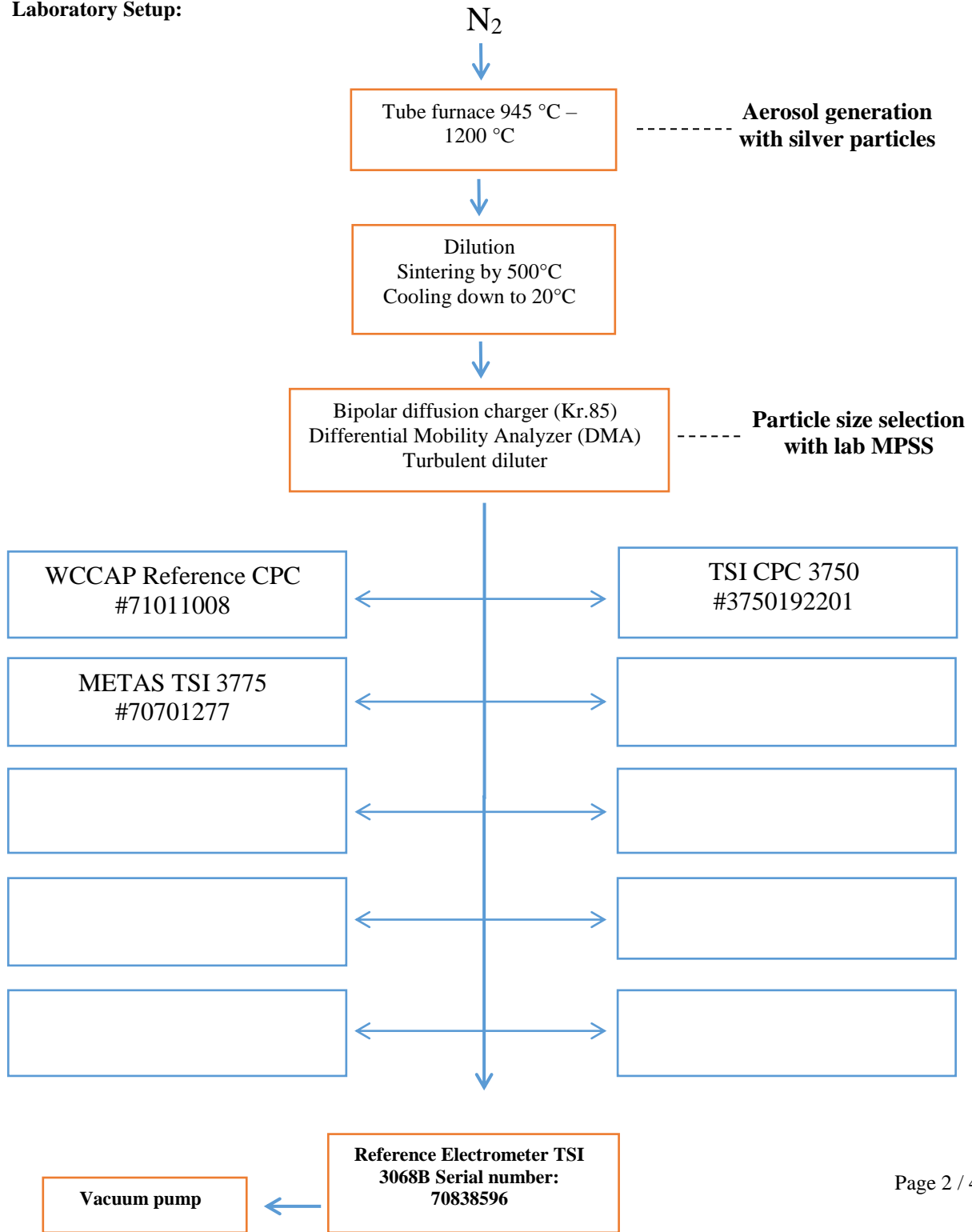
Summary of Intercomparison

Status:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 100% efficiency at 40 nm. The Dp50 is at 3.36 nm. The CPC efficiency curve corresponds to the standard of ACTRIS and GAW.

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Laboratory Setup:





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Date of arrival of instrument in calibration lab: *September 02, 2019*
Instrument: *Condensation Particle Counter*
Model and serial number of instrument: *CPC 3775 S/N 70701277*

Result of physical inspection: *no damages*
Result of functional test: *no repair*

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 05, 2018, calibrated at PTB Braunschweig*

Corrections of electrometer, for instance, differing flow rate: *Within tolerance range (+/-2%); reference: 4.0 l/min, measured: 4.00 l/min*

Software for recording: *LabView 2010; National Instruments; Program „LabCount.vi“*

Date of calibration: *September 02, 2019*
Lab temperature and pressure: *23°C, 999.48mbar*
Measured aerosol flow rate of CPC: *0.292 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):

Particle size (nm)	40	30	20	15	10
Number concentration (cm-3)	1194	1190	1739	1752	1511
Counting efficiency η	0.99	1.00	1.02	1.03	1.04
Particle size (nm)	09	08	07	06	05
Number concentration (cm-3)	1936	1775	1903	2016	831
Counting efficiency η	1.03	1.02	1.00	0.96	0.89
Particle size (nm)	40				
Number concentration (cm-3)	1132				
Counting efficiency η	1.00				

Special Information regarding to the Candidate:

Was it necessary to:	yes/no	information
do a second run	no	-
clean the optics	no	-
clean the nozzle	no	-
clean the saturator	no	-
change the wick	no	-
change the laser	no	-
change internal settings	no	-

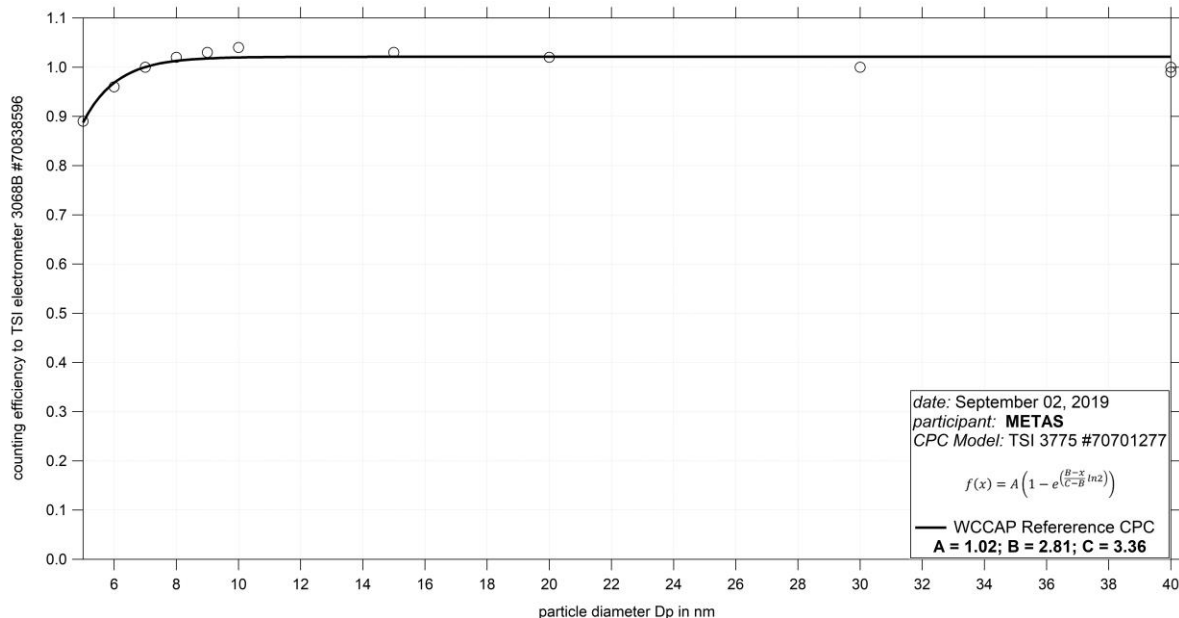


Fig. 1: Counting efficiency for METAS CPC 3775 S/N 70701277 against aerosol electrometer 3068 S/N 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated Dp_{50} is 3.36 nm.

Status information:

Status	T SAT	T CON	T OPT	T CAB	P AMB
from display	39	14	40	30.4	101.4
Status	P OR	P NO	Laser	LV	flow
from display	61.1	0.057	33	full	0.292

Date of issue: September 02, 2019

Reviewed: TROPOS / Kay Weinhold

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