



Leibniz Institute for
Tropospheric Research

Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

Intercomparison of Condensation Particle Counter

Project No.: CPC-2019-4-13

Principal Investigator: Dr. Jason Ward

Home Institution: CSIRO

Participant: -

Candidate: CSIRO Cape Grim
Counter (SN): TSI CPC Model 3772 #3772130801

Location of the quality assurance: TROPOS Leipzig, lab 130

Comparison period: September 17, 2019

Last Intercomparison (with Project No.):

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

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

Summary of Intercomparison

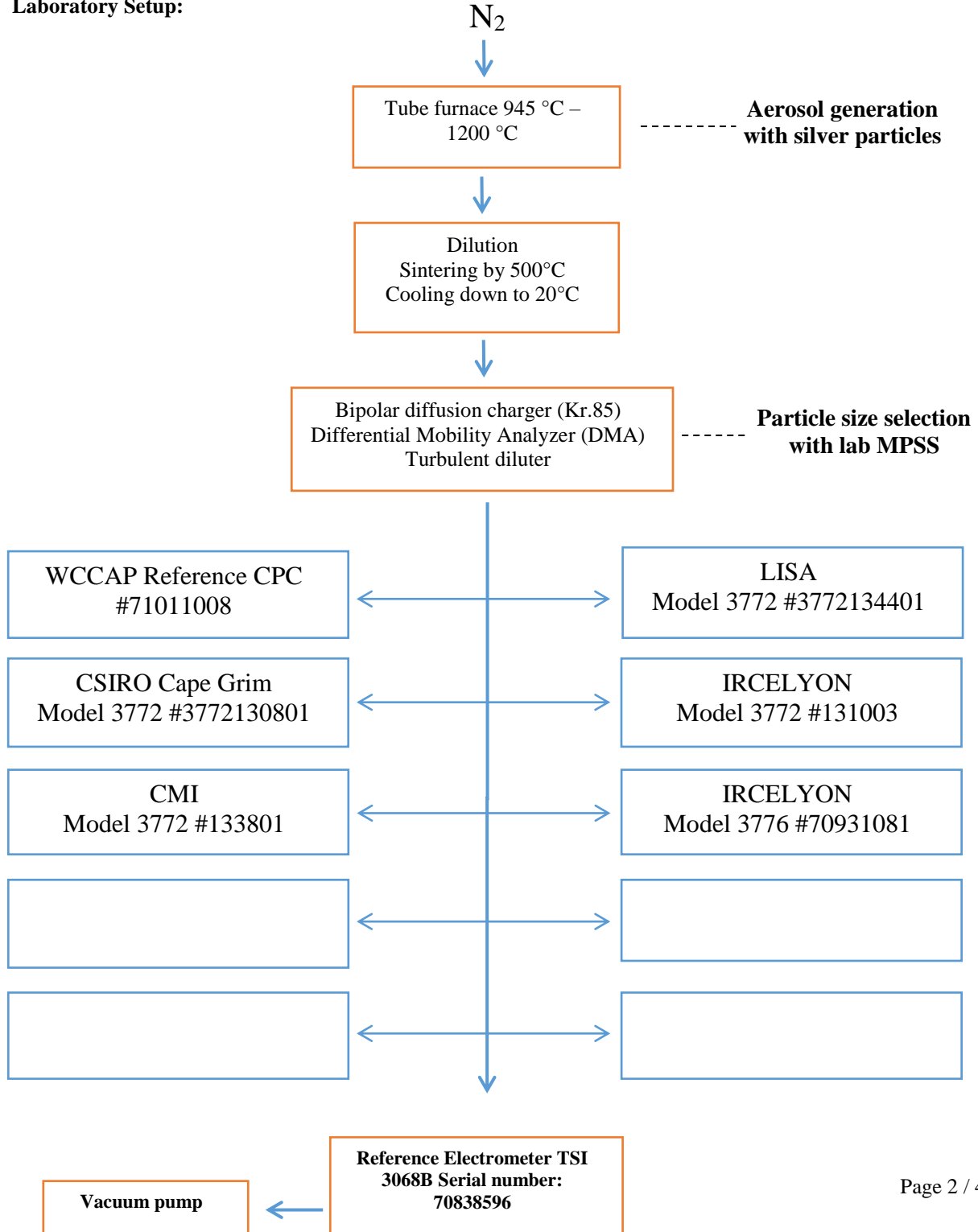
Status:

The candidate passed the quality standards of ACTRIS and GAW. The candidate reached 99% efficiency at 40 nm. The Dp50 is at 8.65 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 17, 2019*
Instrument: *Condensation Particle Counter*
Model and serial number of instrument: *CPC 3772 S/N 3772130801*

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

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 17, 2019*
Lab temperature and pressure: *23°C, 1004 mbar*
Measured aerosol flow rate of CPC: *1.021 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	12
Number concentration (cm-3)	1142	1603	1703	967	1392
Counting efficiency η	0.98	1.00	0.98	0.91	0.81
Particle size (nm)	10	09	08	07	06
Number concentration (cm-3)	703	848	870	411	13
Counting efficiency η	0.67	0.55	0.39	0.17	0.01
Particle size (nm)					
Number concentration (cm-3)					
Counting efficiency η					

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Special Information regarding to the Candidate:

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

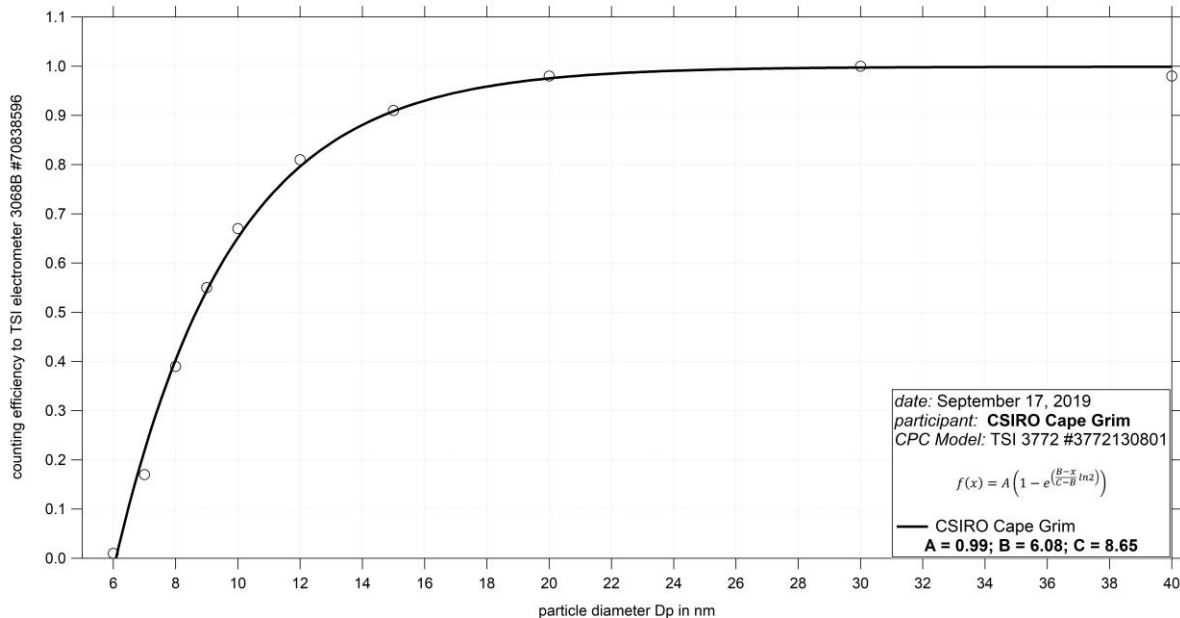


Fig. 1: Counting efficiency for CSIRO Cape Grim TSI 3772 S/N 3772130801 against aerosol electrometer 3068 S/N 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated Dp_{50} is 8.65 nm.

Status information:

Status	T SAT	T CON	T OPT	T CAB	P AMB
from display	39	22	40	32.6	99.8
Status	P OR	P NO	Laser	LV	flow
from display	83.0	2.8	41	full	1.021

Date of issue: September 17, 2019

Reviewed: TROPOS / Kay Weinhold

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