Intercomparison of Condensation Particle Counter

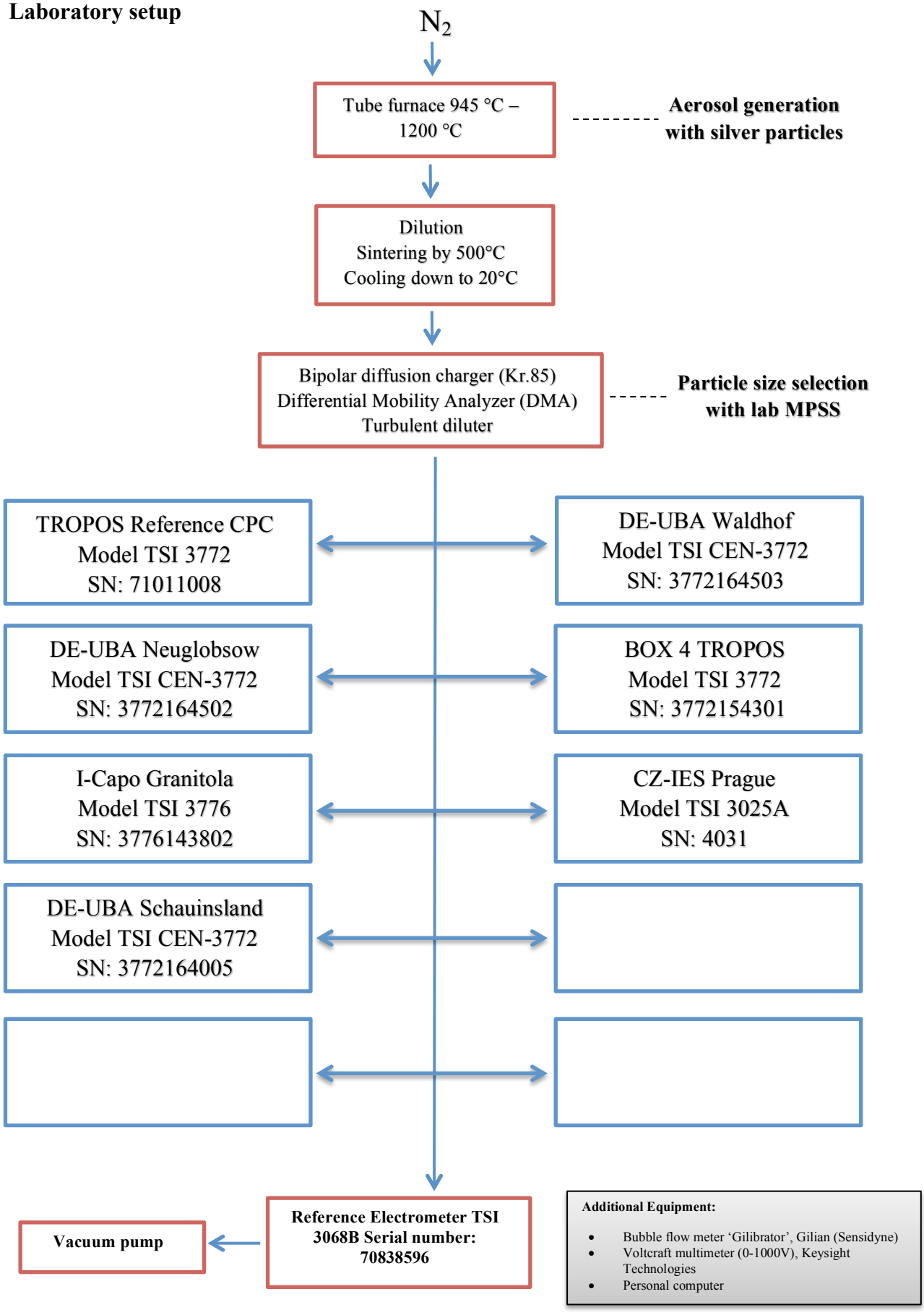
Project No.:	*CPC-2017-1-9*
Principal Investigator:	Kay Weinhold
Home Institution:	TROPOS
Participant:	Round Robin Tour in ACTRIS (Dp50 cal. to 10nm)
Candidate:	**DE-TROPOS Box4**
Counter (SN):	TSI CPC Model 3772; SN: 3772154301
Location of the quality assurance:	TROPOS Leipzig, lab 130
Comparison period:	January 25, 2017
Last Intercomparison (with Project No.):	
TROPOS Reference Instrument:	Electrometer: TSI model 3068B #70838596, Last calibration in April 2016
Additional Equipment:	Bubble flow meter 'Gilibrator', Gilian (Sensidyne)

Summary of Intercomparison

Pre-Status:
The candidate did not pass the quality standards of ACTRIS and GAW. The candidate reached 84% efficiency at 40 nm. The Dp50 is at 9.95 nm. The CPC efficiency curve does not correspond to the standard. During the Round Robin Tour the total CPC in Box4 "TROPOS SN3772154301" showed status values out of the range. TROPOS decided to ship the instrument back to TROPOS for maintenance before continuing the intercomparison.

Final Status:
The candidate passed the quality standards of ACTRIS and GAW. It was necessary to clean and recalibrate the candidate. The CPC efficiency curve corresponds to the standard. The candidate reached 99% efficiency at 40 nm. The Dp50 is at 9.82 nm. The Box4 is going back to the last station for a second intercomparison.

Laboratory setup



Status of the candidate:

CPC status	Pre-Status	Final Status
power/status	LED green	LED green
saturator temp	39.0 °C	39.0 °C
condenser temp	23.9 °C	24.0 °C
optics temp	40.0 °C	40.0 °C
cabinet temp	33.2 °C	26.1 °C
ambient pressure	101.2 kPa	101.2 kPa
orifice pressure	85.4 kPa	83.0 kPa
nozzle pressure	? kPa	3.3 kPa
laser current	23 mA	42 mA
liquid level	full	full
Aerosol flow (l/min)	0.985 l/min	1.001 l/min

Special Information regarding to the Candidate:

Was it necessary to:	yes/no	information
do a second run	Yes	Problems during the Round Robin Tour. CPC was dirty and needed a service.
clean the optics	no	
clean the nozzle	yes	Black maybe soot
clean the saturator	yes	Black maybe soot
change the wick	no	
change the laser	no	
change internal settings	no	

CPC efficiency curve of the candidate: Pre-Status

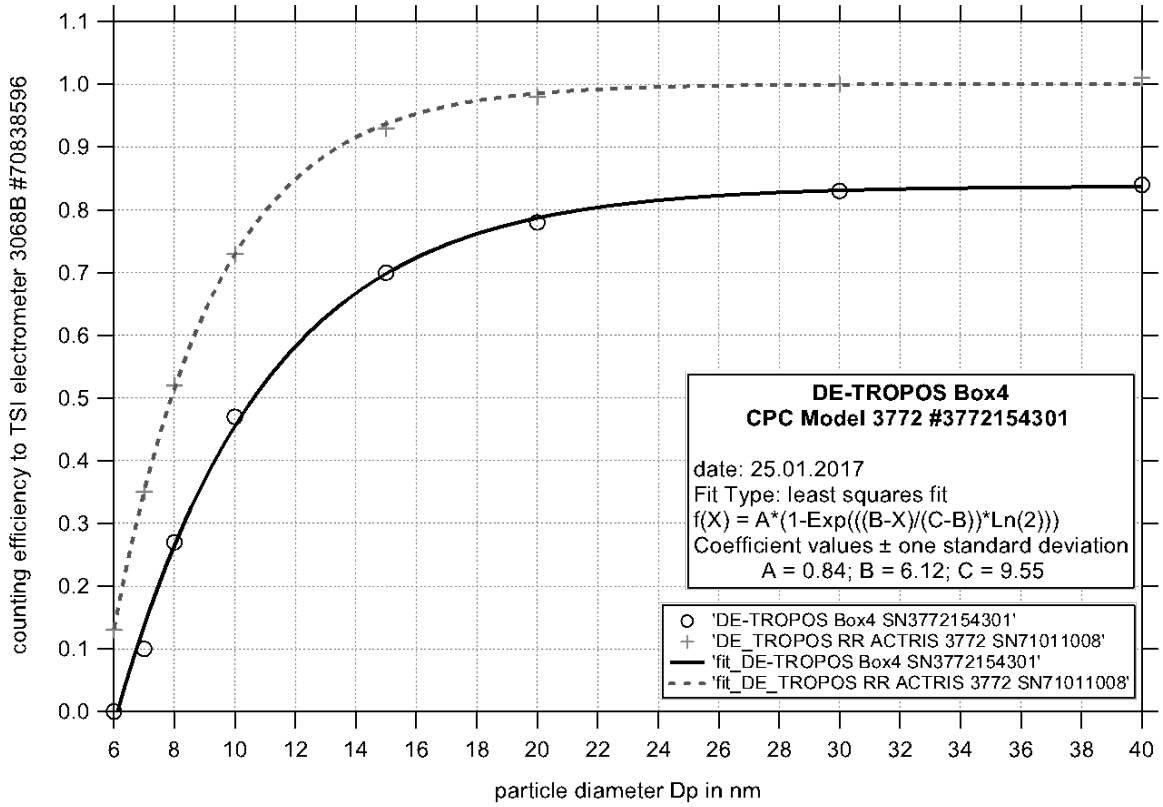


Figure 01: CPC efficiency curve. Based on Electrometer TSI 3068B. Serial number: 70838596

Measured data of the candidate: Pre-Status

Dp in nm	counting efficiency
40 nm	**0.84**
30 nm	**0.83**
20 nm	**0.78**
15 nm	**0.70**
10 nm	**0.47**
8 nm	**0.27**
7 nm	**0.10**
6 nm	**0.00**

CPC efficiency curve of the candidate: Final-Status

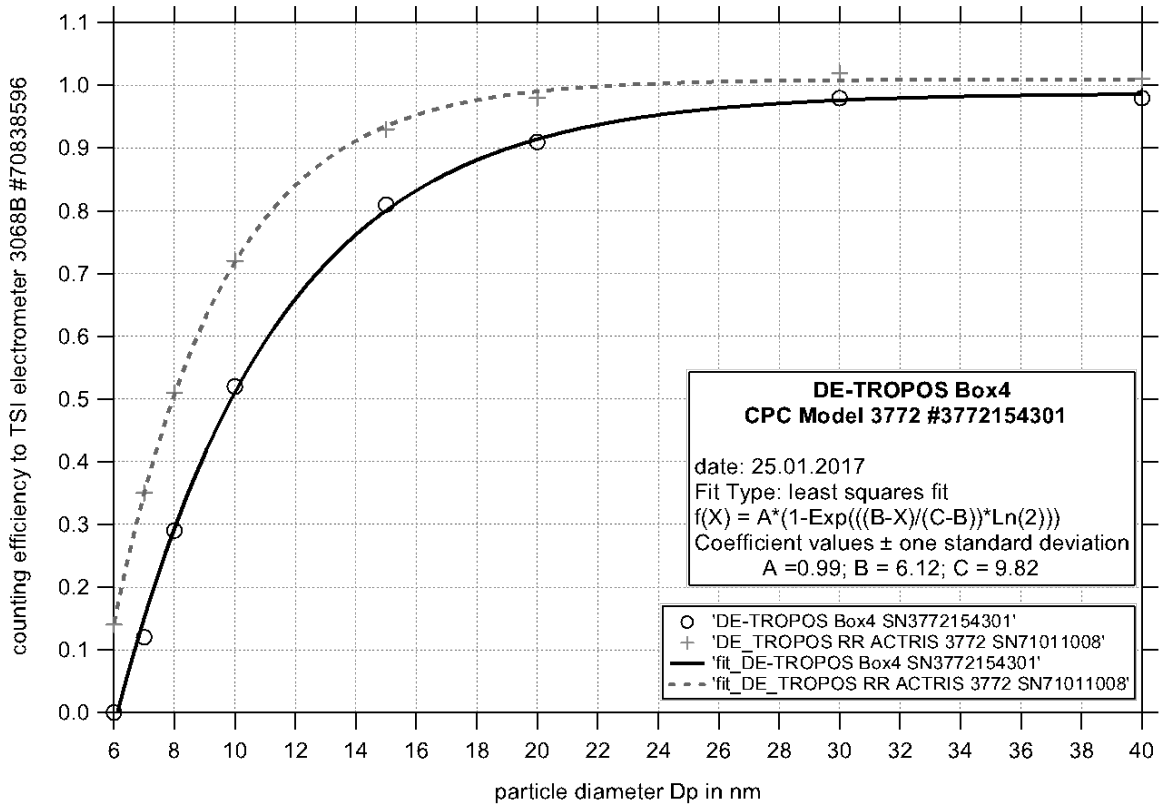


Figure 02: CPC efficiency curve. Based on Electrometer TSI 3068B. Serial number: 70838596

Measured data of the candidate: Final-Status

Dp in nm	counting efficiency
40 nm	**0.98**
30 nm	**0.98**
20 nm	**0.91**
15 nm	**0.81**
10 nm	**0.52**
8 nm	**0.29**
7 nm	**0.12**
6 nm	**0.00**

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

Kalibrierschein
Calibration Certificate

Gegenstand: *Object:*	Aerosol Elektrometer ID-Nummer: TSI_3068B_70838596
Hersteller: *Manufacturer:*	TSI Incorporated
Typ: *Type:*	3068B
Kennnummer: *Serial No.:*	70838596
Auftraggeber: *Applicant:*	AG 3.23 - Herr Nowak, Tel.: 3228
Anzahl der Seiten: *Number of pages:*	4
Geschäftszeichen: *Reference No.:*	PTB AG 2.11-1461323527-0327
Kalibrierzeichen: *Calibration mark:*	20790 PTB 16
Datum der Kalibrierung: *Date of calibration:*	22.04.2016

Im Auftrag:
On behalf of PTB:

Dr. B. Schumacher

Braunschweig, 04. Mai. 2016

Siegel
Seal

Im Auftrag:
On behalf of PTB:

C. Rohrig

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