



World Calibration Centre  
for Aerosol Physics



Leibniz Institute for  
Tropospheric Research

Leibniz-Institut für Troposphärenforschung Permoserstraße 15 04318 Leipzig

**CPC Model:** GRIMM WRAS\_1

**CPC Serial Number:** 54201608

**Customer:** GRIMM Instruments Ltd.

**Project No.:** CPC-2019-5-10

**Principal Investigator:** Dr. Uta Wolf-Benning

**Home Institution:** Flughafen Berlin Brandenburg GmbH

**Participant:** -

**Location of the  
quality assurance:** TROPOS Leipzig, lab 130

**Description:** Calibration of a Condensation Particle Counter (CPC, Model GRIMM WRAS\_1)

**Date of Calibration:** November 13, 2019

**Summary of Intercomparison:**

The candidate did not pass the quality standards of ACTRIS and GAW. The candidate reached 91% efficiency at 40 nm. The Dp50 is at 7.72 nm. TROPOS recommends to send the CPC for maintenance back to GRIMM.

Certificate / Reference: WCCAP

Date of issue: November 13, 2019

Reviewed by: **TROPOS**

Name: **Kay Weinhold**

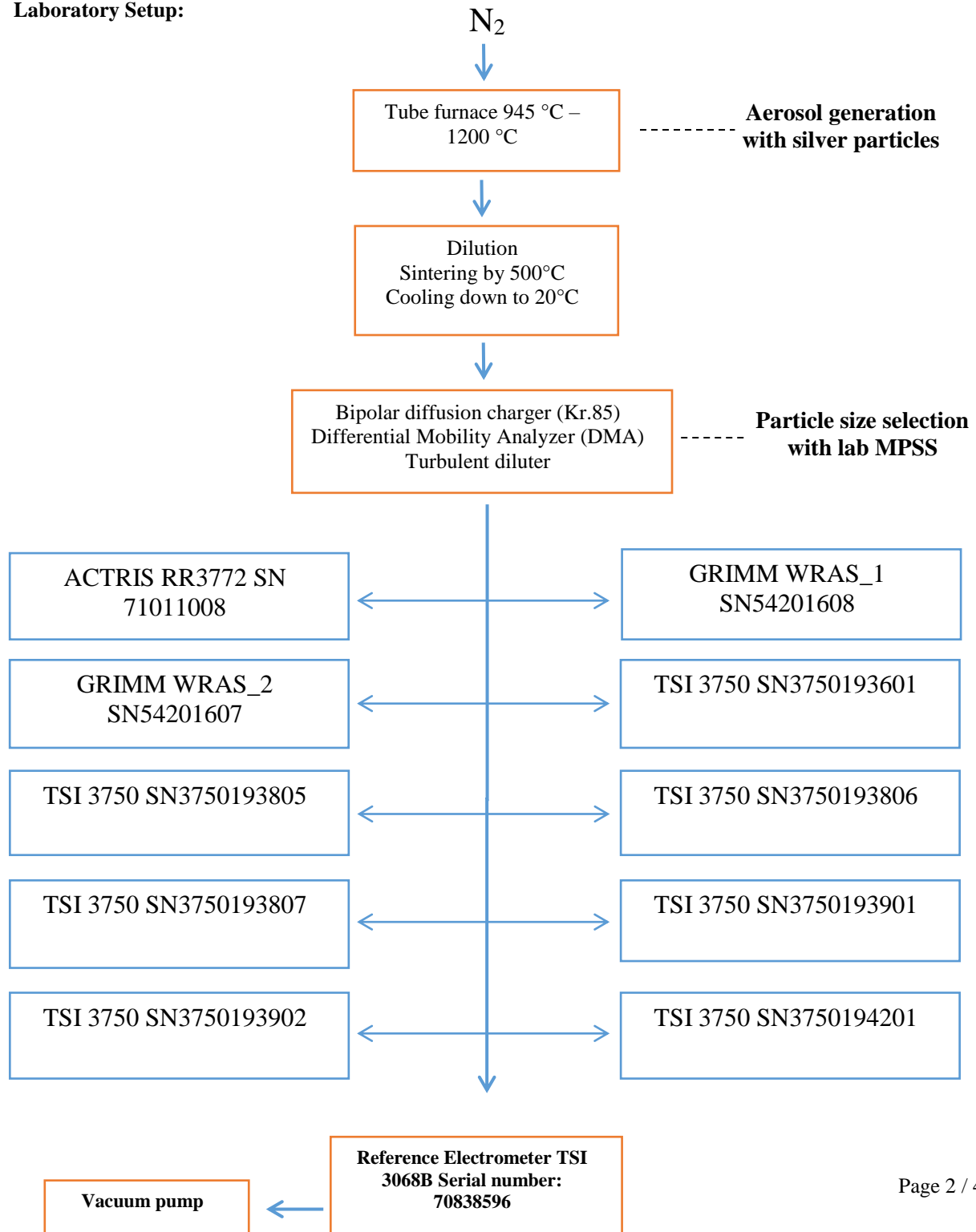


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**Laboratory Setup:**



**Date of arrival of instrument in calibration lab:** *November 11, 2019*  
**Instrument:** *Condensation Particle Counter*  
**Model and serial number of instrument:** *GRIMM WRAS\_1 S/N 54201608*

**Result of physical inspection:** *no damages*  
**Result of functional test:** *functional test successful, no problems*

**Internal parameters of instrument** *nominal flow rate 0.3 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:** *November 13, 2019*  
**Lab temperature and pressure:** *24.5°C, 982.5 mbar*  
**Measured aerosol flow rate of CPC:** *0.304 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/cm<sup>3</sup> in 5 minutes*

**Results (using pulse output):**

Particle size (nm)	<b>40</b>	<b>30</b>	<b>20</b>	<b>15</b>	<b>10</b>
Number concentration (cm-3)	1196	1139	1232	944	839
Counting efficiency $\eta$	0.92	0.89	0.81	0.74	0.59
Particle size (nm)	<b>09</b>	<b>08</b>	<b>07</b>	<b>06</b>	
Number concentration (cm-3)	888	577	575	451	
Counting efficiency $\eta$	0.53	0.48	0.41	0.33	



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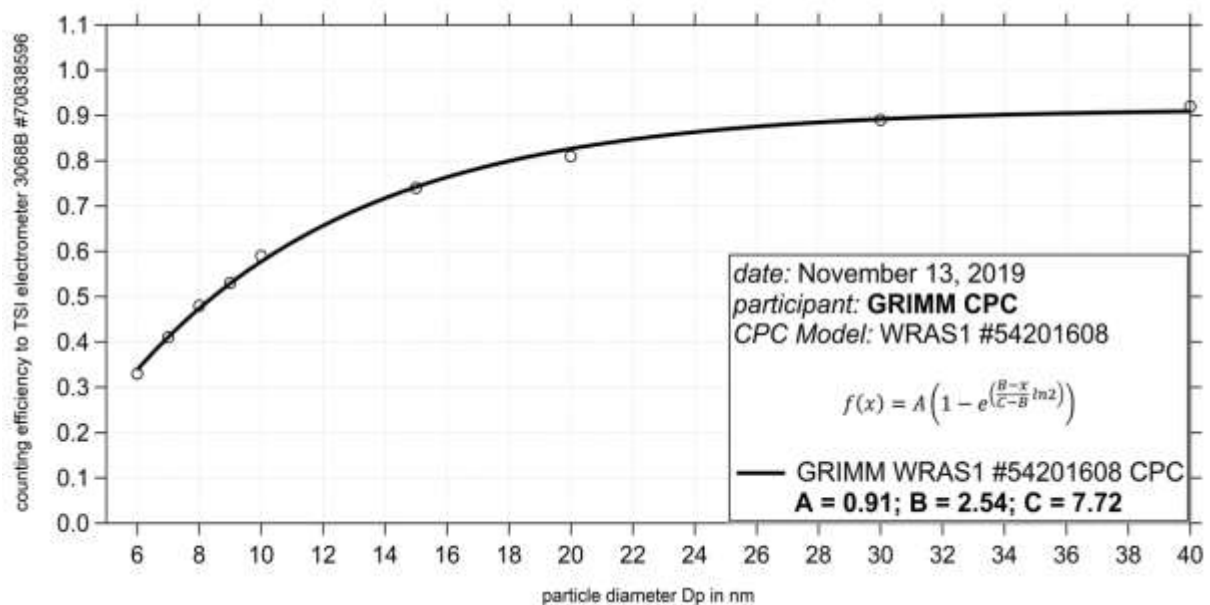


Fig. 1: Counting efficiency for CPC WRAS1 S/N 54201608 against aerosol electrometer 3068 S/N 70838596; silver particles between 6 and 40 nm were used for calibration; the calculated  $Dp_{50}$  is 7.72 nm.

#### Status information:

Status	T SAT	T CON	T OPT	T CAB	P AMB	P VAC
from display	-	-	-	-	-	-
Status	P OR	P NO	Laser	LV	flow	P INLET
from display	-	-	-	-	-	-

Date of issue: November 13, 2019

Reference: TSI electrometer, model 3068, SN 70838596

Reviewed: TROPOS / Kay Weinhold

Signature: