CIRQULAIR

CIRQULAIR MEASUREMENT WITH TSI CPC AND SMPS

22-May-2018

TO

Peter van Wees

FROM

Jan Troost

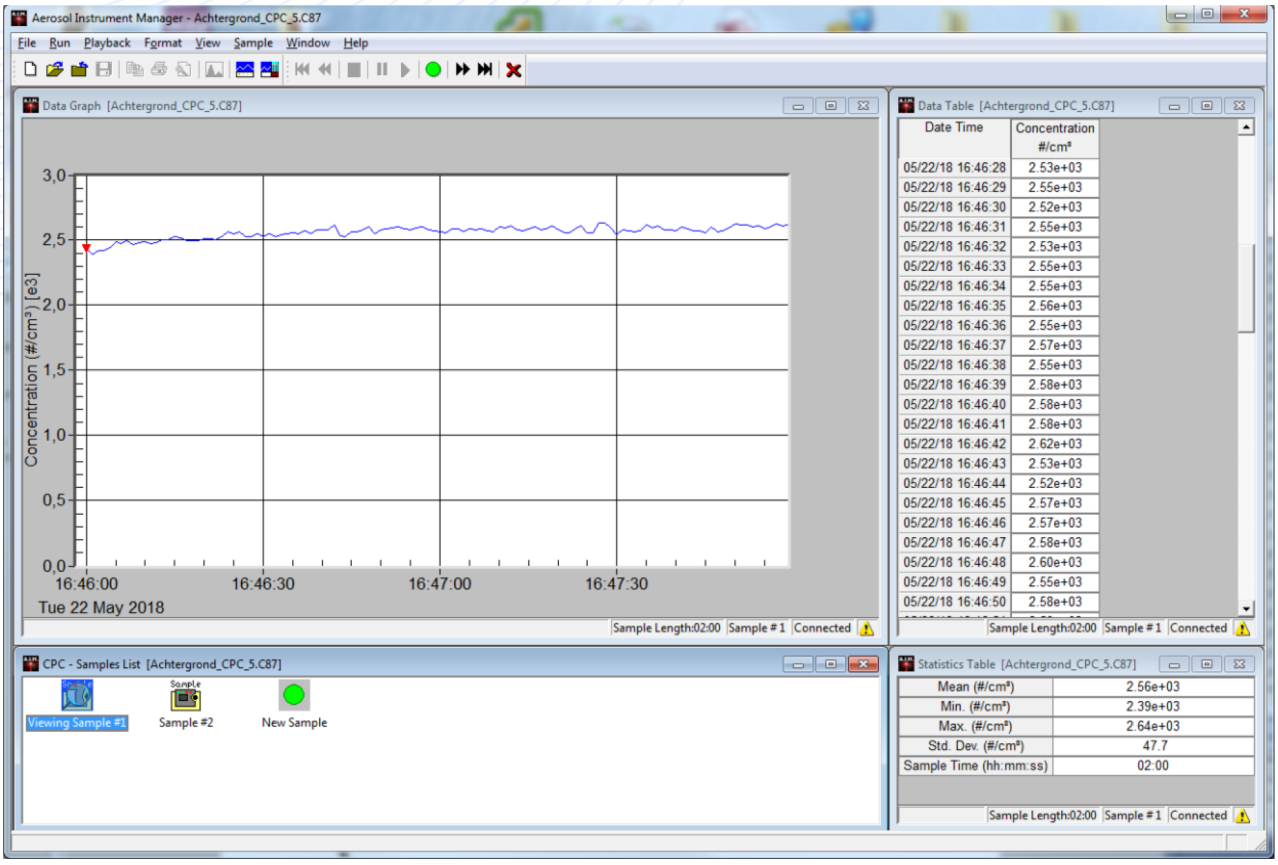
Effectiveness measurement of the Cirqulair at office j.j. bos b.v. (TSI distributor for Benelux countries) in Gouda, NL

USED EQUIPMENT AND SETTINGS:

AIM Version; 10.2
Classifier Model;3082;Classifier S/N;3082001714002;Classifier Firmware Version;2.1
Neutralizer Model;3088;Neutralizer S/N;3088011613003
Impactor (cm);0.0710;Impactor S/N;7100490
DMA Model;3085;DMA S/N;3085A1748001
DMA Inner Radius (cm);0,937
DMA Outer Radius (cm);1,905
DMA Characteristic Length (cm);4,987
HV Polarity;NEG
Detector Model;3787;Detector S/N;3787111703
Detector Sample Flow (L/min);0,60;Detector Inlet Flow (L/min);0,60
Reference Gas Viscosity (Pa*s);1,832450e-005
Reference Mean Free Path (m);6,730000e-008
Reference Gas Temperature (K);296,15
Reference Gas Pressure (kPa);101,30
Sutherland Constant (K);110,40
Tube Length (cm);29,00
Tube Diameter (cm);0,48
Channels/Decade;64
Multiple Charge Correction;TRUE
Nanoparticle Agglomerate Mobility Analysis;FALSE
Diffusion Correction;TRUE

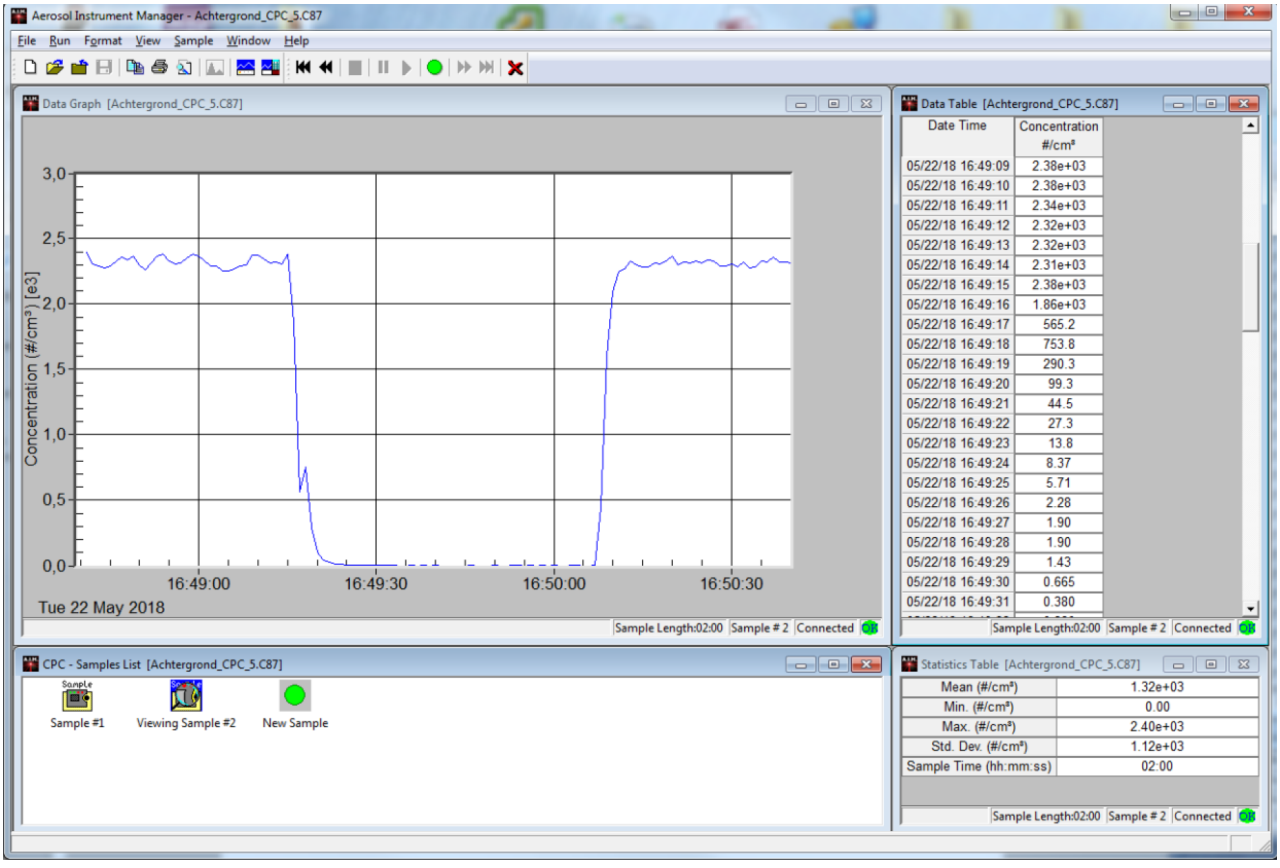
A. Total concentration measurement by CPC (3787) only with a starting point (D50) of 5 nm.:

1) Background measurement (Cirqulair = Off).



Conc: 2.6E3 part/cm3

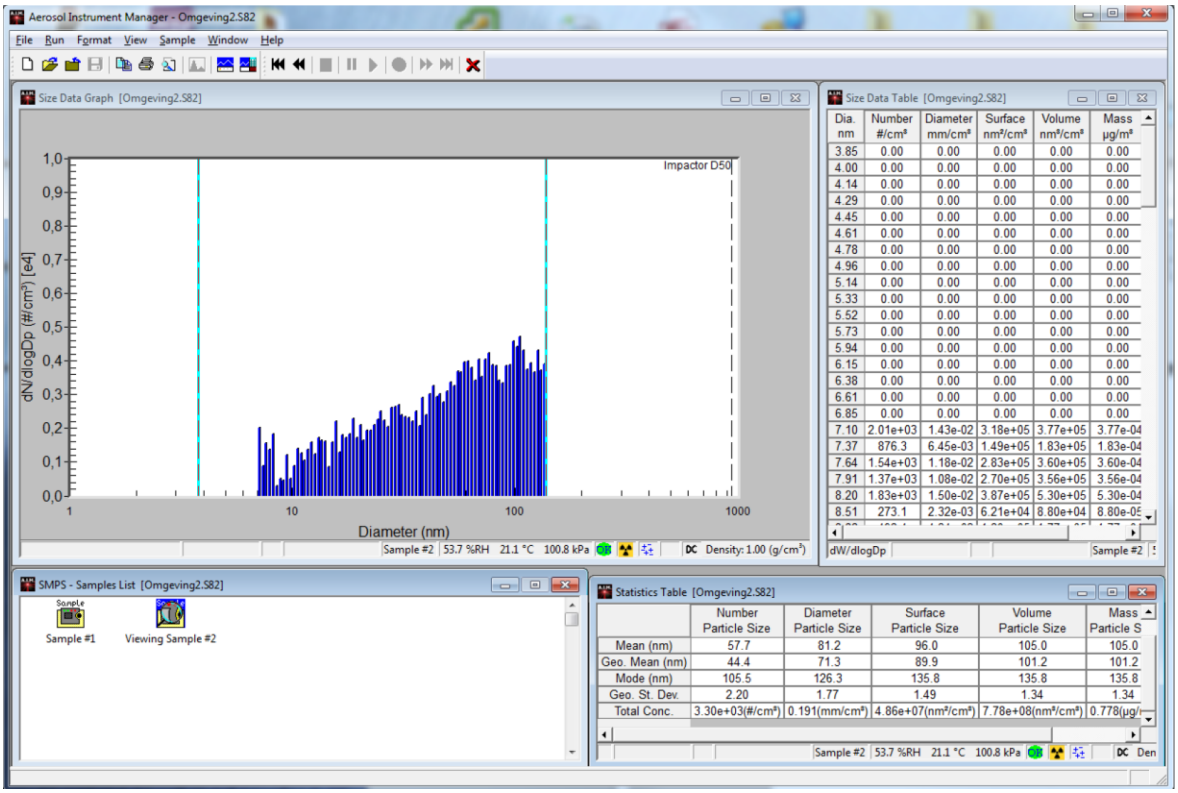
2) Measurement at Inlet and Outlet of the Cirqulair (Cirqulair = On).



Conc: Jump from 2.6E3 part/cm3 at Inlet to 1 to 5 part/cm3 at Outlet and viva versa

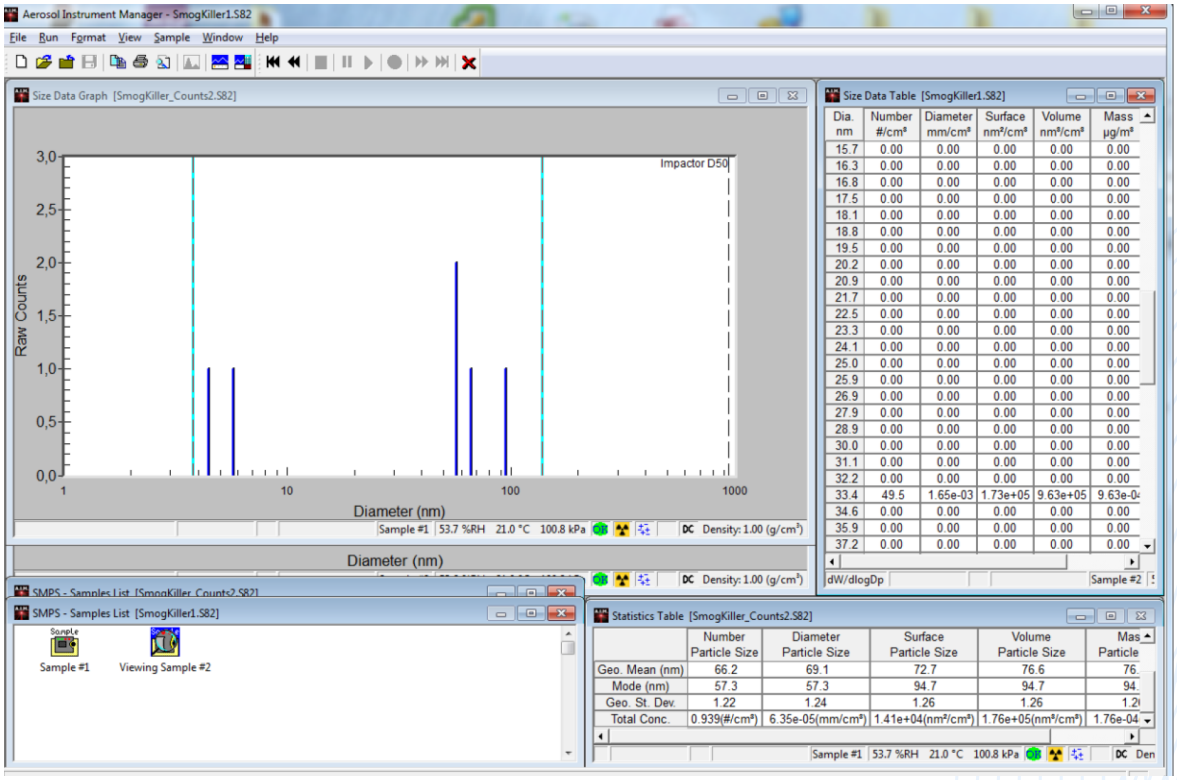
B. Concentration measurement per Size bin by SMPS(3938N87) over size range [5 – 150 nm.] determined by used nano-DMA and CPC model:

1) Background



Total conc. from 5nm up to 140 nm, (determined by SMPS settings): 3.3E3 part/cm3

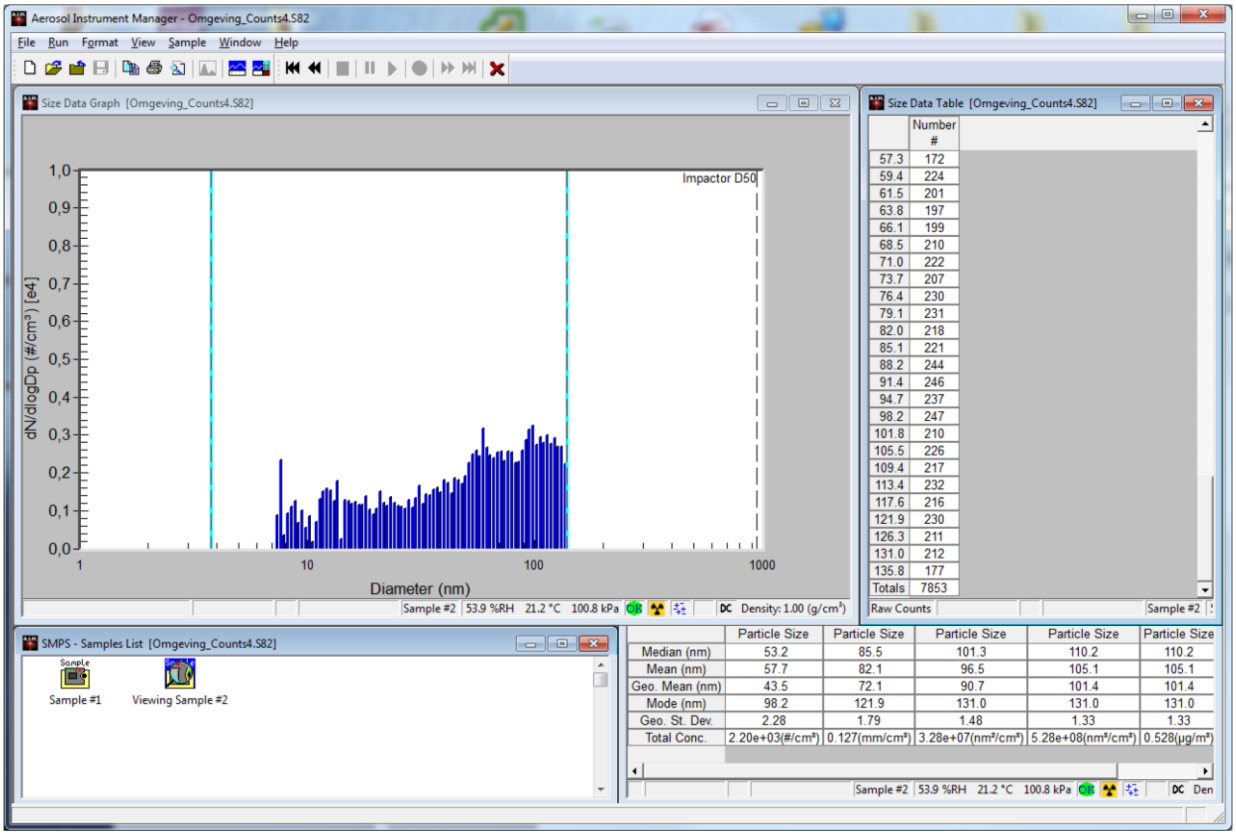
2) At Outlet of the Cirqulair



Total conc. from 5nm up to 140 nm, (determined by SMPS settings): 3.3E3 part/cm3

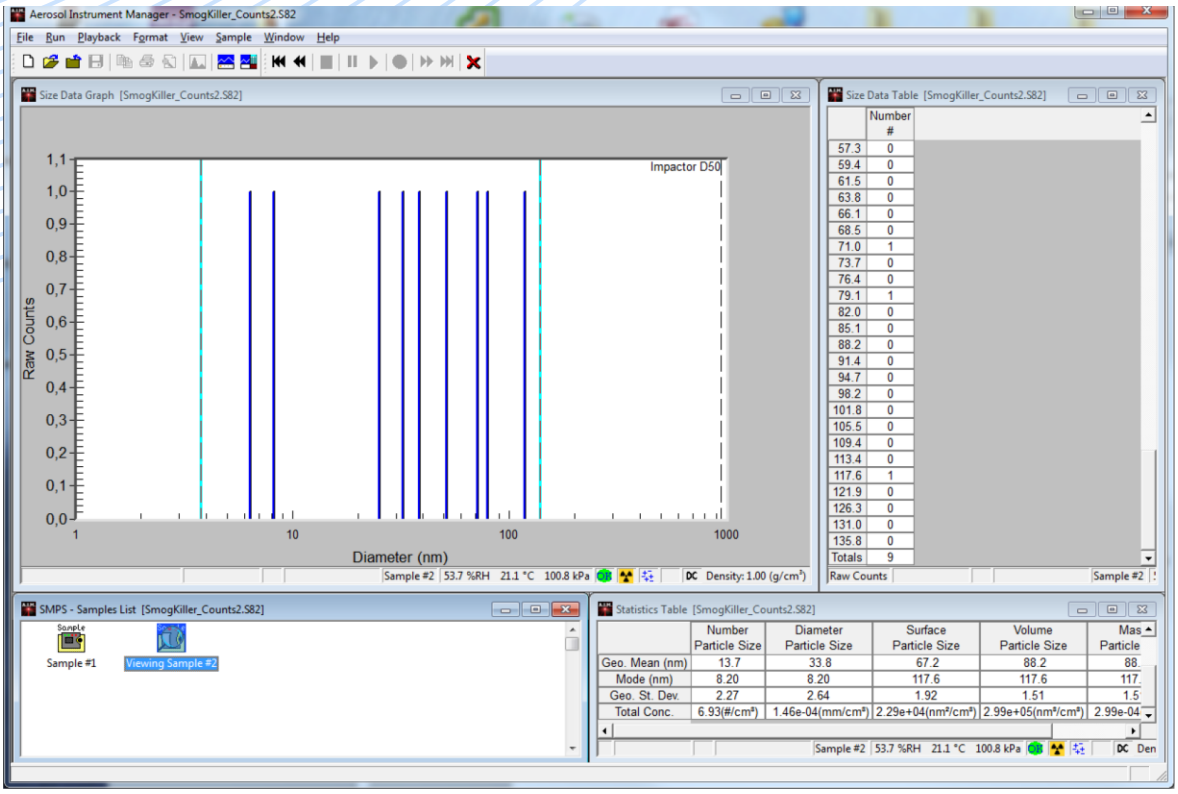
C. Raw particle counts per Size bin by SMPS(3938N87) over size range [5 – 150 nm.] determined by used nano-DMA and CPC model:

1) Background



Total counts from 5nm up to 140 nm, (determined by SMPS settings) during 100 sec.
Scan time: 78533

2) At Outlet of the Cirqulair



Total counts from 5nm up to 140 nm, (determined by SMPS settings) during 100 sec.
Scan time: varying in 2 samples from 6 (to 9 counts

conclusion:

The Cirqulair proves to be very effective in removing (nano) particles in size range up to 10 µm as shown by CPC measurement 1 and in range of 5 to 140 nm. as indicated by SMPS measurement 2 and 3

Kind regards,

Jan Troost

Product Specialist TSI Particle Instruments j.j. bos b.v.

Note:

CPC = Condensation Particle Counter (in this case water based) SMPS = Scanning Mobility Particle Sizer

DMA = Differential Mobility Analyzer

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