

VPR Calibration with Thermally Stable Aerosols

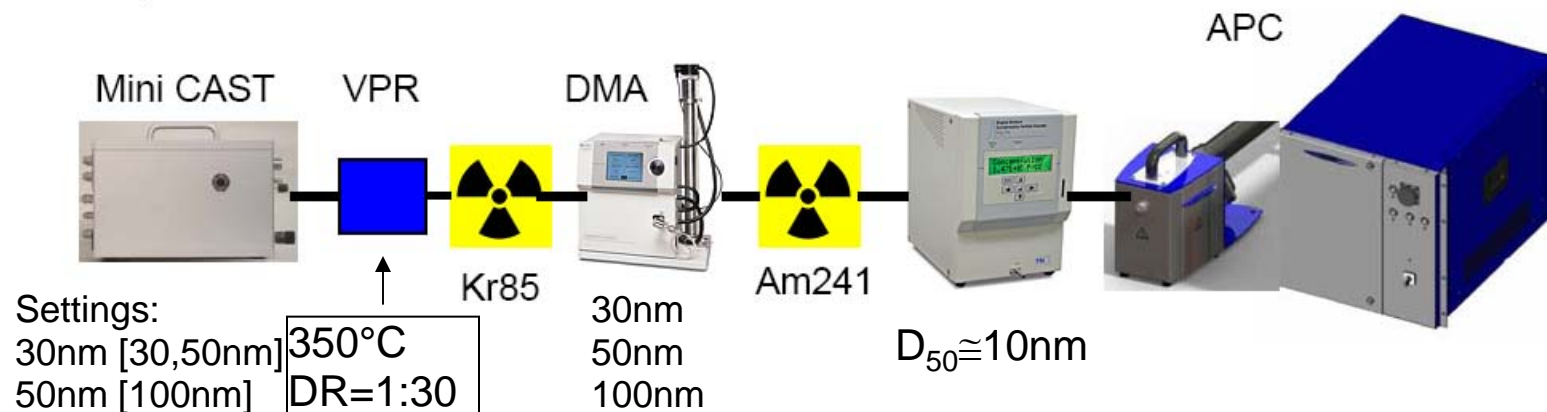
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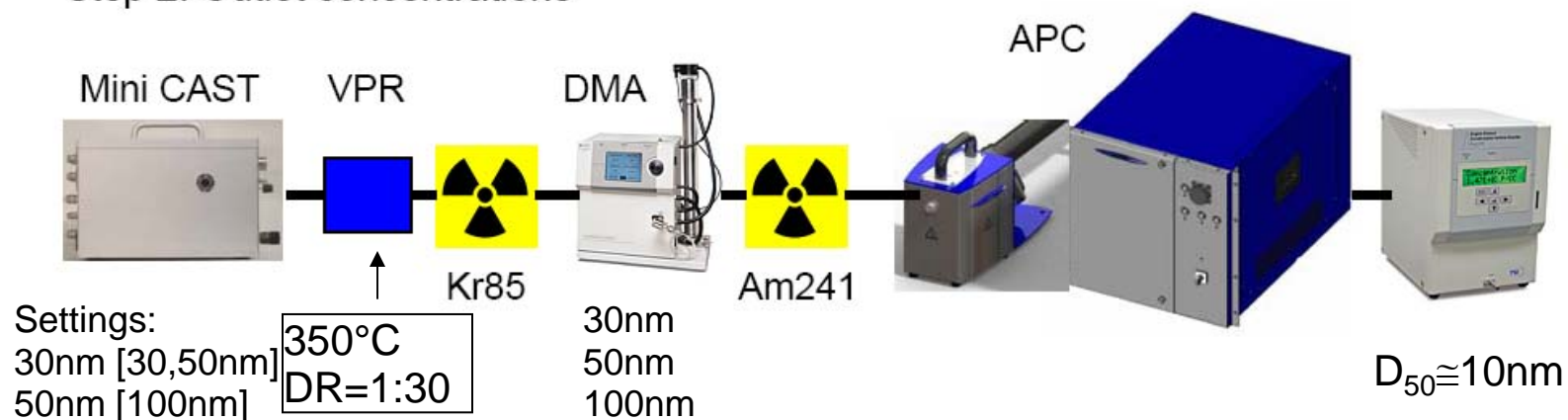


AVL APC Calibration Procedure (PCRF) [since 2007]

Step 1: Inlet concentrations



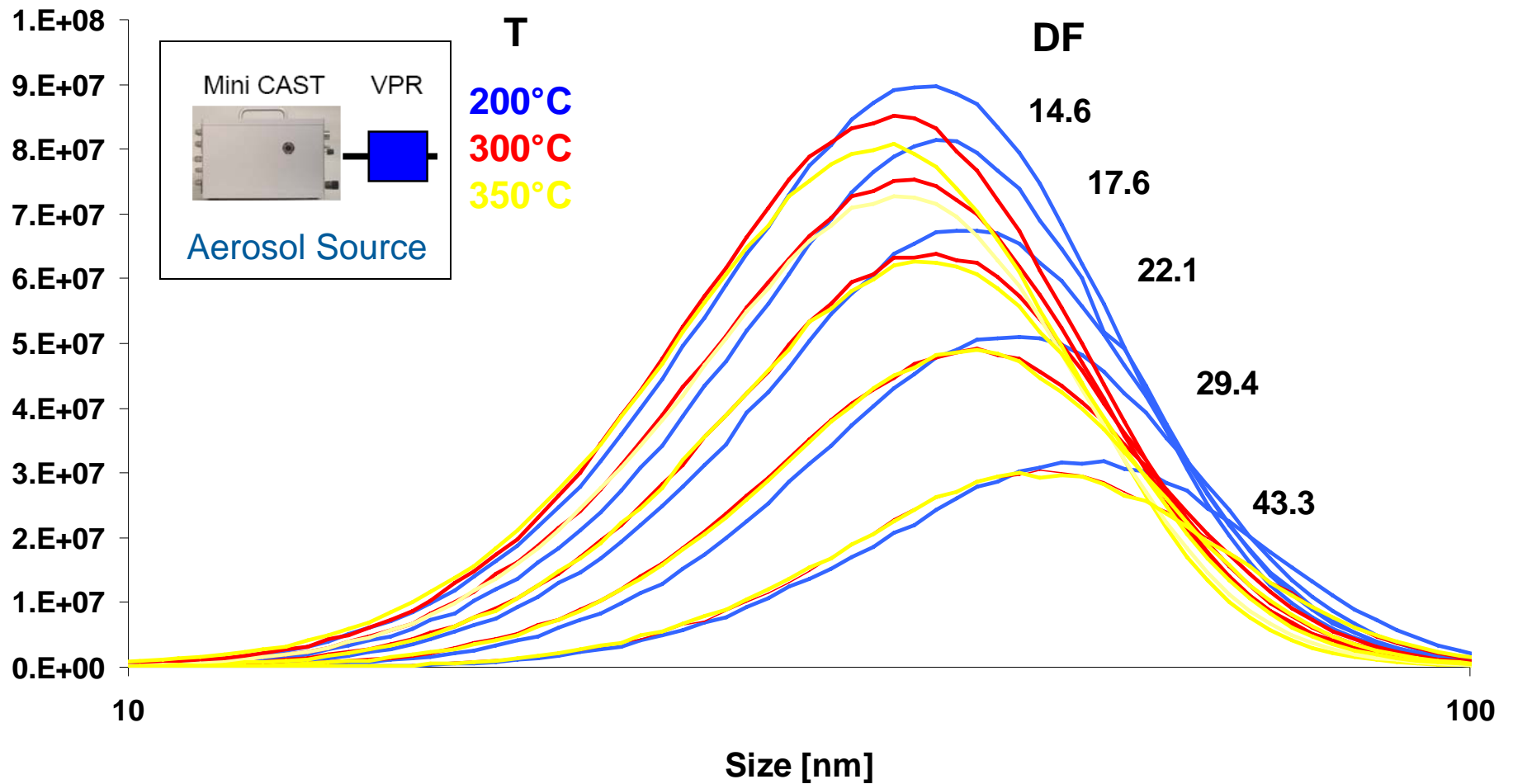
Step 2: Outlet concentrations



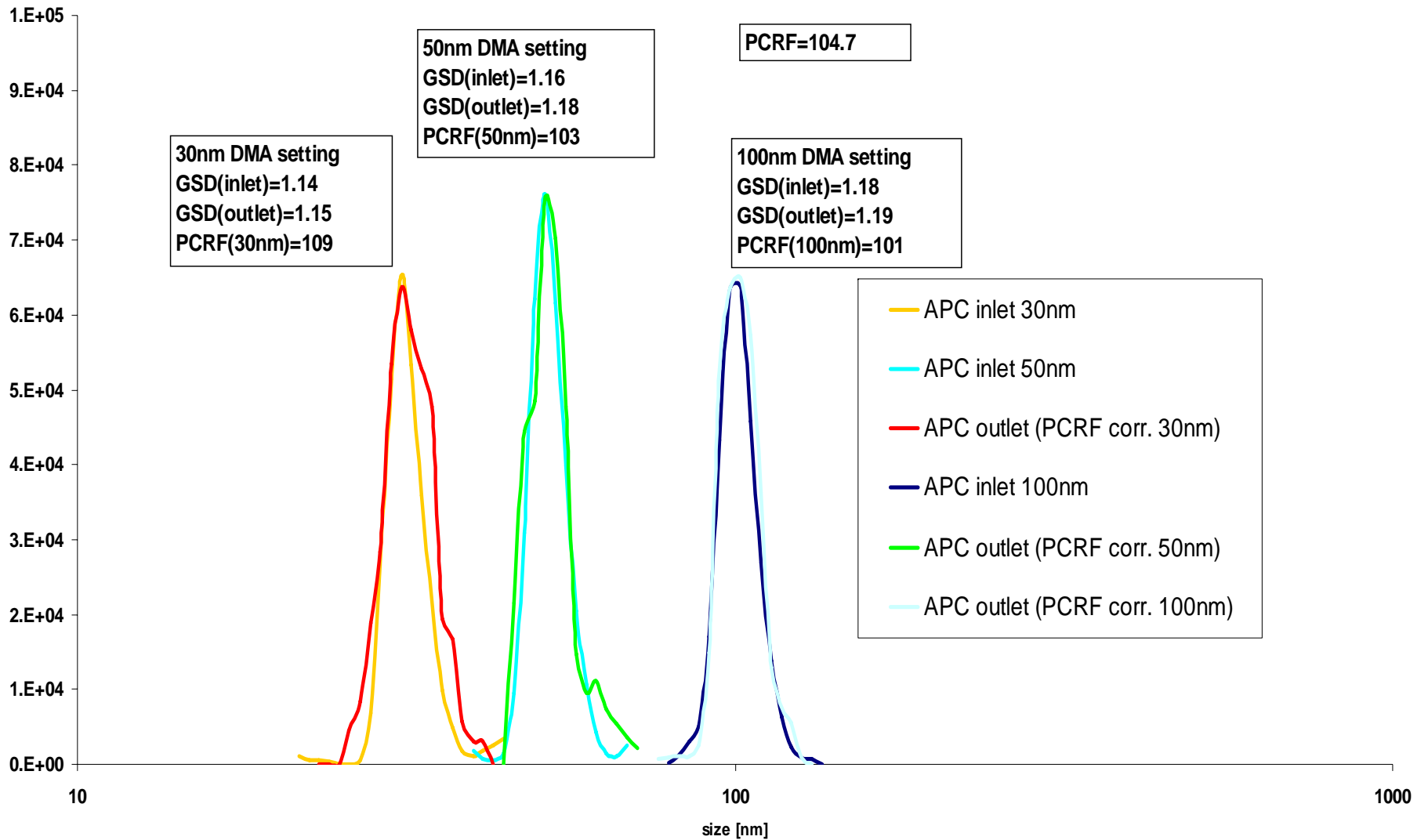
Flows and pressures are kept the same at step 1 and step 2!

Proof of Thermal Stability of the Aerosol

CAST Size Distributions after VPR with different T and DF settings

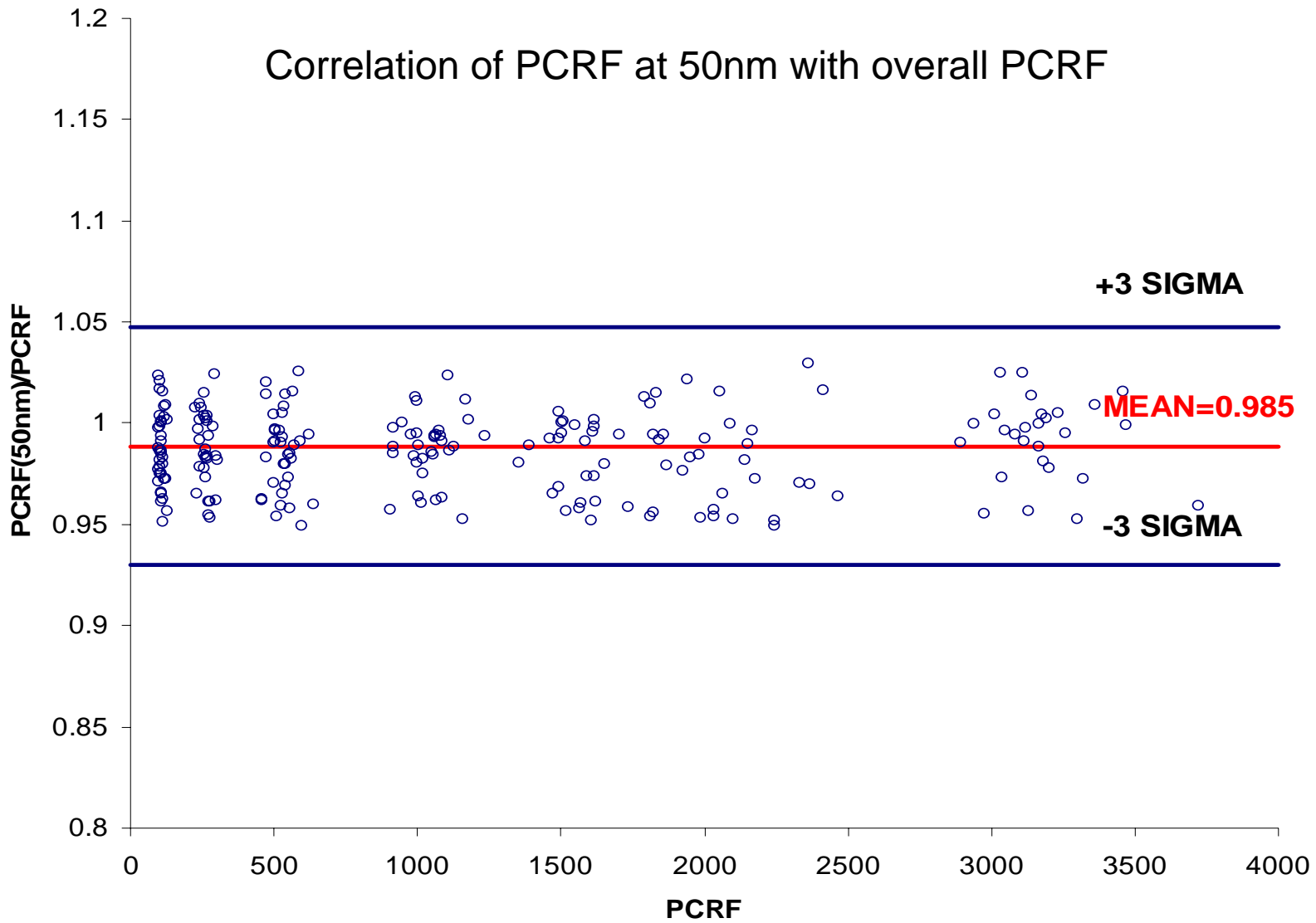


Proof of Particle Number Size distributions at the inlet and the outlet of the APC during Calibration





Calibration of 252 PCRFs with 60 AVL APCs





Conclusions

1. Use of thermally stable aerosols [up to the temperature of the ET (Evaporation Tube Setting)] is of major importance to perform meaningful PCRFB calibrations.
2. One way of generating thermally stable aerosols [up to the temperature of the ET (Evaporation Tube Setting)] is to use a CAST (Combustion Aerosol standard) with following thermal treatment and dilution [e.g. VPR, Catalytic Stripper, etc.].
3. Using CAST Aerosols fullfills the Calibration principle of „Similarity“
4. Experienced particle losses - when using thermally stable aerosols - agree nicely with predictions from aerosol theory.
5. Calibration of >250 PCRFBs for AVL APCs showed very repeatable results ($\pm 5\%$)
6. Simplification of the PCRFB Calibration could be achieved by using only Aerosols with approx. 50nm Mean Diameter and GSD of <1.4, resulting in compareable ($\pm 5\%$) calibration results.