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Usage of porous filter and salt solutions for the generation of constant particle concentrations

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Introduction and Motivation:

Particle counters – based on condensation counting or electrical detection methods – are used in many applications and their use is continuing to grow (e.g. PN-PTI, CEN/TS 17434:2020).

These particle counters are currently calibrated once a year. If deviations are detected, the measurement data generated over the year must be checked for plausibility and, in the worst case, may be unusable.

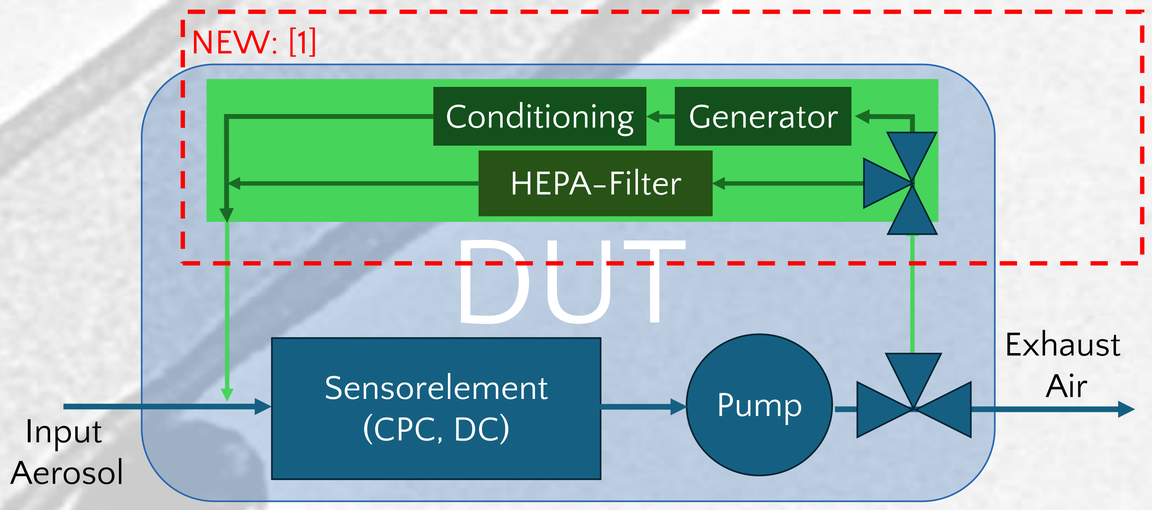
To avoid this, it makes sense to check these devices more regularly. A check could be carried out on site by hand at regular intervals using an external checking device or daily using an integrated low budget quick checker.

External checking devices are already available on the market (e.g., PKS100E for use with PTI).

In this poster, a **Mini Salt Particle Generator** will be presented that is suitable as a daily checker that can be integrated into the particle counter to perform automatic checks before each measurement.

Figure 1: Bubbling salt generator

Schematic Structure:



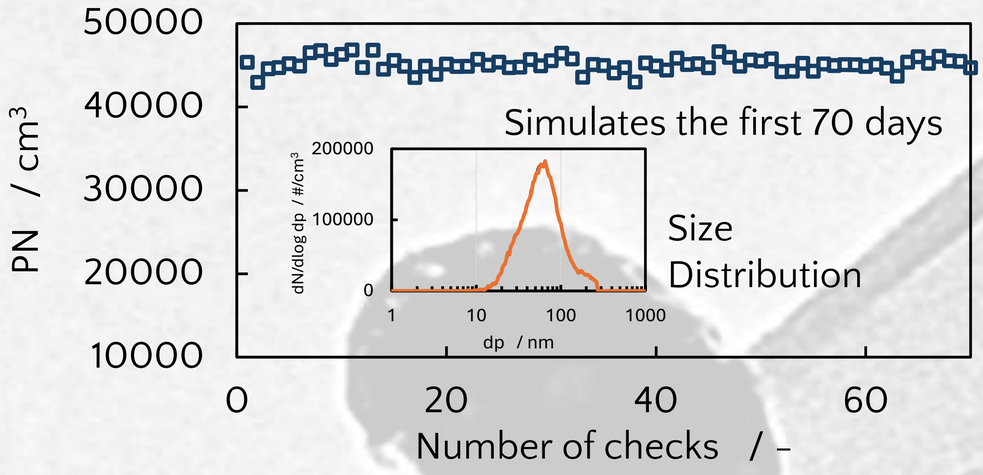
Advantages:

- No additional pump
- Checking the zero point and a defined end point

[1] Patent DE 102024139698.9 , Scale MT GmbH (Seifert, Schwanzer, Hartkopf)

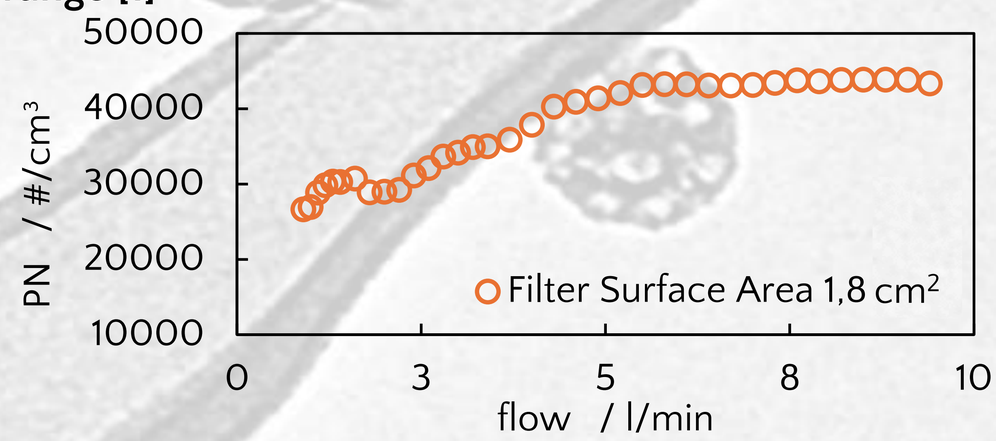
Results:

Long term stability measurements



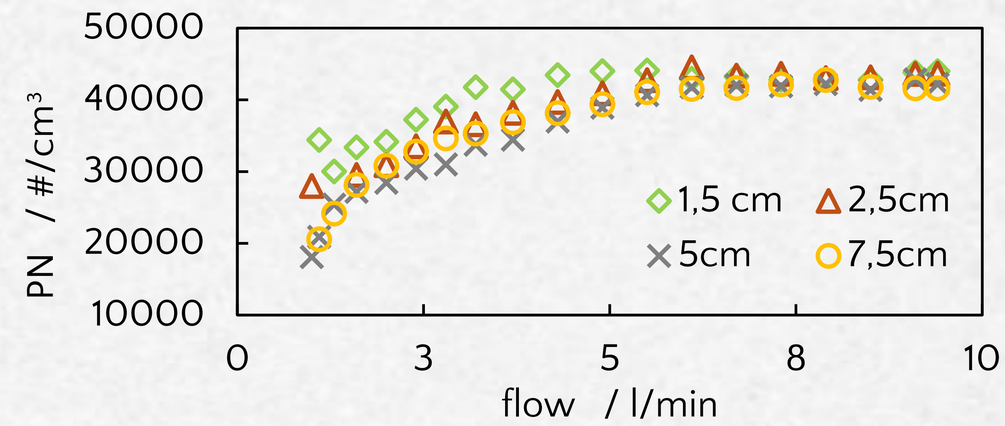
Without the necessity to renew the salt solution, the generated particle concentration and size distribution remains constant, as the consumption of the salt solution is very low.

The concentration generated is independent of the flow in a certain range [1]



For each filter there is a flow range, where the generated particle concentration is independent of the gas volume flow through the filter. This range is defined by the geometry and pore size of the filter.

Liquid filling level of the Mini-Salt Particle Generator [1]



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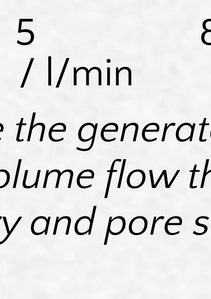

Conclusion:

- Scalable for different flow rates and target concentrations
- Long-term stable without fluid changes
- Low-cost solution, no need for additional generation pumps

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