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**Flowrate testing of the bag filter LANCS-BOP 6CPVC-1.5-2SPVC
(LANCS Industries) at 1 psig**

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ABSTRACT

The air flowrate through a flexible HEPA grade filter (Part LANCS-BOP 6CPVC-1.5-2SPVC www.lancsindustries.com) was measured at 48 ALPM for a differential pressure drop of 1.0 psig (28 inWC, 7.0 kPa). These filters are rated by the manufacturer to have a flowrate of 3 ALPM at a differential pressure drop of 1 inWC (0.25 kPa). The Los Alamos National Laboratory Aerosol Engineering Facility used one of their test rigs (originally developed to measure the pressure drop in capsule HEPA filters) to measure the airflow through the LANCS bag filter.



Figure 1. The LANCS-BOP filters are manufactured in standard diameters of 1.5 and 3.5 inches.

MATERIALS AND METHODS

The LANL (Los Alamos National Laboratory) AEF (Aerosol Engineering Facility) developed the CFMS (Capsule Filter Measurement System) to measure the pressure drop through capsule HEPA (High Efficiency Particulate Air) filters (Moore and Reeves 2013).

Pressure was measured with a Dwyer manometer (marked at 0.1" divisions). For flow measurements, a TSI model 4045 (SN 1129001) mass flowmeter was used, after its accuracy was checked with a dry gas meter (American Meter AC-250 SN 03D166212). All connections were leak tested according to AEF Leak Test Procedure RP2-RIC-77-R0.

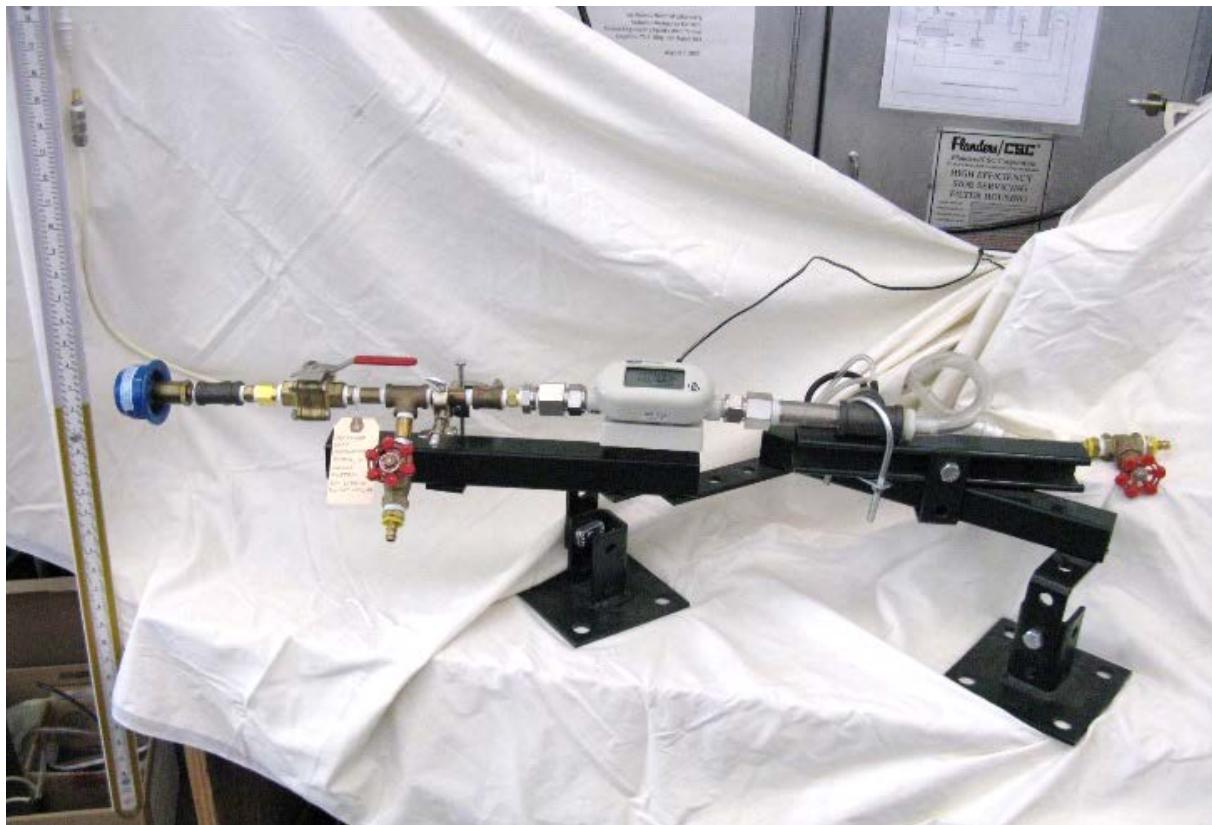


Figure 2. Capsule Filter Measure System (CFMS)



Figure 3. Pall Gelman capsule HEPA filter model 12144 (190 mm length).



Figure 4. The LANL FAS (Fixed Air Sampler) filter holder.



Figure 5. The LANCS bag filter was trimmed to 2.125 in (54 mm) diameter for the FAS testing.

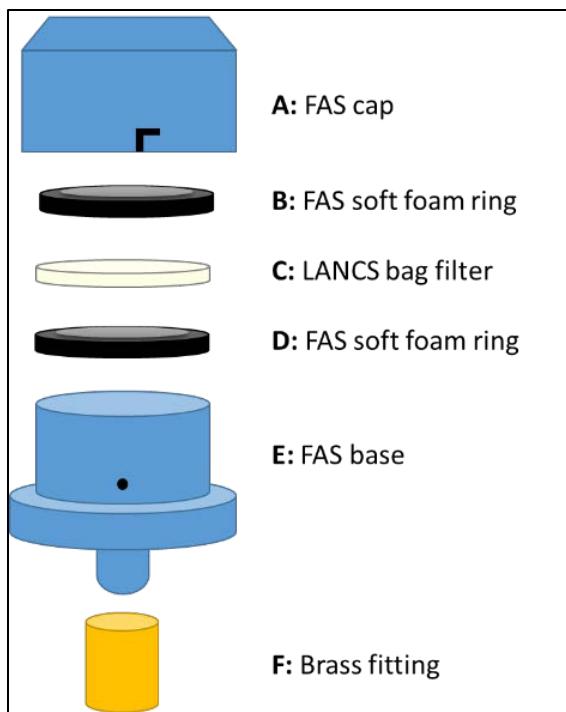


Figure 6. Two O-rings were placed on either side of the filter, since one O-ring allowed leakage.



Figure 7. For the 0.3 μm size channel with ambient aerosol, an optical particle counter measured an 86% bypass leakage with one O-ring in the FAS holder, and $1 \times 10^{-3}\%$ leakage with two O-rings.

RESULTS

The air flowrate through a flexible HEPA grade filter (Part LANCS-BOP 6CPVC-1.5-2SPVC www.lancsindustries.com) was measured at 48 ALPM for a differential pressure drop of 1.0 psig (28 inWC, 7.0 kPa).

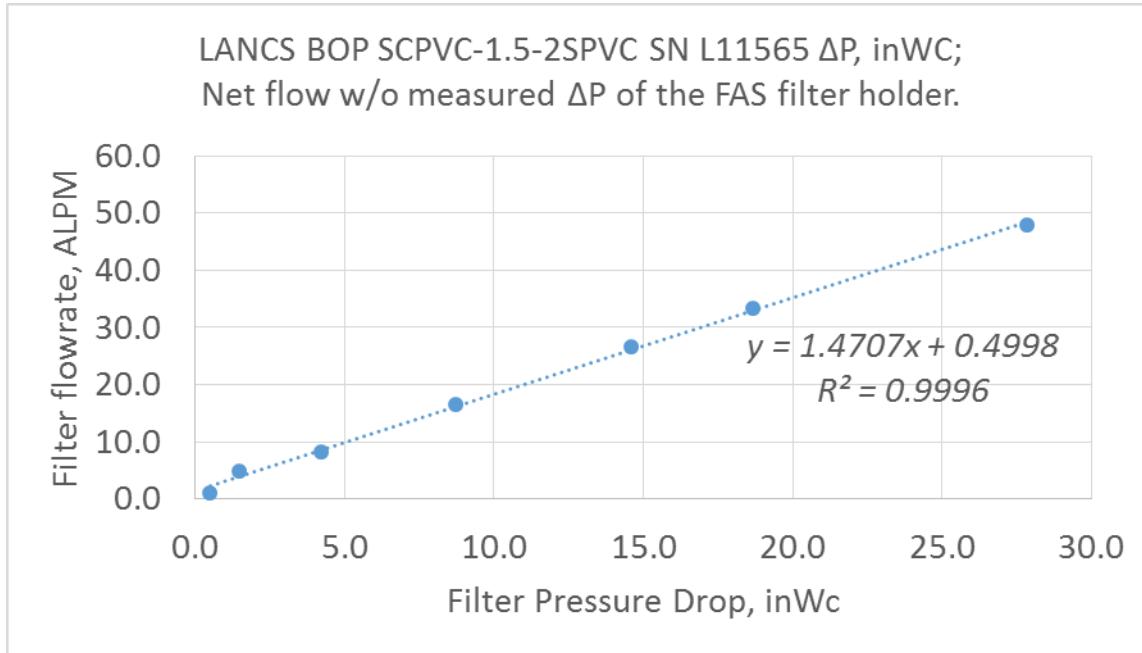


Figure 8. Graphical results of the testing.

Table 1. Tabular results.

LANCS BOP SCPVC-1.5- 2SPVC SN L11565 ΔP , inWC; Net w/o FAS ΔP	MetOne flow, Q_a , ALPM
0.5	1.0
1.5	4.8
4.2	8.3
8.7	16.5
14.6	26.6
18.7	33.4
27.9	47.8

REFERENCES

Medina E and Moore ME. 2009. Air Sampling using the LANL Designed Fixed Air Sampler. LA-UR-09-04881, Los Alamos National Laboratory. Annual student symposium.

Moore ME and Reeves, K. 2013. Filter Measurement System for Nuclear Material Storage Canisters - Midyear Report FY 2013 Los Alamos National Laboratory Report LA-UR-13-23323.