

S.E.A. 125-CBRN1 canister

Brief overview

The S.E.A. 125-CBRN1 canister, developed by The S.E.A. Group, is a combined gas and particulate filter that far exceeds the NIOSH CBRN CAP 1 requirements for gas service life.

The superior performance of the canister has been achieved without any significant increase in weight.

The canister carries NIOSH CBRN CAP 1 approval for use with both the SE40 CBRN positive-pressure demand PAPR (powered air purifying respirator) and the FP-C CBRN negative-pressure full facepiece respirator.

Increased lifespan, reduced costs

The canister has the following advantages:

- **Low resistance to air flow**

The large diameter of the canister means lower air flow resistance due to lower air speeds inside the canister. This in turn means longer battery life and higher peak flow rates for the SE40 PAPR, and noticeably lower breathing resistance for the FP-C APR.

- **Greater adsorption capacity**

This increased volume of carbon means longer service life, as well as greater resistance to breakthrough during sudden high peak flows (for example, during speech or at hard work). In fact, the canister exceeds the NIOSH high flow (100 lpm) service life requirement of 5 minutes by a factor of three (see Table 1).

- **Longer shelf life**

Heavy-duty vacuum packaging means a much longer shelf life.

Designed for real life

Prior to testing for gas service life and particulate efficiency, NIOSH submits canisters to rigorous environmental conditioning, including extremes of temperature, humidity and vibration, plus a drop test. The conditioning simulates extremes of storage, transportation and rough handling. Canisters are then tested against a series of CBRN gases. Entire respirators with canisters are also tested for resistance to chemical war agents mustard and sarin.

The 125-CBRN1 canister meets all these requirements with a greater margin than other CBRN filter cartridges on the market. Additionally, the canister has also been designed for human factors such as breathing patterns, speech, very high peak air flows and more. In short, the S.E.A. 125-CBRN1 filter cartridge is designed for outstanding performance in conditions no conventional laboratory test could simulate.

Particulate efficiency

The 125-CBRN1 canister contains an integrated particulate filter that is tested to an efficiency of 99.997%, far higher than the NIOSH CBRN requirement of 99.97%.

Figure 1: Pressure drop over the S.E.A. 125-CBRN1 filter cartridge in comparison with other brands

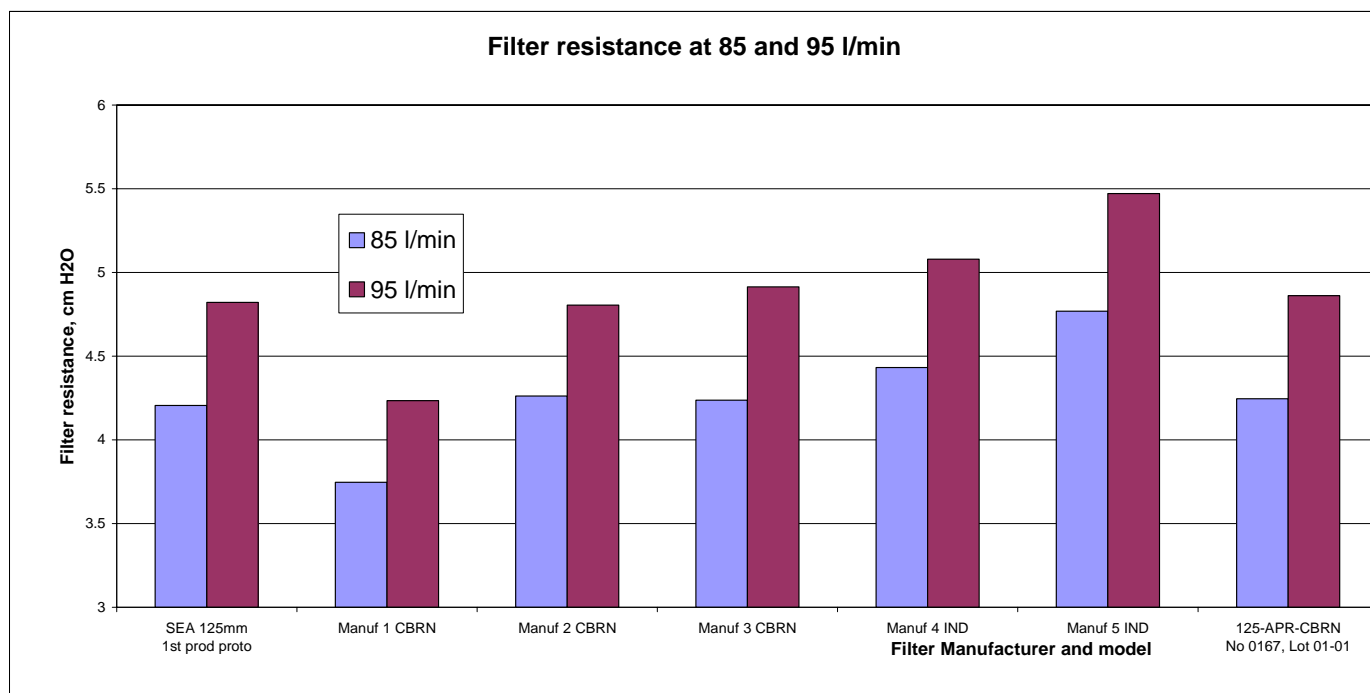


Table 1: 125-CBRN1 canister gas service life characteristics

Test agent	Test concentration (ppm)	Breakthrough concentration ⁶ (ppm)	Service life tests Flow rate 64 lpm (CBRN APR) ³ Temp 25C RH 25% and 80% (only worst result shown)			Service life tests, high flow Flow rate 100 lpm Temp 25C RH 50%		
			Minimum service life requirement (minutes)	Typical service life results 125-CBRN1 (new) (minutes ⁵)	Typical service life results 125-CBRN1 (conditioned ⁴) (minutes)	Minimum service life requirement (minutes)	Typical service life results 125-CBRN1 (conditioned ⁴) (minutes)	
			CAP1	CAP2			CAP1 and 2	
Ammonia	2,500	12.5	15	30	45	29 ⁵	5	17
Cyanogen chloride	300	2	15	30	Too high - not tested	175	5	>60 (test stopped)
Cyclohexane	2,600	10	15	30	Too high - not tested	50-60	5	41
Formaldehyde	500	1	15	30	Too high - not tested	217	5	>60 (test stopped)
Hydrogen cyanide	940	4.7	15	30	Too high - not tested	64	5	32
Hydrogen sulfide	1,000	5	15	30	Too high - not tested	>240 (test stopped)	5	>60 (test stopped)
Nitrogen Dioxide	200	1 ppm NO ₂ or 25 ppm NO [†]	15	30	49	41	5	18
Phosgene	250	1.25	15	30	Too high - not tested	>240 (test stopped)	5	>60 (test stopped)
Phosphine	300	0.3	15	30	Too high - not tested	>240 (test stopped)	5	>60 (test stopped)
Sulfur dioxide	1,500	5	15	30	51	31	5	18
† Sum of HCN (Hydrogen cyanide) and C ₂ N ₂ (Cyanogen)								
† Nitrogen Dioxide breakthrough monitored for both NO ₂ and NO. Breakthrough determined by which quantity, NO ₂ or NO, reaches breakthrough first.								
³ Test flow rate requirement for CBRN PAPR canisters is 57 lpm, but 64 lpm was used for all tests (more conservative)								
⁴ Environmental conditioning involves hot diurnal, cold constant, humidity, vibration and drop.								
⁵ Note that while the conditioned canisters failed to meet CAP2 for one gas only, new (ie: not conditioned) canisters perform better, and would meet CAP2.								
⁶ Service life is the time taken for the concentration downstream of the canister to exceed the "breakthrough concentration".								