

HEPA Filter Frequently Asked Question (FAQ)

“What is the life expectancy of a Biosafety Cabinets HEPA/ULPA filters?”

The life expectancy of any HEPA or ULPA filter within a biosafety cabinet (BSC) varies greatly with the following: Cleanliness of the laboratory, the total hours of cabinet operation and the nature of the work being performed. As filters load or become “dirty” with particles, the resistance to airflow increases, which subsequently increases fan capacity. The Class II Type A1 and A2 biosafety cabinets have an internal fan and balancing damper to compensate for supply and exhaust filter loading. The Class II Type B1 and B2 cabinets’ internal fan is used for supply filter loading compensation only, the exhaust airflow is dependent on the building exhaust capacity and therefore the building exhaust will have to overcome B2 exhaust filter resistance.

Regulatory requirements: As required by NSF/ANSI Standard 49, an internal fan must be capable of handling a 50% increase in pressure drop across the filter with no more than a 10% decrease in total air flow. Depending on the type of BSC, this test is simulated by applying an artificial load to the suction side of the fan increasing the pressure drop across it. After applying this artificial load, the total airflow delivery cannot decrease by more than 10% of the normal operating airflow total. The Baker Company’s new StediFlow design used in the SterilGARD HE product line has been validated to maintain constant airflow when a 250% filter loaded condition is applied. The BioChemGARD product line has been validated to maintain constant airflow when a 420% filter loaded condition is applied. This correlates to extended filter life reducing costly downtime and expensive filter replacement costs.

Field tests have been performed by The Baker Company in various biosafety cabinet settings to measure the typical life expectancy of these HEPA/ULPA filters. With the help of our customers, the following data was compiled in laboratory environments varying in air cleanliness.

Cabinet			Supply Filter					Exhaust Filter				
Cabinet Mfg. Date	Serial #	Location	Clean Filter Specification		Filter Loading results 10 years later. 10/26/2010		Percent Loading	Clean Filter Specification		Filter Loading results 10 years later. 10/26/2010		Percent Loading
			Res.	Flow	Res.	Flow		Res.	Flow	Res.	Flow	
9/26/2000	67777	n/a	0.73	550	0.877	550	16.8	0.42	425	0.475	425	11.6
7/17/2000	68299	n/a	0.78	550	0.8817	550	11.5	0.3	425	1.232	425	75.6
2/29/2000	67135	n/a	0.69	550	0.7104	550	2.9	0.47	425	0.499	425	5.8

Conclusion: The data above illustrates that after 10 years of use in a typical laboratory setting; the SterilGARD supply and exhaust filters have not increased substantially to warrant replacement of either filter. The exhaust filter test results on cabinet serial number 68299 show a substantial increase in resistance of 75.6 %. The cabinet’s airflow set point was within the acceptable velocity range and therefore did not require a filter replacement. When inspection on all used filters were conducted, the exhaust filter on cabinet serial number 68299 displayed heavy particle loading with “bridging” present. (Bridging is defined as heavy particle loading across the top of the filter media pleats). Based on this collective data, the life expectancy of the HEPA or ULPA filters in a SterilGARD III cabinet would most likely far exceed 10 years.