PROTECTING VACUUM SYSTEMS FROM CONTAMINATION WITH BIOHAZARDS

Overview

The use of vacuum to aspirate infectious liquids can result in generation of infectious materials or toxins and subsequent contamination of vacuum lines, pumps and centralized vacuum systems. These systems must be protected by liquid disinfectant traps and an in-line HEPA or 0.2 µm filter placed between the secondary flask and the vacuum source, as described below. A maintenance program for the regular inspection and replacement of in-line filters must be in place.

Vacuum Pump Set-Up

An aspirator bottle or suction flask is connected to an overflow collection flask containing appropriate disinfectant, and to an in-line HEPA or 0.2 µm filter as seen in Figure 1. This combination will provide protection to the central building vacuum system or vacuum pump, as well as to the personnel who service this equipment.
Inactivation of aspirated materials is accomplished by placing sufficient chemical decontamination solution into the flasks to inactivate the microorganisms as they are collected. Once inactivated, the liquids can be disposed of as noninfectious waste.

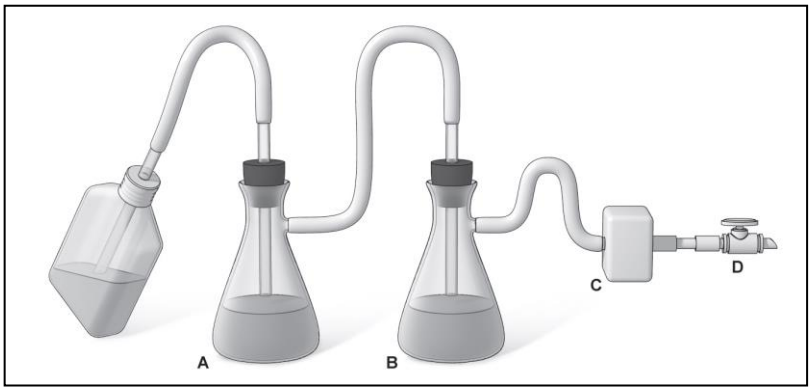

***Figure 1**: Flask (A) collects the contaminated fluids into a suitable decontamination solution; flask (B) also contains a suitable decontaminant and serves as a fluid overflow collection vessel. An in-line HEPA or 0.2 µm filter (C) protects the vacuum system (D) from aerosolized microorganisms or toxins.*

The filter (C) must be replaced at least bi-annually or whenever there is blockage/increased resistance. Several vacuum line protection filters are readily available from major scientific suppliers. See the example bellow:

***Figure 2:** Example of a laminated hydrophobically treated glass microfiber capable of retaining 99.97% of 0.3µm particles. It repels moisture and prevents bacterial growth.*

References:
Canadian Biosafety Standard, 2nd ed. (2015) Matrix 3.7.17
Canadian Biosafety Handbook (2016) Section 12.8
Biosafety in Microbiological and Biomedical Laboratories (BMBL) 5th Edition, CDC/NIH, 2009