



**ENVIRONMENTAL HEALTH  
AND SAFETY**

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**SAFETY GUIDELINE**  
**Vacuum Systems**

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Vacuum systems (centralized or single pump) are often used to help filter and collect liquid waste in research laboratories. It is critical that all vacuum systems are protected from potentially harmful biologicals, chemicals, and toxins.

According to the OSHA bloodborne pathogen standard, “Vacuum lines shall be protected with liquid disinfectant traps and high-efficiency particulate air (HEPA) filters of equivalent or superior efficiency and which are checked routinely and maintained or replaced as necessary.” The BMBL (Biosafety in Microbiological Laboratories), 5<sup>th</sup> Edition, addresses vacuum line protection when working in a Class II Biosafety Cabinet with biohazardous material, “Aspirator bottles or suction flasks should be connected to an overflow collection flask containing appropriate disinfectant, and to an in-line HEPA or equivalent filter.”

The combination of a membrane filter and collection flask will provide protection to the vacuum system/device, to the personnel who service this equipment, and will allow for the appropriate collection of waste. Inactivation of aspirated materials can be accomplished by placing a sufficient chemical decontamination solution into the flask to inactivate the microorganisms as they are collected. Once inactivation occurs, liquid materials can be disposed of as noninfectious waste.

UNMC recommends the use of an in-line, Millipore™ Millex™ filter (or equivalent – hydrophobic PTFE membrane) to protect vacuum lines from contamination and moisture damage. This type of filter also eliminates the need for an overflow flask.



Millipore™ Millex™ filters are available for purchase through UNMC's eShop (Fisher Scientific catalog #SLFA05010).

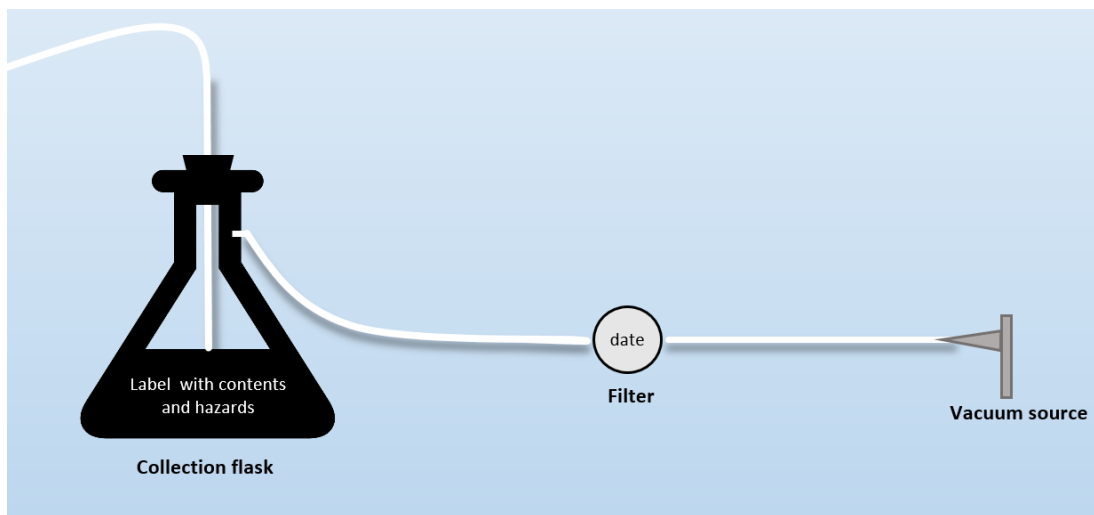


Figure 1: Line set-up (Shown outside of secondary containment for illustration purposes)

### **Vacuum Line Set-up:**

- Tubing should be of the appropriate size and thickness to prevent collapsing under vacuum pressure.
- The glass or plastic tube that is inserted into the rubber stopper of the filtering flask should extend at least 3 inches below the suction port on the side of the flask.
- Flasks and containers used within biosafety cabinets or fume hoods must be situated in a way that does not impede airflow/function of the cabinet.
- The collection flask should contain an appropriate amount of bleach (or another appropriate disinfectant) so that the final concentration is 10% disinfectant when the flask is full. Change disinfectant solutions as required. Refer to CDC guidelines for efficacy of diluted disinfectants.
- Flasks should be contained in a plastic tub or tray to allow for easy cleanup in the event of a spill or breakage.
- The filter should be changed regularly and disposed of as chemical or biohazardous waste, as appropriate. It is recommended that filters are changed annually or more often if there is evidence of a deficiency. Write the change date on the filter in an area that will not impede filter function.
- All containers must be clearly labeled with their contents and hazard labels, as needed.

### **Other considerations:**

In situations where vacuums are used for reduced pressure systems, weak points can pose implosion or explosion hazards. Personal Protective Equipment (PPE), such as face shields, goggles, etc. may be required to avoid potential injury from flying glass, splattering chemicals, and fire.

Clamp / stabilize all components of a vacuum system. Always inspect tubing, glassware, connections/clamps, and equipment before starting a vacuum line or system. Replace items that are degraded, cracked, thin, scratched, or otherwise compromised. Small defects can result in system failure or cause the glass to break.

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