

MANUALLY ASSEMBLED VACUUM ASPIRATION SYSTEMS FOR BIOHAZARDOUS MATERIALS

PURPOSE

Vacuum aspiration inactivates biologically hazardous liquid materials. The purpose of this procedure is to provide guidance on how to perform vacuum aspirations effectively.

OVERVIEW OF THE VACUUM PUMP ASSEMBLY

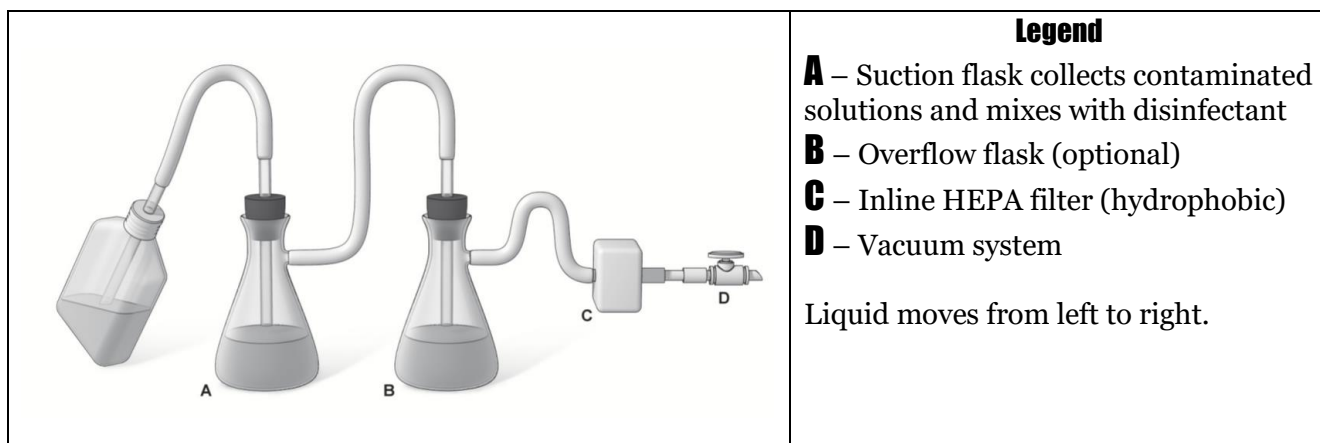


Figure 1: Basic aspirator set-up for biohazardous materials (reproduced from Biosafety in Biomedical and Microbiological Laboratories 5th edition, published by the Center for Disease Control)

When vacuum suction is applied, the media flows from the source container to the first flask (A). The first flask contains disinfectant. The second flask (B) is optional and is used as an overflow to protect the vacuum system. An inline HEPA filter (C) is placed just before the vacuum source to stop contaminated liquid from entering the vacuum system.

PROCEDURE

1. Assemble required materials

- Disinfectant (see step 2 for details)
- One vacuum flask (use plastic flasks as they minimize the potential for breakage)
Note: If overflow is a problem, you can put two flasks in a series
- Thick walled plastic tubing (prevents tubing collapse)
- Plastic serological pipets (not glass)
- Plastic aspiration pipets (not glass)
- Rubber stoppers
- Hydrophobic HEPA filter

2. Add disinfectant

Not all disinfectants are equal. Three parameters you must know and understand are the concentration, when the solution was prepared, and the contact time. For instance, if using bleach you must consider the following:

- The efficacy of bleach continuously diminishes over time. Diluted bleach loses its efficacy within 24 hours, meaning the fresher the bleach solution used the better.
- When determining how much bleach to put into a container, consider the maximum total volume of liquid being treated so the **final concentration** of bleach is known.
- If your solution is cloudy or has fuzzy material growing in it, the disinfectant is no longer effective.

3. Assemble the apparatus (see Figure 1)

- Use plastic and not glass serological pipets to connect tubing to rubber stoppers. Ensure the pipette is placed deeper than the sidearm discharge or there is potential that any liquid collected will be sucked into that sidearm instead of going into the bottom of the flask.
- Install the HEPA filter just before the vacuum port. Orient the filter so the inlet is on the fluid side and the outlet is on the vacuum side.
- Connect the working end of the tube to the plastic aspiration pipet in order to aspirate fluids from your samples. P1000 or P200 pipet tips are recommended for this purpose.
- Label the flask with a biohazard label.
- Place the vacuum flask in a secondary containment tray that has enough volume to hold the contents of the flask.

4. Operating the aspirator

- Affix a fresh sterile pipet tip to the plastic aspiration pipet. This helps maintain sterility.
- Monitor fluid levels and stop the process **before** the liquid reaches the end of the pipet. This prevents overflow or fluid leaking into the HEPA filter.
- When complete, aspirate a small amount of disinfectant through the tubing to help inactivate any materials within the tubing. Do this before disassembling.
- Ensure contact time is appropriate for the disinfectant chosen and material being inactivated. For bleach and cell cultures, give at least 30 minutes.

5. Check efficacy of decontamination

- Once the vacuum system is shutdown and the media or material is ready for disposal, plate the materials within the flask to ensure they are inactivated (monthly).
- Document your findings.

IS DRAIN DISPOSAL ALLOWED?

Drain disposal is not allowed if any of the following conditions exist:

- Efficacy of decontamination is not verified and documented (monthly).
- The media contains a chemical constituent other than the disinfectant.
- The media contains a radiological constituent.