



Glass Aspirator Bottles: Applications & Best Practices

TECHNICAL NOTE

Introduction

Aspirator bottles are specialized laboratory bottles that use a vacuum to facilitate the transfer, aspiration, or dispensing of liquids. By creating negative pressure inside the bottle using a vacuum source, liquid can be drawn out of the container without manual pouring, improving precision, reducing the risk of contamination, and eliminating the risk of spills and accidents.

Design

Bellco aspirator bottles are manufactured from 100% Type 1A borosilicate glass, which is resistant to chemical corrosion, withstands repeated vacuum applications, and can be autoclaved, dry heat sterilized, and depyrogenated. Each bottle features a bottom-mounted side arm for connecting tubing and can be modified with additional tubing side arms on the vessel. The glass can be supplied either clear or colored to protect light-sensitive solutions or supplied with an external PVC safety coating.

Aspirator bottles can be supplied in sizes ranging from 100mL to 150L. Standard neck formats accept standard rubber stopper sizes, but bottles can also be customized with a threaded neck to accept a leak-proof screw cap.

Advantages

Aspirator bottles provide several benefits to the user:

- They provide consistent and controlled liquid flow without the use of external fluid pumps, thus making the system simple and easy to use.
 - This allows them to be used when small volumes of liquids need to be removed or transferred, for example, in the case of small-volume cell culture work with Petri dishes, 96-well plates, etc.
- They significantly reduce the risk of spills and contamination compared to manual pouring
- Glass aspirator bottles offer durability and excellent chemical resistance for long-term laboratory use in a wide range of applications
- Glass aspirator bottles have a compact and stable design, minimizing tipping hazards during use.
- Glass aspirator bottles can be supplied with an external safety coating that protects the operators in the event of accidental breakage and may also retain the fluids to prevent spills.
- Glass aspirator bottles can be supplied with an external amber coating to protect light-sensitive solutions against photochemical-induced breakdown



Applications

Aspirator bottles are widely used in laboratories for:

- Transfer, dispensing, or aspiration of liquids with precise control, e.g.
 - Tissue culture media
 - Supernatants
 - Cell washing solutions
- Filtration and solvent removal during experiments
- Sample aspiration in analytical procedures
- Safe storage of reactive or volatile liquids due to their heavy-duty construction

System Set Up

Following "Best Practices," an Aspiration System for a laboratory would be comprised of the following components:

- A. A primary flask sized according to the liquid volumes being processed.
- B. A cap or a rubber stopper on the primary flask, with two ports for connection of flexible tubing
 - a. One port with a dip tube reaching 2/3 of the depth of the vessels
 - b. One port with a short tube that is attached to the inlet on the secondary flask
- C. A secondary flask for overflow protection of the primary flask; typically, this flask is either the same size or slightly smaller than the primary flask.
- D. A cap or a rubber stopper on the secondary flask, with two ports for connection of flexible tubing
 - a. One port with a dip tube reaching 2/3 of the depth of the vessels
 - b. One port with a short tube that is attached to the vacuum source
- E. A 0.2um pore size, hydrophobic filter positioned in the tubing line between the secondary flask and the vacuum.
- F. A vacuum source; typically, this is a vacuum pump, but maybe a house vacuum line.

Points to remember

- Check the liquid level in the primary flask frequently, depending on the frequency of use.
- When the fluid level reaches a maximum of $\frac{1}{2}$ of the volume of the primary flask, empty the flask, ensuring compliance with all local regulations for waste removal.
- Always have a second or overflow flask in the system between the primary flask and the vacuum source.
- If liquid is drawn into the overflow vessel, stop the process and empty both the primary and overflow vessels, ensuring compliance with all local regulations for waste removal.
- Ensure that the surface area of the hydrophobic filter is oversized compared to the air flow of the vacuum source.
- Check the hydrophobic filter regularly and replace it when needed.



References

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