

Vacuum Solutions for Scientists

How Much Vacuum Do I Need for the Filtration Process?



VACUUBRAND®

Vacuum filtration is a fundamental laboratory technique used to separate solids from liquids. One of the most common questions asked by new lab users is, “How much vacuum do I need?”

The optimal vacuum range for most lab filtration applications is typically between 100 and 300 millibars (mbar). This range provides an effective pressure differential between atmospheric pressure and the pressure inside the filtration flask, driving the filtration process without causing excessive evaporation of the filtrate.

Why is this range ideal?

- **Optimal Pressure Differential:** A greater pressure differential between atmospheric pressure and the flask’s pressure accelerates filtration. However, there is a balance to strike.
- **Evaporation Prevention:** Too much vacuum can cause the filtrate in the flask to evaporate, which can slow down the filtration process and potentially lead to sample loss. This is particularly important when working with volatile solvents or when concentrating samples.
- **Efficiency:** A vacuum of around 100 mbar provides approximately 90% of the maximum pressure differential available, ensuring efficient filtration without excessive evaporation.

Factors Affecting Vacuum Requirements:

- **Viscosity of the Filtrate:** More viscous liquids require higher vacuum levels to achieve efficient filtration.
- **Particle Size of the Solids:** Smaller particles may require higher vacuum levels for liquids to pass through the filter.
- **Filter Material:** The pore size and material of the filter can influence the required vacuum level.
- **Desired Filtration Rate:** If a faster filtration rate is needed, a higher vacuum level may be necessary.

Key Points for Successful Filtration

- **Equipment Compatibility:** Ensure that your filtration apparatus, tubing, and flask are rated for vacuum use.
- **Vacuum Limits:** Do not exceed the maximum vacuum specifications of your materials.
- **Vapor Pressure:** Avoid using a vacuum level lower than the vapor pressure of your filtrate to prevent evaporation.
- **Corrosive Materials:** Use a chemistry-rated vacuum pump when working with corrosive substances.

In conclusion, understanding the optimal vacuum range for your filtration process is crucial for achieving efficient and accurate results. By considering the factors mentioned above and following the guidelines provided, you can effectively optimize your filtration process in your laboratory.

VACUUBRAND Pumps Commonly Used for Filtration



[ME 1C chemistry diaphragm vacuum pump #20721103](#)



[ME 1 diaphragm vacuum pump #20721003](#)



[ME 4 C NT chemistry diaphragm vacuum pump #20731203](#)



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Find the right pump for your application with the Vacuum Pump Selection Guide

Header photo depicts a basic of filtration set-up with a Buchner funnel placed atop a Buchner flask with a vacuum pump connected to the side arm of the flask. The bottom of the funnel has either filtration paper or a membrane filter.