

Inlet Differences between Mobile Phase Filters and Sparging Filter Fittings - Tech Information

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Overview

Mobile phase inlet filters and sparging filters may appear similar at first glance, but they operate under very different mechanical and pressure conditions. These differences directly influence the type of fittings required and the way each component integrates with your solvent delivery system.

Understanding how inlet filters function under negative pressure versus how sparging stones and sparging filter elements behave under positive pressure ensures you choose the proper connection method for safety, performance, and reliability.

Fundamental Difference: Pressure Conditions

- Mobile phase inlet filters operate under negative pressure (vacuum or suction) created by the HPLC pump.
- Sparging filters—such as stainless-steel stones or sintered filter elements—operate under positive pressure, where gas is actively pushed into the solvent.
- This fundamental difference changes everything about how each filter should be connected.

Fittings for Mobile Phase Inlet Filters

Inlet filters used solely for mobile phase delivery are compatible with friction-fit connectors such as “Tripod” style push-in fittings.

These work well because:

- Negative pressure naturally holds the tubing in place
- There is minimal risk of tubing blow-off
- The system is not pressurized at the filter junction

Friction fittings should only be used on inlet filters and other negative-pressure applications.

Fittings for Sparging Filters and Stones

Sparging stones and sparging filter elements experience positive pressure, where gas is being driven into the liquid. Because of this, secure mechanical fittings are required, including:

- Nuts
- Ferrules
- Threaded compression fittings

These fittings prevent tubing from becoming dislodged under pressure, ensuring safe and consistent sparging operation.

Why the Fitting Type Matters

Positive-pressure sparging can easily force tubing out of a friction-fit connector, causing:

- Gas leaks
- Safety risks
- Loss of sparging efficiency
- Contamination or disturbance of the solvent reservoir

Therefore, sparging filters must always use mechanically secured fittings.

Negative-pressure inlet filters do not present this risk and can safely utilize simpler friction-fit connectors.

Pressure Limitation Consideration

The limiting pressure factor in sparging systems is typically not the sparging stone or filter itself, but the connections and fittings.

This makes proper fitting selection crucial for achieving safe, leak-free operation.

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