Maximum Flow Rate Considerations for Sparging Stones - Tech Information

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Overview

Understanding the flow behavior of sparging stones is essential for ensuring reliable operation in any gas-liquid system. While users often ask for maximum flow rate specifications, flow performance depends heavily on the solvent environment and system configuration.

This technical note explains why flow rate specifications are not published, clarifies the confirmed operating pressure rating, and outlines the variables that directly influence achievable flow in real-world situations.

Why Maximum Flow Rate Specifications Are Not Published

At this time, MICROSOLV does not provide maximum flow rate ratings for its sparging stones due to the significant variability introduced by different solvent compositions and viscosities. Each fluid behaves differently as it interacts with the porosity of the stone, making standardized comparative data unreliable.

For example:

- A low-viscosity solvent such as methanol may pass more readily through the pores.
- A high-viscosity liquid or buffered solution may restrict flow substantially.

Because of these fluid-dependent factors, no universal flow rate chart can accurately represent performance across all user applications.

Confirmed Operating Pressure Rating

Although no flow-specific values are provided, all MICROSOLV sparging stones are confirmed to support a maximum operating pressure of 1,000 bar under standard conditions.

This rating reflects the mechanical integrity of the stainless-steel sintered component—not the achievable flow rate through a specific liquid.

Primary Factors Influencing Flow Rate

Solvent Viscosity

Higher viscosity directly lowers flow rate by restricting movement through the stone’s micro-porous structure.
Examples of viscosity-dependent behavior include:

- Faster flow in water or low-viscosity organic solvents
- Slower flow in glycerol-containing mixtures or high-viscosity buffers

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Solvent Bottle Placement

The relative height of the solvent bottle to the pump affects gravity-assisted flow and hydrostatic pressure.

- Bottle above pump: Increases gravitational assistance, promoting better flow
- Bottle at pump level: Neutral effect
- Bottle below pump: May restrict flow or promote bubble formation

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Degassing Status of the Solvent

Poorly degassed solvents often form bubbles in the solvent line after filtration or sparging. This disrupts uniform flow and can introduce pulsation, cavitation, or pressure fluctuations.

Proper degassing stabilizes hydraulic behavior and ensures more predictable flow characteristics.

Practical Notes for Users

To optimize real-world performance:

- Use degassed solvents to reduce bubble-related flow disruption
- Consider pre-warming viscous solvents for improved flow
- Avoid unnecessary tubing elevation changes
- Ensure connections are secure to prevent flow restriction or air ingress

Flow rate should always be evaluated under actual working conditions rather than assumed from generalized specifications.

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