Pressure Rating Maximum for the 2.1 mm PEEK HPLC Column Hardware - Tech Information

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Maximum Pressure Rating for 2.1 mm PEEK HPLC Columns

Introduction

PEEK (polyether ether ketone) HPLC columns offer a metal-free alternative to stainless-steel hardware, making them well-suited for applications requiring inert sample contact surfaces—particularly when analyzing proteins, peptides, metal-sensitive compounds, or corrosive buffers.

Understanding the pressure limitations of PEEK hardware is essential for ensuring safe operation and preventing damage to both the column and the instrument.

Recommended Pressure Limits for Routine Operation

During standard analytical use, the maximum recommended operating pressure for a 2.1 mm ID PEEK HPLC column is:

- 165 bar (2400 psi)
  This limit ensures that the polymeric hardware maintains structural stability while preserving column efficiency over its lifetime. Operating within this pressure range prevents swelling, deformation, or micro-fracturing of the PEEK tubing.

Short-Term Pressures During Column Packing

While routine use is capped at **165 bar,** higher pressures may be tolerated briefly under controlled packing conditions.

- Maximum short-term packing pressure: approximately **250 bar (3600 psi)**

This elevated pressure is only applied during the packing of stationary phase material and should not be used during normal operation. Pushing PEEK beyond its routine rating in daily use risks hardware failure, leaks, or compromised column performance.

Practical Considerations for Using PEEK Columns

To maintain column longevity and ensure safe operation:

- Avoid sudden pressure spikes caused by rapid solvent changes or abrupt flow-rate increases.
- Verify that system backpressure does not approach the maximum limit during high-viscosity or high-flow methods.

- Confirm compatibility of mobile phases—some solvents may soften or swell PEEK at elevated pressures.
- Periodically inspect fittings and tubing for signs of stress or deformation.
  Following these guidelines helps protect the structural integrity of the PEEK hardware and ensures reproducible chromatographic performance.

Conclusion

A 2.1 mm ID PEEK HPLC column is designed for routine operation up to **165 bar (2400 psi)**, with short-term exposure up to **250 bar (3600 psi)** limited to the manufacturing packing process.

Staying within the recommended pressure range is crucial for maintaining column performance and preventing damage to the PEEK hardware.

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