

Pressure Ratings for PEEK Fittings, Unions, and Tubing - HPLC Primer

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Overview

PEEK is widely used in HPLC fluidic systems due to its chemical resistance, flexibility, and ease of use. However, its pressure performance varies depending on the component (fitting, union, or tubing), solvent conditions, and temperature.

MICROSOLV provides general guidance rather than fixed ratings because several variables influence pressure stability.

Pressure Ratings for PEEK Fittings and Unions

General Rating

- Many HPLC PEEK fittings, including tubing connectors, male nuts, and unions, are rated up to 6,000 psi when used with finger-tight nuts.

Important Considerations

- Ratings assume proper installation and appropriate ferrule engagement.
 - Over-tightening may cause deformation, lowering pressure capability.
 - Misalignment or damaged tubing ends can reduce pressure tolerance.
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Pressure Ratings for PEEK Tubing

Back Pressure Is Variable

PEEK tubing does **not** have a single universal pressure rating.

Back pressure depends on:

- Flow rate
- Solvent density
- Temperature
- Tubing inner diameter and length
- Overall system setup

Burst Strength

- Burst pressure varies with tubing dimension and grade; PEEK tubing has well-documented size-specific limits.
- The tubing itself may fail before the fitting or union when operating near high-pressure limits.

Temperature Dependence

- PEEK becomes less mechanically stable as temperature increases, reducing allowable working pressure.
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Practical Guidelines for Users

To Maximize Pressure Performance

- Use the smallest feasible ID to reduce stress from flow-related back pressure.
- Avoid elevated temperatures when working near pressure limits.
- Choose carbon-PEEK (Endure™) or stainless-steel fittings if high pressure or heat is expected.
- Confirm that all system components—tubing, fitting, ferrule, union—have compatible ratings; the weakest component determines the system limit.
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