Minimum Bend Radius for PEEK Tubing Recommendation - HPLC Primer

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Overview

PEEK tubing is valued for its flexibility, chemical resistance, and mechanical stability in HPLC systems. However, bending the tubing too tightly can cause kinking, internal restriction, cracking, or reduced pressure performance.

Knowing the minimum safe bend radius ensures optimal instrument performance and consistent flow.

Minimum Bend Radius for PEEK Tubing

Recommended Bend Radius

- The smallest recommended bend radius for PEEK tubing is 25 mm, which corresponds to a 50 mm (2 inch) bend diameter.

General Specification

- MICROSOLV's PEEK tubing specifications also state a minimum bending radius of < 50 mm as a design guideline for our tubing.

These two details are consistent: the functional guidance is that bends should not be tighter than a 25 mm radius, which matches the "< 50 mm" general specification.

Why Bend Radius Matters

Potential Problems if Bent Too Tightly

- Kinking, leading to flow restriction
- Dead-volume changes affecting chromatography
- Pressure drop or flow instability
- Cracking or weakening of the tubing wall
- Reduced pressure rating, especially at elevated temperatures

Maintaining the minimum radius prevents internal deformation and helps the tubing retain its structural and pressure-handling integrity.

Practical Usage Recommendations

Best Practices

- Allow natural curved routing rather than forcing sharp bends.

- Use longer tubing paths if needed to maintain safe radius.
- When coils or bundling are required, choose loop sizes ≥ 5 cm (2 inches).
- Avoid bending the tubing at fittings or near ferrules where stress is concentrated.
- Replace tubing immediately if any flattening or whitening occurs along a bend.

Factors That Can Influence Bend Performance

- Tubing ID and OD (smaller IDs kink more easily)
- Temperature (PEEK softens as temperature increases)
- Solvent compatibility (some solvents reduce flexibility)

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