Temperature Maximum for PEEK HPLC Column Hardware - Tech Information

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Maximum Recommended Operating Temperature for PEEK HPLC Column Hardware

ARE-Applied Research brand All-PEEK HPLC column hardware is designed to withstand moderately elevated temperatures, but like all polymer-based hardware, its performance and safety margins depend strongly on operating conditions.

The maximum recommended operating temperature is approximately 200 °C for column sets such as the 49334-05 hardware configuration.

However, users should understand that this is an upper theoretical limit, not a universally safe temperature. In practical chromatography work, the allowable temperature may be considerably lower due to interactions between temperature, pressure, and solvent properties.

Temperature Limitations and Real-World Considerations

1. The 200 °C Rating Is an Approximate Maximum

Although the All-PEEK hardware can tolerate temperatures near **200 °C**, factors such as solvent composition, system pressure, mobile-phase volatility, and sample chemistry may require operation well below this ceiling.

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2. Solvent Behavior at High Temperature

As temperature increases, many mobile phases—especially those containing volatile or flammable solvents—exhibit:

- Rapid increases in vapor pressure
- Accelerated evaporation
- Lower flash points

This can lead to bubble formation, flow instability, or hazardous internal pressure conditions. Users must evaluate solvent stability before operating at elevated temperatures.

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3. Combined Temperature & Pressure Effects

High temperature amplifies the mechanical load on PEEK hardware when pressure is applied. The manufacturer specifically notes that temperature and pressure together pose greater risk than temperature alone, and users should adjust expectations accordingly.

In other words, a system operating near its pressure limit should not simultaneously approach the maximum temperature rating.

Recommended User Precautions

- Review solvent physical properties at elevated temperature
- Lower temperature limits when using flammable or highly volatile organic modifiers
- Ensure the system has adequate pressure relief
- Conduct method development at incremental temperature steps, not all at once
- Never assume the 200 °C limit applies universally—evaluate each method individually

Conclusion

The ARE-Applied Research All-PEEK HPLC column hardware is rated for temperatures up to ~200 °C, but actual safe operating temperatures depend on:

- Solvent system behavior
- System pressure
- Column dimensions
- Overall application risk profile

For reliable, long-term performance and safe operation, users must consider all of these variables before choosing a temperature set point.

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