Resolution Test Mixture Purpose in the Qualification Kits - Tech Information

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The Resolution Test Mixture (RTM) included in the "Do It Yourself", Chemical Solutions Qualification Kits serves a critical dual purpose in HPLC system evaluation:

1. Similar to a System Suitability Check

The RTM acts as a quick verification tool to ensure:

- The mobile phase has been prepared correctly
- The HPLC system is functioning within expected parameters
- The test column is still viable and has not degraded significantly

While a single-component standard like caffeine could be used for a basic check, the RTM provides a more robust and informative assessment by incorporating multiple analytes with varying retention and separation characteristics.

2. Quantifying System Variance

By analyzing multiple peaks in the RTM, users can:

- Graph total observed variance across peaks
- Deconvolute column variance from extra column variance (ECV) using linear regression
- Determine the intercept of the variance vs. retention time plot, which corresponds to the extra column variance

This analysis is particularly valuable for understanding how your system's plumbing and hardware affect performance. For example:

> On many Agilent 1100/1200 systems, the typical extra column variance is around 120 μL^2 (equivalent to a standard deviation of ~11 µL). This is acceptable for standard 4.6 mm ID columns but may be too high for narrow-bore 2.1 mm columns, where dispersion effects are more pronounced.

In contrast, older or poorly maintained systems may exhibit extra column variances as high as 800–900 μL^2, making them unsuitable for high-efficiency or small-format columns.

Why This Matters

Understanding and quantifying ECV helps you:

- Select the right column dimensions for your system
- Optimize tubing and fittings to reduce dispersion
- Ensure your system is suitable for high-resolution or fast-gradient methods

The RTM is a powerful diagnostic tool that goes beyond basic qualification—it helps you characterize your system's true performance envelope.

📦 Click ***HERE*** for PQ and HSQ Kit™ ordering information and images.

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