Thermo Scientific Vanquish UHPLC System

How Solvent Delivery Technology Can Improve Confidence in Peak Identification and Quantification

Product Spotlight

The Thermo Scientific™ Vanquish™ UHPLC system was developed to offer more pressure capabilities than ever before, without any compromise on durability and robustness. From ultra-fast to extremely shallow gradients, at pressures up to 1500 bar, the system provides the ability to unveil more compounds than ever before. The solvent delivery technology always provides unmatched retention time reproducibility and the lowest baseline noise for the highest detection sensitivity. The tool-free operation makes the system easier to use and a joy to work with.

Peak Identification — Retention Time Reproducibility

With the higher pressure capabilities of the Vanquish UHPLC system, the use of very long columns and column chains with sub-2 micron particles are no longer a challenge. Thus peak capacities beyond the common UHPLC range are now achievable, and even more complex matrices can be resolved. Additionally, this enhances requirements for reliable peak identification, with regards to higher retention time reproducibility, to maintain the level of data quality.

The Vanquish system utilizes the industry-leading fourth generation SmartFlow™ pumping technology, which is highly optimized to provide unmatched retention time reproducibility under any working conditions. This can be achieved due to its unparalleled flow accuracy and precision provided by nanometer piston motion control. This harmonization of pumping control and smart fluidics ensures exceptional gradient accuracy and precision and sharpest gradient profile formation at lowest gradient delays.

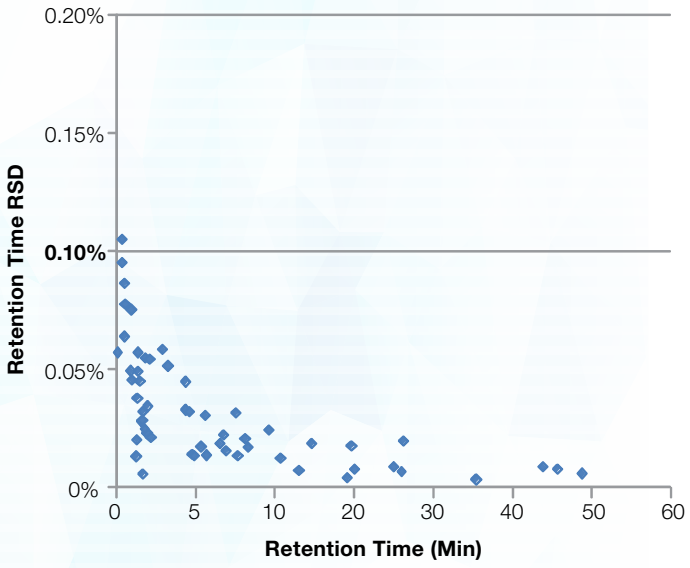

Figure 1. Retention time precision for several gradient applications (n=7 for each application) of Active Pharmaceutical Ingredient (API) and Traditional Chinese Medicine (TCM).

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Quantification — Pulsation and Baseline Noise

Compressing solvents to the system pressure will heat them up. This becomes more pronounced as the system pressure increases. Immediatly after heating, the solvents will start to cool again to ambient temperature in the connection tubing. This cooling results in volume reduction and causes pressure pulsation, leading to flow and solvent compositional fluctuations pulsation. In the case of different extinction coefficients of the solvents this can become visible by UV detection, resulting in characteristic baseline ripples. These baseline ripples can significantly decrease the limit of detection (LOD).

The Vanquish system utilizes fourth generation SmartFlow pumping technology and Adaptive Thermal Effect Compensation (ATEC™), a state-of-the-art compensation of thermal effects caused by compression heat and solvent cool down at ultra-high system pressures. It ensures the lowest pulsation at up to 1500 bar system pressure, independent of mobile phase composition. Together, with the fully automated compressibility compensation, the solvent delivery consistently provides unmatched performance.

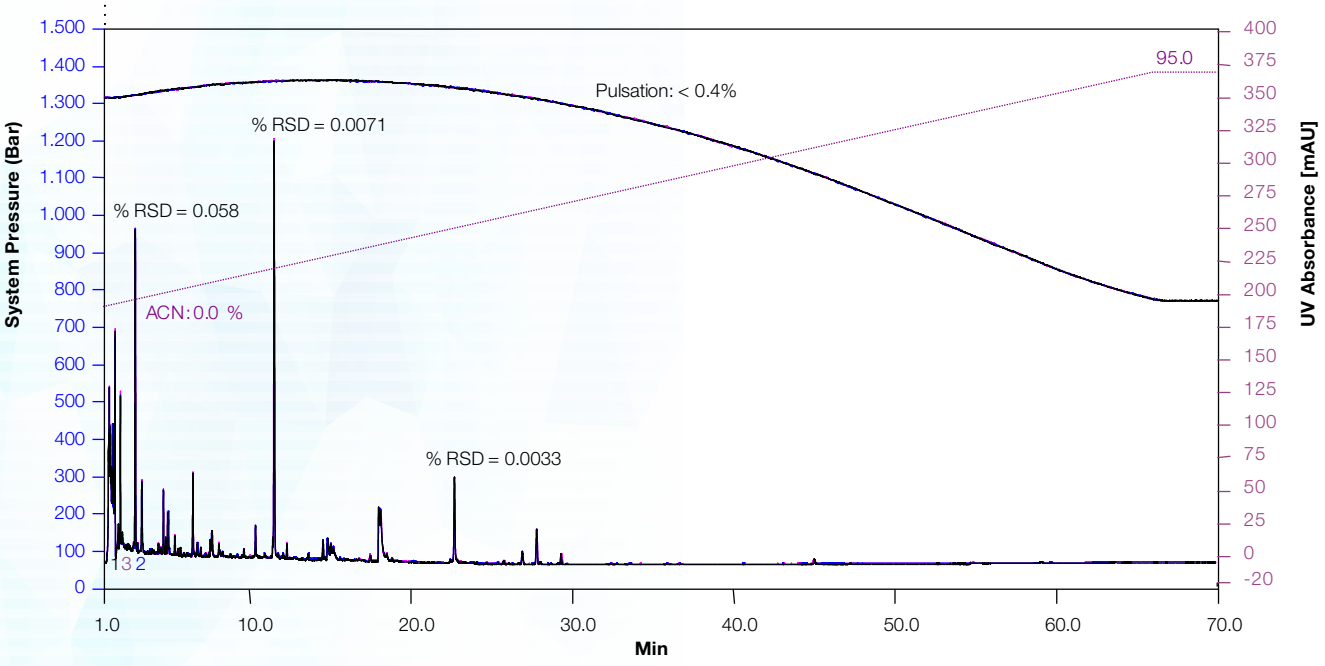

Figure 2. Ultra-high resolution generic screening of an unknown TCM sample at 1350 bar.The overlay of 7 replicates shows outstanding retention time reproducibility.

Learn more at thermoscientific.com/vanquish

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