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SIELC

PVP HPLC Column

High-performance separation. Precision in every run.

RELIABLE PVP ANALYSIS STARTS HERE

Accurate and reproducible analysis of polyvinylpyrrolidone (PVP) has long posed a challenge due to its complex polymeric structure and variable molecular weight.

> **The new HPLC column is specifically engineered to meet these analytical demands, providing unmatched performance for PVP and related compounds.**

Whether monitoring polymer purity, studying degradation profiles, or performing quality control in pharmaceutical and industrial applications, this innovative column delivers the performance and reliability required for critical analyses.

> **Polyvinylpyrrolidone (PVP), also known as povidone, is a water-soluble polymer extensively utilized in pharmaceutical, cosmetic, food, and industrial applications.**

Known for its excellent binding, film-forming, and solubilizing properties, PVP plays a crucial role in formulations such as tablets, eye drops, adhesives, and coatings. Its molecular weight varies significantly depending on the application, necessitating precise analytical characterization. Accurate profiling of PVP's molecular weight distribution, purity, and potential impurities is essential to ensure product quality, consistency, and regulatory compliance.

COMMON CHALLENGES WHEN ANALYZING PVP

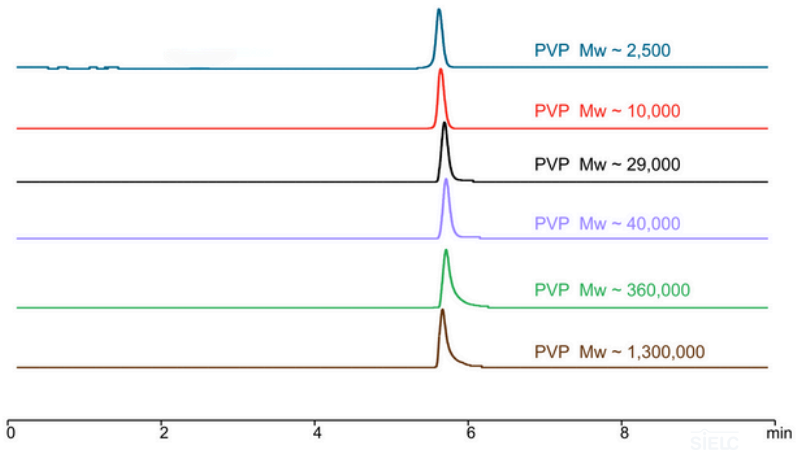
Extremely difficult to elute – Due to its amphiphilic nature, PVP can strongly interact with both polar and nonpolar stationary phases. This dual affinity often results in irreversible binding, making complete elution one of the biggest challenges in HPLC analysis.

Broad, tailing peaks – Due to its polymeric nature, PVP often produces diffuse peaks with poor shape, especially at higher molecular weights.

Sample adsorption or carryover – PVP can bind strongly to column surfaces or remain trapped.

Conformational flexibility complicates separation – PVP can shift its conformation depending on the solvent environment, appearing more polar in aqueous media and more hydrophobic in organic-rich phases — leading to inconsistent retention behavior.

PVP ANALYSIS

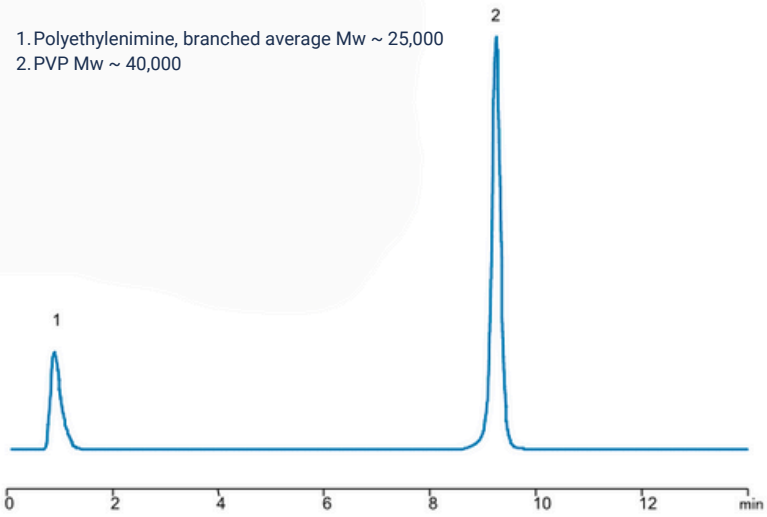


Column: PVP
Column size: 2.1 × 50 mm, 5 µm, 100A
Column part number: PVP-21.050.0510
Mobile phase: Step gradient from H_2O/MeCN (100:0) to H_2O/MeCN (50:50) after 2 minutes
Buffer: Ammonium Acetate pH 4.0 - 20 mM
Flow rate: 0.4 ml/min
Detection: ELSD, the nebulizer and evaporator temperatures 40°C, with a gas flow rate of 1.6 Standard Liters per Minute (SLM)
Concentration: 1.0 mg/ml
Injection Volume: 5 µL
Diluent: MeCN/H_2O - 50/50%
Limit of Detection: PVP 2 ppm

A stationary phase specifically designed for PVP polymer analysis enabled efficient separation with consistent and reproducible results, featuring sharp peak shapes and minimal adsorption. The method demonstrated robust performance across a broad molecular weight range, making it suitable for both low- and high-molecular-weight PVP. The optimized stationary phase effectively accommodated the unique properties of polymers such as PVP, supporting reliable retention behavior and overall method performance.

A key feature of this method is the use of step-gradient elution. Due to the amphiphilic nature of PVP, a sudden change in the mobile phase—from fully aqueous to a mixed acetonitrile/water system—facilitates rapid desorption and complete elution. This sharp polarity shift disrupts strong interactions with the stationary phase, preserving peak integrity and ensuring reproducibility. As a result, the method is well suited for accurate polymer analysis in both research and quality control settings.

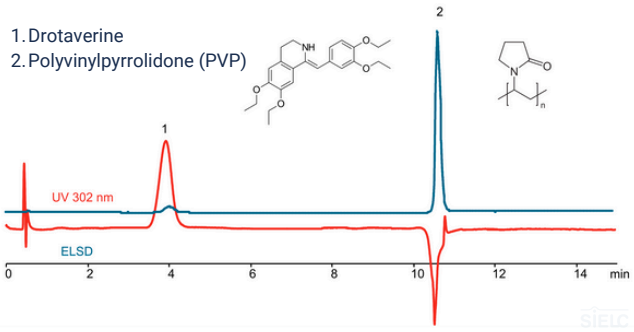
Column: PVP
Column size: 2.1 × 50 mm, 5 µm, 100A
Column part number: PVP-21.050.0510
Mobile phase: Step gradient from H_2O/MeCN (100:0) to H_2O/MeCN (50:50) after 2 minutes
Buffer: Ammonium Acetate pH 4.0 - 20 mM
Flow rate: 0.4 ml/min
Detection: ELSD, the nebulizer and evaporator temperatures 40°C, with a gas flow rate of 1.6 Standard Liters per Minute (SLM)
Concentration: 1.0 mg/ml
Injection Volume: 5 µL
Diluent: H_2O
Limit of Detection: PEI - 1.7 ppm, PVP - 0.5 ppm



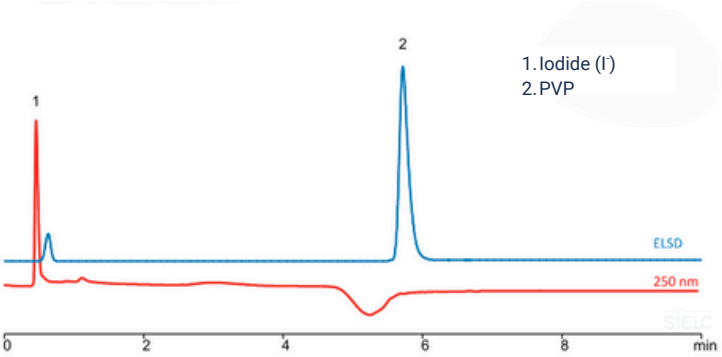
PVP ANALYSIS

PVP is widely used in pharmaceutical and personal care products, and the column is specifically engineered to efficiently handle both raw polymer and formulated mixtures.

In the first example (top), povidone-iodine—a common antiseptic formulation in which PVP is complexed with iodine—is analyzed. Using a step-gradient method, the specialized stationary phase provides excellent retention of PVP and effective separation from free iodide, enabling accurate detection of the polymer component.



Column: PVP
Column size: 2.1 × 50 mm, 5 µm, 100A
Column part number: PVP-21.050.0510
Mobile phase: Step gradient from H_2O/MeCN (2:98) to H_2O/MeCN (50:50) after 6 minutes
Buffer: Step gradient Ammonium Acetate pH 4.0 from 2 mM to 20 mM after 6 minutes
Flow rate: 0.4 ml/min
Detection: ELSD, the nebulizer and evaporator temperatures 40°C, with a gas flow rate of 1.6 Standard Liters per Minute (SLM)
Concentration: Drotaverine - 0.8 mg/ml
Injection Volume: 5 µL
Diluent: MeCN/H_2O - 50/50%
Limit of Detection: Drotaverine 200 ppb



Column: PVP
Column size: 2.1 × 50 mm, 5 µm, 100A
Column part number: PVP-21.050.0510
Mobile phase: Step gradient from H_2O/MeCN (100:0) to H_2O/MeCN (50:50) after 2 minutes
Buffer: Step gradient Ammonium Acetate pH 4.0 from 2 mM to 20 mM after 2 minutes
Flow rate: 0.2 ml/min
Detection: ELSD, the nebulizer and evaporator temperatures 40°C, with a gas flow rate of 1.6 Standard Liters per Minute (SLM)
Concentration: 1.0 mg/ml
Injection Volume: 5 µL
Diluent: MeCN/H_2O - 50/50%
Limit of Detection: PVP 2 ppm

In the second example (bottom), PVP is detected within a pharmaceutical formulation containing drotaverine.

Despite the complexity of the matrix, the method achieves effective separation of PVP from the active pharmaceutical ingredient.

Adjusting the step gradient—starting from a high organic content (MeCN) and transitioning to a 50:50 MeCN/H_2O mixture—enables analysis of PVP in formulations and effective separation from the active ingredient, demonstrating the column's flexibility and robustness for diverse sample types.

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We offer free HPLC method development tailored to your specific compounds, ensuring optimized separations with reliable, reproducible results. Free custom solutions—designed for seamless analytical performance.

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