Difference Between a 4um and a 5um Particle in a C18 Column - Tech Information

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Understanding Particle Size Designations in HPLC Columns

A column labeled as having 4 µm particles performs very similarly to one labeled 5 µm—the difference is nominal.

The “particle size” designation for C18 HPLC columns refers to the approximate diameter of the silica beads used to create the stationary phase. This applies to most silica-based columns, regardless of bonded phase.

In practice, silica particles are produced with a size distribution rather than a single uniform size. This approach is both economical and beneficial for column packing. Modern HPLC columns typically contain a range of particle sizes, measured before surface modification. When plotted (particle size vs. quantity), the distribution forms a Gaussian curve, and the column is named based on the most common size—not the exact median.

Common nominal sizes include 1.8 µm, 2.2 µm, 3 µm, 5 µm, and 10 µm, each representing a range rather than a precise value.

For a C18 column to qualify as an L1 in the USP classification system, it must meet specific criteria and be approved by the USP.

NOTE: Octadecyl silane chemically bonded to porous or non-porous silica or ceramic micro-particles or superficially porous particles, 1.5 to 10 µm in diameter, or a monolithic rod.

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