What results when I use a small guard column with a larger ID or prep column – FAQ

To have optimal performance, guard columns should have the same packing material as the column used and the inner diameter (ID) of the guard column should match as closely as possible to the larger column inner diameter (ID).

In HPLC, a mobile phase with a constant flow rate will have a linear velocity. This velocity is a major factor with regards to the interaction/retention of the analyte to the stationary phase. As analyte retention is a direct function of this linear velocity, the mobile phase flow dispersion will change significantly when transitioning to different sized column diameters.

Different ID columns, as with larger particle sizes than the analytical packing, can result in separation deterioration due to band broadening effect created by these velocity changes.

If one were to incorporate a smaller ID guard column with a large prep column, the initial contact with the analytes begins with the stationary phase in the guard column. Next, by changing to a much larger diameter, the transfer of the analytes through the phase decreases significantly. This linear velocity shift of analyte retention can cause poor peak shape and performance.

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