

What are the most common reasons for column performance degradation?

Common causes of column performance degradation include, physical damage, thermal damage, oxidation, chemical damage (by samples) and contamination.



Sample preparation and column care

Considering your sample preparation technique is important for extending the life-time of your gas chromatography (GC) column. Using highly selective sample preparation techniques is imperative for prolonging the life of your chromatography column. SPE and QuEChERS are suitable selective sample preparation methods. By using such methods it is possible to remove the majority of impurities and interferences thus extending the life time of your column.

How to store your gas chromatography column

For short term storage your column may be kept inside the instrument. However, for longer term storage the column can be disconnected from the instrument and the ends capped (septa is suitable for capping ends) – this is important because if the column is exposed to oxygen and/or moisture it can degrade. It is also important to store columns in their box as the degradation of the stationary phase is UV-catalysed.

Cutting the column

Gas chromatography columns should be cut using a column cutter. Score through the polyamide coating and then carefully snap the column. The cut should be straight with no jagged edges.

Peak shape deterioration

In the event of peak shape deterioration it is possible to trim the column in order to recover column performance.

Solvents and column care

Some solvents like THF and acetonitrile can be damaging to GC columns, therefore it is important to take this into consideration when designing your sample preparation method. Solvents which can be harmful to the stationary phase of capillary columns should be avoided where possible.

Preventing thermal damage

Before using your gas chromatography column it is important to understand the column specifications. Your column manual will tell you the maximum temperature the column can operate at safely.

Column contamination

The best way to avoid column contamination is to ensure that the sample preparation technique is highly selective for the analyte and removes any unwanted contaminants within the sample matrix.

