CHROMATOGRAPHIC SPECIALTIES INC.

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The Benefits of Guard Columns for Capillary Gas Chromatography

Use of Guard Columns

The purpose of using guard columns is to protect the analytical column from contamination because the sample that is introduced is not always pure. Although the best chromatography is obtained with "clean" samples, the practical situation is that sample clean-up procedures are minimized and relatively "dirty" samples are introduced onto the column. Samples can contain particulates, heavy components, derivatization reagents, ionic residues, acids, bases... All these compounds can interfere with the stationary phase and they will influence the separation process. Usually the degradation of column performance is a slow process, but it will happen.

Most of the time the impurities accumulate in the first meter(s) of the column and by cutting off this section, adequate separation is restored. Many users choose to connect a guard column in front of the analytical column. Such a guard column is deactivated and can be trimmed when contaminated and eventually replaced. Depending on the application, guard columns have a lifetime of 1 week up to 6 months. There are different choices for guard columns; it can consist only of deactivated capillary, or it can be a coated capillary.

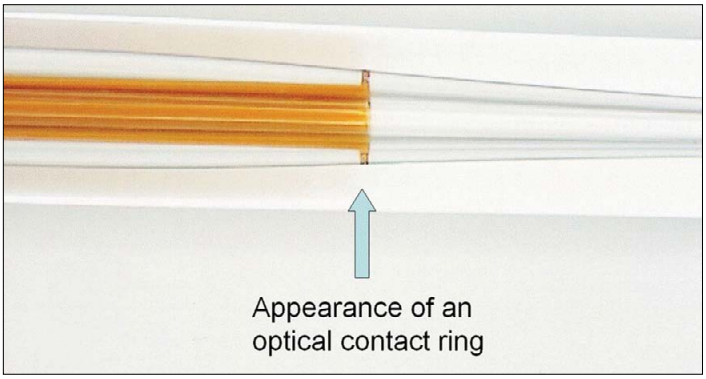
Deactivated capillary tubing: Deactivated fused silica tubing can be purchased by the meter. A defined length can then be coupled in front of the analytical column. Upon contamination, a section of the guard column is removed. When the whole guard is "consumed" a new guard column can be coupled.

Coated capillary tubing: As the guard column needs to prevent contamination of the analytical column, a coated guard column can help as it has both the surface deactivation and also the stationary phase layer. We can run our samples until contamination affects peak shape/response and then we can replace the guard with a new 1 -5 m section.

Making the Connection

One of the biggest challenges is to make the column coupling. The best "generic" results are obtained using a universal Press-Tight® connector. Make a 90-degree cut by using a ceramic wafer and let the wafer slide one-way along your nail, wet the column and guard ends with some methanol and push it into the Press-Tight. By pushing it, an optical "ring" is observed (Figure 1), which is the actual seal made by the polyimide and the surface.

Figure 1. Making the Connection



A more elegant solution that eliminates column coupling is to use Integra-Guard® columns.

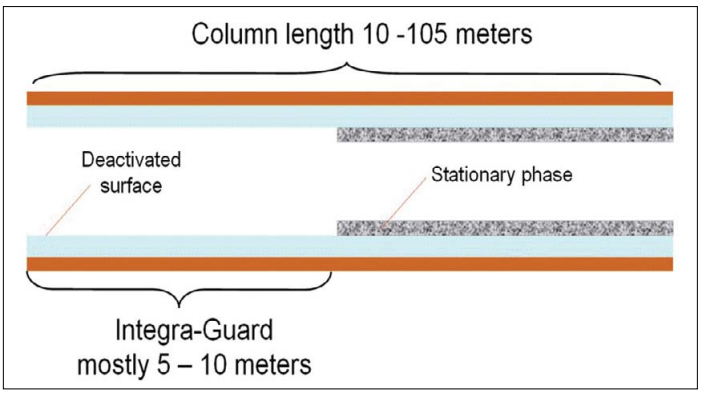
Integra-Guard® Columns

Integrated guard columns are prepared by coating only the last section of the column. This technique is also called "segment" coating.

These guard columns present clear advantages as there is no coupling present (Figure 2).

- No connection to make, saves lots of time.
- No leaks, improved stability and more accurate data.
- No dead volumes/ activity or thermal mass.
- Easy in maintenance; integrated solution.

Figure 2: Integrated guard column: No coupling at all



Contact our Technical Team at **1-800-267-8103** or **tech@chromspec.com** for more information about guard columns for GC.