

THERE'S MORE TO A FERRULE

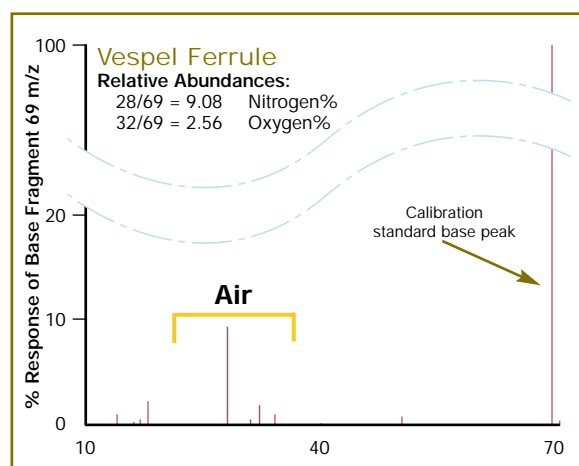
Q I am getting leaks in my GC-MS after a few temperature cycles and I think the leak comes from my ferrule. I am using a Graphite/Vespel[®] ferrule but I am not satisfied with the seal it gives me. What other alternatives are there?

a Ferrules are the smallest, cheapest and probably the most easily forgotten components that are used in every gas chromatograph. Yet without ferrules the airtight sealing that is required at the detector and injector of a GC system would be impossible to achieve.

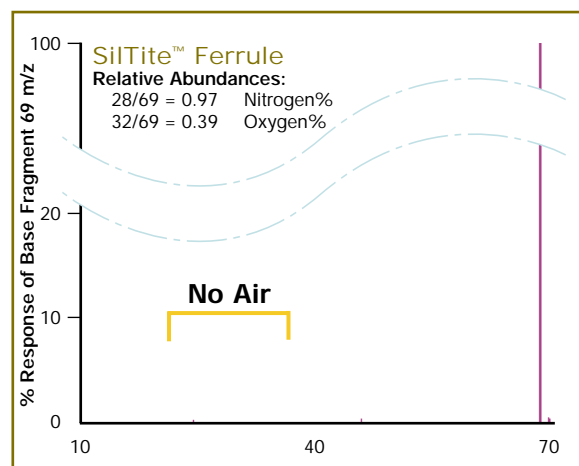
Ferrules are available in a variety of different materials, shapes and sizes depending on their use, the instrument and the size of the capillary column being used. Usually your instrument type and the column will determine the shape and size of the ferrule. Probably the most important but difficult aspect of choosing a ferrule is the selection of the material type.

Until recently two main types of material have been used in the manufacture of ferrules for use in GC instruments: 100% graphite and composites* of graphite and Vespel[®]. A new and unique metal ferrule (SilTite[™]) is now also available.

Ferrules made from 100% graphite are ideal ferrules for use when connecting a column to injectors and non mass spectrometer detectors such as FID, ECD, TCD and NPD. They form a soft grip with the GC column and as such are reusable. They have an upper temperature limit of 450°C, making them ideal for detectors that can reach temperatures as high as 360-380°C. The downside to 100% graphite ferrules is that they are soft and porous to oxygen, which makes them unsuitable for connecting columns to mass spectrometers.



MS trace using a Vespel ferrule after 5 temperature cycles.



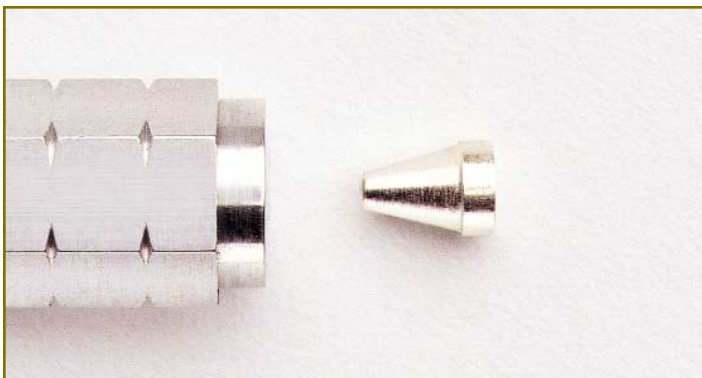
MS trace using a SilTite ferrule after 5 temperature cycles. (Using a MS no leaks can be detected, even after 400 temperature cycles between 70°C and 400°C)

The Graphite/Vespel composite ferrules have a temperature limit of 300°C and are not porous like the porosity of the graphite ferrules making them suitable for connecting columns to mass spectrometer detectors. These composite ferrules are much harder than pure graphite and cannot be reused. They also must be re-tightened after the initial temperature cycles. This is because the metal nut and the ferrule have different coefficients of thermal expansion. The ferrule shrinks more during GC oven cool down and this causes leaks. If the Graphite/Vespel ferrule is not re-tightened after installation, air may enter the mass spectrometer decreasing sensitivity of the analysis and possibly degrading components of the mass spectrometer.

SilTite™ metal ferrules have been developed specifically to overcome the problems associated with the use of 100% graphite and composite ferrules. SilTite™ ferrules form a strong and permanent airtight seal around the capillary column and have a temperature limit well above the temperature capacity of the injector, MS interface or GC oven. The metal SilTite™ ferrule together with the metal nut have the same coefficient of thermal expansion. Consequently, the ferrule and nut expand and contract at the same rate eliminating any chance of annoying leaks. Hence, the nut does not need to be re-tightened after initial temperature cycles.

If you are not happy with the seal you are achieving with the Graphite/Vespel ferrule you are using, you should try a SilTite™ ferrule. I am sure you will find they give an excellent seal.

* typically 15 % Graphite/85% Vespel or 40% graphite/60% Vespel



The new SilTite metal ferrule for fused silica capillary columns.

