



GC COLUMN FERRULE SELECTION GUIDE

During GC column installation, ferrules are used to provide a leak-free seal. Different materials and configurations of ferrules are available, the choice of which depends on your application and use within the GC instrument. This primer provides a guide to GC column ferrule selection including ferrule material, I.D., and design (short vs. standard).

Choice of Ferrule Material

Our ferrules are available in different material types:

- Pure Graphite (Ferrule Code: OGF)
- Graphite/Vespel® (Ferrule Code: GVF)

Graphite Ferrules (Ferrule Code: OGF)

Graphite ferrules (Figure 1) are shiny in appearance and are constructed of compressed graphite yarn (Figure 2). Graphite ferrules are easy to use but can only be reused with care as they are soft, thus easily distorted by compression. They are suitable for use with FID, TCD and ECD detectors.



Figure 1: Graphite ferrules.



Figure 2: Two pieces of yarn unspooled from the second ferrule in Figure 1.

Advantages

- Easy to use
- Soft and therefore seals well, maintaining a leak-free seal throughout temperature cycling
- Works well at all GC oven temperatures (ferrule of choice for high-temperature applications up to 450 °C)
- Easy to readjust after use

Disadvantages

- Not recommended to reuse
- Graphite particles can flake off after repeated compressions
- Not recommended by many for MS detectors

Table 1: Recommended ferrule material for injector, detectors and high temperature applications.

Ferrule	Injectors	MS	FID	ECD	High Temperature
Graphite	Good	Not Recommended	Good	Good	Best
Graphite/Vespel	Good	Good	Good	Good	Not Recommended

Graphite/Vespel Ferrules (Ferrule Code: GVF)

'Graphite/Vespel' or 'Graphitized Vespel' ferrules (Figure 3) are composed of graphite dispersed in a plastic (polyimide). Vespel is a trade name of polyimide and the exact composition used in our ferrules is 15% graphite/85% polyimide. These ferrules are hard and have a matte finish rather than shiny.



Figure 3: Graphite/Vespel Ferrules.

Advantages

- Easy to use
- Can provide a leak free seal for MS and other leak sensitive detectors. Their non-porous material prohibits oxygen permeation.
- Can be reused when not removed from the column
- Column can be repositioned when used under approx. 100 °C
- Forms a strong seal at the column over 200 °C

Disadvantages

- Overtightening can break the column
- When the column is heated, the ferrule "shrinks" and the column nut will need to be retightened after a few runs. If used under 300 °C, this shrinkage will stop and provide a good stable seal after a few conditioning oven cycles. However, at temperatures over 300 °C, these ferrules will constantly cause the column nut to become loose, especially over 325 °C

Choice of Ferrule Design

Selection of ferrule design (Short and Standard – Figure 4) depends on the GC instrument model.

Short Ferrules

Short ferrules are for use with the new capillary injector design on the Clarus® 590 and 690 systems. These short ferrules are not compatible with older Clarus instruments.

Standard Ferrules

PerkinElmer standard ferrules are used in for connecting columns to the detectors on all PerkinElmer GC models. They are suitable for use on the older Clarus capillary injectors (480, 580, 680 and prior instruments).



Figure 4: Standard ferrule, 3.7 mm length (left) and short ferrule, 2.7 mm length (right).

Choice of Ferrule I.D.

Selection of the internal diameter (I.D.) of the ferrule depends on the I.D. of the column being used (Table 2).

Table 2: Ferrule ID selection.

Column I.D. (mm)	Ferrule I.D. (mm)
≤ 0.25	0.4
0.32	0.5
0.53	0.8

A NOTE FROM PERKINELMER

It is our hope that by using this resource you can ensure selection of the right ferrule for your application and instrument to minimize downtime and improve lab productivity. At a near-negligible price point, ensuring correct ferrule selection isn't just the responsible thing to do - it's good for your laboratory's bottom line.

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