

Capillary Column Ferrules and Nuts

Using the wrong ferrule or a worn-out ferrule to seal your column connection can result in inconsistent and unreliable chromatography. An improper ferrule can cause leaks, which allow air and other contaminants to enter the instrument through the column seal, causing major interference with column and detector performance.

For optimum performance, ferrules should be replaced every time the column is replaced and when performing column maintenance.

To minimize problems, follow these general techniques for ferrule installation:

- Don't overtighten – finger tighten the column nut, then use wrench to tighten
- Maintain cleanliness
- Bake out ferrules prior to use (Vespel and Vespel/Graphite only)
- Avoid contamination, such as fingerprint oils
- Inspect used ferrules with magnifier for cracks, chips, or other damage before reusing them
- Change ferrules when new columns or injector/detector parts are installed



Vespel/Graphite ferrules, 5181-3323



Caution: Agilent capillary column ferrules are manufactured to tolerances specific for Agilent J&W HP and DB brand columns. Fused silica tubing used for Agilent J&W VF columns has slightly different tolerances for the outer diameter. Turn to pages 32-33.



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Ferrule Selection Recommendations

Ferrule Type	Upper Temp. Limit	Usages	Advantages	Limitations
Graphite (100%)	450 °C	<ul style="list-style-type: none"> • General purpose for capillary columns • Suitable for FID and NPD • Recommended for high temperature and cool on-column applications 	<ul style="list-style-type: none"> • Easy-to-use stable seal • Higher temperature limit • Can be removed easily 	<ul style="list-style-type: none"> • Not for MS or oxygen-sensitive detectors • Soft, easily deformed or destroyed • Possible system contamination
Vespel/Graphite (85%/15%)	350 °C	<ul style="list-style-type: none"> • General purpose for capillary columns • Recommended for MS and oxygen-sensitive detectors • Most reliable leak-free connection 	<ul style="list-style-type: none"> • Mechanically robust • Long lifetime 	<ul style="list-style-type: none"> • Not reusable • Flows at elevated temperature • Must re-tighten frequently
Vespel (100%)	280 °C	<ul style="list-style-type: none"> • Isothermal operation • Can be reused or removed easily • Excellent sealing material when making metal or glass connections 	<ul style="list-style-type: none"> • Mechanically robust • Long lifetime • Can be reused or removed easily 	<ul style="list-style-type: none"> • Leaks after temperature cycle • Flows at elevated temperature • Must re-tighten frequently

TIPS & TOOLS

Look for the following signals that indicate ferrule damage:

- Background noise from oxygen diffusing into the system
- Column bleed catalyzed by oxygen
- Sample degradation
- Sample loss
- Increase in detector signal/noise
- Poor retention time reproducibility



Short and Long Ferrules

Short Ferrules (height 3 mm)



Vespel/Graphite ferrules, 5181-3323



Universal column nut, 5181-8830

Standard fitting for Agilent GC inlet and detectors (FID, NPD, ECD) column connections use short ferrules and the Universal nut

Long Ferrules (height 3.6 mm)



Pre-conditioned long ferrule for MSD connection, 5062-3508



MS interface column nut, 05988-20066

Pre-conditioned graphite/vespel ferrules are recommended with MSD Interface nut



Column nut for long or long two-hole ferrules, 05921-21170

Alternative nut for Agilent standard inlet or detector fittings used with long graphite/vespel ferrules

TIPS & TOOLS



100% Vespel ferrules should only be used for isothermal applications.

Capillary Column Ferrules – for use with the most brands of column, including DB and HP columns

Column ID (mm)	Ferrule Nom ID	Graphite Ferrule Short Part No.	Vespel Short Ferrule Part No.	85% Vespel/15% Graphite Short Ferrule Part No.	Pre-Conditioned Long Ferrule 85% Graphite/15% Vespel for MSD connection
0.1-0.25	0.4	500-2114	5181-3322	5181-3323	5062-3508
0.32	0.5	5080-8853	5062-3513	5062-3514	5062-3506
0.45	0.8	500-2118	5062-3511	5062-3512	5062-3538
0.53	0.8	500-2118	5062-3511	5062-3512	5062-3538
No hole				5190-4054	5181-3308

Capillary Column Ferrules – for use with CP, VF and Select columns

Column ID (mm)	Factor 4, Select and CP Column Brands	Ferrule Nom ID	Graphite Ferrule Short Part No.	Vespel Ferrule Short Part No.	85% Vespel/15% Graphite Short Ferrule	Pre-Conditioned Long Ferrule 85% Graphite/15% Vespel for MSD*
0.025-0.05	CP, VF, Select	0.4	500-2114	5062-3515	5062-3516	5062-3507
0.075	CP, VF, Select	0.4	500-2114	5062-3515	5062-3516	5062-3507
0.1-0.25	CP, VF, Select	0.5	5080-8853	5062-3513	5062-3514	5062-3508
0.32	CP, VF, Select	0.5	5080-8853	5062-3513	5062-3514	5062-3508
	CP-silica PLOT	0.8	500-2118	5062-3511	5062-3512	5062-3538
0.53	CP, VF, Select	0.8	500-2118	5062-3511	5062-3512	5062-3538
No hole					5190-4054	5181-3308

*These ferrules are recommended for GC/MS

For additional capillary column ferrule selection, please refer to our CrossLab portfolio. Turn to page 143.



Vespel ferrule, 5181-3322



Graphite ferrules, 5080-8853



Vespel/Graphite ferrule, 5062-3514



Universal column nut, 5181-8830



MS interface column nut, 05988-20066

Column Nuts

Description	Part No.
Short Nuts	
Universal column nut, 1/16 in hex, 2/pk	5181-8830
Finger tight column nut for 530 µm columns*	5020-8293
Finger tight column nut for 320 µm columns and smaller*	5020-8292
Blanking plug, finger tight style	5020-8294
6850 column nut, 2/pk	5183-4732
Extended column nut, VI inlet	G3504-20504
High Temperature SimDis PTV inlet, 4 mm hex	5188-5312
Long Nuts	
MS interface column nut, female	05988-20066
Column nut for long or long two-hole ferrules	05921-21170
Accessories	
Open end wrench, 1/4 and 5/16 in	8710-0510

*For use with graphite ferrules only

Specialty Ferrules, 85% Vespel/15% Graphite

Ferrule ID (mm)	Column ID (mm)	Unit	Part No.
Two Hole			
0.5	0.1	10/pk	5181-3388
0.5	0.10.20.25	10/pk	5062-3580
0.5	0.32	10/pk	5062-3581
No Hole			
Capillary column long ferrule		10/pk	5181-3308
Capillary column short ferrule		10/pk	5190-4054
High Temperature PTV Inlet SS/Graphite			
0.4	0.32	10/pk	5188-5315
0.4	0.53	10/pk	5188-5314



Straight Ferrules

Description	Unit	Part No.
1/4 in PTFE	10/pk	0100-1378
1/4 in Graphite	10/pk	0100-1324
1/8 in PTFE	10/pk	0100-1365
1/8 in Graphite	10/pk	0100-1325
1/8 in 85% Vespel/15% Graphite	10/pk	0100-1332
1/16 in PTFE	10/pk	0100-1375
1/16 in Graphite	10/pk	0100-1326
1/16 in VG-2 Vespel, 40% Graphite	10/pk	0100-1379
6.4 mm Vespel		0100-1104
1/4 in 85% Vespel/15% Graphite	10/pk	0100-1331



1/8 in 85% Vespel/15% Graphite, 0100-1332

Reducing Ferrules

Description	Unit	Part No.
1/8 to 1/16 in Vespel	10/pk	0100-1342
1/8 to 1/16 in VG-1 Vespel, 15% Graphite	10/pk	0100-1344
1/16 in to 0.4 mm VG-2 Vespel, 40% Graphite	10/pk	0100-1381

Ferrules for LTM Rapid Heating/Cooling System

Description	Original Design (5/pk)	2010+ Siltite/Ultimate Union (10/pk)
For use with 0.25-0.4 mm id LTM columns	5190-1437	5188-5361
For use with 0.4-0.5 mm id LTM columns	5190-1438	5188-5362
For use with 0.5-0.8 mm id LTM columns	5190-1439	5188-5363

Ferrules and Nuts for NCD and SCD

Description	Part No.
Spare column nut and ferrule kit	G6600-80018