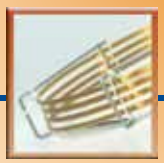


Ferrules for GC

- **Graphite** ferrules provide the highest temperature stability (up to 450 °C). They are reusable, if handled with care. We also offer 1/16" graphite ferrules specially designed for Carlo Erba / Fisons or for Agilent gas chromatographs.
- Vespel ferrules come in three types: pure Vespel, Vespel with 15% graphite and Vespel with 40% graphite. All versions are temperature-stable up to 400 °C and reusable.
- **PTFE** ferrules can only be used up to 250 °C. They are not reusable and not recommended for temperature programming. However, they show the best chemical inertness of all ferrules.

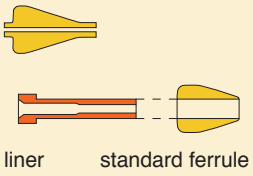
Ordering information (packing unit 10 ferrules)

Bore (= column OD)	Graphite	Vespel			PTFE
		plain	+ 15% graphite	+ 40% graphite	
max. temperature →	450 °C	400 °C	400 °C	400 °C	250 °C
1/16" ferrules					
no bore	708336	706187	706167		706177
0.4 mm	708309			706246	
0.5 mm	708308			706247	
0.8 mm	708301			706248	
1.0 mm	708302				
1.2 mm	708303				
1/16"	706155	706180	706160	706190	706170
1/16" ferrules for Carlo Erba (Fisons) instruments					
0.4 mm	708338				
0.5 mm	708339				
0.8 mm	708340				
1/16" ferrules for Hewlett-Packard (Agilent) instruments					
0.4 mm	708353				
0.5 mm	708354				
0.8 mm	708355				
1/8" ferrules					
no bore	708341	706188	706168		706178
0.4 mm	708342	706266	706249	706240	
0.5 mm	708343				
0.8 mm	708333	706268			
1/16"	708158	706183			
1/8"	708156	706181		706191	706171
1/4" ferrules					
no bore	708344		706169	706199	
0.4 mm	708345				
0.5 mm	708346				
1/16"			706164		
1/8"		706185			
6.0 mm	708348	706186		706196	706176
1/4"	706157	706182		706192	706172
6 mm ferrules					
no bore		706252			
6.0 mm					706259

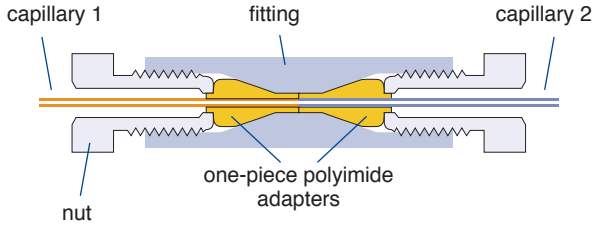
If you are in doubt about the correct size or REF please send us an old, used ferrule as a sample.

Valco fused silica adapters and fittings for capillary GC

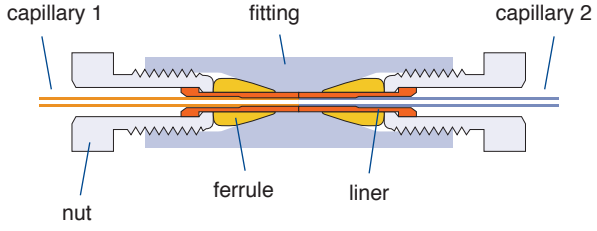
- **One-piece FS adapters:** recommended for use in fittings where the polyimide ferrule need not be removed
- **Two-piece removable FSR adapters:** recommended for use in Valco valves; consists of a liner which slides over the fused silica tubing, and a ferrule, both made of high temperature polyimide alloys
  The liner has an enlarged diameter at one end that is captured by the nut, so both (liner and tube) are removed when the nut is unscrewed from the valve (see figure below).
  The 1/16" FSR adapter comes with a special counterbored 1/16" nut (ZCN1) to receive the liner. The 1/32" adapter works with standard Valco 1/32" nuts.



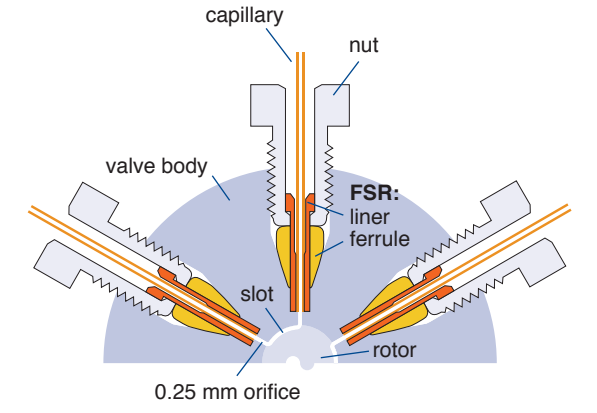
Union with FS adapters



Union with FSR adapters



Valve with FSR adapters



If you intend to use fused silica adapters (FS or FSR) with Valco unions, please order the fittings with "J" at the end of the Valco code and the appropriate number of adapters. The fittings in the table on the opposite page are supplied without stainless steel ferrules, but with standard nuts. For two-piece FSR adapters, the use of specially counterbored nuts ZCN1 (provided with the adapters) is mandatory.

Examples:

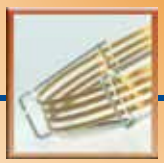
1) Connection of 2 capillaries with 0.25 mm ID and 0.4 mm OD: either use a 1/32" union ZU.5TJ and 2 FS adapters FS.4 or a 1/32" union ZU.5TJ and 2 removable FSR adapters FSR.4
2) Connection of 2 capillaries with 0.53 mm ID and 0.8 mm OD: we recommend either a 1/16" union ZU1TJ and 2 FS adapters FS1-.8 or a 1/16" union ZU1TJ and 2 removable FSR adapters FS1R.8

If capillaries 1 and 2 have different outer diameters, the corresponding different FS adapters have to be used.

If you want to use Valco valves with fused silica adapters, you need to order the required quantity of FSR adapters in addition to the valve. Please note that the specially counterbored nut ZCN1, included in FS1R.5 and FS1R.8, is still mandatory for 1/16" FSR adapters.

Examples:

1) Attachment of a capillary with 0.32 mm ID (0.5 mm OD) to a valve with 1/32" fittings: we recommend the removable FSR adapter FSR.5.
2) Attachment of a capillary with 0.53 mm ID (0.8 mm OD) to a valve with 1/16" fittings: we recommend the removable FSR adapter FS1R.8.



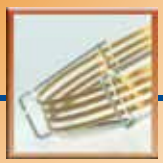
Ordering information

Valco code	Description		Pack of	REF	
One-piece fused silica adapters					
		for capillary OD			
FS.25-5	1/32"	< 0.25 mm	5	**724405**	
FS.4-5	1/32"	0.25-0.4 mm	5	**724243**	
FS.5-5	1/32"	0.4-0.5 mm	5	**724244**	
FS1.4-5	1/16"	< 0.4 mm	5	**724406**	
FS1.5-5	1/16"	0.4-0.5 mm	5	**724407**	
FS1.8-5	1/16"	0.6-0.8 mm	5	**724408**	
Removable fused silica adapters (incl. nuts)					
FSR.25-5	1/32"	< 0.25 mm	5	**724409**	
FSR.4-5	1/32"	0.25-0.4 mm	5	**724410**	
FSR.5-5	1/32"	0.4-0.5 mm	5	**724411**	
FS1R.5-5	1/16"	< 0.5 mm	5	**724335**	
FS1R.8-5	1/16"	0.5-0.8 mm	5	**724334**	
Replacement liners					
FSL.25-5	1/32"	< 0.25 mm	5	**724412**	
FSL.4-5	1/32"	0.25-0.4 mm	5	**724413**	
FSL.5-5	1/32"	0.4-0.5 mm	5	**724414**	
FS1L.5-5	1/16"	< 0.5 mm	5	**724415**	
FS1L.8-5	1/16"	0.5-0.8 mm	5	**724416**	
Special nut for fused silica adapters					
ZCN1	1/16"	counterbored	1	**724417**	
For standard Vespel ferrules as well as standard nuts please have a look at the Valco program, which is available on request.					
Unions, Tees and crosses for fused silica adapters (without ferrules, but incl. standard nuts)					
ZU.5TJ	1/32"- 1/32"	for butt connection	1	**724418**	
ZU1TJ	1/16"- 1/16"	for butt connection	1	**724333**	
ZT.5J	1/32"	Tee	1	**724421**	
ZT1CJ	1/16"	Tee, capillary bore	1	**724336**	
ZX.5J	1/32"	cross	1	**724422**	
ZX1CJ	1/16"	cross, capillary bore	1	**724337**	
Tools for Valco fused silica adapters					
OEW	open end wrench (3/16" x 1/4")		1	**724423**	for use with 1/32" fittings
PV	pin vise and drill index (0.34 to 1.0 mm)		1	**724424**	application see text below

In case of a broken tubing in a through-bore union, remove the nut and the intact tubing on the opposite site of the broken one. Clear the fitting by pushing a fine wire or capillary drill through the center.

To remove ferrules from fittings, we recommend the use of a ferrule rmoval kit (Valco code FRK1). Use a pin vise and drill index (Valco code PV) to widen the inner diameters of FS adapters.

For other fittings and valves for GC please ask for our VICI® / Valco program.

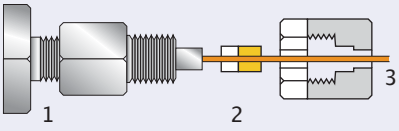


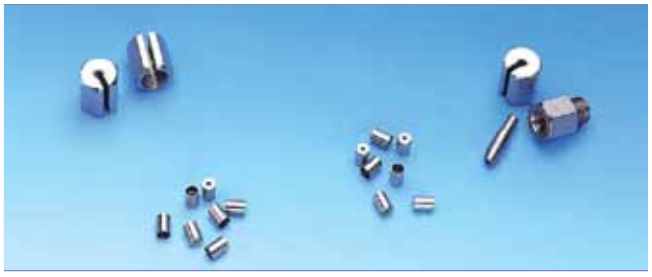
Accessories for capillary columns

Connectors for capillary GC columns

- **Graphseal ferrules** for capillary columns: a stainless steel ferrule filled with graphite – the ideal sealing material for capillaries · The capillary is mounted on a 1/16" exit (detector, injector etc.), with the appropriate ferrule, a nut (with slit) and an adapter (see table below).
- **Glass connectors** for fused silica capillary columns from 0.2 to 0.53 mm ID manufactured from deactivated glass with slightly tapered inner diameter; used to join two fused silica capillaries of equal or different diameters. Advantages compared to stainless steel fittings are easy connection without tools, optical control during connection, negligible heat capacity and no dead volume.
- **PTFE shrink tube**
  also applicable for capillary connection. The minimum ID of the expanded tubing is 1.17 mm, the maximum ID of the shrunk tube is 0.40 mm. Shrinking occurs above 310 °C. Connections with PTFE shrink tube are applicable up to 200 °C only. They should never be used above 250 °C.

Ordering information

Description	Pack of	REF	Specification
Graphseal ferrules for capillary columns			
0.4 mm bore	10 ferrules	**708337**	 1 1/16" exit, injector or detector; 2 Graphseal ferrule; 3 capillary
0.5 mm bore	10 ferrules	**708318**	
0.8 mm bore	10 ferrules	**708319**	
Universal capillary glass connectors			
linear	5 connectors	**707971**	
linear	10 connectors	**707972**	
Y splitter	1 connector	**707973**	
PTFE shrinking tube, thin-walled	1 m	**708305**	for capillary connection, min. ID expanded 1.17 mm, max. ID shrunk 0.40 mm

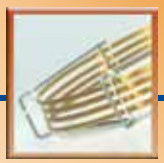


Septa for GC

Designation	Standard septa (ST)	High temperature septa (HT)	Silicone septa, soft	Silicone septa PTFE
				
Material	beige silicone	red, non-bleeding silicone	transparent silicone	white silicone, one side laminated with grey PTFE
Thickness	4 mm	3 mm	3 mm	3 mm
Hardness	60 shore A	60 shore A	45 shore A	
max. Temp.		320 °C *	250 °C	200 °C

* If used at considerably higher temperatures – and working without septum purge – interfering peaks can occur due to thermal decomposition of the material.

Accessories for capillary columns



Ordering information

Septum grade (packs of 50 septa)	Outer diameter 9 mm N 9	10 mm N 10	11 mm N 11	12 mm N 12	13 mm N 13	17 mm N 17
Standard septa (ST)	**702609**	**702610**	**702611**	**702612**	**702613**	
High temperature septa (HT)	**702619**	**702620**	**702621**	**702622**	**702623**	**702632**
Silicone septa, soft	**702602**		**702604**	**702605**	**702606**	
Silicone septa PTFE		**702625**	**702626**	**702627**	**702628**	
Septum remover (tool for removing septa baked into the injection port of the gas chromatograph)						**706141**

Tools and general accessories for GC

- **Diamond file:**
  a useful tool for cutting capillaries and smoothing ends of capillaries. Square capillary ends are especially important for butt connections (e.g., in Valco unions).
- **Magnifying lens:** an essential tool for any laboratory.
  In capillary GC it is often important to inspect column integrity or check cut ends of capillaries. When closing a column by melting the magnifying lens can be used to check whether the column is really closed or whether an open channel has been formed in the sealed end. Our lens provides 8fold magnification and is supplied with a scale as pictured in the figure below. The space between lines is equivalent to 1/10 mm.
- **Glass wool, quartz wool** and **glass fiber wadding** are used for, e.g., GC liners, packed GC columns etc.

Lens with scale

Diamond file

Ordering information

Description	Specification	Pack of	REF
Tools for capillary GC			
Diamond file	for cutting capillaries and straightening capillary ends	1	**708300**
Magnifying lens with scale	magnification 8x	1	**706296**
Glass wool			
Glass wool, long fibers, DMCS treated, for packed GC columns		50 g	**706201**
Glass fiber wadding silanized, very fine fibers		25 g	**718002**
Quartz wool, very fine fibers		25 g	**718587**
Glass wool extractor for GC columns		1	**706117**
PTFE tape for sealing, reels 10 m long, 12 mm wide, 0.1 mm thick		1 reel	**706512**