Agilent LC Capillary Supplies Selection Guide

CONFIDENTLY BUILD HIGH PERFORMANCE CONNECTIONS FROM RAW SAMPLE TO ANALYTICAL RESULT

The Measure of Confidence

Agilent Technologies

Agilent's unique laser welding process ensures that the capillary ends are absolutely flat, eliminating any chance of capillary-induced dead volume.

Your LC system's components are only as reliable as the connections between them

Think of your LC system as a chain from analyte…to pump…to column…to detector…to waste. Every link must operate at maximum efficiency, or the whole chain risks failure – compromising your results.

Agilent LC capillaries: Your link to analytical success

At Agilent, we invest heavily in the quality of our capillary connections. All are engineered and manufactured to the same quality standards as our columns and instruments, so you can protect the integrity of your results at every step of your LC flow path.

Using our flexible stainless steel and polymer capillaries and fittings can provide:

- Tight, leak-free connections
- Zero dead volume connections
- An inert surface (when using polymer or PEEK/stainless steel bio-inert capillaries)
- High flexibility without sacrificing durability
- Easy cutting to the exact length you need (PEEK tubing)
- Predefined lengths for specific flow path locations (capillaries)

In addition, all Agilent capillaries are precision cut with square ends, are burr-free, have no inner-diameter distortion, and come in a variety of materials to suit your needs.

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

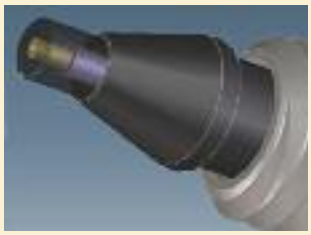
Table of contents

Engineering of Agilent Capillaries

The same professional engineers in our LC manufacturing facility in Germany who design our industry-leading LC instruments, also play a critical role in developing capillaries and fittings for your instrument. Their attention to detail helps you to get the best performance possible for your applications.

Our LC manufacturing tools – like high-end, special laser-cutting machines – result in completely tight, smooth and perfect-cut capillaries. Our broad selection of capillaries is made only from the highest-quality materials and will meet any of your application needs.

Avoid chromatographic issues – like peak broadening and system leaks – by choosing Agilent's selection of premium capillaries. Agilent is committed to Fast LC and high-productivity performance, together with accurate quantitation.



Advantages for Bio Capillaries

- **Laser-welded capillary tip** for precise capillary cut
- **Metal-free connection** for all HPLC applications
- **PEEK and stainless steel design** allows you to exceed typical pressure limit reached with conventional polymer.

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

Fast LC performance comes from the right instruments, columns and connections

Everyone's looking for increased throughput these days. The Agilent 1200 Infinity Series LC Systems give you UHPLC performance at every price range, whether you need a "workhorse" LC system for routine analysis or a sophisticated, high resolution LC/MS system.

The 1200 Infinity Series arms you with the tools for high performance Fast LC. Here, we'll provide some additional tips about how to get the most from your Fast LC instruments and columns.

Optimizing Your Instrument for Fast LC Performance

Capillaries with 0.12 mm id (red) are recommended capillaries for the 1200 Infinity Series

Pair your UHPLC instrument with an Agilent Fast LC Column – ZORBAX Rapid Resolution High Definition (RRHD), 1.8 µm, stable to 1200 bar, ZORBAX Rapid Resolution High Throughput (RRHT), 1.8 µm or Poroshell 120 superficially porous columns for high efficiency performance up to 600 bar.

You'll get the best performance from your high efficiency column when you ensure your system is optimized for a Fast LC Column:

- Minimize extra-column volume by selecting the right length capillaries for your connections, and by using the most narrow diameter tubing that you can for your application.
- Make sure your data collection rate is optimized for your Fast LC column – set the detector to the fastest setting, then to the second fastest setting and evaluate if the resolution is different.
- Use a semi-micro flow cell or micro-flow cell: The standard flow cells on older instruments may diminish the performance you can achieve with your Fast LC column. Smaller volume flow cells such as the semi-micro (6 mm/5 µL), micro (3 mm/2 µL), or newer DAD cartridge flow cells (e.g. Ultra-Low Dispersion Max-Light Flow Cell, see next page) are recommended for highest resolution.

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

Improve your Ultra-Fast LC results with ZORBAX RRHD columns and **ultra-low dispersion capillaries**

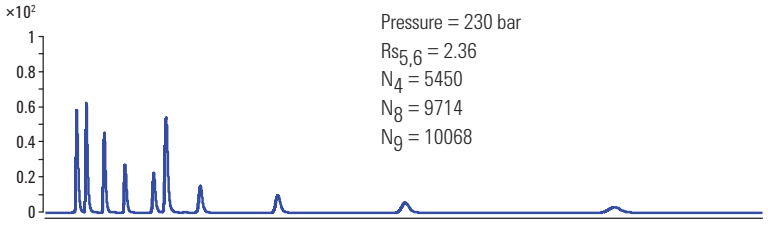
The 1290 Infinity LC operates up to 1200 bar, providing premium UHPLC capabilities – more power, more sensitivity, more flexibility for your analyses. Agilent ZORBAX Rapid Resolution High Definition (RRHD) columns are recommended to use on the 1290 Infinity LC, due to their 1200 bar stability. This offers you greater flexibility with solvent selection and flow rates. And, with more than 17 phases, including HILIC and 300Å configurations for protein analysis, you have many options to refine your separation.

To optimize the performance of your 1290 Infinity LC, be sure to pair the right flow cell with your column. The universal Agilent Max-Light Cartridge Standard Cell with 10 mm optical path length and a dispersion volume of V(σ)=1.0 µL is a good choice for most applications on 2.1 mm, 3 mm and 4.6 mm id columns.

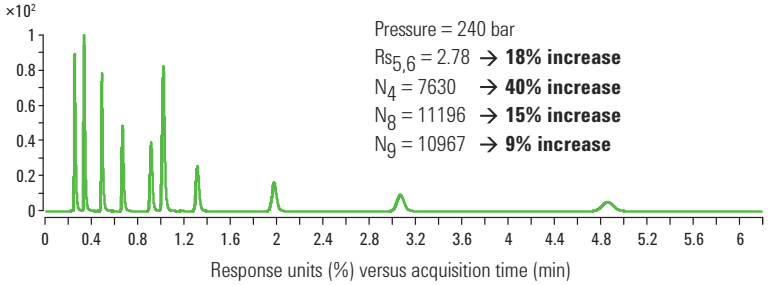
- For highest sensitivity on 3.0 and 4.6 mm id columns, use the 60 mm high sensitivity, V(σ)=4.0 µL Max-Light Cartridge Cell (p/n G4212-60007)
- Optimal column performance for narrow columns is obtained with Agilent Ultra-Low Dispersion Capillaries, 0.08 mm id (p/n 5067-5189) and the Agilent Ultra-Low Dispersion Max-Light Cartridge Flow Cell , V(σ) = 0.6 µL (p/n G4212-60038).

Ultra-low dispersion enhances UHPLC performance

Default Agilent 1290 Infinity LC system, 9.7 µL extra-column volume



Optimized Agilent 1290 Infinity LC system, 3.9 µL extra-column volume



Response units (%) versus acquisition time (min)

Column:	**ZORBAX RRHD Eclipse Plus C18 2.1 x 50 mm, 1.8 µm 959757-902**
Mobile Phase:	A: H_20 B: CH_3CN
Isocratic:	0.4 mL/min 60% B
Injection:	1.0 µL
TCC:	26 °C
DAD:	Sig = 254, 4 nm; Ref = Off
Sample:	1. Thiourea (v_0 marker) 2. Acetanilide 3. Acetophenone 4. Propiophenone 5. Butyrophenone 6. Benzophenone 7. Valerophenone 8. Hexanophenone 9. Heptanophenone 10. Octanophenone

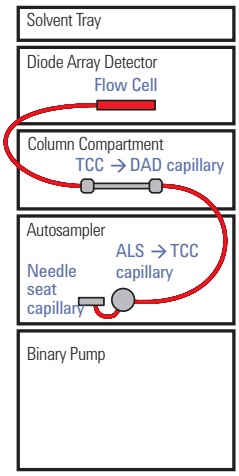
See Agilent pub. no. 5990-9502EN "Ultra-low dispersion optimizes performance of small dimension LC columns" for more details.

Agilent **LC Rack** can help you reduce capillary lengths – and minimize extra-column volume

While the 1290 Infinity LC System is traditionally stacked with the binary pump on the bottom due to its weight, using an Agilent LC system rack (p/n 5001-3726) allows the pump to be safely located at the top of the stack (see illustration). This permits use of the shortest possible capillaries. A shorter 220-mm length capillary connects the autosampler valve to the column inlet (as compared to 340 mm in the default configuration) and the same length capillary, 220 mm, is used to connect the column outlet to the detector flow cell. The result is a 60% reduction in extra-column volume from the default 1290 configuration (9.7 µL) to the optimized configuration (3.9 µL).

Recommended HPLC Stack Configuration

Agilent 1290 Infinity LC system: default staking and capillary tubing configuration



Needle Seat capillary:
0.12 x 100 mm = 1.1 µL

ALS → TCC capillary
0.12 x 340 mm = 3.8 µL

TCC → DAD Capillary:
0.12 x 220 mm = 2.5 µL

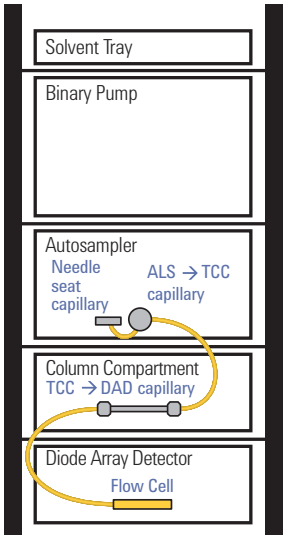
Flow Cell V(σ)1.0 µL = 2.3 µL
Total extra-column volume = 9.7 µL

Volume of 2.1 x 50 mm column = 172.3 µL
Void volume of column = 103.9 µL

Percent extra-column Volume = 9.3%

60% Reduction in extra-column volume

Agilent 1290 Infinity LC system: with LC system rack and ultra-low dipersion optimizations



Needle Seat Capillary:
0.11 x 100 mm = 0.9 µL

ALS → TCC Capillary:
0.08 x 220 mm = 1.1 µL

TCC → DAD Capillary:
0.08 x 220 mm = 1.1 µL

Flow Cell V(σ)0.6 µL = 0.8 µL
Total extra-column volume = 3.9 µL

Volume of 2.1 x 50 mm column = 172.3 µL
Void Volume of Column = 103.9 µL

Percent extra-column volume = 3.7%

Syntax for capillary description

The tables below will be your guide to identifying the proper specifications for your capillary. On all capillaries, dimensions are noted in id (mm), length (mm) and where applicable, volume (µL). When you receive your capillary, these abbreviations are printed on the packaging.

Using the guide: This fitting is coded as "SPF", for Swagelok, PEEK, Fingertight.

Type

Key	Description
Capillary	Connection capillaries
Loop	Loop capillaries
Seat	Autosampler needle seats
Tube	Tubing
Heat exchanger	Heat exchanger

Material

Key	Description
SS	Stainless steel
Ti	Titanium
PK	PEEK
FS/PK	PEEK-coated fused silica*
PK/SS	Stainless steel-coated PEEK**
PTFE	PTFE
FS	Fused silica

*Fused silica in contact with solvent

**PEEK in contact with solvent

Fitting Left/Fitting Right

Key	Description
W	Swagelok + 0.8 mm Port id
S	Swagelok + 1.6 mm Port id
M	Metric M4 + 0.8 mm Port id
E	Metric M3 + 1.6 mm Port id
U	Swagelok union
L	Long
X	Extra long
H	Long head
G	Small head SW 4 mm
N	Small head SW 5 mm
F	Finger-tight
V	1200 bar
B	Bio
P	PEEK

The **type** gives some indication on the primary function, like a loop or a connection capillary.
The **material** indicates which raw material is used.
The **fitting** left/right indicate which fitting is used on both ends of the capillary.

At-a-glance color-coding keys

The color of your capillary will help you quickly identify the capillary id – see the chart to the right for reference.

Color-coding key for Agilent capillary tubing

Internal Diameter in mm	Color code
0.015	Orange
0.025	Yellow
0.05	Beige
0.075	Black
0.1	Purple
0.12	Red
0.17	Green
0.20/0.25	Blue
0.3	Grey
0.50	Bone White

Tip: As you move to smaller-volume, high efficiency columns, you'll want to use narrow id tubing, as opposed to the wider id tubing used for conventional HPLC instruments.

Agilent capillary supplies are made from a variety of top-quality materials to suit your lab's every need

Stainless Steel: good resistance to pitting corrosion

Stainless steel is ideal for most standard applications – except where bio-inertness is required, in which case we recommend PEEK-lined or Bio-inert titanium capillaries. Agilent's 0.6 mm od flexible grade 316L stainless steel capillaries (chrome/nickel/molybdenum bearing grade) are also much easier to handle than conventional, rigid 1.6 mm od capillaries.

Titanium: high inertness for biological applications

Analyzing metal-sensitive proteins and biotherapeutics presents challenging solvent conditions for LC instruments. In addition, bio-molecules tend to bind non-specifically to surfaces. For these reasons, bio-inert titanium is the best choice for these applications. Titanium is biocompatible, making Bio-inert Titan capillaries perfect for applications where bio-inertness is paramount.

Stainless Steel-coated PEEK: high-pressure bio-inertness and robustness

In bio-chromatography, capillaries and connectors should be inert to ensure the lowest interaction with protein samples. They must also be highly robust to withstand harsh cleaning procedures.

Unfortunately, metal-free PEEK capillaries can only withstand pressures of up to 200 bar in a thermostatically controlled cabinet with acetonitrile; even then, flexibility is compromised. To meet the growing need for bio-inertness, robustness, and higher operating pressures, Agilent has engineered a bio-inert PEEK liner clad with high-strength stainless steel to withstand pressures of at least 600 bar. This same technology is used in Agilent capillary fittings – giving you a strong, metal-free, capillary/connector flow path for bio-inert applications.

PEEK-coated fused silica: rugged and pliable

Since their introduction in the early 1980s, fused silica capillaries have become the industry standard for many GC and LC applications – as well as capillary electrophoresis. Agilent fused-silica capillaries are made from high-purity silicon dioxide, and coated with PEEK for strength, durability, and pliability.

PEEK: durable and abrasion-resistant

Agilent PEEK capillaries are best for standard and bio-inert applications. PEEK (polyetheretherketone) is a thermoplastic polymer that resists mechanical and solvent damage, even at high temperatures. Because it is less vulnerable to corrosion than stainless steel, PEEK can be used in place of stainless steel when the capillary's external diameter is 1/16 in or less. It also resists abrasion, making it an excellent coating for fused silica capillaries. **Tip:** Use our color-coded PEEK fittings to track inlets and outlets of valves, columns, and detectors.

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

Agilent capillaries for routine applications

Category	Applications	Internal diameter (mm)	Pressure limit (bar)	pH range	Comments
Stainless steel	• All capillary applications, except where bio-inertness is required • 1/32 in od designed for Agilent 1100 systems • 1/16 in and 1/8 in od for most applications	0.075 0.12 0.17 0.25 0.3 0.5 0.61 0.93	1200	1-14	• Flexible for easy routing • Ready to use: cleaned and passivated to a high standard • Pre-cut capillaries are optimized for the lowest internal volume • Use pre-cut lengths to maintain zero-dead-volume performance
Titanium	• Where ultimate bio-inertness is essential	0.17 0.61	600	1-14	
Stainless-steel-coated PEEK	• Universal for standard and bio-inert applications • UHPLC bio-inert applications	0.17	1200	1-14	• Metal-free flow path • Robust • Flexible • Resists corrosion better than stainless steel
PEEK-coated fused silica	• Industry standard for most LC applications	0.025 0.050 0.075 0.100 0.125	690	1-10	• Mechanically strong • Consistent, rigid flow path • Ideal replacement for stainless steel • To avoid permanent tube damage, always use pre-cut lengths
PEEK	• Most HPLC applications	0.13 0.18 0.25 0.50	480* 200**	1-14	• Smooth internal surface minimizes turbulence for improved resolution • Flexible, easily cut to length • Use with PEEK or stainless steel fittings • Excellent solvent compatibility

*At ambient temperature with water
**With acetonitrile at non-ambient temperature

Fittings for a strong, capillary flow path

Agilent offers more than 20 fitting varieties for Swagelok-type or metric M4/M3-type connections. Depending on your application, different materials must be used:

- Stainless steel or PEEK delivers permanent high-pressure sealing performance for connections such as valves, heaters, and columns
- Stainless steel ensures permanent high-pressure sealing and optimal performance throughout your LC system up to 1200 bar
- Finger-tight fittings (polymeric for 400 bar and polyketone for 600 bar) are a convenient option; They allow easy end fitting adjustment, so you can seat the capillary into the column properly, preventing extra-column voids and leaks
- High-pressure fittings, which can be used with pressures up to 1200 bar, can be removed and replaced
- It's a good idea to use stainless steel nuts and ferrules for instrument connections, and PEEK nuts and ferrules for column and guard column connections, since these are changed most frequently

Agilent fittings for leak-free connections

Fitting type	Advantages/Tips

Swagelok-type fittings	• Suitable for most connections
	• Available in a variety of combinations:
	  • One piece or multiple pieces with nut + front and back ferrules
	  • Stainless steel, PEEK, polyketone, or a stainless steel/PEEK combination

Metric M4/Metric M3	• For micro valve connections
Stainless steel	• At least 1200 bar • Most popular material for permanent, high-pressure sealing • Use our slitted socket wrench (Part No. 8710-2391 or 5023-0240) for optimal tightness
1200 bar removable fittings for 1290 Infinity LC	• 1200 bar • Available in standard, long, and extra-long sizes for compatibility with columns that have different sized nuts • Removable and replaceable • Use our slotted socket wrench (Part No. 8710-2391 or 5023-0240) for optimal tightness
PEEK	• Up to 400 bar (at ambient temperature with water) • Easy, finger-tight column connections • Ideal for frequently changed connections, such as column connections • Pressure is less critical
Polyketone	• <600 bar (600 bar pressure rating) • Easy, finger-tight column connections • Fits stainless steel tubing

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

LC Capillaries ordering information

Agilent 1260/1200/1100 Infinity Series LC

From (A)	To (B)	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Notes	Part No.
Pump	Autosampler	SS	0.17	900	S	S	Pre-swaged on A	G1329-87300
Pump	Autosampler	SS	0.17	700	S	S	Pre-swaged on A and B	G1312-87304
Pump	Autosampler	SS	0.17	500	S	S	Pre-swaged on A	G1312-67305
Pump	Autosampler	SS	0.17	400	S	S	Pre-swaged on A and B	G1312-87303
Pump	Autosampler	SS	0.17	380	S	S	Pre-swaged on A and B	01090-87306
Manual injector	Column	SS	0.17	180	S	S	Pre-swaged on A	G1313-87305
Manual Injector	TCC	SS	0.17	500	SH	S		G1328-87600
Heater	Column	SS	0.17	90	S	S		G1316-87300
Column	Detector	SS	0.17	380	S	S	Pre-swaged on A; thermal isolation	G1315-87311
TCC\VWD	MS	SS	0.12	500	S	S	Pre-swaged on A	G1316-87309
Column	VWD	PK	0.17	600			Finger-tight fittings not included (0100-1516, 2/pk)	5062-8522
Pump Purge Valve	Waste	PK	1.3	5000*			No fitting needed	5062-2461
Detector	Waste	PTFE	0.8	5000*			Finger-tight fittings not included (0100-1516, 2/pk)	5062-2462
VWD	Waste	PK	0.25	500			Finger-tight fittings not included (0100-1516, 2/pk)	5062-8535
Autosampler	TCC	SS	0.12	180	S	S	Pre-swaged on A; can also be connected to low dispersion heat exchanger	G1313-87304
Thermostatted Autosampler	TCC	SS	0.12	280	S	S	Pre-swaged on A; can also be connected to low dispersion heat exchanger	01090-87610
TCC	Column	SS	0.12	105	S	S	Pre-swaged on A	01090-87611
Column	DAD	SS	0.12	150	S	S	Pre-swaged on A	G1315-87312
Female adapter for connecting long columns		SS	0.17	150	S			G1315-87303
Purge Valve**	Waste	SS and FS	0.17	150	S	U		G1312-67500

*Capillary is intended to be cut to the right length for your need.

**Calibration capillary assembly

Material

Key	Description
SS	Stainless steel
PK	PEEK
PTFE	PTFE
FS	Fused silica
S	Swagelok 1.6 mm port id
SH	Swagelok 1.6 mm port id, long head
U	Swagelok union

Agilent 1290 Infinity Series LC

From (A)	To (B)	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Notes	Part No.
Pump	Autosampler	SS	0.17	300	S	S	Pre-swaged on A and B	5067-4657
Pump	Thermostatted Autosampler	SS	0.17	450	S	S	Pre-swaged on A and B	5067-4658
Autosampler	TCC	SS	0.12	340	S	S	Pre-swaged on A	5067-4659
Column	DAD	SS	0.12	220	S	S	Pre-swaged on A	5067-4660
1290 System	CTC Autosampler	SS	0.17	600	S	SH	Pre-swaged on A	5067-4670
CTC Autosampler	Column	SS	0.12	600	S	S		5067-4669
Detector	Waste	PTFE	0.8	5000*			Finger-tight fittings not included (0100-1516, 2/pk)	5062-2462

*Capillary is intended to be cut to the right length for your need.

Stainless steel fittings (S), 5062-2418

Finger-tight PEEK fitting (SPF), 0100-1516

Stainless steel back ferrule, 5180-4114

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

LC Capillaries ordering information

Agilent 1290 Valve Head

From (A)	To (B)	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Notes	Valve Information	Part No.
Autosampler	Valve with Swagelok port	SS	0.12	340	S	SX	Pre-swaged on A		5067-4684
Autosampler	Valve with Swagelok port	SS	0.12	340	S	SX	Pre-swaged on B	G4231A/B 2 Position/6 Port valve head, 600/1200 bar	5067-4647
Autosampler	Valve with M4 port	SS	0.12	340	SLV	M		G4232A 2 Position/10 Port micro valve head, 600 bar	5067-4744
Autosampler	Valve with M4 port	SS	0.12	500	SLV	M		G4234A/B 6 column selector valve, 600/1200 bar	5067-4745
Valve with 10/32 Swagelok port	Heat exchanger	SS	0.12	90	SX	S	Pre-swaged on A and B	G4231A/B 2 Position/6 Port valve head, 600/1200 bar	5067-4649
Valve with M4 port	Heat exchanger	SS	0.12	90	M	SL	Pre-swaged on B	G4232A 2 Position/10 Port micro valve head, 600 bar	5067-5106
Short column	Valve with M4 port	SS	0.12	130	SV	M		G4234A/B 6 column selector valve, 600/1200 bar	5067-4735
Short column	Valve with M4 port	SS	0.12	150	SV	M		G4232A 2 Position/10 Port micro valve head, 600 bar	5067-5104
Long column	Valve with M4 port	SS	0.12	280	SV	M		G4232A 2 Position/10 Port micro valve head, 600 bar	5067-5107
Short column	Valve with Swagelok port	SS	0.12	150	SL	SX	Pre-swaged on B	G4231A/B 2 Position/6 Port valve head, 600/1200 bar	5067-4650
Short column	Valve with 10/32 Swagelok port	SS	0.12	150	SL	SX		G4232B 2 Position/10 Port valve head, 1200 bar	5067-4686
Long column	Valve with Swagelok port	SS	0.12	280	SL	SX	Pre-swaged on B	G4231A/B 2 Position/6 Port valve head, 600/1200 bar	5067-4651
Long column	Valve with Swagelok port	SS	0.12	280	SL	SX		G4232B 2 Position/10 Port valve head, 1200 bar	5067-4687

(Continued)

Stainless steel extra long fitting (SX), 5065-9967

1200 bar removable long fitting (SLV), 5067-4738

M4 stainless steel screw, 5067-1558

Stainless steel fittings (S), 5062-2418

Stainless steel ferrule (M), 5067-1557

Agilent 1290 Valve Head

From (A)	To (B)	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Notes	Valve Information	Part No.
Valve Swagelok port	Detector	SS	0.12	200	SX	S	Pre-swaged on A and B	G4231A/B 2 Position/6 Port valve head, 600/1200 bar	5067-4653
Valve with Swagelok port	Detector	SS	0.12	200	SX	S	Pre-swaged on A	G4232B 2 Position/10 Port valve head, 1200 bar	5067-4689
Valve with M4 port	Detector	SS	0.12	250	M	SLV		G4232A 2 Position/10 Port micro valve head, 600 bar	5067-4746
Heat exchanger	Valve with M4 port	SS	0.17	90	SL	M	Pre-swaged on A	G4232A 2 positions/10 ports valve head, 1200 bar	5067-5109
Column	Valve with M4 port	SS	0.17	90	SV	M		G4232A 2 positions/10 ports valve head, 1200 bar	5067-5110
Column	Valve with M4 port	SS	0.17	150	SV	M		G4232A 2 positions/10 ports valve head, 1200 bar	5067-5111
Column	Valve with M4 port	SS	0.17	280	SV	M		G4232A 2 positions/10 ports valve head, 1200 bar	5067-5112
G4232A 2 positions/ 10 ports valve head, 1200 bar		SS	0.17	250	SL	M	Pre-swaged on A	G4232A 2 positions/10 ports valve head, 1200 bar	5067-5113

Agilent 1200 and 1100 Prep LC Systems

From	To	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Notes	Part No.
Prep Isocratic	Autosampler	SS	0.6	400	S	S	Pre-swaged on A and B	G1361-67302
Autosampler	Column	SS	0.5	600	S	S/SX		G2260-87300
Autosampler	Column	SS	0.5	400	S	SH		G2260-87301

Material

Key	Description
SS	Stainless steel
S	Swagelok 1.6 mm port id
SH	Swagelok 1.6 mm port id, long head
SL	Swagelok 1.6 mm port id, long
SLV	Swagelok 1.6 mm port id, long, 1200 bar
SX	Swagelok 1.6 mm port id, extra-long
M	Metric M4 0.8 mm port id

Stainless steel fittings (S), 5062-2418

Stainless steel extra long fitting (SX), 5065-9967

1200 bar removable fitting (SV), 5067-4733

PEEK fittings, plugs (MP), 5065-4410

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

LC Capillaries ordering information

Miscellaneous Capillaries

Material	ID (mm)	Length (mm)	Fitting Type From (A)	Fitting Type To (B)	OD (mm) A*	OD (mm) B*	Notes	Part No.
SS	0.12	70	S	S	1.6	1.6		G1316-87303
SS	0.12	2000	U	U			Restriction Capillary	5022-2159
SS	0.12	105			1.6	1.6	Capillary without fitting	5021-1820
SS	0.12	400			1.6	1.6	Capillary without fitting	5021-1823
SS	0.12	150			1.6	1.6	Capillary without fitting	5021-1821
SS	0.12	280			1.6	1.6	Capillary without fitting	5021-1822
SS	0.12	500			1.6	1.6	Capillary without fitting	5065-9964
SS	0.12	200			1.6	1.6	Capillary without fitting	5065-9935
SS	0.12	50	S	U	1.6			G1316-87312
SS	0.12	340	S	S	1.6	1.6		G1316-87319
SS	0.12	170	S	S	1.6	1.6		G1316-87316
SS	0.12	300	S	S	1.6	1.6		G1316-87318
SS	0.12	210	S	S	1.6	1.6		G1316-87317
SS	0.12	70	S	U	1.6			G1316-87313
SS	0.12	90	S	U	1.6			G1316-87314
SS	0.12	60	S	S			Pre-swaged on A and B	79841-87610
SS	0.12	340	S	M		0.8	Pre-swaged on A	G1316-87305

*1.6 mm = 1/16 in

(Continued)

Material

Key	Description
SS	Stainless steel
PK	PEEK
PK/SS	PEEK and Stainless steel
Ti	Titanium
S	Swagelok 1.6 mm port id
U	Swagelok union
SL	Swagelok 1.6 mm port id, long
SLB	Swagelok 1.6 mm port id, long bio
SV	Swagelok 1.6 mm port id, 1200 bar
SLV	Swagelok 1.6 mm port id, long, 1200 bar
SX	Swagelok 1.6 mm port id, extra-long

Stainless steel fittings (S), 5062-2418

Miscellaneous Capillaries

Material	ID (mm)	Length (mm)	Fitting Type From (A)	Fitting Type To (B)	OD (mm) A*	OD (mm) B*	Notes	Part No.
SS	0.12	100	M	M	0.8	0.8		G1316-27301
SS	0.12	75	S	M	1.6	0.8		G1316-87306
SS	0.12	90	S	SX	1.6	1.6		5067-4685
SS	0.12	120	SX	SX	1.6	1.6		5067-4688
SS	0.17	105			1.6	1.6	Capillary without fitting	5021-1816
SS	0.17	400			1.6	1.6	Capillary without fitting	5021-1819
SS	0.17	150			1.6	1.6	Capillary without fitting	5021-1817
SS	0.17	280			1.6	1.6	Capillary without fitting	5021-1818
SS	0.17	280	S	S	1.6	1.6	Pre-swaged on A	01090-87304
SS	0.17	200			1.6	1.6	Capillary without fitting	5065-9931
SS	0.17	600			1.6	1.6	Capillary without fitting	5065-9933
SS	0.17	800	S	S	1.6	1.6	Pre-swaged on A	01048-87302
SS	0.17	900			1.6	1.6	Capillary without fitting	5065-9963
SS	0.17	105	S	S	1.6	1.6		G1316-87321
SS	0.17	700			1.6	1.6	Capillary without fitting	5065-9932
SS	0.17	170	S	S	1.6	1.6		G1316-87323
SS	0.17	250	S	S	1.6	1.6	Pre-swaged on A and B	G1367-87304
SS	0.17	150	S	S	1.6	1.6	Pre-swaged on A and B	G1312-87305
SS	0.17	800	SL	S	1.6	1.6	Pre-swaged on A	01078-87305
SS	0.17	105	S	S	1.6	1.6	Pre-swaged on A and B	G1312-87306
SS	0.17	280	SX	S	1.6	1.6	Pre-swaged on A and B	5067-4608
SS	0.17	700	S	SX	1.6	1.6	Pre-swaged on A and B	5067-4648
SS	0.17	150	M	M	0.8	0.8		5067-4737
SS	0.17	700	SL	M	1.6	0.8	Pre-swaged on A	5067-5120

*1.6 mm = 1/16 in

(Continued)

Stainless steel extra long fitting (SX), 5065-9967

Stainless steel ferrule (M), 5067-1557

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

LC Capillaries ordering information

Miscellaneous Capillaries

Material	ID (mm)	Length (mm)	Fitting Type From (A)	Fitting Type To (B)	OD (mm) A*	OD (mm) B*	Notes	Part No.
SS	0.17	280	SX	SX	1.6	1.6	Pre-swaged on A and B	5067-4607
SS	0.17	280	SX	S	1.6	1.6	Pre-swaged on A and B	5067-4608
SS	0.17	400			1.6	1.6	Capillary without fitting	5021-1819
SS	0.17	500	SX	Nut (P/N 0100-2086)	1.6	1.6	Pre-swaged on A	5067-4609
SS	0.17	600			1.6	1.6	Capillary without fitting	5065-9933
PK/SS	0.17	100			1.6	1.6	Capillary without fitting	5067-4777
PK/SS	0.17	150			1.6	1.6	Capillary without fitting	5067-4778
PK/SS	0.17	200			1.6	1.6	Capillary without fitting	5067-4779
PK/SS	0.17	300			1.6	1.6	Capillary without fitting	5067-4780
PK/SS	0.17	400			1.6	1.6	Capillary without fitting	5067-4781
PK/SS	0.17	500			1.6	1.6	Capillary without fitting	5067-4782
SS	0.25	320	S	S	1.6	1.6	Pre-swaged on A and B	79835-87638
SS	0.5	105			1.6	1.6	Capillary without fitting	5065-9927
SS	0.5	150			1.6	1.6	Capillary without fitting	5022-6509
SS	0.5	200			1.6	1.6	Capillary without fitting	5022-6510
SS	0.5	800			1.6	1.6	Capillary without fitting	5065-9926

*1.6 mm = 1/16 in

Material

Key	Description
SS	Stainless steel
PK	PEEK
PK/SS	PEEK and Stainless steel
Ti	Titanium
S	Swagelok 1.6 mm port id
U	Swagelok union
SL	Swagelok 1.6 mm port id, long
SLB	Swagelok 1.6 mm port id, long bio
SV	Swagelok 1.6 mm port id, 1200 bar
SLV	Swagelok 1.6 mm port id, long, 1200 bar
SX	Swagelok 1.6 mm port id, extra-long

Stainless steel fittings (S), 5062-2418

Stainless steel extra long fitting (SX), 5065-9967

Stainless steel ferrule (M), 5067-1557

Supplies for the Agilent Infinity 1260 Bio-inert LC System

From (A)	To (B)	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Notes	Part No.
Pump	Thermostatted autosampler	Ti	0.17	700	SLB	SLV	Pre-swaged on A	G5611-60501
Pump	Manual injection valve	Ti	0.17	900	SLB	SLV	Pre-swaged on A	G5611-60502
Pump	Injector	Ti	0.17	400	SLB	SLV	Pre-swaged on A	G5611-60500
Injector	Detector	PK/SS	0.17	400	SV	SV		G5667-60500
Manual injector	Detector	PK/SS	0.17	500	SV	SV		G5667-60501
Autosampler injection valve	Autosampler analytical head	Ti	0.17	160	SLB	SV	Pre-swagged on A	G5611-60503
Damper	Pump head	Ti	0.6	234	SLB	SLB	For pump only. Pre-swaged on A and B	G5611-67301
Outlet ball valve	Damper	Ti	0.6	248	SLB	SLB	For pump only. Pre-swaged on A and B	G5611-67300
Autosampler injection valve	Column	PK/SS	0.17	100	SV	SV	Included in the Bio Capillary starter kit; used for 2 position/6 port and 4 column selector valve	G5667-60502
Autosampler injection valve	Column	PK/SS	0.17	150	SV	SV	Included in the Bio Capillary starter kit	G5667-60503
Autosampler injection valve	Column	PK/SS	0.17	200	SV	SV	Included in the Bio Capillary starter kit	G5667-60504
Autosampler injection valve	Column	PK/SS	0.17	300	SV	SV	Included in the Bio Capillary starter kit; used for 2 position/6 port and 4 column selector valve	G5667-60505
Autosampler injection valve	Column	PK/SS	0.17		SV	SV	Bio-inert Low Dispersion Heat Exchanger	G5616-60050

Bio-inert Low Dispersion Heat Exchanger, G5616-60050

1200 bar removable fitting (SV), 5067-4733

1200 bar removable long fitting (SLV), 5067-4738

Titanium fitting (SLB), G5611-60502

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

LC Capillaries ordering information

PEEK Coated Fused Silica Capillaries for Nano LC

From (A)	To (B)	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Part No.
Switching valve	Column	FS/PK	25	100	MP	WPF	G1375-87320
EMPV	Flow sensor	FS/PK	25	220	WG	MP/WG	G1375-87321
Flow sensor	Injection valve	FS/PK	25	350	MP/WG	MP	G1375-87322
Switching valve	Column	FS/PK	25	550	MP	WPF	G1375-87323
Switching valve	Column	FS/PK	25	700	MP	WPF	G1375-87324
Switching valve	Column	FS/PK	50	100	MP	WPF	G1375-87325
Injection valve	Injector seat or to 2nd pump	FS/PK	75	650	MP	WG/WPF	G1375-87327

PEEK Coated Fused Silica Capillaries – 20 µL/min Flow

From (A)	To (B)	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Part No.
EMPV	Flow sensor	FS/PK	50	220	WG	WG	G1375-87301
Flow sensor	Injection valve	FS/PK	50	550	WG	MP	G1375-87310
Injection valve	Metering device	FS/PK	50	200	MP	WG	G1375-87302
Injection valve	Column	FS/PK	50	500	MP	WPF	G1375-87304
Column	Detector	FS/PK	50	400	WPF		G1315-68703
Detector	Waste	FS/PK	75	700			G1315-68708
µ-switching valve	Column	FS/PK	50	280	MP	WPF	G1375-87309

Stainless steel fittings, male (G), 5063-6593

Ferrule and stainless steel lock ring (W), 5065-4423

PEEK fittings, plugs (MP), 5065-4410

Double winged PEEK nut & ferrule (WPF), 5065-4422

PEEK Coated Fused Silica Capillaries – 100 µL/min Flow

From (A)	To (B)	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Part No.
EMPV	Flow sensor	FS/PK	100	220	WG	WG	G1375-87305
Flow sensor	Injection valve	FS/PK	100	550	WG	MP	G1375-87306
Injection valve	Metering device	FS/PK	100	200	MP	WG	G1375-87312
Injection valve	Column	FS/PK	75	500	MP	WPF	G1375-87311
Column	Detector	FS/PK	75	400	WPF		G1375-87308
Detector	Waste	FS/PK	75	700			G1315-68708
µ-switching valve	Column	FS/PK	50	280	MP	WPF	G1375-87309

Material

Key	Description
FS/PK	Fused silica/PEEK
W	Swagelok 0.8 mm port id
WG	Swagelok 0.8 mm port id, small head SW 4 mm
MP	Metric M4 0.8 mm port id, PEEK
WPF	Swagelok 0.8 mm port id, PEEK, finger-tight

Loop Capillaries

Volume (µL)	Agilent Autosampler	Part No.
8	G1389A	G1375-87303
	G1377A	G1375-87315
20	G1367E, G4226A	G4226-60310
40	G1367D	G1377-87310
	G1367E, G4226A	5067-4703
	G1377A	G1377-87300
	G1389A	G1329-87302
100	G1313A, G1329A/B, 1120, 1220 Infinity LC	01078-87302
	G1367A/B/C	G1367-87300
	G1367E, G4226A	5067-4710
	G5667A	G5667-60310
900	G1329A/B, G2260A	G1313-87303
5000	G2260A	G2260-68711

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

LC Capillaries ordering information

Agilent 1220/1120 Infinity Series LC Systems

From (A)	To (B)	Material	ID (mm)	Length (mm)	Fitting Type From	Fitting Type To	Notes	Part No.
Pump	Autosampler	SS	0.17	380	S	S	Pre-swaged on A and B	01090-87306
Manual Injector	Column	SS	0.17	180	S	S	Pre-swaged on A	G1313-87305
Heater	Column	SS	0.17	90	S	S		G1316-87300
Column	Detector	SS	0.17	380	S	S	Pre-swaged on A; thermal isolation	G1315-87311
VWD	Waste	PK	0.25	500			Finger-tight fittings not included (0100-1516, 2/pk)	5062-8535
Detector	Waste	PTFE	0.8	5000			Finger-tight fittings not included (0100-1516, 2/pk)	5062-2462

Material

Key	Description
SS	Stainless steel
S	Swagelok 1.6 mm port id
PK	PEEK
PTFE	PTFE

Stainless steel fittings (S), 5062-2418

Finger-tight PEEK fitting (SPF), 0100-1516

Tubing

PEEK Tubing

- Flexible and easy to cut to desired lengths
- Color coded for easy tracking
- Accepts both stainless steel and PEEK fittings
- 1/16 in od

PEEK Tubing

ID (mm)	Length (m)	Color Code	Part No.
0.50	1.5	Bone white	0890-1761
0.25	1.5	Blue	0890-1762
0.25	5	Blue	5042-6463
0.18	1.5	Green	0890-1763
0.18	5	Green	5042-6462
0.13	1.5	Red	0890-1915
0.13	5	Red	5042-6461

Other Tubing

Description	Length (m)	ID (mm)	OD (mm)	Part No.
PTFE tubing, FEP, primary use for valve solutions	5	0.7	1.6	5062-2462
PTFE solvent tubing, primary use for flow path from solvent bottle to degasser, to pump	5	1.5	3.1	5062-2483
Corrugated tubing, polypropylene	5	6.5		5062-2463
Silicone tubing	5	1	3	5065-9978
Clamps and micro clamps, 10/pk				5065-9976
Barbed Y-connector PP for 3/16 in id tube, 10/pk				5065-9971

(Continued)

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

LC Capillary Tubing ordering information

Other Tubing

Description	Length (m)	ID (mm)	OD (mm)	Part No.
For G2258A 1100/1200 Series Dual Loop Autosampler				
Front seat tube, SS	0.1	0.5		G2258-87316
Back seat tube, SS	0.12	0.5		G2258-87315
Front seat tube, PTFE	0.1	0.2		G2258-87312
Back seat tube, PTFE	0.12	0.25		G2258-87313
Waste tube	0.15	0.8		G2258-87310
Waste tube	0.1	0.8		G2258-87311
Drawing tube assembly for flush solvent				G2258-87307
Tubing assembly, solvent flush				G2258-87314
For G1313/27/29A 1100/1200 Series Autosampler				
Waste tube				G1313-87300
Corrugated tubing, polypropylene	5	6.5		5062-2463
For G1387A 1100/1200 Series Micro Autosampler				
Waste tube, FEP		0.8	1.6	G1375-87326

Plastic tubing cutter, 8710-1930

Accessories

Description	Part No.
Plastic tubing cutter	8710-1930
Blades for plastic cutter, 5/pk	8710-1931
Fitting screws, stainless steel, 10-32, 4 mm, 5/pk	5065-9948
PEEK ferrule and stainless steel ring for 2 mm tube, 5/pk	5065-9950
Union, PEEK for 1/8 in od tubing	0100-2410
Waste adapter, 1200 Series autosamplers, gray	G1313-43216

Fitting screws, 5065-9948

PEEK ferrules and SS rings, 5065-9950

Rigid Capillary Tubing

- Squarely cut, pre-cleaned and ready to use
- Use with stainless steel fittings and ferrules (P/N 5062-2418) or PEEK fittings (P/N 0100-1516)

Rigid Capillary Tubing

Length (mm)	ID (mm)	Unit	Part No.
100	0.17	10/pk	5061-3361
200	0.17	10/pk	5061-3362

Your best value:
Agilent multi-use capillary and fitting kits with FREE cybertool

Agilent starter kits contain the most widely used capillary tubing, Swagelok connectors, and fittings in a variety of sizes, so you can find just the right length to minimize your connections and tubing volume. We've also included our flexible stainless steel capillaries to help you make the best LC connections, regardless of equipment brand. Plus, as a special bonus, every multi-use kits (the first three listed here) feature a FREE cybertool that puts more than 30 lab essentials at your fingertips.

Keep in mind that Agilent tubing is color-coded to help you identify its diameter quickly.
See page 7

For high-efficiency columns, it's best to use narrow-diameter red tubing (0.12 mm id), instead of conventional green (0.17 mm id) tubing.

Capillary and fittings kits

Description	Contents	Part No.
Capillary/fitting starter kit for 1100 Capillary LC System Multi-use kit, a collection of various capillaries and tools for use in the lab.	Kit includes: Qty 2 – Fused silica/PEEK capillary, 50 µm, 55 cm Qty 1 – Fused silica/PEEK capillary, 50 µm, 20 cm Qty 1 – Fused silica/PEEK capillary, 100 µm, 110 cm Qty 2 – Fused silica/PEEK capillary, 50 µm, 50 cm Qty 2 – Fused silica/PEEK capillary, 50 µm, 40 cm Qty 4 – 4 mm stainless steel fitting, male 10-32 Qty 4 – 1/32 in PEEK ferrule and stainless steel lock ring Qty 4 – PEEK fittings for µ-valves Qty 4 – Double winged PEEK nuts and 1/32 in ferrules Cybertool	5065-9938
Capillary/fitting starter kit, 0.12 mm id Multi-use kit, a collection of various capillaries and tools for use in the lab.	Kit includes: Qty 1 – PEEK capillary, 0.13 mm id, 1.5 m Qty 4 – Stainless steel capillary, 0.12 x 105 mm Qty 4 – Stainless steel capillary, 0.12 x 150 mm Qty 2 – Stainless steel capillary, 0.12 x 170 mm Qty 2 – Stainless steel capillary, 0.12 x 200 mm Qty 2 – Stainless steel capillary, 0.12 x 220 mm Qty 2 – Stainless steel capillary, 0.12 x 280 mm Qty 1 – Stainless steel capillary, 0.12 x 400 mm Qty 3 – Stainless steel ZDV union Tubing cutter for PEEK capillaries 1/16 in Stainless steel fittings, 10/pk 1/16 in PEEK fittings, color, 10/pk 1/16 in PEEK fittings, 10/pk Rheotool Cybertool	5065-9937

(Continued)

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

LC Capillaries ordering information

Capillary and fittings kits

Description	Contents	Part No.
Capillary/fitting starter kit, 0.17 mm id Multi-use kit, a collection of various capillaries and tools for use in the lab.	Kit includes: Qty 1 – PEEK capillary, 0.18 mm id, 1.5 m Qty 4 – Stainless steel capillary, 0.17 x 105 mm Qty 4 – Stainless steel capillary, 0.17 x 150 mm Qty 2 – Stainless steel capillary, 0.17 x 200 mm Qty 2 – Stainless steel capillary, 0.17 x 280 mm Qty 1 – Stainless steel capillary, 0.17 x 400 mm Qty 3 – Stainless steel ZDV union Tubing cutter for PEEK capillaries 1/16 in Stainless steel fittings, 10/pk 1/16 in PEEK fittings, color, 10/pk 1/16 in PEEK fittings, 10/pk Rheotool Cybertool	5065-9939
Capillary starter kit, 0.17 mm BIO	Kit includes: Qty 1 – 1.5 m PEEK tubing PEEK finger-tight fitting, 10/pk Colored finger-tight PEEK fittings, 10/pk Qty 3 – Bio-inert union, 600 bar Qty 1 – Plastic tubing cutter Qty 1 – Rheotool socket wrench, 1/4 in Qty 1 – Ti capillary, 0.17 x 400 mm Qty 2 – PK/SS capillary, 0.17 x 105 mm Qty 2 – PK/SS capillary, 0.17 x 150 mm Qty 1 – PK/SS capillary, 0.17 x 300 mm Qty 2 – PK/SS capillary, 0.17 x 200 mm Multifunction tool	G5611-68710
Rapid Resolution High Throughput capillary kit Used for converting an Agilent 1200 instrument to the RRLC configuration, to enable use of high efficiency columns (to 600 bar). Can also be used for Agilent 1100 instruments.	Kit includes: Qty 1 – PEEK fitting long for 1/32 in od capillaries Qty 1 – Stainless steel capillary, 0.12 x 280 mm Qty 1 – Stainless steel capillary, 0.12 x 150 mm Qty 1 – Stainless steel capillary, 0.12 x 70 mm Qty 1 – Needle seat capillary, 12 µL x 0.12 mm Qty 1 – PEEK capillary, 0.125 x 550 mm	5065-9947
Low dispersion capillary kit for G1316C	Kit includes: Qty 1 – Flexible tubing, 280 mm, 0.12 mm id Qty 1 – Heater Long Down 0.12 id (1.6 µL internal) Qty 1 – Carrier for heat exchanger TCC SL Plus	5067-4633

(Continued)

Capillary and fittings kits

Description	Contents	Part No.
1200 Infinity Series capillary kit 0.12 mm id, G1316C for installing valves G4231A (2 position/6 ports – 600 bar) and G4231B (2 position/6 ports – 1200 bar)	Kit includes: Qty 1 – Column clip set, eight colors Qty 1 – Stainless steel capillary 0.12 x 340 mm Qty 1 – Stainless steel capillary 0.17 x 700 mm Qty 2 – Stainless steel capillary 0.12 x 90 mm Qty 2 – Stainless steel capillary 0.12 x 150 mm Qty 2 – Stainless steel capillary 0.12 x 280 mm Qty 1 – Stainless steel capillary 0.12 x 120 mm Qty 1 – Stainless steel capillary 0.12 x 200 mm Qty 1 – Heater Long Up 0.12 id (1.6 µL internal) Qty 1 – Heater Long Down 0.12 id (1.6 µL internal) Qty 2 – Carrier for heat exchanger TCC SL Plus	5067-4646
1200 Infinity Series capillary kit 0.17 mm id G1316C for installing a 2 position/10 port valve G4232A (600 bar)	Kit includes: Qty 2 – PEEK tubing, 1/32 in od, 0.4 mm id, 450 mm Qty 1 – Column clip set, eight colors Qty 3 – Stainless steel capillary 0.17 x 150 mm Qty 1 – Stainless steel capillary 0.17 x 340 mm Qty 4 – Stainless steel capillary 0,17 x 90 mm Qty 2 – Stainless steel capillary 0.17 x 280 mm Qty 1 – Stainless steel capillary 0.17 x 250 mm Qty 1 – Stainless steel capillary 0.17 x 700 mm	5067-5103
1200 Infinity Series capillary kit 0.12 mm id G1316C for installing a 2 position/10 port valve G4232B (1200 bar)	Kit includes: Qty 1 – Stainless steel capillary 0.12 x 120 mm Qty 2 – Stainless steel capillary 0.12 x 150 mm Qty 1 – Stainless steel capillary 0.12 x 200 mm Qty 2 – Stainless steel capillary 0.12 x 280 mm Qty 1 – Stainless steel capillary 0.12 x 340 mm Qty 1 – Stainless steel capillary 0.17 x 700 mm Qty 2 – Stainless steel capillary 0.12 x 90 mm Qty 1 – Column clip set, eight colors Qty 1 – Heater Long Up 0.12 id (1.6 µL internal) Qty 1 – Heater Long Down 0.12 id (1.6 µL internal) Qty 2 – Carrier for heat exchanger TCC SL Plus	5067-4682
1200 capillary kit for 0.12 mm id	Kit includes: Qty 1 – Stainless steel capillary, 0.12 x 130 mm Qty 2 – Stainless steel capillary, 0.12 x 170 mm Qty 1 – Stainless steel capillary, 0.12 x 210 mm Qty 1 – Stainless steel capillary, 0.12 x 300 mm Qty 3 – Stainless steel capillary, 0.12 x 500 mm Qty 1 – Stainless steel capillary, 0.12 x 700 mm Qty 1 – Stainless steel capillary, 0.12 x 340 mm Qty 1 – Low carry over seat Qty 1 – DAD heat exchanger capillary, 0.12 x 310 mm	G1316-68716

(Continued)

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

LC Capillaries ordering information

Capillary and fittings kits

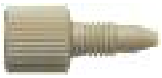
Description	Contents	Part No.
Stainless steel flexible capillary tubing kit	Kit includes: Qty 10 – 1.6 mm (1/16 in) Stainless steel back ferrules Qty 10 – 1.6 mm (1/16 in) Stainless steel front ferrules Qty 10 – Stainless steel fittings Qty 3 – Stainless steel Swagelok nut, 0.12 x 105 mm Qty 1 – Stainless steel capillary, 0.12 x 150 mm Qty 1 – Stainless steel capillary, 0.12 x 280 mm	5061-3304
Stainless steel flexible capillary tubing kit	Kit includes: Qty 2 – Stainless steel capillary, 0.12 x 35 mm Qty 3 – Stainless steel capillary, 0.12 x 105 mm Qty 1 – Stainless steel capillary, 0.12 x 280 mm	5061-3315
1200 Infinity Series low dispersion capillary kit for installing a 6 position/14 port valve G4234A (600 bar) and G4234B (1200 bar)	Kit includes: Qty 1 – Stainless steel capillary, 0.12 x 250 mm, with removable fitting Qty 1 – Stainless steel capillary, 0.12 x 340 mm, with removable fitting Qty 1 – Stainless steel capillary, 0.12 x 500 mm, with removable fitting Qty 8 – Stainless steel capillary, 0.12 x 130 mm, with removable fitting Qty 1 – Stainless steel capillary, 0.17 x 150 mm, with 2 long pre-swaged fittings Qty 4 – Stainless steel capillary, 0.12 x 170 mm Qty 2 – PEEK tubing, 1/32 in od, 0.4 mm id, 450 mm Qty 2 – PEEK fitting, special for Chip-LC Qty 1 – Column clip set, eight colors Qty 2 – Heater Long Up 0.12 mm id (1.6 µL internal) Qty 2 – Heater Long Down 0.12 mm id (1.6 µL internal) Qty 2 – Carrier for heat exchanger TCC Qty 2 – Fitting holder assembly	5067-4729
Ultra-low dispersion capillary kit for the 1290 Infinity LC	Kit includes: Qty 1 – Stainless steel capillary, 0.075 x 220 mm SV/SLV Qty 1 – Stainless steel capillary, 0.075 x 340 mm SV/SLV Qty 1 – Low dispersion needle seat for 1290 Infinity LC Qty 1 – Heater Long Up 0.075 mm (nominal 1.0 µL) Qty 1 – 1290 Infinity LC Low Dispersion Kit Note	5067-5189

Ultra-low dispersion capillary kit, 5067-5189


Stainless steel fittings (S), 5062-2418


PEEK fittings (SPF), 0100-1516/5063-6591


Stainless steel long fittings (SL), 5065-4454


Finger-tight PEEK fitting (SPF), 0100-1516


Stainless steel extra long fitting (SX), 5065-9967


PEEK long fittings (SPFL), 5062-8541


Stainless steel fitting, 5061-3303


Finger-tight PEEK fittings (SPF), 5065-4426


Stainless steel front ferrules, 5180-4108


Double winged fitting (SPF), 5042-6500


Stainless steel back ferrule, 5180-4114


PEEK RheFlex fittings (SPF), 0100-1631


1200 bar removable fitting (SV), 5067-4733


PEEK RheFlex fittings (SPF), 0100-2175


1200 bar removable long fitting (SLV), 5067-4738


Stainless steel blanking nut, 01080-83202


1200 bar removable extra long fitting (SXV), 5067-4739

Fittings

Description	Key	Unit	Part No.
Swagelok 1.6 mm stainless steel fitting	S	10/pk	5062-2418
Swagelok 1.6 mm stainless steel fitting, long screw	SL	10/pk	5065-4454
Swagelok 1.6 mm stainless steel fitting, extra long screw	SX	10/pk	5065-9967
Swagelok 1.6 mm screw		10/pk	5061-3303
1.6 mm stainless steel front ferrule		10/pk	5180-4108
1.6 mm stainless steel back ferrule		10/pk	5180-4114
Swagelok 1.6 mm 1200 bar removable fitting	SV	1/ea	5067-4733
Swagelok 1.6 mm 1200 bar removable fitting, long screw	SLV	1/ea	5067-4738
Swagelok 1.6 mm 1200 bar removable fitting, extra long screw	SXV	1/ea	5067-4739
Swagelok 1.6 mm finger-tight PEEK fitting	SPF	10/pk	5063-6591
Swagelok 1.6 mm PEEK finger-tight fitting	SPF	2/pk	0100-1516
Swagelok 1.6 mm PEEK finger-tight long fitting	SPLF	10/pk	5062-8541
Swagelok 1.6 mm PEEK finger-tight fitting (mixed colors)	SPF	10/pk	5065-4426
Swagelok 1.6 mm finger-tight PEEK double winged fitting	SPF	10/pk	5042-6500
Swagelok 1.6 mm finger-tight PEEK Rheflex fitting	SPF	5/pk	0100-1631
Swagelok 1.6 mm finger-tight PEEK Rheflex fitting (mixed color)	SPF	10/pk	0100-2175
Swagelok 1.6 mm stainless steel blanking nut	S	1/ea	01080-83202

(Continued)

Material

Key	Description
S	Swagelok 1.6 mm port id
SL	Swagelok 1.6 mm port id, long
SX	Swagelok 1.6 mm port id, extra-long
SV	Swagelok 1.6 mm port id, 1200 bar
SLV	Swagelok 1.6 mm port id, long, 1200 bar
SLB	Swagelok 1.6 mm port id, long bio
SXV	Swagelok 1.6 mm port id, extra-long, 1200 bar
SPF	Swagelok 1.6 mm port id, PEEK, finger-tight
SPLF	Swagelok 1.6 mm port id, PEEK, long, finger-tight

To learn more about Agilent LC capillary supplies, or to order now, visit **www.agilent.com/chem/LCcapillaries**

Fittings ordering information

Stainless steel nut and PEEK ferrule, 5067-1540

PEEK ferrule, 5067-1547

Finger-tight polyketone fitting (SPF), 5042-8957

M4 stainless steel screw, 5067-1558

Stainless steel ferrule (M), 5067-1557

Plastic fitting (S), 0100-1259

Stainless steel screw, 5063-6593

Ferrule and stainless steel lock ring (W), 5065-4423

PEEK fittings, plugs (MP), 5065-4410

Double winged PEEK nut & ferrule (WPF), 5065-4422

PEEk fitting, long (WPFL), 5022-6536

Fitting screws, 5065-9948

PEEK ferrules and SS rings, 5065-9950

Fittings

Description	Key	Unit	Part No.
Swagelok 1.6 mm stainless steel screw for PEEK ferrule 5067-1547	S	6/pk	5067-1540
Swagelok stainless steel screw with 1.6 mm PEEK ferrule	SP	1/ea	0100-2086
1.6 mm PEEK ferrule for 5067-1540 screw	SP	6/pk	5067-1547
Swagelok 1.6 mm finger-tight polyketone fitting	SPF	10/pk	5042-8957
M4 stainless steel screw for stainless steel ferrule 5067-1557	M	6/pk	5067-1558
0.8 mm stainless steel ferrule for 5067-1558 screw	M	6/pk	5067-1557
Swagelok 1.6 mm plastic blank nut	M	1/ea	0100-1259
Swagelok 1.6 mm SS screw, 4 mm head	G	10/pk	5063-6593
0.8 mm PEEK ferrule and stainless steel ring for 5063-6593 screw	W	10/pk	5065-4423
M4 0.8 mm PEEK fitting	MP	6 fittings, 2 plugs	5065-4410
Swagelok 0.8 mm finger-tight PEEK double winged fitting	WPF	10/pk	5065-4422
Swagelok 0.8 mm finger-tight PEEK long fitting	WPFL	1/ea	5022-6536
Swagelok 2.0 mm stainless steel screw, 4 mm head		5/pk	5065-9948
2.0 mm PEEK ferrule and stainless steel ring		5/pk	5065-9950

Material

Key	Description
S	Swagelok 1.6 mm port id
SP	Swagelok 1.6 mm port id, PEEK
SPF	Swagelok 1.6 mm port id, PEEK, finger-tight
W	Swagelok 0.8 mm port id
G	Small head SW 4 mm
WG	Swagelok 0.8 mm port id, small head SW 4 mm
MP	Metric M4 0.8 mm port id, PEEK
WPF	Swagelok 0.8 mm port id, PEEK, finger-tight

ZDV union, 5022-2145

Adapter, PEEK, 0100-2298

ZDV universal union, 5022-2184

Barbed Y-Connector PP, 5065-9971

ZDV union with fittings, 0100-0900

Union, female to female, 5042-8517

ZDV union, PEEK with fittings, 0100-2441

High flow union, 5022-2133

Adapter, male luer to female, 5042-8518

PEEK adapter, 0100-1847

Adapter, female to male, 5023-1803

Bio-inert union, 600 bar, 5067-4741

Micro T-connector, PEEK, 5042-8519

Unions

Description	Use With	Part No.
ZDV union, no fittings	Nano LC	5022-2145
ZDV universal union, stainless steel, no fittings	Standard LC	5022-2184
ZDV union, with fittings	Standard LC	0100-0900
ZDV union, PEEK with fittings	Bio-applications	0100-2441
High flow union, no fittings	Prep LC	5022-2133
PEEK adapter 1/4-28 to 10-32		0100-1847
Adapter, PEEK int. 1/4-28 to ext. 10-32		0100-2298
Barbed Y-connector PP for 3/16 in id tube, 10/pk		5065-9971
Adapter, union PEEK 1/4-28		5042-8517
Adapter, male Luer to female 1/4-28		5042-8518
SS adapter Swagelok to 1/4-28		5023-1803
T-connector, PEEK, swept volume 0.57 µL	For 1/16 in od tubing	5022-2144
Micro T-connector, PEEK, swept volume 29 nL, with 1/32 in id fittings		5042-8519
Bio-inert union, stainless steel with PEEK insert 600 bar	Bio-applications	5067-4741

Tips and tools for creating the best possible connections

How do I tighten fittings correctly?

The chart below describes the steps you'll need to follow.

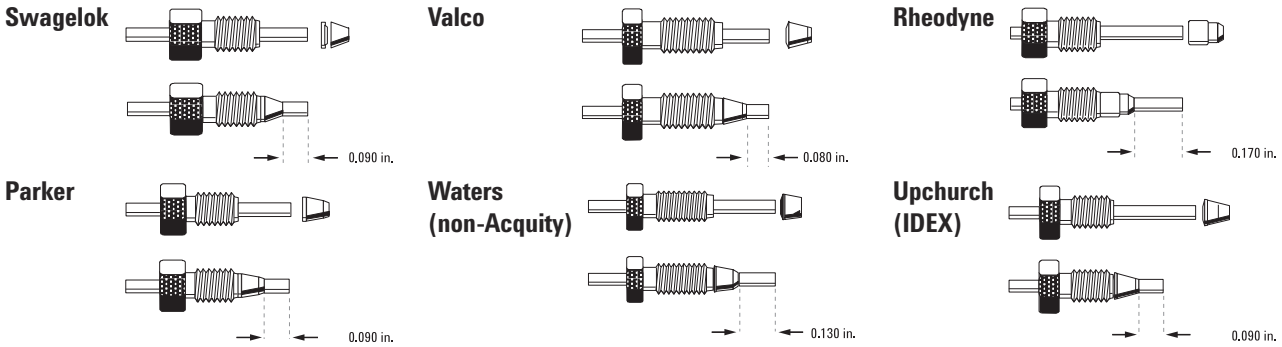
Fitting type	First Connection	Further connection
Stainless steel	1. Slide the screw, along with the back and front ferrules, onto the capillary. 2. Insert capillary into the port until it is completely seated in the end fitting. 3. Finger-tighten the nut until the capillary does not rotate. 4. Tighten the nut ½ to ¾ turn with a slitted socket wrench or Rheotool (P/N 8710-2391). If you are using a torque wrench, tightening torque should be between 1.5 and 3.0 Nm)	Finger-tighten, then tighten an extra ¼ to ½ turn with a slitted socket wrench or Rheotool (P/N 8710-2391). (If using a torque wrench, tightening torque should be between 1.5 and 3.0 Nm).
Polymeric finger-tight: PEEK and polyketone	1. Slide the screw and ferrule onto the capillary. 2. Insert capillary into the port until it is completely seated in the end fitting. 3. Finger-tighten the nut until the capillary does not rotate. 4. Make sure the capillary cannot be easily pulled out.	Additional tightening if necessary See "good connections" step by step
1200 bar removable fitting	1. Slide the screw, along with the back and front ferrules, onto the capillary. 2. Insert capillary into the port until it is completely seated in the end fitting. 3. Finger-tighten the nut until the capillary does not rotate. 4. Tighten the nut about ¾ turn with a socket wrench. 5. For stainless steel capillaries, if using a torque wrench, tightening torque should be between 1.0 and 1.2 Nm. 6. For stainless steel coated PEEK capillaries, do not exceed 0.8 Nm.	Finger-tighten, then tighten an extra ¼ to ½ turn with a socket wrench. For stainless steel capillaries, if using a torque wrench, tightening torque should be between 1.0 and 1.2 Nm. For stainless steel coated PEEK capillaries, if using a torque wrench, do not exceed 0.8 Nm
PEEK/stainless steel	1. Slide the screw, along with the back and front ferrules, onto the capillary. 2. Insert capillary into the port until it is completely seated in the end fitting. 3. Finger-tighten the nut until the capillary does not rotate. 4. Tighten the nut about ½ turn with a socket wrench.	Finger-tighten, then tighten an extra ¼ to ½ turn with a socket wrench.

How do I prepare the perfect fitting connection?

Problems with stainless steel tubing connections are commonly mistaken for column issues – and are the source of many calls to Agilent's technical support line.

Connection problems often arise because different manufacturers supply different types of fittings, as you can see in the following diagram:

Common HPLC column connectors by manufacturer



Ideally, you should use the fittings recommended by your column manufacturer. Most analytical reversed-phase columns are compatible with Swagelok or Parker-type fittings when correctly seated in the column.

Stainless steel fittings are the best choice for permanent, high-pressure sealing. Agilent recommends Swagelok-type fittings with front and back ferrules, because they deliver the best performance for Agilent LC systems – and can be used on most instrument connections, including valves, heaters, and column connections.

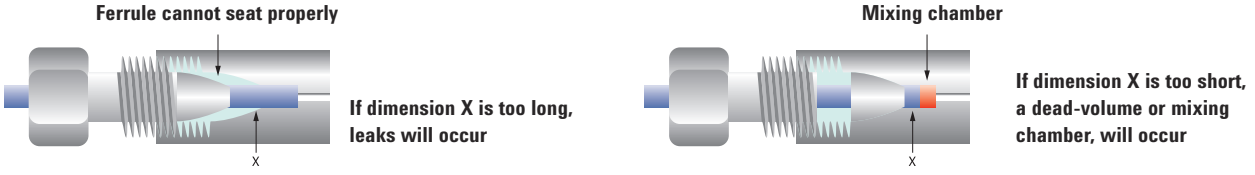
For lower-pressure operation to 600 bar, finger-tight polymeric fittings allow you to easily adjust the end-fitting to seat the capillary into the column properly – helping avoid extra-column voids and leaks. These connectors can be tightened without wrenches. High-pressure fittings, which are designed to be removed and resealed, are also available for pressures up to 1200 bar.

How do I align the connection properly?

The importance of correct tubing length (relative to the distance from the end of the tubing to the bottom of the ferrule) cannot be overstated. If the tubing is too long, the ferrule will not seat properly and leaks will occur. Likewise, if the tubing is not pushed in far enough, a void occurs, creating extra-column volume that acts as a "mixing chamber", which can cause peak tailing, and/or poor peak shape.

Always make sure you use the correct fittings, and that all fittings are properly seated in the column end fitting – especially if you use columns from different manufacturers.

Examples of incorrect fittings



Tips and tools

A good connection, step by step

This connection uses a Swagelok-type fitting which is good for connections to the instrument. For column connections, it is ideal to use polymeric finger-tight fittings, which are removable, or the 1200 bar removable fitting.

1. Select a nut that is long enough for the fitting you'll be using.
2. Slide the nut over the end of the tubing.
3. Carefully slide the ferrule components on after the nut, then finger-tighten the assembly while making sure the tubing is completely seated in the bottom of the end fitting.
4. Use a wrench to gently tighten the fitting; this will force the ferrule to seat onto the tubing, ½ to ¾ turn with a wrench. Do not over-tighten! That will shorten the useful life of the fitting.
5. Once you are sure your fitting is complete, loosen the nut and inspect the ferrule for correct position on the tubing.

Note: Avoid re-using a capillary on a different location. The position of the fitting is done the first time it is screwed on a port and all the ports are not strictly identical.

What are the benefits of a small internal diameter?

The roughness of the internal capillary surface is a function of the capillary's outer diameter.
A smaller outer diameter provides better smoothness for the internal capillary surface.

Agilent's unique stainless steel LC capillary connections for liquid chromatography are designed for small inner diameters, reducing backpressure and blocking. To make these connections compatible with standard 1/16 in capillaries, we weld a tight, flat sleeve at both ends. Agilent's unique laser welding process ensures that the capillary ends are absolutely flat, eliminating any chance of additional dead volume.

Which capillary connection size is right for me?

Choose the shortest practical length and narrowest diameter that your application and system allows. For 4.6 mm id columns, 0.17 mm capillaries are usually sufficient, but for narrower id columns like 2.1 mm, 0.12 mm id capillaries are used to keep sample dispersion as low as possible. There are also new ultra-low dispersion capillaries (0.075 mm id) for use with the 1290 Infinity LC.

How can I get rid of extra-column effects?

Extra-column volume effects can be caused by capillaries that are too long, so try a shorter-length capillary. For low-volume, high efficiency columns (e.g., Agilent ZORBAX Eclipse Plus C18, 2.1 x 50 mm, 1.8 µm), replace 0.17 mm id (green) capillaries with 0.12 mm id (red).

For additional information on extra-column volume and its effect, see our application note "Reduce Tubing Volume to Optimize Column Performance" at **www.agilent.com/chem/library/applications/5990-4964EN.pdf**

What should I do about high backpressure?

High backpressure issues are usually not caused by capillaries. However, you should check to make sure the capillary isn't blocked, and replace if necessary, as part of your troubleshooting.

How can I reduce peak broadening, related to my capillary?

In addition to optimizing the length and diameter of the capillary, proper positioning in the fitting is important. The distance between the end of the capillary and the bottom of the ferrule may be too long or too short (creating a void), resulting in a poor connection. This can cause leaks or peak shape issue, such as broadening when the sample mixes in the void. A re-usable fitting can be adjusted, but with stainless steel a new fitting will need to be made.

How do I eliminate detector spikes and bubbles?

Check for air leaks at the capillary connections, and tighten as needed.

Additional resources to help you get the best LC results

The LC Handbook: Guide to LC Columns and Method Development

This handy guide makes it easy to choose the right LC column, and contains plenty of tips and tricks to make your job easier and more productive.

Request a copy or download a mobile copy at **www.agilent.com/chem/lchandbook** (Publication no. 5990-7595EN)

LC Method Translator

Use this online tool to quickly factor in changes to column length, diameter, flow rate, and more – and to calculate method adjustments. This is particularly useful for gradient methods.

To download, go to **www.agilent.com/chem/lcmethodtranslator**

LC Flow Rate Calculator App

This FREE Smartphone app lets you quickly adjust your flow rate to accommodate other method changes.

Download at **www.agilent.com/chem/lcapp**

Agilent chemistries:
Keeping you in command of your analysis

Confidence comes from having the right tools and a partner you can count on. To give you the best choices for every analysis, Agilent offers the widest range of advanced sample preparation products, GC columns, and LC columns.

Agilent's meticulous production oversight ensures column and sample prep consistency and performance. With more than 40 years of experience producing polymers and silica chemistries, our team is committed to continuously developing new advances to make you more productive.

Agilent pH Meters:
Easy, Reliable pH Testing, Designed for Chromatographers

Agilent now offers a full line of pH meters and electrodes. Designed for chromatographers, these pH meters offer intuitive user design and exceptional ruggedness for your lab. Learn more at **www.agilent.com/chem/pHmeters**

For more information

Learn more:
www.agilent.com/chem/LCcapillaries

Buy online:
www.agilent.com/chem/store

Find an Agilent customer center in your country:
www.agilent.com/chem/wheretobuy

U.S. and Canada
1-800-227-9770
agilent_inquiries@agilent.com

Europe
info_agilent@agilent.com

India
lsca_india_marketing@agilent.com

Asia Pacific
adinquiry_aplsca@agilent.com

Printed in USA January 16, 2013
5991-0121EN

Scan the QR code with your smartphone for more information

Agilent Technologies