

# Selection Guide for GC Consumables

## GC Syringes

### Syringe selection by needle tip style

Needle Tip Style	Features / Applications
Cone (Tapered tip)	Most versatile needle for autosampler use and resist coring of vial and inlet septa
Bevel (Sharp tip)	Typically used for manual injections. The tip shape helps reduce septa coring
Side Hole (Dome tip with a side hole for sample exit)	Usually used for headspace and large volume injections
Blunt End or 90° (flat top)	Used for injectors that do not contain an inlet septa
Dual Gauge	Narrow gauge part suitable for megabore on-column injection. Wider part suitable for autosampler use

### Syringe selection by needle gauge size

- Gauge is a measure of the "thickness" of the needle
- The higher the gauge number, the thinner the needle e.g. a 23 gauge is thicker than a 26 gauge
- Suffix "s" e.g. 23s refers to a needle with a narrower internal diameter
- For on-column injection ensure that the column id is greater than the needle gauge

## Vials and Closures

Nature of Sample	Vial Type Recommended
Routine samples	Clear glass (with or without patch) as SureStop 9 mm screw thread or 11 mm crimp vial
Light sensitive samples	Amber glass (with or without patch) as SureStop 9 mm screw thread or 11 mm crimp vial
Low volume samples	Micro-Inserts or Microsampling and High Recovery vials with fixed inserts or reduced internal volume
Trace levels	Thermo Scientific™ Chromacol™ GOLD Inert glass vials, silanized glass and/or Certified Kits
Ultra Trace MS analysis	MSCERT kits: The first low particle, low background chromatography vials, pre-cleaned to provide unmatched consistency; tested and certified for up to 15 critical physical characteristics affecting vial performance for mass spectrometry

A benefit of the **AVCS** closures together with **Thermo Scientific™ SureStop™** vials is to provide a "crimped-like" product tightness and reliable quantification even for low boiling compounds; you remove the subjectivity of "is it tight enough/is it too tight?" When the cap stops, it is right!

## GC Liners

Liners are used as a vessel in which the injected liquid sample is vaporized into the gaseous state and then passed into the GC column.

Injection Method	Liner Requirements	Benefits
<b>Split</b>	<ul style="list-style-type: none"> <li>Typically open-ended</li> <li>Large surface area and volume</li> <li>Design to aid vaporization and mixing</li> <li>Low activity</li> </ul>	<ul style="list-style-type: none"> <li>High concentrated samples</li> <li>Less sample matrix into GC column</li> <li>High efficiency for capillary GC</li> </ul>
<b>Splitless</b>	<ul style="list-style-type: none"> <li>Typically tapered</li> <li>Small volume to aid transfer</li> <li>Low activity</li> </ul>	<ul style="list-style-type: none"> <li>Low concentrated samples or trace level analysis</li> </ul>
<b>PTV</b>	<ul style="list-style-type: none"> <li>Small to aid sample transfer</li> <li>Good thermal properties for rapid heating &amp; cooling</li> </ul>	<ul style="list-style-type: none"> <li>Most versatile injection including Split, Splitless, On-Column, Large Volume...</li> <li>Broad boiling range</li> </ul>

## GC Septa

Material	Max Operating Temperature	Key Features
BTO	400 °C (330 °C for 17 mm size)	Low bleed
TR-Green	350 °C	Long lifetime
Marathon	350 °C	High mechanical durability
TR-Blue	200–250 °C	Easy to penetrate, for routine applications

Used to isolate sample flow path from the outside world. Must be easily penetrated by the injector needle, whilst maintaining internal pressure.

## GC Ferrules

Material	Uses	Advantages	Limitations
100% Graphite	FID, NPD, high temperature	<ul style="list-style-type: none"> <li>Easy-to-use stable seal</li> <li>Higher temperature limit</li> <li>Can be easily removed</li> <li>Can be re-used</li> </ul>	<ul style="list-style-type: none"> <li>Not for MS or oxygen-sensitive detectors</li> <li>Soft, easily deformed or destroyed</li> <li>Possible system contamination</li> </ul>
85% Vespel / 15% Graphite	MS and oxygen-sensitive detectors	<ul style="list-style-type: none"> <li>Long lifetime</li> <li>High temperature limit</li> <li>MS compatible</li> </ul>	<ul style="list-style-type: none"> <li>Cannot be re-used</li> <li>Must be re-tightened after initial temperature cycles</li> </ul>
SilTite™ Metal	MS and oxygen-sensitive detectors	<ul style="list-style-type: none"> <li>Long lifetime</li> <li>High temperature limit</li> <li>MS compatible</li> </ul>	<ul style="list-style-type: none"> <li>Cannot be re-used</li> </ul>

Used to seal the connection of the column or liner to the system

## GC Columns

Column Parameter	Parameters Affecting Resolution			Performance Changes
	Efficiency	Retention	Selectivity	
Column Length (m)	✓			Doubling column length increases resolution by ~ 40%
Internal Diameter (mm)	✓	✓		The smaller the column I.D., the greater the efficiency and better the resolution
Film Thickness (µm)		✓		The thicker the film, the greater the retention e.g. ideal for highly volatile compounds. The thinner the film, the sharper the peaks and lower the bleed
Stationary Phase Chemistry			✓	Altering the stationary phase can affect elution order and help separate closely, or co-eluting peaks

For application specific GC columns visit [thermofisher.com/GCcolumns](http://thermofisher.com/GCcolumns)

Thermo Scientific™ GC consumables are available for both Thermo Scientific and Agilent™ instruments.

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