



# GC AND GC/MS

Your Essential Resource for Columns & Supplies

20  
15|16



Agilent Technologies



## Inlet Liners

Injection port liners have a variety of features to help vaporize the sample so that a true representation of the sample enters the column. Additionally, Agilent liners are individually packaged to maintain cleanliness until used. The part number and lot are silk screened on the liner for quality control and user convenience, and lot tracking is available for quality assurance.

## Liner Dimensions Driven by Inlet Operation

Well-controlled glass dimensions promote better liner-to-liner consistency, ensuring GC system accuracy and reproducibility. That is why Agilent liners are made to the following precise tolerances:

### Outer Diameter (OD)

- Larger od liners fit tightly to improve analyte recovery and limit sample migration onto the inlet's metal surface. Ideal for splitless injection.
- Smaller od liners are less resistant to carrier and split flow inside the inlet. Best for split injection.

### Internal Diameter (ID)

- Ensures that the sample vapor is small enough to fit within the volume of the liner.
- Prevents backflash, sample loss into the septum purge, and split lines – all of which can lower reproducibility and sensitivity.

## TIPS & TOOLS

### Clearly Better Inertness

Confidently quantify active analytes with industry leading Inert Flow Path solutions



- Agilent industry leading GC/MS instruments
- Ultra Inert columns
- Ultra Inert liners

To learn more and order your free poster, visit [www.agilent.com/chem/inert](http://www.agilent.com/chem/inert)

## Length

- Regulates internal volume and ensures proper sealing between the septum and the inlet seal.
- Precise glass bumps on the bottom of the liner allow you to repeatably position the liner relative to the inlet bottom. This is especially critical if you install liners by measuring the distance from the O-ring to the top of the liner.

## Tapers

None	Bottom Tapers	Dual Tapers
<ul style="list-style-type: none"> <li>• Straight tubes used in split injection with autosamplers</li> </ul>	<ul style="list-style-type: none"> <li>• Directs sample onto head of column and limits analyte exposure to bottom of inlet</li> <li>• Minimizes decomposition and discrimination</li> </ul>	<ul style="list-style-type: none"> <li>• Contain sample within glass liner limiting contact with metal inlet surface</li> <li>• Thought to limit loss through septum purge</li> </ul>

## Glass Wool

- Less molecular weight discrimination
- Provides additional surface area for sample vaporization, increasing reproducibility
- Serves as a trap for non-volatiles

For split liners, Agilent specifies the placement of glass wool in the liner so that the syringe penetrates the glass wool, wiping the syringe, to provide the most repeatable results with Agilent autosampler and split/splitless inlet design thermal profile.

Agilent Ultra Inert deactivated liners are recommended for samples with active analytes – such as phenols, amines, organic acids, pesticides and drugs of abuse – that could be irreversibly adsorbed on active surfaces in the inlet.

## Deactivation

Developed for your high sensitivity analyses, Ultra Inert deactivation provides extreme surface inertness – even for liners containing glass wool. Agilent Original deactivation is recommended for your everyday analyses. With use, even deactivated liners become active. Replace the liner regularly.

### TIPS & TOOLS

Tight control of liner dimensions is critical to reproducibility of GC results.





## Agilent Ultra Inert Liners

### Ensure a reliably inert flow path – with or without glass wool

Whether you are analyzing difficult, active environmental samples or screening for drugs of abuse, our Ultra Inert Inlet liners help ensure an inert GC flow path for higher sensitivity, accuracy, and reproducibility, especially at trace levels.

For samples that contain active or labile compounds, labs typically use liners without wool to prevent degradation or loss of active analytes. However, with Agilent Ultra Inert deactivation, liners with wool are recommended for no loss of sensitivity. The benefits provided by wool, such as homogeneous sample mixing and vaporization, non-volatile residue trapping, and column and detector protection, are gained without compromising detection of active analytes. Plus, Ultra Inert liners are more stable than liners with other deactivations, as shown on the following page. More samples can be analyzed before inlet or column maintenance is required when using Ultra Inert liners with wool.



#### Certified performance

Each deactivation lot is certified to ensure efficient, consistent coverage using both acidic and basic probes at trace (2 ng) levels on-column. In addition, every liner is packaged with a Performance Certificate that you can peel and stick into your lab notebook for quick compliance reference.

**Easy traceability:** The deactivation lot number is printed directly on the Performance Certificate; the liner lot number and part number are permanently etched on glass.

## Unequalled manufacturing and quality control deliver best-in-class liner deactivation performance

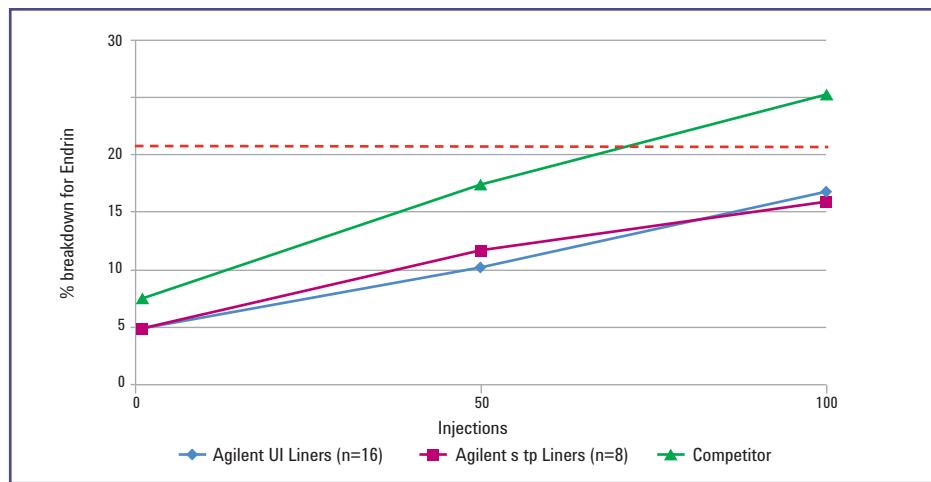
Agilent's proprietary manufacturing process produces Ultra Inert liners that are rigorously tested and certified to ensure exceptional batch-to-batch uniformity, low (to no) bleed or background contamination, and superior coverage – even with highly active compounds. This rigorous process includes:

- Lot testing to ensure reproducible deactivation coverage – and the stability of deactivation over time
- QC testing with probes specifically chosen to reveal activity
- A GC method that tests liner (not column or system) inertness
- The elimination of contamination – a common side effect of manufacturing and packaging



## Touchless packaging – an Agilent exclusive – eliminates O-ring hassles

Ultra Inert Inlet liners are delivered in pharmaceutical-grade PTEG tubing approved by GC/MS extraction testing. But what really sets Agilent's packaging apart is a pre-installed O-ring that has been pre-cleaned, conditioned, and non-stick plasma treated. This unique touchless packaging allows you to quickly and easily install the new liner without searching for and installing the O-ring – saving time and improving productivity, without the risk of contamination from touching.



Agilent Ultra Inert Liners with wool are superior vs. the competition as shown in this endrin breakdown comparison.

To learn more about creating the most inert flow path, visit [www.agilent.com/chem/inert](http://www.agilent.com/chem/inert)



Single taper, Ultra Inert liner with glass wool,  
5190-2293



Agilent Ultra Inert Liners

## Agilent Ultra Inert Liners

Agilent Ultra Inert liners are the perfect companion to Agilent J&W Ultra Inert GC columns. They provide reproducible inertness liner after liner, maintained through a sequence of samples, and for a range of analytes. Agilent's Ultra Inert liners were developed – and are manufactured and certified – using a suite of tests specifically designed to ensure batch-to-batch uniformity.

- Exceptional batch-to-batch liner uniformity
- Low to no bleed or background contamination
- Superior coverage, allowing use of glass wool even with highly active compounds

Only Ultra Inert liners are delivered in Agilent's exclusive touchless packaging with a pre-cleaned, conditioned and non-stick plasma treated O-ring pre-installed. Touchless packaging aids in removal of the old liner, and easy installation of the new, clean, preconditioned liner – without risk of contamination from touching.



### Agilent Ultra Inert Liners

Description		Volume ( $\mu\text{L}$ )	ID (mm)	1/pk	5/pk	25/pk	100/pk*
<b>Split Inlet Liners</b>							
	Low pressure drop, Ultra Inert Liner with glass wool	870	4	5190-2295	5190-3165	5190-3169	5190-3173
	Straight, Ultra Inert Liner with glass wool	990	4	5190-2294	5190-3164	5190-3168	5190-3172
<b>Splitless Inlet Liners</b>							
	Single taper, Ultra Inert Liner	900	4	5190-2292	5190-3162	5190-3166	5190-3170
	Single taper, Ultra Inert Liner with glass wool	900	4	5190-2293	5190-3163	5190-3167	5190-3171
	Splitless, double taper Ultra Inert Liner, no wool	800	4	5190-3983	5190-4007		
	Dimpled, splitless, Ultra Inert Liner	200	2	5190-2297	5190-4006		
	Splitless, straight, Ultra Inert Liner	250	2	5190-6168			
	Straight, Ultra Inert Liner	60	1	5190-4047			
	Straight Ultra Inert Liner for SPME	35	0.75	5190-4048			

\*The 100/pk is not in the Touchless packaging. O-rings must be purchased separately, p/n 5190-2269.

### TIPS & TOOLS

#### Ultra Inert gold seals prevent active sites from ruining your analysis



Unlike traditional machined seals, Agilent Ultra Inert gold inlet seals are manufactured using metal injection molding, followed by gold plating to ensure a smooth, consistent surface. We then apply our Ultra Inert chemistry on the gold to produce a leak-free seal that reduces active analyte adsorption.

Turn to page 67 for ordering information.

# Agilent Original Deactivation Split Liners

Agilent single taper split liners are made to strict dimension specifications for optimal inlet performance and feature the tightest tolerances for od, id, taper, and glass wool placement. For ease-of-use and reproducibility, some liners have a positioning bead, a restriction to secure the position of the glass wool, and a feature to consistently self-position to the recommended height. The liners also feature Agilent's Original proprietary deactivation.

## TIPS & TOOLS

Agilent recommends part number 5190-2295 as the top split liner, and for splitless injection UI part number 5190-2293

### Agilent Original Deactivation Split Liners

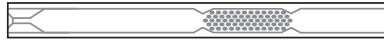
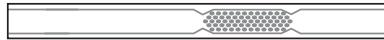
Description	Volume (µL)	ID (mm)	1/pk	5/pk	25/pk	100/pk
<b>Single Taper Split Liners</b>						
Single taper, glass wool, deactivated, low pressure drop	870	4	5183-4647	5183-4701	5183-4702	5190-2275
Single taper, glass wool, deactivated	870	4	5183-4711	5183-4712	5183-4713	
<b>Straight Split Liners</b>						
Straight, glass wool, non-deactivated	990	4	19251-60540	5183-4691	5183-4692	
<b>Focus Liners</b>						
Deactivated with glass wool	935	4		210-4004-5		
Tapered, deactivated with glass wool	880	4		210-4022-5		



Single taper split liner, 5183-4647, 5183-4711



Straight split liner, 19251-60540



Focus liners, 210-4004-5, 210-4022-5



View the Touchless Packaging demonstration video at [www.agilent.com/chem/touchless](http://www.agilent.com/chem/touchless)

## TIPS & TOOLS

To learn more about our comprehensive portfolio of Agilent CrossLab GC supplies – including our Agilent CrossLab original deactivation liners – go to [www.agilent.com/chem/CrossLab](http://www.agilent.com/chem/CrossLab)



## Agilent Original Deactivation Splitless Liners

### Agilent Original Deactivation Splitless Liners

Description	Volume ( $\mu\text{L}$ )	ID (mm)	1/pk	5/pk	25/pk	100/pk
<b>Single Taper Splitless Liners</b>						
Single taper, deactivated	900	4	5181-3316	5183-4695	5183-4696	5190-2270
Single taper, inert	900	4	5181-3316i			
Single taper, glass wool, deactivated	900	4	5062-3587	5183-4693	5183-4694	5190-2271
<b>Double Taper Splitless Liners</b>						
Double taper, deactivated	800	4	5181-3315	5183-4705	5183-4706	5190-2272
<b>Straight Splitless Liners</b>						
Straight, deactivated, quartz	250	2	5181-8818	5183-4703	5183-4704	
Straight, non-deactivated, quartz	250	2	18740-80220	5183-4707	5183-4708	
Straight, non-deactivated	990	4	210-3003	210-3003-5		
<b>Direct Inlet Liners</b>						
Straight, non-deactivated (for gas samples, headspace, or purge & trap)	140	1.5	18740-80200	5183-4709	5183-4710	
Direct inject liner, 18740-80200						

### TIPS & TOOLS

Need inlet liners and O-rings for your non-Agilent instruments?  
Check out the Agilent CrossLab inlet liners.

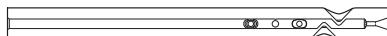
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# Agilent Specialty Injection Liners

## Agilent Specialty Injection Liners

Description	Volume (µL)	ID (mm)	1/pk	5/pk	25/pk
<b>MultiMode Inlet Heavy Matrix</b>					
<b>Dimpled</b>					
Dimpled splitless single taper, deactivated	200	2	5190-2296		
<b>Ultra Inert Deactivated Dimpled Liners</b>					
Dimpled, splitless, Ultra Inert Liner	200	2	5190-2297	5190-4006	
<b>Manual Injection</b>					
Straight split liner with cup, glass wool, and packing, 18740-60840	800	4	18740-60840	5183-4697	5183-4698
<b>SPME</b>					
SPME, deactivated	70	0.75	5188-6471		
SPME, Ultra Inert deactivation	70	0.75	5190-4048		
<b>Volatiles</b>					
Volatiles Organic Analysis liner	60	1	5190-4047		



Single taper dimpled splitless liner,  
5190-2296, 5190-2297

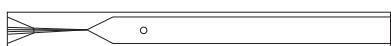


Straight split liner with cup, glass wool,  
and packing, 18740-60840

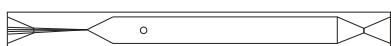
## TIPS & TOOLS

With Agilent Parts Finder quickly locate replacement parts for your Agilent instruments. Finding and ordering a part is as simple as clicking on an instrument model, clicking to locate the part, adding the part to a parts list, and printing the list for easy ordering – go to [www.agilent.com/chem/go2partsfinder](http://www.agilent.com/chem/go2partsfinder)





Single taper direct connect liner, G1544-80730



Dual taper direct connect liner, G1544-80700

**Direct Connect**

Description	ID (mm)	Part No.
<b>Direct Connect</b>		
Direct column connect	4	G1544-80730
Dual taper direct connect liner, splitless, Agilent proprietary deactivation	4	G1544-80700
Single taper direct connect liner, splitless, deactivated, inert	4	G1544-80731

**Programmed Temperature Vaporization (PTV) Liners**

Description	Volume ( $\mu\text{L}$ )	ID (mm)	Part No.
<b>PTV Liners</b>			
PTV liner, single baffle, glass wool, deactivated	180	2	5183-2038
PTV liner, single baffle, deactivated	200	2	5183-2036
PTV liner, multi baffled, deactivated	150	1.8	5183-2037
PTV liner, sintered glass, deactivated	112	1.5	5190-1426
<b>Liners for High Temperature PTV Inlet, G3506A</b>			
PTV liner, high temperature, quartz	713	3.4	5188-5313
PTV liner, high temperature, borosilicate	668	3.4	5188-5356

## Liner O-Rings

- Liners are sealed in the inlet with O-rings or graphite seals
- Graphite seals are used when inlet temperatures exceed 350 °C
- Fluorocarbon O-ring seals are easier to replace than graphite that deforms and flakes apart

Only Agilent fluorocarbon liner O-rings are:

- Pre-cleaned, then conditioned to eliminate out-gassing of contaminants, which is especially important for trace, ECD and MSD analyses
- Plasma treated for a non-stick, contaminant-free surface that won't stick to the inlet metal surface
- Packaged for convenience and cleanliness in a novel dial package that delivers 1 clean O-ring at a time



Liner O-rings, 5188-5365

### Liner O-Rings

Description	Unit	Part No.
Certified non-stick fluorocarbon O-ring	10/pk	5188-5365
	100/pk	5190-2269
Graphite O-ring for splitless liner	10/pk	5180-4173
Graphite O-ring for split liner	10/pk	5180-4168
Non-stick fluorocarbon liner O-ring for Flip Top	10/pk	5188-5366
	100/pk	5190-2268
High temperature PTV inlet liner fluorocarbon O-ring	10/pk	5188-5311



Non-stick fluorocarbon liner O-ring for Flip Top,  
5188-5366



### TIPS & TOOLS

Agilent's Ultra Inert GC liners are delivered in Touchless packaging with a certified, non-stick O-ring pre-installed.

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