

Dual Vespel Ring Inlet Seals

Washerless, Leak-Tight Seals for Agilent GCs

By Scott Grossman

- Easy installation reduces operator variability.
- Prevent leaks—improve chromatography and increase column lifetime.
- Maintain a leak-tight seal, even after multiple oven cycles.

A Critical Seal

In an Agilent split/splitless inlet, a critical seal is made between the bottom of the inlet body and the top of the inlet seal. This seal must be leak-free to maintain pressure and to prevent the air leaks that can compromise chromatography and shorten column lifetime. Traditionally, a lot of force was recommended to create this metal-to-metal connection, which caused installation variability among operators and a significant amount of wear and tear on the sealing edge of the inlet.

Restek's innovative Dual Vespel Ring inlet seal solves both these problems and eliminates the need for a spacing washer, giving you a better seal with fewer parts (Figure 1). Because there is no metal-to-metal contact, the Dual Vespel Ring seal requires much less torque to install, reducing variability among operators. The Vespel ring on the bottom creates another leak-free point and functions as a spacing ring, eliminating the need for a washer. This seal is also more forgiving than a metal-to-metal seal; the soft Vespel material will not damage the bottom of your inlet and it will seal more easily on inlets that have existing damage.

Figure 1: Vespel rings on both the top and bottom surfaces simplify installation by reducing the torque requirement and eliminating the need for a washer.



Reliable, Leak-Tight Seals

The Dual Vespel Ring inlet seal gives a much lower leak rate, with less torque required, than a conventional metal inlet seal (Figure 2). The seal is also exceptionally robust. While metal-to-metal connections are prone to leaking after multiple oven cycles, the Vespel material maintains a leak-free seal—even after repeated heating cycles—without retightening the reducing nut (Figure 3).

Figure 2: The Dual Vespel Ring inlet seal achieves a lower leak rate at lower torque than the conventional metal inlet seal at 200 °C.

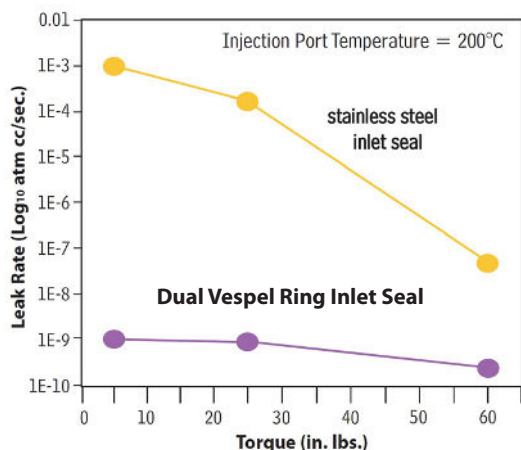
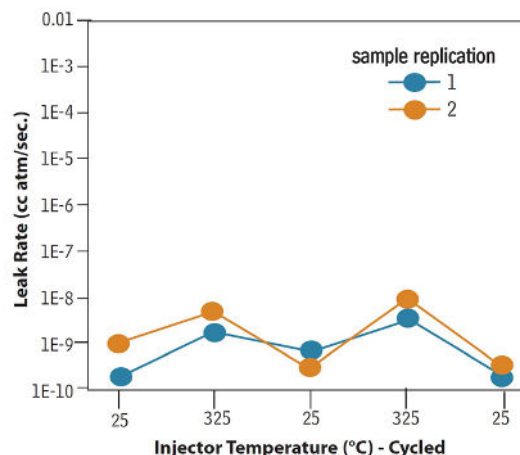


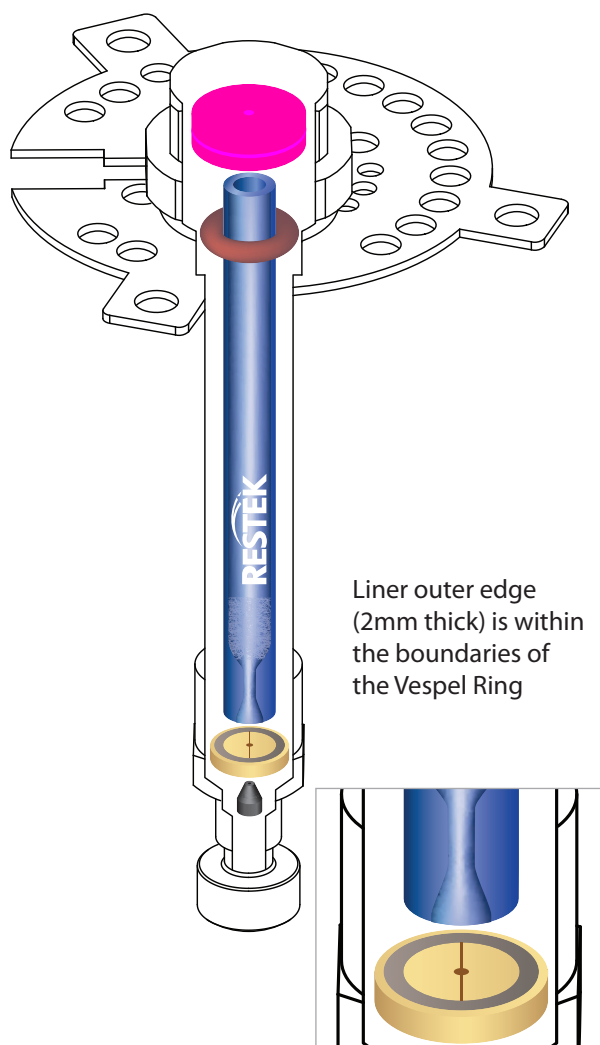
Figure 3: Dual Vespel Ring inlet seals remain leak-tight, even after repeated temperature cycles.



Inertness

Dual Vespel Ring inlet seals are designed to minimize sample exposure. The outer edge of the inlet liner is within the boundaries of the Vespel ring (Figure 4). Since the walls of the bottom of the liner are approximately 2mm thick, the Vespel material is well outside the flow path of the sample during split mode. In splitless mode, the sample may contact the Vespel material, however, the Vespel material is chemically resistant and has a very low offgassing profile. It is a polyimide-based polymer and is commonly used in ultra-high vacuum systems (e.g. lens insulators in some mass spectrometer sources) and in composite ferrules for inlets and mass spectrometer transfer lines, where leak-free seals and chemical inertness are critical.

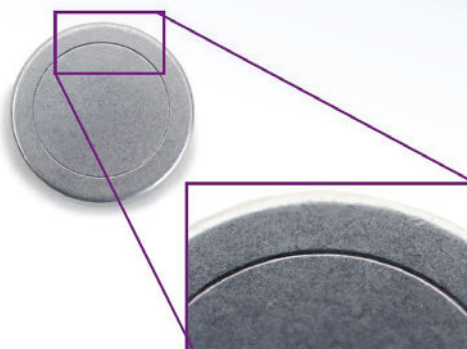
Figure 4: Cutaway image of an Agilent split/splitless inlet focused on the relative position of the inlet liner to the Vespel ring embedded in the top of the Dual Vespel Ring inlet seal.



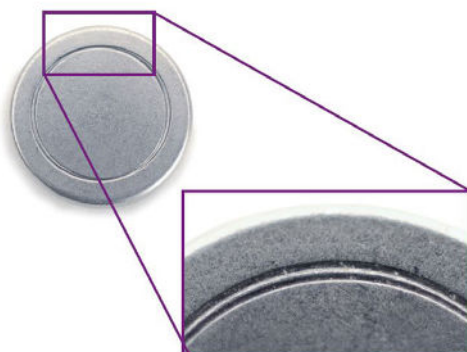
The Risks of Reuse

While reusing inlet seals may be an appealing money-saving technique, it can decrease the lifetime of both the column and the inlet. When you reinstall an inlet seal in the reducing nut it isn't always seated in the same position and more torque is required to create another leak-tight seal. This creates overlapping channels which may cause air leaks, introducing oxygen into a hot column and shortening column lifetime. Using new seals at each installation is far less costly than having to replace your column or inlet prematurely due to damage from over-tightening or leaks that could have been prevented.

After First Installation



After Second Installation



Conclusion

Restek's Dual Vespel Ring inlet seals offer a unique combination of performance and convenience. The soft Vespel sealing surface improves the quality of the seal between the reducing nut and the inlet without damaging the critical seal at the bottom of the inlet. Additionally, the Vespel ring on the bottom of the seal eliminates the need for a spacing washer, reducing necessary parts and simplifying installation.

Dual Vespel Ring inlet seals are the best choice for simple, leak-tight seals. They are available in bare stainless steel for analysis of unreactive compounds, gold-plated seals for more sensitive compounds, and Siltek-treated seals for the ultimate in inertness.

Dual Vespel Ring Cross-Disk Inlet Seals

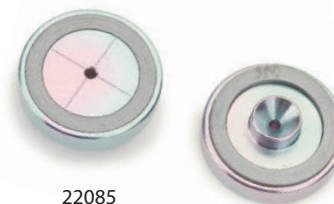
for Agilent GCs

- Ideal for high-flow split applications >500 mL/min.
- Washerless, leak-tight seals.

Description	ID	Material	qty.	cat.#
Dual Vespel Ring Cross-Disk Inlet Seal	0.8 mm	Gold-Plated	2-pk.	22083
	0.8 mm	Gold-Plated	10-pk.	22084
	0.8 mm	Siltek Treated	2-pk.	22085
	0.8 mm	Siltek Treated	10-pk.	22086



22083



22085

Dual Vespel Ring Inlet Seals

Washerless, Leak-Tight Seals for Agilent GCs

- Does not require a separate washer.
- Requires less torque to seal.
- Does not require retightening of reducing nut after several oven cycles.
- Extends column lifetime by preventing oxygen from reaching the column.
- Same price as the regular inlet seals with washers.
- Gold plating provides enhanced inertness versus stainless steel.

Description	ID	Instrument	Material	qty.	cat.#
Dual Vespel Ring Inlet Seal	0.8 mm	for Agilent GCs	Stainless Steel	2-pk.	21238
	0.8 mm	for Agilent GCs	Stainless Steel	10-pk.	21239
	0.8 mm	for Agilent GCs	Stainless Steel	50-pk.	23420
	0.8 mm	for Agilent GCs	Gold-Plated	2-pk.	21240
	0.8 mm	for Agilent GCs	Gold-Plated	10-pk.	21241
	0.8 mm	for Agilent GCs	Gold-Plated	50-pk.	23418
	0.8 mm	for Agilent GCs	Siltek Treated	2-pk.	21242
	0.8 mm	for Agilent GCs	Siltek Treated	10-pk.	21243
	0.8 mm	for Agilent GCs	Siltek Treated	50-pk.	23419
	1.2 mm	for Agilent GCs	Stainless Steel	2-pk.	21244
	1.2 mm	for Agilent GCs	Stainless Steel	10-pk.	21245
	1.2 mm	for Agilent GCs	Gold-Plated	2-pk.	21246
	1.2 mm	for Agilent GCs	Gold-Plated	10-pk.	21247
	1.2 mm	for Agilent GCs	Siltek Treated	2-pk.	21248
	1.2 mm	for Agilent GCs	Siltek Treated	10-pk.	21249



21240

Patented

Dual Vespel Ring Inlet Seals

Washerless, Leak-Tight Seals for Thermo TRACE 1300/1310 GCs and PerkinElmer Clarus 590/690 GCs

- Does not require a separate washer.
- Requires less torque to seal.
- Does not require retightening of reducing nut after several oven cycles.
- Extends column lifetime by preventing oxygen from reaching the column.
- Same price as the regular inlet seals with washers.
- Gold plating provides enhanced inertness versus stainless steel.

Description	ID	Instrument	Material	qty.	cat.#
Dual Vespel Ring Inlet Seal	0.8 mm	for Thermo 1300/1310 GCs and PerkinElmer Clarus 590/690 GCs	Gold-Plated	2-pk.	22243
	0.8 mm	for Thermo 1300/1310 GCs and PerkinElmer Clarus 590/690 GCs	Gold-Plated	10-pk.	22244
	0.8 mm	for Thermo 1300/1310 GCs and PerkinElmer Clarus 590/690 GCs	Siltek Treated	2-pk.	22247
	0.8 mm	for Thermo 1300/1310 GCs and PerkinElmer Clarus 590/690 GCs	Siltek Treated	10-pk.	22248
	1.2 mm	for Thermo 1300/1310 GCs and PerkinElmer Clarus 590/690 GCs	Gold-Plated	2-pk.	22245
	1.2 mm	for Thermo 1300/1310 GCs and PerkinElmer Clarus 590/690 GCs	Gold-Plated	10-pk.	22246
	1.2 mm	for Thermo 1300/1310 GCs and PerkinElmer Clarus 590/690 GCs	Siltek Treated	2-pk.	22249
	1.2 mm	for Thermo 1300/1310 GCs and PerkinElmer Clarus 590/690 GCs	Siltek Treated	10-pk.	22250

Patented