

Understanding Variations in Silicone Rubber Used in Autosampler Vial Septa - HPLC Primer

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Silicone rubber is the foundational material for most septa used in chromatography autosampler vial caps. However, the method of curing the silicone significantly affects its chemical properties, extractables profile, and suitability for specific analytical applications.

Curing Methods for Silicone Rubber

Silicone rubber must be cured (cross-linked) to achieve the mechanical and chemical properties required for septa. Two primary curing methods are used:

1. Addition Cure (Platinum-Catalyzed)

- Involves vinyl-functional oligomers and silicon hydride groups, catalyzed by platinum.
- Produces no new impurities during curing.
- Results in low extractables, making it ideal for LCMS and trace analysis.
- More expensive due to the platinum catalyst and controlled process.

2. Free Radical Cure (Peroxide-Catalyzed)

- Uses organic peroxides and heat to initiate cross-linking (vulcanization).
- May leave behind residual byproducts and higher extractables.
- Cost-effective and widely used for HPLC and GC applications.

MICROSOLV Septa Options

- AQR™ Septa (Advanced Quality): Manufactured using platinum-catalyzed curing, optimized for LCMS and ultra-trace analysis.
- Bonded Septa (Standard MICROSOLV Brand): Produced using peroxide curing, suitable for routine HPLC and GC workflows.

Role of PTFE Liners

All septa are lined with **PTFE** to minimize direct contact between the sample and silicone. However, repeated needle punctures can expose the sample to the underlying rubber, increasing the risk of contamination over time.

Comparative Extractables Profile

Extractable

Platinum-Cured Peroxide-Cured

pH Shift	0.0	-2.3
Total Organic Carbon (TOC)	2.63 µg/g	62.73 µg/g
Residue	13.3 mg/g	10.51 mg/g
Siloxanes	10,241 µg/g	3,837 µg/g

Note: While platinum-cured septa exhibit lower TOC and pH impact, they may have higher siloxane levels. Selection should be based on your analyte sensitivity and detection method.

Product Lines Featuring These Septa

- [AQ Brand Autosampler Vials and Caps](#)
- [RSA™ Vials, Inserts & Caps](#)

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