



Silicone rubber used in septa for autosampler vials purity variations – Tech Information

Silicone rubber is the backbone of most modern septum for chromatography vial caps. But the way the silicone is made will vary from manufacturer to manufacturer and even within the same manufacturer or brand.

During the manufacturing process, silicone rubber must be “cured” when it is cross-linked to produce the desired physical properties needed for autosampler vial caps.

There are two main processes to cure silicone rubber: an “Addition Cure” makes use of the vinyl functional groups, oligomers and silicon hydride groups with a catalyst such as platinum. This process produces no new impurities but is more expensive than other types of curing such as “Free Radical Cure”. The latter method uses peroxides at high heat to cross link the silicone. This process is often referred to as vulcanizing and is the second or alternate process used today.

All MicroSolv AQ™ (*Advanced Quality*) and AQR™ septa are manufactured with the platinum process making it most suitable for LCMS. The MicroSolv brand bonded septa (*silicone rubber bonded to the plastic cap*) caps are made with the peroxide process and have been used for years for HPLC and GC.

It is important to note that contact between silicone rubber and your sample is always minimized with the use of a PTFE liner that is bonded to the rubber. However, each time this liner is pierced by the autosampler needle, the possibility of contamination grows with contact to the silicone rubber.



Estimated example of the residue and impurities, referred to as extractables, of each type of curing process for autosampler vial cap septa are listed below.

| Extractables | Platinum Cured | Peroxide Cured |
|----------------------------|-----------------------|-----------------------|
| Possible pH Changes | 0 | -2.3 |
| Carbon (TOC) | 2.63 ug/g | 62.73ug/g |
| Residue | 13.3 mg/g | 10.51 mg/g |
| Siloxanes | 10,241 ug/g | 3,837 ug/g |

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