



CHROMATOGRAPHIC SPECIALTIES INC.

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Technical Note CS40

GC Injection Port Septa

Want to improve productivity and reduce costly downtime? It's as simple as changing your GC injection port septa on a regular basis as prolonged septum use can cause leaks that can lead to sample loss and column degradation due to oxygen exposure and septum bleed.

WHAT IS SEPTUM BLEED?

All septa contain volatile materials (e.g., silicone oils, phthalates, etc.) that can be released when heated to analysis temperatures. Septum bleed occurs when these volatiles collect on the column, then elute creating baseline disturbances or extraneous (ghost) peaks in the chromatogram. This problem is prevalent in temperature-programmed analyses, because the septum volatiles collect on the column during the oven cool-down and initial hold periods. Capillary columns require much lower gas flow rates than packed columns, therefore septum volatiles are more concentrated, and bleed problems are more pronounced in capillary GC systems. Baseline rise and extraneous peaks caused by septum bleed can interfere with identification and quantification of target analytes; because septum bleed is inconsistent, method reproducibility can also be a problem.

Using a split/splitless injector in conjunction with a septum purge vent decreases the amount of volatiles that collect on the column. However, direct injection techniques tend to concentrate the volatiles on the column head and amplify bleed; it is extremely important to use low bleed septum for these applications. It is worthwhile noting that while bleed tends to decrease over time as the septum becomes "conditioned", the likelihood of column degradation as the result of oxygen permeating the septa increases.

Over tightening the septum nut causes another common problem. The increased septum compression that results often causes bent needles and septum coring. Fragments from the cored septum can become trapped in the injector or column and result in additional bleed.

A QUICK TEST TO DETERMINE IF SEPTUM BLEED IS PRESENT

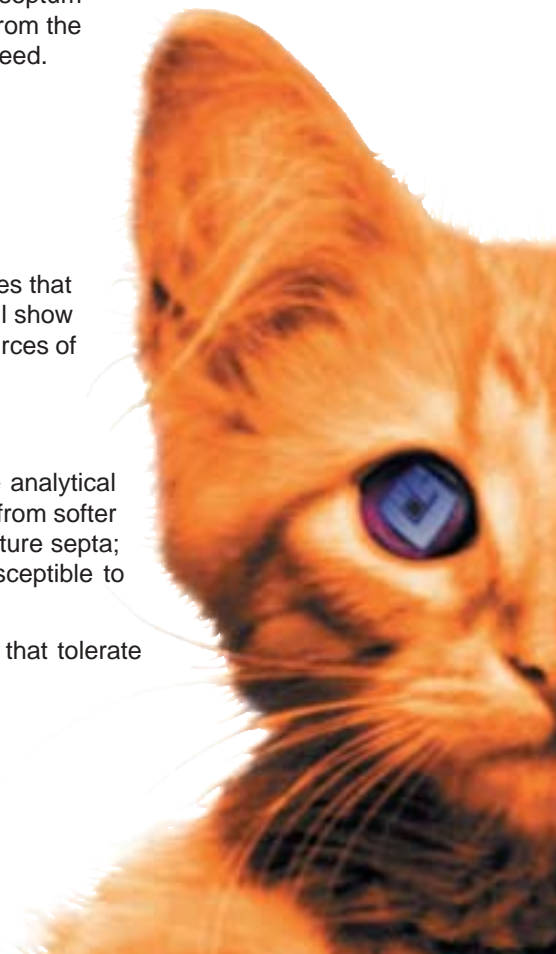
Perform this simple test if septum bleed is suspected.

1. Wrap the septa in clean aluminum foil and return it to the injection port.
2. Lower the injection port temperature to 50°C.
3. Using the same conditions as the analytical method, inject a blank sample, twice.
4. If septum bleed is present, the first run will show extraneous peaks (due to volatiles that had collected on the head of the column during analysis) while the second run will show diminished or absent extraneous peaks. If ghost peaks are still present, other sources of contamination should be investigated.

WHICH SEPTA SHOULD I USE?

Which septum to use is dependent on the injection port temperature dictated by the analytical method and the septum's thermal stability. Low temperature septa are manufactured from softer silicone formulations for better resealability and tend to last longer than high temperature septa; however septum bleed is more pronounced. This type of septum is also more susceptible to damage when the septum nut is over tightened.

High temperature septa are manufactured from slightly harder silicone formulations that tolerate higher temperatures and produce less bleed.



SEPTA HANDLING GUIDELINES

All septa, regardless of their composition, penetrability, or resistance to thermal degradation, will be a source of problems if they are mishandled.

- Always use clean forceps or cotton gloves to handle septa. Avoid handling septa with bare hands or powdered gloves as the septa will absorb finger oils, talcum, perfumes, etc.
- Follow manufacturer's instructions for septa installation and use.
- When conditioning septa, do not expose them to excessively high temperatures for extended periods as this can make the septa brittle. The best time to install a new septum is at the end of the day, allowing it to condition overnight.
- Avoid septum coring by using the proper injection syringe needle gauge and ensuring the needle is free of burrs. Tapered or conical needle terminations reduce both coring and the chance of residual sample being left on the septum.
- Over tightening a septum nut will invariably reduce septum lifetime by increasing coring and splitting problems.
- Use autoinjectors whenever possible.

CHROMSPEC GC SEPTA — TECHNICAL SPECIFICATIONS

CHROMSPEC GC Injection Port Septa are formulated to meet low bleed, heat stability and sealing specifications. All CHROMSPEC Septa are packaged in non-contaminating glassware. Request literature code **CS11** for ordering information.

CHROMSPEC Arctic Blue

This general purpose septum has excellent resealing properties and is stable to 250°C.

CHROMSPEC Emerald Green-HT

Low bleed CHROMSPEC Emerald Green septa are stable to 300° and excellent for MS applications.

CHROMSPEC ELB (Extreme Low Bleed)

CHROMSPEC ELB septa are manufactured using a new silicone manufacturing technology and a unique conditioning process to minimize bleed.

CHROMSPEC SEPTA Specifications

| Properties | Arctic Blue | Emerald Green | ELB |
|----------------------------|-------------|---------------|-----------|
| Colour | Blue | Green | Blue |
| Hardness (Durometer) | 40 | 60 | 50-60 |
| Temperature Range (°C) | 200-250* | 300 | >350 |
| Weight loss @ 350°C | 1.0% max. | 0.5% max | 0.5% max. |
| Lifetime (# of injections) | up to 150 | up to 100 | over 200 |

**Stable at 300°C for short periods of time*

For assistance selecting the best septum for your particular application or if you are interested in trying a sample, contact our Technical Support Team toll free at 1-800-267-8103 or by email at tech@chromspec.com.