

## Preventing Septum Problems

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- Avoid extraneous peaks by proper septum handling & maintenance.
- Handy size chart & septum choice guidelines.
- Optimize performance by choosing the right septum for the job.

### Septum Handling

All septa, regardless of their composition, puncturability, or resistance to thermal degradation, will be a source of problems if they are mishandled. Always use clean forceps or wear clean powderless or cotton gloves when handling septa. Do not handle them with bare fingers or with powdered latex gloves—contaminants such as finger oils, perfumes, make-up, fingernail polish, skin creams, hand soaps, and talcum can be absorbed into the septum and will bleed out during your analyses.

Also, follow septum and instrument manufacturers' recommendations when installing a septum. Over-tightening a septum nut invariably will reduce septum lifetime by increasing coring and splitting problems.

### Septum Bleed

All septa contain various amounts of volatile materials (e.g., silicone oils, phthalates) that can be released when the septum is heated to analysis temperatures. Septum bleed occurs when these volatiles enter the column, then elute from the column, creating elevated baselines (for isothermal analyses), baseline disturbances, or extraneous (but consistent) 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.

To avoid septum bleed, either condition your septum prior to running your analyses, or use a pre-conditioned septum that is ready for immediate use. Allowing the septum to condition at operating temperatures for a few hours is an excellent way to assure optimum performance.

### Septum Coring

Most modern gas chromatographs have a septum purge flow that is designed to flow across the inward face of the septum, sweeping most of the volatiles away from the column. What happens when the septum has either been punctured too many times, or the syringe is damaged or has the wrong tip type? In these cases, small septum particles can be cored from the body of the septum and fall into the inlet liner. Once in the liner, they are typically subjected to even higher temperatures than in the septum housing (see [How Hot is Your Septum?](#)), and the volatile compounds they release are swept directly into the column or out the split vent.

To prevent septum coring, don't overtighten the septum nut, be sure to routinely replace your septum, and inspect your syringe (manual or autosampler) for tip damage. Also consider switching to a softer, more pliable septum. Softer septa are less likely to core than firmer septa. Remember, however, that softer septa usually have a lower maximum operating temperature than firmer septa, so consider your method requirements carefully before deciding to switch. Changing syringe needle styles can also help reduce coring. For example, point-style #2 needles (beveled needle point) are much more likely to core septa (especially when the tip has become bent or dull) than a point-style #5 needle (conical needle with side-port).

### Why are Low-Bleed Septa Important?

Either baseline rise or extraneous peaks caused by septum bleed can interfere with identification and quantification of target analytes.

### Why Does Septum Puncturability Matter?

A septum that can be penetrated cleanly and easily by a syringe needle has a longer life. Moreover, consistent injections made through such a septum help ensure accurate results. The soft silicone rubber from which all Restek septa are manufactured is specially formulated for chromatographic performance, which ensures our septa are easy to puncture. However, in cases in which a small degree of pliability is sacrificed for high-temperature optimization, the CenterGuide™ dimple will help guide the syringe, for clean, consistent injections, minimizing septum coring.

### What Septum Configurations are Available, and for Which GCs?

Restek has fashioned septa for all major brands of gas chromatographs and injectors. Use the [septum size chart](#) to determine the septum diameter for your instrument or contact us at 1-800-356-1688 (ext. 4) to discuss your application.

### Handy Septum Size Chart

Use the septum size chart to look up the correct septum diameter for your GC.

### Which Septa Should I Use?

Thermolite® septa are a proven low-bleed champion. With a maximum temperature of 340°C, Thermolite® septa are suitable for most applications.



BTO® septa are bleed and temperature optimized with a maximum temperature of 400°C, for the most demanding GC and GC/MS applications. They retain remarkable softness and puncturability at high temperatures. The CenterGuide™ can help reduce coring when tapered (rounded-tip) needles are used to puncture the septum.



*Restek septa are precision molded for a consistent and accurate fit, they are pre-conditioned so they are ready for immediate use, and they are packaged in ultra-clean blister packs for a reliably clean product.*

#### **Thermolite® Septa**

- Usable to 340°C inlet temperature.
- Excellent puncturability.

#### **BTO® Septa**

- CenterGuide™ design—requires less force for initial penetration.
- Usable to 400°C inlet temperature.
- Each batch GC-FID tested.
- Bleed and temperature optimized; ideal for demanding GC and GC/MS applications.

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#### **Septum Puller**

- Keep several on hand in your laboratory—can be used in many different ways.
- Use hooked end for removing septa and O-rings; pointed end works well for removing stuck ferrules or fragments.

