

Gas Chromatography

Inlet Septum Maintenance for the Clarus® 590 and 690 Capillary Split/Splitless Injector

Introduction

When compared to the exacting attention that gas chromatographers pay the analytical column, it often seems that the inlet septum receives relatively little consideration. In fact, many chromatographers are surprised to discover that GC instrument manufacturers recommend daily inspection and/or replacement of the inlet septum to maximize instrument performance. Although inexpensive compared to other chromatography consumables, a freshly replaced septum is essential for maintaining system isolation from the outside environment. A poorly maintained inlet will cause the instrument to suffer from diminished sensitivity, shifting response factors, asymmetrical peak shapes, and an overall poorer precision and accuracy compared to a well-maintained one. When older, damaged septa are cored by the syringe needle these cores of septa can drop into the inlet liner, blocking the flow of gas and releasing bleed volatiles onto the column. Such detriments impact system sensitivity and inevitably result in unscheduled maintenance and more frequent calibrations.

This technical note outlines the inlet septum replacement procedure for the capillary split/splitless (CAP) injector (Item #: N6550130, 120V; N6550131, 230V) for the Clarus® 590/690 GC platform. The CAP injector is designed for quick access to the inlet septum for routine maintenance and easy integration into daily workflows. Figure 1 provides an “exploded” diagram of the CAP injector, highlighting placement of the septum and septum nut.

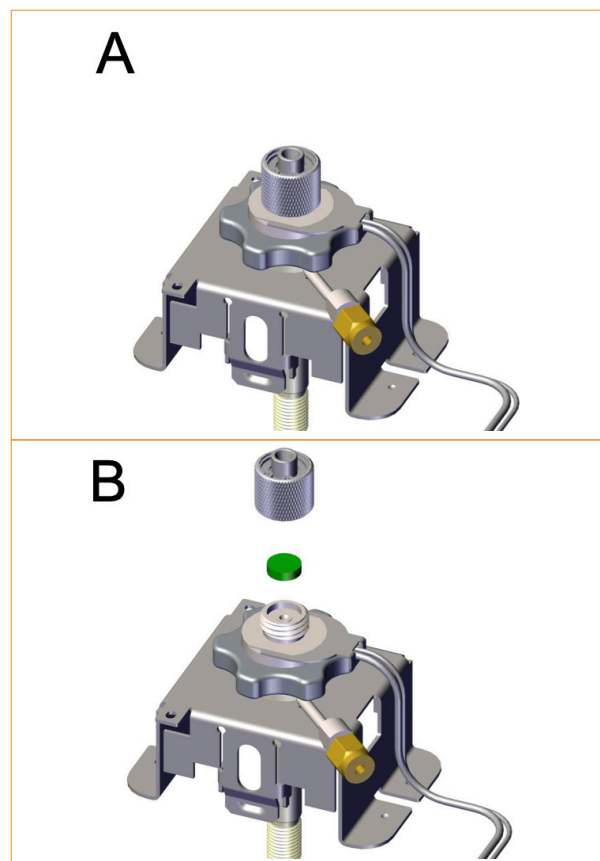


Figure 1. A) CAP injector. B) Exploded CAP diagram highlighting placement of the septum and septum nut.

Preparing the Instrument

Prior to replacing the septum, all heated zones and gas flows in the instrument must be shut off and/or cooled close to room temperature.

Note: *failure to cool the injector, detector, and oven could result in irreparable damage to the column.*

1. In TotalChrom on your PC, release the instrument from the computer. This is done by left-clicking the "RUN" module and selecting "Release Control". In the status window at the top left corner of the TotalChrom window, wait for it to say "Released".
2. Using a stylus (Item #: N6501060) or your finger, press the instrument icon at the top-right of the tablet screen on your GC. This will bring up the instrument layout including the oven, injector(s) and detector(s).
3. Select the GC oven icon in the center.
4. In the GC oven menu, simply check the small white box to the bottom-left that says "Oven Off". Open the oven door to help cool the oven and eliminate the potential for damaging the column.
5. On the tablet, navigate back to the instrument layout menu and select the CAP injector. If your Clarus 590/690 has two injectors/detectors installed, select injector "A" or "B", depending on which one you are servicing.
6. In the CAP injector menu, select "Heater Off" at the top of the tablet screen.
7. Next, shut off the flow through the column. Press the flow program button to the center-right, select the initial flow field (top left white box), and press the calculator button at the bottom. A red "OFF" button will appear. Press this to shut down flow through the inlet and return to the previous menu. Press "Close" from the flow program menu to return to the CAP injector menu.
8. Shut off the split flow. Select the total flow field (bottom center white box) and press the calculator button. Press the red "OFF" button and return to the previous menu.
9. Once again, from the instrument layout menu, select the corresponding detector, "A" or "B", to the injector that is being serviced.
10. The Clarus 590/690 GC can be outfitted with different detectors, including flame ionization detection (FID), thermal conductivity detection (TCD), electron-capture detection (ECD), photoionization detection (PID), nitrogen/phosphorous detection (NPD), flame photometric detection (FPD), and mass spectrometer (MS). Ensure all heated zones of your specific detector are shut off from the detector menu.
11. If your Clarus 590/690 GC has two injectors/detectors, "A" and "B", repeat steps 5-10 to service the other injector/detector pair.

Replacing the Inlet Septum

The efficient design of the Clarus 590/690 GC allows for easy access to the inlet septum without having to lift the top of the instrument chassis.

1. Wait for the heated zones to have cooled down sufficiently enough to be touched by a gloved hand. Exact temperatures can be monitored on the corresponding CAP injector menu on the tablet.
2. With a gloved hand, unscrew the septum cap of the appropriate CAP injector and remove. This will expose the used inlet septum, see Figure 2A.

Note: *it may be necessary to lift off the injector cover bezel to gain better access to the septum nut and septum.*

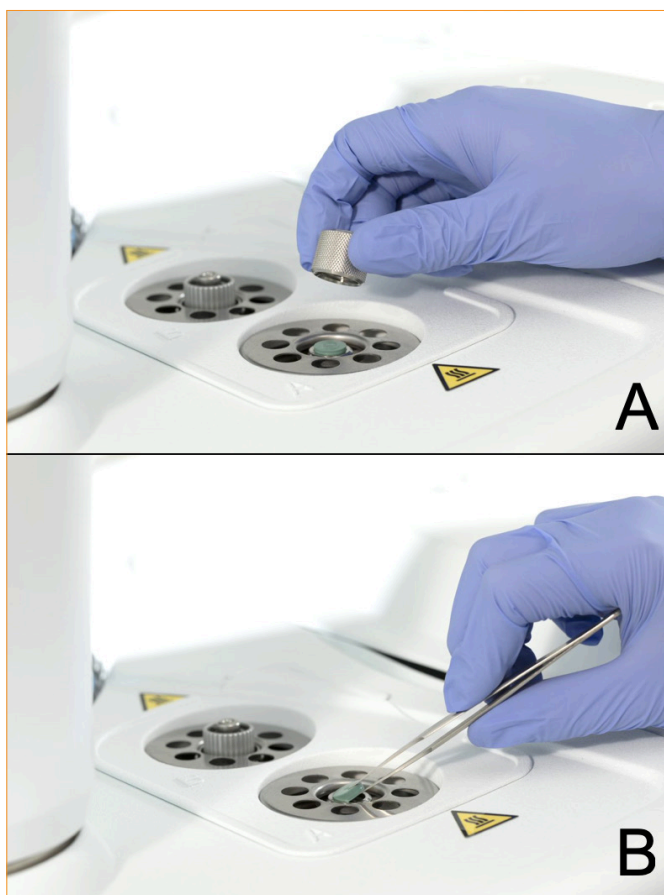


Figure 2. A) Removing the septum nut. B) Removing the inlet septum.

3. Using the small screwdriver that shipped with the GC (Item #: 09907273), tweezers, or small prying implement, pop out the old septum, see Figure 2B.
4. Select the appropriate septum for your lab operations. PerkinElmer offers multiple septum product lines for different applications, see Table 1.



Figure 3. GC injection port septa portfolio.

Table 1. Ordering information for GC injection port septa at www.perkinelmer.com

Product	Description	Quantity	Part Number
Blue Injection Port Septa	Soft silicone rubber; ideal for routine applications up to 275 °C	50	N9306874
		10	N9306873
Green Injection Port Septa	Molded silicone rubber; low bleed and low injection port adhesion with non-stick coating; ideal for routine applications up to 350 °C	50	N9306219
		10	N9306218
BTO Orange Injection Port Septa	"Bleed Temperature Optimized" molded silicone rubber; ultra low bleed and low injection port adhesion with non-stick coating; ideal for routine applications up to 400 °C	50	N9302972
		10	N9306872

5. Using a gloved hand or tweezers, place a fresh septum in the port.

Note: if your septum has an indented needle guide, ensure the indented side is facing upwards when installing.

6. Screw in the septum cap by hand; do not overtighten. If it was removed previously, place the bezel back over the injector.

7. Close the oven door if open.

8. In TotalChrom on your PC, click the "RUN" module and select "Take Control". You may now proceed to set up your analysis.

A Message from PerkinElmer

Routine replacement of the inlet septum using this method will help ensure your data quality meets the rigorous standards set forth by your laboratory. By setting aside a couple minutes each morning to inspect the septum, your lab will save hours in unplanned instrument down-time and recalibrations in the long term, driving efficiency and productivity. At a near-negligible price point, maintaining a fresh inlet septum isn't just the responsible thing to do — it's good for your laboratory's bottom line.