

Troubleshooting 6890/6850 Split/Spitless Inlet Leaks Cannot achieve Setpoint Pressure

The purpose of this document is to outline a logical procedure for troubleshooting a 6890 or 6850 series GC that will not equilibrate to the setpoint pressure of the capillary inlet system. The inlet actual pressure stays below the Setpoint (or at 0 psi) and the GC cannot become “Ready for Injection”. The procedures in this document address the class of problems that are generally related to inlet leaks.

Overview

The 6890/6850 GC Capillary Inlet system uses pressure to control flow through open tubular, capillary columns. The capillary column flow is not measured directly, but is calculated from the column dimensions, inlet and exit pressures, temperature of the column, and carrier gas type.

The Capillary Inlet system can be run in two modes of operation—Split and Splitless. The capillary inlet can equilibrate to the pressure setpoint if the following conditions are met:

- 1) The capillary inlet system is assembled correctly and is leak free.
- 2) The EPC control module is functioning properly.
- 3) There is sufficient carrier supply pressure applied to the inlet fitting of the EPC module.

80-120 PSI for the standard capillary EPC systems

100-170 PSI for the high pressure systems

- 4) The capillary column is installed and configured correctly.

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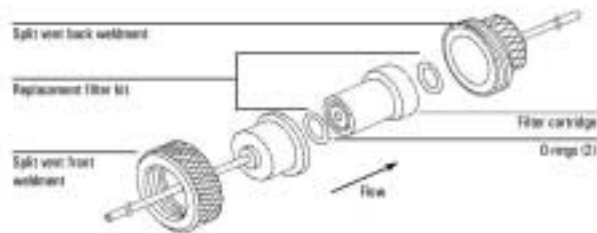
There are three classes of capillary inlet leak problems:

- 1) The inlet will not pressurize at all—actual pressure stays a 0 PSI after a pressure setpoint has been entered.—usually large leak.
- 2) The inlet pressure rises very slowly and does not reach the setpoint pressure—moderate leak.
- 3) The inlet pressure control appears to be functional, however due to chromatographic symptoms or reproducibility problems a small inlet leak is suspected.

CASE 1: The inlet will not pressurize at all—actual pressure stays at 0 PSI after the setpoint has been entered.

Check the following:

- 1) Supply pressure is sufficient for the application.
 - 20 psi > maximum inlet pressure of the method
 - Typically 80-120 PSI for 100 PSI modules and 120-170PSI for 150 PSI modules.
- 2) The carrier gas supply manifold is free of leaks and restrictions.
- 3) The septum has been replaced and is inserted correctly.
- 4) The glass liner and liner O-ring are installed correctly and the liner isn't cracked—Insert weldment is tightened.
- 5) The gold seal and stainless steel washer are installed correctly (washer on the bottom, grooves in the seal facing up) and the retaining nut is tightened securely.
- 6) Confirm that the column ferrule is installed correctly.
- 7) If the Split Vent Cartridge filter was replaced, confirm that both o-rings were installed correctly. (see diagram)



- 8) If the insert weldment “gang fitting” has been removed from the EPC Module, check that the correct length screw was used to re-attach—if it is too long the fitting will not seal.
- 9) If the 1/8” copper Split Vent tubing was disconnected from the inlet, confirm that it has been re-attached without leaks.

The epc module can fail in a mode where the inlet EPC valve does not open, causing this same symptom.

An electronic leak detector is very useful in isolating large leaks.

CASE 2: Actual inlet pressure increases slowly and does not reach the setpoint:

Check all of the parameters from Case 1 before proceeding.

- 1) Set the inlet to be tested to the following configuration:
 - Confirm that the installed column is configured correctly to the capillary and that there is only **ONE** column configured to the inlet.
 - Split Mode
 - Inlet pressure 25 psi
 - Split flow 400 ml/min
 - Confirm that the actual inlet pressure is still lagging the setpoint
- 2) Block the split vent exit on the top.

- If the pressure increases, there could be a problem with the module.
- 3) Perform the leak test that is outlined in the 6890 Operating Manual Volume 2—
inlets.

Leak Checking a Split/Splitless Inlet

If the inlet pressure test doesn't pass the problem could be attributed to:

- Insufficient supply pressure to the inlet EPC module.
- Leak at the gang fitting of the EPC module
- Cracked stainless steel tube on the insert weldment
- Septum may have a hole in it
- The injection port body
- The split vent trap 1/8" swagelock fittings or the split vent trap itself.
- The o-ring that seals the "split" line in the EPC gang fitting
- The gold seal/column fitting
- A leak in the EPC module itself, or some problem within the module

CASE 3: Chromatographic Performance problems suggest a leak.

Changes in chromatography performance affecting reproducibility could suggest a small leak.

A non-invasive leak test can be performed without removing the column.

- Confirm that the installed column is configured correctly to the capillary inlet.
- Put the inlet into "Splitless" Mode
- Set the purge flow to 50 ml/min; purge time to 1.0 minutes
- Set the column flow to 2 ml/min
- Force the instrument into "Prep Run" by hitting the prep run key.

If there are no leaks, the total flow will drop to the sum of the column flow +septum purge flow.

If there are leaks in the inlet, the total flow will be greater than expected. Since the flow sensor is a readout device only in splitless prep run, it will measure any flow that escapes the inlet via a leak.

(This is not an absolute test in that the flow sensor is not accurate or stable at low flows (< 20 ml/min) but, a good starting point.

If it is determined or there is some idea that there is a problem with the EPC module in any of these cases, it is recommended that Agilent Technical Service be contacted.

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