6890 and 7890 Series GC Flow Recommendations

To whom it may concern,

Operating at such low EPC flows is not advised on the 7890 series GC or the 6890 series GC. At these low flows slight deviations in back pressure in the system due to things like tubing and split vent trap restriction contribute to large flow changes. Running at extremely low flow/pressure is considered outside of the normal limits of the EPC module and Agilent does not test to these very low values. Attempting to run a method with a 0.1:1 split ratio would mean that the column flow rate is 1.0 ml/min and the split flow is only 0.1ml/min.

The flow calculation for the 7890 is as follows:

Flow\(\text{total} = \text{Flow (column)} + \text{Flow (septum purge)} + (\text{Flow (column)} \times \text{Split ratio})\)

Therefore based on this the total flow calculation is as follows.

Flow (total) = 1.0 + 3.0 + (1.0 \times 0.1) = 4.1

The total flow value of 4.1 ml/min is a very low flow to operate at. The EPC flow sensor has a range of 0-1250ml/min so trying to run with total flow of 4.1 ml/min working in the range of 0.3% of the sensor as well as the very low limit of the controlling proportional valve.

In addition, the following should also be noted.

At low flow levels it is essential that the flow and pressure sensors are zeroed. Any small deviation in drift means a large change in flow.

Agilent recommendations:

1. Zero all pressure and flow sensors on a very regular basis.
2. Use in splitless mode which operates in forward pressure mode.
3. Use a larger split ratio whereby the split ratio can be maintained.
4. Inlet maintenance is very important and should also be performed on a regular basis.
5. Operate the line pressure going into the rear of the GC at only 20 psi higher than the inlet needs. High line pressures may result in flow instability due to proportional valve being unable to completely close.
6. If low split flows cannot be avoided, it is advisable to use Gas Saver mode. Setting this parameter to 20 ml/min after 1 min will ensure that the GC does not become “not ready” due to the low flows forcing a pneumatic shut down of the instrument.

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