Agilent Technologies

Flame Ionization Detector

(FID)

Sudden Loss of Sensitivity

The Flame Ionization Detector (FID) passes sample entrained in carrier gas through a hydrogen-air flame. The FID is a destructive detector and when carbon-hydrogen bonds are burned in air, ionized particles are produced. A polarizing voltage attracts these ions to the collector and the current produced is essentially proportional to the number of carbon-hydrogen bonds.

The FID is a relatively simple detector in that if the electronics are functioning, a sudden change in performance is often either a matter of checking flows and cleaning or replacing the jet. The following scenarios may be of help in diagnosing a loss of sensitivity in a previously functional method.

1) No peaks, not even the solvent peak: Verify that the flame is lit in two ways. First, check the signal level from the front keypad of the GC to verify that it is not severely elevated. Typical values for 5890/6890/6850 FID's are from 3 to 20 in a functional FID. Higher values would tend to suggest anything from contamination to bad gases to electronic problems (extremely high signal). If the signal is normal, verify ignition by holding a watch glass, wrench, or other item above the detector to detect moisture coming from the flame. If there is no moisture, there is no flame. If the flame is not lit, or the signal is significantly elevated, address these problems before continuing. Detector maintenance and flow verification are good starting points.

2) No peaks, solvent peak is present: In this case, the flame is lit but there is a significantly reduced amount of sample getting to the FID, or the signal background is as high as the sample response. Again, check the signal from the front keypad of the GC. If it is elevated, there may be contamination or bad gas. Consider the last good chromatogram and what has happened since then. Detector maintenance would be a good first step. If the signal is good, investigate the inlet and column to make sure that there is not a leak or inlet issue that is preventing the normal amount of sample from getting to the detector.

3) Flame goes out upon injection (Relights on 6890 and 6850): If the flame will not stay lit during the run, it is quite possible that the jet is fouled. If this is a proven method, either the jet is fouled causing turbulence that can "blow out" the flame, or the column may be compromised i.e., has no more separation capability, has been trimmed too short, column flow is too high, for whatever reason. Detector maintenance and method review would be good here.

Keep in mind that if the FID signal is normal, the flame is lit, and a response can be achieved by placing a screwdriver inside the detector chimney (against the inside wall), the problem is not likely to be in the detector. If these suggestions do not address the loss of sensitivity, Agilent service may be needed.