

TIPS TO MAXIMIZE GC-FID PERFORMANCE



PerkinElmer GC 2400

Gas Chromatography with Flame Ionization Detector (GC-FID) instrument performance is dependent upon proper operation, use of the correct consumables, and following manufacturer guidelines. Here we show a list of some of the best and worst practices during set-up and maintenance of your GC-FID. Adhere to these guidelines to maximize your instrument's performance potential and ensure your laboratory's data quality meets your exacting specifications.



- ✓ Whenever possible, use recommended PerkinElmer consumables to avoid repeat analysis and obtain reliable results
- ✓ To improve analytical performance and extend column lifetime, use moisture, hydrocarbon, and oxygen filters installed, in this order, on the carrier gas supply lines as close to the GC as possible, installed vertically with an upward flow of gas through the filter's sorbent packing
- ✓ To improve analytical performance, use moisture and hydrocarbon filters installed on the hydrogen, air, and makeup (nitrogen preferred, or helium) fuel gas supply lines, taking note of the previously described installation requirements
- ✓ Only use filtered gases with a purity of $\geq 99.999\%$, and dry hydrocarbon free compressed zero grade or ultra-zero air for combustion gas
- ✓ Establish and adhere to a routine preventative maintenance schedule for replacing consumables to avoid unplanned instrument downtime (e.g. syringes, inlet septa, liners, O-rings, gold seal, washer, and gas filters)
- ✓ Replace ferrules after removing any fitting. Re-using ferrules can compromise the integrity of the seal and cause leaks over time
- ✓ Ensure recommended column length in injector/detector (use ruler p/n N6403045 as a guide) to maximize performance
- ✓ Regularly leak check all gas fittings and column fittings
- ✓ Always have carrier gas flow through the column before heating to avoid column damage
- ✓ Always turn off the flame (hydrogen, air, and makeup gas) before cooling the detector or turning off the GC to prevent condensation forming in the FID
- ✓ If the FID jet becomes plugged (this is rare and usually sample dependant), it is recommended to clean the jet (by sonicating with methanol) or replace it
- ✓ Always use gloves when working with any consumable in the sample flow path to reduce contamination from finger oils



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- ✓ Keep all temperature zones (injector/detector) at operating temperatures to maintain ferrule/fitting integrity. Lowering zones, even briefly, can cause leaks due to contraction of Vespel/graphite ferrules and even graphite ferrules. If zones must be lowered, always re-check your fittings for leaks
- ✓ Condition new column installs or after a period of non-use to reduce background signal
- ✓ Keep thermal 'cozies' on the split/splitless injector. This will allow the system to maintain the most consistent repeatability

- ✓ Keep all covers in place. Air flow in and around the system is designed to allow the most consistent conditions for the best repeatability
- ✓ Use a guard column when analyzing complex samples and/or regularly clip 6" off the front end of the column to maintain the integrity of your column (after trimming, column length should be adjusted in the method for optimum pressure/flow/velocity control)



- ✗ Do not heat column oven above maximum column temperature to avoid column damage
- ✗ Do not heat the column in the GC oven prior to purging it of oxygen and moisture to avoid column damage

- ✗ Do not leave the end of the detectors (FID, MS, etc) open in the oven. It is important to note that an explosion hazard could develop if the base of the FID is left open, the FID hydrogen gas is left on, and the oven door is closed
- ✗ Do not overtighten fittings. This can cause improper seals or breaks to the column. Follow the user manual for proper procedure