

KORY'S GC TECK-TIPS

How to Choose and Change Syringe Wash Solvents

We often get queries about why syringes become stuck or jammed with particular methods. Other methods are fine with the same solvent and can last months but some problem methods require that syringes be replaced every couple of days. What most often happens is the syringe plunger becomes stuck and the autosampler bends the plunger during the injection. After hearing many similar requests, this most often occurs with semi-volatile analytes in volatile solvents like pentane or dichloromethane.

The stuck plungers may be a classic case of a contaminated syringe. The syringe is not being effectively cleaned after each injection. In the time between injections, the solvent evaporates and leaves behind concentrated analytes, which become sticky and make the plunger hard to move.

One quick solution for this may be to use the solvent wash option available with the autosampler. The syringe wash is most effective immediately after the injection to remove as much sample as possible before any solvent from the syringe can evaporate. If already using the solvent wash option, a solution may be increasing the number of times the syringe is washed after the injection.

Changing or adding additional wash solvents can help too, but there are some things to take into consideration. First, a new solvent must be soluble with the injection solvent and previous wash solvents. Using water would not be acceptable when used with non-polar injection solvents like pentane and dichloromethane. Second, the goal of the wash solvent is to dissolve and remove the analytes, so analytes must be very soluble in the new solvent. Lastly, the new wash solvent must not co-elute with any compounds in the chromatographic analysis, because it will show up in the chromatogram.

There is one additional recommendation that can help too. If the syringe is still sticking after trying the above recommendations, try using a gas-tight syringe. The plunger is tipped with a Teflon plug which provides a physical barrier and more effectively removes the sample from the syringe barrel as the plunger is depressed. This keeps more of the analytes out of the barrel of the syringe.