

KORY'S GC TECK – TIPS

Tips for meeting System Suitability Requirements for USP Chapter 467

The new Chapter 467 Residual Solvents method went into effect on July 1, 2008. Since then, many people have found it difficult to consistently meet all of the method requirements for the chapter, especially the requirement for the 3:1 signal to noise for carbon tetrachloride in the Class 1 mixture. There are a couple of parameters to optimize that can help, but it may always be difficult to surpass this requirement.

- Make sure that the sample is prepped as fast as possible while still maintaining effectiveness and efficiency. Carbon Tetrachloride is a volatile compound that isn't soluble in water. Therefore, it will have a very low partition coefficient and will evaporate from the standards readily. The faster that the sample is prepared, the less evaporation will occur and a higher signal will result.
- When prepping the samples in the first dilution step, make sure that the 1 mL of RS solution is added to the 9mL of DMSO and *then* water is added. Many people start with the volumetric flasks filled most of the way with solvent, adding their sample, and then diluting to the line. By adding to a mixture of water and DMSO, the carbon tetrachloride will crash out of solution and therefore not make it to the next dilution step!
- Make sure that you have the correct liner for the analysis. Headspace injections seem to work better with a small ID liner like a straight through 2 mm ID liner. It should help with peak shape and transfer onto the column.
- Another option may be to have a pressure pulsed injection. For the first 15 to 20 seconds, increase the pressure in the inlet (available with EPC controlled instruments). However, this gets tricky as to if this change is allowed via the USP so should be used as a last resort. Changes to pressure and flow are allowed but the customer will need to calculate how much pressure increase will be allowed based upon the flow that they are using.
- Make sure that all of the sample vials are capped tight. Any leak will result in loss in signal.
- Make sure that all gasses are of the highest purity. Higher purity gasses can result in lower baseline signal and therefore less noise which can impact S/N calculations.
- Make sure that the detector is clean. This can be done by taking the detector up to 400 °C overnight with a paperclip installed instead of the column. Make sure to keep a flow going through the detector, either the make-up or a low air flow (20mL/min) to help purge the detector as it conditions. This will limit the noise in the system and should be done either bimonthly or monthly as routine maintenance.
- There is no requirement of headspace vial size. An increase in signal/sensitivity can be achieved by using 10mL headspace vials instead of the 20mL headspace vials.

Implementing one, some, or all of these changes should help to increase the sensitivity of the low responding compounds like carbon tetrachloride while still staying within the requirements of Chapter 467.