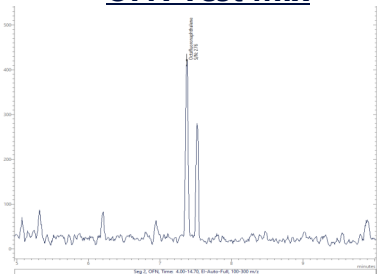
GC/MS Installation Evaluation Quick Reference Guide

Knowledge When You Need It

What tests are performed on GC/MS installations? It will depend on the configuration that has been specified. in 99% of cases If no customer specification has been agreed, a GC/MS with electron impact ionisation (EI), a sensitivity test will be performed using a very low concentration of Octafluoronaphthalene (OFN), this will be injected in splitless mode on a 5% PDMS column (30M *0.25mm 0.25um). It has to pass a minimal S/N criteria for 272 ion.

OFN Test Mix



Column Test Mix

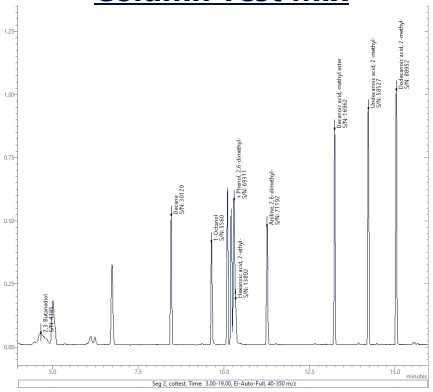
However, the OFN test does not take into account of activity within the sample path, contamination and column bleed, whereas a column test mix can, and is a better alternative.
The original purpose of any capillary column test mix is to determine its' quality and/ or monitor the performance and deterioration of a column during use. Column efficiency, activity and film thickness are easily evaluated using an appropriately designed test mixture.
Due to the time requirements of the original Grob test procedure, most column manufacturers have developed modified versions of this test mix and the condition under which the test is performed. Furthermore, other tests have been developed for application specific columns, such as EPA method and ASTM method columns, which are more suitable for those particular applications.

COMPONENT	FUNCTION
Normal alkanes, C10-C11	Column efficiency, theoretical plates, separation efficiency- separation number or Trennzahl (TZ)
Fatty acid methyl esters, C10-C12	Column efficiency, theoretical plates, separation efficiency- separation number or Trennzahl (TZ)
1-Octanol	Detection of hydrogen-bonding sites such as silanol groups
2,3-Butanediol	Detection of hydrogen-bonding sites such as silanol groups
Nonanal	Detection of saturated aldehyde adsorption other than by means of hydrogen-bonding
2,6-Dimethylphenol and 2,6-Dimethylaniline	Acid / base surface characterization by DMP / DMA peak height or peak area ratio
2-Ethylhexanoic acid	Acid surface characterization by peak height or peak area ratio

So why is column test mix not used by the instrument manufacturers at install and why is the injector not evaluated in split mode and repeatability tests performed as a matter of course using autosamplers. It's basically down to time. Installation engineers are on strict KPI's regarding installations and the instrument would take a longer period to settle down to pass these tests.

Also what happens if the configuration of the GC/MS maybe more customised (other injectors, detectors, valves, ionisation options etc, How do they test these are all functioning at the instruments location?

Column Test Mix



This can become a long winded and costly exercise especially if it is within an industry controlled by validation protocols.

ChromSolutions have devised relevant, rapid, installation tests and set realistic criteria around an standard GC/MS installation. In addition we have customized tests and criteria for a wide range of GC & GC/MS configurations.

Conclusion

Column test mix in splitless mode is a more useful test for installation purposes. It takes approximately the same time as an OFN test and checks for activity of the whole of the sample path. In addition sensitivity, background contamination and bleed criteria can be set. Combined with a repeatability in test in split mode, a "regular" GC/MS system can be accepted as functional and future issues are likely to be associated with the application itself rather than the performance of the instrument.

ChromSolutions Ltd

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