

KORY'S GC TECK – TIPS

How to create a GC performance test mixture

This is a topic that we often encounter from our customers. Our typical response is that any system performance mix for a specific method should be based upon the compounds that are going to be typically run on the instrument. For example, it wouldn't be wise to use an active test mix that may contain pentachlorophenol or DDT on a system that is going to run volatile hydrocarbons because the analytes don't show activity. Time may be spent making the system inert even though activity wouldn't matter because the actual sample analytes wouldn't react anyway.

The best method specific mixes tend to use compounds that the analyst expects to encounter in their own samples. Choose compounds that have a tendency to perform poorly from past experience. When present, these tend to include compounds that may be active or have resolution problems. Some examples are listed below.

- If they are running chlorinated pesticides, Endrin, DDT, and pentachlorophenol may be good options to measure activity. If running other pesticides, choose pesticides that usually show activity, have lower response, or tend to tail. If looking for active compounds, it may be good to have an inert compound in there as well to compare relative responses.
- If measuring PAHs, critical pairs like Benzo[b]fluoranthene and Benzo[k]fluoranthene isomers may be necessary to show sufficient efficiency and resolution. For PAHs, active compounds would not be necessary because PAHs are not active.
- If there are other compounds from the customer's mix that may co-elute but have similar masses, it would be good to include those. Specific PCBs like congeners 28 and 31 may be good examples for PCBs.

Most methods may be run only on one phase or dimension, but this may not always be the case as with dual column analysis. The goal is to make a mix that is specific to the customer's needs and as simple as possible (for as many phases and dimensions as possible) to test activity, resolution, and system response. This may mean that the test mix that may be ideal for one customer or even for one method may not be the best mix for another customer or method because system parameters and therefore performance may be different.

If customers don't wish to develop their own test mix or are trying to perform troubleshooting, Phenomenex offers test mixes that were used in the original QC of the column. This test offers a couple of advantages. The first is that if there is ever a performance issue, the same test mix can be used to compare current performance with the original performance from QC. The second is that there is no development needed. The test conditions have already been developed and the test mix contains active compounds as well as neutrals to measure efficiency, activity, and other aspects of column performance. The only disadvantage is that the test mix may not test specific performance requirements of every analytical method.