Troubleshooting GC Columns – a Methodological Approach – Part 1

4–5 minutes

When it comes to troubleshooting GC columns, often a methodological approach is best, unless you know exactly what has caused the issue. If you are struggling to find the cause for an issue/problem, perhaps the outlines below will help.

New column (no samples/matrix injected into the column)

1. How old is the column?

a. When exactly was this column purchased?

b. How was this column stored?

2. Was the column installation verified to be leak free?

a. How was leak checking performed?

b. Was the electronic leak detector working properly?

3. Have the carrier gas traps/filters been inspected and confirmed to be in good working order?

a. Are the carrier gas filters "indicating" or "non-indicating"?

b. If non-indicating, how long ago were they replaced?

4. Was the column purged long enough to remove all traces of air (oxygen) before heat was applied?

a. What was the purity of the carrier gas?

b. What was the flow rate used to purge the system and how long was the system purged?

5. How exactly was the column conditioned?

a. Was the column conditioned according to the manufacturer's instructions?

b. Has a similar column been successfully conditioned in the past using the same instructions?

6. When a column test mix was injected/analyzed, how did the peak shapes, responses, retention times and baseline compare to the original QA column test chromatogram that was supplied by the manufacturer?

a. Did your newly generated chromatogram closely match the one obtained from the manufacturer?

b. If not, does the system/instrument need to be optimized or serviced?

Used column (samples/matrix have been injected into the column)

1. How old is the column?

a. How long has this column been used?

b. How was this column stored between analysis?

2. Has this column ever worked well for the current analysis,

or for any other analysis?

a. If "yes", when exactly did this column stop working well?

b. If "no", what exactly is the column doing or not doing that makes its performance unacceptable?

3. If the column did work well in the past, is it installed into that exact same instrument?

a. If the instrument is the same, has a different column been installed into this instrument to confirm the instrument is working properly?

b. If the instrument is different, has the instrument been optimized for this method and verified that it is working properly?

4. If the instrument has multiple injection ports and/or detectors, have the column positions been switched?

a. Has the column been installed into the second injection port and tested?

b. Has the column been installed into the second detector and tested?

5. If the column had been working well in a particular instrument and now is not, what has changed?

a. Was it performing well until matrix/samples were analyzed?

b. Was it performing well until something else happened, like a power outage or loss of carrier gas?

6. How quickly did the change take place from working well to working poorly?

a. Was the change immediate?

b. Did the change occur over time?

7. Which GC maintenance steps were necessary to improve

the column's performance?

a. Did routine maintenance, such as trimming the column or replacing the injection port liner, bring back the performance?

b. Did the column need replaced?

I hope that the outlines above will assist you in determining the cause of the issue, or almost equally as important, what is not causing the issue. Once you have narrowed down possible reasons for the problem, see **Troubleshooting GC Columns – a Methodological Approach - Part 2** for possible fixes/solutions.