AlyTech
Centre Hoche – 3, rue Condorcet
91260 JUVISY SUR ORGE
Tél. : 33 (0)1 69 56 07 17 – Fax : 33 (0)1 69 44 49 81 – alytech@alytech.fr
SARL au capital de 46 000 € – RCS Evry B 421 709 700 – TVA FR 16 421 709 700

Application Note GasMix 15-01

Automatic µGC calibration from pure gases

Charly BELLLIARD, Carine CARDELLA and Laurent COURTHAUDON, AlyTech, Juvisy-sur-Orge, France, alytech@alytech.fr, www.alytech.fr

One of the possible applications of GasMix™ is the automatic calibration of a micro-GC. The following note describes the set-up and the procedure to do so with a micro-GC equipped with a TCD detector.

Technical set-up description

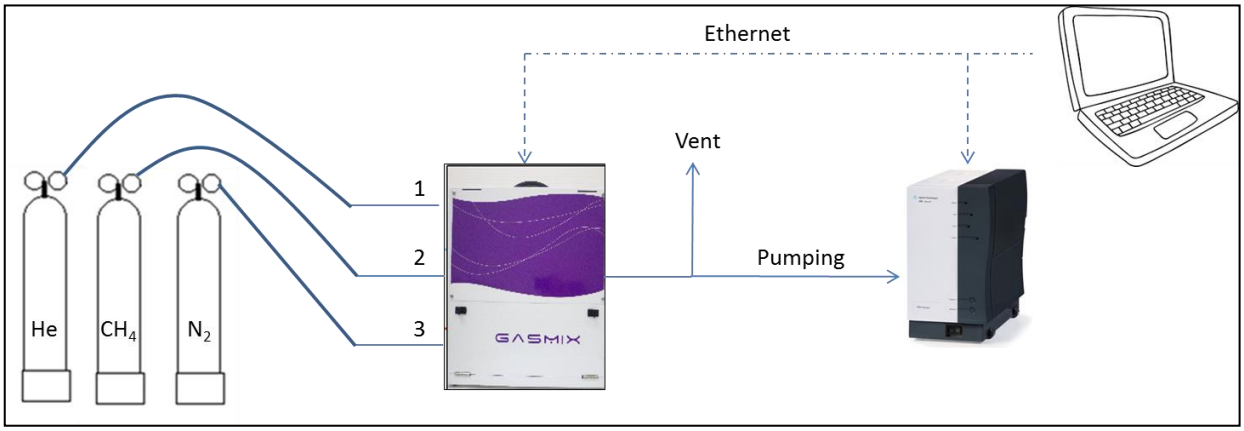

Figure 1 –GasMix - µGC set-up.

The GasMix™ is equipped with three mass flow controller (MFC). Helium is connected on channel 1 (50 Scc/min), Methane is connected on channel 2 (50 Scc/min) and both gases are diluted with Nitrogen (channel 3, 1 000 Scc/min). The three gases are connected with 1/8" transfer lines.
GasMix™ is connected to a Varian CP4900 micro-GC by a heated 1/16" transfer line. The excess of the gas mixture flow will be sent to vent, the micro-GC will take only what it needs thanks to its pump.

Thanks to a relay cable, GasMix™ will drive the micro-GC, in order to synchronize the clocks and make the sequence start together.

GasMix™ and micro-GC software are set up on the same computer.

Analysis progress

The total procedure lasts about 1 minute and 40 seconds. The analysis progress is detailed on figure 2.

GasMix™ starts to generate the gas mixture only if the GC is ready. After 30 seconds of purge, the start signal is given to the GC: the pump starts and takes the gas mixture. The pump stops after 10 seconds for data acquisition.
Right after, GasMix™ stops to flow and waits for the next « GC ready ».

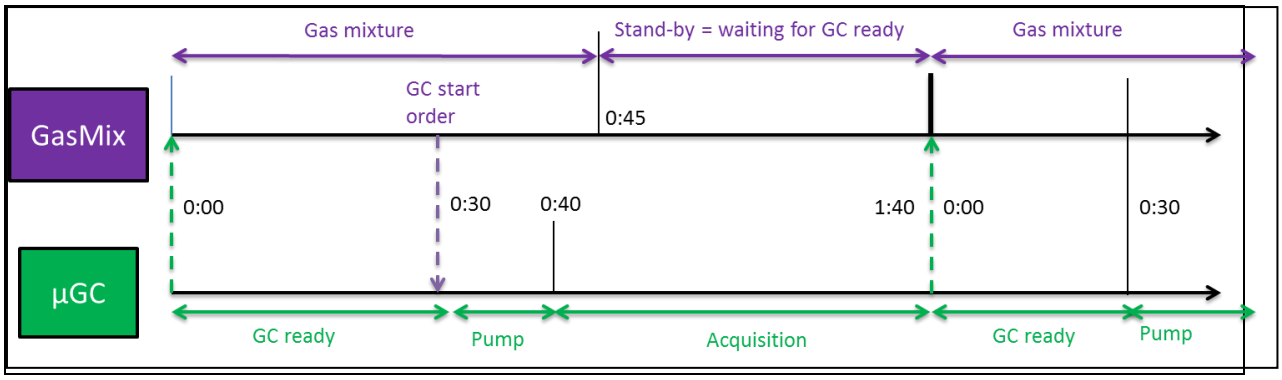

Figure 2: Analysis progress

Results

Ten replicates are carried out for each concentration level: 25%/10%/5%/1%/0.5%.

The figure 3 shows an optimum separation between helium and methane (GC carrier gas: nitrogen).

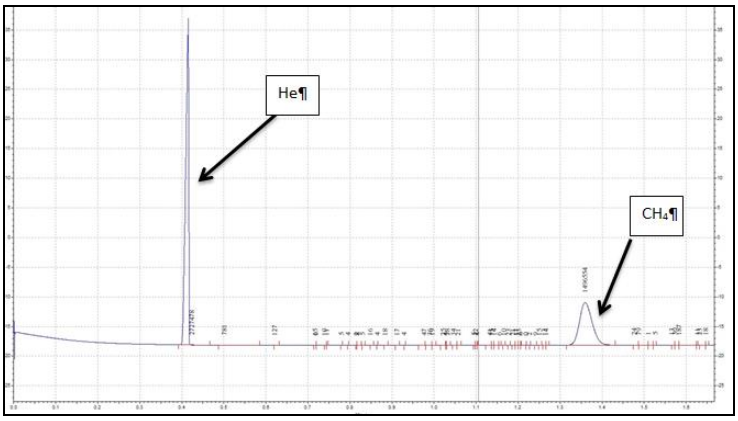

Figure 3: Chromatogram of a 5% Methane / 5% Helium mixture

After processing the different chromatograms, we have been able to plot calibration curves for He and CH_4.

The repeatability on 10 injections meet the specifications.

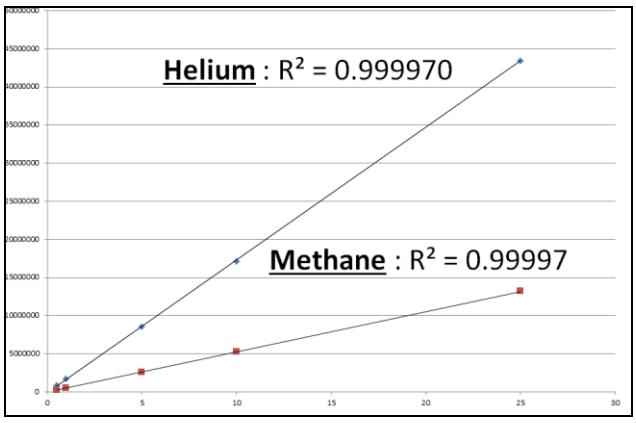

Figure 4 :Examples of calibration curves (Helium & Methane)

Table 1: %RSD sur 10 measures (Helium & Methane)

Concentration	He	CH4
%	%RSD	%RSD
25	0.35%	0.58%
10	0.91%	0.47%
5	0.27%	0.58%
1	1.08%	0.99%
0.5	1.23%	1.20%

Figure 4 demonstrates the excellent linearity of the two calibrations. Table 1 allows highlighting the precision and repeatability of preparing mixtures by GasMix ™.

Conclusion

From two pure gases and one dilutent (nitrogen), we have been able to automatically calibrate our micro-GC on two compounds thanks to GasMix™.