Procedure for Sampling of Liquefied Gas Mixtures

Background

This procedure is intended to highlight the differences between the sampling of Gas Mixtures and the sampling of a liquefied gas mixture.

A Gas Mixture can be sampled by the use of the appropriate pressure regulator to regulate the cylinder pressure down to a pressure which is usable and appropriate to the final application.

This is usually as simple a pressure regulator on the outlet of a gas cylinder and a tube (stainless steel,brass or plastic) from the regulator outlet to the instrument (meter, sample loop etc)

A Liquefied Gas Mixture, if used in the way outlined above, will probably give inconsistent results due to the phase of the gas as it enters the instrument/sample loop etc.

Connected to the Liquid outlet port on the cylinder, the liquid from the cylinder, may vaporise, partially vaporise, or remain in the liquid form as it enters the sample loop. Total vapourisation or no vaporisation will give consistent results.

Unfortunately, given the sample is no longer under helium overpressure once it passes through the regulator, it will start to vapourise giving a partial gas and partial liquid sample.

This mixture of phases will, almost certainly result in inconsistent results being produced.

Connection to the gas valve

A liquefied gas mixture will almost always be provided with a dual port valve.
One port will be labeled 'GAS' and the other 'LIQUID' or 'FLUSSIG'

The GAS port should only ever be used to 'top up' the overpressure which will keep the components of the mixture homogeneous within the liquid phase.

The LIQUID/FLUSSIG port is the one which should be used.

METHOD

1. Connect a diaphragm regulator to the LIQUID/FLUSSIG outlet
2. Connect a needle valve to the outlet of the regulator.
3. Connect a sample bag to the needle valve
4. Open the LIQUID port valve slowly and open the regulator slightly.
5. **Slowly** open the needle valve and slowly inflate the sample bag.
6. Close the needle valve well before the sample bag is fully inflated.
7. Disconnect the sample bag and leave it for 30 minutes for the gas to fully homogenize
8. Take a gas syringe sample from the septum point on the sample bag and inject onto the column

Other methods may be used:

EG

A Sample chamber may be used instead of a sample bag.

In all methods it should be remembered that the fundamental principle is that the liquid leaving the cylinder/regulator MUST vaporise entirely before entering any sample loop/instrument.