Selecting the right generator for your GC system

By Ed Connor, GC Product Specialist,
Peak Scientific Instruments Ltd

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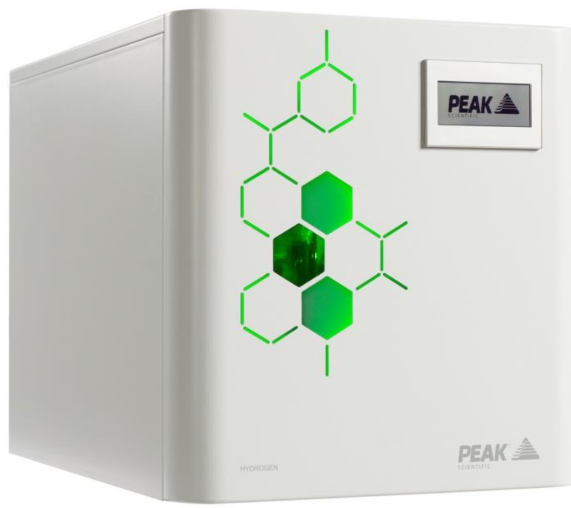
Gas generators offer a guaranteed round the clock supply of consistently pure gas, however it is important to choose the correct configuration for your GC system. Generators produce gases at a variety of flow rates and purities, depending on the purification system they employ.

Hydrogen generators



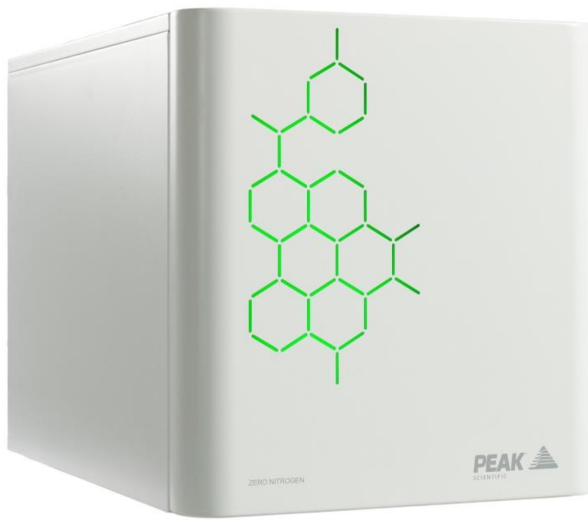
Precision Range - Hydrogen Gas Generator

Hydrogen for detectors. The most commonly used GC detector worldwide is the flame ionisation detector (FID), which uses hydrogen as the fuel gas. Flame photometric detectors (FPD), pulsed flame photometric detectors (PFPD) and nitrogen phosphorous detectors (NPD) also require hydrogen. By checking the flow rate of hydrogen used by each detector, you can easily calculate your total hydrogen requirement for your GC detectors.

Hydrogen for carrier gas. If you are considering using hydrogen for carrier gas, you will need to calculate the total flow requirement of your GC method(s) and add this to your detector hydrogen requirement (if applicable). The total flow information can be found in your instrument software, on the GC display panel, or on a method report. Otherwise you can calculate the total flow by adding together the column flow, split flow and septum purge flow. If you are currently using helium carrier gas and are planning to translate your methods to hydrogen carrier gas, you can use method translation software to calculate your hydrogen flow rate for the translated method. When using the same column, with adjusted pressure, the hydrogen requirement is typically around 1.25 x the helium requirement.

Which system? Depending on the manufacturer, there is typically a choice between palladium, pressure swing adsorption (PSA) and desiccant hydrogen driers. Each has its relative pros and cons in terms of purity, longevity and price. For detector supply, all three purification systems are suitable. For carrier gas, people usually opt for palladium or PSA systems since these are completely regenerative driers, compared with desiccant systems, which must be periodically replaced or reconditioned.

Nitrogen generators



Precision Range – Nitrogen Gas Generator

Nitrogen for detectors. Nitrogen is commonly used as a make-up gas in GC detectors such as flame ionisation detector (FID), thermal conductivity detectors (TCD), electron capture detectors (ECD), flame photometric detectors (FPD), pulsed flame photometric detctors (PFPD) and nitrogen phosphorous detectors (NPD). By checking the flow rate of nitrogen used by each detector, you can easily calculate your total nitrogen requirement for detectors.

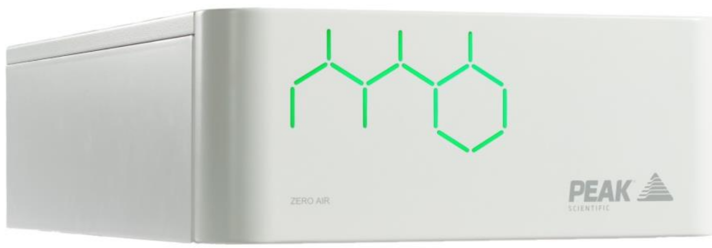
Nitrogen for carrier gas. If you want to use nitrogen for carrier gas, you will need to calculate the total flow requirement of your GC method(s) and add this to your detector nitrogen requirement. The total flow information can be found in your instrument software, on the GC display panel, or on a method report. Otherwise you can calculate your total flow by adding together the column flow, split flow and septum purge flow. If you are currently using helium carrier gas and are planning to translate your methods to nitrogen carrier gas, you can use method translation software to calculate your nitrogen flow rate for the translated method.

Which system?

There are a huge number of nitrogen generators available, from systems producing tens of litres per minute at lower purity, to UHP generators producing nitrogen at 99.9995% purity at lower flow rates. These systems typically purify nitrogen using one of two methods: The first method uses a membrane, which is selectively permeable to oxygen and hydrocarbons which it removes from compressed air. The other technique is pressure swing adsorption (PSA), where a carbon molecular sieve column removes oxygen and hydrocarbons from compressed air. The PSA system is usually employed in the UHP systems.

Additional removal of methane from UHP nitrogen is also available from zero nitrogen generators. These generators produce zero air (methane free air) from which they purify nitrogen. When using nitrogen for carrier gas or in labs with higher methane levels, it is advisable to use zero nitrogen, since external traps will not effectively remove methane, which can affect GC baseline signal.

Zero air generators



Precision Range – Zero Air Generator

Zero air for detectors. Zero air (methane-free air) is required as a flame support gas in flame ionisation detectors (FID), flame photometric detectors (FPD), pulsed flame photometric detectors (PFPD) and as the oxidiser in nitrogen phosphorous detectors (NPD). Zero air is compressed air with methane removed typically down to levels below 1.0 ppm.

Zero air for carrier gas. For applications requiring zero air for carrier gas, methane removal down to a level below 1.0 ppm is important.

Which system? Zero air generators from reputable manufacturers should have a reliable removal of methane down to levels below 1.0 ppm. It is good to check which parts need to be periodically changed/replaced eg. filters, catalyst chamber as this can add considerable cost to the initial capital investment.

Ed Connor DR.SC. is GC-MS Application Specialist, Peak Scientific, Inchinnan Business Park, Scotland, UK . Prior to joining Peak in February of this year, Ed completed his Dr.Sc. at ETH Zurich in Switzerland using GC-MS to look at herbivore induced plant volatiles and their interaction with beneficial insects. He then joined the University of Zurich where his work focused primarily on volatile collection methods and analyses using GC-MS and GC-FID . +44 141 812 8100, econnor@peakscientific.com

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Call: +44 141 812 8100
Email: marketing@peakscientific.com
www.peakscientific.com