Application Note:

Hydrogen Generators

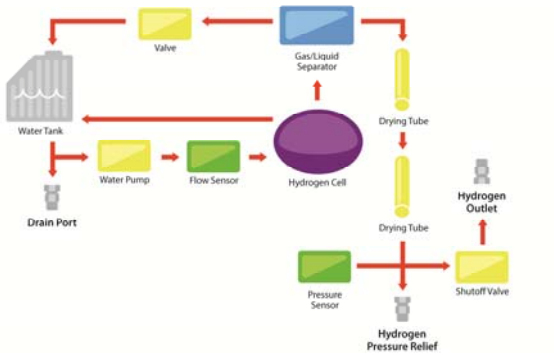
The use of Perma Pure's new BE Series braided moisture exchangers in hydrogen gas generators.

There is broad industry agreement that hydrogen is the best carrier gas for GC (gas chromatography) analysis in the laboratory. Hydrogen is an attractive option to the far more expensive helium. Hydrogen also allows for much faster separation of the sample as compared to a nitrogen carrier gas. Lastly, hydrogen is critical for the high-temperature analysis of triglycerides and fatty acids.

In order to eliminate the costs and potential hazards of gas cylinder storage many labs have switched to the on-demand production of gases like zero air, nitrogen, and hydrogen. These benchtop generators use an electrolyzer to produce 500mL/min of hydrogen for supply to the GC instruments while eliminating the expense of maintaining gas pipelines from the cylinder storage to the laboratory.

The Moisture Management Challenge

The hydrogen is produced through electrolysis, where an electric current is used to split water into oxygen and hydrogen. The gas exiting the electrolyzer has a very high moisture content and it must be dried prior to use. Desiccants, such as silica gel and calcium sulfate, are a common solution to this issue. However, they are expensive, must be frequently changed and/or regenerated, and disposal can be expensive.



The Solution

Perma Pure's new BE Series of moisture exchangers/dryers offers an economical alternative to the use of chemical desiccants. When installed after the electrolyzer, the dryer will remove up to 90% of the moisture from the gas flow by utilizing the unique properties of Nafion™.

Moisture is continuously removed without the loss of hydrogen or oxygen. Since moisture is transferred to the ambient air and not adsorbed, there is no finite life for the dryer as opposed to a desiccant column.

Installation

The BE Series dryer can act as a final polisher to remove any traces of moisture left in the gas in cases where a desiccant column is continued to be used. The BE Series dryer greatly extends the life of this column and permits the use of a smaller volume of desiccant material, allowing for a smaller footprint in the lab and reducing overall disposal costs.