

High purity gases in the laboratory

Today, modern laboratories are constantly testing, examining and analyzing. Part of what makes this possible is the use of compressed gases, such as helium, hydrogen and nitrogen. We typically see labs using these gases for different applications, whether they are being used to power instruments or as a carrier gas to carry samples for chromatography.

Depending on the use of the gas will determine what grade you need. For example, sampling may require a high purity gas, as having fewer impurities may lead to inaccurate results. The purity of a gas can have a significant impact on the work done in the laboratory.

In this article, we will cover some common laboratory applications and how gases are used in these processes.

Atmosphere control

As we know, performing tests and analyses in the laboratory can become dangerous due to many factors. One of these factors is the atmosphere in the environment. Laboratories contain sensitive equipment, samples and the procedures performed there.

To maintain optimal levels of oxygen, humidity and temperature in the laboratory, nitrogen is often used. As a non-reactive gas, it is the perfect element to maintain a stable laboratory atmosphere.

In addition to maintaining optimal oxygen levels in the laboratory atmosphere, it can also help control oxygen levels in other laboratory equipment, such as glove boxes and cell incubators.

Chromatography

Helium and hydrogen are often used as the carrier gases of choice for gas chromatography. This is due to the fact that they are highly efficient gases with large flow rates and that they work with most detection systems. The detection system provides measurements with a mixture of the carrier gas.

Other gases can be used as carrier gases, such as argon or nitrogen, but this depends on the detector system used, as there are different types. Helium typically has a shorter analysis time because it is a lighter gas and has a higher flow rate.

When ordering gases to be used as carriers, you want to make sure they are ultra-high purity gases with very low oxygen content in the tank. When the gases are put into service, they will pass through the gas system in the lab to remove any potential contamination or moisture.

The pressure at which the gas is released is also important. Pressure surges should be avoided by using a pressure regulator at the tank and chromatograph gas inlet.

Evaporative light scattering detector (ELSD)

There are different types of chromatographic methods, but especially for high pressure liquid chromatography, ELS detectors are used. These ELS detectors can help identify samples that cannot be detected using UV detection.

ELSD requires a clean, inert gas in order to convert the liquid used to clean the component being measured into a spray. This is where nitrogen plays an important role. The component under test is carried by the nitrogen gas, which forms a spray that is then heated to evaporate.

Sometimes compressed air can be used for ELS detectors, but this requires an additional step to remove any traces of oil or water that may be left behind. This is why the use of a clean inert gas like nitrogen is preferred.

Instrumentation

As a rule of thumb for gases used in laboratory instrumentation, the higher the purity, the lower the level of possible impurities that can cause problems with instruments and measurement and analysis results.

Various high purity gases are used including: helium, hydrogen, argon and nitrogen. Nitrogen and other gas mixtures are used for span calibration of instruments as each instrument has different minimum and maximum calibration spans that it can support.

In addition, gases are used to clean analytical equipment, which is why high purity levels are important when applying gases in the laboratory.

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