

Your questions answered on:

# BALLOON GAS

*What to know what balloon gas is and where it comes from? Read on.*

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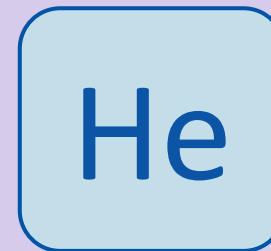
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- Helium was first discovered in 1868 in the sun's corona
- The name is derived from 'Helios' which means 'sun' in Greek
- It has a boiling point of -268.9 Celsius, is colorless and odorless and completely unreactive
- It's the only gas lighter than air except for hydrogen – which is highly flammable

It has many uses including:

- MRI medical scanners to cool super conducting magnets
- Large Hadron Collider (cooling application)
- NMR spectrometers (cooling application)
- Satellite instruments (cooling application)
- Decorative balloons
- Weather balloons
- Airships
- Provides inert atmosphere for manufacturing fibre optics & semi conductors
- Inert atmosphere for Arc welding
- Detecting leaks in vehicle air conditioning
- Inflate air bags in vehicles
- Provides artificial atmosphere for deep sea diving
- Helium-neon lasers for barcode scanners
- Newly developing helium-ion microscope



# Helium is a unique gas, here are some facts about the element.

Balloon gas is a mixture of mainly helium and some atmospheric gases. It is predominantly a by product of the helium gas industry and cannot be used in science and academic applications.

# Where is balloon gas obtained from?

Balloon gas is predominantly a by-product from other filling applications

Helium for balloon gas is obtained in the same way as for other helium applications: helium is extracted from mining natural gas fields or CO<sub>2</sub> fields and liquefied before being shipped into the market. Helium is then sold in either liquid form (in containers or dewars) or gaseous form (in tube trailers, bundles or cylinders) and in a variety of purities to meet supply needs. Gaseous helium used in balloons is the product with the lowest concentration of helium of all the pure helium products.

For some gas manufacturers - balloon gas is simply a by-product from bottling helium and other industrial appliances and would have otherwise been wasted. Instead of losing the gas to atmosphere, it is captured and sold as balloon gas and not helium due to its high level of impurity.

# Is it a waste to use it on balloons?

The simple answer is no – it is not a waste.

As cylinders of pure helium are filled, the escaped gas collects in a dome with mixture of air, which is captured and compressed into cylinders for balloons, whilst some manufacturers capture this helium when filling MRI scanners. Manufacturers have stated that they consider this wasted helium as a ‘recycled product’ as it would have been lost to the environment had it not been captured and re-purposed.

If the balloon market demand declined, manufacturers would have to re-evaluate other markets and consider the possibilities of re-liquefying it. Re-liquefying is currently considered uneconomical from the location of where the filling applications take place.

Let’s not forget that the balloon market is only one application and makes up less than 10% of the worldwide helium market, there are thus several other applications that use helium.

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# Can we recycle it instead of using it on balloons?

The expense of capturing and purifying the escaped helium far outweighs what it can be sold for.

Since the helium shortage ended end of 2013 there is currently no more allocation between helium applications, that is to say no competition between applications to be supplied with helium. However, recycling helium is possible if necessary.

Some helium clients re-liquefy the helium onsite to decrease dependency on external purchases. For fixed plant this works well as a process and becomes economically viable over a number of years.

Most manufacturers could potentially recycle helium but the logistics of doing this would be too difficult and uneconomical. The expense of capturing and purifying the escaped helium far outweighs what it can be sold for. In order to capture and purify the gas, the cost of transporting the by-product back to their plant, cost of re-compression and/or re-liquefying against the original costs of production currently make this option unviable.

# What % of helium balloon gas is actually helium and what else is in it?

Global purity for balloon gas is around 95% helium. ALbee Fly, Helibal, Helial, Carbalon, Ballongas, Ballonal, Helihi are just some of brand names for balloon gas. Other main components of balloon gas are nitrogen and oxygen.

Some manufacturers have advised us that their balloon gas has a mixture of helium, O<sub>2</sub>, nitrogen & traces of air (atmosphere gases not intentionally added). Margin in purity for balloon helium can be quite large but a minimum of 92% is required for the balloon to float. For some bottling manufacturers – purity is measured at bottling point and a gas certificate is sent with the cylinders if a special mixture is requested.

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# Why can't we use it in science and academia applications instead?

For some scientific applications in particular, helium purity required can be 99.9999% and nearly reach 100% purity for liquid application (at  $-269^{\circ}\text{C}$ ) – balloon gas is far short of this.

Depending on the application, the quality and purity of helium required varies. For some scientific applications in particular, helium purity required can be 99.9999% and nearly reach 100% purity for liquid application (at  $-269^{\circ}\text{C}$ ) – balloon gas is far short of this. Again, helium shortage ended end of 2013, so no priority is set as for where helium should be used.

There is nothing stopping science and academic institutions using this except the premium cost of re-processing the impure helium to pure helium as high purity is required in science and academia.

This is difficult to predict as it depends on supply and demand – but no shortage is anticipated.

One manufacturer has advised us they do not foresee any end to helium availability. As an example, a major new helium gas field has been discovered in Tanzania in June 2016. Its estimated helium resources may be able to supply 8 years of the current worldwide annual helium consumption. This has been discovered using a new detection technique which will focus on finding new helium reserves instead of obtaining helium from mining natural gas.

Another manufacturer as advised us that to estimate the amount of helium reserves is difficult. Some of this is dependent on finding new reserves such as recently found in Russia and Qatar (in 2014), as well as how we use helium i.e. supply and demand. It has been suggested that one particular project of helium discovery will produce the largest reserves of helium that will be seen.

In addition to this, some applications where helium was being used are being developed to use alternative gases such as:

- He free MRI scanners currently being developed
- He free airbags where Argon can be used as a substitution

# How much helium do we have and are we running out?

This is difficult to predict as it depends on supply and demand – but no shortage is anticipated.



# Respect helium

Check cylinders for damage  
& never inhale helium

Balloon gas should only be used as it's meant to be used – in balloons. Inhaling helium may appear to provide fun and entertainment but risks associated can be fatal.

Our advice is to always play it safe:

- Never use a balloon gas canister that appears to be damaged. If you do have one with signs of damage – please return it to the retailer where purchased and ask for a refund or exchange.
- Helium inhalation can be very dangerous and result in asphyxiation as the body becomes deprived of oxygen. Unfortunately there are a few reported cases where helium inhalation has resulted in fatality.
- Only use official balloon gas for balloon inflation. Other gases can be dangerous and lead to serious injuries.

Retailers should ensure that balloon gas is only sold to persons over the age of 18.

Brought to you by  
The European Balloon & Party Council



[sc@ebpcouncil.eu](mailto:sc@ebpcouncil.eu)



[www.ebpcouncil.eu](http://www.ebpcouncil.eu)



+44(0)1279 888388

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