



Westfalen



Here is Your Helium.

It goes down well: Efficient Helium Supply.

Fresh off the ship: 41,000 litres of liquid helium set off from Antwerp on their journey to Hörstel in Germany.

It occupies the second position in the periodic table of elements. It is a noble gas. It has an atomic mass of 4.0026. And aside from those details: it is inert, non-combustible, but has a particularly high thermal conductivity. It has the lowest boiling point of all known elements. Apart from that, it is non-toxic and has no taste. It is highly sought after in research, medicine and industry. However, it is also rare and so is not always available everywhere: Helium.

Assured Supply.

What's the use of having so many great properties in a product, if reliable supply is not guaranteed?

Westfalen has invested extensively in markedly improving the availability of the sought-after noble gas: in access to international sources, in transport capacities, in technology for pure grade filling and in a cylinder and container fleet that is suitable for all requirements.



Straight from the Ground: Helium Production.

Helium may indeed be the second commonest element, after hydrogen, in the universe. It makes up for this by being extremely rare on earth: since it is very light and since, because of its extremely low reactivity, it does not permanently bond to other elements, most of the gas escapes into space. The highest known concentrations of helium occur around 1,000 kilometres above sea level. However, economically worthwhile exploitation is not possible at this altitude.

Instead, the noble gas is obtained from below ground; specifically from natural gas, which contains helium. Because of its very low proportion however extraction is profitable at only a few sources, since an expensive separation process is required: in the liquefaction of natural gas gaseous raw helium is obtained, which is then cleaned and likewise liquefied for economical transport.



Arrive, dock, fill: Westfalen's Specialty Gases Centre is the filling, production and distribution centre for all helium purities and mixtures.

At Source.

An essential prerequisite for reliable and economical helium supply is access to one or more of the world's only very limited available sources. Westfalen has this access - which is fixed by long-term contracts that guarantee sufficient quantities, so your supply of helium stands on a solid footing.

On Route.

"Packed" in special containers having two vacuum insulations and a cold shield of liquid nitrogen, 41,000 litres of liquid helium start their journey to Germany. Liquefaction of the noble gas at minus 269 degrees Celsius allows it to be transported economically. The destination of the containers, transported by land and sea, is Westfalen's Specialty Gases Centre in Hörstel near Osnabrück. This is where the filling to specific requirements is performed for the numerous areas of application.

In Practice.

The versatility of helium is demonstrated by the variety of areas of application, for example:

- as a shield gas component in welding,
- as an operating gas component for CO₂ lasers,
- as a detector gas for the checking of seals and for leak detection,
- as a protective gas in glass fibre manufacture,
- as a reference and carrier gas in instrumental analysis,
- as a lifting gas for balloons and airships,
- as a breathable gas additive for divers and astronauts,
- as a liquid coolant for superconductors.



Helium is a major component of the welding shield gas Argon He 11®, which amongst other things is used for the MIG welding of pressure vessels etc.



As an operating gas helium is indispensable in laser technology - as here in laser cutting.



Everything tight? With helium even the tiniest leaks can be reliably traced.



*Left:
In instrumental analysis helium functions as a reference and carrier gas.*

MRI scans are indispensable to modern medical diagnosis - helium makes possible the build-up of the strong magnetic fields.

Now - over to you.

How do you need your helium? As a high purity gas with up to 99.9999 percent volume purity? Or as a component of a mixture? Gaseous? Liquid? A little or a lot? Filled at 200 or 300 bar pressure?

In Westfalen's state-of-the-art filling system, your wish is our command.

And voilà: Here is your helium.



In cylinders and bundles ...

... or as liquid in so-called Dewars ...

Helium Delivery Formats.

Product	Purity	Alumini® ¹⁾		High Pressure Container ^{2) 3)}					Trailer ²⁾	Dewar ⁴⁾	
		12	200	2 l	10 l	20 l	50 l	600 l	17 500 l	100 l	250 l
Helium 4.6	99.996 % vol.	-	-	X	X	X	X	X	X	-	-
Helium 5.0	99.999 % vol.	X	X	-	X	X	X	X	X	-	-
Helium 5.5	99.9995 % vol.	-	-	-	X	-	X	X	-	-	-
Helium 6.0	99.9999 % vol.	-	-	-	X	-	X	X	-	-	-
Helium ECD	ECD	-	-	-	X	-	X	-	-	-	-
Liquid Helium		-	-	-	-	-	-	-	-	X	X
Balloon Gas		-	-	-	X	X	X	X	-	-	-

¹⁾ Alumini® 12: Pressurised can of 1 l geometric volume, 12 bar filling pressure, gaseous content approx. 12 l.
Alumini® 200: Mini cylinder of 0.5 l geometric volume, 200 bar filling pressure, gaseous content approx. 75 l.

²⁾ Geometric volume in litres, gaseous content at 1 bar and 15 °C as appropriate: 2 l: approx. 0.4 m³; 10 l: approx. 1.8 m³; 20 l: approx. 3.6 m³; 50 l: approx. 9.1 m³; 600 l (cylinder bundle 12 x 50 l): approx. 109.2 m³; trailer: approx. 3,500 m³.

³⁾ 50 l high pressure container and cylinder bundle also available in 300 bar technology.

⁴⁾ Cryo-transport container, liquid content 100 or 250 litres.

The Westfalen range additionally comprises numerous gas mixtures that contain helium as a component – for example for welding and instrumental analysis. Just ask for our complete range!



... or as gas compressed at 200 bar in the 3,500 cubic metre capacity trailer for large users: The numerous different supply formats ensure that supply is tailored to need.

Important detail: cryo containers from Westfalen – known as Dewars – come ready to connect, with provided filling siphons.

Helium in Figures.

Physical Data.			
Molar Mass	4.00 g mol ⁻¹		
Liquid State			
Boiling point	4.22 K (-268.9 °C)		
Heat of Evaporation	20.42 kJ kg ⁻¹		
Liquid Density	125 kg m ⁻³		
Gaseous State (at 1.013 bar)			
Density (at 273.15 K)	0.18 kg m ⁻³		
Density Ratio to Air (at 288.15 K)	0.14		
Specific Heat (at 298.15 K)	5.20 kJ kg ⁻¹ K ⁻¹		
Thermal Conductivity (at 288.15 K)	0.1482 J s ⁻¹ m ⁻¹ K ⁻¹		
Critical Point			
Temperature	5.2 K (-268 °C)		
Pressure	2.28 bar		
Density	69.6 kg m ⁻³		
Triple Point			
Temperature (at conversion point)	2.177 K (-271 °C)		
Vapour Pressure	0.051 bar		
Heat of Fusion	3.49 kJ kg ⁻¹		
Ignition point	- K (°C)		
Ignition Range in Air	- Vol.-%		
Calorific Value	- kJ m ⁻³		
Conversions	m ³	l _{liquid}	kg
1 m ³ at 288.15 K (15 °C); 1 bar	1	1.336	0.167
1 l _{liquid} at T _{boiling point} ; 1 bar	0.784	1	0.125
1 kg	5.988	8.00	1



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