BOC

INSPIRING GASES

BOC EDUCATION

HELIUM

THE INERT GAS

Pierre Janssen, a French astronomer, discovered helium in the Sun in 1868. Its name comes from 'helios', the Greek word for the Sun. Helium was discovered on Earth in 1895 by a British chemist, Sir William Ramsay.

The Earth's atmosphere contains helium, but certain natural gas fields contain larger proportions. The main sources are in the US, Algeria, Russia, Poland and the Middle East.

Helium is colourless, odourless, tasteless and non-toxic. It is chemically inert, so it does not react with other substances. Liquid helium is very cold, and helium gas has a low density. These properties give helium a wide range of uses.

Percentage by volume in dry air	0.000524%
Atomic symbol	He
Relative atomic mass	4
Boiling point	4.2 K

Balloons

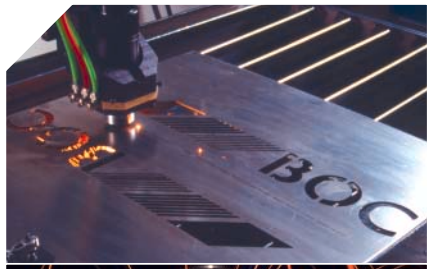
- Helium has a very low density so it can lift balloons of all sizes, including party balloons and weather balloons. Hydrogen can do the same job but unlike helium it is flammable.
- Sufficient helium is supplied to the UK market every week to lift half a dozen medium sized family cars!
- This was the largest balloon release in the world. 1 1/2 million balloons were released to launch a new Hollywood film.

Diving

- Deep sea divers are subjected to very high pressures. Nitrogen dissolves into their blood, then bubbles out of solution when they return to the surface, which may cause painful 'bends'.
- Helium is 80% less soluble in blood than nitrogen, so a helium/oxygen mixture is used as a breathing gas to prevent this dangerous condition happening.

Medicine

- Liquid helium is the coldest liquid on Earth and boils at just –268.9 °C. This property gives it a major application in MRI scanners in hospitals.
- MRI scanners need very strong magnetic fields generated by superconducting magnets. Superconductivity only occurs at very low temperatures. Liquid helium cools these magnets.
- MRI scans help diagnose conditions such as tumours and cysts.



Fabrication

- Light is emitted when electricity is discharged through helium, allowing high-energy lasers to be built for welding and cutting.
- Helium forms an inert shield during welding to prevent hot metal oxidising and weakening the weld.
- Helium atoms are very small compared to other atoms, making it the ideal gas for detecting leaks in pressurised systems.
- It is also used in the production of optical fibres and semiconductors.

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