

INSPIRING GASES

BOC EDUCATION

OXYGEN

THE REACTIVE GAS

Properties of Oxygen

The principal properties of oxygen are that it is reactive and supports combustion.

These properties are useful in a wide range of industrial applications.

Percentage, by volume, in dry air	21%
Symbol of element	O
Molecular formula	O ₂
Relative atomic mass	16
Relative molecular mass	32
Boiling point	90 K

Oxygen, combined with other elements, is the most abundant element in the Earth's crust. It accounts for nearly half (46.6%) of the Earth's crust by mass.



Steel manufacture

Oxygen is a reactive gas and allows substances in it to burn

- ◆ The carbon content of iron must be reduced to make steel.
- ◆ This is achieved by injecting pure oxygen into molten iron at the steelworks.
- ◆ The carbon is oxidised to carbon dioxide, which escapes from the molten metal, and the iron is converted to steel.



Cutting metals

Acetylene (ethyne) gas burns in oxygen with a very hot flame

- ◆ An oxy-acetylene (ethyne) flame can be up to 3423 K – hot enough to make steel oxidise easily.
- ◆ When a stream of pure oxygen is added, it reacts with the steel in an exothermic reaction
- ◆ This generates enough heat to melt the metal, so that it even burns under water.



Medicine

Oxygen has a major use in healthcare

- ◆ Patients with breathing difficulties may need to breathe oxygen instead of air, as it allows their bloodstream to be more fully oxygenated.
- ◆ Oxygen is also used in breathing mixtures, such as those used by aircraft pilots at high altitudes.



Breathing life into polluted rivers

Polluted rivers can be improved by pumping oxygen into the water

- ◆ Bacteria may grow rapidly in heavily polluted rivers, using up the oxygen dissolved in the water.
- ◆ Oxygen can be pumped into the river so that it continues to support fish and other water life.

For more information go to: www.boc.com/education