

# INSPIRING GASES

BOC EDUCATION

## CARBON DIOXIDE

### THE VERSATILE GAS

#### Properties of carbon dioxide

Carbon dioxide appears as a trace gas in the atmosphere but is also a product of various industrial processes and of burning fuels. It is a versatile and useful gas, especially at low temperatures where it is used to freeze food and carbonate drinks. It is very effective at smothering oxygen-rich fires and in medicine it helps surgical procedures.

Percentage by volume in dry air 0.038%

Molecular formula  $\text{CO}_2$

Relative molecular mass 44

Boiling point 195 K



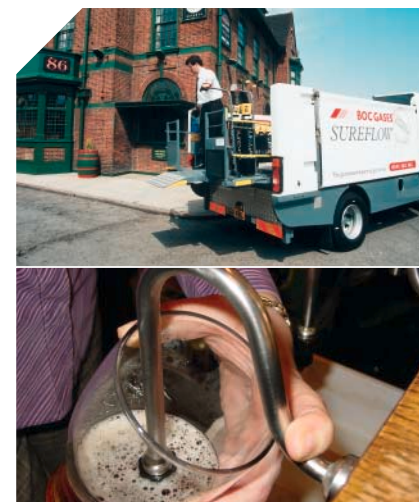
#### Food freezing

- ◇  $\text{CO}_2$ , in liquid or gaseous form, is used by the food industry for chilling, quick freezing, and refrigeration during food transport.
- ◇ Cryogenic freezers convert liquid carbon dioxide under high pressure to a mixture of  $\text{CO}_2$  gas, and a snow of solid dry ice, that covers the food's surface.
- ◇ As the  $\text{CO}_2$  changes from solid to gas, the food becomes refrigerated.



#### Fire extinguishers

- ◇ The inert properties of carbon dioxide make it ideal for use in fire extinguishers.
- ◇ A typical extinguisher uses a snow horn to convert  $\text{CO}_2$  liquid to dry ice and gas and direct the stream towards the fire.
- ◇ The  $\text{CO}_2$  snow and gas put out the fire by cooling it and excluding air.



#### Carbonation

- ◇  $\text{CO}_2$  puts the fizz into soft drinks, such as cola and lemonade.
- ◇ It is injected into the drink in a high pressure 'mixing bowl' before packaging in cans or bottles.
- ◇ When the drink is opened, pressure is released and dissolved carbon dioxide comes out of the solution, creating bubbles.
- ◇ Some of the carbon dioxide forms carbonic acid when it dissolves, giving the drink a sharper, crisper taste.



#### Medicine

- ◇ Carbon dioxide is used in keyhole surgery.
- ◇ When it is blown into body cavities, they expand to facilitate examination and surgical procedures.
- ◇ By adding carbon dioxide to the oxygen that patients breathe, the mixture works as a respiratory stimulant and helps them breathe more deeply.