

What is oxygen?

Oxygen is a gas which is:

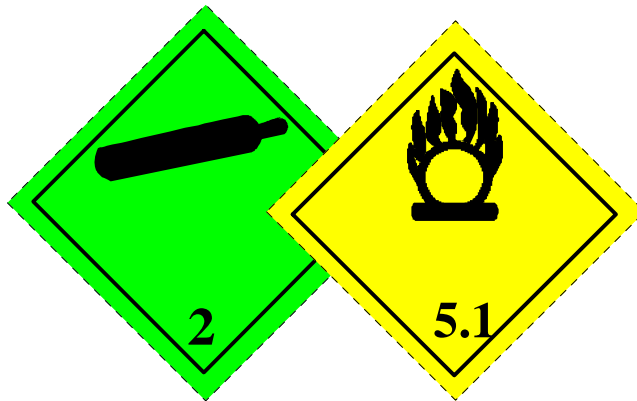
- Colourless
 - (liquid oxygen is pale blue)
- Odourless
- Tasteless
- Non-irritating
- Necessary to support life
- Necessary for combustion

Applications

- Welding
- Combustion Enhancement
- Oxidation / Chemical Reactions
- Iron and Steel Production
- Pulp and Paper Industry
- Glass Manufacturing
- Chemical and Petroleum Industry
- Semiconductor Manufacturing
- Medical

The hazards of oxygen

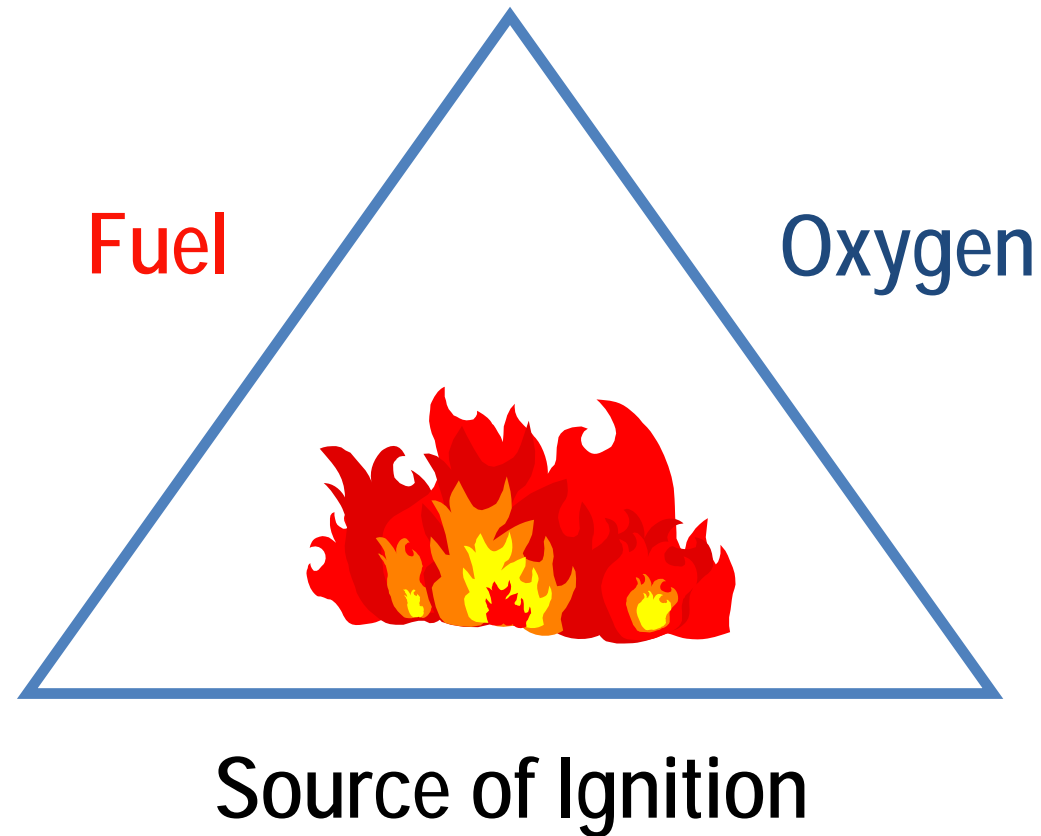
- Pressure (200 Bar)
- Supports and accelerates combustion
- Oxygen Enrichment
- Reactivity



Reactivity

- Increases with concentration and pressure
- Contamination in systems may ignite
 - heat generated from this reaction may spread to the whole system
 - systems must be cleaned for O2 service
 - no oil or grease

The Fire Triangle



Fuels

- Common fuels in an atmosphere of air
 - wood
 - coal
 - gas
 - oil
- Fuels in enriched oxygen atmospheres
 - flame retardant clothing
 - aluminium
 - stainless steel
 - steel

Non-typical ignition sources for oxidisers

- Velocity
 - particle impingement
- Friction
- Adiabatic compression and heat generation
- Contamination

Oxygen Enrichment

At oxygen concentrations of 23.5% or greater:

- Fire chemistry starts to change
 - flammable ranges expand
 - auto ignition temperatures start to drop
 - materials that typically would not burn in air will burn in enriched atmospheres
 - materials that readily burn in air will ignite very easily and burn violently
- Enrichment of clothing is a serious hazard
 - isolate from ignition sources
 - get into to fresh air for 30 min
 - change clothes



Oxygen Enrichment

- Enrichment of Fabric is a serious hazard
 - do not place mask or cannula on upholstery or bedding
 - air all materials that may have become saturated for at least 30 min



General Precautions - Oxygen

- Open and close valves slowly
- No smoking or open flames in storage areas or near piping
- **Never** consider oxygen as a direct substitute for compressed air
- If clothing becomes saturated with oxygen, or you suspect you may have been exposed to oxygen, fully aerate clothing and avoid all ignition sources for at least 30 minutes
- **Fire extinguishers:**
 - Under oxygen enriched conditions the best fire fighting media are water or extinguishers containing dry chemical powder or carbon dioxide.

Gas Monitors

- Oxygen is not detectable by human senses
- Types:
 - stationary area monitors
 - portable hand held monitors
 - personal monitors
- Monitoring capability
 - continuous (automated)
 - grab sample (manual)

Oxygen

The End