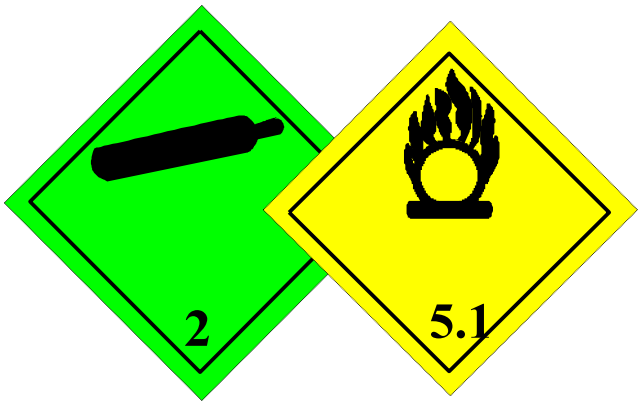
What is oxygen?

Oxygen is a gas which is:

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



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AIR PRODUCTS

Applications

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

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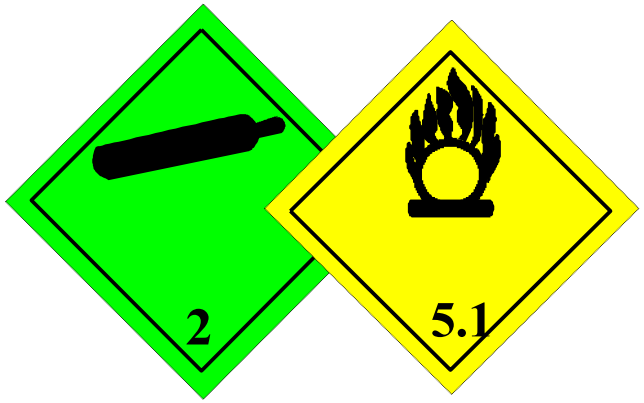
The hazards of oxygen

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



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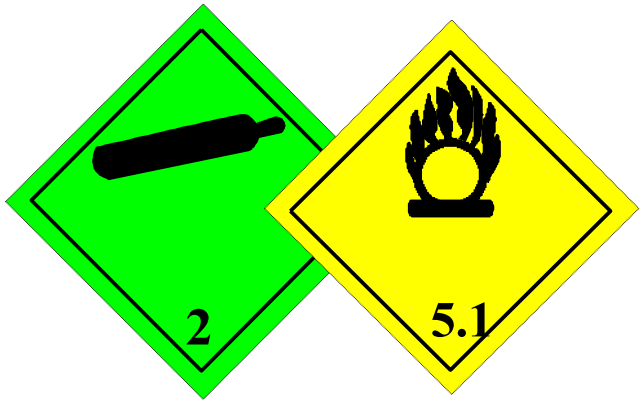
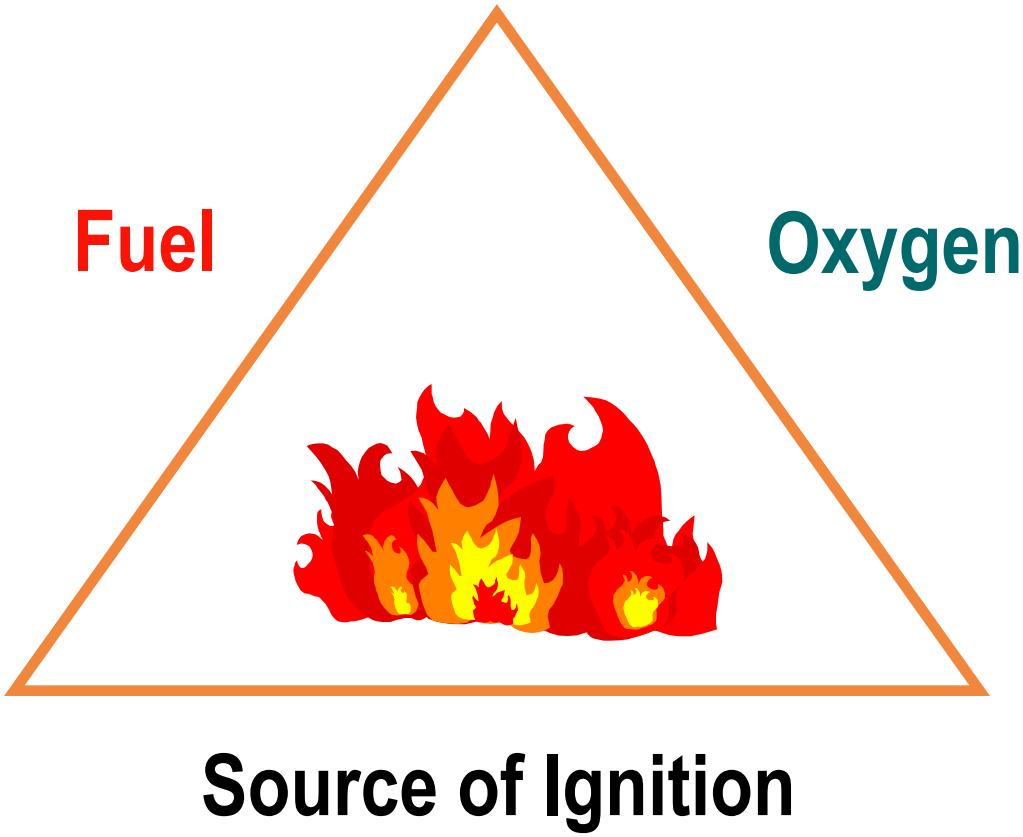
Reactivity

- 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



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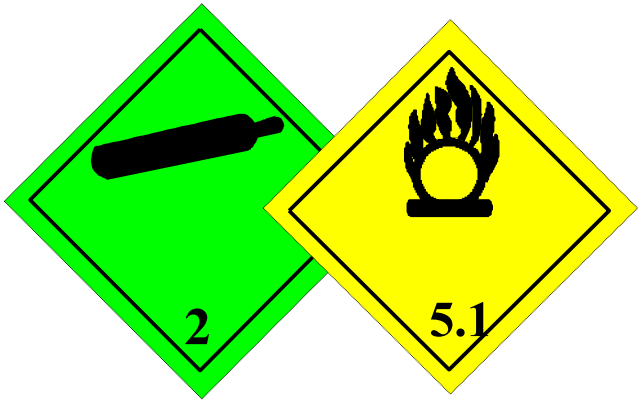
Fuels

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



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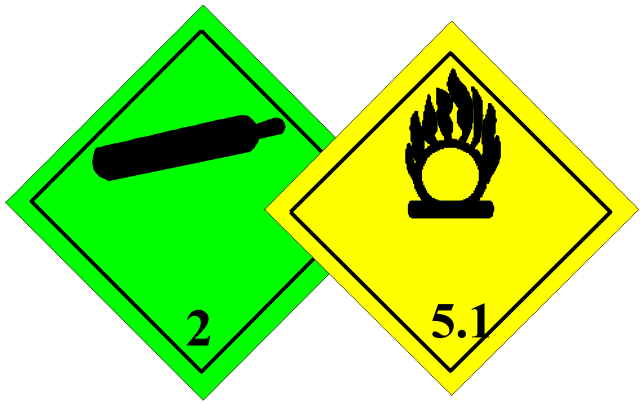
Non-typical ignition sources for oxidisers

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



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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**

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.**

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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)

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