



Welding and flame cutting

Welding and flame cutting are widely used in many different workplaces and can cause injuries such as burns, damaged eyesight and suffocation. The main danger is fire, often caused when nearby materials catch fire or when gases leaking from the hoses catch fire. Other dangers include exposure to intense ultraviolet (UV) light, hot particles of molten metal being released and 'flashback', which happens when the flame goes back through the blow pipe into the hoses and the regulators. It may also reach the acetylene cylinder causing it to heat up and explode.

Following the steps below will help you to control the risks associated with welding in your workplace. You may find them useful as a safety checklist.

Typical equipment used in gas welding and flame cutting

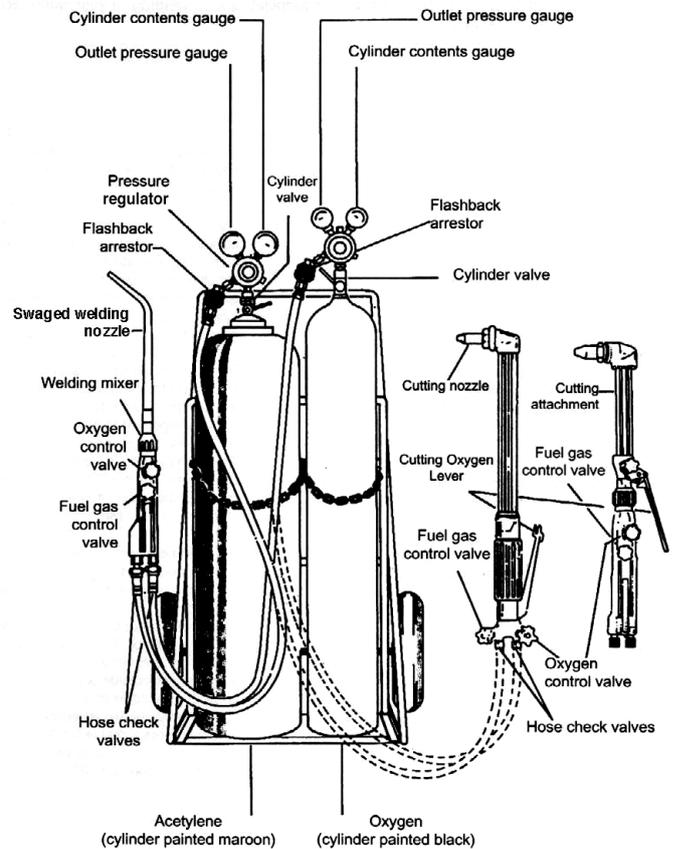


Illustration courtesy of Murex Saffire from the publication "The safe use of oxy-fuel gas equipment."

Step 1 Equipment

Gas cylinders should be kept secure and upright, for example, chained on a mobile stand. Cylinders are colour coded as follows.

Oxygen - black

Acetylene - maroon

Propane - red

The hose length should be kept as short as possible (up to five meters for welding and 20 metres for cutting). Flame (flashback) arrestors reduce the risk of flashbacks entering cylinders or distribution pipework, and help protect cylinders from the effects of fire by cutting off the gas supply in case there is a flashback. They should be fitted to all fuel gas and oxygen supply lines at the regulator end. Non-return valves and pressure contents gauges should also be fitted to equipment as appropriate. Hoses should not be joined but, if necessary, you must use approved hose couplers and crimped fittings.

Step 2 Maintenance

Cylinder valves should be kept free from oil, grease and dirt. Oxygen equipment is most at risk from oil and grease so keep greasy hands, rags and gloves away from any part of the cylinder and fittings. All equipment should be checked for damage each day, or before use if they are not used every day. Use soapy water when for leaks. Introduce a system where leaks are reported immediately to a supervisor and the damaged equipment must not be used until it is repaired or replaced. Also, a formal system of regular inspection should be developed and put into practice.



Step 3 Storage

When cylinders are not being used store them:

- upright and secure in a well-ventilated area;
- on a well-drained surface to prevent corrosion; and
- away from a fire risk, sources of heat and the workplace.

Within the storage area, oxygen cylinders should be stored at least three metres from fuel gas cylinders. Also, full cylinders should be stored separately from empty cylinders, and cylinders containing different gases whether full or empty should be stored separately from each other. To prevent manual handling injuries and damage to the cylinders, they should be transported around the workplace on a cylinder trolley and never rolled along the ground.

Step 4 Operating area

Where possible, welding should be done in a specific area which is suitably laid out and well ventilated to prevent fumes building up. If the ventilation is limited or the area confined, it may be necessary to extract the dust and fumes - portable extractors can be used but it is important to remember to reposition the extractor nozzle as welding progresses. Before starting work, all combustible materials (anything that can catch fire easily) must be removed from the area and if this is not possible they should be protected by non-combustible screens. Make sure that suitable fire extinguishers are provided close to the welding work and make sure that staff know what to do in case there is a fire.

Step 5 Use

Only staff who have been trained in using welding equipment should be allowed to handle, maintain and use it. Operators should be provided with suitable protective clothing and equipment, for example, goggles or headshields to protect against flying molten metal, sparks and intense light. You should also provide flame-retardant overalls and gloves. Safety footwear with steel toe-caps may also be needed. Operators should stand the cylinders as far away as possible from the welding area and follow the manufacturer's procedures for ignition. Do not use hoses that appear worn. During use, make sure that both hoses are of equal length and do not coil around the cylinder or regulator. It is important to make sure that the hoses do not become kinked or crushed, and they should be emptied to prevent 'flashback' the next time they are used. All cylinders should be returned to their storage area after use.

Step 6 Arc welding

Electrical flexes, associated fittings and electrode holders must be properly insulated for outdoor use and there should be a suitable procedure for isolating the electrical power supply near to the operator. All electrical circuits should be fitted with an over-current device, for example, a miniature circuit breaker (MCB). Supplies used outside or powered by a portable generator should be protected by a 30milliAmpere (30mA) residual current device (RCD). Workpieces should be earthed unless a double insulated transformer is being used, in which case the transformer casing should be earthed and not the workpiece.



Remember, skilled welders are rare so make sure they don't become extinct.