

RISK MANAGEMENT PROGRAMME FOR THE SAFE USE AND STORAGE OF ACETYLENE

Acetylene is a potentially dangerous gas which, following a process of decomposition and pressure accumulation, can cause fire or explosion. Because of the possibility of this risk, Fire and Rescue Service safe working practices can require the establishment of a hazard zone around an acetylene cylinder involved in a fire, to help protect personnel, property and the public during cooling operations. This can impact local businesses, transport systems, hospitals, schools and the community which can result in claims against the business for the costs of interruption.

It is essential businesses carefully consider the risk to their operation and the surrounding infrastructure.

The following information is provided for guidance purposes only

1) GENERAL

- a) Only appropriately trained personnel to be allowed to use oxyacetylene welding equipment
- b) The credentials of contractors to be checked and approved prior to hot works commencing. Alternative methods to be encouraged where scheduled works propose the use of acetylene based equipment
- c) An emergency procedure to be established for leaking acetylene cylinders and flashback incidents outlining valve isolation should the flame not extinguish
- d) In the event of fire at the premises, the Fire and Rescue Services to be informed of the presence and/or involvement of acetylene cylinders. If safe to do so acetylene cylinders on trolleys to be removed from the buildings during emergency evacuation.

2) EQUIPMENT

- a) Acetylene cylinder to be coloured maroon in accordance with EN 1089-3
- b) Acetylene cylinders to also be clearly labelled and safety data sheets provided and recorded
- c) Cylinders to be inspected upon delivery to the premises for signs of damage and correct colour coding. Cylinders should be rejected if any signs of damage are noted
- d) Pressure regulators (the valve which allows only a sustained flow of acetylene) to conform to BS EN 585 or BS 7650. Pressure adjusting screws to be set to the zero pressure position when the regulator is not in use. Outlet pressures to be set no higher than needed for the work
- e) Hoses to conform to BS EN 559 and should be no longer than is necessary for the work. Temporary extensions may be used but they must be removed when no longer needed. Hoses are not to be coiled while in use. Hose connections to conform to BS EN 560
- f) Supplier's operating instructions for use and maintenance to be available for users

and followed. Training to be provided where necessary by a competent person

- g) Non-return valves and flame arrestors in accordance with BS EN 730-1 to be utilised particularly in oxygen rich, explosive, toxic or other hazardous environments
- h) Hoses, regulators, flashback arrestors, check valves and nozzles to be routinely inspected/maintained/cleaned and replaced if damaged. Records of inspection to be maintained.

3) SAFE USE OF ACETYLENE

- a) Hot work to only be undertaken in an area cleared of combustible materials to a distance of at least 10 metres
- b) Suitable dry powder fire extinguishers to be readily available to personnel during use of oxyacetylene equipment. It is good practice to attach an extinguishing appliance to the welding trolley
- c) Leakage from damaged or faulty hoses is the most common cause of fires. In the event of ignition, the cylinder valve to be closed and the fire extinguished as soon as possible. The valve should be closed to avoid re-ignition
- d) Wherever reasonably practicable, cylinder valves to be closed
- e) Cylinders to be used only in an upright position and securely supported either on racks or trolleys
- f) Only transport in open vehicles or those with separate cabs and ventilated holds.

4) FLASHBACK

Flashback can occur if there is a flammable mixture of oxygen and acetylene already in the hose when the torch is lit. If unchecked, the mixture will ignite



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and the flame will travel back from the torch, through the hoses and regulators and into the cylinder. If the flame reaches the cylinder it can trigger decomposition and the aforementioned heating and pressure accumulation. The following guidance to be followed:

- a) a lighting-up procedure to be introduced covering hose purging and closing of the blowpipe valve following purging; ensuring the correct gas pressures and nozzle sizes for the work are used and a proprietary spark igniter utilised
- b) fit approved arrestors to the regulators on both the acetylene and the oxygen cylinders. Arrestors to be fitted to the blowpipe on equipment with the hose longer than 3m
- c) non-return valves (check valves) to be fitted to the torch to prevent gas backfeeding into the hoses
- d) ensure nozzles are in good order prior to work commencing. Damaged nozzles can cause turbulent gas flow, increasing the risk of flashback.

5) STORAGE

- a) All spare acetylene cylinders to be kept in a designated secured cylinder store in the open when not in use. The amount stored to be kept to the minimum and located at least 7m (and wherever possible 10m) from buildings and/or boundary fencing
- b) The store to be well ventilated and adequate space maintained between the cylinders and the 'roofing' to allow cooling water to be applied in the event of fire. The 'roofing' to be of solid rather than perforated construction to provide shelter from direct sunlight
- c) Acetylene not to be stored with other pressurised cylinders. A distance of at least 3m is recommended between separate cylinder enclosures
- d) The surrounding area to be kept clear of combustible materials such as pallets, waste storage and vegetation to at least 5-7m and the enclosures to display warning signage prohibiting smoking, naked flames and other hazardous activities
- e) Cylinders in use within the premises to be limited to the smallest practicable number and size needed for a day's activities. Cylinders to be stored on trolleys and secured with welded steel chains to allow removal in the event of a fire at the premises.

The trolleys to be stored near exit doors to aid evacuation

- f) Cylinders in the building to be kept away from any fire hazard, e.g. stores of flammable or oxidising materials or heat, i.e. radiators, curing ovens or heaters
- g) Cylinder valves to be closed when the gas is not in use
- h) Suitable safety warning signage to be displayed
- i) For large manufacturing sites, where acetylene is used in designated workshops only, the storage to be as far from the principal buildings as is practical, to help avoid closure of the whole site if a fire develops in the workshop or stores.

6) ALTERNATIVES TO ACETYLENE

Consider replacement of acetylene with alternatives wherever possible:

- a) most metals and metal combinations can be arc welded. MIG/MAG welding is particularly suitable for welding steel
- b) tungsten inert gas welding is effective for fine, high quality welding especially in thinner materials
- c) many metals can be effectively cut using saws (band and jig), angle grinders, slitting wheels or guillotines. They can provide good performance and productivity
- d) plasma cutting may be a viable alternative for sheet work
- e) oxy-propane equipment is often used as an alternative to acetylene when high cutting speeds and efficiencies are not required and for pre-heating component.

7) FIRE RISK ASSESSMENT

- a) A fire risk assessment to be undertaken to ascertain the type and amount of cylinders used or stored on site. This will determine how and where to store the cylinders safely away from ignition sources and potential malicious damage
- b) Completion of a fire risk assessment is a legal requirement under The Regulatory Reform (Fire Safety) Order 2005 or Fire (Scotland) Act. Further information and guidance may be found on the web site for the Department for Communities and Local Government www.communities.gov.uk or by reference to the Risk Management Programme for Fire Risk Assessment.



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IMPORTANT NOTE

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RM Data Sheet Safe Use of Acetylene/0215

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