

# SAFETY AND HYGIENE REGULATIONS



Servei de Prevenció de Riscos Laborals  
UNIVERSITAT POLITÈCNICA DE CATALUNYA

## OXYACETYLENE WELDING

CODE

SHR 216

Date:

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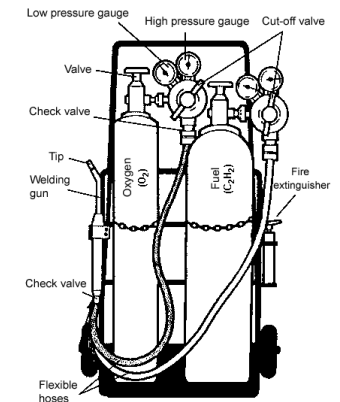
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### DESCRIPTION OF OXYACETYLENE WELDING

In this type of welding, parts are joined by the heat of a flame produced by burning a combustible gas. The main types of flames used are oxyacetylene, although alternatives are oxypropane, oxyhydrogen or oxy-natural gas.

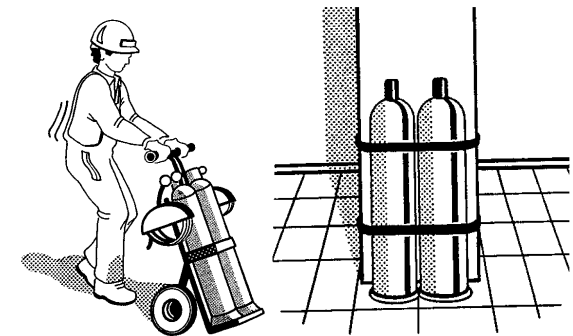
The main elements used in oxyacetylene welding are two moveable cylinders that contain the fuel gas and the oxidiser, pressure regulators, the welding gun, check valves and hoses.

The process of oxy-fuel cutting consists of pre-heating the part using a flame produced by a mixture of fuel gas (hydrogen, propane, acetylene, etc.) and oxygen, and then cutting it using a stream of oxygen that cuts the material and removes the slag that is formed.



### GENERAL RECOMMENDATIONS

1. Cylinders containing combustible gases must be stored separately from each other, and away from oxygen cylinders in particular. Full cylinders should not be stored next to empty ones. Cylinders must be attached to frames or trolleys using safety chains and protected from the sun's rays.
2. To handle and transport cylinders, use suitable trolleys or supports for this purpose. Cylinders must be handled with care and must not be knocked.
3. Before you transport a cylinder, regardless of whether it is full or empty, check that the valve is closed and the safety cap is on.
4. Do not lift any full or empty cylinders by the valve.
5. If cylinders are handled by crane or by pulley blocks, the cylinder should be placed in a box or container to prevent it from falling. Electromagnets must not be used to lift cylinders.



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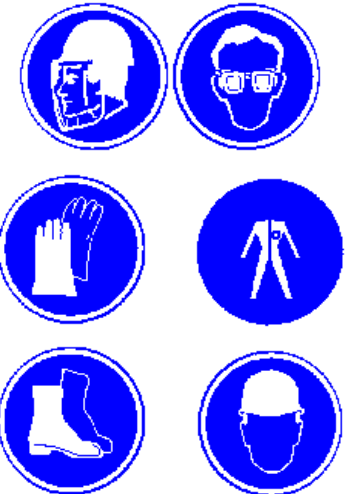
### GENERAL RECOMMENDATIONS

6. Cylinders that are full of acetylene must be kept in a vertical position for at least 12 hours before use. When cylinders need to be laid flat, check that the gas outlet is facing upwards and is never less than 50 cm from the ground.
7. Cylinders that are in use must be kept in a vertical position in their support or trolley, or attached so that they cannot fall over. In the case of leaks, to prevent oxygen and acetylene from mixing, the valves must be placed parallel to each other, or better still, the gas outlets should point in opposite directions.
8. Cylinders must be kept away from sources of heat, and protected from electrical and earth contacts.
9. Cylinders that are in use must always be visible. Nothing should be placed over them, even when they are empty. They should be kept 5 to 10 m away from the work area.
10. Whenever possible, shields or screens should be used to isolate the place where cutting or welding is being undertaken.



### PERSONAL PROTECTION EQUIPMENT TO USE

1. Obligatory personal protection equipment for welding consists of:
  - A shield for protecting the face and eyes / suitable safety goggles
  - Long leather gloves
  - A leather apron and leather spats over the trousers that are easy to unfasten
  - Safety footwear
  - Safety helmet when the work requires one
2. When you handle a cylinder, stand beside the valves rather than in front of them.
3. Do not work with clothing that has spots of grease, solvent or any other substance that could catch fire.
4. When you work at height, use a body belt that is duly protected so that it cannot be burnt by sparks.
5. Whenever possible, use screens or partitions that isolate the place where you are welding or cutting.
6. Both the valve on the cylinder and the handle of the welding gun must have a device to prevent the flame from flashing back.



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### BEFORE WELDING

1. Before working with a new cylinder, follow these recommendations:
  - Check that the pressure gauge reads “zero” when the valve is closed.
  - If the valve on a cylinder gets stuck, never force it. Instead, return the cylinder to the supplier.
  - Before you attach a pressure regulator, purge the oxygen cylinder valve by opening it a quarter of a turn and closing it as quickly as possible.
  - Position the pressure regulator with the poppet valve completely open.
  - Open the cylinder valve slowly. If the oxygen cylinder valve opens too quickly, the regulator may be damaged.
  - Once the regulator has been fitted, check that there are no leaks. This can be done with soapy water; never with a flame.
2. If a pressure regulator is leaking, send it to be repaired immediately.
3. The key for closing the pressure regulator must be attached to every cylinder that is in use, so that the gas can be shut off in case of fire. The best option is to attach it to the pressure regulator.
4. Faults in cylinder valves must be repaired by the supplier. Never disassemble the cylinder valve.
5. Do not replace fibre gaskets with rubber or leather ones.
6. If the regulator freezes in winter, never defrost it with the welding gun or with any other naked flame or incandescent body, but with cloths soaked in hot water.
7. Connect the hoses correctly. Acetylene hoses tend to be black with a larger interior diameter, and oxygen hoses red with a smaller interior diameter.
8. Before you start work, check that there are no leaks in the hose connections.  
Never use a flame to locate leaks; use soapy water or a suitable detector.

### DURING WELDING

1. Do not use all of the gas in a cylinder (danger of air entering). Always maintain slight excess pressure inside cylinders.
2. Close the valves of the cylinders after each work session and when the content of the cylinder has been used. After closing the cylinder valve, always discharge the regulator, the hoses and the welding gun.
3. To light the welding gun, first open the oxygen valve slightly, and then open the acetylene valve to a greater extent. Then, light the mixture and regulate the flame, until a suitable flame is obtained.
4. Do not light the welding gun with a flame as this can cause severe burns. Use a spark lighter.
5. To switch off the welding gun, first close the acetylene valve and then the oxygen valve.
6. If any leaks are observed in the welding gun, take it to be repaired as soon as possible. Oxygen leaks can be very dangerous, particularly in enclosed spaces.
7. Do not work with the hoses between your legs or over your shoulder.
8. Do not leave rolled hoses on the shoulders of cylinders.

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### WELDING IN CONFINED SPACES

1. When cutting or welding is carried out in confined spaces, good ventilation should be ensured by pumping in fresh air and extracting foul air, especially when the work is carried out on zinc, brass, copper, galvanized materials or materials coated in lead or paint.
2. When work must be done in closed chambers, double floor structures, etc., one person must remain outside supervising the equipment, to shut off the cylinders immediately in case of an accident. In addition, this person must be equipped with fire extinguishers, body belts, etc. to help the person who is doing the welding, if necessary.

### FIRES AND EXPLOSIONS

1. Welding and cutting jobs should not be undertaken in places in which flammable or combustible materials are stored; in areas in which there is a risk of explosion; or in containers that have held flammable substances.
2. To work on containers that have held flammable or explosive substances, first clean them thoroughly with hot water and degas them with steam, for example. An explosimeter should be used to check that there are no gases present.
3. When a cylinder of fuel gas is opened for the first time, ensure that the welding gun is not lit and there are no other flames present. An explosion could easily occur.
4. Take particular care to stop sparks from the welding gun from reaching or falling on cylinders or hoses or on flammable objects or liquids.
5. Do not use the oxygen to blow on or clean parts, pipes etc. In particular, never use the oxygen to improve ventilation. Too much oxygen in the air leads to a high fire risk.
6. Never grease or spill oil, fat or any other combustible material on the valves or regulators of oxygen cylinders. These substances can spontaneously combust due to the action of oxygen.
7. If the cylinder of acetylene gets hot on its own, there is a risk of explosion. In this case, close the valve and cool the cylinder with water for several hours.
8. If the valve of an acetylene cylinder catches fire, try to close it. If this is not possible, put it out with water or with a carbon dioxide snow or powder fire extinguisher.
9. After a flame flash back or fire in the valve of an acetylene cylinder, check that the cylinder is not getting hot on its own.

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## MANTENANCE, ORDER AND CLEANING

1. Hoses must always be in perfect condition and firmly attached to the connectors.
2. To prevent deterioration of hoses, avoid contact with hot surfaces, puddles, sharp edges and sharp corners. Try to avoid loops forming in the hoses and prevent sparks from falling on them.
3. Hoses should not pass over transit routes without being duly protected with supports that can withstand compression.
4. When hoses are difficult to handle, do not pull on them. This could cause damage and lead to a serious accident.
5. If a flame flashes back, the hoses should be changed and inspected before deciding whether to continue to use them or not.
6. Do not hang welding guns from cylinders, even if the guns are turned off.
7. Do not put welding guns attached to cylinders in closed containers, such as tool boxes.
8. When a flame flashes back and combustion continues within the welding gun, do not bend the hoses to stop the flow of gas (except as a last resort), as this can be very dangerous. In these cases, close the cylinder valves and stop the flow of acetylene to the welding gun.
9. Clean the nozzle of the welding gun carefully. A dirty nozzle can cause a flame to flash back. Use a brass needle to clean nozzles.