

Total Safety Cylinders in fires

When a filled cylinder is exposed to excessive heating there is a risk of bursting due to two effects:

- (i) The gas inside expands, due to the increase in temperature and exerts a greater pressure on the cylinder wall.
- (ii) The cylinder body itself is weakened due to the rise in temperature.

If the cylinder bursts:

- Objects may be sent hurtling through the air for distances of up to 300m.
- The gas will escape into the atmosphere

This can induce further problems.

- Flammable gases will mix the air and may form explosive mixtures.
- Oxidising gas will intensify the fire
- Toxic or corrosive products may be released.
- Gases such as LPG may collect in low lying spaces creating an explosion risk away from the cylinder itself.

Some cylinders are fitted with pressure relieving devices. These protect the cylinder from over pressure and operate at a specific pressure above normal conditions. Therefore care must be taken in fire conditions, as product may still be escaping even if the cylinder appears to be intact.

Dealing with cylinders in fires

In all cases:

- Raise the alarm and evacuate the area.
- Contact the emergency services
- Inform them of the number, type and location of the cylinders where possible.
- Advise Air Products on 08085 02 02 02.

Do not approach cylinders that are involved in the fire until you have been advised by the emergency services that it is safe to do so.

If cylinders containing toxic or corrosive gases are present it may also be necessary to call in persons with specialist knowledge to provide help and advice. Depending on the nature of the product, an area downwind of the fire may have to be evacuated.

Once the emergency services arrive, they will establish a hazard zone and evacuate the area. Cylinders directly involved must be sprayed with copious amounts of water. The use of fire water monitors is advisable since they allow fire fighters to withdraw to a safe position.



Once the fire is extinguished, continue to cool until the cylinders are no longer steaming (special precautions required for acetylene—see below). At this point approach the cylinders with caution, having tested the atmosphere with relevant safety instruments.



Feel the cylinders with the bare hand. If they are warm, continue to spray until cold. At this point cylinders which have fallen over should be removed from the scene of the fire.



Acetylene cylinders and the wetting test

Acetylene cylinders are unique in their design due to the special properties of the product itself.

Acetylene gas is highly unstable so that once energy is supplied, it will decompose into carbon and hydrogen, emitting a large quantity of energy in the form of heat.

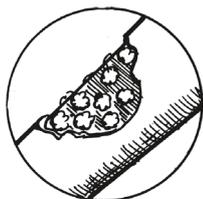
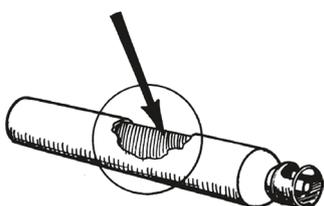
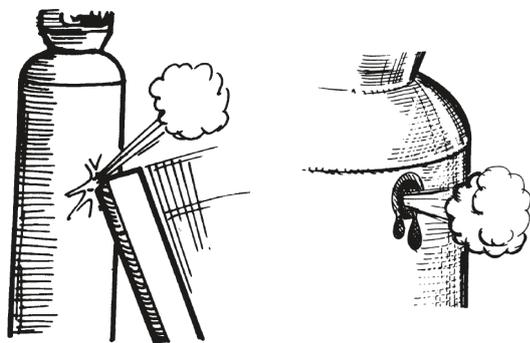
At atmospheric pressure this decomposition is limited. However, once the gas is compressed, decomposition progresses much more easily throughout the entire mass of the gas and this can lead to an explosion.

In order to store and transport acetylene safely, the cylinders are filled with a porous material known as the Mass.

A solvent, usually acetone, absorbs the acetylene and fills the pores creating tiny pockets of the gas. In this way decomposition is limited and an explosion becomes very unlikely.

The mass is only effective as long as its structure is in sound condition. The mass can be damaged by blows to the cylinder or if the cylinder is dropped from height.

If the mass is damaged, the risk of decomposition increases. This decomposition reaction will also be accelerated if significant leakage occurs.



Acetylene cylinders may burst if exposed to excessive heating.

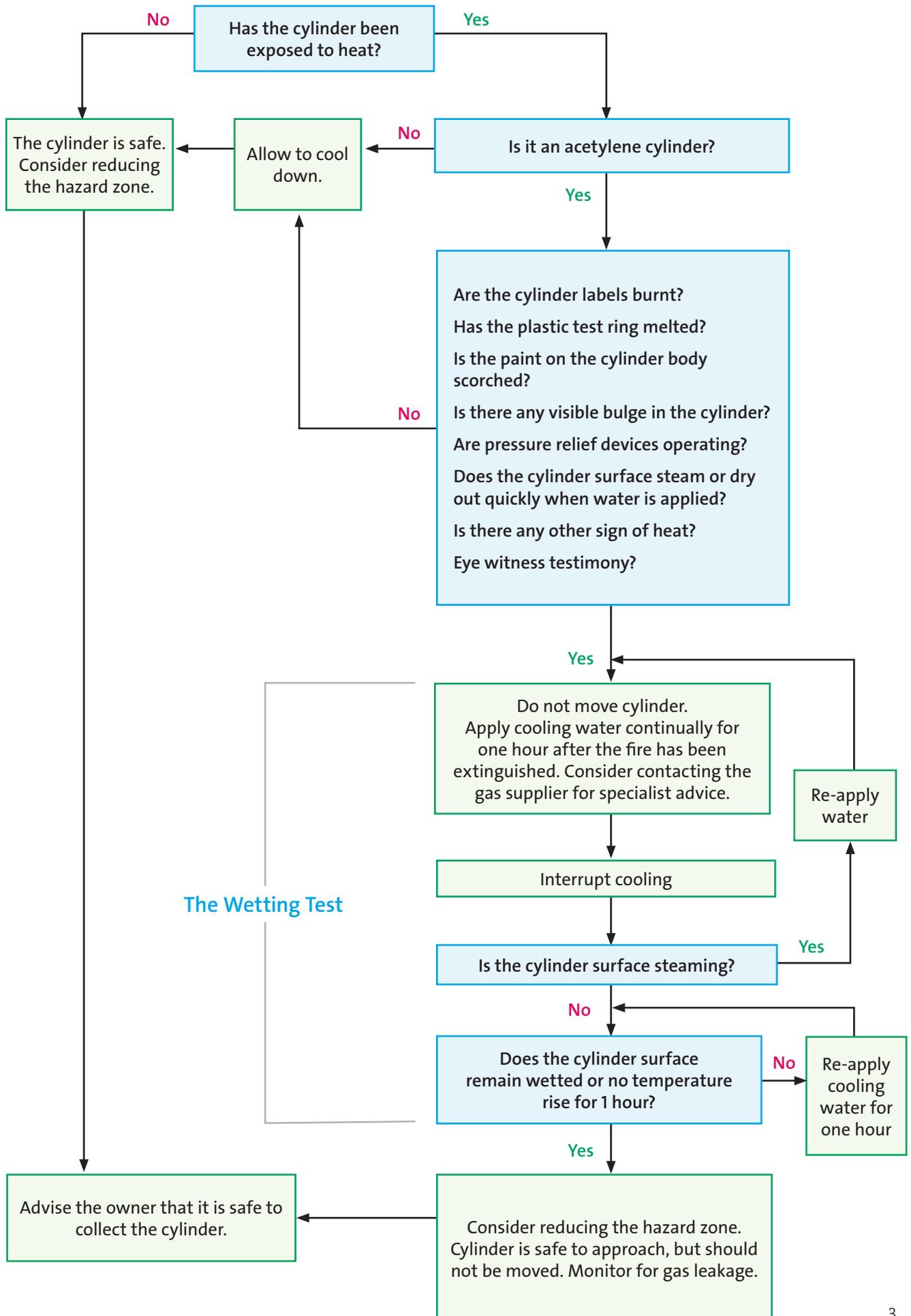
As a safety measure some acetylene cylinders are fitted with a fusible plug. Once the temperature reaches 100°C, the fusible plug will melt allowing the gas to escape, relieving the pressure inside the cylinder.

N.B. The escaping gas is extremely flammable and is easily ignited. The resulting jet flame is very noisy and can be frightening. However, if there is nothing in its way there is little danger and it is best left to vent off.

Acetylene has a wide flammability range in air and, being only slightly less dense than air, mixes very easily with it creating an explosive atmosphere. Therefore it is advisable to store these cylinders outside or in well ventilated areas, away from other flammable materials and sources of ignition.

If identification of the cylinders cannot be established, or the cylinders are identified as acetylene, the wetting test should be used to make them safe.

Procedures for dealing with gas cylinders involved in a fire



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**In the event of an emergency,
call Air Products on 08085 02 02 02.**

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