



SAFETY TRAINING LEAFLET 10 ACETYLENE CYLINDERS

AIGA 009.10/26

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1 Introduction

1.1 Safety leaflets

Safety training leaflets summarise the basic operational safety knowledge which needs to be known by employees working in the gas industry.

Refer to AIGA 009, *Safety Training of Employees* for the various combinations of leaflets which define the scope of safety training for a variety of specific jobs.

Each leaflet addresses a specific topic as identified in the title.

1.2 Comprehension tests

There is a comprehension test for each leaflet, included in **Appendix 1**.

Each test comprises several questions. To pass the test it is suggested that the employee should score 75% at the first attempt. Incorrect answers should be discussed to confirm understanding.

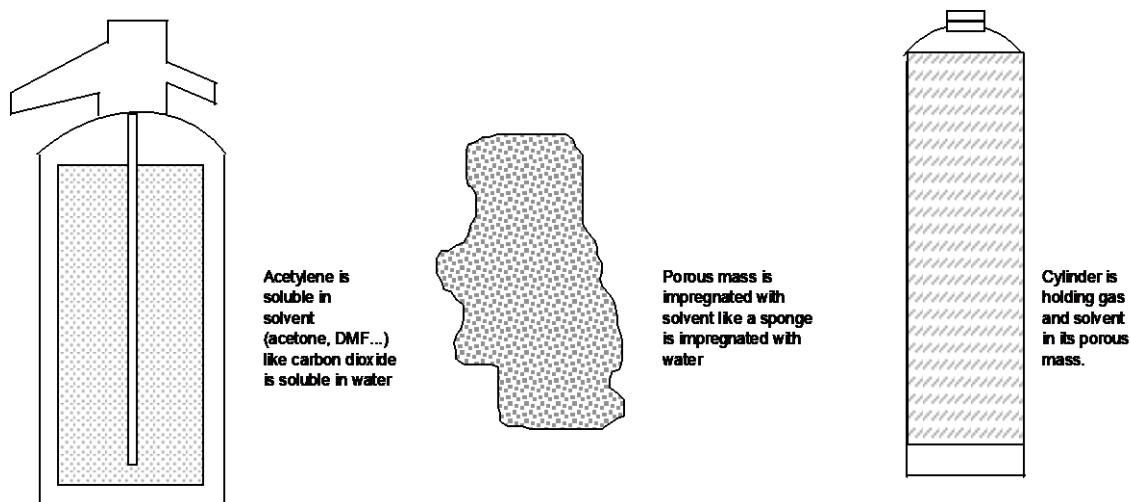
Appendix 2 includes the list of correct answers.

2 ACETYLENE CYLINDERS

Acetylene is unstable and cannot be stored at high pressure in the same way as other gases in normal compressed gas cylinders.

To overcome this difficulty, acetylene is dissolved in a solvent which is held in a porous mass material inside the cylinder shell.

These techniques are based on the following principles:



The cylinder shell itself is made of steel and is either of extruded or welded construction. All cylinders are fitted with valve outlets and have a left-hand thread (because acetylene is a flammable gas) or a special connection.

Cylinders are made in accordance with different standards and regulations and can only be filled in countries the regulation of which they comply with.

Some specifications require that the cylinders are fitted with safety devices. These may be in the form of bursting discs or fusible (capable of being molten) plugs. These devices are fitted either in the valve, on the shoulder of the cylinder or in the base of the cylinder.

- Ask your supervisor how to identify the cylinders which may be filled at your facility and what to do if you find cylinders which do not conform to these specifications.

- Never fill acetylene into a cylinder designed for another gas; there will be an immediate risk of explosion inside the cylinder.

2.1 Cylinder identification

All cylinders are stamped on the shoulder or a reinforced part of the neck ring with identification marks. These vary between countries but normally include:

- manufacturing specification,
- test pressure,
- serial number,
- tare weight.

Never remove or deface these marks or stamp any additional marks.

Never fill a cylinder unless it carries the correct identification marks.

2.2 Cylinder inspection

Acetylene cylinders have to be internally inspected at regular intervals, depending on the manufacturing specification and national regulations.

- Obtain from your supervisor the rules which apply to acetylene cylinders in your works and how to read inspection date.
- Never fill a cylinder which has not been internally examined within the appropriate period.

2.3 Cylinder filling

Cylinders can only be filled if they are in a satisfactory condition.

Never transfill acetylene.

Examine all cylinders before they are sent for filling. A cylinder is satisfactory if:

- it is not soiled externally,
- it is not damaged by dents or burn marks,
- it is not rusty, paint is in good condition,
- it is not corroded by chemicals,
- the valve is in good condition and is not tarnished with soot.

2.4 Cylinder misuse

Cylinders can be misused by customers, either by withdrawing the gas too fast or by using the cylinder on its side. In both cases solvent is lost. When excess solvent is lost it must be replaced before the cylinder is sent for filling.

- Check solvent content by comparing actual weight of cylinder with the tare weight stamped on it, making allowances for ambient temperature and gas content as measured by pressure gauge (charts are available in the workshop).
- Check that the cylinder is not overdue for internal examination. The operation is carried out by specially trained personnel (your supervisor will explain how to identify a cylinder which is due for internal examination).

3 SOLVENTS

The solvents used in acetylene cylinders are acetone and dimethylformamide (DMF). Acetone is the most commonly used solvent. DMF is used in some countries for cylinder bundles.

Find out from your supervisor which solvent is used in cylinders in your company.

3.1 Acetone

Acetone is a colourless liquid, with fragrant mint-like odour; it is flammable and narcotic in high concentrations; breathing acetone vapour can cause headaches and sickness.

- Do not block ventilation in places where solvents are stored or handled.
- Do not bring any source of ignition (matches, lighter, heating and cutting equipment) into a solvent storage or handling area.
- Keep drums closed when not in use.
- Wear goggles, gloves and other personal protective equipment as requested - see Leaflet 22 Solvents.

3.2 DMF

DMF is a colourless flammable liquid with a characteristic odour; it is toxic and highly irritating. DMF can be absorbed through the skin. In consequence of that,

- Do not block ventilation in places where solvents are stored or handled.
- Do not bring any source of ignition (matches, lighter, heating and cutting equipment) into a solvent storage or handling area.
- Keep drums closed when not in use.
- Wear goggles, gloves and other personal protective equipment as requested - see Leaflet 22 Solvents.
- Always transfer DMF as instructed.
- If DMF contacts the skin flush it off with water.
- If any skin irritation or injury develops, get medical assistance.

4 Special hazards with acetylene cylinders

Acetylene within a cylinder can decompose explosively, with or without apparent cause. This may be preceded by localised heating in the cylinder (hot spots).

- If you detect a hot cylinder, close the valve and spray the cylinder with water from a safe place (shelter, distance). Advise your supervisor immediately. See Leaflet 17 for handling of acetylene cylinders in fire situations.

In case of damaged cylinder or activities such as devalving, inspecting or demassing, there is a risk of exposure to asbestos which needs to be prevented by adequate operating procedures including requirement to wear respiratory protective equipment.

Appendix 2 – ACETYLENE CYLINDERS – Test Answers

1. A
2. B and D
3. A
4. A
5. A and B
6. A, B and C
7. A and B
8. A