



SAFETY TRAINING LEAFLET 09 CYLINDERS FOR COMPRESSED AND LIQUEFIED GASES

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Table of Contents

1	Introduction	1
1.1	Safety leaflets	1
1.2	Comprehension tests.....	1
2	Cylinders for compressed gases.....	1
	Appendix 1 – CYLINDERS FOR COMPRESSED GASES – Test Questions	4
	Appendix 2 – CYLINDERS FOR COMPRESSED GASES – Test Answers.....	5

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 EIGA Doc 23 *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 Cylinders for compressed gases

1. Cylinders for compressed gases are manufactured, filled, inspected and tested in accordance with specific regulations and standards. Relevant regulations and standards shall be identified and made available for review. Relationships between regulations and work instructions must be explained to employees. This would include the requirements to comply with ADR, the European Agreement Concerning the International Carriage of Dangerous Goods.
2. High pressure gas cylinders are made of steel, aluminium alloys or composite materials. Cylinder valves need to be sufficiently resistant to mechanical impact or protected with a removable cap or permanently mounted guard.
3. Valve outlets are also made in conformity with standards and national specifications. In order to avoid confusion between flammable and non-flammable gases, the valves on flammable gas cylinders have a left-hand outlet thread and those on non-flammable gas cylinders have a right-hand outlet thread. For example, hydrogen left hand; oxygen, nitrogen and argon right hand.
4. The contents of cylinders are identified by adhesive labels, and a system of colour coding of the cylinder shoulder allows consistent identification. Labelling is the primary means of identifying the contents of a cylinder and the cylinder shoulder colour coding is only an indication.
 - 4.1. Obtain from your supervisor the details of colour coding and labelling applicable to the cylinders which you will be handling.
 - 4.2. For cylinders in medical applications the cylindrical part needs to be painted in white colour
5. Each cylinder has the following information marked on the cylinder, which are relevant for filling:
 - Year of next test.
 - hydrogen compatibility (if given),
 - filling pressure, (not for liquefied gases),
 - tare weight (for liquefied gas service)
 - test pressure,
 - water capacity,
 - approval mark of country of use.
 - 5.1. Never remove or erase these marks.
 - 5.2. Never stamp mark a cylinder unless you are authorised to do so.

- 5.3. Only fill cylinders that have the correct identification.
- 6 Cylinders have to be subjected to inspection and hydraulic testing by the manufacturer before they can be put into service.
- 7 Cylinders have to be periodically inspected and tested at set intervals throughout their working life. The periodic inspection can be either a hydraulic test or an ultrasonic examination.
- 7.1. Obtain from your supervisor the rules which apply to the cylinders which you will be handling and learn how to read test dates on cylinders.
- 7.2. Never fill a cylinder which has not been tested or examined within the appropriate period.
- 8 A cylinder which is in a satisfactory condition to be filled shall conform to the following:
- it must not be excessively dirty,
 - pressure test date must be valid,
 - it must not show any physical damage such as dents, burn marks,
 - it must not be rusty,
 - it must be free from corrosion by chemicals,
 - maximum allowed working pressure must be consistent with filling pressure and over pressure protections of filling rack,
 - the valve must be of the correct type, clean and in good condition,
 - the residual contents must be the same gas as indicated by label and colour,
 - the valve protection cap, if used, must be available.
- 8.1. Examine all cylinders before filling to see that they are in a satisfactory condition.
- 8.2. Report to your supervisor any cylinders which you consider to be unsatisfactory.
- 9 When filling cylinders:
- ensure that the safety cable that is part of the hose or filling connector is installed and adequately hooked over the valve
 - inspect the hoses and their safety cables and replace any damaged ones
- 10 Cylinders standing on uneven surfaces and cylinders with defective foot rings are unstable and can fall over.
- Cylinders which are standing unattended and unsupported can be knocked over; and in falling, they could hit other cylinders and cause them to fall.
- 10.1. Always let cylinders stand on flat and level surfaces and secure them, for example, using chains or pallets.
- 10.2. Report any cylinders with defective foot rings to your supervisor.
- 10.3. Never leave cylinders freestanding in places where they could be accidentally knocked over.
- 11 Never trans fill cylinders without the appropriate qualification, procedures and equipment.
- 12 Adapters to convert cylinder valves from one type of gas to another can lead to contamination and serious accidents. Their use is forbidden unless covered by a work permit.
- 12.1. Report the presence of any adapters to your supervisor.
- 13 When handling cylinders into or out of a pallet, make sure that the pallet is in good condition, and report deficiencies to your supervisor. Where fitted, do not move the gate or bar before having loosened the strap around cylinders and make sure that cylinders inside the pallet are

steady. Never try to grasp a falling cylinder, just keep clear. Ensure cylinders are strapped into a pallet and where fitted, close the bar or gate when not handling cylinders in a pallet and lock the bar open when handling cylinders.

- 14 Keep clear of forklifts handling pallets.

Appendix 1 – CYLINDERS FOR COMPRESSED GASES – Test Questions

Tick the correct answer (s) or write in the blank spaces as requested.

1. Tick at least two of the following sentences as true:
 - A. No specific regulation covers this subject
 - B. Filling process is controlled by pressure
 - C. Carbon Dioxide can be filled in any compressed cylinders
 - D. Cylinders have to be periodically tested at set intervals
 - E. Each cylinder must be inspected before filling
2. The valves on flammable gas cylinders have a right-hand outlet thread and those non-flammable gas cylinders have a left hand outlet thread
 - A. True
 - B. False
3. Cylinders which are standing unattended and unsupported may be knocked over; in falling, they may hit other cylinders and cause them to fall. List two safety instructions to prevent this:
 - a) _____
 - b) _____
4. Complete the sentence: “Never fill a cylinder which has not been _____ within the appropriate period.”
5. Tick the correct statements:
 - A. Report any cylinder with defective foot ring to your supervisor
 - B. Never transfill cylinders without the appropriate qualification, procedures and equipment
 - C. Unidentified cylinders only can be filled with inert gases
 - D. If a cylinder falls, try to grasp it before it could hit someone
6. Tick at least two items of Personal Protective Equipment that you should always wear while handling cylinders:
 - A. Safety shoes
 - B. Safety glasses
 - C. Hearing protection
 - D. Safety shoes with metatarsal protection
 - E. Safety gloves
 - F. Rubber apron
7. Adapters to convert cylinders valves from one type of gas to another can lead to contamination and serious accidents.
Their use is forbidden unless it is covered by a Work Permit.
 - A. True
 - B. False
8. **Tick the correct instruction(s):**
 - A. When filling cylinders ensure that the safety cable that is part of the hose or filling connector is installed and adequately hooked over the valve
 - B. When filling cylinders inspect the hoses and their safety cables and replace any damaged ones

Appendix 2 – CYLINDERS FOR COMPRESSED GASES – Test Answers

1. B, D and E
2. B
3. Always let cylinders stand on flat and level surfaces
Never leave cylinders freestanding in places where they can be accidentally knocked over
4. Tested/Examined
5. A and B
6. B, D and E
7. A
8. A and B