



SAFETY TRAINING LEAFLET 17 FIRE

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FIRE

Prepared by Safety Advisory Council

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Note: this Safety Training Leaflet is taken from Leaflet 16: FIRE in Doc 23/08 Safety Training of Employees. The leaflet has been put into a new format and revised.

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.

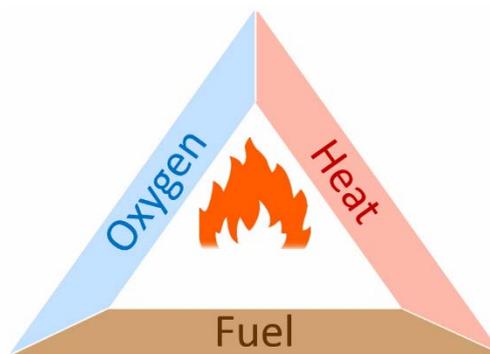
Appendix 2 includes the list of correct answers.

2 Fire

Every employee must be trained in the emergency response procedures and actions necessary to prevent the spreading of fires. The priority is to raise the alarm.

In order to know how to prevent fires from starting, it is necessary to understand the basic process; fire is a reaction resulting in the release of heat, light and smoke, which is started and maintained by the simultaneous presence of three factors:

- Fuel, i.e. a combustible material,
- Oxygen (or oxidizing agent), usually air which contains 21 % oxygen,
- An external source of ignition (such as heat, shock, flame). Once a fire has started it generates its own energy / heat supply.



Fuels which exist in our factories are:

- Gases, such as hydrogen, acetylene, natural gas, propane, butane, propylene,
- Flammable liquids such as diesel oil, oils, solvents, liquefied natural gas, propane, (LPG).

The main sources of ignition are:

- Smoking,
- Welding, flame-cutting, grinding,
- Friction,

- Short circuits,
- Heat and sparks,
- Mechanical shocks,
- High velocity metal chip in oxygen piping.

Once fires have started, they spread by different means:

- Conduction: metallic frames and piping have high heat conductivity,
- Convection: hot gases and vapours rise and transport heat as well as light weight pieces of burning materials,
- Radiation: high temperature generates heat which travels across open spaces without any flame or burning material (this is what you feel when you stand in front of a fireplace).

2.1 Specific hazards in our industry

Specific hazards in our industry are represented by:

Area/Equipment	Risk	Recommendations
Cylinder	If exposed to excessive heat, cylinders may explode; alternatively, the material may be weakened.	Keep all cylinders away from heat sources.
Calcium Carbide	When wet, calcium carbide generates heat and acetylene gas which is highly flammable and potentially explosive.	Keep drums of calcium carbide in dry conditions and not exposed to heat.
Oxygen-fed fires	Oxygen vigorously supports combustion. In oxygen, everything burns more or less violently.	Report leaks from oxygen systems immediately and make sure that they are promptly fixed.
Hydrogen fires	Hydrogen burns with an invisible flame: precautions and procedures are detailed in Safety Training Leaflet 7 <i>Hydrogen</i> .	Report a hydrogen fire or a suspected hydrogen fire to your supervisor immediately.
Acetylene fires	Special training is required to deal with acetylene fires on plant.	Cylinders need to be either taken away from fire, if not yet hot, or cooled down with large quantities of water where their removal might be hazardous.
Electrical equipment	Electrical equipment gets hot when it is overloaded or in case of short circuit.	Report any electrical equipment, such as motors, generators, cables, switchgear which is found to be hotter than normal.
Machinery	Motion generates heat and all machinery is designed to operate between certain temperature limits (critical are valves on reciprocating Oxygen compressors).	Report any cases of machinery overheating to your supervisor.

Area/Equipment	Risk	Recommendations
Welding, cutting and grinding operations	Sparks and molten metal can ignite combustible materials in the vicinity. Also torches generate high temperature flames.	Before starting work check that there are no combustible materials in the vicinity. Work in specified areas only or get a Work Permit. See Safety Training Leaflet 23 <i>Work Permit</i> .
Chemicals	Some chemicals ignite when exposed to heat.	
Clothing	Clothing, particularly soiled clothing, can ignite when exposed to heat or flame.	Keep all clothing which is not being worn in authorised lockers.
Electric or gas cookers, fires and heaters		Use only those cookers, fires and heaters which have been authorised by management in the authorised area.

2.2 Training

All employees will be trained in basic fire prevention, firefighting and emergency procedures before commencing work.

- Know which extinguishers can be used to fight particular types of fire and be able to recognise firefighting appliances by type, colour and use - see attached chart,
- Easy access to fire-fighting equipment must be maintained,
- Report any use of fire extinguisher so that it is replaced immediately,
- Firefighting equipment need be inspected periodically.

2.3 Emergencies:

If you hear the alarm, proceed to your meeting point via the normal escape route or, if not available, it's nearest alternative. All employees must know the escape route and meeting point. Learn what to do in case of an emergency.

If you discover a fire:

- Sound fire alarm,
- fight fires with appropriate extinguisher,
- do not allow fire to spread so as to cut off escape route,
- If fire cannot be extinguished, personal safety comes first: Escape!

Fire and emergency instructions must be posted and maintained at various places in your plant or office. You must know these places and instructions.

2.4 Types and use of fire extinguishers

v Fire classes	Extinguisher type and content >				
	Group 1 Water	Group 2 Carbon Dioxide	Group 3 Vaporising liquid	Group 4 Dry powder	Group 5 Foam
Class A FIRES SOLIDS such as paper, wood, plastic etc.	Excellent; cools down; Not for calcium carbide!	Not ideal: insufficient cooling to prevent re- ignition.	Not ideal: insufficient cooling to prevent re- ignition.	Not ideal: insufficient cooling to prevent re- ignition.	Yes cools down
Class B FIRES FLAMMABLE LIQUIDS such as paraffin, petrol, oil etc.	No	Yes	Yes excellent	Yes excellent	Yes Smothers fire
Class C FIRES FLAMMABLE GASES such as propane, butane, methane etc.	SDS: yes	No	No	SDS: yes	SDS: yes
Class D FIRES METALS such as aluminium, magnesium, titanium etc.	No	No	No	Special eutectic powders	No
Class E FIRES involving ELECTRICAL APPARATUS	No Hazardous!	Yes excellent	Yes excellent	Yes	No

Appendix 2 - Fire – Test Answers

1. A
2. A, B and D
3. A-3, B-1, C-2 and D-4
4. B and D
5. C, then B, then D, then A
6. **"Accessible" ... "signposted"**
7. **See company procedures**
8. A