



# CONTROLLING FIRE AND EXPLOSION RISKS IN THE WORKPLACE (OSH002)

Course material – March 2020

**HSE portal**

For better HSE practice

**By:**

Eng. Khalid Ahmed, CMIOSH, MCIWEM, M.Sc. (Safety),  
EnvDipNEBOSH, B.Sc. (Hons.) Chem. Eng., L3AET, ICDL

## **Copyright notice**

This material utilizes public sector information published by the Health and Safety Executive and licensed under the Open Government Licence.

## Contents

Copyright notice .....	1
1. Module 1: Controlling fire and explosion risks in the workplace .....	4
1.1. Control measures.....	4
1.2. Mitigation measures .....	5
1.3. Additional requirements where explosive atmospheres can occur.....	5
1.4. Provision of information, instruction and training for employees .....	6
1.5. Preparation for accidents, incidents and emergencies.....	7
1.6. Sources of information on fire and explosion risks .....	8
1.7. Module quiz.....	9



## Module 1: Controlling fire and explosion risks in the workplace

# 1. Module 1: Controlling fire and explosion risks in the workplace

Dangerous substances such as solvents, paints, varnishes, flammable gases, liquefied petroleum gas (LPG), dusts from machining and sanding operations, and dusts from foodstuffs can be found in nearly all workplaces and could, if not properly controlled, cause harm to people as a result of a fire, explosion or similar incident, such as an uncontrolled chemical reaction.

An employer must first consider eliminating or reducing the risk by replacing the dangerous substance with another substance, or using a different work process. In practice, it is recognized this may be difficult to achieve, e.g. where the dangerous substance is used as a fuel. However, for some work activities and processes it may be possible to eliminate or reduce the risk by using a non- or less dangerous substance, e.g. by replacing a low-flashpoint liquid with a non-flammable liquid, or one with a higher flashpoint. Where this is not reasonably practicable, an employer should consider what control measures to take to prevent a fire, explosion or similar energetic incident from occurring.

## 1.1. Control measures

Control measures should be prioritized as follows:

- Reducing the quantity of dangerous substances to a minimum.
- Avoiding or minimizing releases of dangerous substances.
- Controlling releases of dangerous substances at source.



- Preventing the formation of an explosive atmosphere, including by ventilation.
- Collecting, containing and removing any releases to a safe place.
- Avoiding ignition sources.
- Avoiding adverse conditions (such as exceeding pressure/temperature limits) that could lead to danger.
- Keeping incompatible substances apart.

Following implementation of the control measures, the next priority is the identification and implementation of mitigation measures to reduce the detrimental effects of a fire, explosion or similar incident.

## **1.2. Mitigation measures**

These are as follows:

- Reducing the number of employees exposed to the risk.
- Providing plant that is explosion resistant.
- Providing explosion suppression or explosion relief equipment.
- Taking measures to control or minimize the spread of fires or explosions.
- Providing suitable personal protective equipment (PPE).

The provision of suitable PPE should not be a substitute for providing appropriate protective measures on the plant, equipment or workplace itself.

## **1.3. Additional requirements where explosive atmospheres can occur**

The correct implementation of control measures aims to prevent the formation of potentially explosive atmospheres, or limit their extent. However, due to the way

dangerous substances are stored, handled and used, it is not possible to fully avoid the risk of potentially explosive atmospheres occurring.

In areas where hazardous explosive atmospheres may occur, employers must ensure that:

- All potential ignition sources, including sparks, hot surfaces, smoking materials, naked flames, unsuitable equipment etc are excluded.
- Only equipment and protective systems, including portable equipment that meets the requirements of the equipment and protective systems intended for use in potentially explosive atmospheres should be used and installed.
- Before bringing them into operation for the first time, as part of the commissioning procedure, a person competent to do so should verify that the equipment and protective systems provided are suitable and sufficient to make sure the fire and explosion risks are properly controlled.
- People who provide, maintain or verify electrical installations and equipment in, or associated with, the hazardous areas are competent to undertake the task.
- Where necessary, a warning sign is posted at the entry points of places that have been classified as hazardous areas to warn those entering those areas that special precautions are required.
- Employees working in hazardous areas are provided with appropriate clothing that does not create a risk of an electrostatic discharge capable of igniting the explosive atmosphere.

#### **1.4. Provision of information, instruction and training for employees**

Relevant information, instruction and training for employees includes:

- Details of dangerous substances in the workplace and the risks they present, including access to any relevant safety data sheets and information on any other legislation that applies to the dangerous substance.

- The findings of the risk assessment and the control and mitigation measures put in place as a result (including their purpose and how to follow and use them).
- Emergency procedures.

Employers need to provide information, instruction and training to other people (non-employees) where it is required to ensure their safety, and it should be in proportion to the level and type of risk.

The contents and associated hazards of pipes, containers etc used for dangerous substances in the workplace should be clearly identifiable so that employees and others are alerted to the presence of the dangerous substance.

## **1.5. Preparation for accidents, incidents and emergencies**

Employers should assess the likelihood of, and scale or magnitude of the effects that may result from, any foreseeable accident, incident, emergency or other event involving dangerous substances present in the workplace. Based on this assessment, they should put in place appropriate emergency arrangements to safeguard people on their premises, mitigate the effects of any such event, and restore the situation to normal.

Such arrangements include the plans and procedures for safety drills, warning and other communication systems, and first-aid facilities. Equally, no additional arrangements are required where an employer risk assessment determines that the dangerous substance poses only a slight risk – because of the quantity present.

If an accident, incident or emergency occurs, the employer should provide employees tasked with carrying out repairs or other necessary work with the appropriate equipment,



including PPE and information, instruction and training to enable them to carry out this work safely.

The information in the emergency plans and procedures should be made available to the emergency services to allow them to develop their own plans if necessary.

## **1.6. Sources of information on fire and explosion risks**

Information on workplace fire and explosion risks can be obtained from:

- Enforcement bodies such as the Health and Safety Executive (website: <http://www.hse.gov.uk>) and OSHA (website: <http://www.osha.gov>).
- Professional bodies such as IOSH (website: <http://www.iosh.com>) and IIRSM (website: <http://www.iirsm.org>).

## 1.7. Module quiz

Select the best answer for the questions below:

**Q1: An employer has large flammable stores and want to control fire risk in the workplace. What should he do?**

- A) Get rid of the flammable material.
- B) What is reasonably practicable.
- C) Replace the flammable with a non-flammable material.
- D) Use a different work process.

**Q2: A UK-based employer has an area in his workplace that is classified as a Zone 2 area. Which one of the below-described could it be?**

- A) An area where an explosive gas atmosphere is likely to occur in normal operation.
- B) An area where explosive gas atmosphere is not likely to occur in normal operation and, if it occurs, will only exist for a short time.
- C) An area where an explosive gas atmosphere is present continuously or for long periods.
- D) An area where an explosive atmosphere occurs for more than 1000h/yr.

**Answers:**

The correct answer for question one is B. An employer must do what is reasonably practicable to control fire risk in workplace.

The correct answer for question two is B. According to the Health and Safety Executive, in a Zone 2 area an explosive gas atmosphere is not likely to occur in normal operation and, if it occurs, will only exist for a short time..

Answer to question two can be found in the Health and Safety Executive website at: <https://www.hse.gov.uk/comah/sragtech/techmeasareac1as.htm>.