

Explosives Regulations 2014

Guidance on Regulations - Pyrotechnic articles in retail
and commercial premises

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This guidance has been developed by a sector working group established under the Explosives Legislative Review (www.hse.gov.uk/explosives/news/explosives-legislative-review.htm). It includes content previously found on HSE's website and in the Approved Code of Practice to the Manufacture and Storage of Explosives Regulations 2005 (L139) which was withdrawn on 1 October 2014.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance, you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

Acknowledgements

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Introduction

Who is this publication for?

- 1 This publication is for people who store pyrotechnic articles:
- in retail premises and similar environments; and/or
 - in support of their main commercial activity.
- 2 It will be particularly relevant to:
- theatrical suppliers;
 - theatrical and other entertainment venues where pyrotechnic articles are stored for use in productions;
 - chandlers and other suppliers of pyrotechnic articles intended for raising alarms or saving life;
 - agricultural suppliers;
 - retailers and gaming site operators supplying pyrotechnic accessories for paintball and airsoft; and
 - motor vehicle manufacturers and repairers who install or replace airbag inflators, modules and seat-belt pretensioners

and who store pyrotechnic articles as part of their business.

3 It also contains material relevant to enforcing authorities such as local authority trading standards officers, the police, fire and rescue services and other emergency services. This publication may also be of interest to other government or regulatory agencies and waste disposal operators.

What is this publication about?

4 This publication provides guidance on the safe and secure storage of pyrotechnic articles (other than fireworks) in retail premises and in premises storing limited quantities of pyrotechnic articles (other than fireworks) in support of their main commercial activities. It explains why some of the day-to-day precautions are necessary, and supplements the simple guidance available elsewhere.

5 Following this guidance will enable compliance with the safety and security provisions of the Explosives Regulations 2014 (SI 2014/1638) (ER2014) where they relate to the storage of pyrotechnic articles.

6 This document also provides guidance on some wider areas which are relevant to ER2014. These wider areas are included as they help support compliance with the safety provisions.

Throughout this guidance, you will see statements in boxes. The statements identify successful outcomes of the application of appropriate safety and security measures to explosives operations. Dutyholders can use the statements to challenge themselves on the effectiveness of the safety and security precautions they have implemented.

Other guidance that applies to the storing and selling of pyrotechnic articles in retail premises and the storage of pyrotechnic articles in support of other commercial activities

7 HSE has published detailed guidance on the safety provisions (L150)¹ and security provisions (L151)² of ER 2014. This guidance provides the background to this document and will be useful to those who require a deeper understanding of the precautions required to store and/or sell pyrotechnic articles safely and securely. It will also be useful to those people who conduct activities that would be considered to be explosives manufacture.

8 HSE also has published a summary of the straightforward steps that people storing and selling pyrotechnics articles in retail premises³ should follow on a day-to-day basis.

9 L150 and L151 are referred to throughout this guidance. In each case, we have quoted the relevant section heading to make it easier for you to find the information you need.

Other legislation that applies to explosives operations

10 There are other general health and safety regulations which apply to explosives operations including the storage of pyrotechnic articles. This publication gives additional guidance where there are particular issues which need to be considered, for example in selecting work or personal protective equipment, or in vacating an explosives site.

11 The Pyrotechnic Articles (Safety) Regulations 2015 (SI 2015/1553) apply to the supply of pyrotechnic articles. These Regulations transpose European Directive 2013/29 on the placing on the market of pyrotechnic articles into UK law. The Regulations deal with the harmonisation of standards and the safety of pyrotechnic articles placed on the market. They also define:

- those products which are available to the general public and the specific age restrictions on sale; and
- those articles which are only for supply to specialists.

12 Fire safety legislation also applies to premises used for the retail of pyrotechnic articles and their storage in support of other commercial activities.

Application and scope of the Regulations

13 Regulations 2 and 3 of ER2014 identify how the Regulations apply to explosives operations. This section provides information and guidance on how the Regulations apply to safety and security of pyrotechnic articles in retail and commercial premises.

Explosives for work, personal and recreational use

14 ER2014 applies to pyrotechnic articles whether they are for work or non-work purposes. They therefore apply to anyone storing pyrotechnic articles for personal recreational use, or to voluntary clubs or societies storing explosives (examples include storage for theatrical productions or re-enactment events).

Transport

15 ER2014 *do apply* to the transport of pyrotechnic articles on site. This includes movement on public roads between different buildings on the same site.

16 ER2014 *do not apply* to pyrotechnic articles being transported by road, rail, air or water, provided that the pyrotechnic articles are not kept in one place for longer than 24 hours.

17 Explosives, including those which are pyrotechnic articles which are being transported, will be treated as being in storage when they are kept, or are to be kept, at one place for more than 24 hours.

18 Dutyholders who keep explosives which are being transported as part of the supply chain should ensure that any explosives whose onward journey cannot take place, are stored safely and lawfully.

19 As a general rule, where explosives are on a stationary vehicle which has arrived at its destination and does not have an onward journey, and have not been unloaded within a reasonable period of time, the explosives should be regarded as being in storage.

Application offshore

20 ER2014 (other than regulations 4, 5, 31 and 32) apply to certain activities in the UK territorial sea adjacent to Great Britain (for example, coastal construction activities which extend into the territorial sea and the construction, operation and demolition of wind farms).

21 Detailed guidance on the application offshore of the Explosives Regulations 2014 to commercial activities involving pyro articles can be found in L150 under 'Application offshore'.

Explosives in use

22 The safety provisions of ER2014 do not generally apply to explosives which are in use.

Hazard type

The role of hazard type

23 Hazard type (HT) is central to both the safety provisions and the licensing elements of the Regulations.

24 Hazard type defines and describes the nature of the hazard arising from a pyrotechnic article in storage conditions.

Definition of 'hazard type' and its relationship to hazard division

25 Definitions of the hazard types are given in regulation 2 of ER2014:

- *Hazard Type 1: '...an explosive which, as a result of, or as a result of any effect of, the conditions of its storage or process of manufacture, has a mass explosion hazard' (a mass explosion can be one in which the entire body of explosives explodes as one; where a substantial proportion of the explosives present could explode in such a way that the practical hazard should be assessed by assuming simultaneous explosion of all the explosives present; or one which is associated with a serious blast hazard);*
- *Hazard Type 2: '...an explosive which, as a result of, or as a result of any effect of, the conditions of its storage or process of manufacture, has a serious projectile hazard but does not have a mass explosion hazard' (where a fragment hazard arises solely as a consequence of the store where the explosives are being kept breaking up, the explosives would normally be treated as Hazard Type 1);*
- *Hazard Type 3: '...an explosive which, as a result of, or as a result of any effect of, the conditions of its storage or process of manufacture, has a fire hazard and either a minor blast hazard or a minor projectile hazard, or both, but does not have a mass explosion hazard' (ie those explosives which give rise to considerable radiant heat or which burn to produce a minor blast or projection hazard);*
- *Hazard Type 4: '...an explosive which, as a result of, or as a result of any effect of, the conditions of its storage or process of manufacture, has a fire hazard or slight explosion hazard, or both, with only local effect' (ie those explosives which present*

only a relatively low explosives hazard in the event of ignition or initiation, where no significant blast or projection of fragments of appreciable size or range is expected).

26 Hazard division is the classification assigned (along with a four-digit UN Number) by a competent authority for an explosive as packaged for transport according to the requirements of the UN scheme. Hazard types share similar criteria for describing behaviours (blast, fragmentation etc) as hazard divisions, but represent the hazards posed in manufacture and storage rather than when an explosive has been packaged for transport.

Determination of hazard type

27 For those pyrotechnic articles being kept as packaged for carriage, and which have been classified, there will generally be a direct correlation between the UN hazard division (HD) assigned them on classification for transport, and the hazard type (HT) they should be allocated for storage, ie:

- UN HD 1.1 (UN 0333) = HT1
- UN HD 1.2 (UN 0334) = HT2
- UN HD 1.3 (UN 0335) = HT3
- UN HD 1.4 (UN 0336 & UN 0337) = HT4

28 Pyrotechnic articles sold in retail premises will normally have been classified for transport as UN HD 1.4. Some pyrotechnic articles (eg some flares and some bird-scaring rockets) sold on retail premises will have been classified as UN HD 1.3, and it is possible that some specialist retailers may supply pyrotechnic articles that have been classified as UN HD 1.1 and UN HD 1.2 (eg some line throwing rockets, some parachute flares, some sound-producing devices such as maroons and more energetic bird-scarers).

29 Some pyrotechnic articles that would normally attract a 1.3 classification are packaged in such a way that they can be treated as HD 1.4 (and HT4) in their transport or retail packaging (aka mitigatory packaging). Particular care needs to be taken with these pyrotechnic articles to ensure that:

- they are not removed from their packaging in an explosives store but in an appropriate place outside the store;
- they are handled appropriately when they are removed from their mitigatory packaging; and
- the mitigatory packaging is properly closed when items are removed to ensure that the pyrotechnic articles it still contains can continue to be treated as HT4. Your supplier should be able to tell you how to properly close any packaging.

30 Where the above conditions are met and the pyrotechnic articles are removed from their mitigatory packaging, provided to the customer and removed from the premises without delay, the storage activity can continue to be treated as HT4.

31 Where pyrotechnic articles would present a higher hazard (HT1 or HT2) when removed from mitigatory packaging, either:

- a detailed assessment of the implications for the HT of the storage hazards associated with the removal of the pyrotechnic articles should be undertaken and appropriate controls to mitigate those hazards implemented; or
- the pyrotechnic articles should be supplied to the customer in their full mitigatory packaging.

32 More information on how to identify and safely store pyrotechnic articles which are transported in mitigatory packaging or are supplied for retail sale in mitigatory packaging can be

obtained from suppliers. Your supplier should also provide you with information on how to properly close any packaging once it has been opened.

33 Pyrotechnic articles that present a higher hazard in storage (HT1 or HT2) should not be stored on retail premises or in a stockroom, warehouse, or workshop etc unless the total quantity of explosives of all hazard types present does not exceed 100 grams. Pyrotechnic articles that present a higher hazard in storage (HT1 or HT2) in quantities greater than 100 grams should be stored in a separate dedicated building.

34 Appendix 1 provides further information on how to identify the hazard type of pyrotechnic articles from labels and information on transport cartons, and from transport documentation.

Terminology

35 Further information on various terms used in the Regulations and in this document can be found in the Glossary.

Safety requirements

Explosives operations are subject to robust controls to maintain safety standards.

General principles of safety in explosives operations

36 High standards of safety need to be in place before explosive operations (including those involving pyrotechnic articles) begin, and should remain in place – and be effective – for as long as the explosive operations continue. It is generally difficult or impossible to regain control of an event involving explosives once control has been lost. The effects of an explosive event involving pyrotechnic articles can often be catastrophic, and can impact those beyond the immediate activity, eg members of the public and the emergency services. The safety provisions of ER2014 provide the regulatory framework for identifying and implementing these standards of safety, and are based on generally recognised principles of safe operation in the sector.

37 Further information on the 10 general principles underpinning the safety provisions of ER2014 can be found in L150 under 'General principles of safety in explosives operations'.

Regulatory framework

38 The safety provisions in ER2014 are contained within five Regulations:

- **Regulation 26** requires anyone manufacturing or storing explosives to take appropriate measures:
 - to prevent fire or explosions;
 - to limit the extent of fire or explosion, including measures to prevent the spreading of fires and the communication of explosions from one location to another; and
 - to protect people from the effects of fire or explosion.
- **Regulation 27** requires people storing explosives to maintain separation distances, identifies the circumstances in which separation distances do not need to be applied, and identifies how separation distances are applied to certain sites which are granted a licence by HSE or the Office for Nuclear Regulation (ONR).
- **Regulation 28** requires anyone discarding or disposing of explosives, or who is decontaminating explosive-contaminated items, to ensure, so far as reasonably practicable, that they are undertaking those activities safely.
- **Regulation 29** prohibits the manufacture and storage and import of pyrotechnics containing sulphur and/or phosphorus mixed with chlorates without the approval of HSE.
- **Regulation 13** relates to the grant of licences, but also includes safety provisions. It allows licensing authorities to reinforce the requirements of regulation 26 as they relate to the sale of pyrotechnic articles at a site which they have licensed for the storage of explosives.

Fire and explosion measures (Regulation 26)

During manufacture and storage, appropriate measures are taken to:

- **prevent an unplanned fire or explosion;**
- **limit the extent of fires or explosions;**
- **prevent fires spreading;**
- **stop explosions communicating from one place to another; and**
- **protect people from the effects of a fire or explosion.**

Safety measures

39 The same approaches are taken for the safe display, storage and handling of pyrotechnic articles in retail and other similar premises (such as agricultural suppliers), in places where pyrotechnic articles are stored to support the site's main commercial activity, and to ensure the safety of other types of explosive. Those storing pyrotechnic articles should identify the safety measures to be taken by carrying out a risk assessment, and take appropriate measures to control the risks identified.

40 When storing pyrotechnic articles, the primary initiating events that need to be considered are a fire elsewhere on the premises or the accidental initiation of the pyrotechnic articles by other means. The principal hazards that need to be considered are the spread of fire, the propagation of any explosives event, and the potential for people to be struck by pyrotechnic effects.

41 The safety measures taken should ensure that:

- the likelihood of an event involving pyrotechnic articles or explosives is minimised;
- an event involving pyrotechnic articles or other explosives which are being worked on will not communicate to pyrotechnic articles or other explosives in storage;
- people present on site will be able to evacuate before the pyrotechnic articles (or any other dangerous substances) become involved in an outbreak of fire; and
- people both on site and off are adequately protected from both fire and the potential consequence of any event involving the pyrotechnic articles or other explosives.

Identify safety measures

Safety measures to:

- **prevent unplanned fires and explosion;**
- **prevent the spread of fire and the communication of an explosion; and**
- **protect people from the effects of a fire and explosion**

are identified using a structured approach.

42 In deciding if the prevention and mitigation control measures in use are appropriate, the primary consideration will generally be to ensure that employees and others are protected from harm by fire.

43 The principal objectives of the appropriate measures will be to ensure that sources of ignition are controlled, and that people are able to evacuate before the pyrotechnic articles (or any other dangerous substances) become involved in an outbreak of fire.

Risk assessment

44 Employers will generally identify and implement appropriate measures as an outcome of a risk assessment or as part of the implementation of a safety management system. HSE has published a 'retailers' risk assessment checklist⁴ which can be used by people who sell pyrotechnics, to help them carry out a risk assessment and plan what actions they need to take to protect the safety of staff and customers.

45 Where the site or the activities undertaken are complex, it may be necessary to conduct a more detailed hazard identification and evaluation in support of the risk assessment. Further information on hazard identification and evaluation and the assessment of explosives risks can be found in Appendix 1 of L150.

46 Employers and the self-employed who comply with the risk assessment requirements of:

- the Management of Health and Safety at Work Regulations 1999 (SI 1999/3242) (the Management Regulations);
- the Dangerous Substances and Explosive Atmospheres Regulations 2002 (SI 2002/2776) (DSEAR); and
- fire safety legislation

will have taken the steps necessary to identify the appropriate measures they are required to take under regulation 26(1) of ER2014.

47 Regulation 3 of the Management Regulations requires all employers and self-employed people to assess the risks to workers and any other people who may be affected by their work or business. This is to enable them to identify the sensible and proportionate measures they need to take to control the risks.

48 Regulation 5 of DSEAR requires a risk assessment to be carried out to identify whether dangerous substances are present on site, and the risks they present. DSEAR apply to all hazards arising from both the manufacture and storage of explosives and from the other dangerous substances on site. This includes, for example, dangerous substances not in use, or those in storage awaiting use.

49 Fire safety legislation requires responsible persons to make a suitable and sufficient assessment of the risks to which 'relevant persons' are exposed. This is to identify the general fire precautions that need to be taken to comply with the requirements and prohibitions imposed by fire safety legislation.

Management arrangements

Appropriate safety measures are in place. Roles and responsibilities for implementing and maintaining them are specified and understood.

50 Arrangements should be in place to manage explosives operations. These arrangements should address the responsibilities for:

- identifying;
- implementing; and
- maintaining

the safety measures.

51 Employers and the self-employed will generally identify and implement management arrangements as a consequence of their duties under regulation 5 of the Management Regulations.

52 Employers will also have duties as a responsible person under fire safety legislation.

53 Further information can be found in Appendix 2 of L150.

Cross-cutting safety measures

Cross-cutting safety measures (ie measures which address more than one duty) are implemented to ensure the safe manufacture and storage of explosives.

54 Some safety measures are particularly important because they reduce the risk of a fire or explosion being initiated, and limit the consequences in the event of an initiation. These safety measures are:

- appropriate training and competence;
- safe systems of work and working practices;
- high standards of housekeeping;
- providing and maintaining appropriate barriers;
- effective stock management;
- segregating explosives presenting different likelihoods of initiation (or different hazard types);
- segregating explosives operations from other activities; and
- safely transporting explosives on site.

Competence

People manufacturing or storing explosives are competent to carry out activities under normal conditions. They understand the hazards and risks which may arise and the actions to take in abnormal or emergency situations.

55 Competent people understand how a fire and explosion can occur, and know what to do to prevent it. They understand how it can be stopped from spreading or communicating to other explosives, and know what to do to protect people, including themselves.

56 Dutyholders should have systems in place to assess and identify training and competency needs. They should also follow up where training needs are identified or competency needs to be developed. The extent and formality of these systems depends on factors such as the outcomes of the risk assessment, the complexity of the explosives operation, the size of the organisation, and the rate of turnover of the people involved in the operation. Competence should be reviewed at periodic intervals and when there have been significant changes to:

- people;
- procedures;
- equipment; and

- materials

or when the regulatory framework or recognised industry practice has changed.

57 Training provided to workers should include instructions on:

- storing pyrotechnic articles well away from flammable liquids and materials that can easily catch fire and burn;
- controlling the quantities being stored, handled, processed or displayed in areas where people work or gather;
- prohibiting smoking anywhere near the pyrotechnic articles;
- ensuring that sources of heat, such as heaters, are kept well away from pyrotechnic articles;
- keeping pyrotechnic articles in closed transport packaging whenever it would be practicable to do so;
- storing pyrotechnic articles away from hazardous substances;
- protecting pyrotechnic articles from damp;
- ensuring that other chemicals do not contaminate pyrotechnic articles;
- how to avoid accidental damage to packaged pyrotechnic articles; and
- what to do in an emergency.

Safe systems of work and working practices

Explosives operations and activities involving pyrotechnic articles are carried out to agreed procedures.

58 Developing safety measures for the safe storage and sale of pyrotechnic articles on retail premises, and in those places where pyrotechnic articles are stored to support the site's main commercial activity, will normally include consideration of:

- the activity and where it is to be carried out;
- the sequence of tasks needed to complete the activity and how they will be done;
- the outcomes of the hazard identification and analysis;
- the skills and competencies required to deal with the hazards;
- the precautions necessary to prevent a fire and explosion; to stop a fire spreading and an explosion communicating; and to protect people from the effects of a fire or explosion;
- recognised and generally accepted safety procedures covering known hazards;
- how the pyrotechnic article-related activities will be segregated from other activities, and any controls necessary to maintain that segregation;
- the tools and equipment (including personal protective equipment) to be used; and

- how to minimise both waste pyrotechnic articles and other waste that could act as a source of ignition for the pyrotechnic articles, and how that waste will be managed prior to disposal.

59 Procedures would be expected to include the following activities:

- receipt and unloading of deliveries;
- storage of pyrotechnic articles;
- removing pyrotechnic articles from transit packaging;
- movement of pyrotechnic articles on site;
- providing pyrotechnic articles to customers;
- managing returns from customers and to suppliers; and
- management and disposal of damaged stock

and, where the pyrotechnic articles are stored to support the site's main commercial activity:

- preparing pyrotechnic articles for use; and
- packing or repacking of transit cartons or retail packaging.

Housekeeping

High standards of housekeeping are maintained to:

- **provide control over sources of initiation;**
- **prevent fires and explosions;**
- **reduce the likelihood of a fire spreading or an explosion communicating; and**
- **reduce the risks of people becoming trapped or harmed if a fire or explosion occurs.**

60 Areas where pyrotechnic articles are being stored should be kept clean and tidy. Only those materials necessary for the storage operations should be kept in the storage area, and particular attention should be paid to preventing the build-up of flammable fines.

61 Damp pyrotechnic articles can be dangerous, especially to users. They are also more prone to leak explosive compositions which increase the likelihood of a fire or can help a fire to spread. Therefore, appropriate measures should be taken to keep pyrotechnic articles dry. Storage areas should be dry before use to avoid the pyrotechnic articles becoming damp. They should be thoroughly cleaned after use to ensure no loose composition is left behind.

62 To avoid the spillage of explosives, pyrotechnic articles should only be transferred from one transport package to another when necessary.

Barriers

Barriers are used where appropriate to prevent or limit the spread of fires or the communication of an explosion, and to protect people.

63 Barriers are physical structures that will prevent or delay the spread of fire and intercept fragments and debris caused by an explosive event in a building or store. Doors can often act as an effective barrier to the communication of a minor event.

64 Areas where pyrotechnic articles are stored should be physically separated from sales areas or other workplaces in the same building by an appropriate barrier. The purpose of the barrier is to contain a fire or explosives event for sufficient time to allow people to move to a place of reasonable safety.

65 The barrier should be capable of:

- preventing projected effects, such as rockets and pyrotechnic units, from entering the sales area or workplace while people move to a place of reasonable safety; and
- providing fire-resistance for at least half an hour.

66 Barriers could include a brick or breeze block wall or a suitably robust stud partition (eg half-hour fire-resistant) or sheet steel structure. Any doors in the barrier should be self-closing and capable of providing effective protection to people in the sales area.

67 Standards for constructing half-hour fire-resistant structures can be found in Appendix B of *Fire safety risk assessment: offices and shops*⁵.

Stock management

Dutyholders know the type and quantity of all explosives present on site and their locations.

68 Dutyholders should have a suitable stock management system to ensure that appropriate information is available in an emergency. Dutyholders should be able to tell the fire and rescue service:

- the types and quantities of pyrotechnic articles present on site which are involved in the fire;
- the types and quantities of pyrotechnic articles and other explosives which are present elsewhere on site; and
- the hazards that the pyrotechnic articles and any other explosives present.

69 The fire and rescue service should also be told whether any other dangerous substances are present on site, their quantities and where they are.

70 A suitable stock management system will also enable dutyholders to ensure that any licence limits (or relevant exceptions) are not breached.

71 Stocks should be managed to identify any potential deterioration in packaging, and to avoid the need to repack pyrotechnic articles. Some of the empty transport packages should be retained and safely stored so that:

- articles can continue to be stored in their original transport packaging, should cartons deteriorate or become damaged; and

- any unsold or unused pyrotechnic articles can be repacked in the appropriate transport packaging for return to the supplier or transport to the site where they are to be disposed of.

72 Where it would be practicable to do so, any empty transport cartons should be opened out and stored flattened so that they cannot be mistaken for full cartons in an emergency. Where packaging is re-used, it should be labelled so that its contents can be correctly identified.

73 There are legal requirements on the packaging of pyrotechnic articles for transport, and advice from the supplier or other competent person (such as a dangerous goods safety adviser) should be sought on how unsold articles should be repackaged for transport.

Segregating explosives presenting different likelihoods of initiation

Explosives which have significantly different likelihoods of initiation are segregated from one another.

74 Pyrotechnic articles should only be removed from their transport packaging in an appropriate place. Normally, this will be outside the store in a place where an event involving the pyrotechnic articles being handled will not communicate directly with the pyrotechnic articles in the store.

75 Damaged pyrotechnic articles (other than those where the damage is simply cosmetic) generally present an enhanced likelihood of initiation, and should be stored in a designated place segregated from pyrotechnic articles that are not damaged. Where a damaged pyrotechnic article has been assessed as being safe to store, this segregation can be achieved by storing it within an appropriately labelled, authorised UN transport carton kept in a separate suitable storage container.

76 Further guidance on managing damaged pyrotechnic articles should be available from the supplier of the article.

Segregating explosives operations from other activities

Explosives operations are segregated from activities that do not include explosives.

77 Where it is not possible to reserve a storeroom exclusively for the storage of pyrotechnic articles, the bulk of the pyrotechnic articles should be stored away from the retail premises or other workplace. Where this is not feasible, pyrotechnic articles which are not required for display purposes should be kept in the packaging they have been supplied in within:

- a suitable cage; or
- a fire-resistant cabinet or container.

78 Fire-resistant cabinets or containers should only be used when any confinement they provide will not enhance the hazard presented by the pyrotechnic article. Suppliers should be able to provide guidance on the suitability of fire-resistant cabinets or containers for the storage of their products.

79 Further information on the fire resistance of cabinets and suitability of cages can be found in Appendix 2.

80 Pyrotechnic articles should not be stored anywhere where, in the event of a fire, the fire could quickly spread from or to any other flammable materials (for example, white spirit, barbeque-lighting fluid, paint thinners or other flammable liquids, matches, firelighters) or materials that can easily catch fire (for example, bulk quantities of paper, cardboard, scenery, surplus wooden pallets, tights, stockings or other clothing).

81 Pyrotechnic articles should not be stored with products that might create an additional explosion hazard, including:

- products such as fertilisers containing oxidising agents;
- products containing peroxides such as certain fibreglass hardeners; and
- aerosols and bottled gas canisters.

Safely transporting explosives on site

Particular care is taken when transporting explosives on site, and only appropriate methods are used.

82 All movements of pyrotechnic articles around the site should be properly supervised in order to ensure that:

- the pyrotechnic articles are never left unattended;
- pyrotechnic articles are not left, however briefly, in places where they could be inadvertently mixed up with other goods, especially flammable products; and
- boxes containing pyrotechnic articles are not inadvertently handled by staff (or members of the public) unaware of their contents.

83 Pyrotechnic articles should be taken direct from the store to the shop floor or the workplace or other location where they are to be used. Where it is necessary to keep pyrotechnic articles temporarily in a holding area specified for that purpose:

- the quantity in movement at any one time should be kept to the minimum necessary;
- the stock replenishment should be timed to avoid the pyrotechnic articles being in movement for an unnecessarily long period of time;
- the holding area should be away from other goods; and
- the pyrotechnic articles should not be left unattended.

84 Pyrotechnic articles stored in holding areas should be kept in metal-caged trolleys or other suitable containers that will not aggravate the effects of the pyrotechnic articles and will limit the throw of fragments or projected effects should an explosive event take place.

85 When pyrotechnic articles which are being kept within an explosives store have been sold to a customer, they should, in general, be taken direct from the explosives store to the customer on the shop floor.

Preventing fires and explosions

(Regulation 26(1)(a))

Safety measures are in place to prevent the accidental initiation of explosives.

86 Keep sources of ignition away from pyrotechnic articles or other flammable materials on site. The presence of pyrotechnic articles (and explosive vapours and dusts) should be controlled, especially in areas of activity, for example, places where work is done or where people or other traffic move around regularly.

87 The following sections give guidance on how the main sources of ignition can be controlled, and the general principles that can be followed to prevent fire and explosion.

General precautions

Explosives operations only occur in an appropriate place, using appropriate tools and equipment and following an appropriate process.

88 Activities involving pyrotechnic articles should only be undertaken in a suitable place and within the scope of any licence or other permission. The suitability of the location will depend on the quantity and type of pyrotechnic articles and the planned activity.

89 The precautions are covered in detail in paragraphs 94–114. In summary, they include ensuring that any store, storage area, container or cupboard, place of manufacture or processing facility is:

- suitably weatherproof;
- designed to ensure that explosives do not come into contact with substances with which they are incompatible;
- protected by a lightning conductor, where appropriate;
- not used for other activities at the same time explosives are kept, manufactured or processed, eg a store should only be used to keep explosives and the tools or implements necessary for the safe keeping of those explosives; and
- kept clean, with steps taken to prevent grit entering unpackaged explosives.

90 ISO containers (or similar metal storage units) used for pyrotechnic article storage should be kept in an area away from public access. Measures should be taken to prevent smoking and the build-up of flammable materials in the immediate area of the container.

91 It is not normally practicable to ensure safety when pyrotechnic articles are stored in a public place without employing extensive precautions. Where a container is located in a public place such as a car park, it is essential to take effective measures to prevent vehicular impacts, arson or other malicious attacks.

92 The ISO or similar container should either be under constant supervision, or other physical measures such as the erection of a suitable fence should be taken to prevent unauthorised access to the area around the container. Cars and other vehicles should not be permitted to park within 3 m of the container.

93 Where an ISO or similar container used for the storage of pyrotechnic articles is kept in a goods delivery yard, it is important to put it in a suitable place in order to reduce the risk of it being hit by vehicles. Access to the area surrounding the container should be controlled.

Protecting explosives from sources of ignition

Pyrotechnic articles are protected from sources of ignition that could cause them to initiate, and are kept in a suitable closed container or in suitable packaging, whenever it would be reasonably practicable to do so.

94 Where pyrotechnic articles are kept in a store used exclusively for this purpose, the transport packaging alone may be considered to be a container offering sufficient protection, providing that the safety measures set out in paragraphs 95–117 are taken.

95 The transport packages should not be left opened in the storage area. The packages should normally only be opened when access to the pyrotechnic articles is needed (eg if the contents are to be transferred to a display cabinet).

96 After opening, it is important to close the packaging securely if pyrotechnic articles remain in the package (for example, by taping box flaps down, interleaving the flaps, or securing them by placing a suitably-sized wooden sheet over the flaps).

Naked lights and flames

Robust systems are in place to prevent the introduction of naked lights and flames into explosives areas.

97 Generally, any equipment or article that could introduce a naked light or flame should not be brought into an explosives area. This means that matches, lighters and smokers' materials should be forbidden from explosives areas.

Heat and temperature

Potential sources of heat energy and high temperature are identified and kept to the minimum necessary for the safe operation of an explosives area.

98 Ensure that pyrotechnic articles do not come into unintentional contact with hot surfaces, or are exposed to direct sunlight and other strong sources of illumination.

99 Heating devices with exposed elements, such as electric fan heaters and gas-powered or other similar convection heaters, should not be used in explosives areas. Oil or water-filled electrically powered portable radiators can be used where fixed heating systems that use, for example, hot water or steam are not available.

100 Site (or guard) radiators and pipes to prevent physical contact with containers holding pyrotechnic articles. The maximum temperature of all radiators and heating pipes should be limited either by specification or by the use of suitable thermal cut-outs. It is also recommended that heating units are fitted with tamper-proof controls and an indication to show when they are energised. Radiators sited in dusty areas should be cleaned regularly.

Electrical, electrostatic and electromagnetic energy

Sources of electrical energy are identified and kept to the minimum necessary for the safe operation of an explosives area.

101 Electrical equipment and installations within any explosives area should be confined to that which is essential to the operation of the facility. Where it is necessary to install electrical equipment, it should conform to the relevant standards, and must be designed and constructed to prevent it becoming a source of ignition. Suitable lightning protection should be installed in pyrotechnic article stores, except where the store:

- is temporary (for example, for use during legally specified sales periods or for no more than a few weeks on a seasonal basis) and holding Hazard Type 4 pyrotechnic articles;
- is used to keep less than 75 kg of HT4 pyrotechnic articles;
- is used to keep less than 25 kg of HT3 pyrotechnic articles;
- is made by excavation and is thereby inherently protected from lightning; or
- is exempted under the terms of a licence issued by HSE or ONR.

Lightning protection should be based on the requirements set out in an appropriate relevant standard.

102 Steel-framed structures with metallic cladding may be regarded as self-protecting, provided the requirements of paragraph 32 of Appendix 3 of L150 are met.

103 Steel ISO or similar containers used for the storage of explosives can be regarded as self-protecting, provided that:

- the walls are lined with wood (or other appropriate lining), or the explosives are kept at least 150 mm away from the container's walls;
- the panels and doors are electrically bonded with straps of a cross-section of at least 50 mm²;
- two earthing points connected to earth rods are provided at opposite corners; and
- resistance from the top of the container to earth is less than 10 ohms.

104 Further guidance on protecting explosives from electrical, electrostatic and electromagnetic energy can be found in Appendix 3 of L150.

Mechanical sparks

Potential sources of mechanical sparks, including those that could arise from equipment failure, are identified and kept to the minimum necessary for the safe operation of an explosives area.

105 Where it would be reasonably practicable to do so, the metal and other surfaces in explosives areas which have the potential to generate mechanical sparks should be replaced with, or covered by, a durable non-metallic material such as paint.

106 Ferrous and other hand tools capable of producing mechanical sparks (eg staple guns) should only be used where they do not present a significant risk of initiation, and precautions have been taken to avoid metal-to-metal contact.

107 Where it is necessary to use tools and equipment such as angle grinders or other power tools in an explosives area, for example during a maintenance activity, any explosives should be removed from the area or precautions taken to completely segregate the explosives or any other flammable materials from any sparks the tools and equipment may produce so that the equipment cannot act as a source of ignition.

Impact and friction

Potential sources of impact and friction are identified and kept to the minimum necessary for the safe operation of an explosives area.

108 Pyrotechnic articles should be handled with care and kept, whenever practicable, in their transit or retail packaging they have been supplied in.

109 Cartons containing pyrotechnic articles should be stacked so that stacks are stable and packaging will not become crushed or damaged by the height of the stack. Suppliers should be able to advise the maximum height of stack for each type of product.

110 Where pyrotechnic articles are kept outside their transport packaging, they should be laid out in an orderly fashion so that they will not be knocked, dropped, crushed or damaged.

111 When pyrotechnic articles are moved (including when they are moved in their transit or retail packaging), they should be lifted and carefully placed. They should not be dropped, slid or dragged.

Pressure

Sources of pressure are identified and kept to the minimum necessary for the safe operation of an explosives area.

112 In most circumstances, the preventative measures used to protect pyrotechnic articles from impact and friction will protect them from the effects of excessive pressure.

Chemical incompatibility

Chemicals and materials incompatible with the explosives used or with each other are identified and either kept to the minimum necessary for the safe operation of the explosives facility, or completely segregated from the explosives.

113 As well as presenting a risk from fire, certain chemicals may be chemically incompatible with pyrotechnic articles or present an additional explosion hazard. These chemicals should therefore be stored far enough away from pyrotechnic articles so that there is no risk of contamination, and so that they cannot aggravate a fire or explosion.

114 Examples of products that could be incompatible with pyrotechnic articles include:

- products containing corrosive or caustic substances (acids or alkalis) such as drain cleaners and paint strippers;
- products including certain wood preservatives which might have chemical incompatibility;
- products such as fertilisers containing oxidising agents;
- products containing peroxides such as certain fibreglass hardeners; and
- aerosols and bottled gas canisters.

Maintenance systems

The safety measures are properly maintained.

115 Maintenance systems should include:

- identifying the safety measures and any safety-critical systems (including procedures and management arrangements), plant and equipment;
- record keeping;
- planning and prioritisation of maintenance work;
- either planned preventative maintenance or risk-based inspection and maintenance;
- inspection of the safety measures by a competent person at regular specified intervals; and
- reporting and acting on faults with systems, plant, equipment and relevant site infrastructure.

116 The maintenance regime should include periodic inspections of the safety measure to ensure they are in place and remain effective.

117 Maintenance activities often introduce sources of ignition into pyrotechnic article storage areas, so should generally be subjected to a high level of control, for example through a 'permit-to-work' system.

118 Further information on developing a maintenance regime and controlling maintenance activities can be found in L150 under 'Protecting explosives from sources of ignition'.

Measures to limit the extent of a fire or explosion

(Regulation 26(1)(b))

Appropriate steps are taken to:

- **limit the size of any explosion or fire that may occur;**
- **stop fires spreading; and**
- **limit the size of an explosive event and the area the event affects.**

119 A fire involving pyrotechnic articles often has the potential to spread very quickly. This means that, whenever it would be reasonably practicable to do so, pyrotechnic articles should be kept in a storage place that can be used exclusively for this purpose.

120 Where pyrotechnic articles are kept in a warehouse (or similar room or building) which also holds significant quantities of other combustible materials, the storage arrangements need to be designed to prevent the spread of fire by fragment throw. This will involve either:

- storing the pyrotechnic articles in an ISO transport container or similar fully enclosed metal structure;
- building a structural partition to segregate the pyrotechnic articles from other combustible materials;
- keeping pyrotechnic articles behind a suitably robust and suitably sized wire mesh screen or in a suitable cage; or
- keeping the pyrotechnic articles in storage cupboards or cabinets (providing the requirements of paragraph 80 are met).

121 Any container or enclosure should be:

- suitably constructed – it should be sufficiently robust to remain stable and effective throughout its expected working life, taking into account the expected working conditions; and
- suitably located – it must be located well away from flammable or hazardous substances. For example, in the warehouse of an agricultural supplier, it should be located in the area of the warehouse used to store inert non-combustible materials or non-hazardous agricultural products.

Protecting people from the effects of fire or explosion

(Regulation 26(1)(c))

Measures are in place to protect people in the event of a fire or explosion.

122 When pyrotechnic articles are kept in places where members of the public are present, there is an increased likelihood that an accident could take place and, if there were an accident, a larger number of people could be at risk.

123 These risks need to be controlled by storing and displaying the articles in a way that limits the risks of an accidental ignition, and taking precautions to protect people (both members of the public and employees) in the event of a fire. Appendix 3 contains further information on the precautions to be taken when pyrotechnic articles are displayed in the sales area.

124 The explosive content in items such as toy caps, subject to the Toys (Safety) Regulations 2011, is such that, in the quantities in which they are normally likely to be found on retail premises, they present a limited risk. These articles may be kept on open display in their retail packaging, providing that the total quantity of pyrotechnic articles on display does not exceed 5 kg net mass, and appropriate arrangements are in place to ensure their security.

125 Although the quantity of explosive in each toy cap is small, large or very large quantities may together contain a significant quantity of explosive, and should be treated with the same care as other explosive articles.

Limiting the number of people in explosives areas

The number of people in explosives areas is kept to the minimum needed to safely carry out and support the explosives operations.

126 Ensure that the number of people present in an area where pyrotechnic articles are being:

- stored; or
- handled or used to support the site's main commercial activity

is controlled, and that pyrotechnic articles storage is segregated from non-explosives operations.

127 Depending on the site, controls might include:

- physical controls that only allow access to pyrotechnic articles to authorised people;
- providing instructions to people engaged in the sale, handling or use of pyrotechnic articles;
- supervising people engaged in the sale, handling or use of pyrotechnic articles;
- placing signs and notices on doors or at other appropriate places, indicating who is authorised to be present and the maximum number of people permitted in the area at any one time; and
- ceasing operations when visitors or unauthorised people are present in storage areas.

Engineering controls

Engineering controls to protect people from the effects of a fire or explosion are identified on a case-by-case basis.

128 If HT3 or more than 75 kg net of Hazard Type 4 pyrotechnic articles are kept in a store within, or adjoining, a building containing domestic/sleeping accommodation, suitable steps must be taken to protect residents of those premises in the event of a fire. The following specific precautions must be taken:

- a fire detection system should be installed, with either a linked alarm installed in the domestic accommodation or an effective sprinkler fitted in the pyrotechnic article store;
- the domestic parts of the building must have access/exit routes which are fire-separated from those used for the pyrotechnic store;
- there must be suitable fire separation between the pyrotechnic store and the domestic accommodation (for example, doors, floors and ceilings offering 30 minutes' fire resistance); and
- the store must be closed off and secured from the domestic part of the property in order to prevent unauthorised access (including by children connected with the domestic accommodation), and also to help prevent the accidental introduction of sources of ignition.

129 Where these precautions cannot be taken, the licensing authority may:

- decide that the premises are not a suitable place for the storage of pyrotechnic articles and refuse a licence;
- place conditions on the licence limiting the maximum quantity of pyrotechnic articles that can be stored; and/or
- require a greater degree of fire separation before it decides that the premises are a suitable place for storing pyrotechnic articles.

Provision of personal protective equipment

Personal protective equipment is used as a last line of protection. It is not solely relied upon when people can be protected by engineering controls.

130 Personal protective equipment can protect individuals by supplementing engineering controls, or by supplementing procedural controls where engineering controls are not reasonably practicable. Further information on the regulatory framework surrounding the selection and use of personal protective equipment can be found in *L25 Personal protective equipment at work*³.

131 Personal protective equipment is not normally required to protect people selling pyrotechnic articles from explosives hazards.

132 Personal protective equipment for people handling or using pyrotechnic articles to support the site's main commercial activity should be identified on a case-by-case basis.

133 Further information on the selection of personal protective equipment for use in explosives operations can be found in L150 under 'Protecting people from the effects of fire and explosion'.

Emergency procedures

Effective emergency procedures are in place.

134 Emergency procedures must clearly set out what dutyholders, employees and others should do and should not do in an emergency. The procedures should normally be written down to allow them to be communicated to others consistently. Information on the procedures must be provided to all employees and to others involved in the site's activities. This does not necessarily require extensive documentation. For example, where a site has a single small store, the emergency procedures might consist of evacuating the area around the store and calling the fire and rescue service. In this case, the documentation might simply involve a written notice displayed prominently where all staff will see it.

135 Emergency procedures should cover:

- what constitutes an emergency;
- what to do in the event of an emergency;
- fire precautions relevant to the emergency procedures;
- fire detection and warning systems;
- means of escape and evacuation;
- providing information to the emergency services;
- what to do when the emergency is over; and
- how the recovery phase will be managed.

136 Pyrotechnic articles should not be kept anywhere where, in the event of a fire, they might endanger the safety of those using escape routes from the building.

137 Further information can be found in L150, under 'Protecting people from the effects of fire and explosion' and Appendix 4.

Separation distances

(Regulations 27 and 13(6))

Separation distances are met.

Application

138 A separation distance greater than 0 m will not need to be maintained where a site stores up to 25 kg of HT3 pyrotechnic articles or 250 kg of HT4 pyrotechnic articles.

139 If you want to store more than 25 kg of HT3 or 250 kg of HT4 pyrotechnic articles, you should speak to your licensing authority about your intentions, and they will be able to determine what separation distances will apply to protected places on site and off site.

140 If you store a mixture of hazard types, the limit for the most energetic explosive will apply. For example, if HT3 pyrotechnic articles are kept with HT4, then HT3 distances will apply. The quantity will be determined by adding the net mass of the HT3 explosives to the net mass of the HT4 explosives. This process is called aggregation. For example:

- 10 kg of HT3 and 200 kg of HT4 is treated as 210 kg of HT3.
- 1 kg of HT3 and 10 kg of HT4 is treated as 11 kg of HT3.
- 0.1 kg of HT1 and 250 kg of HT4 is treated as 250.1 kg of HT1.

141 If you store more than 25 kg of a mixture of HT3 and HT4 pyrotechnic articles, you will need to maintain a separation distance greater than 0 m.

142 If you store more than 0.1 kg of HT1 or HT2 pyrotechnic articles either with or without any other explosives including pyrotechnic articles, you will need to maintain a separation distance greater than 0 m.

143 Further information on the application of separation distances can be found in L150, under 'Separation distances' and Appendix 5.

Discarding, disposal and decontamination

(Regulation 28)

Explosives and explosives-contaminated items are disposed of or discarded safely.

Explosives-contaminated items are safely decontaminated.

Discarding and disposal of explosives

Explosives are not discarded as general or household waste.

144 The discard, disposal and destruction of explosives including pyrotechnic articles is a high-hazard activity. Failure to dispose of, or discard, explosives safely is one of the main causes of events and injuries in explosives work. Explosives events can happen because of:

- a failure to recognise that explosives requiring disposal are accumulating in manufacturing, process or storage areas;
- casual attitudes when dealing with the discard or disposal of explosives, often arising out of a lack of competence or a failure to properly supervise, inspect or audit the activity;
- people not appreciating the properties and behaviour of explosives under certain conditions (explosives that have been discarded or require disposal may be unusually sensitive); or
- ill-considered systems of work or no basic safety precautions, often arising out of a failure to identify and evaluate the hazards, or a failure to follow prescribed procedures.

145 Your supplier should be able to provide you with advice on how to identify and safely manage any pyrotechnic articles that require disposal.

Vacating an explosives site

Vacated explosives sites are left in a safe state.

146 Where a site which has been used for the storage and retail sale of pyrotechnic articles, or for the storage of pyrotechnic articles in support of other commercial activities, is to be vacated, it will generally be sufficient for the dutyholder to remove all the pyrotechnic articles from the site and then sweep out and wash down storage areas, cabinets and containers with water.

Prohibitions concerning manufacture, storage and importation of certain explosives

(Regulation 29)

Only approved pyrotechnic substances and articles containing sulphur and/or phosphorus mixed with chlorates are manufactured, stored and imported.

147 Pyrotechnic mixtures of sulphur and/or phosphorus with chlorates are not only liable to spontaneous ignition, but also tend to become exceedingly sensitive to ignition by friction or impact over time.

148 Anyone wishing to manufacture, import or store any pyrotechnic article or pyrotechnic substance containing these mixtures must apply to HSE for the article or substance to be approved.

149 Your suppliers will be able to tell you whether or not a pyrotechnic article contains any mixtures of sulphur and/or phosphorus with chlorates, and whether or not the pyrotechnic article has been approved by HSE.

Security

Preventing unauthorised access to pyrotechnic articles

(Regulation 30)

People who manufacture, keep or store explosives ensure that those explosives are secure. Unauthorised access is prevented.

150 Entry to the room or store used for storage of the pyrotechnic articles should be restricted to those members of staff who need to be there.

151 Stores should be kept locked unless access is required to the pyrotechnic articles they contain.

152 Where a store is a room in a building which is used for multiple purposes and the entrance to the store cannot be secured by a locked door, the pyrotechnic articles should be kept in locked cages or storage cabinets (providing the requirements of paragraph 77 are met), and controls should be in place to identify and deter casual/opportunistic theft.

153 When a building used for multiple purposes is left unattended, access to the building or pyrotechnic articles should be secured by a multi-lever mortice deadlock. New or replacement locks should have at least five levers.

154 Where the entrance to a store is secured by a padlock, the padlock should be of the heavy-duty, close shackle type, and the lock mechanism should have at least five levers. The hasp of the padlock should be covered by a metal shroud that will protect the hasp from attack, and the shroud should be firmly fixed to the door. When the store is located in a building that has either:

- staff present all the time; or
- external doors secured by multi-lever mortice deadlocks

any padlock will not need to be covered by a metal shroud.

155 Display cabinets should be lockable or should be secured by a padlock which is sufficiently robust to deter a casual/opportunistic theft when they are left unattended.

156 Pyrotechnic articles which are not kept in a store or locked display cabinet should be subject to continuous supervision.

157 Where a site is located in a high crime area, has been targeted by intruders or repeatedly been subjected to theft, higher standards of security should be applied. For example:

- hinge bolts should be fitted to the hinges of ISO containers;
- visible alarming systems should be fitted as a deterrent; and
- the security standards applicable to relevant explosives should be considered and applied appropriately.

158 Further information on the security of explosives in general and the standards to be applied to relevant explosives can be found in L151 *Guidance on Regulations – Security provisions*².

Explosives certificates

(Regulations 4 and 5)

159 An explosives certificate certifies that the person to whom it is issued is a fit person to:

- acquire relevant explosives; or
- acquire and keep relevant explosives.

160 An explosives certificate is not required for the acquisition or keeping of most pyrotechnic articles (including fireworks), but will generally be required for the acquisition or keeping of pyrotechnic substances such as flashpowder.

161 Explosives certificates are granted by the police, and it is an offence for a person to acquire and/or keep relevant explosives unless they have a valid explosives certificate.

162 The pyrotechnic articles that can only be acquired or acquired and kept by a person who has been granted an explosives certificate by the police are listed in Schedule 3 of ER2014. They are pyrotechnic articles that are or would, if packaged for transport, be assigned the UN nos:

- 0350, 0352, 0353, 0354, 0355, 0356, 0462, 0463, 0464, 0465, 0466, 0467, 0468, 0469, 0470 or 0472, ie 'pyrotechnic articles not otherwise specified';
- 0349, 0351 or 0471 and which are not intended for the propulsion of model rockets or similar articles;
- 0033, 0034, 0035, 0037, 0038, 0039, 0171, 0254, 0291, 0297, 0299, 0399 or 0400 and which are intended to be dropped as bombs from an aircraft;
- 0329, 0330, 0449, 0450 or 0451 and which are intended to be dropped as torpedoes from an aircraft or dispatched from an installation on land or a vessel; or
- 0212 or 0306, ie tracers for ammunition.

163 Further information on the additional duties associated with relevant explosives, including the keeping of records, the reporting of losses and the controls the regulations place on prohibited persons, can be found in L151 *Guidance on Regulations – Security provisions*².

Appendix 1 Identifying hazard type and net mass of explosives from labelling and documentation

Identifying hazard division and indicative hazard type from transport carton labels

1 The cartons used as transport packaging for pyrotechnic articles will be labelled with an orange diamond similar to those shown in Figure 1. The orange diamonds identify the hazard division (HD) that the pyrotechnic articles have been classified in for transport. The hazard division can then be used to determine the indicative hazard type (HT) for storage.

Figure 1 - Transport classification labels



Identifying net mass from transport carton labelling

2 Explosives industry voluntary good practice on labelling means cartons used as transport packaging for pyrotechnic articles will also generally be labelled with the number of pieces the carton contains and the net mass of the explosives within the pyrotechnic articles. Where this information is not provided on the carton, it may be found on the transport documentation or obtained directly from the supplier.

Identifying hazard division and net mass from transport documentation

3 Depending on type and quantity of pyrotechnic articles, deliveries might be accompanied by transport documentation. The transport documentation identifies:

- the total quantity of explosives in the shipment; and
- the hazard division of each different type of pyrotechnic article.

Appendix 2 Further information on the suitability of cages, cabinets and cupboards for the storage of pyrotechnic articles

1 This appendix provides information on the suitability of cages and cupboards for the storage of pyrotechnic articles. Cages and cupboards can provide appropriate segregation of HT4 and some HT3 pyrotechnic articles from other activities where it is not possible for a storage area to be solely used for the purpose of storing pyrotechnic articles. The appendix provides guidance and advice to assist dutyholders and enforcing authorities when considering what storage arrangements are appropriate for pyrotechnic articles on retail premises or in stockrooms and warehouses.

Cages, cabinets and cupboards

Cages

2 Cages are generally manufactured from either suitably-sized robust metal mesh or perforated metal sheet.

3 Cages can be particularly effective in containing the effects of pyrotechnic articles that present a projection hazard, that break up, come apart or produce large fragments (eg airbags). They can also allow pressure generated during some explosive events to vent safely.

4 Cages are usually only fully effective when they contain articles that produce fragments or burning debris larger than the mesh size.

Wooden cabinets and cupboards

5 Wooden cupboards can offer significant fire resistance. In trials, HSE has observed that wooden cupboards purchased from a national chain of office suppliers and constructed of 19 mm chipboard, melamine-coated (all surfaces, including the back) provide 15 minutes of fire resistance to their explosive contents.

6 Wooden cupboards will eventually catch fire and collapse. Once they have burnt away, any fire spreads to the pyrotechnic articles they contain, and the wooden cupboards will then do little to contain fragment throw or projected effects.

7 Wooden cupboards are suitable storage places when they will:

- not aggravate the hazards presented by the pyrotechnic articles; and/or
- delay the ignition of pyrotechnic articles long enough for people to reach a place of reasonable safety.

Metal cabinets and cupboards

8 Metal cupboards can be particularly useful in containing the effects of pyrotechnic articles which present a projection hazard.

9 Metal cupboards do not generally offer significant fire resistance. In trials, HSE has observed that metal cupboards purchased from a national chain of office suppliers and constructed of 2 mm thick steel panels pop riveted/welded at 30 mm intervals provide less than one minute's fire resistance.

10 Metal cupboards are suitable storage places when they will:

- not aggravate the hazards presented by the pyrotechnic articles; and

- contain the effects of an explosive event long enough to allow people in the immediate vicinity to reach a place of reasonable safety.

General comments on cages, cabinets and cupboards

11 Pyrotechnic articles stored in a cupboard or cage should be kept in their transit packaging or other appropriate protective container. This will control the risks associated with pyrotechnic articles initiating as items are moved into or out of the cupboard or cage.

12 Cages, cabinets and cupboards used for the storage of airbag modules and other similar pyrotechnic articles that can generate significant quantities of gas or significant shock effects should be large enough to allow the airbag to inflate or other article to initiate without the cupboard or cage opening or fragmenting.

Guidance

13 Where a fire has already become established, the priority is to ensure that there is sufficient time for people to escape, and that a fire involving the pyrotechnic articles does not threaten escape routes and people trying to escape. Some pyrotechnic articles can, if uncontained, significantly increase the speed at which a fire can spread; suitable storage arrangements can prevent or slow the spread of a fire.

14 The following paragraphs apply to the use of cages for the longer-term storage of pyrotechnic articles, rather than the use of cages to move pyrotechnic articles or to provide short-term interim storage.

Cages – mesh larger than the expected casing fragments and projected effects

15 Where pyrotechnic articles are stored in cages whose mesh is larger than the smallest casing fragments or projected effects that would be expected in an explosive event, additional physical and management measures will be required to:

- detect fire before it spreads to the pyrotechnic articles;
- prevent or slow down the spread of fire to the pyrotechnic articles; and
- prevent or slow down the spread of fire from the pyrotechnic articles, so that people can be safely evacuated.

16 This combination of measures could take the form of storing the pyrotechnic articles either exclusively in a room, or enclosure, separated from the rest of the premises by a fire-resisting partition, or providing an effective automatic fire detection and suppression system. The use of cages would be appropriate where either of these conditions is met.

17 The use of these cages may also be appropriate where there is a fire detection system but no suppression system. In such a case, additional physical and/or management measures will need to be taken to reduce the likelihood of a fire communicating to the pyrotechnic articles and, where the pyrotechnic articles can cause a fire to spread more rapidly, vice versa:

- the pyrotechnic articles should only be stored adjacent to articles or materials which are incombustible or would not readily catch fire (this would include a wall or walls);
- alternatively, empty space greater than the maximum distance any fragment could be thrown or effect projected should be left between the pyrotechnic articles and other combustible items.

18 Where there is no fire detection system, cages with a mesh larger than the smallest fragment or projected effect should not be regarded as an appropriate measure for preventing the spread of fire by throw of hot fragments or projected effects.

Cages – mesh smaller than the expected casing fragments and projected effects

19 Cages with a mesh smaller than the expected fragments or projected effects can give a high level of protection against fragment throw or projected effects, although the energy of some fragments can cause them to break up and escape the cage.

20 It will still be important to take additional measures, such as not keeping cages in proximity to readily combustible materials, and keeping cages adjacent to incombustible materials etc, in order to further reduce fire risk. These cages should not be used where there is no fire detection system or fire alarm system.

Points applying to all mesh cages

21 Whichever type of cage is used, the following measures should be taken:

- the cage should fully enclose the contents, ie it should have an integral top of the same mesh gauge;
- the cage should be in good condition, with no breaches in the integrity of the mesh;
- any hinges and securing mechanisms should be robust enough to prevent the premature failure of the gate;
- the pyrotechnic articles should be kept in their closed transport cartons or other protective packaging;
- the cage gate should be kept securely closed, except when the pyrotechnic articles are being handled; and
- the top of the cage should not be used to store other commodities or used packaging materials etc.

22 Where cages are used in an area where other goods are stored, the pyrotechnic articles should be kept under regular supervision and limited in quantity. The maximum number of cages should be appropriate to the available storage area and the nature and quantity of the other goods stored in that area.

23 Where there is no fire detection system or fire alarm system, or if there is only one escape route from the premises, wooden or metal cupboards can be used in a stockroom or warehouse instead of mesh cages, provided they:

- are suitably segregated from combustible materials; and
- do not aggravate the hazards presented by the pyrotechnic articles.

Relevant assumptions and type testing

24 Where more powerful pyrotechnic articles (especially those containing flash powder compositions, generating large quantities of hot gas or developing significant amounts of kinetic energy) are stored in cabinets, cupboards and cages, there is the potential for:

- the opening of the cabinet, cupboard or cage's doors, which would allow fragments and projected effects to escape the cupboard; or
- the violent rupture of the cabinet or cupboard, and flying metal shrapnel or wooden splinters.

25 Where it is not possible for a storage area to be solely used for storing pyrotechnic articles, the storage arrangements for pyrotechnic articles, which would either be expected to comprise HT3 or

which have only been identified as HT4 as a consequence of mitigatory packaging, should be subject to a detailed assessment.

26 Where necessary, relevant tests should be conducted to demonstrate the effectiveness of any cage or cupboard. The supplier of the pyrotechnic articles should be able to provide further information about the properties of particular types of pyrotechnic article and the results of any type testing conducted.

Appendix 3 Further information on the display of pyrotechnic articles in a sales area

1 Additional appropriate measures to those normally used for the storage of pyrotechnic articles and other explosives should be taken when pyrotechnic articles are placed on display in a sales area. These additional measures are necessary to control the increased risks that an explosive event could take place, and to ensure that members of the public present on the premises are protected.

2 Whenever reasonably practicable to do so, the risks from pyrotechnic articles should be eliminated by using labelled inert or non-explosive samples of pyrotechnic articles for displays. Live articles and dummies should not be mixed, and only HT4 pyrotechnic articles should be kept on display in the sales area.

3 Pyrotechnic articles which have been identified as HT1, HT2 or HT3 should not be kept or placed on display in a sales area.

4 Pyrotechnic articles which have been removed from mitigatory packaging should not be put on display in the sales area.

Preventing accidental ignition

5 Pyrotechnic articles on the shop floor should be kept:

- in a designated area well away from sources of ignition (for example naked flames, lit cigarettes and portable gas heaters); and
- on display in a display case or in a display case's small integral store.

6 In this context, 'well away' means far enough to remove the risk of ignition. This distance will depend on the nature of the source of ignition, and whether there are any barriers between the articles and the potential source of ignition.

7 Smoking should not be allowed anywhere where pyrotechnic articles are stored or sold. 'No smoking' notices should be displayed, and appropriate action should be taken when someone is found smoking.

8 Display cases and storage cabinets should be designed to protect against sparks or other sources of ignition that could be expected in the environment where they are being used. They should also be designed to prevent handling of unpackaged items by members of the public, or by members of staff who are not specifically engaged in activities related to the sale of the pyrotechnic articles.

9 When live samples are removed from a display case, they must be kept under the supervision of a member of staff until sold.

10 Display cases should not be used for the display or storage of other articles (except any instruction leaflets/safety literature), so that the case is only opened when the pyrotechnic articles are sold. Pyrotechnic articles should not be kept in the same display case as flammable substances, chemicals, or other types of pyrotechnic articles.

11 Lights or other electrical fittings should only be used in display cases containing dummy pyrotechnic articles. If such cabinets are to be used to store or display live articles, they should be disconnected from the electrical supply and measures taken (such as warning notices) to prevent the apparatus from being inadvertently reconnected.

12 Appropriate steps must be taken to prevent unauthorised access to display cases. Normally, this would mean using lockable or padlocked cases which are locked when unattended.

Controlling the quantity in the sales area

13 The levels of stock held in the sales area should be controlled. Controlling levels of stock will limit the extent of the hazard to which people would be exposed in the event of a fire by avoiding storing unnecessary quantities of explosives on the shop floor. However, in considering how much stock to keep in the sales area, it will also be necessary to avoid excessive transport movements through the shop, taking into account the anticipated trading levels for the day.

14 The amount kept on the shop floor should not exceed the levels set out in Table 1, unless the licensing authority has specified a greater maximum quantity. Where significant quantities of highly flammable liquids or other highly flammable articles are likely to be present in the sales area, the amount to be stored will need to be reduced to take into account the additional fire loading from these substances. This decision should be made by a competent person, and will depend on factors such as whether the premises have an automated sprinkler system etc. It is also important to remember that the licence quantity limit applies to the amount held on the premises, including the amount held on the shop floor.

15 Regulation 13(7) provides for the licensing authority to insert additional licence conditions where pyrotechnic articles are offered for sale at a site. These licence conditions may cover:

- the amount of pyrotechnic articles that can be kept in the area to which the public has access;
- the location of the sales/storage areas in relation to escape routes and the storage of flammable substances (if any);
- escape routes;
- fire safety measures such as the provision of smoke detectors or restrictions on the presence of flammable substances; and
- other safety precautions.

16 The licensing authority may therefore issue a licence to permit a greater amount to be kept than that specified in the table, or may specify a reduced quantity in the conditions of the licence. Where the licensing authority is not the fire and rescue service, they may need to consult a competent person to make an assessment of any appropriate conditions that should be attached to any licence.

17 The table takes into account the size of the sales area where the pyrotechnic articles are present, and from which the public will need to escape. Where the premises are divided into a number of sales areas (whether rooms or otherwise enclosed areas), the size of the individual room or area where the pyrotechnics are sold should be used in determining the maximum amount of pyrotechnic articles that may be kept in the sales area (as distinct from the maximum amount that may be kept on the site).

Table 1 Maximum quantities on the shop floor

Total floor area of the sales area (square metres)	Maximum quantity of pyrotechnic articles that may be kept under a licence requiring a separation distance of 0 m (net mass – kg)	Maximum quantity of pyrotechnic articles that may be kept under a licence requiring a separation distance of greater than 0 m (net mass – kg)
up to 20	12.5	20
up to 40	15	25
up to 60	20	35
up to 80	25	50
up to 100	30	60
up to 150	35	70
up to 200	40	80
up to 250	45	90
up to 300	50	100
up to 350	55	110
up to 400	60	120
up to 450	65	130
up to 500	70	140
500 and over	75	150

18 The amount that can be kept in any given location will depend on the circumstances, and on the ability to comply with the requirements of the Regulations. For example, in considering where to locate the display/storage area, it is essential to ensure that the items are located so that employees and members of the public can easily evacuate the area in the event of a fire.

19 Responsibility for controlling the amount of pyrotechnic articles on the premises also extends to designing sales systems that avoid the need for customers to carry quantities of pyrotechnic articles (other than toy caps and other similar novelties) around the shop, and enable/encourage customers to make (or collect) their purchases immediately before leaving the shop. This should be achieved by operating a system where customers can order their purchases and pick them up on their way out, or by selling pyrotechnic articles from a separate sale point located near to, but not impeding, the exit.

Slowing the spread of fire in the sales area

20 As well as controlling the overall total amount of pyrotechnic articles kept on the shop floor, the hazard should be reduced by taking steps to slow the spread of fire both within the stock and from the pyrotechnic articles to other flammable substances.

21 In order to slow the spread of fire, the pyrotechnic articles should be divided between storage cabinets, or display cases, each holding no more than 12.5 kg net mass of pyrotechnic articles.

22 The storage cabinets and display cases should be constructed from materials that do not readily catch fire, and which will not aggravate the hazard presented by the pyrotechnic articles, should they initiate.

Protecting people in the sales area in the event of a fire

23 The safety measures to be taken to protect people in the event of a fire are:

- ensuring that they are able to escape quickly from the area and from the shop;
- controlling the quantity of pyrotechnic articles present on the shop floor;
- breaking that quantity down into smaller units (so that if there is a fire, this does not immediately involve the whole stock), and taking steps to slow the spread of fire between the units; and
- taking steps to ensure that, if the pyrotechnic articles catch fire, the fire does not easily spread to other flammable substances on the shop floor.

24 The provision of fire escapes and other precautions is covered by fire safety legislation. Anyone storing and selling pyrotechnic articles must ensure they comply with the relevant requirements of that legislation, and in particular ensure that the pyrotechnic articles are not stored or placed anywhere where they would endanger people escaping from a fire, or impede their exit routes.

25 Further information on how to plan for an emergency on an explosives site can be found in Appendix 4 of L150. It is particularly applicable to those sites which are complex, or where higher-hazard or higher-risk explosives operations take place.

Glossary

communication the process of an ignition, burn, deflagration, detonation or other explosive event progressing to adjacent or nearby explosives.

competent authority an authority or other body designated as such in member states which are contracting parties to the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR). A list of competent authorities can be found on the United Nations website www.unece.org.

cross-cutting safety precaution an appropriate measure that addresses more than one duty.

explosion a violent reaction of an explosives substance or article with the potential to cause harm or damage to its surroundings by either shock, overpressure, thermal effects or projected effects and fragments.

explosive includes explosive articles (including pyrotechnic articles), explosive substances and desensitised explosives. Explosives are defined according to their properties and by the criteria in the United Nations Recommendations on the Transport of Dangerous Goods as revised or re-issued from time to time. Pyrotechnic substances are considered to be explosives for the purposes of the Regulations, along with pyrotechnic articles that would, if classified for transport, fall within UN Class 1 or be too dangerous to transport because of their explosive properties. However, this does not mean that a substance or article has to have been subjected to formal classification procedures before it is considered to be an explosive.

explosives area any area, which may be outdoors or within a building, where explosives are stored, manufactured, disposed of or otherwise processed.

explosives building any building in which explosives are stored, manufactured, or otherwise processed.

explosives operations any activity involving explosives which is subject to the requirements of the Regulations. It will include manufacture, storage, disposal, discard and decontamination, and may include explosives processing that does not constitute manufacture and, on certain sites, use.

fire safety legislation the Regulatory Reform (Fire Safety) Order 2005 (SI 2005/1541) and its equivalent in Scotland, the Fire (Scotland) Act 2005 (asp 5) and legislation made under it.

firework an explosive article producing a pyrotechnic effect designed for entertainment and classified for transport as UN 0333, UN 0334, UN 0335, UN 0336 and UN 0337.

flammable fines small particles of flammable materials. They are generally much easier to ignite than the bulk material because they have a much higher specific surface area. Flammable fines can be generated when packaging materials, such as wood or cardboard, are moved into or out of buildings and rub against walls, doors or equipment.

HSE the Health and Safety Executive.

initiation the act of causing an explosive material to ignite, burn, deflagrate, detonate or otherwise explode.

ISO container a steel freight container specially designed to facilitate the transport of goods, designed and constructed to a relevant standard, and used for the storage of explosives.

manufacture the interpretation in the Regulations specifies certain activities which are regarded as manufacture. However, manufacture is not limited to these activities, but would include any activity where the process undertaken changes the nature of the substance or article. This includes processes where explosive substances or explosives are made or assembled, or unmade or disassembled (for example, manufacture of gunpowder, filling or fusing of fireworks, assembling fireworks displays from components etc).

There are a number of processes which are not considered to be 'manufacture' for the purposes of the Regulations. These can include:

- packing or repacking explosives or explosive articles;
- breaking down explosives stored in bulk into smaller storage containers;
- labelling explosives or explosive articles;
- testing and proofing explosives or explosive articles; and
- using explosive articles as components to make a product which is not classified as an explosive (for example, the preparation of an explosive actuator into a fire drencher system, fitting air bags to vehicles, fitting ejector seats and other pyrotechnic articles to aircraft).

Where these activities alone are undertaken, there is no requirement to hold a licence under regulation 6. However, such activities fall within the scope of the Regulations as a whole, and of the safety requirements set out in regulations 26 to 29.

mitigatory packaging packaging that reduces the effect of an initiation within the package when compared to that which might be expected from the same articles in the open, or when simply placed into a transport carton. Mitigation can rely on:

- the method of packaging used;
- the packaging material used;
- the separation or arrangement of the explosive articles within the packaging;
- the use of packing pieces that prevent an explosive event communicating between articles; and
- structural features which contain some or all of the explosive effects of an initiation within the package.

net mass the terms 'net explosive content' and 'net explosive quantity' are commonly used in the industry to refer to the weight of the explosive contained within an article (ie less packaging, casings etc). Although these terms are commonly understood to refer to mass, there is scope for differing interpretations of 'content' and 'quantity' in that these could be taken to refer to volume. The term 'net mass' is used for the sole reason of avoiding any scope for confusion or misinterpretation.

offshore the belt of sea over which the UK exercises sovereign jurisdiction, and any area designated under:

- section 1(7) of the Continental Shelf Act 1964;
- section 1(5) of the Energy Act 2008; or
- a 'renewable energy zone' designated by section 84(4) of the Energy Act 2004.

ONR the Office for Nuclear Regulation.

person the term 'person' is used in a number of the Regulations. 'Person' can be an individual and it includes a body of persons corporate or unincorporated.

place of reasonable safety in a non-explosives building, the meaning of 'place of reasonable safety' is the definition in the fire safety legislation guide⁴ :

a place within a building or structure where, for a limited period of time, people will have some protection from the effects of fire and smoke. This place, usually a corridor or stairway, will normally

have a minimum of 30minutes' fire resistance and allow people to continue their escape to a place of total safety.

For buildings containing explosives, it should be either an exit from a building (including its mound, where present), or a place within the building where, for a limited period of time, people will have some protection from the effects of fire, smoke and radiated heat. This place must have suitable fire resistance to allow people to continue their escape to a place of total safety.

place of total safety in a non-explosives building, the meaning of 'place of total safety' is the definition in the fire safety legislation guide⁷:

a place, away from the premises, in which people are at no immediate danger from the effects of the fire.

For buildings containing explosives, in addition to the above, it includes a place away from the building in which people are at no immediate danger from the effects of the fire or potential explosion.

For explosive sites, the place of total safety is not the same as the 'minimum hazard zones' identified within the operational guidance for the fire and rescue service.

propagation the process of burning, deflagration, detonation or other explosive effect progressing through the mass of material in a container or stack.

pyrotechnic articles articles that contain explosives substances or an explosive mixture of substances designed to produce heat, light, sound, gas or smoke or a combination of such effects through self-sustained exothermic chemical reactions. They include fireworks plus other items such as flares, smoke signals and flash cartridges. Pyrotechnic articles will also include:

- all articles described as such by a notified body under the provisions of Directive 2013/29/EU;
- pyrotechnic articles that are equipment falling within the scope of Directive 96/98/EC; and
- percussion caps intended specifically for toys falling within the scope of Council Directive 2009/48/EC

Pyrotechnic articles which have been excluded from Class 1 by a competent authority under the provisions of the UN recommendations are not explosive articles whose storage is subject to the provisions of ER2014.

Pyrotechnic articles such as airbag inflators, modules, seat-belt pretensioners and other life-saving equipment, which are stored in packaging within which they have been classified for transport as being in Class 9 under the UN scheme, are not explosive articles whose storage is subject to the provisions of ER2014.

However, compliance with the guidance contained in this document will allow appropriate steps to be taken to safely store:

- pyrotechnic articles which have been excluded from Class 1; and
- pyrotechnic articles which are stored in packaging within which they have been classified for transport as being in Class 9.

pyrotechnic substance an explosive substance of a kind designed to produce heat, light, sound, gas or smoke, or a combination of any of these, as a result of non-detonative, self-sustaining, exothermic chemical reactions.

reasonably practicable this means balancing the level of risk against the measures needed to control the real risk in terms of money, time or trouble. However, you do not need to take action if it would be grossly disproportionate to the level of risk. See www.hse.gov.uk/risk/expert.htm.

relevant explosive an explosive for which an 'explosives certificate' is required under regulation 5 of ER2014 for acquiring or keeping that explosive, or would be required if it were not being acquired or kept by a person or organisation exempted by regulation 3(7). In relation to regulations 35 (records) and 37 (reporting loss) of ER2014, it also includes:

- ammunition, the acquisition of which is regulated or prohibited by virtue of the Firearms Act 1968 to 1997; and
- smokeless powder

even though, in the case of smokeless powder, an explosives certificate is not always required for its acquisition or keeping.

Explosives listed in Schedule 2 (other than smokeless powder, as noted above) and pyrotechnic articles (apart from those listed in Schedule 3) are *not* relevant explosives.

Most pyrotechnic articles will *not* be relevant explosives.

relevant standard a code of practice or other standard linked to legislation (CEN, BS EN, ANSI, BS, IEC, ISO) or a published and commonly known industry-produced standard of performance, providing specific standards relevant to an explosives operation, activity or facility.

A relevant standard will be a document established by consensus and approved by a recognised body that provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

A relevant standard will be based on consolidated results of science, technology and experience.

site 'site' is defined as 'the whole area under the control of the same person'. In most instances, it will be the same as the area of the establishment at which the explosives operations take place although, in some cases, the extent of the area under control of that person will be much greater than the area within which the explosives operations take place. See www.hse.gov.uk for more detailed guidance on the application of the Regulations to sites which are shared by different people and between a parent company and its subsidiaries (or between subsidiaries).

storage includes all possession, keeping or holding, other than when the explosives are actually undergoing manufacture or are in use.

storage area any area where explosives are stored either on a short- or long-term basis.

References and further reading

References

- 1 *Explosives Regulations 2014. Guidance on Regulations – Safety provisions* L150 HSE Books 2014 ISBN 978 0 7176 6551 8
- 2 *Explosives Regulations 2014. Guidance on Regulations – Security provisions* L151 HSE Books 2014 ISBN 978 0 7176 6638 6
- 3 *Storing and selling pyrotechnic articles safely: Advice for anyone selling pyrotechnic articles* HSE 2015 <http://www.hse.gov.uk/pubns/indg476.htm>
- 4 *Pyrotechnic articles in shops: Retailers' risk assessment checklist* HSE 2015 <http://www.hse.gov.uk/pubns/indg476ch.pdf>
- 5 *Fire safety risk assessment: offices and shops* www.gov.uk/government/publications/fire-safety-risk-assessment-offices-and-shops
6. *Personal protective equipment at work (Second edition). Personal Protective Equipment at Work Regulations 1992 (as amended). Guidance on Regulations* L25 (Second edition) HSE Books 2005 ISBN 978 0 7176 6139 8 www.hse.gov.uk/pubns/books/l25.htm
- 7 *Fire safety legislation guide* www.gov.uk/government/collections/fire-safety-law-and-guidance-documents-for-business

Further reading

Hazard identification and evaluation and the assessment of risk

General information on risk assessment can be found at www.hse.gov.uk/risk/index.htm

More information describing approaches to the identification and evaluation of explosives hazards and the assessment of risks associated with explosives operations can be found in:

Risk assessment for explosives including fireworks: A practical approach to risk assessment which is relevant to small companies including wholesale and retail organizations involved in the storage, distribution and supply of explosives including fireworks Confederation of British Industry 2012 www.eig.org.uk/eig2007/wp-content/uploads/Guide-on-Risk-Assessment-.pdf

Protective measures: A guide on measures other than personal protective equipment to protect people in explosives working areas Confederation of British Industry 2003 ISBN 0 85201 572 0 www.eig.org.uk/eig2007/wp-content/uploads/PROTECTIVE_MEASURES.pdf

Managing safety

More information on establishing effective management arrangements can be found in the following sources:

See the *Health and safety made simple* website for basic information for businesses www.hse.gov.uk/Simple-health-safety/index.htm

See the *Health and safety toolbox* website for more information on multi-occupancy workplaces www.hse.gov.uk/toolbox/index.htm

The health and safety toolbox: How to control risks at work HSG268 HSE Books 2014 ISBN 978 0 7176 6587 7 www.hse.gov.uk/pubns/books/hsg268.htm

Managing for health and safety website www.hse.gov.uk/managing/

Managing for health and safety HSG65 (Third edition) HSE Books 2013 ISBN 978 0 7176 6456 6
www.hse.gov.uk/pubns/books/hsg65.htm

Worker involvement

See the *Worker involvement* website for more information on consulting employees
www.hse.gov.uk/involvement

Leadership

Leadership is particularly important in organisations that manage major hazards such as explosives. More information on leadership in health and safety can be found at www.hse.gov.uk/leadership

Training and competence

For general advice on health and safety training, see *Health and safety training: A brief guide* Leaflet INDG345(rev1) HSE Books 2012 ISBN 978 0 7176 6466 5 www.hse.gov.uk/pubns/indg345.htm

To find competence-related guidance for a specific industry, task or working environment including National Occupational Standards and Sector Skills Councils, see www.hse.gov.uk/competence/industry-specific-competence.htm

Controlling maintenance and permits to work

Further information on controlling maintenance activities and permits to work can be found at:

Isolation and permits to work www.hse.gov.uk/safemaintenance/permits.htm

Guidance on permit-to-work systems: A guide for the petroleum, chemical and allied industries HSG250 HSE Books 2005 ISBN 978 0 7176 2943 5 www.hse.gov.uk/pubns/books/hsg250.htm

Managing contractors

Using contractors: A brief guide Leaflet INDG368(rev1) HSE Books 2013 ISBN 978 0 7176 6467 2
www.hse.gov.uk/pubns/indg368.htm

Managing contractors: A guide for employers HSG159 (Second edition) HSE Books 2011 ISBN 978 0 7176 6436 8 www.hse.gov.uk/pubns/books/hsg159.htm

Topic-based guidance

Further information on a wide range of explosives safety-related topics can be found at www.eig.org.uk

Further information on the control of electrical, electrostatic and electromagnetic hazards and the hazards arising out of surface temperatures of equipment can be found in *Guidance for electrical installation and equipment within explosives manufacturing and storage facilities including fireworks* Confederation of British Industry 2009 ISBN 978 0 85201 722 7 www.eig.org.uk/eig2007/wp-content/uploads/30777%20BAE%20Systems%20CBI%20GuideV2.pdf

Further information on protecting people from the effects of explosive events can be found in *Protective measures: A guide on measures other than personal protective equipment to protect people in explosives working areas* Confederation of British Industry 2003 ISBN 0 85201 572 0
www.eig.org.uk/eig2007/wp-content/uploads/PROTECTIVE_MEASURES.pdf

Fire safety

Fire safety www.hse.gov.uk/toolbox/fire.htm

Planning for emergencies

Emergency procedures www.hse.gov.uk/toolbox/managing/emergency.htm

Dangerous substances and explosive atmospheres: Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance L138 (Second edition) HSE Books 2013 ISBN 978 0 7176 6616 4 www.hse.gov.uk/pubns/priced/l138.pdf

Disposal

Further information on the safe disposal of explosives and explosives-contaminated items can be found in *Guidance for the safe management of the disposal of explosives* Confederation of British Industry 2007 www.eig.org.uk/eig2007/wp-content/uploads/disposal_guide.pdf

Decontamination and vacating an explosives site

Management guidance for the safe decommissioning of explosives sites: A guide to the safe decommissioning of explosives sites, the relevant legislation, and the techniques used for decontamination Confederation of British Industry 2003 www.eig.org.uk/eig2007/wp-content/uploads/disposal_guide.pdf

Pyrotechnic Articles (Safety) Regulations 2015

Further information on the Pyrotechnic Articles (Safety) Regulations 2015 can be found at http://www.legislation.gov.uk/uksi/2015/1553/pdfs/uksi_20151553_en.pdf

Shipping dangerous goods including pyrotechnic articles

General information on shipping dangerous goods can be found at www.gov.uk/shipping-dangerous-goods/overview

Further information on the carriage of dangerous goods by road and rail can be found at www.hse.gov.uk/cdg/

Further information on the carriage of explosives by road can be found in *Industry Code of Practice for Carriage of Explosives by Road Regulations* Confederation of British Industry www.eig.org.uk

Further information on sending dangerous goods by post can be found at www.royalmail.com/sites/default/files/DangerousGoods_BusinessCustomerBooklet_July2013_0.pdf..unpublished

Further information

For information about health and safety, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

You can report inconsistencies or inaccuracies in this guidance by sending an email to the Explosives Legislative Review team (ELR@hse.gsi.gov.uk). Reports of inconsistencies or inaccuracies will be considered by the Explosives Industry Forum (webcommunities.hse.gov.uk/connect.ti/explosives/grouphome).

This guidance can be found online at www.eig.org.uk.

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