

RC19: Recommendations for the storage of aerosol products



Symbols used in this guide



Good practice



Bad practice



Discussion topic



Frequently asked question

Acknowledgements

RISCAuthority wishes to thank the British Aerosol Manufacturers' Association for their comments and assistance during the drafting of these Recommendations.

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Contents

1	Synopsis	5
2	Scope	5
3	Definitions	5
4	Introduction	6
5	Recommendations	7
	5.1 Compliance with fire safety legislation	7
	5.2 Business continuity	7
	5.3 Fire safety management	8
	5.4 Storage	9
	5.5 Waste and damaged containers	10
	5.6 Fire protection	10
6	Checklist	12
7	References	16

Summary of Key Points

Comply with fire safety legislation	<ul style="list-style-type: none">• In addition to a fire risk assessment undertaken in compliance with national fire safety legislation, an assessment should be undertaken by a competent person in accordance with the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR).• Premises where 150 tonnes or more of flammable aerosols (including LPG) are stored need to be managed in compliance with the Control of Major Accident Hazards Regulations (COMAH).
Protect business continuity	<ul style="list-style-type: none">• All businesses should take steps to maintain the continuity of their operations by making and rehearsing a suitable emergency plan.
Provide suitable training for staff	<ul style="list-style-type: none">• All relevant staff, including temporary staff, should have induction and follow-up training concerning the hazards of the products stored, correct handling techniques, good housekeeping, emergency procedures and procedures for dealing with damaged or leaking stock.• Training should provide clear advice regarding the use of portable fire extinguishers to fight a fire in the vicinity of stored aerosols. Staff should be warned against continuing to fight a fire if aerosols have become, or are likely to become, involved.
Apply effective fire safety management	<ul style="list-style-type: none">• The use of lift trucks in an aerosol warehouse should be carefully managed.• Organisations storing aerosols should establish access (either on-site or immediately available off-site) to a source of competent expert advice to provide training on aerosol safety and advice in case of an incident.• Ensure that fork-lift trucks have suitable protection for the hazard zone in which they are to be used.
Store aerosols safely	<ul style="list-style-type: none">• Bulk stocks of aerosols should be segregated and isolated from other materials, preferably by being housed in a separate building.• Where this is not possible, stocks of aerosols may be totally enclosed within a stout steel mesh cage of appropriate size and strength, including self-closing doors, to prevent projection of exploding aerosols.• Special care should be taken in the storage and handling arrangements of aerosols to prevent accidental damage due to crushing, falling or impact.• Aisles should be of adequate width to allow free movement of lift trucks or automated equipment used for the handling of aerosols.
Establish procedures for managing waste and damaged containers	<ul style="list-style-type: none">• Any damaged aerosols (aerosols affected by rusting, impact or other causes) should be immediately removed from the storage area to the open air where any flammable vapours can be safely dispersed.• Powered vehicles must not be used to move damaged stock unless they are specially adapted for use in flammable atmospheres. Vehicles powered by internal combustion engines should not be used.
Provide effective fire protection	<ul style="list-style-type: none">• Premises used for the storage of aerosols should be protected by a sprinkler system to prevent a fire spreading to aerosols and to limit a fire involving aerosols.• It is important that arrangements are made to provide the best possible access for firefighting.

1 Synopsis

These recommendations are applicable to the storage of aerosol dispensers in warehouses and similar premises and are intended to give guidance on ways in which the hazards associated with fire initiation and fire spread may be reduced to a minimum.

This guidance is not intended for domestic and small business premises where small numbers of aerosol cans may be in use, for example those containing products for cleaning and painting, and is not intended to apply to the sales areas of retail premises.

2 Scope

These recommendations are intended to provide guidance relating to the storage of all forms of aerosol cans. They present an appreciation of fire hazards associated with aerosols, and the control measures that should be taken when stored. It also addresses the measures that should be taken when storing 'empty' aerosol containers.

The information is intended mainly for commercial and industrial applications where aerosol cans are stored in bulk, rather than those used for cleaning and similar purposes in domestic and small business environments.

3 Definitions

Aerosol:

An aerosol is a suspension of solid or liquid particles in a gas, normally the air.

Aerosol dispenser:

A non-reusable container made of metal, glass or plastic containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state. Aerosol dispensers have become commonly known simply as 'aerosols'. In this document the term 'aerosol' refers to an aerosol dispenser together with its contents unless otherwise stated.

Flammable and extremely flammable aerosols:

The labelling requirements of the Aerosol Dispensers Regulations 2009 (ref 1), which implements the Aerosols Dispensers Directive (ADD) (ref 2) in the UK, refer to the contents of aerosols being 'flammable' or 'extremely flammable'. Additional advice is set out in an advisory note from the Department of Business and Skills (ref 3).

Aerosols are classified as follows in accordance with a specific testing regime:

- the aerosol is classified as 'extremely flammable' if it contains 85% or more flammable components and the chemical heat of combustion exceeds or is equal to 30kJ/g; or
- the aerosol is classified as 'non-flammable' if it contains 1% or less flammable components and the chemical heat of combustion is less than 20 kJ/g.

Aerosols may be classified as 'flammable' after undergoing further tests based on the heat of combustion and an ignition distance test. Those that do not meet the specified requirements are determined to be 'extremely flammable'.

Liquefied petroleum gas (LPG):

Commercial butane or propane or any mixture of the two.

Propellant:

A liquefied, compressed or dissolved gas that provides the pressure inside the aerosol dispenser. The propellant may, or may not, be part of the active ingredients of the formulation of the product.

A wide spectrum of products is available in aerosol containers. While much has been done to reduce the fire hazards associated with these by replacing flammable propellant gases with non-flammable alternatives, aerosols nevertheless still present significant hazards, both from fire and explosions.

Flammable aerosols can be more hazardous than some flammable liquids because aerosol containers rupture when exposed to sufficient heat. The bursting containers then become projectiles and if their contents are flammable burning liquid can be sprayed, causing multiple fires and flames over large areas. Projectile distances of over 30m have been recorded. This behaviour has resulted in multiple fires starting from a single aerosol. Fighting fires in large aerosol stores has on occasion proved unmanageable for firefighters and has resulted in the loss of entire warehouses.

If overheated in the absence of a source of ignition, there is the possibility of a serious hazard arising from a layer of unburnt flammable vapours forming beneath the ceiling or roof of the storage area. However, the risk of this occurring in a well designed and operated warehouse is extremely low and specific guidance is available from the HSE (ref 4) and BAMA (ref 5) on how to demonstrate that the risk has been addressed and eliminated or minimised.

Leaks of flammable gases from stored containers can also form flammable mixtures with air, which in a confined space with an ignition source can ignite and involve other cans to cause rapid fire growth with life safety and property protection implications.

The contents of aerosols and indications of their flammability are shown on the labels on the cans. Details regarding the properties of the active constituents are set out in suppliers' product safety data sheets in accordance with the EU Classification, Labelling and Packaging (CLP) Regulations (ref 6).

Labelling

From 1st June 2015, Directive 213/10/EU (ref 7) amends Directive 75/324/EEC (the ADD) (ref 2) to require that all aerosol dispensers must be labelled according to the CLP.

However, to ensure a smooth transition aerosols manufactured on or before 31st May 2015 do not need to be relabelled until 1st June 2017 if they are labelled according to the existing requirements of the ADD.

Aerosols must be labelled as 'flammable' or 'extremely flammable', as determined by the contents, in compliance with the Aerosol Dispenser Regulations (ref 1). Where an aerosol contains flammable components but the aerosol has been shown by testing to be neither 'flammable' nor 'extremely flammable' it must be labelled with the wording 'X% by mass of the contents are flammable'.



Figure 1: Example of an aerosol label

5 Recommendations

5.1 Compliance with fire safety legislation

- 5.1.1 In premises to which the Regulatory Reform (Fire Safety) Order 2005 (or equivalent legislation in Scotland and Northern Ireland) (ref 8-12) applies, the fire safety management strategy should consider practical passive, active and managerial control measures. These should be applied as part of the fire risk assessment for the premises when selecting and designing areas for storing aerosol containers. All fire risk assessments should also consider the possibility of deliberate fire setting; further information regarding the protection of premises from deliberate fire raising is set out in RISC Authority recommendations RC48 (ref 13).
- 5.1.2 An assessment in compliance with the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) and the associated guidance, HSE publication L138 (refs 14 and 15), should be undertaken to identify hazard zones and ensure that storage areas for aerosol cans are sufficiently remote from other hazardous materials such as flammable liquids and gases and from potential ignition sources on the premises.
- 5.1.3 From 1st June 2015, the Control of Major Accident Hazards (COMAH) Regulations (ref 16) and the Planning (Hazardous Substances) Regulations (ref 17) are revised and introduce a new class of Dangerous Substance – ‘flammable aerosols’. Premises where 150 tonnes or more of flammable aerosols (net contents) are stored may need hazardous substance planning consent and be managed in compliance with COMAH. In these cases specialist advice should be sought.

The main COMAH duties will remain broadly the same, but there are some important changes particularly on how dangerous substances, such as flammable aerosols, are classified and information that has to be made available to the public.

Operators will be referred to as upper and lower tiers operators (currently top and lower tier) and for the first time, lower tier operators will have to provide public information about their site and its hazards.

- 5.1.4 The response by fire and rescue services to 999/112 calls and signals routed via fire alarm monitoring organisations varies widely throughout the UK, and differs from day to night time. Fire safety managers should liaise with the relevant fire and rescue service to make themselves aware of the levels of response in the areas in which their premises are located and consider this information when undertaking and reviewing fire risk assessments.



- Segregate and isolate bulk stocks of aerosols from other materials.
- Establish good liaison with the fire and rescue service to ensure adequate access and ensure familiarity with the site.

5.2 Business continuity

- 5.2.1 Aerosols in daily use contain a wide range of products and there is the potential for a leaking or bursting aerosol to have a disproportionate effect on a business if the event affects a critical area. Where practicable, consideration should be given to dividing large volumes of stock and storing it on different sites or in different buildings on the same site.
- 5.2.2 All organisations should take steps to ensure the continued smooth running of their business by making a suitable emergency plan. Guidance for this is set out in **Business resilience: A guide to protecting your business and its people** (ref 18). The emergency plan should address the implications of a fire, flood or other perceived disaster on all facets of the business model. The plan should also indicate the lines of communication that should be followed and the contact details for specialist assistance, providers of alternative accommodation and suppliers of manufacturing plant or services.
- 5.2.3 When complete, the emergency plan should be rehearsed periodically by means of a tabletop exercise, with the results being assessed and amendments made to the plan as necessary.

- 5.2.4 Consideration may be given to applying commercially available computer programmes, such as the ROBUST software (Resilient Business Software Toolkit) (ref 19) that is available free of charge, or other appropriate product, to develop and check the adequacy of the plan.

5.3 Fire safety management

- 5.3.1 Organisations storing aerosols should establish access (either on-site or immediately available off-site) to a source of competent expert advice to provide training on aerosol safety and advice in case of an incident. All relevant staff, including temporary staff, should have induction and follow-up training concerning the hazards of the products stored, correct handling techniques, good housekeeping, emergency procedures and procedures for dealing with damaged or leaking stock.
- 5.3.2 Training should provide clear advice regarding the use of portable fire extinguishers to fight a fire in the vicinity of stored aerosols. Staff should be warned against continuing to fight a fire if aerosols have become, or are likely to become, involved.
- 5.3.3 The training of staff also should include the relevance of any hazard zones identified in the DSEAR assessment for the premises.
- 5.3.4 Aerosol storage areas should be kept clean and tidy at all times. Discarded packaging and other combustible materials should be removed to a waste container outside the building as soon as practicable.
- 5.3.5 Packs of aerosols should not be carried or moved by lifting their plastic shrink wrapping.
- 5.3.6 Aerosols in daily use in the premises should be separated from stock in storage.
- 5.3.7 The use of lift trucks in a warehouse should be carefully managed:
- 5.3.7.1 Diesel-powered vehicles present potential ignition sources such as sparks from exhaust systems and hot engine components, exhausts and brakes. Over speeding of diesel engines is a particularly serious problem that occurs when flammable vapours are drawn into the engine through the air inlet system.
- 5.3.7.2 Potential ignition sources on battery-powered appliances include arcing and sparking of unprotected electrical components, hot surfaces such as brakes and sparks from friction or the build-up of static electricity.
- 5.3.7.3 On LPG powered trucks hot surfaces and exhausts present the most serious potential ignition sources.
- 5.3.8 It is imperative that fork lift trucks have suitable protection for the hazard zone in which they are to be used. Details regarding this type of appliance and suitable recommendations are included in the HSE publication HS(G)113 (ref 20). Further advice is also set out in RISC Authority recommendations RC11 (ref 21).
- 5.3.9 All lift trucks should be regularly inspected and maintained by properly trained engineers in accordance with the manufacturers' recommendations.
- 5.3.10 In addition, after servicing or repair, trucks certificated for use in a hazardous environment should be confirmed, by a competent person, as still meeting the certification criteria before being returned to operation.
- 5.3.11 The number of aerosol cans on display in a retail environment should be minimised in accordance with a risk assessment.
- 5.3.12 Where aerosol cans are taken out of combustible packaging, the packaging material should be removed from the workplace on a regular basis and stored in secure, enclosed metal skips or bins with a compactor being used where necessary. Where open topped skips have to be used, they should be located at least 10m clear of the buildings and any external storage.
- 5.3.13 Wherever practicable, hot work should be prohibited in areas where there could be a release of flammable vapour. Instead, the equipment should be removed to a safe environment, such as a workshop, for the work to be carried out.



- Avoid carrying shrink wrapped packages of aerosols by their packaging.
- Plastic pallets should not be used for the storage of aerosols due to the ease with which they may be ignited and the rapidity with which an intense fire can develop.



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Figure 2: Metal mesh storage cage for aerosols

FAQ

- What should be done with leaking or damaged aerosol cans? (See section 5.5)
- How should small numbers of flammable and extremely flammable aerosols be stored? (See 5.4.3)

Where there is no alternative to hot work, it should be subject to a risk assessment and strict implementation of the necessary control measures. Any hot work should be conducted by a competent person under an effective Permit to Work system and in strict accordance with the RISC Authority document RC7: **Recommendations for hot work** (ref 16).

5.4 Storage

- 5.4.1 Bulk stocks of aerosols should be segregated and isolated from other materials, preferably by being housed in a separate building. Where this is not possible:
- 5.4.1.1 Aerosols may be stored in a compartment free of other stored materials and providing at least 60 minutes' fire resistance.
- 5.4.1.2 Alternatively, stocks of aerosols may be totally enclosed within a stout steel mesh cage of appropriate size and strength, including self-closing doors that are secured with a suitable lock or padlock when the cage is not in use, to prevent projection of exploding aerosols. Expanded metal or wire mesh may be used providing the metal is at least 2mm thick and the mesh size does not exceed 25mm by 25mm. Other than the aerosol packaging, containers and wooden pallets on which they stand, no combustible material should be stored inside or within 6m of any protective cage.
- 5.4.2 Plastic pallets should not be used for the storage of aerosols due to the ease with which they may be ignited and the rapidity with which an intense fire can develop.
- 5.4.3 Small quantities of aerosols may be stored within a metal gas cylinder storage cabinet designed and tested to BS EN 14470-2 (ref 22).
- 5.4.4 Aerosols should be stored in a cool, dry area that is sheltered from direct sunlight and free from the risk of freezing. The area should be ventilated at high and low levels.
- 5.4.5 To prevent the possible accumulation of flammable vapours, which may be denser than air, aerosols should not be stored adjacent to drains, basements or similar low lying areas.
- 5.4.6 The use of naked flames and heat generating processes should be prohibited inside and within 6m of buildings in which aerosols are stored. Thus hot work, shrink wrapping, portable space heaters and the charging of lift trucks should not be allowed in buildings used for the storage of aerosols.
- 5.4.7 Smoking should be prohibited within 10m of external storage areas. Smoking should only be permitted within a designated shelter or area provided with non-combustible smoking receptacles. The contents of smoking receptacles should be wetted before emptying and care must be taken to ensure that they are not emptied into skips or bins containing combustible waste.
- 5.4.8 Care should be taken to ensure that stacks of aerosols are level and with no broken pallets or boxes that might result in the premature release of the contents of an aerosol can. No heavy items should be stacked on top of aerosols.
- 5.4.9 Special care should be taken in the storage and handling arrangements of aerosols to prevent accidental damage due to crushing, falling or impact. Suitable precautions should include constraint to pallets, well supported stacks or racking.
- 5.4.10 Electrical installations in areas where aerosols are stored should be minimised. Where they are unavoidable, electrical installations within aerosol storage areas should be subject to a DSEAR assessment and suitable for the hazard zone in which they are installed. All electrical equipment should be located above 1m from floor level and should comply with BS EN 60079-14 (ref 23).
- 5.4.11 There should be a minimum of 0.5m between the ceiling and the top of the stacked aerosols to allow for handling and the effective action of fire detectors.
- 5.4.12 Aisles should be of adequate width to allow free movement of lift trucks or automated equipment used for the handling of aerosols. Where mechanical handling is not undertaken, a clear pathway no less than 0.5m wide should be maintained along the external walls and, where achievable, aisles should be at least 2.5m wide. Areas of undivided free-standing storage should be limited so as not to restrict access for firefighting. The precise dimensions should be determined by risk assessment.

5.5 Waste and damaged containers

The following precautions should be observed when handling damaged aerosol containers, but extreme care is essential.

- 5.5.1 Any damaged aerosols (aerosols affected by rusting, impact or other causes) should be immediately removed from the storage area to the open air where any flammable vapours can be safely dispersed unless all of the contents of the aerosols can be positively identified as non-flammable.
- 5.5.2 Powered vehicles must not be used to move damaged stock unless they are specially adapted for use in flammable atmospheres. Vehicles powered by internal combustion engines should not be used.
- 5.5.3 The route from the aerosol store to the open air should be as short as practicable, avoiding any sources of ignition on the way.
- 5.5.4 Once in the open air, damaged aerosols should be taken to a designated area that is well ventilated, as far as possible from buildings, outside plant and storage, and from potential ignition sources such as boiler rooms and vehicles.
- 5.5.5 Any obviously leaking aerosols should be totally discharged into suitable containers so that the contents can be collected and disposed of safely. Other aerosols should be carefully examined and, if necessary, 'leak tested' in a container of water; any found to be leaking should be treated as above. Those found undamaged should be returned to storage.
- 5.5.6 Even when emptied, damaged aerosols should be kept in this safe area for at least a further 24 hours to allow any final traces of propellant or flammable contents to dissipate safely.
- 5.5.7 Aerosols must not be incinerated on-site even when empty. The disposal of aerosols is a task which should only be carried out by specialist organisations off-site.



- Why are aerosols so hazardous?
- What actions should be taken when a fire occurs in an aerosol warehouse?

5.6 Fire protection

- 5.6.1 Fire protection measures for aerosol storage areas should be proportionate to the risk and should be based on the findings of the fire risk assessment.
- 5.6.2 The aerosol store should be protected by an automatic fire detection and alarm system designed to take into account the need for property protection, and be certificated by an independent UKAS accredited third party certification body. The installation should be to a recognised category of installation in accordance with BS 5839-1 (ref 24) as determined by a risk assessment and in consultation with the insurer.
- 5.6.3 The automatic fire detection and alarm system should be monitored either on-site or by an off-site alarm receiving centre certificated by an independent UKAS accredited third party certification body and operating in accordance with a Category II facility as defined in BS 5979 (ref 25).
- 5.6.4 The installation should be periodically serviced and maintained by a competent engineer certificated by an independent UKAS accredited third party certification body in accordance with BS 5839-1 (ref 24).
- 5.6.5 Premises used for the storage of aerosols should be protected by a sprinkler system to prevent a fire spreading to aerosols and to limit a fire involving aerosols. The system should comply with **LPC Rules for automatic sprinkler installations incorporating BS EN 12845** (ref 26) and, in particular, **Technical Bulletin 216, Sprinkler protection of aerosols** (ref 27). TB 216 makes specific requirements for alcohol-based and hydrocarbon-based aerosols. Note should be taken of the clear space limit above stacks of goods as set out in the **Sprinkler Rules** (ref 26).
- 5.6.6 In addition to an automatic sprinkler installation or other fixed fire suppression system, a suitable number of appropriate portable fire extinguishers should be available and immediately accessible in the case of a fire. Such portable extinguishers should be approved and certificated by an independent, third party certification body. Extinguishers should be installed in accordance with BS 5306-8 (ref 28) and inspected and maintained in compliance with BS 5306-3 (ref 29).

- 5.6.7 In certain high-risk aerosol storage (eg petroleum-based products), the provision of adequate specialist foam or drypowder extinguishers appropriate to the hazard should be considered.
- 5.6.8 Fire extinguishing appliances should be positioned at prominent fire points, usually sited on an exit route. Extinguishers should be prominently signed and, where necessary, high level signs may also be needed to indicate their location to staff. A weekly inspection of all fire points should be carried out, to ensure that extinguishers are in place, undamaged and readily accessible.
- 5.6.9 It is important that arrangements are made to provide the best possible access for firefighting. Arrangements should be made to provide prompt access to the site on the arrival of the fire and rescue service. Firefighters should be met by security personnel or a designated member of staff who should have the gates or barriers open awaiting their arrival.
- 5.6.10 Information should be provided for the fire and rescue service at a prominent location to include:
- the layout of the site, including a clear indication of the location of aerosol stores;
 - the location of the indicator panel for the automatic fire detection and alarm installation;
 - details of any automatic fire suppression system(s) and the location of their controls (eg stop valves for the sprinkler system);
 - details of ventilation systems;
 - the nature and location of any hazardous substances on the premises;
 - contact details for staff who may need to be consulted; and
 - the location of hydrants, rising mains or other sources of water on-site or nearby for firefighting purposes.
- 5.6.11 Water supplies should be in the form of one or more of the following:
- hydrants provided by a water company on street mains;
 - private hydrants designed and maintained in accordance with BS 750 (ref 30), ideally forming part of a ring main system. Hydrant outlets should be positioned not more than 70m from an entry to a building on the site and not more than 150m apart. They should preferably be sited immediately adjacent to roadways or hardstanding facilities provided for fire service appliances and not less than 6m from the building or risk so that they remain usable during a fire;
 - a static or natural water supply capable of providing a minimum capacity of 67,500 litres.
- 5.6.12 Smoke venting systems may be installed in large storage areas for life safety and property protection purposes, and may be a requirement of the fire and rescue service. Venting helps to prevent smoke logging, thereby assisting the means of escape and the fire and rescue service in their firefighting efforts.
- 5.6.13 When smoke venting is installed within a sprinkler-protected building, expert guidance should be sought to ensure that it does not interact adversely with the operation of the sprinklers or any other fire suppression system.

6.0 Checklist

Compliance with fire safety legislation (section 5.1)						
6.1		Yes	No	N/A	Action required	Due date Sign on completion
6.1.1	Does the fire safety management strategy consider practical passive, active and managerial control measures as part of the fire risk assessment for the premises when selecting and designing areas for storing aerosol containers? (5.1.1)					
6.1.2	Does the fire risk assessment consider the possibility of deliberate fire setting? (5.1.1)					
6.1.3	Has an assessment been made in compliance with the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) to identify hazard zones and ensure that storage areas for aerosol cans are sufficiently remote from other hazardous materials and from potential ignition sources? (5.1.2)					
6.1.4	If the premises contain in total 150 tonnes or more of flammable contents (net) are they managed in compliance with the current edition of the Control of Major Accident Hazards Regulations (COMAH)? (5.1.3)					
6.1.5	Has the fire safety manager liaised with the local authority fire and rescue service so as to be aware of the levels of response to the site and considered this information when undertaking and reviewing fire risk assessments? (5.1.4)					
Business continuity (section 5.2)						
6.2						
6.2.1	Where practicable, has consideration been given to dividing large volumes of stock and storing it on different sites or in different buildings on the same site? (5.2.1)					
6.2.2	Have steps been taken to ensure the continued smooth running of the business by making a suitable emergency plan? (5.2.2)					
6.2.3	Is the emergency plan rehearsed periodically by means of a tabletop exercise, with the results being assessed and amendments made to the plan as necessary? (5.2.3)					
6.2.4	Is consideration given to applying commercially available computer programmes, such as the ROBUST software or other appropriate products, to develop and check the adequacy of the plan? (5.2.4)					
Fire safety management (section 5.3)						
6.3						
6.3.1	Has access been established to a source of competent expert advice to provide training on aerosol safety and advice in case of an incident? (5.3.1)					
6.3.2	Have all relevant staff, including temporary staff, received induction and follow-up training concerning the hazards of the products stored, correct handling techniques, good housekeeping, emergency procedures and the procedures for dealing with damaged or leaking stock? (5.3.1)					
6.3.3	Does staff training provide clear advice regarding the use of portable fire extinguishers to fight a fire in the vicinity of stored aerosols? (5.3.2)					

		Yes	No	N/A	Action required	Due date	Sign on completion
6.3.4	Does the training of staff also include the relevance of any hazard zones identified in the DSEAR assessment for the premises? (5.3.3)						
6.3.5	Are aerosol storage areas kept clean and tidy at all times? (5.3.4)						
6.3.6	Are staff aware that packs of aerosol cans should not be carried or moved by lifting their plastic shrink wrapping? (5.3.5)						
6.3.7	Are aerosol cans in daily use in the premises separated from stock in storage? (5.3.6)						
6.3.8	Is the use of lift trucks in the warehouse carefully managed? (5.3.7)						
6.3.9	Are only fork-lift trucks with suitable protection used in hazardous areas? (5.3.8)						
6.3.10	Are all lift trucks regularly inspected and maintained by properly trained engineers in accordance with the manufacturers' recommendations? (5.3.9)						
6.3.11	After servicing or repair, are trucks certificated for use in a hazardous environment confirmed, by a competent person, as still meeting the certification criteria before being returned to operation? (5.3.10)						
6.3.12	Has the number of aerosol cans on display in a retail environment been minimised in accordance with a risk assessment? (5.3.11)						
6.3.13	Where aerosol cans are taken out of combustible packaging, is the packaging material removed from the workplace on a regular basis and stored in secure, enclosed metal skips or bins with a compactor being used where necessary? (Where open topped skips have to be used, are they located at least 10m clear of the buildings and any external storage?) (5.3.12)						
6.3.14	Is hot work prohibited in areas where aerosol cans are stored, handled or used? (5.3.13)						
6.4 Storage (section 5.4)							
6.4.1	Are bulk stocks of aerosols segregated and isolated from other materials, preferably by being housed in a separate building? (5.4.1)						
6.4.2	Where the requirements of section 4.1 cannot be met, are stocks of aerosols either: <ul style="list-style-type: none"> • stored in a compartment free of other stored materials and providing at least 60 minutes' fire resistance, or • segregated within a stout steel mesh cage of appropriate size and strength, including self-closing doors, to prevent projection of exploding aerosols? (5.4.1) 						
6.4.3	Are plastic pallets prohibited from use for the storage of aerosols? (5.4.2)						
6.4.4	Are small quantities of aerosols stored within a metal gas cylinder storage cabinet designed and tested to BS EN 14470-2? (5.4.3)						
6.4.5	Are aerosols stored in a cool, dry area, sheltered from direct sunlight that is ventilated at high and low levels and free from the risk of freezing? (5.4.4)						
6.4.6	To prevent possible accumulation of flammable vapours, which may be denser than air, are aerosols stored away from drains, basements and similar low lying areas? (4.5)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.4.7	Is the use of naked flames and heat generating processes prohibited inside and within 6m of buildings in which aerosols are stored? (5.4.6)						
6.4.8	Is smoking prohibited within 10m of external storage and only permitted within designated smoking shelters or areas? (5.4.7)						
6.4.9	Is care taken to ensure that stacks of aerosols are level with no broken pallets or boxes that might result in damage to the aerosols and the premature release of the contents? (5.4.8)						
6.4.10	Is special care taken in the storage and handling arrangements of aerosols to prevent accidental damage due to crushing, falling or impact? (5.4.9)						
6.4.11	Are electrical installations minimised in areas where aerosols are stored? (Where they are unavoidable, have they been subject to a DSEAR assessment and does all electrical equipment located within 1m of floor level comply with BS EN 60079-14?) (5.4.10)						
6.4.12	Is there a minimum of 0.5m between the ceiling and the top of stacked aerosols to allow for handling and the effective action of fire detectors? (5.4.11)						
6.4.13	Are aisles of adequate width to allow free movement of lift trucks or automated equipment used for the handling of aerosols? (5.4.12)						
6.5	Waste and damaged containers (section 5.5)						
6.5.1	Are any damaged aerosols immediately removed from the storage area to the open air where any flammable vapours can be safely dispersed unless all of the contents of the aerosols can be positively identified as non-flammable? (5.5.1)						
6.5.2	Are only powered vehicles that have been specially adapted for use in flammable atmospheres used to move damaged stock? (5.5.2)						
6.5.3	Is the route from the aerosol store to the open air as short as practicable, avoiding any sources of ignition on the way? (5.5.3)						
6.5.4	Once in the open air, are damaged aerosols taken to a designated area that is well ventilated, as far as possible from buildings, outside plant and storage, and from potential ignition sources such as boiler rooms and vehicles? (5.5.4)						
6.5.5	Are any obviously leaking aerosols totally discharged into suitable containers so that the contents can be collected and disposed of safely? (5.5.5)						
6.5.6	Even when emptied, are damaged aerosols kept in this safe area for at least a further 24 hours to allow any final traces of propellant or flammable contents to dissipate safely? (5.5.6)						
6.5.7	Are staff aware that aerosols must not be incinerated on-site even when empty? (5.5.7)						
6.6	Fire protection (section 5.6)						
6.6.1	Are the fire protection measures for aerosol storage areas proportionate to the risk and based on the findings of the fire risk assessment? (5.6.1)						
6.6.2	Is the aerosol store protected by an automatic fire detection and alarm system designed to take into account the need for property protection? (5.6.2)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.6.3	Is the automatic fire detection and alarm system monitored either on-site or by an off-site alarm receiving centre certificated by an independent UKAS accredited third party certification body and operating in accordance with a Category II facility as defined in BS 5979? (5.6.3)						
6.6.4	Is the AFD installation periodically serviced and maintained by a competent engineer? (5.6.4)						
6.6.5	Are premises used for the storage of aerosols protected by a sprinkler system to prevent a fire spreading to aerosols and to limit a fire involving aerosols? (5.6.5)						
6.6.6	Are a suitable number of appropriate portable fire extinguishers available and immediately accessible in the case of a fire? (5.6.6)						
6.6.7	In high-risk aerosol storage has the provision of adequate specialist foam or dry powder extinguishers been considered? (5.6.7)						
6.6.8	Are fire extinguishing appliances positioned at prominent fire points, usually sited on an exit route, with extinguishers prominently signed? (5.6.8)						
6.6.9	Have arrangements been made to provide prompt access to the site on the arrival of the fire and rescue service? (5.6.9)						
6.6.10	Is appropriate information provided for the fire and rescue service at a prominent location? (5.6.10)						
6.6.11	Are adequate water supplies available for firefighting? (5.6.11)						
6.6.12	Are smoke venting systems installed in large storage areas for life safety and property protection purposes? (5.6.12)						
6.6.13	Has expert advice been sought to ensure that the smoke venting does not interact adversely with the operation of the sprinklers or any other fire suppression system? (6.13)						

1. The Aerosol Dispensers Regulations 2009, SI 2009 No.2824, as amended by The Aerosol Dispensers (Amendment) Regulations 2014, SI 2014 No. 1130, The Stationery Office.
2. Directive 75/324/EEC on Aerosols Dispensers (ADD), 1975, as amended by Commission Directive 2013/10/EU of 19 March 2013, The Stationery Office.
3. **Aerosol Dispensers** – Advisory Note, 2011, Department of Business and Skills.
4. RR916: **Risk assessment for VCE scenario in an aerosol warehouse**, 2012, Health and Safety Executive.
5. **Practical guidance on assessing the risk of a VCE in an aerosol warehouse**, 2012, British Aerosol Manufacturers' Association (BAMA).
6. European Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures (CLP), The Stationery Office.
7. Commission Directive 2013/10/EU amending Directive 75/325/EEC (in order to adapt its labelling provisions to CLP). The Stationery Office.
8. The Regulatory Reform (Fire Safety) Order 2005, SI 2005 No 1541, The Stationery Office.
9. The Fire (Scotland) Act 2005, asp 5, The Stationery Office.
10. The Fire Safety (Scotland) Regulations 2006, Scottish SI 2006 No 456, The Stationery Office.
11. The Fire and Rescue Services (Northern Ireland) Order 2006, SI 2006 No 1254 (NI9), The Stationery Office.
12. The Fire Safety Regulations (Northern Ireland) 2010, SI 2010 No 325 (NI), The Stationery Office.
13. RC48: **Arson prevention: The protection of premises from deliberate fire raising**, 2010, Fire Protection Association.
14. Dangerous Substances and Explosive Atmospheres Regulations (DSEAR), 2002, SI 2002 No 2776, The Stationery Office.
15. L138 **Dangerous Substances and Explosive Atmospheres Regulations 2002, Approved code of practice and guidance**, 2013, Health and Safety Executive.
16. The Control of Major Accident Hazards Regulations 2015, SI 2015 No. 483, The Stationery Office.
17. The Planning (Hazardous Substances) Regulations 2015, SI 2015 No. 627, The Stationery Office.
18. **Business resilience: A guide to protecting your business and its people**, 2005, Fire Protection Association.
19. The ROBUST software (Resilient Business Software Toolkit) may be found at <https://robust.riscauthority.co.uk>
20. HS(G)113: **Lift trucks in potentially flammable atmospheres**, 1996, Health and Safety Executive.
21. RC11: **Recommendations for fire safety in the use of lift trucks**, 2014, Fire Protection Association.
22. BS EN 14470-2: 2006: **Fire safety storage cabinets. Safety cabinets for pressurised gas cylinders**, British Standards Institution.
23. BS EN 60079-14: 2014: **Explosive atmospheres. Electrical installations design, selection and erection**, British Standards Institution.
24. BS 5839-1: 2013: **Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises**, British Standards Institution.

25. BS 5979: 2007: **Remote centres receiving signals from fire and security systems. Code of practice**, British Standards Institution.
26. **LPC Rules for automatic sprinkler installations incorporating BS EN 12845: (Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance**, British Standards Institution), 2009, Fire Protection Association.
27. TB 216 **Sprinkler protection of aerosols**, 2010, Fire Protection Association.
28. BS 5306-8: 2012: **Fire extinguishing installations and equipment on premises. Selection and positioning of portable fire extinguishers. Code of practice**, British Standards Institution.
29. BS 5306-3: 2009: **Fire extinguishing installations and equipment on premises. Commissioning and maintenance of portable fire extinguishers. Code of practice**, British Standards Institution.
30. BS 750: 2012: **Specification for underground fire hydrants and surface box frames and covers**, British Standards Institution.

Further reading

L111: **The Control of Major Accident Hazard Regulations 2015**, Guidance on regulations, third edition, 2015, Health and Safety Executive

L117 **Rider-operated lift trucks. Operator training and safe use**. Approved Code of Practice and guidance, third edition, 2013, Health and Safety Executive.

Waste Exemption: T15 treating waste aerosol cans, 2014, Environment Agency.



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