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Key Facts of The British Health & Safety Legislation 2019

Everything you need to know about:

- DSEAR
- HSE Key Facts
- BS EN 14470-1
- Pressurised Gas Cylinder Cabinets
- BS EN 14470-2
- Ventilation
- Consequences of Management Failure

The Importance of Health and Safety Management

We tend to underestimate the dangers in handling hazardous substances in the workplace. That’s why incidents happen every day. Companies are responsible for the safety of their employees and rescue teams and must take reasonable precautions. If they do not abide by the rules, they are liable for prosecution.

This information brochure provides a summary of the current British Health and Safety legislation and how to increase the safety in your firm or organisation through risk assessment and safe storage of dangerous materials.



"Business partnerships are essential in achieving big goals. This is why at DENIOS we don't just see ourselves as a product or service provider, but as your partner. Together we can ensure that your business works toward legal compliance when it comes to hazardous material storage and handling.

James Jenkinson, Managing Director of DENIOS Ltd for the United Kingdom & the Republic of Ireland

Major accidents in the industrial property insurance

The incorrect handling and storage of hazardous materials can cause major financial damages. The following statistics reflect the financial claims due to fire in recent years. As the number of accidents per year is decreasing the average financial loss per damage is increasing.

Year	Claims expenditure in bn €	Number	Claims average in m €
1980	0,64	278	2,31
1985	0,79	289	2,74
1990	0,85	289	2,95
1995	1,13	267	4,24
200	0,88	199	4,43
2001	1,02	183	5,75
2002	0,55	160	3,46
2003	0,55	150	3,67
2004	0,54	150	3,58
2005	0,93	161	5,75
2006	1,03	154	6,71
2007	0,67	171	3,92
2008	0,75	142	5,05

Source:
Gesamtverband der Deutschen Versicherungswirtschaft e.V.
(Association of German Insurers)

DSEAR 2002

“The particular objective in the event of an incident, is to ensure that people can safely escape from the workroom/working area.” (DSEAR ACoP L136 par. 68 refers)

What is DSEAR?

DSEAR stands for the Dangerous Substances and Explosive Atmospheres Regulations 2002. Dangerous substances can put peoples’ safety at risk from fire and explosion or energetic event. DSEAR puts duties on employers and the self-employed to protect people from risks from fires, explosions and similar events in the workplace. This includes members of the public who may be put at risk by both the work hazards and any secondary hazards likely to occur at the time of Incident, Accident or Emergency, arising from the work activity, such as toxicity, or escalating fire load.

What are dangerous substances?

Dangerous substances are any substances used or present at work that could, if not properly controlled, cause harm to people as a result of a fire or explosion.

They are clearly defined into five separate categories.

- 1. A substance or preparation which meets the criteria in the approved classification and labelling guide for classification as a substance or preparation which is explosive, oxidising, extremely flammable, highly flammable or flammable, whether or not that substance or preparation is classified under the CHIP Regulations or CLP.
- 2. A substance or preparation which because of its physico-chemical or chemical properties and the way it is used or is present at the workplace creates a risk, not being a substance or preparation falling within subparagraph (a) above; or
- 3. Any dust, whether in the form of solid particles or fibrous materials or otherwise, which can form an explosive mixture with air or an explosive atmosphere, not being a substance or preparation falling within subparagraphs (a) or (b) above;

From the 1st June 2015, DSEAR also includes

- 4. Substances that are corrosive to metals - Substances that can corrode metals could cause structural damage reducing integrity of structures if not suitably contained.
- 5. All gases under pressure. Gases that are under pressure (eg gas in a cylinder) may present a risk of explosion if not correctly handled in the workplace.

Such substances are common in industry and include solvents, paints, varnishes, hydrogen, acetylene or liquid petroleum gas (LPG), organic peroxides, to name just a few. DSEAR places a formal requirement on employers to assess the risks for substances if classified for these properties and put in place suitable control and mitigation measures. Materials and chemicals of the nature specified in the regulation can be found in nearly every workshop, factory, laboratory or workplace and few companies are exempt from the DSEAR legislation.

Dangerous substances can be categorised in different storage classes. Separate storage may be required to reduce hazards when storing goods of the same storage class or materials of different storage classes. Information regarding the requirement for separate storage in the United Kingdom is given in the following table:

		8	6	5.2	5.1	4.3	4.2	4.1	3	2.3	2.2	2.1
Compressed gases (Flammable)	2.1											
Compressed gases (Non-flammable/non-toxic)	2.2											
Compressed gases (Toxic)	2.3											
Flammable liquids	3											
Flammable solids (Ready combustible)	4.1											
Flammable solids (Spontaneously combustible)	4.2											
Flammable solids (Dangerous when wet)	4.3											
Oxidising substances	5.1											
Oxidising substances (Organic peroxides)	5.2											
Toxic substances	6											
Corrosive substances	8											

- ☐ **Separation may not be necessary**
Separation may not be necessary, but consult suppliers about requirements for individual substances. In particular, note that some types of chemicals within the same class, particularly Class 8 corrosives, may react violently, generate a lot of heat if mixed or evolve toxic fumes.
- ☒ **Segregate from**
These combinations should not be kept in the same building compartment or outdoor storage compound. Compartment walls should be imperforate, of at least 30 minutes fire resistance and sufficiently durable to withstand normal wear and tear. Brick or concrete construction is recommended. An alternative is to provide separate outdoor storage compartments with an adequate space between them.
- ☒ **Keep apart**
Separate packages by at least 3 m in the storeroom or storage area outdoors. Materials in non-combustible packaging that are not dangerous substances and that present a low fire standard of separation should be regarded as a minimum between substances known to react together readily, if that reaction would increase the danger of an escalating incident.
- ☒ **Segregate from or keep apart**
The lower standard refers to the outside storage of gas cylinders. Where non-liquefied flammable gases are concerned, the 3 m separation distance may be reduced to 1 m.
- ☐ **Isolate**
This is used for organic peroxides, for which dedicated buildings are recommended. Alternatively, some peroxides may be stored outside in fire-resisting secure cabinets. In either case, adequate separation from other buildings and boundaries is required.

Important:
Safety storage cabinets with at least 90 minute fire resistance are also classified as storage sections.

No. 2

British Legislation:

HSE Position Key Facts

Compliance with DSEAR is LAW!

What does DSEAR require? Employers must:

- Find out what dangerous substances are in their workplace and what the fire and explosion risks are (see page 4 for the definition of dangerous substances);
- Put control measures in place to either remove those risks or, if not possible, control them;
- Put controls in place to reduce the effects of any incidents involving dangerous substances;
- Prepare plans and procedures to deal with accidents, incidents and emergencies involving dangerous substances;
- Make sure employees are properly informed about and trained to control or deal with the risks from dangerous substances;
- Identify and classify areas at work where explosive atmospheres may occur and avoid ignition sources (from unprotected equipment, for example) in those areas.

Whenever elimination of risks is not possible, arrangements for the safe storage of hazardous materials have to be made. These measures are defined by DSEAR and include the approaches in the event of a fire. Dangerous substances need to be stored in suitable cupboards or bins to protect these from fire and to prevent the expansion of a fire. A certain fire resistance and fire integrity are required. Referring to fire integrity the cupboard or bin has to prevent fire penetration and therefore stop the flames from interfusing and furthermore needs to maintain its original shape for a specified period of time. Compared to this, fire resistance relates to the temperature inside the safety storage cabinet or bin, which need to be resistant for a defined time period and prevent the temperature from rising above the auto-ignition point of the stored substances.

How ACoPs (Approved Codes of Practice) and guidelines issued by the HSE help conformance to DSEAR:

- In respect to storage these are procedures which are normally sufficient to prove conformance to DSEAR.
- These are not compulsory but do have special legal status. In the event of prosecution, you will have to prove that you have complied with the law in some other way, or a court will find you guilty.
- asecos products are instrumental in ensuring conformance to DSEAR requirements. The BCGA (British Compressed Gas Association) and HSE have confirmed their status in internal storage of gas cylinders and flammable solvents, where breaking regulations and codes of practice is sometimes unavoidable.

Feel free to contact us for more information about DSEAR: +44 1952 822 241.



HSE Position Key Facts

What does DSEAR require? Employers must:

It is recommended that the maximum quantities that may be stored internally is no more than 50 litres for extremely, highly flammable or those flammable liquids with a flash point below the maximum ambient temperature of the workroom or area. No more than 250 litres for flammable liquids with a higher flashpoint of up to 60 °C.

These quantities are intended to be viewed as the **recommended maximum** representing good industry safe practice, rather than being taken as the **absolute limits**. However, where the employer/duty holder does identify a need to store quantities in excess of the recommended maxima, a robust demonstration of this requirement would need to be made. Performance requirements for fire resistant safety storage cabinets and bins: It is important to understand that these do not specify an absolute test or standard for the safety storage cabinet or bin itself, rather they relate to nominal construction principles. These are:

- Materials used to build the sides, top, bottom, door(s) and lid are capable of providing the required fire resistance (i.e. 30 minutes integrity) and reaction to fire (i.e. minimal risk);
- Joints between the sides, top, bottom of safety storage cabinets and bins should be free from openings or gaps;
- Lid/doors should be close fitting against the frame of the cabinet/bin supports and fastenings should be of a material with a melting point greater than 750°C.

These criteria represent the minimum performance requirements for compliance with the current legislation.

However, it is to be noted that there are a number of more demanding standards and design specifications, which refer to the fire performance of the complete cabinet structure, including **BS EN 14470-1:2004 “Fire safety storage cabinets - Part 1: Safe storage cabinets for flammable liquids”**:

“... it is to be emphasized that their implementation in the UK is not a legal requirement. However, for quantities in excess of the recommended maxima employers/dutyholders may find cabinets with enhanced fire performance help in making their risk assessment demonstration.”

It is, of course the responsibility of the employer/duty holder to ensure that cabinets to any particular standard or design specification do meet the minimum legal requirements.

Our conclusion:

Take a closer look at your existing safety storage cabinets or the ones you intend to buy. Do they meet the minimum requirements stated by the HSE? Experience has shown that most storage cabinets used in the UK today do not comply with regulations. They either have gaps without insulation, or aluminium (which melts at 660°C) is used for the fittings. Seldom can independent certificates prove that the minimum fire resistance can be provided.

The Health and Safety Executive publishes Health and Safety Guidance such as the HSG 51, HSG 71 and HSG 140 to create the safest workplace possible while handling and storing hazardous and flammable materials.

What is HSG 51?

This guidance explains the fire and explosion hazards associated with flammable liquids. It will help those responsible in determining how to store containers containing flammable liquids safely and how to control the risks in workplaces, applying to containers up to 1000 litres capacity.

What is HSG 71?

This guidance addresses those with responsibility for storing dangerous goods. Showing control measures that will assist in eliminating and reducing the risks of the storage of packaged dangerous substances. It includes practice advice on designing new facilities most safely and efficiently.

What is HSG 140?

This guidance is for those handling and using flammable liquids on a daily basis. Fire and explosion hazards related to handling flammable substances are explained and suggestions for minimising the risks in your workplace are made.

Make no compromise when it comes to your safety! If you have any doubts just call us on +44 1952 822 241. We will be pleased to assist you.

No. 3

European Legislation:
BS EN 14470-1

European Legislation: BS EN 14470-1

Cabinets designed and built to comply with BS EN 14470-1 offer vastly superior protection over single or double wall steel cabinets to BS476.

This European Standard describes the design and testing criteria for safety storage cabinets to be used in laboratories to store **flammable liquids** in locked containers at normal room temperatures.

Three major safety requirements for the storage of flammable liquids are covered, which are:

- Minimising the fire risks associated with the storage of flammable substances and protection of the cabinet's contents in the event of fire for a known (tested) minimum length of time (fire rating);
- Minimising the amount of vapour released into working environment;
- Retention of accidental spillage within the cabinet.



Could you evacuate your facility in 3 minutes... how about 90 minutes?

Do you know how your flammable storage cabinet will perform?

Our latest video compares the performance of the three most common types of safety storage cabinets.



No. 4

Pressurised Gas
Cylinders

HSE Position Key Facts

External storage and dedicated, fire rated internal rooms are strongly recommended as the first and second preferences for the storage of compressed gas cylinders. Obviously they have to be brought inside for daily use but should be returned outside at the end of the working day because cylinders can turn into destructive missiles in the event of a fire and can cause great damage and injury if such an incident occurs indoors. In general, gas cylinders should be kept below 50 °C as there is an increased risk of over-pressurisation and gas discharge or rupture in the event of them being subject to temperature rises.

Exceptionally, gas cylinders may be stored indoors where there is a specific safety, security or process quality consideration. For example, for toxic or ultra-high-purity gases, where gases have to be temperature controlled for process reasons, or where there is potential risk of deterioration/corrosion of the cylinder. The amounts kept should be minimised and the gas cylinders should be housed/stored in a dedicated, well-ventilated, secure storeroom or cabinet/cupboard of adequate fire-resisting construction (see DSEAR regulations 2002).

However, if these situations are considered impractical, a third preference is to consider the merits of using special cabinets manufactured according to BS EN 14470-2 for internal storage. A strict fire safety risk assessment must be carried out and the local fire service normally consulted. asecos would be pleased to advise on your personal situation.

Achieving the standard requires that certain strict criteria are met, which include:

- The internal temperature of the cabinet must not rise by more than 50 degrees centigrade after a specified period (15, 30, 60 or 90 minutes depending on the Type) in a furnace test.
- Cabinets must have extraction fitted to prevent the buildup of explosive atmospheres.
- If pipework or electric cables are fed through the ceiling of cabinets, maximum diameter holes are stipulated.
- All standard requirements must be independently tested.

European Legislation: BS EN 14470-2

Cabinets designed and built to comply with BS EN 14470-2, and correctly extracted, offer a great increase of safety when storing gas cylinders inside.

This European Standard describes the design and testing criteria for safety storage cabinets to be used in laboratories to store gas cylinders in locked containers at normal room temperatures.

Three major safety requirements for storage of **gas cylinders** are covered, which are:

- a) Minimising the fire risks associated with the storage of gas cylinders and protection of the cabinet's contents in the event of fire for a known (tested) minimum length of time (fire rating);
- b) Minimising the risk if explosive gas/air mixtures are released into working environment;
- c) Ease of handling cylinders.

Testing the cabinet under fire conditions is normative. The fire test is utilised for four categories of fire ratings. In practice the degree of fire rating allows the user to select a cabinet which will allow sufficient time for personnel to leave, and fire fighters to enter the laboratory before the gases stored may turn from a possible minor/extinguishable fire into an uncontrollable one.

The methods of achieving b) and c) above are sufficiently flexible to allow for local/national needs.



No. 5

European Legislation:
BS EN 14470-2

Ventilation

Definition explosive atmosphere

An explosive atmosphere is a mixture of air and one or more dangerous substances in the form of gases, vapours, mists or dusts, under atmospheric conditions, in which, after ignition has occurred, combustion spreads to the entire unburned mixture.

Definition dangerous explosive atmosphere

This is an atmosphere which could become explosive due to local and operational conditions. These would include maintenance activities and fault conditions such as leakages. The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) place duties on employers to eliminate or control the risks from explosive atmospheres in the workplace. For the purposes of DSEAR the following elements must all be present for an explosive atmosphere which is subject to regulations 5(4)(c), 7 and 11 to form:

(a) atmospheric conditions – for the purposes of standardisation, normal atmospheric conditions are defined as -20 °C to 40 °C, and 0.8 to 1.1 bar;

(b) mixtures of air and dangerous substances – dangerous substances or mixtures of such substances, that are explosive with an oxidant other than air, for example pure oxygen or chlorine, are outside the scope of the definition of explosive atmosphere. The provisions of regulations 5(4)(c), 7 and 11 do not apply although other requirements in DSEAR may do;

(c) combustion – the definition of explosive atmosphere in regulation 2 is intended to make clear that where it can be ensured that the gas or dust is present in a concentration below the lower explosive limit, the atmosphere is not explosive, and regulations 5(4)(c), 7 and 11 do not apply. In this guidance, in the terms ‘flammable limit’ and ‘explosive limit’ (as used for example in ‘lower flammable limit’), the words ‘flammable’ and ‘explosive’ are intended to have the same meaning and are interchangeable. For simplicity, the term ‘lower explosive limit’ (LEL) is used throughout this document.

Possibilities to prevent explosive atmospheres:

- 1. Connecting the cabinet to an existing exhaust system.
- 2. Using an extraction add-on and install extensive ducting.
- 3. Using a re-circulating air filter add-on.

Consequences of Management Failure:
Corporate Manslaughter Act 2007 & Health and
Safety Offences Act

New parliamentary acts have an important influence on how highly flammable solvents, compressed gas cylinders and other hazardous materials are stored internally. They are as follows:

- 1. **The Corporate Manslaughter and Homicide Act** – which came into force in April 2008 (CM). If a person's death has been a result of a proven act of gross negligence, should senior management organisation be a substantial element of the breach, corporations are far more likely to be prosecuted than before the act came into force. Senior management stands for a public or private company, educational institutions, public bodies, councils, etc. Average fines would be 5% of the annual turnover from the last 3 years but can increase to 10% in aggravated cases. A publicity order may also be made. Imagine the negative impact this might have.
- 2. **The Health and Safety Offences Act** – which came into force in January 2009, and has now been amended on several occasions. The Health and Safety at Work Act 1974 has effectively been amended by the Health and Safety Offences Act 2008. Until now no person could be imprisoned for health and safety offences except in exceptional circumstances such as the failure to comply with an improvement or prohibition notice or failing to comply with a court order. At the last amendment 12th March 2015, a magistrate's court was given the authority to impose an unlimited fine and up to a 6 month jail term or both, simply for having a major incident,
- 3. **or in the event of a fatality**, though the crown court system, an unlimited fine and up to a 2 year jail term can be imposed for every person killed.

These acts carry increased fines or possible prison sentences. When being tried, health and safety legislation, guidelines and approved codes of practice will be taken into account by the jury. Ignorance of such information in the public domain will not be tolerated as an excuse. This applies to the storage of hazardous materials as described above. It is not sufficient to post an assessment showing risks. This must be regularly reviewed to take into account amongst other things, correct storage of hazardous materials according to the latest publications, and communicated to all levels of organisation.