

DSEAR Assessment



An assessment of the risks of a fire or explosion is a legal requirement where processes involve substances that are defined as dangerous within DSEAR (Dangerous Substances and Explosive Atmospheres Regulations). DSEAR is a Regulation that implements parts of the European ATEX Directive. ATEX and DSEAR are often used interchangeably to refer to hazardous area assessments and equipment. In the UK, technically the risk assessment element must be in accordance with DSEAR and the equipment used in hazardous areas must be compliant with the requirements of the ATEX Directives.

The definition of a dangerous substance includes flammable, highly flammable and extremely flammable liquids or gases, as well as dusts that have the potential to form an explosive atmosphere in air. A DSEAR assessment will also be required where the creation of a flammable or explosive atmosphere is foreseeable e.g. heating a liquid above its flashpoint. As a rule of thumb, operations handling liquids within 10 °C of their flashpoint have the potential to create a flammable atmosphere.

A DSEAR assessment must include

- The likelihood of an explosive atmosphere forming and its expected duration. This assessment must include normal operation and foreseeable events such as maintenance and leaks.
- The classification of the workplace into zones where flammable or explosive atmospheres are predicted and the recording of the zoned areas in the form of a diagram.
- The evaluation of ignition sources in zoned areas to demonstrate that equipment is appropriately designed. Ignition sources include electrical and mechanical equipment as well as electrostatic hazards.

A properly undertaken DSEAR assessment requires a high degree of technical competency. An inadequate assessment could lead to ignition sources not being controlled in areas where flammable atmospheres may occur. However, an overly conservative approach can lead to increased equipment and maintenance costs. Where a flammable or explosive atmosphere is foreseeable, it is recommended that the DSEAR assessment is undertaken by a competent professional.

The purpose of this Technical Guide is to assist in understanding when a DSEAR assessment would be required and the standards to which it should be completed.

Likelihood of an Explosive Atmosphere Occurring

The assessment of likelihood is based on factors such as the physical properties of the substances handled, quantities released, degree of containment and ventilation.

The old system for classifying chemicals, CHIP, is being superseded by the CLP (Classification, Labelling and Packaging) Regulations. Under CLP, liquids with flashpoints of up to 60 °C will be classified as flammable liquids. Diesel, gas oil and light heating oils will therefore be classified as flammable liquids in the future. However, a flammable atmosphere is unlikely to be created from these high flashpoint substances where they are handled in bulk and there is no heating. The DSEAR assessment may simply be a summary of the review undertaken and the conclusion that a flammable or explosive atmosphere is not foreseeable.

CE	XXXX	Ex	II	2	G	d	IIc	T4
	Code number of notified body	Standard Marking for explosion protection	Equipment Group II is industrial	Equipment category.	Protection against Gas (G) or Dust (D)	Type of protection	Gas Group	Temperature class

Definition of Classified Zones

The areas where flammable atmospheres are predicted are classified into zones according to the likelihood of the danger being present.

- Zone 0 or 20, for dusts: An area where a flammable atmosphere is expected to exist continuously.
- Zone 1 or 21, for dusts: An area where a flammable atmosphere is expected to exist for long periods of time, typically between 10 and 2000 hrs per year.
- Zone 2 or 22, for dusts: An area where a flammable atmosphere is expected to exist for limited periods only, typically < 10 hrs per year.

Zoning Plan

The electrical zoning must be established on a layout drawing, preferably with plan and side views to establish the precise scale and extent of zones.

After the zoning plan has been established it should be sense checked. A zone 1 atmosphere in an open area where people are also present for long periods is unlikely to be acceptable. The explosion risks and occupational exposure to the employees would be substantial.

The size and classification of zoned areas is influenced by factors such as size of the source, available ventilation, local extraction systems, leak tightness of equipment, containment and inerting. Published guidance is available, but due to the variations between sites a high degree of competence and experience is required to confidently establish a safe and pragmatic zoning plan.

Suitability of Equipment for Use within Zoned Areas

Once the extent of the different zones has been established then the equipment within the zoned areas must be confirmed as appropriate. The equipment including lights, motors and instrumentation must be checked to ensure that they will not be potential ignition sources.

Electrical equipment that is suitable for use within electrically classified areas will be marked. The information provided should include (see table above):

Equipment category

Indicates the zone that the equipment is suitable for use in.

- **Category 1** suitable for use in zone 0 or 20, if specified for dusts.
- **Category 2** suitable for use in zone 1 or 21, if specified for dusts.
- **Category 3** suitable for use in zone 2 or 22, if specified for dusts.

Type of protection

This indicates the basis of safety for the equipment e.g. oil filled (o) or flameproof (d).

Gas Group

Gases and vapours are classified into broad groups according to their physical properties. The marking indicates the group or groups that the equipment is suitable for.

The temperature Class

Ignition could be from a hot surface and equipment is specified to ensure that the maximum surface temperature is below the auto-ignition temperature of the gas or dust.

Installation and Maintenance

Electricians are required to be competent to work in zoned areas. A higher level of competency is required than for normal domestic, industrial or commercial work. In the UK, qualifications such as CompEx are accepted as proof that an electrician is competent to work in zoned areas. It is essential that any installation or maintenance work involving electrical equipment in zoned areas is undertaken by competent employees.

Periodic inspection of electrical equipment should be undertaken to ensure that it remains fit for purpose. The extent and frequency will depend on local conditions, but would typically consist of a visual inspection (light fittings not broken etc.) annually and a more detailed biennial inspection by a competent electrician.

Summary

A DSEAR assessment is a critical element in the safe handling of materials that have the potential to form an explosive atmosphere. In most cases a competent consultant should be used as omissions can be dangerous and an overly cautious approach expensive. Please contact QBE Risk Solutions if you require further guidance after reading this Technical Guide.

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