

## **DSEAR guidance – what needs to be considered as part of your DSEAR/ATEX assessment**

The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) is a set of regulations concerned with protection against risks from fire, explosion and similar events arising from dangerous substances used or present in the workplace.

A 'dangerous substance' includes any substance or preparation, which because of its properties or the way it is used could cause harm to people from fires and explosions - e.g. paints; varnishes; solvents and dusts which when mixed with air could cause an explosive atmosphere.

The impact of DSEAR should not be significant where good practices already exist but it is concerned with the harmful physical effects from thermal radiation (burns), over-pressure effects (blast injuries) and oxygen depletion effects (asphyxiation) arising from fire or explosion.

DSEAR impose a requirement to eliminate or reduce risks to safety from fire, explosion or other events arising from hazardous substances used in connection with work processes. The employer is required to carry out a suitable and sufficient assessment of risk to employees where a dangerous substance is, or may be, present at the premises – and to take relevant action to mitigate risk.

DSEAR should supplement ongoing fire risk assessment undertaken in compliance with the Regulatory Reform (Fire Safety) Order 2005.

An explosive atmosphere does not always result in an explosion, but if it caught fire the flames would quickly travel through it and if this happened in a confined space (e.g. in plant or equipment) the rapid spread of the flames or rise in pressure could also cause an explosion.

The DSEAR regulations require:

- A risk assessment of any work activities involving dangerous substances;
- Measures to eliminate or reduce risks as far as is reasonably practicable (regulation 5 & 6);
- Provide equipment and procedures to deal with accidents and emergencies (regulation 8);
- Provide information and training to employees (regulation 9);
- Classification of places where explosive atmospheres may occur into zones & mark if necessary (regulation 7)

Hazardous material use is a key consideration in preventing fire & explosion. Risk of ignition is real wherever flammable dust, vapour or gases are present. Unless affected areas have sufficient extract or suppression controls, flammables may ignite – and mixed with air potentially create a flammable or explosible atmosphere.

Not all flammable gas, vapour or dust concentrations in air will burn or explode and data is generally widely available.

Fire or explosion hazard arises when flammable vapour or dust attains a sufficient concentration in air where there may also be an ignition source - such as unprotected electrical equipment.

The DSEAR regulations require identification of potentially explosive atmospheres and suitable control of storage, handling & access to hazardous substances within discrete zones. Areas classified into zones must then be protected from any ignition sources and entry points must be marked with a specified 'Ex' sign – though this is normally only appropriate where signs are of benefit in reducing residual risk.



For Flammable Gases, Vapours and Liquids the zone classifications are based upon probability:

- Zone 0. A place in which an explosive atmosphere consisting of a mixture of air and flammable (dangerous) substances in the form of a gas, a vapour or mist is present continuously, or for long periods or **frequently**
- Zone 1. A place in which an explosive atmosphere consisting of a mixture of air & flammable (dangerous) substances in the form of gas, vapour or mist is likely to occur in normal operation but only **occasionally**
- Zone 2. A place in which an explosive atmosphere consisting of a mixture of air & flammable (dangerous) substances in the form of gas, vapour or mist is unlikely to occur during normal operations but, if it does occur, will persist **for a short period only**.

Similar zone classifications also apply to dust clouds:

- Zone 20. A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or **frequently**
- Zone 21. A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation – but only **occasionally**
- Zone 22. A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is unlikely to occur in normal operation but, if it does occur, will persist **for a short period only**

A hazardous area classification sheet is normally produced under DSEAR to indicate the location and extent of identified zones - and reflects the likelihood of an explosive atmosphere in a given area during *normal* operation. Drawings may aid front-line interpretation and show the extent of classified zones - including a degree of safety.

Generally, hazardous zones are not appropriate if a flammable atmosphere does not persist in the workplace - unless control measures such as ventilation are deemed inadequate - or where routine intrusive maintenance or upset conditions (e.g. a leak) may occur.