

Principles

Did you know that...

A Boeing 737, spray-painting and a gas storage area all have something in common? They all can give rise to a potentially explosive atmosphere that requires special precautions to be taken with electrical and mechanical equipment.

Where flammable liquids, gases, mists or combustible dusts are stored or used then provision has to be made to prevent the possibility of release of these materials. This is normally done by the design of the process containment.

However, there may well be situations where releases can occur in the presence of air and these will give rise to potentially explosive atmospheres. Such areas are known as hazardous areas.

To assist the user a system called area classification defines three zones indicating the likelihood of the presence of a potentially explosive atmosphere based on the frequency and duration of any release. The area outside the zoned area is non-hazardous. The assessment of area classification would usually be done by a process or chemical engineer working with a control and electrical engineer and the person responsible for the operational management of the plant. One of the assessment team should be experienced in the technique of area classification.

Following the completion of the area classification the user can then select electrical and mechanical equipment, with protection against the likelihood of becoming ignition capable and appropriate to the zone. When the zone and the appropriate level of protection are considered together, an acceptable level of safety is achieved.

Ideally sources of ignition such as arcs and hot surfaces should be excluded from hazardous areas to prevent the possibility of an explosion. Wherever possible equipment should be installed where the area is non-hazardous. If it is essential that equipment be installed in hazardous areas the equipment should be designed and constructed to ensure that any risk of it causing an ignition is acceptably low. Where new electrical and mechanical equipment is to be provided this should conform with local regulations for equipment to be used in any of the hazardous zones.

UK Legislation and Implementation

Electrical and mechanical equipment and protective systems intended to be used within the hazardous zones should conform with **“The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996 - Statutory Instrument 1996/192”**. Equipment already in use in hazardous zones before July 2003 can continue to be used indefinitely provided a risk assessment shows it is safe to do so.

Following the introduction of the **Dangerous Substances and Explosive Atmospheres Regulations (DSEAR)** in July 2003 area classification is a requirement under these Regulations. DSEAR also requires, where necessary, the provision of a sign to mark places, which have been classified as hazardous places. The Regulations require a risk assessment to identify all other sources of ignition including existing equipment. Guidance on area classification and methods of protection for equipment are contained in British, European and International standards.

References

- The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996: Statutory Instrument (S.I.) 1996 No.192, HMSO, 1996, see http://www.opsi.gov.uk/si/si1996/uksi_19960192_en_1.htm
- Dangerous Substances and Explosive Atmospheres Regulations 2002 (SI 2002/2776) (DSEAR) ISBN 0110429575 published by The Stationery Office Ltd. Tel: 0870 600 5522, <http://www.opsi.gov.uk/si/si2002/20022776.htm>
- BS EN 60079-10-1:2015 Explosive atmospheres. Classification of areas. Explosive gas atmospheres. BSI, 31 March 2016, ISBN 978 0 580 96948 5
- BS EN 60079-10-2:2015 Explosive atmospheres. Classification of areas. Explosive dust atmospheres. BSI, 31 March 2015, ISBN 978 0 580 80696 4
- BS EN 60079-14:2014 Explosive atmospheres. Electrical installations design, selection and erection. BSI, 30 June 2014, ISBN 978 0 580 93501 5
- BS EN ISO 80079-36:2016 Explosive atmospheres. Non-electrical equipment for explosive atmospheres. Basic method and requirements. BSI, 30 April 2016, ISBN 978 0 580 94726 1
- BS EN 60079-17:2014 Explosive atmospheres. Electrical installations inspection and maintenance. BSI, 31 March 2014, ISBN 978 0 580 80125 9

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