

UNDERSTANDING HAZARDOUS AREA MARKINGS

Many industrial processes involve flammable or explosive materials. These include the oil and gas, chemicals, coal and metals industries. A hazardous area is one where a fire or explosion hazard may be present, either as an inevitable part of the process or as a consequence of an abnormal condition such as a gas leak. Equipment used in a hazardous area must be designed so that it cannot be a source of ignition through sparks, hot surfaces or discharges of static electricity.

HAZARDOUS AREAS AND CLASSIFICATIONS

The classification of a hazardous area is determined by a qualified professional engineer following an appropriate standard. There are two main groups of standards used to classify hazardous areas and the ways that electrical equipment can be made safe. Class and Division are used in the traditional North American system whereas Zones are used in the other parts of the world. Even in North America, Zone classifications are finding increasing acceptance.

Nature of Hazard	Frequency	Rest of World IEC EX, Atex, UK EX	North America NFPA 70 NEC
Gas	Always	Zone 0	Class I Div 1
	Intermittent	Zone 1	
	Abnormal condition	Zone 2	Class I Div 2
Dust	Always	Zone 20	Class II Div 1
	Intermittent	Zone 21	
	Abnormal condition	Zone 22	Class II Div 2

Both systems recognize that some substances are more flammable than others and define groups according to their flammability. The Zone system has Group II for gases and Group III for dusts.

Substance	Class-Div Group	Zone Group
Acetylene	A	IIC
Hydrogen	B	IIC
Ethylene	C	IIB
Propane, Methane	D	IIA
Metal dust	E	IIIC
Carbonaceous dust	F	IIIB
Other combustible dust	G	IIIB

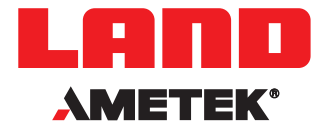
PROTECTION CONCEPTS

There are several protection mechanisms which are recognized in the standards. Some are only applicable to the lower-risk categories such as Div 2 or Zone 2 whereas others may be used in all categories. Among the most common are:

- **Intrinsic Safety** The electrical equipment cannot generate enough energy to ignite a flammable mixture, either through a spark or through elevated temperature.
- **Explosion-proof or Flame-proof** Any fire or explosion occurring within the enclosure will be contained and cannot ignite material outside.
- **Protection By Enclosure** The enclosure containing the electrical equipment is sealed to prevent ingress of hazardous dust.



REFERENCE GUIDE



LABELLING – IECEx, Atex, UKEX

Equipment which has been tested and approved for use in a hazardous area must carry a label showing the types of hazardous areas it has been approved for. The label for the AMETEK Land EXSH1 housing is shown here. In addition to identifying the manufacturer, the label gives detailed information on the certification and on the approved conditions of use.

BREAKING DOWN EACH PART IN ORDER




The first line refers to its suitability for use in an area with flammable gases.

- The equipment is Ex rated and is suitable for use in a hazardous area
- The db protection concept is a flameproof enclosure
- It is suitable for use above ground in a location where Group IIC gases such as hydrogen or acetylene may be present.
- Maximum surface temperature is T6, or 85 °C
- Protection level Gb means it remains safe with a single fault and can be used in Zone 1

The second line refers to its suitability for use in an area with flammable dusts.

- The equipment is Ex rated and is suitable for use in a hazardous area
- The tb protection concept is a dust-proof enclosure
- It is suitable for use above ground in a location where conductive dust may be present
- Maximum surface temperature is 85 °C
- Protection level Db means it remains safe with a single fault and can be used in Zone 21

Ex db IIC T6 Gb
Ex tb IIIC T85C Db
Tamb = -40C TO +70C

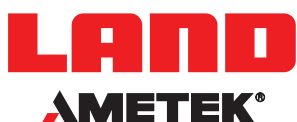
 II 2 G D  2813
CML 21ATEX11300X
IECEx CML 21.0158X  0518
CML 21UKEX11316X

The second label gives additional information.

- Ex logo means it is certified under ATEX rules
- Equipment Group II is suitable for use above ground
- Equipment category 2 G remains safe in single fault condition and can be used in Zone 1
- Equipment category 2 D remains safe in single fault condition and can be used in Zone 21
- The CE and UKCA logos indicate that the equipment complies with all relevant European Union and United Kingdom laws.

Finally, the label shows the test lab and certificate reference of the test certificate. The suffix X means that specific conditions must be met for safe use. These are listed in the certificate and in the manufacturer's documentation.

FIND OUT MORE: WWW.AMETEK-LAND.COM/HAZARDOUS-AREAS



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www.ametek-land.com



land.enquiry@ametek.com



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