

GUIDE TO HAZARDOUS AREAS FOR THE USE OF ELECTRICAL EQUIPMENT IN EXPLOSIVE ATMOSPHERES

There is a potential risk of explosion where dangerous mixtures of flammable materials, gas and air, dust and air or vapours and air exist.

The necessity to remove the sources of ignition for these mixtures or combinations is essential. Electrical equipment has to be designed, tested and certified before it can be used in these hazardous areas.

Classification of the area

All process plants are divided into either Zones (European or IEC) or Divisions (North American) , this is dependent upon the type of potentially explosive atmosphere present.

Classification European or IEC	Definition of the zone or area	Classification North America
Zone 0 (gases)	An area where a potentially explosive mixture is present either continuously or for long periods	Class I Division 1 (gases)
Zone 20 (dusts)		Class II Division 1 (dusts)
Zone 1 (gases)	An area where a potentially explosive mixture can occur in normal operations	Class I Division 1 (gases)
Zone 21 (dusts)		Class II Division 1 (dusts)
Zone 2 (gases)	An area where a potentially explosive mixture is not likely to occur during normal operations, but if it does occur it exists only for short periods	Class I Division 2 (gases)
Zone 22 (dusts)		Class II Division 2 (dusts) Class III Division 1 (fibres) Class III Division 2 (fibres)

Groups of potentially explosive gases plus dusts and fibres

There are two main gas groups, Group I for underground mining where methane and coal dust are present, and Group II where gases occur in surface industries allowing equipment to be designed to less onerous tolerances.

Type of gas (or material)	European or IEC gas group	North American gas group
Methane	I	-
Acetylene	IIC	A
Hydrogen	IIC	B
Ethylene	IIB	C
Propane	IIA	D
Metal dust	-	E
Coal dust	-	F
Grain dust	-	G

Temperature related surfaces that can ignite potentially explosive gases, dusts and fibres

Electrical equipment that can reach high operational temperatures must be classified according to the maximum surface temperature. This is based on an ambient temperature of 40 degrees Centigrade.

Temperature	European or IEC	North American	Temperature	European or IEC	North American	Temperature	European or IEC	North American
450 deg C	T1	T1	215 deg C		T2D	135 deg C	T4	T4
300 deg C	T2	T2	200 deg C	T3	T3	120 deg C		T4A
280 deg C		T2A	180 deg C		T3A	100 deg C		T5
260 deg C		T2B	165 deg C		T3B	85 deg C		T6
230 deg C		T2C	160 deg C		T3C			

