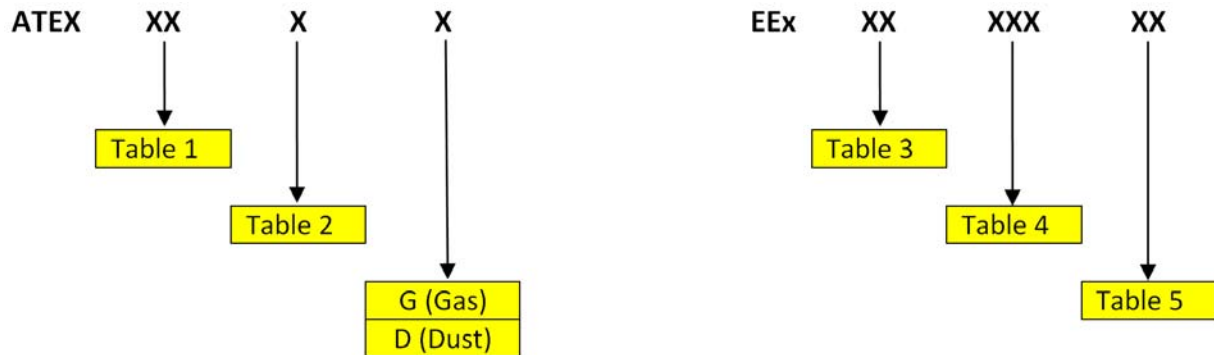


Hazardous Area Classification



Groups (Table 1)

I	Electrical equipment intended for use in mines susceptible to firedamp
II	Electrical equipment intended for use in places with an explosive gas atmosphere other than mines susceptible to firedamp
III	Electrical equipment intended for use in places with an explosive dust atmosphere other than mines susceptible to firedamp

Categories (Table 2)

ATEX Cat.	Typical Zone Suitability
1G 1D	Equip. suitable for zone 0 Equip. suitable for zone 20
2G 2D	Equip. suitable for zone 1 Equip. suitable for zone 21
3G 3D	Equip. suitable for zone 2 Equip. suitable for zone 22

Hazardous Area Classification

Types of Protection (Table 3)

GAS Type of Protection	ATEX Code	Standard
General Requirements	–	EN 60079-0
Intrinsic Safety	Ex ia & ib*	EN 60079-11
Increased Safety	Ex e	EN 60079-7
Flameproof	Ex d	EN 60079-1
Pressurization	Ex p	EN 60079-2
Powder Filling	Ex q	EN 60079-5
Encapsulation	Ex ma & mb	EN 60079-18
Oil Immersion	Ex o	EN 60079-6
Type n	Ex n	EN 60079-15

*Ex ia means protection is guaranteed with a combination of two faults (suitable for zone 0, 1&2), while Ex ib means protection is guaranteed with only one fault (suitable for zone 1 & 2).

Gas group (Table 4-1)

IIA	Propane
IIB	Ethylene
IIC	Hydrogen/Acetylene

Dust group (Table 4-2)

IIIA	Combustible Flying
IIIB	None - conductive dust
IIIC	Conductive dust

Hazardous Area Classification



Temperature (Table 5-1)

Class of electrical component	Maximum surface temperature of electrical component (°c)	Ignition temperature of gas or vapor (°c)
T1	300 < - < 450	> 450
T2	200 < - < 300	>300
T3	135 < - < 200	>200
T4	100 < - < 135	>135
T5	85 < - < 100	>100
T6	< 85	>85

The gas groups are divided in three categories and are determined according to the maximum experimental safe gap width and minimum ignition current required to ignite the gas (IIC < 20μ J, IIB < 60 μ J and IIA < 180 μ J). These values have been determined empirically and are valid under atmospheric conditions (between 0.8 bar and 1.1 bar). The category IIC with the maximum of ignition energy of less than 20 mj is the most critical, having highest risk of explosion. Tables can be consulted for the temperature and gas group categories of a particular substance (see table 5-2).

The temperature category and gas group should also be indicated on an explosion zone diagram of the plant according to the explosive gas or vapor likely to be present in the zone. This allows the selection of the correct form of protection; the temperature and gas group should also be clearly indicated on equipment approved for use in flammable atmospheres.

Explosive characteristics of some products (Table 5-2)

Substance	Ignition temp. (°c)	Temp. class	Gas group
Acetone CH ₃ COCH ₃ (2-propanone)	540	T1	IIA
Acetylene C ₂ H ₂ (ethane)	305	T2	IIC
Acetic anhydride (CH ₃ CO) ₂ O	330	T2	IIA
Benzene C ₆ H ₆	555	T1	IIA
Butane C ₄ H ₁₀	365	T2	IIA
n-Butyl alcohol C ₄ H ₉ (1-butanol)	340	T2	IIA
Benzene chloride C ₆ H ₅ CL	590	T1	IIA
Ethanol C ₂ H ₅ OH (ethyl alcohol)	425	T2	IIA
Ethyl acetate Ch ₃ COOC ₂ H ₅ 460	T1	IIA	
Methanol CH ₃ OH (methyl alcohol)	455	T1	IIA
Nitrobenzene C ₆ H ₅ NO ₂	430	T1	IIA
n-pentane C ₅ H ₁₂	285	T3	IIA
Propane C ₃ H ₈	470	T1	IIA
Toluene C ₆ H ₅ CH ₃	535	T1	IIA
Hydrogen H ₂	560	T1	IIC
Carbon disulphide CS ₂	102	T5	IIC
Hydrogen sulphide H ₂ S	270	T3	IIB

Note:

There is no relationship between gas group and temperature class. For example, hydrogen belongs to the most dangerous gas group IIC with the lowest ignition energy, but is in the safest temperature class T1 for ignition temperatures above 450°C.