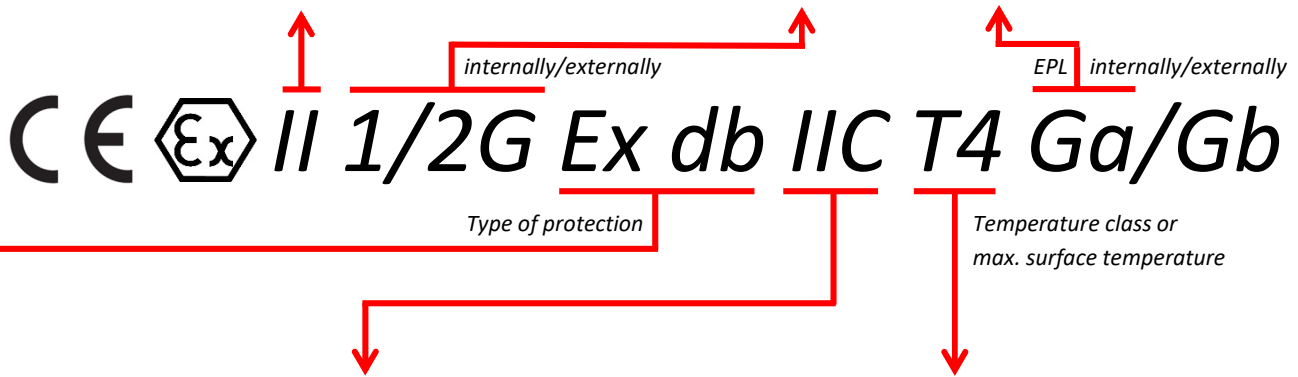


Application	Equipment group acc. to ATEX 114	Environment	Group acc. to EN 60079-0	Equipment category	Equipment Protection Level	Allowed in zone
Mining	I	Gas and dust	I	M1	Ma	-
				M2	Mb	-
Industry	II	Gas, vapour and mist	IIA, IIB or IIC	1G	Ga	0, 1 and 2
				2G	Gb	1 and 2
				3G	Gc	2
		Combustible Dust	IIIA, IIIB or IIIC	1D	Da	20, 21 and 22
				2D	Db	21 and 22
3D	Dc	22				



Gas or Dustgroup equipment	Allowed in area with
IIA	IIA gases (like methane, propane, acetone, kerosene or petrol)
IIB	IIA and IIB gases (like ethyl glycol, ethylene or ethanol)
II or IIC	IIA, IIB and IIC gases (like hydrogen or acetylene)
IIIA	IIIA fibers (fibers > 0,5 mm)
IIIB	IIIA and IIIB dust (non-conducting dust < 0,5 mm)
IIIC	IIIA, IIIB and IIIC dust (conducting dust < 0,5 mm)

Temperature class equipment	Max. surface temperature	Allowed in area with
T1	T450°C	T1
T2	T300°C	T1, T2
T3	T200°C	T1, T2, T3
T4	T135°C	T1, T2, T3, T4
T5	T100°C	T1, T2, T3, T4, T5
T6	T85°C	T1, T2, T3, T4, T5, T6

Type of explosion protection					
Gas (electrical)		Dust (electrical)		Gas or Dust (non-electrical)	
Ex d*	Flameproof	Ex t* or tD A2x	Protection by enclosure	b	Control of ignition source
Ex e*	Increased safety	Ex p or pD	Overpressure	c	Constructional safety
Ex i*	Intrinsic safety	Ex i* or iD	Intrinsic safety	k	Liquid immersion
Ex m*	Encapsulation	Ex m* or mD	Encapsulation	Ex h	Mechanically protected with b, c or k
Ex p	Overpressure			d	Flameproof
Ex q	Powder filling				
Ex o	Liquid immersion				
Ex nA, nR, nC	Non-arcing, restricted breathing, enclosed construction				
Ex op is	Optical radiation				



EXPLOSION SAFETY EXPERT

* Protection methods can be supplemented with the EPL, eg Ex ia for use in Zone 0, or Ex ib and Ex db in Zone 1, or Ex mc and Ex dc for use in zone 2.

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Examples:

II 2 (1) G Ex db [ia] IIC T6 Gb

Flameproof enclosure, suitable for zone 1 or 2, IIC, T6 with intrinsically safe output to zone 0, 1 or 2

II (2) G

Motor protection switch, not suitable for use in a zone, but suitable for protecting a motor in zone 1 or 2

II 2/3 D Ex h IIIB T85°C Db/Dc

Fan, mechanically explosion-proof, internally suitable for zone 21 or 22, externally for zone 22

II (1) G [Ex ia] IIC

Intrinsically safe zener barrier, not explosion-proof, but suitable for protecting an Ex ia device in zone 0, 1 or 2

II 2 GD c T4


Non-electrical gearbox, constructionally safe, suitable for zone 1, 2, 21 or 22, all gas groups, T4

Classification of hazardous areas (EN 60079-10-1 or EN 60079-10-2)

Environment	Probability of explosive atmosphere	Duration of explosive atmosphere	Zone classification	Equipment classification		
				Equipment group	Equipment category	
Gases, vapours and mists	Continually present	> 1000 hour per year > 10% operating time	Zone 0	II		
	Likely to occur in normal operation occasionally	10 to 1000 hour per year 0,1% to 10% operating time	Zone 1	II	1G	2G
	Not likely to occur in normal operation	< 10 hour per year < 0,1% operating time	Zone 2	II		3G
Combustible Dust	Continually present	> 1000 hour per year > 10% operating time	Zone 20	II		
	Likely to occur in normal operation occasionally	10 to 1000 hour per year 0,1% to 10% operating time	Zone 21	II	1D	2D
	Not likely to occur in normal operation	< 10 uur hour per year < 0,1% operating time	Zone 22	II		3D

Zone	Hand tools (EN 1127-1, Annex A)	
	Single sparks (hand tools)	Shower of sparks (sawing, grinding)
0/20	Not allowed	Not allowed
1	Limited allowed *1	Not allowed
2	Allowed	Not allowed
21/22	Allowed	Limited allowed *2
*1	Steel tools not allowed with gas group IIC, H ₂ S, CO or ethylene oxide	
*2	Protect the workplace and remove accumulated dust or keep the workplace wet	



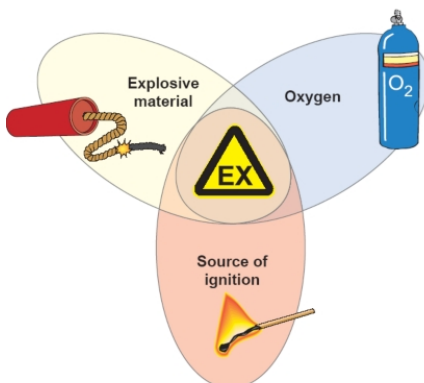
Clothing (CLC/TR 60079-32-1, 11.5)	
All zones	Antistatic shoes (also consider the surface) Do not put clothes on or off
Zone 0 and 1	Anti-static clothing 
Zone 2, 20, 21 and 22	No special requirements, except for very sensitive gases or dusts

Points of attention in ATEX areas:

- Area classification present (EPD and classification drawing)
- Selection of equipment (both electric and non-electric)
- Competent personnel
- Avoid ignition sources
- Work permit and work instructions
- ATEX installation requirements (EN 60079-14)
- Installation conditions (X)
- Periodic inspection and maintenance of equipment (EN 60079-17)
- Repair and overhaul (EN 60079-19)
- Assemblies (assessed as a whole)

Sequence of measures:

1. Prevent explosive atmosphere by removing fuel or oxygen
2. Prevent ignition sources (ATEX equipment, spark-free tools, etc.)
3. Limit consequences (pressure relief, isolation, suppression)



ATEX 114 -> Manufacturers of equipment, safety devices and protective systems



ATEX 153 -> Employer/ End-user, safety and health protection of workers

