



# Safety – everytime and everywhere

ATEX: Ex protection for Europe | IECEx: International Ex protection | NEC: Ex protection for USA

## Ex marking according to the international standards

### ATEX

1	2	3	4	5	6	7
II	2G	Ex	ib	IIC	T4	Gb
II	2D	Ex	ib	IIIC	T135°C	Db
1	2	3	4	5	6	7

### IECEx

3	4	5	6	7
Ex	ib	IIC	T4	Gb
Ex	ib	IIIC	T135°C	Db
3	4	5	6	7

### NEC 505

8	3	4	5	6	7
Class I, Zone 1	AEx	ib	IIC	T4	Gb
Class II, Zone 21	AEx	ib	IIIC	T135°C	Db
8	3	4	5	6	7

### NEC 500

8	5	6
Class I, Division 1	Group A,B,C,D	T4
Class II(III), Division 2	Group E,F,G	
8	5	

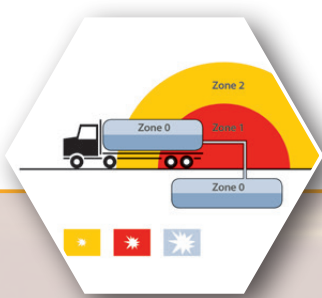
#### 1 Equipment groups

- I Devices for use in overground and underground mining / mining.
- II Devices for use in all other areas at risk from explosive atmospheres.

#### 2 Equipment category and type of explosive atmosphere

G = Gases, vapors, fog | D = Dust

- M1** (for group I)
  - 1 (for group II) Very high safety. For use in the zones 0, 1, 2 (**1G**) and 20, 21, 22 (**1D**)
- M2** (for group I)
  - 2 (for group II) High safety. For use in the zones 1, 2 (**2G**) and 21, 22 (**2D**)
  - 3 (for group II) Normal safety. For use in the zones 2 (**3G**) and 22 (**3D**)



#### 3 Ex protection

Corresponds to one or more types of extinction.

#### 4 Type of protection

Type	Identification	Standard	Use according to approval
	Degree of hazard*	EN EC ANSI	
Flameproof enclosure	d da/db/dc	EN 60079-1	0, 1, 2   M1, M2
Pressurized enclosure	p pxb/pyb/pzc	EN 60079-2	1, 2   21, 22   M2
Sand filling	q qb	EN 60079-5	1 or 2   M2
Oil immersion	o ob/oc	EN 60079-6	1 or 2   M2
Increased safety	e eb/ec	EN 60079-7	1 or 2   M2
Intrinsic safety	i ia/ib/ic	EN 60079-11	0, 1, 2   20, 21, 22   M1, M2
Electr. resources protection type „n“	n nC/nR	EN 60079-15	2
Encapsulation	m ma/mb/mc	EN 60079-18	0, 1, 2   20, 21, 22   M1, M2
Optical radiation	op	EN 60079-28	0, 1, 2   20, 21, 22   M1, M2
Protection by housing	t ta/tb/tc	EN 60079-31	20, 21, 22

\*Degree of hazard see table 7 Equipment Protection Level EPL

#### 5 Explosion groups

Typical Gas	(NEC 500)	Dust groups	(NEC 500)
I Methane	-	IIIA ignitable fibers/flyings	Fibers or flyings Class III
IIA Propane	Class I, Group D	IIIB non conductive dust	Grain dust Class II, Group G
IIB Ethylene	Class I, Group C	IIIC conductive dust	Carbon dust Class II, Group F Metal dust Class II, Group E
IIC Hydrogen	Class I, Group B		
Acetylene	Class I, Group A		

#### 6 Temperature classification

Maximum surface temperature of the resources in **gas hazardous area**

T1   450 °C	T2   300 °C	T3   200 °C
T4   135 °C	T5   100 °C	T6   85 °C

Maximum surface temperature of the resources in **dust hazardous area, ATEX, IECEx – direct indication of the maximum surface temperature in °C**

#### 7 Equipment Protection Level – EPL

Application	Degree of hazard	Equipment category	Use in zone
G	a	1G	0, 1, 2
G	b	2G	1, 2
G	c	3G	2
D	a	1D	20, 21, 22
D	b	2D	21, 22
D	c	3D	22
M	a	M1	
M	b	M2	

#### 8 Zones

	Constant hazard	Occasional hazard	Rare or short term hazard
Class I = Gas	Zone 0	Zone 1	Zone 2
NEC 500 (Class I)	Division 1		Division 2
Class II = Dust	Zone 20	Zone 21	Zone 22
NEC 500 (Class II, III)	Division 1		Division 2