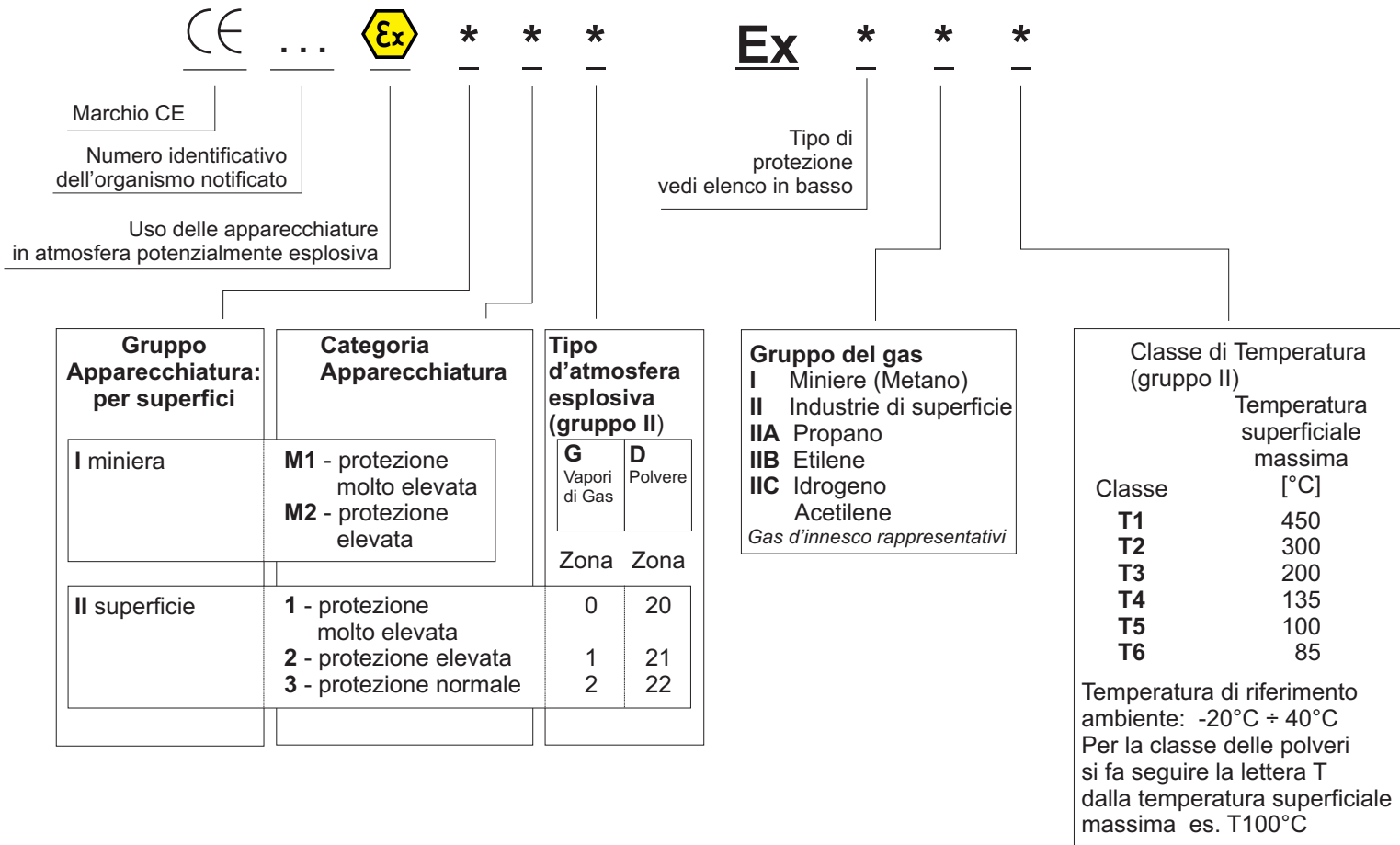


GUIDA RAPIDA **ATEX**

Direttiva ATEX 94/9/CE

Apparecchiature elettriche e non elettriche e grado di protezione

Contrassegni delle apparecchiature



CLASSIFICAZIONE DELLE APPARECCHIATURE

Apparecchiature per miniere - Gruppo I

Categoria M1

Livello di protezione: Molto elevato. Apparecchiature che possono funzionare anche in presenza di atmosfera esplosiva

Categoria M2

Livello di protezione: Elevato. Apparecchiature che devono essere messe fuori tensione in presenza di atmosfera esplosiva

Apparecchiature per superficie - Gruppo II

Categoria 1

Livello di protezione: Molto elevato

Presenza di atmosfera esplosiva: sempre, spesso e per lunghi periodi

Categoria 2

Livello di protezione: Elevato

Presenza di atmosfera esplosiva: probabile

Categoria 3

Livello di protezione: Normale

Presenza di atmosfera esplosiva: scarsa possibilità e per breve tempo

NORME E TIPI DI PROTEZIONE

Apparecchiature elettriche per gas (G)

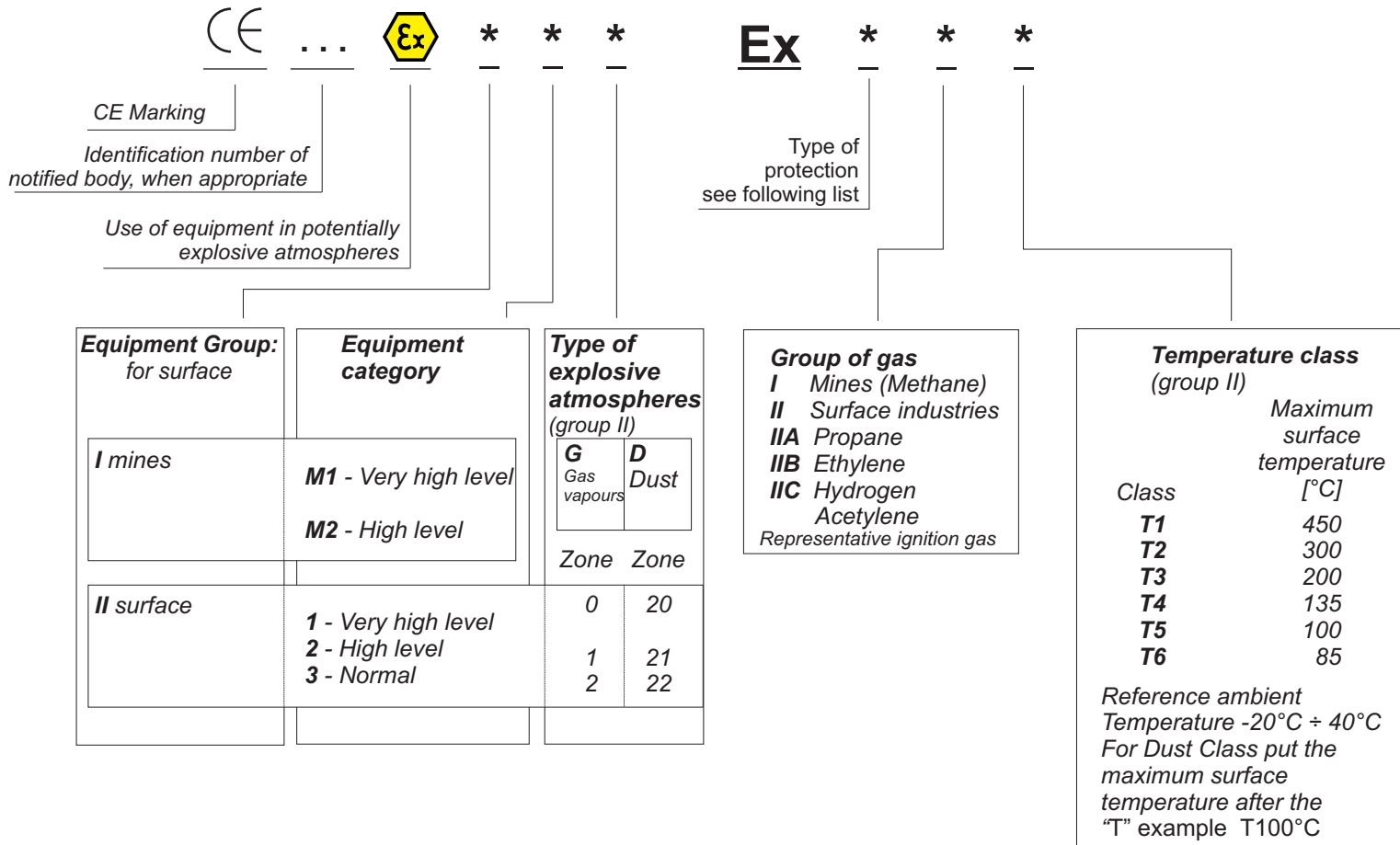
	Codice	Norma EN	Categoria
Regole generali		60079-0	
Immersione in olio	o	60079-6	M2-2G
Sovrapressione interna	p	60079-2	M2-2G
Riempimento polverulento	q	60079-5	M2-2G
Custodie a prova di esplosione	d	60079-1	M2-2G
Sicurezza aumentata	e	60079-7	M2-2G
Sicurezza intrinseca	ia	60079-11	M1-1G
Sicurezza intrinseca	ib	60079-11	M2-2G
Incapsulamento	m	60079-18	M2-2G
Tipo di protezione "n"	n	60079-15	3G
Categoria 1G		60079-26	1G
Categoria M1		50303	M1

Apparecchiature elettriche per polveri (D)

Custodia a tenuta di polvere	Ex tD	EN 61241-1	1D
Protezione con pressurizzazione	Ex pD	EN 61241-4	2D
Protezione con sicurezza intrinseca	Ex iD	EN 61241-11	1D
Protezione con incapsulamento	Ex mD	EN 61241-18	1D

ATEX GUIDE

European ATEX Directive 94/9/CE
Electrical and non-electrical equipment and protection systems



CATEGORY OF EQUIPMENT

Equipment of mines - Group I

Category M1

Level of protection: Very high level
2 types of protection or 2 independent faults

Category M2

Level of protection: High level
1 type of protection Normal operation

Equipment of surface - Group II

Category 1

Level of protection: Very high level
2 types of protection or 2 independent faults

Category 2

Level of protection: High level
Common frequent malfunction

Category 3

Level of protection: Normal
Required level of protection

STANDARDS AND TYPE OF PROTECTION

Electrical equipment for gas (G)

	Code	EN Rule	Category
General requirements		60079-0	
Oil immersion	o	60079-6	M2-2G
Pressurized apparatus	p	60079-2	M2-2G
Powder filling	q	60079-5	M2-2G
Flameproof enclosure	d	60079-1	M2-2G
Increased safety	e	60079-7	M2-2G
Intrinsic safety	ia	60079-11	M1-1G
Intrinsic safety	ib	60079-11	M2-2G
Encapsulation	m	60079-18	M2-2G
Protection type "n"	n	60079-15	3G
Category 1G		60079-26	1G
Category M		50303	M1

Electrical equipment for dust (D)

Protection by enclosures	Ex tD	EN 61241-1	1D
Protection by pressure	Ex pD	EN 61241-4	2D
Protection by intrinsic safety	Ex iD	EN 61241-11	1D
Protection by encapsulation	Ex mD	EN 61241-18	1D

CLASSIFICAZIONE DEI GAS E VAPORI INFIAMMABILI INFLAMMABLE GASES AND VAPOURS CLASSIFICATION

Gruppo Apparecchiatura group of container	I	IIA				IIB		IIC
gas o vapore gas or vapour	Metano (grisou) <i>Methane</i> (firedam p)	Ammoniaca Metano ind. Gas d'altoforno Ossido di Carbonio Propano Butano Pentano Esano Eptano Iso-ottano Decano Benzene Xilene Cicloesano Acetone Etil-metil-chetone	<i>Ammonia</i> <i>Industrial methane</i> <i>Blas-furnace gas</i> <i>Carbon monoxide</i> <i>Propane</i> <i>Butane</i> <i>Pentane</i> <i>Esane</i> <i>Eptane</i> <i>Iso-octane</i> <i>Decane</i> <i>Benzene</i> <i>Xilene</i> <i>Cyclohexane</i> <i>Acetone</i> <i>Ethyl-methyl-ketone</i>	Acetato di metile acetato di etile Acetato di n-propile Acetato di n-butile Acetato di amile Cloroetilene Metanolo Etanolo iso-Butanolo n-Butanolo Alcool amilico Nitrito di etilene	<i>Methyl acetate</i> <i>Ethyl acetate</i> <i>Normal propyl acetate</i> <i>Normal butyl acetate</i> <i>Amyl acetate</i> <i>Chloroethylene</i> <i>Methanol</i> <i>Ethanol</i> <i>Iso Butanol</i> <i>Normal Butanol</i> <i>Amyl alcohol</i> <i>Ethyl nitrite</i>	Buta1:3-diene Etilene Etere dietilico Ossido di etilene Gas di città (gas illuminante) Gas di forno a coke	<i>Buta 1:3-diene</i> <i>Ethylene</i> <i>Diethyl ether</i> <i>Ethylene oxide</i> <i>Town gas</i> <i>Coke-oven gas</i>	Idrogeno Acetilene Hydrogen Acetylene















GRADO DI PROTEZIONE IP - INDEX OF PROTECTION

1 Cifra-1 st figure:

protezione contro il contatto di corpi solidi
protection against solid bodies

2 Cifra - 2 st figure:

Protezione dalla penetrazione di liquidi
protection against liquids

IP	tests	IP	tests
0	Nessuna protezione - <i>No protection</i>	0	Nessuna protezione - <i>No protection</i>
1	 Protezione contro corpi solidi di dimensioni superiori a 50 mm (dal contatto accidentale con le mani) <i>Protected against solid bodies larger than 50 mm (eg. : accidental contact with the hand)</i>	1	 Protezione dalla caduta verticale di gocce d'acqua (condensa) <i>Protected against vertically-falling drops of water (condensation)</i>
2	 Protezione contro corpi solidi di dimensioni superiori a 12,5 mm (dal contatto accidentale con le mani) <i>Protected against solid bodies larger than 12,5 mm (eg. : accidental contact with the hand)</i>	2	 Protezione dalla caduta di gocce d'acqua inclinazione max 15° <i>Protected against drops of water falling at up to 15° from the vertical</i>
3	 Protezione contro corpi solidi di dimensioni superiori a 2,5 mm (utensili, cavi) <i>Protected against solid bodies larger than 2,5 mm (tools, wires)</i>	3	 Protezione dalla caduta di gocce d'acqua inclinazione max 60° <i>Protected against drops of rainwater at up to 60° from the vertical</i>
4	 Protezione contro corpi solidi di dimensioni superiori a 1 mm (piccoli utensili, cavi sottili) <i>Protected against solid bodies larger than 1 mm (fine tools, small wires)</i>	4	 Protezione contro gli spruzzi d'acqua provenienti da tutte le direzioni <i>Protected against projections of water from all directions</i>
5	 Protezione contro la polvere (no deposito dannoso) <i>Protected against dust (no harmful deposit)</i>	5	 Protezione contro getti d'acqua provenienti da tutte le direzioni <i>Protected against jets of water from all directions</i>
6	 Protezione completa dalla polvere <i>Completely protected against dust</i>	6	 Protezione contro ondate o getti d'acqua potenti <i>Completely protected against jets of water or similar force to heavy seas</i>
		7	 Protezione contro gli effetti dell'immersione <i>Protected against the effects of immersion</i>
		8	 Protezione contro gli effetti della prolungata immersione a condizioni particolari <i>Protected against effects of prolonged immersion under specified conditions</i>

CENELEC-IEC AND NEC COMPARISON

International electrotechnical Commission (www.iec.ch)

The IEC (International Electrotechnical Commission), created in 1904 in Geneva (Switzerland) establish the IEC regulations. In 1947, with the creation of the International Standards Organisation (ISO) by the United Nations, the IEC became responsible for the organisation of the electrical division, while still remaining independant.

The IEC has defined three categories of hazardous zones:

- Zone 0 : the explosive atmosphere is continuously present.
- Zone 1 : the explosive atmosphere is often present.
- Zone 2 : the explosive atmosphere may accidentally be present.

Gas and vapour classification

Gases are divided into four groups by the CEC and the NEC (with some additional gases). The IEC also defines different groups of gases and vapours. The IEC and North American groups are viewed as fundamentally the same, apart from the fact that there are three groups in the IEC and four for the NEC. (See table as follows)

Temperature classification

IEC defined a temperature classification for materials used in hazardous areas. Following this, CEC and NEC have also been modified to include a temperature classification. (See table as follows)

GAS AND VAPOUR CLASSIFICATION

Group		Group or vapour
IEC	NEC (North America)	
II C	A	Acetylene
II C	B	Hydrogen
II B	C	Ethylene
II B	C	Ethyl ether
II B	C	Cyclopropane
II B	C	Butadene 1-3
II A	D	Propane
II A	D	Ethane
II A	D	Butane
II A	D	Benzène
II A	D	Pentane
II A	D	Heptane
II A	D	Acetone
II A	D	Methyl Ethyl
II A	D	Methyl Alcohol
II A	D	Ethyl Alcohol

TEMPERATURE CLASSIFICATION

Temperatures IN °C	Classification	
	IEC	NEC (North America)
450	T1	T1
300	T2	T2
280	T2	T2A
260	T2	T2B
230	T2	T2C
215	T2	T2D
200	T3	T3
180	T3	T3A
165	T3	T3B
160	T3	T3C
135	T4	T4
120	T4	T4A
100	T5	T5
85	T6	T6

Group 1 - underground workin mine
Group 2 - surface industry

CENELEC-IEC / NEC COMPARISON

Inflammable Material	CENELEC/IEC				NEC		
	Protection	Zone	Group	Subdivision	Class	Division	Group
Gases and vapours							
Acetylene	d - e	1,2	II	C	I	1 - 2	A
Hydrogen	d - e	1,2	II	C	I	1 - 2	B
Propylene Oxide Ethyl oxide Butadiene	d - e	1,2	II	B	I	1 - 2	B
Cyclopropane Ethyl ether Ethylene	d - e	1,2	II	B	I	1 - 2	C
Acetone Benzene Butane Propane Hexane Paint Solvents Natural Gas	d - e	1,2	II	A	I	1 - 2	D
Combustible dusts	Protection		Zone		II	1	E
	D/DIP		21-22				
Magnesium Aluminium or metallic dusts with $R \leq 10^5$ Ohms x cm	D/DIP		21-22		II	1	F
Floor Non metallic dusts with $R > 10^5$ Ohms x cm	D/DIP		21-22		II	2	G
Fibers and flying					III	1-2 ⁽¹⁾	
Rayon Cotton Linen Wood Hemp Flax bast Tow Coconut fiber Oakum							

(1) Division 1: Manufacturing location
Division 2: Storage location