

### SOME HISTORY

The classification of hazardous areas into zones established the level of protection required for electrical equipment installed in explosive gas atmospheres (IEC 60079-10). Since this approach proved successful, it was applied to explosive dust atmospheres (IEC-EN 61241-10).

The new edition of IEC 60079-0 (2007) [EN 60079-0 (2009)] progressively replaces IEC-EN 60079-10 and IEC-EN 61241-10 by the two following standards:

IEC-EN 60079-10-1: Classification of areas, explosive gas atmospheres

IEC-EN 60079-10-2: Classification of areas, combustible dust atmospheres (dust groups/EPL)

The selection and erection of electrical installations is defined by standard EN 60079-14.

### DEFINITION OF A PLACE WHERE A POTENTIALLY EXPLOSIVE ATMOSPHERE MAY OCCUR

The classification of an installation into distinct zones has two objectives (according to ATEX 1999/92/EC):

- To define the categories of equipment used in the zones indicated, provided they are suitable for gases, vapours or mists and/or dusts.
- To classify hazardous places into zones to prevent ignition sources and be able to select the correct electrical and non-electrical equipment accordingly. The zones are defined on the basis of the occurrence of explosive gaseous or dusty atmospheres.

### GAS GROUPS

**Group II** : Equipment intended for use in places with an explosive gas atmosphere other than mines susceptible to firedamp.

**Group I** : Equipment intended for use in mines susceptible to firedamp.

	<b>Zone</b>	<b>Category (ATEX 94/9/EC)</b>	<b>Presence of explosive atmospheres</b>
<b>Group II</b>	zone 0	1 G <sup>(1)</sup>	<b>Continuous, frequent</b> or for long periods
	zone 1	2 G	<b>Intermittent</b> in normal operation ( <b>likely</b> )
	zone 2	3 G	<b>Occasional</b> or for short periods (never in normal operation)
<b>Group I</b> (mines)		M1 <sup>(1)</sup>	<b>Presence</b> (methane, dust)
		M2	<b>Risk of presence</b> (methane, dust)

### DUST GROUPS (according to the fifth edition, IEC 60079-0, 2007 (EN 60079-0, 2009) <sup>(2)</sup>)

**Group III** : Equipment intended for use in places with an explosive dust atmosphere other than mines susceptible to firedamp.

	<b>Zone</b>	<b>Category (ATEX 94/9/EC)</b>	<b>Presence of explosive atmospheres</b>
<b>Group III</b>	zone 20	1 D <sup>(1)</sup>	<b>Continuous, frequent</b> or for long periods (air/cloud of combustible dust)
	zone 21	2 D	<b>Intermittent</b> in normal operation
	zone 22	3 D	<b>Occasional</b> or for short periods

The classification of the installation is **the responsibility of the user**. He must individually evaluate each installation to determine the differences between them.

**Separate assessments must be made for places with potentially explosive atmospheres caused by gases or vapours and for those caused by dusts.**

### EQUIPMENT PROTECTION LEVELS - EPLs

In normal circumstances the effect of the EPLs will be to retain the normal zone/equipment protection relationship. If, however, the risk is considered especially severe, then the required EPL for the zone may be increased. Similarly, if the risk is deemed to be especially small or negligible, the EPL may be reduced from the norm.

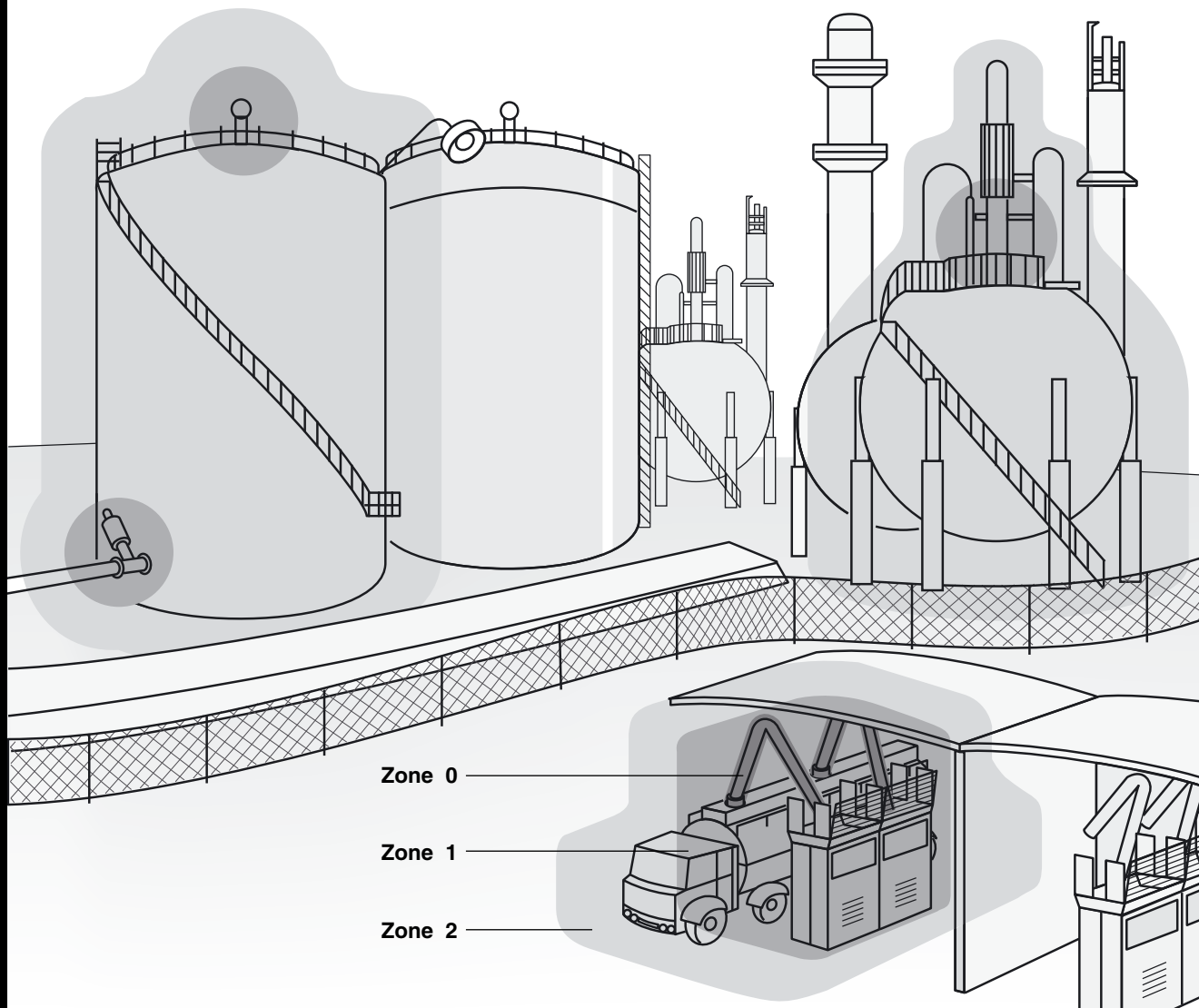
The following table shows the normal relationship between EPL and zone/category (without supplementary risk assessment).

<b>Equipment Protection Level (EPL)</b>	<b>Normal Applicable Zone(s)</b>	<b>Category (94/9/EC)</b>
Ga	0 (and 1 and 2)	1G
Gb	1 (and 2)	2G
Gc	2	3G
Da	20 (and 21 and 22)	1D
Db	21 (and 22)	2D
Dc	22	3D
Ma / Mb	mines	M1 / M2

<sup>(1)</sup> G = gas ; D = dust ; M = mines

<sup>(2)</sup> Including IEC 61241-0 (dusts)

**A**

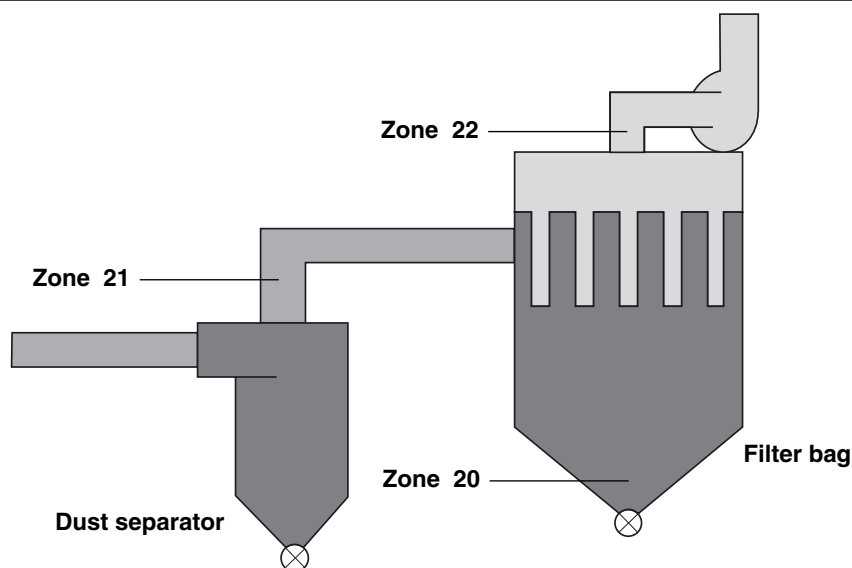


Zone 0

Zone 1

Zone 2

**B**



Zone 22

Zone 21

Zone 20

Filter bag

Dust separator

### EXAMPLES OF A CLASSIFICATION INTO ZONES

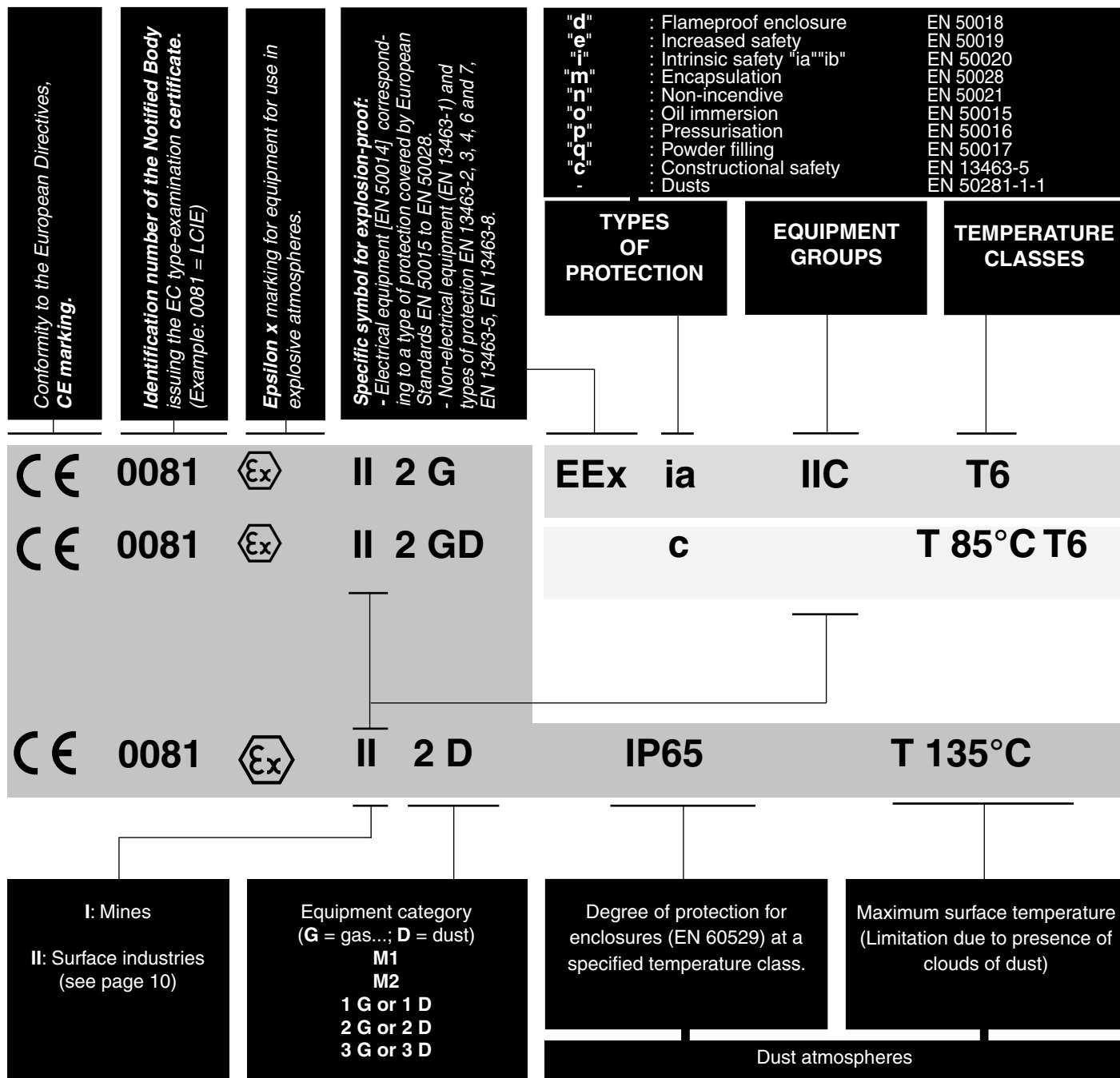
Drawing **A** of an explosive atmosphere caused by gas:

Drawing **B** of an explosive atmosphere caused by dust:

	Zone 0		Zone 1		Zone 2
	Zone 20		Zone 21		Zone 22

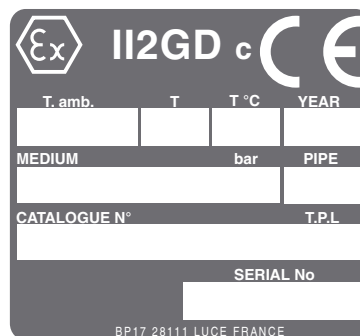
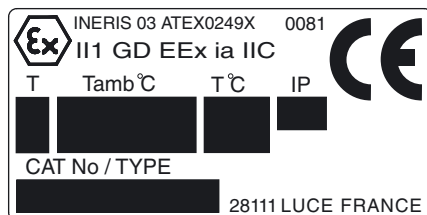
Above drawings **A** and **B** are an example only and must not be used as a model for an actual plant whose design is, in every case, the responsibility of the constructor and operator.

### HOW CAN ATEX, EN 50014, EN 50281-1-1 OR EN 13463-1 APPROVED APPARATUS FOR USE IN EXPLOSIVE ATMOSPHERES BE IDENTIFIED?

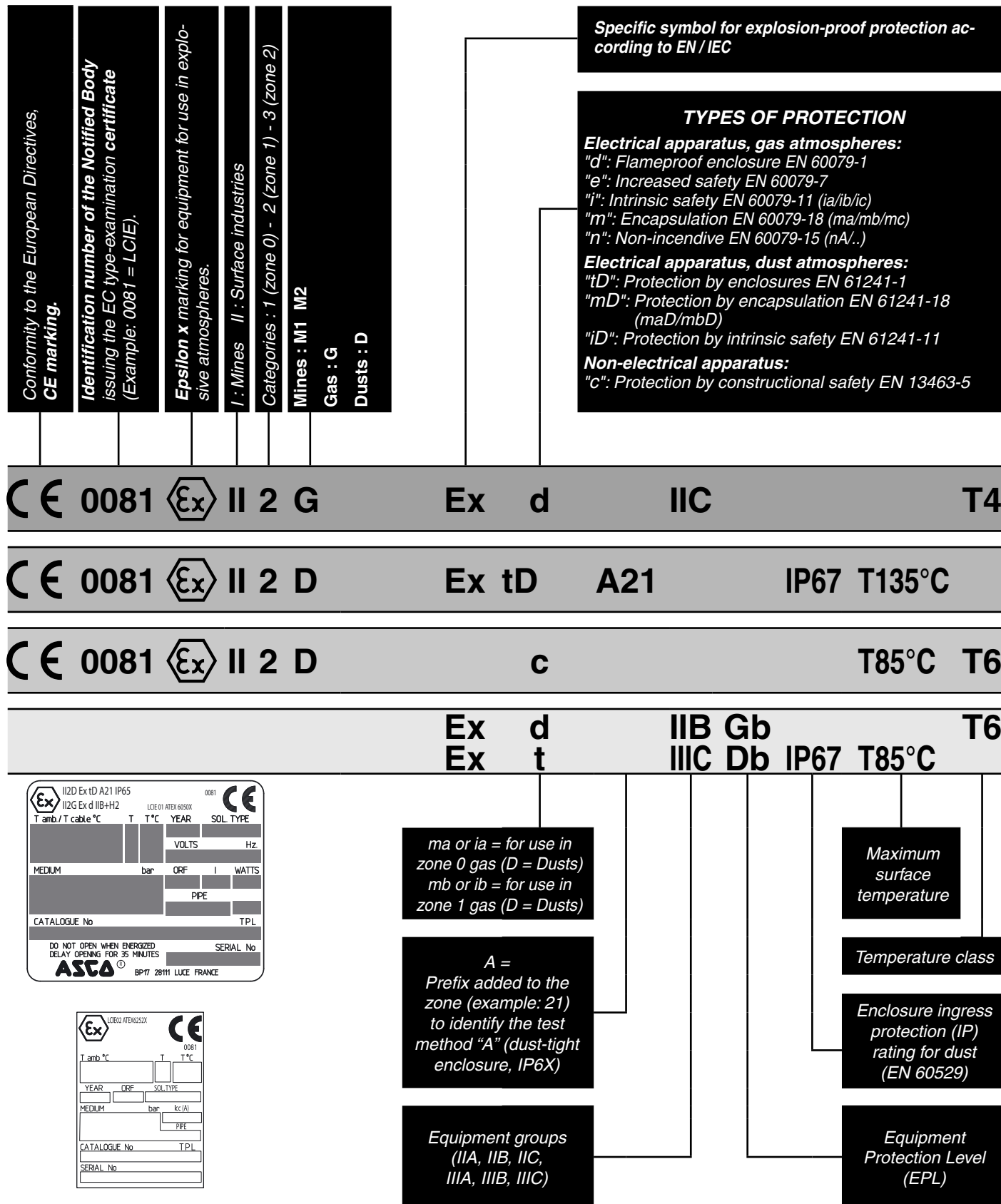


- Marking to ATEX 94/9/EC
- Additional marking of electrical equipment according to EN 50014
- Additional marking of non-electrical equipment according to EN 13463-5

### MARKING EXAMPLES





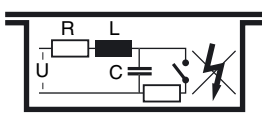

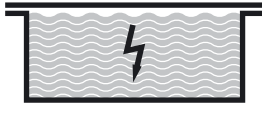
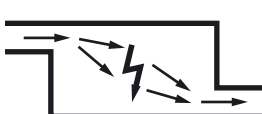
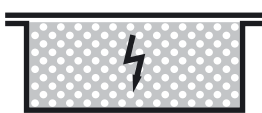
HOW CAN ATEX, EN-IEC 60079-0, EN 61241-0 OR EN 13463-1 APPROVED APPARATUS FOR USE IN EXPLOSIVE ATMOSPHERES BE IDENTIFIED?



- Marking according to EN 60079-1 (electrical apparatus / gas atmospheres)
- Marking according to EN 61241-1 (electrical apparatus / combustible dust)
- Marking according to EN 13463-5 (non-electrical apparatus)
- Marking according to EN-IEC 60079-0 (2007), including EN 61241-0 ; EN-IEC 60079-1/EN-IEC 61241-1

### WHAT IS A TYPE OF PROTECTION FOR ELECTRICAL APPARATUS FOR USE IN GAS ATMOSPHERES?

It is the comprehensive range of protective measures applied to an electrical apparatus to prevent possible ignition of the surrounding atmosphere.

Protection symbol		Zones			Description	Drawing
		0	1	2		
"d"			●	●	Type of protection in which the parts which can ignite an explosive atmosphere are placed in an enclosure which can withstand the pressure developed during an internal explosion of an explosive mixture and which prevents the transmission of the explosion to the explosive atmospheres surrounding the enclosure.	
"e"			●	●	Type of protection in which measures are applied so as to prevent with a higher degree of safety the possibility of excessive temperatures and of the occurrence of arcs or sparks in the interior and on the external parts of electrical apparatus, which does not produce them in normal service.	
"i"	"ia"	●	●	●	Type of protection when no spark or any thermal effect in the circuit, produced in the test conditions prescribed in the standard (which include normal operation and specific fault conditions), is capable of causing ignition.	
	"ib"		●	●		
"m"			●	●	Type of protection in which the parts which can ignite an explosive atmosphere are enclosed in a resin sufficiently resistant to the environmental influences in such a way that this explosive atmosphere cannot be ignited by either sparking or heating which may occur within the encapsulation.	
"n"				●	Method of protection for electrical equipment designed so that it will not ignite the surrounding explosive atmosphere in normal operation and under certain fault conditions specified in the standard. There are 5 categories of equipment: nA (non-sparking), nC (hermetically sealed), nR (restricted breathing), nL (limited energy) and nP (simplified pressurisation).	
"o"			●	●	Type of protection in which the electrical apparatus is immersed in oil.	
"p"			●	●	Type of protection in which the protective inert gas inside the enclosure is maintained at a higher pressure than that of the surrounding atmosphere.	
"q"			●	●	Type of protection in which the enclosure is filled with a material in a finely granulated state.	

Types of protection offered:



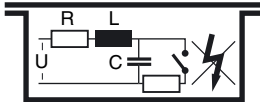
- a wide range of certified solenoid valves with "d", "m", "em", "n" or "i" type of protection;
- certified air operated valves, pressure-operated valves, cylinders and air service equipment with "c" type of protection.

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### TYPES OF PROTECTION FOR ELECTRICAL APPARATUS FOR USE IN THE PRESENCE OF COMBUSTIBLE DUST (EN 60241-0)

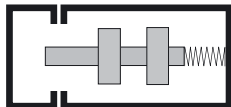
Applicable to electrical apparatus for use in areas where combustible dust may be present in quantities which could lead to a fire or explosion hazard.

EN 61241-1 = tD ; EN 61241-18 = mD ; EN 61241-11 = iD

Protection symbol		Zones			Description	Drawing
		0	1	2		
"tD"			●	●	<p>Electrical apparatus protected by enclosure and surface temperature limitation for use in areas where combustible dust may be present in quantities which could lead to a fire or explosion hazard.</p> <p>The ignition protection is based on the limitation of the maximum surface temperature of the enclosure and other surfaces which may come into contact with dust and on the restriction of dust ingress into the enclosure by the use of "dust-tight" or "dust-protected" enclosures.</p> <p>This standard is not applicable to electrical apparatus intended for use in underground parts of mines as well as those parts of surface installations of such mines endangered by firedamp and/or combustible dust; nor does it take account of any risk due to an emission of flammable or toxic gas from the dust.</p>	
"mD"	maD	●	●	●	<p>Electrical apparatus protected by encapsulation type of protection 'mD' and surface temperature limitation for use in areas where combustible dust may be present in quantities which could lead to a fire or explosion hazard.</p> <p>Type of protection in which the parts which can ignite an explosive atmosphere are enclosed in a resin sufficiently resistant to environmental influences in such a way that a dust cloud or layer cannot be ignited during installation or operation.</p>	
	mbD		●	●		
"iD"		●	●	●	<p>Intrinsically safe apparatus intended for use in potentially explosive dust cloud or dust layer environments and for associated apparatus that is intended for connection to intrinsically safe circuits which enter such environments.</p> <p>Applicable to electrical apparatus in which the electrical circuits themselves are incapable of causing an explosion in the surrounding combustible dust environment.</p>	

### TYPE OF PROTECTION FOR NON-ELECTRICAL APPARATUS

EN 13463-5 = c

"c"		●	●	●	<p>This standard establishes manufacturing requirements which have been proven safe, in order to avoid any inflammation sources such as friction or heating sparks.</p> <p>It applies to apparatus where movement and friction can occur (clutches, brakes, bearings, springs...).</p>	
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### CLASSIFICATION OF GASES INTO EXPLOSION GROUPS

**Group I** : Electrical equipment intended for use in the underground parts of mines, and to those parts of surface installations of such mines, likely to become endangered by firedamp and/or combustible dust.

**Group II** : Electrical equipment intended for use in other places likely to become endangered by explosive atmospheres (surface industries).

For the types of protection "d" and "i", group **II** is subdivided into **IIA**, **IIB**, **IIC**. Electrical apparatus certified for **IIB** may be used in applications requiring apparatus to be certified for group **IIA**. Electrical apparatus certified for **IIC** may be used in applications requiring apparatus to be certified for groups **IIA** and **IIB**.

For example the "d" and "i" types of protection are respectively subdivided according to the Maximum Experimental Safe Gap (MESG) and to the Minimum Igniting Current (MIC).

Electrical apparatus certified for **IIB** may be certified for use with a gas belonging to group **IIC**. In this case, the identification is supplemented with the chemical symbol or the name of the gas (example: Ex d IIB + H<sub>2</sub> according to EN 60079-0 and EN 60079.1).

The table below indicates the groups to which some gas mixtures belong:

Groups	Gas	Ignition temperature <sup>(1)</sup> (°C)	Temperature class					
			T1	T2	T3	T4	T5	T6
<b>I</b>	methane (firedamp)							
<b>II</b>	<b>A</b>	acetone	•					
		acetic acide	•					
		ammonia	•					
		ethane	•					
		methylene chloride	•					
		methane (CH <sub>4</sub> )	•					
		carbon monoxyde	•					
		propane	•					
		n-butane		•				
		n-butyl		•				
		n-hexane			•			
		acetaldehyde				•		
		ethyl ether				•		
		ethyl nitrite						•
	<b>B</b>	ethylene		•				
		ethyl oxyde		•				
		hydrogen sulfide			•			
	<b>C</b>	acetylene (C <sub>2</sub> H <sub>2</sub> )		•				
		carbon disulphide (CS <sub>2</sub> )						•
		hydrogen (H <sub>2</sub> )	•					

<sup>(1)</sup> Temperature of a hot surface able to ignite a gas mixture.

The ignition temperature of the gas mixture must be higher than the maximum surface temperature. In practice, a 10 to 20% safety margin is observed between the ignition temperature and the rated nameplate temperature.

The ignition temperature of a cloud of dust is generally between 300 and 700°C. At 150 to 350°C, the ignition temperature of a layer of dust is far below that of a dust cloud. A burning dust layer can initiate a dust explosion if brought in contact with a combustible dust cloud, so these values must be taken into account to limit the risk.

### TEMPERATURE CLASS

The temperature classification is based on the maximum surface temperature of equipment. That is the highest temperature any part of or the entire surface of an electrical device can reach under the most unfavourable operating conditions capable of igniting a surrounding explosive atmosphere.

**Group I** : Temperature ≤ 150°C or ≤ 450°C according to coal dust accumulation on equipment

**Group II** : Equipment must be classified and marked:

- preferably with the temperature class (T classification)
- defined by the surface temperature or,
- limited to the specified flammable gases or dusts for which it is approved, if necessary (and marked accordingly).

Temperature class	Maximum surface temperature (°C)	Ignition temperature <sup>(1)</sup> (°C)
<b>T1</b>	450	> 450
<b>T2</b>	300	> 300
<b>T3</b>	200	> 200
<b>T4</b>	135	> 135
<b>T5</b>	100	> 100
<b>T6</b>	85	> 85

### CLASSIFICATION OF DUSTS INTO EXPLOSION GROUPS (according to the fifth edition, IEC 60079-0, 2007)

**Group III** : Electrical equipment intended for use in places with an explosive dust atmosphere other than mines susceptible to firedamp.

Group **III** is subdivided into **IIIA** (combustible flyings), **IIIB** (non-conductive dust) and **IIIC** (conductive dust).

**Combustible dust:** Finely divided solid particles, 500 µm or less in nominal size, which may be suspended in air, may settle out of the atmosphere under their own weight, may burn or glow in air, and may form explosive mixtures with air at atmospheric pressure and normal temperatures.

**Non-conductive dust:** Combustible dust with electrical resistivity greater than 10<sup>3</sup> Ω.m

**Conductive dust:** Combustible dust with electrical resistivity equal to or less than 10<sup>3</sup> Ω.m

Combustible dust	Ignition temperature <sup>(1)</sup> (°C)	Self-ignition temperature of dust layers <sup>(1)</sup> (°C)
Starch	440	290
Aluminium	530	280
Cotton	560	350
Cereals	420	290
Magnesium	610	410
Soybean	500	245
Sulphur	280	280
Tabacco	450	300



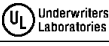



























- <sup>(1)</sup> The maximum surface temperature must be identified and suitable for the specified type of dust present (equipment marked for zone 21). In order to prevent the ignition of dusty atmospheres, the maximum surface temperature needs to be limited. It must not exceed:
- 2/3 of the auto-ignition temperature of the specified **cloud of dust**,
  - the auto-ignition temperature of a 5 mm **layer of dust** minus 75°C.



### WHO ISSUES THE CERTIFICATE OF CONFORMITY?

Some of the approved organisations for testing and certification according to ATEX are mentioned below.

The certificates of conformity according to ATEX issued by these organisations are **recognised** by all the Member States of the European Union. An IECEx certification based on the International Electrotechnical Commission's (IEC) international standards for equipment for use in explosive atmospheres can also be issued by some of the organisations mentioned below.

Country	ATEX N°	IECEx	Logo	Notified bodies	
Belgium	• 26			AIB	Vinçotte International S.A. - Bruxelles
Czech Republic	• 1026	•		FTZU	Fyzikální technický zkušební ústav (Physical Technical Testing Institute) - Radvanice
Denmark	• 539	•		UL/DEMKO	Danmarks Elektriske Materielkontrol - Herlev
Finland	• 537	•		VTT	VTT Industrial Systems (VTT Tuotteet ja Tuotanto) - VTT
France	• 80	•		INERIS	Institut National de l'Environnement Industriel et des Risques - Verneuil-en-Halatte
	• 81	•		LCIE	Laboratoire Central des Industries Electriques - Fontenay-aux-Roses
Germany	• 32	•		TÜV	Technischer Überwachungs-Verein Nord CERT - Hannover
	• 35	•		TÜV	TÜV Anlagentechnik Unternehmensgruppe TÜV Rheinland/Berlin-Brandenburg - Köln
	• 102	•		PTB	Physikalisch-Technische Bundesanstalt - Braunschweig
	• 123	•		TÜV	Technischer Überwachungs-Verein Product Service - München
	• 158			DMT	Deutsche Montan Technologie - Essen
		•		EXAM	Dekra EXAM
	• 637	•		IBExU	Institut für Sicherheitstechnik - Institut an der Technischen Universität - Bergakademie - Freiberg
	• 820	•		ZELM EX	Prüf- und Zertifizierungsstelle - Braunschweig
Hungary	•	•		BKI	Hungarian Approval Service for Ex-proof Electrical Equipment - Mikovuny
Italy	• 722	•		CESI	Centro Elettrotecnico Sperimentale Italiano - Milano
Luxembourg	• 499			SNCH	Société Nationale de Certification et d'Homologation - Sandweiler
Netherlands	• 344	•		KEMA	KEMA Quality B.V. - Arnhem
Norway	• 470	•		NEMKO	NEMKO AS - Oslo
	• 575	•		DNV	DET Norsk Veritas Certification - Hovik
Russia		•		MANIO CCVE	Certification Centre of explosion-proof and mine electrical equipment
Slovenia		•		SIQ	Slovenian Institute of Quality and Metrology - Ljubljana
Spain	• 163			LOM	Laboratorio Oficial Jose Maria de Madariaga - Madrid
Sweden	• 402	•		SP	Swedish National Testing and Research Institute LTD - Boras
Switzerland	• 1258			SEV	Swiss Electrotechnical Association - Fehraltorf
United Kingdom	• 359	•		ITS	Testing and Certification LTD - Leatherhead
	• 518	•		SIRA	Certification Service Sira Test & Certification Limited - Kent
	• 600			EECS	Electrical Equipment Certification Servicehealth and Safety Executive - Buxton
	• 891			TRL	Compliance Services LTD - Up Holland
	• 1180	•		BASEEFA 2001	British Approval Service for Electrical Equipment in Flammable Atmospheres - Buxton

(2008)

### What does this mean for the manufacturer?

Obtaining the certificate:

- **gives proof** of the conformity of equipment with the Certificate standards;
- **authorises** the manufacturer to issue a copy of the Certificate;
- **gives** the testing authorities delivering the certificate free access to the manufacturer's production units.

The marking of a certified product must specify:

- **the name** of the manufacturer or his registered trademark;
- **the description** of the manufacturer's product;
- **its identification** by means of the code (eg : Ex d IIC T4);
- **the name or logo** of the testing authority;
- **the reference to the type examination certificate** according to ATEX 94/9/EC and/or the IECEx number for an IEC certification.

### What are the obligations of the person installing the equipment?

- He must select electrical apparatus **certified** for use in explosive atmospheres under specific conditions.
- He must install them **according to** each zone defined by the user.

### What are the obligations of the user?

- He is **responsible** for using certified equipment in **hazardous areas**.
- He must **carry out** regular maintenance work and **ensure** the safety of the installation and staff.

### THE EUROPEAN STANDARDS

The old standards for electrical equipment (EN 50014 series) were established starting 1977. A second revised edition was published in 1993. In order to be able to use these standards, the European Commission established Directive 97/53/EC which allows the issuance of Certificates of Conformity **related to Directive 94/9/EC**.

The second editions of the standards are at the basis of the third editions. No fundamental technical modification is necessary to ensure conformity with the essential safety requirements laid down in the directive.

Other standards: EN 50281-1-1/2 and EN 50281-2-1 (CENELEC, dusts); EN 13463-1 to 8 (non-electrical apparatus, CEN)

In the ongoing standardisation process for electrical apparatus, IEC standards will progressively be adopted as CENELEC standards. These standards can be identified by their numbers (series 60000, e.g. EN 60079-10, classification of hazardous gaseous areas to ATEX).

### TABLE OF CORRELATION BETWEEN NATIONAL STANDARDS AND THE CENELEC STANDARD GENERAL REQUIREMENTS

Member countries	National standards	
	EN 50014	EN 60079-0
Austria	ÖVE EN 50014	ÖVE/ÖNORM EN 60079-0
Belgium	NBN-EN 50014	NBN-EN 60079-0
Bulgaria	BDS EN 50014	BDS EN 60079-0
Croatia	HRN EN 50014	HRN EN 60079-0
Cyprus	-	CYS EN 60079-0
Czech Republic	CSN EN 50014	CSN EN 60079-0
Denmark	DS/EN 50014	DS/EN 60079-0
Estonia	EVS-EN 50014	EVS-EN 60079-0
Finland	SFS-EN 50014	SFS-EN 60079-0
France	NF EN 50014	NF EN 60079-0
Germany	DIN EN 50014	DIN EN 60079-0
Greece	ELOT EN 50014	ELOT EN 60079-0
Hungary	MSZ EN 50014	MSZ EN 60079-0
Iceland	IST EN 50014	IST EN 60079-0
Ireland	I.S. EN 50014	I.S. EN 60079-0
Italy	CEI EN 50014	CEI EN 60079-0
Latvia	LVS EN 50014	LVS EN 60079-0
Lithuania	LST EN 50014	LST EN 60079-0
Luxembourg	EN 50014	EN 60079-0
Malta	MSA EN 50014	MSA EN 60079-0
Netherlands	NEN-EN 50 014	NEN-EN 60079-0
Norway	NEK EN 50 014	NEK EN 60079-0

Member countries	National standards	
	EN 50014	EN 60079-0
Poland	PN-EN 50014	PN-EN 60079-0
Portugal	EN 50014	EN 60079-0
Romania	SR EN 50014	SR EN 60079-0
Slovakia	STN EN 50014	STN EN 60079-0
Slovenia	SIST EN 50014	SIST EN 60079-0
Spain	UNE EN 50014	UNE EN 60079-0
Sweden	SS EN 50014	SS-EN 60079-0
Switzerland	SN EN 50014	SN EN 60079-0
United Kingdom	BS EN 50014	BS EN 60079-0
Affiliated countries	EN 50014	EN 60079-0
Albania	-	S SH EN 60079-0
Belarus	-	-
Bosnia & Herzegovina	-	-
Former Youg. Rep. of Macedonia	-	-
Israel	-	-
Libya	-	-
Montenegro	-	-
Serbia	-	-
Tunisia	-	-
Turkey	-	TS EN 60079-0
Ukraine	-	-

### TYPES OF PROTECTION

type	«d»	«e»	«i»	«m»	«n»	combustible dust	«c»
CENELEC/CEN standards	EN 60079-1	EN 60079-7	EN 50020	EN 60079-18	EN 50021 (EN 60079-15)	EN 61241-1	EN 13463-5
Member countries	National standards						
Austria	ÖVE/ÖNORM EN 60079-1	ÖVE/ÖNORM EN 60079-7	ÖVE EN 50020	ÖVE/ÖNORM EN 60079-18	ÖVE/ÖNORM EN 50021	ÖVE/ÖNORM EN 61241-1	ÖVE ÖNORM EN 13463-5
Belgium	NBN-EN 60079-1	NBN EN 60079-7	NBN EN 50020	NBN EN 60079-18	NBN EN 50021	NBN EN 61241-1	NBN-EN 13463-5
Bulgaria	BDS EN 60079-1	BDS EN 60079-7	BDS EN 50020	BDS EN 60079-18	BDS EN 50021	BDS EN 61241-1	BDS 13463-5
Croatia	HRN EN 60079-1	HRN EN 60079-7	HRN EN 50020	HRN EN 60079-18	HRN EN 50021	HRN EN 61241-1	HRN EN 13463-5
Cyprus	CYS EN 60079-1	-	-	CYS EN 60079-18	CYS EN 50021	-	-
Czech Republic	CSN EN 60079-1	CSN EN 60079-7	CSN EN 50020	CSN EN 60079-18	CSN EN 50021	CSN EN 61241-1	CSN EN 13463-5
Denmark	DS EN 60079-1	DS EN 60079-7	DS EN 50020	DS EN 60079-18	DS EN 50021	DS EN 61241-1	DS / EN 13463-5
Estonia	EVS EN 60079-1	EVS EN 60079-7	EVS EN 50020	EVS EN 60079-18	EVS EN 50021	EVS EN 61241-1	EVS-EN 13463-5
Finland	SFS-EN 60079-1	SFS-EN 60079-7	SFS EN 50020	SFS-EN 60079-18	SFS-EN 50021	SFS EN 61241-1	SFS-EN 13463-5
France	NF EN 60079-1	NF EN 60079-7	NF EN 50020	NF EN 60079-18	NF EN 50021	NF EN 61241-1	NF EN 13463-5
Germany	DIN EN 60079-1	DIN EN 60079-7	DIN EN 50020	DIN EN 60079-18	DIN EN 50021	DIN EN 61241-1	DIN EN 13463-5
Greece	EN 60079-1	EN 60079-7	NF EN 50020	EN 60079-18	ELOT EN 50021	ELOT EN 61241-1	ELOT EN 13463-5
Hungary	MSZ EN 60079-1	MSZ EN 60079-7	MSZ EN 50020	MSZ EN 60079-18	MSZ EN 50021	MSZ EN 61241-1	MSZ EN 13463-5
Iceland	IST EN 60079-1	IST EN 60079-7	IST EN 50020	IST EN 60079-18	IST EN 50021	IST EN 61241-1	IST EN 13463-5
Ireland	I.S. EN 60079-1	I.S. EN 60079-7	I.S./ EN 50020	I.S. EN 60079-18	I.S. EN 50021	I.S./ EN 61241-1	I.S. EN 13463-5
Italy	CEI EN 60079-1	CEI EN 60079-7	CEI EN 50020	CEI EN 60079-18	CEI EN 50021	CEI EN 61241-1	CEI EN 13463-5
Latvia	LVS EN 60079-1	LVS EN 60079-7	LVS EN 50020	LVS EN 60079-18	LVS EN 50021	LVS EN 61241-1	LVS EN 13463-5
Lithuania	LST EN 60079-1	LST EN 60079-7	LST EN 50020	LST EN 60079-18	LST EN 50021	LST EN 61241-1	LST EN 13463-5
Luxembourg	EN 60079-1	EN 60079-7	EN 50020	EN 60079-18	EN 50021	EN 61241-1	EN 13463-5
Malta	MSA EN 60079-1	MSA EN 60079-7	MSA EN 50020	MSA EN 60079-18	MSA EN 50021	MSA EN 61241-1	MSA EN 13463-5
Netherlands	NEN-EN 60079-1	NEN-EN 60079-7	NEN-EN 50020	NEN-EN 60079-18	NEN-EN 50021	NEN-EN 61241-1	NEN-EN 13463-5
Norway	NEK-EN 60079-1	NEK-EN 60079-7	NEK-EN 50020	NEK-EN 60079-18	NEK-EN 50021	NEK-EN 61241-1	NEK-EN 13463-5
Poland	PN-EN 60079-1	PN-EN 60079-7	PN-EN 50020	PN-EN 60079-18	PN-EN 50021	PN-EN 61241-1	PN EN 13463-5
Portugal	EN 60079-1	EN 60079-7	EN 50020	EN 60079-18	EN 50021	EN 61241-1	EN 13463-5
Romania	SR EN 60079-1	SR EN 60079-7	SR EN 50020	SR EN 60079-18	SR EN 50021	SR EN 61241-1	SR EN 13463-5
Slovakia	STN EN 60079-1	STN EN 60079-7	STN EN 60079-7	STN EN 60079-18	STN EN 50021	STN EN 61241-1	STN EN 13463-5
Slovenia	SIST EN 60079-1	SIST EN 60079-7	SIST EN 50020	SIST EN 60079-18	SIST EN 50021	SIST EN 61241-1	SIST EN 13463-5
Spain	UNE EN 60079-1	UNE EN 60079-7	UNE EN 50020	UNE EN 60079-18	UNE EN 50021	UNE EN 61241-1	UNE-EN 13463-5
Sweden	SS EN 60079-1	SS EN 60079-7	SS EN 50020	SS EN 60079-18	SS EN 50021	SS EN 61241-1	SS EN 13463-5
Switzerland	SN EN 60079-1	SN EN 60079-7	SN EN 50020	SN EN 60079-18	SN EN 50021	SN EN 61241-1	SN EN 13463-5
United Kingdom	BS EN 60079-1	BS EN 60079-7	BS EN 50020	BS EN 60079-18	BS EN 50021	BS EN 61241-1	BS EN 13463-5
Affiliated countries							
Bosnia & Herzegovina	-	-	-	-	BAS EN 50021	-	BAS EN 13463-5
Turkey	TS EN 60079-1	TS EN 60079-7	TS EN 50020	TS EN 60079-18	TS EN 50021	TS EN 61241-1	TS EN 13463-5

### INTERNATIONAL CLASSIFICATION OF ZONES

Standards		Hazardous areas		
IEC CENELEC		Zone 0 (gas, vapours) or 20 (dust) <b>permanent, frequent</b> or for a long period of time	Zone 1 (gas, vapours) or 21 (dust) <b>intermittent</b> in normal operation ( <b>likely</b> )	Zone 2 (gas, vapours) or 22 (dust) <b>occasional</b> , or for short periods (never in normal operation)
US	NEC 505	Zone 0	Zone 1	Zone 2
	NEC 500	Division 1		Division 2

### INTERNATIONAL TYPES OF PROTECTION

Zone	Type of protection	Applicable certification				
		UL	FM	CSA	IEC	CENELEC
0	Intrinsic safety "ia"	UL 2279, Pt.11	—	CSA-E79-11	IEC 60079-11	EN 50020 (EN 60079-11)
	Classe I, Div. 1	ANSI/UL 913	FM 3610	CSA-157	—	—
1	Encapsulation "m"	UL 2279, Pt.18	FM 3614	CSA-E79-18	IEC 60079-18	EN 60079-18 (EN 50028)
	Flameproof enclosure "d"	UL 2279, Pt.1	FM 3618	CSA-E79-1	IEC 60079-1	EN 60079-1 (EN 50018)
	Increased safety "e"	UL 2279, Pt.7	FM 3619	CSA-E79-7	IEC 60079-7	EN 60079-7 (EN 50019)
	Intrinsic safety "ib"	UL 2279, Pt.11	FM 3610	CSA-E79-11	IEC 60079-11	EN 50020 (EN 60079-11)
	Oil immersion "o"	UL 2279, Pt.6	FM 3621	CSA-E79-6	IEC 60079-6	EN 50015
	Powder filling "q"	UL 2279, Pt.5	FM 3622	CSA-E79-5	IEC 60079-5	EN 50017
	Pressurised apparatus "p"	UL 2279, Pt.2	FM 3620	CSA-E79-2	IEC 60079-2	EN 50016
2	Non-incendive "NI"	UL 2279, Pt.15	FM 3611	CSA-E79-15	IEC 60079-15	EN 50021 (EN 60079-15)
	Non-sparking device "nA"	UL 2279, Pt.15	—	CSA-E79-15	IEC 60079-15	EN 50021 (EN 60079-15)
	Restricted breathing "nR"	UL 2279, Pt.15	—	CSA-E79-15	IEC 60079-15	EN 50021 (EN 60079-15)
	Hermetically sealed "nC"	UL 2279, Pt.15	—	CSA-E79-15	IEC 60079-15	EN 50021 (EN 60079-15)

### TYPE EXAMINATION CERTIFICATES

available at "www.asconumatics.eu"

### SELECTION OF PRODUCTS



Certificates issued by the IECEx Certified Equipment Program are issued as "Electronic Certificates" and are live on the IECEx Website. This enables full public access for viewing and printing. Visit the IECEx "On-Line Certificate" System.

### SELECTION OF PRODUCTS AT "www.asconumatics.eu"