

REFERENCE GUIDE ON THE MARKING OF ELECTRICAL AND NON-ELECTRICAL EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES (EU/ATEX/IECEX)

Typical marking of electrical equipment for use in explosive GAS atmospheres (EU/ATEX/IECEX)

Marking according to Directive 2014/34/EU

Marking according to IEC/CENELEC standard 60079-0

CE 1304 Ex II 2G Ex db eb IIC T4 Gb

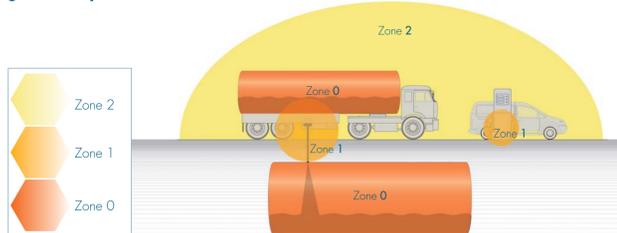
- CE marking and number of the "notified body" responsible for monitoring the quality system (not for equipment category 3)
- Ex Explosion protection symbol
- II Equipment group (equipment for use in hazardous areas, other than mines susceptible to firedamp)
- 2 Equipment category (category 2)
- G Explosive atmosphere (gas, vapour or mist)

- Ex Explosion protection marking
- db Type of protection (flameproof enclosure, level of protection "db")
- eb Type of protection (increased safety, level of protection "eb")
- IIC Equipment group (Electrical equipment group II, subgroup IIC (typical gas: hydrogen), intended for use in areas where an explosive gas atmosphere is to be expected, other than mines susceptible to firedamp)
- T4 Temperature class (max. surface temperature 135°C)
- Gb Equipment protection level (EPL Gb; equipment with high protection level)

Types of protection for electrical equipment in explosive gas atmospheres

Type of protection	Ex code	Zone	Symbol	Main application	Standard
General requirements					IEC 60079-0 EN 60079-0 UL 60079-0
Increased safety	eb ec	1 2		junction boxes, control stations for installing Ex-components (with a different type of protection), squirrel-cage motors, light fittings	IEC 60079-7 EN 60079-7 ISA 60079-7
Flameproof enclosures	da db dc	0 1 2		switchgears, control stations, indicating equipment, control systems, motors, transformers, heating equipment, light fittings	IEC 60079-1 EN 60079-1 ISA 60079-1
Pressurized enclosure	pxb pyb pzc	1 1 2		switchgear and control cabinets, analysers, large motors	IEC 60079-2 EN 60079-2 ISA 60079-2
Intrinsic safety	ia ib ic	0 1 2		instrumentation technology, fieldbus technology, sensors, actuators [Ex ib] = associated electrical apparatus - installation in the safe area	IEC 60079-11 EN 60079-11 ISA 60079-11
				intrinsically safe systems	IEC 60079-25 EN 60079-25
Liquid immersion	ob oc	1 2		transformers, starting resistors	IEC 60079-6 EN 60079-6 ISA 60079-6
Powder filling	qpb	1		sensors, display units, electronic ballasts, transmitters	IEC 60079-5 EN 60079-5 ISA 60079-5
Encapsulation	ma mb mc	0 1 2		switchgear with small capacity, control and signalling units, display units, sensors	IEC 60079-18 EN 60079-18 ISA 60079-18
Optical radiation	op is op sh op pr	0 0 1		op is = inherently safe optical radiation op pr = protected optical radiation op sh = optical radiation interlock	IEC 60079-28 EN 60079-28

Example of classification of explosive gas atmospheres into zones



REQUIRED CERTIFICATION OF ELECTRICAL EX-EQUIPMENT

Zone	IECEX Certification Scheme	ATEX Directive 2014/34/EU	Certificate
0 or 20	Ga or Da	1G or 1D	YES
1 or 21	Gb or Db	2G or 2D	YES
2 or 22	Gc or Dc	3G or 3D	Not required

Typical marking of electrical equipment for use in explosive DUST atmospheres (EU/ATEX/IECEX)

Marking according to Directive 2014/34/EU

Marking according to IEC/CENELEC standard 60079-0

CE 1304 Ex II 2D Ex tb IIIC T80°C Db

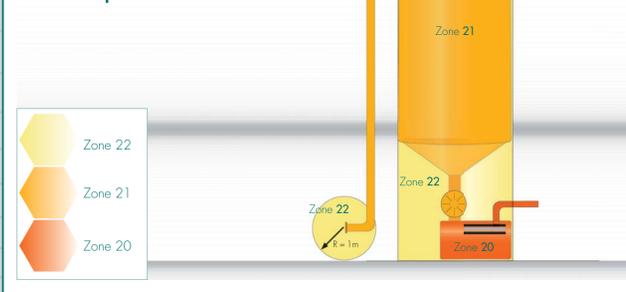
- CE marking and number of the "notified body" responsible for monitoring the quality system (not for equipment category 3)
- Ex Explosion protection symbol
- II Equipment group (equipment for use in hazardous areas, other than mines susceptible to firedamp)
- 2 Equipment category (Category 2)
- D Explosive atmosphere (dust)

- Ex Explosion protection marking
- tb Type of protection (protection by enclosure "tb")
- IIIC Equipment group (Electrical apparatus group III, subgroup IIIC (conductive dust), intended for use in areas where an explosive dust atmosphere is to be expected, other than mines susceptible to firedamp)
- T80°C Surface temperature (max. 80 °C)
- Db Equipment protection level (EPL Db; equipment with high protection level)

Types of protection for electrical equipment in explosive dust atmospheres

Type of protection	Ex code	Zone	Symbol	Main application	Standard
Protection by enclosure	ta tb tc	20 21 22		switchgear, control stations, junction boxes, control boxes, motors, light fittings	IEC 60079-31 EN 60079-31
				old identification: ID A21 = under procedure A for Zone 21 ID B21 = under procedure B for Zone 21	IEC 61241-1 EN 61241-1 ISA 61241-1
Pressurization	pxb pyb pzc	21 21 22		switchgear and control cabinets, motors	IEC 60079-2 EN 60079-2 ISA 60079-2
				old identification: pD21, pD22	IEC 61241-4 EN 61241-4 ISA 61241-2
Intrinsic safety	ia ib ic	20 21 22		instrumentation technology, fieldbus technology, sensors, actuators [Ex ib] = associated electrical apparatus - installation in the safe area	IEC 60079-11 EN 60079-11
				old identification: iaD = for use in Zone 20, 21, 22 ibD = for use in Zone 21, 22	IEC 61241-11 EN 61241-11 ISA 61241-11
Encapsulation	ma mb mc	20 21 22		switchgear with small capacity, control and signalling units, display units, sensors	IEC 60079-18 EN 60079-18 ISA 61241-18
				old identification: maD = for use in Zone 20, 21, 22 mbD = for use in Zone 21, 22	

Example of classification of explosive dust atmospheres into zones



Example of type label

1 Name and address of the manufacturer

2 CE marking and number of the "notified body" responsible for monitoring the quality system

3 Marking according to directive: Equipment group (II) and equipment category (2); type of explosive atmosphere G (gas, vapour or mist) - D (dust)

4 Marking according to standard: IEC/EN

5 Equipment name/type

6 Serial number including year of manufacture

7 Electrical parameters

8 Certificate number, may end with "X" or "U":

9 Other optional information (e.g. degree of protection)

10 Permissible ambient temperature (-20°C to +50°C); no marking required for temperatures from -20°C to 40°C (standard values for all equipment)

TEVEL Type: SB-52-Ex/II
Snr: 231/2018
U_i: 230V ± 10% 50-60Hz
FTZU 11 ATEX 0066
II 2G Ex eb mb Ib IIC T4 Gb
II 2D Ex mb Ib IIC T135°C Db
-20°C ≤ T_a ≤ +50°C IP66

Typical marking of non-electrical equipment

CE 1304 Ex II 2G Ex h T6

Types of protection for non-electrical equipment in explosive atmospheres

Type of protection	Ex code	Zone	Symbol	Main application	Standard
basic methods and requirements					ISO 80079-36 EN ISO 80079-36
constructional safety "c"	h	0, 20 1, 21 2, 22		couplings, pumps, gear drives, chain drives, belt drives old marking according to EN 13463-5: c	ISO 80079-37 EN ISO 80079-37
control of ignition sources "b"	h	0, 20 1, 21 2, 22		pumps, belt drives old marking according to EN 13463-6: b	ISO 80079-37 EN ISO 80079-37
liquid immersion "k"	h	0, 20 1, 21 2, 22		submerged pumps, gears old marking according to EN 13463-8: k	ISO 80079-37 EN ISO 80079-37
flameproof enclosures "d"	da db dc	0, 20 1, 21 2, 22		brakes, couplings old marking according to EN 13463-3: d	IEC 60079-1 EN 60079-1
protection by enclosure "t"	ta tb tc	0, 20 1, 21 2, 22		protection by enclosures	IEC 60079-31 EN 60079-31
pressurized enclosure "p"	pxb pyb pzc	1, 21 1, 21 2, 22		pumps	IEC 60079-2 EN 60079-2

Marking of assemblies according to directive 2014/34/EU

Example 1: Pump II 2G Ex h IIC T6

Example 2: Normal (not Ex) Electric Motor Fan II 2/3 G Ex h IIA T3

Assembly II 2G II B T4

Assembly II 2/3 - G - IIA T3

REQUIRED CERTIFICATION OF NON-ELECTRICAL EX-EQUIPMENT

Zone	IECEX Certification Scheme	ATEX Directive 2014/34/EU	Certificate
0 or 20	Ga or Da	1G or 1D	YES
1 or 21	Gb or Db	2G or 2D	Not required*
2 or 22	Gc or Dc	3G or 3D	Not required

*The manufacturer is obliged to deposit the documentation with the notified body

Equipment category and Equipment protection level (EPL)

According to EU directive 2014/34/EU (ATEX)	According to IEC and CENELEC	EPL	Level of protection
Mines susceptible to firedamp			
I M1	Ma		"Very high" (Continuation of operation is possible in the event of firedamp)
I M2	Mb		"High" (Power to the device must be switched off in the event of firedamp)
Explosive gas atmosphere			
II 1G	Ga	Zone 0, 1, 2	"Very high" (Which is not a source of ignition in normal operation, during expected malfunctions or during rare malfunctions)
II 2G	Gb	Zone 1, 2	"High" (Which is not a source of ignition in normal operation or during expected malfunctions)
II 3G	Gc	Zone 2	"Enhanced" (Which is not a source of ignition in normal operation and which may have some additional protection to ensure that it remains inactive as an ignition source in the case of regular expected occurrences)
Explosive dust atmosphere			
II 1D	Da	Zone 20, 21, 22	during rare malfunctions
II 2D	Db	Zone 21, 22	during expected malfunctions
II 3D	Dc	Zone 22	in normal operation

Groups	T class
IEC/CENELEC	
Group I Mines susceptible to firedamp methane	
Group II Explosive gas atmosphere Subdivisions Typical gas	
IIA propane	
IIB ethylene	
IIC hydrogen acetylene	
Group III Explosive dust atmosphere Subdivisions Typical dust	
IIIA combustible flyings	
IIIB non-conductive dust	
IIIC conductive dust	
Max surface temperature	T class
450°C	T1
300°C	T2
200°C	T3
135°C	T4
100°C	T5
85°C	T6

IP (Ingress Protection) Ratings Guide

Solids	Water
1 Protected against a solid object greater than 50 mm such as a hand.	1 Protected against vertically falling drops of water. Limited ingress permitted.
2 Protected against a solid object greater than 12.5 mm such as a finger.	2 Protected against vertically falling drops of water with enclosure tilted up to 15 degrees from the vertical. Limited ingress permitted.
3 Protected against a solid object greater than 2.5 mm, such as a screwdriver.	3 Protected against sprays of water up to 60 degrees from the vertical. Limited ingress permitted for 3 minutes.
4 Protected against a solid object greater than 1 mm such as a wire.	4 Protected against water splashed from all directions. Limited ingress permitted.
5 Dust Protected. Limited ingress of dust permitted. Will not interfere with operation of the equipment. Two to eight hours.	5 Protected against jets of water. Limited ingress permitted.
6 Dust tight. No ingress of dust. Two to eight hours.	6 Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities.
	7 Protection against the effects of immersion in water between 15 cm and 1 m for 30 minutes.
	8 Protection against the effects of immersion in water under pressure for long periods.

Rating Example: IP65 INGRESS PROTECTION

TEVEL 30 YEARS IN INDUSTRY

TEVEL, d. o. o.
Borovniško naselje 7, 1412 Kisovec SLOVENIA - EUROPE

Phone +386 3 5672050
Fax +386 3 5671119
Email info@tevel.si
www.tevel.si

OUR QUALITY - YOUR SAFETY