CE 0035
Code Number of the Notified Body
Here: TÜV Rheinland

Certification of equipment/Certification of persons according to ATEX/IECEx

ELECTRICAL EQUIPMENT

ATEX	Ex II (1) 2 G	Ex	db [ia Ga]	IIC	T4	Gb
IECEx		Ex	db [ia Ga]	IIC	T4	Gb
IECEx		Ex	tb	IIIC	T90°C	Db
NEC 505	Class I, Zone 1	AEx	db [ia Ga]	IIC	T4	Gb
NEC 506	Zone 21	AEx	tb	IIIC	T90°C	Db
NEC 500	Class I, Division 1			Group C,D	T4	

NON-ELECTRICAL EQUIPMENT

Ex II 2 G	Ex	h	IIC	T4	Gb
II 2 D	Ex	h	IIIB	T120°C	Db
	Ex	h	IIIB	T120°C	Db

ATEX: Explosion protection for Europe
IECEx: International explosion protection
NEC: Explosion protection for USA

EXAMPLES FOR MARKING ACCORDING TO ATEX

I M2	For mining, intended to be de-energized in the presence of an explosive atmosphere
II 1 G resp. II 1 D	For non-mining, installed in zone 0 resp. zone 20
II 1/2 G resp. II 1/2 D	For non-mining, installed in zone 1 resp. zone 21, zone 0 resp. 20 inside of the equipment
II 2/2 G resp. II 2/2 D	For non-mining, installed in zone 1 resp. zone 21, zone 1 resp. 21 inside of the equipment
II -/2 G resp. II -/2 D	For non-mining, installed in zone 1 resp. zone 21, no explosive atmosphere inside of the equipment
II 2/- G resp. II 2/- D	For non-mining, installed outside explosive hazardous area, zone 1 resp. 21 inside of the equipment
II (2) 3 G resp. II (2) 3 D	For non-mining, installed in zone 2 resp. zone 22, associated apparatus located in zone 1 resp. zone 21
II (2)	For non-mining, installed outside explosive hazardous area, associated apparatus located in zone 1 resp. zone 21

TYPES OF PROTECTION FOR ELECTRICAL EQUIPMENT

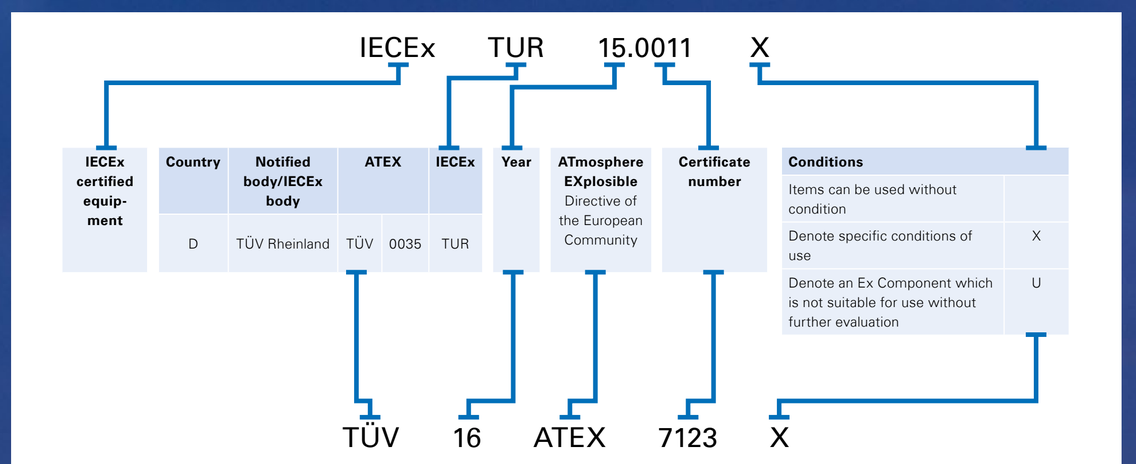
Type of protection	Symbol	Zone		Diagram	Protection principle	Standard
General requirements						EN IEC 60079-0 IEC 60079-0
Flameproof enclosures	da db dc	0 1 2			Parts capable of igniting an explosive atmosphere are placed inside an enclosure which withstands the pressure and which prevents the transmissi-on of the explosion to the explosive atmosphere surrounding the enclosure.	EN 60079-1 IEC 60079-1
Pressurized enclosure	pxb pyb pzc	1 1 2	21 21 22		Parts capable of igniting an explosive atmosphere are placed inside an enclosure where overpressure resp. purging prevents the parts having contact with the explosive atmosphere resp. where the concentration is decreased in such a way no ignition can occur.	EN 60079-2 IEC 60079-2
Powder filling	q	1			Parts capable of igniting an explosive atmosphere are fixed in position and completely surrounded by filling material to prevent the ignition of explosive atmosphere.	EN 60079-5 IEC 60079-5
Liquid immersion	ob oc	1 2			Parts capable of igniting an explosive atmosphere are immersed by protection liquid to prevent the ignition of the explosive atmosphere above the protection liquid.	EN 60079-6 IEC 60079-6
Increased safety	eb ec	1 2			Additional measures are applied so as to give increased security against the possibility of excessive temperatures and against the occurrence of arcs and sparks.	EN IEC 60079-7 IEC 60079-7
Intrinsic safety	ia ib ic	0 1 2	20 21 22		Restriction of the electrical energy of equipment and of interconnecting wires exposed to the explosive atmosphere to a level below that which can cause an ignition by either sparks or heating effects.	EN 60079-11 IEC 60079-11
Intrinsically safe systems					Assembly of interconnected items of electrical apparatus, described in a descriptive system document, in which the circuits or parts of circuits, intended to be used in an explosive atmosphere, are intrinsically safe circuits.	EN 60079-25 IEC 60079-25
Type of protection „n“	nC nR	2 2			The electrical equipment is in normal operation and in certain specified regular expected occurrences not capable of igniting explosive atmosphere.	EN IEC 60079-15 IEC 60079-15
Encapsulation	ma mb mc	0 1 2	20 21 22		Parts capable of igniting an explosive atmosphere are fully enclosed in a compound or other non-metallic enclosure with adhesion in such a way as to avoid ignition of a dust layer or explosive atmosphere under operating or installation conditions.	EN 60079-18 IEC 60079-18
Optical radiation	op is op pr op sh	0,1,2 1,2 0,1,2	20,21,22 21,22 20,21,22		op is: inherently safe optical radiation. op pr: the radiation is protected in such a way as there is no escape of radiation and no ignition can occur. op sh: optical radiation is automatically switched off to prevent ignition of external explosive atmosphere.	EN 60079-28 IEC 60079-28
Protection by enclosure	ta tb tc		20 21 22		Electrical equipment is placed inside an enclosure providing ingress protection against particles and/or fluids. Additional means to limit surface temperature are applied as well.	EN 60079-31 IEC 60079-31

TYPES OF PROTECTION FOR NON-ELECTRICAL EQUIPMENT

Type of protection	Symbol	Zone		Diagram	Protection principle	Standard
Basic methods and requirements	h				New: Marking with Ex, introducing of designation type of protection h, gas or dust group and EPL	EN ISO 80079-36 IEC 80079-36
Constructional safety	h	0,1,2 0,1,2 0,1,2	20, 21, 22 20, 21, 22 20, 21, 22		Constructional safety „c“: Constructional measures are applied as to protect against the ignition of an explosive atmosphere from hot surfaces, sparks and adiabatic compression generated by moving parts.	EN ISO 80079-37 IEC 80079-37
Control of ignition sources	h	0,1,2 0,1,2 0,1,2	20, 21, 22 20, 21, 22 20, 21, 22		Contorl of ignition sources „b“: Temperatures, pressures, rotational speeds, vibrations etcetera are monitored to prevent the ignition source from becoming effective and to prevent the ignition of the explosive atmosphere.	EN ISO 80079-37 IEC 80079-37
Liquid immer-sion	h	0,1,2 0,1,2 0,1,2	20, 21, 22 20, 21, 22 20, 21, 22		Liquid immersion „k“: Parts capable of igniting an explosive atmosphere are totally or partly immersed by a protective liquid or are continuously coated by a protection liquid to prevent the ignition of the explosive atmosphere above the protection liquid.	EN ISO 80079-37 IEC 80079-37
Flameproof enclosures	db dc	1 2			Parts capable of igniting an explosive atmosphere are placed inside an enclo-sure which withstands the pressure and which prevents the transmission of the explosion to the explosive atmosphere surrounding the enclosure.	EN 60079-1 IEC 60079-1
Pressurized enclosure	pxb pyb pzc	1 1 2	21 21 22		Parts capable of igniting an explosive atmosphere are placed inside an enclo-sure where overpressure resp. purging prevents the parts having contact with the explosive atmosphere resp. where the concentration is decreased in such a way no ignition can occur.	EN 60079-2 IEC 60079-2
Protection by enclosure	ta tb tc		20 21 22		Electrical equipment is placed inside an enclosure providing ingress protecti-on against particles and/or fluids. Additional means to limit surface tempera-ture are applied as well.	EN 60079-31 IEC 60079-31

IECEx SCHEME – CERTIFIED PERSON UNITS OF COMPETENCY

Unit Ex 000	Basic knowledge and awareness to enter a site that includes a classified harzardous area
Unit Ex 001	Basic philosophy of protection in explosive atmospheres
Unit Ex 002	Area classification of harzardous areas
Unit Ex 003	Installation of explosion-protected equipment and wiring systems
Unit Ex 004	Maintenance of equipment in explosive atmospheres
Unit Ex 005	Carry out overhaul and repair of explosion-protected equipment
Unit Ex 006	Testing of installations in hazardous areas
Unit Ex 007	Conduct visual and close inspection of installations in hazardous areas
Unit Ex 008	Conduct detailed inspection of installations in hazardous areas
Unit Ex 009	Design electrical installations in or associated with hazardous areas
Unit Ex 010	Audit inspection on installations in hazardous areas



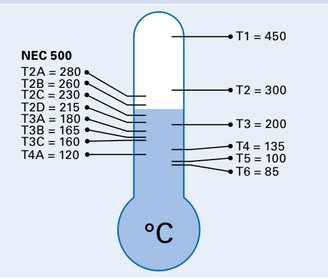
ZONES AND CATEGORIES

Flammable substances	Temporary behavior of flammable substances in potentially explosive areas	Categorization of the potentially explosive areas	Sufficient safety	Required marking of the used device in accordance with		
				ATEX 2014/34/EU		IEC/CENELEC
				Device group	Category	Equipment protection level (EPL)
Gas Fog Liquid	Continuous, long periods, frequent	Zone 0	During rare malfunctions	II	1G, (1)G	Ga
	Occasional	Zone 1	During expected malfunctions	II	2G, (2)G	Gb
	Normally not, only for a short period	Zone 2	In normal operation	II	3G, (3)G	Gc
Dust	Continuous, long periods, frequent	Zone 20	During rare malfunctions	II	1D, (1)D	Da
	Occasional	Zone 21	During expected malfunctions	II	2D, (2)D	Db
	Normally not, only for a short period	Zone 22	In normal operation	II	3D, (3)D	Dc
Methane, Coal dust	Constantly	Coal mining	During rare malfunctions	I	M1	Ma
Methane, Coal dust	Frequent	Coal mining	Until de-energizing of the equipment	I	M2	Mb

TEMPERATURE CLASSES AND MAX. SURFACE TEMPERATURE

Ignition temperature of the gas	
Ammonia	630°C
Methane	595°C
Hydrogen	560°C
Propane	470°C
Ethylene	425°C
Butane	365°C
Acetylene	305°C
Cyclohexane	259°C
Diethyl ether	170°C
Carbon disulfide	95°C

Group II (Gas)



Group I	Temperature	Conditions
Mines susceptible to firedamp (coal mining)	150°C	With deposits of coal dust on the operating equipment
	450°C	Without deposits of coal dust on the operating equipment

Group II (Dust)

Specification of maximum surface temperature, e.g. T120°C

EXPLOSION GROUPS

IEC/CENELEC/NEC 505/NEC 506			NEC 500
Group I	Mines susceptible to firedamp		
Methane			
Group II	Explosive gas atmosphere		Class I
Subdivisions	Typical gas		Subdivisions
IIA	Propane	Propane	Class I, Group D
IIB	Ethylene	Ethylene	Class I, Group C
IIC	Hydrogen Acetylene	Hydrogen	Class I, Group B
		Acetylene	Class I, Group A
Group III	Explosive dust atmosphere		Class II, Class III
Subdivisions	Typical dust		Subdivisions
IIIA	Combustible flyings	Fibres and flyings	Class III
IIIB	Non-conductive dust	Non-carbonaceous dust	Class II, Group G
IIIC	Conductive dust	Carbonaceous dust	Class II, Group F
		Combustible metal dust	Class II, Group E

IP CODE

Protection against foreign bodies/dust	
No protection	0
Foreign bodies ≥ 50 mm	1
Foreign bodies ≥ 12,5 mm	2
Foreign bodies ≥ 2,5 mm	3
Foreign bodies ≥ 1,0 mm	4
Dust protected	5
Dust tight	6

IP X X

Protection against water	
0	No protection
1	Vertical dripping water
2	Angled dripping water (15°)
3	Spraying water
4	Splashing water
5	Water jets
6	Powerful water jets
7	Immersion up to 1 m
8	Immersion beyond 1 m

TÜV Rheinland Industrie Service GmbH
Center of Competence ATEX / IECEx
Alfredstr. 81 · 45130 Essen · Germany
Tel. +49 201 63496-400
bea-salessupport@de.tuv.com

www.tuv.com

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