

MARKING OF ELECTRICAL EQUIPMENT FOR DUST AND GAS EXPLOSIVE-ENDANGERED AREAS

EX POSTER



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II 2D

Ex tb IIIC T80°C Db

Production-monitoring authority			Conditions in the explosive endangered areas				per EC directive 2014/34/EU				
Notified body	Country	Code No.	Flammable material	Temporary behaviour of the flammable material in Ex zones	Classification of the explosive endangered areas			Equipment group	Equipment category		
TÜV NORD	Germany	0044			IEC/CENELEC	NEC 505	NEC 500			Equipment group	Equipment category
PTB	Germany	0102	Dusts	Are continuously present, for long periods or frequently	Zone 20	Zone 20	Class II/III Division 1	II	1D		
DEKRA	Germany	0158		Are likely to occur	Zone 21	Zone 21	Class II/III Division 2			II	2D or 1D
BAM	Germany	0589		Are unlikely to occur by whirled dust, if they do, though only rarely or only for a short time	Zone 22	Zone 22					
IBEXU	Germany	0637									
INERIS	France	0080									
LCIE	France	0081									
DEKRA	Netherlands	0344									
RISE	Sweden	0402									
LOM	Spain	0163									
BASEEFA	Great-Britain	0600									
SCS	Great-Britain	0518									
OBAC	Poland	1441									

Equipment groups to IIEC/CENELEC/NEC 506		to NEC 500	
Group III		Class II/III	
Dust explosive atmosphere	1D	Dust explosive atmosphere	
Sub groups		Sub groups	
IIIA	flammable fluffs	Class III	fibers/fluffs
IIIB	non-conductive dust	Class II Group G	non-conductive dust
IIIC	conductive dust	Class II Group F	carbonaceous dust
		Class II Group E	metal dust

Equipment group and equipment protection level (EPL)			
To Atex 2014/34/EU		To IEC and CENELEC	
Group	Equipment category	EPL	Sufficient security
Mines susceptible to firedamp			
I	M1	Ma	during rare malfunctions
I	M2	Mb	until de-energizing of the equipment
Dust explosive atmosphere			
II	1D	Da	during rare malfunctions
II	2D	Db	during expected malfunctions
II	3D	Dc	in normal operation

Protection methods		Equipment protection level (EPL)				
Protection method	Symbol	Marking	Protection concept	Ex area Zone Class, Division	Global IEC EU CENELEC US FM/UL CA CSA	Application
General Requirements		Ex Ex AEx - Ex	-	20 / 21 / 22 20 / 21 / 22 20 / 21 / 22 CL II/III, Div. 1/2 20 / 21 / 22	Global IEC 60079-0 EU EN IEC 60079-0 US UL 60079-0 US FM 3600 CA CSA C22.2 No. 60079-0	All applications
Protection by enclosure	☒	Ex t _g /t _b /t _c Ex t _g /t _b /t _c AEx t _g /t _b /t _c Ex t _g /t _b /t _c	Ex atmosphere is kept apart from ignition source and temperature limitation	20 / 21 / 22 20 / 21 / 22 20 / 21 / 22	Global IEC 60079-31 EU EN 60079-31 US UL 60079-31 CA CSA C22.2 No. 60079-31	Switching, command and signalling devices, lights, junction and terminal boxes, enclosures
Purged	☒	Ex p _{xb} /p _{yb} /p _{zc} Ex p _{xb} /p _{yb} /p _{zc} [PX] [PY] [PZ] AEx p _{xb} /p _{yb} /p _{zc} Ex p _{xb} /p _{yb} /p _{zc}	Ex atmosphere is kept apart from ignition source	21 / 22 21 / 22 CL II, Div. 1/2 21 / 22	Global IEC 60079-2 EU EN 60079-2 US FM 3620 US UL 60079-2 CA CSA C22.2 No. 60079-2	Switchgear and control cabinets, motors, measuring and analysis devices, calculators
Intrinsic Safety	☒	Ex i _a /i _b /i _c Ex i _a /i _b /i _c [I.S.] AEx i _a /i _b /i _c AEx i _a D/i _b D Ex i _a D/i _b D	Energy limitation of sparks and temperatures	20 / 21 / 22 20 / 21 / 22 CL II/III, Div. 1 CL II/III, Div. 1 20 / 21 / 22 20 / 21 / 22	Global IEC 60079-11 EU EN 60079-11 US FM 3610 US UL 913 US UL 60079-11 CA CSA C22.2 No. 60079-11	measuring, control technology and engineering, sensors, actuators, instrumentation
Encapsulation	☒	Ex m ₃ /m _b /m _c Ex m ₃ /m _b /m _c AEx m ₃ /m _b /m _c Ex m ₃ /m _b /m _c	Ex atmosphere is kept apart from ignition source	20 / 21 / 22 20 / 21 / 22 20 / 21 / 22 20 / 21 / 22	Global IEC 60079-18 EU EN 60079-18 US UL 60079-18 CA CSA C22.2 No. 60079-18	Coils of relays and motors, electronics, magnetic valves, connecting systems
Non-incendive		[NI] [NI]	Avoidance of sparks and high temperatures	CL II, Div. 2 CL II, Div. 2	US FM 3611 CA CSA C22.2 No. 213	
Dust ignition-proof		[DIP] [DIP]	Transmission of an explosion to the outside is excluded	CL II, Div. 1 CL II, Div. 1	US FM 3616 CA CSA C22.2 No. 25	
		[DIP] [DIP]		CL III, Div. 1/2 CL III, Div. 1/2	US FM 3611 CA CSA C22.2 No. 213	

Legend	
Global	worldwide
EU	Europe
US	USA
CA	Canada

Marking of electrical equipment
Gas-explosive endangered areas



II 2G Ex db eb IIC T6 Gb

BVS 16 ATEX E113 X

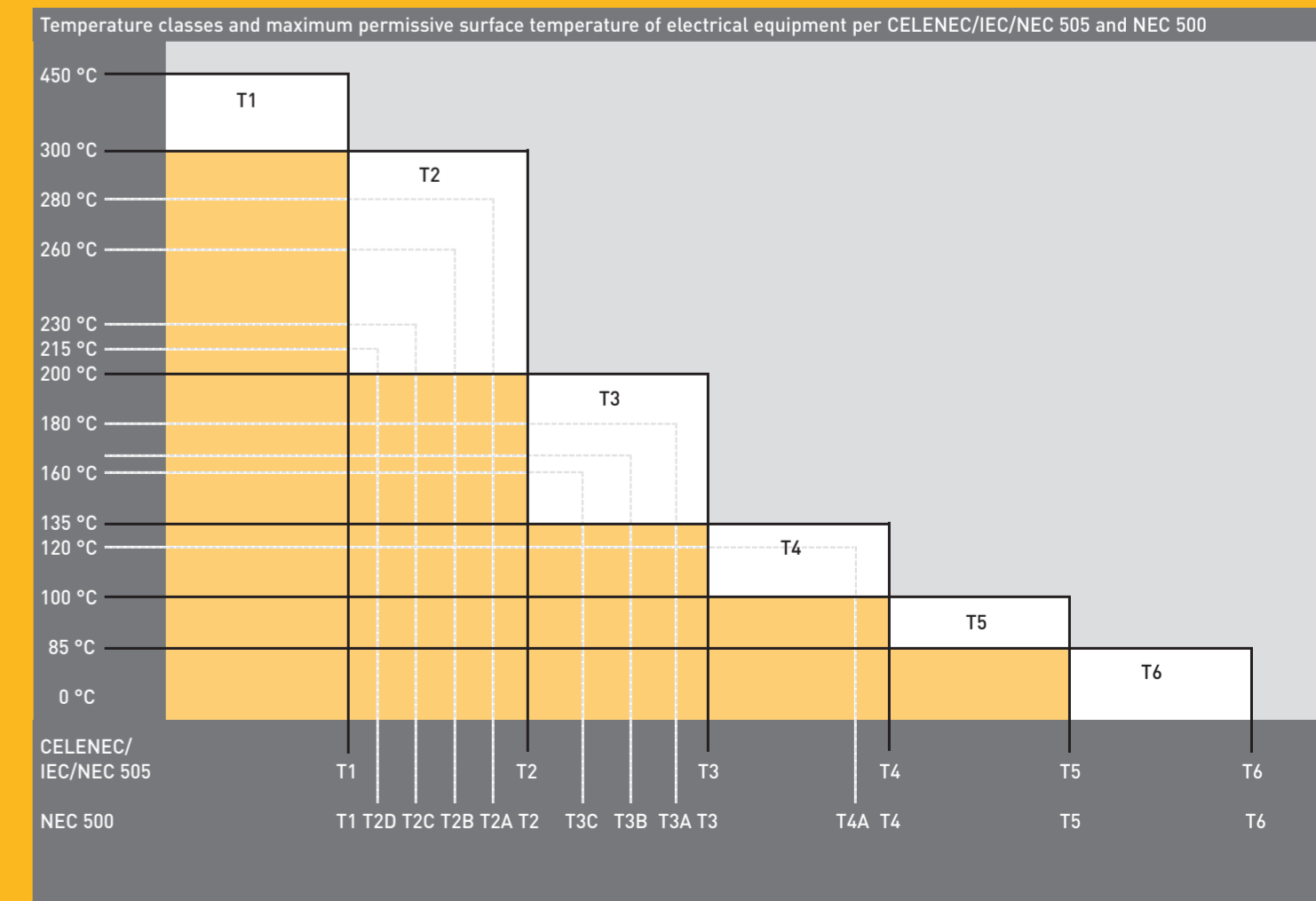
Production-monitoring authority			Conditions in the explosive endangered areas				per EC directive 2014/34/EU				
Notified body	Country	Code No.	Flammable material	Temporary behaviour of the flammable material in Ex zones	Classification of the explosive endangered areas			Equipment group	Equipment category		
TÜV NORD	Germany	0044			IEC/CENELEC	NEC 505	NEC 500			Equipment group	Equipment category
PTB	Germany	0102	Gases, vapours	Are present permanently, long time or often	Zone 0	Class I Zone 0	Class I Division 1	II	1G		
DEKRA	Germany	0158		Are likely to occur	Zone 1	Class I Zone 1	Class I Division 2			II	2G or 1G
BAM	Germany	0589		Are unlikely to occur, if occur, though only rarely or for a short time	Zone 2	Class I Zone 2					
IBEXU	Germany	0637									
INERIS	France	0080									
LCIE	France	0081									
DEKRA	Netherlands	0344									
RISE	Sweden	0402									
LOM	Spain	0163									
BASEEFA	Great-Britain	0600									
SCS	Great-Britain	0518									
OBAC	Poland	1441									

Equipment groups to IIEC/CENELEC/NEC 506		to NEC 500	
Group I		Group II	Class I
Mines susceptible to firedamp	Gas explosive atmosphere	Gas explosive atmosphere	
	Sub groups	Sub groups	
Methane	IIA Propane IIB Ethylene IIC Hydrogene Acetylene	Group D Ethylene Group C Hydrogene Group B Hydrogene Group A Acetylene	Propane Ethylene Hydrogene Acetylene

Equipment group and equipment protection level (EPL)			
To Atex 2014/34/EU		to IEC and CENELEC	
Group	Equipment category	EPL	Sufficient security
Mines susceptible to firedamp			
I	M1	Ma	during rare malfunctions
I	M2	Mb	until de-energizing of the equipment
Gas explosive atmosphere			
II	1G	Ga	during rare malfunctions
II	2G	Gb	during expected malfunctions
II	3G	Gc	in normal operation

Protection methods		Equipment protection level (EPL)				
Protection method	Symbol	Marking	Protection concept	Zone	Global IEC CENELEC EU CENELEC US FM/UL CA CSA	Application
General requirements		Ex Ex AEx - Ex	-	0 / 1 / 2 0 / 1 / 2 CL I, Zone 0/1/2 CL II/III, Div. 1/2 0 / 1 / 2	Global EN 60079-0 EU EN IEC 60079-0 US UL 60079-0 US FM 3600 CA CSA C22.2 No. 60079-0	All applications
Increased safety	☒	Ex eb/ec Ex eb/ec AEx eb/ec Ex eb/ec	Avoidance of sparks and temperatures	1 / 2 1 / 2 CL I, Zone 1/2 1 / 2	Global IEC 60079-7 EU EN IEC 60079-7 US UL 60079-7 CA CSA C22.2 No. 60079-7	Junction and terminal boxes, enclosures, motors, lights, terminals
Flameproof enclosure	☒	Ex d _g /d _b /d _c Ex d _g /d _b /d _c AEx d _g /d _b /d _c Ex d _g /d _b /d _c	Transmission of an explosion to the outside is excluded	0 / 1 / 2 0 / 1 / 2 CL I Zone 0/1/2 0 / 1 / 2	Global IEC 60079-1 EU EN 60079-1 US UL 60079-1 CA CSA C22.2 No. 60079-1	Switchgear, control units, motors command and signalling devices, power electronics
Intrinsic Safety	☒	Ex i _a /i _b /i _c Ex i _a /i _b /i _c [I.S.] AEx i _a /i _b /i _c AEx i _a /i _b /i _c	Energy limitation of sparks and temperatures	0 / 1 / 2 0 / 1 / 2 CL I, Div. 1 CL I, Div. 1 CL I, Zone 0/1/2 0 / 1 / 2	Global IEC 60079-11 EU EN 60079-11 US FM 3610 US UL 913 US UL 60079-11 CA CSA C22.2 No. 60079-11	Measuring, control technology and engineering, sensors, actuators, instrumentation
Pressurized	☒	Ex p _{xb} /p _{yb} /p _{zc} Ex p _{xb} /p _{yb} /p _{zc} Type X/Y/Z AEx p _{xb} /p _{yb} /p _{zc} Ex p _{xb} /p _{yb} /p _{zc}	Ex atmosphere is kept apart from ignition source	1 / 2 1 / 2 CL I, Zone 1/2 CL I, Zone 1/2 1 / 2	Global IEC 60079-2 EU EN 60079-2 US FM 3620 US UL 60079-2 CA CSA C22.2 No. 60079-2	Switchgear and control, cabinets, motors, measuring and analysis devices, calculators
Encapsulation	☒	Ex m ₃ /m _b /m _c Ex m ₃ /m _b /m _c AEx m ₃ /m _b /m _c Ex m ₃ /m _b /m _c	Ex atmosphere is kept apart from ignition source	0 / 1 / 2 0 / 1 / 2 CL I, Zone 0/1/2 0 / 1 / 2	Global IEC 60079-18 EU EN 60079-18 US UL 60079-18 CA CSA C22.2 No. 60079-18	Coils of relays and motors, electronics, magnetic valves, connecting systems
Oil immersion	☒	Ex o _b /o _c Ex o _b /o _c AEx o _b /o _c Ex o _b /o _c	Ex atmosphere is kept apart from ignition source	1 / 2 1 / 2 CL I, Zone 1/2 1 / 2	Global IEC 60079-6 EU EN 60079-6 US UL 60079-6 CA CSA C22.2 No. 60079-6	Transformers, relays, start-up control units, switchgear
Sand encapsulation	☒	Ex q _b Ex q AEx q Ex q	Transmission of an explosion to the outside is excluded	1 / 2 1 / 2 CL I, Zone 1/2 1 / 2	Global IEC 60079-5 EU EN 60079-5 US UL 60079-5 CA CSA C22.2 No. 60079-5	Transformers, relays, capacitors
Protection method «nR»	☒	Ex nC/nR Ex nC/nR AEx nC/nR Ex nC/nR	Different protection concepts for zone 2 nC: encapsulated, sealed nR: restricted breathing	2 2 CL I, Zone 2 2	Global IEC 60079-15 EU EN 60079-15 US UL 60079-15 CA CSA C22.2 No. 60079-15	Only applications zone 2
Optical radiation	☒	Ex op is/pr/sh Ex op is/pr/sh AEx op is/pr/sh Ex op is/pr/sh	Limit, avoid etc. transmission of optical radiation	0 / 1 / 2 0 / 1 / 2 CL I, Zone 0/1/2 0 / 1 / 2	Global IEC 60079-28 EU EN 60079-28 US UL 60079-28 CA CSA C22.2 No. 60079-28	Optoelectronic devices, e.g. with fibreoptics
Non-incendive		[NI] [NI]	Avoidance of sparks and temperatures	CL I, Div. 2 CL I, Div. 2	US FM 3611/ CA CSA C22.2 No.213	
Explosion-proof		[XP] [XP]	Transmission of an explosion to the outside is excl.	CL I, Div. 1 CL I, Div. 1	US FM 3615 CA CSA C22.2 No.30	

Classification per CENELEC/IEC/NEC 505, Explosion sub-group gases and vapours							Additional conditions	
	T1	T2	T3	T4	T5	T6	Conditions	Marking
I	Methane	-	-	-	-	-	Equipment applicable without restriction	-
IIA	Ammoniac Methane Ethane Propane	Ethyl alcohol Cyclohexane n-Butane n-Hexane	Fuel in general Aircraft fuel Fuel oil	Acetaldehyde	-	-	Observe special application conditions	x
IIB	Lighting gas Acrylonitrile	Ethylene Ethylene oxide	Ethylene glycol Hydrogene sulphide	Ethyl ether	-	-	Ex device with part certificate cannot be used alone; CE conformity will be certified through assembly in a complete equipment	u
IIC	Hydrogene	[Ethine (Acetylene)]	-	-	-	Coal disulphide		



Legend	
Global	worldwide
EU	Europe
US	USA
CA	Canada