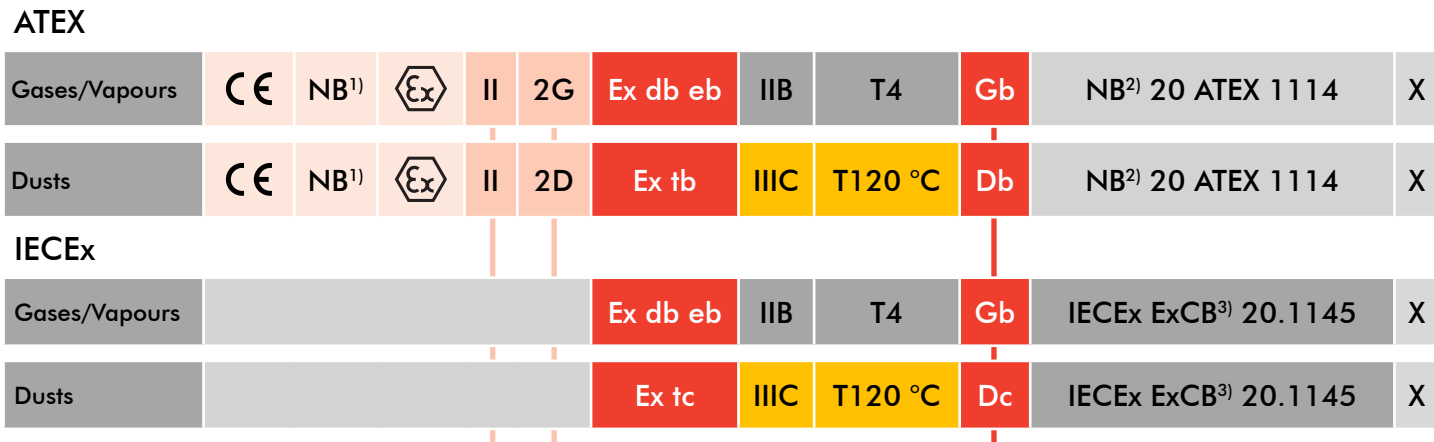
ISOHEAT®

Marking of ATEX/IECEx electrical explosion protected equipment



Potentially explosive areas

Conditions and Zone classification

Flammable materials	**Temporary behaviour** of explosive atmosphere	**Classification** of hazardous areas
Gases Vapours	is present continuously or for long periods or frequently	Zone 0
	arises in normal operation occasionally	Zone 1
	is not likely to arise in normal operation, or if it does, will persist for a short time only	Zone 2
Dusts	is present in the form of a cloud continuously, or for long periods or frequently	Zone 20
	occasionally develops into a cloud during normal operation	Zone 21
	is not likely to develop into a cloud during normal operation, or if it does, for a short time only	Zone 22
Methane and Carbon dust	operation where there is a risk of explosion	-
	disconnection where there is a risk of explosion	-

Required marking on the equipment

Group as defined in directive 2014/34/EU	**Equipment category** as defined in directive 2014/34/EU	**Equipment group** as defined in EN IEC 60079-0	**Equipment protection level** (EPL) as defined in EN IEC 60079-0
II	1G	II	Ga
II	2G or 1G	II	Gb or Ga
II	3G or 2G or 1G	II	Gc or Gb or Ga
II	1D	III	Da
II	2D or 1D	III	Db or Da
II	3D or 2D or 1D	III	Dc or Db or Da
I	M1	I	Ma
I	M2 or M1	I	Mb or Ma

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The ATEX certification process is mandatory in the EU. The IECEx-system is a voluntary certification procedure in the EU. For correct application of the ATEX certification procedure, please note the EU Directive 2014/34/EU and the harmonized EN standards.

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ATEX

Gases/Vapours	CE	NB[1]	Ex	II	2G	Ex db eb	IIB	T4	Gb	NB[2] 20 ATEX 1114	X
Dusts	CE	NB[1]	Ex	II	2D	Ex tb	IIIC	T120 °C	Db	NB[2] 20 ATEX 1114	X

IECEx

Gases/Vapours						Ex db eb	IIB	T4	Gb	IECEx ExCB[3] 20.1145	X
Dusts						Ex tc	IIIC	T120 °C	Dc	IECEx ExCB[3] 20.1145	X

Protection principle/types of protection

Applications	Flammable materials	Protection principle	Type of protection	Standards	Marking in accordance with the equipment protection level		
					very high level of protection	high level of protection	enhanced level of protection
All	Gases, vapours (G) and dusts (D)	–	General requirements	EN IEC 60079-0	+	+	+
Control stations, motors, fuses, switchgear, power electronics, *catalytic gas detectors only	Gases and vapours (G)	Propagation of an explosion inside to the outside is excluded	Flameproof enclosure	EN IEC 60079-1	Ex da*	Ex db	Ex dc
Junction and connection boxes, enclosures, motors, luminaires, terminals	Gases and vapours (G)	Avoidance of arcs, sparks and excessive temperature	Increased safety	EN IEC 60079-7	–	Ex eb	Ex ec
Junction and connection boxes, enclosures, motors, luminaires, switch and control cabinets, plugs	Dusts (D)	Explosive dust atmosphere keep at a distance from the ignition source	Protection by enclosure	EN IEC 60079-31	Ex ta	Ex tb	Ex tc
Measurement and control technology, automation technology, sensors, actuators	Gases, vapours (G) and dusts (D)	Limitation of energy as well as arcs and temperature	Intrinsic safety	EN IEC 60079-11 EN IEC 60079-25	Ex ia	Ex ib	Ex ic
Switch and control stations, motors, analyzers, computers	Gases, vapours (G) and dusts (D)	Explosive atmosphere keep at a distance from the ignition source	Pressurization	EN IEC 60079-2	–	Ex pxb, Ex pyb	Ex pzc
Coils of motors or relays, solenoid valves, connection systems	Gases, vapours (G) and dusts (D)	Explosive atmosphere keep at a distance from the ignition source	Encapsulation	EN IEC 60079-18	Ex ma	Ex mb	Ex mc
Transformers, relays, control stations, magnetic contactors	Gases and vapours (G)	Explosive atmosphere keep at a distance from the ignition source	Liquid immersion	EN IEC 60079-6	–	Ex ob	Ex oc
Capacitors, transformers, relays	Gases and vapours (G)	A propagation of an explosion inside to the outside is excluded	Powder filling	EN IEC 60079-5	–	Ex q	–
Applications for zone 2	Gases and vapours (G)	Protection principles adapted for zone 2	Enclosed construction Restricted breathing	EN IEC 60079-15	–	–	Ex nC Ex nR
Optical devices, laser scanners, light barriers, fibre-optic systems	Gases, vapours (G) and dusts (D)	Limitation of optical energy radiating in the explosive atmosphere	Inherent safe optical radiation	EN IEC 60079-28	Ex op is	–	–
Fibre-optic systems	Gases, vapours (G) and dusts (D)	Ex atmosphere is kept distant from the ignition source	Protected optical radiation	EN IEC 60079-28	–	Ex op pr	–
Fibre-optic systems	Gases, vapours (G) and dusts (D)	Ex atmosphere is kept distant from the ignition source	Optical system with interlocking	EN IEC 60079-28	–	Ex op sh	–

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Dusts	CE	NB[1)]	Ex	II	2D	Ex tb	IIIC	T120 °C	Db	NB[2)] 20 ATEX 1114	X

IECEx

Gases/Vapours	Ex db eb	IIB	T4	Gb	IECEx ExCB[3)] 20.1145	X
Dusts	Ex tc	IIIC	T120 °C	Dc	IECEx ExCB[3)] 20.1145	X

Subdivisions and classification of gases and vapours

Gases and vapours			Assignment of gases and vapours accordance to the ignition temperature	Tempe-rature class
Ammonia, methane, ethane, propane	Town gas, acrylnitril	Hydrogen	>450 °C	T1
Ethyl alcohol, cyclohexane, n-butane	Ethylene, ethylene oxide	Ethine, acetylena	>300 °C ... < 450 °C	T2
Gasoline, n-hexane	Ethylene glycol, hydrogen sulphide		>200 °C ... < 300 °C	T3
Acetaldehyde	Ethyl ether		>135 °C ... < 200 °C	T4
			>100 °C ... < 135 °C	T5
		Sulphide of carbon	>85 °C ... < 100 °C	T6

Gas groups		
IIA	IIB	IIC

Permitted Equipment groups		
IIA, IIB, IIC	IIB, IIC	IIC

Equipment

Maximum surface temperature	Permitted Temperature classes
450 °C	T1 or T6
300 °C	T2 or T6
200 °C	T3 or T6
135 °C	T4 or T6
100 °C	T5 or T6
85 °C	T6

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Dusts	CE	NB[1)]	Ex	II	2D	Ex tb	IIIC	T120 °C	Db	NB[2)] 20 ATEX 1114	X

IECEx

Gases/Vapours	Ex db eb	IIB	T4	Gb	IECEx ExCB[3)] 20.1145	X
Dusts	Ex tc	IIIC	T120 °C	Dc	IECEx ExCB[3)] 20.1145	X

Permitted Equipment groups

Permitted Equipment groups
IIIA, IIIB, IIIC
IIIB, IIIC
IIIC

Subdivision of dusts

Dust groups	Dusts
IIIA	combustible flyings
IIIB	non-conductive
IIIC	conductive

Use of the operating equipment

Marking	Conditions
without X or U	Equipment can be operated without restrictions
with X	Specific conditions of use of the equipment
with U	Component certificate (uncompleted), conformity is certified when used in an overall equipment

Max. permissible surface temperature of the equipment

Temperature limitation because of dust layer T5 mm: Minimum ignition temperature of 5 mm layer of dust	$T_{max.} < T_{5\ mm} - 75°C$
Temperature limitation because of dust cloud TCL: Minimum ignition temperature of the cloud of dust	$T_{max.} < 2/3\ T_{CL}$

Max. permissible surface temperature of the equipment:	lowest outcome of the Tmax. - values

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