Marking of non-electrical explosion protected equipment

BARTEC

Potentially explosive areas

Conditions and Zone classification			Required marking on the equipment			
Flammable materials	**Temporary behaviour** of explosive atmosphere	**Classifi-cation** of hazardous areas	**Group** as defined in directive 2014/34/EU	**Equipment category** as defined in directive 2014/34/EU	**Equipment group** as defined in EN 13463-1 ff EN ISO 80079-36	**Equipment protect level** (EPL) as defined in EN ISO 80079-36 EN IEC 60079-0
Gases, vapours	is present continuously or for long periods or frequently	Zone 0	II	1G	II	Ga
	arises in normal operation occasionally	Zone 1	II	2G or 1G	II	Gb or Ga
	is not likely toarise in normal operation, or if it does, will persist for a short time only	Zone 2	II	3G or 2G or 1G	II	Gc or Gb or Ga
Dusts	is present in the form of a cloud continuously, or for long periods or frequently	Zone 20	II	1D	III	Da
	occasionally develops into a cloud during normal operation	Zone 21	II	2D or 1D	III	Db or Da
	is not likely to develop into a cloud during normal opera-tion, or if it does, for a short time only	Zone 22	II	3D or 2D or 1D	III	Dc or Db or Da
Methane, carbon dust	operation where there is a risk of explosion	-	I	M1	I	Ma
	disconnection where there is a risk of explosion	-	I	M2 or M1	I	Mb or Ma

Subdivisions and classification of gases and vapours

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

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

ATEX

Gases/Vapours	CE NB[1] Ex	II	1G	Ex h	IIC	T6	Ga	NB[2] 18 ATEX 1234 X
Dusts	CE Ex	II	2D	Ex h	IIIC	T120 °C	Db	X

ISO (IECEx)

Gases/Vapours				Ex h	IIB	T4	Gb	IECEx ExCB[3] 11.1234 X
Dusts				Ex h	IIIB	T120 °C	Dc	IECEx ExCB[3] 11.1234 X

Protection principle/types of protection

Applications (examples)	Flammable materials	Protection principle	Type of protection	Marking in accordance with the equipment protection level: very high level of protection	high level of protection	enhanced level of protection	Standards
All applications	Gases, vapours (G) and dusts (D)	–	General requirements	+	+	+	EN ISO 80079-36 EN IEC 60079-0 EN 13463-1
Coupling, belt drive, agitator, ventilator, mill	Gases, vapours (G) and dusts (D)	This protection principle ensures that a source of ignition cannot occur.	Constructional safety	Ex h c	Ex h c	Ex h c	EN ISO 80079-37 EN 13463-5
Plain bearing, pump, agitator, vacuum pump, centrifuges	Gases, vapours (G) and dusts (D)	This protection principle prevents a source of ignition from becoming effective.	Control of ignition sources	Ex h b	Ex h b	Ex h b	EN ISO 80079-37 EN 13463-6
Gear	Gases, vapours (G) and dusts (D)	This protection principle prevents the hazardous atmosphere reaching the source of ignition.	Liquid immersion	Ex h k	Ex h k	Ex h k	EN ISO 80079-37 EN 13463-8
Centrifuge, compressor, geared motor, complex assembly group	Gases, vapours (G) and dusts (D)	This protection principle prevents the hazardous atmosphere reaching the source of ignition.	Pressurised enclosure	– – –	Ex h Ex pxb, pyb p	Ex h Ex pzc –	EN ISO 80079-36 EN IEC 60079-2 EN 13463-8
Centrifuge, compressor, geared motor, complex assembly group	Gases and vapours (G)	This protection principle prevents the hazardous atmosphere reaching the source of ignition.	Protection by flow restricting enclosure	–	–	fr	EN 13463-2
Mill, geared motor, complex assembly group	Dusts (D)	This protection principle prevents the hazardous atmosphere reaching the source of ignition.	Protection by enclosure	Ex h Ex ta	Ex h Ex tb	Ex h Ex tc	EN ISO 80079-36 EN IEC 60079-31
Brakes	Gases and vapours (G)	This protection principle prevents flame propagation through an enclosure.	Flame-proof enclosure	–	Ex h Ex db d	Ex h Ex dc –	EN ISO 80079-36 EN IEC 60079-1 EN 13463-3

Application area (equipment)		
Zone 0/20 Zone 1/21 Zone 2/22	Zone 1/21 Zone 2/22	Zone 2/22

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 (uncomple-ted), conformity is certified when used in an overall equipment

Max. permissible surface temperature of the equipment

Temperature limitation because of dust layer $T_{5\,mm}$: Minimum ignition temperature of 5 mm layer of dust	$T_{max.} \leq T_{5\,mm}$ - 75°C
Temperature limitation because of dust cloud T_{CL}: Minimum ignition temperature of the cloud of dust	$T_{max.} \leq 2/3\ T_{CL}$
Max. permissible surface temperature of the equipment:	lowest outcome of the $T_{max.}$ - values

Subdivision of dusts

Permitted Equipment groups	Dust groups	Dusts
IIIA, IIIB, IIIC	IIIA	combustible flyings
IIIB, IIIC	IIIB	non-conductive
IIIC	IIIC	conductive

1) Identification number of the Notified Body responsible for the surveillance of the manufacturer's quality system (Cat. 1).

2) Notified Body (NB) that has tested and certified the product (Cat. 1).

3) Certification Body (CB) that has tested and certified the product (EPL a, b and c).

ATEX is in the European Union a mandatory and IECEx a voluntary certification procedure.
For the correct application of the certification procedures, please follow the corresponding guidelines, regulations and standards.

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