

Marking of non-electrical equipment for use in potentially explosive atmospheres

Conditions and subdivisions						
Conditions and subdivisions			Required marking on the usable operating equipment			
Flammable materials	Temporary behaviour of explosive atmosphere	Classification 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 60079-0 EN ISO 80079-36	Equipment protection level (EPL) as defined in EN ISO 80079-36
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 to arise 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 operation, 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 of gases and vapours				
Gases and vapours			Assignment of gases and vapours according to the ignition temperature	Temperature class
ammonia, methane, ethane, propane	town gas, acrylonitrile	hydrogen	> 450 °C	T1
ethyl alcohol, cyclohexane, n-butane	ethylene, ethylene oxide	ethine (acetylene)	> 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

Explosion groups

IIB

IIC

Permissible equipment groups

IIB, IIC

IIC

Gas

CE

NB*

Ex

II

2G

c

Ex h

IIB

T4

Gb

NB* 16 ATEX 1234

X

Dust

CE

NB*

Ex

II

2D

c

Ex h

IIIB

T110 °C

Db

NB* 16 ATEX 1234

X

Protection principle/types of protection							
Applications	Flammable materials	Protection principle	Type of protection	Symbol	Marking in accordance with the equipment protection level		
					EPL a very high level of protection	EPL b high level of protection	EPL c enhanced level of protection
all applications	gases, vapours (G) and dusts (D)	–	general requirements	–	+	+	+
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		c Ex h	c Ex h	c Ex h
Plain bearing, pump, agitator, vacuum pump	gases, vapours (G) and dusts (D)	This protection principle prevents a source of ignition from becoming effective.	Control of ignition sources		b Ex h	b Ex h	b Ex h
Gear	gases, vapours (G) and dusts (D)	This protection principle prevents the hazardous atmosphere reaching the source of ignition.	Liquid immersion		k Ex h	k Ex h	k Ex h
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		– –	p Ex pxb, pyb	– Ex pzc
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	–	–	–	Ex fr
Centrifuge, compressor, geared motor, complex assembly group	dusts (D)	This protection principle prevents the hazardous atmosphere reaching the source of ignition.	Protection by enclosure		Ex ta	Ex tb	Ex tc
Brakes	gases and vapours (G)	This protection principle prevents flame propagation through an enclosure.	Flame-proof enclosure		– Ex da	d Ex db	– Ex dc

Use of the operating equipment	
Marking	Conditions
without	operating equipment can be used without restriction
X	special conditions of use
U	operating equipment with partial certificate, CE-conformity is certified when it is installed into a complete item of operating apparatus

Ignition temperature of dust	
permissible temperature of the layer	T _{adm, C} = T _{5 mm C} - 75 K
permissible temperature of the cloud	T _{adm, nuage} = 2/3 T _{nuage}
max. permissible surface temperature of the equipment	T _{adm, C} ≥ T _{adm} ≤ T _{adm, nuage}

Groups of dust		
Marking	Dusts	Permissible equipment group
IIIA	combustible flyings	IIIA, IIIB, IIIC
IIIB	non-conductive dust	IIIB, IIIC
IIIC	conductive dust	IIIC

* Notified Bodies' identification number
e.g. BAM 0589 (Germany), DEKRA EXAM 0158 (Germany), EECS (BASEEFA) 0600 (Great Britain), IBEX/0637 (Germany), KEMA 0344 (Netherlands), LCIE 0081 (France), PTB 0102 (Germany), SIR 0518 (Great Britain), TÜV 0044 (Germany), who – where required – have certified the QA system or inspected the products (only with Category 1)

