

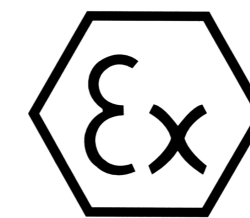


BS EN ISO 9001:1994
Certificate No FM55900

FLAMETEC LTD

SPECIALISTS IN FLAME PROTECTION

POTENTIALLY EXPLOSIVE ATMOSPHERES



ATEX 95
Directive 94/9/EC



ATEX 137
Directive 1999/92/EC

Equipment Selection (ATEX)

Equipment Group	Category of equipment	Atmosphere	Level of protection	Performance of protection	Conditions of operation
Equipment Group I (Mines)	M1	Methane, Dust	Very high	2 independent protection methods, or Safe with 2 faults	Equipment remains energised and functioning
	M2	Methane, Dust	High	Suitable for normal operation and severe operating conditions	Equipment is de-energised
Equipment Group II (Surface)	1	Gas, Vapour, Mist, Dust	Very high	2 independent protection methods or Safe with 2 faults	Equipment remains energised and functioning in Zones 0,1,2 (G) and/or 20,21,22 (D)
	2	Gas, Vapour, Mist, Dust	High	Suitable for normal operation and frequently occurring disturbances, or Safe with 1 fault	Equipment remains energised and functioning in Zones 1,2 (G) and/or 21,22 (D)
	3	Gas, Vapour, Mist, Dust	Normal	Suitable for normal operation	Equipment remains energised and functioning in Zones 2 (G) and/or 22 (D)

Work equipment and Workplaces - Directive 1999/92/EC

Scope	Details	Compliance
Work equipment	Already in use or made available for the first time before 30 June 2003	May continue to be used provided the RA* indicates it is safe
Work equipment	Made available for the first time after 30 June 2003	ATEX 95 applies (selection on the basis of categories)
Workplaces	Used for the first time after 30 June 2003 OR Modifications, extensions or restructuring after 30 June 2003	ATEX 137 applies
Workplaces	Already in use before 30 June 2003	Classify into zones, Mark with a sign, Provide protective clothing, Duty of coordination by 30 June 2006

Note: The mineral extracting industries are exempt from ATEX 137 BUT ATEX 95 applies. However, Chemical Agents Directive 98/24/EC does apply to the extracting industries and both CAD and ATEX contain a lot of common requirements for employers such as risk assessment, prevention and protection measures, providing training, emergency arrangements. ATEX 137 and the safety requirements of CAD are implemented through the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).

Conversion of US "Type" to European "IP Code" designations

3	IP54
3R	IP14
3S	IP54
4 and 4X	IP56
6 and 6P	IP67

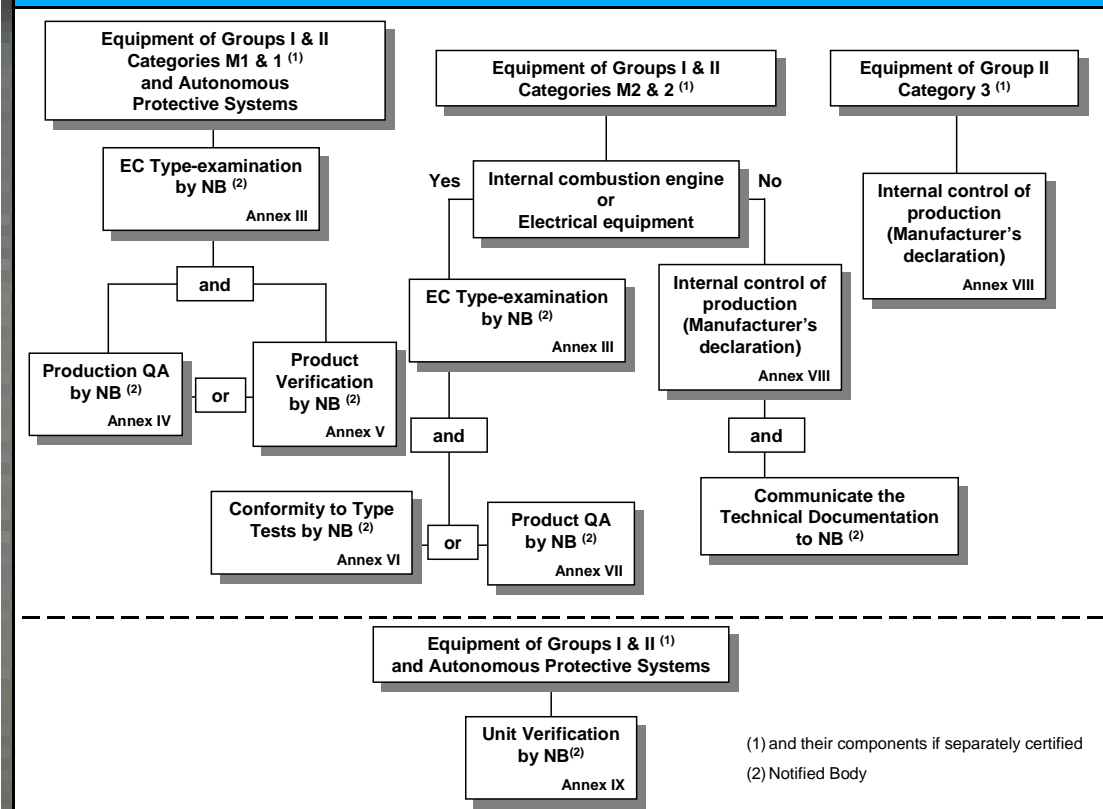
Employer's Obligations under Directive 1999/92/EC

- Prevent the formation of explosive atmospheres OR Avoid the ignition of the explosive atmosphere, and Control the effects of explosions
- Assessment of explosion risks
 - Likelihood of explosive atmospheres occurring and their persistence
 - Likelihood that ignition sources are present
 - Scale of the anticipated effects
- Duty of coordination between employers
- Hazardous Area classification
- Mark explosive atmospheres with sign at point of entry (where necessary)
- Verification before first use
- Risk Assessment Record (extension of MHSW record - no separate EPD required)
 - Explosion risks have been determined and assessed
 - Safety measures taken to eliminate or reduce the risk
 - Hazardous areas classified into zones
 - Selection of equipment (link to ATEX 95)
 - Arrangements for incidents and emergencies
 - Measures taken to inform, instruct and train employees

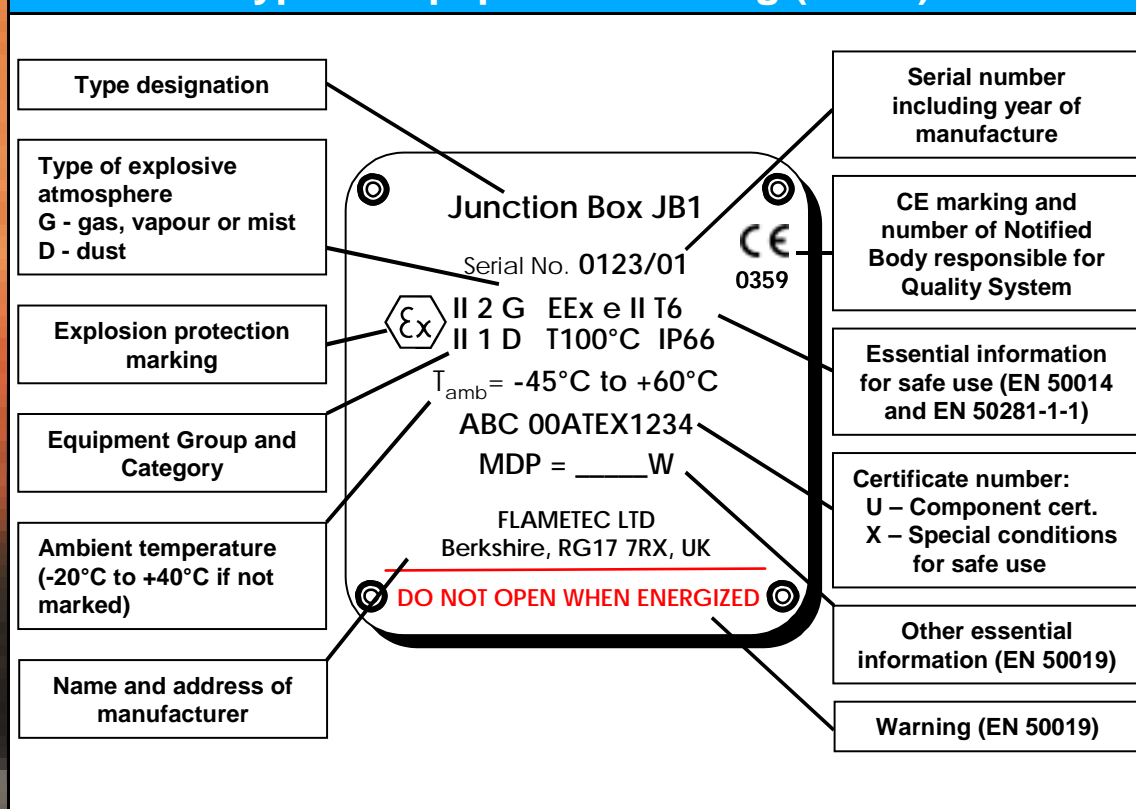


Warning sign for places where explosive atmospheres may occur

Conformity Assessment Procedures (ATEX)



Typical Equipment Marking (ATEX)



Explosion Protection Methods (NEC)

NEC 500	NEC 505
Division 1: Explosionproof Intrinsic Safety Purged/Pressurised (Type X or Y)	Zone 0: Intrinsic Safety 'ia' Class I, Division 1 Intrinsic Safety Zone 1: Encapsulated, 'm' Flameproof, 'd' Increased Safety, 'e' Intrinsic Safety, 'ib' Oil Immersed, 'o' Powder Filled, 'q' Purged/Pressurised, 'p' Any Class I, Zone 0 or 1 method Any Class I, Division 1 method
Division 2: Hermetically Sealed Nonincendive Circuits Nonincendive Components Nonincendive Equipment Nonsparking Devices Oil Immersion Purged/Pressurised (Type Z) Any Class I, Division 1 method Any Class I, Zone 0, 1 or 2 method	Zone 2: Hermetically Sealed, 'nC' Nonincendive, 'nC' Nonsparking, 'nA' Restricted Breathing, 'nR' Sealed Device, 'nC' Any Class I, Zone 0 or 1 method Any Class I, Division 1 or 2 method
Division 1: Dust-ignition Proof Intrinsic Safety Purged/Pressurised	-
Division 2: Dust Tight Hermetically Sealed Nonincendive Circuits Nonincendive Components Nonincendive Equipment Nonsparking Devices Any Class II, Division 1 method	-
Division 1: Dust Tight Intrinsic Safety Hermetically Sealed Purged/Pressurised	-
Division 2: Nonincendive Circuits Nonincendive Components Nonincendive Equipment Nonsparking Devices Any Class III, Division 1 method	-

Protection Concepts (ATEX)

Type of Protection	Symbol	Category	CENELEC	Basic concept of protection
Increased Safety	e	M2 & 2	EN 50019	No arcs, sparks or hot surfaces
Non-Sparking	nA	3	EN 50021	
Flameproof	d	M2 & 2	EN 50018	Contain the explosion, prevent flame propagation
Enclosed Break	nC	3	EN 50021	
Quartz/Sand Filled	q	2	EN 50017	
Intrinsic Safety	ia	M1 & 1	EN 50020/39	Limit the energy of the spark and the surface temperature
Intrinsic Safety	ib	M2 & 2	EN 50020/39	
Energy Limitation	nL	3	EN 50021	
Pressurised	p	2	EN 50016	
Restricted Breathing	nR	3	EN 50021	
Simple Pressurisation	nP	3	EN 50021	
Encapsulation	m	2	EN 50028	Keep the flammable gas out
Encapsulation (Cat 1)	ma	1	EN 50284	
Oil Immersion	o	2	EN 50015	
Category 1G	-	1	EN 50284	
Category M1	-	M1	EN 50303	

Equipment Marking (NEC)

Zones	Divisions
Class I, Zone 0, AEx ia IIC T4	Class I, Division 1, Groups A&B T4
Means: Class I Flammable gas or vapour Zone 0 Area classification (explosive atmosphere always present) AEx ia Approved to US standards Protection method (Intrinsic Safety) IIC Gas group (acetylene & hydrogen) T4 Temperature class	Means: Class I Flammable gas or vapour Division 1 Area classification (explosive atmosphere can exist under normal operating conditions) Groups A & B T4 A: acetylene, B: hydrogen Temperature code

Temperature Classification

Maximum Surface Temperature	CENELEC/IEC NEC 505 (Group II)	NEC 500
450°C (842°F)	T1	T1
300°C (572°F)	T2	T2
280°C (536°F)	-	T2A
260°C (500°F)	-	T2B
230°C (446°F)	-	T2C
215°C (419°F)	-	T2D
200°C (392°F)	T3	T3
180°C (356°F)	-	T3A
165°C (329°F)	-	T3B
160°C (320°F)	-	T3C
135°C (275°F)	T4	T4
120°C (248°F)	-	T4A
100°C (212°F)	T5	T5
85°C (185°F)	T6	T6

N.B. For Group I (CENELEC/IEC) applications, electrical apparatus has fixed temperature limits i.e. 150°C and 450°C.

Documents issued by the Manufacturer (ATEX)

Description	Documentation
Attestation of Conformity (1)	Declaration by the manufacturer that the components conform with the provisions of Directive 94/9/EC and includes details on how to be incorporated into equipment or protective systems
EC Declaration of Conformity (1)	Declaration by the manufacturer that the equipment complies with the EHSR's of Directive 94/9/EC and any other relevant directives that apply
Instructions (2)	- Detailed information for safe use, installation, commissioning, maintenance, etc.. - Drawn up in one of the community languages - On putting into service, translation of the instructions in the language of the country in which the equipment or protective system is to be used

Group Comparison

CENELEC/IEC NEC 505	NEC 500
IIA (Propane)	Class I D (Propane)
IIB (Ethylene)	C (Ethylene)
IIC (Acetylene & Hydrogen)	B (Hydrogen) A (Acetylene)
-	Class II E (Metal Dust)
-	F (Coal Dust)
-	G (Grain Dust)
-	Class III - (Fibres)

EN 60079-10:2003 (IEC79-10) - Classification of Hazardous Areas
Institute of Petroleum, Part 15 - Model Code of Safe Practice in the Petroleum Industry, 2002 2nd Ed.

(1) Declaration to accompany information given with each single product or each batch of identical products
(2) Instructions to accompany each piece of equipment or protective system



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MINING - MATERIAL HANDLING - OFFSHORE & ONSHORE - DIESEL & ELECTRIC - CATEGORY 2G OR 3G EQUIPMENT FOR ZONE 1 OR ZONE 2