1 ELECTRICAL AND NON-ELECTRICAL EQUIPMENT: GUIDANCE FOR MANUFACTURERS

FOR THE WORLD

Aim: One single certificate for any hazardous area product recognised and accepted throughout the world.

Already accepted in many countries. Alternatively a single test report (ExTR) can be sent to any member certification body (ExCB) to issue locally accepted certification.

Currently only electrical equipment/component to IEC Standards (but IEC Standards for non-electrical equipment are being developed).

ExCB issues an ExTR (covering the product type) and a quality assessment report (QAR) (covering the related production facility)

Certificates of conformity created directly on the IECEx website, fully visible for the whole world to read and check status.

ExCB maintains the status of certificate based on the outcome of further QARs, a minimum of 2 audit visits in a 3 year period.

IECEx PRODUCT CERTIFICATION

Technically identical standards for electrical equipment since 2006.

For single standards, a single set of tests and assessments can support both IECEx and ATEX.

An ATEX EC-Type Examination Certificate can be based on an IECEx ExTR but ATEX documentation does not necessarily support an IECEx certificate.

The technical requirements of a manufacturer's QA system are effectively the same, both are based on ISO/IEC 80079-34 and an IECEx QAR can support the issue of an ATEX QAN.

ATEX CONFORMITY ASSESSMENT

FOR EUROPE

A common approach to lifting barriers to trade within the European Economic Area (EEA).

The Directive becomes law on implementation in each member country and compliance is mandatory within the EEA.

Applicable to non-electrical equipment/component and protective systems as well as electrical equipment.

Certification from a Notified Body is Mandatory for Category 1 and M1 electrical and non-electrical equipment/component, protective systems and Category 2 and M2 electrical equipment/component. Otherwise self declaration of compliance is permitted.

An EC-Type Examination Certificate and Quality Assessment Notification (QAN) are issued by a Notified Body.

The manufacturer – alone – is responsible for the Declaration of Conformity which must accompany every product which bears the European (CE) Marking.

PRINCIPAL ELECTRICAL PROTECTION CONCEPTS

STANDARD IEC/EN		CODE		PROTECTION CONCEPT	ZONE	
Gas	Dust	Gas	Dust		Gas	Dust
60079-0				General Requirements		
60079-1		Ex da Ex db Ex dc		Flameproof (Prevention of propagation)	0 1 2	
60079-2		Ex pxb Ex pyb Ex pzc	Ex pxb Ex pyb Ex pzc	Pressurised (Gas/Dust exclusion)	1 1 2	21 21 22
60079-5		Ex q		Powder Filled (Prevention of propagation)	1	
60079-6		Ex ob Ex oc		Oil Filled (Gas exclusion)	1 2	
60079-7		Ex eb Ex ec		Increased Safety (By design)	1 2	
60079-11		Ex ia Ex ib Ex ic	Ex ia Ex ib Ex ic	Intrinsic Safety (Energy limitation)	0 1 2	20 21 22
60079-13		pb pc	pb pc	Equipment protection by pressurised room "p" and artificially ventilated room "v" (Dust and/or Gas exclusion)	1 2	21 22
		v vc			(see standard)	
60079-15		Ex nA Ex nR Ex nC		Non Sparking Restricted Breathing Enclosed break	2	
60079-18		Ex ma Ex mb Ex mc	Ex ma Ex mb Ex mc	Encapsulation (Gas and Dust exclusion)	0 1 2	20 21 22
60079-28		Ex op is Ex op pr Ex op sh	Ex op is Ex op pr Ex op sh	Protection of equipment and transmission systems using optical radiation (is: Inherently safe) (pr: Mechanically protected) (sh: Interlock/shutdown)	0 1 1 or 2 (see standard)	20 21 21 or 22 (see standard)
	60079-31		Ex ta Ex tb Ex tc	Enclosure (Dust exclusion)		20 21 22
60079-33		Ex sa Ex sb Ex sc	Ex sa Ex sb Ex sc	Equipment protection by special protection "s"	0 1 2	20 21 22

INGRESS PROTECTION (IP)

Hazardous area equipment typically requires a minimum IP rating of IP54 but may be assessed and tested to the higher ratings below:

TYPE OF PROTECTION		IP RATING
Dust	Dust Protected	IP5x
	Dust Tight	IP6x
Water	Protection against – splashing water	IPx4
	Protection against – water jets	IPx5
	Protection against – powered water jets	IPx6
	Protection against – temporary immersion	IPx7
	Protection against – continuous immersion	IPx8

See IEC/EN 60529 for full definitions of IP ratings.

NON-ELECTRICAL (MECHANICAL) PROTECTION CONCEPTS

STANDARDS	CODE	CONCEPT	ZONE
EN13463-1		general requirement	
EN13463-2	fr	flow restriction	2 22
EN13463-3	d	flameproof	1 21
EN13463-5	c	constructional safety	1 21
EN13463-6	b	control of ignition sources	1 21
EN13463-8	k	liquid immersion	1 21

Mechanical certification is based on a risk assessment approach.

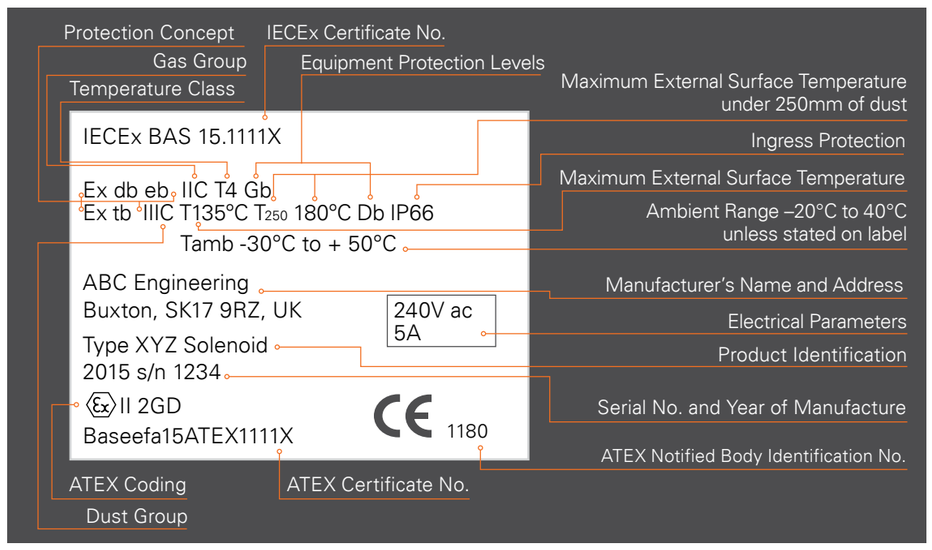
Category 3 equipment must be safe for use in normal operation.

Category 2 equipment must be safe for use in normal operation and expected malfunction

Category 1 equipment must be safe for use in normal operation, expected and rare malfunction.

Potential ignition sources identified in the risk assessment are made safe by applying one or more of the concepts. The number of '*' in the table below indicate the number of protection concepts which need to be applied.

	cat 3	cat 2	cat1
normal operation	*	*	**
expected malfunction		*	**
rare malfunction			*



IEC 61508 – SAFETY SYSTEMS

IEC/EN 61508 is the international standard for electrical, electronic and programmable electronic safety related systems. It sets out the requirements for ensuring that systems are designed, implemented, operated and maintained to provide the required safety integrity level (SIL). Four SILs are defined according to the risks involved in the system application, with SIL4 being used to protect against the highest risks.

IEC 61508 is the base standard for EN 50495 Safety Devices for ATEX.

The standard is in seven parts:

- IEC 61508-1, General requirements
- IEC 61508-2, Requirements for E/E/PE safety-related systems
- IEC 61508-3, Software requirements
- IEC 61508-4, Definitions and abbreviations
- IEC 61508-5, Examples and methods for the determination of safety integrity levels
- IEC 61508-6, Guidelines on the application of IEC 61508-2 and IEC 61508-3
- IEC 61508-7, Overview of techniques and measures

TEMPERATURE CLASS

T CLASS	MAXIMUM SURFACE TEMPERATURE
T1	450°C
T2	300°C
T3	200°C
T4	135°C
T5	100°C
T6	85°C

DUST GROUPS

DUST GROUP	
IIIA	Combustible flyings
IIIB	Non-conductive dust
IIIC	Conductive dust

EQUIPMENT PROTECTION LEVEL

EQUIPMENT PROTECTION LEVEL	ZONE
Ga	0
Gb	1
Gc	2
Da	20
Db	21
Dc	22
Ma	Energised*
Mb	De-energised*

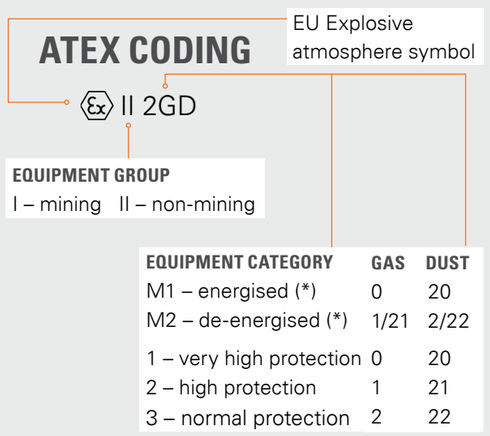
*G=gas, D=dust, M=mining *in presence of explosive atmosphere*

GAS GROUPS

GAS GROUP	REPRESENTATIVE TEST GAS
I	Methane (mining only)
IIA	Propane
IIB	Ethylene
IIC	Hydrogen

Gases are classified according to the ignitability of gas-air mixture.
Refer to EN 60079-20-1 for classification of common gases and vapours.

ATEX CODING



(*) = in presence of explosive atmosphere

SGS BASEEFA SERVICES

- ATEX and IECEx equipment/component certification
- IECEx Certificate of Personnel Competence
- IEC 61508 certification
- Quality system approval
- Assistance with DSEAR (ATEX user directive) Implementation
- Training and Technical advice
- IECEx Service facility Certification
- Technical file storage
- Testing

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WHEN YOU NEED TO BE SURE