



# 1 ELECTRICAL AND NON-ELECTRICAL EQUIPMENT: GUIDANCE FOR MANUFACTURERS



## 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 all non-electrical equipment 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.

### ATEX CONFORMITY ASSESSMENT

- Technically identical standards for electrical equipment since 2006 and some identical standards for non-electrical equipment from 2016.
- 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.

### IECEX PRODUCT CERTIFICATION

## FOR THE WORLD

- Aim: one single certificate for any hazardous area product recognized 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.
- Originally only for electrical equipment but, with the publication of ISO/IEC standards for non-electrical equipment in the first half of 2016, the scheme has been extended to cover non-electrical equipment.
- 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, and they are 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.

## 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 pzb Ex pyb Ex pzc		Pressurized (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		Intrinsic safety (energy limitation)	0 1 2	20 21 22
60079-13		pb pc v vc		Equipment protection by pressurized room "p" and artificially ventilated room "v" (dust and/or gas exclusion)	1 2 (see standard)	21 22
60079-15		Ex nA Ex nR Ex nC		Non-sparking restricted breathing enclosed break	2	
60079-18		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		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		Equipment protection by special protection "s"	0 1 2	20 21 22

## INGRESS PROTECTION (IP)

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

- Non-electrical products have been required to comply with the ATEX Directive since July 2003.
- The original (European only) standards EN 13463 series supported compliance and were published from 2001 onwards. Harmonization status (confirming that meeting the standard gives presumption of conformity with the Directive) ceases in October 2019. The current (international) standards should now be used both for the international certification to the IECEx Scheme and (in their EN version) for ATEX.
- Further details of EN ISO 80079-36, EN ISO 80079-37 and ISO/IEC 80079-38 are provided on wallchart 2, along with details of:
- Design compliance and production responsibility
  - Protection concepts (new and old)
  - Marking requirements (new and old)
  - Potential ignition sources
  - Ignition hazard assessment process

Protection Concept: Gas Group, Temperature Class, Equipment Protection Levels

IECEx Certificate No. BAS 19.1111X

Maximum External Surface Temperature under 250mm of dust: Ingress Protection

Maximum External Surface Temperature: Ambient Range -20°C to 40°C unless stated on label

Manufacturer's Name and Address: ABC Engineering, Buxton, SK17 9RZ, UK

Electrical Parameters: 240V ac, 5A

Product Identification: Type XYZ Solenoid, 2019 s/n 1234

Serial No. and Year of Manufacture: II 2GD, Baseefa19ATEX1111X

ATEX Coding: II 2GD, Dust Group

ATEX Certificate No. 1180

ATEX Notified Body Identification No.

## 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

## DUST GROUPS

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

## GAS GROUPS

GAS GROUP	REPRESENTATIVE TEST GAS
I	Methane (mining only)
IIA	Propane
IIIB	Ethylene
IIIC	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.

## EQUIPMENT PROTECTION LEVEL

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

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

## ATEX CODING

EU Explosive atmosphere symbol: Ex II 2GD

EQUIPMENT GROUP: I – mining II – non-mining

EQUIPMENT CATEGORY	GAS	DUST
M1 – energized (*)	0	20
M2 – de-energized (*)	1/21	2/22
1 – very high protection	0	20
2 – high protection	1	21
3 – normal protection	2	22

(\*) = 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 certification
- Technical file storage
- Testing

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WHEN YOU NEED TO BE SURE

