

# Hazardous Area Wallchart

## IEC, IECEx, Baseefa and Ex ATEX Standards



### 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 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.



### Putting IECEx and ATEX together

**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 EN13980 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 and protective systems as well as electrical equipment.
- Certification from a Notified Body is Mandatory for cat. 1 and M1 equipment, protective systems and cat. 2 and M2 electrical equipment. 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.

### Electrical Protection Concepts

Standard IEC/EN		Code		Protection Concept	Zone	
Gas	Dust	Gas	Dust		Gas	Dust
60079-0	61241-0			General Requirements		
60079-1		Ex d		Flameproof	1	
	61241-1		Ex tD	Enclosure		20/21/22
60079-2		Ex p		Pressurised	1	
	61241-4		Ex pD	Pressurised		21/22
60079-5		Ex q		Powder Filled	1	
60079-6		Ex o		Oil Filled	1	
60079-7		Ex e		Increased Safety	1	
60079-11	61241-11	Ex ia	Ex iaD	Intrinsic Safety	0	20
		Ex ib	Ex ibD		1	21
60079-15		Ex nA		Non-sparking		
		Ex nL		Energy limited	2	
		Ex nR		Restricted breathing		
		Ex nC		Enclosed break		
60079-18	61241-18	Ex ma	Ex maD	Encapsulation	0	20
		Ex mb	Ex mbD		1	21

### 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:

**DUST**  
IP 5x - Dust protected  
IP 6x - Dust tight

**WATER**  
Protected against:  
IP x4 - splashing water  
IP x5 - water jets  
IP x6 - powered water jets  
IP x7 - temporary immersion  
IP x8 - continuous immersion

See IEC/EN 60529 for full definition of IP ratings

### Mechanical Protection Concepts

Standards	Code	Concept	Zone	Mechanical certification is based on a risk assessment approach.
EN13463-1		general requirements		Category 3 equipment must be safe for use in normal operation.
EN13463-2	fr	flow restriction	22	Category 2 equipment must be safe for use in normal operation and expected malfunction
EN13463-3	d	flameproof	21	Category 1 equipment must be safe for use in normal operation, expected and rare malfunction.
EN13463-5	c	constructional safety	21	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.
EN13463-6	b	control of ignition sources	21	
EN13463-7	p	pressurisation	21	
EN13463-8	k	liquid immersion	21	

### 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

- Gas Group
- Protection Concept
- Temperature Class
- Ingress Protection
- ATEX Coding

IECEx BAS05.0001X

Ex de IIB T4 -30°C < T<sub>a</sub> < 50°C

ABC Engineering  
Buxton, SK17 9RZ, UK

240V ac  
5A

Type XYZ Solenoid  
2005 s/n 1234 IP66

CE 1180

Baseefa05ATEX0001X

IECEx Certificate No.  
Ambient Range  
-20°C to 40°C unless stated on label  
Manufacturer's Name and Address  
Electrical Parameters  
Product Identification  
Serial No. and Year of Manufacture  
ATEX Notified Body Identification No.  
ATEX Certificate No.

### 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 IEC/EN 60079-20 for classification of common gases and vapours.

### ATEX User Directive - DSEAR Implementation

#### What does DSEAR require?

#### Employers must:

- find out what dangerous substances are in their workplace and what the fire and explosion risks are
- put control measures in place to either remove those risks or, where this is not possible, control them;
- put controls in place to reduce the effects of any incidents involving dangerous substances;
- prepare plans and procedures to deal with accidents, incidents and emergencies involving dangerous substances;
- make sure employees are properly informed about and trained to control or deal with the risks from the dangerous substances;
- identify and classify areas of the workplace where explosive atmospheres may occur and avoid ignition sources (from unprotected equipment, for example) in those areas

The following are just some of the standards that can assist in the implementation of DSEAR

EN 1127-1	Explosion prevention and protection
IEC/EN 60079-10	Classification of hazardous areas
IEC/EN 60079-14	Electrical installations hazardous areas
IEC/EN 60079-20	Data for flammable gases and vapours

### 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 becoming increasingly relevant in the assessment of ATEX Safety Related Devices.

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

### ATEX Coding

EU Explosive atmosphere symbol

ATEX Coding: Ex II 2 GD

Equipment group: I - mining

Equipment category: M1 - energised, M2 - de-energised (\*)

	Gas	Dust
1 - very high protection	0	20
2 - high protection	1	21
3 - normal protection	2	22

(\*) = in presence of explosive atmosphere

