GUIDELINES

on

the Interpretation of

"ATEX" Directive

Equipment and Protective Systems
Intended for Use in
Potentially Explosive Atmospheres Directive 94/9/EC

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for the
Valve and Actuator Industry
prepared by

The British Valve and Actuator Association

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BVAA GUIDELINES ON THE INTERPRETATION OF THE ATEX DIRECTIVE

INDEX

These BVAA ATEX Guidelines should be used to compliment the European ATEX Guidelines 2nd Edition, published by the European Commission in July 2005

ATEX Directive
("**At**mosphères **Ex**plosibles")

1. What is the ATEX Directive?

The ATEX Directive 94/9/EC is a directive adopted by the European Union (EU) to facilitate free trade in the EU by aligning the technical and legal requirements in the Member Sates for **products intended for use in potentially explosive atmospheres**. The full text of the Directive was published in the Official Journal of the European Communities No L 100, dated 19 April 1994.

1.1 What products are covered by the ATEX Directive?

The Directive covers equipment and protective systems, which may be used in areas endangered by potentially explosive atmosphere created by the presence of flammable gases, vapours, mists or dusts.

"Equipment" is any item which contains or constitutes a potential ignition source and which requires special measures to be incorporated in its design and/or its installation in order to prevent the ignition source from initiating an explosion in the surrounding atmosphere. Also included in the term "equipment" are safety or control devices installed outside the hazardous area but having an explosion protection function. A wide range of products comes within the definition of equipment, including valves, actuators and ancillary equipment, which will include mechanical, electrical & electro/mechanical equipment.

Please note that the ATEX directive also applies to non-electrical equipment such as valves, pneumatic and hydraulic actuators and gearboxes.

All Industrial Valves must be subjected to an ATEX Risk Assessment to identify any potential ignition source. This includes those originating from the static charge build-up, arising from the throughput of the flow media or system vibrations, which should be considered an "own ignition source" for a valve.
The European ATEX Guidelines 2nd edition (July 2005) has however introduced a term 'simple valve' stating that a 'simple valve' is outside of the scope the ATEX 94/9/CE directive. This statement is based upon the assumption that a 'simple valve' does not have an ignition source, however, a clear definition of a "simple valve" has not been identified.

BVAA define a 'simple valve' to be:

A "simple valve" – in respect to ATEX Directive – is an industrial valve that has undergone an ATEX Risk Assessment by the Manufacturer and has been proven to have no own ignition risk in normal operation as well as expected and rare malfunctions. Such a valve is outside of the scope of the ATEX Directive.

However, where an ATEX risk assessment shows that an industrial valve does have its own ignition sources, including electrostatic charges build up, such a valve is not a "simple valve" and does fall within the scope of the ATEX Directive.

Protective systems intended for use in potentially explosive atmospheres, defined as design units, which are intended to halt incipient explosions immediately and/or to limit the effective

range of explosions flames and explosion pressures. Protective systems may be integrated into equipment or separately placed on the market for use as autonomous systems.

1.2 When did the ATEX Directive come into effect?

The Directive came into effect on a voluntary basis on 1 March 1996 and became mandatory on 1 July 2003. It replaces the 'old' Explosive Atmospheres and Gassy Mines Directives.

From 1 July 2003, is has been necessary for all products placed on the market or put into use in potentially explosive atmospheres, to comply with the ATEX Directive, even if they are only intended for use in their country of origin.

1.3 Complimentary Directives ATEX 94/9/EC and 99/92/EC

ATEX Directive 94/9/EC (formerly ATEX 100a) - covers PRODUCTS intended for use in potentially hazardous areas – duties are placed on the manufacturer of the PRODUCT.

Worker Protection Directive 99/92/EC (formerly ATEX 137) – intended to compliment ATEX 94/9/EC – covers Health and Safety protection of workers in hazardous areas – duties are placed on the employers to ensure that workers have a minimum level of protection.

These two Directives are intended to compliment each other; they cover different areas and are intended to achieve different objectives. Manufacturers of PRODUCTS intended for use in potentially explosive areas must comply with ATEX 94/9/EC.

1.4 What must I do to comply with the ATEX Directive?

If your products come within the scope of the Directive and you wish to sell them or have them put into service in the EU, you must ensure that they comply with the essential requirements specified in the Directive and mark them with the CE Marking.

Explosion Protection

2. What is Explosion Protection?

Explosion protection is the technique of preventing or controlling the effects of explosions, which might otherwise occur where flammable materials are handled, stored or processed. It is widely recognised internationally by the symbol: 

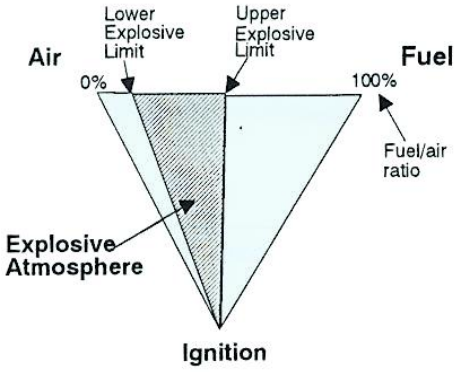
2.1 Why is Explosion Protection needed?

In the past two centuries the process of industrial development has been punctuated by major disasters involving explosions and fires, which caused extensive fatalities, injuries and damage. Coal mining disasters caused by the ignition of firedamp, destruction of dwellings following leakage of gas from the public supply and the more recent Piper Alpha disaster on a North Sea oil platform all resulted from a combination of three key factors:

- a flammable material (fuel)
- oxygen (usually air)

- an ignition source

The fuel (in the form of a gas, vapour, mist or dust) and the air together form a potentially explosive atmosphere, which can be ignited by an ignition source. Outside the limits, known as the upper and lower explosive limits, the mixture will not ignite but has the potential to do so if the proportion can change.



The Explosion Triangle

2.2 Preventing ignition

Where formation of explosive atmosphere cannot be ruled out, measures must be taken to prevent their ignition. The measures will be related to the risk involved. The area classification system commonly used for non-mining applications identifies:

2.2.1 Zone 0, Atex Equipment category 1 Explosive atmosphere present continuously or for long periods of time.

2.2.2 Zone 1, Atex Equipment category 2 Explosive atmosphere present occasionally under normal operating circumstance.

2.2.3 Zone 2, Atex Equipment category 3 Explosive atmosphere not normally present and then only for short periods.

2.3 The following potential ignition sources have been identified:

- **electrical arcs**
- **electric sparks**
- **flames**
- **hot surfaces**

- ❖ **static electricity**
- ❖ **mechanical impact sparks**
- ❖ **mechanical friction**
- ❖ **compression ignition**
- ❖ **electromagnetic radiation including optical frequencies**

Specific examples of some of the above potential sources of ignition have been identified by valve/actuator manufacturers:-

- drive nut/stem thread friction on outside screw, rising stem valves
- high friction due to unsuitable tolerances on moving parts
- friction in worm gear drive gearboxes
- friction in thrust collar bearings on non-rising stem valves (particularly bronze thrust pads
- build up of static electricity in non-metallic, non-conducting seat/bearing materials
- build up of static electricity in non-conducting fabric dust boots on stem extensions
- build up of static electricity in spring energised polymeric stem packings
- build up of static electricity in diaphragm operated actuators

Essential Requirements

3. What are the Essential Requirements?

The ATEX Directive, 94/9/EC specifies the Essential Health and Safety Requirements (EHSR) relating to the design and construction of equipment and protective systems intended to be used in potentially explosive atmospheres.

The EHSR are listed in annex II of the ATEX Directive and relate to concepts that are necessary in order to prevent explosions or to control the effects of incipient explosions. In addition to design and construction, annex II also provides concepts on marking, instructions for use and replacement parts and the level of detail requirements are specified therein.
This guide provides an overview of the EHSR and therefore the reader must make reference to the Directive and, in particular, annex II for detail.

An overview of annex II is provided by its *principles of explosion safety:*

- **above all, if possible, prevent the formation of an explosive atmosphere which may be produced or released by equipment and by protective systems themselves**
- **prevent the ignition of explosive atmospheres, taking into account every electrical and non-electrical source of ignition**
- **should an explosion occur, to halt it immediately and/or limit the range of explosion flames and pressure to a sufficient level of safety**

Annex II makes the following preliminary observations:

- Technological knowledge, which can change rapidly, must be taken into account as far as possible and be utilised immediately. This implies that only the latest standards should be used.
- For Equipment and protective systems the EHSR shall apply only in so far as they are necessary for the safe and reliable functioning and operation of those devices with respect to the risk of explosion.

The EHSR are divided into three groups:

- **Common requirements for equipment and protective systems**
- **Supplementary requirements for equipment**
- **Supplementary requirements for protective systems**

3.1 Common requirements for equipment and protective systems

3.1.1 General requirements

- ❖ principals of integrated explosion safety
- ❖ design and manufacture taking into account possible operating faults, including misuse, to preclude a dangerous situation occurring.
- ❖ special checking and maintenance conditions
- ❖ surrounding area conditions
- ❖ marking
- ❖ instructions

3.1.2 Selection of materials
3.1.3 Design and construction
3.1.4 Potential ignition sources
3.1.5 Hazards arising from external effects
3.1.6 Requirements in respect of safety devices
3.1.7 Integration of safety requirements relating to the system

3.2 Supplementary requirements for equipment

The supplementary requirements relate to each of the equipment categories.

3.2.1 **Category M1** – mining equipment with very high level of protection.

3.2.2 **Category M2** – mining equipment with high level of protection.

3.2.3 **Category 1** – non-mining equipment with very high level of protection.

3.2.4 **Category 2** – non-mining equipment with high level of protection.

3.2.5 **Category 3** – non-mining equipment with normal level of protection.

Within each section the requirements cover:

- prevention of ignition sources from becoming active
- control of surface temperatures
- safe opening
- prevention of dust ingress and egress.

3.3 Supplementary requirements for Protective Systems

3.3.1 General requirements

- dimensions to reduce effects of explosions to a safe level
- positioning to prevent explosions from spreading
- power failure
- resistance to outside interference.

3.3.2 Planning and design

- characteristics of materials
- shockwave resistance
- pressure-withstand of accessories
- account taken of pressure in peripheral equipment and pipework
- pressure relief systems
- explosion suppression systems
- explosion decoupling systems
- integration into safety system

Equipment Groups / Categories

4. What are the Equipment Categories?

The ATEX Directive, in annex 1, defines five categories divided into two groups. The categories define the level of protection of equipment:

Group I - Mining

Category M1 - Very High
Category M2 - High

Group II - Non Mining

Category 1 - Very High
Category 2 - High
Category 3 - Normal

4.1 Definitions of Categories

4.1.1 Category M1

Equipment which is:

- intended for use in mines endangered by firedamp and/or coal dust.
- required to remain functional with an explosive atmosphere present.

- ❖ capable of providing a very high level of protection against the ignition of an explosive atmosphere, even in the event of rare incidents and malfunctions relating to the equipment.
- ❖ characterised by means of protection which will either:

  - provide an independent second means of protection in the event that the first means should fail, or

  - assure the requisite level of protection in the event of two faults occurring independently of each other.

4.1.2 Category M2
Equipment which is:

- ❖ intended for use in mines endangered by firedamp and/or coal dust
- ❖ intended to be de-energised in the presence of an explosive atmosphere
- ❖ capable of providing a high level of protection against the ignition of an explosive atmosphere during normal operation and in the case of more severe operating conditions such as rough handling or changing environmental conditions.

Although Category M2 equipment is intended to be de-energised in the presence of an explosive atmosphere, it must still retain its explosion protection capability in case the means of detecting an explosive atmosphere or de-energising the equipment should fail.
Note that in order to determine the appropriate conformity assessment processes, Category M2 is subdivided into:

- ❖ electrical equipment and internal combustion engines
- ❖ other equipment

where “electrical equipment” can be taken to mean equipment having a potential ignition source of electrical origin (mains or battery)

4.1.3 Category 1
Equipment which is:

- ❖ intended to be used in areas in which explosive atmospheres caused by mixtures of air and gases, vapours, mists or dusts are present continuously or for long periods of time

- ❖ capable of providing a very high level of protection against the ignition of an explosive atmosphere even in the event of rare incidents and malfunctions relating to the equipment

- ❖ characterised by means of protection which will either:

  - provide an independent second means of protection in the event that the first means should fail, or

  - assure the requisite level of protection in the even of two faults occurring independently of each other.

4.1.4 Category 2
Equipment which is:

- ❖ intended to be used in areas in which explosive atmospheres caused by mixtures of air and gases, vapours, mists or dusts are likely to occur.

- ❖ capable of providing a high level of protection against the ignition of an explosive atmosphere even in the event of frequently occurring disturbances or equipment faults which normally have to be taken into account.

It is intended that Category 2 equipment should be able to retain its explosion protection capability in the event of a fault affecting the means of protection.

Note that in order to determine the appropriate conformity assessment processes, Category 2 is subdivided into:

- ❖ electrical equipment and internal combustion engines

- ❖ other equipment

where “electrical equipment” can be taken to mean equipment having a potential ignition source of electrical origin (mains or battery)

4.1.5 Category 3
Equipment which is:

- intended to be used in areas in which explosive atmospheres caused by mixtures of air and gases, vapours, mists or dusts are unlikely to occur or only to occur infrequently or for short periods of time

- capable of providing a normal level of protection against the ignition of an explosive atmosphere during normal operation.

4.2 How do I decide which Category my equipment comes within?

As a first approximation, and for guidance purposes only, the following rules may be applied:

4.2.1 Mining equipment
If the equipment has to remain energised in the presence of firedamp, for example for safety or rescuer purposes, it should be classified as M1. Otherwise, if for use in “gassy” mines, then Category M2 would be appropriate.

4.2.2 Non-mining equipment

- ❖ Equipment intended for use in Zone 0 would normally be classified as Category 1, which would include equipment designed to the Intrinsic Safety ia standard

- ❖ Equipment intended for use in Zone 1 would normally be classified as Category 2. Included in this category would be:

Intrinsic safety ‘ib’

Flameproof enclosure ‘d’

Increased safety ‘e’

Purged and pressurised ‘p’

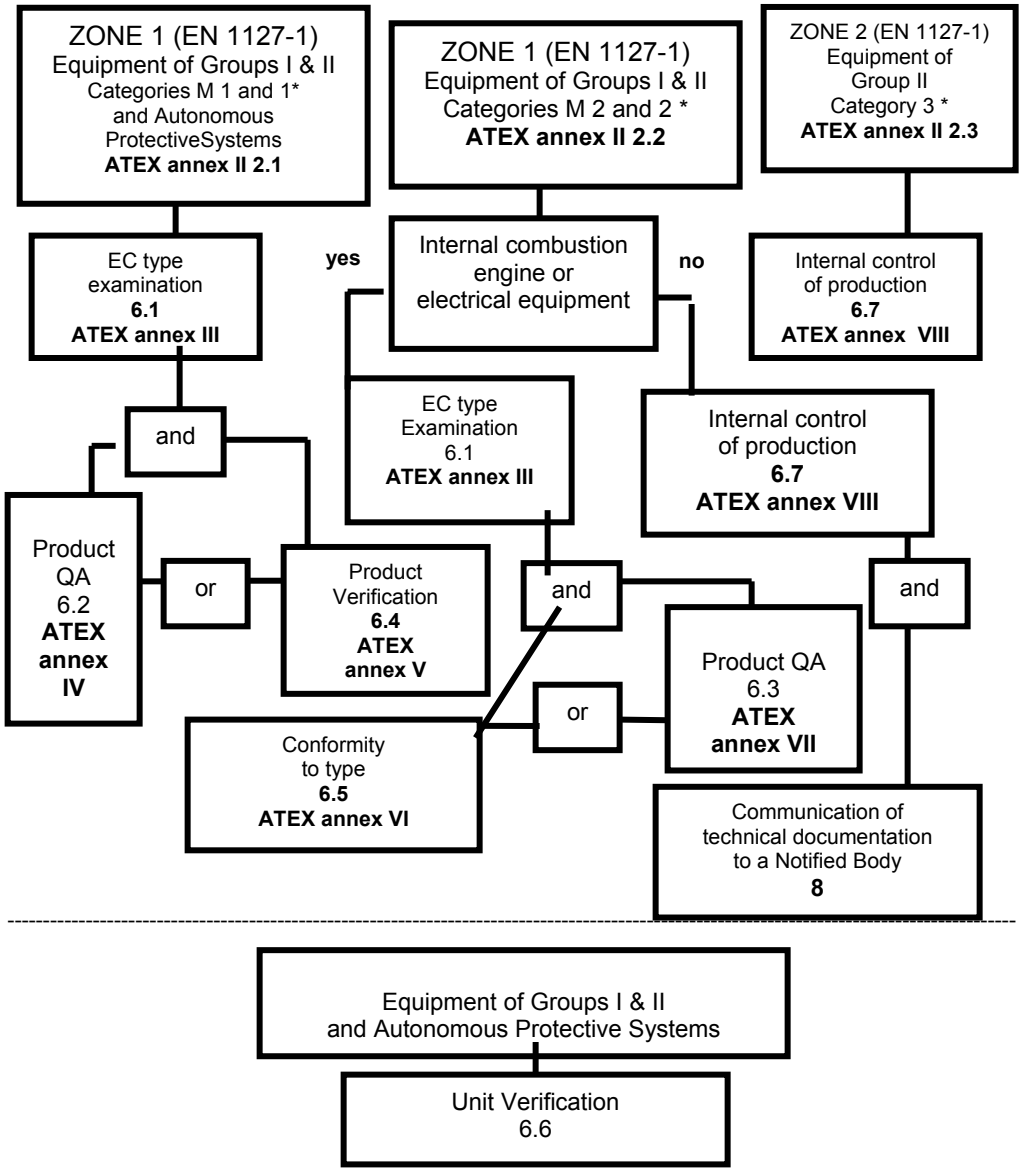
Encapsulated, ‘m’

Oil filled, ‘o’

Powder filled, ‘q’

- Equipment intended for use in Zone 2 would normally be classified as Category 3, which would include equipment designed to the non-incendive standard n.

5. Conformity Assessment Procedures



(*) and their components if separately certified 6.

6. What are the conformity assessment procedures?

The ATEX Directive specifies a number of conformity assessments and the circumstances when they must be used. The procedures are:

6.1 EC Type Examination – the examination, including testing and inspection where appropriate, of a product design and samples by a Notified Body for conformity with either harmonised European Standards or the essential requirements or a combination of the two.
This process is specified in annex III of the Directive
The application must include:

- the name and address of the manufacturer and, if the application is lodged by an authorised representative, his name and address as well.
- a written declaration that the same application has not been lodged with any other notified body.
- the technical file defining the product.

6.2 Production Quality Assurance – the assessment and periodic auditing (including inspection or testing of production samples where appropriate) by a Notified Body of the manufacture's quality systems for compliance with ISO 9002.
This process is specified in annex IV of the directive

The Directive requires the quality assurance system to address the following points:

- Quality objectives, organisational structure, responsibilities and powers of management with regard to equipment quality.
- Manufactured, quality control and quality assurance techniques, processes and systematic actions, which will be used.
- Examinations and tests, which will be carried out before, during and after manufacture and frequency with which they are carried out.
- Quality records (inspection reports, test data, calibration data, qualifications of personnel, etc.)
- Means to monitor achievement of required equipment quality and effective operation of the system.

6.3 Product Quality Assurance – the assessment and periodic auditing (including inspection or testing of production samples where appropriate) by a Notified Body of the manufacturer's quality system for compliance with ISO 9003.
This process is specified in annex VII of the directive

The Directive requires the quality assurance system to address the following points:

- quality objectives, organisational structure, responsibilities and powers of management with regard to product quality
- examinations and tests which will be carried out after manufacture.
- means to monitor effective operation of the system.
- quality records (inspection reports, test data, calibration data, qualifications of personnel, etc)

6.4 Product Verification – the inspection and/or testing of each production item by a Notified Body for conformity with the type that was subjected to EC Type Examination.
This process is specified in annex V of the directive

The Directive requires:

- the manufacturer to ensure that the manufacturing process guarantees conformity of the equipment with type described in the EC Type Examination certificate.
- the manufacturer or his authorised representative in the EU to affix the CE Marking to each piece of equipment.
- the Notified Body to examine and test each item of equipment to verify conformity with the type as described in EC Type Examination certificate.

6.5 Conformity to Type – the examination and/or testing of each production item by the manufacturer under the responsibility of a Notified Body for conformity with type that was subjected to EC Type examination.
This process is specified in annex VI of the directive

The Directive requires the manufacturer to:

- ensure that the manufacturing process assures compliance of the manufactured products with type described in EC Type Examination Certificate.
- carry out test under the responsibility of a Notified Body to confirm the conformity of each item manufactured with the certified type.
- affix the CE Marking to each item that has been found to be in conformity.
- affix the Notified Body's identification number to each item that has been found to be in conformity, under the responsibility of the Notified Body.

6.6 Unit Verification – the examination, including inspection and testing as appropriate, of each production item by a Notified Body for conformity with either harmonised European Standards or the essential requirements or a combination of the two.
This process is specified in annex IX of the directive

The Directive requires:

- the manufacturer to draw up technical documentation.
- the Notified Body to carry out the necessary work to confirm that the equipment meets the requirements of the Directive.
- the Notified Body to affix its identification number to the approved equipment, and provide a certificate of conformity.
- the manufacturer or his authorised representative in the EU to affix the CE Marking to the equipment.

6.7 Internal Control of Production – verification by the manufacturer that the product design and each production item conform to either harmonised European Standards or the essential requirements or a combination of the two.
This process is specified in annex VIII of the directive

The Directive requires the manufacturer to:

- assess the conformity of the equipment with essential requirements.
- draw up the technical documentation.
- check that each piece of equipment conforms to the design specified in the Technical File.
- affix the CE Marking to each conforming product.
- draw up a declaration of conformity.
- retain the declaration of conformity and the technical file for a least 10 years after the last piece of equipment was manufactured.
- update the technical file to cover changes to the equipment.
- in some cases send a copy of the technical file to a Notified Body.

7. Which conformity assessment procedures are applicable?

Equipment is classified into five categories according to the level of risk in its intended area of use. For mining equipment, Category M1 is intended to remain energised in the presence of an explosive atmosphere, while Category M2 is intended to be de-energised if the concentration of flammable gas exceeds the lower explosive limit.

For non-mining equipment, Category 1 is intended for high-risk areas where an explosive atmosphere is present for long periods, Category 2 is intended for medium risk areas where an explosive atmosphere may occur occasionally under normal operating conditions, while Category 3 is intended for areas where an explosive atmosphere is unlikely to occur or only infrequently and for short period only.

The applicable conformity assessment procedures are:

7.1 Categories 1 and M1, and Protective System:

EC Type Examination + either Production Quality Assurance or Product Verification.
This process is specified in annex II 2.1

7.2 Categories 2 and M2 Electrical Equipment and Internal Combustion Engines:

EC Type Examination + either Product Quality Assurance or Conformity to Type.
This process is specified in annex II 2.2

7.3 Categories 2 and M2 Non-electrical Equipment:

Internal Control of Production + deposit technical file with Notified Body.
This process is specified in annex II 2.2

7.4 Category 3:

Internal Control of Production.
This process is specified in annex II 2.3

7.5 All products (optional as alternative to above):

Unit Verification.

8. What is a Technical File?

A technical file is a dossier of information specifying the product in sufficient detail for it to be manufactured and containing the evidence of conformity with requirements of the Directive. The evidence may include reference to applicable standards and results of tests carried out. A technical file must be prepared by the manufacturer regardless of which conformity assessment procedures are used. For EC type examination the technical file will consist of records gathered during the assessment and be represented by the Notified Body issuing a report certificate.

Non electrical equipment Category 2 & M2 and Equipment Category 3

It is permissible for the manufacturer of non-electrical or non-combustion engine equipment with protection level Category 2 & M2 and equipment Category 3 to self assess their equipment in order to demonstrate conformity to the EHSR's. This may be done via calculation and/or testing or by demonstrating compliance with the EN13463 series of standards.
A technical file must be lodged with a notified body prior to marking the equipment and issuing the EC declaration of conformity for the equipment.

8.1 What should be included in a Technical File?

The technical file shall contain:

- a general description of the product
- design and manufacturing drawings and layouts of components, sub-assemblies, circuits, etc.
- description and explanations necessary for the understanding of the drawings and layouts and the operation of the product
- a list of harmonised or other standards that have been applied in full or in part
- for aspects where standards have not been applied, description of the solutions that have been adopted to meet the essential requirements of the Directive
- results of design calculations made, examinations carried out, etc.
- test reports.

9. CE Marking

9.1 Who affixes the CE Marking?

The CE Marking is normally affixed to the products by the manufacturers. Where products are manufactured outside the EU the CE Marking may be affixed by the manufacturer's legally appointed representative in the EU. However, the representative would then be taking legal responsibility for verifying the conformity of the products with the requirements of the relevant directives. In that case the representatives would have to comply with the conformity assessment procedures, including, where required, EC Type Examination and EC Quality Assurance.

9.2 Where must the CE Marking be used?

For the ATEX Directive, the CE Marking must be affixed to each item of equipment or to each protective system. Ideally it should be placed in such a position that the regulatory authorities can readily see it, if only to avoid the inconvenience of questions being raised as to the sustainability of the product. The CE Marking must not be affixed to components which do not of themselves comply with all relevant requirements but which must be combined with other parts in order to comply.

9.3 What is the CE Marking?

The CE Marking is intended to facilitate the free movement of products within the EU by signifying that essential health and safety requirements have been met.

The CE Marking comprises CE together with such other information as may be required by the European Union directives that apply to a particular product. For the ATEX Directive, the symbols CE must be accompanied by the following:

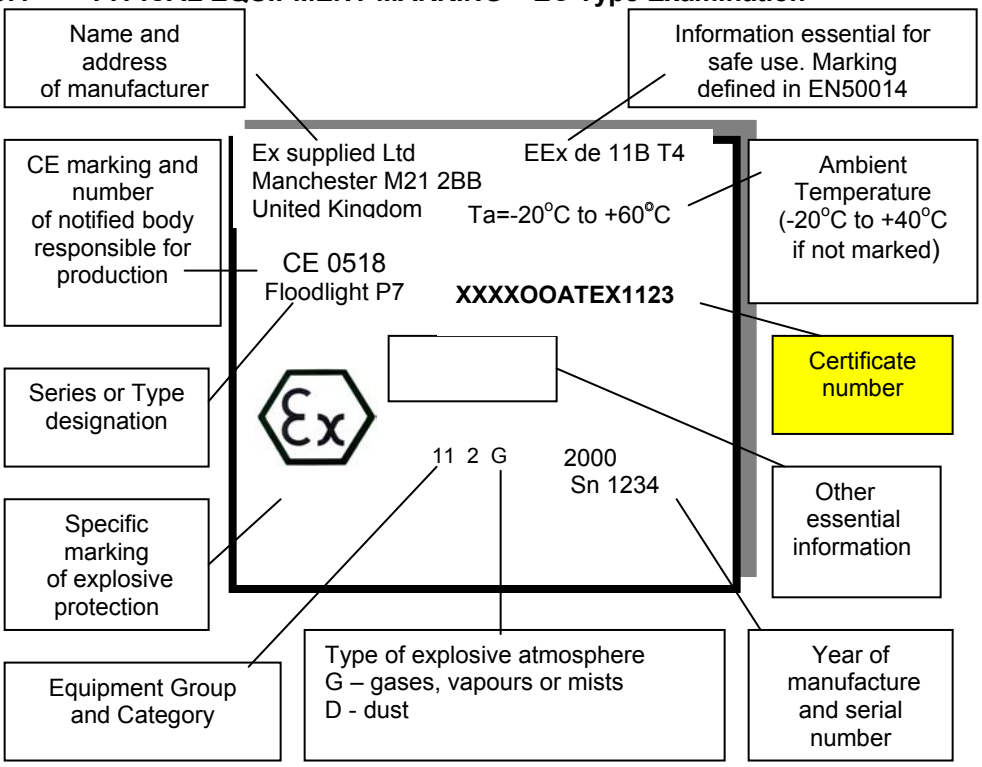
- Name and address of manufacturer
- Designation of series or type
- Serial number, if any
- Year of construction
-  symbol, followed by equipment group and category
- For equipment Group II the letters G and /or D for type of atmosphere (gases, vapours, mists/dusts.)
- Where required, the identification number of the Notified Body involved in the manufacturing phase.

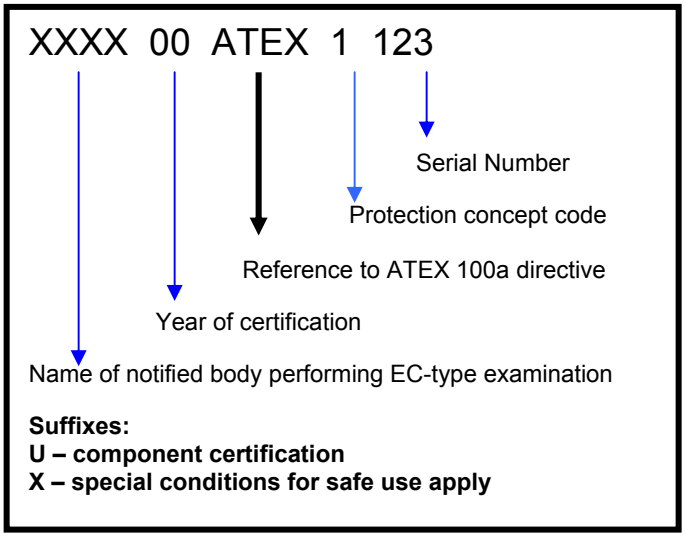
Declaration of Conformity

Equipment conforming to ATEX must include a EC Declaration of Conformity. The EC declaration of conformity must contain the following elements:

- the name or identification mark and the address of the manufacturer or his authorised representative established within the Community;
- a description of the equipment, protective system or device;
- all relevant provisions fulfilled by the equipment, protective system or device referred to;
- where appropriate, the name, identification number and address of the notified body and the number of the EC type examination certificate;
- where appropriate, reference to the harmonised standards;
- where appropriate, the standards and technical specifications which have been used;
- where appropriate, references to other Community Directives which have been applied
- identification of the signatory who has been empowered to enter into commitments on behalf of the manufacturer or his authorised representative established within the Community

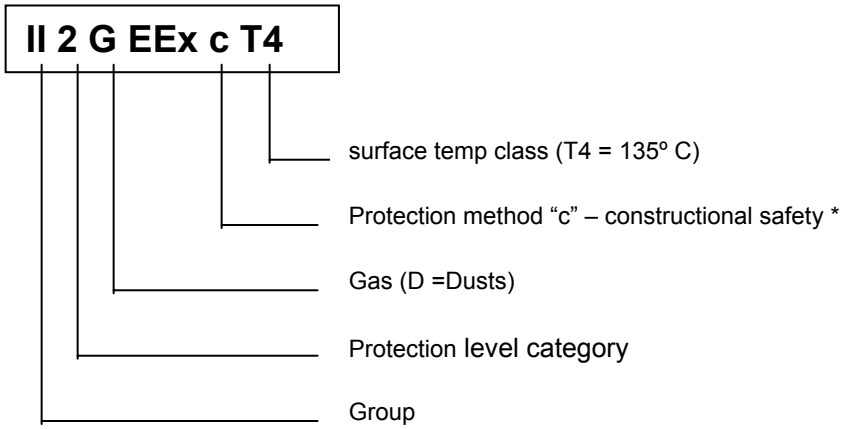
9.4 TYPICAL EQUIPMENT MARKING – EC Type Examination





TYPICAL EQUIPMENT MARKING – Non-Electrical
If compliance with the EN13463 series of standards has been demonstrated, the standard details how the equipment shall be marked. A declaration of conformity is also required.

Example:



*prEN 13463 – 2 “fr” Protection by flow restriction; prEN 13463 – 3 “d” Protection by flameproof enclosure
prEN 13463 –. 3 “g” Protection by inherent safety; prEN 13463 – 5 “c” Protection by constructional safety;
prEN 13463 – 6 “b” Protection by control of ignition sources; prEN 13463 – 7 “p” Protection by pressurisation;
prEN 13463 – 8 “k” Protection by liquid immersion.

10. Assemblies

An assembly formed by combining two or more pieces of equipment, together with components if necessary, has to be considered as a product falling under the scope of directive 94/9/EC, provided that this assembly is placed on the market and/or put into service by a responsible person (who will then be the manufacturer of that assembly) as a single functional unit.

The above mentioned parts are put together by the same person (the manufacture of the assembly), and placed on the market as a single functional unit. This person assumes responsibility for the compliance of the integral assembly with the directive.

The EC declaration of conformity, as well as the instructions for use must refer to the assembly as a whole. It must be clear (e.g. by enclosing a list of all parts and/or a list of safety related data) which is/are the combination(s) that form(s) the assemblies. The manufacturer assumes responsibility for compliance with the directive, and must therefore, in accordance with annex

11 1.0.6, provide clear instructions for assembly/installation/operation/maintenance etc. in the instructions for use.

The manufacture of the assembly may presume conformity of these pieces of equipment and may restrict his own risk assessment of the assembly to those additional ignition and other relevant hazards, which become relevant because of the final combination. If additional hazards are identified a further conformity assessment of the assembly regarding these additional risks is necessary.

11. Risk Assessments for Products

To meet the requirements of directives 94/9/EC it is absolutely necessary to conduct a risk assessment process. According to annex 11, 1.0.1 manufacturers are under an obligation to design equipment and protective systems from the point of view of integrated explosion safety. Integrated explosion safety is conceived to prevent the formation of explosive atmospheres as well as sources of ignition and, should an explosion nevertheless occur, to halt it immediately and/or to limit its effects. In this connection, the manufacturer must take measures with respect to the risks of explosion. In addition, as required in annex 11, 1.0.2 of the directive, equipment and protective systems must be designed and manufactured after due analysis of possible operating faults in order, as far as possible, to preclude dangerous situations.

Risk assessment methodology should comprise the risk profiles including the accidental parameters that can reasonably be anticipated. These aspects become subject to a risk assessment as a “series of logical steps to enable, in a systematic way, the examination of the hazards associated with products”.

In principle, the risk assessment comprises four steps:

a) Hazard identification: A systematic procedure for finding all of the hazards, which are associated with the products. Once a hazard has been recognised, the design can be changed to minimise it, whether or not the degree of risk has been estimated. Unless the hazard is recognised it cannot be addressed in the design.

b) Risk estimation: Determination of the probability of occurrence of the identified hazards and of the levels of severity of the possible harm of the considered hazards (see as well BS EN 1050).

c) Risk evaluation: Comparison or the risk estimated with criteria in order to decide whether the risk is acceptable or whether the product design must be modified in order to reduce the risk.

d) Risk reduction option analysis: The final step of risk assessment is the process of identifying, selecting and modifying design changes which might reduce the overall risk from products. Although risks can always be reduced further they can seldom be reduced to zero except by eliminating the activities.

12. Harmonised Standards

What are the harmonised standards for the ATEX Directive?

The standards listed below have been harmonised. References were published in OJEC C 319 of 6.11.99. Further standards are in the process of development by CEN and CENELEC.

EN 1127 – 1: 1997
Explosive atmosphere – Explosion prevention and protection – Part 1: Basic Concepts and methodology.
EN 50014: 1997
Electrical apparatus for potentially explosive atmosphere – General requirements
Amendment A2: 1999 to EN 50014: 1997
Amendment A1: 1999 to EN 50014: 1997
EN 50015: 1998
Electrical apparatus for potentially explosive atmosphere – Oil immersion 'o'
EN 50017: 1998
Electrical apparatus for potentially explosive atmosphere – Power filling 'q'
EN 50021: 1999
Electrical apparatus for potentially explosive atmospheres – Type of protection 'n'
EN 50054: 1998
Electrical apparatus for the detection and measurement of combustible gases – General requirements and test methods
EN 50055: 1998
Electrical apparatus for the detection and measurement of combustible gases – Performance requirements for Group I apparatus indicating up to 5% (v/v) methane in air
EN 50056: 1998
Electrical apparatus for the detection and measurement of combustible gases – Performance requirements for Group I apparatus indicating up to 100% (v/v) methane in air
EN 50057: 1998
Electrical apparatus for the detection and measurement of combustible gases – Performance requirements for Group II apparatus indicating up to 100% lower explosive limit.
EN 50058: 1998
Electrical apparatus for the detection and measurement of combustible gases – Performance requirements for Group II apparatus indicating up to 100%(v/v) gas
EN 50104: 1998
Electrical apparatus for the detection and measurement of oxygen – Performance requirements and test methods.
EN 50241 – 1: 1999
Specification for open path apparatus for the detection of combustible or toxic gases and vapours – Part 1: General requirements and test methods
EN 50241 – 2: 1999
Specification for open path apparatus for the detection for combustible or toxic gases and vapours – Part 2: Performance requirements for apparatus for the detection of combustible gases
EN 50281 – 1 – 1: 1998
Electrical apparatus for use in the presence of combustible dust – Part 1-1: Electrical apparatus protected by enclosures – Construction and testing

EN 50281-2-1: 1998
Electrical apparatus for use in the presence of combustible dust – Part 2-1: Test methods – Methods for determining the minimum ignition temperatures
EN 50284: 1999
Special requirements for construction, test and marking of electrical apparatus of equipment Group II, Category 1 G
prEN13463-1: 2000
Non-electrical equipment for potentially explosive atmospheres – Part 1: Basic method and requirements
prEN13463-2: 2000
Non-electrical equipment for potentially explosive atmospheres – Part 2: Protection by flow restricting devices (fr)
prEN13463-3: 2000
Non-electrical equipment for potentially explosive atmospheres – Part 3: Protection by flameproof enclosure (d)
prEN13463-4: 2000
Non-electrical equipment for potentially explosive atmospheres – Part 4: Protection by inherent safety (g)
prEN13463-5: 2000
Non-electrical equipment for potentially explosive atmospheres – Part 5: Protection by constructional safety (c)
prEN13463-6: 2000
Non-electrical equipment for potentially explosive atmospheres – Part 6: Protection by control of ignition sources (b)
prEN13463-7: 2000
Non-electrical equipment for potentially explosive atmospheres – Part 7: Protection by pressurisation (p)
prEN13463-8: 2000
Non-electrical equipment for potentially explosive atmospheres – Part 8: Protection by liquid immersion (k)

13. Notified Bodies:

There are now a total of six appointed Notified Bodies. These appear in the DTI website http://www.dti.gov.uk/strd/atex.html

The new list as of September 2003 shows the following names:-

Baseefa (2001) Ltd (formerly EECS)
BSI Product Services
Intertek Testing and Certification Ltd
Lloyd's Register Verification Ltd
SIRA Certification Service
TRL Compliance Services Ltd

Addresses can be found at the above website using the link "list of notified bodies" and then downloading document atexnbs.pdf. The ref.doc. is numbered URN 02/668

A Notified Body is a body which is independent of the supply of the products and which has the necessary technical competence and administration structure to assess the conformity of products and manufacturers with the requirements of the Directive.

A Notified Body has to be approved and appointed by its government who notify the European Commission of the appointment. In general, Notified Bodies will be the recognised certification bodies in their field.

14. BIBLIOGRAPHY:

1) EECS ATEX reference guide & information sheets.

2) MTL ATEX reference guide.

3) SIRA ATEX reference guide. Second edition February 2002

4) European Union ATEX guide.
(http://europa.eu.int/comm/enterprise/atex/guide)

15. ADDITIONAL INFORMATION:

European (CENELEC) Standards – www.cenelec.org

International (IEC) Standards – www.iec.ch

Notes

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