

2.3.5 ATEX DOCUMENTATION

The term 'ATEX' is taken from the French 'Atmospheres Explosibles', which refers to two specific European Directives issued in 1994 and 1999. These are aimed at industrial premises that operate with Hazardous Areas (See section 1.8).

The first one, 94/9/EC, is called the 'Product' Directive or the '100a'. It defines 'equipment and protective systems designed for use in potentially explosive atmospheres'. The UK issued this as a Statutory Instrument: SI 1996 No. 192; "Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres", which came into force as from 1st March 1996.

The second, 1999/92/EC, is called the 'Safety of Workers' Directive or the '137'. It states the requirements that must be met for the use of equipment covered by the first directive in a place where a potentially flammable atmosphere may be present.

Only in the UK, the 'Safety of Workers' Directive has been combined with the Chemical Agents Directive. Together, these have been issued and implemented as the Dangerous Substances and Explosive Atmospheres Regulations (referred to as DSEAR). The opportunity was taken by authorities in the UK to repeal old Regulations that were considered to be out of date. The UK issued this as a Statutory Instrument: SI 2002 No. 2776; "The Dangerous Substances and Explosive Atmospheres Regulations 2002", which came into force in all parts from 1st July 2003.

From 1st July 2003, all new installations involving hazardous areas must use ATEX compliant 'equipment and protective systems'.

Installations completed before this date must have been shown to comply with the DSEAR and therefore the ATEX Directives before 1st July 2006.

The need for ATEX

The Directives have been put in place to establish a uniform approach to explosion protection throughout Europe, principally to facilitate trade between member nations. It achieves this by ensuring that all equipment and protective systems for use in hazardous areas meet stated technical requirements that apply in all EC countries. As a result, trade barriers cannot be raised on the basis that equipment is unsuitable. It is comprehensive and thorough in its approach.

Health and Safety Law that is already in place in the UK requires industry to operate with safety in mind. ATEX formalises this approach, specifying what organisational and technical requirements must be in place. In summary, it requires:-

- Proper management of hazardous areas
- Good communication throughout organisations by appropriate documentation
- Competency of personnel through proper training at all levels
- Identification of hazardous areas
- Marking and identification of apparatus
- Safe working procedures

ATEX Compliance

The Product Directive requires that if 'equipment and protective systems' are to be designed, manufactured or supplied as intended for use in hazardous areas, they must be assessed to determine if they could be 'ignition capable'. If not, then no further consideration is required.

If they can provide a source of ignition, by whatever means, then precautions must be taken in the design, manufacture, installation, operation and maintenance, such that they are adequately protected by type(s) of explosion protection that meet the requirements of European Standards.

This applies to equipment and protective systems, whether it is electrical or non-electrical. The ATEX 100a Directive lays down 'Essential Health and Safety Requirements' (E.S.R.s) in Annex II that must be met. The process of assessment of ignition capability is to be performed by the manufacturer; the organisation 'placing the equipment on the market'. Thus, manufacturers of weighing equipment must determine if their products designed for use in the hazardous area are ignition-capable.

Where electricity is used, there is a risk that heat or sparks could be generated. Protection must be applied according to the existing European EN50 series Standards discussed under 'Hazardous Areas' (section 1.8 of the Technical Articles). Thus, the apparatus is certified to these Standards and marked accordingly. The certification process will also confirm that the apparatus meets the requirements of the ATEX 100a Product Directive and additional marking is applied.

In addition, any non-electrical aspect of any products that may be ignition capable must also be assessed and certified to a new series of Standards in EN13463. If equipment uses springs, for example, this may be cause for concern owing to the likelihood of breakage and the potential creation of frictional sparking and/or heating. The accumulation or generation of static charge must be considered. Mechanical movement and stored energy in load-cells are normally quite small and so, the risk of ignition may be adequately low. In contrast, electric motors are an example of where rotating bearings are used in equipment; mechanical failure would cause rubbing of surfaces and would therefore generate considerable heat.

The material used in construction of equipment may also need to be considered. For example, if aluminium is used for load-cells, which contains a high percentage of magnesium, then there may be a risk of 'thermite reaction' from impact with rusty iron. This can liberate incensive sparks. Maintaining a low percentage of magnesium reduces the risk. Where this is not possible, other precautions may need to be taken to ensure that impact risks are adequately low.

Once equipment has been designed and certified it is placed in one of three categories:

Equipment	Level of Protection	Permitted Zones of use
Category 1	Very High Level of protection	Used in Zone 0, 1 or 2
Category 2	High Level of protection	Used in Zone 1 or 2
Category 3	Normal Level of protection	Used in Zone 2 only

Standards

British Standards for explosion protected apparatus have been harmonised with European Standards: BS5501 has now been replaced with the EN50 series. More recently, the IEC Standards are being adopted in Europe and are issued as, in the case of the UK, BS EN 60079 series. It is the same document as the IEC79 Series for electrical apparatus and systems.

In Europe, Standards for non-electrical equipment are also emerging; BS EN 13463. Part 1 covers the requirements for all explosion-protected non-electrical equipment whilst subsequent parts (some currently still in draft form) detail the types of protection for certification and assessment purposes; the important standards are referred to at the end of this section.

Marking

Equipment complying with the ATEX 100a Directive will now be additionally marked, for example:

CE  II 1 G/D

- The CE mark confirms that the product meets all relevant European Directives
- The Ex in the Hexagon now means that the Product meets the ATEX Directive when used as part of the above marking system
- The Roman II indicates the suitability for Surface industry use in Hazardous Areas
- The Arabic 1 permits the use of the apparatus in Zone 0 as it has a very high level of protection applied
- G allows the use of the apparatus in Gaseous and Vapour hazards
- D permits its use in Dust hazards

The EEx marking discussed in Section 1.8 of the Technical Articles will also appear after the ATEX Marking. Thus, all apparatus must be marked to show that it is suitable for the place in which it is to be used.

	Category 1	Category 2		Category 3	
Equipment Type	Electrical AND Non-Electrical	Electrical	Non-Electrical	Electrical AND Non-Electrical	Annex ref
Certification Phase					
Certification by Notified Body	Required	Required			III
Certification by manufacturer			Permitted	Permitted	VIII
Unit verification by Notified Body	Universal option				IX
Surveillance					
QA of production by Notified Body	Required				VI
QA of product by Notified Body		Required			VII
QA by manufacturer			Permitted	Permitted	VIII

The above table shows the various options available to a manufacturer when designing hazardous area equipment. All 'Category 1' equipment must be certified by a Notified Body, as must 'Category 2' electrical. 'Category 2' non-electrical and all 'Category 3' equipment can be self-certified. The appropriate Annexes of the Directive are given for reference and should be consulted.

In addition, manufacturers must have appropriate Quality Assurance (QA) in place as stated in the appropriate Annexes.

The ATEX Product Directive permits a new system of manufacturer 'self-certification'. The manufacturer can assess the design to a recognised construction Standards without gaining external certification. The design documentation would then be submitted to a Notified Body (NB) for safe keeping but would not be assessed by the NB unless there is cause for concern that the equipment is unsafe. This arrangement relieves the financial overhead on manufacturers for the certification of equipment used in lower risk circumstances.

The Universal Option alternative covers submission to a NB of an arrangement of items for independent testing. The other requirements are set out in the Directive and manufacturers must be familiar with these.

One important criteria is that of the requirement for manufacturers to supply adequate instructions for safe use and operation. This has always been good practice and a selling point but never before been formalised as a legal obligation.

The Safety of Workers (137) Directive

The principle aim of this Directive is to place clear requirements on the owners of industrial plants containing hazardous areas.

Owners of industrial plants must implement formal systems relating to:

- Proper Area Classification
- Identification of Hazards
- Provision of Personal Protective Equipment
- Plant modification review procedures
- Inspection and Maintenance requirements and routines
- Training and competency assessment of personnel and contractors
- Appointment of a 'responsible person' competent to oversee the safety of the above systems

The '137' Directive cross-refers to the '100a', to use the same technical terminology, for example choosing Category 2 equipment for a Zone-1 hazard.

Owners must familiarise themselves with the detailed requirements of this Directive and implement it according to their plant operational arrangements. Thus, the Directive may be regarded as one aimed principally at management.

Documentation

The '137' Directive requires the generation of an 'Explosion Protection Document' (EPD) in which all aspects of safety, both technical and organisational, are formally laid down.

The 'Apparatus Certificates of Conformance' issued by Notified Bodies or manufacturers must also state compliance with the ATEX requirements. These will form part of the EPD. In addition, Area Classification, including the supporting calculations; other instructions, provided by manufacturers; system descriptive documents, covering Ex i interconnected apparatus; procedures for inspection and maintenance and 'Permit to Work' systems will all need to be cited.

The 'EPD' thus becomes a central repository for all safety-related information. Work on any site must be co-ordinated and controlled by the owner in a safe manner by reference to the information it contains.

DSEAR in the UK

The implementation of the '137' Directive in the UK was combined with the requirements of another, called the Chemical Agents Directive. These two have been issued under the Dangerous Substances and Explosive Atmospheres Regulations (2002); it is known as the 'DSEAR'.

The DSEAR provides requirements under each of the following section headings:

1. Citation and commencement.
2. Interpretation.
3. Application.
4. Duties under these Regulations.
5. Risk assessment.
6. Elimination or reduction of risks from dangerous substances.
7. Places where explosive atmospheres may occur
8. Arrangements to deal with accidents, incidents and emergencies.
9. Information, instruction and training.
10. Identification of hazardous contents of containers and pipes.
11. Duty of co-ordination.
12. Extension outside Great Britain.
13. Exemption certificates.
14. Exemptions for Ministry of Defence etc.
15. Amendments.
16. Repeals and revocations.
17. Transitional provisions.

Owners of companies must indicate how they have complied with the requirements embodied in the above sections, by reference to adequate documentation and procedures. The DSEAR does not refer to the production of an EPD. In the UK, the 'Control of Substances Hazardous to Health', (COSHH: 2002) and the 'Management of Health and Safety at work', (MHS: 1999) are regulations which require owners to implement, and then to document, procedures which demonstrate compliance. The DSEAR recognises this and permits the integration of safety documentation within a 'Risk Assessment'. This is sometimes referred to as a Safety Case or a Technical File in other UK regulations.

The owner is ultimately responsible for the generation of such documentation. The DSEAR does not prescribe how this should be done, as the individual owners must generate the systems to suit the operation of their plant.

Conclusion

For all new equipment and protective systems installed after 1st July 2003, Certificates of Conformance to the explosion protection Standards, provided by equipment manufacturers, will state that the equipment complies with the minimum requirements, (the ESRs) of the ATEX 100a Directive.

Retrospectively, the owners must assess their premises to ensure that their equipment and the installations meet the requirements of the ATEX 100a Directive and DSEAR respectively.

Installations completed before 1st July 2003 will need to be re-examined to ensure that they meet the criteria outlined in this section. The owner may choose to do this, requesting supporting documentation from the manufacturers and suppliers. Alternatively, the owners may request that the manufacturers/suppliers provide assessments for their equipment.

The onus has always been placed on the manufacturers to provide the specification for their products, from which the owners must select equipment suitable for their application. The explosion protection and, now through ATEX, the documentation provided by the manufacturer becomes a significant part of the owners' evaluation. The formal date set for completion of this assessment was by 1st July 2006.

When first introduced, the Directives and Regulations were viewed as yet another burden on the processing industry and its suppliers. Ultimately, this must be set against the need to raise and maintain the standard of safety. The European-wide approach will be successful if it influences the management of safety at a philosophical level. Signs are that this is happening and other countries are now monitoring its progress with a view to adopting ATEX.

Further information on the implementation of ATEX can be found on a website:

<http://europa.eu.int/comm/enterprise/atex/index.htm>



General References of Key Standards

Standard	Title	Notes
EN 1127	Explosive atmospheres - Explosion prevention and protection Part 1 - Basic concepts and methodology	Key document providing philosophy
EN 13463	Non-electrical equipment for potentially explosive atmospheres. Part 1: Basic method and requirements Part 2: Protection by flow restriction "fr" Part 3: Protection by flameproof "d" Part 4: Protection by inherent safety "g" Part 5: Protection by constructional safety "c" Part 6: Protection by controlled ignition sources "b" Part 7: Protection by pressurisation "p" Part 8: Protection by liquid immersion 'k'	Non-electrical apparatus methods of protection
EN50281	Electrical apparatus for use in the presence of combustible dust Part 1-1: Electrical apparatus protected by enclosures - Construction and testing Part 1-2: Electrical apparatus protected by enclosures - Selection and installation Part 2-1: Test methods - Methods for determining the ignition temperatures of dusts	Dust hazards European
BS IEC 61241	Electrical apparatus for use in the presence of combustible dusts. Part 0: General requirements Part 14: Selection and installation of apparatus	Dust hazards International
EN50014	General requirements for electrical apparatus for use in hazardous areas	Being replaced by IEC79-0
EN50020 EN50039	Requirements for type of protection "i" Intrinsically safe systems	Replaced by IEC79-25
BS EN 60079 (IEC79)	Electrical apparatus for explosive gas atmospheres Part 0: General requirements Part 11: Electrical apparatus with type of protection "i" Part 14: Electrical installations in hazardous areas (other than mines) Part 17: Recommendations for inspection and maintenance of electrical installations in hazardous areas (other than mines) Part 19: Repair and overhaul for apparatus used in explosive atmospheres (other than mines or explosives) Part 25: Intrinsically safe systems Part 27: FISCO and FNICO	Electrical apparatus