



# LEADING STANDARDS IN COMPLIANCE & SAFETY

## NON ELECTRICAL EQUIPMENT IN HAZARDOUS AREAS

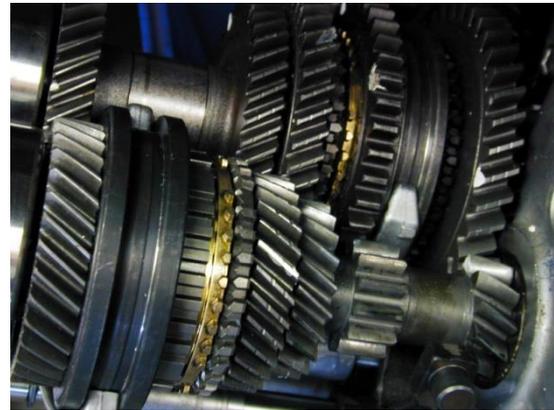
The ATEX Directive consists of two EU Directives, ATEX Directive 2014/34/EU and ATEX Directive 99/92/EC.

ATEX Directive 2014/34/EU embodies the European minimum technical and legal requirements for equipment used in potentially Explosive Atmospheres, whereas ATEX Directive 99/92/EC is set out for improving the health and safety of workers potentially at risk from explosive atmospheres. Only ATEX Directive 2014/34/EU applies to manufacturers; ATEX Directive 99/92/EC applies to end-users.

The ATEX Directive became mandatory on 30 June 2003 for all electrical and non-electrical (mechanical) equipment intended for use in potentially Explosive Atmospheres. Prior to the ATEX Directive it was only necessary to apply explosion safety principles to electrical equipment; Non-Electrical (mechanical) equipment was not considered, relying only on regional regulations, national technical guides and 'Good Engineering Practice' to ensure that potential ignition risks, such as hot surfaces or sparks, would not occur.

Consequently, many countries applied their own criteria for acceptance, making the movement of a product across international borders difficult. ATEX draws attention to the non-electrical hazards and requires a consideration of these with respect to explosion safety.

ATEX has two aspects - the equipment design and production control.



The requirements become more onerous as the level of risk increases.

According to the requirements of the ATEX Directive, all equipment intended for use in explosive atmospheres must be categorised into groups and categories. Equipment is classified by group and category in relation to its intended use, the probability of occurrence of the potential source of ignition and the degree of protection it offers against the risk of becoming a potential source of ignition in an explosive atmosphere.

The ATEX Directive comprises two Equipment Groups; Group I and Group II. Equipment of Group I is intended for use in mining applications (ground and underground) susceptible to firedamp. Equipment of Group II is intended for use in industrial applications with an explosive gas and/or dust atmosphere other than mining applications.

The Equipment Groups are subdivided into categories according to the level of safety provided; in particular, Equipment of Group I comprises Categories M1 and M2. Equipment of Group II comprises Category 1, Category 2

FORM 9227 Issue 11





and Category 3; equipment of Group II is subdivided further in accordance with the nature of the explosive gas or dust atmosphere which is intended.

**The key requirements for each equipment category are as follows:-**

#### **Equipment Category 1 or M1**

Equipment designed to ensure a very high level of protection, during normal operation, and in the event of an expected malfunction or rare malfunction. The equipment is required to be capable of functioning safely in the presence of an explosive atmosphere, and to be safe either with two faults occurring or protected by two independent means of protection.

To comply with the Directive, manufacturers are required to obtain an EU-Type Examination certificate and Quality Assurance Notification (QAN) by working with a Notified Body.

#### **Equipment Category 2 or M2**

Equipment designed to ensure a high level of protection, during normal operation and in the event of an expected malfunction. The equipment must be designed to be de-energised in the event of an explosive atmosphere occurring.

To comply with the Directive, manufacturers are required to follow Annex VIII of the Directive (“Internal Control of Production”) and submit certain technical documentation to a Notified Body.

#### **Equipment Category 3**

Equipment with a requisite level of protection during normal operation.

To comply with the Directive, manufacturers are required to follow Annex VIII of the Directive (“Internal Control of Production”).

### **Internal Control of Production**

The actual process of “Internal control of production” does not involve a Notified Body. Rather, it includes for the creation and maintenance of a **Technical Documentation file** and requires that the manufacturing process guarantees that the manufactured equipment is the same as that covered by the Technical Documentation.

For category 2 or M2 equipment, this file must then be submitted to a Notified Body who will store the file for at least ten years. There is no requirement for the Notified Body to check the contents or accuracy of the technical file.

### **Technical Documentation**

In general, Technical Documentation includes:

- A general description of the product.
- Conceptual design and manufacturing drawings.
- Descriptions and explanations necessary to understand the drawings and operation of the equipment.
- A list of standards applied in full or in part and descriptions of solutions adopted where the standards have not been applied.
- Results of design calculations and examination carried out.
- Test Reports (if applicable).
- Declaration of Conformity.

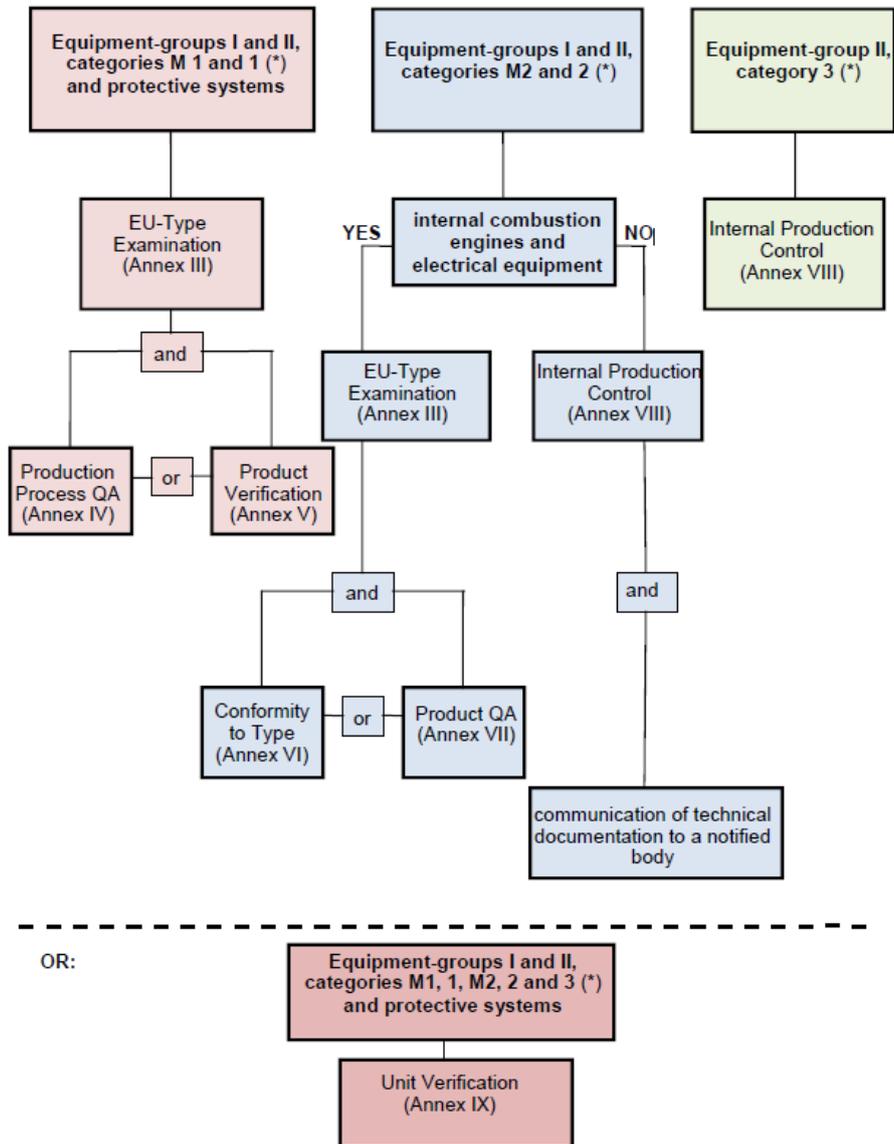
FORM 9227 Issue 11





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## Conformity Assessment Procedure, ATEX 2014/34/EU



(\*) and their components and devices according to Article 1(1), if separately assessed

Note: According to Article 13(4) for all equipment and protective systems of all groups and categories conformity to 1.2.7 of Annex II to the Directive 2014/34/EU (protection against other hazards) can be fulfilled by following the procedure of Internal Production Control (Annex VIII).

Ref: ATEX 2014/34/EU Guidelines, 1<sup>st</sup> Ed, April 2016

FORM 9227 Issue 11





# LEADING STANDARDS IN COMPLIANCE & SAFETY

## Assemblies of Electrical and Non-electrical Equipment

Non-electrical equipment may be supplied on a skid or as an assembly with electrical equipment. Provided the electrical equipment is suitably certified and installed, the manufacturer does not need additional certification for these items.

A good example is a CE marked, ATEX compliant flameproof motor attached to a mechanical pump or gearbox. When preparing the Technical Documentation, the motor, used as intended, does not need further assessment (i.e. there is a presumption of conformity).



The significant part of the Technical Documentation will concentrate on the non-electrical ignition sources of the pump.

## Ignition Hazard Assessment

The ignition hazard assessment will identify sources of ignition and these can then be dealt with in turn, either through compliance with EN ISO 80079 (parts 36 and 37 as applicable) or through compliance with additional parts of that series of standards.

The main task is to establish the ignition risks that are present in normal operation (Category 3), or could be present under certain operating conditions on the equipment.

Examples of these could include an expected malfunction (Category 2/M2) or rare malfunction (Category 1/M1). EN ISO 80079-36:2016, Clause 5 and Annexes B & C, includes necessary technical guides on how to conduct an Ignition Hazard Assessment.

An expected malfunction could be the failure of a bearing or loss of oil in a gearbox. A rare malfunction could be a catastrophic failure of an air circulated fan or a pump shaft.

Some items of equipment will be designed to work across a boundary between zones. For example, in industrial applications where mixers or agitators are used, a different hazardous zone may be designated internally and externally to the equipment; in particular, a typical industrial agitator assembly may comprise a vessel, a shaft fitted with impeller blades, a mechanical seal device, a gear unit and an electrical drive; the vessel internally may be classified as zoned 0, whilst the space outside the vessel may be classified as Zone 1.

In that particular case, the drive of the equipment, (i.e. gearbox and motor) will be operating in Zone 1, whilst the mechanical seal and the shaft fitted with the impellers will be operating in Zone 0. These arrangements require special consideration to establish the appropriate requirements for each part.

FORM 9227 Issue 11



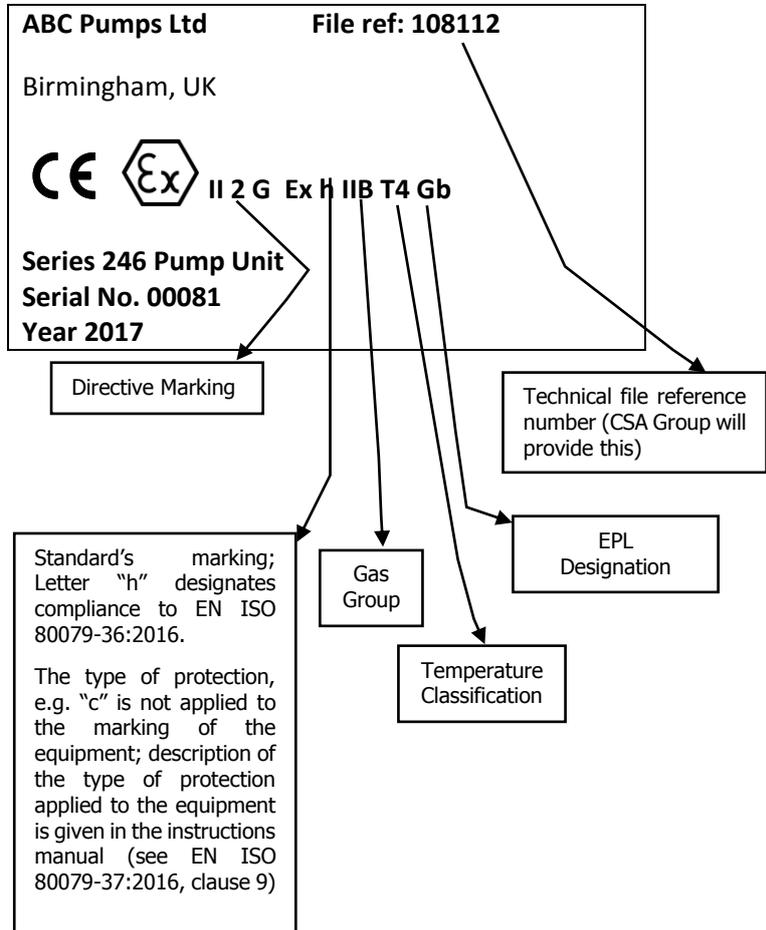


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## Marking

The example to the right shows a label that might be applied to an item of Category 2 non-electrical equipment. The example equipment is suitable for potentially explosive gas (G) atmospheres, and uses constructional safety (designated 'c' by EN ISO 80079-37) to reduce the risk of ignition sources becoming effective.

For details of marking requirements and examples, refer to EN ISO 80079-36:2016, Annex ZB and Clause 11.



## More Information

For further information please contact us.

FORM 9227 Issue 11

