



*As far back as over 100 years ago inventors, engineers and companies were looking for effective ways of protecting against the hazards of firedamp and explosions caused by gas and coal dust in mining. For this reason, electric drive motors, lighting systems and devices were increasingly designed and manufactured in encapsulated form.*

*In Germany, the first Regulation for protecting systems subject to explosion hazards was published by the VDE (Association of German Electrical Engineers) in 1935. Further safety requirements, directives and regulations on this subject followed.*

*The Regulations on electrical systems in premises subject to explosion hazards (ExVO) came into force in 1963. These regulations stipulated that it was mandatory for explosion-protected equipment to be inspected by the PTB (German Office for Physics and Technology) or the BVS (Mining Test Centre). Type approval also became compulsory.*

*In 1975 the Council of the European Communities adopted outline directives on explosion protection. The European Commission's directive 79 / 196 / EEC provided the legal basis for producing a complete set of European Standards for explosion-protected equipment.*

*The European Committee for Electrotechnical Standardisation (CENELEC) drew up the European Standards governing areas subject to explosion hazards.*

*The Standards EN 50014 to EN 50020 / VDE 0170 / 171 which appear as "Electrical equipment for areas subject to explosion hazards" in the VDE regulations, have applied since 1 May 1978.*

*Type approval and testing agency inspections were replaced by a prototype test in the Regulation on electrical systems in premises subject to explosion hazards dated 27. 2. 1980, now called **ElexV**. The certificate confirming that a prototype test has been passed must be issued by an authorised testing agency of an EU member state (e.g. BVS, DEMKO, KEMA, PTB). The CERTIFICATE OF CONFORMITY issued is mutually recognised by all EU member states without any restrictions.*

*Over the years a few changes and amended versions have been issued in respect of EN 50014 ff and ElexV.*

早在百年前，发明者、工程师和许多公司就试图寻找有效的方法，排除沼气和由煤气以及开矿中的煤尘引起爆炸的危险。为此，由电动马达、照明系统和设备在设计、制造中增加了密封装置。

在德国，第一种防爆条例是由德国电气工程师协会（VDE）于1935年发布的。以下提供其他法规，以适应更进一步的安全要求。

关于有爆炸危险的电气装置的条例（ExVO）于1963年实施。这些条例规定，防爆设备必须由德国物理技术研究院（PTB）或开矿测试中心（BVS）检测。也必须进行防护型式的核定。

1975年，欧洲共同体委员会采用了防爆的外形规定。欧洲委员会的规定（79 / 196 / EEC）提供了制定成套防爆设备欧洲标准的法律基础。

欧洲电气标准化委员会（CENELEC）拟定了欧洲的防爆标准。

标准 EN 50014-EN 50020 / VDE 0170 / 171 已于1978年5月1日作为电气防爆标准实施。

防护型式的核定和测试机构的检验，由电气防爆条例（1980年2月27日发布）中的标准测试代替。此条例现称作 **ElexV**，通过了标准测试的证明书，必须由欧洲成员国的权威测试机构（例如 BVS, DEMKO, KEMA, PTB）发出。发出的证明书，是欧洲成员国无条件共同认可的。

过去数年，对标准 EN 50014 ff 和条例 ElexV 的几次修改，其修订版都已发布。

## ATEX 100a

*With a view to further harmonisation of the legal provisions in the European Union in respect of use of equipment and protection systems in accordance with the regulations in areas subject to explosion hazards, the European Parliament and Council passed **Directive 94 / 9 / EC** on 23 March 1994.*

*This directive is also called ATEX 100a .The period for implementing this guideline started on 1 March 1996 and from 1 July 2003 onwards it will replace and supplement all directives on explosion protection applicable to date at the European level.*

*The single market requires national regulations to be replaced by European Standards (EN).*

*The **ATEX 100a** governs the requirements for all, in other words, both electrical and non-electrical equipment and protection systems which are used as intended in areas subject to explosion hazard. Monitoring, control and safety equipment for use outside areas subject to explosion hazards also fall within the provisions of this directive if they are necessary in view of explosion hazards for a safe running of equipment and protection systems.*

*ATEX 100a consists of a section covered by law and appendices.*

*The part covered by law consists of four sections sub-divided into 16 articles. Appendices I to XI contains 7 modules.*

*The guideline governs directly fundamental health and safety requirements for the building of equipment and protection systems.*

*Equipment groups and categories are also redefined.*

*A manufacturer must submit an EU certificate of conformity issued on the basis of a prototype test conducted by a nominated approved test agency and a CE mark must appear on the product.*

*Each device must be provided with assembly or operating instructions which, if so requested by a European customer, must be available in his or her national language.*

*To date, the quality assurance system of a manufacturer of explosion-protected equipment has been ignored: now proof of quality management must be furnished to a "nominated agency".*

## ATEX 100a

为了进一步调整欧洲共同体在设备及其防护装置使用方面的法律，欧洲议会和委员会根据防爆条例于 1994 年 3 月 23 日通过了 94 / 9 / EC 的规定。

这个规定也称作 ATEX 100a。这个指导性的法规于 1996 年 3 月 1 日开始实施。从 2003 年 7 月 1 日起，它将取代和补充所有至今适用的欧洲防爆标准法规。

单一市场要求各国的法规由《欧洲标准》(EN) 取代。

ATEX 100a 符合所有设备的要求，即意味着，电气和非电气设备及其防护装置都是当作有爆炸危险的设备使用。如果为了保护设备及其防护装置正常运转而也有必要实施防爆措施的话，此条例也适用于有爆炸危险范围以外用来监控、控制和防护设备。

ATEX 100a 由“法律”和附录部分组成。“法律”又由 4 部分-16 条款组成。附录 I-XI，含 7 个单元。

此法规直接关系到设备和防护装置制造基本的安全要求。设备的分类和范畴也再加以定义。

制造商必须提供通过由指定机构进行标准测试的欧洲证书和产品必须有 CE 标记。

每种装置必须附有装配或操作说明书，若是欧洲用户提出说明书的要求，一定要提供此用户所在国家的语言写成的说明书。

目前，已不用防爆设备制造商的质量保证制，而一定要由指定机构提供质量管理证明书。



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## Definition of terms

## 名词解释

### Primary explosion protection

### 主防爆:

*It is always better to avoid the risk of explosion rather than to put in place any type of protection against explosion.*

它总是较好地避免了爆炸危险而不用把任何形式的防爆装置安装在适当地方。

*Measures that avoid the creation of an explosive atmosphere and thus prevent an explosion are termed primary explosion protection.*

避免爆炸气压的产生和防爆和措施称作主防爆。

*These include the avoidance of combustible substances, concentration limitation, raising of the flash point, inerting and ventilation.*

这些措施包括回避可燃物质、限制浓度、提高闪点，提高惰性和通风。

### Secondary explosion protection

### 二次防爆

*Once the options offered by primary explosion protection have been exhausted, there may still be areas where a dangerous explosive atmosphere is present - areas subject to explosion hazards.*

一旦主防爆已无法工作，仍然可能存在危险的爆炸气压而产生爆炸。

*Secondary protective measures to prevent explosion are implemented in areas subject to explosion hazards and these counteract sources of ignition.*

二次防爆措施是在有爆炸危险的地方发挥作用，抵消发火源的作用。

*Secondary explosion protection is considered to be all electrical equipment, devices and protection systems for areas subject to explosion hazards.*

所有电气设备、装置和防护系统，在有爆炸危险的地方应考虑二次防爆。

### Classification of areas subject to explosion hazards

### 爆炸危险区域分类

*In areas subject to explosion hazards, the atmosphere may become explosive because of conditions specific to the site and company.*

在有爆炸危险的地方，由于场所和环境的情况特殊，大气压可能会变成爆炸性气压。

*Depending on the likelihood and duration of the occurrence of a dangerous explosive atmosphere, areas subject to explosion hazards are classified in zones:*

根据危险爆炸性气压出现的可能性和持续时间，爆炸危险区域的分类是：

*Zone 0, Zone 1 and Zone 2: for areas with a dangerous explosive atmosphere caused by a mixture of air and flammable gases, vapours or fine mists under atmospheric conditions. (cf. EN 60079 - 10:1996)*

0级区、1级区、2级区：  
在大气压下，由空气和可燃气体、蒸气或薄雾混合物引起的危险爆炸气压的地方（参见标准 EN60079-10:1996）

*Zone20, Zone21 and Zone22: for areas with a dangerous explosive atmosphere caused by Combustible dusts.*

20级区、21级区和22级区：  
由可燃尘埃引起的危险爆炸气压的地方。

### Device classification

Devices are considered to be machines, equipment, stationary or portable fixtures, control and equipment components as well as warning and preventive systems that are used individually or combined to generate, transfer, store, measure, control and convert energy and to process materials and have their own ignition sources and can therefore cause an explosion.  
(Directive 94/9/EG, Kap. 1 (3) a)

In accordance with Directive 94/9/EG appendix 1 and EN 50014/A1: 1996 devices are sub-divided into groups and categories.

#### Device group I

with sub - division into **categories M1 and M2**  
(Firedamp or combustible dust in mines)

#### Device group II

with sub - division into **categories 1, 2 and 3**  
(other areas)

For **device group II** the designation is sub-divided:

Letter „**G**“ - For areas where explosive mixtures of gas, vapours, fine mists or air are present.

Letter „**D**“ - For areas in which dust can form explosive atmospheres.

**Example: II 2G** = Device group II, category 2, explosive gas mixture

EN 50014 / A1: 1996, Appendix G provides an informative comparison between classification into categories and zones.

### Types of protection

Specific measures applied to electrical equipment to prevent ignition in an atmosphere subject to explosion hazards are termed “types of protection”.

**The following standards apply to types of protection:**

| Standard | Type of protection    | code |
|----------|-----------------------|------|
| EN 50014 | General requirements  |      |
| EN 50015 | Oil immersion         | “o”  |
| EN 50016 | Pressurised enclosure | “p”  |
| EN 50017 | Sand filling          | “q”  |
| EN 50018 | Flameproof enclosure  | “d”  |
| EN 50019 | Increased safety      | “e”  |
| EN 50020 | Intrinsic safety      | “i”  |
| EN 50028 | Encapsulation         | “m”  |

### 装置分类

这里所说的“装置”是指机器、设备、固定与移动装置、控制元件和设备部件以及报警系统和防护装置。它们是单独或组合在一起用来产生、传递、储存、计量、控制、转换能量和材料加工，它们有各自的发火源，因此能引起爆炸 (条例 94 / 9 / EG, Kap.1 (3) a)。

根据条例 94/9/EG, 附录 1 和 EN50014/A1: 1996 年的装置细分成如下组和类:

#### 装置组 I:

再细分成 M 1 和 M 2 两小类 (沼气或矿井中的可燃尘埃)

#### 装置组 II:

再细分成 1、2、3 三小类 (组 I 以外的地方)。

对于装置组 II 的小类，再细分成两种:

**G 种:** 指存在气体、蒸气、薄雾和空气等爆炸性混合物的地方。

**D 种:** 指尘埃能形成爆炸性气压的地方。

例: II 2G 就是 II 组, 2 类, G 种, 即爆炸性气体混合物。

标准 EN 50014/A1: 1996, 附录 G, 提供了“类”与“区”之间的资料比较。

### 防护型式:

防止电气设备在大气压下发生爆炸的特殊措施称作“防护型式”。

**如下标准适用的防护型式为:**

| 标准       | 防护型式   | 代号  |
|----------|--------|-----|
| EN 50014 | 通用要求试验 |     |
| EN 50015 | 充油型    | “o” |
| EN 50016 | 正压型    | “p” |
| EN 50017 | 充砂型    | “q” |
| EN 50018 | 隔爆型    | “d” |
| EN 50019 | 增安型    | “e” |
| EN 50020 | 本质安全度  | “i” |
| EN 50028 | 浇封型    | “m” |



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