

2.1 EXPLOSION PROTECTION WORLDWIDE

The International Electrotechnical Commission (IEC) is responsible for global standards in the field of electrical engineering. IEC publications regarding the explosion protection of electrical equipment and installations are drafted by the Technical Committee TC31 and are deemed as recommendations. All standards observe the latter as far as possible. Until recent years, regulations for gas explosion hazardous areas were stipulated in the 60079 standard series and those for dust explosion hazardous areas in the 61241 series. As many requirements are identical for both, the two standard series have now been grouped under **IEC 60079**.

The various methods of ensuring **ignition protection for equipment** are called protection types. They are described in the various sections of **IEC 60079** and are construction regulations recognised in many countries (see Table 3).

Systems in hazardous areas must be classified according to their **degree of endangerment** in respect of the likelihood of the occurrence of explosive atmospheres in zones. IEC drafted two standards for this purpose:

- IEC 60079-10-1: Classification of areas – gas explosion hazardous areas.
- IEC 60079-10-2: Classification of areas – dust explosion hazardous areas.

Further standards are available for the **installation and operation** of electrical systems:

- IEC 60079-14: Project engineering, selection and installation of electrical systems.
- IEC 60079-17: Inspection and maintenance of electrical systems.
- IEC 60079-19: Equipment repair, overhaul and recycling.

In 2016 standards for **non-electrical equipment** for use in explosive atmosphere were published:

- ISO 80079-36: Non-electrical equipment for explosive atmospheres – basic method and requirements.
- ISO 80079-37: Non-electrical equipment for explosive atmospheres – non-electrical protection type constructional safety “c”, control of ignition sources “b”, liquid immersion “k”.

National regulations may however differ from IEC standards. For this reason the extent to which they may be applied in the respective countries must be verified. As this entails a high outlay for development and approval procedures particularly on the part of global players, it seemed advisable to subject approval conditions for electrical equipment to international regulations, thus permitting a free global movement of goods on the basis of country or region-neutral certificates. Furthermore, consistent standards should ensure the maximum safety of Ex products throughout their entire life cycle. IEC therefore introduced a procedure with the aim of standardisation: the **IECEx Scheme**.

2. LEGAL BASES

Recognised IECEx certification bodies (ExCB = certification body) and IECEx test laboratories (ExTLs) exist worldwide and are accredited on the basis of high standard criteria and regularly monitored. An IECEx certificate is only issued if test sample type testing is successful and an audit verifies that an effective quality management system is in place. However, different regional and national approval procedures currently exist all over the world, including for example the ATEX directive in the European Union or national approvals in the USA (UL, FM).

Besides the IECEx Scheme for testing and **certifying new products** (IECEx Equipment Scheme), for some years now the system has also included **certification of service providers** (IECEx Certified Service Facilities Program). The service provider must prove that it maintains a quality assurance system. It is audited every three years by an accredited auditing body (Ex-CB).

The third component of the IECEx Scheme (IECEx Certification of Personnel Competencies) runs on similar lines. It focuses on the **certification of the personal skills** of professionals working in hazardous areas. This is designed as a guarantee for global operators that employees possess the necessary qualification and experience to perform with perfection highly complex tasks in hazardous areas.

In the "Recognised Training Provider (RTP)" programme the IECEx organisation examines the competence of providers offering explosion protection courses. A list of training providers is available on the IECEx website.

2.2 EXPLOSION PROTECTION IN THE EUROPEAN UNION

Explosion protection is governed by directives and standards in the European Union.

Directives

In 1976 the Council of the European Community established the basis for the free movement of explosion-protected electrical equipment within the European Union with its "Directive on the harmonisation of the laws of the member states concerning electrical equipment for use in potentially explosive atmospheres (76/117/EEC)". This directive has since been continuously adapted to state-of-the-art standards by means of single and supplementary directives, which however only concerned electrical equipment.

Full harmonisation and extension to all types of equipment, both electrical and non-electrical, was achieved in 1994 by the new 94/9/EC (ATEX) directive. This was followed in 1999 by the 1999/92/EC directive, which governs operation in hazardous areas and defines safety measures for the persons working in those areas. In February 2014, Directive 2014/34/EU (ATEX) was published. Actual implementation with regards to equipment certification took place on 20 April 2016, replacing Directive 94/9/EC.

Standards

The European EN 50014 – EN 50020 electrical equipment standards were issued in 1978 and replaced the previous national standards for this equipment valid across Europe. Aside from the electrical equipment standards (published by the European Committee for Electrotechnical Standardization CENELEC), the European Committee for Standardization (CEN) has drafted respective standards for non-electrical explosion-protected equipment.

According to an agreement between the European Committee for Electrotechnical Standardization CENELEC and the International Committee for Electrotechnical Standardization IEC, international standards for electrical equipment have generally been adopted by CENELEC as they stand. The EN 50014 ff series defining requirements for equipment in explosive gas atmospheres has been gradually replaced by the EN 60079 series (at international level IEC 60079). In Germany these standards are issued as VDE 0170.