

# Fifty Years of Progress - Performance Standards for Gas Detectors and Other Equipment



## 1957–2007: Growing Markets through European Standards - 50 years of progress

This year marks 50 years since the treaty that created the 'Common Market' for goods in Europe was signed in Rome. The Treaty of Rome, signed by France, Italy, West Germany, Belgium, The Netherlands and Luxembourg, founded the European Economic Community (EEC) and later developed into the European Union (EU) of today.

Article 100 of the Treaty is of capital importance: "Member States resolved unanimously to abolish existing trade barriers created through legislation and standardization."

To mark this event, standards-makers across Europe are highlighting the evolution from standards for national markets to European standards which reduce technical barriers to trade, support the European Single Market and can be applicable to goods worldwide, making important contributions to innovation and market growth.

Hermann Ahls, European Committee for Standardization Secretary General, said: "Standardization is one of the big success stories of European integration over the past 50 years. Without European Standards, the European Single Market as it is today would not exist. European Standards have reduced technical barriers to trade for big industries such as machinery, construction, consumer products and many more as well as opened global markets for European industry. We are confident that the system of co-regulation we have established with the European Commission and EFTA is a good tool serving industry and consumers in Europe."

European Standards, known as European Norms (ENs), have been

produced since the 1960s, thanks to the joint efforts of the three European Standards Organizations (CEN - European Committee for Standardization, CENELEC - European Committee for Electrical Standardization and ETSI- European Telecommunications Standards Institute) together, with the European Commission and EFTA, the European Fair Trade Association.

Progressively, ENs have been approved by a growing number of National Standards Organizations. The foundation of the European Single Market in the 1990s was a further big step that boosted European standardization. Today, one European Standard is valid in 30 European countries and can be applied voluntarily by standards users. Standards have consistently been one of the key drivers for growth in Europe.

## European Policy and International Standardization

Europe has an interest in international standardization because of its potential to eliminate technical barriers to trade and to increase market access for all. International standardization also offers the possibility to promote and disseminate technologies.

The Vienna and Dresden Agreements between the International Electrotechnical Commission (IEC) and CENELEC give examples of how to avoid double work and to speed up standardization work. For example:

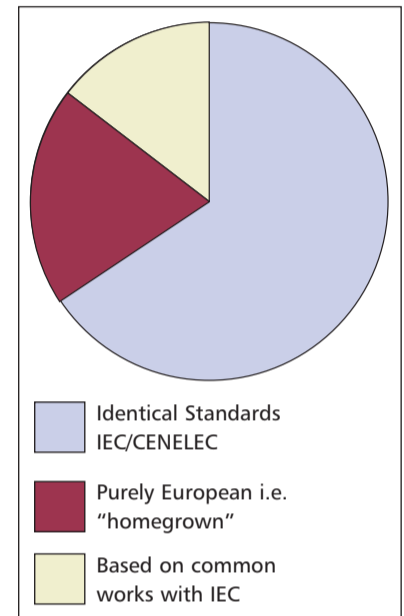
- Any new standard works cannot start without a proposal at the IEC level. EC Standardization works are preferably undertaken at IEC worldwide level. If IEC is not interested, the works can be then be handled by CENELEC.
- IEC / CENELEC procedures are identical for CDV / parallel enquiry and FDIS / parallel vote. Some exceptions occur for several sensitive fields such as nuclear industries. This shows that IEC and EN standards are the same or very near. For example the body of the EN standards relative to explosive atmospheres is the same as the IEC standards, with some exceptions relevant to the requirements of ATEX European Directives 94/9, such as the CE marking. The new harmonized standards are now accompanied by Annex ZZ which indicates how the standard covers the essential requirements of the Directive.

This globalization policy for standardization works has maximized the common standard of the IEC and CENELEC. See the chart above for the split of the standards.

## 2006 – 2007: Moving from EN 50000 Series to EN 60000 Series

In the last year, we have seen the ATEX Standards moving from EN 50000

## Repatriation of Harmonized European standards versus IEC works



Series to EN 60000 Series for explosive atmospheres. This is a very significant change for manufacturers and especially for gas detection manufacturers.

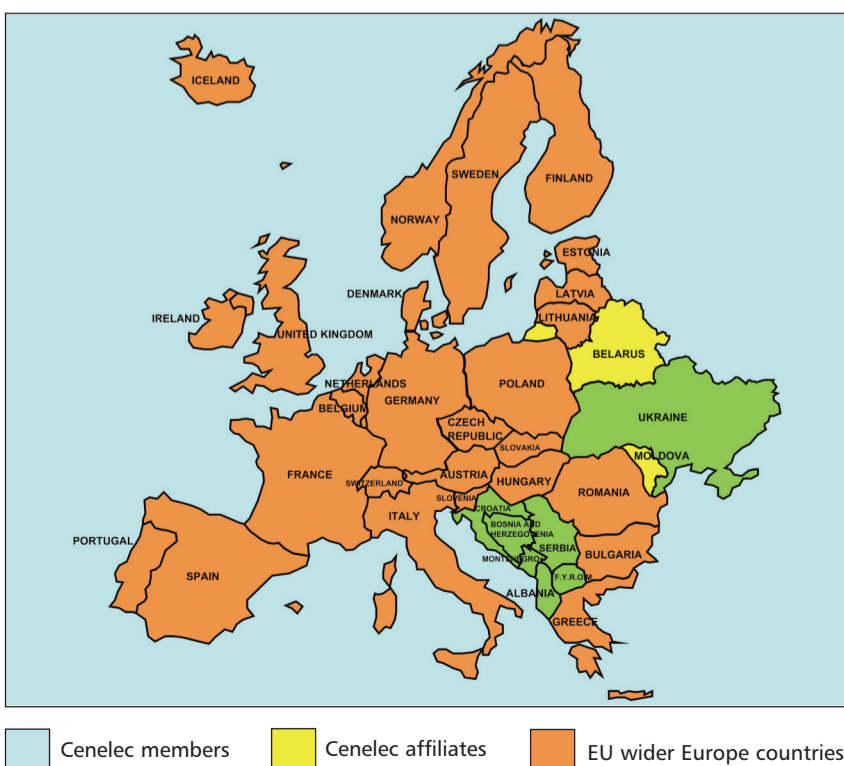
Under the New Approach, the European Directive 94/9/EC defines "Essential Requirements" for equipment and protective systems intended for use in potentially explosive atmospheres. ATEX-certified products must meet these requirements in order to be placed on the European market.

The CENELEC harmonized standards define the state of the art and the relative level of the requirements, which satisfy the Essential Health and Safety Requirements of directive 94/9/EC. The list of the harmonized standards giving the presumption of conformity is published by the European Union and is available on the web site, <http://ec.europa.eu/enterprise/newapproach/standardization/>.

As a consequence of European policy regarding the international standardization, the standards Series 50014....50028 that apply, among others, to gas detectors, are gradually replaced by Series EN 60079, based on IEC 60079 Series works. This process began on 01/07/2006, with the change of EN50019 "Increased Safety" for EN 60079-7. Recently, in March 2007, the EN50018 "Flame proof enclosure" has been replaced by EN 60079-1. In other words, the EN 50014..28 Series will lose their statute of harmonized standards giving the presumption of conformity to the Essential Requirements of directive 94/9/EC.

It is not mandatory by the directive to be in conformity with the harmonized standards when a manufacturer wants to release equipment to the market; however, the equipment must have an equivalent level of safety.

**The manufacturer can no longer manufacturer and sell equipment**





**Status of the harmonization of the EN 50014..28 and EN 50281-1-1 for ATEX 94/9/EC European Directive**

Reference of the Harmonized Standards	Title	Replaced by Harmonized Standards	In 2008/09 Will be Potentially Replaced by
EN 50014:1997 +A1 +A2 EN 50015:1998	General rules Oil Immersion "o"		EN 60079-0:2006
EN 50016:1998	Pressurized "p"	EN 60079-2:2004	
EN 50017:1998	Powder filling "q"		
EN 50018:2000 +A1	Explosion-proof enclosure "d"	EN 60079-1: 2006	
EN 50019:2000	Increased safety "E"	EN 60079-7:2003	
EN 50020:2002	Intrinsic safety "I"		EN 60079-11:2007
EN 50021:1999	Type of protection "n"	EN 60079-15:2003	
EN 50028:1987	Encapsulation "m"	EN 60079-18:2004	
EN 50281-1-1: 1998 +A1	Protection in ATEX		61241-0 and -1

which was designed and certified in accordance with the EN 50014..28 standards series without a re-examination.

This re-examination consists of checking to see if the standards used are the subject of **substantial modifications**, which are defined as modifying the state of the art to such a degree that the equipment certified previously no longer fills the essential requirements of the Directive. If this is the case, then the original certificate is no longer valid and the equipment must be certified again.

INERIS, a French notification body for ATEX, and a competent body for IEC Ex, has issued the following guideline for manufacturers to answer the question: Do your certified products consider the evolution of the standards?

**Case 1:** The equipment was certified according to standards series 50014..28, but it is not affected by substantial modifications.

- The manufacturer of the equipment does not have to recertify the equipment by the Notified Body, as it continues to fill the essential requirements of the ATEX Directive.
- The EC type examination certificate and the marking are not modified (marking remains " EEx... ," because it is not in conformity with the EN 60079 standards series).
- EC declaration must be updated by specifying that the standards used are no longer those which are harmonized and that the conformity of the equipment is not impacted by the substantial modifications of the EN 60079 standards series.
- If the manufacturer does not wish to make this analysis alone, the notification body can assist them and do the analysis for them. For example, INERIS can make the necessary examinations and can issue an official statement indicating that the equipment satisfies the essential requirements of the ATEX Directive.

**Case 2:** The equipment was certified according to EN 50014..28 standards series and it is affected by substantial modifications.

- The manufacturer must recertify the equipment by the Notified Body before the date of the cessation of presumption of conformity.
- The Notified Body will perform the entire examination and tests according to the EN 60079 standards Series which differ from those of the EN50xxx standards. The Notified Body will issue an addition to the EC type examination certificate by quoting the new standards used and the modification of the marking.
- The EC declaration, the user manual and the marking must be updated.

**Case 3:** The certified equipment is not affected by the substantial modifications but the manufacturer wants to be in conformity with the new standards.

- The notification body will carry out the analysis compared to the EN 60079 standards series and will include an addition to the EC type examination certificate by quoting the new standards used and the modifications of the marking.
- The EC declaration, the user manual and the marking must be updated.

Normally the list of the substantial modifications will be published by CENELEC. In the meantime, INERIS has established its own list. This list is available on the web site: [www.ineris.fr](http://www.ineris.fr) Some examples of substantial modifications established by INERIS:

**Explosion-proof boxes for use between -30°C and 65°C.**

- Assembly and specific choice of cable entries
- Joining of the seals ensuring IP degree of the box
- Realization of specific tests for explosion pressure determination with regard to the extreme temperatures expected.

**Portable equipment**

- Reevaluation of plastic material of enclosures not having a surface resistance lower than one gigaohm.

**Electric motor protected by increased safety**

- Modification of the insulation distances and creepage distances.
- New examination and test for the cage rotor machines.
- New definition of the shaft seals.

**Standardization Works for Gas Detectors at the IEC Level**

As for the above standards for Explosion Proof protection, the actual performance standards will be replaced by the series 60079 for explosive atmospheres. The IEC standards will also be converted

Reference of the IEC Standards	Title	Status	Will replace
IEC 60079-29-1 Ed. 1.0	Explosive atmospheres: Gas Detectors - General and performance requirements	FDIS – Final Draft International Standard	IEC / EN 61779-1 to IEC / EN 61779-5:
IEC 60079-29-2 Ed. 1.0	Explosive atmospheres: Gas Detectors - Guide for selection, installation, use and maintenance.	FDIS – Final Draft International Standard	IEC 61779-6
IEC 60079-29-3 Ed. 1.0	Explosive atmospheres - Part 29-3: Gas detectors - Requirements on the functional safety of fixed gas detection systems	CD - Committee draft	EN 50402
IEC 60079-29-4 Ed. 1.0	Explosive atmospheres: Gas detectors - Open path apparatus	CD - Committee draft	EN 50241-1-2
IEC 60079-29-5 Ed. 1.0:	Explosive atmospheres - Part 29-5: Gas Detectors - Open path installations practice	CD - Committee draft	EN 50241-1-2

to EN 60079, replacing the existing Harmonized Standards of ATEX Directive 94/9/EC.

**IEC Ex International Certification Scheme**

In order to facilitate the international trade of the electric equipment intended to be used in explosive atmospheres, and to avoid the multiplicity of national certifications while guaranteeing an adapted level of safety, a scheme of conformity certification to the international standards was founded at the international level under the aegis of the International Electrotechnical Commission, IEC. This certification is called IEC Ex.

The IEC Ex certification scheme is a voluntary certification system which offers to the manufacturers of "ATEX" equipment a compliance certificate accepted in the participating countries in which this certification scheme is recognized.

As the IEC Ex scheme is based on IEC standards and thus very close to the European Standards EN, the evaluation of a product certified IEC Ex coming from a non-EC country is largely simplified as the requirements and tests are acceptable by a notified European organization.

The stages of the IEC Ex certification of equipment are:

- Evaluation and test according to the IEC standards which apply to the equipment. These examinations must be carried out by a laboratory recognized by IEC Ex: ExTL (Ex Testing Laboratory). The Ex TL will issue the IEC Ex Tr (Tr test report).
- Evaluation and audit of the manufacturer quality assurance carried out by ExCB (Ex Certification Body). The Ex TL will issue the IEC Ex QAR (Quality Assessment Report).
- Release of a compliance certificate IEC Ex CoC (Certificate of Conformity).

The various documents comprising the reference frame of evaluation, understanding international standards, ATEX, and other documents are available on the web site of the IEC Ex at: <http://www.iecex.com/>.

In the past fifty years, the continued harmonization of standards has provided manufacturers with a framework for compliance with international certification of products. The consolidation of requirements has reduced standards redundancy, and increased the level of safety expected from manufacturers of gas detection and other electronic equipment. For more information on international and European standards, please visit any of the web sites mentioned in this article.

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Sources: IEC, CENELEC,  
EC, INERIS web sites.