STANDARDIZATION BODIES

Laws and technical standards
First it is important to understand the difference between legal and technical standards. In all technical fields, particularly where safety is fundamental, it is important to comply with all the relevant standards and be familiar with all of them in order to be able to deal with problems in protective electrical systems.
Legal standards dictate safety regulations in each state. In Italy, the main sources of legal regulations are laws enacted by Parliament, law decrees issued by the government and Presidential Decrees.
While legislative measures dictate guidelines, incorporating regulations and technical standards specify the requirements. Technical standards embrace all the specifications for designing, producing and verifying all equipment and plants, in order to guarantee maximum efficiency and safety during operation.
Technical standards are issued by national and supranational authorities and are prepared and published in detail. They can have legal value if they are implemented by a legislative provision.

History
As well as understanding the difference between legal and technical standards, it is interesting to go back in time and see which laws and orders have led to this situation and created the foundations for future regulations.
The history of standards is similar in all fields. Unlike today, technical standards were originally made to protect domestic markets and prevent foreign manufacturers from competing successfully against local manufacturers.
Since the opening of borders and free trading, standards have become a benchmark for harmonizing products and making them usable in all countries.
In electrotechnical and electronic fields, the standardization body in Italy is CEI. It began issuing the first standards for explosion-proof electrical equipment almost fifty years ago. Before then, both plants and electrical equipment were designed and produced in a rough and ready fashion, based on the specifications of foreign companies or information taken from standards of other countries.
To give an overview of Italy's beginnings in this field, below is a list of the country's earliest laws, standards and directives:
- Presidential Decree 547 "Standards for accident-prevention at work" of 27/04/1955.
- Standard CEI 2-2 "Explosion-proof rotary electrical machinery" file n. 88, (1955);
- Standard CEI 23-4 "Explosion-proof enclosures for electrical equipment" file n. 92, (1956);
- Standard CEI 31-1 "Explosion-proof safety enclosures" file n. 259, (1969);
- Standard CEI 64-2 "Electrical systems in areas with risk of explosion or fire" file n. 319, (1973).

In May 1969, the European Community Commission launched a program to eliminate technological barriers and encourage free trading within the European Community.
This led to the need to harmonize the standards of various member states and create a common standard that could be accepted by all EEC states.
CENELEC (European Committee for Electric Standardization) prepared the EN European Standards from 50014 to 50020 for explosionproof electrical equipment. These were accepted by all EEC member states.
In addition to the other EEC member states, Austria, Finland, Norway, Greece, Portugal, Sweden and Switzerland all accepted the new harmonized standards and still send their technicians to help update and review these standards prepared by CENELEC.
Today, some of the above countries have joined the European Community, while other countries from the ex-Eastern block have adapted their technology to European standards since the fall of the Berlin wall and are making the EN standards their own.

Standardization bodies
Now we are going to see what the standardization bodies are and what they do.
Currently, standards and regulations are basically issued on three different levels: international, regional and national.
There are three organizations for the electricity industry.
a) IEC International Electrotechnical Commission
b) CENELEC European Committee for Electrotechnical Standardization
C) CEI Italian Electrotechnical Committee

Table 1 - Standardization bodies

	FIELD		
	Electrotechnical and electronic	***Telecommunications***	***Other fields***
Internetional	IEC	ITU	ISO
Europe	CENELEC	ETSI	CEN
Italy	CEI	CONCIT	UNI

a) IEC - International Electrotechnical Commission
This authority was founded in London in 1907 and is now based in Geneva.
It groups all the national electrotechnical committees of the most industrialized countries and represents over 80% of the world's population and 95% of produced and consumed electrical energy.
It issues technical standards and recommendations which member states can follow without any obligation.
It is hoped (and most likely) that these standards will form the basis of all national standards and regulations.
As the first step towards the globalization of standards, a new international standard called IECEX will be implemented in 2007.

b) CENELEC - European Committee for Electrotechnical Standardization
This authority was founded by the European Economic Community in the aim to eliminate technical barriers against European trading. Unlike the standards issued by the IEC, CENELEC standards are technical regulations which are binding for member states.
CENELEC produces two types of documents: HD (Harmonized document) and EN (European Norm).
The HD harmonized documents containing technical information tend to unify the standards of different countries.
The EN European Standards are official and must be fully translated and adopted as a national standard by all EC member states within an established period.

c) CEI - Italian Electrotechnical Committee
This was founded in 1909 by the Italian Electrotechnical Association and was acknowledged in 1967 as a private association with legal powers under Italian Presidential Decree n. 822 of 11/07/67.
The aim of CEI is to "establish the requirements that materials, machinery, quipment and electrical systems must have in order to comply ith the standards of quality electrical technology, and the criteria for
verifying these requirements ".
The CEI is divided into Technical Committees and Sub-committees nd issues technical standards and dimensional specifications for the entire electrical industry, based on a convention endorsed by the CNR.
It represents Italy in European and international organizations (CENELEC and IEC) for the preparation and harmonization of standards.
Together with UNEL (Electrotechnical and Electrical Standardization), it prepares and publishes CEI-UNEL tables.
It collaborates with UNI (Italian Unification Authority) in the preparation and publication of tables and standards of common interest.

Laws and directives for protective systems and equipment
As you can see from above, a technical standard is a way of guaranteeing the safety of materials and the methods for design, installation and maintenance. However, these standards have no legal value unless they are incorporated in a country's law or directive **(see table 2).**
Under Articles 32 and 41, the Italian Constitution acknowledges individual health as a basic right and undertakes to protect this right. The first decree that refers to the protection of health in the workplace is Presidential Decree n. 547 of 27 April 1955, "Standards for accident- prevention in the workplace".
This is still the most commonly known decree today and is divided into twelve parts called "titles". In particular, Title VII, "electrical plants, machinery and equipment", refers specifically to the prevention o electrical accidents.
Title VII consists of eleven chapters containing 84 articles. These stablish the basic safety measures for electrical plants, machinery and equipment. In particular, chapter 10 refers to "electrical installations in areas with risk of explosion or fire".

Table 2 - European Community Directives

EC Directive	***Content***	***Incorporating Law***
76/117/CEE del 18/12/1975	This is a framework directive which: - allows the free trading of explosion-proof materials provided with a conformity certificate	Presidential Decree n. 727 21/12/82

	- defines the responsibilities of bodies authorized to issue conformity certificates - defines the procedure for issuing conformity certificates - establishes the use of the European Community mark - issues regulations to member states regarding production control	
79/196/CEE del 6/2/79	This directive defines: The types of Ex material governed by previous directive 76/117/EC - The harmonized CENELEC reference standards - the symbol used as the European Community mark	Presidential Decree n. 675 21/7/82
84/47/CEE del 16/1/84	This directive: - adapts previous directive 79/196/EC to technical progress - introduces amendments prepared by CENELEC to reference standards - defines the configuration of the European Community Mark in more detail - establishes the expiration date of old standards as 1/1/2005	Ministerial Decree 5/10/84
88/571/CEE del 10/11/88	Introduces generation C amendments to harmonized standards	
90/487/CEE del 17/09/90	Introduces other protection methods: - materials with "m" encapsulation - intrinsic safety systems - manual spray guns for electrostatic coating	
94/26/CE del 15/06/94	Introduces generation D amendments to harmonized standards	
ATEX 94/9/CE del 23/3/94	This new directive: - governs trading and use of Ex products - introduces the CE mark in addition to the Ex European Community mark - establishes as 30/6/2003 the term by which products on the market must conform to European Community directives	

In addition to Italian Presidential Decree 547/55 and Legislative Decree 626/94, more commonly known as Law 626, there is another very important law (n. 186 of 1 March 1968) which consists of the two following articles:
Art. 1 - All electrical and electronic plants, installations, machinery, equipment and materials must be made to the highest standards of workmanship.
Art. 2 - Electrical and electronic plants, installations, machinery, equipment and materials produced in compliance with the Standards of the Italian Electrotechnical Committee (CEI) are considered made to the highest standards of workmanship.
This law allows anyone working in the electrical field in Italy to follow the CEI standards as a benchmark and be sure they are working in full compliance with the law. In addition to national laws, other EC directives have been adopted over the last twenty years under Presidential Decrees regarding materials destined for use in areas with risk of explosion or fire.

Certification authorities
As you can see, equipment designed to be used in areas with risk of explosion is regulated by EN European standards, which are known Italy as CEI standards. These are referred to in the European directives which have now become national laws. However, the manufacturer's declaration is still not enough to guarantee the conformity of a product made to these standards – this conformity must be certified.

A recognized body, completely independent from the manufacturer, issues a certificate declaring that the component or the equipment has passed the type tests required by the relevant standards.
All tests must be made by an accredited laboratory or one which has passed the procedures that establish it as competent and reliable.
In Italy, the laboratory appointed to examine explosion-proof electrical material is the CESI (Italian Experimental Electrotechnical Centre).
This was designated under Italian Ministerial Decree 01/03/83. After the product has passed the type test, the laboratory issues a certificate stating that the prototype of this electrical product conforms to the standards.
The certificate also lists all the routine tests to be carried out on the product before it is put on the market, as well as its limits of use and any departures from the standard.
The certificate authorizes the manufacturer to apply the European Community mark and establishes what information is to be provided with the mark.