

Fires are a main cause of death casualties in accidents and cause major damage. It is believed that every year alone 1% of all inhabitants of the European Union are affected by burns. Prevention is the only answer and costs always less than to end fires. But there is no single policy for fire prevention and fire protection in the European Union. One volcano sparks the discussion on a better flight control coordination in the EU, but the everyday news about fires is not able to reach a unified approach in preventing fires. Currently fire detectors, fire extinguishers and sprinkler systems remain the most effective means of fire prevention and protection. But most Europeans still do not use the available means or ignore their need and importance in fire prevention. The lack of European legal harmonization and a common regulatory framework causes avoidable casualties and damages from fires. This article sets out what Europe already has done in fire prevention, what it could do and highlights Luxembourg's case.

FIRE PREVENTION IN EUROPE_

_Table 1
Trends in fires in European Union countries in 2002-2006⁴
(No information found on the Netherlands, Belgium, Cyprus, Malta and Luxembourg)

N°	Country	Population, thous. inh.	Number of fires					Average per	
			2002	2003	2004	2005	2006	year	1000 inh. a year
1	Germany	82401	183913	213035	179272	158600	187604	184485	2,24
2	France	63714	323241	394707	334421	376600	359300	357654	5,61
3	UK	60776	519373	621000	443000	430291	436047	489942	8,06
4	Italy	58148	180327	218486	212837	218858	227014	211504	3,64
5	Poland	38518	151026	222199	161720	184316	-	179815	4,67
6	Romania	21537	12745	-	-	10199	12926	11957	0,56
7	Greece	10706	-	24463	30318	-	-	27391	2,56
8	Portugal	10643	-	-	-	64560	-	64560	6,07
9	Czech Rep.	10229	18295	28156	20550	19181	10665	19369	1,89
10	Hungary	9956	31541	-	21471	24748	21829	24897	2,5
11	Sweden	9031	26998	29088	24620	26050	27106	26772	2,96
12	Austria	8200	32590	34531	-	31397	30297	32204	3,93
13	Bulgaria	7323	18450	-	23830	18969	29090	22585	3,08
14	Denmark	5468	16362	-	-	16551	16965	16626	3,04
15	Slovakia	5448	12181	15189	10118	-	10442	11978	2,2
16	Finland	5239	-	-	11713	-	17800	14757	2,82
17	Ireland	4109	-	31837	30778	30537	-	31051	7,56
18	Lithuania	3575	21237	18295	16279	15075	24030	18983	5,31
19	Latvia	2260	12744	11030	9901	8853	17720	12050	5,33
20	Slovenia	2009	-	-	6361	6780	-	6571	3,27
21	Estonia	1316	17311	12719	12002	10614	14900	13509	10,27

_Table 2
Trends in fire deaths in the European Union countries in 2002-2006⁴
(No information found on Belgium)

N°	Country	Population, thous. inh.	Number of fire deaths					Average number of fire deaths		
			2002	2003	2004	2005	2006	per year	per 100 thousand inhabitants	per 100 fires
1	Germany	82401	550	475	446	498	424	479	0,58	0,26
2	France	63714	486	514	467	469	341	455	0,71	0,13
3	UK	60776	562	592	508	492	504	532	0,87	0,11
4	Italy	58148	120	112	135	81	112	112	0,19	0,05
5	Spain	40448	230	224	218	223	-	224	0,55	-
6	Poland	38518	484	525	486	515	-	503	1,3	0,28
7	Romania	21537	222	-	-	209	220	217	1,01	1,88
8	Netherlands	16571	58	53	42	-	80	58	0,35	0,05
9	Greece	10706	103	40	37	100	72	70	0,66	0,26
10	Portugal	10643	77	108	-	-	-	93	0,87	0,14
11	Czech Rep.	10229	109	100	130	69	-	102	1	0,53
12	Hungary	9956	136	192	157	131	154	154	1,55	0,62
13	Sweden	9031	137	135	65	104	83	105	1,16	0,39
14	Austria	8200	39	45	46	45	33	42	0,51	0,13
15	Bulgaria	7323	97	116	105	102	96	103	1,41	0,46
16	Denmark	5468	79	90	85	87	69	82	1,5	0,49
17	Slovakia	5448	62	54	45	51	49	52	0,96	0,43
18	Finland	5239	95	105	103	-	119	106	2,01	0,72
19	Ireland	4109	47	34	35	41	-	39	0,96	0,13
20	Lithuania	3575	236	255	233	295	307	265	7,42	1,4
21	Latvia	2260	268	261	195	236	235	239	10,58	1,98
22	Slovenia	2009	20	25	17	12	7	16	0,81	0,24
23	Estonia	1316	131	142	127	134	164	140	10,61	1,04
24	Cyprus	788	-	-	5	-	-	5	0,63	-
25	Luxembourg	480	2	2	1	2	-	2	0,36	-
26	Malta	402	2	3	1	2	-	2	0,5	-

Accidents are the most terrifying causes for death. Beside the shock effect accidents have on victims, the frightening part is that accidents are the main killers for people younger than 30 years old¹. Whoever wants to have a long life should first of all look into accident prevention.

Not only from a personal perspective avoiding accidents makes a lot of sense, but also for the society as a whole increased security is a stabilizing factor. The recently adopted Internal Security Strategy for the European Union aims protecting people and the values of freedom and democracy, so that everyone can enjoy their daily lives without fear. The consequence of this strategy is a strong emphasis on prevention measures to prevent in particular human made disasters.

Besides car accidents, falls and drowning, fire accidents are still too common. Each year an estimated two and a half million fires kill about twenty five thousand people in Europe alone while injuring another five hundred thousand. Such high loss of life and injuries is a shame as one knows that it is rather easy to take measures, while 80% of fatalities occur in private homes.² And it is believed that the number of man made fires is much larger than the number of fires caused by technical malfunctions. In fact smoking and cooking take the leading place among causes of fires at homes. And most of the fatalities occur at night while people are at sleep.

It is too ridiculous for words that in general European politicians do not give higher priority to fire prevention. Important causes of death like diabetics and asthma suffer from the lack of attention in the headlines in newspapers, but fires are every day in the news headlines. And the measures to prevent fire are easy to take as well as for politicians as for all Europeans.

1. Fire incidents in Europe

Fire prevention is a typical area in which European countries have different and uncoordinated policies. Even official fire statistics at a European level do not exist. National statistics do exist, but are based on different assumptions from country to country.

What is known is that every year five million people or 1% of the all people in the European Union are affected by burns, of which seventy thousand get seriously injured and need hospitalisation. A hidden issue is that young people are the most affected by burns. American statistics shows that in 40% of cases fire victims are younger than 21 years old.

The number of fires and the number of victims vary widely in EU member states³. The largest average number of fires per 1000 inhabitants is observed in Estonia (10.27), followed by Britain (8.06), Ireland (7.56), Portugal (6.07) and France (5.61). Statistically the lowest number of fires is recorded in Romania (0.56), the Czech Republic (1.89), Slovakia (2.20), Germany (2.24) and Hungary (2.50). But probably this says more about the peculiarities and imperfections of national statistical data than about fires taking place.

Table 1

Fire is a major cause of deaths and injuries. Statistics indicates that on average each year in European countries more than 4200 people become the victims of fires. Average absolute number of victims was the largest in the UK, Poland, Germany and France. However, the number of victims per million inhabitants in these countries is not the largest. The highest risk to get killed by fire is in Estonia (10.61 victims per million inhabitants), Latvia (10.58) and Lithuania (7.42). Most of the victims per 100 fires take place in Latvia (1.98), Romania (1.88) and Lithuania (1.40). The most safe in this respect are Italy (0.05), Netherlands (0.05), Britain (0.11), France, Austria and Ireland (0.13).

Table 2

Mistakenly one could conclude that apparatuses around us impose different risks in various EU countries, but with a free internal market and common product standards that is highly unlikely. Why then there is such a significant difference in the number of fires and the number of victims in different EU countries? The main reason is legislative. Legislative features of European countries in the fire protection vary greatly from country to country. In some European Union countries fire legislation does not exist, or it is under conception. Also building standards and fire safety regulations vary, as do the national experience of implementing mandatory requirements for construction with fire prevention devices. Moreover technical standards for fire equipment and features of product certification differ in various EU countries. Even legislative requirements for mandatory installation of smoke detectors and sprinkler systems vary from country to country and attention of state authorities towards fire safety and protection are not the same throughout Europe.

The obvious solution would be a European public policy against fire which would harmonise European fire protection legislation. That would lead to a better awareness of European citizens in matters of fire safety and would improve the public fire prevention education.

2. What can be done to prevent fire?

Rather simple measures can reduce the risk of fire drastically. Probably the most effective is the use of fire detectors. The majority of fires occur during the night when people are at sleep. Potential victims need to be woken up, before they get caught in the smoke of direct fire. In combination with fire extinguishers, smoke alarms are even more effective. Disadvantage of fire extinguishers is that they need to be at the right place at the right time and people have to know how to operate them. Sprinkler installations are even more effective. Especially in Europe – where sprinkler installations are nearly absent in residential buildings – sprinkler

installations still provide a large potential in reducing fire casualties.

One of the promising means of reducing the number of fires is the use of noninflammable consumer goods, including selfextinguishing cigarettes, upholstered furniture and electrical appliances with inflammable plastic coverings.

2.1. Fire Detectors

Fire detectors are one of the most popular and most effective means in fighting fires in residential and commercial premises. Most of them are automatic smoke alarm detectors and they should be installed on each floor. Their use can not only prevent damage from fire, but also save lives and prevent inhabitants injuries. Most fires occur at night when people sleep. When the fire is still small and limited, the fire can be fought by simple means like putting a blanket over it. The earlier one is at the fire spot, the easier is to prevent a complete disaster to occur.

Three main types of smoke alarm are currently on the market. They are known as ionisation detectors, optical detectors which are also described as photo electronic detectors and a combination of both

– Ionisation detectors are the cheapest to produce and cost very little to purchase. They are very sensitive to small particles of smoke resulting from flaming fires, such as an overheated pan with potatoes. Before the smoke gets too thick an ionisation detector starts of the alarm. A disadvantage is that they are marginally less sensitive to slow burning and smouldering fires. Such fires give off larger quantities of smoke before flaming occurs. The main disadvantage of ionisation detectors is that they emit weak radiation and therefore they are prohibited in most European countries.

– Optical detectors are more expensive but more effective than ionisation detectors at detecting larger particles of smoke produced by slow-burning fires. Take very dangerous fires such as smouldering foam-filled upholstery and overheated PVC wiring. Optical detectors are marginally less sensitive to free burning flaming fires.

– Combined ionisation and optical detectors are as well effective at detecting slow-burning as well as flaming fires – which are cover all common types of fire.

Said this, the use of fire detectors currently used in European homes is still limited. Only a few EU countries have mandatory requirements for installation of fire detectors in homes, offices, government institutions, and all other buildings. In practise a lot of fire detectors enter the EU market without being refused, while inadequately addressing the norms and regulations already in place at EU level. As a result low quality fire detectors are entering the market having a negative effect on the image of detectors. Cheap detectors give false alarms, reducing the impact of the way people perceive them. These cheap detectors are stand-alone, but good detectors linked into a single system determine more accurately, quickly and effectively the source of fires. The majority of fatal victims are not in the same room as the point of origin.

2.2. Fire extinguishers

Fire extinguishers, along with other passive fire protection equipment, such as fireproof doors, fire blankets etc. are very effective and can significantly reduce the number of fires and damage caused by them. Between 2005 and 2006 a survey⁴ carried out on a total number of 1244 stove top fires, 46% were extinguished by the occupant. This implies that at least 12 % of all the domestic fires has been extin-

guished by the occupant, while the contribution of stove top fires to domestic fires was 27%.

2.3. Sprinkler systems

Sprinkler systems are very effective in fighting fire and even in fire prevention. And they are a promising option while they are mostly unused in residential areas in European countries. Unfortunately there is very limited research on their impact on fire safety. However a study performed in a small city of 130,000 inhabitants (Scottsdale in Arizona, USA) showed significant impact. Since 1985 an obligation to include sprinklers in newly built houses has been fixed in (municipal) legislation. After ten years the number of non-fatal casualties in fires decreased with 80% and the 40 fires in houses applied with a sprinkler caused no fatalities.⁵ There is however an issue with the costs of sprinkler installations. In 1993 it was concluded that based on a cost benefit analysis, "notwithstanding the substantial reduction in life risk, sprinklers in dwellings may, at current prices (in 1993), be uneconomic compared with the cost of safety measures in other fields. (...) Nearly half of fatal fire casualties in dwellings occur in fires started in living or dining rooms. Hence, it may be more cost effective (...) to install sprinklers only in those rooms."⁶

3. What are legislators doing about it?

3.1. European legislation

Fire prevention and protection devices are regulated already to a certain extent by European standards and qualifications. The European fire protection legislation consists of directives, construction and technical standards, compliance with which is compulsory for construction companies, manufacturers and suppliers of fire equipment. Fire detectors are subject to several directives:

1. The Electromagnetic Compatibility Directive (EMC) first limits electromagnetic emissions of equipment in order to ensure that, when used as intended, such equipment does not disturb radio and telecommunication as well as other equipment. The Directive also governs the immunity of such equipment to interference and seeks to ensure that this equipment is not disturbed by radio emissions when used as intended.

The EMC Directive operates on two levels, depending on the industry:

- _ Industrial level. On this level electric noise is allowed as powerful electrical machines create significant electrical noise and interference.
- _ Light (Commercial) industry level.

Most of the fire safety equipment does not create a high level of noise, but for use in all applications it should carry a high level of electrical noise. The EN50130-4 standard has been published to cover alarm equipment susceptibility. The general light industrial standard is used for emissions.

2. The Low Voltage Directive (LVD) ensures that electrical equipment within certain voltage limits both provides a high level of protection for European citizens and enjoys a Single Market in the European Union. For electrical equipment within its scope, the Directive covers all health and safety risks, thus ensuring that electrical equipment is safe in its intended use. The Directive covers electrical equipment with a voltage between 50 and 1000 V for alternating current and between 75 and 1500 V for direct current. The majority of fire protection equipment works on ultra-low voltage (24V), so this directive does not apply for them. The LVD directive applies to fire alarm panels,

mains rated relays or interfaces and other equipment connected to the mains supply such as door closers, smoke vents etc.

3. The Construction Products Directive (CPD), 89/106/EEC, applies to any product which is produced for incorporation in a permanent manner in construction works, including buildings and civil engineering. Part of this directive relates to safety in case of fire and requires all fire alarms and smoke detectors have to be certified by a third party in accordance with the harmonized European standard. Often this will be the part of EN 54 standard (eg, EN 54-2 for control and indicating equipment, EN 54-3 for fire alarm sounders, EN 54-7 for smoke detectors, EN 54-11 for manual call points, etc.). Most parts of this standard have been agreed or are under harmonization. After harmonization of standards their implementation will be required. So after few next years the presence of a third party will be required.

4. CE marking is a mark to indicate that the product on which it is affixed is in conformance with EU Product Safety Directives. Today CE marking means that the product meets the EMC and LV directives. As part of CPD Directive CE marking equipment will ensure compliance to national or European harmonized standards. CE marking is not retrospective and that is why it will be clear as to what directive the marking relates to.

5. Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment aims to minimize the environmental impact of waste electrical and electronic equipment by reducing the quantities of four heavy metals and two flame retardants. This directive is not currently apply to fire alarm and smoke detectors. However, it is likely that in the near future the scope of this directive will be expanded to include more dangerous substances and materials used in electrical and electronic equipment that can harm health.

The two broad technical standards EN 14604 and EN 54 apply to fire detectors in the European Union.

1. The European standard EN 14606 is imposed for all detectors since 1 August 2008. This European standard was developed under a mandate from the European Commission to support the essential requirements of European Directive 89/106/EEC on construction products. It specifies requirements, test methods, performance criteria and instructions of manufacturers of the smoke alarm using the principle of dissemination or transmission of light, or ionization, intended for household or similar residential application. It does not apply to alarm devices for incorporation in systems using control equipment and otherwise separated, these components are covered by the series of standards EN 54.

2. Suite of standards EN 54. Fire detection and alarm systems.

Standards EN 14604 and EN 54 cover all technical requirements for fire detectors and their components and their compliance is mandatory in all EU countries from the 1st of August 2008. Besides that, most European countries issue their own national technical standards, strengthening and also making changes to European standards. To enforce such, most countries involve their own national institutes of standardization and their certification bodies designated to bring standards in line with the characteristics of each country and carry out certification of producers in accordance with national specifications.

N°	Standard	Name	Description
1	EN 54-1	Introduction	The Standard EN54-1 is the first of the EN54 series of fire alarm and fire alarm systems. This standard sets the scope, definitions and general construction of such a system.
2	EN 54-2	Control and indicating equipment	Specifies requirements, methods of test and performance criteria for control and indicating equipment for use in fire detection and fire alarm systems installed in buildings.
3	EN 54-3	Fire alarm sounders	Specifies the requirements, test methods and performance criteria for a fixed installation intended to signal and audible warning of fire between a fire detection and fire alarm system and the occupants of a building. It is intended to cover only those devices which derive their operating power by means of a physical electrical connection to an external source as a fire alarm system. This standard specifies fire alarm sounders for two types of application environment, type A for indoor use and type B for outdoor use.
4	EN 54-4	Power supply equipment	Specifies requirements, methods of test and performance criteria for power supply equipment of fire detection and fire alarm systems installed in buildings.
5	EN 54-5	Heat detectors - Point detectors	Specifies the requirements, test methods and performance criteria for point detectors for use in fire detection and fire alarm systems for buildings. For other types of heat detector, or for detectors intended for use in other environments, this standard should only be used for guidance. Heat detectors with special characteristics and developed for specific risks are not covered by this standard
6	EN 54-7	Smoke detectors - Point detectors using scattered light, transmitted light or ionization	Specifies requirements, test methods and performance criteria for point smoke detectors that operate using scattered light, transmitted light or ionization, for use in fire detection systems for buildings. For other types of smoke detector, or smoke detectors working on different principles, this standard should only be used for guidance. Smoke detectors with special characteristics and developed for specific risks are not covered by this standard.
7	EN 54-10	Flame detectors - Point detectors	Specifies requirements, test methods and performance criteria for point-type, resettable flame detectors that operate using radiation from a flame for use in fire detection systems installed in buildings.
8	EN 54-11	Manual call points	Specifies the requirements and methods of test for manual call points in fire detection and fire alarm systems. It takes into account the appearance and operation of the call points for type A "direct operation" and type B "indirect operation" and covers those which are simple mechanical switches, those which are fitted with simple electronic components (e.g. resistors, diodes) and those which contain active electronic components and which work with the control panels for signalling and identifying, for example, an address or location.
9	EN 54-12	Smoke detectors - Line detectors using an optical beam	This European Standard specifies the requirements, test methods and performance criteria for line smoke detectors using attenuation of an optical beam, for use in fire detection systems installed in buildings.
10	EN54-13	Assessment of the compatibility	This document specifies the requirements for compatibility and connectability assessment of system components that either comply with the requirements of EN 54 or with a manufacturer's specification where there is no EN 54 standard. This document only includes system requirements when these are necessary for compatibility assessment. This document also specifies requirements for the integrity of the fire detection and fire alarm system when connected to other systems. This document does not specify the manner in which the system is designed, installed and used in any particular application. This document recognizes that it is not practical to assess the compatibility or connectability of components in all possible configurations. Methods of assessment are specified to reach an acceptable degree of confidence within pre-determined operational and environmental conditions. This document specifies requirements related to compatibility and connectability assessment methods and tests for the system components. This document is applicable to systems where the components are connected to control and indicating equipment and where the components are interconnected by electrical wires. For fire detection and fire alarm systems that use other means of interconnection (for example optical fibre or radio frequency links), this document may be used as guidance.
11	EN 54-16	Voice alarm control and indicating equipment	-
12	EN 54-17	Short-circuit isolators	-
13	EN 54-18	Input/output devices	This European Standard specifies requirements, test methods and performance criteria for input/output devices connected to a transmission path of a fire detection and fire alarm system, used to receive and/or transmit electrical signals to or from the transmission path, necessary for the operation of the fire detection and fire alarm system and/or fire protection system. An input/output device may be a physically separate device or its function may be integrated into another device in which case this European Standard may be used to assess this function. Control and indicating equipment, and ancillary control and indicating equipment (e.g. repeater panels and fire brigade panels) are not covered by this European Standard.
14	EN 54-24	Components of voice alarm systems. Loudspeakers	-
15	EN 54-25	Components using radio links	-
16	EN 54-15	Combination Fire detectors (Design standard)	Fire detection and fire alarm systems - Point detectors using a combination of detected fire phenomena. It is expected that this standard will be published from 2008-10.
17	EN 54-16	Evacuation Emergency Center (Design standard)	This European Standard specifies requirements, methods of test and performance criteria for voice alarm control and indicating equipment (VACIE) (see item C of Figure 1 of EN 54-1) for use in fire detection and fire alarm systems installed in buildings. This standard may also be used for the assessment of similar control and indicating equipment for use in systems where the alarm output is only in the form of alarm tones (no emergency message content). Although the scope of this standard does not cover emergency alarm systems for non-fire applications, it may be used as a basis for the assessment of the control and indication equipment for such systems. The VACIE may include combinations of emergency microphones, message stores, amplifiers, routing and prioritising matrices delay lines, equalization, and ambient noise level compensators. This standard does not specify requirements for such components as separate parts; they are tested as part of the VACIE as a whole. However, recommendations are made for standards that may be applicable to these components in informative Annex E. This part of EN 54 applies only to voice alarm control equipment for use in fire detection and fire alarm systems. The overall requirements of a voice alarm system, especially concerning audibility and intelligibility, are not covered in this part of EN 54. The manufacturer shall ensure compliance with this product standard. In addition the manufacturer shall consider requirements of an overall system that may affect the equipment design. Such system requirements may be specified in another part of this standard, in national legislation, codes and standards or in contractual documents.

_Table 3
European standard EN 54 specifies requirements for all component parts of a fire alarm system

3.2. National Legislation

Most EU countries now have their own national legislation of fire protection of premises, but not for residential buildings. The volume and rigidity of legislation caused to the presence of mandatory requirements for installation of fire protection. Currently, such requirements exist in several European Union countries.

In the UK an act to equip premises with fire detector came into force in 1991. All homes that were built from 1992 forward are required to have at least one main smoke detector on every floor. Thanks to this law the number of homes equipped with smoke detectors increased by more than 45%. Currently the more than 82% of all homes are equipped with a fire detector and it is proven that fires decreased significantly. The UK has set de facto standards. Its Institute for Standardization has developed and improved technical standards for fire equipment which has become the standard for other countries in the European Union and used in their legal basis for fire protection.

Today only a few European Union countries (Britain, Netherlands, France, Finland, and partly Germany and Belgium) have a legislative requirement to install smoke detectors in residential buildings and every year their positive experience attracts more countries to introduce such practices. Table 4 illustrates the legal requirements of some European countries in the field of fire protection.⁷

_ Table 4

Fire protection requirements in European countries

* Denmark asks for emergency lighting only if the occupancy of a building exceeds 150 people.

Facility	England and Wales	Northern Ireland	Ireland	Scotland	Belgium	Denmark	Finland	Norway
Sprinklers	No	No	No	No	No	No	No	No
Emergency lighting	Yes	Yes	Yes	Yes	Yes	No*	Yes	Yes
Signage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Alarm	Yes	Yes	Yes	Yes	No	No	No	No
Escape windows	No	No	No	No	No	No	Yes	Yes
Hose reels	No	No	No	No	Yes	No	No	No

In most European countries, the national technical standards are based on the European or British standards. Each country makes changes according to national characteristics and the need to strengthen existing regulations. Table 5 provides an overview of national technical standards for fire detectors in some European countries.

_ Table 5
National fire detection standards

N°	Country	Prefix	Main standards	Standardization Institute
1	United Kingdom	BS	BS5839 BS5588 BS7273, BS EN 60079-14 BS EN 50281-1-2	British Standards Institution (BSI)
2	France	NF	NF EN 14604 NF EN 54 NF 292 NF EN 50291	Association française de Normalisation (AFNOR)
3	Germany	DIN	DIN 14676 DIN EN 14604	Deutsches Institut für Normung (DIN)
4	Netherland	NEN	NEN2555: 2002 NEN2555-A1: 2006	National Standards Body of the Netherlands (NEN)
5	Belgium	NBN	NBN S 21 NBN EN 54 NBN EN 14604	Bureau De Normalisation (NBN)

At first glance it seems that national standards are not so important for manufacturers and suppliers of fire protection equipment, while compliance is voluntary in line with the European principle of free moving goods. European

reality is however much more complicated. Each European country has its own certification procedure of fire protection equipment up to national standards, officially set to provide additional proof of quality, reliability and conformity of products with national legislative requirements.

Significant differences in the standards of different countries and differences in certification requirements make certification a painful exercise. Certification takes a lot of time, is sometimes difficult and is an expensive process slowing down the free movement of goods. Certification hinders fair competition, because it reduces the number of players in the market and hinders implementation of national fire prevention programs. The only correct way out of this national market protection practices is European harmonisation on a unified approach to the certification of fire protection products throughout the European Union.

4. Need for European harmonisation

Harmonized European standards have a prominent role in the opening up of public procurement markets⁸ and the realisation of the Single Market. Through harmonisation technical barriers to trade are eliminated and are a tool to obtain the full economic benefits of the European internal market. The harmonisation of European standards is an economic objective in their own right. It allows the free move of goods with CE mark in the European Union and creates a fair playing field for increased internal trade and for European economic growth in general.

The latest approach to technical harmonization and standardization in the EU refers to voluntary standards as the appropriate method of giving technical expression to the essential requirements of Community Directives. This legislation confines itself to laying down the essential requirements to which products must comply in order to ensure the protection of public health, of safety, of the environment or of the consumer. European standards are developed in respect of each Directive.

European standards are developed in order to provide manufacturers with a set of technical specifications recognized in the Directive to verify compliance with the essential requirements. The European standards concerned, the so-called "harmonized standards" remain voluntary. Manufacturers are still able to put products on the community market which either meet other standards or no standards at all, subject to fulfilling the procedures for assessment of conformity laid down by the Directive.

The main motive for promoting any standardization activity is economic. The motivation for standardizing products, processes or services at the national level -namely, to reduce costs for producers and to improve transparency of the market for consumers – clearly exists at the European level. Given the current fragmentation of the European market, economic gains is much higher from European standardization than from previous national standardization. Common European standards reduce research, production and distribution costs for producers, and promote more intensive competition, to the benefit of consumers, in respect of the non-standard features of products.

Today, different countries have their own methodology for testing and certification of fire safety equipment. This creates a great inconvenience and problems in the classification and certificates recognition in some European countries. With the harmonization of technical standards for fire products all citizens can equally interpret and understand product requirements and will ensure that the product meets the legislation requirements.

One of the major advantages of harmonisation for manufacturers is that agreed standards of testing a product in one country should apply throughout Europe. There will be no need to repeat tests in each country, allowing manufacturers to save costs and to bring products to the market at a more competitive price.

The same holds for building standards. While national standards have helped to achieve quality in building, they vary widely from one Member State to the next and have acted as a technical barrier to international trade in construction products. Such barriers must be removed if there is to be more effective competition in the construction supply chain and on construction prices, within the EU Internal Market.⁹

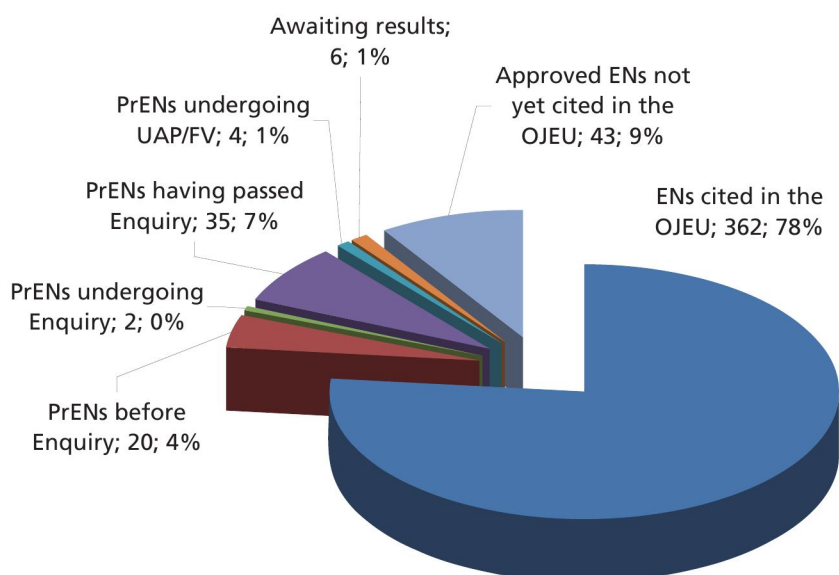
So far European harmonization on fire protection product standards has had already its benefits. Before the existing harmonisation level fire expertise was a pure national issue and investigations in the causes of fires were only carried out by nationals of the country in question. Before the harmonisation started it was difficult to ask for experts from other countries because of the different existing methods. Thanks to common standards technical relationships have highly increased in fire investigations resulting in better insight in causes of fire and increased insights in how to prevent them.

To address the problem of technical barriers to international trade caused by varying national standards, the EU adopted the Construction Products Directive (CPD)- 89/106/EEC- for the harmonisation of construction product standards.

TITLE	FINALIZED/HARMONIZED PRODUCT STANDARDS	OUTSTANDING STANDARDS
<p>Fire alarm/detection, fixed fire-fighting, fire and smoke control and explosion suppression products</p>	<p>1. Already cited</p> <ul style="list-style-type: none"> • Fixed fire-fighting systems-components for gas extinguishing systems (EN 12094-1; EN 12094-2; EN 12094-3; EN 12094-4; EN 12094-5; EN 12094-6; EN 12094-7; EN 12094-9; EN 12094-10; EN 12094-11; EN 12094-12; EN 12094-13); • Smoke and heat control systems (EN 12101-1; EN 12101-2*; EN 12101-3; EN 12101-6; EN 12101-10*); • Powder systems (EN 12416-1; EN 12416-2); • Hose systems (EN 671-1; EN 671-2); • Components for sprinklers (EN 12259-1; EN 12259-2; EN 12259-3; EN 12259-4; EN 12259-5); • Automatic sprinkler systems; foam systems (EN 13565-1); • Fire alarm devices (EN 54-3); • Powder supply equipment (EN 54-4); • Heat detectors (EN 54-5); • Smoke detectors (EN 54-7; EN 54-12); • Flame detectors-Point detectors (EN 54-10); • Fire detection and fire alarm systems-Manual call points (EN 54-11); • Fire detection and fire alarm systems-Short-circuit isolators (EN 54-17); • Fire detection and fire alarm systems-Input/output devices (EN 54-18); • Underground fire hydrants (EN 14339); • Pillar fire hydrants (EN 14384); • Smoke alarm devices (EN 14604*); • Fire detection and fire alarm systems – Part 20: Aspirating smoke detectors (EN 54-20); • Fire detection and fire alarm systems – Part 21: Alarm transmission and fault warning routing equipment (EN 54-21); • Fixed firefighting systems – Components for gas extinguishing systems – Part 8: Requirements and test methods for connectors (EN 12094-8); • Fire detection and fire alarm systems – Part 2: Control and indicating equipment (EN 54-2); • Voice alarm control and indicating equipment (EN 54-16); • Loud speakers (EN 54-24); • Components using radio links and system requirements (EN 54-25); 	<ul style="list-style-type: none"> • Components for gas extinguishing (prEN 12094-20) • Smoke control ducts (prEN 12101-7); • Specification for smoke control dampers (prEN 12101-8); • Control panels (prEN 12101-9) • Pressure switches(prEN12259-8) • Deluge valve assemblies (prEN 12259-9) • Components for sprinkler and water spray systems – Part 12: Pumps (prEN 12259-12) • Point detectors using a combination of detected fire phenomena (prEN 54-15) • Line type heat detectors (prEN 54-22); • Visual alarms (prEN 54-23); <p>Fire detection and fire alarm systems – Part 26: Point fire detectors using carbon monoxide sensors (prEN 54-26)</p> <p>Addition to work programme</p> <ul style="list-style-type: none"> • Ventilation for buildings - Duct mounted fire dampers (prEN 15650*) Note: CEN/TC 156 is working on a new response to the mandate M/109. • Ventilation for buildings - Fire resisting duct sections (prEN 15871) NOTE: CEN/TC 156 is working on a new response to the mandate M/109.

Fire protection standards harmonization¹²

*the standards are the subject of QUERIES

CEN harmonization process¹⁰

The differences are not great between the EU member states and where they are, reconciliation should not be too difficult. The biggest obstacle to harmonisation will be political rather than professional, with some countries not wishing to hand over any sovereignty at all (as is presently being experienced in the UK) [6].

5. What can house owners do?**1. Basic rules for all**¹¹

- _ Install smoke detectors at every floor of your home and outside sleeping areas. Test every detector at least once a month. Keep smoke detectors dust free. Replace batteries with new ones at least once a year, or sooner if the detector makes a chirping sound.
- _ Install and maintain heating equipment correctly. Don't leave space heaters operating when you're not in the room. Keep space heaters at least three feet away from anything that might burn, including the wall. When lighting a gas space heater, strike your match first, then turn on the gas. Have your furnace inspected by a professional prior to the start of every heating season.
- _ Check the gas hose every year.
- _ Heating equipment regularly maintained: the chimney and flues should be cleaned out once a year (required for insurance and especially if we heat with oil or wood). The best method is the mechanical sweeping performed by qualified professionals.
- _ No unnecessary fuel storage (cardboard, paper) and flammable products (alcohol, petrol) especially near sources of heat. Allow flammable products away from heaters, lights, candles, hot plates etc.
- _ In the kitchen, do not let appliances connected that are unused. Electrical shortcuts can also happen when appliances are unused, but still connected to the electricity network.
- _ Never smoke in bed in the room. Extinguish cigarettes completely. Fires occur while people fall asleep with a lit cigarette.
- _ Do not use alcohol or petrol to light the fireplace or barbecue. Use a fireplace screen to prevent sparks from flying.

- _ Have a fire extinguisher at home. Learn how to use your fire extinguisher before there is an emergency.
- _ Teach every family member to "Stop, Drop, Roll and Cool" if clothes catch fire by dropping immediately to the ground, crossing hands over your chest and rolling over and over or back and forth to put out the flames. Cool the burned area with cool water and seek medical attention for serious burns.

2. Children

- _ Never leave young children alone in an apartment or a house. In case of fire, there is a good chance they will be trapped by the smoke. Grown ups might know they have to crawl over the floor to avoid inhalation of smoke, but children stay up and start to scream.
- _ Do not let children play with open flames (matches, lighters, candles). Give them a flashlight to play safely in the dark.
- _ Never leave pots, pans or dishes on the fire unattended.
- _ Teach children that fire is dangerous and it hurts.
- _ Teach them as soon as possible to use the phone and dial firefighters.
- _ Teach them the right attitudes to fire, how to crawl on the floor if smoke invades room and how to manifest the window.
- _ Do not put up heating in their room.

6. What can politics do?**1. Short term**

- On the short term politics is able to decrease rapidly at least 10% of the number of deaths by home fires and implicitly decrease the accidental fire death and victims for a much longer period to come through:
- _ Adoption of a law on compulsory installation of smoke detectors in private homes. The occupant shall be the first responsible for his own safety. Such a law has to accommodate the process in which the occupant buys a smoke detector, installs it, and maintains it. The law has to leave the options open for more sophisticated systems f of remote monitoring, which are currently offered and installed by insurance companies and banks.
 - _ Using media prime-time to promote the fire prevention companies and accompany the law on compulsory installation of smoke detectors in private houses.
 - _ Start the investigation of fire causes with substantial financial resources and political will. This will create statistics of fire causes in European countries and help to develop effective measures to prevent fires in buildings.

2. In the medium term serious deficiencies found in private and communal buildings can be addressed by:

- _ Setting basic requirements for the safe use of electrical installations, without replacing the entire system. For example French company Promotelec issued Guidance of safekeeping of an existing electrical installation in housing, which suggest the 5 basic rules for providing simple and inexpensive electrical safety of the existing housing¹² :
 - _ Presence of a central switch for all electricity.
 - _ Presence of a residual-current device (RCD).
 - _ Presence of a connection to the ground, in particular in bath rooms and kitchens where water is used.

- _ Presence of a fuse box, in particular a Residual Current Circuit Breaker (RCCB).
- _ Absence of any risk of direct contact with parts under electrical current which may cause electrocution/
- _ Prohibit flammable foam padding material for furniture.
- _ Provide an instruction sheet to tenants upon renewal of lease describing the best practices of security against the risk of fire.
- _ Regulate the processes of thermal insulation or sound from the outside to limit the increase in the risk of fire.

3. Long term

These measures require strong political will and an important legislative work:

- _ Strengthen and make binding recommendations on the safety of persons and protection against fire. This includes prohibiting the paneling, coatings fuel in the common parts of buildings, forcing the creation of closed spaces for storage bins, prams and strollers. This must be accompanied by the introduction of security lighting on the stairs. The replacement of gas mains lead with steel pipes in the common areas of apartment buildings is desirable.
- _ Expand the duties of firefighters to communication activities in schools, calendars or trucks for example.
- _ Impose periodic checks of common security equipment and their maintenance. And make them subject to imposed controls and sanctions.
- _ Promote fire detectors, sprinkler installations or fire extinguishers with tax incentives or financial assistance.

7. What has Luxembourg done?

In 2008 there were more than 2300 fires occurred in Luxembourg¹³. An estimation of the costs of the damage caused by fires is each year tens of millions euro. Over 50 businesses suffer a fire every year in Luxembourg. More than half of these businesses close their doors in five years.¹⁴

In Luxembourg there are no national fire standards. Luxembourg applies European standards, especially the German DIN or VDE standards. Prescriptions on fire safety are also initiated from the Inspection of Labour for the so-called "classified establishments" and from the Fire Prevention Office of Luxembourg's City Career Fire Brigade. General prescriptions - based on Belgian regulations - divide the buildings according to their height. Specific prescriptions - based on French and German regulations - make the difference between non-classified (all sorts of habitations) and classified establishments (for example the number of persons to be accommodated in a concert hall, surface of an office building...). There are also specific rules - based on the European directive for building materials - for all kinds of architectural / structural cases (eg restaurant, cinema, underground parking, etc.).¹⁵

Luxembourg intends to enhance the cooperation with the European Fire Protection Association because the CTIF Commission cooperates in the development of common security standards to achieve common standards in Europe. The guidelines are primarily designed for safety of firms and organizations, as well as fire departments or insurance companies.

Today in Luxembourg the Kommodo-Inkommodo Act classifies buildings according to their potential danger to people and the environment. However, recently the law was adapted to the purely environmental protection and now does not affect much in fire protection.

In the nineties the Luxembourg government tried to create a National fire protection Act but that attempt failed. Today Luxembourg has no proper fire protection legislation. Under the Kommodo-Inkommodo Law in 2003 a number of Directives governing fire safety were published. Today these Directives are used as technical regulations and therefore are not controlled by Brussels.

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