

9.0 Standards and directives

9.1 Directives

Directives are European laws that apply to all EU member states. Directives that follow Article 175 permit member states some local variation, but directives that follow Article 95 apply equally and unaltered to all member states.

CE Marking

The CE mark signifies that a product conforms to the requirements of relevant EEC directives. The prime purpose of the mark is to assist customs and market inspectors in facilitating the free trading and movement of products within the EEC. Some of the directives appropriate to general lighting products are the Low Voltage Directive (LVD), the Electromagnetic Compatibility (EMC) Directive and the Energy Efficiency (Ballasts for Fluorescent Lighting) Directive. CE marking is compulsory to indicate LVD, EMC and Ballast Efficiency conformity.



Low Voltage Directive (LVD)

Low Voltage directive for selling safe products. This demands that products are designed, manufactured and tested to give proof of electrical safety. Conformity to EN 60598 guarantees compliance.

Electromagnetic Compatibility Directive (EMC)

The ElectroMagnetic Compatibility directive requires that the product are designed and operate so that they meet limits of electrical and magnetic interference by emission and conduction with other electrical devices. Also requires that adequate capacity is built in for immunity (rejection) to interference imposed by other electrical devices upon the lighting product. Conformity can be verified by the appropriate IEC standard.

WEEE Directive

Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) is an Article 175 directive and defines requirements and responsibilities for the management of waste lighting equipment within the European Union. This places responsibility for managing waste on the producer, reseller (in cases of re-branded product) or importer of the product. To fulfil these obligations many lighting companies have registered with third party recycling companies who then take on the

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responsibility of handling the electrical waste. If a company has not done this then they are themselves responsible for the recovery and handling of their waste products. Irrespective of the method of waste management, lighting products should be marked with the symbol shown to indicate that it may not be disposed of as unsorted waste. Therefore when purchasing lighting products it is important to ascertain how these products will be managed at their end of life, and when removing lighting units it must be ensured that they are handled separately and the appropriate company is contacted to remove the product.



RoHS Directive

Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment is and article 95 directive, and products purchased within the European Union must conform to these restrictions. However certain exemptions exist including mercury in lamps, lead in the glass of fluorescent tubes and nickel cadmium in batteries for emergency lighting products. However these exempted items are still required to be correctly disposed of. Therefore when purchasing exempted items it is important to ascertain how these items will be managed at their end of life, and when removing exempted items it must be ensured that they are handled separately and the appropriate company is contacted to remove the product. (Note that when removing complete light fittings it is generally not necessary to separate out lamps, batteries, etc. This will be performed within the overall waste management process).

Other Directives

Other important European energy efficiency directives are;

- EELP** Energy Efficiency Labelling of Product directive
This requires that manufacturers add an energy class label to relevant products (fluorescent lamp and ballast)

- EPB** Energy Performance of Buildings directive
This requires that an estimate of the energy requirements of a building and its services is made. This is displayed using a label with energy details. This applies both for existing buildings and new buildings which must pass design criteria during the planning permission process for approval to build.

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EuP Ecodesign of Energy-using Products directive
The aim of this directive is to reduce the consumption of natural resources and energy, and to minimise environmental impacts of products across the whole of their life cycle. Manufacturers must practice ecodesign, give instruction on correct and efficient product use and limit power consumption including that by stand-by devices

9.2 Standards

A variety of documents exist to ensure a product conforms to relevant directives and safety requirements. Some of the relevant standards are listed in Table 9.1.

Subject	European Standard	International Standard
Luminaires – General requirements and tests	EN 60598-1	
Luminaires – General types	EN 60598 2-1	IEC 60598-2-1
Luminaires – Recessed	EN 60598 2-2	IEC 60598-2-2
Luminaires – Street lighting	EN 60598 2-3	IEC 60598-2-3
Luminaires – Floodlights	EN 60598 2-5	IEC 60598-2-5
Luminaires – with transformers	EN 60598-2-6	IEC 60598-2-6
Luminaires – Air handling	EN 60598 2-19	IEC 60598-2-19
Luminaires – Emergency	EN 60598 2-22	IEC 60598-2-22
Luminaires Track systems	EN 60570	IEC 60570
Photometric Measurements		CIE 24/CIE 27
Photometry and data transfer	EN 10302-1: 2004	
Photometry for workplace luminaires	EN 10302-2: 2004	
Photometry for emergency luminaires	EN 13032-3: 2007	
EMC Emissions-Lighting	EN 55015	CISPR 15
EMC Immunity-Lighting	EN 61547	IEC 61547
Quality Systems	EN ISO 9000	ISO 9000
Emergency Lighting	EN 1838	
Electronic transformers for lamps	EN 61347-2-2	IEC 61347-2-2
Safety		
Electronic transformers for lamps	EN 61047	IEC 61047
Performance		
Safety isolating transformers	EN 60742	IEC 742
Lighting Columns	EN 40	

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Application		
Lighting of workplaces – indoor workplaces	EN 12464-1: 2003	
Lighting of workplaces – outdoor workplaces	EN 12464-2: 2007	CIE S 015/E:2005
Light and lighting – Sports lighting	EN 12193:1999	
Emergency lighting	EN 1838	CIE S 020/E:2007
Emergency lighting – testing and inspection	EN 50172: 2004	
Road lighting practice	EN 13201-1/4: 2004	
Energy performance of buildings, lighting	EN 15193: 2007	
Radiation exposure limits	EN 14255	
Maintenance of indoor electric lighting		CIE 97.2
Lighting education		CIE 99
Discomfort glare in interior lighting UGR		CIE 117
Obrusive light		CIE 150
Maintenance of outdoor electric lighting		CIE 154

Table 9.1 Selection of relevant standards

ENEC Marking

For luminaires and lighting components, European harmonisation of national approval marks has been achieved through introduction of the ENEC mark. The ENEC mark may be awarded by any one of the recognised European approval authorities, such as BSI, VDE or SEMKO, in the same way as a national approval mark. ENEC is important however, because it indicates that the product is suitable for use throughout Europe and that all of the most onerous special national conditions of test standards have been complied with.



EN40

When designing an exterior lighting installation it must be ensured that the lighting columns are not only strong enough to support the weight of the equipment attached to them but are also strong enough to withstand the more significant loading effect from wind pressure against the project area of the complete structure. In Europe document EN40 is used to check suitability, allowing the structure to be verified against statistical data for a geographical area and thereby ensuring that the column can withstand the wind conditions. The calculation process takes into account variables such as the height of the site above local ground level, the height above sea level, the distance from the coastline and the degree of shelter provided by local obstructions and features as all of these

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cause variations in the wind pressure at the location. It must be emphasised that the calculation process is for the complete system, including the column and all equipment attached to it (luminaires, brackets, etc.) so a column cannot be certified in isolation. It should also be noted that a CE mark cannot be applied to a column in isolation, but applies to the complete system.

9.3 Quality and safety marks

It is important that a product is suitable for the method of installation, environmental conditions and usage it will encounter. Some safety consideration and markings are given below.

Quality Standard Marks (Kite Marks)

A third party approval is an independent endorsement that product design is in accordance with published standards, and that controls to maintain quality in manufacture are applied. Many products carry European Test House approvals such as those shown. This can assist wider market acceptance in Europe.



Electrical safety classification

Class I

Luminaires in this class are electrically insulated and provided with a connection to earth. Earthing protects exposed metal parts that could become live in the event of basic insulation failure.



Class II

Luminaires in this class are designed and constructed so that protection against electric shock does not rely on basic insulation only. This can be achieved by means of reinforced or double insulation. No provision for earthing is provided.



Class III

Here protection against electric shock relies on supply at Safety Extra - Low Voltage (SELV) and in which voltages higher than those of SELV are not generated (max. 50V ac rms).



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F mark

F mark (mounting surface)

Luminaires suitable for mounting on normally combustible surfaces (ignition temperature at least 200°C) are marked with the 'F' symbol.



F mark (Thermal Insulation Covering)

Recessed luminaires suitable for covering in the ceiling void with thermal insulating material (without causing overheating to the luminaire) are marked with this variation of the F mark symbol.



Ingress Protection

The ingress protection (IP) code denotes the protection against dust, solid objects and moisture provided by the luminaire enclosure. If no code is marked the luminaire is deemed to be IP20.

First digit of code denotes protection against dust and solid objects		Second digit of code denotes protection against moisture	
IP2X	No entry of standard test finger to live parts	IPX0	No special protection
IP3X	No entry of 2.5mm ø probe to live parts	IPX1	Protection against drops of condensed water
IP4X	No entry of 1mm ø probe to live parts	IPX2	Drip-proof (vertical falling drops of liquid)
IP5X	Dust proof. (no dust deposit around live parts)	IPX3	Rain-proof (rain up to angles of 60°)
IP6X	Dust tight (no dust entry)	IPX4	Splash proof (spray from any angle)
		IPX5	Water jet
		IPX6	Heavy downpours
		IPX7	Temporary immersion
		IPX8	Submersion to declared depth

Table 9.2 IP Code

ATEX classification

The IP rating is not sufficient as a safety criterion in areas with particularly hazardous or explosive atmospheres. Equipment for use in these environments is classified according to the expected conditions using the ATEX group category, as shown in Table 9.3.

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ATEX category	Equivalent zonal classification	Level of protection provided	Environmental conditions for use
1	Zone 0 (gas) Zone 20 (dust)	Very high	An explosive atmosphere of gas/vapour/haze/dust is continuously present or present for long periods (> 1000 hours/year)
2	Zone 1 (gas) Zone 21 (dust)	High	An explosive atmosphere of gas/vapour/haze/dust is likely to be present (between 10 and 1000 hours/year)
3	Zone 2 (gas) Zone 22 (dust)	Normal	An explosive atmosphere of gas/vapour/haze/dust is unlikely to occur or could occur for a short period (< 10 hours/year)

Table 9.3 ATEX classifications

Ta classification

Denotes the maximum ambient temperature in which the luminaire is suitable for use. No ta mark indicates suitable for use in maximum 25°C ambient.

750°/850°/950° hot wire

Abbreviation for compliance with glow wire test for plastic parts tested at the stated temperature.

Impact Resistance

The use of Joules (Newton metres - Nm) has been common for many years. More recently an IK rating normally used for electrical enclosures and cabinets (EN50102:1995) has emerged as manufacturers apply it to their luminaires, as they also enclose electrical circuits. Table 9.4 compares both ratings:

IK rating	IK01	IK02	IK03	IK04	IK05	IK06	IK07	IK08	IK09	IK10
Joules of energy	0.15j	0.23j	0.35j	0.5j	0.7j	1.0j	2.0j	5.0j	10.0j	20.0j

Table 9.4 Comparison of impact resistance ratings

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9.4 Product/corrosion compatibility guide

When designing an installation in an area that is potentially harmful due to concentrations of chemicals in the atmosphere care must be taken to ensure that the materials used in the construction of the luminaire are suitable for the environment it is being used in. Different materials have differing tolerances to chemical agents and all materials used in the luminaire need to be considered.

Table 9.5 gives information on six luminaires suitable for use in chemically hazardous areas. This information is provided to give guidance about luminaire selection assuming prolonged exposure to potentially aggressive chemicals or atmospheres. Occasional exposure to low concentrations of potential aggressors is unlikely to be harmful to any of these luminaires. The risk of damage to the luminaires is dependent on the concentration of the aggressor, the duration and frequency of exposure and environmental conditions. If there is any doubt about the suitability of a luminaire for a particular application please enquire with details of the chemicals that will be present and the conditions of use.

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Chemical Type	Chemicals Specific	ImpactForce	CorrosionForce	ColdForce	HeatForce	StormForce	StormForce
		GRP body	GRP body	GRP body	GRP body	GRP body	GRP body
		PC diffuser	PMMA diffuser	PC diffuser	PC diffuser	PC diffuser	PMMA diffuser
		Stainless toggle	Stainless toggle	Stainless toggle	Stainless toggle	Stainless toggle	Stainless toggle
Acids	acetic <30%	Y		Y	Y	Y	
	nitric <10%	Y	Y	Y	Y	Y	Y
	sulphuric <20%	Y	Y	Y	Y	Y	Y
	hydrochloric <10%	Y	Y	Y	Y	Y	Y
	chromic <20%	Y	Y	Y	Y	Y	Y
	phosphoric <40%	Y	Y	Y	Y	Y	Y
Salts	marine salts	Y	Y	Y	Y	Y	Y
	copper sulphate	Y	Y	Y	Y	Y	Y
	sodium chloride	Y	Y	Y	Y	Y	Y
Organics (Aliphatics)	ethanol <30%	Y	Y	Y	Y	Y	Y
	propanol<30%	Y	Y	Y	Y	Y	Y
	methane	Y	Y	Y	Y	Y	Y
	propane	Y	Y	Y	Y	Y	Y
	formaldehyde/ formalin	Y	Y	Y	Y	Y	Y
	formic acid<5%	Y	Y	Y	Y	Y	Y
	stearic acid soap	Y	Y	Y	Y	Y	Y
	urea	Y	Y	Y	Y	Y	Y
	ethylene glycol (antifreeze)	Y	Y	Y	Y	Y	Y
	glucose sugar	Y	Y	Y	Y	Y	Y
	glycerol/glycerine	Y	Y	Y	Y	Y	Y
	(aromatics) Foodstuffs, cooking products drinks, beverages	milk	Y	Y	Y	Y	Y
fruit juices		Y	Y	Y	Y	Y	Y
vegetable oils (cold)		Y	Y	Y	Y	Y	Y
vegetable oils (hot)			Y				Y
meats, beef, lamb, pork, game, poultry		Y	Y	Y	Y	Y	Y
fish		Y	Y	Y	Y	Y	Y
pork fat			Y				Y
cooking fats (cold)		Y	Y	Y	Y	Y	Y
cooking fats (hot)			Y				Y
alcoholic beverages							
beer		Y	Y	Y	Y	Y	Y
carbonated beverages, lemonade		Y	Y	Y	Y	Y	Y
wines & spirits		Y	Y	Y	Y	Y	Y
water <60°C		Y	Y	Y	Y	Y	Y
vinegar		Y	Y	Y	Y	Y	Y
Gases	ozone	Y	Y	Y	Y	Y	Y
	sulphur dioxide		Y		Y		Y
	industrial pollutant	Y	Y	Y	Y	Y	Y

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Chemical Type	Chemicals Specific	ImpactForce	CorrosionForce	ColdForce	HeatForce	StormForce	StormForce
		GRP body	GRP body	GRP body	GRP body	GRP body	GRP body
		PC diffuser	PMMA diffuser	PC diffuser	PC diffuser	PC diffuser	PMMA diffuser
		Stainless toggle	Stainless toggle	Stainless toggle	Stainless toggle	Stainless toggle	Stainless toggle
Building materials, paints	emulsion paints water based	Y	Y	Y	Y	Y	Y
	oil based paint		Y				Y
	white spirit/turps substitute	Y	Y	Y	Y	Y	Y
	cement	Y	Y	Y	Y	Y	Y
Oils, fats fuels	mineral oils	Y	Y	Y	Y	Y	Y
	animal fats (cold) but not pork		Y				Y
	silicone oil	Y	Y	Y	Y	Y	Y
	diesel	Y	Y	Y	Y	Y	Y
	kerosene/paraffin oil		Y				Y
	petroleum spirit/ petroleum ether	Y	Y	Y	Y	Y	Y
Disinfectants, cleaning agents	hydrogen peroxide <40%	Y	Y	Y	Y	Y	Y
	sodium hypochlorite <10%	Y	Y	Y	Y	Y	Y
	soaps	Y	Y	Y	Y	Y	Y
	wetting agents/ biocides (dilute)	Y	Y	Y	Y	Y	Y

Table 9.5 Product/corrosion compatibility guide for Thorn X-Force range

A selection of the most common chemicals that are used in applications the X-Force would come into contact with.

The tabulated information is valid under the following conditions:

- The chemical substance listed in the table is an element and not part of a chemical compound
- The ambient temperature is 22°C