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FROM SOURCE TO SITE

Guide on Lighting Risks and Regulations

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Introduction

This guide highlights the risks and associated regulations, and offers practical technical guidance to electrical contractors and electricians when installing lighting products and complete lighting installations.

Lighting fittings and lighting installations have been around for many years, but although they may be easy to install, they can have many problems and risks if design considerations and installation workmanship issues are not considered carefully.

This guide offers solutions to assist with the compliance of the latest Edition of BS 7671 (2008) Amendment 2: 2013 IET Wiring Regulations as well as the applicable Building Regulations, together with details of the actual regulations in each case.

This guide is not intended to replace the electrical industry regulations or give definitive installation instructions that could apply to all products, installations or projects, since each of these may have differing requirements.

It is often the case that complying with one particular issue concerning lighting installations may often create problems of another issue. A typical example of this is perhaps when a roof space or attic is fully insulated, but in doing so the ventilation and the heat dissipation of installed lighting products may be compromised.

This guide raises awareness of typical lighting installation risks and gives practical solutions, to help the reader address them on their job or project and provide a fully compliant lighting installation to industry standards.

The IET Wiring Regulations, also known as BS 7671, have always been important for electricians, electrical contractors and for electrical designers, these regulations cover most electrical installations and give the requirements for electrical standards for electrical safety within the UK and indeed overseas. The Wiring Regulations go back to the end of the 19th century, almost to the time of the very first electrical installation in the UK.

The Building Regulations are a legal requirement approved by Parliament which provide guidance and specify minimum building standards for design and building work (including lighting installation work), for the construction of domestic, commercial and industrial buildings and they also include minimum requirements for the energy performance of lighting installations.

Sections

1 Energy Efficient Lighting for Dwellings

This section provides guidance on the requirements for fixed internal and external lighting installations for new and existing dwellings to meet the relevant energy efficiency standards in the Part L Approved Documents (AD's) of the Building Regulations.

Key Terms

Circuit-watt means the power consumed in lighting circuits by lamps and, where applicable, their associated control gear (including transformers and drivers) and power factor correction equipment.

Light fitting means a fixed light or lighting unit that can comprise one or more lamps and lampholders, control gear and an appropriate housing. The control gear may be integrated in the lamp or located elsewhere in or near to the fixed light.

Fixed external lighting means lighting fixed to an external surface of the dwelling supplied from the occupier's electrical system. It excludes lighting in common areas of blocks of flats and in other communal access ways.

Internal and external lighting

Fixed internal and external lighting should meet the minimum standards for efficacy and controls in Table 1 below.

Table 1: Recommended minimum standards for fixed internal and external lighting		
Lighting	**New and replacement systems**	**Supplementary information**
Fixed internal lighting	a. In the areas affected by the building work, provide low energy **light fittings** (fixed lights or lighting units) that number not less than three per four of all the **light fittings** in the main dwelling spaces of those areas (excluding infrequently accessed spaces used for storage, such as cupboards and wardrobes). b. Low energy **light fittings** should have lamps with a luminous efficacy greater than 45 lamp lumens per circuit-watt and a total output greater than 400 lamp lumens. c. **Light fittings** whose supplied power is less than 5 circuit-watts are excluded from the overall count of the total number of light fittings.	**Light fittings** may be either: • dedicated fittings which will have separate control gear and will take only low energy lamps (e.g. pin based fluorescent or compact fluorescent lamps); or • standard fittings supplied with low energy lamps with integrated control gear (e.g. bayonet or Edison screw base compact fluorescent lamps). **Light fittings** with GLS tungsten filament lamps or tungsten halogen lamps would not meet the standard. The Energy Saving Trust publication GIL 20, "Low energy domestic lighting", gives guidance on identifying suitable locations for fixed energy efficient lighting. A single switch should normally operate no more than six light fittings with a maximum total load of 100 circuit-watts.

Fixed external lighting	Where fixed external lighting is installed, provide **light fittings** with the following characteristics: a. Either: i. lamp capacity not greater than 100 lamp-watts per light fitting; and ii. all lamps automatically controlled so as to switch off after the area lit by the fitting becomes unoccupied; and iii. all lamps automatically controlled so as to switch off when daylight is sufficient. b. Or i. lamp efficacy greater than 45 lumens per circuit-watt; and ii. all lamps automatically controlled so as to switch off when daylight is sufficient; and iii. light fittings controllable manually by occupants.	

2 Energy Efficient Lighting for Buildings other than Dwellings

This section provides guidance on the lighting requirements for new and existing buildings other than dwellings (commercial, industrial, retail, etc) to meet the relevant energy efficiency standards in the Part L Approved Documents (AD's) of the Building Regulations.

There are two alternative approaches, applicable both to lighting installations in new buildings and to replacement lighting installations in existing buildings.

The guidance in this section applies to the following types of lighting installations:

- general interior lighting
- display lighting.

Key terms

Office area means a space that involves predominantly desk-based tasks, e.g. a classroom, seminar or conference room.

Daylit space means any space:

a. within 6 m of a window wall, provided that the glazing area is at least 20 percent of the internal area of the window wall; or

b. below roof lights provided that the glazing area is at least 10 per cent of the floor area.

The normal light transmittance of the glazing should be at least 70 per cent; if the light transmittance is below 70 per cent, the glazing area should be increased proportionately for the space to be defined as daylit.

Space classification for control purposes:

Owned space means a space such as a small room for one or two people who Control the lighting, e.g. a cellular office or consulting room.

Shared space means a multi-occupied area, e.g. an open-plan office or factory production area.

Temporarily owned space means a space where people are expected to operate the lighting controls while they are there, e.g. a hotel room or meeting room.

Occasionally visited space means a space where people generally stay for a relatively short period of time when they visit the space, e.g. a store room or toilet.

Unowned space means a space where individual users require lighting but are not expected to operate the lighting controls, e.g. a corridor or atrium.

Managed space means a space where lighting is under the control of a responsible person, e.g. a hotel lounge, restaurant or shop.

Local manual switching means, in local or flexible manual switching, the distance on plan from any local switch to the luminaire it controls should generally be not more than six metres, or twice the height of the light fitting above the floor if this is greater. Where the space is a daylit space served by side windows, the perimeter row of lighting should in general be separately switched.

Photoelectric control is a type of control which switches or dims lighting in response to the amount of incoming daylight.

Presence detection is a type of control which switches the lighting on when someone enters a space, and switches it off, or dims it down, after the space becomes unoccupied.

Absence detection is a type of control which switches the lighting off, or dims it down, after the space becomes unoccupied, but where switching on is done manually.

Lamp lumens means the sum of the average initial (100 hour) lumen output of all the lamps in the luminaire.

Circuit-watt is the power consumed in lighting circuits by lamps and, where applicable, their associated control gear (including transformers and drivers) and power factor correction equipment.

Lamp lumens per circuit-watt is the total **lamp lumens** summed for all luminaires in the relevant areas of the building, divided by the total circuit-watts for all the luminaires.

LOR is the light output ratio of the luminaire, which means the ratio of the total light output of the luminaire under stated practical conditions to that of the lamp or lamps contained in the luminaire under reference conditions.

Luminaire lumens per circuit-watt is the (**lamp lumens x LOR**) summed for all luminaires in the relevant areas of the building, divided by the total circuit-watts for all the luminaires.

LENI is the Lighting Energy Numerical Indicator, which is a measure of the performance of lighting in terms of energy per square meter per year used (kWh/m²/year), based on BS EN 15193:2007, energy performance of buildings.

Lighting in new and existing buildings

a. Lighting installations in new and existing buildings should meet the recommended minimum standards for:

- efficacy (averaged over the whole area of the applicable type of space in the building) in Table 2 below, or
- the LENI in table 4. The LENI should be calculated using the procedure described in the LENI section below.

b. Metering of lighting for new and existing buildings (to record the lighting energy consumption) should meet the minimum standards in Table 3 below.

c. Lighting controls in new and existing buildings should follow the guidance in BRE Digest 498 Selecting lighting controls. Display lighting, where provided, should be controlled on dedicated lighting circuits that can be switched off at times when exhibits or merchandise are not on show, or the area is not being for entertainment.

Table 2: Recommended minimum lighting efficacy with controls in new and existing buildings		
		Initial luminaire lumens/ circuit-watt
General lighting in office, industrial and storage spaces		**60**
Controls	**Control factor**	**Reduced luminaire lumens/circuit-watt**
a daylit space with photo-switching with or without override	0.90	54
b daylit space with photo-switching and dimming with or without override	0.85	51
c unoccupied space with auto on and off	0.90	54
d unoccupied space with manual on and auto off	0.85	51
e space not daylit, dimmed for constant illuminance	0.90	54
a + c	0.80	48
a + d	0.75	45
b + c	0.75	45
b + d	0.70	42
e + c	0.80	48
e + d	0.75	45
General lighting in other types of space		The average initial efficacy should be not less than 60 lamp lumens per circuit-watt
Display lighting		The average initial efficacy should be not less than 22 lamp lumens per circuit-watt

Table 3: Recommended minimum standards for metering of general and display lighting in new and existing buildings		
	Standard	
Metering for general or display lighting	a.	kWh meters on dedicated lighting circuits in the electrical distribution; or
	b.	local power meter coupled to or integrated in the lighting controllers of a lighting or building management system; or
	c.	a lighting management system that can calculate the consumed energy and make this information available to a building management system or in an exportable file format. (This could involve logging the hours run and the dimming level, and relating this to the installed load.)

Lighting Energy Numerical Indicator (LENI)

An alternative to complying with the efficacy standards in Table 2 is to follow the Lighting Energy Numerical Indicator (**LENI**) method.

The **LENI** method calculates the performance of lighting in terms of energy per square metre per year. The approach described below must be followed in calculating the **LENI** for a lighting scheme. The **LENI** should not exceed the lighting energy limit specifed in Table 4 for a given illuminance and hours run.

Design the lighting

The first step to energy efficient lighting is to design the lighting installation in a way that meets all of the users' needs for the space under consideration. Recommendations for appropriate illuminance values and other lighting requirements may be found in BS EN 12464-1:2011, *Light and lighting – Lighting of work places – Indoor work places,* and in the Society of Light and Lighting (SLL) *Code for Lighting*. The SLL Handbook provides practical advice on how to design lighting for a number of different applications.

Look up the lighting energy limit

In designing the lighting, a level of illuminance will have been selected as necessary for the tasks being done in a particular area. It is also necessary to

determine how many hours per year the lighting will be needed. Once both the illuminance and the hours are known it is possible to look up the lighting energy limit in Table 4. For example, a classroom in a school may be lit to 300 lux and used for 40 hours per week for 39 weeks of the year, giving a total of 1560 hours per year. Values of 1500 hours and 300 lux give a lighting energy limit of 7.70. Table 4 also gives day time (Td) and night time (Tn) hour values which are used in the calculation of energy consumption.

If display lighting is used, then the lighting energy limit may be increased by the value given for normal display lighting for the area of the room where display lighting is used. For example, in an entrance area for a building there may be some display lighting in a small area around the reception desk but not in the rest of the area.

Shop windows use a lot of display lighting and may use up to 192.72 kWh/m^2/yr if the window faces a public road, and 96.8 kWh/m2/yr if the window is in a shopping centre that is closed during the night.

Calculate the parasitic energy use (Ep)

If some form of lighting control system is used, then an allowance needs to be made for the energy used by the control system, and the fact that the luminaires take a little power even if they are dimmed down to give no light. An allowance of 0.3 W/m2 should be made for power used in this way. If the whole lighting system is switched off when the room is not in use, then the power loss is only during the hours of use. If the system is left on all the time then the power loss occurs for 8760 hours per year.

If no lighting control system is used, then the parasitic energy use is zero.

Determine the total power of lighting (Pl)

This is the total power in watts consumed by the luminaires within a space.

Determine the occupancy factor (Fo)

Fo allows for the fact that energy is saved if an automatic control system detects the presence or absence of people in a room and switches off the lights when there is nobody using the room. If no automatic control is used, then the occupancy factor Fo=1. If controls turn off the lights within 20 minutes of the room being empty, then Fo=0.8.

Determine the factor for daylight (Fd)

Fd allows for the fact that if the lighting is dimmed down when there is daylight available, then less energy will be used. If no daylight-linked dimming system is used, then Fd=1. If the electric lighting dims in response to daylight being available, then in areas with adequate daylight Fd=0.8. Adequate daylight may be found in areas that are within 6 m of a window wall or in areas where 10% or more of the roof is translucent or made up of rooflights.

Determine the constant illuminance factor (Fc)

When lighting is designed, a maintenance factor (MF) is used to allow for the fact that as the lighting system ages it produces less light. This means that on day one the lighting system is providing more light than needed. Thus with a constant illuminance system, it is possible to under-run the lighting on day one, and then slowly increase the power used by the lighting until the point is reached when maintenance needs to be carried out by changing the lamps or cleaning the luminaires. Systems that control the lighting in this way have an Fc=0.9, and those that do not have an Fc=1.

Determine the daytime energy use (Ed)

The day time energy use is:

$$Ed = \frac{Pl \times Fo \times Fd \times Fc \times Td}{1000}$$

Determine the night time energy use (En)

The night time energy use is:

$$En = \frac{Pl \times Fo \times Fc \times Tn}{1000}$$

Calculate total energy (kWh) per square metre per year (LENI)

The total energy per square metre per year is the sum of the day time, night time and parasitic energy uses per year divided by the area, as set out in the formula below:

$$LENI = \frac{Ep + Ed + En}{A}$$

Table 4: Recommended maximum lighting energy consumption (kWh) per sqm per year in new and existing buildings (lighting energy limit)												
Hours			Illuminance (lux)								Display Lighting	
Total	Day	Night	50	100	150	200	300	500	750	1000	Normal	Shop windows
1000	821	179	1.11	1.92	2.73	3.54	5.17	8.41	12.47	16.52	10.00	
1500	1277	223	1.66	2.87	4.07	5.28	7.70	12.53	18.57	24.62	15.00	
2000	1726	274	2.21	3.81	5.42	7.03	10.24	16.67	24.70	32.73	20.00	
2500	2164	336	2.76	4.76	6.77	8.78	12.79	20.82	30.86	40.89	25.00	
3000	2585	415	3.31	5.72	8.13	10.54	15.37	25.01	37.06	49.12	30.00	
3700	3133	567	4.09	7.08	10.06	13.04	19.01	30.95	45.87	60.78	37.00	
4400	3621	779	4.89	8.46	12.02	15.59	22.73	37.00	54.84	72.68	44.00	96.80
5400	4184	1216	6.05	10.47	14.90	19.33	28.18	45.89	68.03	90.17	54.00	
6400	4547	1853	7.24	12.57	17.89	23.22	33.87	55.16	81.79	108.41	64.00	
8760	4380	4380	10.26	17.89	25.53	33.16	48.43	78.96	117.12	155.29	87.60	192.72

3 Manufacturers' instructions

There may be a view that manufacturer instructions are only meant for the DIY enthusiasts, who may be installing a lighting product for the first time, and that any 'experienced' electrician or contractor does not need these instructions.

This is not the case since many different lighting products, from different lighting manufacturers, installed in differing locations may have very differing characteristics and requirements that may need to be considered before installation.

The risk if these instructions are not followed and problems then arise, may mean the installer will often be left without technical support, and the product manufacturer may decline any responsibility for any performance issue of the respective lighting product.

In many cases manufacturers' instructions also often contain information that the end user of the lighting installation may require long after the installation has been finished and handed over by the electrician or contractor. It is therefore essential that this information is left with the end user, and handed over as part of any operation and maintenance documentation upon completion of the lighting installation.

Associated Regulations

Building Regulations, AD Part P, Regulation P1 (Applying to dwellings)

'Reasonable provision shall be made in the design and installation of electrical installations in order to protect persons operating, maintaining or altering the installations from fire or injury'

BS 7671 IET Wiring Regulations, Regulation 134.1.1

'Good workmanship by competent persons or persons under their supervision and proper materials shall be used in the erection of the electrical installation. Electrical equipment shall be installed in accordance with the instructions provided by the manufacturer of the equipment.'

BS 7671 IET Wiring Regulations, Regulation 132.13

'Every electrical installation shall be provided with appropriate documentation, including that required by Regulation 514.9, Part 6 and where applicable in Part 7'

4 Heat generation from lighting products

The biggest single risk that lighting products have is that of heat generation and the inherent risk of fire. This is particularly the case with the smaller lighting fittings that house the popular 'extra low voltage' reflector type lamps, or their mains voltage equivalents.

The main heat generation risk is that many lighting products are often relatively small and compact, and thus often specified to be installed in very tight and small spaces or voids. Very few people including lighting experts do not seem to appreciate the high temperatures that these lighting products can generate.

High temperature heat sources like lighting fittings may pose a risk of ignition to combustible materials that may come in close proximity to the same, or even the material upon which the lighting fittings are mounted.

The risk may be further compounded by the fact that some lighting products or, lamp types are designed to dissipate their heat out of the back of the product or lamp (typically 'dichroic' type lamps) whilst others are designed to direct their heat forward (typically 'aluminium reflector' type lamp).

Another risk is that to an untrained person during maintenance, many lamp types look the same, and have similar interchangeable bases and lamp caps, and incorrect lamp types may be fitted.

Designers, electricians and contractors when specifying or installing lighting products or replacing lamps need to carefully consider their selection and adequately address the design issues and potential fire risks of their designs and installations.

Typical examples of risks to be considered;

- Soft furnishings, curtains, etc. placed close to lighting products.
- Combustible dust/debris building up behind lighting products.
- Lighting products in voids, roof space, or attic areas must be kept away from combustible materials.

Additional heat protection measures may need to be considered if there is any risk of ignition from the heat generated by the lighting products to be installed.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 131.3.2

'Persons, livestock, fixed equipment and fixed materials adjacent to electrical equipment shall be protected against harmful effects of heat or thermal radiation emitted by electrical equipment, and in particular the following:

(i) Combustion, ignition or degradation of materials

(ii) Risk of burns

(iii) Impairment of the safe function of installed equipment.

Electrical equipment shall not represent a fire hazard to adjacent materials'

BS7671 IET Wiring Regulations, Regulation 422.4.2 (relating to areas with combustible construction materials)

'Except for equipment for which an appropriate product standard specifies requirements, a luminaire shall be kept at an adequate distance from combustible materials. Unless otherwise recommended by the manufacturer, a small spotlight or projector shall be installed at the following minimum distance from combustible materials:

(i)	Rating up to 100W	0.5m
(ii)	Over 100W and up to 300W	0.8m
(iii)	Over 300 and up to 500W	1.0m

Lamps and other components of luminaires shall be protected against foreseeable mechanical stresses. Such protection shall not be fixed to lampholders unless they form an integral part of the luminaire or are fitted in accordance with manufacturer's instructions.

A luminaire with a lamp that could eject flammable materials in case of failure shall be constructed with a safety protective shield for the lamp in accordance with the manufacturer's instructions'

5 Proximity of cables to hot surfaces

This risk is most common when open-backed lighting fittings are used, particularly when the fittings are installed from below a fixed ceiling fabric and where it is not possible to check the top of the light fitting during installation.

Typical examples have been noted over the years where the wiring directly over the top of a light fitting has come into contact with the back of a bare lamp which normally results in that the cable insulation then melts and burns through.

In some cases this may result in complaints of 'burning smells', reports of 'lighting circuits tripping off for no apparent reason', or in some cases there could be risk of a fire.

Even 'heat resisting cabling' (normally rated at 80 degrees C) would stand little chance of survival if it is in contact with a hot lamp.

In all instances the responsible electrician or contractor should ensure that all wiring is suitably rated and secured in such a manner so that contact with hot surfaces or lamps is avoided.

Where lighting products are proposed to be installed solely from below a ceiling with no access for inspection from above, an option would be to consider using totally enclosed fittings to totally avoid this risk.

Associated Regulations

BS7671 IET Wiring Regulations, Regulation 522.2.1

'In order to avoid the effects of heat from external sources, one or more the following methods or an equally effective method shall be used to protect a wiring system:

(i) Shielding

(ii) Placing sufficiently far from the source of heat

(iii) Selecting a system with due regard for the additional temperature rise which may occur

(iv) Local reinforcement or substitution of insulating material'

6 Proximity of transformers / drivers to hot surfaces

This risk can be encountered when lighting transformers or drivers designed to feed Extra Low Voltage (ELV) or LED lighting product, are pushed up through the mounting hole in the ceiling fabric for the light fitting.

What can happen in tight spaces is that, wiring, transformer/driver and connections are all in very close proximity to one another and, may become in contact with a very hot surface, or the back of a local lamp.

The risks outlined in section 5 above maybe then compounded, in that in addition to the heat generated by the lamp or fitting, heat is also generated by the local transformer or driver.

This heat build up is detrimental to the transformer/driver, lamp, and the wiring, resulting in failure of one or more of the lighting products in due course.

This may then result in either complaints of 'burning smells', reports of 'lighting circuits tripping off for no apparent reason', individual lamps not working due to transformer/driver failure or in some cases there could be a fire risk.

In order to rectify such problems the electrician or contractor would then be faced with several difficulties, particularly if access from above the ceiling fabric is restricted.

Possible solution to minimise this risk might be to try and eliminate the need for transformers or driver's altogether, by perhaps considering self-contained low voltage (230 Volt) operated lighting products and lamps.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 421.1.2

'Fixed electrical equipment shall be selected and erected such that its temperature in normal operation will not cause a fire. This shall be achieved by the construction of the equipment or by additional protective measures taken during erection.

The heat generated by electrical equipment shall not cause danger or harmful effects to adjacent fixed material or to material, which may foreseeably be in proximity to such equipment.

Where fixed equipment may attain surface temperatures, which could cause a fire hazard to adjacent materials, one or more of the following installation methods may be adopted.

The equipment shall:

(i) be mounted on a support which has low thermal conductance, or within an enclosure which will withstand, with minimum risk of fire or harmful thermal effect, such temperatures as may be generated, or

(ii) be screened by materials of low thermal conductance which can withstand, with minimal risk of fire or harmful thermal effect, the heat emitted by the electrical equipment, or

(iii) be mounted so as to allow safe dissipation of heat and at a sufficient distance from adjacent material on which such temperatures could have deleterious effects. Any means of support shall be of low thermal conductance.'

7 Ventilation and heat dissipation of lighting products

This is another common risk that affects lighting transformers and drivers, which due to their compact dimensions are normally pushed up through the light fitting aperture in the ceiling fabric during installation.

The risk in this case is that the transformer or driver may then be surrounded either fully or partially by thermal insulation material, which may restrict the heat dissipation of the device causing, overheating, failure, or risk of a fire.

This risk is forever being increased due to the higher performance of thermal insulation being required, for both energy saving and sound reduction standards, as required by the Building Regulations.

Possible solution to overcome this risk, the electrician or contractor may wish to consider options in sections 5 and 6 above.

If this is not feasible, then alternative well-ventilated, accessible voids or locations should be found in which to locate the necessary remote lighting products.

Consideration should also be given during the installation as to how the future lighting maintenance and replacement functions may be carried out.

Associated Regulations

In addition to Regulation 421.1.2 considered in section 6 above, the following regulation should also be considered:

BS 7671 IET Wiring Regulations, Regulation 421.1.4

'Fixed equipment causing a concentration and focusing of heat shall be at sufficient distance from any fixed object or building element so that the object or element is not subject to a dangerous temperature in normal conditions.'

8 Lighting products being covered with thermal insulation

This is a common risk mainly with domestic lighting installations and lighting products, where often the requirements of the Building Regulations relating to thermal performance of buildings conflicts with the ventilation and the electrical fire safety requirements for electrical installations.

What tends to happen is that the electrician or contractor installs a domestic lighting installation. Then another trade contractor may subsequently install thermal insulation in close proximity and in many cases covering completely all the local lighting products within that area.

Complaints that may then result are that lamps appear to have very short operating life, smells of burning, or transformers, drivers, control gear or associated wiring has failed, or there may be a risk of fire.

The Building Regulation requirement is for the uninterrupted provision of thermal insulation in loft spaces or flat roofs to minimise heat losses, and this requirement is now being strongly enforced particularly on new-build work.

Electricians and contractors therefore need to consider this requirement when installing domestic lighting installations.

Typical solutions:

- Make a boxing around the back of the light fitting; formed from non-combustible material, taking into account the product requirements for necessary fixings and ventilation.
- Use a proprietary manufactured cover or cap.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 559.4.1

'Every luminaire shall comply with the relevant standard for manufacture and test of that luminaire and shall be selected and erected in accordance with the manufacturer's instructions.'

BS7671 IET Wiring Regulations, Regulation 559.5.1

'In the selection and erection of a luminaire the thermal effects of radiant and convected energy on the surroundings shall be taken into account, including:

(i) the maximum permissible power dissipated by the lamps

(ii) the fire resistance of adjacent material at the point of installation, and in the thermally affected areas

(iii) the minimum distance to combustible materials, including material in the path of a spotlight beam.'

Building Regulations, AD Part L1A, Paragraph 5.9 (Applying to new dwellings)

'The building fabric should be constructed so that there are no reasonably avoidable thermal bridges in the insulation layers caused by gaps within the various elements, at the joints between elements and at the edges of elements such as those around window and door openings'

Similar requirements apply to existing dwellings in AD Part L1B.

9 Fire integrity of building fabric and fire compartmentation

On many projects ceiling fabrics and other building fabrics may often be required by the architect or the fire design consultant to form part of the fire compartmentation strategy for the project and provide a level of fire resistance, to inhibit the spread of fire, and to protect the building structure for a stipulated time during a fire in accordance with the Building Regulations. By cutting away parts of this fire compartment, its fire integrity may be compromised and in some cases lost altogether.

It is essential that electricians and contractors carefully consider the fire compartmentation strategy for their jobs or projects, and if necessary may need to talk to the architect or the person responsible for the building works regarding their fire risk strategy and compliance with the Building Regulations.

Possible solution may be to consider using suitably fire-rated light fittings to be installed in all instances, thus reducing the risk and liability as far as possible. Other suitable alternatives may be used to provide equal levels of fire protection, such as fire hoods, boxing-in, etc where necessary.

Good definitive advice is now also published by the Electrical Safety Council in their 'Best Practice Guide No 5 – Electrical installations and their impact on fire integrity of buildings' and is available as a free download from the Electrical Safety Council website.

Electricians and contractors should try to ultimately reduce their risk and safeguard their liability by asking to see copy of the fire strategy for their job or project work being undertaken from the person ordering the work. Then carry out a risk assessment for their own electrical works and complete their installation accordingly.

Associated Regulations

Building Regulations AD Part B, Paragraph 7.2

'If a fire separating element is to be effective, then every joint, or imperfection of fit, or opening to allow services to pass through the element, should be adequately protected by sealing or fire-stopping so that the fire resistance of the element is not impaired'.

Appendix A table A1 and A2 (specific provisions of test for fire resistance of elements of structure) details -

Fire resistance of structural floor in upper storey of 2-storey dwelling house- minimum provision 30-minute integrity (based on load bearing). Similar requirement for other dwelling houses with top floor not more than 5m above ground, but increasing to 60 minute integrity if top floor is more than 5m above ground

BS 7671 IET Wiring Regulations, Regulation 527.2.1

'Where a wiring system passes though elements of a building construction such as floors, walls, roofs, ceilings, partitions or cavity barriers, the openings remaining after the passage of the wiring system shall be sealed according to the degree of fire-resistance (if any) prescribed for the respective element of building construction before penetration.

This requirement is satisfied if the sealing of the wiring system concerned has passed a relevant type test meeting the requirements of Regulation 527.2.3'

(Note – BS7671 definition of 'wiring system' does not include lights, but in most cases the openings made for lighting would be larger and more onerous than openings created for cables).

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10 Lighting circuit cable type and cable sizing

This risk does not only just concern SELV wiring serving typically low energy and 12 Volt lighting products, but it also concerns the wiring to mains operated lighting products in many cases.

It does not seem to be appreciated that a typical 'extra low voltage' lamp rated at say 50 Watts and running on 12 Volts, will draw over 4 Amps, yet the same wattage lamp rated for 230 Volt operation will draw less than 0.25 Amps from the supply.

Electricians and contractors should always consider the lighting circuit load current being drawn at any point in the lighting circuit wiring and ensure that cables are provided with adequate current carrying capacity for that circuit.

Where applicable, cable de-rating factors will need to be considered if cables are run in, or near thermal insulation, or are run in areas where high ambient temperatures may be expected.

The IET Wiring Regulations BS7671 stipulates minimum sizes of conductors for lighting circuit wiring both for nominal mains voltage and for extra low voltage lighting circuits.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 524.1

'The cross-sectional area of each conductor in a circuit shall be not less than the values given in Table 52.3, except as provided for extra-low voltage lighting installations according to regulation 559.11.5.2.'

(The table 52.3 shows for non-sheathed and sheathed cables used on lighting circuits, using copper conductors, the minimum conductor cross sectional area to be 1.0 mm sq.)

BS 7671 IET Wiring Regulations, Regulation 559.11.5.2

'The minimum cross-sectional area of the extra-low voltage conductors shall be:

(i) 1.5mm sq copper, but in the case of flexible cables with a maximum length of 3m a cross sectional area of 1 mm sq copper may be used.

(ii) 4mm sq copper in the case of suspended flexible cables or insulated conductors for mechanical reasons.

(iii) 4mm sq copper in the case of composite cables consisting of braided tinned copper outer sheath, having a material of high tensile strength inner core.'

11 Ingress of insects and foreign bodies

Where open-backed light fittings are installed, the source of light from the back of the fitting will frequently attract insects. When coming into contact or close proximity to the fitting, the heat often stuns the insect, and most likely kills them outright, with the result that the dead insect then falls onto, or into the fitting.

This problem is most noticeable to end users where enclosed light fittings have some form of plastic or glass diffuser. In these cases, the dead insects build up between the diffuser and the lamp, thus reducing the light output performance.

Complaints and risks attributable to this cause may be reports of 'burning smells' or in extreme cases the risk of fire.

A practical solution that electricians or contractors could consider is some form of additional guarding or use enclosed light fittings. Any such guarding would need to have adequately fine ingress protection however, to ensure that insect entry is prevented.

Other forms of foreign body entry into or onto lighting fittings should also be considered and suitable preventative steps taken. Typical loose building debris, sawdust, split ceiling laths and loose fill insulation can often be found to have accumulated behind or within lighting fittings, giving rise to similar problems and risks.

The use of enclosed lighting fittings will often greatly reduce this problem, whilst also at the same time dealing with many of the other risks covered in this guide.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 522.4.1

'A wiring system shall be selected and erected so as to minimise the danger arising from the ingress of solid foreign bodies. The completed wiring system shall comply with the IP degree of protection relevant to the particular location.'

BS 7671 IET Wiring Regulations, Regulation 522.4.2

'In a location where dust in significant quantity is present (AE4), additional precautions shall be taken to prevent the accumulation of dust or other substances in quantities which could adversely affect the heat dissipation from the wiring system.'

BS 7671 IET Wiring Regulations, Regulation 422.3.2

'Measures shall be taken to prevent an enclosure of electrical equipment such as a heater or resistor from exceeding the following temperatures:

(i) 90 degrees C under normal conditions, and

(ii) 115 degrees C under fault conditions

Where materials such as dust or fibres sufficient to cause a fire hazard could accumulate on an enclosure of electrical equipment, adequate measures shall be taken to prevent an enclosure of electrical equipment from exceeding the temperatures stated above.

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12 Lighting controls and dimmer switch compatibility

When thinking about dimming controls or lighting control systems for a new project, the control requirements should be discussed at the early design stage with your dimming or control system supplier and proposed lighting product suppliers to review and resolve any compatibility issues between the dimming, controls and lighting products.

The compatibility problem often may not become apparent until sometime after the lighting installation has been completed, sometimes months or even years after.

Every dimmer and control system has a defined operating voltage and power rating. Not all dimmers or control systems share the same functionality and before developing a lighting control strategy, you need to understand the basic facts and characteristics of the different lighting loads and suitable dimmer types and the different control systems available.

Overloading a dimmer with too many lamps or transformers is likely to result in failure to illuminate, flickering or delays in dimming. Some lamps might display 'stepping' in lumen output at points within the dimming range and occasionally an incompatible lamp or LV transformer may cause a buzzing in the dimmer.

Some lamp types cause high in rush currents when they are initially turned on, which may course unwanted tripping of the lighting circuit protective device and should be considered at the design stage.

During normal operation, dimmers generate heat and get warm to touch. This needs to be considered and taken into account especially when grouping dimmers together on a wall mounted dimming control switch, within a dimmer rank or dimmer panel.

Some types of dimmers have a limit on the minimum and maximum circuit load (Watts) that can be connected and function correctly with any one dimmer.

Common complaints are that the lighting will no longer turn on, lights flicker, lights do not dim smoothly or that lights go out by themselves some time after being turned on. Another common complaint is that dimmer switches, MCBs, RCBOs, transformers, drivers, or sometimes just the lamps are noisy in operation.

The problem is most common when CFL, LED lighting, SELV lighting or so-called 'dimmable' low energy lighting products are installed.

There is no hard and fast rule that will guarantee a solution in all instances, apart from that, the electrician or contractor should follow the respective manufacturers' instructions for each of the lighting products and the lighting control or dimming devices.

It is common for reputable manufacturers of control systems and dimmer switches to specify typical minimum and maximum connected lighting circuit loads in Watts for their control products, together with other operational requirements for different lamp types, or lighting product.

If in any doubt, the electrician or contractor should verify prior to the installation stage that all dimmers, control devices and lamps types are fully compatible with each other, as obviously call backs and replacement of components at later stage will be time consuming and costly.

Past experience and records of combinations of what controls, dimmer switches, lamps, transformers, drivers, etc. have previously operated well together can be very helpful. This is particularly the case with low energy lighting products employing compact fluorescent or LED technology.

For further information or advice regarding your dimming or lighting control proposals, contact the Orlight technical department.

Associated Regulations

Building Regulations AD's Part L2A and Part L2B.

Lighting controls required for compliance with the energy efficiency regulations that apply when installing fixed building services in new and existing buildings other than dwellings (commercial and similar).

BS 7671 IET Wiring Regulations, Regulation 559.4.1

'Every luminaire shall comply with the relevant standard for manufacture and test of that luminaire and shall be selected and erected in accordance with the manufacturer's instructions.'

BS 7671 IET Wiring Regulations, Regulation 331.1

'An assessment shall be made of any characteristics of equipment likely to have harmful effects upon other electrical equipment or other services or likely to impair the supply, for example, for co-ordination with other concerned parties e.g. petrol stations, kiosks and shops within shops. Those characteristics include for example:

(i) transient overvoltages,

(ii) undervoltage,

(iii) unbalanced loads,

(iv) rapidly fluctuating loads,

(v) starting currents,

(vi) harmonic currents,

(vii) earth leakage current,

(viii) excessive PE conductor current not due to a fault,

(ix) d.c. feedback,

(x) high frequency oscillations,

(xi) necessity for additional connections to Earth,

(xii) power factor

For an external source of energy the distributor shall be consulted regarding any equipment of the installation having a characteristic likely to have significant influence on the supply.'

13 Lighting in bathroom areas and IP ratings

This risk is common particularly where lighting has been installed in a bathroom area, and no consideration has been given to the requirements of BS 7671 regarding ingress protection and moisture protection.

BS 7671 clearly defines the respective 'zones' in bathroom or shower room based on stipulated dimensions. Each zone has in turn clearly defined requirements, in particular minimum IP ratings that need to be achieved with electrical products.

By simple measurement, an item of equipment can be clearly determined as within or outside a particular zone.

Electricians and contractors must be fully familiar with these zone requirements of BS7671 and ensure that suitably rated lighting products are installed.

These requirements must be made very clear to customers, if customers wish to select or supply their own lighting products, for the electrician or contractor to install.

It should also be remembered that the IP ratings required under BS7671 apply, irrespective of whether an item is 12Volt, 230Volt, low energy or SELV operated.

A common misunderstanding is that because a low energy lamp may operate at ELV, that the IP requirements will not have to apply. This is not the case.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 701.512.2

'Installed electrical equipment shall have at least the following degrees of protection:

(i) In zone 0: IPX7

(ii) In zones 1 and 2: IPX4

This requirement does not apply to lighting product with integral shaver socket outlet complying with BS EN 61558-2-5 installed in zone 2 and located where direct spray from showers is unlikely.

Electrical equipment exposed to water jets, e.g. for cleaning purposes, shall have a degree of protection of at least IPX5.'

Figures 701.1 and 701.2 of BS 7671 clearly show the zone diagrams

Note: It should be noted that the zone requirements in BS 7671: 2008 have now changed from those detailed in earlier editions of the standard. In particular zone 3 no longer exists, and the previous horizontal 'hook-over' of certain zones above other zones has now been deleted.

It should also be noted that BS7671 does not stipulate zones around wash basins and sinks, although common sense needs to prevail in these instances!

14 Lighting in bathroom areas and equipotential bonding

This concerns the requirements of BS 7671, when installing lighting products in a bathroom area. Although not specifically aimed only at lighting installations, the bonding requirements may apply to such lighting installations under certain conditions.

Typical problems are where lighting products have been installed, either as new build work or more frequently refurbishment work, whereby the supplementary bonding requirement have been ignored. Consequently, the lighting installation may not be deemed to be in compliance with BS 7671.

The electricians or contractors when installing lighting in a bathroom area must consider fully the BS 7671 requirements, and where applicable ensure that such bonding is provided as part of the lighting installation.

BS 7671 under certain circumstances requires that the circuit protective conductor (CPC) of the lighting circuit is locally bonded to the CPCs of other circuits supplying equipment within the bathroom area, and also bonded to other extraneous conductive parts, such as metallic pipe-work, baths, etc.

It should be noted that bonding requirements, if applicable would apply equally to circuits supplying Class I equipment and Class II.

BS 7671: 2008 introduced a fundamental change, whereby it is now permitted to omit the supplementary bonding requirements, provided that all of the stipulated conditions are met.

Electricians and contractors must satisfy them self that all such conditions have been met, before electing to omit any supplementary bonding requirements within a bathroom area.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 701.415.2

'Local supplementary bonding according to regulation 415.2 shall be established connecting together the terminals of the protective conductor of each circuit supplying Class I and Class II equipment to the accessible extraneous-conductive parts, within a room containing a bath or a shower, including the following:

(i) metallic pipes supplying services and metallic waste pipes (e.g. water, gas)

(ii) metallic central heating pipes and air conditioning systems

(iii) accessible metallic structural parts of the building (metallic door architraves, window frames and similar parts are not considered to be extraneous conductive-parts unless they are connected to metallic structural parts of the building)

Supplementary bonding may be installed outside or inside rooms containing a bath or shower, preferably close to the point of entry of extraneous-conductive-parts into such rooms.

Where the location containing a bath or shower is in a building with a protective equipotential bonding system in accordance with Regulation

411.3.1.2, supplementary equipotential bonding may be omitted where all of the following conditions are met:

(iv) All final circuits of the location comply with the requirements for automatic disconnection according to Regulation 411.3.2

(v) All final circuits of the location have additional protection by means of an RCD in accordance with Regulation 701.411.3.3

(vi) All extraneous-conductive-parts of the location are effectively connected to the protective equipotential bonding according to Regulation 411.3.1.2

NOTE: The effectiveness of the connection of extraneous-conductive-parts in the location to the main earthing terminal may be assessed, where necessary, by the application of Regulation 415.2.2

15 Lighting in bathroom areas and RCD additional protection

This concerns the requirements of BS 7671, when installing lighting products within a bathroom area. Although not specifically aimed only at lighting installations, the RCD additional protection requirement would almost certainly be a requirement, for most new bathroom lighting installations.

BS 7671 requires all new circuits within all bathroom areas to be RCD protected at a level of 30mA. By definition, this would include low voltage operated lighting, and associated switching products.

It should be remembered that under BS 7671, 'low voltage' is defined as exceeding 50V ac, or 12V ripple free dc but not greater than 1000V ac or 1500V dc. In other words the normally encountered 230V supply is deemed 'low voltage'.

Electricians and contractors should remember that if installing any form of low voltage (230V) lighting circuit or lighting control into such locations, that RCD additional protection is now required, if the new installation or project is to comply with BS 7671. Quite how this RCD protection is provided will vary from job to job.

In new build, or more extensive work for example, such RCD protection may well be installed centrally within a consumer unit or distribution board.

More localised work, perhaps within just the bathroom area, the electrician or contractor may decide to meet the RCD requirement by covering only his lighting circuit work with an RCD. Typical example, by intercepting an existing non-RCD protected lighting circuit and installing a separate RCD, RCBO or locally via a 30mA RCD fused connection unit to cover the new installation works.

Whichever method is selected, electricians and contractors must ensure that as a minimum their new installation work that they are responsible for complies fully with BS 7671 in this respect.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 701.411.3.3

'Additional protection shall be provided for all low voltage circuits of the location, by the use of one or more RCDs having the characteristics specified in Regulation 415.1.1

Note: See also Regulation 314.1 (iv) and 531.2.4 concerning the avoidance of unwanted tripping.'

BS 7671 IET Wiring Regulations, Regulation 415.1.1

'The use of RCDs with a rated residual operating current IΔn not exceeding 30mA and an operating time not exceeding 40ms at a residual current of 5 x IΔn is recognised in ac systems as additional protection in the event of failure of the provision for basic protection and/or the provision for fault protection or carelessness by users.'

16 Initial lamp type and ensuring correct replacement

Ensuring the correct lamp types are installed is not only a problem during the initial installation, but may also be a problem during maintenance and future replacement of faulty lamps.

In recent years, particularly since the advent of new technology and low energy lamps, ELV, CFL's, LED's, mains operated GU10 type lamp and the existing conventional lamps, the choosing of the correct lamp type for a lighting fitting has become more critical than ever before.

Incorrect lamp types within a lighting product will often result in poor lighting performance, greatly reduced lamp life, damage to the fitting itself, its wiring and in extreme cases, risk of fire.

The electrician or contractor should ensure that correct lamps are fitted initially, fully in line with the lighting product manufacturer's instructions. Even more important, the end users and customers must be made aware of the maintenance and lamp changing requirements.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 134.1.1

'Good workmanship by competent persons or persons under their supervision and proper materials shall be used in the erection of the electrical installation. Electrical equipment shall be installed in accordance with the instructions provided by the manufacturer of the equipment.'

BS 7671 IET Wiring Regulations, Regulation 132.13

Every electrical installation shall be provided with appropriate documentation, including that required by Regulation 514.9, Part 6 and where applicable Part 7.'

17 Resistance to the passage of sound and the building regulations

AD Part E of the Building Regulations requires that new building work should be constructed to provide reasonable resistance to sound between rooms or other local buildings, with the type of floor construction and building fabric in particular being seen as a key element in achieving this requirement.

The Building Regulations recognise that as well as using specified products and solutions, sound transfer will occur through the smallest of gaps and voids, and as such stress the importance of good workmanship to avoid such issues. The relevant Building Regulations also notes quite clearly that the lighting installation into certain ceiling fabrics can reduce the resistance to the passage of airborne and impact sound.

Electricians and contractors need to be aware of these requirements, when installing lighting installations, particularly on new-build work in order to comply with the Building Regulations.

Associated Regulations

Building Regulations AD Part E, Requirement E1

Dwelling-houses, flats and rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjacent buildings'

Building Regulations AD Part E, Requirement E2

'Dwelling-houses, flats and rooms for residential purposes shall be designed and constructed in such a way that –

(a) internal walls between a bedroom or a room containing a water closet, and other rooms; and

(b) internal floors, provide reasonable resistance to sound provide reasonable resistance to sound'

18 Resistance to the passage of moisture and the building regulations

AD Part C of the Building Regulations requires that new building work should be constructed to provide reasonable resistance against excessive moisture-laden air transfer into roof voids in particular, which may in turn lead to risk of condensation, mould, damp and building fabric decay.

Such moisture resistance is traditionally achieved by good sealing of different parts of the building coupled with adequate ventilation.

In terms of the sealing requirements, the Building Regulations note that a key element in this respect is to ensure that all penetrations and gaps for such items as pipes, wiring, etc, are filled on completion of work – particularly in areas of high humidity such as kitchens and bathroom areas. Electricians and contractors need to be fully aware of these requirements when installing lighting installations in such rooms.

All new building work, where statutory compliance must be achieved, a solution must be found. Similarly with new work in existing buildings, particularly bathroom areas, and kitchen areas, the electrician or contractor must ensure that the new building work, is 'no less compliant than before the work started' in order to comply with the Building Regulations.

Associated Regulations

Building Regulations AD Part C, Paragraph 6.12

'To avoid excessive moisture transfer to roof voids, gaps and penetrations for pipes and electrical wiring should be filled and sealed; this is particularly important in areas of high humidity, e.g. bathrooms and kitchens. An effective draught seal should be provided to loft hatches to reduce inflow of warm air and moisture.'

19 Lighting product cable connections

This problem is still fairly common, despite the industry raising the electrical installation standards in the UK.

It is non-compliant and bad workmanship practice, to connect lighting products by using open wiring connector blocks pushed up into the ceiling void for any electrical terminations, or for wiring branches, or making joints in the wiring, even if they are bound up in insulation tape.

This practice is not acceptable to BS 7671, and the wiring regulations have always required that wiring connections be fully enclosed, either within a recognised wiring accessory, compliant equipment enclosure or within some other form of enclosure constructed from a material proven to be non-combustible.

Electricians and contractors should fully recognise this requirement, and ensure that all wiring terminations and joints associated with their lighting installations are fully enclosed, either within proprietary terminal chambers on lighting fitting's, or within enclosed junction boxes as necessary.

Another issue to consider is the accessibility to connections and wiring joints, especially relevant if such are to be located inaccessibly behind ceiling fabrics.

BS7671 now allows inaccessible joints only if one or more of the following conditions are met – a joint made by soldering, brazing or appropriate compression tool, or 'maintenance free' accessories provided that they are made to BS5733 and marked with an (MF)' (MF symbol within a circle)

Regardless of the actual method of jointing, the joint or termination still needs to be properly enclosed, and its location should be recorded and passed onto the end user of the installation.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 526.3

'Every connection shall be accessible for inspection, testing and maintenance, except for the following:

(i) A joint designed to be buried in the ground

(ii) A compound-filled or encapsulated joint

(iii) A connection between a cold tail and the heating element as in ceiling heating, floor heating or a trace heating system

(iv) A joint made by welding, soldering, brazing, or appropriate compression tool

(v) Joints made in equipment by the manufacturer of the product and not intended to be inspected or maintained

(vi) Equipment complying with BS 5733 for a maintenance-free accessory and marked with the symbol (MF) and installed in accordance with the manufacturer's instructions.'

BS 7671 IET Wiring Regulations, Regulation 526.5

'Every termination and joint in a live conductor or a PEN conductor shall be made within one of the following or a combination thereof:

(i) A suitable accessory complying with the appropriate product standard

(ii) An equipment enclosure complying with the appropriate product standard

(iii) An enclosure partially formed or completed with building material which is non-combustible when tested to BS476-4.'

BS 7671 IET Wiring Regulations, Regulation 526.8

'Cores of sheathed cables from which the sheath has been removed and non-sheathed cables at the termination of conduit, ducting or trunking shall be enclosed as required by Regulation 526.5.'

20 Accessibility to cable connections

This risk is most prevalent when the first fix of the lighting installation has to be installed before the final ceiling construction is in place, then rendering the respective lighting installation connections and terminations inaccessible.

Another common problem is where lighting junction boxes are installed in a floor void, serving lighting fittings in a room below, and subsequently the floor is covered with some form of floor finishing, again rendering the lighting installation terminations inaccessible.

Electricians and contractors need to recognise what BS 7671 actually requires lighting installations to be planed accordingly to preferably make all such terminations fully accessible, or avoid all joints wherever practicable.

BS 7671 requires that all joints and terminations comprising screwed or bolted connections are accessible. A joint taking the form of perhaps compression (crimped), soldered connections or one of the modern 'maintenance free' design connectors by definition would not need such accessibility for BS 7671 compliance, although the requirements for a suitable enclosure would still apply.

BS 7671now recognises the new type of 'maintenance free connectors', or 'maintenance free' accessories, stipulating that access need not be provided, as long as that they are made to BS5733 and marked with MF' (MF symbol within a circle)

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 526.3

'Every connection shall be accessible for inspection, testing and maintenance, except for the following:

(i) A joint designed to be buried in the ground

(ii) A compound-filled or encapsulated joint

(iii) A connection between a cold tail and the heating element as in ceiling heating, floor heating or a trace heating system

(iv) A joint made by welding, soldering, brazing, or appropriate compression tool

(v) Joints made in equipment by the manufacturer of the product and not intended to be inspected or maintained

(vi) Equipment complying with BS 5733 for a maintenance-free accessory and marked with the symbol (MF) and installed in accordance with the manufacturer's instructions.'

21 Accessibility to lighting products

This issue is normally encountered close to the completion or, at the 'finishing works stages' of a project. Other trades such as decorators or builders, often in good faith may be unaware of possible potential problems that may come from their actions. Typical common problem in this respect may be where recessed lighting products are painted or mastic sealed around, often for aesthetic reasons.

Assuming that good, accessible lighting products are installed, the electrician or contractor needs to do their best to make other trades and possible end users aware of the need to maintain accessibility.

If possible, the electricians and contractors should follow best practice and install all such 'second fix products' after the work of other finishing trades such as painting, etc. wherever possible. However, time pressures and contractual conditions may often prevent this happening.

Associated Regulations

BS 7671 IET Wiring Regulations, Regulation 132.12

'Electrical equipment shall be arranged so as to afford as may be necessary:

(i) sufficient space for the initial installation and later replacement of individual items of electrical equipment.

(ii) accessibility for operation, inspection, testing, fault detection, maintenance and repair.'

BS 7671 IET Wiring Regulations, Regulation 513.1

'Except for a joint in cables where Section 526 allows such a joint to be inaccessible, every item of equipment shall be arranged so as to facilitate its operation, inspection and maintenance and access to each connection. Such facility shall not be significantly impaired by mounting equipment in an enclosure or compartment.'

Further information

If you require any additional information or technical support regarding the specification or the installation of any Orlight product please do not hesitate to contact us directly on telephone number 01707 663 883, or visit our website at www.orlight.com

Notes:

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FROM SOURCE TO SITE

Guide on Lighting Risks and Regulations

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