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Introduction to the United Kingdom Building Regulations Approved Documents for the Conservation of Fuel and Power - 2014

The Government in England uses the 2014 editions of the building regulations approved document L. These came into force on 6th April 2014.

The Welsh Government has also published their 2014 update to the requirements which mirror the English document. The Welsh approved document L came into force on 31st July 2014.

The Government of Scotland also updated their requirements and these came into force on 1st October 2015.

Northern Ireland is currently using The Building Regulations (Northern Ireland) 2012. This uses the requirements of the 2010 compliance guide for England and Wales.

Note that the requirements and content across countries of the United Kingdom can in principle differ significantly after 6th April 2014.

The majority of the content of these documents deals with the building envelope and fixed building services giving guidance on how to meet the requirements of the Building Regulations. However, there is very little reference to lighting in these documents. The lighting requirements appear in the compliance documents which have the same legal standing as the Regulations

Country	Document Part	Date of implementation
England	**L**	**6th April 2014**
Northern Ireland	**F**	**31st October 2012**
Scotland	**J**	**1st October 2015**
Wales	**L**	**31st July 2014**

Requirements are split depending upon the building type, either domestic or non-domestic. They also consider whether the development is a new building or a refurbishment of an existing building.

For a new building or a major refurbishment (where the building fabric is affected) the lighting requirements cannot be considered in isolation but as part of the whole building fabric and building services and these must be considered as a whole. Compliance is demonstrated via an approved calculation methodology such as the SAP software for domestic buildings and the SBEM software for non-domestic building. Therefore to demonstrate compliance all of the building parameters must be available. However for minor refurbishments lighting may be considered in isolation without consideration of other building criteria through the elemental approach.

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Elemental requirements for the refurbishment of non-domestic buildings

From August 2010 until 6th April 2014 the requirements for the elemental method for England, Scotland, Wales and Northern Ireland were

REQUIREMENTS FOR ALL UK COUNTRIES AUGUST 2010 PRIOR TO 6TH APRIL 2014	
Area of application	**Requirement**
General lighting in office, industrial and storage areas	55 luminaire lumens per watt
General lighting in other types of spaces	55 lamp lumens per watt
Display lighting	22 lamp lumens per watt

From 6th April 2014 in England, 31st July 2014 in Wales and 1st October 2015 in Scotland the requirements for these countries became

REQUIREMENTS FOR ENGLAND POST 6TH APRIL 2014 WALES POST 31st JULY 2014 SCOTLAND POST 1ST OCTOBER 2015	
Area of application	**Requirement**
General lighting in office, industrial and storage areas	60 luminaire lumens per watt
General lighting in other types of space	60 lamp lumens per watt
Display lighting	22 lamp lumens per watt

Note that these limits are for the AVERAGE across the areas and are not limits for individual luminaires.

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Control factors

For all countries CONTROL FACTORS may be applied. These may only be applied to general lighting in office, industrial and storage spaces and not to any other spaces. These factors are multiplied with the luminaire lumens per watt value to provide a corrected value that rewards the use of lighting controls.

REQUIREMENTS FOR ALL UK COUNTRIES AUGUST 2010 PRIOR TO 6TH APRIL 2014		
Light output control	**Control Factor**	**Result of applying the control factor**
(a) Luminaire in a daylit space, light output controlled by photoelectric switching or dimming control, with or without override	0.9	50 luminaire lumens per Watt
(b) Luminaire in a space likely to be unoccupied most of the time, where a sensor switches off the lighting in the absence of occupants but switching on is done manually except where this would be unsafe	0.9	50 luminaire lumens per Watt
(c) Circumstances (a) and (b) combined	0.85	47 luminaire lumens per Watt
(d) None of the above	1.00	55 luminaire lumens per Watt

Note that control factors for occupancy control are only for ABSENCE control, not presence control.

If no automatic lighting controls are used then local manual switching is required. The distance to the switch in plan should generally not be more than six metres or twice the height of the luminaire above the floor if this is greater.

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From 6th April 2014 in England, 31st July 2014 in Wales and 1st October 2015 in Scotland the permissible control factors for these countries became

REQUIREMENTS FOR ENGLAND POST 6TH APRIL 2014 WALES POST 31st JULY 2014 SCOTLAND POST 1ST OCTOBER 2015		
Light output control	**Control Factor**	**Result of applying the control factor**
(a) Daylit space with photo-switching with or without override	0.90	54 luminaire lumens per Watt
(b) Daylit space with photo-switching and dimming with or without override	0.85	51 luminaire lumens per Watt
(c) Unoccupied space with auto on and off	0.90	54 luminaire lumens per Watt
(d) Unoccupied space with manual on and auto off	0.85	51 luminaire lumens per Watt
(e) Space not daylit, dimmed for constant illuminance	0.90	54 luminaire lumens per Watt
a + c	0.80	48 luminaire lumens per Watt
a + d	0.75	45 luminaire lumens per Watt
b + c	0.75	45 luminaire lumens per Watt
b + d	0.70	42 luminaire lumens per Watt
e + c	0.80	48 luminaire lumens per Watt
e + d	0.75	45 luminaire lumens per Watt

Note that this expands the available control factors by adding presence and absence detection and also constant illuminance control.

In all cases to qualify for daylight control the room must be a daylit space, which means any space:

- within 6 m of a window wall, provided that the glazing area is at least 20% of the internal area of the window wall; or
- below roof lights provided that the glazing area is at least 10% of the floor area.

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

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LENI requirements for the refurbishment of non-domestic buildings

From 6th April 2014 in England, 31st July 2014 in Wales and 1st October 2015 in Scotland compliance with the requirements may also be shown through use of the Lighting Energy Numeric Indicator (LENI), as described in BS EN 15193. This approach is more flexible and limiting criteria are based upon energy required per square meter year, as opposed to elemental product efficacy.

The process for using LENI is given below

- Design the lighting
- Look up the energy limit
- Calculate the parasitic energy use (Ep)
- Determine the total power of lighting (Pl)
- Determine the occupancy factor (Fo)
- Determine the factor for daylight (Fd)
- Determine the constant illuminance factor (Fc)
- Determine the daytime energy use (Ed)
- Determine the night time energy use (En)
- Calculate LENI

The LENI limiting value is taken from table 44 using the occupancy hours and design illuminance.

Table 44 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 window
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

Again benefit is given for the use of controls

Light Output Control	Control Factor
F_o – occupancy control (presence / absence)	0.80
F_d – daylight control	0.80
F_c – constant illuminance control	0.90

Note that all control factors may be used in parallel so unlike the elemental method benefit is given for the use of daylight and constant illuminance controls together.

Additional requirements – equipment information

Within England, Scotland, Wales and Northern Ireland it is a requirement that the owner of the building is provided with sufficient information on the building and fixed building services and their maintenance requirements so that the building can be operated efficiently, for example via the building log book.

Additional requirements – metering of electric circuits

Within England, Wales and Northern Ireland it is a requirement for metering of general and display lighting in new and existing buildings through either

- kWh meters on dedicated lighting circuits in the electrical distribution, or
- local power meter coupled to or integrated in the lighting controllers of a lighting building management system, or
- 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.

Within Scotland it is a requirement that every building must be designed and constructed in such a way that each building or part of a building designed for different occupation is fitted with fuel and power meters. However this requirement does not apply to

- domestic buildings
- district or block heating systems where each part of the building designed for different occupation is fitted with heat meters
- heating fired by solid fuel or biomass

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Requirements for new build or major refurbishment of existing non-domestic buildings

For a new building or a major refurbishment (where the building fabric is affected) the lighting requirements cannot be considered in isolation but as part of the whole building fabric and building services being considered as a whole. Compliance is demonstrated via an approved calculation methodology such as the SBEM software for non-domestic building.

It is essential that the correct version of SBEM is used for the country concerned.

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Elemental requirements for the refurbishment of domestic buildings

From August 2010 until 6th April 2014 the requirements for domestic buildings for England, Wales and Northern Ireland were

DOMESTIC REQUIREMENTS FOR ENGLAND, WALES AND NORTHERN IRELAND FROM AUGUST 2010 UNTIL 6TH APRIL 2014		
Lighting	**New and replacement systems**	**Supplementary information**
Fixed internal lighting	In areas affected by the building work a minimum of 75% of all light fittings in the main dwelling spaces shall be low energy light fittings Low energy light fittings use lamps with a lamp efficacy greater than 45 lumens per circuit watt. Light fittings with a total lumen output less than 400 lamp lumens are excluded from the requirement Light fittings whose supplied power is less than 5 circuit watts are excluded from the requirement	Light fittings may be either • dedicated fittings which have separate control gear and only take low energy lamps • standard fittings supplied with low energy lamps with integrated control gear Light fittings with GLS tungsten filament lamps or tungsten halogen lamps will not meet the requirement The Energy Saving Trust publication GIL20 "Low energy domestic lighting" gives guidance on identifying suitable locations for fixed energy efficient lighting
Fixed external lighting	Where fixed external lighting is installed light fittings should have the following characteristics. **EITHER** lamp capacity not greater than 100 lamp watts per light fitting with automatic control by both movement detection and photocell to ensure operation only when needed **OR** have a lamp efficacy greater than 45 lumens per circuit watt with automatic photocell control to switch off during daylight hours. The light fittings should be manually controlled by building occupants.	

These requirements were also adopted in Scotland on 1st October 2015.

From 6th April 2014 in England, 31st July 2014 in Wales and 1st October 2015 in Scotland an additional requirement exists that a single light switch should normally operate no more than six light fittings with a maximum total load of 100 circuit watts. The requirement in Northern Ireland is unchanged.

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Links to relevant web-sites

England
http://www.planningportal.gov.uk/buildingregulations/approveddocuments/

Scotland
http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards

Wales
http://wales.gov.uk/topics/planning/buildingregs/?lang=en

Northern Ireland
http://www.dfpni.gov.uk/index/buildings-energy-efficiency-buildings/building-regulations/content_-_building_regulations-newpage-3.htm

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