

# Dwellings and energy efficient lighting: new regulation Part L

IP 5/02

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## information paper

**Part L (Conservation of fuel and power) of the Building Regulations for England and Wales contains requirements on energy efficient lighting. An Approved Document gives examples of ways to meet**

**the requirements. In the 2002 edition, published in October 2001 and in force from 1 April 2002, these requirements have been extended to cover internal and external lighting in dwellings.**

**This paper describes the scope of the requirements, and explains the guidance in the Approved Document. It will be of interest to housebuilders and domestic electrical contractors.**

### Introduction to the regulations

Part L of the Building Regulations deals with the conservation of fuel and power. Since 1994, Part L has included requirements for energy efficient lighting in non-domestic buildings. In the recent amendment, in force from 1 April 2002, these requirements have been revised and extended. In particular, for the first time the Building Regulations include a requirement for energy efficient internal and external lighting in new and extended (and some altered) dwellings.

The requirements of the Building Regulations are brief and functional performance statements. For dwellings, the lighting requirement is '*providing lighting systems with appropriate lamps and sufficient controls so that energy can be used efficiently*'. The requirement for sufficient controls applies only to external lighting.

An Approved Document or AD<sup>[1]</sup> gives guidance on ways of complying with the requirements. The solutions in the AD do not have to be adopted, but if they are not then

compliance must be demonstrated in another way. The AD was published in October 2001 after wide consultation in the summer of 2000, including with the House Builders Federation, Lighting Association, and Electrical Contractors Association.

Approved Document L1 deals with dwellings. There is a second AD (L2) which



Courtesy Lampholder 2000

**Figure 1**

A suspended lampholder with an integrated electronic ballast, suitable for compact fluorescent lamps

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describes the requirements for other buildings. Multi-residential buildings, including hotels, hostels, old people's homes, hospitals, nurses' homes and boarding schools, do not count as dwellings for the purposes of the Building Regulations.

This paper provides additional practical explanation of the lighting guidance in Approved Document L1. It has been endorsed for this purpose by the Department for Transport, Local Government and the Regions.

A BRE Report *Energy efficient lighting: Part L of the Building Regulations explained*<sup>[2]</sup> describes in detail the lighting requirements for non-domestic buildings.

## Scope

The Regulations apply to new dwellings, to extensions, and where there has been a material change of use (for example a hotel or office becoming a dwelling). However, replacing the lighting in a dwelling, without any other changes, does not count as a controlled service and so in this case the replacements do not come under Part L.

The Regulations apply to any size of dwelling, even one-bedroomed flats.

The AD addresses internal and external lighting.

## Internal lighting

For internal lighting a way to comply would be to provide *some* lighting sockets or luminaires that only take lamps with a circuit luminous efficacy greater than 40 lumens/watt (lm/W) (for example fluorescent tubes and compact fluorescent lamps). These lamps would normally be labelled Class A or Class B<sup>[3]</sup>, although not all Class B lamps would comply.

The types of fitting that would comply include linear fluorescent luminaires, and lampholders (Figure 1) or fittings (Figure 2) that can only take compact fluorescent lamps. These normally have a ballast and starter within the lampholder or fitting, and a special socket which takes pins on the base of the lamp. A simple bayonet or Edison screw type of holder would not meet the requirement, even if it were fitted with a self-ballasted compact fluorescent lamp. This is to discourage the immediate replacement of the lamp with a tungsten one. The special lampholder with control gear is also a more sustainable solution because the ballast does not have to be replaced every time a lamp fails. Further information



Courtesy/Micromark Limited

**Figure 2** This fitting has an integral ballast and can only be used with compact fluorescent lamps

about compact fluorescent luminaires is given in BRECSU Good Practice Guides<sup>[4,5]</sup>.

Table 1, taken from Approved Document L1 (paragraph 1.55), gives guidance on how many of these lampholders or fittings might reasonably be installed in a dwelling. This corresponds roughly to one per three rooms in the dwelling. In dwellings with more rooms, the figures in the table could be extrapolated (five locations in dwellings with 13–15 rooms, six in 16–18 rooms, etc). In the table, 'rooms' includes lounges, kitchens, bedrooms, bathrooms, toilets and utility rooms, but not garages, lofts and outhouses. A conservatory in a new dwelling counts as a room, but not when a new conservatory is attached to an existing dwelling. Hall, stairs and landing(s) count as one room.

**Table 1** Method for determining the number of locations to be equipped with efficient lighting to comply with Part L

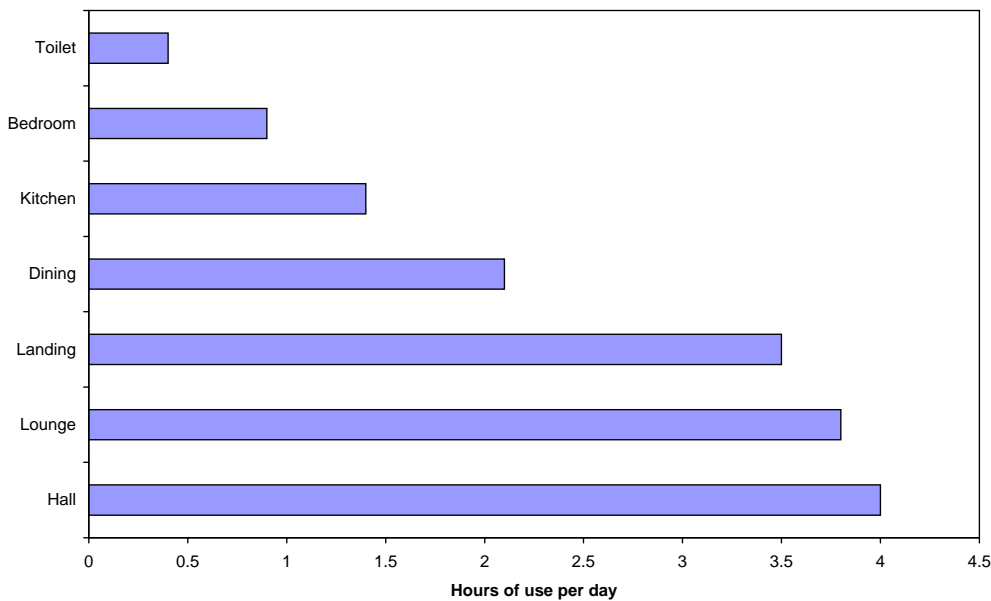
Number of rooms created	Recommended minimum number of locations
1–3	1
4–6	2
7–9	3
10–12	4

Energy efficient light fittings can be installed in any of the rooms defined above. It is possible to have more than one 'location' in the same room. However, it is sensible to put them where the lighting is likely to be most in use, because the energy savings (and financial benefits to householders) will then be greatest. Studies for BRECSU<sup>[6]</sup> indicate that lamps in halls, lounges and landings are left on the most (Figure 3). Energy efficient lamps in these locations would give the highest energy savings and shortest payback periods (typically 2 to 3 years). The next most used lamps are in dining rooms and kitchens, so these could also be locations for efficient lighting.

If a dwelling is extended, one way to comply with the requirement would be to show that lampholders or fittings for energy efficient lamps have been installed in the extension, in at least the number of locations given in Table 1. So in a one- to three-room extension, a single energy efficient fitting or lampholder would comply. An alternative approach would be to show that the extended dwelling as a whole has the number of energy efficient fittings or lampholders in the table. So if a nine-room dwelling were extended to 11 rooms, it would comply if it had four or more energy efficient light fittings or lampholders in total (either new or existing), even if none of these were in the extension.

## Choosing fittings and lamps for internal lighting

Manufacturers of compact fluorescent lamps (CFLs) often quote an equivalent wattage of tungsten lamp (typically four to five times the CFL wattage) for each



**Figure 3** Average hours that lighting is in use in different locations (data from reference 6)

lamp type. For various reasons, a CFL can, particularly after prolonged use, look dimmer than the equivalent tungsten lamp. So it may be a good idea to use a CFL with a wattage around one-third the wattage of the tungsten lamp that would be used in that particular application. There will still be significant energy savings, and householders are less likely to want extra lighting.

Fluorescent lamps, including CFLs, can have magnetic or high-frequency electronic ballasts<sup>[4]</sup>. Both would meet the requirements of Part L, but high-frequency ballasted types have several advantages. Although more expensive to install, they are more energy efficient, and fittings are smaller and lighter. Flicker is eliminated, and they start immediately. This is particularly valuable in a hallway or landing, and an attractive fitting in these areas can be an important selling point for the home. The electronic start is also kinder to the lamp, resulting in increased life.

High-voltage testing of the lighting circuit can damage the electronics used with CFLs; alternative ways of testing the wiring should be used<sup>[5]</sup>.

Fluorescent lamps cannot be dimmed with conventional domestic dimming switches. Linear fluorescents and four-pin CFLs can be dimmed with a special regulating ballast and circuit. Special electronic dimming ballasts are preferable and can sometimes be used to dim more than one lamp at once<sup>[4]</sup>.

Unlike tungsten lamps, CFLs and linear fluorescent lamps come in a range of colours. For domestic applications the warm white (low colour temperature) types are usually more appropriate as they are closer in colour to the tungsten lamps householders are used to. White and cool white lamps are widely used in non-domestic buildings.

Often light fittings are chosen on their appearance. However, it is important (though not a requirement of Part L) to ensure that the fitting itself is efficient at emitting light. The light output ratio of a luminaire is the light emitted by it, divided by the light coming out of the

bare lamp. It depends on the shape of the lamp, the shape of the light shade or diffuser, and the material used. As a guide, the light output ratio of the fitting should be at least 0.5 (50%), so that at least half the light from the lamp comes out of the fitting<sup>[4,5]</sup>.

An advantage of compact fluorescent lamps is their long life, typically ten times that of tungsten light bulbs. Eventually, however, the lamps will need replacing. The replacement lamps will need to be of the same type, and usually the same wattage. A sticker on the lampholder or inside the fitting can tell the householder which lamp type is needed.

## External lighting

External lighting (paragraph 1.57 in the AD) includes lighting in porches, but not lighting in garages and carports. It does not include lighting that is not attached to the dwelling. So lighting at the end of a garden, or at the garden gate, would not come under the requirements of Part L.

External lighting would comply with the requirement if it automatically went out when there was enough daylight, and when not required at night (for example if it had a presence detector that turned the light on for a limited time (Figure 4)). Even a tungsten or tungsten halogen lamp would comply if it had this form of control.

The AD does not specify what wattage of lamp should be used. However, it is good practice to specify a lamp that is not too bright. High wattage halogen lamps can be very intrusive and annoy neighbours. For most small domestic gardens no more than 60 watts is suitable.

To reduce nuisance triggering, careful siting of the presence detector is important (though again not a requirement of Part L). Ideally it should be angled downwards, so that movement in the street does not set it off, and located so that people approaching the house walk across its field of view. If people walk directly



Courtesy Ring Lighting

**Figure 4** An exterior lantern fitted with photocell and presence detection control



Courtesy ASD Limited

**Figure 5** Exterior fitting with compact fluorescent lamp

towards the detector they might not trigger it.

Alternatively, external luminaires would also comply if they could only be used with lamps with better than 40 lm/W circuit efficacy (fluorescent and discharge lamps). So a dedicated compact fluorescent external luminaire (Figure 5) (of the type described under *Internal lighting*) would be satisfactory even under manual control. The aim is to avoid inefficient tungsten lighting being left on continuously.

In outdoor fittings, compact fluorescent lamps generally work better if the lamp is placed cap down, and the luminaire is enclosed so that the lamp runs warmer<sup>[4]</sup>.

Where a dwelling is extended, the extension will comply with Part L if any external light fittings attached to it are as described above.

Throughout the Building Regulations, the requirement is to make provisions which are reasonable in the circumstances. It is recognised that special care will be needed in designing lighting for dwellings in historic buildings. The Approved Document L1 suggests that lesser provision may be reasonable in conservation and restoration work and recommends contact with local authority conservation officers.

#### More advice

Further advice on the requirements and the guidance in the AD can be obtained from the Department for Transport, Local Government and the Regions (email [energy.br@dtlr.gov.uk](mailto:energy.br@dtlr.gov.uk)) or from BRE (email [environment@bre.co.uk](mailto:environment@bre.co.uk)) which is contracted to supply technical expert advice on these matters.



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## Conclusions

The recent revision to Part L, in force from 1 April 2002, includes significant changes. New requirements cover energy efficiency of internal and external lighting in new dwellings.

The new measures are expected to improve the average energy efficiency of lighting by around 15% in new dwellings, contributing significantly to targets for reducing carbon emissions.

## Acknowledgement

This paper was produced as part of the research programme of the Building Regulations Division of the Department for Transport, Local Government and the Regions.

## References

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March 2002  
ISBN 1 86081 543 X