

# **Lighting Addendum**

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### 3.12 Lighting

#### 3.12.1 General Requirements

Generally lighting shall comprise of high frequency fluorescent luminaires incorporating DALI control gear. Where downlighters are required these should be of the LED type. The circuitry for the lighting shall be controlled and protected from the 'riser b or local lighting boards', not the room distribution board.

A method of electrically isolating the various lighting fittings and/or lighting circuits, other than using the MCB's within the lighting distribution boards, shall be provided to enable the building users to safely replace the fluorescent tubes and lamps. Where plug-in connection is not appropriate the designer shall contact Estates Services Electrical section for guidance.

The method of isolation adopted must comply with the 'mechanical maintenance requirements' of BS7671 and the 'secure isolation' requirements of the Electricity at Work Regulations 1989.

Illuminance levels, Glare, Uniformity and Colour Rendering in all internal areas of the building shall be specified in accordance with the SLL Code for Lighting and BS EN: 12464.

All lighting designs shall be submitted to the Estates Services Electrical section for approval at the earliest opportunity. No work should take place on site until the scheme has been approved. Lighting calculations to support the design shall also be provided where requested. All drawings submitted to Estates Services Electrical section shall have the following information:

- Luminaire description
- Luminaire efficiency
- Average lux level
- uniformity
- w/m<sup>2</sup>/100lux

#### 3.12.2 Target Energy Parameters

The designer shall in all cases design systems to meet the following energy targets. If these cannot be achieved then the designer shall approach Estates Services Electrical section to discuss a suitable solution.

- |   |                             |
|---|-----------------------------|
| • Office Area lighting (recessed)                           | 2w/m <sup>2</sup> /100 lux  |
| • Office Area lighting (suspended)                          | 3w/m <sup>2</sup> /100 lux  |
| • Lab Area lighting (recessed)                              | 2w/m <sup>2</sup> /100 lux  |
| • Lab Area lighting (suspended)                             | 3w/m <sup>2</sup> /100 lux  |
| • Open area Circulation spaces (excluding display lighting) | 4w/m <sup>2</sup> /100 lux  |
| • Corridors   | 3w/ m <sup>2</sup> /100 lux |
| • Toilets   | 4w/ m <sup>2</sup> /100 lux |

### 3.12.3 Control System

Centrally administered fully networked lighting control systems are NOT acceptable within the University. Unless agreed in writing with Estates Services Electrical section

Lighting controls shall be provided to reduce energy consumption. All occupied spaces shall be provided with absence detection (manual on/automatic off) to ensure

lights are switched off when the room has been left unoccupied for a preset period of time of 15 minutes unless otherwise agreed. Circulation spaces shall be provided with fully automated controls, circulation detectors shall be set for a dimming period of 15 minutes prior to completely turning off the luminaire when no presence is detected. Day light regulation shall be provided in areas where natural light is available.

All lighting control sensors shall be of DALI type unless otherwise agreed with Estates Services Section, and located in a suitable position and shall be configured for Broadcast DALI. All sensors shall be configured by a remote IR device. A handheld programmer shall be given to the Building services manager (if required) after consultation with Estates Services Electrical Section.

The university preferred manufacturer for this type of device is **ExOr**.

Lighting control systems in specialised areas such as Lecture Theatres, Museums, exhibitions etc shall be discussed and approved by Estates Services Electrical Section.

Preferred Manufacturer: **iLight**

Plantrooms, Switchrooms and other areas where there are safety considerations shall be manually switched.

The contractor shall allow for commissioning of the system. A repeat visit shall be made post handover to check the operation is correct and optimised.

### 3.12.4 Design Criteria

Illuminance levels shall be as outlined within SLL Code for Lighting and BS EN:12464. The designer shall ensure that the recommended average maintained lighting level recommended by the standard be provided by fixed lighting — task lighting, such as desk lamps shall **not** be used to meet the required level unless agreed with Estates Services Electrical Section.

The lighting design shall be provided to ensure that the lighting level is uniform across the space to enable furniture layouts to be flexible.

Office lighting shall be designed to at meet a minimum of 420 Lux,

When selecting any LED products, the designer shall make allowance for the maintenance factor so that the correct lighting levels are still achieved after 50,000 hours.

In order to assist with good recognition of objects and visual communication, the volume of the space shall be provided with good illumination. To provide good illumination, the "mean cylindrical illuminance" shall be provided as follows:

- For teaching spaces, meeting rooms and lecture theatres a "mean cylindrical illuminance" of not less than 150 lux shall be provided with a minimum uniformity of 0.3. This shall be measured on a horizontal plane of 1.6m above floor level.

The calculation grid shall be set out in accordance with the requirements of CIBSE Lighting Guide 5`

In all enclosed places, the maintained illuminances on the major surface shall meet the following requirements:

- Minimum of 75 lux with a uniformity of 0.3 on the walls
- Minimum of 50 lux with a uniformity of 0.3 on the ceiling

#### **3.12.4 Luminaire Selection**

General lighting (excluding display lighting) within Office, Industrial and Storage spaces shall have a luminaire efficacy of not less than 60 luminaire lumens per circuit watt **BEFORE** any control factor is applied. This requirement also applies to all areas provided with a desk — for example classrooms and meeting rooms.

Display lighting (excluding Museums) shall have a minimum luminaire efficacy not less than 30 luminaire lumens per circuit watt.

DALI Ballasts shall be fitted to all internal luminaires regardless of whether or not controls are to be applied.

Lamp types shall be selected to suit the application, energy efficiency requirements and to minimise maintenance.

Lamp colour temperature shall be discussed and agreed with Estates Services electrical section during the design phase. Lamps will generally be 4000K but building finishes need to be considered prior to selection. Lamp colour temperature when installed within Listed Buildings will also need approval from Estates Services building conservation section.

Circulation area lighting (except display lighting) shall have a luminaire efficacy of no less than 65 luminaire lumens per circuit watt **BEFORE** any control factor is applied.

If the efficacy requirements outlined above cannot be achieved due to design constraints of the building then the designer shall discuss and obtain approval from Estates Services Electrical Section.

When downlighters are required then LED shall be used with a luminaire efficacy of no less than 70 luminaire lumens per circuit watt. These shall be selected from one of the following manufacturers (or equal and approved by Estates Services Electrical Section)

- Phillips — Luxspace Range
- Zumtobel - Panos Infinity Range

Fluorescent Tubes shall be manufactured by one of the following suppliers:

- Phillips Lighting
- Osram
- GE Lighting
- Sylvania

The following lamp types shall not be used:

- Incandescent
- Tungsten Halogen
- T8/112 fluorescent lamps

All LED products must meet the following criteria:

- 5 year warranty (including driver)
- All LED luminaires to have a minimum service life of 50,000 hour at 70% luminous flux at 25 degrees Celsius.
- Colour temperature shall be within a 3 step ellipse on all luminaires. (unless agreed with Estates Services Electrical Section)
- Minimum CRI of 80 (subject to requirements outlined in SLL Code for Lighting and BS EN:12464.)
- Colour Rendering Index for the luminaire shall not decrease by more than 3 points for the rated CRI value after 25% of the luminaires rated life.
- Minimum power factor of 0.95
- Maximum failure percentage of 10% over the rated life of the LED

### **3.12.5 Historic Buildings**

Lighting of Historic buildings can be difficult, it is noted that many of the requirements of this document cannot be achieved without detrimental impact on the appearance of the building. The designer and installer shall have detailed discussions with Estates Services Electrical section and the Head of building conservation to provide an energy efficient system that is still in keeping with the buildings appearance.

### **3.12.6 Examples**

#### **Typical Corridor**

Luminaires used within circulation spaces shall be selected to achieve the required efficacy requirements, however strong consideration shall be given to the use of LED type luminaires.

Lighting controls within corridors shall consist of suitable movement detectors capable of detecting movement in all areas of the space. Detectors shall be set for a dimming period (approximately 15 minutes) prior to completely turning off the luminaire when no presence is detected.

Automatic dimming shall be provided in areas where natural light is available.

#### **Typical Office**

Where display screen equipment is used the lighting design shall comply with the requirements of CIBSE Lighting Guide 7.

Each office space shall be provided with a standalone lighting control system comprising manual on/off switches with absence detection and with daylight automatic dimming where natural light is available.

Luminaires should be selected to ensure a minimum efficacy as detailed in this document before any control factors are applied. This will ensure that when controls are applied, the installation will be 10%-15% more efficient than the minimum building control requirements.

No more than 4 desk positions shall be monitored by a single detector.

