

## SECTION 16 LIGHTING

### 1 GENERAL

#### 1.1 RESPONSIBILITIES

##### General

General: Provide lighting as documented.

#### 1.2 PROJECT REQUIREMENTS

##### Proprietary equipment

General: The requirements of this specification for lamps, ballasts and luminaire control equipment over-ride the specifications inherent in the selection of a particular make and model of luminaire.

##### Minimum energy performance standards (MEPS)

General: To AS/NZS 4783.2 and AS/NZS 4782.2.

Self ballasted lamps: To AS 4847.2 (Int).

#### 1.3 CROSS REFERENCE

##### General

Requirement: Conform to the following:

- *General Requirements.*

#### 1.4 STANDARDS

##### Standards

Air-handling luminaires: To AS/NZS 60598.2.19.

EMC compliance: To AS/NZS CISPR 15.

Energy efficiency for ballasts and lamps: To AS/NZS 4783.2.

Fixed general purpose luminaires: To AS/NZS 60598.2.1.

Floodlights: To AS/NZS 60598.2.5.

Harmonic limits: AS/NZS 61000.3.2.

Luminaires, general requirements and tests: To AS/NZS 60598.1.

Luminaires: To AS/NZS 60598.1.

Luminaires with built-in transformers for filament lamps: To AS/NZS 60598.2.6.

Recessed luminaires: To AS/NZS 60598.2.2.

Road lighting luminaires: To AS/NZS 1158.6.

Radio interference limits: To AS/NZS CISPR 15.

#### 1.5 INTERPRETATIONS

##### Abbreviations

General: For the purposes of this worksection the abbreviations given below apply.

- CCT: Correlated colour temperature.
- CRI: Colour rendering index.
- DALI: Digital addressable lighting interface.

- EEI: Energy efficiency index.
- ELV: Extra low voltage.
- EMC: Electromagnetic compatibility.
- ILCOS: International lamp coding system.
- PLC: Programmable logic controllers.
- SBC: Small bayonet cap.
- SES: Small Edison screw.

### **Definitions**

General: For the purposes of this worksection the definitions given below apply.

- Control system: A lighting control system comprising a combination of some or all of the following:
  - . Automatic sensing and control components.
  - . Timers.
  - . Manual overrides.
- Proprietary luminaires: Luminaires available as a catalogue item.
- Custom-built luminaires: Luminaires manufactured to order.
- Incandescent lamp: Lamps as covered in AS/NZS 4934. 2 including both tungsten filament and tungsten halogen types.

## **1.6 SUBMISSIONS**

### **Technical data**

General: Submit technical data of the following:

- Luminaires.
- Lamps.
- Ballasts.
- Power factor correction equipment.

### **Shop drawings**

General: Submit shop drawings of lighting column mounting bases.

## **2 PRODUCTS**

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### **2.1 PROPRIETARY LUMINAIRES**

#### **General**

General: Provide proprietary luminaires complete with lamps, luminaire control equipment, lighting control equipment, and accessories as documented.

### **2.2 LAMPS**

#### **Standards**

Fluorescent: To AS/NZS 4782.1 and AS/NZS 4782.2.

Self ballasted lamps: To AS/NZS 60968 and AS/NZS 60969.

Single capped fluorescent lamps: To AS/NZS 60901.

Tungsten halogen: To IEC 60357.

**Fluorescent lamps**

Colour corrected temperature: 4000 K.

Colour rendering: Group 1B to AS/NZS 1680.1.

**Tungsten halogen lamps**

Tungsten halogen lamps not enclosed behind glass: low pressure, low UV emission type.

**2.3 BALLASTS**

**General**

General: Provide ballasts for lighting systems selected to be compatible with the lamp and control method.

Standard: To AS/NZS 61558.1.

**Electronic fluorescent lamp ballasts**

Standards: To AS/NZS 61347.2.3 and AS/NZS 60929.

Current total harmonic distortion: < 15%.

Number of ballasts: Provide separate ballasts for each lamp.

**Reactive fluorescent lamp ballasts**

Standard: To AS/NZS 60921 and AS/NZS 61347.2.8.

Connections: Provide quick-connect terminals or wiring, suitable for the operating temperature close to the ballast.

Number of ballasts: Provide separate ballasts for each lamp.

**Ballast performance measurement – fluorescent lamps**

Standard: To AS/NZS 4783.1.

**Discharge lamp ballasts**

Metal halid type: To AS/NZS 61347 and AS/NZS 60923.

Metal halide type:

- ≤ 150 W: Reactors or electronic controlgear.
- > 150 W indoor: To the lamp manufacturer's recommendation.
- > 150 W outdoor: To the lamp manufacturer's recommendation.

Igniters: Provide igniters which cut out when lamp ignites and after pre-determined time period if lamp fails to ignite.

**2.4 POWER FACTOR CORRECTION**

**General**

General: Provide power factor correction on all luminaires to a minimum power factor of 0.9 lagging.

**Capacitors**

Standard: To AS/NZS 61048 and AS/NZS 61049.

**Integral fuses**

General: Provide integral fuses for high intensity discharge (HID) lamp ballasts.

**2.5 GEAR TRAY COVER**

**General**

Fixing: Screw fixed.

## 2.6 WIRING

### Flexible cords

General: Provide recessed luminaires with an external  $\geq 1.5$  m length of  $0.75 \text{ mm}^2$  3-core V75 (minimum) PVC/PVC flexible cord, connected to a 10 A 3-pin moulded plug to AS/NZS 3112.

Other fittings flexible cord cross sectional area:  $\geq 1 \text{ mm}^2$ .

## 2.7 LIGHTING CONTROL

### Manual controls

General: Provide manual control of luminaires into groups, zones and to individual devices as documented.

## 2.8 ACCESSORIES

### Lighting outlets

Pin arrangement: Standard: 3 flat pin with looping terminal.

### Lighting switches

General: Provide light switches as documented.

Standard: To AS/NZS 3133.

Minimum: 10 A, 230 V a.c.

### Key switches

General: Provide key switches as documented.

### Daylight switches

General: Provide integral photo electric switch units as documented.

Performance: Adjustable between 50 and 1000 lux.

Time delay:  $> 2$  minutes.

Illumination differential:  $> 50$  lux.

## 2.9 COMPLETION

### General

Prior to practical completion carry out the following:

- Verify the operation of all luminaires.
- Adjust aiming and controls for all luminaires under night time conditions.
- Replace lamps which have been in service for a period greater than 50% of the lamp life as published by the lamp manufacturer.