



# Technical Standard - TS101

Public Lighting - Design and Installation

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## 1. Purpose

This document specifies the public lighting standards, including flood lighting, which are either new and or upgraded installations that will be a connected to SA Power Networks distribution network.

## 2. Scope

The specifications in this technical standard are applicable (but not limited) to all parties involved in the installation and or alterations of public lighting on SA Power Networks distribution network.

The public lighting electrical design and installations shall comply with this technical standard, AS/NZS 3000, AS/NZS 1158 Series, [Manual 32: Service and Installation Rules](#), and any additional requirements stipulated by council or / Department of Infrastructure and Transport (DIT). There should be additional requirements and specifications which are project specific.

The process for seeking approval of public lighting is outline in [NICC402](#).

## 3. Definitions and Abbreviations

### 3.1 Definitions

<b>Column Setback</b>	The horizontal distance between the centre line of the road lighting column and the adjacent kerb or carriageway edge.
<b>Connection Point:</b>	Has the meaning given to that term in the current Electricity (General) Regulations, namely a connection point to a transmission or distribution network. For this document connection point also has the same meaning as Point of Supply as defined in AS/NZS 3000.
<b>Customer:</b>	Has the meaning given to that term in the Electricity Act 1996, namely a person who has a supply of electricity available from a transmission or distribution network for consumption by that person and includes: <ol style="list-style-type: none"> <li>1. The occupier for the time being of a place to which electricity is supplied.</li> <li>2. Where the context requires, a person seeking an electricity supply; and</li> <li>3. A person of a class declared by regulation to be customers/ landowners. Customer should or should not necessarily be the landowner.</li> </ol>
<b>Frangible Column:</b>	Is a lighting column designed to collapse in a controlled manner on impact.
<b>Landowner:</b>	The landowner is the person or entity that is the registered proprietor/owner of the land as recorded at the Lands Titles Office. All easement agreements shall be with the landowner.
<b>Lighting column:</b>	A rigid style lighting column without luminaire.
<b>Luminaire:</b>	An apparatus which distributes filters or emits light from one or more lamps. It contains all the parts necessary for fixing and protecting the lamp and circuit auxiliaries.
<b>MEN:</b>	Multiple Earthed Neutral is also known in IEC 60364 as a TC-N-S earthing system. In the SA Power Networks MEN system, the LV earthing/neutral system is kept distinctly separate from the HV earthing systems.
<b>Pole:</b>	To be understood as a Stobie pole, unless stated otherwise.
<b>Residential Column:</b>	A lighting column used for street lighting of category 'P' installations including roads.
<b>SAPN LED Tariff:</b>	The 'SAPN LED Tariff' applies where SA Power Networks funds a luminaire upgrade or new installation.
<b>Separation Distance:</b>	Is either the vertical and/or the horizontal distance, measured between any SA Power Networks plant and the Third Party's infrastructure.
<b>Vested:</b>	An asset that is constructed on behalf of the customer where ownership is transferred to SA Power Networks.

### 3.2 Abbreviations

<b>AS/NZS</b>	Australia and New Zealand Standards published by Standards Australia
<b>CLER</b>	Customer Lighting Equipment Rate
<b>CMEN</b>	Common Multiple Earthed Neutral Systems
<b>DIT</b>	The Department of Infrastructure and Transport
<b>HV</b>	High Voltage
<b>LED</b>	'Light Emitting Diode' Luminaire
<b>LV</b>	Low Voltage
<b>MEN</b>	Multiple Earthed Neutral Systems
<b>NAP</b>	Network Access Permit
<b>NICC</b>	Network Information for Contractors and Customers
<b>NSM</b>	Network Standards Manager
<b>OTR</b>	The Office of Technical Regulator
<b>PM</b>	Project Manager
<b>SLUoS:</b>	Street Light Use of System

### 3.3 Terminology

<b>Shall</b>	Indicates a mandatory requirement.
<b>Should</b>	Indicates a recommendation that will not be mandatory but can be imposed as deemed appropriate by SA Power Networks.

## 4. Relevant Rules, Regulations, Standards and Codes

### 4.1 Standards and Codes

The following listed documents are for additional information and other documentation should be required on a project specific basis.

Please Note: It is the responsibility of the installer to ensure you have complied with all applicable, SA Legislative Regulations (under Acts), ESCOSA/ENA/AEMC/IEC documentations, relevant AS/NZS standards, the SA Power Networks publications, and you have ensured their current publications, before implementing them.

#### Australian Standards Publications

AS 4506	Metal Finishing - Thermoset Powder Coatings
AS 60038	Standard voltages
AS/NZS 1158.1.1	Lighting for roads and public spaces. Part 1.1: Vehicular traffic (Category V) lighting - Performance and design requirements
AS/NZS 1158.1.2	Lighting for roads and public spaces. Part 1.2: Vehicular traffic (Category V) lighting - Guide to design, installation, operation, and maintenance
AS/NZS 1158.3.1	Lighting for roads and public spaces. Part 3.1: Pedestrian area (Category P) lighting - Performance and design requirements
AS/NZS 3000	Electrical Installations (known as the wiring rules)
AS/NZS 3017	Electrical Installations - (LV Earthing System) Verification Guidelines
AS/NZS 3019	Electrical Installations - (LV Supply System) Periodic Verification
AS/NZS 4026	Electric cables - for underground residential distribution systems
AS/NZS 4282	Control of the Obtrusive Effects of Outdoor Lighting

#### SA Power Networks Publications

##### Manuals

<a href="#">Manual 32</a>	Service and Installation Rules
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##### Network Information for Customers and Contractors

<a href="#">NICC400</a>	Information for an applicant undertaking a contestable extension
<a href="#">NICC401</a>	Information on Network Design and Installation by an External Contractor
<a href="#">NICC404</a>	Working in the Vicinity of SA Power Networks Infrastructure - Permit Process

##### Technical Standards

<a href="#">TS085</a>	Design Parameters for the Construction of Underground Electrical Network (up to and including 33kV)
<a href="#">TS099</a>	Distribution and Sub-Transmission CAD Drafting Standards
<a href="#">TS105A (Forms)</a>	Standard Forms for SA Power Networks Underground & Overhead Electricity Distribution and Sub-Transmission Cable Networks
<a href="#">TS107</a>	Overhead Line Design Standard for Electrical Sub-Transmission and Distribution Systems
<a href="#">TS109</a>	Earthing of the Distribution Network

##### Relevant E-Drawing Series

##### Relevant JSWP Series

## 4.2 Legislation and Regulations

This section provides a list of the relevant legislation and regulations which shall apply to the design, manufacture, installation, testing and commissioning, and operations and maintenance of all plant and equipment for the distribution network.

In an event where there is any inconsistency between legislation and regulations and these technical requirements, the legislation and regulations shall prevail.

1. Electricity Act 1996
2. Electricity (General) Regulations 2012
3. Competition and Consumer Act 2010
4. Competition and Consumer Regulations 2010
5. Plumbers, Gas Fitters & Electricians Act 1995
6. Plumbers, Gas Fitters and Electricians Regulations 2010
7. Work Health & Safety Act 2012
8. Work Health & Safety Regulations 2012
9. Environment Protection Act 1993
10. Environment Protection Regulations 2009

## 5. Drawings

### 5.1 Drawing Requirements

External designs for Public Lighting shall be of a standard that uses the SA Power Networks standards and conventions. The following design standards will apply:

- Design drawing format, symbology and issuing process shall comply with [TS099](#)
- Ensure that current E-Drawings and Standard Design Templates are considered
- Bracket details, including relevant supply item numbers, E-Drawing references, mounting heights, and outreaches to be shown on drawing
- Identify the ideal proposed service points for all underground supplied lighting columns
- Depict existing tree interference
- Depict precise physical site features (eg side streets, block boundaries) in enough detail to precisely locate and describe the site
- Confirmed, dimensioned locations of constructed/altered/removed assets relative to enduring site features (on 'As Constructed' drawing)

### 5.2 Drawing Files Requirements

The drawing lodgement process and associated requirements are detailed in the [TS099](#).

SA Power Networks shall be kept in receipt of the most recent design drawing revisions throughout the life of the project up to and including the 'As Constructed' revisions.

### 5.3 Non- Standard Construction Drawings

If a design requires a non-standard E-drawing, the designer shall submit a request and shall acquire a written approval from SA Power Networks Network Standards Manager.

Contact 'Standards and Equipment Team' via Hotline on (08) 8404 4200 or send an email to: [networkstandards@sapowernetworks.com.au](mailto:networkstandards@sapowernetworks.com.au). The request shall be accompanied by an illustration of the proposal, ie reworked E-Drawing(s), sketches and or photographs of the proposed arrangement.

## 6. Lighting Systems - Categories

The lighting designs are categorised as following:

- Category ‘P’ for lighting that is applicable to roads and other outdoor public areas for which the visual requirements of pedestrians are dominant, eg local roads, outdoor shopping precincts
- Category ‘V’ for main roads and freeways

### 6.1 Category ‘P’ Lighting Systems

For category ‘P’ lighting systems, SA Power Networks standard LED luminaires are summarised below in Table 1. Refer to **Appendices A.1** and **A.2** for more information.

Category ‘P’ lighting systems should also be achieved by using the luminaires used on category ‘V’ roads. However, reference should be made to AS/NZS 1158 Series in relation to specific glare requirements.

Pathway and Cycle Paths (Category PP), Public Activity (Category PA), Connecting Elements (Category PE) and Public Carparks (Category PC) are normally owned and maintained by the council, DIT, or Private customers. The respective customer will nominate the public category that is to be considered for appropriate lighting designs.

**Table 1: Category ‘P’ Lighting Systems**

SA Power Networks Standard Column/Stobie Poles	SA Power Networks Standard LED Luminaires
4.5m post top	Kensington (LED)
4.5m side outreach with 0.6m outreach	StreetLED 3
4.5m post top with top entry 0.875m decorative outreach	Bourke Hill LED
6.5m with 0.5m integrated outreach	StreetLED 3
Stobie Poles (various mounting heights & outreaches)	StreetLED 3

### 6.2 Category ‘V’ Lighting Systems

For category ‘V’ lighting systems, the SA Power Networks standard LED luminaires are summarised below in Table 2. Refer to **Appendices A.3** and **A.4** in this document for more information.

**Table 2: Category ‘V’ Lighting Systems**

SA Power Networks Standard Column/Stobie Poles		SA Power Networks Standard LED Luminaires
Height	With Outreach	
9.0m Column	2.0m and 3.0m	RoadLED Midi LED Aeroscreen
10.5m Column	2.0m and 3.0m	
Stobie Poles	Various	
7.5m Column	3.0m	Parkville Luminaires (Refer Note)
9.0m Column	3.0m	
10.0m Column	3.0m	

Note: The Parkville Luminaires are not permitted to be installed on a Stobie pole.

## 7. Emerging Smart Control Technologies

For information on smart control technologies/devices, please contact SA Power Networks Asset Services Manager on 8404 5077. Refer to [NICC402](#) for more details.

## 8. Design Requirements

The choice of public light source should be based on an analysis of all the factors relevant to the particular application, including aesthetics, environmental factors, lamp mortality, and lumen depreciation, lamp cost, energy use, etc.

The designer shall ensure that:

- The public lighting electrical design shall comply with this technical standard, AS/NZS 1158 Series, AS/NZS 3000, [Manual 32](#): Service and Installation Rules, and any specific requirements stipulated by council or DIT.
- There should be additional requirements and specifications which are project specific.
- Any deviations to AS/NZS 1158 are to be approved by the road controlling authority
- Provide public lighting design information and authorisation forms as stipulated in [NICC402](#)
- The easements shown on the design shall reflect the easements that have been negotiated with, and agreed to, by property owners. Refer to [TS102](#) for more details
- All clearances shall comply with the SA Electricity (General) Regulations 2012
- Appropriate electrical safety clearances are maintained unless SA Power Networks agrees to determine appropriate bracket use and clearances
- Where SA Power Networks is to own and maintain the asset, luminaires and brackets shall be of types which have been approved for use by SA Power Networks
- Proposed mounting heights and outreaches are to be shown on the drawing and should be appropriate for the luminaire, utilising the SA Power Networks standard brackets and mounting conventions
- Underground services shall be supplied from existing service arrangements wherever practicable
- The ideal proposed service points for all underground supplied lighting columns are identified on the design drawing. Loop in - Loop out arrangements is required for underground supply of multiple lighting columns as per the appropriate E-Drawings arrangements
- From time-to-time SA Power Networks should need to relocate Stobie poles by up to 2m if a damaged pole cannot be reinstalled in its current location. Designers need to consider this in their lighting design to ensure compliance to AS/NZS 1158 if a luminaire is installed on a Stobie pole
- New luminaires shall be individually controlled by photo-electric cells and any existing switch wire shall be removed as part of the design
- Proposed mounting brackets shall not pass between existing HV and or LV conductors
- The maximum permissible voltage drop per circuit is as per AS/NZS 3000
- Highways cross arm brackets and Traffic Route brackets are only suitable on steel cross arms. Where these brackets are required, the designer shall indicate the type of existing construction with reference to the relevant E-Drawing and identify the need for any replacement cross arm

## 9. Documentation

The following documentation should be required to demonstrate compliance with relevant standards:

- Details of all elements of the road or area to be lit
- Council/DIT confirmation of lighting category requirements
- Details of the lighting arrangement and installation geometry, eg. spacing, mounting height, outreach up cast angle
- Pole and bracket loading calculation

- Details of the cable size used
- Details of luminaires and lamps to be used
- Origin of photometric data for the lamps and luminaires
- Name and source of the computer program used
- Details of the maintenance factor used in the calculation
- For each area or road element, the design method used, and the values of the light technical parameters obtained, compared with the limiting values required by the relevant standards
- Details delineating contestable and non-contestable construction works
- Isolux plots depicting compliance

## 10. Columns

### 10.1 Location/Alignment

The preferred location for public lighting columns in road reserves, within the residential allotment area of a sub-division or street lighting upgrade, is on the extended side boundary alignment of an allotment. The extended side boundary is to be utilised regardless of the angle of the side boundary to the front boundary.

There will be occasions when the designer needs to consider other locations to ensure the public lighting design is cost effective yet satisfies the council's requirements. SA Power Networks will consider a design with a column located in a position other than an extended boundary on the proviso that titles have not been issued and the designer has the approval of the developer and the respective council.

A location other than the boundary should consider the future building envelope.

For coastal regions it is recommended that galvanised columns be used in lieu of powder coated columns due their higher corrosion resistance.

### 10.2 Column Orientation

The fuse panel hatch is to be positioned at right angle to the traffic, opposite roadside. If a column is positioned close to a structure such as a wall or fence the fuse panel hatch is to be positioned on the non-traffic side. For double outreach columns the fuse panel hatch is to be in line with the traffic.

### 10.3 Column Setback

For both category 'P' and category 'V' installations, public lighting columns are to be set back from the face of kerb to the centre of the column, a minimum distance of 700mm for straight sections of road and 1000mm at the road intersections.

The type of pole, either frangible, impact absorbing or rigid, that can be used at different pole setback distances is described in AS/NZS 1158.1.2.

The location of public lighting column should be affected where the verge is very narrow, ie. less than 2.5m. The caisson for a column shall be external to the common service trench.

### 10.4 Mechanical Protection

Where there is no kerbing, the protection of the public lighting column is required in a trafficable area to prevent from vehicular impacts/damages.

Mechanical protection, such as bollards or guard rails, are to be specified and approved by the customer (DIT/council) and are required to allow operational access to the column and fuse panel. The bollards are to be maintained by the customer/landowner.

Installation of two fixed bollards (minimum) placed 100mm in front of column with 600mm spacing between them. The distances are measured with the column placed centrally between the bollards. Refer to Figure 1.

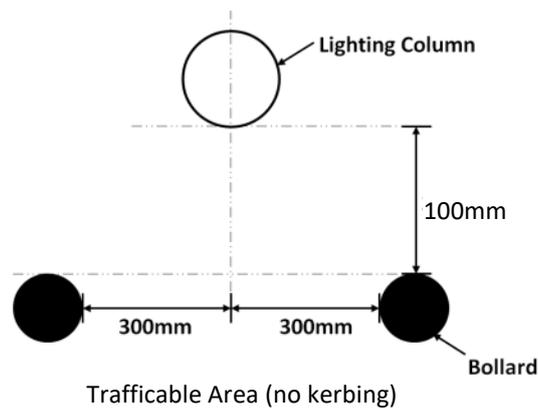


Figure 1: Typical Public Lighting Bollard Heavy Duty - (Not to Scale)

## 10.5 Road Name Signs and Banners on Lighting Columns

Refer to [NICC210](#) for more details.

## 11. Public Lighting on Stobie Poles

The public lighting brackets on Stobie poles in MEN areas have a potential concern for safety risk therefore certain restrictions apply in MEN areas:

- On poles where LV mains are attached below HV mains. MEN suitable bracket and adaptors are to be used.
- If there are no LV mains or services on a HV pole, a small transformer should be installed to supply the public light only. (Note: No customer connection is permitted to this transformer)

If several lights are required to be erected in a MEN area, lighting columns and underground wiring can be used, however, such columns are not permitted to be installed directly under the HV line. Preferably install on the opposite side of the road

The preference is to consider alternatives rather than installing public lighting systems on 66kV poles. However, if it is the only option then approval should be sought from SA Power Networks.

Public lighting systems are prohibited on 66kV poles without CMEN earthing.

## 12. Installation

It is the responsibility of the customer to ensure that the electrical contractor installing a SA Power Networks public lighting (excluding floodlighting) installation that is to be vested, has the appropriate accreditation to undertake the construction to SA Power Networks specification.

For SA Power Networks owned installations, the installations are to be accordance with the relevant E drawings. For a CLER, Energy Only or Metered Supply, the constructor shall satisfy council/DIT requirements. These installations shall be separated from any SA Power Networks public lighting installation.

## 13. Energisation

An underground supplied public lighting installation can only be completed once an energised connection point is provided.

For connections of public lighting on a standard SLUoS tariff or LED tariffs, the public lighting will be energised by SA Power Networks at the time the subdivision is energised unless otherwise advised by the council.

## 14. Security/Floodlighting

Floodlighting luminaires (ie Kanon 180W LED, 12.9kg) stock item EM1830 is offered by SA Power Networks, refer to **Appendix B** for more details. The purpose of the floodlights is to provide general illumination to a customer's premises. Conditions applicable to the installation of floodlights include, but not limited to:

- Floodlights should be attached to SA Power Networks owned Stobie poles or, 9m and 10.5m tubular lighting poles. However, this will be subject to pole load calculations considering floodlight weight to determine the suitability of Stobie pole/Columns. For installation on Stobie poles/Columns, please refer to the calculation methods as outlined in [TS107](#)
- Floodlights are not to be installed on DIT columns
- Floodlights are not to be installed and aimed across freeways, main and arterial roads (V-Category roads)
- For P-Category roads, floodlights should be installed across the road from the intended property however shall be aimed directly at a 90-degree angle to the road, and not into oncoming traffic
- Antiglare shields are fitted to the Kanon LED floodlights as standard
- Antiglare shields are to be fitted to all flood lights

The floodlight will be removed, and the contract terminated if reasonable objections are raised from adjoining property owners concerning obtrusive light and the floodlight cannot be satisfactorily refocused to alleviate the concerns

## 15. Public Lighting not owned by SA Power Networks

Any public lighting installation that does not fit within the requirements of the standard SA Power Networks assets will be the responsibility of another party, eg, Councils/DIT and can be energised under the following:

1. CLER scheme
2. Energy only
3. Metered supply

These electrical installations shall comply with AS/NZS 3000, [Manual 32](#): Service and Installation Rules, and any additional requirements stipulated by council/DIT.

### 15.1 Asset Labelling

All public lighting assets forming a CLER, Energy only or Metered supply scheme shall be clearly identified on the column as the respective owner's asset.

All asset identification labels are required to be durable to all weather conditions and clearly visible from the ground. Also refer to SA Power Networks [Manual 32](#): Service and Installation Rules.

Labels on the column shall comply with following requirements:

#### For CLER Installations:

Text height = 25mm, Colour = black text on white background

Text stating: 'CLER and Council/DIT Name'

In addition, for CLER the luminaire shall have the following external identifiers:

1. Lamp type
2. Wattage
3. Year of manufacture
4. Lamp envelope
5. Aeroscreen

**For Energy Only Installations:**

Text height = 25mm, Colour = black text on white background

Text stating: 'EO, Council/DIT Name and Phone Number'

**For Metered Installations:**

Text height = 25mm, Colour = black text on white background

Text stating: 'Metered, Council/DIT Name and Phone Number'

## 15.2 Extent of Maintenance

### (By SA Power Networks for a CLER Installation)

SA Power Networks will replace failed lamps provided that:

1. The lamp is a standard type held in stock by SA Power Networks.
2. The lamp is easily accessible.
3. Unrestricted all-weather heavy vehicle access is available 24/7.
4. Access is available for large heavy vehicles.
5. The luminaire is accepted by SA Power Networks for use on the SA Power Networks network.

## 15.3 Connection Procedure for Contractors

### (For CLER, Energy Only and Metered Supplies)

1. Electrical contractor installs lights and associated cabling to appropriate standards.
2. Electrical contractor shall contact SA Power Networks Customer Service Line on 13 12 61 and apply for a Public/CLER lighting connection via the online web form at <https://forms.apps.sapowernetworks.com.au/formnws> for each lighting installation and arrange a date for an SA Power Networks Connect Officer to install fuses in the connection points.
3. Electrical contractor fills out 'Electrical Certificate of Compliance' (eCoC) forms for each lighting installation.
4. Electrical contractor forwards eCoC forms to the relevant Council / DIT for signature / approval, as the council is the ultimate owner and is the customer / applicant.
5. Electrical contractor leaves completed eCoC forms on site in each lighting column with a site location plan in one column. SA Power Networks Connect Officer verifies the installation and collects eCoC forms and checks site location plan before installing fuses in each connection point on the appointed day.
6. Electrical contractor verifies that SA Power Networks connection point is energised.
7. Electrical contractor ensures subdivision is energised.
8. SA Power Networks Connect Officer forwards eCoC forms to SA Power Networks Facilities Records Coordinator. After processing they will be forwarded to the energy retailer to commence charging the Council / DIT for the lighting at the relevant tariff.

## 16. Who You Should Talk To?

### General Enquiries and Support:

In the first instance, contact Builders and Electrical Contractors Service (8am to 5pm, Mon to Fri):

Call **13 12 61** or email [appointments@sapowernetworks.com.au](mailto:appointments@sapowernetworks.com.au)

### Faults and Emergencies:

24/7 phone line Call **13 13 66**

### Documentation Access or For Approval of Non-Standard Special Purpose E-drawings:

For E-Drawings, Non-Standard Special Purpose E-drawings (E-SP), AutoCAD standard templates, Technical Standards, and Instructional manuals, please contact 'Standards and Equipment Team'.

Call **(08) 8404 4200** or email [networkstandards@sapowernetworks.com.au](mailto:networkstandards@sapowernetworks.com.au)

### Service and Installation Rules Support:

For support regarding Service & Installation Rules or your connection, contact our Customer Service number, and a team member will assist or direct you to the appropriate SA Power Networks Customer Solutions Manager.

Call **13 12 61** or email <https://www.sapowernetworks.com.au/contact-us/>

### Customer Solutions Managers Contact:

Visit our Internet website at:

<https://www.sapowernetworks.com.au/connections/new-connections/commercial-industrial-and-developer-new-connection/>

then browse page and click link 'Contact our Customer Solutions Managers'.

## Appendices

### A. Streetlight Luminaires

#### A.1 Category 'P' Standard Luminaires

Table 3: Category 'P' Standard Luminaires

Description	Rating/Type	Lamp Lumen Output	Maintenance Factor	Catalogue No.	Photo
StreetLED 3 17W LED	17W LED Black Aeroscreen 4000K	2009	0.80	EM4022	 Aeroscreen
	17W LED Grey Aeroscreen 4000K	2009	0.80	EM4024	
	17W LED Black Semi Cut-Off 4000K	2078	0.80	EM4021	 Semi Cut-Off
	17W LED Grey Semi Cut-Off 4000K	2078	0.80	EM4023	
StreetLED 3 24W LED	24W LED Black Aeroscreen 4000K	2729	0.80	EM4025	 Aeroscreen
	24W LED Grey Aeroscreen 4000K	2729	0.80	EM4026	
	24W LED Grey Aeroscreen 3000K (Note 1)	2535	0.80	EM5000	
	24W LED Black Aeroscreen 3000K (Note 1)	2535	0.80	EM5001	

**Note 1:** The LED 3000K luminaires shall not be used for 'V' category roads.

## A.2 Category 'P' Decorative Luminaires

**Table 4: Category 'P' Decorative Luminaires**

Description	Rating/ Type	Lamp Lumen Output	Mainte- -nance Factor	Catalogue No.	Photo
Kensington Mk2 16W LED Black	16W LED 4000K	1724	0.80	EM4032	
Bourke Hill MK2 14W LED Black	14W LED 4000K	1969	0.80	EM4125	
B2001 Mk2 17W LED Black	17W LED 4000K	1680	0.80	EM3130	

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### A.3 Category 'V' Standard Luminaires

Table 5: Category 'V' Standard Luminaires

Description	Rating/Type	Lamp Lumen Output	Maintenance Factor	Catalogue No.	Photo
RoadLED Midi LED Aeroscreen	60W LED Black 4000K	6880	0.80	EM4116	
	60W LED Grey 4000K	6880	0.80	EM4106	
	80W LED Black 4000K	9064	0.80	EM4117	
	80W LED Grey 4000K	9064	0.80	EM4107	
	100W LED Grey 4000K	12396	0.80	EM4105	
	120W LED Grey 4000K	14745	0.80	EM4109	
	150W LED Black 4000K	17778	0.80	EM4118	
	150W LED Grey 4000K	17778	0.80	EM4108	

### A.4 Category 'V' Decorative Luminaires

Table 6: Category 'V' Decorative Luminaires

Description	Rating/Type	Lamp Lumen Output	Maintenance Factor	Catalogue No.	Photo
Parkville MK2 LED Black	80W LED 4000K	11595	0.80	EM4126	
	100W LED 4000K	14341	0.80	EM4127	
	150W LED 4000K	23423	0.80	EM4128	

## A.5 Photo Electric 'PE' Cells

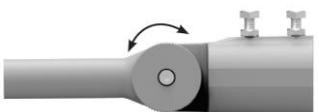
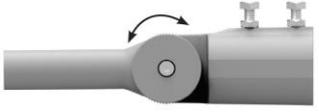
**Table 7: Photo Electric 'PE' Cells**

Description	Rating/Type	Light Control	Catalogue No.	Photo
Standard PE Cell	10A NEMA	Ambient Light Sensor	EM1435	
Smart PE Cell	902-928 MHz	Programmable /Controllable	TBA	

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## A.6 Mounting Accessories

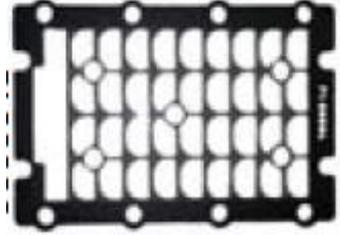
**Table 8: Mounting Accessories**

Description	Adjustment Capabilities	Compatible with the following luminaires	Catalogue No.	Weight	Photo
Tilt Adaptor	5 to 0 degrees	RoadLED/ RoadLED Midi	DL1080	0.5kg	
Variable Tilt Adaptor	0 to 90 degrees	RoadLED/ RoadLED Midi	DL1081	2.0kg	
Tilt Adaptor	5 to 0 degrees	StreetLED 3	DL1082	0.2kg	
Variable Tilt Adaptor	0 to 90 degrees	StreetLED/ StreetLED 2/ StreetLED 3	DL1083	2.0kg	

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## A.7 Optic Tuners and Anti-glare Louvres

**Table 9: Optic Tuners and Anti-glare Louvres**

Description	Compatible with the following luminaires	Catalogue No.	Weight	Photo
Optic Tuner	RoadLED Midi	EM3125	0.2kg	
Optic Tuner	StreetLED 2/3 Kensington LED Bourkehill LED	EM3126	0.2kg	
Optic Tuner	StreetLED 2/3 Kensington LED Bourkehill LED	EM3127	0.2kg	
Anti-glare Louvre	StreetLED 3	EM3128	0.5kg	
Anti-glare Louvre	RoadLED Midi	EM3129	0.5kg	

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## B. Floodlights

**Table 10: Floodlights**

Description	Rating/ Type	Lamp Lumen Output	Catalogue Number	Weight	Catalogue No.
Kanon 180W LED	180W LED 4000K	22,200	EM1830	12.9kg	

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