

 Eskom	Standard	Technology
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Title: **LED FLOODLIGHTS FOR
DISTRIBUTION SUBSTATION
APPLICATIONS**

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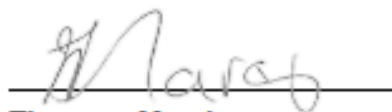
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Disclosure**

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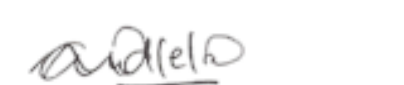
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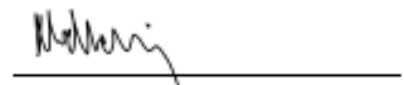
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1. Introduction

Operational Floodlighting is used throughout Eskom Substations. The purpose of Floodlighting is for personnel to observe obstructions & other hazards while moving within the high voltage yards at night time, and to read high voltage apparatus identification labels, mounted at heights not exceeding 2m above the ground level.

The illumination levels for any substation shall be according to the latest revision of SANS 10389-1 and not less than stipulated in the OHS-act. The Floodlighting installation shall provide a minimum average illumination level of 10 lux within the high voltage yard and 20 lux at transformers and reactors, with a uniformity ratio of 1:5 (minimum to average) within 5m of critical equipment.

Historically only 400W HPS floodlights have been used in Distribution substation yards, and this standard details requirements for LED Floodlights to be used in Distribution substation yards.

2. Supporting clauses

2.1 Scope

This standard sets out Eskom's requirements for the supply and delivery of LED Floodlights for use in Distribution substations, but when a proper lighting design is done can also be used for other applications.

2.1.1 Purpose

This document specifies the technical requirements for the operational LED Floodlights to be used in Eskom Distribution substations, and will be used for technical enquiry and evaluation purposes.

2.1.2 Applicability

This document shall apply throughout Eskom Holdings Limited Divisions, specifically the Distribution Group for use in Distribution substation yards.

2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

Prospective suppliers are responsible for obtaining the latest copies of the South African national standards (SANS) and international standards referred to in this document. Copies of the latest revision of Eskom documents will be supplied by the purchaser and will form part of the enquiry documentation.

2.2.1 Normative

- [1] ISO 9001, Quality Management Systems.
- [2] 32-1034, Eskom Procurement and Supply Management Procedure
- [3] 240-48929482, Tender Technical Evaluation Procedure
- [4] D-DT-6009, Floodlight: LED
- [5] EN 55015, Limits and methods of measurement of radio disturbance of electrical lighting or equipment.
- [6] SANS 121, Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods
- [7] SANS 475, Luminaires for interior lighting, streetlighting and floodlighting – Performance requirements
- [8] SANS 1091, National colour standard
- [9] SANS 10389-1, Exterior lighting: Part 1: Artificial lighting of exterior areas for work and safety

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- [10] SANS 60529, Degrees of protection provided by enclosures (IP Code)
 - [11] SANS 60598-1, Luminaires Part 1: General requirements and tests
 - [12] SANS 62262, Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

2.2.2 Informative

- [13] EN 61000-3-2, Electromagnetic compatibility (EMC) Limits for harmonic current emissions
- [14] EN 61000-3-3, Electromagnetic compatibility (EMC) - Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems
- [15] EN 61547, Equipment for general lighting purposes: EMC immunity requirements
- [16] Electromagnetic Compatibility (EMC) Directive (2014/30/EU)
- [17] IEC-EN 62471, Photo biological Safety of Lamps and Lamp Systems for LED's
- [18] IEC 62493, Assessment of lighting equipment related to human exposure to electromagnetic fields
- [19] IES LM-79-08, Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products
- [20] IES LM80, Approved Method: Measuring lumen maintenance of LED light sources
- [21] Low Voltage (LV) Directive (2014/35/EU) Directives.
- [22] SANS 1777, Photoelectric control units for lighting (PECUs)
- [23] SANS 60598-2-1, Luminaires Part 2: Particular requirements Section 1: Fixed general purpose luminaires
- [24] SANS 60598-2-3, Luminaires Part 2-3: Particular requirements – Luminaires for road and street lighting
- [25] SANS 60598-2-5, Luminaires Part 2-5: Particular requirements – Floodlights
- [26] SANS 61347-1, Lamp control gear Part 1: General and safety requirements.
- [27] SANS 61347-2-13, Lamp control gear Part 2-13: Particular requirements for d.c. or a.c. supplied electronic control gear for LED modules.
- [28] SANS 62031, LED modules for general lighting - Safety specifications.
- [29] SANS 62384, DC or AC supplied electronic control gear for LED modules - Performance requirements
- [30] SANS 62560, Self-ballasted LED-lamps for general lighting services by voltage > 50 V - Safety specification
- [31] SANS 62612, Self-ballasted LED lamps for general lighting services with supply voltages > 50 V - Performance requirements

2.3 Definitions

2.3.1 General

Definition	Description
Colour rendering index (CRI)	A quantitative measure of the ability of a light source to reveal the colours of various objects faithfully in comparison with an ideal or natural light source.
Colour temperature	Colour temperature is a characteristic of visible light and is stated in units of absolute temperature, known as Kelvin (K).
Diffuser	A device which spreads the light from a light source evenly and reduces harsh shadows.

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Definition	Description
Downward light output ratio	An indication of what percentage of light shines down. (To be read in conjunction with the definition for "Light output ratio".)
Efficacy	Refer to "luminous efficacy" below.
Efficiency	Ratio of total LED power consumption to total luminaire power consumption.
Equipment	Assemblies of components, sub-units or sub-assemblies usually contained in a suitable enclosure, and capable of performing an overall specified function.
Harmonic distortion	The ratio of the sum of the powers of all harmonic components to the power of the fundamental frequency.
IK rating	The extent (or level) of protection of the equipment provided by an enclosure against harmful mechanical impacts and verified by standardised test methods.
IP rating	System to indicate the degrees of protection provided by an enclosure against access to hazardous parts, ingress of solid foreign objects, ingress of water and to give additional information in connection with such protection.
Label	An inscription on equipment or on a sub-unit, either integral therewith or on a separate piece of material affixed thereto.
Light output ratio	An indication of how much light gets lost inside the luminaire. It is the ratio of light output emitted by the luminaire.
Luminaire	Apparatus which distributes, filters or transforms the light transmitted from one or more lamps or LED modules and which includes all the parts necessary for supporting, fixing and protecting the lamps or LED modules, and where necessary circuit auxiliaries together with the means for connecting them to the supply.
Luminous efficacy	Ratio of luminous flux of a lamp (in lumens) to the total electric power consumed (in watts)
Luminous flux	Quantity of the energy of the light emitted per second in all directions. The unit of luminous flux is lumen (lm).
Maintenance factor	The minimum light level (luminous intensity) to be safeguarded, independently from the installation's number of burning hours and service life. This is a reduction factor based on the as new luminous intensity.
Power factor	The ratio between the useful (or true) power (W) to the total (or apparent) power (VA) consumed by AC electrical equipment or a complete electrical installation.
Qualitative	Concerned with or depending on quality rather than on quantity.
Reliability	The ability to consistently function as specified under stated conditions for a stated time period.
Terminal	A metallic device for connecting electrical conductors.
Upward light output ratio	An indication of what percentage of light shines up. (To be read in conjunction with the definition for "Light output ratio".)

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
AC	Alternating Current
CG	Care group
CRI	Colour rendering index
DLOR	Downward light output ratio
EMC	Electromagnetic Compatibility
HPS	High pressure sodium
HV	High Voltage
Hz	Hertz
IES	An electronic photometric data file in the IES format using the IES LM-63-1991 standard
IK	Impact Protection rating
IP	Ingress Protection rating
K	Kelvin
LED	Light-emitting diode
lm	Lumen
LOR	Light output ratio
LTD	An electronic photometric data file in the EULUMDAT photometric data format
LV	Low Voltage
mA	milli-Ampere
mm	millimetre
RT&D	Research, Testing and Development
SANS	South African National Standard
SC	Study committee
ULOR	Upward light output ratio
UV	Ultraviolet
V	Volt
W	Watt

2.5 Roles and responsibilities

All employees that specify and technically evaluate LED luminaires for Distribution substation applications shall adhere to this standard during tender and/or technical evaluation activities.

Procurement officials must refer to this standard in their purchasing documents and require that equipment and material offered for purchase, meet the requirements of this standard. Compliance with the requirements of this standard must be guaranteed by the vendor.

2.6 Process for monitoring

Not applicable.

2.7 Related/supporting documents

Not applicable.

3. LED floodlighting requirements

This section covers the requirements that the LED floodlight luminaires shall comply with, as well as the technical criteria that will be used when evaluating the offered luminaires.

Luminaire data and documentary evidence of compliance in the form of reports and certificates by a national or international accredited laboratory stating the tests conducted and associated results must be submitted at the time of submission.

3.1 Luminaire technical requirements

3.1.1 Photometric requirements

This section contains the minimum photometric requirements that luminaires shall comply with:

The photocell (PECU) shall comply with the illuminance levels for switching requirements given in SANS 1777 Section 5 Clause 5.5 for test method.

- a) Light colour must be "Neutral White", i.e. 4000 K.
- b) Colour rendering index must be equal to or greater than 80.
- c) Luminaire minimum output must be equal to or greater than the value listed in Table 1.
- d) Luminaire efficacy must be equal to or greater than 120 lm/W.
- e) Luminaire downward light output ratio (DLOR) must be equal to or greater than 95%.
- f) The luminaire must reach its full brightness instantaneously.
- g) The illumination pattern of acceptable luminaires shall be in the "bat wing" shape as indicated in Figure 1 to ensure sufficient forward and lateral light distribution, which must be verified by a photometric test report.
- h) IES and/or LTD files for use with DIALux or Relux must be supplied in electronic format.

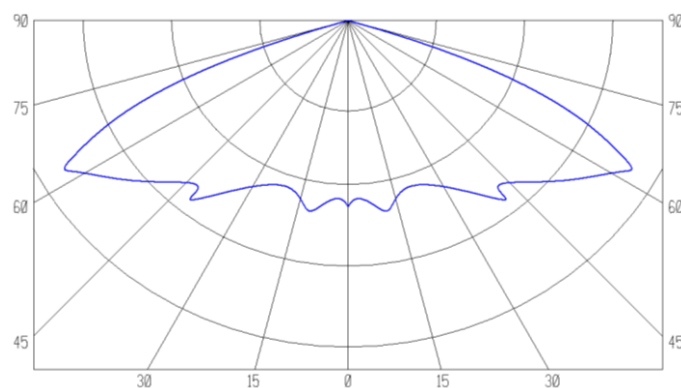


Figure 1: Indicative acceptable illumination pattern

3.1.2 Electrical requirements

This section contains the minimum electrical requirements that luminaires shall comply with:

- a) The luminaire shall be a CLASS 1 type in accordance with the description given in SANS 60598-1 Section 1 Clause 1.2.22.
- b) Luminaire input voltage shall be 230 V AC $\pm 15\%$.
- c) Luminaire operating frequency shall be 50 Hz $\pm 5\%$.
- d) Total luminaire power consumption shall be equal to or less than the values stipulated in Table 1.
- e) Luminaire efficiency (total LED to total luminaire power consumption) shall be equal to or greater than 95%.
- f) Luminaire power factor shall be equal to or better than 0.95.
- g) Luminaire total harmonic distortion shall be equal to or less than 20%.

Table 1: LED luminaires for use in Eskom Distribution (D-DT-6009)

1	2	3	4	5
Luminaire option	SAP number	SAP description	Mounting requirements	Minimum output (lm)
1	0658980	FLDLIGHT:LED;ALUMINIUM;60 W;7200 LM;FLT	Flat (Figure 2 a)	7200
2	0659811	FLDLIGHT:LED;ALUMINIUM;60 W;7200 LM;RND	Round (Figure 2 b)	7200
3	0696268	FLDLIGHT:LED;ALUMINIUM;90 W;10800 LM;FLT	Flat (Figure 2 a)	10800
4	0696271	FLDLIGHT:LED;ALUMINIUM;90 W;10800 LM;RND	Round (Figure 2 b)	10800

3.1.3 Electromagnetic compliance

Luminaires shall comply with the electromagnetic compatibility requirements listed in EN 55015.

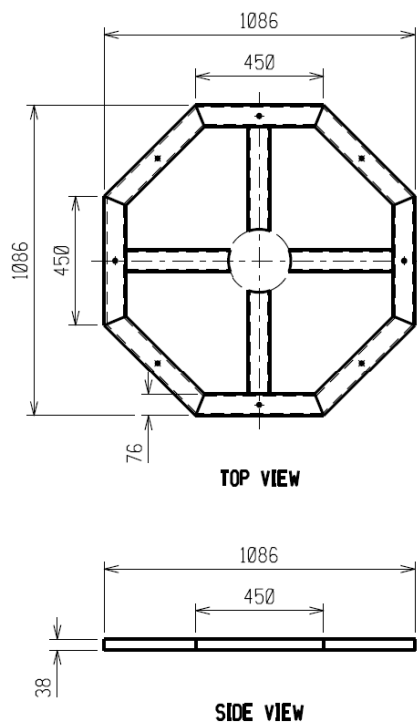
Proof of compliance shall be provided through standard test reports listing actual measurement data for the frequency spectrum tested.

3.1.4 Mechanical requirements

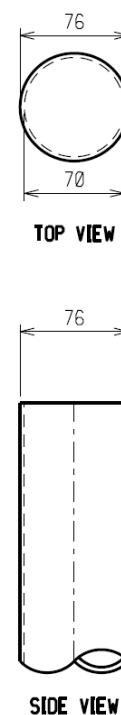
This section contains the minimum mechanical requirements that luminaires shall comply with:

- a) All external parts and components of the luminaire must be designed to shed debris and water and ensure that accumulation of condensation or precipitation does not occur. An exterior lip on the housing to ensure that there is no direct rainwater contact with the gasket, between the housing and the diffuser must be available, thus ensuring that no moisture is sucked into the diffuser when the luminaire is switched off and cools down.
- b) Luminaires shall be constructed from durable lightweight materials and must be accompanied by comprehensive test reports certifying that the luminaires have successfully passed SANS 475.
- c) Luminaires shall be supplied complete with control gear, lamp and mounting brackets with protractor scales to set the training angle.
- d) Luminaires shall not be spray painted but shall be left bare or powder coated and baked to achieve the required corrosion protection level. Ferrous components must be hot-dip galvanized in accordance with SANS 121. All external small components such as; clips, screws, bolts, nuts, washers, etc., must be manufactured from stainless steel (grade 304 or better).
- e) Luminaires must be of a neutral colour, i.e. Light Grey G29 or similar in accordance with SANS 1091.

- f) Diffusers / lenses must not have external prisms that could accumulate dirt and dust, and thus reduce the light output of the luminaires. Diffusers must be constructed in such a manner that the wall thickness of the material is maintained at a constant thickness, hence preventing the projection of lines or patterns onto the ground level.
- g) In case where luminaires are fitted with reflectors, the reflector shall be made of high-grade super pure deep anodized aluminium.
- h) The operating temperature range shall be from -10 to +60 degrees Celsius.
- i) The operating relative humidity range shall be 10% to 70%.
- j) LED drivers shall be fully housed within the body of the luminaire.
- The control gear or driver shall be in its own compartment complying with the required IP rating.
 - All LED drivers shall be suitable for operation with the specified rating of the luminaire on a 230 VAC \pm 10% 50 Hz single-phase electrical power supply system.
- k) The complete luminaire must have an IK rating of 08 or better in accordance with SANS 60529.
- l) The complete luminaire must have an IP rating of 65 or better in accordance with SANS 62262.
- m) The luminaire shall be tilt adjustable relative to the horizontal plane through a range of 90 degrees with a protractor included to set it to required angles.
- n) The luminaire shall be supplied with the necessary means to be securely fitted onto either:
- A flat horizontal galvanised surface as indicated in Figure 2 (a) with the fitting plane pictured being manufactured from 76 x 38 mm galvanised mild steel channel.
 - A vertical 76 x 3 mm round pole tube as indicated in Figure 2 (b). Luminaires with a Spigot as part of its construction are also accepted



(a) Flat horizontal surface



(b) Round vertical pole

Figure 2: Standard mounting surface for luminaire**ESKOM COPYRIGHT PROTECTED**

3.1.5 Guarantees

The tenderer/s must guarantee, from date of delivery:

- a) Each luminaire housing for a minimum period of ten (10) years.
- b) The electrical components for 30 000 hours (five years).
- c) The LED cells for 30 000 hours (five years).
- d) Any luminaire found unsuitable for use, its IP rating compromised within a period of ten years from date of delivery, or not performing acceptably compared to the unit tested during technical evaluation must be replaced free of charge by the supplier.

3.1.6 Delivery

Lead time for delivery within 60 calendar days from date of order.

3.1.7 Maintenance strategy

The tenderer/s must provide Eskom with a sustainable maintenance/cleaning strategy for the luminaires offered.

This strategy must ensure that a maintenance factor of at least 0.80 will be maintained for the LED luminaires through its expected service life.

3.2 Returnables to be submitted as part of a tender

3.2.1 Documents

The following electronic files, documents, test certificates and reports shall be submitted per luminaire offered:

- Completed technical Schedule B in Annex A.
- Deviations and Declarations report, refer to Annex B.
- Type Test Schedule, refer to Annex C.
- IES and/or LTD files supplied in electronic format per luminaire offered.
- Photometric test reports per luminaire offered.
- Test report verifying compliance with SANS 60598-1.
- Test report verifying compliance with SANS 475.
- Test report verifying compliance with EN55015.
- Test report indicating IK rating verification.
- Test report indicating IP rating verification.
- Luminaire guarantee certificate.
- Certificate indicating lead time for delivery from date of order.
- Luminaire maintenance strategy.

No luminaire will be evaluated or tested if the above are not provided.

3.2.2 Luminaire samples

One sample luminaire must accompany each submission for inspection and to undergo photometric and electrical performance tests in the Eskom RT&D photometric laboratory to verify compliance to the photometric and electrical data submitted.

All samples not meeting the set criteria can be returned on request. Samples that met the set criteria will be retained for reference purposes for the period the luminaire will be considered acceptable (typically the period for which technical approval is granted plus the warranty period (ten years minimum as stipulated in section 3.1.5)).

4. Authorization

This document has been seen and accepted by:

Name and surname	Designation
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Ariseelan Moodley	Network Engineering and Design Manager – Gauteng OU
Baldwin Maudu	Network Engineering and Design Manager – Limpopo OU
Cyril Danisa	Network Engineering and Design Manager – KwaZulu Natal OU
Emmanuel Mokalanyane	Network Engineering and Design Manager – Free State OU
Faans van Zyl	Network Engineering and Design Manager – Mpumalanga OU
Mohau Mapane	Network Engineering and Design Manager – North West OU
Tatolo Ramoolla	Network Engineering and Design Manager – Northern Cape OU
Vikesh Bhikha	Network Engineering and Design Manager – Western Cape OU
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5. Revisions

Date	Rev	Compiler	Remarks
July 2021	4	Theunus Marais	2.2 Normative and Informative References updated 2.4 Abbreviations updated 2.5 Roles and responsibilities updated 3.1.1 Photometric requirements updated 3.1.2 Electrical requirements updated Table 1 added with 90W options 3.1.3 Electromagnetic compliance added 3.1.4 Mechanical requirements updated Figure 2 updated 3.2.1 Documentation to be submitted updated Annex A Technical Schedules updated Annex B Technical Evaluation Scoring Matrix removed New Annex B added: Deviations and Declarations Annex C added: Test Report Schedule

Date	Rev	Compiler	Remarks
Aug 2018	3	Anton Naude	<p>Section 3.1.1: Added luminaire minimum output, updated luminaire efficacy, DLOR, and time to full brightness.</p> <p>Section 3.1.2: Removed 90 W and 120 W options and updated luminaire efficiency and power factor requirements.</p> <p>Section 4 updated as per distribution list.</p> <p>Annex A: Product Details section added.</p> <p>Photometric and electrical requirements aligned with sections 3.1.1 and 3.1.2.</p> <p>Annex B: Evaluation weights per section revised.</p> <p>Evaluation section B2.1 "Efficiency requirements" added.</p> <p>Scoring weights adjusted</p>
July 2017	2	Anton Naude	<p>References added:</p> <p>32-1034, Eskom Procurement and Supply Management Procedure</p> <p>240-48929482, Tender Technical Evaluation Procedure, added as reference.</p> <p>Scoring table in section B.2 aligned with table 2 in Document 240-48929482.</p> <p>All references to mandatory evaluation criteria have been removed.</p> <p>Evaluation scoring aligned with 240-48929482.</p>
Sept 2016	1	Anton Naude	First issue

6. Development team

The following people were involved in the development of this document:

- Anton Naude
- André Blignaut
- Theunus Marais

7. Acknowledgements

Not applicable.

Annex A – Technical Schedules A and B

This section must be read together with section 3.1 of this document.

Schedule A: Eskom's Particulars Requirements

Schedule B: Technical Particulars of Luminaire Offered

A separate technical schedule shall be completed per luminaire. Select the appropriate luminaire from the table below.

LUMINAIRE	SAP No	SAP DESCRIPTION	SELECT ITEM
1	0658980	FLDLIGHT:LED;ALUMINIUM;60 W;7200 LM;FLT	
2	0659811	FLDLIGHT:LED;ALUMINIUM;60 W;7200 LM;RND	
3	0696268	FLDLIGHT:LED;ALUMINIUM;90 W;10800 LM;FLT	
4	0696271	FLDLIGHT:LED;ALUMINIUM;90 W;10800 LM;RND	

ITEM	DESCRIPTION	SCHEDULE B
1	Manufacturer's details	
1.1	Manufacturer	
1.2	Manufacturer's local agent/supplier	
1.3	Manufacturer's range code	
1.4	Manufacturer's product code	

ITEM NO	CLAUSE	DESCRIPTION	UNIT	SCHEDULE A	SCHEDULE B
2	3.1.1	Photometric Requirements			
2.1	(a)	Colour temperature	K	3750 to 4250 (Neutral White)	
2.2	(b)	Colour rendering index (CRI)		≥ 80	
2.3	(c)	Luminaire minimum output	lm	As specified	
2.4	(d)	Luminaire efficacy	lm/W	≥ 120	
2.5		Light output ratio (LOR)	%		
2.6	(e)	Downward light output ratio (DLOR)	%	95	
2.7		Upward light output ratio (ULOR)	%	0	
2.8	(f)	Time to full brightness		Instantaneous	
2.9	(g)	Illumination pattern		Bat wing	
2.10		Total number of LEDs			
2.11		Number of cells			

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ITEM NO	CLAUSE	DESCRIPTION	UNIT	SCHEDULE A	SCHEDULE B
2.12		Arrangement (number of LEDs per cell)			
2.13		Life expectancy	hours		
3	3.1.2	Electrical Requirements			
3.1	(a)	Class type		1	
3.2	(b)	Input voltage	V AC	230 ±15%	
3.3	(c)	Operating frequency	Hz	50 ± 5%	
3.4	(d)	Total luminaire power consumption	W	As specified	
3.5		Input current (at 230V)	mA		
3.6		Total LED power consumption	W		
3.7	(e)	Efficiency (total LED to total luminaire power consumption)	%	≥ 95	
3.8	(f)	Power factor		≥ 0.9	
3.9	(g)	Harmonic distortion	%	≤ 20	
3.10		Protection type			
3.11		Safety class			
4	3.1.3	Electromagnetic compliance			
4.1		Compliant to EN 55015			
5	3.1.4	Mechanical Requirements			
5.1	(b)	Body material (state material)			
5.2	(d)	Body covering (e.g. none, hot-dip galvanized, baked powder coating, etc.)			
5.3	(e)	Body colour (state colour)			
5.4	(f)	Diffuser material (state material)			
5.5	(g)	Reflector incorporated in design?		Yes / No	
		Reflector material			
5.6	(h)	Operating temperature range	°C	-10 to +60	
5.7	(i)	Operating relative humidity	% RH	10 to 70	
5.8	(k)	Luminaire IK rating		≥ IK08	
5.9	(l)	Luminaire IP rating		≥ IP65	
5.10	(m)	Tilt adjustment relative to horizontal plane	degrees	90	
		Protractor fitted		Yes	

ITEM NO	CLAUSE	DESCRIPTION	UNIT	SCHEDULE A	SCHEDULE B
5.11	(n)	Mounting device for fitment as specified (rectangular tube or round pipe)		As specified	
5.12		Luminaire dimensions			
		Height	mm		
		Width	mm		
		Length	mm		
		Luminaire Weight	kg		
5	3.1.5	Guarantee Requirements			
5.1	(a)	Luminaire housing (minimum)	years	10	
5.2	(b)	Electrical components (minimum)	hours	30 000	
5.3	(c)	LED cells (minimum)	hours	30 000	
6	3.1.6	Delivery			
6.1		Lead time for delivery from time of order	Calendar days	< 60	

Annex B – Deviations and Declarations

The following must be noted:

- 1) All deviations to any requirement in this technical schedule and associated specification must be listed below with clear explanations/justification.
- 2) All documents to be provided in hard copy in addition to any soft copies offered, in accordance with tender requirements.
- 3) If no deviations/modifications/alternatives are offered, this schedule must be marked N/a and signed.

SPECIFICATION/ SCHEDULE PAGE NUMBER	SPECIFICATION/ SCHEDULE CLAUSE NUMBER	PROPOSED ALTERNATIVES	DEVIATIONS/MODIFICATIONS/

Declaration by supplier:

With the exception of the above deviations, this specification, associated technical schedules, factory evaluation, and annexures together with the requirements contained within, will be fully complied with in the manufacture, testing, supply, provision of drawing and documents, packaging, labelling, transport, and delivery of the product being offered, amongst others. Further, it is declared that all information provided has been checked and is correct.

Full name of authorised representative: _____

Designation of authorised representative: _____

Signature: _____

Date: _____

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Annex C – Test Report Schedule

The following must be noted:

- 1) This section must be read together with Section 3.3 of this document.
- 2) A separate type test schedule shall be completed per luminaire. Select the appropriate luminaire from the table below.
- 3) List all the type test report numbers applicable.

LUMINAIRE	SAP No	SAP DESCRIPTION	SELECT ITEM
1	0658980	FLDLIGHT:LED;ALUMINIUM;60 W;7200 LM;FLT	
2	0659811	FLDLIGHT:LED;ALUMINIUM;60 W;7200 LM;RND	
3	0696268	FLDLIGHT:LED;ALUMINIUM;90 W;10800 LM;FLT	
4	0696271	FLDLIGHT:LED;ALUMINIUM;90 W;10800 LM;RND	

ITEM	DESCRIPTION	REPORT NO.
1	Photometric test reports per luminaire offered	
2	Test report verifying compliance with SANS 60598-1	
3	Test report verifying compliance with SANS 475	
4	Test report verifying compliance with EN55015	
5	Test report indicating IK rating verification	
6	Test report indicating IP rating verification	

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