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		REFERENCE	REV
TITLE	**SPECIFICATION FOR ENERGY EFFICIENT STREET LIGHTING LUMINAIRES**	**CP_TSSPEC_231**	**3**
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FOREWORD

This specification was prepared by the following work group members:

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2016

INTRODUCTION

Street lighting luminaires are used for the lighting of public thoroughfares and roadways, contributing to road safety as well as public safety. The reliability and safety of these luminaires have a direct impact on levels of customer satisfaction as well as quality of supply.

1. SCOPE

This specification covers City Power's requirements for the manufacture, testing, supply and delivery of street lighting luminaires in accordance with ARP 035.

2. NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

SANS 60529: Degrees of protection provided by enclosures (IP Code)

ARP 035:2014: Guidelines for the installation and Maintenance of street lighting

SANS 121 Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods

SANS 475 Luminaires for interior lighting, street lighting and floodlighting – Performance requirements

SANS 1088 Luminaires entry and spigots

SANS 1507-1 Electric cables with extruded solid dielectric insulation for fixed installations (300/500V to 1 900/3 300V) – Part 1: General

SANS 1507-2 Electric cables with extruded solid dielectric insulation for fixed installations (300/500V to 1 900/3 300V) – Part 2: Wiring cables

SANS 1507-3 Electric cables with extruded solid dielectric insulation for fixed installations (300/500V to 1 900/3 300V) – Part 3: PVC distribution cables

SANS 10098 – 1 Public lighting - Part 1; the lighting of public thoroughfares.

SANS 60598/ Luminaires – Part 1: General requirements and tests

SANS 60598/ Luminaires – Part 2-3: Particular requirements -

SANS 60598-2-3 Luminaires for road and street lighting

OHSACT (ACT 85 of 1993) Occupational Health and Safety ACT and Regulations

CP_TSSPEC_012, Specification for photoelectric control units [PECU]

3. DEFINITIONS AND ABBREVIATIONS

As per the documents listed above

4. REQUIREMENTS

4.1. General Construction

4.1.1 Luminaire

4.1.1.1 The luminaire should be robustly constructed from marine grade (LM6) die cast aluminium to prevent undue deterioration in its safe operation or appearance during normal life when operated in climatic conditions prevailing in the country.

4.1.1.2 The luminaire should be designed to enable ease of maintenance and replacement on site of the LED photometric engine without having to remove the whole luminaire, to allow integration of future technological development of the LEDs and power supply.

4.1.1.3 The LED optical unit should be completely sealed with a smooth, clear tempered glass protector, or impact resistant, non-degrading, material, to IP 66 tightness to maintain its photometric performance over its rated life,

4.1.1.4 Attachment of the luminaire base casting to its bracket arm should be by means of at least two stainless steel M8 grub screws into stainless steel sockets or any other methods to prevent cathodic corrosion between stainless steel and aluminium. The attachment of the luminaire should be designed to withstand wind speeds of up to 150km/h on the projected surface of the luminaires, without due deflection.

4.1.1.5 The luminaires shall be delivered completely assembled with housing, driver, and LED module.

4.1.1.6 The luminaires shall be designed such that no maintenance and/or replacement of the LED module, driver and/or any other component shall be required for at least ten years.

4.1.1.7 The luminaires shall at minimum consume 50% less energy (input power) when compared to the luminaire they are designed to replace.

4.1.1.8 Due attention shall be paid to accessibility of parts and to other requirements necessary for efficient maintenance and cleaning, where required. If screws are used to secure covers, they shall be held captive when opened.

4.1.1.9 Small components such as toggle clips, bolts, screws, nuts and washers shall be manufactured of stainless steel (grade 304 or better).

4.1.1.10 Fixing devices, junctions, lips and the like shall be designed to shed water. Pockets and ledges in which condensation may accumulate shall be avoided.

4.1.1.11 The optical unit should be completely sealed with a smooth, clear tempered glass protector or impact resistant, non–degrading material to IP66 tightness to maintain its photometric performance over the rated life.

a) The driver shall be mounted internally and be replaceable with the aid of commonly available hand tools.

b) The LED module or array shall be designed in such a way that the failure of one LED shall not cause additional LEDs to switch off.

c) The luminaire shall be so designed that there is sufficient space to permit repairs, replacement of components and reassembly without difficulty and without the removal of the luminaire from its mounting.

d) The control gear should be housed within the body of the luminaire in separate gear compartment sealed with a hinged, non-corrosive lid. Covers and other parts that provide protection against electric shock should have adequate mechanical strength and should be reliably secured so that they will not work while in service.

e) The gasket shall be fitted into the groove in the housing and shall be kept in place by a tongue provided on the diffuser, thus ensuring the integrity of the IP66 rating. Further, the gasket shall not work loose during maintenance of the luminaire.

f) luminaires shall have a data dotting inside the luminaire or some kind of identification marks showing that it is the property of City Power and the label shall be visible on the exterior of the luminaire. The label shall be durable and not removable.

g) The cable of 0.5metres (1.5mm) shall be from the luminaire terminals exiting the luminaire with a connector for the supply cable, if the supply cable does not reach the terminals of the luminaire.

h) Luminaires shall be installed with compatible non-corroding spirit level gauge which shall be used to level the luminaire when being installed.

i) Luminaires shall be fitted with National Electrical Manufacturers Association (NEMA) receptacle/base into which control unit shall be inserted on top of the luminaire for future connection.

4.2. Electrical requirements

j) The LED module driver(s) should be suitable for operation with the specified rating of the luminaire on a 185 – 265V, 50Hz single phase system. All control gear components should be mounted on a removable gear tray to facilitate ease of maintenance.

k) The luminaire shall operate at a power factor of 0.85 or higher and the harmonic distortion levels shall be limited so as to not cause interference on the electrical network.

l) The power supply or driver compartment shall be so designed that there is sufficient space to permit repairs, replacement of components and reassembly without difficulty and without the removal of the luminaire from its mounting.

m) The luminaire should incorporate a surge protection device mounted inside the gear compartment to withstand surges of up to 10kV /20kA and should be easily replaceable. The surge protection device shall fail in open circuit mode to protect the luminaire from further surges.

4.3. Thermal management

4.3.1 The cooling fins should be designed in such a manner to prevent the accumulation of dirt, thus ensuring the continuous effective cooling.

4.3.2 Heat from the LED source should take the shortest path to the exterior by direct conduction or any other reliable form of cooling that will not compromise the useful life of the LEDs.

4.3.3 The printed circuit board (PCBs) should be fitted with temperature sensor that reduces the current to prevent any accidental overheating of the LEDs at higher than rated temperatures.

4.3.4 The Power Supply (driver) should incorporate a thermal switch to prevent exceeding the case temperature for maximum life time of equipment.

4.3.5 Full details of how the luminaire manages its temperature and the effect on lumen maintenance at various operating temperatures shall be supplied with the bid.

4.4. Photometric requirements

4.4.1 Luminaires should be photo metered according to the C-Gamma system as detailed in CIE Publication NO.27. For LED luminaires with non-replaceable LED modules, the intensity values shall be given in candela.

4.4.2 The results should be published in an intensity distribution table, indicating the intensity in cd/klm at each horizontal and vertical angle. This intensity distribution table should be converted by an accredited test facilitator luminaire supplier (or both) into a suitable electronic, format for use with any of the commercially viable computer programs.

4.4.3 The luminaire shall have high power LEDs with a colour temperature of 4 000K.

4.4.4 The total system efficiency shall be at least 70lm/W operating at an ambient performance temperature (Ta) of 35°C.

4.4.5 The manufacturer shall indicate the time it takes for the LED streetlight luminaire to reach L90, L80, L70 and L50, which is the time it takes for the LED to reach 90%, 80%, 70% and 50% light output.

4.5. Control gear

The LED lumen properties are usually described as a function of current, but not a function of voltage. The constant voltage source driver cannot guarantee the consistency of the LED brightness and affect the reliability of the LED life and lumen maintenance.
Therefore, a constant current source driver is mandatory. Additionally, the predicted lifetime of such an LED control gear should match the lifetime of the LED.

4.6. Terminal blocks

Where luminaries are fitted with supply incoming terminal blocks, the terminal blocks shall be independently fixed and fastened to the body of the luminaire or to the mounting plate. The terminal blocks shall be capable of accepting two 2,5 mm conductors each.

4.7. Provision for Earthing

4.7.1 The luminaire shall be earthed in accordance with clause 13 of the Electrical Machinery Regulations of the OSH Act (Act 85 of 1993).

n) The earthing of the luminaire shall comply with sub clause 7.2 of IEC 60598 – 1. All parts of an earth terminal shall be made of brass or other corrosion resistant metal, and the contact surface shall be bare metal and not be painted or varnished surfaces.

o) Metal parts of luminaires which may become alive in the event of an insulation fault and which are not accessible when the luminaire is mounted but liable to come into contact with the supporting surface shall be permanently and reliably connected to an earthing terminal.

p) Luminaire with detachable parts provided with connectors and similar connection devices, the earth connection shall be made before the current-carrying contacts are made and the current–carrying contacts shall separate before the earth connection is broken.

q) All earth connections shall be affected by means of suitable lugs appropriately made to avoid all possibility of electrolytic corrosion.

r) An earth connection shall be provided in all instances, even if the luminaire is fully insulated and even if all conductive parts, which could become alive in the event of insulation fault, are not accessible.

s) Protection against electric shock shall be provided for all methods and positions of installation in normal use. Protection shall also be maintained after removal of all parts which can be removed by hand, except those parts of lamp holders specified in SANS/ IEC 60598 – 1.

4.8. Wiring

t) The internal wiring of the luminaire shall be flexible and suitably insulated to withstand the voltage and maximum temperature to which is subjected to in service. Wiring shall comply with the requirements stipulated in SANS/ IEC 60598-1.

u) Wiring to the LED module shall be suitably sealed to prevent ingress of insects into the LED module compartment.

v)

4.9. PV (Photovoltaic) cell

The plant shall be made from glass material, and no glass tubes will be acceptable.

w) The PV plant shall be as part of the luminaire housing.

x) The plant should be cable of charging the batteries rated at 24V

y) The PV plant should be able to withstand all environmental conditions (UV, hail, winds etc.)

z) The life expectancy of the plant should be 10 years

4.10. Guarantee

4.10.1 A guarantee of each integrated solar street lighting luminaire for a minimum period of 10 years from the date of installation shall be provided.

4.10.2 This guarantee is primarily intended to be a material guarantee. This means that if any luminaire is unsuitable for use, or its IP ratings are compromised within a period of ten years from the date of delivery, it shall be replaced free of charge by the manufacturer.

4.10.3 Failure of the luminaire in terms of this clause would entail degradation of the luminaire material (e.g. Dough Moulding Compound (DMC) or other polymeric material, or aluminium) by ultraviolet radiation for example, to a point where cracks or holes appear in the luminaire housing (or diffuser), thus compromising the structural integrity and IP rating of the luminaire it shall be replaced free of charge by the manufacturer.

4.11. Samples

4.11.1 City Power reserves the right to perform a protype testing and inspection prior to the first order being issued.

4.12. Test

4.12.1 Type test

4.12.1.1 The performance test reports shall include the following:

aa) Photometric test
bb) Endurance test and thermal test
cc) Resistance to corrosion
dd) Insulation resistance and electric strength
ee) Humidity test
ff) Mechanical strength test
gg) Electrical test
hh) IP rating test
ii) Power factor

4.12.1.2 The special test reports shall include the following:

a) Colour temperature
b) Luminaire efficacy

4.13. Design Data

jj) All designs for the below should be based on pole spacing of 40m (250w equivalence and 400w equivalence)
kk) Data from the same luminaire equivalence should be used for all types of roads within the category (e.g. one luminaire series should meet all the requirements)

ll) No interchangeability of luminaire within the same category will be accepted

mm) The following data should reflect on the design report

nn) Colour temperature as per spec

oo) Luminaire efficacy as per spec

pp) Flux as per spec

qq) Power factor as per spec

rr) Driver current as per spec

ss) Lux (cd/m²)

4.13.1 Parameters shall be utilized for the designs

tt) Maintenance factor of 80%

uu) For 250W and 400W equivalence road arrangement of median 1 of 2m-3m and 4 lanes with a maximum of 2 luminaire per pole (double Spigot)

vv) For 250W and 400W equivalence road arrangement with no median and 4 lanes with a maximum of 2 luminaire per pole (Single Spigot)

ww) Luminaire losses of 80% minimum

xx) Boom length of 0.5

yy) Boom angle between 0 and 15°

zz) Angle of rotation 0

aaa) Tar surface R3

bbb) Wet Surface W3

ccc) Longitudinal displacement of 0

ddd) The lane width is 4.5m (A type road)

eee) Design should be based on the 600 cars per hour as per SANS 10098

4.13.2 Pole data

Pole description	Pole height	Pole Mounting Height
A2	5m	4m
A4	7,2m	6m
A5	13,8m	12m
A6	11,5m	10m
A7	9,2m	8m
S1 (single arm 2m)	11.5m	10m
S2(single arm 3m)	11.5m	10m
S3(single arm 2m)	9,2m	8m
M1 (high mast)	17m	15m
M3 (high mast)	21m	19m

4.13.4 Led Streetlight Equivalence of the 70 Watt HPS/T: Sap No. 3533

Item	Maximum Luminaire equivalence (W)	Pole type	Pole Spacing	Type of road
1.	25	A2	25 to 30	B1
2.	25	A4	25 to 30	B1
3.	25	A7	25 to 30	B1
4.	25	S3	25 to 30	B1
5.	25	A2	25 to 30	B2
6.	25	A4	25 to 30	B2
7.	25	A7	25 to 30	B2
8.	25	S3	25 to 30	B2
9.	25	A2	25 to 30	B3
10	25	A4	25 to 30	B3
11.	25	A7	25 to 30	B3
12.	25	S3	25 to 30	B3

4.13.5 Led Streetlight Equivalence of the 100 Watt HPS/T: Sap no. 3532

Item	Maximum Luminaire equivalence (W)	Pole type	Pole Spacing	Type of road
1.	35	A2	25 to 30	B1
2.	35	A4	25 to 30	B1
3.	35	A7	25 to 30	B1
4.	35	S3	25 to 30	B1
5.	35	A2	25 to 30	B2
6.	35	A4	25 to 30	B2
7.	35	A7	25 to 30	B2
8.	35	S3	25 to 30	B2
9.	35	A2	25 to 30	B3
10	35	A4	25 to 30	B3
11.	35	A7	25 to 30	B3
12.	35	S3	25 to 30	B3

4.13.6 Led Streetlight Equivalence of the 250 Watt HPS/T: Sap No. 3531

Item	Maximum Luminaire equivalence (W)	Pole type	Pole Spacing	Type of road
1.	112	A5	30 to 40	A1
2.	112	A6	30 to 40	A1
3.	112	S1	30 to 40	A1
4.	112	S2	30 to 40	A1
6.	112	A5	30 to 40	A2
7.	112	A6	30 to 40	A2
8.	112	S1	30 to 40	A2
9.	112	S2	30 to 40	A2
11.	112	A5	30 to 40	A3
12.	112	A6	30 to 40	A3
13.	112	S1	30 to 40	A3
14.	112	S2	30 to 40	A3
16.	112	A5	30 to 40	A4
17.	112	A6	30 to 40	A4
18.	112	S1	30 to 40	A4
19.	112	S2	30 to 40	A4

4.13.7 Led Streetlight Equivalence Of 400 Watt HPS/T: Sap No. 3534

Item	Maximum Luminaire equivalence (W)	Pole type	Pole Spacing	ype of road
1.	180	A5	30 to 40	A1
2.	180	A6	30 to 40	A1
3.	180	S1	30 to 40	A1
4.	180	S2	30 to 40	A1
6.	180	A5	30 to 40	A2
7.	180	A6	30 to 40	A2
8.	180	S1	30 to 40	A2
9.	180	S2	30 to 40	A2
11.	180	A5	30 to 40	A3
12.	180	A6	30 to 40	A3

13.	180	S1	30 to 40	A3
14.	180	S2	30 to 40	A3
16.	180	A5	30 to 40	A4
17.	180	A6	30 to 40	A4
18.	180	S1	30 to 40	A4
19.	180	S2	30 to 40	A4

4.14. Marking and Packaging

4.13.1 Each luminaire shall be individually packed in a sturdy cardboard box in order to prevent damage during handling, transportation and storage. The cartons shall be clearly marked with the appropriate description of the luminaire contained therein.

4.13.2 Each luminaire shall be marked, by means of a suitable sticker or similar, in 25 mm lettering, with the rated wattage of the luminaire. In addition, each luminaire shall be marked with a coloured dot indicating the type of lamp with which a luminaire is designed to be used. The diameter of the dot shall not be less than 20 mm.

4.13.3 The colours shall be as close as possible to primary colours and shall be heat-resistant and shall not fade for the duration of the life of the luminaire. Since the dots will be exposed to weather, the stickers should be of a material suitable for use in this application e.g. UV stabilised vinyl.

4.13.4 Luminaires marked by means of an appropriately coloured sticker instead of a separate dot shall also be acceptable.

4.15. Documentation

4.14.1 Full technical and descriptive details, relating to the luminaires offered shall be submitted so that the offer can be fully evaluated. This shall include, but not limited to the following details:

a) Manufacture and country of origin

b) Name of LED luminaire

c) Catalogue number of the luminaire

d) Standards to which luminaire comply (SANS / IEC)

e) Luminaire type test reports in English (From an accredited testing laboratory)

f) Luminaire special test reports in English (From an accredited testing laboratory)

g) Actual design data and results, and luminaire data files

h) Mortality curves

i) Dimension and weight of luminaire

j) Proof of calculation to achieve more than 50% savings

k) Details of cooling mechanism of luminaire to adequately dissipate heat

l) Lifespan of LED module driver and LED Module

m) The design reports shall be done on a Dialux or Relux simulation packages and submit IES and / or LTD files.

5. SECURITY AND MANAGEMENT SYSTEM

5.1 City Power is committed to enhancing the security of its streetlight luminaires in response to the ongoing challenges of theft and vandalism, which result in significant financial losses. To address this issue, the Municipality will integrate its Smart City Platform into the luminaires, enabling advanced monitoring and security features.

5.2 City Power will provide suppliers with an integrated smart controller, which shall be installed within the driver compartment of the luminaires. This controller will enable smart monitoring capabilities, ensuring real-time surveillance, fault detection, and proactive maintenance.

5.3 The luminaire control gear compartment shall include a designated space for an integrated inline smart controller supplied by City Power.

5.4 The provision within the driver compartment of the luminaire for the smart controller shall be the following dimensions do not exceed Length: 140mm, Width: 80mm and Height: 60mm

5.5 The smart controller shall be incorporated during the manufacturing stage. The smart controller shall be securely integrated to ensure that any tampering results in the luminaire becoming inoperative.

5.6 Compliance with all relevant electrical standards and best practices to maintain the integrity and functionality of the luminaire system shall be adhered to.

6. TRAINING

6.1 The following training courses shall be offered for City Power's staff free of charge:

a) Correct handling and care of the luminaires; and

b) Correct and safe installation and maintenance of the luminaires.

7. QUALITY MANAGEMENT

A quality management system shall be set up in order to assure the quality of the luminaires during manufacture, installation, removal, transportation and disposal of scrap material/Waste/E-waste Guidance on the requirements for a quality management system may be found in the following standards: ISO 9001:2015. The details shall be subject to an agreement between the purchaser and supplier.

8. HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance during manufacture, installation, removal, transportation, and disposal. Guidance on the requirements of a health and safety plan shall be found in ISO 45001:2018 standards. The details shall be subject to an agreement between City Power and the Supplier.

9. ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to ensure the proper environmental management and compliance is adhered to during manufacture, installation, removal, transportation, and disposal. Guidance on the requirements for an environmental management system shall be found in ISO 14001:2015 standards. The details shall be subject to an agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy.

TECHNICAL SCHEDULES A & B:

ITEM No. 1 SAP No. 3533: LED Streetlight Luminaire – Equivalence of the 70 Watt HPS/T streetlight luminaire

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Technical Details	Schedule A	Schedule B
1	Name of LED streetlight luminaire manufacturer	Required	
2	Place of manufacture	Required	
3	Manufacturer's identification reference	Required	
4	Type of luminaire	LED	
5	Standard to which LED luminaire complies	IEC 60598	
6	Optic mounting angle	15 degrees	
7	Nominal flux at Tq of 35°C at 100%	4650lm (minimum)	
8	Class and type of luminaire	Class 1 of IEC 60598 – 1 and totally enclosed type	
9	Streetlight luminaire to be replaced	70W HPS	
10	Rated Wattage of the equivalent luminaire	25 W (maximum)	
11	Mass of luminaire	15kg (maximum)	
12	Colour temperature	4 000K (neutral white) (minimum)	
13	Luminaire efficacy (lm/W)	150 lm/W (minimum)	
14	Colour rendering index	70 (minimum)	
15	Minimum energy saving by LED luminaire compared to 70W HPS streetlight	50% (minimum)	
16	Lumen depreciation of LED luminaire after 60 000 hours of operation	80% of initial lumens	
17	Degree of protection to SANS 60529		
	a) LED module compartment	IP66 (minimum)	
	b) Driver/power supply compartment	IP66 (minimum)	
18	Material of LED luminaire housing	LM 6 die cast aluminium	
19	Does luminaire have a heat sink	Required	
20	Location of LED driver	Inside the luminaire housing	
21	Is the driver accessible and replaceable with the aid of commonly available hand tools	Yes (Required)	
22	Type and nominal size of spigot entry	Side entry, Inside diameter of 42 mm	
23	Maximum length of spigot entry	125mm	

TECHNICAL SCHEDULES A & B:

ITEM No. 1 SAP No. 3533: LED Streetlight Luminaire – Equivalence of the 70 Watt HPS/T streetlight luminaire continues

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Schedule A	Schedule B
24	Driver		
24.1	Driver make	Required	
24.2	Voltage range of driver	Required	
24.3	Type of driver or power supply	Dimmable	
24.4	Power factor of the power supply	0,85 lagging (minimum)	
24.5	Operating frequency	50 Hz (input)	
24.6	Transient protection	Required (specify)	
25	Protector Lens		
25.1	Material of protector lens	High impact glass or acrylic	
25.2	Material of gasket	Silicon	
25.3	Material of small metal components	Stainless steel	
25.4	IP rating	66	
25	LED module life span – Operating hours	10000 hours	
26	Driver life span – Operating hours	Required	
27	Luminaire Life Expectancy	20 Years (Minimum)	
28	Guarantee period required and offered	10 Years (minimum)	
29	Photometric data enclosed	Required	
30	Material safety datasheet attached	Required	
31	Test reports submitted	Required	
32	Special test reports submitted	Required	
33	Designs submitted	Required	
34	Data dot and labelling	Required	
35	Quantity already installed in South Africa	XXXXXXXXXX	

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letter_____Signature_____

Full name of company: _____

DEVIATION SCHEDULE:

ITEM No 1.SAP NO:3533: LED Streetlight Luminaire – Equivalence of the 70 Watt HPS/T streetlight luminaire

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item No.	**Sub-clause of CP_TSSPEC_001**	**Proposed deviation**

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letter_____Signature_____

Full name of company: _____

TECHNICAL SCHEDULES A & B:

ITEM No. 2 SAP No. 3532: LED Streetlight Luminaire – Equivalence of the 100 Watt HPS/T streetlight luminaire

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Technical Details	Schedule A	Schedule B
1	Name of LED streetlight luminaire manufacturer	Required	
2	Place of manufacture	Required	
3	Manufacturer's identification reference	Required	
4	Type of luminaire	LED	
5	Standard to which LED luminaire complies	IEC 60598	
6	Optic mounting angle	15 degrees	
7	Nominal flux at Tq of 35°C at 100%	6750lm (minimum)	
8	Class and type of luminaire	Class 1 of IEC 60598 – 1 and totally enclosed type	
9	Streetlight luminaire to be replaced	100W HPS	
10	Rated Wattage of the equivalent luminaire	35W (maximum)	
11	Mass of luminaire	15kg (maximum)	
12	Colour temperature	4 000K (neutral white) (minimum)	
13	Luminaire efficacy (lm/W)	150 m/W (minimum)	
14	Colour rendering index	70 (minimum)	
15	Minimum energy saving by LED luminaire compared to 150W HPS streetlight	50% (minimum)	
16	Lumen depreciation of LED luminaire after 60 000 hours of operation	80% of initial lumens	
17	Degree of protection to SANS 60529		
	a) LED module compartment	IP66 (minimum)	
	b) Driver/power supply compartment	IP66 (minimum)	
18	Material of LED luminaire housing	LM 6 die cast aluminium	
19	Does luminaire have a heat sink	Required	
20	Location of LED driver	Inside the luminaire housing	
21	Is the driver accessible and replaceable with the aid of commonly available hand tools	Yes (Required)	
22	Type and nominal size of spigot entry	Side entry, Inside diameter of 42 mm	
23	Maximum length of spigot entry	125mm	

TECHNICAL SCHEDULES A & B:

ITEM No. 2 SAP No. 3532: LED Streetlight Luminaire – Equivalence of the 100 Watt HPS/T streetlight luminaire continues

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Schedule A	Schedule B
24	Driver		
24.1	Driver make	Required	
24.2	Voltage range of driver	Required	
24.3	Type of driver or power supply	Dimmable	
24.4	Power factor of the power supply	0,85 lagging (minimum)	
24.5	Operating frequency	50 Hz (input)	
24.6	Transient protection	Required (specify)	
25	Protector Lens		
25.1	Material of protector lens	High impact glass or acrylic	
25.2	Material of gasket	Silicon	
25.3	Material of small metal components	Stainless steel	
25.4	IP rating	66	
25	LED module life span – Operating hours	100000 Hours	
26	Driver life span – Operating hours	Required	
27	Luminaire Life Expectancy	20 Years (Minimum)	
28	Guarantee period required and offered	10 Years (minimum)	
29	Photometric data enclosed	Required	
30	Material safety datasheet attached	Required	
31	Test reports submitted	Required	
32	Special test reports submitted	Required	
33	Designs submitted	Required	
34	Data dot and labelling	Required	
35	Quantity already installed in South Africa	XXXXXXXXXX	

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letter_____Signature_____

Full name of company: _____

DEVIATION SCHEDULE:

ITEM No 2.SAP NO: 3532 :LED Streetlight Luminaire – Equivalence of the 100 Watt HPS/T streetlight luminaire

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item No.	**Sub-clause of CP_TSSPEC_001**	**Proposed deviation**

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letter_____Signature_____

Full name of company: _____

TECHNICAL SCHEDULES A & B:

ITEM No. 3 SAP No. 3531: LED Streetlight Luminaire – Equivalence of the 250 Watt HPS/T streetlight luminaire

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Technical Details	Schedule A	Schedule B
1	Name of LED streetlight luminaire manufacturer	Required	
2	Place of manufacture	Required	
3	Manufacturer's identification reference	Required	
4	Type of luminaire	LED	
5	Standard to which LED luminaire complies	IEC 60598	
6	Optic mounting angle	15 degrees	
7	Nominal flux at Tq of 35°C at 100%	16800lm (minimum)	
8	Class and type of luminaire	Class 1 of IEC 60598 – 1 and totally enclosed type	
9	Streetlight luminaire to be replaced	250W HPS	
10	Rated Wattage of the equivalent luminaire	112W (maximum)	
11	Mass of luminaire	15kg (maximum)	
12	Colour temperature	4 000 K (neutral white) (minimum)	
13	Luminaire efficacy (lm/W)	150 lm/W (minimum)	
14	Colour rendering index	70 (minimum)	
15	Minimum energy saving by LED luminaire compared to 250W HPS streetlight	50% (minimum)	
16	Lumen depreciation of LED luminaire after 60 000 hours of operation	80% of initial lumens	
17	Degree of protection to SANS 60529		
	a) LED module compartment	IP66 (minimum)	
	b) Driver/power supply compartment	IP66 (minimum)	
18	Material of LED luminaire housing	LM 6 die cast aluminium	
19	Does luminaire have a heat sink	Required	
20	Location of LED driver	Inside the luminaire housing	
21	Is the driver accessible and replaceable with the aid of commonly available hand tools	Yes (Required)	
22	Type and nominal size of spigot entry	Side entry, Inside diameter of 42 mm	
23	Maximum length of spigot entry	125mm	

TECHNICAL SCHEDULES A & B:

ITEM No. 3 SAP No. 3531: LED Streetlight Luminaire – Equivalence of the 250 Watt HPS/T streetlight luminaire continues

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Schedule A	Schedule B
24	Driver		
24.1	Driver make	Required	
24.2	Voltage range of driver	Required	
24.3	Type of driver or power supply	Dimmable	
24.4	Power factor of the power supply	0,85 lagging (minimum)	
24.5	Operating frequency	50 Hz (input)	
24.6	Transient protection	Required (specify)	
25	Protector Lens		
25.1	Material of protector lens	High impact glass or acrylic	
25.2	Material of gasket	Silicon	
25.3	Material of small metal components	Stainless steel	
25.4	IP rating	66	
25	LED module life span – Operating hours	100000 Hours	
26	Driver life span – Operating hours	Required	
27	Luminaire Life Expectancy	20 Years (Minimum)	
28	Guarantee period required and offered	10 Years (minimum)	
29	Photometric data enclosed	Required	
30	Material safety datasheet attached	Required	
31	Test reports submitted	Required	
32	Special test reports submitted	Required	
33	Designs submitted	Required	
34	Data dot and labelling	Required	
35	Quantity already installed in South Africa	XXXXXXXXXX	

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letter_____Signature_____

Full name of company: _____

DEVIATION SCHEDULE:

ITEM No. 3:SAP NO:3531 : : LED Streetlight Luminaire – Equivalence of the 250 Watt HPS/T streetlight luminaire

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item No.	**Sub-clause of CP_TSSPEC_001**	**Proposed deviation**

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letter_____Signature_____

Full name of company: _____

TECHNICAL SCHEDULES A & B:

ITEM No. 4 SAP No. 3534: LED Streetlight Luminaire – Equivalence of the 400 Watt HPS/T streetlight luminaire

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Technical Details	Schedule A	Schedule B
1	Name of LED streetlight luminaire manufacturer	Required	
2	Place of manufacture	Required	
3	Manufacturer's identification reference	Required	
4	Type of luminaire	LED	
5	Standard to which LED luminaire complies	IEC 60598	
6	Optic mounting angle	15 degrees	
7	Nominal flux at Tq of 35°C at 100%	27000lm (minimum)	
8	Class and type of luminaire	Class 1 of IEC 60598 – 1 and totally enclosed type	
9	Streetlight luminaire to be replaced	400W HPS	
10	Rated Wattage of the equivalent luminaire	135W (maximum)	
11	Mass of luminaire	15kg (maximum)	
12	Colour temperature	4 000K (neutral white) (minimum)	
13	Luminaire efficacy (lm/W)	150 lm/W (minimum)	
14	Colour rendering index	70 (minimum)	
15	Minimum energy saving by LED luminaire compared to 400W HPS streetlight	50% (minimum)	
16	Lumen depreciation of LED luminaire after 60 000 hours of operation	80% of initial lumens	
17	Degree of protection to SANS 60529		
	a) LED module compartment	IP66 (minimum)	
	b) Driver/power supply compartment	IP66 (minimum)	
18	Material of LED luminaire housing	LM 6 die cast aluminium	
19	Does luminaire have a heat sink	Required	
20	Location of LED driver	Inside the luminaire housing	
21	Is the driver accessible and replaceable with the aid of commonly available hand tools	Yes (Required)	
22	Type and nominal size of spigot entry	Side entry, Inside diameter of 42 mm	
23	Maximum length of spigot entry	125mm	

TECHNICAL SCHEDULES A & B:

ITEM No. 4 SAP No. 3534: LED Streetlight Luminaire – Equivalence of the 400 Watt HPS/T streetlight luminaire continues

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Description	Schedule A	Schedule B
24	Driver		
24.1	Driver make	Required	
24.2	Voltage range of driver	Required	
24.3	Type of driver or power supply	Dimmable	
24.4	Power factor of the power supply	0,85 lagging (minimum)	
24.5	Operating frequency	50 Hz (input)	
24.6	Transient protection	Required (specify)	
25	Protector Lens		
25.1	Material of protector lens	High impact glass or acrylic	
25.2	Material of gasket	silicon	
25.3	Material of small metal components	Stainless steel	
25.4	IP rating	66	
25	LED module life span – Operating hours	100000 Hours	
26	Driver life span – Operating hours	Required	
27	Luminaire Life Expectancy	20 Years (Minimum)	
28	Guarantee period required and offered	10 Years (minimum)	
29	Photometric data enclosed	Required	
30	Material safety datasheet attached	Required	
31	Test reports submitted	Required	
32	Special test reports submitted	Required	
33	Designs submitted	Required	
34	Data dot and labelling	Required	
35	Quantity already installed in South Africa	XXXXXXXXXX	

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letter_____Signature_____

Full name of company: _____

DEVIATION SCHEDULE: ITEM No. 4

ITEM No 4. SAP NO 3534: LED Streetlight Luminaire – Equivalence of the 400 Watt HPS/T streetlight luminaire

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item No.	**Sub-clause of CP_TSSPEC_001**	**Proposed deviation**

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letter_____Signature_____

Full name of company: _____

Annex A – Bibliography

Tshwane municipality LED specification

ANNEX D - STOCK ITEMS

10. Material Group: Street lighting

Item	SAP No.	SAP Short Description	SAP Long Description
1	3533	LED streetlight equivalence of the 70 Watt HPS/T	LED streetlight luminaire equivalence of the 70 Watt HPS/T CP_TSSPEC_231
2	3532	LED streetlight equivalence of the 100 Watt HPS/T	LED streetlight luminaire equivalence of the 100 Watt HPS/T CP_TSSPEC_231
3	3531	LED streetlight equivalence of the 250 Watt HPS/T	LED streetlight luminaire equivalence of the 250 Watt HPS/T CP_TSSPEC_231
4	3534	LED streetlight equivalence of 400 Watt HPS/T	LED streetlight luminaire equivalence of the 400 Watt HPS/T CP_TSSPEC_231