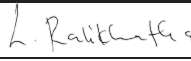


PERFORMANCE SPECIFICATION: LED DECORATIVE PENDANT LUMINAIRES (TYPE 4)

Signatures						
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1.0 SCOPE

- 1.1 This specification defines the performance and technical requirements for the supply of decorative cylindrical pendant luminaires for TNPA facilities.
- 1.2 This includes luminaire construction, materials and finishes, LED light sources, remote power supplies/drivers, optics, diffusers, glare control, suspension systems, emergency battery backup (where specified), wiring, earthing, electromagnetic compatibility, packaging, and associated documentation.
- 1.3 The luminaires are intended for use in TNPA port facilities, which are characterised by high humidity and saline atmospheres. All equipment supplied shall be designed and manufactured to withstand these conditions and provide reliable, long-term service.
- 1.4 This specification covers LED decorative cylindrical suspended luminaires suitable for indoor general lighting applications, including shopping centres, office receptions, conference centres, and similar commercial spaces, as indicated in the relevant lighting design schedules.
- 1.5 The luminaires shall provide symmetrical light distribution and shall be manufactured from a combination of die-cast and extruded aluminium, finished with a durable powder-coated surface.
- 1.6 The luminaires shall be supplied complete with all necessary mounting hardware, decorative ceiling cups, suspension systems, remote LED drivers, and all required certification and test documentation as specified herein.
- 1.7 Where specified in the tender schedule, the luminaires shall be supplied with integrated emergency battery backup systems, complying with IEC 60598-2-22.

2.0 REFERENCES

All materials and manufacturing shall comply with the latest editions of the following standards, codes, and regulations, unless otherwise specified:

Luminaires & Performance

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

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

SANS 60598-2-1 – Luminaires – Part 2-1: Particular requirements – Fixed general purpose luminaires

SANS 60598-2-22 – Luminaires – Part 2-22: Particular requirements – Luminaires for

emergency lighting (where applicable)

Enclosures & Protection

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

SANS 62262 / IEC 62262 – Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK Code)

Electrical Safety & Wiring

SANS 10142-1 – The wiring of premises – Part 1: Low-voltage installations

IEC 61347-1 – Lamp controlgear – Part 1: General and safety requirements

IEC 61347-2-13 – Lamp controlgear – Part 2-13: Particular requirements for DC or AC supplied electronic controlgear for LED modules

Emergency Lighting (where applicable)

IEC 61347-2-7 – Lamp controlgear – Part 2-7: Particular requirements for battery supplied electronic controlgear for emergency lighting (self-contained)

IEC 62034 – Automatic test systems for battery powered emergency escape lighting

Photometry & Lighting Design

IES LM-79 – Optical and Electrical Measurements of Solid-State Lighting Products

IES LM-80 – Measuring Lumen Maintenance of LED Light Sources

IES TM-21 – Projecting Long-term Lumen Maintenance of LED Light Sources

SANS 10098 – Public lighting: The lighting of public thoroughfares and certain specific areas

Electromagnetic Compatibility (EMC)

SANS 61000-3-2 – Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions

SANS 61000-3-3 – Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems

SANS 61000-4-5 – Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test

IEC 55015 – Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

IEC 61547 – Equipment for general lighting purposes – EMC immunity requirements

Materials & Finishes

EN 1706 – Aluminium and aluminium alloys: Castings – Chemical composition and mechanical properties

ISO 12944 – Paints and varnishes – Corrosion protection of steel structures by protective paint systems

Quality & Compliance

ISO 9001 – Quality management systems – Requirements

OHSACT (Act 85 of 1993) – Occupational Health and Safety Act – Electrical Machinery Regulations (Earthing requirements)

3.0 SERVICE CONDITIONS

3.1 The luminaires shall be designed and manufactured to operate reliably under the following indoor service conditions typically encountered in TNPA port facilities (e.g., offices, corridors, reception areas, staircases and commercial spaces):

3.1.1 Environmental Conditions

- a. Ambient temperature range: 0°C to +25°C
- b. Relative humidity: 10% to 95% (non-condensing)
- c. Coastal environment: Saline coastal environment with potential for airborne salt spray, dust, and moisture ingress
- d. Dust and particulate matter: Low to moderate levels, typical of indoor commercial spaces

3.1.2 Electrical Supply Conditions

- a. Nominal supply voltage: 220V to 240V AC
- b. Supply frequency: 50 Hz $\pm$ 5%
- c. Voltage fluctuations and surges: Typical of commercial power networks

3.1.3 Mechanical Conditions

- a. Vibration: Low levels typical of buildings
- b. Mounting: Ceiling suspended pendant using adjustable suspension cables
- c. Ceiling types: Soffit, tiled, or plastered ceilings

3.2 All luminaires supplied shall be suitable for continuous operation under the above conditions without degradation of performance, reduction of service life, or failure of components.

3.3 The luminaire's thermal management system shall be capable of maintaining LED

junction temperatures within acceptable limits at the maximum specified ambient temperature of 25°C.

- 3.4 The luminaire's corrosion protection (aluminium housing, powder coating, etc.) shall be sufficient to withstand the saline coastal atmosphere without deterioration during the warranted period.
- 3.5 The luminaires are suitable for indoor use only.

4.0 STANDARD OF EQUIPMENT

- 4.1 Equipment shall be of a high-quality design and manufacture and shall comply with the relevant specifications and recommendations mentioned in this specification.
- 4.2 Every reasonable precaution and provision shall be incorporated in the design of the equipment for the safety and security of the system and of those concerned with its operation and maintenance.
- 4.3 Any proposed alternative equipment or material not strictly complying with the specified requirements shall be submitted to the TNPA's Technical Officer for prior written approval. Such approval will not diminish the tenderer's responsibility to meet the performance requirements.

5.0 MATERIALS AND FINISHES

- 5.1 The luminaire housing shall be manufactured from a combination of LM6 die-cast aluminium and extruded aluminium, providing robust construction and excellent durability.
- 5.2 The internal finish of the shade shall be white reflective, maximising light output and ensuring uniform illumination.
- 5.3 The luminaire shall be supplied with a powder-coated finish, providing a durable, corrosion-resistant surface suitable for indoor applications.
- 5.4 The luminaire shall be available in coloured finishes of charcoal grey, gold, black, white and matt silver, as specified in the tender schedule.
 - 5.4.1 The powder coating shall be applied over a suitable pre-treatment process to ensure optimal adhesion.
 - 5.4.2 The powder coating shall have a minimum thickness of 60 microns.
 - 5.4.3 The powder coating shall be UV-stabilised to prevent chalking and discolouration over time.
 - 5.4.4 The powder coating shall comply with the corrosion protection requirements of ISO 12944 for the relevant environment.
- 5.5 The diffuser shall be manufactured from UV-stabilised acrylic, providing uniform light

distribution and low glare.

- 5.6 The suspension system shall consist of stainless steel wire with decorative ceiling cup.
- 5.7 The diffuser shall be available in the following options:
 - Clear diffuser (standard)
 - Opal diffuser (when specified)
 - As specified in the tender schedule
- 5.8 All external fasteners (bolts, screws, nuts, washers) shall be manufactured from stainless steel grade AISI 304 or higher.

6.0 SYSTEM DESCRIPTION

- 6.1 The luminaire shall be a decorative suspended cylindrical pendant type with an aluminium shade and integral lamp diffuser.
- 6.2 The luminaire shall bear the SANS 60598-1 safety mark and shall comply with the specifications as per SANS 60598-2-1.
- 6.3 The luminaire shall be of the totally enclosed type.
- 6.4 The luminaire shall provide symmetrical light distribution.
- 6.5 The luminaire shall have a cylindrical body with a nominal diameter of 100 mm.
- 6.6 The luminaire shall be available in the following lengths:
 - 400 mm for integrated LED
 - Custom lengths available to project requirements
 - As specified in the tender schedule
- 6.7 Luminaires shall be delivered with the cylindrical housing, diffuser, decorative ceiling cup, and suspension system.
- 6.8 The remote LED driver shall be located in an accessible ceiling void, ceiling cup, or remote enclosure as indicated on the drawings.
- 6.9 The luminaire shall be designed for ceiling suspended pendant mounting.
- 6.10 The luminaire shall be factory pre-wired for connection to the remote driver.
- 6.11 The luminaire shall provide uniform, low-glare downward illumination through the diffuser assembly.
- 6.12 Where specified in the tender schedule, the luminaire shall be supplied with an integrated emergency lighting solution comprising a remote emergency LED driver/inverter and battery pack, complying with IEC 60598-2-22.

7.0 FUNCTIONAL AND PERFORMANCE REQUIREMENTS

7.1 Luminaire Construction

- 7.1.1 The luminaire housing shall be manufactured from a combination of LM6 die-cast aluminium and extruded aluminium, providing robust construction and excellent durability.
- 7.1.2 The cylindrical body shall have a nominal diameter of 100 mm.
- 7.1.3 The luminaire shall provide uniform, low-glare downward illumination through the diffuser assembly.
- 7.1.4 The luminaire shall be suitable for decorative architectural lighting applications.
- 7.1.5 The design of the external surfaces shall prevent the accumulation of dirt and dust.
- 7.1.6 All parts requiring maintenance and cleaning shall be easily accessible.
- 7.1.7 The luminaire shall be designed with a classic aesthetic suitable for offices, corridors, reception areas, staircases and commercial spaces.

7.2 **LED Light Source**

- 7.2.1 The luminaire shall be supplied with a high-efficiency LED light engine, providing optimal performance and energy efficiency, with the luminaire having a minimum luminaire efficacy of 120 lm/W.
- 7.2.2 The effective lumen package and wattage of the fitting shall be as specified in the tender schedule.
- 7.2.3 The light source shall be available in the following correlated colour temperatures (CCT) of 3000K or 4000K.
- 7.2.4 The Colour Rendering Index (CRI) shall be 80 minimum (CRI ≥80).
- 7.2.5 The luminaire shall provide low glare lighting suitable for indoor applications.
- 7.2.6 The luminaire shall be available in the beam distributions of 35° and 40°.
- 7.2.7 The LED life expectancy @ T_q 25°C shall be 50,000 hours minimum (L80B10)
- 7.2.8 LED driver design life shall be not less than 50 000 hours at T_q 25°C and 230V ±10%, 50Hz.

7.3 **Power Supply / Driver**

- 7.3.1 The electronic power supply (driver) shall be suitable for operation with a 220 – 240 V, 50 Hz, single-phase supply.
- 7.3.2 The driver shall be of the constant-current type located in an accessible ceiling void or remote enclosure.
- 7.3.3 The driver shall be flicker-free in all operating modes.
- 7.3.4 The driver shall incorporate the following protection features:
 - Overload protection
 - Short circuit protection

7.3.5 The driver shall be available with a dimmable option where specified in the tender schedule.

7.3.6 The driver shall support the following electrical characteristics:

- Input voltage: 220 – 240 V AC
- Mains frequency: 50 Hz
- Power factor: ≥ 0.95
- Total Harmonic Distortion (THD): $< 10\%$
- SELV output

7.4 Optics and Diffuser

7.4.1 The luminaire shall be equipped with a clear or opal lamp diffuser, providing uniform light distribution and low glare.

7.4.2 The diffuser shall provide glare reduction through the diffuser arrangement.

7.4.3 The diffuser shall be UV-stabilised to prevent discolouration over time.

7.5 Emergency Battery Backup System (Where Specified)

7.5.1 Where specified in the tender schedule, the luminaire shall be provided with an integrated emergency lighting solution comprising:

- Remote emergency LED driver/inverter
- Automatic battery charging and monitoring
- Lithium Iron Phosphate (LiFePO_4) battery technology

7.5.2 The emergency system shall comply with IEC 60598-2-22.

7.5.3 The emergency system shall provide emergency lighting illumination during mains failure transitions, keeping the luminaire operational for the period as specified in the tender schedule.

7.5.4 The emergency system shall incorporate automatic changeover upon mains failure, with seamless transition between modes.

7.5.5 The emergency system shall be available in maintained or non-maintained operation as specified in the tender schedule.

7.5.6 The emergency system shall include an LED status indicator and test facility for routine functional testing.

7.5.7 The emergency control gear shall incorporate the following protection features:

- Battery reverse polarity protection
- Overcharge protection
- Over-discharge protection

- Short circuit protection

7.5.8 The emergency control gear shall have a hardware warranty as specified in Section 9.0.

7.6 Suspension System

7.6.1 The luminaire shall be available with the following suspension options:

- Rigid suspension rod
- Stainless steel suspension cable
- As specified in the tender schedule

7.6.2 The suspension system shall be ceiling mounted with a decorative ceiling cup.

7.6.3 The mounting system shall be suitable for soffit, tiled, or plastered ceilings.

7.6.4 The luminaire shall be supplied with cable as part of the suspension system.

7.6.5 The suspension type and height shall be to the specifications indicated in the tender schedule.

7.7 Ingress Protection and Impact Resistance

7.7.1 The luminaire shall have an Ingress Protection (IP) rating appropriate for its intended indoor application (Minimum IP20).

7.7.2 The IP rating shall be certified by a test report for the specific luminaire model.

7.8 Wiring and Electrical Connections

7.8.1 The internal wiring of the luminaires shall be flexible and suitably insulated to withstand the voltage and temperature encountered in service.

7.8.2 The luminaire shall be factory pre-wired for connection to the remote driver.

7.8.3 The supply terminals shall accept the appropriate conductor sizes and be easily accessible.

7.9 Earthing

7.9.1 Luminaires shall be designed to facilitate earthing as per the Electrical Machinery Regulations of the OHSACT (Act 85 of 1993).

7.9.2 Metal parts that may become live in the event of an insulation fault shall be permanently and reliably connected to an earthing terminal, complying with the test specified in SANS 60598-2-1.

7.9.3 Earthing terminals shall comply with clause 7.2 of SANS 60598-1. All parts of an earth terminal shall be made of brass or other corrosion-resistant metal, with bare (unpainted/varnished) contact surfaces.

- 7.9.4 Earth connections shall be by means of suitable lugs, designed to prevent electrolytic corrosion.

7.10 Electromagnetic Compatibility

- 7.10.1 The luminaire shall comply with IEC 55015 (Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment).

7.11 Packaging and Transport

- 7.11.1 The luminaires shall be packed in a manner that ensures protection during handling and transport by road, rail, or sea.
- 7.11.2 The packaging shall be designed to prevent vibration damage to the LED modules and control gear during transit.
- 7.11.3 Where sea transport is involved, a suitable dehydrating agent (desiccant) shall be included in the packaging to prevent corrosion.
- 7.11.4 Where lithium iron phosphate (LiFePO₄) battery packs are supplied for emergency backup, they shall be transported in accordance with applicable dangerous goods regulations (e.g., IATA, IMDG, ADR).

8.0 CERTIFICATION AND TEST REPORTS

- 8.1 The tenderer shall provide the following documentation:
- a. Product data sheets and catalogues.
 - b. Type Test Report conforming to SANS 60598-1.
 - c. Test reports for the SANS 60598-2-1 safety mark.
 - d. LM-80 (Measuring Lumen Maintenance of LED Light Sources) report.
 - e. LM-79 (Electrical and Photometric Measurements of Solid-State Lighting Products) report.
 - f. TM-21 (LED Lifetime prediction extrapolation method) report.
 - g. IP rating test reports for the complete luminaire.
 - h. Photometric test reports and photometric data files (IES/LDT format).
 - i. Emergency battery backup system test reports (where applicable), including:
 - Emergency duration test report confirming minimum specified runtime
 - Battery charging and discharge characteristics
 - Battery temperature range compliance
 - Compliance with IEC 61347-2-7

9.0 WARRANTY AND DOCUMENTATION

- 9.1 The tenderer shall guarantee all equipment supplied against this specification for a period as specified in the tender schedule. The tenderer shall explicitly state their compliance herewith.
- 9.2 This guarantee shall cover all materials, parts, workmanship, performance, and efficiency of the equipment supplied, including the LED module and driver.
- 9.3 Should any part or equipment fail during the guarantee period due to defective materials or workmanship, the supplier shall immediately replace such part or equipment free of charge, including all costs for transport and associated logistics.
- 9.4 The Contractor shall submit all required documentation as detailed in Section 8.0.

10.0 QUALITY ASSURANCE

- 10.1 The design, assembly, and testing of the luminaire shall be undertaken in an ISO 9001:2015 certified facility.
- 10.2 The Contractor's quality management system shall comply with the requirements of SANS/ISO 9001. These requirements are mandatory for all items supplied against this specification.
- 10.3 All products shall be factory tested and quality-assured prior to dispatch.
- 10.4 All devices shall operate without perceptible delay, flicker, or interference under normal service conditions.
- 10.5 Prior to bulk delivery, the Contractor shall supply a full set of sample luminaires for inspection and approval by the Engineer. Samples shall be subject to testing to verify compliance with the performance requirements specified herein.