

GENERAL REQUIREMENT

1- Housing

The fixture shall have a full die cast aluminum housing providing adequate rigidity, strength and heat dissipation. The housing shall have integrated driver and LED compartments for better heat dissipation and convenience in maintaining at the site, and shall feature highly reflective components and films to increase light output. The optical LED compartment shall have thermally hardened (tempered) glass cover and high quality silicon gaskets. The glass shall be extra-white for maximum light transmission. The glass cover shall be tightly secured with the housing. The fixture shall be rated for ingress protection class IP66.

2- OPTICS

The fixture for Group-I and Group-II shall have flexible optical systems for the wattage range in the respective group. The fixture shall use high efficiency (greater than or equal to 90%) LED and optics system. The light output ratio (LOR) shall not be less than 85%. The fixture shall offer a composite system efficiency above 130 lumen/Watt. The lens system design and high efficiency LED shall facilitate maximum spacing between the road lighting poles and coverage of wider roads {(according to Centre/Centre pole distance (in meters) and height (in meters) (to be filled in by procuring agency)} The multilayer optics design shall ensure adequate luminance and illuminance uniformity in the unlikely event of an individual LED failure. The fixture shall offer choice of narrow, medium and wider beam light distribution. The optical lens system shall feature long life with no discoloration (I/V protection), highest possible light.

3- SURGE PROTECTION

The lighting fixture shall have separate surge protection to protect the electronic driver and LED system. Minimum surge protection rating shall be 10KV.

IP PROTECTION/ IMPACT RESISTANCE

The fixture shall have ingress protection class IP66 for long reliable performance and minimal maintenance requirement and an impact resistance of IK08 or above. No chemical glue shall be used as that may cause breakdown of water-proof and dust-proof seal. All synthetic materials shall be 100% UV Stable and scratch resistant.

MAINTENANCE

Both the driver and LED compartments shall be designed to be easily accessible for maintenance. Whatever method of securing/assembling of fixture used screws/clamps. it is to be ensured that the fixtures are manufactured so that frequent opening/closing at site during maintenance does not compromise its ingress protection (IP) rating and the various components like terminal blocks, LED drivers etc are not dislocated from their designated position. Gas Kets are to be properly secured in special groves made for the same and must not be fixed to the body by any adhesive material. The components like LED drivers, terminal blocks etc must be easily detachable by using plug and play connectors/ terminals to ensure ease of replacement at site and to be secured in the body of the fixture making special mounting arrangements so that the same are not dislodged / dislocated from their designated position.

MOUNTING

The mounting of the fixture shall be in axial orientation through suitable sized sidearm. The means for attaching the luminaire or external part to its support shall be appropriate to the weight of the luminaire of external part. The connection shall be designed to with stand wind speeds of 160km/h on the project surface of the assembly without undue deflection.

FUTURE COMPATIBILITY

The fixture shall be fully compatible with future LED upgrades when they become available. It shall have a modular design to upgrade/replace with new LED modules or LED drivers at site conveniently with minimum effort. All electronic components/drivers shall be mounted on a separate tool-less gear-tray. LED compartment shall have a easy access for opening the glass cover.

LED DRIVER/ ELECTRONIC CONTROL GEAR FOR LED MODULES

The LED driver shall be designed to operate large array of high powered LED's through current controlled output. The driver shall be suitable for 100V to 300V,50Hz, single phase mains AC supply.

THE LED DRIVER SHALL HAVE AN EFFICIENCY OF AT LEAST 85%.

The LED driver shall have energy saving/dimming options. So, that the driver can be easily programmed at site in a manner that different output wastages are available from the same fixture as per requirements. In the late night mode the fixture can thus be operated at various reduced wattages as per traffic conditions to have an energy efficient use. The driver shall be rated for ingress protection class IP65. Drivers shall have a Power Factor (PF) of $L : \geq 0.90$.

LEDs

The LED chip shall be Philips Lumiled, Cree, Nichia or Osram Make or Equivalent (duly type tested as specified and in full conformance to the technical requirement/specifications) The LEDs shall: 1. Be designed for lumen maintenance of L70 or 70% at the end of useful life at ambient temperature of 35 deg C. 2. Have a useful life of 50,000 burning hours at 50C with certified by TM21 report. Have a minimum color rendering index (Ra) of 70(± 10) and a color temperature above 5000K and preferable 6500K. 3. Have a color consistency within 7SDCM (Standard deviation of color matching) as defined by Mac Adam. The bidder shall submitted LED manufacturer authorization for the usage of its LED in the fixture manufactured by them.

THERMAL MANAGEMENT

Managing thermal properties in LED fixture is most critical to ensure optimum performance of LEDs and reliability of the system. The housing under the circuit board shall be specially designed to ensure perfect contact between the board and the fixture housing for efficient heat dissipation. Only metal core PCBs shall be used to maximize heat transfer process and to offer reinforced electrical insulation via dielectric layer. The metal core PCBs shall be mounted only housing using a highly efficient thermal interface material. Use of silicon glue is not acceptable. The housing over the driver chamber shall have additional ribs to ensure direct contact with the drivers. The housing shall have adequate surface area to ensure fast heat dissipation.

PHOTOMETRIC

Fixture shall have illumination engineering society (IES) Type II or III distribution pattern, with short or medium longitudinal distribution. LM-80 LED and photometric test reports and IES files from a third party testing laboratory shall be available.

WARRANTIES

The complete fixture including all accessories shall have at least five (5) years warranty,

APPLICABLE STANDARD AND CODES

The fixtures shall conform to the following latest standards and codes. It shall be the mandatory requirement that the bidder shall submit detailed type test reports from certified international testing agency/laboratory/body to establish its conformance to the Form A – 13 -27- specified international standard.

1. IEC 60598-1
2. IEC 60598-2-2
3. IEC 60598-2-3 (Road Light)
4. LM-79 for the luminaries being offered
5. LM-80 for LED chips being used.
6. LM-82-12-Approved method of measuring LPW @500C.
7. IEC 62471 (Photo Biological safety test for the complete fixtures being offered as well as for LED Chips)
8. EN 59015: 2006 and 2007-Limits and methods of measurement of radio disturbance characteristics of electrical lighting.
9. EN 61547: 1995 / +A1:2000-Equipment for general lighting purpose EMC immunity requirements.
10. EN 61000-3-2:2006- Limitation of harmonic current emission.
11. EN 61000-3-3:2008- Limitation of voltage fluctuation and flicker.
12. EN 62493-Assessment of Lighting Equipment related to human exposure to electromagnetic field (Environmental friendly)
13. IK test report –IEC 62262
14. Thermal Management Test (UL 1598)

15. IESNA (Illumination Engineering Society of North America) - lighting Handbook 10th Edition.
16. CIE (International Commission of Illumination)
17. IESNA RP-08 (reaffirmed 2005) – Roadway Lighting.
18. CIE 115-2010-Lighting of Roads for Motor and Pedestrian Traffic.
19. IESNA RP-19-01-Roadway Sign Lighting.
20. IESNA RP-20-92-Lighting for Parking Facilities.
21. CIE 129- Guide for Lighting Exterior Work Areas.
22. IESNA DG-19-08-Design Guide for Roundabout Lighting.
23. IESNA TM-16-05-Technical Memorandum on Light Emitting Diode (LED) Sources & Systems.
24. IESNA DG-04-03-Design Guide for Roadway Lighting Maintenance.
25. IESNA RP-16-10-Nomenclature & Definitions for Illuminating Engineering.
26. IEC 60529 or EN 60 529 (IP) and EN 50 102 (IK) – Degrees of Protection Provided by Enclosures (IP Code for Ingress protection and IK Code for Form A – 13 -28- Mechanical Strength)
27. ANSI/NEPA/ANSLG C78.377-2008-American National Standard for Chromatically of Solid State Lighting Products.
28. CIE 126-1997 Guidelines for Minimizing Sky Glow and IESNA TM-10 Addressing Obtrusive (Urban Sky Slow and Light Trespass) in conjunction with Urban Lighting.
29. JEDEC-Joint Electron Device Engineering Council.
30. ASTM – American Society for Testing of Materials.
31. ASTM B 117-07a – Standard Practice for Operating Salt Spray (Fog) Apparatus, 2007 or ISO International Organization for Standardization.
32. ISO 9227 - Corrosion Tests in artificial atmospheres (Salt Spray Tests, 2006)

33. IEC 60068-2-68 ed 1.0-Environmental testing - Part 2. Test-Test L : Dust and Sand.

34. ANSI C82.77-2002 – Harmonic Emission Limits & IEEE Std 519 1992 - Harmonic Limits.

The LED driver shall conform to the following standard and codes:

1. EN 61347-1: LED control gear general and safety requirement.
2. EN 61347-2-13: Particular requirements for DC or AC supplied electronic control gear for LED modules.
3. EN 62384:DC of AC supplied electronic control gear for LED modules performance requirement.
4. Technical and descriptive data and drawings.

Note:-The Product offered must be verified/ tested from PCSIR on the cost of contractor after advertisement.