
	<b>SPECIFICATION FOR LOW VOLTAGE INTERNAL ELECTRICAL INSTALLATION ADDENDUM 1 (L-S1)</b>	<b>CKE.LS.01.01.(02).2011</b>
		<b>Date: April 1999</b>
<b>SECTION 11.0</b>	<b>LUMINAIRES</b>	<b>Revision: 2</b>
		<b>Date: May 2011</b>
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## **11.4 LED LUMINAIRES**

### **11.4.1 DOWNLIGHT TYPE LED LUMINAIRES**

- 11.4.1.1 The luminaires shall be of type approved by JKR. The luminaires shall comply with IEC 60598, IES LM-79-08, IES LM-80-08, IEC 62471, IEC 61547, IEC 61000-3-2, BS EN 55015.
- 11.4.1.2 The luminaires shall have two separate components comprising of a electronic LED driver and optical system. The construction of the luminaires shall be two separate housing/compartment.
- 11.4.1.3 Electronic LED driver system comprises of electronic circuit board, converter, etc. and shall comply to IEC 61347-2-13 and IEC 62384. The optical system shall incorporate a one piece full bowl reflector and single piece high power LED of required wattage and shall comply to IEC 60231.
- 11.4.1.4 The housing of the electronic LED driver shall be made from steel of thickness not less than 0.8mm and shall be of sound and rigid construction suitable for suspended installation. The metalwork shall be rust inhibited to prevent corrosion. The housing of the electronic LED driver system shall be coated by electrostatic powder. The housing shall be provided with a mean to dissipate heat. Rubber grommets shall be provided at cable entry.
- 11.4.1.5 Wiring within the electronic LED driver shall be carried out with heat resistant cable marked with the word 'HR 105°C'. It shall be done in a neat way with holder to avoid contact with heat-producing components. Cable shall be terminated in a termination block marked 'L' and 'N' for connection to the incoming wires. A brass direct pressure type earth terminal shall be provided in the power supply driver near the termination block for earth connection. This earth terminal shall be clearly marked with the standard earth terminal symbol. The HR 105°C cable shall be used to connect the optical system and electronic LED driver system. It shall not be more than 300mm long. The cable shall be enclosed in a cable sleeve HR 105°C.

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11.4.1.5.1 Electrical connection and disconnection of the electronic LED driver system from the incoming supply cable and optical system shall be through a plug and socket/ connection unit and shall comply to IEC 60838-2-2. It shall be made from non-flammable material. The plug and socket shall be rated at 10A. a means of clamping the electrical cable shall be provided. The cable clamp arrangement shall not damage the insulation of the cables.

11.4.1.5.2 The manufacturer shall provide installation instruction for each model of the luminaires by means of hook or other suitable method.

11.4.1.6 The reflector shall be made of high purity anodized aluminum with at least 99.85% pure aluminum with low iridescent/iridescent free mirror finished (e.g. polished aluminum). The thickness of the reflector shall be minimum 1.0mm. the support shall be made from mild steel with minimum thickness of 1.5mm. the ring shall be made from die-cast aluminum with minimum thickness of 1.5mm. the support and ring shall be coated by electrostatic powder. The clip shall be made from stainless steel.

11.4.1.6.1 Photometric data for the luminaires shall be made available and submitted to S.O.'s Representatives. The required photometric data for the luminaires shall be Polar Curve, Utilization Factor, Luminance Distribution Table, Downward Light Output Ratio, Upward Light Output Ratio, Light Output Ratio, Spacing to Mounting Height Ratio and Threshold Increment as per 11.2.3.11 IES LM-79-08.

11.4.1.6.2 Light Output Ratio for the luminaires shall be minimum 70%.

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- 11.4.1.7 The LED shall be single high power type for the 9W/10W/15W/19W/20W. The LED shall be shined downwards to provide uniform light distribution and it shall has adequate heat sink for heat dissipation. The LED downlight shall comply to the following characteristic:

Electrical Characteristic of LED Downlight

<b>Characteristic</b>	<b>Description</b>
Light Source	High Power LED
Housing	Aluminum
Lens	Frosted glass
Color Temperature	3000K – 5000K
Beam Angle	≥ 60°
Power Supply	220-240V AC, 50-60Hz
Power Consumption	9W/10W/15W/19W/20W
System Efficiency	≥ 55lm/W
Color Rendering Index	≥ 80
Ambient Temperature	-20°C to 35°C
Classifications	Class 1, IP20
Lifetime	≥ 40,000 hours, 70% lumen maintenance at Ta=25°C