

## SPECIFICATION

### GENERIC

<b>Height of High Mast Tower (in Meters)</b>	16
<b>Installation and commissioning (Installation and commissioning work at multiple locations shall follow as per the guidelines of State/Central Govt rules and regulations as applicable)</b>	Yes. Including Civil work at site
<b>Each pole shall be supply with suitable foundation bolts,nuts and washers, Instruction manuals</b>	Yes
<b>Onsite warranty (in Years)</b>	3
<b>High mast System</b>	
<b>Cross section of mast (no of sides)</b>	20 sided polygon
<b>No of sections</b>	2
<b>Effective length of each section (in m)</b>	8.375
<b>Material construction: The mast shall be manufactured using special steel plates, conforming to</b>	355 gradeasper BSEN10 025
<b>Bottom diameter (in mm) - Minimum</b>	450
<b>Top diameter (in mm) - Minimum</b>	150
<b>Plate thickness for top (in mm) - Minimum</b>	4
<b>Plate thickness for Middle (in mm) - Minimum</b>	NA
<b>Plate thickness for Bottom (in mm) - Minimum</b>	4
<b>Length of overlap for Top (in mm) - Minimum</b>	750

<b>Length of overlap for Bottom (in mm) - Minimum</b>	NA
<b>Type of joints</b>	Stress fit
<b>No of longitudinal welds / section (in Nos)</b>	2
<b>Metal protection treatment of fabricated mast section</b>	Hot dip galvanised
<b>Thickness of galvanisation</b>	Average: 86 Micron
<b>Provision for cable termination</b>	MCB Isolator
<b>Diameter of base plate (in mm) - Minimum</b>	670
<b>Thickness of base plate (in mm) - Minimum</b>	25
<b>Lantern carriage shall be fabricated suitably and hot dip galvanized for fixing and holding required no of floodlight fixtures and their control gear boxes</b>	Yes
<b>Test Report from Central Government lab/NABL/ILAC accredited lab and report shall furnish to buyer on demand</b>	Yes
<b>Lightning Finial</b>	
<b>Heavy duty hot dip galvanized lightning finial shall be provided for each mast (in Nos)</b>	1
<b>The lightning finial shall be provided at the center of the head frame (minimum length) in meters</b>	1.2
<b>It shall be solidly bolted to the head frame to get a direct conducting path to the center of the earth through the mast</b>	Yes
<b>The lightning finial shall not be provided on the lantern carriage under any</b>	Yes

<b>circumstances in view of the safety of the system</b>	
<b>Aviation Obstruction Lights</b>	
<b>Aviation obstruction lights shall be provided on top of each mast(in Nos)</b>	2
<b>Type</b>	LED, Vertical stand
<b>Earthing Terminals</b>	
<b>Suitable length of earthing terminals shall be provided at a convenient location on the base of the mast, for lightning and electrical protection of the mast</b>	Using 12 mm dia SS Bolts
<b>Wind Load</b>	
<b>Wind loadings as per</b>	IS 875:1987 part 3latest
<b>Gust Factor</b>	1.15
<b>Maximum Wind load</b>	50 m/sec
<b>The design Life of the mast shall be (in Years)</b>	25
<b>The Test Report from Central Government lab/NABL/ILAC accredited lab and report shall furnish to buyer on demand</b>	Yes
<b>Door Opening</b>	
<b>An adequate door othapening shall be provided at the base of the mast and the opening shall be such t it permits clear access to equipment like winches, cables, etc and also facilitate easy removal of the winch</b>	Yes
<b>Type of locking arrangement for door</b>	Pad lock
<b>Size of opening and closing door at base compartment of high mast (in mm) - Minimum</b>	1000 x 250

## Lantern Carriage

<b>A fabricated Lantern Carriage shall be provided for fixing and holding the flood light fitting and control gear boxes</b>	Yes
<b>The Lantern Carriage shall be of steel tube construction, the tubes acting as conduits for wire, with holes fully protected by grommets</b>	Yes
<b>The Lantern Carriage shall be so designed and fabricated to hold the required number of flood light fitting and control gear boxes, and also have a perfect self balance</b>	Yes
<b>The Lantern Carriage shall be fabricated in two / three halves and joined by bolted flanges with steel nuts to enable easy installation or removal from the erected mast</b>	Yes
<b>The entire lantern carriage shall be hot dip galvanized after fabrication</b>	Yes
<b>The inner lining of the carriage shall be provided with protective PVC arrangement, so that no damage is caused to the surface of the mast during raising and lowering operation of the carriage</b>	Yes

## Junction Box

<b>Weather proof junction box shall be provided on the Carriage Assembly as required, from which the inter-connections to the designed number of the flood light luminaries and associated control gears fixed on the carriages shall be made</b>	Yes
<b>Ingress protection for Junction Box i.e. IP Class (as per IS/IEC:60529:2001 latest) Test Report from Central Government lab/NABL/ILAC accredited lab and report shall furnish to buyer on demand</b>	IP 65
<b>Junction Box material</b>	Cast aluminium

<b>Cable connections from the top junction box to the individual luminaries and cable shall conforming to</b>	IS: 694: 2010 latest
<b>No of core</b>	3
<b>Cable category</b>	FR-LSH
<b>Size of cable (in Sq mm)</b>	2.5
<b>Conductor material shall be</b>	Copper
<b>Raising and lowering mechanism</b>	
<b>For the installation and maintenance of the luminaries and lamps, it shall be necessary to lower and raise the Lantern Carriage Assembly</b>	Yes
<b>To enable this, a suitable Winch Arrangement shall be provided, with the winch fixed at the base of the mast the specially designed head frame assembly at the top</b>	Yes
<b>Winch</b>	
<b>The winch shall be of "Integral Power Tool" type with motor</b>	Yes
<b>The winch shall have provision for manual operation in case of failure of the motor</b>	Yes
<b>Minimum working load of winch (in Kg)</b>	750
<b>Motor capacity - Minimum (in HP)</b>	1.5
<b>Suitable rating and connecting copper cable also shall be provided for the motor</b>	Yes
<b>The winch shall be type tested from a Central Govt Lab/NABL/ILAC accredited lab and the test certificate shall be furnished to buyer on demand. The test certificate shall include the maximum</b>	Yes

load operated by the winch

## HEAD FRAME

The head frame is to be designed as a capping unit of the mast, shall be of welded steel construction, galvanized both internally and externally after assembly

Yes

The top pulley shall be of appropriate diameter, large enough to accommodate the steel wire ropes and the multi-core electric cable

Yes

The pulley block shall be made of non-corrodible material, and shall be of die-cast Aluminum Alloy (LM-6). Pulley made of synthetic materials such as plastic or PVC are not acceptable

Yes

Self-lubricating bearings and steel shaft shall be provided to facilitate smooth and maintenance free operation for a long period

Yes

The pulley assembly shall be fully protected by a canopy galvanized internally and externally. The head frame shall be provided with guides and stops with PVC buffer for docking the lantern carriage

Yes

## Stainless Steel Wire Rope

The suspension system shall essentially be without any intermediate joint. The steel wire ropes shall be of suitable construction, the central core being of the same

Yes

The overall diameter of the rope

$\geq 6$  mm

The breaking load of each rope shall be at full load as per the relevant standard

$\geq 2400$  Kg

Grade / construction

AISI 316, 7/19 construction

<b>Number of ropes</b>	3 Nos for L Ring & 2 Nos for winch
<b>Torque- limiting device with load adjustment facility to protect the wire ropes</b>	Yes

### **Electrical System, Cable and Cable Connections**

<b>A suitable terminal box shall be provided as part of the supply at the base compartment of the high mast for terminating the incoming cable</b>	Yes
<b>At the top there shall be weather proof junction box to terminate the trailing cable</b>	Yes
<b>Electric cables shall used in the high mast system shall be</b>	ISI Marked
<b>The trailing cable (from base compartment to top of the mast system junction box ) conforming to</b>	IS:7098 (Part 1):1988 latest
<b>No. of cores</b>	3
<b>Size of cable (in Sq.mm)</b>	2.5
<b>Cable shall be</b>	Unarmoured
<b>Conductor material shall be</b>	Copper
<b>Cable Category</b>	1
<b>Incoming power cable from feeder panel to base compartment of mast and cable shall conforming to</b>	IS:7098 (Part 1):1988 latest

### **Feeder pillar Panel**

<b>Feeder pillar panel for each mast</b>	Yes
<b>Feeder panel shall be suitable for</b>	415 V, 3 phase, 4 wire, 50 Hz, AC
<b>The control panels shall be</b>	Stand mounted

<b>Ingress protection for feeder pillar panel i.e IP Class (as per IS/IEC:60529:2001 latest).Test Report shall furnish from Central Government lab/NABL/ILAC accredited lab to buyer on demand</b>	IP 65
<b>It shall be fabricated out of</b>	14 SWG CRCA sheet steel
<b>Thickness of sheet (in mm)</b>	2
<b>The panels shall be given pre-treatment and powder coated and color shall be</b>	Grey
<b>The stand shall be painted in</b>	Black color
<b>Cable entry shall be at the</b>	Bottom
<b>The panels shall have</b>	knock outs of the required cable
<b>Laminated circuit diagram shall be pasted</b>	inside of the door
<b>Feeder pillar shall have pad locking arrangement</b>	Yes
<b>Earth terminal</b>	12 mm dia. Bolts
<b>Panel shall have a sloping cover to avoid accumulation of dust</b>	Yes
<b>Panel shall be provided with incoming &amp; outgoing MCCB / MCB of appropriate rating and in desired quantity depending on total no of circuits in use</b>	yes
<b>Timer for automatic ON &amp; OFF of lights with pilot lamps shall be provided</b>	Yes
<b>Bus bars material</b>	Yes. Copper
<b>Cables used in the high mast system shall be</b>	ISI Marked
<b>The incoming power cable (from feeder panel to base compartment) conforming</b>	IS:7098 (Part 1):1988 latest



to	
No of Cores	5
Size of cable (in Sq.mm)	4
Cable Shall be	Unarmoured
The conductor material shall be	Copper
cable category	1
<b>LED FLOOD LIGHT LUMINAIRE</b>	
No. of Luminaires for each high mast lighting tower (in Nos)	12
LED Luminaire conformity to IS:10322/Part5/Section5/2012latest and IS: 16107 (Part 2/Sec 1):2012 latest	Yes
Photo biological safety of LEDs used shall be as per IS:16108/2012 (exempt group)	Yes
Types of LED Luminaire as per the IS: 16107(Part-2/ Sec-1)/2012	Type B
Types of LED Modules as per the IS: 16103(Part-2)/2012	Type 3
LED Rating/System Wattage/Rated Power for each luminaire	500W
Luminaire System Efficacy (Lumen/watt)	>= 100 Lm/Watt
Ingress Protection (IP Rating) as per IS:10322 (Part 1):1982 latest	IP65
Mounting brackets (included)	Adjustable
Input operating Voltage range and frequency	90 to 300 Volts AC at 50Hz+/-2Hz

<b>Automatic Higher Cut off voltage above 300 volt</b>	Yes
<b>Rated voltage</b>	230 V AC 50 Hz
<b>AC Power Factor at full load</b>	≥ 0.95
<b>Driver Efficiency (in %age)</b>	≥85
<b>Total Harmonics Distortion (in %age)</b>	≤ 10
<b>LED chip Efficacy</b>	≥130 Lm/Watt
<b>Colour temperature</b>	6000K (+/- 500K)
<b>Working life for LED (Minimum 50,000 burning hours as per LM-80 report)</b>	Yes
<b>Colour Rendering Index(CRI)</b>	≥70
<b>Beam Angle</b>	≥120
<b>Optic lense material (UV stabilised) (Write NA for without optic lense supply)</b>	Poly carbonate lense
<b>Heat sink should be die-cast aluminium along with sufficient heat sink fins to dissipate heat effectively</b>	Yes
<b>Capacitor shall be rated for a temperature of 105 deg celsius or better</b>	Yes
<b>Junction temperature</b>	< 85 degC
<b>Operating temperature range</b>	-20 deg C to +50 deg C
<b>Operating Humidity Range</b>	10 % to 95 % RH
<b>Short circuit Protection</b>	Yes
<b>Over load protecton</b>	Yes

<b>Over Voltage protection</b>	Yes
<b>Reverse polarity</b>	Yes
<b>High voltage test (1.5 KV for one minute between supply terminals and body of the unit)</b>	Yes
<b>Insulation resistance between earth and current carrying part</b>	>100 M ohm
<b>The luminaire shall be protected against surges and transients( Internal)</b>	>/=5KV
<b>The luminaire shall be protected against surges and transients of &gt;/=10KV (External)</b>	Yes
<b>The Luminaires casing/housing (single piece housing) shall be pressure die casted aluminium alloy with higher thermal conductivity</b>	Yes
<b>The luminaire body must be corrosion resistant epoxy powder coated</b>	Yes
<b>All fastners must be of stainless steel</b>	Yes
<b>The entire housing (both LED section and driver section) shall be dust and water proof protection as per IS:10322 (Part 1):1982latest</b>	IP66
<b>Extruded silicon loop gasket shall be provided in the lantern body to ensure a weather proof seal between the UV Glass cover and the metal housing to exclude the entry of the dust,water,insects etc</b>	Yes
<b>Luminaries light transparency should be of Toughened glass</b>	Yes
<b>Toughned transparent glass cover thickness</b>	>/=4 mm
<b>Toughned Glass shall not get</b>	Yes

<b>discoloured, shall not suffer degraation due to heat and ageing within warranty period</b>	
<b>Number of electronic control gear per luminaire (power supplies)</b>	1 No.
<b>Driver components shall be industrial grade or above</b>	Yes
<b>PCB shall be FR4 grade minimum 0.8 to 1.0 mm thick or more</b>	Yes
<b>The Luminaires works on single phase three wires system (Phase, Neutral and Earth)</b>	Yes
<b>Suitable connector shall be provided for LED connection between driver output and LED</b>	Yes
<b>Length of ISI marked three core wire (shall be provided along with supply of material)</b>	50 cm
<b>Light Source</b>	SMD LED Chip as per LM80/IS16106
<b>Manufactures Name and and brand on the aluminium die cast body</b>	Engraved / Embossed
<b>Manufacturer's name, model number, serial number</b>	Yes
<b>Date of manufacture (month-year), and lot number as identification mark in side each unit and the out side of each packaging box</b>	Yes
<b>The operation characteristics voltage and power be marked inside of each LED luminaire unit</b>	Yes
<b>LED Make</b>	OSRAM / NICHIA/CREE/SAMSUNG / SEOUL / LUMILED / PHILIPS/ EDISON/