Annexure-2

GENERAL TECHNICAL REQUIREMENT OF LED LIGHT FITTING			
SR.	**PARAMETERS**	**SPECIFICATIONS**	**VENDOR'S CONFIRMATION/ REMARKS**
1. TECHNICAL REQUIREMENTS OF LED			
1	LED Efficacy	LED efficacy shall be greater than > 140Lumen/Watt@ 350 mA drive current. In respect of LEDs of higher power ratings, drive current greater than 350 mA can be accepted if the LEDs LM80/IS:16105 test reports support the same. LED type shall be SMD (surface mounted device) type LED for all applications. COB to be considered only for applications such as Highbays. Flood lights & Flameproof light fittings.	
2	Make & Type of LED	LED Approved Make	
		SMD : Nichia, Osram, Lumileds (erstwhile philips Lumileds) CREE	
		COB : Citizen, Bridgelux	
3	Ambient Temprature of LED	Tset Report for Ambient Temperature of 55/85/105 °C at rated and maximum current shall be submitted for SMD type LED. For COB type LED, as soldering temperature is not applicable for COB technology.LM 80 test report shall be submited.	
4	TM 21 life projection	TM 21 life projection calculation along with LM80 for all three ambient temperature of 55/85/105 °C as per applicable standard shall be subimitted to substantiate that life of LED Chip shall be more than 50000 Hrs .	
5	Life of LED	Reported life Span of LED used in the Luminaries shall be greater than 50,000 Hrs at the Soldering Point temperature of 85°C and at the luminaries driving current.	
6	Photobiological	The LEDs shall comply to photo biological norms as per IEC 62471/EN 471/IS:16108 and should fall in the exempt group for indoor luminaaries and in exempt or low risk group for outdoor LED luminaires	
7	Beam angle	View angle: typical 120°	
8	Colour Temperature	Colour temperature of the proposed white colour LED shall be from 5700K (i.e 5665K±355K) to 6500K for indoor type liminaries Step 5 or Step 3 McAdam, as per ANSI standard C78.377A, 5700K (i.e 5665K±355K). For outdoor type luminaires, Step 7 Mc Adam, as per ANSI standard C78.377A, will be accepted on account of colour consistency.	
9	Colour Rendering Index (CRI):	CRI should include all colour range from R1 to R15, shall be>80 for indoor luminaire and >70 for outdoor luminaires.	
2.0. TECHNICAL RRQUIREMENTS FOR LED DRIVER			
1	Effiiciency of driver	The minimun efficiency of drive: The minimum efficiency of LED driver shall be 85% for driver power output rating <= 40W and 87% for driver power output rating>40W	
2	Power Factor	Power factor of complete fitting : Grater than 0.90 (Excepted for Domestic /Decorative LED Luminaies)	
3	In-built high voltage cutoff	In-built high voltage cutoff:> 290Volt(high)	
4	Protection	Short circuit protection /Open load protection shall be required	
5	Surge Protection	Driver Surge Protection Standards: Surge Protection for minimum 3kV. & the surge protection devices(SPD) should be series type with fail safe. (applicable for flood light fitting only)	
6	Total Harmonic Distortion	Less than 10% for full load for more than 20W and less than 20% for less than 20W .	
7	Driver	Isolated driver should be used.	
8	Potting of LED driver :	For driver power output rating >50W, potted driver shall be a mandatory requirement.	
9	Connection	The power supply shall be connected to the LED PCBs through proper connectors.	
3. EMI/EMC compliance: Compliance to the following EMI/EMC standards:			
10		CISPR 15/IS:6873 (CE,RE,CDN) or compliance to equivalent EN Standard.IEC 61547 reference standards are listed ad follows)	
11	Safety Requirement	Driver shall comply with the safety requirements laid down in IEC:61347-2-13/EN:61347-2-13/IS:15881-2- 13	
12	Performance Requirement	Driver shall also comply with the performance requirements per IEC: 62384/IS:16104.	

4..0 TECHNICAL REQUIREMENTS OF ELECTRONICS COMPONENTS USED			
1	The circuit boards and electronic components to be used in the luminaire should be rating/type so as to provide reliable functioning following shall be the		
2	PCB	MCPCB is to be used for SMD technology for LED wattage in excess of 0.5> The minimum thickness should be 1.0 mm for indoor and 1.6mm for outdoor type luminaire. However, the same is not applicable for COB	
3		FR4 grade PCBs of minimum thickness of 1.6 mm shall be used in driver circuit. The same is most applicable for COB.	
5.0 TECHNICAL REQUIREMENTS OF LUMIMAIRE			
1		The lumainaire shall have LM -79/IS : 16106 test report from a accredited laboratory.	
2		The min system lumen efficacy of the luminaire shall be 95lm/W (for Luminaires system wattage <=15W) and 100lm/W for wattage >15 W.	
3		Folowing shall be required in terms of secondary lens/optics:	
4	Secondary optics	Industrial and outdoor fixtures, luninaires must have secondary lens/optics of the PMMA / Borosilicate glass /Policarbonate	
5	Color Temperature	5700K (5665±355K) as per ANSI standards C78,377A)	
6	CRI	CRI should include all color range from R1 to R15 and Ra shall be > 80 for 6.9 .	
7		Housing of FLP shall be pressure diecast LM6/ADC12/LM24.	
6.0 ENCLOSURE			
1	Ingress Protection	IP 65	
2	Impact resistance:	M minimum impact resistance shall be IK-05	
3	Temperature Rise Test	When the luminaire has stabilized thermally soldering point temperature shall be ≤ 85°C for SMD type but for COB type the temperature rise test shall not be applicable.	
4	Temperature Rise of Heat Sink	Temperature rise (above ambient) of heat sink should generally remain within 20°C relaxation on this account can be granted as long as the soldering point temperature limit of 85°C is not violated and there is no unacceptable outcome.	
7.0 CERTIFICATION			
1	ISO certification	The vendor/manufacturer of LED Luminaries should be an ISO 9000:2008/ ISO 9001:2015 certificated organization. The agency shall preferably possess the ISO certification for design, manufacturing and supply of the complete Lighting Unit. Vendor to attached Copy of valid certificate(s)	
8.0 INSPECTION AND TESTING			
1	Inspection and Testing	The following tests may be considered for carrying out post award. In case the tests have been performed at NABL accrediated laboratories, submission of the following test reports same shall suffic the requirement. Following acceptance tests shall be carried out as per relevant standards and approved sampling plan:	
		Visual and dimensional checks , Resistance to humidity test Insulation Resistance (IR), High Voltage Test	
		Over voltage protection Surge Protection	
		Total Harmonic Distortion test, Reserve polarity test, Temperaure rise test	
		Ingress protection test	
		Type test report/certificate as per relevant standards on selected sample including endurance test as per IS10322 & Safety test for drivers as per IS15885 from NABL accredited lab shall be submitted along with the other offer and supply.	

9.0 WARRANTY CLAUSE			
1	The supply of LED shall cover minimum warranty from date of supply of lighting	60 Month warranty complete luminaries including LED	
2	Defecct liability for which 10% security deposit?PBG shall be held towards performance	5 Years complete luminaries including LED	
10 .MARKING			
1	9.1 The following information shall be distinctly and indelibly marked on the housing:	• Year of manufacture • Batch Number • Serial Number • Name of Manufacturer • Rated Wattage and Voltage (Input) • Markings like CE, CB	