NTPC LTD

CPG-1/VDC Raipur

Sub: Qualifying Requirement (QR) for Vendor Enlistment for Supply of LED Lights & Fixtures

A)	MEG DETAILS		**82MEG01**
	1.0	MEG DESCRIPTION	LED Lights & Fixtures
	2.0	MEG RESPONSEBILITY	VDC

B) Technical Criteria of QR:

1. The Applicant should be a manufacturer of LED Lights and Fixtures .
2. The Applicant should have type test reports (from NABL Lab /Witnessed by Client) for following tests for any model/rating in past :
   a. Endurance & Thermal
   b. Resistance to Heat, Fire & Tracking
   c. Photometric Test

C) Documents required in support of meeting QR:

1. Latest annual report or NSIC / SSI / MSME registration certificate / BIS license / ISO certificate / Certificate of registration from the concerned excise department / any other statutory document as a proof of being manufacturer of the LED Lights & Fixtures
2. Brief details of manufacturing facilities or Standard published catalogue for LED Lights & Fixtures also to be given.

D) Documents to be submitted to find executed value of orders :

In addition to the documents required in support of meeting technical requirements as stated above, following documents are required to be submitted by the Applicants applying for enlistment: -

1. Three (3) POs of the highest executed values of similar work (see definition at point E:Note- 1 below) during previous five (5) years from the date ofapplication. Copy of Invoice / Completion certificate from the concerned buyer/s in support of successful execution of supply against the POs to be submitted. These will be required for calculation of execution capability.

2. Audited balance sheet including Profit & Loss statement for the previous three (3) completed financial years reckoned from the date of application. In case where the audited results for the last financial years as on the date of application are not available, the financial result certified by a practicing Chartered accountant shall be considered acceptable.

3.GSTIN certificate, PAN, Power of attorney, Letter of undertaking, works information etc. as mentioned in enlistment application pages of website www.vendor.ntpc.co.in

4. NTPC can request for other documents as necessary during the course of evaluation.

E)	NOTE-1	Similar works means: "Supply of LED Lights & Fixtures

	NOTE-2	The executed value means Basic value of quantity of similar works executed/supplied against thereference PO (also applicable to partly executed POs as on date of application). Where PO value is composite(i.e. including Taxes etc.),the applicant to give item-wise break-up of Composite PO value mentioning Basic Value, Taxes etc.

1.00.00 **GENERAL**

1.01.00 This specification covers the general description of design, manufacture and construction features, testing, supply, of LED Lights & Fixtures.

2.00.00 **CODES AND STANDARDS**

2.01.00 All standards and codes of practice referred to herein shall be the latest edition including all applicable official amendments & revisions as on date of bid opening. In case of conflict between this specification and those (IS codes, standards etc.) referred to herein, the former shall prevail. All work shall be carried out as per the following standards & codes.

2.02.00 **LED Luminaries**

16101:2012	General Lighting. LEDs and LED modules Terms and definitions
16102(Part 1):2012	Self Ballasted LED Lamps for General Lighting Services. Part-1 Safety Requirements.
16102(Part 2):2012	Self Ballasted LED Lamps for General lighting Services. Part-2 Performance Requirements.
16103(Part I):2012	LED modules for General lighting Safety Requirements.
15885(Part 2/Sec. 13) :2012	Lamp control gear Part 2 particular Requirements Section 13 d.c. or a.c. Supplied Electronic control gear for LED modules
16104:2012	d.c. or a.c. Supplied Electronic control gear for LED modules - Performance Requirements.
16105:2012	Method of Measurement of Lumen maintenance of Solid-state Light (LED) Sources.
16106:2012	Method of Electrical and photometric Measurements of Solid State Lighting (LED) Products
16107:2012	Luminaires Performance
16108:2012	Photo-biological safety of Lamps and Lamp Systems
IS 513	Cold rolled low carbon steel sheets and strips
IS 12063	Classification of degree of protection provided by enclosures.
IS 14700 (Part 3/Sec. 2)	Electro magnetic compatibility (EMC) – Limits for Harmonic current emission – THD < 15% (equipment, input current < 16 Amps. per phase.
IS 9000 (Part 6)	Environment testing: Test Z – AD:

composite temperature/humidity cyclic test.

IS 15885 (Part 2/Sec. 13)	Lamp control gear: particular requirements for DC or AC supplied electronic control gear IS 16004 – 1 and 2) for LED modules.
IS 4905	Method for random sampling

3.00.00 DESIGN PHILOSOPHY

1. **LED Luminaires:**

The individual lamp wattage for LED shall be upto 3 watt. Fractional wattage LEDs are also acceptable. The LED chip efficacy shall be min 120 Lm/W. The luminaire efficacy shall be not less than 100 Lm/W. Suitable heat sink shall be designed & provided in the luminaire. The LED used in the luminaires shall have colour rendering index (CRI) of Min 80. Colour designation of LED shall be "cool day light" (min 5700K) type for indoor lights. However for outdoor lights, the colour temperature of LED shall be min. 4000K, including rough & dust prone areas. The LED luminaries shall have a minimum life of 25000 burning hours with 80% of lumen maintenance at the end of the life. LED shall conform to the LM 80 requirements.

The max. junction temperature of LED shall be 85 deg C. Further the lumen maintenance at this temperature shall be min 90%. The THD of LED Luminaires shall be less than 10%. Further the EMC shall be as per IS 14700. The power factor of the luminaire shall not be less than 0.9. The marking on luminaire & safety requirements of luminaire shall be as per IS standards. Suitable heat sink with proper thermal management shall be designed & provided in the luminaire.

The connecting wires used inside the system, shall be low smoke halogen free, fire retardant type and fuse protection shall be provided in input side specifically for LED luminaires.

Care shall be taken in the design that there is no water stagnation anywhere in the housing of luminaire. The entire housing shall be dust and water proof protection as per IS 12063.

2. **Driver Circuit**

LED modules and drivers shall be compatible to each other. The LED module driver's ratings and makes shall be as recommended by corresponding LED chip manufacturer.

LED Drivers shall have following control & protections:-

- Suitable precision current control of LED.
- Open Circuit Protection
- Short Circuit Protection
- Over Temperature Protection
- Surge Protection

3. (i) All outdoor fixtures shall be weather proof and of min. IP65 degree of protection.

(ii) For Indoor type of fixtures:-

(a) Surface/Pendent mounting: - IP 54 class of protection.

(b) Recess Mounting (False ceiling):- IP 20 class of protection.

4.00.00 **TESTS**

4.01.00 **For LED Fixture**

All LED Fixtures (Viz. High bay fixture, Well glass fixture, Street light fixture, Surface mounted type fixture, Recessed mounted type fixture, flood light, Tube Light with fitting etc.) shall be type tested design. Manufacturer should have conducted such specified type test(s) within last ten years from date of bid opening.

However if the manufacturer is not able to submit report of the type test(s) conducted within last ten years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the manufacturer shall conduct all such tests at no additional cost to the owner either at third party lab or in presence of client/owners representative and submit the reports for approval.

4.02.00 All lighting fixtures, lamps and other items shall be subjected to acceptance and routine test, as per relevant specified standards. Charges for these shall be deemed to be included in the equipment price.

4.03.00 Selection of samples for type test, acceptance test & routine test and acceptance criteria for all the items shall be as per relevant I.S

4.04.00 Type test reports of the following items as per technical specification requirements/ standards shall be submitted for approval.

SL NO.	DESCRIPTION
i.	Lighting fixtures of each type

Type test reports for LED as per standards for following shall be submitted for approval.

1. Visual and Dimension check
2. Proof of procurement of LEDs
3. Safety tests
a) Marking
b) Construction
c) Provision for Earthing
d) External and Internal wiring
e) Protection against electrical shock
f) Endurance and Thermal
g) Insulation resistance & electrical strength
h) Resistance to heat fire & tracking
i) Resistance to Humidity
4. Fire Retardant test

5. Performance tests (electrical, Photometric color and Life)
6. Burn-in Test
7. Power Cycling
8. Temperature rise test
9. Emission Tests
a) Radiated & conducted emission
b) Harmonics & flickers
10. Immunity tests

In addition, following test reports to be submitted for LED chip/LED luminaire:

a) LED parameters like Lumen per watt, CRI, Beam angle from manufacturer.

b) LM 80/IS: 16105 report. LM 79/IS: 16106 report.

			ITEM : LIGHTING FIXTURES (LED type)		INDICATIVE QUALITY PLAN				QP.NO:0000-999-QOE-S-062	REVIEWED BY					APPROVED BY
					CONFORMING TO CODE : As applicable				Rev No.: 00	SWAPNESWAR MISHRA					K.M.Jain
									Date: 02/11/15	VIKRAM TALWAR					
									VALID UPTO: 01/11/18	SUNIL MALANI					
No	COMPONENT & OPERATIONS		CHARACTERISTICS / INSTRUMENTS	CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD					REMARKS
						6 M	6 C/N					M	C	N	
	2		3	4	5			7	8	9	D*	**	10		11
	LED type Lighting fixture														
A	**Bought out items / in-process checks**														
	LED Chip		LED chip efficacy	Major	Visual	Mnfr Std.	Mnfr Std.	NTPC Spec/ Appd. Data sheet/ LM 80 report	NTPC Spec/ Appd Data sheet	LM 80 report		V	V	V	At the time of final inspection
			LED chip CRI and CCT	Major	Visual	Mnfr Std.	Mnfr Std.	NTPC Spec/ Appd. Data sheet/ LM 80 report	NTPC Spec/ Appd Data sheet	LM 80 report		V	V	V	At the time of final inspection
			Reported TM21 (L80) lifetime of LED chip	Major	Visual	Mnfr Std.	Mnfr Std.	NTPC Spec/ Appd. Data sheet/ LM 80 report	NTPC Spec/ Appd Data sheet	LM 80 report		V	V	V	At the time of final inspection
.1	LED Driver	a	Compatibility with LED module/chip, controls & protection features as per NTPC spec	Major	Visual	-	-	NTPC spec requirements	Certificate of compliance by LED driver manufacturer / lighting fixture supplier that driver meets all NTPC specification requirements	Certificate of compliance		V	V	V	
		b	THD and pf check	Major	Electrical	Mnfr std.	-	NTPC specification	THD < 10% and pf >= 0.9	Inspection report		P/V *	-	-	P/V * - means test will be performed either by lighting fixture supplier or their sub-vendor and Verified by lighting fixture supplier
	Castings		Freedom from defects	Major	Visual	Mnfr std.		NTPC specification requirements	Castings shall be free from any defects such as blow holes, surface blisters, cracks and cavities etc.	Inspection report		P/V *	-	-	P/V * - means test will be performed either by lighting fixture supplier or their sub-vendor and Verified by lighting fixture supplier
	Sheet metal forming and fabrication		Freedom from defects	Major	Visual	Mnfr std.	-	NTPC specification requirements	sheet metal fabriaction / formng etc should be as per manufacturer standards and good engg practices	Inspection report		P/V *	-	-	P/V * - means test will be performed either by lighting fixture supplier or their sub-vendor and Verified by lighting fixture supplier
	Pre-treatment and powder coating		Pre-treatment process checks, Powder coating finish, thickness, uniformity of coating and adhesion	major	Visual, chemical & mech	Mnfr std.	-	Mnfr standard , NTPC specification requirements	Nominal coating thickness 50 microns or more	Inspection report		P/V *	-	-	P/V * - means test will be performed either by lighting fixture supplier or their sub-vendor and Verified by lighting fixture supplier

LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/ SUB-SUPPLIER: C: MAIN SUPPLIER, N: NTPC
P: PERFORM W: WITNESS AND V: VERIFICATION. CHP: CUSTOMER HOLD POINT BY NTPC SHALL BE IDENTIFIED UNDER AGENCY COLUMN "N" AS 'W'.

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						6 M	6 C/N					M	C	N	
1	2		3	4	5			7	8	9	D*	**	10		11
B	**Acceptance Tests on LED Lighting fixture**	a	Details of lot offered and Certificate of compliance that lighting fixture supplier has inspected the offered lot as per their own standard	Major	Visual	-	-	lighting fixture supplier to submit the details of lot offered for NTPC inspection (Type of lighting fixtures, their batch number, sub-vendor name, quantity)	-	List		P	V	V	The list may be used by NTPC for sample selection
		b	LED chip make	Major	Visual	-	-	NTPC accepted type test reports (LM80/LM79) report	Certificate of compliance	Certificate of compliance		V	V	V	
		c	Constructional features including: Internal wiring, terminal block, earthing terminal, safety chain (if applicable)	Major	Visual	1 sample per type	1 sample per type	NTPC specification and NTPC approved data sheet/drg.	NTPC specification and approved data sheet/drg.	Inspection report		P	W	W	
		e	Resistance to moisture test in case of lighting fixtures having IP X4 and above rating	Major	Mechanical	1 sample per type	1 sample per type	NTPC approved data Sheet	IS 10322 Part 1	Inspection report		P	W	W	
		f	Resistance to dust (applicable if IP5X and above)	Major	optical	Mnfr std.	Mnfr std	NTPC accepted type test reports	Certificate of compliance	Certificate of compliance		P/V *	V	V	P/V * - means test will be performed either by lighting fixture supplier or their sub-vendor and Verified by lighting fixture supplier
		f	Photometry check	Major	optical	Mnfr std.	Mnfr std	NTPC accepted type test reports, LM 79, IS 16106, IS 16107	Certificate of compliance for the batch: that offered lighting fixture LOR and lighting fixture efficacy is not be less than 90% (refer IS 16107) with reference to type test reports	Certificate of compliance		P/V *	V	V	P/V * - means test will be performed either by lighting fixture supplier or their sub-vendor and Verified by lighting fixture supplier

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Sl No	COMPONENT & OPERATIONS		CHARACTERISTICS / INSTRUMENTS	CLASS OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD					REMARKS
						6 M	6 C/N					M	C	N	
1	2		3	4	5			7	8	9	D*	**	10		11
		g	Dimensions	Major	Visual	1 sample per type	1 sample per type	NTPC specification and approved data sheet/drg.	NTPC specification and approved data sheet/drg.	Inspection report		P	W	W	
		i	LED driver: THD and pf check	Major	Electrical	1 sample per type	1 sample per type	NTPC specification	THD < 10% and pf >= 0.9	Inspection report		P	W	W	At lighting fixture supplier test lab
		j	LED driver: Precision current control check	Major	Electrical	1 sample per type	1 sample per type	NTPC specification	NTPC specification and NTPC approved data sheet	Inspection report		P	W	W	
		k	LED driver: Open circuit protection simulation check	Major	Electrical	1 sample per type	1 sample per type	NTPC specification	NTPC specification and NTPC approved data sheet	Inspection report		P	W	W	
		l	LED driver: Short circuit protection simulation check	Major	Electrical	1 sample per type	1 sample per type	NTPC specification	NTPC specification and NTPC approved data sheet	Inspection report		P	W	W	
		m	LED driver: Over temperature protection simulation check	Major	Electrical	1 sample per type	1 sample per type	NTPC specification	NTPC specification and NTPC approved data sheet	Inspection report		P	W	W	
		n	LED driver: Overload protection simulation check	Major	Electrical	1 sample per type	1 sample per type	NTPC specification	NTPC specification and NTPC approved data sheet	Inspection report		P	W	W	
		o	LED driver: Surge protection compliance check	Major	Electrical	-	-	NTPC specification	Certificate of compliance that surge protection is provided	Certificate of compliance		V	V	V	

NOTES :-A) All the QC records mentioned in this QP to be maintained by the manufacturer whether NTPC witness/verification is envisaged or not.
B) Reference and Acceptance norms shall be derived from following in the same sequence-
1) NTPC Approved drawing / data sheet ; 2) NTPC tech specs ; 3) Purchase Order ; 4) Relevant national standard
5) Relevant International standard ; 6) Manufacturer's standard 7) Good Engineering practices
C) Main Contractor Column may please be ignored.
D) Type test requirement, as envisaged by respective PO specifications.

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