

TENDER ENQUIRY LETTER (NIT)

Ref. Enquiry No.: PE/PG/YAD/E-6750/2021 dated 25.08.2021

Bid Submission Due Date & Time:
04.09.2021 (by 14:00 hrs IST)

Part-1 Opening Date & Time:
04.09.2021 (by 16:30 hrs IST)

Dear Sir,

Subject: Tender Enquiry for “Lighting Fixtures, lamps & Misc. Items” as per Technical Specification No. PE-TS-417-558-E006 Rev 00 for 5X800 MW YADADRI TPP.

BHEL is pleased to invite offer for **“Lighting Fixtures, lamps & Misc. Items”** package of 5X800 MW YADADRI TPP through E-procurement route. Please submit your best quotation/offer online via e-procurement portal (<https://eprocurebhel.co.in/nicgep/app>). Detailed Scope of work & Equipment details shall be as per Technical Specification no. **PE-TS-417-558-E006 Rev 00** and other tender documents hosted on <https://www.bhel.com/tenders>, <https://pem.bhel.com/Current Tender.aspx> & <https://eprocurebhel.co.in/nicgep/app> /enclosed herewith.

Your best quotation/offer shall be submitted in two parts (Techno-Commercial Bid and Price Bid) strictly as per Clause-2.0 of the **“Instructions to Bidders”** of GCC, Rev. 07 (<https://pem.bhel.com/gcc.aspx>) online via e-Procurement portal (<https://eprocurebhel.co.in/nicgep/app>) for the under mentioned equipment/system.

Item Description	Project	Technical Specification
Lighting Fixtures, lamps & Misc. Items	5X800 MW YADADRI TPP	PE-TS-417-558-E006Rev 00

All corrigenda, addenda, amendments, time extensions, clarifications etc., to the tender will be hosted on websites only (<https://www.bhel.com/tenders>, <https://pem.bhel.com/Current Tender.aspx> & <https://eprocurebhel.co.in/nicgep/app>) under subject tender reference. Bidders are requested to visit the websites constantly to keep themselves updated. Bidders to obtain required Digital Signature Certificate for participating in the subject tender.

It shall be the responsibility of the bidder to ensure that the tender is submitted via e-procurement system (<https://eprocurebhel.co.in/nicgep/app>) on or before the due date and time.

Important Note to be considered by All Bidders:

The offers of the bidders who are on the banned list as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com. The list of banned firms is available on BHEL website at following URL: <https://www.bhel.com/list-banned-firms>

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ENQUIRY LETTER (NIT) TERMS AND CONDITIONS

Please refer to GCC Rev. 07 (available at <https://pem.bhel.com/gcc.aspx>), Bidders are requested to go through the same while submitting the offer.

1. Integrity Pact:

Integrity pact is applicable for subject package. IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitors (IEMs) have been appointed by BHEL with the approval of CVC. The names of the IEMs in panel are as follows:

I. Shri Arun Chandra Verma, IPS (Retd.) - acverma1@gmail.com

II. Shri Virendra Bahadur Singh, IPS (Retd.) - vbsinghips@gmail.com

The IP as enclosed is to be submitted (duly signed by authorized signatory) along with techno-commercial bid. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this pact would be a preliminary qualification.

Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the any of the IEMs mentioned above. All correspondence with the IEMs shall be done through email only.

"No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department officials."

2. Pre-Qualifying Requirements:

Bidders have to provide the required details as per TECHNICAL PQR in their Techno-Commercial offer and has to note that bids of only those bidders shall be evaluated who meet the Technical Pre-Qualifying requirements.

- 3. Make in India:** Bidders to note that for this procurement, the local content to categorize a supplier as a Class I Local Supplier / Class II Local Supplier / Non Local supplier and Purchase preference to Class I local supplier, is as defined in Public Procurement (Preference to Make in India), (PPP-MII) Order 2017 dt. 16/09/2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.

Minimum Local Content - Since this package falls under the category of goods, services or works in respect of which nodal ministry/ department has communicated that there is a sufficient local capacity and competition, **only Class-I local suppliers as defined in the PP (MII) order are eligible to bid.**

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Regarding verification of local content, the local supplier at the time of tender, bidding or solicitation shall be required to provide certification as per para 9 of PP-MII order revision dated 16.09.2020.

Following may also please be noted by the bidders:

- a. **Eligibility of Suppliers:** Only Class I Local Supplier (as per para no. 3(a) of Public Procurement (Preference to Make in India), (PPP-MII) Order 2017 dt. 16/09/2020 issued by DPIIT)
 - b. **Minimum Local Content required for qualifying a bidder as "Class I Local Supplier":**
As per para no. 5 of Public Procurement (Preference to Make in India), (PPP-MII) Order 2017 dt. 16/09/2020 issued by DPIIT.
4. This is a conditional tender enquiry. Part-II opening/RA participation of a bidder shall be subjected to the following:
 - i) Approval of vendor by end customer i.e. (TSGENCO)
 - ii) Techno-Commercial evaluation by BHEL.
 - iii) Qualification of Technical & Financial PQR
 - iv) Offered item should mandatorily conform to PP-MII order provisions.
 5. This item/package /system falls under the list of items defined in para 3 of ministry of finance guideline dtd. 20.09.16 (Procurement of items related to Public safety, Health, Critical Security operations & Equipments etc.) & hence criteria of prior experience/Turnover shall be same for all the bidders including startup/MSME.
 6. Bidders have to note that following forms the part of Tender Documents:
 - General Conditions of Contract (GCC) Rev. 07.
 - Technical Specification: PE-TS-417-558-E006 Rev 00
 - Technical PQR
 - Financial PQR
 - Integrity Pact
 - Price format
 - Special Conditions of Contract (SCC of project)
 - NIT CONDITIONS & other Enclosures

Bidders to note that offers shall be submitted strictly in accordance with the requirements of the above Tender Documents & all the above Tender Documents along with post-bid agreements/MoMs (during Techno-Commercial evaluation) shall automatically become the part of the Order/Contract after its finalisation.

7. DELIVERY TERMS:

For Main Supply: For Lot-1: Within 4 months from the approval of last applicable primary drawing/document for the released items in lot-1 or BHEL manufacturing clearance whichever is later, subjected to drawing/document submission/re-submission schedule as stipulated. Delay in initial submission (if any) of last submitted applicable primary drawing/document and/or delay in re-submissions of last applicable approved primary drawing/document (with reduction of overlapping period) shall be reduced from delivery period of four months. Delay in BHEL's comments/approval of last applicable approved primary drawing/document beyond 18 days shall also be considered for delay analysis.

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BHEL Drawing No	Drawing Title	Primary/ Secondary	Drg Sch for Vendors
PE-V0-417-558-E101	OGA of equipments such as fixture, SBs, JBs, Receptacles, free standing ladder, Emergency exit sign, wheel mounted ladder, ceiling fans, ELU, etc.	Primary	R-0 within 28 days from Purchase order & subsequent revisions within 10 days of comments received from BHEL. BHEL shall furnish comments / approval on each submission within 18 days from receipt.
PE-V0-417-558-E102	Datasheet of lamps, CFL, Fluorescent tube, PVC coated conduit	Primary	
PE-V0-417-558-E901	MQP FOR LUMINARIES	Primary	
PE-V0-417-558-E905	MQP FOR MISCELLANEOUS ITEMS	Primary	
PE-V0-417-558-E201	Lighting design Calculation	Secondary	Within 3 weeks from the date of BHEL input drawing & re-submission within 15 days of BHEL comments. BHEL shall furnish comments / approval on each submission within 18 days from receipt.
PE-V0-417-558-E301	Lighting Layout	Secondary	
PE-V0-417-558-E401	Conduit Layout	Secondary	R-0 within 15 days from the approval of respective LLOs and re submission within 15 days of BHEL comments.
PE-V0-417-558-E103	MOUNTING ARRANGEMENT OF BULK HEAD FIXTURE	Secondary	Along with respective OGA
PE-V0-417-558-E104	TYPE TEST REPORTS FOR LIGHTING FIXTURES	Secondary	Within 2 months from lot clearance for applicable items
PE-V0-417-558-E105	FIELD QUALITY PLAN OF LIGHTING FIXTURES	Secondary	Within 3 months from PO
PE-V0-417-558-E106	MOUNTING ARRANGEMENT drgs.	Secondary	Along with respective OGA

Delivery of subsequent lots: within 4 months from approval of last applicable primary drawing/document (of items released first time in present lot only) or lot clearance by BHEL, whichever is later. This is subjected to drawing/document submission/re-submission schedule as stipulated, delay in initial submission (if any) of last submitted applicable primary drawing/document and/or delay in re-submissions of last applicable approved primary drawing/document (with reduction of overlapping period) shall be reduced from delivery period of four months. Delay in BHEL's comments/approval of last applicable approved primary drawing/document beyond 18 days shall also be considered for delay analysis.

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For Mandatory Spares: Mandatory spares BOQ is included in the main supply BOQ. Mandatory spares quantities shall be released as separate LOT & following will be the delivery schedule for that LOT: To be supplied within Four (04) months from BHEL LOT clearance. Separate LOT clearance shall be given for Mandatory spares. Further, packing instructions for Mandatory Spares LOT shall be as per GCC Rev 07.

Supervision of E&C at site by vendor:

Vendor to depute its service engineer for respective site activity within 15 days from BHEL's intimation (for deputing service engineer) for such site activity.

For delay in deputing service engineer, LD on site activities portion shall be applicable @ ½% of the total site activities portion contract value (excluding element of taxes) per week or part thereof, with applicable GST. However, total LD (supply + site activities) shall be limited to 10% of cumulative total contract value excluding taxes and freight (supply + site activities).

Notes:

- A. The end period specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule.
 - B. Vendor to start manufacturing activities only after obtaining specific manufacturing clearance from BHEL Purchase group.
 - C. The delivery conditions specified are for contractual LD purposes, however BHEL may ask for early deliveries without any compensation thereof.
 - D. Wherever schedule of drawings/documents submission / re-submission is stipulated in the Technical Specifications, same shall be superseded by delivery specified in NIT.
8. **Freight & GST:** Bidder to mention freight%, applicable GST rate on (Total Ex. works + freight) & type of GST in the specified cells of price schedule on price form in e-procurement portal.
 9. The Evaluation Currency for this tender shall be INR.
 10. Evaluation shall be done on Total Cost to BHEL basis (excluding GST) on lump sum basis.
 11. **Overall (%) quantity variation:** Overall (%) variation in contract values (due to changes in the scope) shall be limited to ±30%.
 12. Bidder has to note, 'BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among the techno-commercially qualified bidders. Price bids of all techno commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking'.

Vendors to note that above RA clause will supersede clause no 13 of "Instruction to Bidders" of GCC Rev 07.

The Bidder has to quote the Single Price (i.e. Total Cost to BHEL excluding GST) in Reverse Auction (inclusive of loading (if any), Packing & Forwarding charges, all the routine & type tests as per tender scope, Freight as applicable). De-loading (if any) shall be done in line with NIT terms.

Link for RA guidelines to be followed as: <https://www.bhel.com/guidelines-reverse-auction-2021>.

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13. CIF is not applicable for this package.
14. Bidder has to note that in the event of ordering when contract value exceeds 25 lakhs, Bidder has to mandatorily furnish Gem seller ID prior to award of contract.
15. The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
In case, the bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/guidelines.
16. Bidders to ensure that Third party/Customer issued certificates being submitted as proof of PQR qualification should have verifiable details of documents/certificate issuing authority such as name & designation of issuing authority and its organization contact number and e-mail id etc. In case the same found not available, purchaser has right to reject such document from evaluation.
17. Bidder agrees to submit performance security required for execution of the contract within the time period mentioned. In case of delay in submission of performance security, enhanced performance security which would include interest (SBI rate + 6%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms defined in NIT /contract, from the bills along with due interest.
18. In course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective bidders. In case more than one bidder happens to occupy L-1 status even after soliciting discounts, the L1 bidder shall be decided by a toss / draw of lots, in the presence of respective bidder(s) or their representative(s). Ranking will be done accordingly. BHEL's decision in such situation shall be final and binding.
19. Bidders to,
- ensure compliance to Ministry of Power (MoP) Order No. 25-11/6/2018-PG dt. 02/07/2020 & Order No. 11/05/2018-Coord. dt. 23/07/2020, if applicable.
 - ensure compliance of Ministry of Finance (MoF) Order (Public Procurement No. 1 & 2) F. No. 6/18/2019/PPD dt. 23/07/2020.
 - to submit "Model Certificate for Tenders" as per Annexure-III of Ministry of Finance (MoF) Order (Public Procurement No. 1 & 2) F. No. 6/18/2019/PPD dt. 23/07/2020.
20. Due to COVID-19 pandemic condition prevailing in the country, BHEL/PEM may go for Remote Inspection of Offered items, if required. Vendors are requested to be equipped with the facilities/gadgets as indicated in the guidelines attached to take up the inspection REMOTELY.

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21. All other correspondence thereof shall be addressed to the undersigned by name & designation and sent at the following address:

Mr. Amit Meena, Manager/ PG-II M/s Bharat Heavy Electricals Ltd., Project Engineering Management, PPEI Building, HRD & ESI Complex, Plot No 25, Sector-16 A, Noida-201301 E-MAIL: amitmeena@bhel.in Ph. No. +91-120-4213613	Ms. Naina Singh, Sr Manager/ PG-II M/s Bharat Heavy Electricals Ltd., Project Engineering Management, PPEI Building, HRD & ESI Complex, Plot No 25, Sector-16 A, Noida-201301 E-MAIL: nainasingh@bhel.in Ph. No. +91-120-4368762
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22. Prices shall be Firm till completion of contract.
23. The bidders who are not registered with BHEL-PEM may apply for registration in BHEL-PEM through Registration Portal available at www.bhelpem.com-->vendor section-->online supplier registration. All credentials and/or documents duly signed & stamped related to registration has to be uploaded on the website & submit the application for registration. One set of hard copy filled-up SRF downloaded from Online Registration Portal duly signed & stamped has to be submitted.
24. If any bidder uploads price bid in the unpriced section (techno-commercial attachment page) of the tender in e-procurement, in that case bidder(s) shall only be responsible for such mistake and any consequences thereof. Hence all bidders are requested to be more careful at the time of uploading the Unpriced and Price Bid for Part-I and Part-II respectively to avoid mismatch.
25. Bidders have to note that Deviations from NIT are generally not acceptable. Deviations, if any, are to be listed out clearly, as per Annexure-II (Deviation Sheet – Cost of Withdrawal), of GCC Rev 07, in techno-commercial offer. Any deviation mentioned or shown separately or found hidden in offer, will not be taken cognizance of.

In case of deviations from NIT, the bidder shall give the cost of withdrawal of such deviation in Price Bid, as per Annexure-II, Deviation Sheet (Cost of Withdrawal) of GCC Rev-07. For multiple deviations, all deviations are to be mentioned in “Deviation Sheet” and “cost of withdrawal” must be mentioned separately against each deviation.

26. All terms & conditions shall be as per NIT, SCC of Project & GCC Rev. 07. In the event of any contradiction in the terms and conditions mentioned, the order of preference shall be as mentioned in cl. no. 36 of GCTC of GCC Rev. 07.

Note - In case you are not making an offer against this enquiry, you are requested to send a regret letter so as to reach us on or before the due date.

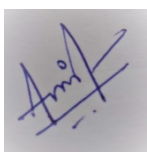
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Thanking you,
Yours faithfully,
For and on behalf of BHEL



AMIT MEENA
(MANAGER / PROJECT GROUP-II)

Enclosures:

- I. Land Border Sharing format
- II. BOQ (as per online bidding form in e-procurement)
- III. Technical Specification
- IV. Technical PQR
- V. Financial PQR
- VI. Integrity Pact
- VII. SCC of Project
- VIII. Guidelines for Remote Inspection of PEM BOIs
- IX. Local Content Certificate Format
- X. Unpriced Format
- XI. Vendor approval format

NAME OF PROJECT: 5 X 800 MW YADADRI																
NAME OF PACKAGE: Lighting Fixtures, lamps & Misc. Items																
ANNEXURE-A																
ENQUIRY No.: PE/PG/YAD/E-6750/2021 dated 25.08.2021																
NAME OF BIDDER:																
S. N.	DESCRIPTION	HSN/SAC CODE	UNIT	ORDER QUANTITY	LOT 1 QUANTITY	UNIT EX-WORKS PRICE (DULY PACKED) (INR)	TOTAL EX-WORKS PRICE (DULY PACKED) (INR)	Freight rate in %	Freight Amount, in INR	Total Ex works + Freight (INR)	GST type	GST rate in %	GST amount in INR	TOTAL F.O.R SITE PRICE (INR)	Total FOR site Price In Words	Remarks
1.0	Lighting Luminaires (complete with all accessories)															
1.1	Luminaire Type FC06 (LED)	85395000	Nos.	5585	1100		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.2	Luminaire Type FC26 (LED)	85395000	Nos.	710	150		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.3	Luminaire Type FC30 (LED)	85395000	Nos.	1320	250		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.4	Luminaire Type FC07 (LED)	85395000	Nos.	1525	300		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.5	Luminaire Type FC33 (LED)	85395000	Nos.	410	80		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.6	Luminaire Type FC34 (LED)	85395000	Nos.	1220	250		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.7	Luminaire Type FC32 (LED)	85395000	Nos.	205	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.8	Luminaire Type FC81 (LED)	85395000	Nos.	915	200		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.9	Luminaire Type SF63 (LED)	85395000	Nos.	225	50		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.10	Luminaire Type SF64 (LED)	85395000	Nos.	355	70		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.11	Luminaire Type SF66 (LED)	85395000	Nos.	115	20		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.12	Luminaire Type SB11 (LED)	85395000	Nos.	510	100		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.13	Luminaire Type SB02 (LED)	85395000	Nos.	1525	300		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.14	Luminaire Type SB03 (LED)	85395000	Nos.	530	100		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.15	Luminaire Type SS61 (LED)	85395000	Nos.	105	20		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.16	Luminaire Type SS62 (LED)	85395000	Nos.	1015	200		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.17	Luminaire Type SS63 (LED)	85395000	Nos.	1830	250		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.18	Luminaire Type SW41 (LED)	85395000	Nos.	20305	4000		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.19	Luminaire Type SW42 (LED)	85395000	Nos.	6090	1200		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.20	Luminaire Type MW96 (LED)	85395000	Nos.	915	300		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.21	LUMINAIRES TYPE DOWNLIGHTER 15-18W(LED)	85395000	Nos.	255	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
1.22	COVE LIGHT (LED) - 5 MTR STRIP		Nos.	500	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.0	Driver for LED Luminaires															
2.1	Driver - Luminaire Type FC06 (LED)		Nos.	325	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.2	Driver - Luminaire Type FC26 (LED)		Nos.	40	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.3	Driver - Luminaire Type FC30 (LED)		Nos.	75	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.4	Driver - Luminaire Type FC07 (LED)		Nos.	90	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.5	Driver - Luminaire Type FC33 (LED)		Nos.	25	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.6	Driver - Luminaire Type FC34 (LED)		Nos.	70	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.7	Driver - Luminaire Type FC32 (LED)		Nos.	15	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.8	Driver - Luminaire Type FC81 (LED)		Nos.	55	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.9	Driver - Luminaire Type SF63 (LED)		Nos.	15	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.10	Driver - Luminaire Type SF64 (LED)		Nos.	20	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.11	Driver - Luminaire Type SF66 (LED)		Nos.	10	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.12	Driver - Luminaire Type SB11 (LED)		Nos.	30	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	

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ENQUIRY No.: PE/PG/YAD/E-6750/2021 dated 25.08.2021																
NAME OF BIDDER:																
S. N.	DESCRIPTION	HSN/SAC CODE	UNIT	ORDER QUANTITY	LOT 1 QUANTITY	UNIT EX-WORKS PRICE (DULY PACKED) (INR)	TOTAL EX-WORKS PRICE (DULY PACKED) (INR)	Freight rate in %	Freight Amount, in INR	Total Ex works + Freight (INR)	GST type	GST rate in %	GST amount in INR	TOTAL F.O.R SITE PRICE (INR)	Total FOR site Price In Words	Remarks
2.13	Driver - Luminaire Type SB02 (LED)		Nos.	90	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.14	Driver - Luminaire Type SB03 (LED)		Nos.	30	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.15	Driver - Luminaire Type SS61 (LED)		Nos.	10	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.16	Driver - Luminaire Type SS62 (LED)		Nos.	60	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.17	Driver - Luminaire Type SS63 (LED)		Nos.	105	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.18	Driver - Luminaire Type SW41 (LED)		Nos.	1170	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.19	Driver - Luminaire Type SW42 (LED)		Nos.	350	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.20	Driver - Luminaire Type MW96 (LED)		Nos.	55	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
2.21	Driver - DOWNLIGHTER 15-18W(LED)		Nos.	15	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
3.0	Switch boxes for individual control of circuits															
	Switchboards consisting of switch boxes, switches, switch plates and fixing accessories.															
3.1	Type SWB1	85361010	Nos.	400	80		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
3.2	Type SWB2	85361010	Nos.	150	30		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
3.3	Type SWB3	85361010	Nos.	50	10		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
4.0	Junction boxes															
4.1	Type JB-F	85369030	Nos.	42000	8600		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
4.2	Type JB-FE	85369030	Nos.	900	200		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
4.3	Type JB-S	85369030	Nos.	800	200		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
5.0	Receptacles															
5.1	Type RA	85361010	Nos.	2500	500		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
5.2	Type RA (Flame proof)	85361010	Nos.	50	10		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
5.3	Type RB	85361010	Nos.	580	100		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
5.4	Type RC	85361020	Nos.	540	100		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
5.5	Type RC (Flame proof)	85361020	Nos.	15	5		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
6.0	Ceiling fans with electronic regulators															
6.1	1200 mm sweep	8414	Nos.	20	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
6.2	1400 mm sweep	8414	Nos.	40	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
6.3	Pedestal Fan	8414	Nos.	20	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
7.0	Emergency lighting Units															
7.1	With Ni-Cd battery and 2 X 6 W LED lamp	85131010	Nos.	40	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
8.0	FlexiblePVC coated conduit															
8.1	20 mm dia PVC coated conduit	8307	mtrs.	50,000	10000		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	
9.0	24V supply module & lamp unit complete with all accessories															
9.1	Fixed type 24V supply modules	85371000	Nos.	150	30		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only	

NAME OF PROJECT: 5 X 800 MW YADADRI																	
NAME OF PACKAGE: Lighting Fixtures, lamps & Misc. Items																	
ANNEXURE-A																	
ENQUIRY No.: PE/PG/YAD/E-6750/2021 dated 25.08.2021																	
NAME OF BIDDER:																	
S. N.	DESCRIPTION	HSN/SAC CODE	UNIT	ORDER QUANTITY	LOT 1 QUANTITY	UNIT EX-WORKS PRICE (DULY PACKED) (INR)	TOTAL EX-WORKS PRICE (DULY PACKED) (INR)	Freight rate in %	Freight Amount, in INR	Total Ex works + Freight (INR)	GST type	GST rate in %	GST amount in INR	TOTAL F.O.R SITE PRICE (INR)	Total FOR site Price In Words	Remarks	
9.2	Portable type 24V supply modules	85371000	Nos.	50	10		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only		
9.3	Portable halogen lamp unit	9405	Nos.	50	10		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only		
9.4	5A, 24V industrial type sockets	85371000	Nos.	600	120		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only		
10.0	Ladder																
10.1	Free standing ladder (Adjustable from 5M to 10M)	7616	Nos.	8	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only		
10.2	Wheel mounted ladder	7616	Nos.	2	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only		
11.0	EXIT SIGN	9405	Nos.	40	0		₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only		
12.0	SUPERVISION OF E&C																
12.1	CHARGES PER VISIT	9954	VISIT	10			₹ -			₹ -			₹ -	₹ -	No Rupees Only	REFER NOTE-1, 2, 3 & 4	
12.2	MANDAYS CHARGES	9954	DAYS	50			₹ -			₹ -			₹ -	₹ -	No Rupees Only	REFER NOTE-1, 2, 3 & 4	
GRAND TOTAL							₹ -		₹ -	₹ -			₹ -	₹ -	No Rupees Only		

Notes	
1	FOR SUPERVISION OF E&C 10 (TEN) VISIT AND 50 (FIFTY) MANDAYS TO BE CONSIDERED. THE PRICES SHALL BE INCLUSIVE OF CHARGES OF AIRFARE (TO & FRO), BOARDING, LODGING, VISA, MEDICAL, INSURANCE ETC & EXCLUSIVE OF TAXES.
2	AMOUNT PAYABLE PER VISIT = VISIT CHARGES AS PER SL. NO. 12.1 ABOVE (+) UNIT PRICE FOR MANDAYS CHARGES AS PER SL. NO. 12.2 ABOVE (x) NO. OF MANDAYS AT SITE (TO BE CERTIFIED BY BHEL SITE)
3	UNIT RATE FOR 12.1 AND 12.2 ARE INR 20000/- AND INR 5000/- RESPECTIVELY AND SAME IS FIRM.
4	NOS. OF VISIT FOR SUPERVISION OF E&C MAY CHANGE BASED ON PROJECT REQUIREMENT.
5	CONTAINERS AS PER SPECIFICATION ARE TO BE SUPPLIED ALONG WITH FIRST SUPPLIES. THE PRICE OF CONTAINER IS DEEMED TO BE INCLUDED IN PACKAGE PRICE. NO SEPARATE CHARGES SHALL BE PAYABLE.
6	THE MATERIAL SHALL BE SUPPLIED IN LOTS. LOTS SHALL BE RELEASED PROGRESSIVELY BASED ON APPROVED CONDUIT LAYOUT OF DIFFERENT AREAS AND PROJECT REQUIREMENT.
7	LIGHTING SYSTEM DESIGN CHARGES ARE DEEMED TO BE INCLUDED IN THE PRICE OF ABOVE ITEMS. NO SEPARATE CHARGES FOR DESIGN ACTIVITY WILL BE PAYABLE.
8	Please refer technical specification for detail.

Bidder shall furnish this price Schedule indicating "Quoted/Not-Quoted" along with technical offer and actual prices in his price offer.



PRE - QUALIFYING REQUIREMENTS

ENQUIRY NO:

PROJECT :

5 X 800 MW YADADRI TPS

PACKAGE:

LIGHTING FIXTURES, LAMPS & MISC ITEMS

CRITERIA FOR EVALUATION - FINANCIAL :

	Amount (in Rs.)
Average annual financial turnover during the last Three Financial Years should not be less than	Rs.5,02,00,000.00
Rupees Five Crore Two Lakh(s) Only	

Notes:-

a) The bidder has to submit financial accounts (audited, if applicable comprising of Audit report, Balance Sheet, Profit & Loss A/c Statement and Notes/Schedules pertaining to Turnover/Sales/Revenue), for last three years (or from the date of incorporation, whichever is less) as on tender due date to review the above criteria. In case the incorporation of vendor is less than 3 years, average annual financial turnover shall be calculated based on available information as below:-

i) If the accounts are available for ≤ 1 Financial Year, the Average Annual Turnover shall be calculated based on available information divided by 1 (One).

ii) If the accounts are available for >1 but ≤ 2 Financial Years, the Average Annual Turnover shall be calculated based on available information divided by 2 (Two).

iii) If the accounts are available for >2 but ≤ 3 Financial Years, the Average Annual Turnover shall be calculated based on available information divided by 3 (Three).

b) Foreign bidder is to submit a latest report from reputed third party business rating agency like Dun & Bradstreet, Credit reform etc. in addition to the documents mentioned at point (a) above for review of above criteria.

c) Other Income shall not be considered for arriving at Annual Turnover/Sales. For evaluation purpose, Turnover figure excluding taxes shall be considered.

d) For evaluation of foreign bidder, exchange rate (TT selling rate of SBI) as on scheduled date of tender opening (Part-I bid in case of two part bid) shall be considered.

	PRE-QUALIFYING REQUIREMENTS FOR LIGHTING FIXTURES, LAMPS & MISC. ITEMS		PE-PQ-999-558-E006	
			REV. 03	DATE: 11/10/2019
	SHEET 1 OF 1			

ITEMS: Lighting fixtures, lamps, receptacles, Junction boxes and Miscellaneous Items.

SCOPE:

Supply(Including Design) : YES

Erection & Commissioning: No

Services : YES (Supervision of E&C)

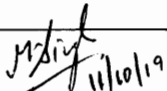
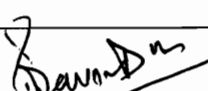
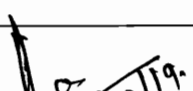
1	<u>Manufacturing Capability</u> i) Manufacturer of applicable type of lighting fixtures as per BHEL-PEM sub-vendor list (Refer Note 4 below) OR ii) Manufacturer of Applicable type of lighting fixtures other than those mentioned in BHEL-PEM sub-vendor list (Refer Note 4 below). In this case, complete credentials for proposed make of lighting fixtures is to be submitted along with the offer. Bidder shall be evaluated as per sub-vendor pre-qualifying criteria attached as Annexure-I however the manufacturer should mandatorily tie up with Lighting designer as per BHEL-PEM sub-vendor list (Refer Note 4 below)
2	<u>Lighting System Design Capability</u> Lighting designer as per BHEL-PEM sub-vendor list (Refer Note 4 below)

Notes:

1. In case vendor is able to meet criteria at Sl. No: 1 only and not Sl. No: 2 above, vendor to furnish undertaking that in case vendor comes out as successful bidder, vendor will submit MOU on non-judicial stamp paper of Rs. 100 /- with any one of the lighting designer as per BHEL-PEM sub-vendor list prior to the placement of order.
2. In case vendor is able to meet criteria at Sl. No: 2 only and not Sl. No: 1 above, vendor to furnish undertaking that in case vendor comes out as successful bidder, vendor will submit MOU on non-judicial stamp paper of Rs. 100 /- with any one of the Manufacturer of applicable type of lighting fixtures as per BHEL-PEM sub-vendor list prior to the placement of order.
3. Bidder to note that MOU on non-judicial stamp paper once offered to BHEL cannot be changed till the execution of the project.
4.
 - a) For Cases of registration, BHEL-PEM sub-vendor list of applicable type of lighting fixtures may be obtained from BHEL-PEM.
 - b) For cases of bidding, sub-vendor list is included in the technical specification.

General Points of PQR:

1. Consideration of offer shall be subject to customer's approval of bidders, if applicable.
2. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.
3. Any other project specific requirement shall be as per Annexure – II and bidder shall submit relevant supporting documents.
4. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder/ collaborators to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
5. After satisfactory fulfilment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all other terms of the tender.

PREPARED BY  MEET SAGAR SINGH RAJPAL (DY.MANAGER)	REVIEWED BY  PRAVEEN DUTTA (SR. DGM)	APPROVED BY  DEBASISA RATH (AGM & DH ELECTRICAL)
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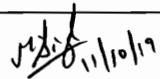
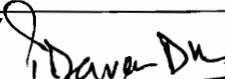
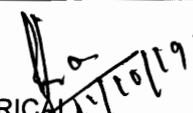
ANNEXURE-I

**PRE-QUALIFYING REQUIREMENTS FOR LIGHTING FIXTURES, LAMPS &
MISC. ITEMS**

DOC NO. PE-PQ-999-558-E006, REV 03

**DOCUMENTS/CREDENTIALS REQUIRED FROM SUB-VENDOR
(MANUFACTURER OF APPLICABLE TYPE OF LIGHTING FIXTURES) FOR
APPLICATION/BIDDING PROCESS:**

1. List of Items normally manufactured by the vendor.
2. Annual turnover for last 3 years
3. Organization & deployment of competent people to various disciplines including quality.
4. Organizations by whom the vendor has been already approved.
5. BHEL units by whom vendor has been already approved
6. Adequacy of past performance.
7. Performance certificate from power utilities
8. Performance certificate from other utilities.
9. Adequacy of technical know-how & design capability.
10. Adequacy of mfg. & shop facilities.
11. Adequacy of testing and inspection facilities.
12. Adequacy of type reports.
13. Adequacy of Quality system, Quality Control, QC record & Quality Plan.
14. ISO certificate
15. MSME certificate

PREPARED BY  MEET SAGAR SINGH RAJPAL (DY. MANAGER)	REVIEWED BY  PRAVEEN DUTTA (SR. DGM)	APPROVED BY  DEBASISA RATH (AGM & DH ELECTRICAL)
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BHEL PEM-ELECTRICAL

PRE-QUALIFYING REQUIREMENTS FOR LIGHTING FIXTURES, LAMPS & MISC. ITEMS

ANNEXURE –I

PROJECT SPECIFIC CRITERIA AGAINST ENQUIRY

PROJECT: 5X800 MW YADRADRI TPS

NIL

**SURYA
DEV**

[Dealing Engineer]

Digitally signed by SURYA DEV
DN: c=IN, o=BHARAT HEAVY
ELECTRICALS LIMITED, ou=BHEL PS-
PEM- Noida, postalCode=201301,
st=Uttar Pradesh,
2.5.4.20=b6b8c6b33f4b40cbde4e50fa1f
68a72e80fec0b5e942b25843608773f4f
34914, cn=SURYA DEV
Date: 2021.08.05 12:33:50 +05'30'

**NARENDRA
NATH
JAJWARE**

[Controlling Officer]

Digitally signed by NARENDRA
NATH JAJWARE
DN: c=IN, o=NARENDRA NATH
JAJWARE, ou=BHEL,
ou=ELECTRICAL,
email=ntnjjajware@bhel.in, cn=IN
Date: 2021.08.06 17:28:44
+05'30'

**PRAVEEN
DUTTA**

[Section Head]

Digitally signed by PRAVEEN DUTTA
DN: c=IN, o=BHARAT HEAVY ELECTRICALS
LIMITED, ou=PS PEM, postalCode=201301,
st=UTTAR PRADESH,
2.5.4.20=da8948a0c3e2703a98a0aaca2aedd61d
d68dbef4c976429c5c374e3b47b930,
cn=PRAVEEN DUTTA
Date: 2021.08.06 17:36:10 +05'30'

**DEBASISA
RATH**

[DH-Electrical]

Digitally signed by DEBASISA RATH
DN: c=IN, o=BHARAT HEAVY ELECTRICALS
LIMITED, ou=BHEL PS PEM Noida,
postalCode=201301, st=UTTAR PRADESH,
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cn=DEBASISA RATH
Date: 2021.08.06 17:42:38 +05'30'

**TELANGANA STATE POWER GENERATION
CORPORATION LIMITED
5X800 MW YADADRI TPS**

VOLUME-II

**TECHNICAL SPECIFICATION FOR *LIGHTING
FIXTURES, LAMPS AND MISCELLANEOUS ITEMS***

SPECIFICATION NO: *PE-TS-417-558-E006*

REVISION: 00



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UP (INDIA) – 201301**

420877/2021/PS-PEM-EL

	TECHNICAL SPECIFICATION FOR LIGHTING FIXTURES, LAMPS AND MISCELLANEOUS ITEMS		SPECIFICATION NO. PE-TS-417-558-E006	
			VOLUME II	
			CONTENTS SHEET	
	5X800 MW YADADRI TPS		REV. 0	DATE: 05.08.2021
			SHEET 1 OF 1	

CONTENTS

<u>S NO.</u>	<u>DESCRIPTION</u>	<u>NO. OF SHEETS</u>
01	SECTION - I	
	COVER SHEET	1
	CONTENT	1
	COMPLIANCE CERTIFICATE	1
	SPECIFIC TECHNICAL REQUIREMENT	19
	DATA SHEET-A	8
	DATA SHEET-B: -TO BE FILLED BY VENDOR	1
	ANNEXURE-E PACKING SPECIFICATION	1
	ANNEXURE-F: SCOPE MATRIX-TO BE FILLED BY VENDOR	1
02	SECTION - II	
	COVER SHEET	1
	STANDARD SPECIFICATION	38
	STANDARD QUALITY PLAN	10
	ANNEXURE-1 TO AMENDMENT TYPICAL ARRANGEMENT	10
TOTAL NUMBER OF SHEETS (INCLUDING COVER & SEPARATOR SHEETS: 92		

420877/2021/PS-PEM-EL

	TECHNICAL SPECIFICATION FOR LIGHTING FIXTURES, LAMPS AND MISCELLANEOUS ITEMS		SPECIFICATION NO. PE-TS-417-558-E006	
			VOLUME II	
			SECTION - I	
	5X800 MW YADADRI TPS		REV. 0	DATE: 05.08.2021
			SHEET 1 OF 1	

COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same.
2. There are no deviation with respect to specification other than those furnished in the 'schedule of deviations'.
3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.
4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in BOQ-Cum-Price schedule of the specification shall not be considered (i.e. technical description & quantities as per specification shall prevail).

BIDDER'S STAMP & SIGNATURE

420877/2021/PS-PEM-EL

20877/2021/PS-PEM-EL				
	TECHNICAL SPECIFICATION FOR LIGHTING FIXTURES, LAMPS AND MISCELLANEOUS ITEMS	SPECIFICATION NO. PE-TS-417-558-E006		
		VOLUME II		
		SECTION - I		
	5X800 MW YADADRI TPS	REV. 0	DATE: 05.08.2021	
		SHEET 1 OF 19		

SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS

0877/2021/PS-PEM-EL			
	TECHNICAL SPECIFICATION FOR LIGHTING FIXTURES, LAMPS AND MISCELLANEOUS ITEMS	SPECIFICATION NO. PE-TS-417-558-E006	
		VOLUME II	
		SECTION - I	
	5X800 MW YADADRI TPS	REV. 0	DATE: 05.08.2021
	SHEET 2 OF 19		

1.0 SCOPE OF SUPPLY AND SERVICES

- 1.1 **SUPPLY:** Design, manufacture, assembly, inspection & testing at vendor's/ sub-vendor's works, proper packing and delivery to site of LIGHTING FIXTURES, LAMPS & MISCELLANEOUS ITEMS as mentioned in different sections of this specification, complete with all accessories for efficient and trouble-free operation.
- 1.2 **SYSTEM ENGINEERING:** System Engineering is included in vendor's scope, which includes design of complete lighting system for indoor and outdoor areas. Tentative areas as mentioned in Annexure-A to be covered by lighting system & other drawings to be submitted by vendor. The aspect of engineering covers preparation of electrical distribution and control schemes, quantity estimation, luminaire layout drawings, conduit layout drawings, wiring schemes up to luminaires, cable schedules and all associated design work not specifically mentioned in the specification. The quantity estimation to include all items required for the complete lighting system viz. lighting fixtures, Lighting DBs, Welding DBs, LPs, Conduits, Wires & other misc. items.
- 1.3 Supervision of Erection & Commissioning (as required by site) of lighting system is included in vendor's scope.
- 1.4 Although Erection and Commissioning is not included in vendor's scope, the vendor shall still not be absolved of his responsibility of establishing the correctness of engineering and equipment at site.
- 1.5 Standard technical requirements of the lighting fixtures, lamps & miscellaneous items and lighting system design requirements are indicated in Section-II. Project specific requirements/changes are listed in Section-I.
- 1.6 The stipulations of Section-I, followed by those of Data Sheet-A shall prevail and govern in case of conflict between the corresponding requirements of Section-I and Section-II.
- 1.7 Review of sub-vendor's documents by the vendor shall not relieve the vendor from the responsibility of design & supply.
- 1.8 The documents shall be in English language and MKS system of units.
- 1.9 Make of all equipment and components shall be as per attached Sub-Vendor List enclosed as per Annexure-C to section- I.

2.0 BILL OF QUANTITIES:

- 2.1 Quantity requirements shall be as per BOQ-cum-price schedule as part of NIT.

3.0 BILL OF QUANTITIES:

- 3.1 Statutory and regulatory regulation shall be applicable as per Indian Electricity Rule, 1956 with amendment-3 Rule no. 35, 48, 49, 50, 61 & 64 for illumination & low voltage power services.

4.0 DOCUMENTATION

0877/2021/PS-PEM-EL			
	TECHNICAL SPECIFICATION FOR LIGHTING FIXTURES, LAMPS AND MISCELLANEOUS ITEMS	SPECIFICATION NO. PE-TS-417-558-E006	
		VOLUME II	
		SECTION - I	
	5X800 MW YADADRI TPS	REV. 0	DATE: 05.08.2021
SHEET 3 OF 19			

4.1 Documents required along with the technical offer: -

- Signed & Stamped copy of Compliance certificate.
- Dully filled in signed & stamped copy of scope matrix for board activities (Annexure-F of Section-I).
- Signed & stamped copy of unpriced price schedule with “quoted” word indicated against all items.
- Duly filled in signed & stamped copy of Datasheet-B.

4.2 Documents required after award of LOI/PO shall be as per NIT (to be submitted by successful bidder).

5.0 SPECIFIC TECHNICAL REQUIREMENTS

Sl. No.	Reference Clause No. of Section- II	Specific Requirement/ Change
1.0	5.2.1(n), 4 : Page-17 of 38	Referred clause shall be read as: “The LED chip efficacy shall be min 120 Lm/W”
2.0	5.2.1(n), 15 : Page-17 of 38	Following protection to be added under clause 15: • Surge Protection
3.0	Additional requirement in Clause no. 12.4, Page 20 of 38	Junction boxes shall be of 16 SWG sheet steel hot-dip galvanised, dust and damp proof, generally conforming to IP-55. Junction boxes shall be complete with gasketed inspection cover, conduit knock out/threaded hub and terminal blocks. Junction boxes for outdoor use shall be weatherproof IPW-55 and those for hazardous location shall be flame-proof type. Junction boxes shall have following indelible markings: Circuit nos. on top Circuit nos. with ferrules (inside) as per drawing DANGER sign in case of 415V circuit
4.0	Clause no. 5.12 g), Page 22-23 of 38 I) i II) i III) i & iv	Referred clause shall be read as: I) i: RA: 20A, 240V, 2 pole, 3 pin with third pin earthed, wall/ column mounted, metal clad gasketed construction, 20mm conduit entry, screwed metal cover tied to it by a metal chain, weatherproof suitable for indoor/outdoor installation. II) i: RB: 5A & 15A to be replaced with 6A & 16A respectively in standard specification. III) i & iv: RC: 63A, 415 V, 3 phase, 4 pin interlocked plug and switch with earthing contact, wall/column mounted, metal clad gasketed construction, weatherproof, suitable for entry and exit of upto 3.5C-95 Sq.mm XLPE cable and loop-in loop-out terminals for the same shall be provided such that not more than one core is terminated at one terminal. Removable, undrilled cable gland plate shall be provided. Tinned copper lugs and double compression cable glands shall also be supplied by the bidder. These shall be fed from Welding DB.
5.0	5.14(a) : Page-24 of 38	Referred clause shall be read as: All switch boards/boxes shall be of bent steel construction, fabricated of 14 SWG M.S. sheet with 6 mm thick bakelite cover

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		with brass fixing screws.
6.0	5.14(f) : Page-25 of 38	Referred clause shall be read as: The size of switch-boxes shall be adequately chosen to accommodate the no. of switches and fan regulator boxes specified below. Fan regulators shall be supplied separately. Flush type receptacles where provided shall be so located that only the plug projects outside. - Type SWB1 - Switch board with 1 no. 6A switch, JB type SW1. - Type SWB2 - 3 nos. 6A switches and 1 no. 6A Socket, JB type SW2. - Type SWB2a - 3 nos. 6A switches and 2 no. fan regulator, JB type SW2. - Type SWB3 - 6 nos. 6A switches and 1 no. 6A Socket, JB type SW3. - Type SWB3a - 5 nos. 6A switches and 2 no. fan regulator, JB type SW3. JB details for lighting control switch boxes are as below: JB-SW1 Provided with four (4) way stud type terminals, each terminal suitable for terminating upto two nos. of 10 mm² stranded aluminium conductor. JB-SW2 Similar to the JB-SW1 but provided with ten (10) way terminals. JB-SW3 Similar to the JB-SW1 but provided with eighteen (18) way terminals.
7.0	Add new clause 7.2.1 after clause 7.2 in Section-II : Page 27 of 38	New Clause 7.2.1: Materials like Concrete Blocks of Paved surface required for installation and placing of container shall be made available by BHEL. Other supporting material like Rails etc. shall be part of Container only. Packing factor & container type/material shall be decided by vendor based on industrial practice and to meet requirement of clause 7.2.
8.0	Clause 12.4, Page 30 of 38	Referred clause shall be read as: Preparation of as-built drawings shall be in BHEL Scope. However, vendor shall be furnishing the Final Auto Cad dwgs to BHEL.
9.0	Additional clause	Portable Emergency Lighting Unit The portable emergency lighting unit shall be complete with 6 volt storage battery (rechargeable), inverter, automatic charger, twin 6 watts LED lamp and test switch. Vendor shall furnish make, type and catalogue out sub vendor list.
10.0	Additional clause	24 V Supply Module Each 24V A.C. supply module shall have one (1) no dry type two winding transformer and necessary terminals for incoming and outgoing connections. The 240V terminals of 24V AC supply module shall be fed from AC emergency lighting panels (ACELP). Details of 24V A.C. supply modules shall be as given below: Module type: Portable type/ Fixed type with receptacle distribution

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		panel Transformer rating: 500 VA Transformer voltage ratio: 240/26.5 Volt Primary side isolation: DP MCB with HRC fuse Isolation rating: 16A HRC fuse rating: 6A Secondary side isolation: SPN MCB with HRC fuse Isolation rating: 6A HRC fuse rating: 16A
11.0	Additional clause	The Contractor shall furnish list of all erection materials, hardware and consumables required for the complete installation. The list materials shall include but shall not be limited to the following : a) Consumables: Welding rods & gas, oil and grease, cleaning fluids, paints, electrical tape, soldering materials etc. b) Hardware: Bolts, nuts, washers, screws, brackets, supports, clamps, hangers, saddles, cleats, sills, shims etc. c) Materials: Junction boxes, terminal blocks, connectors, ferrules, lugs, brass glands, rigid/flexible conduits, cables, ground wires etc.
12.0	Additional clause	1. Voltage drop at the fixture from the MLDB bus will not exceed 3%. 2. Sub circuit loading of each lighting panel will be restricted to 2000 Watts. 3. Circuit loading of each lighting Panel will be done in such a way that almost balanced loading in all the phases is achieved.
13.0	Additional clause	Suitable numbers of 24V portable halogen lamp unit along with flexible copper cable shall be supplied as per details below: Lamp wattage: 40 W Cable size: 2.5 sq. mm Stranded copper Cable length: 20 meter
14.0	Additional clause	Free standing shall be aluminium ladder, adjustable from 5M to 10M & wheel mounted adjustable aluminium ladder shall be 10M high aluminium ladder.
15.0	Additional clause	Following items are excluded from the supply of this package: Poles, Mast, LDB, WDB, Lighting panels, Rigid conduit, and PVC Wires.
16.0	Additional clause	Pedestal Fan will have 400mm Sweep (50-65 Wattage).
17.0	Additional clause	Packing specification as per Annexure-E to be followed by vendor.
18.0	Additional clause	Lighting system will be designed to ensure adequate uniform visual performance, safety & reliability and will be free from excessive glare and flicker from discharge lamp. In main control room, particular attention will be given to ensure that illumination is proper and aesthetic. Control room lighting will be such as to prevent any glare/ luminous patch on control board /panel/ VDUs when viewed from an angle. Customer approved Design memorandum of Illumination System shall be provided to successful vendor.
19.0	Additional clause	Additional Clause No. 6 to be added under Annexure-I of section-II as below.

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6.0 SPECIFIC TECHNICAL REQUIREMENTS

S. No.	Type of Luminaire	Description	Total Luminous Flux (Lumen) of Luminaire – Min. Value	Measured Electrical Input Power (Watt) of Luminaire – Max. Value
01	FC06 (LED)	Industrial type LED fixture suitable for conduit/ surface/ suspended mounting with integral driver aesthetically designed for Switchgear/ Equipment room/ stair case/ corridors.	3780	42
02	FC26 (LED)	Panel (approx. 1200mm x300mm) decorative LED fixture suitable for recess mounting in false ceiling with integral driver aesthetically designed for Control Room/ Office.	3780	42
03	FC07 (LED)	Industrial type LED fixture suitable for conduit/ surface/ suspended/ column mounting with integral driver. Fixture shall operate at 220 V DC supply. Necessary accessories like DC to AC convertor etc. to be included in fixture, if required.	1260	14
04	FC30 (LED)	Panel 600mm x600mm decorative LED fixture suitable for recess mounting in false ceiling with integral driver aesthetically designed for Control Room/ Office.	3780	42
05	FC32 (LED)	Decorative, surface mounted LED fixture having integral driver	3780	42
06	FC33 (LED)	Decorative, recessed type LED fixture (down lighter) with integral driver. Fixture shall operate at 220 V DC supply. Necessary accessories like DC to AC convertor etc. to be included in fixture, if required.	1260	14
07	FC34 (LED)	Well glass, dust proof type LED fixture having integral driver. Fixture shall operate on 220V DC input supply. Necessary accessories like DC to AC convertor etc. to be included accordingly, if required.	1260	14
08	FC81 (LED)	Corrosion proof, totally enclosed type LED fixture with integral driver.	3780	42
09	SF63 (LED)	Flood light, Heavy duty type LED fixture with integral driver.	16920	188
10	SF64 (LED)	Flood light, Heavy duty type LED fixture with integral driver.	27000	300
11	SF66 (LED)	Flood light, Heavy duty type LED fixture with integral driver.	45000	500

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12	SB11 (LED)	Medium Bay, Industrial type LED fixture with integral driver.	10080	112
13	SB02 (LED)	High Bay, Industrial type LED fixture with integral driver.	16920	188
14	SB03 (LED)	High Bay, Industrial type LED fixture with integral driver suitable for mounting height > 10m.	24750	275
15	SS61 (LED)	Street light, LED fixture with integral driver.	6300	70
16	SS62 (LED)	Street light, LED fixture with integral driver.	13500	150
17	SS63 (LED)	Street light, LED fixture with integral driver.	22500	250
18	SW41 (LED)	Well glass type, vapour proof LED fixture suitable for Boiler / ESP platforms	4680	52
19	SW42 (LED)	Well glass type, vapour proof LED fixture suitable for Boiler / ESP platforms	7380	82
20	MW96 (LED)	Well glass, flame proof increased safety LED fixture with integral driver suitable for division-2, Group IIA/IIB of hazardous areas.	6000	94
21	Downlighter* (LED)	Recessed Mounted Downlighter with Integral driver aesthetically designed for Control Room/ Office	1500	18

* For Downlighter* (LED), nomenclature FC35 (LED) to be used in drawing.

Note:

1. Lens, if required shall be part of LED luminaire.
2. LED must comply all the parameters of IS 16105 or IESNA LM-80-08.
3. The Luminaire must comply all the parameters of IS 16106 or IESNA LM-79-08.
4. The LED driver should comply to IEC 61347-2-13, IS 15885: Part 2: Sec 13, IEC 62384, IS 16104 and CISPR 15.
5. The luminaire complete with all accessories shall comply to relevant specified standards.
6. The values of minimum luminous flux & maximum measured electrical input power are specified above for the luminaire (including any accessories like driver module etc). These values shall be measured as per IS 16106 & shall not be subject to any further tolerance.
7. All parameters mentioned in Section-II, Clause 5.2.1 are to be complied in totality.
8. COVE LIGHT(LED)# shall be 5 MTR strip per piece. Cove lighting, if required shall be provided for better aesthetics in false ceiling of common control room(CCR), Service building, Canteen and ESP Control room.

For COVE LIGHT (LED), nomenclature FC36 (LED) to be used in drawing.

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ANNEXURE - A

AVERAGE LUX LEVEL & TYPE OF FIXTURES

* The fixture shall be suitable for Division-2, Group IIA/IIB of hazardous area as per IS-2148.

Notes: (i) Decorative type fixtures will be provided for false ceiling areas.
(ii) Compact florescent fixture shall be used for emergency DC lighting.

S. No.	LOCATION	AVERAGE LUX LEVEL	TYPE OF LIGHTING FIXTURES
AVERAGE AC NORMAL LUX LEVEL & TYPE OF FIXTURES			
1.0	Turbine Generator Building :		
1.1	General Auxiliary Equipment Areas	100	Industrial Well Glass LED
1.2	Cable Spreader Room	70	Industrial type LED luminaire
1.3	Switchgear Room	200	Industrial type LED luminaire
1.4	TG Building Operating Floor	200	High bay Industrial type LED luminaire
1.5	Main Control Rooms	400	Recessed type LED luminaire asthetically designed for control room/ offices
1.6	Battery Rooms	200	Totally enclosed corrosion proof LED luminaire
1.7	Unloading and Maintenance bay	250	High bay Industrial type LED luminaire
2.0	Boiler Area :		
2.1	Boiler area and platforms	100	Industrial type LED well glass luminaire
2.2	Coal Bunker and Mill bay area	100	Industrial type LED well glass luminaire
2.3	ESP areas and Platforms	100	Industrial type LED well glass luminaire
2.4	ESP Control Room	400	Recessed type LED luminaire asthetically designed for control room/ offices
3.0	Transformer Yard :		
3.1	General	20	Street/ Flood light LED luminaire
3.2	Near equipment	50	Street/ Flood light LED luminaire
4.0	Laboratory :		
4.1	General	100	Decorative recess / surface mounted/ Suspended type LED luminaire
4.2	Analysis Area	300	Totally enclosed corrosion proof LED luminaire
5.0	Various Off-site Buildings :		
5.1	Equipment Room / Switchgear Rooms	200	Industrial type LED luminaire.

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5.2	Pump Houses/ DG room / Compressor room	200	Industrial type/Medium bay Industrial type LED luminaire
5.3	DM Plant, Pre-Treatment	150	Industrial type/Medium bay Industrial type LED luminaire
5.4	Workshop	150	Industrial type/Medium bay Industrial type LED luminaire
6.0	Cooling Water Pump House Area :		
6.1	Cooling Tower Area	30	Street lights LED luminaire
6.2	CW PH	200	Medium bay Industrial type LED luminaire
7.0	Road & Yard Lighting:		
7.1	Main Roads	20	Street lights LED luminaire
7.2	Secondary Roads	10	Street lights LED luminaire
7.3	Perimeter (Compound) Lighting	10	Street lights LED luminaire
8.0	Service Building, Canteen, etc.		
8.1	Main Office /Staff Room	300	Recessed type LED luminaire asthetically designed for control room/ offices
8.2	Non-Office /Service Areas	300	Recessed type LED luminaire asthetically designed for control room/ offices
9.0	General :		
9.1	Corridors, Walkways, Staircase, Lockers etc.	70	Recessed/ Surface/ Suspended type LED luminaire
9.2	Toilets, Wash Rooms,etc.	70	Recessed/ Surface/ Suspended type LED luminaire
10.0	Fuel Oil Tank & Hydrogen generation area	20	Flood light LED luminaire
11.0	Fuel oil pump house/ Hydrogen generation plant *	150	Flame proof LED type luminaire

Note: * The fixture will be suitable for Division-2, Group IIA/IIB of hazardous area as per IS-2148.

Decorative type fixtures will be provided for false ceiling areas.

AVERAGE AC EMERGENCY LUX LEVEL & TYPE OF FIXTURES

1.0	Main Control room	50	Same as used in AC Normal
2.0	Other than Main Control room #	20	Same as used in AC Normal

Note: # AC emergency lux level is only applicable in areas mentioned in ANNEXURE-III.

AVERAGE DC EMERGENCY LUX LEVEL & TYPE OF FIXTURES

1.0	Main Control room	50	LED Downlight luminaire, recessed type.
2.0	Other than Main Control room \$	20	LED Industrial luminaire

Note: \$ DC emergency lux level is only applicable in areas mentioned in ANNEXURE-B.

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ANNEXURE – B
LIGHTING & LV POWER SERVICES IN DIFFERENT AREAS

S. No.	AREA	ACN	ACE	DCE	6/16A Socket	20A Socket	63/125A Socket	ELU \$
01	TG building	Y	Y	Y	Y*	Y	Y	-
02	Boiler platforms & boiler area	Y	Y	Y	Y*	Y	Y	-
03	ESP platforms & Mill area	Y	Y	Y	-	Y	Y	-
04	ID, FD & PA FAN area	Y	-	Y	Y*	Y	-	-
05	Transformer Yard	Y	-	-	-	-	Y	-
06	ESP control room	Y	Y	-	Y*	Y	Y	Y
07	DG room	Y	Y	-	-	Y	Y	Y
08	Compressor house	Y	Y	-	-	Y	Y	Y
09	Fuel oil area	Y	-	-	-	Y	-	Y
10	Outdoor area	Y	-	-	-	Y	Y	Y

LEGEND

ACN	AC Normal Lighting
ACE	AC Emergency
DCE	DC Emergency Lighting
Y	Yes
Y*	Yes, only in control room, offices & toilets
\$	Emergency lighting unit (ELU)

Area Wise Distribution of Lighting System

S. No.	AREA	Normal AC	Emergency AC	Emergency DC	Portable DC
01	TG building general	80%	20%	YES	-
02	Boiler platform	80%	20%	YES	-
03	DG / Compressor room	80%	20%	-	YES
04	ESP control room	80%	20%	-	YES
05	Main control room	70%	30%	YES	-
06	Battery room	80%	20%	-	-
07	Cable Spreader	80%	20%	YES	-
08	Pump house, Water Treatment Plant, Chemical house	100%	-	-	YES
09	Transformer yard, Store, Switchyard, Area/Street lighting	100%	-	-	-

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ANNEXURE – C

SUB-VENDOR LIST

ITEM DESCRIPTION	VENDOR NAME
LIGHTING DESIGNER	AVAIDS TECHNOVATORS PVT. LTD.
	BAJAJ ELECTRICALS LTD.
	KELSATEK SOLUTIONS PVT. LTD.
	M/s SUMANAM ENGINEERING SERVICES CONSULTANT
	M/s SURYA ROSHNI LTD
	M/s HPL ELECTRIC & POWER PVT. LTD.
LIGHTING FIXTURES (LED)	Neev Luminaries
	HAVELLS INDIA LIMITED
	BAJAJ ELECTRICALS
	SURYA ROSHNI LIMITED
	PHILIPS
	M/S HPL ELECTRIC & POWER PVT. LTD
	INSTA POWER
	Pyrotech Electronics Pvt. Ltd.
	M/s Halonix Technologies Limited
	M/s JAQUAR & COMPANY PVT. LTD.
	M/s CROMPTON GREAVES CONSUMER ELECTRICALS LTD.
	M/s WIPRO ENTERPRISES PRIVATE LTD.
LIGHTING FIXTURES (FLAME PROOF)	HAVELLS INDIA LIMITED
	BAJAJ ELECTRICALS
	BALIGA ELECTRICALS
AC CONTACTORS	SIEMENS
	GE-POWER
	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.
	L&T
	BCH
AC MCCB	C&S ELECTRIC LTD.
	SCHNEIDER ELECTRIC INDIA PVT. LTD.
	SIEMENS
	GE-POWER
	L&T
	CROMPTON GREAVES
AUXILIARY RELAYS	ABB
	ALSTOM LTD
	JYOTI LTD.
	OEN INDIA LTD
	SIEMENS

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BIMETAL RELAYS	L&T
	GE-POWER
	SIEMENS
	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.
CABLE GLANDS	ALLIED TRADERS & EXPORTERS
	ARUP ENGG & FOUNDARY WORKS
	BALIGA LIGHTING EQPT.PVT.LTD.
	COMMET BRASS PRODUCTS
	DOWELLS
	ELECTROMAC INDUSTRIES
	INCAB
CABLE LUGS	DOWELLS
	UNIVERSAL MACHINES LTD.
D.C. MCCB	CROMPTON GREAVES
	L&T
	GE-POWER
	SIEMENS
GI CONDUITS	BIS APPROVED MAKE
GI CONDUIT (EPOXY PAINTED)	BIS APPROVED MAKE
FLEXIBLE CONDUIT (PVC COATED)	REPUTED MAKE
DC CONTACTORS	SCHNEIDER ELECTRIC INDIA PVT. LTD.
	BHEL (BHOPAL)
	ELECTROMAC INDUSTRIES
	L&T
	SIEMENS
	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.
	GE-POWER
CONTROL SWITCHES/ SELECTOR SWITCH	KAYCEE
	GE-POWER
	ALSTOM LTD
	SCHNEIDER ELECTRIC INDIA PVT. LTD.
	M/s Shrenik & Co.
	RECOM PVT. LTD.
LT- CURRENT TRANSFORMER	SIEMENS
	AUTOMATIC ELECTRIC LTD.
	INDCOIL
	KAPPA ELECTRICALS
	PRAGATI ELECTRICALS
	PRECISE ELECTRICALS
	SILKAANS ELECT.MFG.CO.PVT.LTD
	PRAYOG ELECTRICALS PVT. LTD.

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LT- POTENTIAL TRANSFORMER	C&S ELECTRIC LTD.
	Newtek Electricals
	SIEMENS
	AUTOMATIC ELECTRIC LTD.
	INDCOIL
	KAPPA ELECTRICALS
	PRAGATI ELECTRICALS
	PRECISE ELECTRICALS
	SILKAANS ELECT.MFG.CO.PVT.LTD
	PRAYOG ELECTRICALS PVT. LTD.
	Newtek Electricals
DC SWITCH	GE-POWER
	KAYCEE
	SIEMENS
DISTRIBUTION BOX	SHRENIK & CO.
EMER. PORTABLE LTG. SET	BAJAJ ELECTRICALS
	BAJAJ ELECTRICALS
FUSE BASE	INDO ASIAN
	GE-POWER
	L&T
	C&S ELECTRIC LTD.
	SIEMENS
	ABB
	SPACEAGE SWITCHGEARS LTD.
	SCHNEIDER ELECTRIC INDIA PVT. LTD.
	ALSTOM LTD
	ESSEN DEINKI
HRC FUSES	INDO ASIAN
	GE-POWER
	L&T
	C&S ELECTRIC LTD.
	SIEMENS
	ABB
	SPACEAGE SWITCHGEARS LTD.
	SCHNEIDER ELECTRIC INDIA PVT. LTD.
	ALSTOM LTD
	ESSEN DEINKI
GALVANISING	Jenco Industrial Corporation
	National Galvanizing Company
	Sigma Galvanising Pvt. Ltd.
	B.P. Projects PVT LTD

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	Standard Galvanisers
	Steel Products
	Unitech Fabricators & Engineers Pvt. Ltd.
	Shivam Engineers & Fabricators
	B.G. Shirke Construction Technology Pvt. Ltd
	Galbro Ispat Galvanizers Pvt. Ltd.
	Eros Metals
	Industrial Perforation (India) Pvt. Ltd.
	Indmark Formtech Pvt. Ltd.
	Namdhari Industrial Traders Pvt. Ltd.
	Neha Galvaniser
	Patny Systems (P) Ltd.
	Parmar Metal Company
	Rukmani Electrical & Fabricators Pvt, Ltd.
	DMP Projects Pvt.Ltd.
	Vinfab Engineers India Private Limited
	Saral Projects & Processors
	Brahampuri Steels Limited
	Indiana Gratings PVT. LTD
	AVAIDS TECHNOVATORS PVT. LTD.
IND.POWER & WLDG SOCKETS	CROMPTON GREAVES
	CYCLO ELECTRIC DEVICE & SERV.CO.
	BCH
	BEST & CROMPTON
	AJMERA INDUSTRIES & ENGG. WORKS
INTERPOSING RELAY	ABB
	ALSTOM LTD
	JYOTI LTD.
	OEN INDIA LTD
	SIEMENS
INDICATING LAMPS	BCH
	C&S ELECTRIC LTD.
	ESSEN DEINKI
	VAISHNO(HOTLINE SWGR.& CONTROL)
	GE-POWER
	SIEMENS
	SCHNEIDER ELECTRIC INDIA PVT. LTD.
JUNCTION BOXES (NON FLAME PROOF)	JASPER ENGNIREES PVT. LTD.
	Electro Controls & Devices
	M/s Shrenik & Co.

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	M/s PHOENIX MECANO LTD., Adroit Control Engineers Pvt.Ltd. M/s PHOENIX MECANO LTD., MIKA ENGINEERS M/s PHOENIX MECANO LTD., BAJAJ ELECTRICALS AJMERA INDUSTRIES & ENGG. WORKS S.B. ELECTRICAL ENGINEERING CORPORATION RITTAL INDIA PVT. LTD. HPL ELECTRIC AND POWER LTD.
JUNCTION BOXES (FLAME PROOF)	SUDHIR SWITCHGEAR
LIGHTING DISTRIBUTION BOARDS	ADVANCE ENGG. COMPANY Sterling Generators Pvt. Ltd. MIKA ENGINEERS ELEXPRO ELECTRICALS PVT/ LTD. KMG ATOZ SYSTEMS UNILEC ENGINEERS PVT. LTD. AVAIODS TECHNOVATORS LTD. Adroit Control Engineers Pvt.Ltd. JACKSON ENGINEERS Adlec Systems Private Limited Popular Switchgears Pvt Ltd CANDS Pyrotech Electronics Pvt. Ltd. Positronics Pvt. Ltd. Industrial Switchgears & Control Pvt Ltd M/s Vidhyut Control (I) Pvt.Ltd. MILESTONE SWITCHGEARS PVT. LTD.
LIGHTING LAMP (NON LED)	WIPRO LTD. ESSEN DEINKI BAJAJ ELECTRICALS INSTA POWER PHILIPS HAVELLS INDIA LIMITED HPL SURYA ROSHNI LIMITED M/s Halonix Technologies Limited
LIGHTING LAMP (LED)	Neev Luminaries HAVELLS INDIA LIMITED BAJAJ ELECTRICALS SURYA ROSHNI LIMITED

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	PHILIPS
	M/S HPL ELECTRIC & POWER PVT. LTD
	INSTA POWER
	Pyrotech Electronics Pvt. Ltd.
	M/s Halonix Technologies Limited
LIGHTING SWITCH , SOCKET & S/F UNIT	ELEXPLO ELECTRICALS PVT/ LTD.
	ANCHOR
	KAYCEE
	L&T
	SIEMENS
LIGHTING TRANSFORMER	INDO ASIAN
	AUTOMATIC ELECTRIC LTD.
	INDCOIL
	POWER PACK ENTERPRISES
	VIJAY ELECTRICALS LTD.
	GILBERT & MAXWELL
	KAPPA ELECTRICALS
LOCAL PUSH BUTTON STATION (NON FLAME PROOF)	Ames Impex Electricals Pvt. Ltd
	GE-POWER
	ASIATIC
	C&S ELECTRIC LTD.
	EVERGREEN ENGG. CO.
	TECKNIC CONTROLS
	EX-PROTECTA LIGHTING EQUIPMENT
	BALIGA ELECTRICALS
	ENPRO ENGG.
	STERLING SWGR CONTROL PVT.LTD.
	ELEXPLO ELECTRICALS PVT/ LTD.
	VAISHNO(HOTLINE SWGR & CONTROL)
	JASPER ENGNIREES PVT. LTD.
	KMG ATOZ SYSTEMS
	UNILEC ENGINEERS PVT. LTD.
	BCH
	CANDS
	SIEMENS
	SCHNEIDER ELECTRIC INDIA PVT. LTD.
	TECKNIC CONTROLS
	UNITED ELECTRIC
	M/s Shrenik & Co.
LIGHTING PANEL (NON FLAME PROOF)	MIKA ENGINEERS
	ELEXPLO ELECTRICALS PVT/ LTD.
	Vidhyut Controls (India) Pvt. Ltd.

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	KMG ATOZ SYSTEMS
	UNILEC ENGINEERS PVT. LTD.
	AVAIODS TECHNOVATORS LTD.
	Adroit Control Engineers Pvt.Ltd.
	JACKSON ENGINEERS
	MILESTONE SWITCHGEARS PVT. LTD.
	Positronics Pvt. Ltd.
	Pyrotech Electronics Pvt. Ltd.
MCB	MDS SWITCHGEAR LTD
	INDO ASIAN
	SCHNEIDER ELECTRIC INDIA PVT. LTD.
	S&S POWER SWITCHGEAR LTD,
MODULAR SWITCH BOARD	ANCHOR
	ELEXPRO ELECTRICALS PVT/ LTD.
	HAVELLS INDIA LIMITED
RECEPTACLES - DECORATIVE	ANCHOR
	ELEXPRO ELECTRICALS PVT/ LTD.
	BAJAJ ELECTRICALS
	AJMERA INDUSTRIES & ENGG. WORKS
SWITCH BOX	ANCHOR
	ELEXPRO ELECTRICALS PVT/ LTD.
	BAJAJ ELECTRICALS
	AJMERA INDUSTRIES & ENGG. WORKS
	S.B. ELECTRICAL ENGINEERING CORPORATION
TERMINAL BLOCKS	WAGO-CONTROLS
	CONNECT WELL
	ELMEX CONTROLS PVT. LTD.
	ESSEN DEINKI
	TECHNOPLAST
	M/s PHOENIX MECANO LTD.,
	ESSEN DEINKI
TIMERS - PNEUMATIC	BCH
	ALSTOM LTD
	L&T
	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.
	SCHNEIDER ELECTRIC INDIA PVT. LTD.
	ELECTRONIC AUTOMATION PVT. LTD.
TIMERS - ELECTRONIC	ESSEN DEINKI
TRANSDUCERS	AUTOMATIC ELECTRIC LTD.
	SOUTHERN TRANSDUCERS
RECEPTACLE (FLAME PROOF)	BALIGA ELECTRICALS
	SUDHIR SWITCHGEAR

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	FCG FLAME PROOF CONTROL GEAR
RECEPTACLE (NON FLAME PROOF)	AJMERA INDUSTRIES & ENGG. WORKS
	CROMPTON GREAVES
	CYCLO ELECTRIC DEVICE & SERV.CO.
	BCH
	BEST & CROMPTON
EMERGENCY LIGHTING UNIT (FIXED & PORTABLE TYPE)- NON FLAME PROOF	BAJAJ ELECTRICALS
	PROLITE AUTOGLO LIMITED,
	POWER PACK ENTERPRISES
	INDCOIL
	Ames Impex Electricals Pvt. Ltd
24V SUPPLY MODULE WITH COMPLETE ACCESSORIES	POWER PACK ENTERPRISES
	INDCOIL
	Ames Impex Electricals Pvt. Ltd
AMMETER	AUTOMATIC ELECTRIC LTD.
	RISHABH INST.PVT LTD
VOLTMETER	AUTOMATIC ELECTRIC LTD.
	RISHABH INST.PVT LTD
RCCB	C&S ELECTRIC LTD.
	SCHNEIDER ELECTRIC INDIA PVT. LTD.
	SIEMENS
	GE-POWER
	L&T
	CROMPTON GREAVES
EXIT SIGN (NON FLAME PROOF)	REPUTED MAKE
LADDER	REPUTED MAKE
PEDESTAL FAN & CEILING FAN	REPUTED MAKE

Note:

The makes of all equipment/ instrument under this specification shall be subject to owner's approval in the event of order. Owner reserves the right to accept/ reject any make or sub-vendor and to add new sub-vendors for the project after award of contract. Approval, rejection or addition of makes shall not have any price implication to the owner after award of contract.

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ANNEXURE – D

DOCUMENTS REQUIRED AFTER AWARD OF LOI/PO

- Schedule of drawing/ document to be submitted is part of NIT -

NOTES: -

1. Final Drawing/document list & No. shall be provided to successful bidder.
2. Vendor shall submit the dates for drawing/document submission/BHEL comments/resubmission after approval of documents.
3. In BOM each of the item to be uniquely identified with item code no. or item Sl. No. Supplier to ensure that all the items which will find separate mention in the packing list are covered in detailed BOM. Supplier to give following undertaking in BOM: " The BOM provided here completes the scope (in content and intent) of material supply under PO no. ---- dtd ----- Any additional material which may become necessary for the intended application of supplied item/package will be supplied free of cost in most reasonable time."



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DATA SHEET –A / C

S. No.	Description	Unit	Value
1.0	SYSTEM DESIGN DATA		
1.1	Design ambient	⁰ C	50
1.2	AC Supply		
a)	Rated voltage	V	415
b)	Rated frequency	Hz	50
c)	Voltage variation (permissible)	%	+10% to -10%
d)	Frequency variation (permissible)	%	+3% to -5%
e)	Combined voltage & frequency variation (sum of absolutes permissible)	%	10%
f)	System fault level & duration	kA, sec.	50kA for 1 sec.
1.3	DC Supply		
a)	Rated voltage	V	220
b)	Voltage variation (permissible)	%	+10% to -15%
c)	System fault level & duration	kA, sec.	50 kA for 1 sec.
2.0	SCOPE OF SYSTEM DESIGN ENGINEERING		Included in vendor's scope
3.0	Lighting Concept		
3.1	Types of supplies considered (other than AC Normal)		
a)	AC emergency		☒ Yes ☐ No
b)	DC emergency		☒ Yes ☐ No
c)	DC Normal		☐ Yes ☒ No
3.2	Diversity Factor for Sockets	%	25%
4.0	LUMINAIRES, LAMPS & ACCESSORIES		
4.1	Type of false ceiling for recessed LED luminaire		Grid False ceiling (600mm X 600mm) /Aluminium false ceiling (for Control Room).
4.2	Degree of protection for drip proof luminaires		IPW-55



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4.3	Flame proof luminaires		
a)	Hazardous area classification		IS 2184 Zone II Group IIA & IIB
b)	Degree of protection		IP55
c)	Mounting type for well glass		☒ Eye-bolt ☐ MS Galvanised Strap ☐ Screw neck
4.4	Non-integral control gear box for HPMV/HPSV lamps		Not-applicable
a)	Material		☒ CRCA sheet steel ☐ Cast Aluminium LM6
b)	Sheet thickness	mm	☒ 2 for CRCA sheet ☐ 3 for Cast Aluminium LM6
c)	Degree of protection		IP-55 for indoor & IPW-55 for outdoor
d)	Surface treatment		☒ Painted ☐ Galvanized
e)	If galvanized		
	Process		Hot dip
	Weight of zinc (Thickness)	g/m ²	460 (65 micron)
f)	If painted		
	Paint shade as per IS 5		
	Minimum paint thickness	micron	80
4.5	Lamps		
a)	Type of LED Lamps		☒ Cool Daylight ☒ White Light
4.6	Emergency Lighting Unit		
a)	Lamp type		☐ FLT ☐ CFL ☒ LED
b)	Nos. of Lamp		2
c)	Lamp wattage	W	6
d)	Lumen output of lamp at rated voltage	Lumen	To be furnished by vendor
e)	Type of battery		Ni-Cd/ Lead-Acid
f)	AH capacity of battery	AH	To be furnished by vendor
g)	Battery voltage	V	6
h)	Battery backup time	Hr	4
i)	In-built charger		Yes



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4.7	Exit Sign		
a)	Lamp type		☐ FLT ☐ CFL ☒ LED
b)	Nos. of Lamp		1
c)	Lamp wattage	W	12
d)	Lumen output of lamp at rated voltage	Lumen	To be furnished by vendor
e)	Type of battery		Ni-Cd/ Lead-Acid
f)	AH capacity of battery	AH	To be furnished by vendor
g)	Battery voltage	V	To be furnished by vendor
h)	Battery backup time	Hr	4
4.8	24V Supply Module		
a)	Enclosure		
	Enclosure material		☐ Cast aluminium alloy ☒ CRCA sheet steel
	Enclosure thickness	mm	☐ 3 for Cast aluminium alloy ☒ 2 for CRCA sheet steel
	Louvers provided		☒ Yes ☐ No
b)	Surface treatment		☐ Painted ☒ Galvanized
c)	If galvanized		
	Process		Hot dip
	Weight of zinc (Thickness)	g/m ²	460 (65 micron)
d)	If painted		
	Paint shade as per IS 5		631
	Minimum paint thickness	micron	50
e)	Transformer		
	Rating	VA	500
	Voltage ratio	V	240 V/26.5 V
	Class of insulation		Class F, temperature rise limited to Class-B
f)	24V Hand lamp unit		
	Lamp type		☒ Halogen ☐ LED
	Lamp wattage	W	40
g)	No. of outgoing sockets		4
h)	Whether cord coiling arrangement provided		☒ Yes air cooled ☐ No



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5.0	Junction Box		
a)	Enclosure material		[] FRP [✓] CRCA Sheet.
b)	Enclosure thickness	SWG	16 SWG
c)	Galvanized (applicable for CRCA sheet)		[✓] Yes [] No
d)	Degree of protection		IP-55 for indoor & IPW-55 for outdoor
6.0	Industrial/ Welding Receptacle		
a)	Enclosure material		[] Heavy duty cast aluminium alloy [✓] CRCA sheet steel
b)	Enclosure thickness	mm	[] 3 for cast aluminium alloy [✓] 2 for CRCA sheet steel
c)	Surface treatment		[] Painted [✓] Galvanized
d)	If galvanized		
	Process		Hot dip
	Weight of zinc (Thickness)	g/m ²	460 (65 micron)
e)	If painted		Not applicable
	Paint shade as per IS 5		631
	Minimum paint thickness	micron	50
f)	Degree of protection		IP-55
7.0	Decorative Receptacle		
a)	Enclosure material		[] Cast aluminium alloy [✓] CRCA sheet steel
b)	Enclosure thickness	mm	[] 3 for cast aluminium alloy [✓] 2 for CRCA sheet
c)	Surface treatment		[] Painted [✓] Galvanized
d)	If galvanized		
	Process		Hot dip
	Weight of zinc (Thickness)	g/m ²	460 (65 micron)
e)	If painted		Not applicable
	Paint shade as per IS 5		631
	Minimum paint thickness	micron	50
f)	Degree of protection		IP-55
8.0	Switch Box		

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a)	Enclosure material		☐ FRP ☒ CRCA Sheet.
b)	Enclosure thickness	SWG	14 SWG
c)	Galvanized		☒ Yes ☐ No
d)	Degree of protection		IP-55
9.0	Conduit (Flexible)		
a)	Type		☒ Electrogalvanized ☐ Lead coated
b)	Size	mm	20
c)	Standard length	m	25 to 50
d)	Thickness of Galvanization	microns	25 microns
10.0	Cable Glands		By vendor for all incoming and outgoing cables
a)	Type		☒ Double compression ☐ Single compression
b)	Material		Brass
c)	Nickel Plating provided		☒ Yes ☐ No
d)	Flameproof glands with flameproof equipment		☒ Yes ☐ No
11.0	Cable Lugs		By vendor for all incoming and outgoing cables
a)	Type		Crimping type/ ring type
b)	Material		Tinned copper
12.0	LADDERS		
a)	Type		☐ Free standing ☐ wheel mounted ☒ both
b)	Material		☐ Steel ☒ Aluminium
c)	Duty		☐ Heavy ☒ Medium
d)	Surface treatment		☒ Galvanised ☐ Painted

Notes:

- Detailed luminaire and lamp data shall be placed by vendor after award of contract.
- Galvanization wherever applicable shall be hot dip galvanized with the weight of zinc as 460g/m² (65 micron).

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LIST OF APPLICABLE STANDARDS

ILLUMINATION

Code of practice for interior illumination	IS 3646
Code of practice for industrial lighting	IS 6665
Code of practice for lighting of public thoroughfare	IS 1944

LUMINAIRES

Luminaires	IS 10322
Industrial luminaires with metal reflector	IS 1777
Industrial lighting fittings with plastic reflectors	IS 3287
Decorative lighting outfits	IS 5077
Waterproof electric lighting fittings	IS 3528
Watertight electric lighting fittings	IS 3553
Dust-proof electric lighting fittings	IS 4012
Dust-tight electric lighting fittings	IS 4013
Flameproof electric lighting fittings - well glass & bulk head types	IS 2206
Electric lighting fittings for division 2 areas	IS 8224
General & Safety requirement of Luminaire	IS 1913

LED LUMINAIRES

General Lighting. LEDs & LED Modules Terms and definitions	IS 16101
Self-Ballasted LED lamps for General Lighting Services: Safety requirement	IS 16102-1
Self-Ballasted LED lamps for General Lighting Services: Performance requirement	IS 16102-2
LED modules for General lighting safety requirements	IS 16103-1
Lamp Control gear	IS 15885-2
a.c. or d.c. supplied Control gear for LED modules	IS 16104
Method of measurement of Lumen maintenance of solid state (LED) sources	IS 16105
Method of electric and photometric measurement of solid state (LED) products	IS 16106
Luminaires performance	IS 16107
Photo biological safety of lamps and lamp system	IS 16108
Cold rolled low carbon steel sheets and strips	IS 513
LED Modules	IS 16004

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LAMPS

Tungsten filament lamps for domestic and similar general lighting purpose	IS 418
Tubular fluorescent lamps for general lighting service	IS 2418
High pressure mercury vapour lamps	IS 9900
High pressure sodium vapour lamps	IS 9974

LUMINAIRE COMPONENTS

Ballast for fluorescent lamps for switch start circuits	IS 1534
Ballast for high pressure mercury vapour lamps	IS 15882
Capacitors for use in tubular fluorescent high pressure mercury and low pressure sodium vapour discharge lamp circuits	IS 1569
Bi-pin lamp holders for tubular fluorescent lamps	IS 3323
Methods of measurement of lamp cap temperature rise	IS 8913
Starters for fluorescent lamps	IS 2215
Holders for starters for tubular fluorescent lamps	IS 3324
Cast acrylic sheets for use in luminaires	IS 7569

ASSEMBLED EQUIPMENT AND COMPONENTS

Low voltage switchgear and controlgear.	IS 60947
Code of practice for selection, installation & maintenance of switchgear & control gear	IS 10118
Explosive atmospheres	IS 60079
Classification of hazardous areas for electrical installations	IS 5572
Dry type transformers	IS 11171
Electrical Accessories - circuit breakers for over protection for household and similar installations	IS 60898
Low voltage Fuses for voltages not exceeding 1000 V ac or 1500 V dc	IS 13703
Indicator lamps (visual)	IS 1901

PLUGS, SOCKETS AND OTHER MISCELLANEOUS

Plugs and socket outlets of rated voltage upto and including 250 volts and rated current upto and including 16 amperes	IS 1293
Interlocking switch socket outlet	IS 4160
Electric ceiling type fans and regulators	IS 374
Structural steel (Standard quality)	IS 2062

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Danger notice plates	IS 2551
Enclosures for accessories for household and similar fixed electrical installations	IS 14772
General construction in steel - Code of practice	IS 800
Wrought aluminium and aluminium alloy bars, rods, tubes and sections for electrical purposes	IS 5082
Code of practice for phosphating of iron and steel	IS 6005
Colour for ready mixed paints & enamels	IS 5
Recommended practice for hot dip galvanising of iron & steel	IS 2629
Method of testing uniformity of coating on zinc coated articles	IS 2603
Flexible steel conduits for electrical wiring	IS 3480
Conduits for electrical installations	IS: 9537
Scaffolds & ladders - Code of safety	IS: 3696
Aluminium extension ladders	IS: 4571
General Requirement for enclosures for accessories for household & similar fixed electrical installations	IS: 5133

OTHER MISCELLANEOUS

Electromagnetic compatibility (EMC) Limits (part-3/Sec-2) for harmonic current emission – THD < 15% (input current < 16 A per phase)	IS 14700
Environmental testing: test Z-AD composite temperature/humidity cyclic test	IS 9000-6
Classification of degree of protection provided by enclosures	IS 12063
Method of random sampling	IS 4905
Colour for ready mixed paints and enamels	IS 5
Mild steel wires for general engineering purposes	IS 280
Code for practice for electrical wiring installations	IS 732
Code for practice for installation and maintenance of power cables Upto and including 33kV rating	IS 1255
Methods of testing uniformity of coating of zinc coated articles	IS 2633
Tubular steel poles for overhead power lines	IS 2713
Code of practice for earthing	IS 3043
Guide for safety procedures and practices in electrical work	IS 5216
Guide for selection of electrical equipments for hazardous areas	IS 5571
Mechanical cable glands	IS 6121

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DATA SHEET –B

(Bidder to fill details of luminaires as per parameters mentioned below and furnish Data Sheet – B along with technical offer)

S. No.	DESCRIPTION	LUMINAIRE MAKE AND MODEL	MEASURED ELECTRICAL INPUT POWER (W) MAX. VALUE	TOTAL LUMINOUS FLUX (LUMEN) OF LUMINAIRE - MIN. VALUE
	MAIN SUPPLY ITEMS			
1.0	Lighting Luminaires (complete with all accessories)			
1.1	Luminaire Type FC06 (LED)			
1.2	Luminaire Type FC26 (LED)			
1.3	Luminaire Type FC30 (LED)			
1.4	Luminaire Type FC07 (LED)			
1.5	Luminaire Type FC33 (LED)			
1.6	Luminaire Type FC34 (LED)			
1.7	Luminaire Type FC32 (LED)			
1.8	Luminaire Type FC81 (LED)			
1.9	Luminaire Type SF63 (LED)			
1.10	Luminaire Type SF64 (LED)			
1.11	Luminaire Type SF66 (LED)			
1.12	Luminaire Type SB11 (LED)			
1.13	Luminaire Type SB02 (LED)			
1.14	Luminaire Type SB03 (LED)			
1.15	Luminaire Type SS61 (LED)			
1.16	Luminaire Type SS62 (LED)			
1.17	Luminaire Type SS63 (LED)			
1.18	Luminaire Type SW41 (LED)			
1.19	Luminaire Type SW42 (LED)			
1.20	Luminaire Type MW96 (LED)			
1.21	LUMINAIRE TYPE FC35 DOWNLIGHTER 15-18W(LED)			

ANNEXURE – E**PACKING SPECIFICATIONS- LIGHTING FIXTURES, LAMPS & MISC. ITEMS****PACKING**

1. The material shall be packed to ensure protection against damage during transit, storage for prolonged periods and handling.
2. Lighting Fixtures, Lamps, Receptacles, Switchboards, 24V Supply modules, 24V sockets, Junction Boxes, Exit signs shall be clean and dry prior to packaging.
3. All items specified at sl. No.2 above shall be supplied in packed cartons. The tapes used for packing shall not bleed, leave residue, or damage the item when removed.
4. Fixtures & other lighting material shall be wrapped in weather proof material such as polythene sheets, air bubble sheets/ thermocol etc. The lighting fixtures shall be placed in a corrugated paperboard/ fibreboard container/ mono carton.
5. The mono cartons shall be wrapped or bagged or tied in place in master cartons. The master carton shall be taped and then wrapped with cushioning material.
6. The dimensions of cartons shall be as per manufacturer's recommendations.
7. For items like step ladder, wheel mounted ladder and flexible conduits, packing shall be as per manufacturer standard.

Note: In case Manufacturer has a different packing standard which is equivalent or better same to be submitted for approval during contract stage.

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ANNEXURE-F

SCOPE MATRIX FOR BROAD ACTIVITIES

SCOPE MATRIX FOR BROAD ACTIVITIES				
S. No.	Activities	Contractor	Associate	Remark (if any)
1	System Design			
2	Supply: - (a) Fixtures & Lamps (b) Other Items (as required for System completion)			
3	Supervision of Erection & commissioning			
4	Design review & changes based on site feedback for establishing correctness of the system at site			

Notes: -

1. Bidder to indicate Division of work (DOW)/ scope matrix between contractor & associate by indicating "Yes"/ "No" against each activity in the appropriate column, same to be furnished duly signed & stamped along with technical offer.

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STANDARD TECHNICAL REQUIREMENTS

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1.0 INTENT OF SPECIFICATION

- 1.1 The requirements given in specification for supply of equipment and system design engineering shall be fully complied with.
- 1.2 For the equipment of supply in vendor's scope, the "design" shall broadly cover the selection of components, materials, sizes etc. and complete responsibility of establishing the correctness of equipment design rests with the vendor.
- 1.3 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship, and shall be capable of performing required function in a manner acceptable to Purchaser, who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material, which in his judgement is not in full accordance herewith.
- 1.4 Make of all equipment and components shall be to the approval of Purchaser. Bidder to comply to Sub-vendor list enclosed as Annexure to Section I, however same shall be subjected to end client approval without any commercial implication.

2.0 CODES & STANDARDS

- 2.1 The material shall comply with all currently applicable safety codes and statutory regulations of India as well as of the locality where the material is to be installed.
- 2.2 The material, construction, manufacture, inspection and testing shall conform to the latest revisions of standards as specified in Data Sheet-A.
- 2.3 In case of conflict between the applicable reference standard and this specification, stringent requirement shall govern.

3.0 LIGHTING SYSTEM DESCRIPTION (CONCEPTUAL VIEW)

- 3.1 All areas of plant (indoor and outdoor) shall be provided with suitable lighting arrangement to meet the functional requirements by use of various types of luminaires so as to achieve the desired quality and level of illumination.
- 3.2 Lighting system shall also cover the low voltage power services such as power receptacles and single phase feeders.
- 3.3 Lighting system shall be fed through various power sources such as AC Normal, AC Emergency and DC Emergency supply to achieve the desired reliability.
- 3.4 Power tapped from various sources shall be distributed through lighting distribution boards and lighting panels upto the various luminaires and power outlet sockets / feeders.

4.0 SYSTEM DESIGN ENGINEERING



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Engineering shall be done by the vendor only during the contract engineering stage as the same is covered in his scope. During tender stage, bidder shall make his quotation on the basis of BOQ furnished by the purchaser with the tender document.

- 4.1 **ENGINEERING INPUTS** : Complete engineering shall be done by the vendor on the basis of documents listed below. The engineering inputs shall be furnished by purchaser. However, furnishing of these inputs shall not absolve the vendor of responsibility to visit site and get acquainted with actual site conditions.

4.1.1 Indoor Areas

- a) Room dimensions (details as covered in various layout drawings)
- b) Lighting System Design Data (LSDD) covering typical values for various types of indoor areas, indicating :
 - i. Required average illumination level
 - ii. Reflection factors for walls, ceiling and floor
 - iii. Maintenance factor
 - iv. Type of luminaire
 - v. Mounting height of luminaire
 - vi. Height of working plane
- c) AC Emergency lighting requirements
- d) DC lighting requirements
- e) Requirement of sockets
- f) Requirement of exhaust fans and fan points

4.1.2 Outdoor Areas

- a) Area geometry (details as covered in various layout drawings)
- b) Lighting System Design Data (LSDD) covering typical values for various types of outdoor areas, indicating:
 - i. Average illumination level
 - ii. Type of luminaire
 - iii. Pole heights / mounting height
 - iv. AC Emergency lighting requirement
 - v. DC lighting requirements



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vi. Maintenance factor

c) Requirement of sockets

4.1.3 Other inputs

- a) Plot plan, Main equipment plan and TG hall floor plans (to assess quantum of area lighting drawings)
- b) Suggestive location of LDBs
- c) Suggestive power distribution scheme (SLDs)
- d) Control schemes
- e) Single phase feeder details
- f) No. of sockets / criteria for computation of no. of sockets / location of sockets etc.
- g) LDB/WDB details
- h) LP details
- i) Poles & Masts details
- j) Conduit sizes
- k) Wire sizes
- l) Earthing material sizes

4.2 DESIGN CRITERIA:

4.2.1 General Requirements of Design

- a) Lighting system shall be provided to ensure adequate visual performance, safety and reliability and shall be free from excessive glare and flicker from discharge lamps. Particular attention shall be paid to ensure that level of illumination is satisfactory in all respects including viewing of all instruments, alarms, annunciations and indicating lamps.
- b) Complete system design shall be done on the basis of inputs provided by the purchaser and in line with the laid down criteria.
- c) Requirements of sockets shall be as per the criteria / number of sockets given by the purchaser during detailed engineering stage.
- d) Complete power distribution system shall be designed keeping following criteria in view :
 - Simplicity



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- Controlled voltage drop
- Cost effectiveness

4.2.2 Sources of Power Supply

- a) The illumination of various indoor and outdoor areas in the main plant and off site areas shall comprise of one or more of the following systems:
 - Normal AC Lighting System
 - Emergency AC Lighting System
 - DC Lighting System
- b) Arrangement and distribution of power shall depend upon the functional requirements of areas and therefore supply from all types of power sources shall not be made available to all areas. Lighting & LV power services in different areas shall be provided as per Annexure-B enclosed.
- c) 24V AC lighting for maintenance purposes (for hand lamps and/or hand operated tools) shall be supplied from 240/24V fixed/ portable lighting module.

4.2.3 Lighting philosophy

a) Normal AC Lighting System

Normal AC lighting system 415V, 3 phase, 4 wire, will be fed from lighting panels (LPs) which in turn will be fed from the lighting distribution boards (LDBs). Street lights/ flood lights shall be fed from Street Lighting Panel (SLP), Welding receptacles shall be fed from Welding DB/ MCC in offsite areas.

b) Emergency AC Lighting System

This system shall be provided for certain important areas in the main plant. The lighting fixtures connected to this system shall be normally "ON" along with the normal AC system. These will be fed from emergency lighting panels (ELPs) which in turn will be fed from 3-phase, 4-wire supply from the emergency lighting distribution boards (ELDB'S). These lights will go off for a few seconds in case of AC supply failure at Emergency Switchgear, but shall be automatically restored when Emergency Switchgear is energised by Diesel generator set.

c) DC Lighting System

At strategic locations in the main plant, a few lighting fixtures fed from 220V DC supply, shall be provided to enable safe movement of operating personnel and access to important control points during an emergency, when both the normal AC and Emergency Lighting system fail. These lighting fixtures will be fed from 220V DC LPs which in turn will be fed from DC LDBs.

The supply to the DC lighting panels shall be automatically switched ON in case of loss of AC supply at station service switchgear as well as Emergency switchgear. The DC supply will be automatically switched OFF after about 3 minutes



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following the restoration of supply to normal AC or emergency AC lighting system.

In auxiliary /off site buildings, emergency DC lighting is to be provided through self contained DC emergency fixture at strategic locations. The fixtures shall be switched 'ON' automatically in case of failure of AC supply.

d) Street Lighting/ Flood Lighting

Street lights / flood lights will be fed from Street Lighting Panel (SLP). The number of street lights / flood lights shall be grouped in such a way that they will be fed from the nearest SLP available. Street lights shall have provision of automatic switching ON and OFF in any one of the following modes and as per the purchaser's scheme:

- i. Manual
- ii. Automatic through 00 - 24 hrs time switch
- iii. Automatic through combination of 00 - 24 hrs time switch and a remote sensing device for monitoring external illumination level. Each SLP shall be provided with a time switch and a remote light sensing device.

4.2.4 Number of Luminaires

- a) All calculations shall be done as per the input data covered under "Engineering Inputs".
- b) Total AC luminaires

Total number of AC luminaires for indoor and outdoor areas shall be calculated on the basis of point to point method by an established computer program. Optimisation criteria shall form part of street lighting calculations.

For AC emergency lighting, a specified percentage of total AC luminaires shall be considered as AC emergency luminaires. The percentage shall be informed during detail engineering.

4.2.5 Layout Considerations

a) General Layout Considerations

- i. Layout of equipment such as LDBs and LPs shall be on the basis of following criteria :
 - Ease of operation
 - Maintainability
 - Aesthetics
- ii. Luminaires shall be located to meet the functional requirements of the area. Aesthetics shall form part of layout considerations.
- iii. Due considerations shall be given to the mounting arrangement depending upon location and type of area.



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- iv. While preparing lighting system layout drawings for air conditioned control rooms/areas having false ceilings, the vendor shall be required to interface with the Air Conditioning / Ventilation Duct layout and false ceiling layout drawings to avoid fouling / interference.
- v. The poles shall be located 1.5m away from the road edge. The buried cable shall run in hume pipe / duct bank wherever it is crossing the roads.
- vi. 240V AC, 5/15A universal socket (at least two number) shall be provided in office, store, cabin etc. The receptacles shall be provided at interval of 20m or part thereof for hand tools etc. One no. 20A, 240V AC industrial type receptacle shall be provided at suitable location in all other area as required. The receptacles shall be controlled through switch/MCBs. In hazardous area, receptacles shall be flame proof.
- vii. Suitable nos. of 63A/125A, 3 phase, 415V industrial receptacle with switch shall be provided at specific points in power plant area for welding purposes. At least one 63A/125A receptacle shall be provided in each off-site building.
- viii. 1200mm/ 1400mm sweep ceiling fans with stepped electronic regulator shall be provided for office room, store rooms and social buildings which are not covered by air-conditioned and ventilation system.

b) Conduit System

- i. Unless indicated otherwise, conduits shall originate from respective lighting panels and shall continue upto the luminaires for all indoor areas.
- ii. Conduits shall run in straight runs, parallel to building columns, walls etc. as far as practicable.
- iii. Unnecessary bends and crossings shall be avoided.
- iv. In the corrosive environment, conduit installations shall be made with corrosion proof conduits. Such requirements shall be clearly indicated while preparing BOQ.
- v. Conduits in control room and other air-conditioned areas shall be surface mounted on the roof above false ceiling. However vertical drops of conduits shall be through column flanges or grooved to the wall, finally covered for better aesthetics.

c) Wiring

- i. Each circuit from LP shall be taken in a separate conduit.
- ii. Wiring of AC normal, AC emergency & DC emergency lighting system shall be carried out in separate conduits.



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- iii. Receptacle wiring shall be distinct from lighting conduits. No two phase circuits shall be run in the same conduit. However different circuits of same phase may be laid in the same conduit.
- iv. Maximum three nos. of receptacles shall be loop-in & loop-out in a circuit.
- v. Filling area of wires in conduit shall not exceed 40% of the conduit area.
- vi. Wiring shall be done with following conductor sizes :
 - Luminaires – 2.5 sq. mm
 - 5A plug & socket – 2.5 sq. mm
 - 5/15A and 20A plug & socket – 4 sq.mm
- vii. Wiring shall be designed for the uniformly distributed spread of luminaires on each phase i.e. R, Y,B. Distribution of luminaires on these phases shall be such so that there is generally uniform light intensity in the event of failure of one or two phases.
- viii. Luminaires located in offices, stores, laboratories, toilets etc. shall be individually or group controlled.

d) Cabling

- i. Cables shall be considered wherever it is not desirable to run the insulated wires due to long runs or for any other valid reason.
- ii. Cable Schedule shall be prepared for all cable connections.

4.3 ENGINEERING OUTPUTS:

Vendor shall prepare and submit following documents and drawings for purchaser's approval :

- a) Lighting calculations for indoor areas covering details such as room dimensions (length, width, height), illumination level, reflection factors (walls, ceiling, floor), maintenance factor, type of luminaire, mounting height of luminaire, room index, coefficient of utilisation, no. of luminaires (AC Normal & AC Emergency), lumen output of each luminaire, reference drawings and remarks.
- b) Lighting calculations for outdoor areas covering average illumination level, type of luminaire, chart for illumination level at various points in the area; location (coordinates), number and height of poles; type, number (normal + emergency) and orientation of luminaires etc. Calculated values of average and minimum illumination level as obtained through computer package shall also be furnished. Dot density plots for lux level shall be furnished if available in the computer package.
- c) Single line diagrams of power distribution upto Lighting Panels. Separate drawing for complete lighting distribution shall also be prepared by vendor.



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- d) Loads on each phase of LP and LDB with consideration of diversity factor for sockets.
- e) Layout drawings for each indoor area indicating location of luminaires, sockets, fan points, exhaust fans, LDBs and LPs. Details of type of luminaires, source of power supply (AC Normal, AC Emergency, DC Normal and DC Emergency). Bill of Material shall also be covered which shall include unit wise requirements of luminaires and other items.
- f) Layout drawings for each outdoor area indicating location of poles / towers, orientation of luminaires, sockets and LPs. Details of pole height / mounting height, type of luminaires, source of power supply (AC Normal, AC Emergency, DC Emergency). Bill of Material shall also be covered for various types of luminaires.
- g) Conduit layout drawings with wiring and load distribution details as superimposed on the area layout drawings indicated above. Drawings shall include Bill of Material for conduits, wires etc.
- h) Wiring and load distribution details for outdoor areas.
- i) Master Bill of Material (to be submitted at regular intervals of engineering progress) including all items required for the complete lighting system viz. lighting fixtures, lamps, Lighting DBs, Welding DBs, lighting panels, conduits, PVC wires etc.
- j) In case of revised inputs or site feedback, preparation and submission of revised engineering outputs shall also be in the scope of vendor.
- k) Calculation for selection of number and size of containers
- l) Packing procedures drawings.

5.0 LUMINAIRES, ACCESSORIES AND LAMPS

5.1 GENERAL REQUIREMENTS OF LUMINAIRES

- a) All luminaires and accessories shall be designed for continuous operation and shall be suitable for the system design data given in Data Sheet A.
- b) Luminaires shall be complete with accessories mounted inside the luminaire assembly. Lamps shall be supplied separately as per BOQ.
- c) All luminaires and accessories shall be suitable for operation in the atmospheric conditions prevailing at site.
- d) Power factor for fluorescent lamp luminaires shall be 0.9 or more and that for HPMV/ HPSV luminaires shall be 0.85 or more. Power factor correction capacitors shall be provided for this purpose.



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- e) Luminaires shall be designed for minimum glare. No bright spots should appear from the lamp or from the reflectors.
- f) All accessories shall be wired upto a terminal block or a separate weather proof metallic terminal box suitable for 2.5 sq. mm. copper wire termination.
- g) All internal wiring shall be of PVC or silicon rubber insulation, capable of withstanding the maximum temperature to which it will be subjected under specified service conditions without deterioration.
- h) All luminaires and accessories including the breathing holes shall be vermin proof.
- i) Surface Treatment:
 - All surfaces after manufacture shall be thoroughly cleaned and degreased. Pre-treatment of surfaces shall be as per the applicable standard. Pretreated surfaces shall be free from rust, sharp edges, scales and burrs.
 - Finish of surfaces shall be non-porous, smooth and unfaded.
- j) All metal parts of the luminaires shall be bonded and connected to the earthing terminal. Earthing terminal shall be suitable for connecting 14 SWG GI wire.
- k) Flood lights shall be provided with base frame / base plate for mounting on structural steel members / wall.
- l) All weather proof luminaires shall have the control gear housed in a weather proof enclosure with necessary gaskets, mounting bracket, locking screws etc.

5.2 LUMINAIRE TYPES & OTHER ITEMS

5.2.1 General requirements depending upon type of luminaire are listed below. Specific requirements of each luminaire are indicated in "Luminaire Details" enclosed as Annexure-I.

a) Channel Mounted Luminaires (Fluorescent Luminaires)

- Channel mounted luminaires, except the special purpose luminaires, shall have CRCA sheet steel base plate / rail / channel / box / side panels / housing as per "Luminaire Details". Sheet shall be completely stove enameled unless mentioned vitreous enameled in "Luminaire Details". Colour of enamel shall be grey on all non-reflecting surfaces and white on reflecting surfaces.
- Twin fluorescent luminaires shall be wired in lead-lag circuit to minimise stroboscopic effect.
- Luminaires suitable for surface mounting shall also be suitable for pendant mounting. Knockouts of 20mm ET conduit fixation shall be provided for this purpose.



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b) Decorative Fluorescent Luminaires

- Decorative luminaires shall be provided with one of the following as per “Luminaire Details” :
 - i. Perspex acrylic diffuser.
 - ii. High purity, anodised aluminium, mirror optic reflectors with anodised aluminium matt finish transverse fins to control glare.
 - iii. Opal polystyrene louvers and sheet steel side panels.
 - iv. Vertical metallic louvers finished in stove enamelled white and with sheet steel side panels.
- End plates of decorative luminaires shall be of high impact polystyrene or sheet metal finished in black colour.
- Diffusers and louvers for the fluorescent lamps shall be made of high impact polystyrene sheet and shall have no yellowing property over a prolonged period of use.
- Recessed type decorative luminaires shall be suitable for mounting with gypsum boards / luxalon / plaster of Paris/aluminium frame false ceiling of standard size as per Data Sheet A and “Luminaire details”.

c) Industrial Fluorescent Luminaires (General Purpose)

- Additional reflectors, wherever provided, shall be easily removable type.

d) Industrial Fluorescent Luminaires (Special Purpose)

- Luminaires for chemical vapour (acidic / alkaline) laden environment shall be of cast aluminium controlgear box and end boxes. Controlgear housing shall have detachable, one piece neoprene gasket cover to make it weather proof. Design shall be suitable for chemically charged environment.
- Luminaires for corrosive and dust laden environment shall be made of tray type sheet steel housing and transparent acrylic visor supported by a galvanised sheet steel frame, fitted to the housing with gasket all around. Cable entry shall be from the side of luminaire. Luminaire shall be totally dust and vapour proof.
- Luminaires for highly corrosive environment shall have with sheet aluminium/ polycarbonate housing. controlgear housing, CRCA sheet steel controlgear tray with a stove enamelled white reflector. A clear acrylic cover of dish shape, secured to canopy by stainless steel toggle and neoprene gasket lining, shall be provided at the bottom.



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- Luminaires for drip proof environment such as street lighting fluorescent luminaire shall have sheet aluminium canopy, a detachable reflector-cum-controlgear housing, clear ribbed acrylic cover held in aluminium frame. Luminaire shall have the degree of protection IP:55 unless mentioned otherwise in Data Sheet A. Luminaire shall be suitable for side entry mounting with the pole bracket arm.

e) Bay Type Luminaires

- Luminaires shall be designed for following indoor applications:
 - i) High bay
 - ii) Medium bay
 - iii) Low bay
- Luminaires shall have top mounted, cast aluminium controlgear housing. Housing shall have cooling fins and canopy for easy access to the components. Canopy shall be hinged at one end and wing screw bolted at the other end.
- Controlgear shall be connected to the detachable lamp housing at the bottom such that heat dissipation is proper and distributed.
- Lamp housing-cum-reflector shall be made from spun aluminium, electrochemically brightened and anodised.
- Lamp housing for the dust laden environment shall be totally enclosed type. A clear toughened glass cover shall be attached to the lamp housing with an aluminium frame and neoprene gasket. Luminaire shall be provided with a safety chain for toughened glass.
- Mounting arrangement shall consist of MS brackets with an anti-vibration eye-bolt.
- Side mounted controlgear box shall be provided for low bay luminaires, if mentioned in "Luminaire Details".

f) Well Glass Luminaires

- Well glass luminaires shall be suitable for dust and vapour laden environment.
- Luminaires shall be provided with a die-cast aluminium canopy and heat resistant well glass, fitted with a ring type gasket.
- All well glass luminaires shall be provided with vitreous enamelled reflector.
- Zinc plated MS wire guard shall be provided for protection of well glass.



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- Separate side mounted and top connected controlgear box shall be provided for use with HPMV & HPSV lamps. Separate, non-integral controlgear box is also acceptable.
- Integral controlgear box, where applicable, shall be of die cast aluminium material with one piece neoprene gasket between the box and its cover to make it dust and vapour proof.
- Luminaires shall be conduit mounted type for incandescent lamps and surface mounting type for HPMV & HPSV lamps.

g) Flame Proof Well Glass Luminaires

- Housing material shall be cast aluminium alloy LM6. Housing outer surface shall be provided with cooling fins.
- Flame proof luminaires shall be provided with heavy toughened well glass cemented in a retaining ring.
- Zinc-coated / chrome-plated MS chain connected to the main body and glass retaining ring shall be provided.
- A detachable terminal box at the top shall be provided.
- Neoprene gaskets, where needed, shall be provided for weather proof construction and indoor and outdoor application.
- Two cable entries of 20mm ET conduit shall be provided with one flame proof plug.
- Luminaires shall be suitable for the hazardous areas as classified in Data Sheet A. Design of flame proof luminaire shall be supported by the type test report for flame proofness from a government or government approved independent laboratory.

h) Street Lighting Luminaires (Other than Fluorescent Luminaire)

- These luminaires shall be suitable for street lighting and general purpose outdoor area lighting.
- Luminaire housing shall be one piece cast aluminium alloy to accommodate lamp housing and controlgear for lamp wattage upto 150 watts. For lamp wattage above 150 watts, controlgear housing shall be of cast aluminium alloy whereas lamp housing shall be of deep drawn aluminium.
- Inside finish of the lamp housing shall be stove enamelled white. Optical control shall be provided with two high purity, electro brightened and anodised side reflectors.



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- Clear acrylic bowl fitted with a rubber gasket and easily removable type shall be secured to the lamp housing.
- Provision shall be made for adjustment of lamp location for proper focussing.
- Luminaires shall be suitable for mounting with pole bracket arm.

i) Flood Lighting Luminaires

- Flood light lamp housing and reflector shall be separate from controlgear box. Requirements of controlgear box are specified elsewhere.
- Lamp reflectors shall be of high purity spun aluminium attached to the cast aluminium lamp holder housing at the rear. Lamp holder housing shall be provided with cooling fins.
- Reflector shall be closed from the front by heat resistant toughened glass and synthetic "S" type weather proof gasket.
- Luminaire shall be provided with special lamp centering and focussing device ensuring good beam control.
- MS mounting bracket shall allow fixation of the flood light in any position in a horizontal plane and the flood light can be locked in at any set angle in the vertical plane. Cast iron base and / or two protector scales shall also be provided where specified in "Luminaire Details"
- Design shall permit replacement of lamp from the rear without disturbing the previously set aiming angles. Special guide pins shall also be provided for protecting the lamps from damage while replacing.

j) Halogen Flood Lighting Luminaire

- Luminaires shall be compact in design with aluminium alloy housing and three piece highly polished and anodised reflector assembly.
- Toughened glass panel in the front shall be provided with silicon gaskets.
- Lamp replacement from the front is also acceptable.

k) Post Top Lanterns

- Luminaire shall comprise of a spun aluminium canopy, opal acrylic diffuser and a cast aluminium spigot.
- Controlgear shall be integral type and shall be housed in the spigot.
- Luminaire shall be supplied without mounting pole.

l) Bulk Head (Flame Proof)



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- Bulk head luminaires shall be used for the locations where explosion or fire hazard exists.
- Luminaire shall be made of cast iron housing with integral terminal box.
- Front of the luminaire shall be covered with flat toughened glass cemented into a retaining ring.
- Lamp replacement shall be from the front.
- Controlgear box for HPMV lamps shall be integral to the housing.
- MS fixing straps shall be provided for mounting.
- Luminaire shall be stove enameled grey outside and white inside.
- Terminal box shall be provided with 20 mm ET conduit entry.
- Complete luminaire shall be suitable for the hazardous area as classified in Data Sheet A. Type test certificate for flame proofness test from government or government approved independent laboratory shall be submitted.

m) Bulk Head (Weather Proof)

- Luminaire shall be suitable for indoor / outdoor applications having weather proof features.
- The luminaire shall comprise of die cast aluminium alloy body of dish shape.
- Luminaire shall have a heat resistant prismatic cover held in a weather proof gasket.
- Luminaire shall be stove enamelled grey outside and white inside.
- Glass cover shall have a galvanised wire protection.
- Luminaire shall be provided with locking arrangement with Allen key to prevent pilferage.
- Luminaire shall be suitable for use with incandescent lamp upto 100W.
- Provision for 20 mm ET conduit entry shall be provided at the bottom.

n) LED type Luminaires:

- LED Luminaires shall be used for the lighting if specified in BOQ as part of NIT.
- In false ceiling area LED luminaires shall be recessed mounting type & in non-false ceiling area the LED luminaires shall be surface mounting type.



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- The individual lamp wattage for LED shall be upto 3 watt.
- The LED chip efficacy shall be min 120 Lm/W. The luminaire efficacy shall be not less than 70 Lm/W.
- The LED used in the luminaires shall have colour rendering index (CRI) of Min 65. Colour designation of LED shall be “cool day light” (min 5700K) type.
- The LED luminaire shall have minimum life of 25,000 burning hours with 80% of lumen maintenance at the end of the life.
- The beam angle for LED chip shall be 120 degrees.
- 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 PTFE cable.
- 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. The entire housing shall be dust and water proof protection as per IS 12063.
- 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 manufacturer. LED Drivers may have following control & protections:
 - Suitable precision current control of LED.
 - Open Circuit Protection
 - Short Circuit Protection
 - Over Temperature Protection
 - Overload Protection

o) Emergency Lighting Luminaires



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- The luminaire shall be automatic having in-built battery.
- Battery shall have integral charging unit.
- Charger shall be suitable for operation as per system design data.
- The battery enclosure shall be suitably painted and ventilated for the performance with sealed lead acid battery, as applicable.

5.3 CONTROLGEAR BOX (NON-INTEGRAL TYPE)

- a) Boxes shall have weatherproof construction and shall be provided with one piece neoprene gasket.
- b) Boxes shall be provided with HRC fuse mounted on a removable tray. Boxes shall be provided with all necessary components having a neat layout arrangement such that it is possible to test, inspect or replace any component without difficulty.
- c) Boxes shall be suitable for mounting on structures, walls and columns.
- d) Suitable number of terminals shall be provided for looping-in and looping-out of cable connections and also connections to the luminaire(s).
- e) Cable / conduit knock-outs shall be for each loop-in and loop-out connection and also connection to the luminaire(s).

5.4 REFLECTORS

- a) Reflectors shall be made of sheet steel or aluminium as applicable.
- b) The aluminium reflectors shall be made of high purity aluminium sheet. Sheet will be polished, electrochemically brightened and anodised.
- c) Wherever reflectors are separate from housing, they shall be securely attached to the luminaire by means of easily accessible fastening devices such that they are readily removable from the housing for maintenance.

5.5 LAMP HOLDERS

- a) Holders shall be resistant to wear and shall be smooth in operation.
- b) Contacts shall be of durable quality.
- c) Holders shall hold the lamp under condition of shock and vibration.
- d) Lamp holders for fluorescent lamp shall be spring loaded, bi-pin, rotor type with low contact resistance.



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- e) Live parts of the holder shall not be exposed when the lamp is inserted or removed in case of fluorescent luminaires.
- f) Lamp holders for HPMV & HPSV lamps shall be of porcelain material.
- g) Holders shall be screw type for HPSV & HPMV lamps. Holders for incandescent lamps shall be screw type, unless mentioned otherwise in Data sheet A.
- h) Lamp holders for incandescent lamps shall be of brass or porcelain.

5.6 STARTER HOLDERS

- a) Starter holders shall be designed and manufactured as per the applicable standard.

5.7 BALLASTS

- a) Fluorescent fixtures shall have electronic ballasts. Ballasts shall be totally enclosed type.
- b) Ballasts shall be easily removable type.
- c) Core shall be made of low loss, electrical grading stampings.
- d) End connections shall be made available in a terminal block, rigidly fixed to the ballast enclosure.
- e) Ballasts shall be free from humming.
- f) Ballast shall be provided separately for each lamp in a multi-lamp luminaire.
- g) Tappings shall be provided to set the voltage within range for HPMV & HPSV luminaires.

5.8 STARTERS

- a) Starters shall be made of aluminium material. Plastic or any other material if used shall be subject to purchaser's approval.
- b) Starters shall have bi-metal electrodes.
- c) Starter shall be replaceable without the use of any tool and without disturbing any accessory or lamp.
- d) Starters shall have high mechanical strength.
- e) Starters shall be provided with radio interference suppressing capacitors.
- f) Starters shall have brass contacts.



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5.9 CAPACITORS

- a) Capacitors shall have constant value of capacitance, suitable for operation at supply voltage.
- b) Capacitors shall be hermetically sealed, preferably in a metal enclosure to prevent seepage of impregnant and ingress of moisture.

5.10 LAMPS

- a) Lamps shall be suitable for use in any position.
- b) Lamps shall be capable of withstanding small vibrations without breakage to filaments / electrodes and lead-in wire.

5.10.1 Type of Lamps

- a) Fluorescent Lamp
 - i. Anode rings shall be provided to prevent blackening of the ends.
 - ii. Lamp caps shall be two pin type at each end.
- b) Incandescent (GLS) Lamps
 - i. Incandescent lamps shall be "clear" type.
- c) Mercury Vapour Lamps
 - i. Lamp caps shall be screw type.
- d) Sodium Vapour Lamps
 - i. Lamps shall be ovoid shaped with diffusing powder coating.
 - ii. Lamps shall be provided with external igniters and rapid restart facility.
 - iii. Lamp caps shall be screw type.
- e) Halogen Lamps
 - i. Lamps shall be double ended linear type.
 - ii. Lamps shall be of immediate start type.
 - iii. Design of lamps shall ensure high performance and high efficiency.

5.11 JUNCTION BOXES

- a) Junction boxes with terminals shall be supplied for branching and terminating lighting wires/cables whenever required, as specified.



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b) Construction Features

- i. The junction boxes shall be fabricated out of material & thickness as specified in Datasheet-A and shall be of rectangular shape. The cover shall be hinged or bolted with captive nuts and bolts and shall be provided with neoprene gasket lining all over.
- ii. The junction boxes shall be provided with suitable knock outs/ gland plates for conduit/ cable connection. The conduit connection shall be properly sealed. The junction boxes meant for cable connection shall be complete with removable gland plates, glands and cable lugs, as required. The junction boxes shall be provided with two earthing terminals suitable for GI earthing wires.
- iii. The junction boxes shall be weather proof type conforming to IP-55..
- iv. The boxes and cover shall be hot dip galvanised. Junction boxes for corrosive areas like DM Plant, water treatment plant etc. shall have additional epoxy/acrylic coating of thickness not less than 50microns on outer surface.
- v. The junction boxes shall be suitable for mounting on wall, columns, etc. The brackets, bolts, nuts, screws and any other erection accessories required for erection shall be included.

c) Terminals

- i. Multiway terminal blocks of approved type and make complete with galvanised screws, nuts, washers and marking strips shall be furnished for terminating the lighting wires.
- ii. All the terminals blocks shall be of 650V grade one piece construction with insulating barriers. These terminals shall be made of copper alloy and shall be stud type. Each terminal provided on junction box shall be suitable for terminating two numbers of aluminium conductors of the size as specified without any damage to the conductors or looseness.

d) The junction boxes shall be of following types:

Type	Description
JB-F	Provided with four (4) way stud type terminals for terminating upto 2 nos. 10 mm ² stranded aluminium conductors on each terminal, suitable for outdoor installations.
JB-FE	Same as above but with an additional epoxy coating of 50 micron thickness.
JB-S	Provided with four (4) way stud type terminals, each terminal suitable for terminating upto two nos. of 3.5Cx50 mm ² stranded aluminium conductors & with one no.6A HRC fuse and link.



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5.12 RECEPTACLES

- a) Receptacle unit shall consist of socket outlet with associated switch and plug. The socket outlet and switch shall be flush mounted on a box which shall be suitable for mounting on wall or steel structures.
- b) Receptacle boxes shall be fabricated from material with thickness mentioned in Data Sheet A.
- c) Steel boxes shall be hot dip galvanised/ painted as specified in Datasheet-A.
- d) The boxes shall have conduit knock-outs and shall be suitable for cable entry of the size to be specified by purchaser during detailed engineering.
- e) The boxes shall be provided with neoprene rubber gaskets to make them moisture and dust proof.
- f) Suitable loop-in and loop-out terminals shall be provided inside the box. Terminals for incoming and outgoing shall be suitable for the size of conductor of cables.
- g) The receptacle units shall be of the following types:
 - I. Type RA: It shall have the following:
 - i. 20A, 240V, 1-phase, 2 pole, 3-pin (third pin scrapping earth) porcelain, metal clad socket with a metallic cover tied to it.
 - ii. Rotary, heavy duty 20A switch conforming to applicable standard.
 - iii. Shrouded, die-cast aluminium plug.
 - iv. It shall be combined interlocked weather proof industrial unit.
 - v. Mechanical interlock shall be provided as follows :
 - Switch can be put ON only when plug is fully engaged.
 - Plug can be withdrawn only when switch is in OFF position.
 - Cover can be opened only when switch is in OFF position.
 - vi. The arrangement should ensure that water does not enter the plug when socket is ON.
 - vii. Loop-in loop-out terminals shall be provided inside the box suitable for 10 mm² Al conductor.
 - II. Type RB: It shall have the following:



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- i. Combination of 5A & 15A, 240V, 1-phase, 2 pole, 3-pin, third pin grounded socket with integral piano key type 15A switch, flush mounted on decorative bakelite (6 mm thick)/ perspex (3 mm thick) sheet as cover of the boxes.
 - ii. Loop-in loop-out terminals similar to type RA shall be provided. These will be located in office areas.
- III. Type RC: It shall have the following:
 - i. 63A, 415V, 3-phase-neutral earth, metal clad socket with cover
 - ii. Rotary, heavy duty 63A switch conforming to applicable standard.
 - iii. Shrouded, die-cast aluminium plug
 - iv. It shall be combined, interlocked weather proof industrial unit.
 - v. Mechanical interlock shall be same as that are applicable for RA type receptacles
 - vi. The receptacle boxes shall be suitable for entry and exit of 3.5CX70 mm² Al conductor PVC cable and loop-in loop-out terminals for the same shall be provided such that not more than one core is terminated at one terminal. Removable, undrilled cable gland plate shall be provided. Tinned copper lugs and double compression cable glands shall also be supplied by the bidder.
- IV. Type RD: It shall have the following:
 - i. 125A, 415V, 3-phase-neutral earth, metal clad socket with cover.
 - ii. Rotary, heavy duty 125A switch conforming to applicable standard.
 - iii. Shrouded, die-cast aluminium plug
 - iv. It shall be combined, interlocked weather proof industrial unit.
 - v. Mechanical interlock shall be same as that are applicable for RC type receptacles
 - vi. The receptacle boxes shall be suitable for entry and exit of 3.5CX95 mm² Al conductor PVC cable and loop-in loop-out terminals for the same shall be provided such that not more than one core is terminated at one terminal. Removable, undrilled cable gland plate shall be provided. Tinned copper lugs and double compression cable glands shall also be supplied by the bidder.
- V. Type RE: It shall have the following:



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- i. 5A, 240V, 1-phase, 2 pole, 3-pin, third pin grounded socket with integral piano key type 5A switch, flush mounted on decorative bakelite (6 mm thick)/ perspex (3 mm thick) sheet as cover of the boxes.
- ii. Loop-in loop-out terminals similar to type RA shall be provided. These will be located in office areas.

5.13 CEILING FAN & REGULATORS

- a) The bidder shall supply the following ceiling fans complete with suspension rod, canopy and accessories and regulators:
 - i. 1200 mm sweep
 - ii. 1400 mm sweep
- b) The fan motor shall be totally enclosed. The motor winding shall be of copper wire provided with double or reinforced class-E insulation.
- c) The fan shall have three (3) well balanced blades. Precaution shall be taken in the manufacture of fan as well as regulators to ensure reasonable degree of silence at all speeds.
- d) The regulator shall be electronic type with stepped/smooth (stepless) control of approved make.

5.14 LIGHTING CONTROL SWITCH-BOXES

- a) The switch-boxes shall be of bent steel construction, fabricated of 1.6 mm thick MS steel with 6 mm thick decorative bakelite or 3 mm thick perspex sheet cover. The boxes shall be hot dip galvanised.
- b) The switch-boxes shall be suitable for surface mounting as well as flush mounting in brick walls. They shall be flush mounted in the walls in the office areas where false ceiling is provided.
- c) Switch-boxes shall have conduit knock-out on two sides. Adequate provision shall be made for ventilation of these boxes. Conduit knock-out sizes shall be as per conduit layout drgs.
- d) Switches shall be of piano-key type having quick-make, quick-break mechanism, provided with position marking, suitable for mounting on insulating plate. The switches shall be suitable for 1-phase, 240V, 50 Hz supply. They shall conform to relevant standards. The switches shall be supplied loose and shall be fixed at site according to requirement.
- e) All components housed in the switch-boxes shall be wired to an outgoing junction box by 1.5 mm² Cu wire. The junction box shall have adequate nos. of terminals.



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- f) The size of switch-boxes shall be adequately chosen to accommodate the no. of switches and fan regulator boxes specified below. Fan regulators shall be supplied separately.

- i. Type SWB1 - Switch board with 1 no. 5A switch, JB type SW1.
- ii. Type SWB2 - 3 nos. 5A switches and 1 no. fan regulator, JB type SW2.
- iii. Type SWB2a - 4 nos. 5A switches, JB type SW2.
- iv. Type SWB3 - 7 nos. 5A switches, 3 nos. fan regulator, JB type SW3.
- v. Type SWB3a - 8 nos. 5A switches, JB type SW3.

JB details for lighting control switch boxes are as below :

JB-SW1 Provided with four (4) way stud type terminals, each terminal suitable for terminating upto two nos. of 10 mm² stranded aluminium conductor.

JB-SW2 Similar to the JB-SW1 but provided with ten (10) way terminals.

JB-SW3 Similar to the JB-SW1 but provided with eighteen (18) way terminals.

5.15 CABLE GLANDS

- a) Whether specifically mentioned or not, cable glands of suitable sizes shall be supplied along with each equipment for power and control cables.
- b) Rubber components used in the gland shall be of neoprene.
- c) Name / trade name of manufacturer, type no. and applicable range of outer diameter of cable shall be engraved / indelibly printed on the cable gland.

5.16 CABLE LUGS

- a) All equipment shall be supplied with the power and control cable lugs of suitable size, whether specifically mentioned or not.
- b) Name / trade name and size of lug shall be engraved/ indelibly printed on each cable lug.

5.17 FLEXIBLE METALLIC CONDUITS AND FITTINGS

- a) Flexible metallic conduits shall generally conform to the requirements of IS:3480.
- b) Flexible conduits shall be made of strip steel, which shall be of cold rolled mild steel. The strip shall be of uniform width and thickness throughout.
- c) The strip for making flexible conduit shall be wound tightly and so overlapped in subsequent helicals that no openings are seen in normal position.



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- d) The surface of the strip shall be thoroughly cleaned before application of protective coating. Pre-treatment, before galvanization, shall conform to IS:6005.
- e) The strip shall be electro-galvanized to a minimum thickness of 25 microns as per IS 3480.
- f) Flexible conduits shall be lead coated for application in high temperature zones if specifically mentioned in Data Sheet A.
- g) The conduit shall have uniform diameter throughout its length. The internal surface of all conduits shall be free from burrs and sharp edges and suitable for pulling insulated cables and wires without damage.

5.18 PVC CONDUITS

- a) PVC conduits shall generally conform to the requirements of IS: 9537(Part I & Part III).

6.0 SURFACE TREATMENT

- 6.1 All metal parts and the surfaces (exterior & interior) of equipment, unless stated otherwise in case of reflectors, shall be degreased by dipping in hot alkaline solution and rubbed with wire brush to remove oil & scale from them & then rinsed in water. Alternatively, they may be shot / sand blasted.
- 6.2 Parts shall be pickled by dipping in hydrochloric acid tank to remove the rust from the surfaces formed during storage of sheets & then rinsed to remove traces of the acid. The cleaning and pretreatment of all metal parts shall be as per applicable standard.
- 6.3 The surfaces to be painted shall then be prepared by phosphatizing to protect them from further rusting & to create a good bond with the paint. The pretreatment shall conform to the applicable standard.
- 6.4 All parts shall then be subjected to a coat of red oxide primer paint.
- 6.5 All inside and outside surfaces of panel shall be spray painted with synthetic enamel of the shade as per Data Sheet A.
- 6.6 Electrostatic or powder painting shall be acceptable subject to purchaser's approval.
- 6.7 Wherever possible, finished parts shall be coated with peelable compound by spraying method to protect the finished product from scratches, grease, dirty and oily spots during handling and transportation.

7.0 PACKING



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- 7.1 Vendor shall furnish packing procedure along with packing drawing at contract stage for applicable items for purchaser approval.
- 7.2 Containers adequate for storing 70% of P.O. quantity material at site are to supplied. Vendor shall furnish suitable justification to purchaser during detailed engineering for the number and size of containers being supplied.
- 7.3 Specification for the sea worthy packing, if enclosed, for the export jobs shall form part of the specification.

8.0 GUARANTEED PERFORMANCE REQUIREMENTS

- 8.1 The vendor shall guarantee satisfactory performance of the equipment supplied under all conditions and requirement as laid down by this specification.
- 8.2 Vendor shall ensure satisfactory performance for lighting system designed by them at site.

9.0 INSPECTION & TESTING

- 9.1 Bidder shall confirm compliance with the BHEL Standard Quality Plan (PE-QP-999-558-E006) without any deviations. The equipment which are not covered in the Quality Plan shall be tested as per the QP to be submitted by bidder. In case bidder has reference QP agreed with ultimate customer, same can be submitted for specific project after award of contract for BHEL/ ultimate customer's approval. There shall be no commercial implication to BHEL on account of any changes in QP during contract stage.
- 9.2 All the components and completely assembled equipment shall be tested as per the latest edition of standards. Charges for these tests shall be deemed to be included in equipment price.
- 9.3 All the specified type and routine tests shall be carried out to verify the rating and performance of the equipment. Where valid type test certificates in evidence of equipment performance claimed are available & approved by purchaser, the requirements for conducting type tests may be waived. The general arrangement of object under test shall be to purchaser's approval.
- 9.4 All manufacturing processes viz. machining, sheet forming, electroplating, wire routing, cleating & crimping, assembly, surface preparation shall conform to good manufacturing practices.
- 9.5 Inspection for dimensional & visual checks especially of the following, with respect to contract drawings, documents & standards shall be conducted:
 - a) General sturdiness & rigidity of equipment
 - b) Surface finishing
 - c) Gasketting
 - d) Inter-changeability



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e) Constructional features viz. location, accessibility & marking of components, segregation, accessibility to live parts (shrouding) etc.

f) Completeness of scope

9.6 Equipment shall be liable for rejection if tolerances on the values of dimensions, power consumption, impedances, temperature rise etc. exceed the specified values by purchaser and / or standards.

10.0 SPARES

10.1 Mandatory spares (if applicable) are indicated in BOQ-cum-price schedule.

10.2 Erection & commissioning spares are included in the bidder's scope of supply. BE&C spares are indicated in BOQ-cum-price schedule.

10.3 A list of recommended O&M spares quantities for a duration of 3 years A shall be filled up in the applicable schedule / format and submitted by bidder along with offer. However, the acceptance of the same shall not be binding on purchaser.

11.0 TOOLS AND TACKLE

11.1 Tools & tackle which are essential to facilitate assembly, adjustments, erection, maintenance & dismantling of equipment shall be provided as part of equipment supplied.

11.2 The above tools shall be supplied along with the initial consignment of equipment so as to be available prior to erection but may not be used for erection purposes.

11.3 Vendor shall also submit a list of recommended tools and tackle. Acceptance of these tools and tackle shall not be a binding on the purchaser.

11.4 Schedule of tools & tackle shall be filled up by bidder.

12.0 DOCUMENTATION

12.1 Documents to be submitted by the vendor immediately after award of contract

a) Bar chart of activities of manufacture, testing, inspection and despatch.

12.2 Documents to be submitted during detailed engineering of contract

12.2.1 Engineering documents (refer clause 4.3) to be generated by the vendor, if applicable.

- a) Lighting calculations for indoor areas.
- b) Lighting calculations for outdoor areas.
- c) SLD of power distribution upto LPs.
- d) Power load on each LP & LDB
- e) Layout drawings for indoor areas
- f) Layout drawings for outdoor areas.



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- g) Conduit layout drawings.
- h) Wiring and load distribution details for outdoor areas.
- i) Master Bill of Material.
- j) Packing Procedure & drawing.
- k) Calculation for selection of no. & size of container.

12.2.2 Other documents :

- a) Final Quality Plans
- b) Technical data sheet
- c) Polar curves, zonal flux diagram and CoU charts of luminaires.
- d) Complete design calculations for arriving at number of luminaires.
- e) Fixing / mounting details of luminaires and other items.
- f) General arrangement drawings of following:
 - i. Luminaires
 - ii. Receptacles
 - iii. 24 V Supply module
- g) Field Quality Plan as per General Technical Conditions.
- h) Control Scheme for fluorescent, HPMV and HPSV luminaires.
- i) Schematic drawings for LDBs / LPs.
- j) Type test certificates.
- k) Catalogues / leaflets

12.3 Operation and Maintenance (O&M) manual :

The document shall comprise of installation, operating and maintenance instructions for various items / components. The O&M manual shall include the following :

- a) Write ups / instructions / procedures for
 - i. Storage at site.
 - ii. Unpacking.
 - iii. Handling at site.
 - iv. Erection.
 - v. Pre-commissioning / commissioning tests.
 - vi. Operating procedures.
 - vii. Maintenance procedures.
 - viii. Precautions to be taken during operation and maintenance work.
 - ix. Trouble shooting charts covering problems, cause and solution.
- b) Approved Technical Data Sheets.
- c) Technical leaflet of various items / components.



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- d) Copies of the type, acceptance and routine test certificates in bound volume.
- e) Details of all components liable to be replaced during the life of the equipment.
- f) List of maintenance tools required.
- g) List of testing equipment required.

12.4 AS BUILT DRAWINGS

- a) Preparation of as-built drawings shall be in the scope of vendor.
- b) The as-built drawings shall be prepared on the basis of marked up copies received from the erection contractor.
- c) Entire work of as-built drawings shall be to the satisfaction of purchaser.



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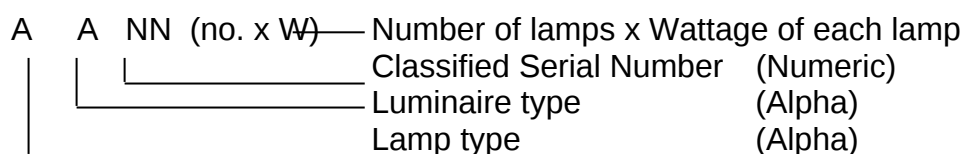
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ANNEXURE-I

LUMINAIRE DETAILS

LUMINAIRE CODING SCHEME

1.0 Code Structure



2.0 Lamp types

- | | | | |
|----|---|---|----------------|
| a) | F | - | Fluorescent |
| b) | M | - | Mercury Vapour |
| c) | S | - | Sodium Vapour |
| d) | T | - | Tungsten |
| e) | H | - | Halogen |

3.0 Luminaire types

- | | | | |
|----|---|---|-------------------------------|
| a) | C | - | Channel Mounted (Fluorescent) |
| b) | B | - | Bay Mounted |
| c) | W | - | Well Glass |
| d) | S | - | Street Lighting |
| e) | F | - | Flood Lighting |
| f) | H | - | Bulk Head |
| g) | P | - | Post Top Lantern |
| h) | E | - | Emergency Lighting |
| i) | X | - | Others |

4.0 Serial Numbers

- | | | |
|----|---------|------------------------------|
| a) | 01 - 20 | General Purpose (Industrial) |
| b) | 21 - 40 | Decorative |
| c) | 41 - 50 | Vapour Proof |
| d) | 51 - 60 | Dust Proof |
| e) | 61 - 70 | Drip Proof |
| f) | 81 - 90 | Corrosion Proof |
| g) | 91 - 99 | Flame Proof |

NOTES :

1. Flood lighting luminaires to have non-integral control gearbox.
2. All other luminaires shall have integral control gearbox, unless specifically mentioned otherwise in enclosed sheets.
3. For more details of each luminaire, refer specification.



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1.0 Fluorescent Lamp Luminaires

- | | | | |
|------|------|--------|---|
| 1.1 | FC01 | 1 x 28 | Fluorescent, industrial box type base without any cover. |
| 1.2 | FC02 | 2 x 28 | Fluorescent, industrial box type base without any cover. |
| 1.3 | FC03 | 1 x 28 | Fluorescent, industrial box type base and stove enamelled side reflectors. |
| 1.4 | FC04 | 2 x 28 | Fluorescent, industrial box type base and stove enamelled side reflectors. |
| 1.5 | FC05 | 1 x 28 | Fluorescent, industrial box type base and vitreous enamelled side reflectors. |
| 1.6 | FC06 | 2 x 28 | Fluorescent, industrial box type base and vitreous enamelled/ anodized glossy side reflectors. |
| 1.7 | FC07 | 1 x 18 | Fluorescent, industrial box type base and vitreous enamelled side reflectors operating on 220V DC input supply. |
| 1.8 | FC21 | 1 x 28 | Fluorescent, decorative with 3 side perspex acrylic diffuser. |
| 1.9 | FC22 | 2 x 28 | Fluorescent, decorative with 3 side perspex acrylic diffuser. |
| 1.10 | FC23 | 1 x 28 | Fluorescent, decorative, recessed type with perspex acrylic diffuser. |
| 1.11 | FC24 | 2 x 28 | Fluorescent, decorative, recessed type with perspex acrylic diffuser. |
| 1.12 | FC25 | 1 x 28 | Fluorescent, decorative, recessed type with mirror optic reflector. |
| 1.13 | FC26 | 2 x 28 | Fluorescent, decorative, recessed type with mirror optic reflector. |
| 1.14 | FC27 | 2 x 28 | Fluorescent, decorative with opal polystyrene louvers. |
| 1.15 | FC28 | 2 x 28 | Fluorescent, decorative, recessed type with opal polystyrene louvers. |
| 1.16 | FC29 | 2 x 28 | Fluorescent, decorative with vertical metallic louvers. |
| 1.17 | FC30 | 4 x 14 | Fluorescent, decorative, recessed type, 600 x 600 size with perspex acrylic diffuser. |
| 1.18 | FC31 | 4 x 20 | Fluorescent, decorative, recessed type, 600 x 600 size with opal polystyrene louvers. |



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1.19	FC32	2 x 20	Fluorescent, decorative, surface mounted with mirror optic reflector.
1.20	FC33	1 x 18	Fluorescent, decorative, recessed type with mirror optic reflector operating on 220V DC input supply.
1.21	FC34	1 x 18	Fluorescent, dust proof, totally enclosed type with sheet steel housing operating on 220V DC input supply
1.22	FC41	2 x 28	Fluorescent, vapour proof with end boxes and controlgear box of cast Al.
1.23	FC51	2 x 28	Fluorescent, dust proof, totally enclosed type with sheet steel housing.
1.24	FC61	1 x 28	Fluorescent, street light with sheet aluminium canopy and ribbed acrylic cover.
1.25	FC62	2 x 28	Fluorescent, street light with sheet aluminium canopy and ribbed acrylic cover.
1.26	FC81	2 x 28	Fluorescent, corrosion proof, totally enclosed type with sheet aluminium/ polycarbonate housing.

2.0 High Pressure Mercury Vapour (HPMV) Lamp Luminaire

2.1	MB01	1 x 250	Mercury, high bay, industrial type.
2.2	MB02	1 x 400	Mercury, high bay, industrial type.
2.3	MB03	1 x 1000	Mercury, high bay, industrial type.
2.4	MB04	1 x 250	Mercury, high bay, totally enclosed industrial type.
2.5	MB05	1 x 400	Mercury, high bay, totally enclosed industrial type.
2.6	MB06	1 x 250	Mercury, high bay with non-integral controlgear box.
2.7	MB07	1 x 400	Mercury, high bay with non-integral controlgear box.
2.8	MB11	1 x 250	Mercury, medium bay, industrial type.
2.9	MB12	1 x 400	Mercury, medium bay, industrial type.
2.10	MB13	1 x 250	Mercury, medium bay, totally enclosed industrial type.
2.11	MB14	1 x 400	Mercury, medium bay, totally enclosed industrial type.



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2.12	MB17	1 x 80	Mercury, low bay, industrial type.
2.13	MB18	1 x 125	Mercury, low bay, industrial type.
2.14	MB19	1 x 80	Mercury, low bay, totally enclosed industrial type.
2.15	MB20	1 x 125	Mercury, low bay, totally enclosed industrial type.
2.16	MW41	1 x 80	Mercury, well glass, vapour proof with vitreous enamelled reflector.
2.17	MW42	1 x 125	Mercury, well glass, vapour proof with vitreous enamelled reflector.
2.18	MW51	1 x 80	Mercury, well glass, dust proof with vitreous enamelled reflector.
2.19	MW52	1 x 125	Mercury, well glass, dust proof with vitreous enamelled reflector.
2.20	MW91	1 x 80	Mercury, well glass, flame proof with vitreous enamelled reflector and cast aluminium alloy LM6 housing.
2.21	MW92	1 x 125	Mercury, well glass, flame proof with vitreous enamelled reflector and cast aluminium alloy LM6 housing.
2.22	MW93	1 x 80	Mercury, well glass, flame proof with vitreous enamelled reflector and cast aluminium alloy LM6 housing
2.23	MW94	1 x 125	Mercury, well glass, flame proof with vitreous enamelled reflector and cast aluminium alloy LM6 housing.
2.24	MW95	1 x 80	Mercury, well glass, flame proof increased safety luminaire with vitreous enamelled reflector and cast aluminium alloy LM6 housing for Div.-2 areas.
2.25	MW96	1 x 125	Mercury, well glass, flame proof increased safety luminaire with vitreous enamelled reflector and cast aluminium alloy LM6 housing for Div. 2 areas.
2.26	MW98	1 x 125	Mercury, well glass, flame proof increased safety luminaire with vitreous enamelled reflector and cast aluminium alloy LM6 housing
2.27	MS61	1 x 125	Mercury, street light with one piece cast aluminium body.
2.28	MS62	1 x 250	Mercury, street light with two piece cast aluminium body.
2.29	MS63	1 x 400	Mercury, street light with two piece cast aluminium body.

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2.30 MF61 1 x 250 Mercury, flood light, general purpose.

2.31 MF62 1 x 400 Mercury, flood light, heavy duty type.

2.32 MF63 2 x 400 Mercury, flood light, heavy duty type.

2.33 MP21 1 x 80 Mercury, post top lantern

2.34 MP22 1 x 125 Mercury, post top lantern

3.0 High Pressure Sodium Vapour (HPSV) Lamp Luminaire

3.1 SB01 1 x 150 Sodium, high bay, industrial type.

3.2 SB02 1 x 250 Sodium, high bay, industrial type.

3.3 SB03 1 x 400 Sodium, high bay, industrial type.

3.4 SB04 1 x 150 Sodium, high bay, totally enclosed industrial type.

3.5 SB05 1 x 250 Sodium, high bay, totally enclosed industrial type.

3.6 SB06 1 x 400 Sodium, high bay, totally enclosed industrial type.

3.7 SB07 1 x 150 Sodium, high bay with non-integral controlgear box.

3.8 SB08 1 x 250 Sodium, high bay with non-integral controlgear box.

3.9 SB09 1 x 400 Sodium, high bay with non-integral controlgear box.

3.10 SB11 1 x 150 Sodium, medium bay, industrial type.

3.11 SB12 1 x 250 Sodium, medium bay, industrial type.

3.12 SB13 1 x 150 Sodium, medium bay, totally enclosed industrial type.

3.13 SB14 1 x 250 Sodium, medium bay, totally enclosed industrial type.

3.14 SB17 1 x 70 Sodium, low bay, industrial type.

3.15 SB18 1 x 150 Sodium, low bay, industrial type.

3.16 SB19 1 x 70 Sodium, low bay, totally enclosed industrial type.

3.17 SB20 1 x 150 Sodium, low bay, totally enclosed industrial type.

3.18 SW41 1 x 70 Sodium, well glass, vapour proof with vitreous enamelled/
powder coated type reflector.



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3.19	SW42	1 x 150	Sodium, well glass, vapour proof with vitreous enamelled/ powder coated type reflector.
3.20	SW51	1 x 70	Sodium, well glass, dust proof with vitreous enamelled reflector.
3.21	SW52	1 x 150	Sodium, well glass, dust proof with vitreous enamelled reflector.
3.22	SW91	1 x 70	Sodium, well glass, flame proof with vitreous enamelled reflector and cast aluminium alloy LM6 housing.
3.23	SW92	1 x 150	Sodium, well glass, flame proof with vitreous enamelled reflector and cast aluminium alloy LM6 housing.
3.24	SW93	1 x 70	Sodium, well glass, flame proof with vitreous enamelled reflector and cast aluminium alloy LM6 housing.
3.26	SW95	1 x 70	Sodium, well glass, flame proof increased safety luminaire with vitreous enamelled reflector and cast aluminium alloy LM6 housing for Div. 2 areas.
3.27	SW96	1 x 150	Sodium, well glass, flame proof increased safety luminaire with vitreous enamelled reflector and cast aluminium alloy LM6 housing for Div. 2 areas.
3.28	SS61	1 x 70	Sodium, street light with one piece cast aluminium body.
3.29	SS62	1 x 150	Sodium, street light with one piece cast aluminium body.
3.30	SS63	1 x 250	Sodium, street light with two piece cast aluminium body.
3.31	SS64	1 x 400	Sodium, street light with two piece cast aluminium body.
3.32	SF61	1 x 250	Sodium, flood light, general purpose.
3.33	SF62	1 x 400	Sodium, flood light, general purpose.
3.34	SF63	1 x 250	Sodium, flood light, heavy duty type.
3.35	SF64	1 x 400	Sodium, flood light, heavy duty type.
3.36	SF65	2 x 250	Sodium, flood light, heavy duty type.
3.37	SF66	2 x 400	Sodium, flood light, heavy duty type.
3.38	SP21	1 x 70	Sodium, post top lantern.



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4.0 Tungsten Lamp Luminaires

- | | | | |
|------|------|---------|--|
| 4.1 | TW41 | 1 x 100 | Tungsten, well glass, vapour proof with vitreous enamelled reflector. |
| 4.2 | TW42 | 1 x 200 | Tungsten, well glass, vapour proof with vitreous enamelled reflector. |
| 4.3 | TW51 | 1 x 100 | Tungsten, well glass, dust proof with vitreous enamelled reflector. |
| 4.4 | TW52 | 1 x 200 | Tungsten, well glass, dust proof with vitreous enamelled reflector. |
| 4.5 | TW91 | 1 x 100 | Tungsten, well glass, flame proof with vitreous enamelled reflector. |
| 4.6 | TW92 | 1 x 200 | Tungsten, well glass, flame proof with vitreous enamelled reflector. |
| 4.7 | TW95 | 1 x 100 | Tungsten, well glass, increased safety (Div. 2) with vitreous enamelled reflector. |
| 4.8 | TW96 | 1 x 200 | Tungsten, well glass, increased safety (Div. 2) with vitreous enamelled reflector. |
| 4.9 | TB21 | 1 x 60 | Tungsten, bulk head, weather proof. |
| 4.10 | TB22 | 1 x 100 | Tungsten, bulk head, weather proof. |
| 4.11 | TB91 | 1 x 100 | Tungsten, bulk head, flame proof. |
| 4.12 | TB92 | 1 x 200 | Tungsten, bulk head, flame proof. |
| 4.13 | TP21 | 1 x 200 | Tungsten, post top lantern. |
| 4.14 | TE02 | 1 x 20 | Tungsten, portable emergency unit with rechargeable battery. |
| 4.15 | TE02 | 1 x 40 | Tungsten, portable emergency unit with rechargeable battery. |
| 4.16 | TX01 | 1 x 60 | Tungsten, dispersive vitreous enamelled reflector. |
| 4.17 | TX02 | 1 x 100 | Tungsten, dispersive vitreous enamelled reflector. |
| 4.18 | TX03 | 1 x 75 | Decorative recessed mounting luminaire suitable for comptalux lamp. |
| 4.19 | TX04 | 1 x 100 | Decorative recessed mounting luminaire suitable for comptalux lamp. |

420877/2021/PS-PEM-EL



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4.20 TX05 2 x 100 Double obstruction aviation light of cast Al. alloy with red glass.

5.0 Halogen

5.1 HF61 1 x 300 Halogen, flood light, drip proof.

5.2 HF62 1 x 500 Halogen, flood light, drip proof.

5.3 HF63 1 x 750 Halogen, flood light, drip proof.

5.4 HF64 1 x 1000 Halogen, flood light, drip proof.

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN					SPEC. NO :		DATE:		
			CUSTOMER :					QP NO.:PE-QP-999-558-E001, R04		DATE: 23.06.2020		
			PROJECT:					PO NO.:		DATE:		
			ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS			SYSTEM:STATION LIGHTING SYSTEM		SECTION: II		SHEET 1 OF 10		
SL NO.	COMPONENT & OPERATIONS	CHARACTERIST ICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTAN CE NORMS	FORMAT OF RECORD		AGENCY	REMARKS
1	2	3	4	5	6		7	8	9	*	**	
					M	C/ N				D	M	C N

1.0 CONVENTIONAL TYPE LIGHTING FIXTURES

A	Bought out items / in-process checks													
1.1	Lamps	Make rating & type	Major	Visual	1 sample per type	-	Approved Data Sheet for rating & type , Make to be BIS approved with CML number	Approved Data Sheet for rating & type , Make to be BIS approved with CML number			P/ V *	-	-	Refer note No. 1
1.2	Electronic Ballast (if applicable)	Certificate of compliance	Major	Visual	Mnfr std.	-	Approved Data Sheet	Certificate of compliance by ballast manufacturer /lighting fixture that supplier that ballast meets all Approved Data Sheet requirements.	Certificate of compliance		P/ V *	-	-	Refer note No. 1
		THD and pf check	Major	Electrical	Mnfr std.	-	Approved Data Sheet	THD<=10% , pf>=0.9 for FH type and pf>=0.95 for other type of florescent lighting fixtures	Inspection report		P/ V *	-	-	Refer note No. 1

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		MEET SAGAR SINGH RAJPAL	Checked by:	09.07.20	KUNAL GANDHI
Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by JAISWAL	by RITESH KUMAR

Date: 2020.07.10 20:27:48 +05'30'

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN				SPEC. NO :		DATE:	
		CUSTOMER :				QP NO.:PE-QP-999-558-E001, R04		DATE: 23.06.2020	
		PROJECT:				PO NO.:		DATE:	
		ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS		SYSTEM:STATION LIGHTING SYSTEM		SECTION: II		SHEET 2 OF 10	

SL NO.	COMPONENT & OPERATIONS	CHARACTERIST ICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTAN CE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	C/ N				D	M	C	N	
1.3	Castings	Freedom from defects	Major	Visual	Mnfr std.	-	Approved Data Sheet	Casting shall be free from any defects such as blow holes , surface blisters , cracks and cavities etc.	Inspection report		P/ V *	-	-	Refer note No. 1
1.4	Sheet metal forming and fabrication	Freedom from defects	Major	Visual	Mnfr std.	-	Approved Data Sheet	Sheet metal fabrication / forming etc should be as per manufacturer drgs.	Inspection report		P/ V *	-	-	Refer note No. 1
1.5	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 , Approved Data Sheet	Nominal coating thickness 50 microns or more	Inspection report		P/ V *	-	-	Refer note No. 1
B. ACCEPTANCE TEST														

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	09.07.2020	MEET SAGAR SINGH RAJPAL		09.07.20	KUNAL GANDHI						
Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by RITESH KUMAR JAISWAL							

Date: 2020.07.10 20:28:22 +05'30'

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN				SPEC. NO :		DATE:	
		CUSTOMER :				QP NO.:PE-QP-999-558-E001, R04		DATE: 23.06.2020	
		PROJECT:				PO NO.:		DATE:	
		ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS		SYSTEM:STATION LIGHTING SYSTEM		SECTION: II		SHEET 3 OF 10	

SL NO.	COMPONENT & OPERATIONS	CHARACTERIST ICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTAN CE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	C/ N				D	M	C	N	

CONVENTIONA L TYPE LIGHTING FIXTURES	a) VISUAL	MA	VISUAL	IS 10322 (PART5 SEC1)	IS 10322 (PART 5 SEC1)	IS 10322 / APPD GA	IS 10322 / APPD GA	Inspection report	√	P	W	W	
	b) IR (Dry)	CR	Electrical	IS 10322	IS 10322	IS 10322	IS 10322	Inspection report	√	P	W	W	
	c) HIGH VOLTAGE	CR	Electrical	IS 10322	IS 10322	IS 10322	IS 10322	Inspection report	√	P	W	W	
	d) DUST PROOF	CR	Electrical	IS 10322	IS 10322	IS 10322	IS 10322	Inspection report	√	P	W	W	
	e) PHOTOMETRIC	CR	Electrical	IS-10322	*	IS 10322	IS 10322	Inspection report	√	P	W	W	*: One no.Luminaire of each type to be witnessed by BHEL/ Customer
	2. ROUTINE TEST												
	a) VISUAL	MA	Visual	IS 10322 (PART5 SEC1)	IS 10322 (PART 5 SEC1)	IS 10322 / APPD GA	IS 10322 / APPD GA	Test cert	√	P	V	-	
	b) IR (Dry)	CR	Electrical	IS 10322	IS 10322	IS 10322	IS 10322	Test cert	√	P	V	-	
	c) HIGH VOLTAGE	CR	Electrical	IS 10322	IS 10322	IS 10322	IS 10322	Test cert	√	P	V	-	

KUNAL
09.07.20 GANDHI

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	09.07.2020	MEET SAGAR SINGH RAJPAL		09.07.20	KUNAL GANDHI
Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by JAISWAL	by RITESH KUMAR

Date: 2020.07.10 20:28:57 +05'30'

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			ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS			SYSTEM:STATION LIGHTING SYSTEM		SECTION: II			SHEET 4 OF 10		
SL NO.	COMPONENT & OPERATIONS	CHARACTERIST ICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTAN CE NORMS	FORMAT OF RECORD		AGENCY		REMARKS
1	2	3	4	5	6		7	8	9	*	**		
					M	C/ N				D	M	C	

2.0 LED TYPE LIGHTING FIXTURES

A	Bought out items / in-process checks													
1.1	LED chip	LED chip efficacy	Major	Visual	Mnfr. Std.	-	LM 80 report	Appd Data Sheet	LM 80 report	√	P/ V	V	V	At the time of final Inspection
		LED chip CRI & CCT	Major	Visual	Mnfr. Std.	-	LM 80 report	Appd Data Sheet	LM 80 report	√	P/ V	V	V	At the time of final Inspection
		Reported TM21 (L80) lifetime of LED chip	Major	Visual	Mnfr. Std.	-	LM 80 report	Appd Data Sheet	LM 80 report	√	P/ V	V	V	At the time of final Inspection
1.2	LED Driver	Compatibility with LED module / chip, controls & protection features	Major	Visual	Mnfr. Std.	-	Appd Data Sheet	Appd Data Sheet	Certificate of Complianc e	√	P/ V	V	V	Certificate of Compliance by LED driver manufacturer / lighting fixture supplier that driver meets all specifications requirement
		THD & pf check	Major	Electrical	Mnfr. Std.	-	Appd Data Sheet	THD <10% and pf >=0.9	Inspection report	√	P/ V *	-	-	Refer note No. 1

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	09.07.2020	MEET SAGAR SINGH RAJPAL		09.07.20	KUNAL GANDHI						
Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by RITESH KUMAR JAISWA							

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	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN					SPEC. NO :		DATE:				
			CUSTOMER :					QP NO.:PE-QP-999-558-E001, R04		DATE: 23.06.2020				
			PROJECT:					PO NO.:		DATE:				
			ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS			SYSTEM:STATION LIGHTING SYSTEM		SECTION: II		SHEET 5 OF 10				
SL NO.	COMPONENT & OPERATIONS	CHARACTERIST ICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTAN CE NORMS	FORMAT OF RECORD		AGENCY	REMARKS		
1	2	3	4	5	6		7	8	9	*	**			
					M	C/ N				D	M	C	N	
1.3	Castings	Freedom from defects	Major	Visual	Mnfr. Std.	-	Mnfr. Std.	Casting shall be free from any defects such as blow holes , surface blisters , cracks and cravities etc.	Inspection report		P/ V *	-	-	Refer note No. 1
1.4	Sheet metal forming and fabrication	Freedom from defects	Major	Visual	Mnfr. Std.	-	Mnfr. Std.	Mnfr. Std.	Inspection report		P/ V *	-	-	Refer note No. 1
1.5	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. Std.	Nominal coating thickness 50 microns or more	Inspection report	√	P/ V *	V	V	Refer note No. 1

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	09.07.2020	MEET SAGAR SINGH RAJPAL		09.07.20	KUNAL GANDHI
Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by	RITESH KUMAR JAISWAL

Date: 2020.07.10 20:30:04 +05'30'

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Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN				SPEC. NO :		DATE:			
			CUSTOMER :				QP NO.:PE-QP-999-558-E001, R04		DATE: 23.06.2020			
			PROJECT:				PO NO.:		DATE:			
			ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS		SYSTEM:STATION LIGHTING SYSTEM		SECTION: II		SHEET 6 OF 10			
SL NO.	COMPONENT & OPERATIONS	CHARACTERIST ICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTAN CE NORMS	FORMAT OF RECORD		AGENCY	REMARKS
1	2	3	4	5	6		7	8	9	*	**	
					M	C/ N				D	M	C N

B	Acceptance Tests on LED Lighting fixtures													
1	LED Lighting fixture	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 fixtures supplier to submit the details of lot offered for inspection (Type of lighting fixtures, their batch number, sub-vendor , name, quantity)	-	List	√	P	V	V	The list may be used for sample selection.
2		LED chip make	Major	Visual	-		Accepted type test reports (LM80/LM79) report	Certificate of compliance	Certificate of compliance	√	V	V	V	
3		Constructional features including: Internal writing , terminal block, earthing terminal, safety chain (if applicable)	Major	Visual	1 Sample per type	1 Sample per type	Approved data sheet/drg.	Approved data sheet/drg.	Inspection report	√	P	W	W	
4		Resistance to moisture test in	Major	Mechanical	1 Sample	1 Sample	IS 10322 / Approved data	Approved data sheet	Inspection report	√	P	W	W	

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal			Sign & Date	Name	Seal
	09.07.2020	MEET SAGAR SINGH RAJPAL		09.07.20	KUNAL GANDHI						
Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by RITESH KUMAR JAISWAL							

Date: 2020.07.10 20:30:34 +05'30'

		MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN				SPEC. NO :		DATE:				
				CUSTOMER :				QP NO.:PE-QP-999-558-E001, R04		DATE: 23.06.2020				
				PROJECT:				PO NO.:		DATE:				
				ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS		SYSTEM:STATION LIGHTING SYSTEM		SECTION: II		SHEET 7 OF 10				
SL NO.	COMPONENT & OPERATIONS	CHARACTERIST ICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTAN CE NORMS	FORMAT OF RECORD		AGENCY	REMARKS		
1	2	3	4	5	6		7	8	9	*	**			
					M	C/ N				D	M	C	N	
		case of lighting fixtures having IP X4 and above rating.			e per type	e per type	sheet/drg							
5		Resistance to dust (applicable if IP5X and above)	Major	Optical	Mnfr. Std.	-	IS 10322 / Approved data sheet/drg.	Approved data sheet/drg	Certificate of compliance	√	P/ V *	V	V	Refer note No. 1
6		Photometry check	Major	Optical	Mnfr. Std.	-	LM79, IS 16106, IS 16107	Certificate of compliance for the batch: that offered lighting fixture LOR and lighting fixtures efficacy is not be less than 90% (refer IS 16107) with reference to type test reports.	Certificate of compliance	√	P/ V *	V	V	Refer note No. 1
7		Dimensions	Major	Visual	1 Sample per type	1 Sample per type	Approved data sheet/drg.	Approved data sheet/drg.	Inspection report	√	P	W	W	
8		LED driver: THD and pf check	Major	Visual	1 Sample	1 Sample	Approved data sheet	THD<10% and pf >= 0.9	Certificate of	√	P	W	W	At lighting fixtures supplier test lab.

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	09.07.2020	MEET SAGAR SINGH RAJPAL	Checked by:	09.07.20	KUNAL GANDHI
Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by JAISWAL	RITESH KUMAR

Date: 2020.07.10 20:31:04 +05'30'

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN				SPEC. NO :		DATE:	
		CUSTOMER :				QP NO.:PE-QP-999-558-E001, R04		DATE: 23.06.2020	
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SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	* D	**			
					M	C/ N					M	C	N	

					e per type	e per type			compliance					
9		LED driver: Precision current control check	Major	Electrical	1 Sample per type	1 Sample per type	Approved data sheet	Approved data sheet	Inspection report	√	P	W	W	
10		LED driver: Open circuit protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved data sheet	Approved data sheet	Inspection report	√	P	W	W	
11		LED driver: short circuit protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved data sheet	Approved data sheet	Inspection report	√	P	W	W	
12		LED driver: over temperature protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved data sheet	Approved data sheet	Inspection report	√	P	W	W	
13		LED driver: overload protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved data sheet	Approved data sheet	Inspection report	√	P	W	W	
14		LED driver: surge protection compliance check	Major	Electrical	-	-	Approved data sheet	Certificate of compliance that surge protection is provided.	Certificate of compliance	√	V	V	V	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	 09.07.2020	MEET SAGAR SINGH RAJPAL	Checked by:	 09.07.20	KUNAL GANDHI
Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by RITESH KUMAR JAISWAL	

Date: 2020.07.10 20:31:35 +05'30'

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
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Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN					SPEC. NO :		DATE:		
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			ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS			SYSTEM:STATION LIGHTING SYSTEM		SECTION: II		SHEET 9 OF 10		
SL NO.	COMPONENT & OPERATIONS	CHARACTERIST ICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTAN CE NORMS	FORMAT OF RECORD		AGENCY	REMARKS
1	2	3	4	5	6		7	8	9	* D	** M C N	
					M	C/ N						

3.0 JUNCTION BOXES & RECEPTACLES

A	Acceptance Tests													
1	Acceptance Tests	Dimensions	Major	MEASURE MENT	100%	-	Appd Drawing	Appd Drawing	Inspection report		P	V	-	Components shall be of approved Make
2		Paint Shade/ Thickness	Major	VISUAL/ME AS.	SAMP LE	-	Appd Drawing	Appd Drawing	Inspection report		P	V	-	At the time of final Inspection
3		HV/ IR	Major	ELECT.TES TS	100%	-	2KV AC FOR 1 MINUTE	2KV AC FOR 1 MINUTE	Inspection report		P	V	-	
4		Degree Of Protection	Major	TEST	1/SIZE	-	IS:2147	IS:2147	TEST CERT.	√	P	V	V	
5		Special tests if any, explosion proof etc.	Major	TEST	1/SIZE	-	IS:2148	IS:2148	TEST CERT.	√	P	V	V	
6		Operation Check	Major	TEST	10%	-	Appd Drawing	Appd Drawing	Inspection report		P	V	-	
7		Mechanical Interlock	Major	TEST	10%	-	Appd Drawing	Appd Drawing	Inspection report		P	V	-	
4.0 PACKING														
	PACKING	Soundness of Packing against transit damage	Major	Visual	100%	100%	BHEL approved document	BHEL approved document	Inspection report	√	P	W	-	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
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Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by JAISWAL	by RITESH KUMAR

Date: 2020.07.10 20:32:09 +05'30'

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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SL NO.	COMPONENT & OPERATIONS	CHARACTERIST ICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTAN CE NORMS	FORMAT OF RECORD		AGENCY	REMARKS
1	2	3	4	5	6		7	8	9	*	**	
					M	C/ N				D	M	C N

NOTES:

1. P/V*- means test will be performed either by lighting fixture supplier or their sub-vendor and verified by lighting fixture supplier.
2. Project specific QP shall be based on customer requirement. In case, any changes in QP commented by customer at contract stage shall be carried out by bidder without any implication to BHEL/ Customer.
3. For export jobs, BHEL technical specification for seaworthy packing for export jobs is to be followed.
4. Packing shall be suitable for storage at site in tropical climatic conditions.
5. Latest revision/ year of issue of all the standards (IS/ ASME/ IEC etc.) Indicated in QP shall be referred.
6. BHEL reserves the right for conducting repeat test if required.
7. Items like ceiling fans, emergency lighting unit, flexible conduit, 24V supply module, ladders, hume pipe, switchboxes, exit signs etc. Will be cleared based on COC (certificate of compliance).
8. After packing and prior to issue MDCC, photographs of items to be dispatched shall be sent to BHEL purchase group for review.

LEGENDS:

*Records, identified with "Tick"(✓) shall be essentially included by supplier in QA Documentation,
 ** **M:** Supplier/ Manufacturer/ Sub-Supplier, **C:** Main supplier/ BHEL/ Third Party Inspection Agency, **N:** Customer,
P: Perform, **W:** Witness, **V:** Verification, as appropriate
MA: Major, **MI:** Minor, **CR:** Critical, **D:** Documentation

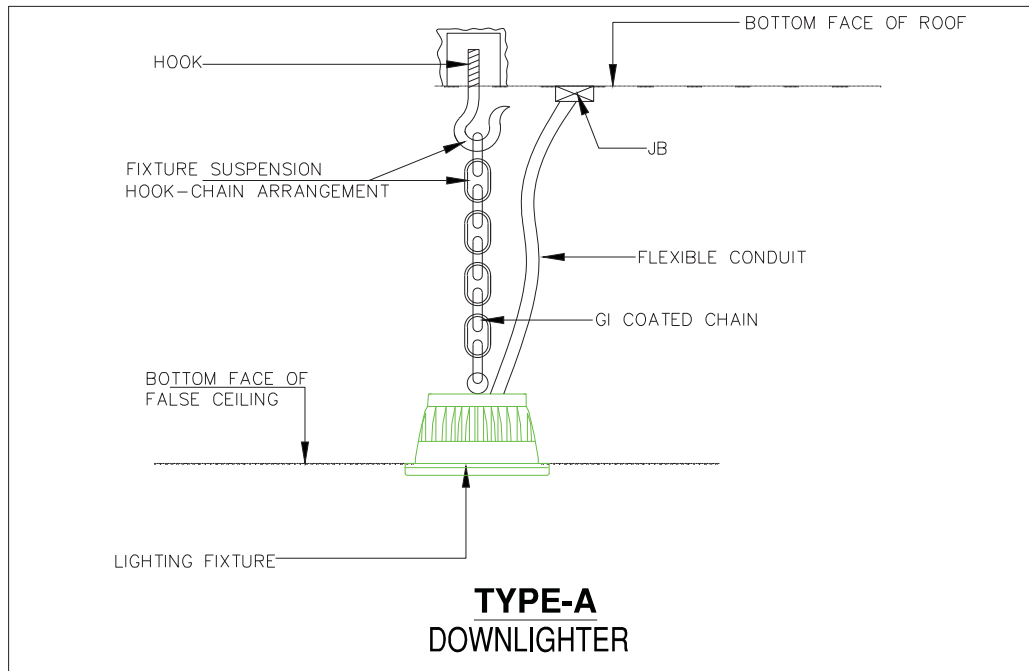
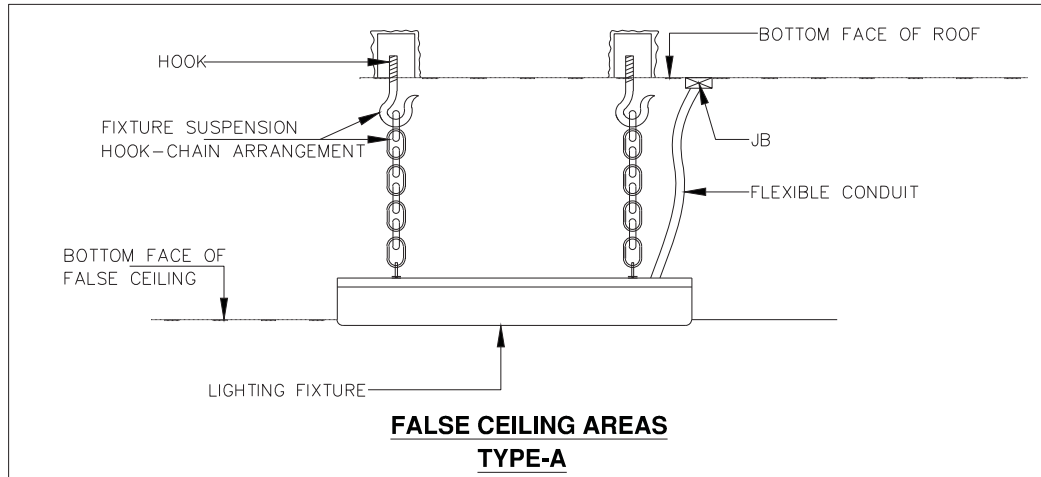
BHEL					
ENGINEERING			QUALITY		
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Date: 2020.07.10 20:32:46 +05'30'

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

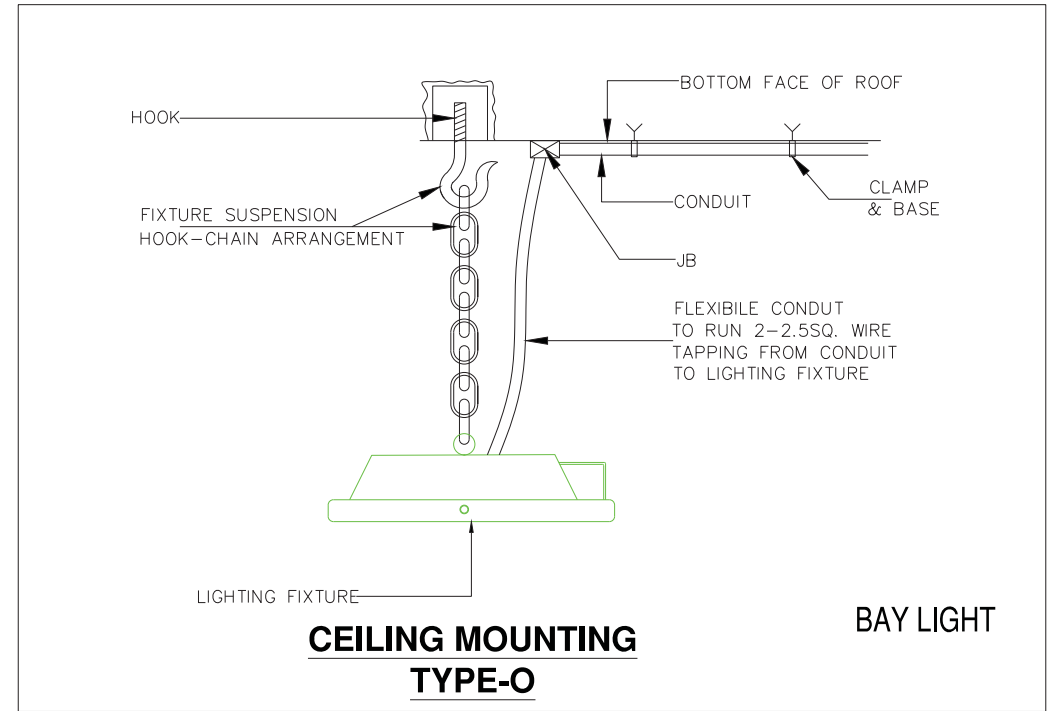
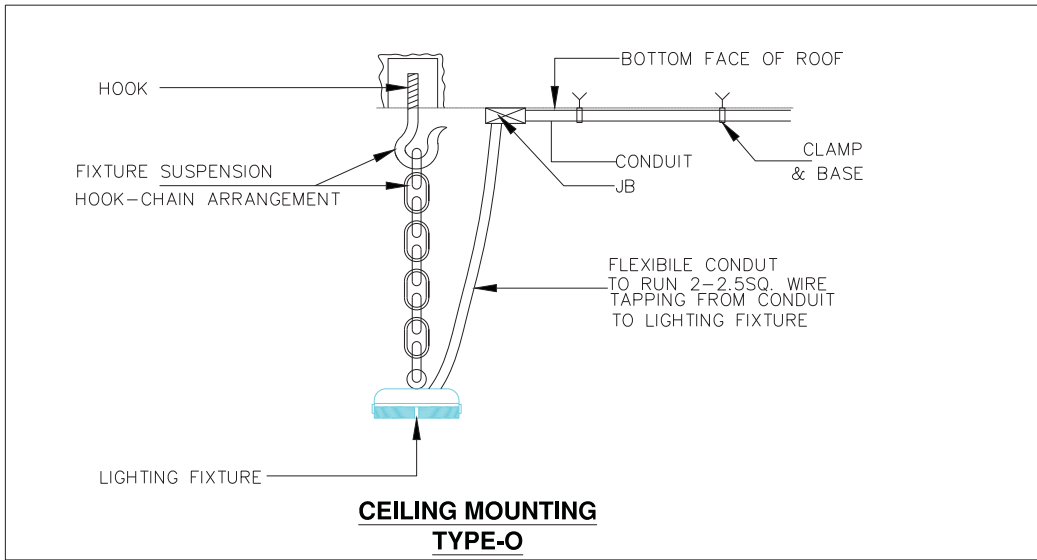
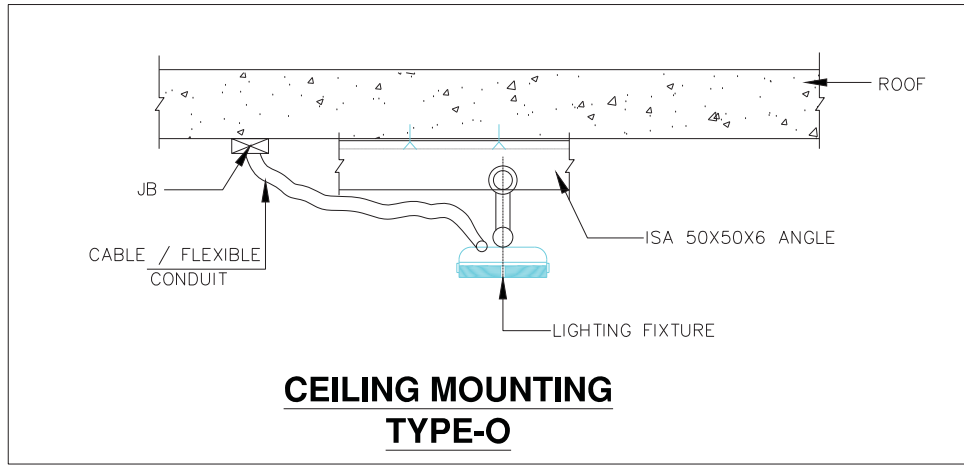
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Doc No:			
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Reviewed by:			
Approved by:			

ANNEXURE-1 to Amendment Typical Arrangement



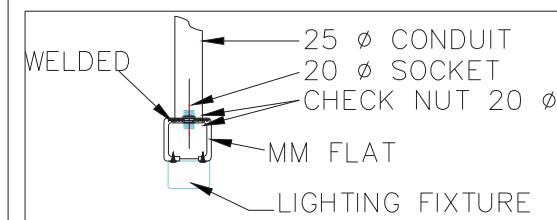
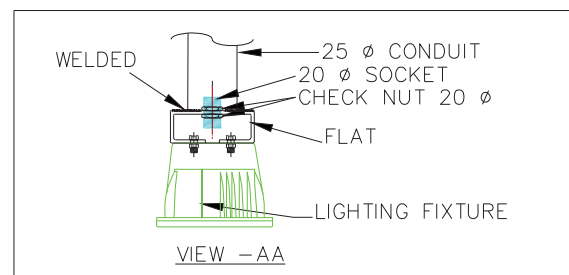
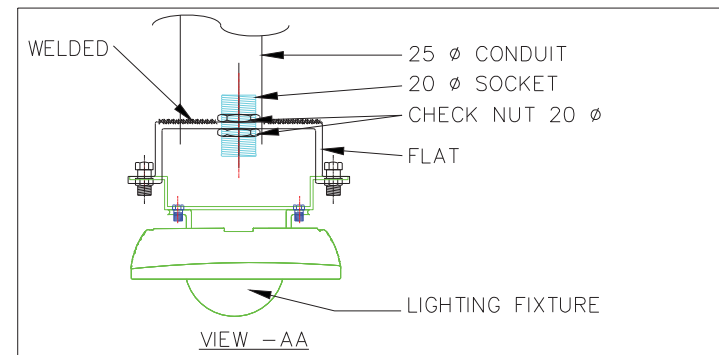
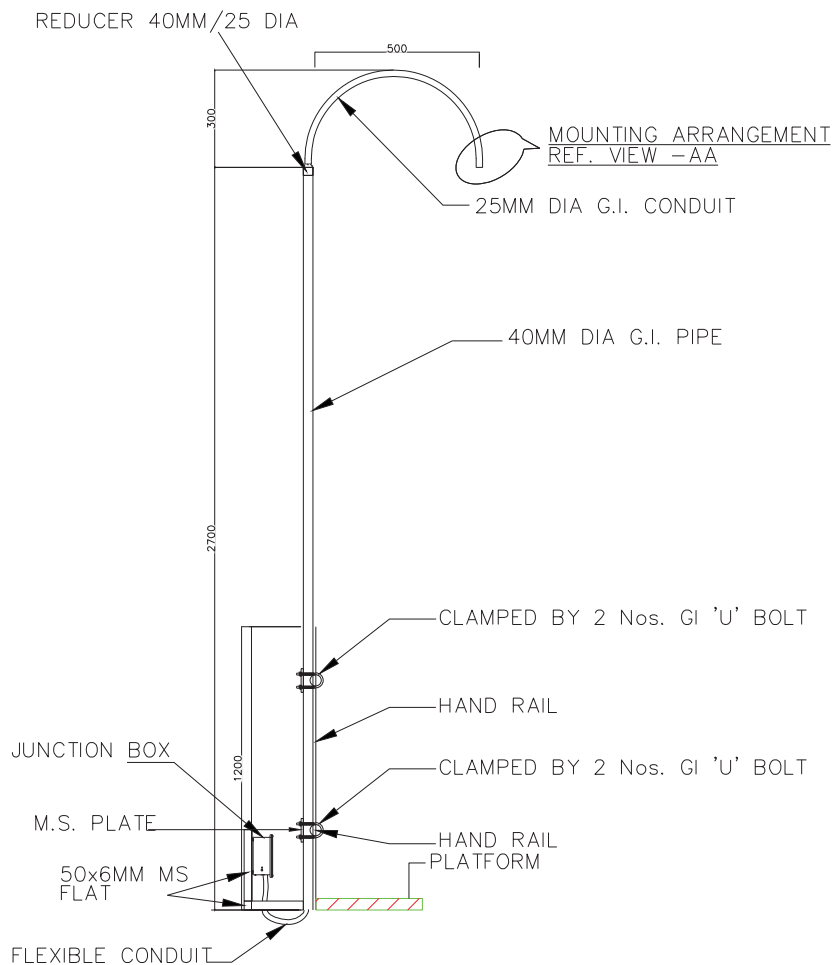
This is a Typical mounting arrangement dwgs/ details for guidance only. Final Mounting arrangement dwg shall be made by the successful bidder during detailed Engineering. It is to be noted that GI Conduit 20mm Dia and Flexible PVC Coated Conduit, Structural Steel shall be provided by BHEL. Balance all other accessories clamps/ chains/ clips/ steel rope/ pins etc required for mounting as per typical mounting arrangement for their fixtures shall be part of fixtures only and shall be provided by the Bidders.

2. In Lighting layout, Mounting arrangement also shown. If any Discrepancy found on both documents than Consult with Design incharge/Site Incharge.
3. Quantity and Material shown in drawings are indicative only and may be change or vary as per site requirement.
4. If any new type of mounting required at site than we can optimized or change the arrangement with prior inform to BHEL site incharge.
5. All structural steel parts/supporting parts shall be hot dip galvanized as per BOQ/TS.



General Notes:

1. Mounting arrangement can be changed/ modified on site as per site requirements.
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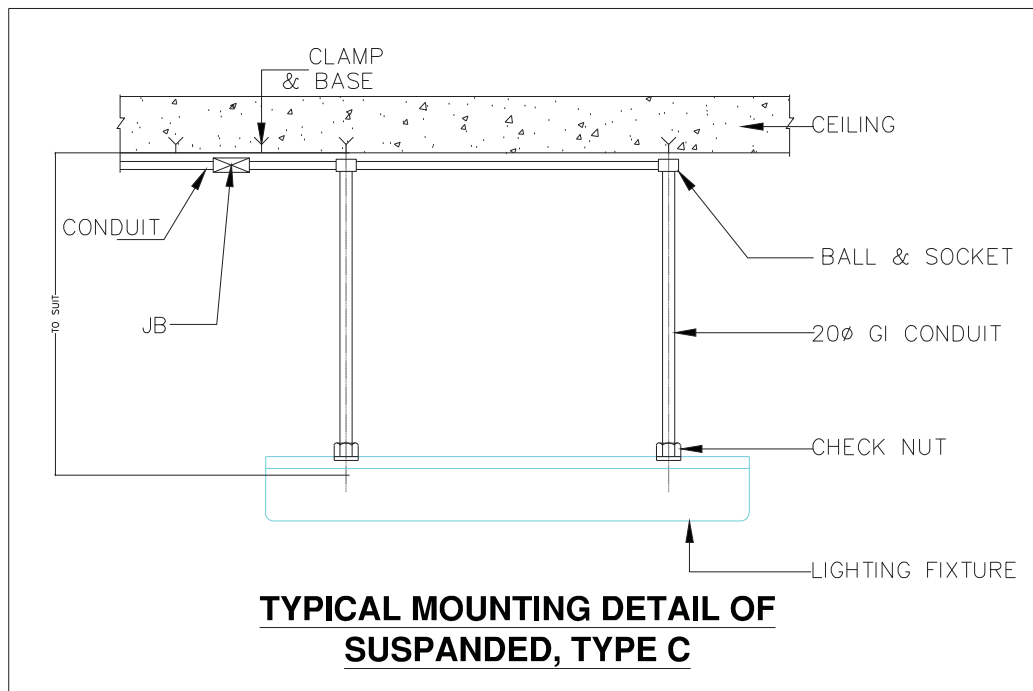
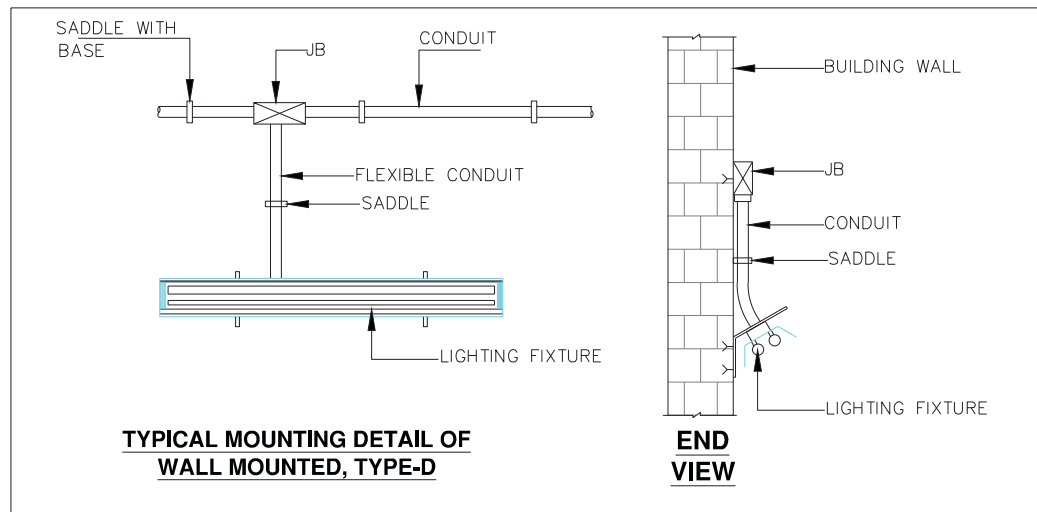


HAND RAIL MOUNTING TYPE-I

General Notes:

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FLOOD LIGHT FIXTURE ANCHOR FASTNER ROOF FLEXIBLE CONDUIT / CABLE JB CONDUIT CLAMP / SADDLE ROOF MOUNTING TYPE-P BUILDING STRUCTURE VERTICAL MOVEMENT FLOOD LIGHT FIXTURE ISA 50x50x6 ANGLE ANCHOR FASTENER JB COLUMN MOUNTING TYPE-Q General Notes: 1. Mounting arrangement can be changed/ modified on site as per site requirements. 2. In Lighting layout, Mounting arrangement also shown. If any Descrepancy found on both documents than Consult with Design incharge/Site Incharge. 3. Quantity and Material shown in drawings are indicative only and may be change or vary as per site requirement. 4. If any new type of mounting required at site than we can optimized or change the arrangement with prior inform to BHEL site incharge. 5. All structural steel parts/supporting parts shall be hot dip galvanized as per BOQ/TS. SIZE-A4									420
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General Notes:

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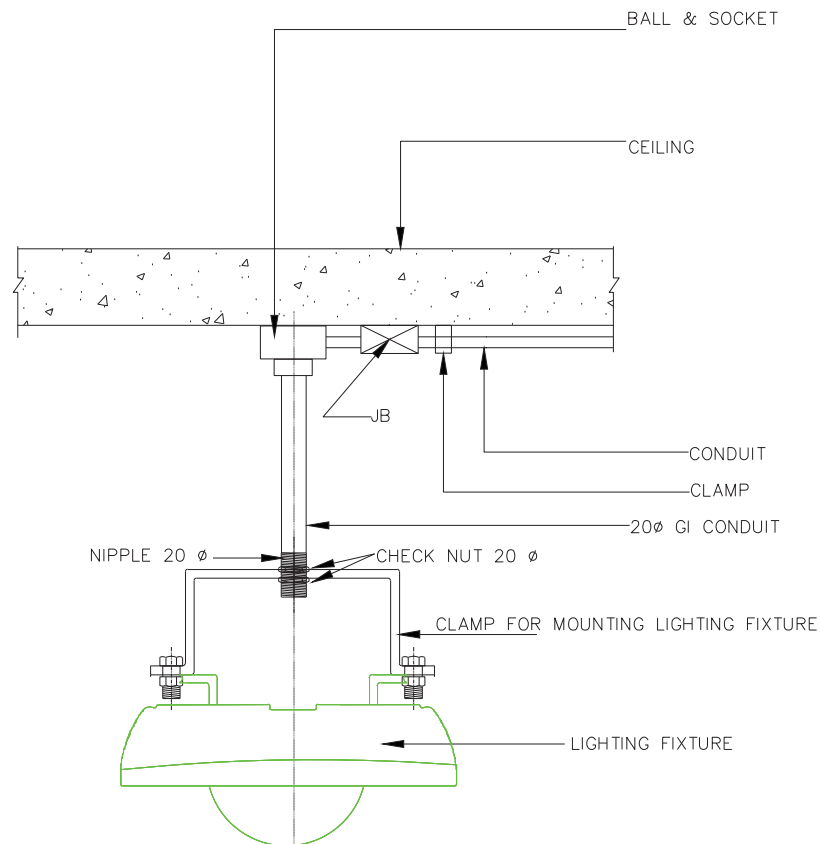
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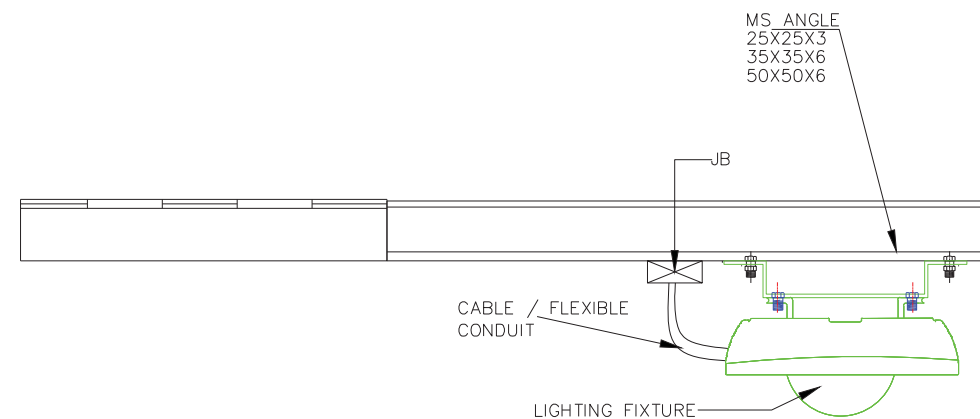
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SUPPORTED FROM CEILING
TYPE-F



**SUPPORTED FROM CHANNEL/
STRUCTURAL STEEL**
TYPE-G

General Notes:

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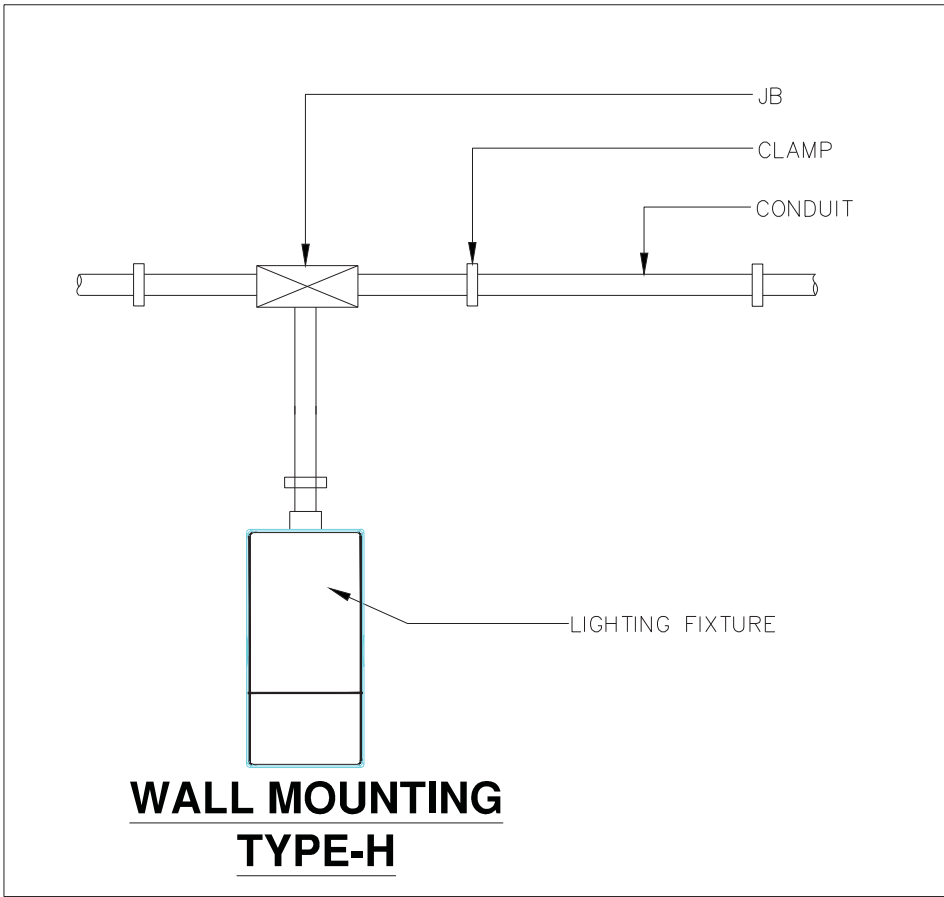
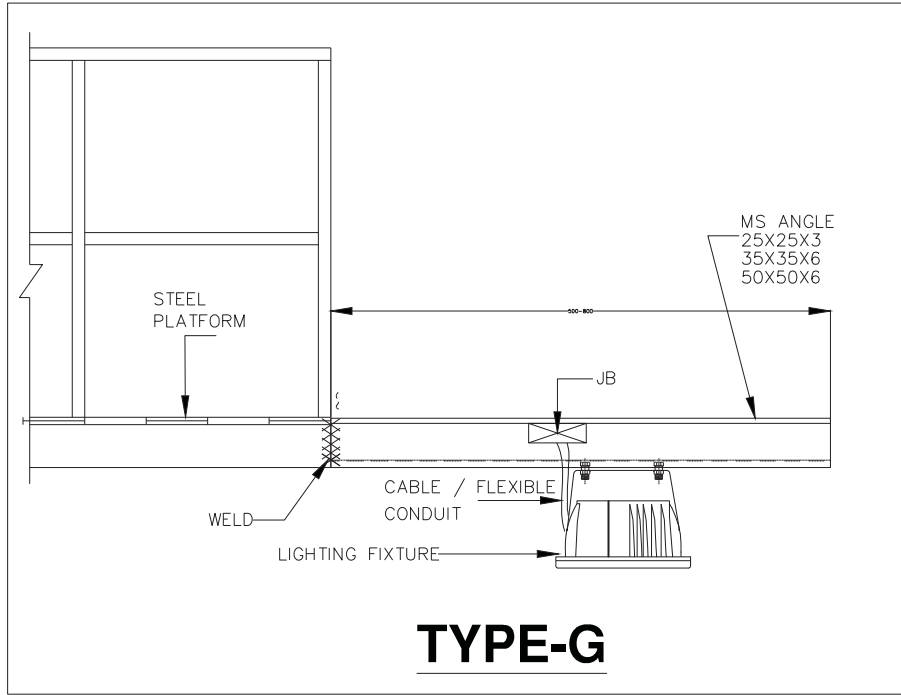
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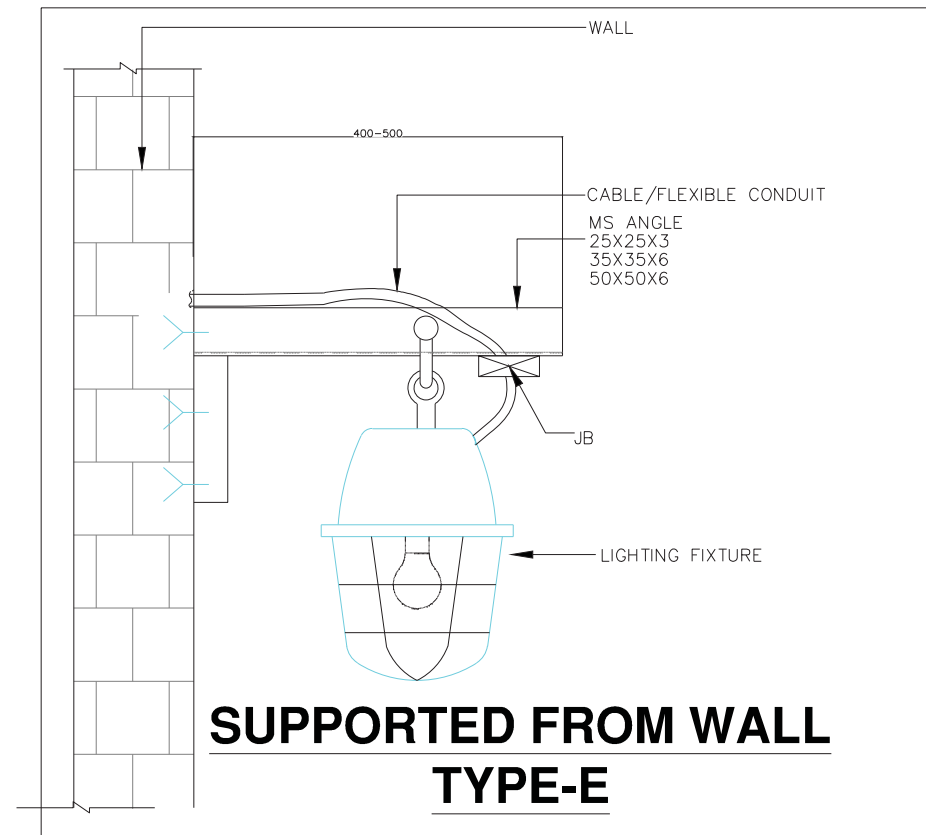
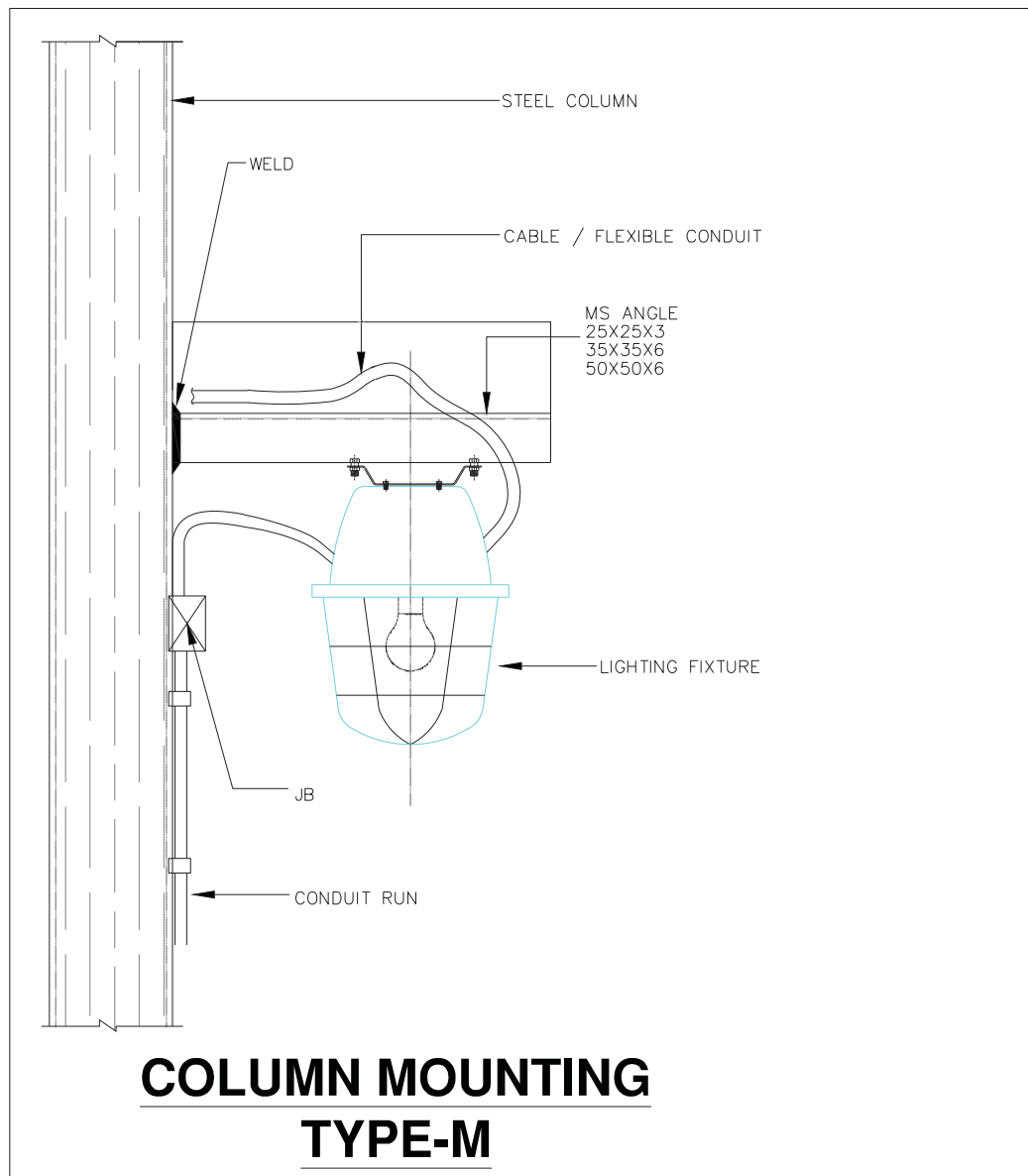
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General Notes:

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SIZE-A4

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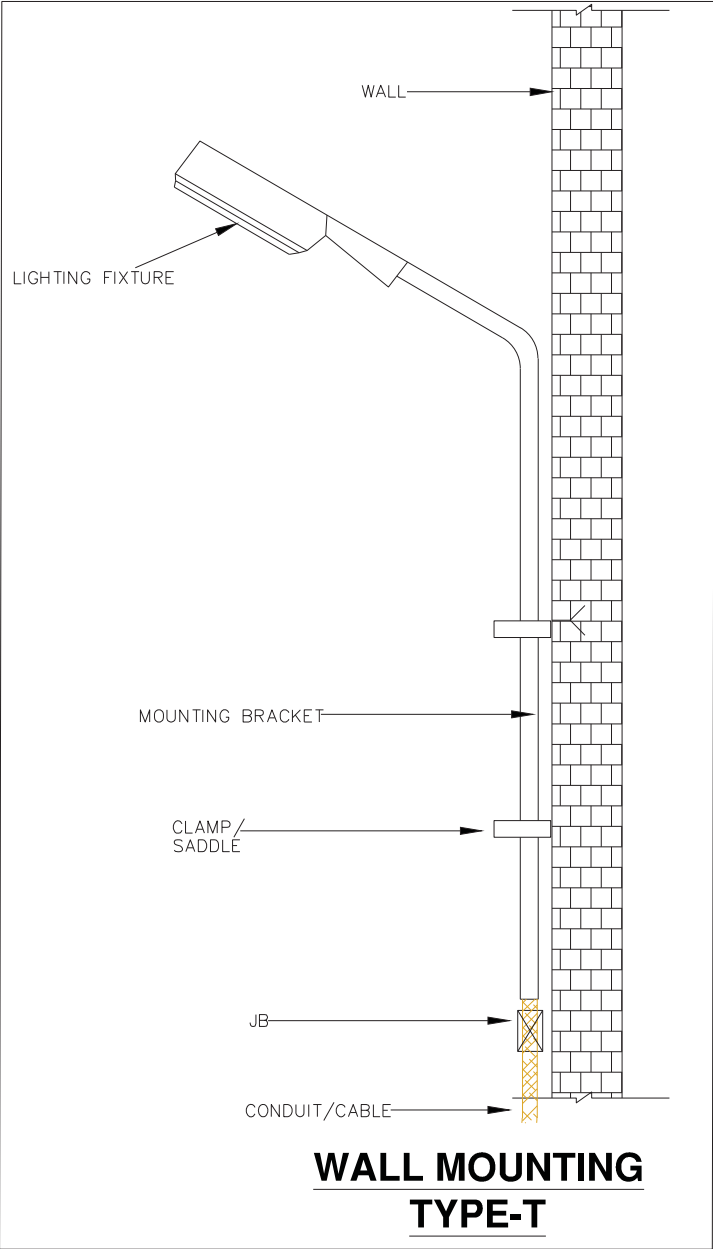
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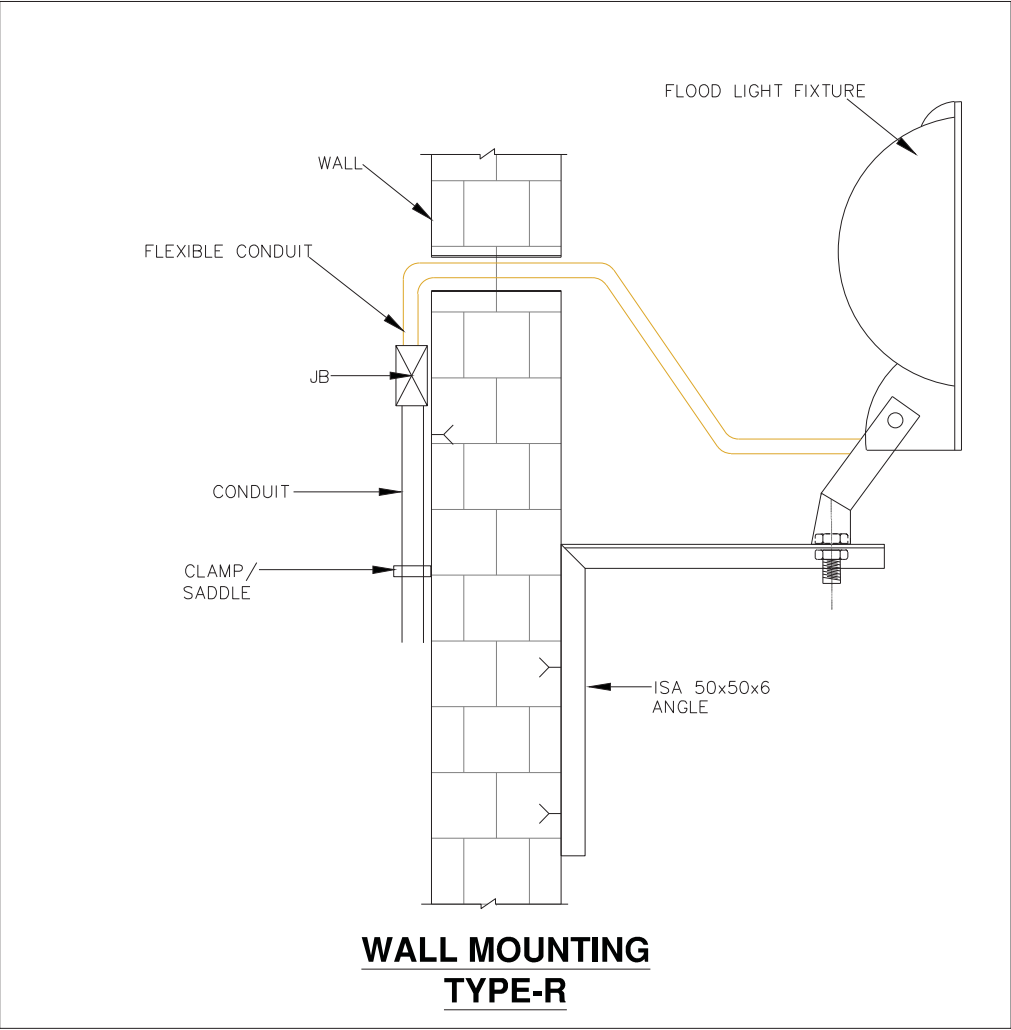
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Project Engineering
Management

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



SPECIAL CONDITIONS OF CONTRACT (REV 01)

FOR 5 X 800 MW TSGENCO YADADRI TPS [Job No. 417]

These Conditions shall be read in conjunction with General Condition of Contract (GCC) enclosed along with the tender enquiry. In case of any conflict or inconsistency, the requirement of SCC shall prevail over the GCC.

1.0	Project Name	5 X 800 MW TSGENCO YADADRI TPS
2.0	Ultimate Customer	TELANGANA STATE POWER GENERATION CORPORATION LIMITED [TSGENCO]
3.0	Location of Plant	Location: At Virlapalem Village, Damaracherla Mandal, Nalgonda District, Telangana State, India. Site is located 7 Kms from NH5. Access by: Nearest Railway Station: 6.5 Km from Damaracherla. Nearest Airport: Vijayawada airport (130 Km) Nearest sea port: Vishakhapatnam Sea Port. Access by road: 30KM from Miryalaguda Latitude: 16° 42'20.40 N. Longitude: 79° 34'41.56 E Elevation above MSL: 85m
4.0	Delivery Address (Ship to)	BHARAT HEAVY ELECTRICALS LIMITED, Site Office, 5X800MWYADADRI TPS (EPC), VEERLAPALEM, DAMARACHARLA MANDAL, NALGONDA, TELANGANA.
5.0	Consignee Address (Bill to) 	BHEL, POWER SECTOR - PROJECT ENGINEERING MANAGEMENT, POWER PROJECT ENGINEERING INSTITUTE, PLOT NO.25, SECTOR-16A, NOIDA-201301 (U.P.)

Handwritten signature and date: 24/09/17

Project Engineering
Management

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)



	Notes 	Consignee address (Bill To) in Invoice & LR should be strictly as per Sl. No. 05. Place of supply along with name of state to be clearly indicated by vendor in invoice. Delivery address (Ship To) in Invoice and LR should be as per Sl. No. 04. Invoice should clearly specify "Billing from" and "Shipping from" addresses. Vendor to note that to effect "Sale in Transit", BHEL shall issue "Delivery Order" to the Transporter for transferring the ownership from BHEL to customer (TSGENCO). It is Vendor's responsibility to ensure availability of trucks well in advance for dispatch of material to meet contractual delivery requirement. Delivery Order shall be carried by transporter along with other dispatch documents.
6.0	Buyer and Paying Authority	Packages for which PO is placed by BHEL-PSSR & LOA is issued by BHEL-PEM - Buyer and Paying Authority shall be <u>BHEL-PSSR</u> .
7.0	Mode of Dispatch	By Road / Rail / Sea on Door Delivery and Freight Pre-Paid Basis.
8.0	Road Permit Required 	To be arranged by Supplier, if required
9.0	Transit Insurance	In BHEL Scope. Vendor shall inform the following details of dispatches to the Underwriter (refer details below) under intimation to BHEL-PEM and BHEL Site office: (1) Policy No. (2) Consignee Name. (3) Consignment Details (items with their weights and value (in INR)). (4) Project Name and P.O. No. (5) LR No. and date, Despatch origin and destination details, Inv. No.
	Policy No.	Later

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	Name of the Insurance Company details	Later
10.0	BHEL-PEM GST No. 	BHEL PEM: 09AAACB4146P2ZC
11.0	Customer GST & PAN No 	TSGENCO provisional GST no.- 36AAFCT0257Q3ZT PAN No. - AAFCT0257Q
12.0	Unloading at site	- By BHEL site office for Supply packages. (The Vendor shall furnish LR wise Gross Wt. of the consignment for the purpose of handling the consignment by BHEL site contractor). - By Vendor for Turnkey i.e. Supply and Erection & Commissioning Packages.
	Storage at site	- By BHEL site for Supply packages. - By Vendor for Turnkey i.e. Supply and Erection & Commissioning Packages.
	Movement of Material within Site	- By BHEL site for Supply packages. - By Vendor for Turnkey i.e. Supply and Erection & Commissioning Packages.
13.0	Provision of facilities at Site (Applicable for Turnkey Packages)	Construction Power: Construction Power shall be provided free of cost at one point. Construction Water: Construction water shall be provided free of cost at one point.

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14.0	Inspection Agency (Domestic supplies)	Vendor shall give inspection call in line with approved QAP / Customer Hold Points to Regional BHEL-CQS center / Third Party Inspection Agency (TPIA) (as informed by PEM) on "BHEL CQS Website"; with a copy of inspection call to BHEL-PEM for arranging Customer/Third Party participation (wherever applicable), with an advance notice of 15 days for participation in inspection/ Joint inspection on the proposed date. The MDCC shall be issued by customer based on the BHEL-CQS/TPIA report OR Joint inspection report of BHEL CQS/TPIA & Customer (wherever applicable).
	Inspection Agency (Imported supplies)	In case of Imported Supplies advance notice of 30 days for participation in inspection (if applicable, in line with approved QAP / Customer Hold Points) to be given. The Test Certificates & Inspection reports duly accepted by the Foreign Vendor Inspection agency in line with approved QAP/Customer Hold Points shall be submitted to BHEL-PEM, NOIDA. The above Inspection reports & Test certificates shall be reviewed by PEM-Engineering in line with the Technical Specifications & Approved Data sheets and then sent to customer for their clearance. The customer dispatch clearance (MDCC) will be given to the Foreign Vendor or their representative in India through BHEL-PEM after acceptance/clearance of above test certificates by Customer.

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15.0	Dispatch Documents required (to be furnished by Vendor for payment)	For Dispatch Payment For materials originating from Indian Territory (a). One (1) original and Six (6) copies of the clean rail/lorry receipt. For payment Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes original / copy. (b). One (1) original and Six (6) copies of signed Invoices (Paying Authority along with TIN No. should be mentioned, for VAT cases Annexure-I to be followed). (c). One (1) original and Seven (7) copies of Challan and Packing List (clearly showing number of packages, gross weight and net weight). (d). Six (6) copies of inspection certificate, if any issued by the customer. (e). Eight (8) copies of Customer/BHEL MDCC. (f). Six (6) copies of Approved Test Certificates if any. (g). Delivery order- Two (2) copies. (h). Guarantee Certificate – One (1) Original + One (1) copy. (i). Insurance Intimation - Two (2) copies. (j). CQIR / Inspection Reports – One (1) Original + One (1) copy. (k). PVC Calculation and copy of all applicable indices, if PVC applicable. – Two (2) copies.
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		For materials originating from non-Indian Territory (a). Three (3) original and Seven (7) copies of clean bill of lading or One (1) clean original Airway Bill & Four (4) copies, in case of air freight. (b). One (1) original and Six (6) copies of signed Invoices (Paying Authority along with TIN No. should be Mentioned). (c). One (1) original and Seven (7) copies of Packing List (clearly showing number of packages, gross weight and net weight). (d). Six (6) copies of certificate of country of origin. (e). Eight (8) copies of Customer/BHEL MDCC. (f). Six (6) copies of inspection certificate, if any, issued by the customer/his authorised representative. (g). Six (6) copies of certificate from the vendor to the effect that drawings and catalogues for customs clearance purpose have been kept with the packages for shipment. (h). Six (6) copies of certificate from the vendor to the effect that the contents in each case are not less than that entered in the invoices and guaranteed as new and as per the relevant technical specifications. (i) Shipping Specification – One (1) copy. (j). Quality Certificate – One (1) copy. (k). Approved Test Certificates if any. - Six (6) copies. (l). Guarantee Certificate – One (1) Original + One (1) copy. (m). Inspection Reports – One (1) Original + One (1) copy. (n). PVC Calculation and copy of all applicable indices, if PVC applicable. – Two (2) copies. Page 6 of 11
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		For Claiming Dispatch payments (for materials originating from Indian territory), Freight, MRC & Services Payments - refer GCC.
16.0	Material Receipt Certificate (MRC)	For Packages wherever E&C is in the scope of Vendor, The vendor shall arrange Material Receipt Certificate from the project site, duly signed by Customer and BHEL-Site after receipt & physical verification of the material at site. For Supply Packages, Material Receipt Certificate shall be arranged by BHEL-PEM. Vendor to provide copy of receipted LR to enable BHEL-PEM to obtain MRC from site.
17.0	Taxes & Duties (For Domestic Bidder) 	All bidders/vendors to note that this project is a Non-Mega power Project. However, Essentiality certificate shall be issued by TSGENCO (customer) for availing concessional custom duty under Project Import Regulations. Essentiality certificate shall be issued by TSGENCO through BHEL for the items to be imported by the vendor for specified items, limited to CIF content mentioned in the offer/order, for availing concessional custom duty. The bidder has to indicate in their offer, the import contents (if any) i.e. list of items along with qty., currency of import, country of import & CIF value. Availability of CIF for packages, if any, shall be intimated in NIT. Bidders has to note that in order to derive the total Landed Cost to BHEL, Evaluation shall be done excluding GST quoted by bidders. However, same shall be re-confirmed during techno-commercial evaluation of bids.

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18.0	Taxes & Duties  (For Order Directly to Foreign Bidders)	In case of Order on foreign Vendor, the dispatches shall be on C&F basis and the Taxes Duties in the country of dispatch (origin) shall be borne by Foreign Bidder & to be accounted in the prices quoted to BHEL/PEM/NOIDA. Evaluation shall be done as per provisions of GCC.
19.0	Packing, Identification & marking	- The supplier shall include and provide for securely protecting and packing the materials so as to avoid loss or damage during handling & transport by air, sea, rail and road. - All packing shall allow for easy removal and checking at site. Special precaution shall be taken to prevent rusting of steel and iron parts during transit by sea. Gas seals or other materials shall be adopted by the Contractor for protection against moisture during transit. - The number of each package in a shipment shall be shown in fraction, numerator showing number of the package and the denominator showing total number of packages in a lot / consignment. The packages number shall be generally prepared in the sequence in which they will be required for erection. - Each package delivered under the Contract shall be marked by and at the expense of the supplier and such marking must be distinct and in English language (all previous irrelevant markings being carefully obliterated). Such marking shall show the description and quantity of contents, the name and address of

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		consignee, the gross weight and net weight of the package, the name of the Contractor with a distinctive number of mark sufficient for purposes of identification. All markings shall be carried out with such materials as to ensure quickness of drying, fastness and indelibility. Each equipment or parts of equipment shall, when shipped or railed or otherwise dispatched be tagged with reference to the assembly drawings and corresponding part numbers. Each bale or package shall contain a packing note quoting specifically the name of the Contractor, the number and date of contract and the name of the office placing the contract, nomenclature of the stores and include a schedule of parts for each complete equipment giving the part numbers with reference to the assembly drawing and the quantity of each part, drawings nos. and tag numbers. • Rotor bearings should not be used as a support while packing. • Besides wherever necessary, packing shall bear a special marking "TOP", "BOTTOM", "DO NOT TURN OVER", "KEEP DRY", "HANDLE WITH CARE" etc. • All packing cases, containers (excluding marine container), packing and other similar materials shall be new. • Notwithstanding anything stated in this clause, the Contractor shall be entirely responsible for loss, damage or depreciation or deterioration to the materials & supplies due to faulty and/or insecure packing. • One copy of respective standard manufacturer's erection instruction/operation instruction manual shall be kept in each package/container for immediate reference. • Each and every package box shall be marked with the following, as a minimum:
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		(i). Name and address of Consignee : (ii). Project reference : (iii). Contract No.: (iv). Packing No.: (1/10, 2/10, 3/10 when there are 10 packages For one consignment) (v). Net Weight/Gross Weight : (vi). Port of Loading : (vii). Destination Port : (viii). Packing Mark : [symbols indicating "TOP" and other special markings as per (ix). Type of Equipment : "E" (for Equipment supply) "T" (for Tools & Tackles) "S" (for Mandatory Spares) Two copies of packing list should be kept in case/package No. 1 of each consignment of the goods and four copies in each case (three inside the box and one copy in a special packet at the outer side of the Box).
20.0	Commissioning spares	The commissioning spares shall be properly packed separately in separate box and each spare shall be properly tagged giving details (to match the description given in the packing slip) to facilitate their proper identification. Three copies of packing list is to be kept inside the box and one copy in a special packet at the outer side of the Box.

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21.0	Mandatory Spares	The Mandatory spares shall be properly packed separately in separate box indicating Mandatory Spares in bold letters and each spare shall be properly tagged giving details i.e. item number of the equipment in line with the Ultimate Customer Contract & Number per item (to match the description given in the packing slip) to facilitate their proper identification by ultimate customer M/s TSGENCO. Three copies of packing list along with Manufacturing drawing no. Reference, Catalogue reference etc. is to be kept inside the box and one copy in a special packet at the outer side of the Box.		
22.0	Submission of Final Drawing / Documents along with O&M Manual, Type Test Certificates (if any)	As per GCC/ Technical specification/ Kickoff meeting.		
	Prepared By	Checked By	Reviewed By	Approved By
Name:	NAINA SINGH	ANIL KUMAR PAL	ASIF IQBAL QURAISHI	PERMINDER SINGH
Designation:	MANAGER	SR. MANAGER	DGM	AGM / DH
Signature:				
Date:	27/09/17	27/09/17	27/09/17	05/10/17

	PROJECT ENGINEERING MANAGEMENT	GENERAL CONDITIONS OF CONTRACT (GCC) Revision no. 07	ANNEXURES
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ANNEXURE– VIII

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at “BHEL House”, Siri Fort, New Delhi – 110049 (India) hereinafter referred to as “The Principal”, which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as “The Bidder/ Contractor” which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles: -

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits

	PROJECT ENGINEERING MANAGEMENT	GENERAL CONDITIONS OF CONTRACT (GCC) Revision no. 07	ANNEXURES
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himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and will await their decision in the matter.

Section 3 – Disqualification from tender process & exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors". framed by the Principal.

Section 4 – Compensation for Damages

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

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5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-contractors

6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain

responsible for any default by his sub-contractors.

6.2 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section 7 – Criminal Charges against violating Bidders / Contractors / Sub-contractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 –Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality in line with Non-disclosure agreement.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.

8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.

8.7 The IEMs would examine all complaints received by them and give their recommendations! views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious

To,

M/S Bharat Heavy Electricals Limited.

Project Engineering Management

Power Project Engineering Institute,

HRD & ESI Complex

Plot no. 25, Sector-16A, Noida-201301

Subject: - Certification regarding local content

Reference: Tender Enquiry No.

Name of Package: " " For Project

Dear Sir,

We hereby certify that items offered by us for " " For
Project have local content of %.

Further, it is also certified that the local content percentage (%) certified above is in line with definition of local content given in Public Procurement (Preference to Make in India), Order 2017-revision, having ref. no. P-45021/2/2017-PP(BE-II) dated 04.06.2020 & 16.09.2020 and we qualify as Class supplier.

We further confirm that address of the location at which the local value addition is made will be as follows:

ON COMPANY LETTER HEAD

To,
M/s Bharat Heavy Electricals Ltd.,
Project Engineering Management,
Power Project Engineering Institute,
HRD & ESI Complex,
Plot No 25, Sector-16 A, Noida-201301

Dear Sir,

This has reference to:

1. Our offer for <<Package Name>> of <<Project Name>>., Tender No. <<Tender No.>>
2. Order no. F.No. 6/18/2019-PPD dt. 23.07.2020 issued by Ministry of Finance, Department of Expenditure Public Procurement Division.

I have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India; I certify that M/s (Company Name_____) is not from such a country or, if from such a country, has been registered with the competent authority.

I hereby certify that M/s (Company Name_____) fulfil all requirements in this regard and is eligible to be considered.

[where applicable, evidence of valid registration by the competent authority shall be attached]

Thanking You,
Yours faithfully,

Director/Properiter/Partner
M/s _____

Guidelines for Remote Inspection of PEM BOIs

1) OBJECTIVE:

To lay down the procedure for carrying out Remote Inspection of Bought-out Items (BOIs) for PEM suppliers wherever applicable.

2) SCOPE:

It will cover suppliers for packages of PEM BOIs for various project requirements.

Invitation is sent to the suppliers for remote inspection on applications like MS Teams, Webex, etc. by BHEL.

3) MINIMUM REQUIREMENTS AT SUPPLIER'S WORKS:

- i. Uninterrupted internet services
- ii. Good internet bandwidth (Min 100 Mbps)
- iii. Good resolution camera (2 nos) – one preferably CCTV (static at one place) and one hand hold (moving)
- iv. Smart phone with minimum 8MPi camera front and back both with optical zoom facility suitable for using web applications like Webex, MicroSoft (MS) Teams, etc.
- v. Computer and Scanner with good resolution
- vi. Digital signatures of supplier's Quality Engineer
- vii. Availability of web applications like Webex, MicroSoft (MS) Teams, as required.
- viii. All Test certificates, internal test reports, calibration reports, etc. for the items offered for inspection.
- ix. Availability of the above to be submitted to BHEL two days in advance before inspection.
- x. Dedicated team from supplier side for facilitating inspection requirements.
- xi. For ensuring proper visibility, the suggested Portable lighting sources (torch/ electric LED bulb of minimum 15 W) with no glare is to be ensured at offered job, location for remote inspection/testing. This is to be verified before start of the inspection.
- xii. The GPS location co-ordinates or any method to locate inspection location shall be captured indicating the location of the Vendor-Premises of remote inspection/testing.

4) MINIMUM REQUIREMENTS AT BHEL and CUSTOMER LOCATION :

- i. Uninterrupted internet services
- ii. Suitable internet bandwidth
- iii. Digital signatures wherever required.
- iv. Availability of web applications like Webex, MS Teams, etc. as required.
- v. Clearance from customer for conducting remote inspection

5) PROCEDURE:

- i. Supplier will raise the inspection call in BHEL - CQIR portal.
- ii. Supplier shall ensure availability of minimum requirements at supplier's works as mentioned above at point 3.

- iii. Before starting the inspection, the supplier shall submit the documents (TCs, internal test reports and calibration certificates as per approved QAP) two days before the date of inspection for review by BHEL and supplier shall coordinate with BHEL and if found satisfactory, inspection shall be considered for remote.
 - iv. Prior to commencement of remote inspection a pre inspection meeting shall be organised by BHEL inspector with supplier to ascertain the readiness for remote inspection.
- 6) During inspection, supplier shall share the location on Google maps for verifying the address of the manufacturer. Location may be captured by BHEL as screenshot.
- i. Inspection shall be on the basis of approved Quality Plans and associated reference documents mentioned.
 - ii. For witnessing inspection, supplier shall bring the mobile video camera near to the surface of the equipment or as per requirement of the inspector for clarity in viewing the test/ equipment which shall be the responsibility of supplier. Supplier shall ensure that proper lighting is available during live video streaming.
 - iii. Before start of the inspection, inspector shall ensure that all instruments shall have valid calibration report. Supplier shall ensure use of digital instruments preferably for inspection to the extent possible.
 - iv. Details of suppliers's dedicated team handling the remote inspection shall also be incorporated in the CQIR.
 - v. All details of inspection/ testing referred documents shall be mentioned in the CQIR. Recording of remote inspection shall be maintained by the BHEL inspector and this recording (unedited) shall be maintained at BHEL system for a minimum period of 3 years or till the warranty period whichever is later.
 - vi. PEM (Engineering) shall accord final technical clearance, in case of any deviation in inspected item noticed during inspection.
 - vii. Inspection shall be conducted by PEM-Q&BE assigned inspector along with PEM-Engg (if required). CQIR shall be prepared and maintained by PEM-Q&BE.
 - viii. PG will issue MDCC on the basis of acceptance of inspected items along with accepted packing photographs as per contract provisions.
- 7) **UNDERTAKING BY VENDOR:** Material inspected through remote inspections is meeting all technical requirements of BHEL. In case of any discrepancy from the above procedure/ material inspected, if found later, vendor will replace the materials without any cost implication to BHEL.
- 8) Vendor shall provide the signed and stamped of the above guidelines to BHEL as a token of acceptance.

CUSTOMER/ BHEL LOGO	VENDOR CREDENTIALS SUMMARY SHEET (TO BE FILLED BY BIDDER AND SUBMITTED WITH BID)
--------------------------------	---

i.	Item/Scope				
ii.	Address of the registered office	Details of Contact Person (Name, Designation, Mobile, Email)			
iii.	Name and Address of the proposed vendor's works where item is being manufactured	Details of Contact Person: (Name, Designation, Mobile, Email)			
iv.	Annual Production Capacity for proposed item				
v.	Annual production for last 3 years for proposed item				
vi.	Details of proposed works				
1.	Year of establishment				
2.	Factory Registration Certificate	Details attached at Annexure – F2.1			
3.	Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc.)	Details attached at Annexure – F2.2			
4.	After sales service set up in India, in case of foreign sub-vendor(Location, Contact Person, Contact details etc.)	Applicable / Not applicable Details attached at Annexure – F2.3			
5.	Sources of Raw Material/Major Bought Out Item	Details attached at Annexure – F2.4			
6.	Quality Control exercised during receipt of raw material/BOI, in-process, Final Testing, packing	Details attached at Annexure – F2.5			
7.	Manufacturing facilities (List of machines, special process facilities, material handling etc.)	Details attached at Annexure – F2.6			
8.	Testing facilities (List of testing equipment)	Details attached at Annexure – F2.7			
9.	Supply reference list including recent supplies (Preferably of reputed, well known clients to whom the vendor has supplied the material and are of quantum of item/scope at point (i) above)	Reputed client name (s)..... Details attached at Annexure – F2.8 (as per format given below)			
Project/ package	Customer Name	Supplied Item (Type/Rating/Model /Capacity/Size etc)	PO ref no/date	Supplied Quantity	Date of Supply

CUSTOMER/ BHEL LOGO	VENDOR CREDENTIALS SUMMARY SHEET (TO BE FILLED BY BIDDER AND SUBMITTED WITH BID)
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10.	Product satisfactory performance feedback letter/certificates/End User Feedback	Attached at annexure - F2.9
11.	Average annual turnover for last three years with documentary proof.	
12.	Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product (similar or higher rating) Note:- Reports need not to be submitted	Applicable / Not applicable Details attached at Annexure – F2.10 (if applicable)
13.	Copy of ISO 9001 certificate (if available)	Attached at Annexure – F2.11
14.	Product technical catalogues for proposed item (if available)	Details attached at Annexure – F2.12

Name		Desig		Sign:		Date	
						:	

Company's Seal/Stamp:-

ANNEXURE II- DEVIATION SHEET (COST OF WITHDRAWAL)-PRICED
NAME OF PROJECT: 5 X 800 MW YADADRI
NAME OF PACKAGE: Lighting Fixtures, lamps & Misc. Items
ENQUIRY No.: PE/PG/YAD/E-6750/2021 dated 25.08.2021

SR.NO	Volume/ Section	Page No.	Clause No.	Technical Specification/ Tender Document	Complete Description of Deviation	Cost of Withdrawal of Deviation	Reference of Price Schedule on Which cost of Withdrawal of deviation is Applicable	Nature of Cost of Withdrawal of deviation (Positive/Negative)	Reason for Quoting Deviation
TECHNICAL DEVIATION:									

COMMERCIAL DEVIATION									

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE					
NAME		DESIGNATION		SIGN & DATE	

- NOTES:
- Cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
 - All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
 - Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
 - Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable. In the absence of same, such deviation(s) shall not be considered and offer shall be considered in total compliance to NIT.
 - Bidder shall furnish price copy of above format along with price bid.
 - The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
 - Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
 - For deviations w.r.t. Credit Period, Liquidated damages, Firm prices if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VII, will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
 - Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be considered.
 - All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
 - Cost of withdrawal is to be given separately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
 - In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
 - In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.