



Ref. Enquiry No.: PE/PG/VYS/E-6735/2021, Dated 16.08.2021

DUE DATE
26 Aug 2021
BY 12:00 NOON

Dear Sir/ Ma'am

Subject: Open tender Enquiry for "LIGHTING FIXTURES, LAMPS AND MISC. ITEMS" for 2 x 60 MW Vyasi HEP as per Technical Specification No. PE-TS-407-558-E006A

BHEL invites your offers for Design, Engineering, Manufacture, assembly, Inspection testing, packing for transportation and delivery of "LIGHTING FIXTURES, LAMPS AND MISC. ITEMS" complete in all respect including all accessories, mandatory spares, supervision of E & C as specified in tender technical specification PE-TS-407-558-E006A amendments & agreements till placement of order for 2 x 60 MW Vyasi HEP.

Your offer shall be submitted in two parts strictly as per Clause-2.0 of the "Instructions to Bidders" of GCC Rev. 07, in sealed cover for the below mentioned equipment/system.

Item Description – LIGHTING FIXTURES, LAMPS AND MISC. ITEMS		
Sl. No.	Project	TECHNICAL SPECIFICATIONS
1	2 x 60 MW Vyasi HEP	PE-TS-407-558-E006A

Your best quotation/offer for the above requirement, in line with tender terms and conditions, should be submitted **online via e-procurement system (NIC portal)**. It shall be the responsibility of the bidder to ensure that the tender is submitted **on or before the due date by 02:00 PM, 26.08.2021**. Part-I (techno-commercial) bids shall be opened at **04:30 PM** on the due date.

Note: 1. Detailed tender documents have been uploaded on following websites: -

<https://eprocurebhel.co.in>, <https://www.bhel.com/tenders>; <https://pem.bhel.com/Home.aspx>

Bidders are requested to upload their best offer on <https://eprocurebhel.co.in> only.

2. In case bidders are not interested to quote, please send us the regret by e-mail or letter.

ENQUIRY TERMS AND CONDITIONS:

1. Offers should be submitted/uploaded separately in two parts **online through e-procurement system** as follows:

Part-I: TECHNO-COMMERCIAL BID

Part-II: PRICE BID

For detailed instructions, please refer GCC Rev 07- Instructions to Bidders.

2. Bidders shall submit their offers meeting the requirements of the following tender documents indicated in BHEL PEM GCC Rev- 07 and other Terms and Conditions included in this Enquiry Letter. Web link of GCC Rev 07 shall be as below, **bidders may download the GCC Rev 07 from the given web link and go through the same before quoting: -**

<https://pem.bhel.com/Documents/GCC/GCCRev07.pdf>

3. Bidders to note that following form the part of tender documents:

- General Conditions of Contract (GCC) Rev 07 comprising of: Instructions to Bidders and General Commercial Terms & Conditions
- Technical Specification
- Technical PQR
- Special Conditions of Contract (SCC Rev. 01) of Project.
- Enquiry terms & conditions (NIT)
- Annexures I-IV

4. Any hidden conditions/deviations mentioned elsewhere in offer and standard pre-printed terms & conditions of the tenderers shall not be considered valid.

5. Tenders shall be submitted strictly in accordance with the requirements of the above-mentioned tender documents. Deviations (Technical as well as Commercial), if any, shall be listed out separately in Annexure-II of GCC Rev-07 along

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PS-Project Engineering Management,
Power Project Engineering Institute,
Plot no. 25, Sector – 16A, Noida (UP) 201301, INDIA
(OFF) +91-120-4368791, (MOB.) +919999851815

Regd. Office
BHEL House Siri Fort
New Delhi-110049

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with reasons for taking such deviations in the bidding format in E-Procurement portal (NIC portal). Any deviations (Technical as well as Commercial) not mentioned in the Annexure-II shall not be considered. Bidders to note all the points mentioned in "Notes" of Annexure-II of GCC Rev.07.

6. Bidder has to submit "NO DEVIATION CERTIFICATE FOR COMMERCIAL TERMS AND CONDITIONS as per General Conditions of Contracts (GCC, Rev.07), and Notice Inviting Tender (NIT)" **in case of no deviations.**
7. Unsolicited fresh/revised bids shall not be entertained.
8. If any bidder has mentioned the term "Not Applicable" / "not required" / "not quoted" in BHEL price format, the same to be substantiated by the bidder. If such item is required to be supplied for system completion in future, same will be supplied free of cost by the successful bidder.
9. Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any/all tender(s) in part or full without assigning any reason whatsoever.
10. Tenderers must enclose the Quality Plan in the prescribed format, for approval. Equipment will be dispatched only after Purchaser's/Owner's inspection of the hold points specified in the approved Quality Plan and issue of Material Dispatch Clearance Certificate (MDCC).
11. Offers should be submitted separately in two parts online through e-procurement system only (NIC portal), however, all correspondence thereof, shall be addressed to the following persons and sent at the following address:

Mr. Amit Kumar Gupta Dy. Engineer, PG-I E-mail: amitkgupta@bhel.in Ph. +91-120-4368731; Mob: 9958375175	Mr. Tarun Arya DY. Mgr. PG-I E-Mail: tarunarya@bhel.in Ph. No. +91-120-4368791; Mob: 9999851815	Mr. Ashish Kumar Gupta Manager, PG-I E-Mail: ashishkumargupta@bhel.in Ph. No. +91-120-4368761; Mob: 9873412410
M/s. Bharat Heavy Electricals Ltd., Project Engineering Management, PPEI Building, Plot No 25, Sector-16A, Noida-201301, U.P., INDIA		

12. Evaluation will be done on L1 (Total cost to BHEL excluding GST) basis and excluding Supervision of E & C Charges as the prices of same are firm and same shall not be included in evaluation, however, prices of supervision of E & C shall be considered for ordering on L1 bidder. Unit rates for item Sl. No. 1.1 (charges per visit) & 1.2 (man-days charges) of supervision of E & C BOQ shall be Rs. 20,000/- and Rs. 5000/- respectively. Separate PO will be placed for supervision of E & C based on above unit rates and quantity as mentioned in BOQ with prevailing GST. Incomplete offer or part offer of NIT BOM/BOQ shall be summarily rejected.
13. **Evaluation Conditions: (Reverse Auction)** -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".
14. **Govt. of India's Public Procurement Policy – Preference to Make in India Clause: -**
For subject tender only Class I local suppliers are eligible to bid (in line with clause no. 3 (a) of MII circular no P-45021/2/2017-PP (BE-II) Dtd-16-09-2020, as there is sufficient Local Capacity & Local Competition. In case of subsequent orders issued by 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".
The local supplier at the time of tender, bidding, solicitation, shall be required to provide self-certification that as per the offered item, they meet the requirements of Class I local supplier as per the provisions of PPP-MII Order of Govt. of India and relevant circulars issued by nodal ministry w.r.t. above mentioned orders and shall give details of location(s) at which the local value addition is made in annexure IV.
Subject package is not divisible in nature.
15. Delivery Schedule: - Main Supply, Supervision of E & C & Mandatory Spares - As per annexure – I to NIT.

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16. Bidder to note that this is a conditional Open Tender enquiry subject to following condition: -
 - A) Meeting of Technical PQR
 - B) Techno-commercial qualification/recommendation of bidder by the BHEL-PEM.
 - C) Approval of vendor from end Customer (UJVNL). Same shall be taken up by BHEL-PEM with customer based on credentials/reference list/experience list. Bidders to submit credentials for customer approval.
17. Bidders to ensure that Third party/Customer issued certificates being submitted as proof of PQR qualification should have verifiable details of document/certificate issuing authority such as name & designation of Issuing Authority and its organization contact number and E-mail Id etc. In case the same is found not available, BHEL has the right to reject such document from evaluation.
18. Compliance of model clauses as provided in Annexure-III of Ministry of Finance Order (Public Procurement No. issued on 23.07.2020 (Restrictions under Rule 144 (xi) of the GFR,2017) shall be applicable for subject tender. Model Certificates provided in same Annexure-III shall also be complied. Further, relevant clause of order no. 25-11/6/2018-PG dated 02.07.20 issued by MoP shall also be complied. An undertaking regarding Model Clauses (as applicable from Annexure-III of the said circular) shall be furnished by bidders along with bid documents.
19. CIF is not available for this package.
20. For bidders (who are not registered with BHEL-PEM) -Online Registration Portal is operational in BHEL. Registration in BHEL-PEM is not mandatory for this tender. However, Non-registered Vendors, who wish to apply for registration with BHEL-PEM, can apply through Online Registration Portal available at www.bhelpem.com → vendor section → Online Supplier Registration. All credentials and/or documents duly signed and stamped related to registration may be uploaded on the website and submit the application for registration.
21. All corrigenda, addenda, amendments, time extensions, clarifications etc. to the tender will be hosted on BHEL websites only (www.pem.bhel.com, www.bhel.com & <https://eprocurebhel.co.in>) under subject tender reference. Bidders are requested to visit our websites from time to time to keep themselves updated. Bidders may go through the Sellers' manual & Help documents provided on E-Procurement Portal website & obtain required Digital Signature Certificate for participating in the subject Tender. For Bidders' convenience, the Helpdesk Nos. of E-Procurement (NIC) Portal is available at website i.e. <https://eprocurebhel.co.in>.
22. If any bidder uploads price bid in the unpriced section (techno-commercial attachment page) of the tender in e-Procurement (NIC portal), 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.
23. Bidders to quote the freight in terms of percentage of Total Ex-works price.
24. Bidders to note that "This item /package/system falls under the list of items defined in para 3 of ministry of finance guideline date 20.09.16 (procurement of items related to public safety, health, critical security operations and Equipments etc.) & hence criteria of prior experience /turnover shall be same for all bidders including start-up /MSME".
25. 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 available at <https://pem.bhel.com/Documents/VendorSection/Vendor/Guidelines.pdf> to take up the inspection REMOTELY.
26. 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.
27. In the 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 L-1 bidders. In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss / draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s). Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding.

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28. **Performance Bank Guarantee:** Performance Security amount shall be @5% of the value of contract value (excluding taxes duties & freight) as per GCC Rev 07.
29. 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 + 6%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till the first bill becomes due, the amount of performance security shall be recovered as per the terms defined in NIT/contract, from the bills along with due interest.
30. Payment terms shall be as follows: -
a) For Main Supply including E&C spares: -
Payment of basic price of material supplied, along with freight and GST shall be paid against receipt of material at site on pro-rata basis. 15% of basic price of materials supplied will be retained as security deposit which will be released on pro-rata basis as per details below: -

Ten percent (10%) will be released on pro-rata basis after submission of Material Receipt Certificate (MRC) from project site engineer of Owner/ Purchaser. For obtaining MRC from project site/ owner, vendor shall depute their representative to project site. Packages shall be opened at site in presence of vendor representative for verification of material supplied. If any material found damaged/short supplied during verification, then vendor shall be responsible for replenishment.
Five percent (5%) payment shall be released on submission of soft and hard copies of final approved drg./docs. (including O & M Manual) along with submission of AUTOCAD drawings as per requirement of project.
- b) For Supervision of E&C:** 100% payment shall be released after successful completion of the activity on Site certification.
- c) For Mandatory Spares:** As per clause no. 9.1 of GCC Rev 07.
31. **Quantity variation: -**
(i) Overall quantity variation shall remain +/- 30% of total order value in line with Cl. No. 6.0 of GCC Rev.07.
(ii) Quantities released (In Lots) up to 100% of contract value shall be intimated within **03** years from date of original PO.
(iii) Additional 30%, if required, shall be released within one year after completion of period mentioned at 3 (ii) above.
(iv) Prices shall remain firm for supply.
32. Bidders who are participating in this tender please note that GeM seller ID is mandatory before placement of order.
33. All other terms and conditions of SCC (Rev 01) of project, NIT & GCC (Rev 07) shall be applicable for the subject package.
34. Detailed offers are to be uploaded including the following along with the Price schedule as per BHEL format enclosed with NIT: -
 - Acceptance of BHEL-PEM GCC (Rev.-07)
 - Acceptance of Special Conditions of Contract (SCC Rev. 01) for the project.
 - Technical & Commercial Deviations, if any along with Cost of withdrawal.
 - TECHNICAL Pre-Qualifying Requirement (PQR)
 - Along with your offer, please submit a copy of this letter duly signed & stamped on each page as token of acceptance of terms & instructions conveyed.
 - Un-Priced price format duly filled in 'Quoted' or 'Q' in each column/row.
 - Filled Format of Certification reg. Local content (annexure –IV)

All the above Tender Documents shall automatically become a part of the Order/Contract after its finalisation.

Thanking You

Tarun Arya /Dy. Mgr/PGI
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Power Project Engineering Institute,
Plot no. 25, Sector – 16A, Noida (UP) 201301, INDIA
(OFF) +91-120-4368791, (MOB.) +919999851815

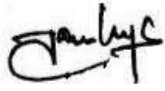
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❖ Please note all correspondence from BHEL-PEM before part – I opening, shall also be part of NIT.

Yours faithfully,

For and on behalf of BHEL-PEM



TARUN ARYA

(DY. MANAGER/PG-I/BHEL-PEM)

Enclosures:

1. Technical Specification No. **PE-TS-407-558-E006A**
2. Technical PQR
3. Delivery completion cum Drawings/documents submission Schedule (Annexure –I)
4. BOQ cum Unpriced format & COW - Annexure –II
5. Instructions to Packing List (annexure –III)
6. Format of Certification reg. Local content (annexure –IV)

Item No.	DESCRIPTION	UNIT	QTY.	HSN CODES (to be filled by bidder)	UNIT EX WORKS PRICE DULY PACKED(INR)	TOTAL EX WORKS PRICE DULY PACKED (INR)	FREIGHT % IN W.R.T TOTAL EX WORKS PRICE (IN %)	FREIGHT AMOUNT (INR)	TOTAL PRICE EX WORKS + FREIGHT (INR)	GST @..% ON TOTAL EX WORKS + FREIGHT (INR)	GST AMOUNT ON EX WORKS + FREIGHT (INR)	TOTAL FOR SITE PRICE (INR)
	MAIN SUPPLY ITEMS											
6.3	Type RB	Nos.	60									
6.4	Type RC	Nos.	15									
6.6	Type RC (Flame proof)	Nos.	2									
7.0	Emergency lighting Units											
7.1	With Ni-Cd battery and 2 X 10W fluorescent lamp	Nos.	5									
8.0	FlexiblePVC coated conduit											
8.1	20 mm dia PVC coated conduit	mtrs.	1,500									
9.0	GI wire, Flat & MS rod											
9.1	16 SWG GI wire	mtrs.	20000									
9.2	25X3 mm GI flat	mtrs.	600									
9.3	50X6mm GI flat	mtrs.	200									
9.4	20mm dia MS rod 3 mtr.	Nos.	150									
10.0	Fans											
10.1	Ceiling fan 1200 mm sweep	Nos.	5									
10.2	Ceiling fan 1400 mm sweep	Nos.	5									
10.3	Pedestal Fan	Nos.	5									
11.0	Ladder											
11.1	Free standing ladder (Adjustable from 2Mtr to 5Mtr)	Nos.	1									
11.2	Wheel mounted ladder	Nos.	1									
12.0	EXIT SIGN	Nos.	4									
13.0	STRUCTURAL STEEL	MT	1									
14.0	Hume pipe 100 mm dia	mtrs.	30									
	Total of Main supply											
	Total of Mandatory spares as per Annexure-II B											
	Grand Total (Main Supply + Mandatory spares)											

NOTES

- 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.
- THE MATERIAL SHALL BE SUPPLIED IN LOTS. LOTS SHALL BE RELEASED PROGRESSIVELY BASED ON APPROVED CONDUIT LAYOUT OF DIFFERENT AREAS AND PROJECT REQUIREMENT.
- LIGHTING SYSTEM DESIGN CHARGES ARE DEEMED TO BE INCLUDED IN THE PRICE OF ABOVE ITEMS. NO SEPARATE CHARGES FOR DESIGN ACTIVITY WILL BE PAYABLE.

BOQ cum Unpriced Schedule (Mandatory spares)
Annexure-II B to Enquiry No. PE/PG/VYS/E-6735/2021, Dated 16.08.2021

[illegible]

Item No.	DESCRIPTION	UNIT	QTY.	HSN CODES (to be filled by bidder)	UNIT EX WORKS PRICE DULY PACKED(INR)	TOTAL EX WORKS PRICE DULY PACKED (INR)	FREIGHT % IN W.R.T TOTAL EX WORKS PRICE (IN %)	FREIGHT AMOUNT (INR)	TOTAL PRICE EX WORKS + FREIGHT (INR)	GST @..% ON TOTAL EX WORKS + FREIGHT (INR)	GST AMOUNT ON EX WORKS + FREIGHT (INR)	TOTAL FOR SITE PRICE (INR)
	MANDATORY SPARES											

NOTES

- 1
- THE ABOVE QUANTITIES ARE ORDER QUANTITY FOR MANDATORY SPARES, FOR ANY ADDITION/DELETION IN ITEM OR ITEM QUANTITY OF MANDATORY SPARES DURING DETAILED ENGINEERING UNIT PRICE OF ITEM SHALL BE USED.

**2 X 60 MW VYASI HEP (UJVN LIMITED)
LIGHTING FIXTURES, LAMPS & MISC. ITEMS**

**BOQ cum Unpriced Schedule (Supervision of E&C)
Annexure-II C to Enquiry No. PE/PG/VYS/E-6735/2021, Dated 16.08.2021**

Vendor Name :-

Item No.	DESCRIPTION	UNIT	SAC code (to be filled by bidder)	QTY.	UNIT RATE (INR)	GST RATE
	Supervision of E&C					
1	SUPERVISION OF E&C					
1.1	CHARGES PER VISIT	VISIT		4	20000	
1.2	MANDAYS CHARGES	DAYS		16	5000	

NOTES

- 1 FOR SUPERVISION OF E&C 4 (FOUR) VISIT AND 16 (SIXTEEN) 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. 1.1 ABOVE (+) UNIT PRICE FOR MANDAYS CHARGES AS PER SL. NO. 1.2 ABOVE (x) NO. OF MANDAYS AT SITE (TO BE CERTIFIED BY BHEL SITE).
- 3 UNIT RATE FOR 1.1 AND 1.2 ARE INR 20000/- AND INR 5000/- RESPECTIVELY AND SAME IS FIRM.
- 4 NOS. OF VISIT FOR SUPERVISION OF E&C MAY INCREASE BASED ON PROJECT REQUIREMENT.

PROJECT: 2x 60 MW VYASI HEP DELIVERY SCHEDULE FOR -LIGHTING FIXTURES, LAMPS & MISC ITEMS ANNEXURE I to NIT NO:- PE/PG/VYS/E-6735/2021, Dated 16.08.21							
Sl. No.	BHEL Drawing No	Drawing Title	Primary /Secondary	BHEL Inputs	Drg Sch for Vendors	Delivery Terms for Supply Portion incl. E & C Spares and Mandatory Spares	Delivery terms for Supervision of E & C
1	PE-V0-407-558-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 the date of PO & subsequent revisions within 10 days of comments received from BHEL. BHEL shall furnish comments / approval on each submission within 18 days from receipt.	For Lot-1: Within 4 months from the approval of last applicable primary drawing/document or manufacturing clearance by BHEL for the released items in lot-1, 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.	(Supervision of E & C):- 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).
2	PE-V0-407-558-E102	Datasheet of lamps, CFL, Fluorescent tube, PVC coated conduit	Primary				
3	PE-V0-407-558-E901	MQP FOR LUMINARIES	Primary				
4	PE-V0-407-558-E905	MQP FOR MISCELLANEOUS ITEMS	Primary				
5	PE-V0-407-558-E201	Lighting design Calculation	Secondary		R0 submission 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.	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.	
6	PE-V0-407-558-E301	Lighting Layout	Secondary				
7	PE-V0-407-558-E401	Conduit Layout	Secondary		R0 submission within 15 days from the approval of respective LLOs & re- submission within 15 days of BHEL comments. BHEL shall furnish comments / approval on each submission within 18 days from receipt.		
8	PE-V0-407-558-E103	MOUNTING ARRANGEMENT OF BULK HEAD FIXTURE	Secondary		Along with respective OGA		
9	PE-V0-407-558-E104	TYPE TEST REPORTS FOR LIGHTING FIXTURES	Secondary		Within 2 months from date of PO/ within 1 week of type test conduction (as applicable)		
10	PE-V0-407-558-E105	FIELD QUALITY PLAN OF LIGHTING FIXTURES	Secondary		Within 3 months from PO		
11	PE-V0-407-558-E106	MOUNTING ARRANGEMENT drgs.	Secondary		Along with respective OGA	Mandatory Spares: Within four (04) months from	

Notes:-

- (i) The end period specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule.
- (ii) The delivery conditions specified are for contractual LD purposes, however BHEL may ask for early deliveries without any compensation thereof.
- (iii) Non-applicable drawings shall be decided during bid evaluation of the package.
- (iv) Wherever schedule of drawings/documents submission / re-submission is stipulated in the Technical Specifications, same shall be superseded by delivery specified in NIT.

ANNEXURE-II: DEVIATION SHEET (COST OF WITHDRAWAL)

PROJECT:-									
PACKAGE:-									
TENDER ENQUIRY REFERENCE:-									
NAME OF VENDOR:-									
SL 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 DEVIATIONS									
COMMERCIAL DEVIATIONS									
PARTICULARS OF BIDDERS' AUTHORISED REPRESENTATIVE									
NAME				DESIGNATIONS			SIGN & DATE		
NOTES:									
1. Cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.									
2. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.									
3. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.									
4. 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.									
5. Bidder shall furnish price copy of above format along with price bid.									
6. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.									
7. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.									
8. 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.									
9. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be considered.									
10. 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.									
11. 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.									
12. In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.									
13. In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.									

PROJECT: 2x 60 MW VYASI HEP
PACAKGE: - LIGHTING FIXTURES, LAMPS AND MISC. ITEMS
ENQUIRY NO. PE/PG/VYS/E-6735/2021, Dt:- 16.08.21
ANNEXURE -III TO INSTRUCTIONS TO PACKING LIST

For faster verification of bills, successful bidder to submit detailed Bill of Material (BOM) at the time of drawings/ documents submission after placement of PO. Each item of the BOM to be uniquely identified with item Sl. No. Supplier to ensure that all items which will find separate mention in the packing list are covered in this detailed BOM.

Supplier to also give the following undertaking in the BOM:

"The BOM provided herewith completes the scope (in content and intent) of material supply under PO No. Dated Any additional material which may become necessary for the intended application of the supplied items/package will be supplied free of cost in most reasonable time.

Packing List must indicate:

- a) Packing size
- b) Gross weight and net weight of each package
- c) Contents of the package with cross reference to BOM item code no. / Sl. No.
- d) Quantity of each items separately.

The packing list must cover all the BOM items.

Supplier to give following undertaking in the packing list:

The Packing list provided herewith is as per BOM approved under PO No. -----

ANNEXURE II
2 x 60 MW Vyasi HEP
LIGHTING FIXTURES, LAMPS AND MISC. ITEMS

Letter head of Company

Ref.....

Date.....

To,
Bharat Heavy Electricals Limited
PEM, PPEI Building, Plot No 25,
Sector -16A, Noida (U.P)-201301

Subject: - Certification regarding local content

Reference: Tender Enquiry No:-

Name of Package: **LIGHTING FIXTURES, LAMPS AND MISC. ITEMS**

Dear Sir,

We hereby certify that items offered by us of **LIGHTING FIXTURES, LAMPS AND MISC. ITEMS** for 2x 60 MW Vyasi HEP meets the requirement of minimum local content in line the Public Procurement (Preference to Make in India), Order 2017 dated-15.06.2017, 28.05.2018 & 29.05.2019, 04.06.20 & 16.09.20

We further confirm that details of location at which the local value addition is made will be our registered works at(address of the works)

Yours very truly

..... (authorized signatory of company)

..... (firm name)

authorized signatory
of company

BHEL PEM-ELECTRICAL

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

ANNEXURE –I

PROJECT SPECIFIC CRITERIA AGAINST ENQUIRY

PROJECT: 2 X 60 MW VYASI HEP (UJVN LIMITED)

NIL

**SURYA
DEV**

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=b6b8c6b33f4b40cbde4e
50fa1f68a72e80fec0b5e942b2584
3608773f4f34914, cn=SURYA DEV
Date: 2021.07.16 15:11:18 +05'30'

[Dealing Engineer]

**NAREND
RA NATH
JAJWARE**

Digitally signed by
NARENDRA NATH JAJWARE
DN: cn=NARENDRA NATH
JAJWARE, o=BHEL,
ou=ELECTRICAL,
email=nnjajware@bhel.in,
c=IN
Date: 2021.07.17 12:29:09
+05'30'

[Controlling Officer]

**PRAVEEN
DUTTA**

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=da8948aa0c3e2703a98a0aacaa2aedd
41d8468b9ef4c9f6429c5c374e3b470930,
cn=PRAVEEN DUTTA
Date: 2021.07.17 17:49:48 +05'30'

[Section Head]

**DEBASIS
A RATH**

Digitally signed by DEBASIS RATH
DN: c=IN, o=BHARAT HEAVY ELECTRICALS
LIMITED, ou=BHEL, PS PEM Noida,
postalCode=201301, st=UTTAR PRADESH,
2.5.4.20=da8118f1eaa223b30a7779e706a0d5
2ba00f9a08f0c08a2c23510a79e706a0d5
c=IN, o=BHARAT HEAVY
Date: 2021.07.19 10:24:11 +05'30'

[DH-Electrical]



**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 Manufacturing Capability

- 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 Lighting System Design Capability

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)

**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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PEM/PG-I BHEL, NOIDA
SPECIAL CONDITIONS OF CONTRACT (REV.-01)
2X60 MW UJVNL VYASI HEP



These Conditions shall be read and construed along with General Condition of Contract (GCC) enclosed along with the tender enquiry. In case of any conflict or inconsistency, the condition given in special condition of contract (SCC) shall prevail over the general condition of the contract (GCC).

- 1.0 **Project Name** : 2 X 60 MW VYASI HYDRO ELECTRIC PROJECT (HEP)
- 2.0 **Consignee Address (Ship To)** : Construction Manager, Bharat Heavy Electricals Limited
(To be mentioned in C/o Executive Engineer, UJVNL
LR/RR/ Consignment Note) E&M-II, VYASI HEP
Dist. Dehradun (Uttarakhand)
- 3.0 **Buyer's Name (Bill To) to be mentioned in Supplier's Invoice** : **For Supply Packages:** (Purchase order by BHEL-PEM):
BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR - PROJECT ENGINEERING MANAGEMENT
PPEI BUILDING, PLOT NO. 25, SECTOR-16A,
NOIDA-201301 (UTTAR PRADESH)
GSTIN NO. – 09AAACB4146P2ZC

: **For Turnkey Packages:** (LOA by BHEL-PEM, PO by BHEL-PSNR):
Construction manager, BHEL Site office,
2X60 MW UJVNL VYASI HEP, Dist. Dehradun (Uttarakhand)
BHEL PSNR GSTIN No.- 05AAACB4146P1ZL
- 4.0 **Customer** : Uttarakhand Jal Vidhyut Nigam Ltd. (UJVNL)
- 5.0 **Project Consultant** : NA
- 6.0 **Mode of Dispatch & Project Location Details** : **By Rail/Road on Door Delivery and freight Pre-Paid Basis.**
Vyasi HE Project, (2X60 MW) is located in Dehradun District of Uttarakhand. The Project sites are easily accessible by road, as all the project components are located on double lane approach roads taking off from National Highway NH-123 at Barawala (3 km from Dakpathar). The nearest railhead (Broad Gauge) is at Dehradun. Vyasi Dam is 17 km from Barawala.
- 7.0 **Clearance for Dispatch of materials** : MDCC will be issued by BHEL.
- 8.0 **Road Permit/ Waybill** : Yes. Supplier to generate the e-waybill at their end and furnish the

Only
16/7/19

PEM/PG-I BHEL, NOIDA
SPECIAL CONDITIONS OF CONTRACT (REV.-01)
2X60 MW UJVNL VYASI HEP



Required

scanned copy of e-waybill along with dispatch document to BHEL immediately on dispatch. In case of default, supplier shall be held responsible.

- 9.0 **Prior dispatch intimation to BHEL site Office and Underwriters** : Yes.
One set consisting of dispatch documents indicating the items dispatched (with the gross weight) and after informing the underwriter about the value of consignment to be sent to following:
a) BHEL Site Office
b) PG-I, BHEL- PEM, PPEI - Noida(U.P)
c) Insurance Co.
It is Supplier's responsibility to ensure availability of trucks well in advance where consignment will require more number of trucks to be deployed for dispatch. No concession for non-availability of trucks, after having given dispatch clearance shall be admissible.
- 10.0 **Transit Insurance** : By BHEL PSNR Noida (Vendor to intimate the underwriters quoting the insurance Policy No. As below)
- 11.0 **Insurance details Policy No. Intimation to Underwriters** : National Insurance Policy number 34010044165050000003
- 12.0 (a) **BHEL GSTIN** : **BHEL PEM GSTIN NO. – 09AAACB4146P2ZC (For Supply packages)**
: **BHEL PSNR GSTIN No.- 05AAACB4146P1ZL (For Turnkey packages)**
- (b) **Customer GSTIN** : **GSTN No. 05AAACU6672R1ZN**
- 13.0 **Paying Authority** : For packages where PEM will issue the Purchase Order: BHEL PEM will be the paying authority.
For packages where PEM will issue only the LOA and Purchase Order shall be issued by PSNR: BHEL Vyasi site /PSNR will be the paying Authority.


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PEM/PG-I BHEL, NOIDA
SPECIAL CONDITIONS OF CONTRACT (REV.-01)
2X60 MW UJVNL VYASI HEP



- 14.0 Documents Required for : Original + 6 Copies
(a) claiming dispatch Payment As per latest General Commercial Terms & Conditions (GCC) of Project Engineering Management (PEM)

NOTE:-

1. Customer or his representative will be involved for inspection as per approved Quality Plan.
2. MDCC will be issued by BHEL in line with approved BBU.
3. The supplier during inspection of Main supplies & Mandatory Spares by BHEL, CQS/ UJVNL/ UJVNL-Nominee shall obtain separate MDCC for Main Supplies & Separate MDCC for Mandatory Spares in line with the approved Billing Break Up.

- (b) For Material Receipt : As per latest General Commercial Terms & Conditions (GCC) of
Certificate(MRC) payment Project Engineering Management (PEM)
Responsibility to obtain MRC from customer at site
a) **For Turnkey Packages:- By Vendor**, where Supply/ Erection and commissioning is under Vendor's scope.

- 15.0 Unloading at site : By BHEL site office for supply packages

: By Supplier for turnkey packages. (Scope consists of supply and Erection & Commissioning).

- 16.0 Storage at site : By BHEL site office for supply packages

: By Supplier for turnkey packages. (Scope consists of supply and Erection & Commissioning).

- 17.0 Movement of Material from : a) By BHEL site for Supply Packages
stores to site and within Site b) By supplier for Turnkey Packages (Total Scope including Supply, Erection & Commissioning)
No movement of loose materials shall be allowed. Items are to be properly packed to ensure proper and safe transportation & storage at site.

- 18.0 Taxes and duties : i) Non Mega project. Custom Duty benefits are not available for this project.

ii) GST- CGST/SGST/IGST: as per corrigendum to GCC Rev 06 or further revisions of BHEL PEM GCC as applicable for the specific Tender enquiry.

Information as per Annexure-1 shall be provided by supplier in the GST compliant invoice.

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PEM/PG-I BHEL, NOIDA
SPECIAL CONDITIONS OF CONTRACT (REV.-01)



2X60 MW UJVNL VYASI HEP

19.0 Dispatch markings

: Each box shall be marked with Capital Letters in "Red" indicating : **Main Supply OR Commissioning spare OR Mandatory Spare** for **2X 60 MW VYASI HYDRO ELECTRIC PROJECT (HEP)**

Each package/Drum delivered under the Contract shall be marked by Supplier as per details listed below and such marking must be distinct and in English Language (all previous irrelevant markings being carefully obliterated) for purposes of identification.

Each and every box(package) shall be marked with following:-

- 1) Name and address of the Consignee
Customer Contract No. 01-02/2014-15/E&M Design -I/Vyasi (Supply and services)
- 2) Package number Description of Works:
- 3) Vendor Name
- 4) PEM P.O reference no.
- 5) Item number (if applicable) Net and gross weight volume
- 6) Country of origin
- 7) Port of entry
- 8) Quantity per package
- 9) Type of Equipment: "E" - For equipment supply
"T" - For Tools and Tackles
"S" - For Mandatory Spares

Besides above necessary, packing shall bear a special marking "TOP", "BOTTOM", "DO NOT TURN OVER", "DEEP DRY", "HANDLE WITH CARE", etc.

IMPORTANT

Two (02) copies of respective standard manufacturer's erection instruction /operation manual shall be kept in each package/container for immediate reference by BHEL site.

NOTE:-

The Copy of complete Packing list for the consignment must be put inside the Box/Boxes.

11 copies + 05nos. of CD ROM of supplier's Erection/ Instruction manuals to be given to the BHEL, PEM, PPEI-Noida (PG) within 30 days of dispatch for handing over to Customer/BHEL site.

20.0 Commissioning Spares

: The commissioning spares shall be properly packed separately in separate box and each spare shall be properly tagged giving details i.e. dispatch (to match the description given in the packing slip) to facilitate their proper identification. One Copy of Packing list must be put inside the Box.


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PEM/PG-I BHEL, NOIDA
SPECIAL CONDITIONS OF CONTRACT (REV.-01)
2X60 MW UJVNL VYASI HEP



- 21.0 **Mandatory Spares** : The Mandatory spares shall be properly packed separately in separate boxes & boxes should be painted in red 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 UJVNL approved BBU for Mandatory spares & Number per item (to match the description given in the packing slip) to facilitate their proper identification by ultimate customer M/s UJVNL. One Copy of Packing List must be put inside the BOX along with Manufacturing drawing no. reference, Catalogue reference etc. Prior intimation to dispatch spares through same LR & clearance from BHEL is required to be taken.
- 22.0 **Warranty period** : Guarantee period shall be as per clause no.12.0 of GCC rev no.06 or as specified in NIT, whichever is later.
- 23.0 **Note for Turnkey Packages:-** : **Construction Power:** - Shall be provided to supplier on chargeable basis
Construction Water: - To be arranged by supplier
- 24.0 **Important Note** : No Chinese National / company having close link with China is envisaged to work on the project site for Vyasi HEP.


16/7/19


16/07/19

PEM/PG-I BHEL, NOIDA
SPECIAL CONDITIONS OF CONTRACT (REV.-01)
2X60 MW UJVNL VYASI HEP



Annexure-I

Excerpts from Chapter VI for compliance of GST Invoice as per Rule 46
TAX INVOICE, CREDIT AND DEBIT NOTES

46. Tax invoice.- Subject to rule 54, a tax invoice referred to in section 31 shall be issued by the registered person containing the following particulars, namely,-

- (a) name, address and Goods and Services Tax Identification Number of the supplier;
- (b) a consecutive serial number not exceeding sixteen characters, in one or multiple series, containing alphabets or numerals or special characters- hyphen or dash and slash symbolised as "-" and "/" respectively, and any combination thereof, unique for a financial year;
- (c) date of its issue;
- (d) name, address and Goods and Services Tax Identification Number or Unique Identity Number, if registered, of the recipient;
- (e) name and address of the recipient and the address of delivery, along with the name of the State and its code, if such recipient is un-registered and where the value of the taxable supply is fifty thousand rupees or more;
- (f) name and address of the recipient and the address of delivery, along with the name of the State and its code, if such recipient is un-registered and where the value of the taxable supply is less than fifty thousand rupees and the recipient requests that such details be recorded in the tax invoice;
- (g) Harmonised System of Nomenclature code for goods or services;
- (h) description of goods or services;
- (i) quantity in case of goods and unit or Unique Quantity Code thereof;
- (j) total value of supply of goods or services or both;
- (k) taxable value of the supply of goods or services or both taking into account discount or abatement, if any;
- (l) rate of tax (central tax, State tax, integrated tax, Union territory tax or cess);
- (m) amount of tax charged in respect of taxable goods or services (central tax, State tax, integrated tax, Union territory tax or cess);
- (n) place of supply along with the name of the State, in the case of a supply in the course of inter-State trade or commerce;
- (o) address of delivery where the same is different from the place of supply;
- (p) whether the tax is payable on reverse charge basis; and
- (q) signature or digital signature of the supplier or his authorized representative:


16/7/19

2X60 MW VVASI HYDRO ELECTRIC PROJECT (UJVN LIMITED)

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

DOC. NO. PE-TS-407-558-E006A

REVISION 0



BHARAT HEAVY ELECTRICALS LIMITED

POWER SECTOR

PROJECT ENGINEERING MANAGEMENT

NOIDA, INDIA



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

**2X60 MW VYASI HYDRO ELECTRIC
PROJECT (UJVN LIMITED)**

SPECIFICATION NO. PE-TS-407-558-E006A

VOLUME II

REV. 0

DATE: 14.07.2021

SHEET 1 OF 1

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	CONTENT	1
	COMPLIANCE CERTIFICATE	1
	SPECIFIC TECHNICAL REQUIREMENT	11
	DATA SHEET-A	9
	DATA SHEET-TO BE FILLED BY VENDOR	3
	ANNEXURE-E PACKING SPECIFICATION	1
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	COVER SHEET	1
	STANDARD SPECIFICATION	38
	STANDARD QUALITY PLAN	10
	CUSTOMER QUALITY PLAN	4
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TOTAL NUMBER OF SHEETS (INCLUDING COVER & SEPARATOR SHEETS: 90		

	TECHNICAL SPECIFICATION FOR LIGHTING FIXTURES, LAMPS AND MISCELLANEOUS ITEMS	SPECIFICATION NO. PE-TS-407-558-E006A	
		VOLUME II	
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	2X60 MW VYASI HYDRO ELECTRIC PROJECT (UJVN LIMITED)	REV. 0	DATE: 14.07.2021
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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 is 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



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

**2X60 MW VYASI HYDRO ELECTRIC
PROJECT (UJVN LIMITED)**

SPECIFICATION NO. PE-TS-407-558-E006A

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SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS



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

**2X60 MW VYASI HYDRO ELECTRIC
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1.0 SCOPE OF SUPPLY AND SERVICES

1.1 SUPPLY:

Manufacture, assembly, inspection & testing at vendor's/ sub-vendor's works, proper packing, delivery to site and guarantee for two years of Lighting system as mentioned in different sections of this specification, complete with all accessories for efficient and trouble-free operation.

It is not the intent to specify completely herein all details of the equipment, nevertheless, the equipment shall be complete and operative in all respects and shall conform to the highest standard of engineering, design and workmanship.

1.2 SYSTEM DESIGN ENGINEERING:

System Design Engineering is included in vendor's scope which include design of complete lighting system for indoor and outdoor areas of the hydro electric plant. Refer Annexure-D for tentative areas 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 equipment at site.

1.5 Standard technical requirements of the various items of lighting system design requirements are indicated in Section-II. Project specific requirements 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 purchaser 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-A to section- I.

2.1 BILL OF QUANTITIES:

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

3.1 STATUTORY AND REGULATORY REGULATION

3.2 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.



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

**2X60 MW VYASI HYDRO ELECTRIC
PROJECT (UJVN LIMITED)**

SPECIFICATION NO. PE-TS-407-558-E006A

VOLUME II

SECTION - I

REV. 0

DATE: 14.07.2021

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4.0 DOCUMENTATION

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.
- Signed & stamped copy of unpriced price schedule with “quoted” word indicated against all items.

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

S. No.	Reference Clause No. of Section- II	Specific Requirement/ Change
1	1.0	Scope shall be as per Volume II, Section-I.
2	7	Refer Annexure- E for packing.
3	12.4	Preparation of as-built drawings has been excluded from the scope of vendor.
4	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.
5	Additional clause	Following sizes of 1100 V grade, PVC insulated, single core, stranded copper conductor wires will be used: Lighting Panel to Fixtures: 1.5 sq. mm (Cu) Lighting Panel to JB's/ Switches: 2.5 sq. mm (Cu) JB's/ switches to Fixtures: 1.5 sq. mm (Cu) Panel to First receptacles: 4.0 sq. mm (Cu) First receptacles to looping other receptacles: 4.0 sq. mm (Cu) In case of only one receptacles in ckt., Panel to receptacles: 4.0 sq. mm (Cu) Panel/ JB's to flood light fixtures: 1 x 2.5 sq. mm (Cu) Wiring in hazardous area if applicable, transformer yard, outdoor area (like Miscellaneous areas) will be done using 3C-2.5 sq. mm (Cu), PVC insulated, FRLS PVC sheathed armoured cable. Note: Wires & Cables are not in vendor's scope of supply, however vendor to show size & quantity in CLO drawings.
6	Additional clause	Earthing of lighting system will be done by using of following sizes of wire / flat: Lighting Distribution Board: GS Flat 50x6 mm Lighting Panels: GS Flat 25x3 mm Lighting fixtures, receptacles, conduits, junction boxes & switch boxes: 16 SWG GI wire Welding receptacles: GS Flat 50x6 mm Street light pole/ flood light pole and High mast: GS Flat 25x3 mm Electrode for Pole/ High mast earthing: 2 no, 20 mm dia MS rod, 3 mtr long
7	Additional clause	Each 1 no. 20 mm dia MS rod to be 3 mtr long.
8	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	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
03	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
04	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
05	FC81 (LED)	Corrosion proof, totally enclosed type LED fixture with integral driver.	3780	42
06	SF63 (LED)	Flood light, Heavy duty type LED fixture with integral driver.	16920	188
07	SF66 (LED)	Flood light, Heavy duty type LED fixture with integral driver.	27000	300
08	SF66 (LED)	Flood light, Heavy duty type LED fixture with integral driver.	45000	500
09	SB11 (LED)	Medium Bay, Industrial type LED fixture with integral driver.	10080	112
10	SB02 (LED)	High Bay, Industrial type LED fixture with integral driver.	16920	188
11	SB03 (LED)	High Bay, Industrial type LED fixture with integral driver suitable for mounting height > 10m.	24750	275
12	SS62 (LED)	Street light, LED fixture with integral driver.	10080	112
13	SS63 (LED)	Street light, LED fixture with integral driver.	16920	188
14	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
15	LAMP 40-60W LED	LED bulb 40-60W suitable for B22 holder along with B22 holder.	4000	60



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ANNEXURE – A

AVERAGE LUX LEVEL & TYPE OF FIXTURES

S. No.	LOCATION	AVERAGE LUX LEVEL	TYPE OF LIGHTING FIXTURES*
01	Machine hall	300	LED, high bay, industrial type fittings & minimum 6 no. LED lamp (40-60W).
02	Service bay	300	LED, high bay, industrial type fittings & minimum 6 no. LED lamp (40-60W).
03	Switchgear/ Charger rooms	200	Industrial type LED, surface mounted.
04	Central control room / Control equipment room	500	Industrial type LED, decorative, recessed type.
05	Office, Conference rooms	500	Industrial type LED, decorative, recessed type.
06	Data processing areas	750	Industrial type LED, surface mounted.
07	Battery rooms	200	Industrial type LED, corrosion proof, totally enclosed type.
08	Cable Vault / cable spreading area	200	Industrial type LED, surface mounted.
09	Transformer room	300	LED, medium bay, industrial type fittings & minimum 6 no. LED lamp (40-60W).
10	Store	300	Industrial type LED, surface mounted.
11	Washrooms and toilets	200	Industrial type LED, surface mounted.
12	Staircases	200	Industrial type LED, surface mounted.
13	AC room, DC distribution, battery charger	200	Industrial type LED, surface mounted.
14	DG room	200	Industrial type LED, surface mounted.
15	Turbine floor, generator floor, MIV area, compressor room	200	Industrial type LED, surface mounted.
16	Generator barrel	200	Industrial type LED, surface mounted.
17	Street lighting	20	LED, street light with one piece cast aluminium body.
18	AC Emergency lighting	50	Similar to specified fittings in respective areas above



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ANNEXURE – B

LIGHTING & LV POWER SERVICES IN DIFFERENT AREAS

S. No.	AREA	ACN	ACE	DCE	6/16A Socket	20A Socket	63A Socket
01	Service bay & Machine hall	Y	Y	Y	Y*	Y	Y
02	Turbine floor, Generator floor & MIV area	Y	Y	Y	Y*	Y	Y
03	AC room, test lab, DC distribution / LT room, battery charger	Y	Y	Y	Y*	Y	-
04	Generator barrel and turbine pit	Y	y	Y	Y	y	-
05	Transformer room	Y	y	-	Y	y	Y
06	Control room & Conference rooms	Y	Y	Y	Y*	-	-
07	DG room	Y	Y	Y	Y	Y	Y
08	Outdoor area	Y	-	-	-	-	-

LEGEND:

ACN:

AC Normal Lighting

ACE:

AC Emergency Lighting

DCE:

DC Emergency Lighting

Y:

YES

Y*:

YES, Only in control room, offices & toilets



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ANNEXURE – C

LIST OF MAKES (SUB VENDOR ITEMS)

ITEM DESCRIPTION	SUB VENDOR NAME
LIGHTING DESIGNER	AVAIDS TECHNOVATORS PVT. LTD.
	BAJAJ ELECTRICALS LTD.
	KELSATEK SOLUTIONS PVT. LTD.
	SUMANAM ENGINEERING SERVICES CONSULTANT
	SPAN MANUFACTURING COMPANY LTD
	CITELUM INDIA PVT. LTD
	SURYA ROSHNI LTD
	HPL ELECTRIC & POWER PVT. LTD.
LIGHTING FIXTURES (LED)	NEEV LUMINARIES
	HAVELLS INDIA LIMITED
	BAJAJ ELECTRICALS
	SURYA ROSHNI LIMITED
	PHILIPS
	HPL ELECTRIC & POWER PVT. LTD
	INSTA POWER
	PYROTECH ELECTRONICS PVT. LTD.
	HALONIX TECHNOLOGIES LTD
	JAQUAR & COMPANY PVT. LTD.
	CROMPTON GREAVES CONSUMER ELECTRICALS LTD.
	WIPRO ENTERPRISES PRIVATE LTD.
LIGHTING FIXTURES (FLAME PROOF)	HAVELLS INDIA LIMITED
	BAJAJ ELECTRICALS
	BALIGA ELECTRICALS
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.
FLEXIBLE CONDUIT (PVC COATED)	REPUTED MAKE
EMER. PORTABLE LTG. SET	BAJAJ ELECTRICALS
	PROLITE AUTOGLO LIMITED
FUSE BASE	INDO ASIAN
	GE-POWER
	L&T
	C&S ELECTRIC LTD.



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	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.
GALVANISING	ALSTOM LTD
	ESSEN DEINKI
	Jenco Industrial Corporation
	National Galvanizing Company
	Sigma Galvanising Pvt. Ltd.
	B.P. Projects PVT LTD
	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.
GI WIRE & FLAT	INDUSTRIAL PERFORATION (I) PVT.LTD.
	INDIA ELECTRICALS SYNDICATE
	INDMARK FORMTECH PVT. LTD.
	PREMIER POWER PRODUCTS (CAL) PVT. LTD.



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	PATNY SYSTEMS (P) LTD
	PASSIVE INFRA PROJECTS PVT. LTD.
	RUKMANI ELECTRICAL & COMPONENTS PVT LTD
	RATAN PROJECTS & ENGINEERING CO. PVT.LTD.
	RABI ENGINEERING WORKS PVT. LTD.
	RAJASTHAN METAL SMELTING CO.
	SARAL INDUSTRIES
	PARCO Engineers Pvt. Ltd.
	UNITECH FABRICATORS and ENGINEERS PVT LTD
IND.POWER & WLDG SOCKETS	CROMPTON GREAVES
	CYCLO ELECTRIC DEVICE & SERV.CO.
	BCH
	BEST & CROMPTON
	AJMERA INDUSTRIES & ENGG. WORKS
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
	Shrenik & Co.
	PHOENIX MECANO LTD.,
	Adroit Control Engineers Pvt.Ltd.
	MIKA ENGINEERS
	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 LAMP (LED)	NEEV LUMINARIES
	HAVELLS INDIA LIMITED
	BAJAJ ELECTRICALS
	SURYA ROSHNI LIMITED
	PHILIPS
	HPL ELECTRIC & POWER PVT. LTD
	INSTA POWER
	PYROTECH ELECTRONICS PVT. LTD.
	HALONIX TECHNOLOGIES LTD
MCB	MDS SWITCHGEAR LTD
	INDO ASIAN



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	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
RECEPTACLE (FLAME PROOF)	BALIGA ELECTRICALS
	SUDHIR SWITCHGEAR
	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
EXIT SIGN (NON FLAME PROOF)	REPUTED MAKE
LADDER	REPUTED MAKE
HUME PIPE	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

NOTES FOR DOCUMENTS REQUIRED AFTER AWARD OF LOI/PO

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	40
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)	%	+5% to -5%
e)	Combined voltage & frequency variation (sum of absolutes permissible)	%	10%
f)	System fault level & duration	kA, sec.	40kA for 1 sec.
1.3	DC Supply		
a)	Rated voltage	V	220
b)	Voltage variation (permissible)	%	+20% to -20%
c)	System fault level & duration	kA, sec.	20 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		
4.2	Degree of protection for drip proof luminaires		IPW-55
4.3	Flame proof luminaires		



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a)	Hazardous area classification		IS 5572 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 [] Li-Ion
f)	AH capacity of battery	AH	To be furnished by vendor
g)	Battery voltage	V	9
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 ☐ Li-Ion
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		Not-applicable
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



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g)	No. of outgoing sockets		4
h)	Whether cord coiling arrangement provided		☒ Yes air cooled ☐ No
5.0	Junction Box (other than Street Light Junction box)		
a)	Enclosure material		☐ FRP ☒ CRCA Sheet.
b)	Enclosure thickness	mm	2
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



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	Minimum paint thickness	micron	50
f)	Degree of protection		IP-55
8.0	Switch Box		
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:

1. Detailed luminaire and lamp data shall be placed by vendor after award of contract.



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2. Galvanization wherever applicable shall be hot dip galvanized with the weight of zinc as 460g/m² (65 micron).
3. LED must comply with all the parameters of IS 16105 or IESNA LM-80-08.
4. The Luminaire must comply with all the parameters of IS 16106 or IESNA LM-79-08.
5. The LED driver should comply to IEC 61347_2_13, IS 15885: Part 2: Sec 13, IEC 62384, IS 16104 and CISPR 15.
6. The luminaire complete with all accessories shall comply with relevant specified standards.
7. The values of minimum luminous flux & maximum measured electrical input power are specified 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.
8. All parameters mentioned in Section-II, Clause 5.2 are to be complied in totality.

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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



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Structural steel (Standard quality)	IS 2062
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

18 ILLUMINATION SYSTEM**18.1 Guaranteed Technical Particulars**

Item	Parameter	Units	Contractor's Data
1	Type / designation		
2	Lux levels		
2.1	General areas		
	- Store	Lux	
	- Washrooms and toilets	Lux	
	- Staircases	Lux	
2.2	Office areas		
	- Offices	Lux	
	- Conference room	Lux	
	- Reception lobby, model room	Lux	
2.3	Equipment areas		
	- Power house machine hall		
	- MIV floor, Turbine floor, generator floor	Lux	
	-Turbine pit , runner removal gallery	Lux	
	- unloading bay area		
	-service bay area	Lux	
	- Generator barrel	Lux	
	- Mechanical equipment areas	Lux	
	- Control room	Lux	
	-High and low voltage switching installation in building	Lux	
	-E&M workshop area	Lux	
	-DG set area	Lux	
2.4	Emergency lighting, all areas	Lux	
2.5	Out door areas		
	- Draft tube deck	Lux	
	- Outdoor switchyard	Lux	
	- Entrance,exit and other areas	Lux	
	- Road and traffic areas	Lux	
3	Illumination panels		
3.1	Minimum number of panels	Nos.	
3.2	Rating of bus bar	A	
3.3	Minimum number of outgoing feeders	Nos.	
3.4	Rating of feeder	A	
3.5	Protection class	IP	
4	Circuit breakers/fused load breaker switches		
4.1	Type / designation		
4.2	Design voltage	V	
4.3	Protection class	IP	
4.4	Rated short circuit making current	kA _{peak}	
4.5	Rated symmetrical short circuit breaking current	kA _{rms}	

18 ILLUMINATION SYSTEM**18.2 Informative Data**

Item	Parameter	Units	Contractor's Data
1	General (Applicable to all panels)		
1.1	Manufacturer		
1.2	Place of manufacture		
1.3	Applicable standards		
2	Illumination panel		
2.1	Dimension (LxWxH)	mmxmmx mm	
2.2	Weight	Kg	
3	Emergency lighting panel		
3.1	Dimension (LxWxH)	mmxmmx mm	
3.2	Weight	Kg	
4	HPMV lamps(each type)		
4.1	Make		
4.2	Applicable standards		
4.3	Wattage	W	
5	HPSV lamps(each type)		
5.1	Make		
5.2	Applicable standards		
5.3	Wattage		
6	Fluorescent lamps(each type)		
6.1	Make		
6.2	Applicable standards		
6.3	Wattage	W	
7	Compact fluorescent lamps (CFL)		
7.1	Make		
7.2	Applicable standards		
7.3	Wattage	W	
8	GLS lamps		
8.1	Make		
8.2	Applicable standards		
8.3	Wattage	W	
9	Power sockets, single phase		
9.1	Make		
9.2	Applicable standards		
9.3	Voltage rating	V	
9.4	Current rating	A	
10	Power sockets, three phase		
10.1	Make		
10.2	Applicable standards		
10.3	Voltage rating	V	
10.4	Current rating	A	
11	Power sockets, 24V (AC)		
11.1	Make		
11.2	Applicable standards		

11.3	Voltage rating	V	
11.4	Current rating	A	
11.5	Rating of transformer	VA	
12	Portable socket cubicle		
12.1	Make		
12.2	Applicable standards		
12.3	Voltage rating	V	
12.4	Current rating	A	
13	Street light poles		
13.1	Make		
13.2	Type / designation		
13.3	Applicable standards		
13.4	Height	m	
14	Lighting masts		
14.1	Make		
14.2	Type / designation		
14.3	Applicable standards		
14.4	Height	m	
14.5	Number of luminaries	nos.	
15	Type of cable		
15.1	Normal lighting system		
15.2	Emergency lighting system		
15.3	Power supply network		
15.4	Telephone network		

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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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, annunciators 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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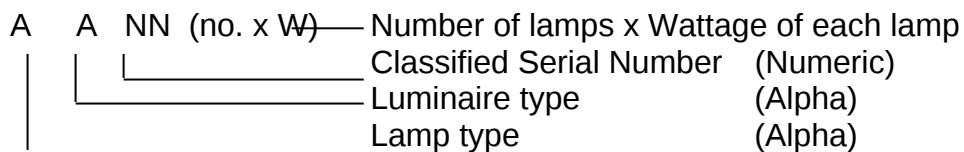
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ANNEXURE-I

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. |



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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

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BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
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	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	
		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
-----------	------------------------

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 20:28:22 +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
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	Sign & Date	Name	Seal
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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 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

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
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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							

Date: 2020.07.10 20:29:34 +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 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

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

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Seal	

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	Sign & Date	Name	Seal
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Approved by:			

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		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:			
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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							

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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 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	

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Doc No:			
	Sign & Date	Name	Seal
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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 8 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	
					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	

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Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by	RITESH KUMAR JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
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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 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	-	
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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	by RITESH KUMAR

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

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Sign & Date	
Seal	

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	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		
			PROJECT:					PO NO.:		DATE:		
			ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS			SYSTEM:STATION LIGHTING SYSTEM		SECTION: II		SHEET 10 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

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						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:			
Reviewed by:		PRAVEEN DUTTA	Reviewed by:	Digitally signed by JAISWAL	RITESH KUMAR			Approved by:			

Date: 2020.07.10 20:32:46 +05'30'

QUALITY ASSURANCE PLAN (MODEL)

PROJECT : Vyasi H.E.P
NAME OF
EQUIPMENT : Illumination System

CLIENT: UJVN Limited
VENDOR :
NIT/P.O. REFERENCE : -----

SR. NO.	ITEM /COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD FORMAT	INSP. AGENCY			REMARKS
							Perform	Witness	Verify	
A	Raw Material									
1	Aluminium Casting									
a)	Dimensional	Measurement	Sample	Tech.Spec./Appd.drg./ IS:617/IEC		TC	3/2	-	1	TC
b)	Surface finish	Visual	-do-	-do-		TC	3/2	-	1	TC
c)	Chemical composition	Chemical test	-do-	-do-		TC	3/2	-	1	TC
d)	Weight	Measurement	-do-	Tech.Spec./Appd.drg./IEC		TC	3/2	-	1	TC
2	Super enamelled copper wire for Ballast									
a)	Thickness of wire	Measurement	-do-	Tech.Spec./Appd.drg./ IS:4800/IEC		TC	3/2	-	1	TC
b)	Pin hole test	Test	-do-	-do-		TC	3/2	-	1	TC
c)	H V test	-do-	-do-	-do-		TC	3/2	-	1	TC
3	Polyester resin quartz mix									
a)	Viscosity of resin	Measurement	Sample	Tech.Spec./Appd.drg./IEC		TC	3/2	-	1	TC
b)	Powder resin mix	-do-	-do-	-do-		TC	3/2	-	1	TC
B	Components									
1	Ballast									
a)	Make & Rating	Visual	100%	-do-		TC	3/2	-	1	TC
b)	Visual examination for painting/markings etc.	Visual	100%	-do-		TC	3/2	-	1	TC

Note: a. In 'Inspection Agency' column figure 1,2,or 3 to be filled. 1- will indicate 'UJVNL', 2- will indicate 'supplier' & 3- will indicate 'sub-supplier'.
b. In 'Remarks' column following abbreviations shall be used - RR-Review of Records, T.C. - Test Certificate Submission, CHP - Customer Hold Point & JIR - Joint Inspection Report
c. Test certificates shall be submitted at the time of final inspection.

Signature
UJVNL

Signature & Seal
(VENDORS Q.C. DEPT. OR REPRESENTATIVE)

Note: Vendor to follow both BHEL Standard QP as well as Customer QP, in case of any conflict between BHEL Standard QP & Customer QP, vendor to follow the stringent requirement between the BHEL Standard QP and Customer QP.

QUALITY ASSURANCE PLAN (MODEL)

PROJECT : Vyasi H.E.P
NAME OF
EQUIPMENT : Illumination System

CLIENT: UJVNL Limited
VENDOR :
NIT/P.O. REFERENCE : -----

SR. NO.	ITEM /COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD FORMAT	INSP. AGENCY			REMARKS
							Perform	Witness	Verify	
c)	Dimensional Check	Measurement	100%	Tech.Spec./Appd.drg./IEC		TC	3/2	-	1	TC
d)	Electrical parameters running current/watt loss/ short circuit current.	Test	100%	Tech.Spec./Appd. Drg./IS:1564 & 6616/IEC		TC	3/2	-	1	TC
e)	IR dry Test	Electrical	100%	-do-		TC	3/2	-	1	TC
f)	HV Test	Electrical	100%	-do-		TC	3/2	-	1	TC
2	Capacitor									
a)	Make & Rating	Visual	100%	Tech.Spec./Appd.drg./IEC		TC	3/2	-	1	TC
b)	Surface finish	Visual	Sample	Tech.Spec./Appd.drg./IEC		TC	3/2	-	1	TC
c)	Discharge Resistance Test	Test	-do-	Tech.Spec./Appd.Drg./IS:1569/IEC		TC	3/2	-	1	TC
d)	Value of capacitance	Measurement	-do-	-do-		TC	3/2	-	1	TC
e)	Thermal Stability Test	-do-	-do-	-do-		TC	3/2	-	1	TC
3	PVC wire									
a)	Make & Rating	Visual	100%	Tech.Spec./Appd.drg./IEC		TC	3/2	-	1	TC
b)	Dimensional conformity (Conductor/Insulation)	Measurement	Sample	Tech.Spec./Appd.drg./IEC		TC	3/2	-	1	TC
c)	HV test	Electrical	-do-	Tech.Spec./ IS:694/IEC		TC	3/2	-	1	TC
d)	Surface finish/colour	Visual	-do-	As per Tech.Specification.		TC	3/2	-	1	TC
e)	IR Test	Electrical	-do-	-do-		TC	3/2	-	1	TC
4	Diffuser									
a)	Make & Rating	Visual	100%	Tech.Spec./Appd.drg./IEC		TC	3/2	-	1	TC
b)	Dimensional conformity	Measurement	-do-	-do-		TC	3/2	-	1	TC
c)	Surface finish	Visual	-do-	-do-		TC	3/2	-	1	TC

Note: a. In 'Inspection Agency' column figure 1, 2 or 3 to be filled. 1- will indicate 'UJVNL', 2- will indicate 'supplier' & 3- will indicate 'sub-supplier'.
b. In 'Remarks' column following abbreviations shall be used - RR-Review of Records, T.C. - Test Certificate Submission, CHP - Customer Hold Point & JIR - Joint Inspection Report
c. Test certificates shall be submitted at the time of final inspection.

Signature
UJVNL

Signature & Seal
(VENDORS Q.C. DEPT. OR REPRESENTATIVE)

Note: Vendor to follow both BHEL Standard QP as well as Customer QP, in case of any conflict between BHEL Standard QP & Customer QP, vendor to follow the stringent requirement between the BHEL Standard QP and Customer QP.

QUALITY ASSURANCE PLAN (MODEL)

PROJECT : Vyasi H.E.P
NAME OF
EQUIPMENT : Illumination System

CLIENT: UJVN Limited
VENDOR :
NIT/P.O. REFERENCE : -----

SR. NO.	ITEM /COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD FORMAT	INSP. AGENCY			REMARKS
							Perform	Witness	Verify	
5	Porcelain Lamp Holder									
a)	Make & Rating	Visual	100%	Tech.Spec./Appd.drg./IEC	TC	3/2	-	1	TC	
b)	Surface finish	Visual	100%	Tech.Spec./ IS:10276 /1258 /IEC	TC	3/2	-	1	TC	
c)	HV Test	Electrical	100%	Tech.Spec./Appd.drg./IEC	TC	3/2	-	1	TC	
d)	IR dry Test	-do-	100%	-do-	TC	3/2	-	1	TC	
e)	Mech. Strength Test	Mechanical	100%	-do-	TC	3/2	-	1	TC	
6	Paint									
a)	Paint shade	Visual	100%	Tech.Spec./Appd.drg./IEC	TC	3/2	-	1	TC	
b)	Viscosity	Measurement	100%	-do-	TC	3/2	-	1	TC	
7	Starter									
a)	Make & Rating	Visual	100%	Tech.Spec./Appd.drg./IEC	TC	3/2	-	1	TC	
b)	Dimensional conformity	Measurement	100%	Tech.Spec./Appd.drg./ IS:2215/IEC	TC	3/2	-	1	TC	
c)	HV test	Electrical	100%	-do-	TC	3/2	-	1	TC	
d)	IR Test	-do-	100%	-do-	TC	3/2	-	1	TC	
C	Luminaire (Assembly)									
	Final Inspection & Testing									
1	Type tests									
a)	Visual examination	Visual	Sample	Tech.Spec./Appd.Drg./	TC	3/2	-	1	TC	
b)	Endurance test	Test	-do-	IS:10322/IEC	TC	3/2	-	1	TC	
c)	Heat run test	-do-	-do-	-do-	TC	3/2	-	1	TC	
d)	Dust tight test	Test	-do-	-do-	TC	3/2	-	1	TC	
e)	Jet proof / Splash proof/ Rain proof Test	-do-	-do-	-do-	TC	3/2	-	1	TC	

Note: a. In 'Inspection Agency' column figure 1, 2 or 3 to be filled. 1- will indicate 'UJVNL', 2- will indicate 'supplier' & 3- will indicate 'sub-supplier'.
b. In 'Remarks' column following abbreviations shall be used - RR-Review of Records, T.C. - Test Certificate Submission, CHP - Customer Hold Point & JIR - Joint Inspection Report
c. Test certificates shall be submitted at the time of final inspection.

Signature
UJVNL

Signature & Seal
(VENDORS Q.C. DEPT. OR REPRESENTATIVE)

Note: Vendor to follow both BHEL Standard QP as well as Customer QP, in case of any conflict between BHEL Standard QP & Customer QP, vendor to follow the stringent requirement between the BHEL Standard QP and Customer QP.

QUALITY ASSURANCE PLAN (MODEL)

PROJECT : Vyasi H.E.P
NAME OF
EQUIPMENT : Illumination System

CLIENT: UJVN Limited
VENDOR :
NIT/P.O. REFERENCE : -----

SR. NO.	ITEM /COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD FORMAT	INSP. AGENCY			REMARKS
							Perform	Witness	Verify	
f)	Insulation Resistance Test	Electrical	Sample	Tech.Spec./Appd.Drg./		TC	3/2	-	1	TC
g)	High voltage Test	-do-	-do-	IS:10322/IEC		TC	3/2	-	1	TC
h)	Photometric Test	-do-	-do-	-do-		TC	3/2	-	1	TC
2	Acceptance Tests									
a)	Visual Examination	Visual	-do-	-do-		TC	3/2	-	1	TC
b)	Jet proof/splash proof/ rain proof Test	Test	-do-	-do-		TC	3/2	-	1	TC
c)	Insulation Resistance Test	Electrical	-do-	-do-		TC	3/2	-	1	TC
d)	High Voltage Test	-do-	-do-	-do-		TC	3/2	-	1	TC
e)	Photometric Test	-do-	-do-	-do-		TC	3/2	-	1	TC
3	Routine Tests									
a)	Dimensional conformity	Measurement	-do-	Tech.Spec./ Appd.drg./IEC		TC	3/2	-	1	TC
b)	Assembly / layout of components	-do-	100%	-do-		TC	3/2	-	1	TC
c)	Provision of earthing	Test	100%	-do-		TC	3/2	-	1	TC
d)	IR dry Test	Electrical	100%	Tech.Spec./Appd.Drg./		TC	3/2	-	1	TC
e)	HV Test	-do-	-do-	IS:10322/IEC		TC	3/2	-	1	TC
f)	Visual examination	Visual	-do-	-do-		TC	3/2	-	1	TC

Note: a. In 'Inspection Agency' column figure 1, 2 or 3 to be filled. 1- will indicate 'UJVNL', 2- will indicate 'supplier' & 3- will indicate 'sub-supplier'.
b. In 'Remarks' column following abbreviations shall be used - RR-Review of Records, T.C. - Test Certificate Submission, CHP - Customer Hold Point & JIR - Joint Inspection Report
c. Test certificates shall be submitted at the time of final inspection.

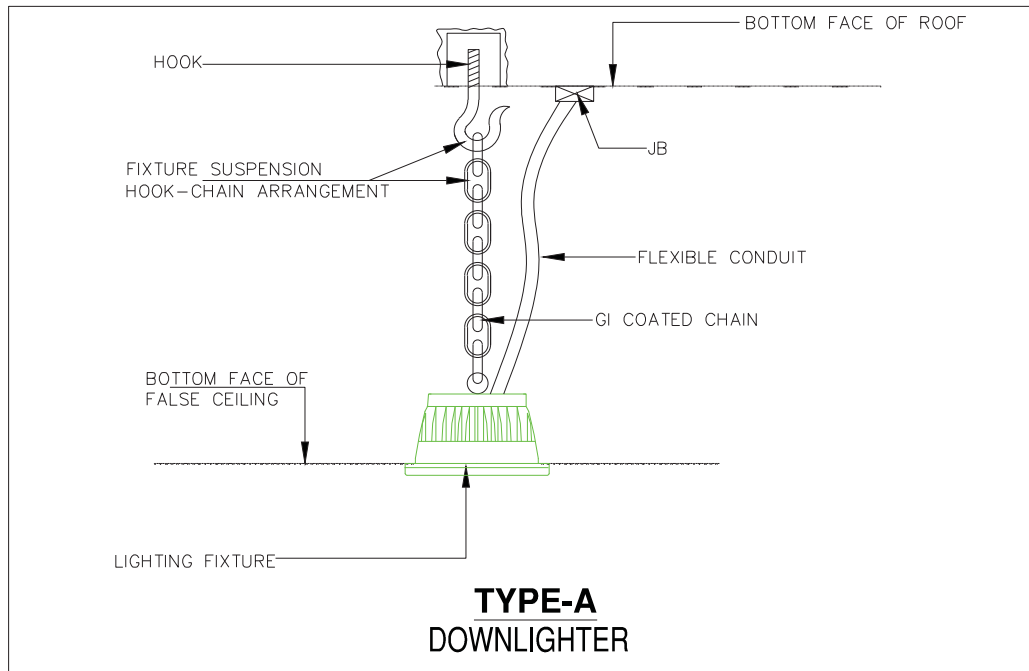
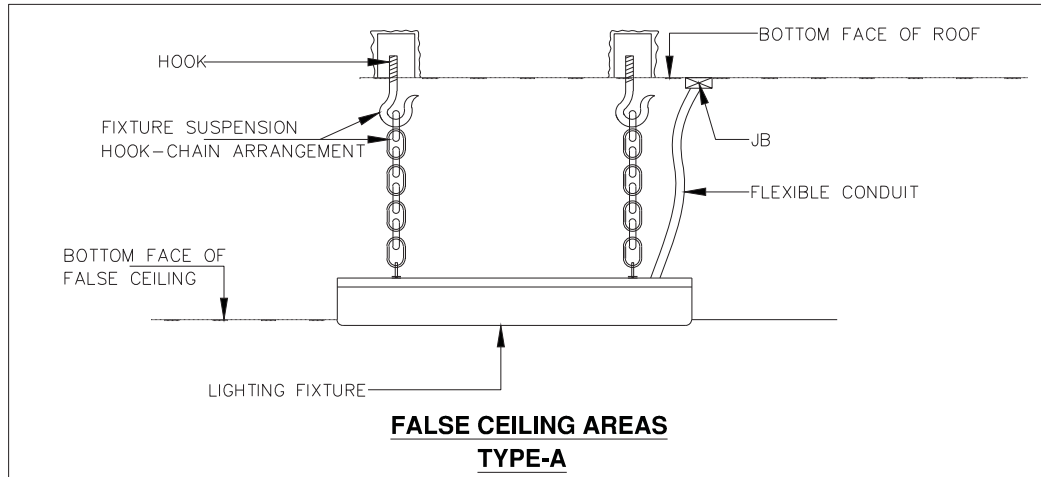
1505

Signature
UJVNL

Signature & Seal
(VENDORS Q.C. DEPT. OR REPRESENTATIVE)

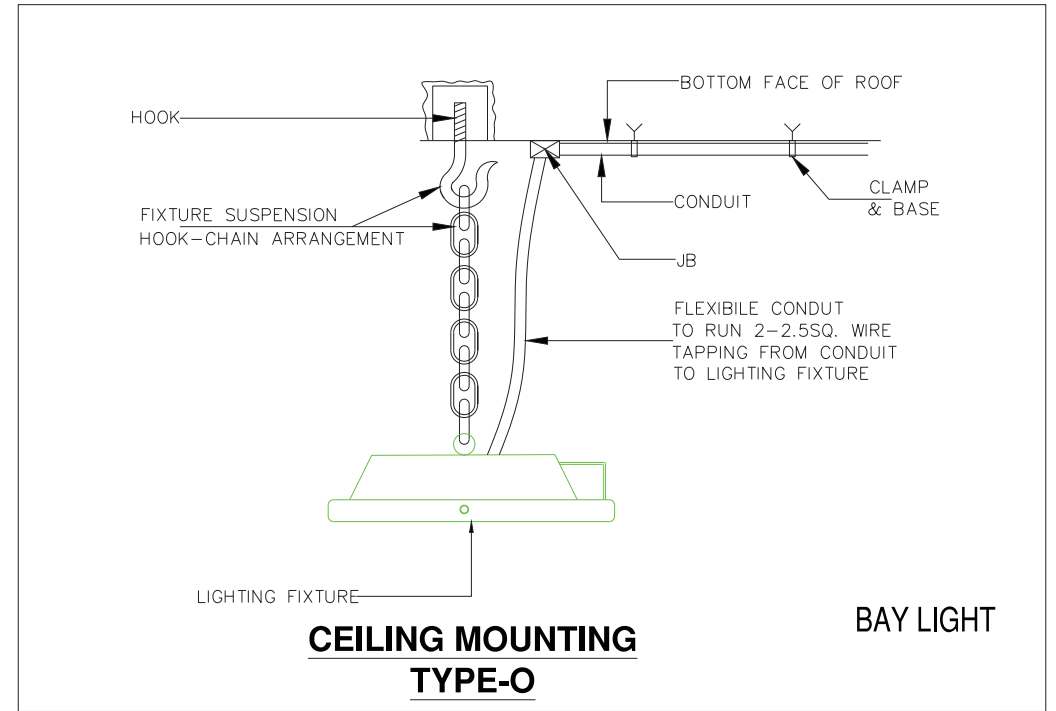
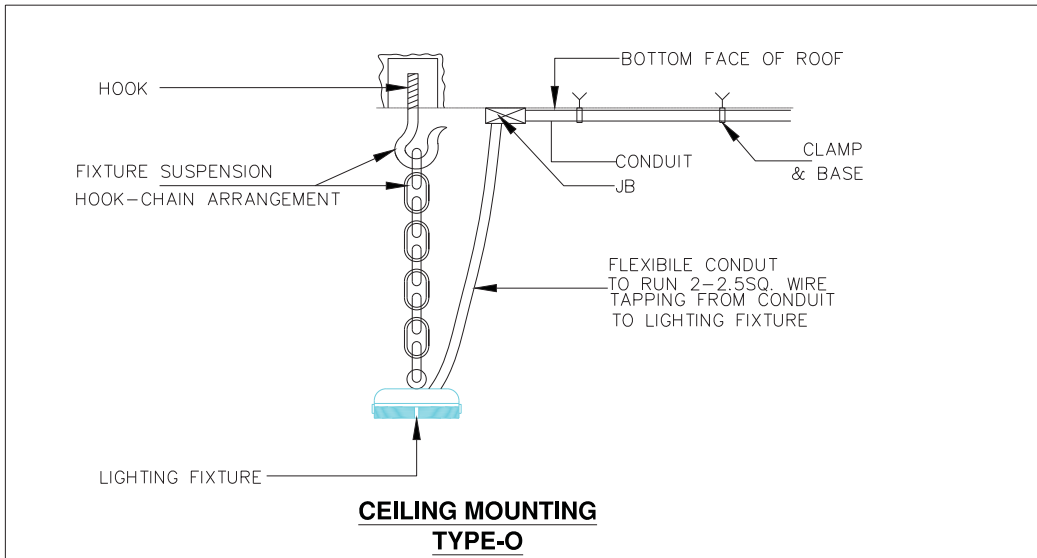
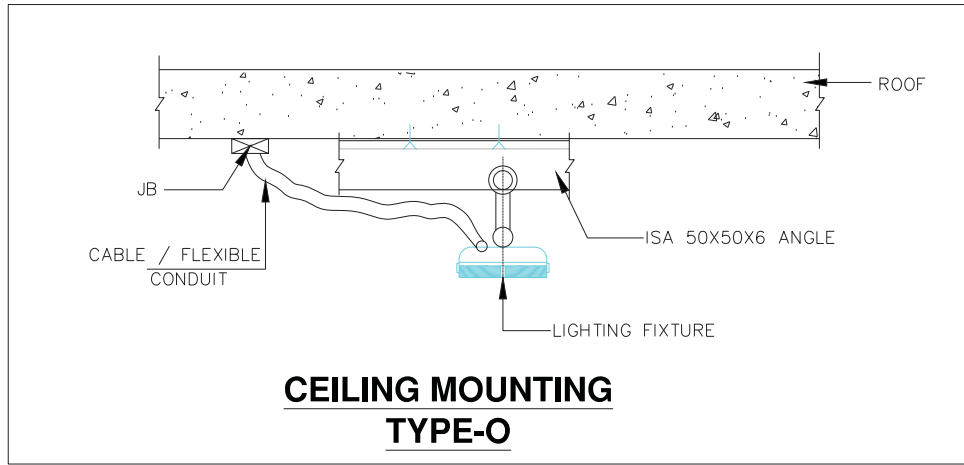
Note: Vendor to follow both BHEL Standard QP as well as Customer QP, in case of any conflict between BHEL Standard QP & Customer QP, vendor to follow the stringent requirement between the BHEL Standard QP and Customer QP.

ANNEXURE-1 to Amendment Typical Arrangement



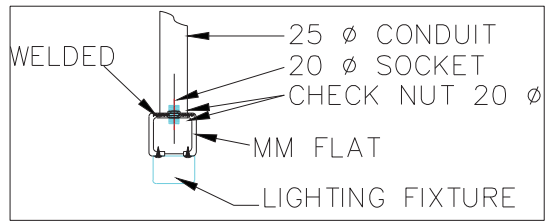
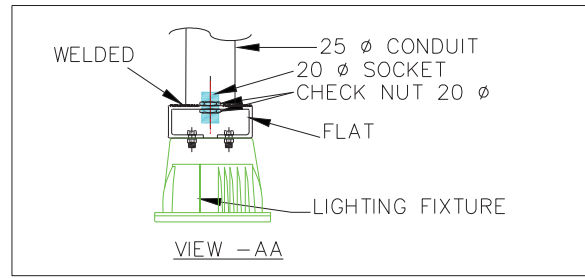
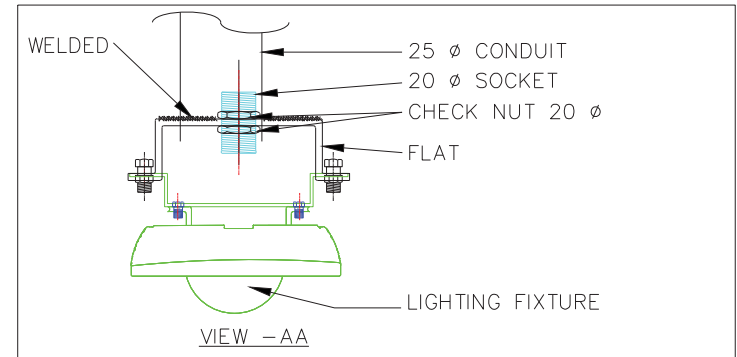
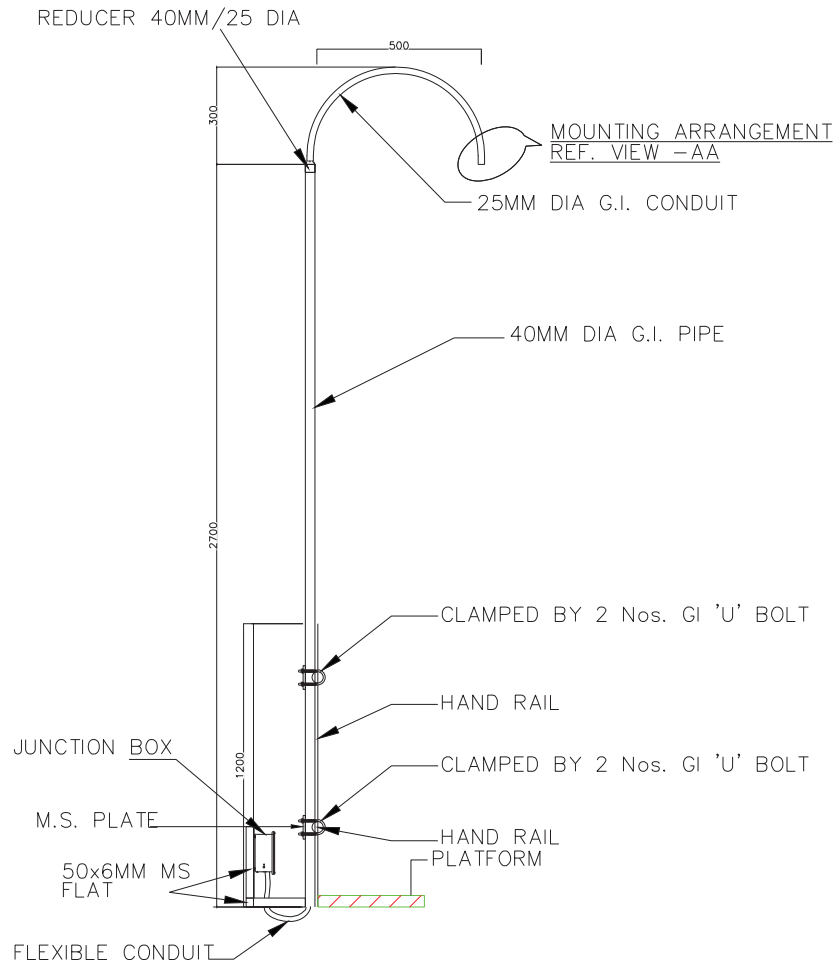
This is a Typical mounting arrangement dwgs/ details for guidance only. Final Mounting arrangement dwg shall be made by the successful bidder during detailed Engineering. It is to be noted that GI Conduit 20mm Dia and Flexible PVC Coated Conduit, Structural Steel shall be provided by BHEL. Balance all 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.



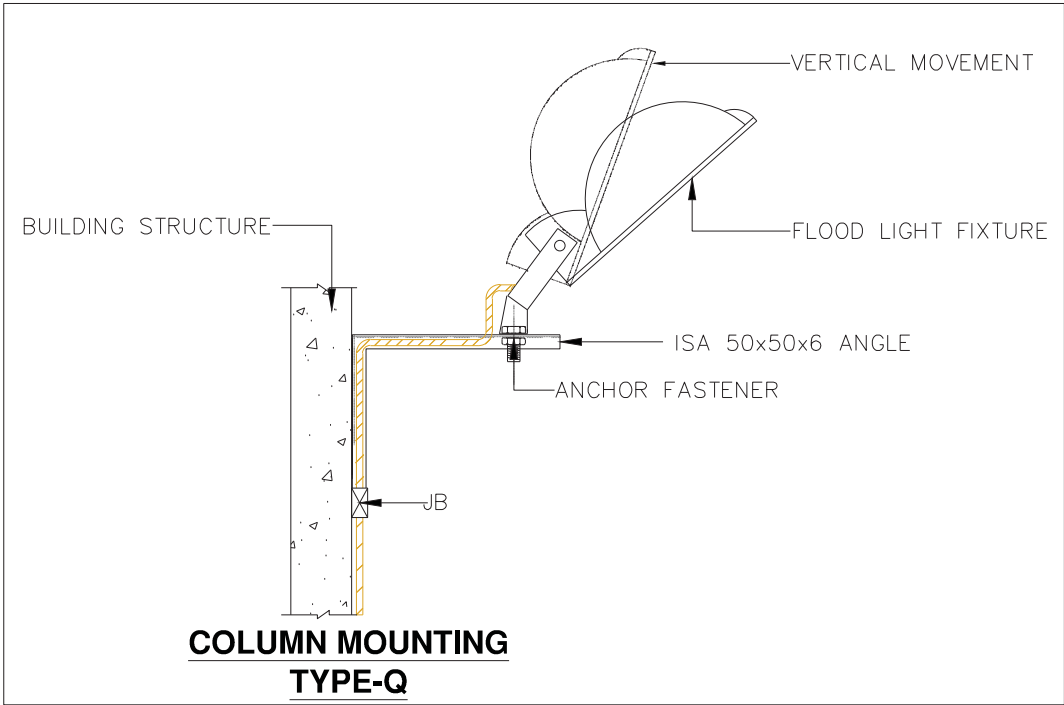
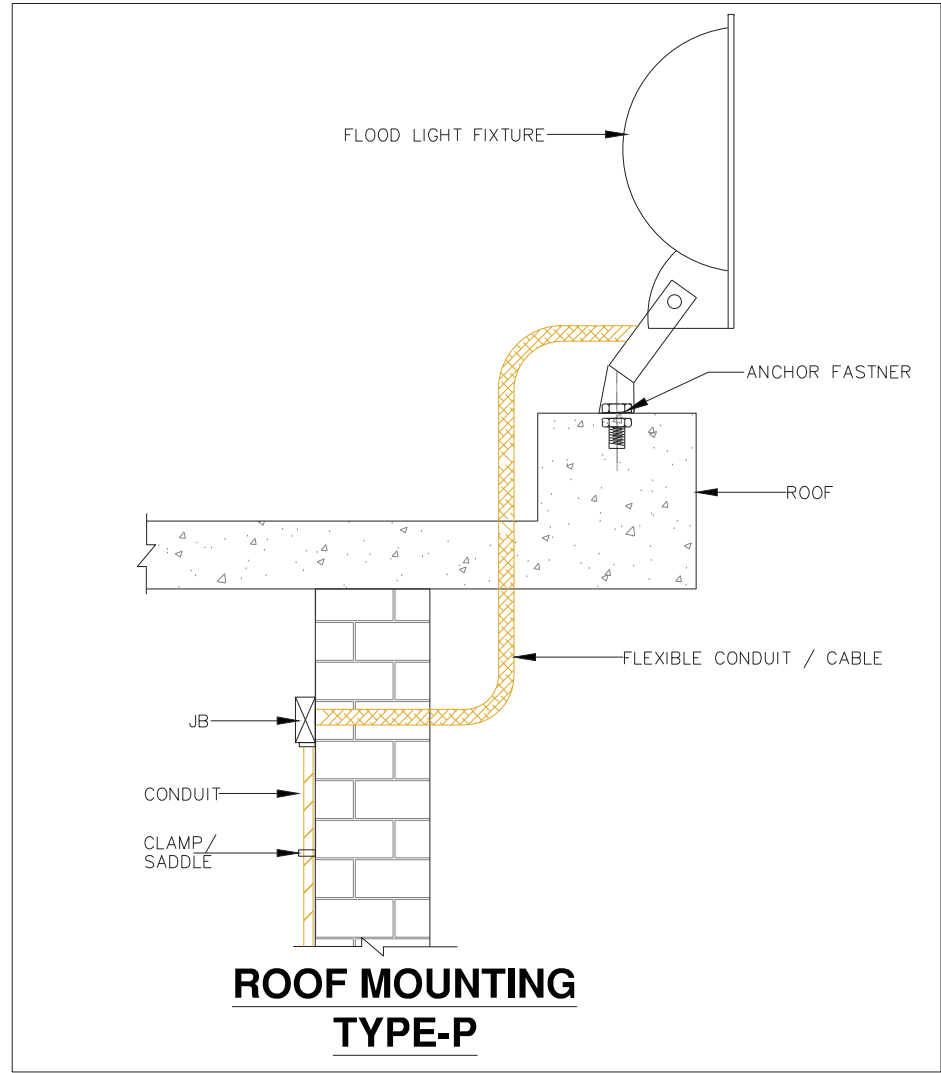
General Notes:

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

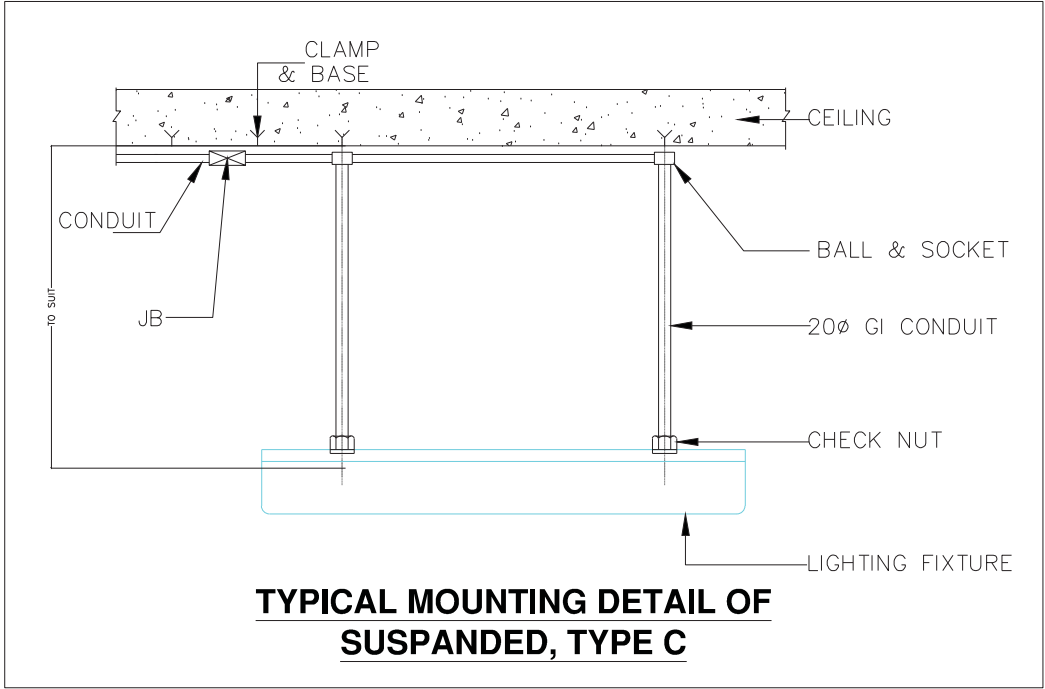
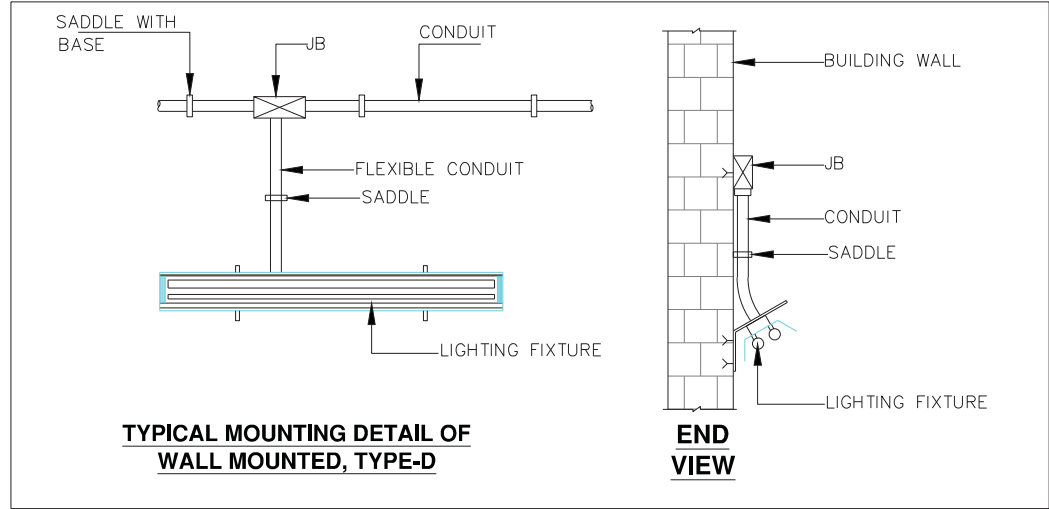


HAND RAIL MOUNTING TYPE-I

- 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 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.
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- 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 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.
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- 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 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.
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 5. All structural steel parts/supporting parts shall be hot dip galvanized as per BOQ/TS.

01

02

03

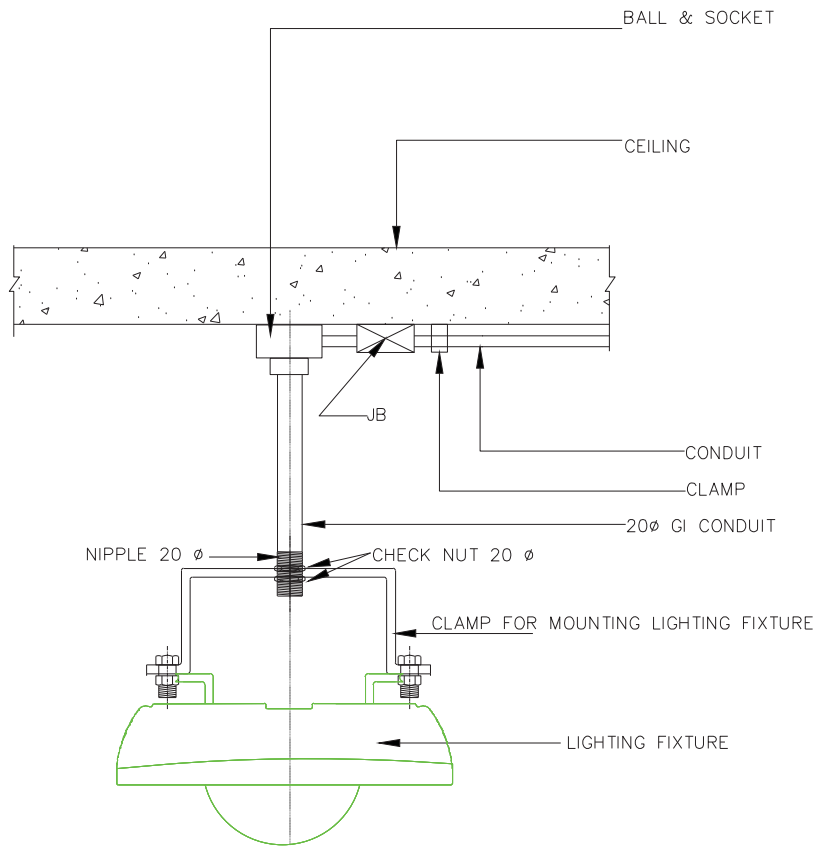
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05

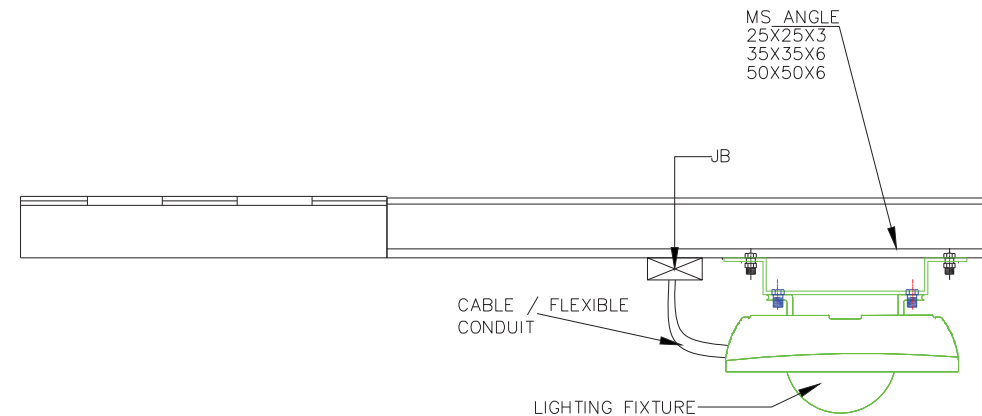
06

07

08



SUPPORTED FROM CEILING
TYPE-F

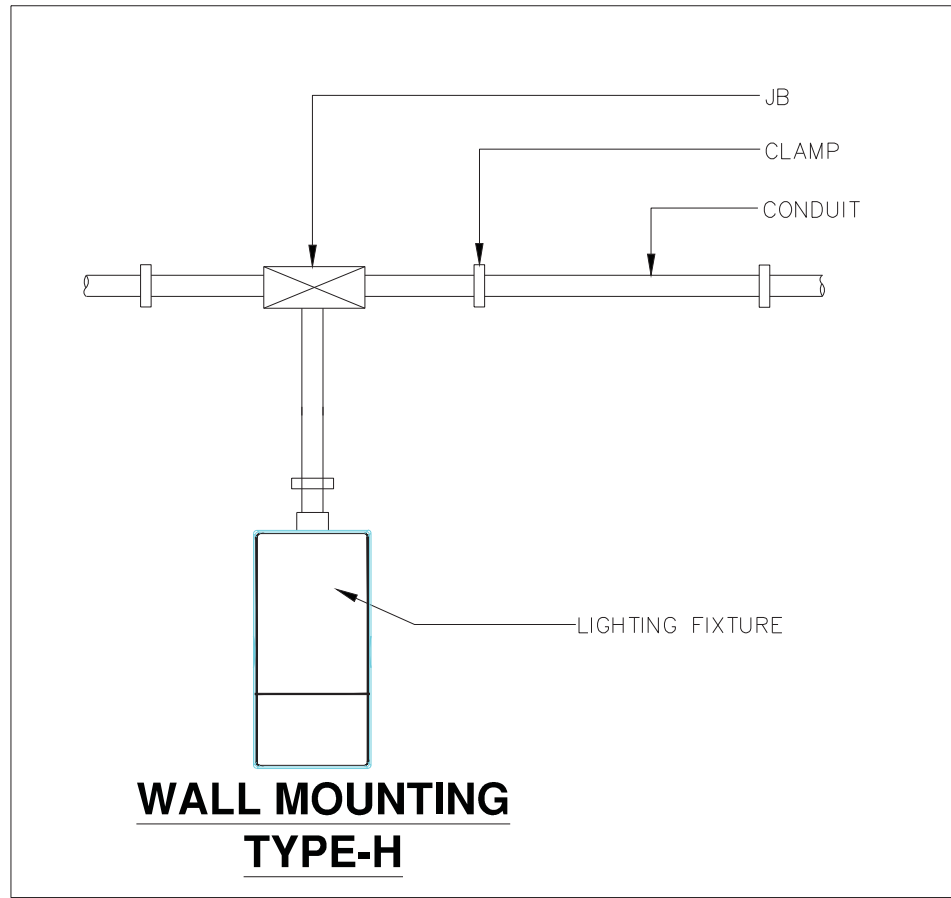
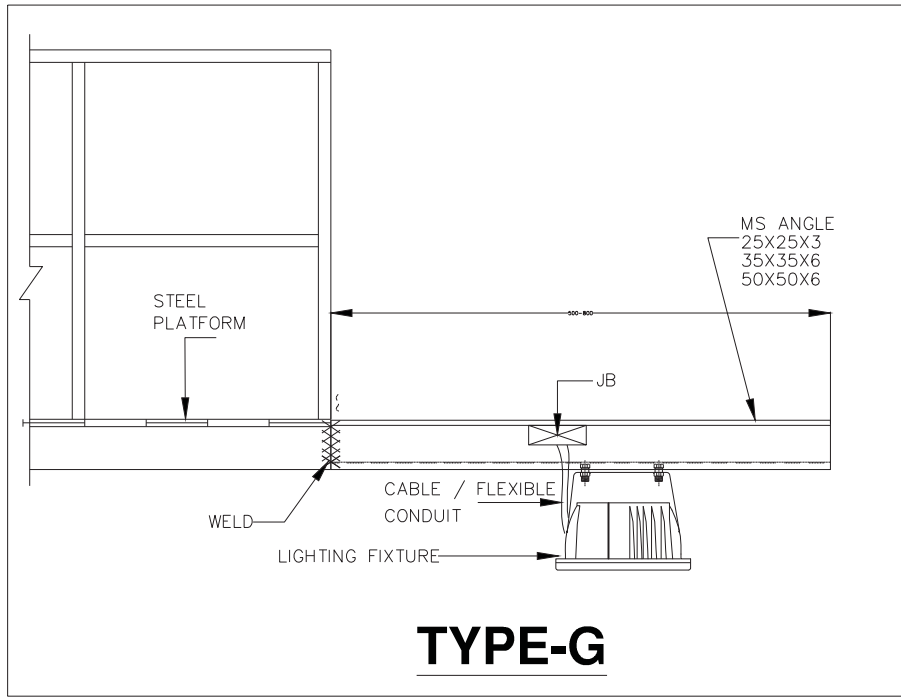


**SUPPORTED FROM CHANNEL/
STRUCTURAL STEEL**
TYPE-G

General Notes:

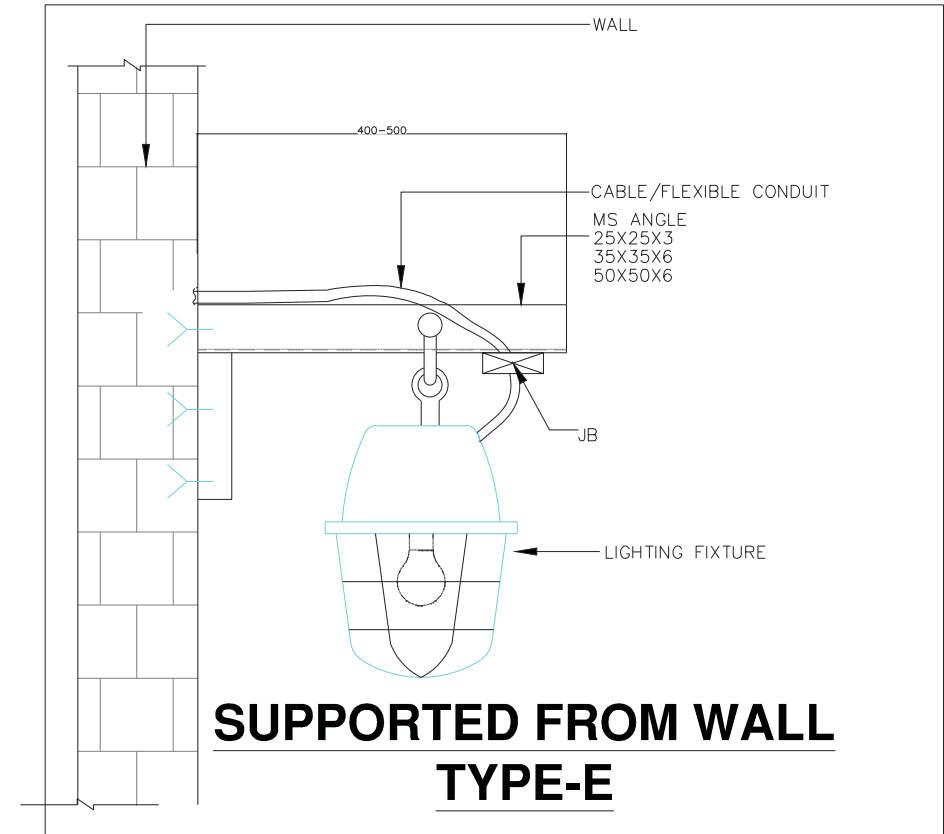
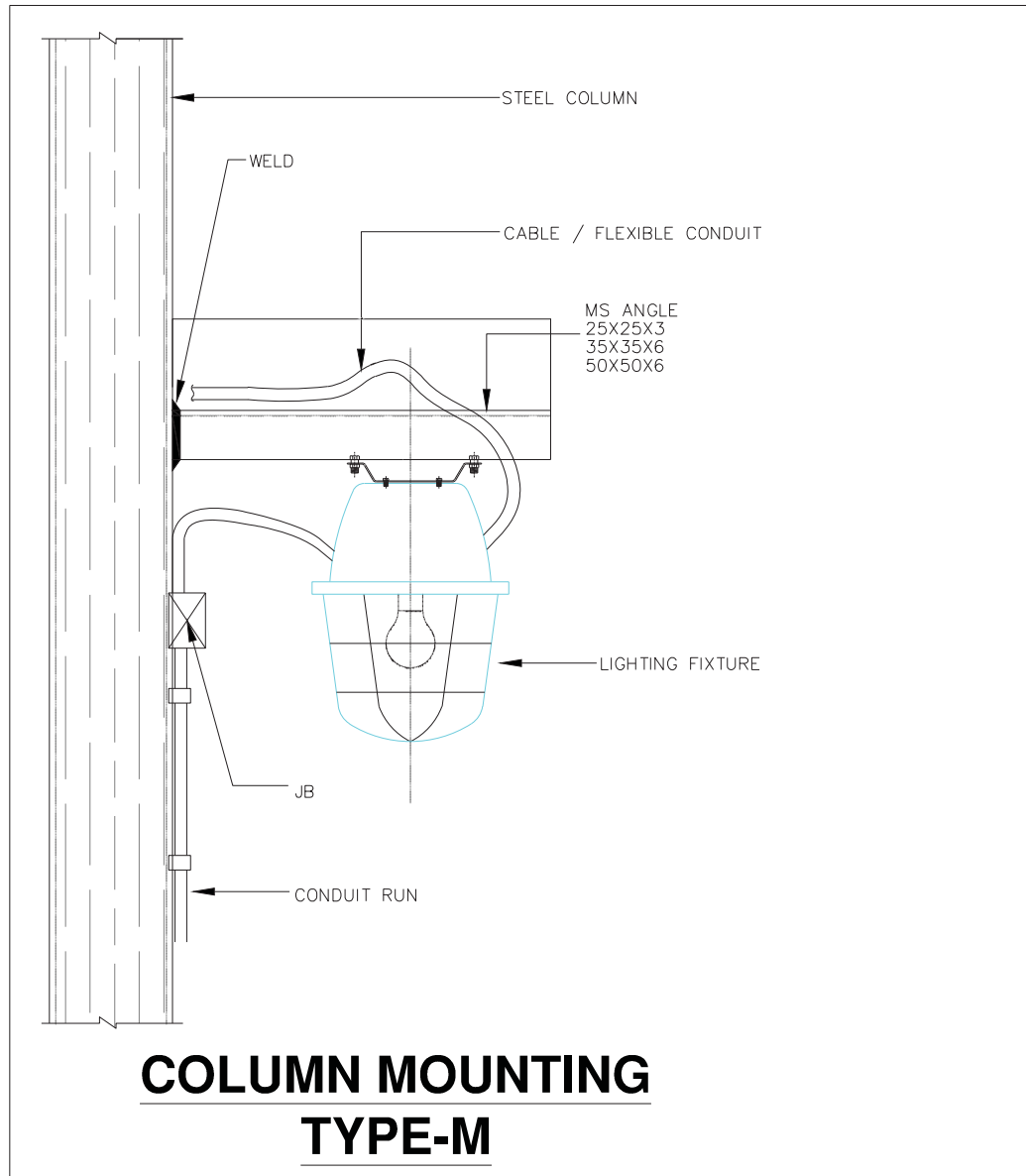
1. Mounting arrangement can be changed/ modified on site as per site requirements.
2. In Lighting layout, Mounting arrangement also shown. If any Discrepancy found on both documents than Consult with Design incharge/Site Incharge.
3. Quantity and Material shown in drawings are indicative only and may 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.

SIZE-A4



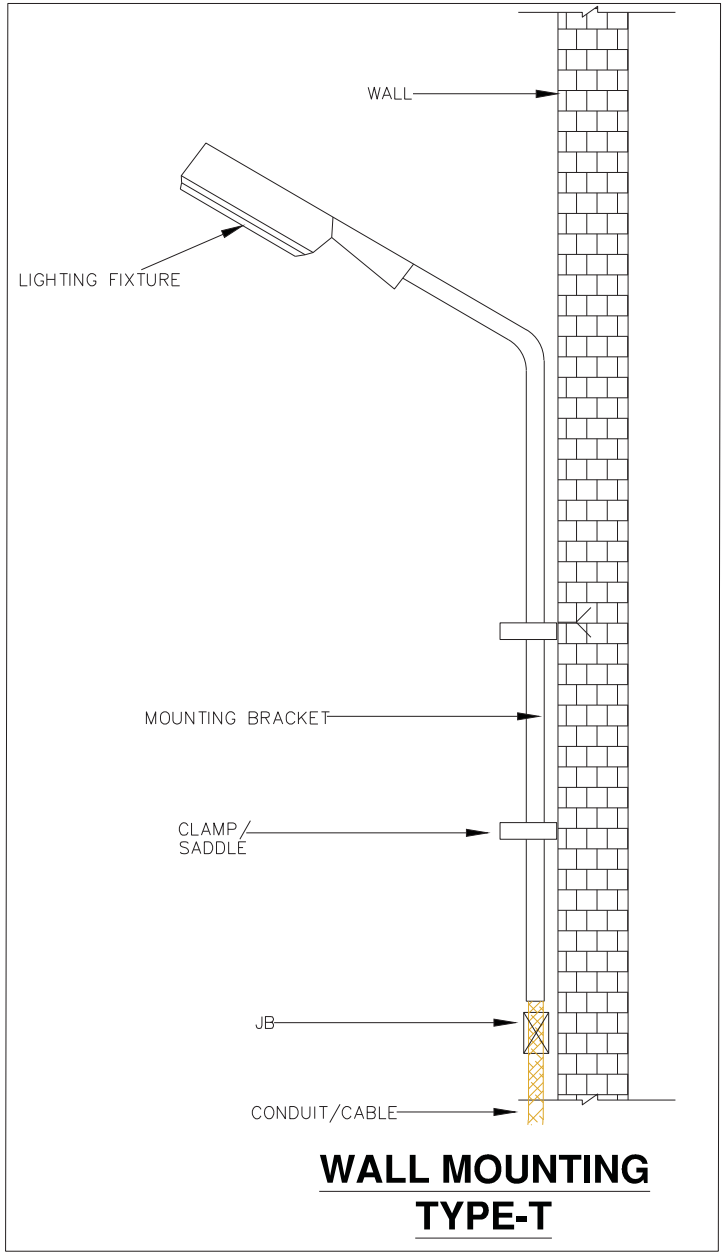
General Notes:

1. Mounting arrangement can be changed/ modified on site as per site requirements.
2. In Lighting layout, Mounting arrangement also shown. If any 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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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.
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- General Notes:
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 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 BQ/TS.

	01	02	03	04	05	06	07	08
H	WALL FLOOD LIGHT FIXTURE FLEXIBLE CONDUIT JB CONDUIT CLAMP/ SADDLE ISA 50x50x6 ANGLE WALL MOUNTING TYPE-R							
G								
F								
E								
D								
C								
B	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 Descrepency 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 BQ/TS.							
A								
	01	02	03	04	05	06	07	08