


3X660 MW NTPC BARH STPP STAGE-I

BOQ CUM PRICE SCHEDULE FOR OCTAGONAL GALVANISED POLE			
Item No.	DESCRIPTION	UNIT	QUANTITY
1	OCTAGONAL POLES TYPE PS1-9M HEIGHT (GALVANIZED)	Nos.	35
2	OCTAGONAL POLES TYPE PF2 -9M HEIGHT (GALVANIZED)	Nos.	7

NOTE:

- 1 4 nos. of foundation bolts for each type of poles (i.e. Total Eight (8) no. of foundation bolts) shall be supplied as erection & commissioning spares. Charges of poles shall be inclusive of erection & commissioning spares.
- 2 PVC shall be applicable for lighting poles package as per IEEMA circular for Polygonal poles (https://ieema.org/wp-content/uploads/2020/07/Poles_Final_PV-clause_Apr-2022.pdf). Price variation shall be limited to +20% and no limit on -ve price variation.

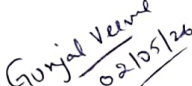
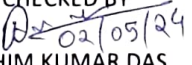
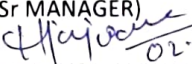


	3X660 MW NTPC BARH STPP STAGE-I (FGD System Package) PRE-QUALIFICATION REQUIREMENTS FOR POLES	PE-PQ-442-558-E004
		REVISION NO. 00 DATE 02.05.2024
		SHEET NO. 1 OF 1

ITEMS : POLES**SCOPE:** Supply: YES; Erection & Commissioning : NO**A. For Poles**

1.	Vendor should be a manufacturer of lighting poles as per relevant IS. In case the vendor is not a manufacturer, the vendor to furnish the following documents:
	a) Undertaking / agreement from OEM of offered make for support in design, manufacture, inspection & testing of poles.
	b) Credentials of the manufacturer of offered make to meet the PQR requirements of S.no. A-2 to 4 below.
	c) Vendor's Credentials to meet S.no. A-5.
	2. Availability of test reports of lighting poles conducted at Govt. Lab/ Govt. approved Independent lab or witnessed by third party as per relevant IS.
3.	Capacity of manufacturing 25 lighting poles per month.
4.	Manufactured and supplied at least 50 lighting poles in one or more orders.
5.	Minimum two (2) nos. purchase orders for lighting poles shall be submitted which should not be more than five (5) years old from the date of techno- commercial bid opening for establishing continuity in business.

NOTES:

- Bidder to note that the arrangement of bidding w.r.t OEM once offered to BHEL as a part of bidding documents cannot be changed till the execution of the project.
- Consideration of offer shall be subject to customer's approval of bidders, if applicable.
- 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.
- Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
- After satisfactory fulfilment of the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of tender.

PREPARED BY  GUNJAL VERMA (MANAGER)	CHECKED BY  ASHIM KUMAR DAS (Sr MANAGER)  NARENDRA NATH JAIWARE (Sr MANAGER)	REVIEWED BY  PRAVEEN DUTTA (AGM)	APPROVED BY  DEBASISA RATH GM (ELECTRICAL)
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**3X660 MW NTPC BARH STPP STAGE-I
FGD**

VOLUME – II

TECHNICAL SPECIFICATION FOR
OCTAGONAL GALVANIZED POLES

SPECIFICATION NO: PE-TS-442-558-E005
REV-0



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UTTAR PRADESH, INDIA – 201301

294320/2024/PS-PEM-EL



TECHNICAL SPECIFICATION FOR OCTAGONAL GALVANIZED POLES

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		06
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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 are no deviations 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).
6. The requirements mentioned in Section-I shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in the descriptive portion in Section-II

BIDDER'S STAMP & SIGNATURE

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**TECHNICAL SPECIFICATION FOR
OCTAGONAL GALVANIZED POLES****3X660 MW NTPC BARH STPP STAGE-I
FGD****SPECIFICATION NO. PE-TS-442-558-E005****VOLUME II****SECTION - I****REVISION 0****SHEET 1 OF 6****SECTION – 'I'****SPECIFIC TECHNICAL REQUIREMENTS**



TECHNICAL SPECIFICATION FOR OCTAGONAL GALVANIZED POLES

**3X660 MW NTPC BARH STPP STAGE-I
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1.0 SCOPE OF ENQUIRY

- 1.1 Design, manufacture, assembly, inspection & testing at manufacturer's works, proper packing and delivery to site of OCTAGONAL GALVANIZED POLES as mentioned in different sections of this specification, complete with all accessories for efficient and trouble-free operation.
- 1.2 Standard technical requirements of the LIGHTING POLES are indicated in Section-II. Project specific requirements/changes are listed in Section-I.
- 1.3 The requirements of Section-I shall prevail and govern in case of conflict between the corresponding requirements of Section-I and Section-II.
- 1.4 Review of sub vendor's documents by the vendor shall not relieve the vendor from the responsibility of design and supply.
- 1.5 The documents shall be in English language and MKS system of units. Submission of all post award stage documents shall be done through document management system-DMS.

2.0 BILL OF QUANTITIES:

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

3.0 SPECIFIC TECHNICAL REQUIREMENTS

S. No.	Reference Clause No. of Section- II	Specific Requirement/ Change
1	3.1.1	Clause 3.1.1 shall be read as: Lighting poles as required for street lighting and flood lighting shall be of Octagonal type as per applicable standard.
2	3.1.2	Clause 3.1.2 Not applicable
3	3.1.5	Clause 3.1.5 shall be read as: Each street lighting pole shall be suitably provided with internal junction box. 6A MCB & neutral link shall be supplied with junction box.
4	3.1.6	Clause 3.1.6 shall be read as: Not applicable
5	3.1.7	Clause 3.1.7 shall be read as: Flood lighting pole shall be provided with galvanised MS plate and shall be suitable for the number of flood lighting luminaires and control gear boxes.
6	3.1.9 (b), (c) & (d)	Clause 3.1.9 (b), (c) & (d) Not applicable
7	3.2.2 (e)	Clause 3.2.2 (e) shall be read as: Junction box shall be integral to pole. Junction Box shall be suitable for mounting inside Octagonal pole.
8	3.2.4 (JB-M)	This clause is deleted.
9	3.2.4 (JB-S)	Clause to be read as: Provided with four (4) way stud type terminals, each terminal suitable for terminating upto two nos. of 3.5Cx50 mm2 stranded aluminium conductors & with one no. 6A MCB & neutral link.
10	3.5	Clause 3.5 Not applicable
11	3.6.1	Clause 3.6.1 Not applicable
12	4.12	Clause 4.12 Not applicable



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13	6.1	<p>Clause 6.1 shall be read as: The approval on Quality plan (ref.no. 9573-215-QVT-Q-013, REV.0) shall be obtained from end customer after award of contract & shall be subjected to modification without any commercial implication to BHEL.</p>
14	7.0 (TOOLS & TACKLES)	Clause 7 Not applicable
15	8.2	<p>Clause 8.2 shall be read as: Erection & commissioning spares are included in the bidder's scope of supply. This includes 4 nos. of foundation bolts for each type of poles (i.e. Total Eight (8) no. of foundation bolts).</p>
16	Sub-vendor list	<p>Following clause is added: The approval on Sub-vendor list shall be obtained from end customer after award of contract & same shall be subjected to modification without any commercial implication to BHEL.</p>
17	Undertaking in the BOM	<p>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 item(s)/package will be supplied free of cost in most reasonable time."</p>

3.1 Galvanized Octagonal poles- technical requirements

- 3.1.1 **Scope:** The octagonal pole shall be mounted on RCC pedestal as per design & drawing prepared by the vendor, after award of contract. Octagonal lighting pole accessories such as arm/ holding brackets, hold fast, base plate, foundation bolt, **wire (if required)**, 100 mm dia. HDPE pipes for cable entry shall be supplied by vendor to meet overall system requirements. The other consumable's required to complete the job in all respects shall also be in contractor's scope.
- 3.1.2 **Exclusion:** The scope of civil work such as embedment, RCC pedestal using M-25 grade concrete, earthing rod, for steel shuttering etc. are excluded from the scope of bidder.
- 3.1.3 The Octagonal Poles shall be designed to withstand the maximum wind speed as per **IS-875 latest revision & amendments**. The top loading i.e. area and the weight of fixtures are to be considered to calculate maximum deflection of the pole and the same shall meet the requirement of BS: 5649 Part VI 1982/ BSEN 40-3:2000, pr EN-10-3-3.
- 3.1.4 The pole shaft shall have octagonal cross section and shall be continuously tapered with single longitudinal welding. There shall not be any circumferential welding joint.
- 3.1.5 The octagonal Poles shall have door of approximate 500 mm length at the elevation of 500 mm from the Base plate. The door shall be vandal resistance and shall be weather proof to ensure safety of inside connections. The door shall be flush with the exterior surface and shall have suitable locking arrangement. There shall also be suitable arrangement for the purpose of earthing **at two points**. The pole shall be adequately strengthened at the location of the door to compensate for the loss in section. Lighting pole junction box shall be provided along with octagonal pole as per requirement.
- 3.1.6 **Material:**
- | | |
|-----------------|---------------------------------------|
| Octagonal Poles | HT Steel Conforming to grade S355JO. |
| Base Plate | Fe 410 conforming to IS 226 / IS 2062 |
| Foundation Bolt | EN.8 grade |



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- 3.1.7 The Octagonal Poles shall be in single section (upto 9 Mtr).
- 3.1.8 The poles shall be hot dip galvanized as per IS 2629 / IS 2633 / IS 4759/ BS EN ISO 1461 standards with average coating thickness of 70 micron. The galvanizing shall be done in single dipping.
- 3.1.9 The Octagonal Poles shall be bolted on a foundation with a set of four foundation bolts for greater rigidity.
- 3.1.10 The galvanized mounting bracket shall be supplied along with the Octagonal Poles for installation of the luminaries.
- 3.1.11 The brackets shall be made of specified size NB G.I heavy duty pipe approx. 1.2 M long, bent at the centre at an angle of 105 degrees, with necessary holding brackets, hold fasts etc. with special reducer at end to accommodate type of street light fitting to be fixed. The bracket shall be galvanised.
- 3.1.12 QP enclosed with the specification shall be subject to customer approval without any commercial implication to BHEL
- 3.1.13 Section –II, General requirements shall also be applicable to Octagonal galvanized poles in general.
- 4.0 Bidder shall furnish all inputs for foundation design to BHEL during detailed engineering.
- 5.0 Inspection & Testing:

Standard quality plan is enclosed. Inspection shall be carried out as per quality plan without any implication on cost and delivery. There shall be no commercial implication to BHEL on account of any changes in QP during contract stage.

All equipment to be supplied shall be of type tested design. During detail engineering, the contractor shall submit for Owner's approval the reports of all the type tests as listed in in relevant specified standards and carried out within last ten years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.

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

All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.

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


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Galvanizing Tests

The quality of galvanizing shall be smooth, continuous, free from flux stains and shall be inspected visually.

In addition, following tests shall be conducted as acceptance tests.

(a) Uniformity of coating - The coating of any article shall withstand for one (1) minute dips in standard copper sulphate solution without the formation of an adherent red spot of metallic copper upon the basic metal.

(b) The quality of cadmium/zinc plating on items with screw threads shall be free from visible defects such as unplated areas, blisters and modules and shall be inspected visually.

(c) In addition, the plating thickness shall be determined microscopically/ chemically or electronically.

4.0 DOCUMENTATION REQUIREMENT
DRAWINGS & DOCUMENTS TO BE SUBMITTED BY ALL THE BIDDERS ALONG WITH THE BID

Sl. No.	DOCUMENT TITLE
1	PQR CREDENTIALS
2	COMPLIANCE CERTIFICATE

**DRAWINGS & DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT
ALONG WITH SUBMISSION SCHEDULE**

Sl. No.	DOCUMENT TITLE	DOCUMENT NUMBER	Primary/Secondary	Vendor submission (Days)*	BHEL Comment (Days)	Vendor submission (Days) #	BHEL & Customer comment/ approval (Days)
1	MQP OF POLES	PE-V0-442-558-E904/ NTPC drg no. 4540-001-215-QVE-Q-013	Primary	11	8	8	18
2	TDS, GA DRAWING AND BOM OF GALVANISED POLE- PS1, PF2	PE-V0-442-558-E033/ NTPC drg no. 4540-001-215-PVE-B-128	Primary	11	8	8	18
3	Field Quality Plan of Poles	PE-V0-442-558-E602	Secondary	11	8	8	18

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4	Foundation details of Poles	PE-V0-442-558-E603	Secondary	11	8	8	18
5	Instructions for Erection of Poles	PE-V0-442-558-E604	Secondary	11	8	8	18

NOTES:

a) * 1st submission within indicated days from date of purchase order.

b) # Submission (within indicated days) after incorporating all BHEL comments.

c) Primary documents shall be considered for Delay analysis

d) Vendor shall submit the dates for drawing/document submission/BHEL comments/ resubmission after approval of documents.

DRAWINGS & DOCUMENTS TO BE SUBMITTED AS FINAL/AS-BUILT DOCUMENT

Sl. No.	DOCUMENT TITLE
	NIL



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APPLICABLE STANDARDS & CODES

[A] POLES

- | | | |
|-----|---|------------------------|
| 1. | Tubular steel poles for over head power lines | IS 2713 |
| 2. | Code and practice for design loads for structures | IS 875 Part III, 1987 |
| 3. | Code of practice for general construction in steel | IS 800 |
| 4. | European structural steel standard (Grade of M.S. plate) | BS-EN 10025/ DIN 17100 |
| 5. | Code of practice for phosphating of iron and steel | IS 6005 |
| 6. | Colour for ready mixed paints & enamels | IS 5 |
| 7. | Recommended practice for hot dip galvanising of iron & steel | IS 2629 |
| 8. | Method of testing uniformity of coating on zinc coated articles | IS 2603 |
| 8. | Method of sampling for steel pipes, tubes & fittings | IS 4711 |
| 10. | Method of chemical analysis of pig iron, cast iron and plain carbon & low alloy steel | IS 228 |
| 11. | Steel tubes for structural purposes | IS 1161 |
| 12. | Mechanical testing of metals-Tensile Testing | IS 1608 |
| 13. | Specification for hot dip zinc coatings on structural steel and allied products | IS 4759 |
| 14. | Method for testing uniformity of coating on zinc coated articles | IS 2633 |
| 15. | Specification for structural Steel | IS: 226 |
| 16. | Hot Rolled Medium and High Tensile. Structural Steel | IS 2062 |
| 17. | Method for Verification of Structural Design by Testing | BS 5649 |



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18. Lighting columns. Design and verification. BS EN 40-3-2:2013

[B] ASSEMBLED EQUIPMENT AND COMPONENTS

- | | | |
|----|--|-----------|
| 1. | Low voltage switchgear and controlgear | IEC 60947 |
| 2. | General requirements for enclosures for accessories for household and similar fixed electrical installations | IS 14772 |
| 3. | Electrical accessories- Circuit breaker for overcurrent protection for household and similar installations | IEC 60898 |
| 4. | Low voltage Fuses for voltages not exceeding 1100V AC or 1500V DC | IS 13703 |
| 5. | Visual indicator lamps | IS 1901 |



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2.0 TECHNICAL DETAILS

S. No.	Description	Unit	Value
1.0	System Design Data		
a	Rated voltage	V	415
b	Rated frequency	Hz	50
c	Voltage and frequency variation (permissible)	%	Voltage: $\pm 10\%$ Frequency: +3 to -5%
d	Combined voltage & frequency variation (permissible)	%	10% absolute
e	System fault level & duration	kA, sec	9kA for 1 sec
2.0	Lighting Poles		Hot dip galvanized Octagonal pole
2.1	Type of Pole		
a	Octagonal pole type PS-1		9 m, Refer Clause 3.1.9 (a) of Section II
b	Octagonal pole type PF-2		9 m, Refer Clause 3.1.9 (e) of Section II
2.2	Material		HT Steel Conforming to grade S355JO
2.3	Tensile Strength	MPa	490-630 N/mm ²
2.4	Mounting arrangement		[] PCC foundation [✓] Base plate
2.5	Grade of concrete		[] M20 [✓] M25 [] M30
2.6	Surface Treatment		[] Painted [✓] Galvanized

2.7 The general dimensions of pole are mentioned below

Sl.no.	Height (meter)	Top Dia A/F (mm) Min.	Bottom Dia A/F (mm) Min.	Sheet thickness (mm) min.	Base plate dim. (LxBxT) mm. min	Foundation bolt	Anchorage plate thickness (mm) min.



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						Bolt size (no. x dia.) (mm) min.	PCD (mm)	Bolt length (mm)	Projected Bolt length (mm)	
1	9	70	155	3	260x260x16	4x24	250	750	125	3

These dimension are subjected to tolerances as per IS-2102 except for bending radius.

2.8	PAINTING details for poles (if applicable)		(AS APPLICABLE)
a	Paint shade as per IS:5		NA
b	Paint Thickness	Microns	NA
2.9	GALVANISATION details for poles		
a	Process		Hot dip
b	Min weight of zinc coating	gm/m ²	460
c	Avg. thickness of zinc coating	Microns	70
3.0	Street Light Junction Box (Integral to pole)		
a	Enclosure material		[] FRP [√] CRCA Sheet.
b	Enclosure thickness	mm	1.6
c	Galvanisation details		
i)	Process		Hot dip
ii)	Min weight of zinc coating	gm/m ²	460
iii)	Avg. thickness of zinc coating	Microns	70
d	Degree of protection		IP-55
4.0	Cable Glands		By vendor for all incoming and outgoing cables at Pole JB
a	Type		[√] Double compression [] Single compression
b	Material		Brass
c	Nickel Plating provided		[√] Yes [] No
d	Size		Cable Gland shall be suitable for cable size : 3.5C-25sqmm
5.0	Cable Lugs		By vendor for all incoming and outgoing cables at Pole JB

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a	Type		<input checked="" type="checkbox"/> Crimping type <input type="checkbox"/> Ring type
b	Material		Tinned copper
c	Size		Suitable for Cable sizes: 3.5C-25sqmm armoured cable.
6.0	WIND SPEED DATA		As per IS-875 latest revision & amendments. (Wind speed : 47 meters/sec)
7.0	Soil bearing Capacity		4 T/m ²



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S. No.	Description	Unit	Value
1.0	System Design Data		
a	Rated voltage	V	
b	Rated frequency	Hz	
c	Voltage and frequency variation (permissible)	%	
d	Combined voltage & frequency variation (permissible)	%	
e	System fault level & duration	kA, sec	
2.0	Lighting Poles		
2.1	Type of Pole		
a	PS-1 (9m), Refer 3.1.9 Section-II		
b	PS-2 (12 m), Refer 3.1.9 Section-II		
c	PS-4 (13 m), Refer 3.1.9 Section-II		
d	PF-1 (11m), Refer 3.1.9 Section-II		
e	PF-2 (9m), Refer 3.1.9 Section-II		
2.2	Material		
2.3	Tensile Strength	MPa	
2.4	Mounting arrangement		
2.5	Grade of concrete		
2.6	Surface Treatment		
2.7	PAINTING details for poles (if applicable)		
a	Paint shade as per IS:5		
b	Paint Thickness	Microns	



**TECHNICAL SPECIFICATION FOR
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DATASHEET-C**

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2.8	GALVANISATION details for poles		
a	Process		
b	Min weight of zinc coating	gm/m2	
c	Avg thickness of zinc coating	Microns	
Note:	Exterior Aluminium paint specified at 2.7 above is not in vendor's scope and is to be carried out at site after installation. It is specified only for completeness of datasheet. However, black bituminous paint & red oxide primer to be applied by vendor as per clause 3.12 of section II.		
3.0	Street Light Junction Box		
a	Enclosure material		
b	Enclosure thickness	mm	
c	Galvanisation details		
i)	Process		
ii)	Min weight of zinc coating	gm/m2	
iii)	Avg. thickness of zinc coating	Microns	
d	Degree of protection		
4.0	Cable Glands		By vendor for all incoming and outgoing cables at Pole JB and feeder panel
a	Type		
b	Material		
c	Nickel Plating provided		
d	Size		
5.0	Cable Lugs		By vendor for all incoming and outgoing cables at Pole JB and feeder panel
a	Type		
b	Material		
c	Size		

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SUB-VENDOR LIST

ITEM CODE	ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
ES11	CABLE GLANDS	1	E1201	ALLIED TRADERS & EXPORTERS	C-124 A, SECTOR-2, NOIDA -201 301, UTTAR PRADESH, INDIA	Mr. Vijay Mohan Sood +(91)-(120)-2525694 +(91)-(120)-3052594 +(91)-(11)-23287156 vijay_mohansood@yahoo.com	
	CABLE GLANDS	2	E1017	ARUP ENGG & FOUNDARY WORKS	391/119, PRINCE ANWAR SHAH ROAD, CALCUTTA-700068	033 2473 0850	
	CABLE GLANDS	3	E1206	BALIGA LIGHTING EQPT. PVT. LTD.	63A, CP RAMASWAMY ROAD, ALWARPET, P.B.No 6910, CHENNAI-600018	44-24995505, 22680990-4	
	CABLE GLANDS	4	E1036	COMMET BRASS PRODUCTS	NUTAN CHEMICAL COMPOUND, WALBHAT ROAD, GOREGAON, MUMBAI-400063	91-022-26852961/62/63 comet@vsnl.net	
	CABLE GLANDS	5	DW08	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD, GOREGAON (EAST). MUMBAI 400 063.	CEO : Mr. Jayantibhai S. Patel TEL: 022-32504770./022-29270876/ 022-29270878.	
	CABLE GLANDS	6	E1044	ELECTROMAC INDUSTRIES	27/28AF NEW EMPIRE IND. ESTT., R. KRISHNA MANDIR RD. JB NGR, ANDHERI(E), MUMBAI-400059	91-22-28324829 / 66919034 devang@electromacglands.com	
	CABLE GLANDS	7	I01	INCAB	HARE STREET, KOLKATA, WEST BENGAL-700001	91-33-2480161/62/63/64 Fax : 91-33-2485766	
ES12	CABLE LUGS	1	E1040	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD, GOREGAON (EAST).	CEO : Mr. Jayantibhai S. Patel TEL: 022-32504770./022-29270876/	
	CABLE LUGS	2	E1149	UNIVERSAL MACHINES LTD.	4, B.D.BAG (EAST) 90, STEPHEN HOUSE, 5TH FLR CALCUTTA-700001	033 2282 2540	
ES30	GALVANISING	1			M/s M J Engg, Delhi		
	GALVANISING	2			M/s A.V. Engg, Kolkata		
	GALVANISING	3			M/s Inar Profiles, Vishakapatnam		
	GALVANISING	4			M/s Anand Udyog, Mumbai		
	GALVANISING	5			M/s Techno Engg, Chandigarh		
	GALVANISING	6			M/S Steelite Engg, Mumbai		
	GALVANISING	7			M/s National Galvanizer, Kolkata		
	GALVANISING	8			M/s Unistar Galvanizer, Kolkata		
	GALVANISING	9			M/s B.P. Project. Kolkata		
	GALVANISING	10			M/s Bajaj Pune		
	GALVANISING	11			M/s Electrocare Industries, Mumbai		
	GALVANISING	12			M/s B.G. Shirke, Pune		
	GALVANISING	13			M/s Gurpreet Galvanizer, Hyderabad		
	GALVANISING	14			M/s Sigma, Mumbai		
	GALVANISING	15			M/s Radhakrishnan Shetty, Chennai		
	GALVANISING	16			Karamtara Mumbai		
	GALVANISING	17			Poona Galvanizers Pune		
	GALVANISING	18			Neha Galvanizer-Kolkata		
	GALVANISING	19			Unitech Fabricators & Galvanizers- Hoogly		
	JUNCTION BOXES (NON FLAME PROOF)	1	J01	JASPER ENGINEERS PVT. LTD.	A-23, SECTOR - 8, NOIDA-201301	0120-4033520/533	
	JUNCTION BOXES (NON FLAME PROOF)	2	EC05	Electro Controls & Devices	M/S ELECTRO CONTROLS & DEVICES, F-41, SITE-C, SURAJPUR INDUSTRIAL AREA GREATER NOIDA, UTTAR PRADESH :201308	Mr. Sanjay Sharma (Chief Promoter) 0120-2569487, 2560100, 2560300	
	JUNCTION BOXES (NON FLAME PROOF)	3	SRC01	M/s Shrenik & Co.	39A/3, PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ-BAVLA ROAD, CHANGODAR, AHMEDABAD – 382 213	020-026708100	
	JUNCTION BOXES (NON FLAME PROOF)	4	PME-01	M/s PHOENIX MECANO LTD.,	388 BHARE, TALUKA MULSHI, POST GHOTAWADE, PIRANGOOT, INDUSTRIAL AREA, PUNE-412115	Awasthi(09971119006) Tel: ++91 20 6674 5103, Mobile: +91 90499 95985, Fax: ++91 20 6674 5126	
	JUNCTION BOXES (NON FLAME PROOF)	5	ACE01	Adroit Control Engineers Pvt.Ltd.	M/S ADROIT CONTROL ENGINEERS PVT.LTD. PLOT-3, KRISHNA INDL. AREA, SECTOR-25 FARIDABAD – 121004	011-47600700, 0129-4251400	
	JUNCTION BOXES (NON FLAME PROOF)	6	PME-01	M/s PHOENIX MECANO LTD.,	388 BHARE, TALUKA MULSHI, POST GHOTAWADE, PIRANGOOT, INDUSTRIAL AREA, PUNE-412115	Awasthi(09971119006) Tel: ++91 20 6674 5103, Mobile: +91 90499 95985, Fax: ++91 20 6674 5126 contact person : Vishwa bandhu E-mail: d.gupta@pmipl-online.com ; admin@pmipl-online.com	

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ITEM CODE	ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
ES36	JUNCTION BOXES (NON FLAME PROOF)	7	MK01	MIKA ENGINEERS	BRANCH OFFICE : 'D'-101, DHEERAJ HERITAGE RESIDENCY II, SHASTRI NAGAR, SANTACRUZ (W), MUMBAI 400 054.	Director : Mr. Asgar Karimi Email: asgar@mikaengineers.com E-mail : mika@mtnl.net.inTelfax : 022-26610081/82/83/84Tel : 02527-249066/70 Cell : 099230 74373	TYPE-S ONLY
	JUNCTION BOXES (NON FLAME PROOF)	8	PME-01	M/s PHOENIX MECANO LTD.,	388 BHARE, TALUKA MULSHI, POST GHOTAWADE, PIRANGOOT, INDUSTRIAL AREA, PUNE-412115	TEL.- +912066745000 Awasthi(09971119006) Tel: ++91 20 6674 5103, Mobile: +91 90499 95985, Fax: ++91 20 6674 5126 contact person : Vishwa bandhu E-mail:d.gupta@pmipl-online.com ;admin@pmipl-online.com	
	JUNCTION BOXES (NON FLAME PROOF)	9	B05	BAJAJ ELECTRICALS	BAJAJ ELECTRICALS LTD. ENGINEERING & PROJECTS BU (NORTH) 3rd FLOOR, GULMOHARHOUSE, COMMUNITY CENTRE 161/B-4, GAUTAM NAGAR, YUSUF SARAI NEW DELHI – 110049	CONTACT PERSON : Mr. S. SREEMANY. SR. MANAGER (PROJECTS) CONTACT DETAILS : (+91) 9871025705. MAIL ID : srabans@bajajelectricals.com;	
	JUNCTION BOXES (NON FLAME PROOF)	10	A03	AJMER INDUSTRIES & ENGG. WORKS	AJMER INDL. AND ENGG. WORKS. AJMER HOUSE, A-61 / KHAIRANE MIDC. , TTC INDL. AREA, NAVI MUMBAI – 400705.	Tel : 022 27620299 / 97 / 96 'mail@ajmera.net	
	JUNCTION BOXES (NON FLAME PROOF)	11	SB02	S.B. ELECTRICAL ENGINEERING CORPORATION	03, SARDAR GRIHA BUILDING, LOHAR CHAWAL, MUMBAI-400002	022- 22069831; 022-66637259	
	JUNCTION BOXES (NON FLAME PROOF)	12	RT13	RITTAL INDIA PVT. LTD.	Espire Building ,Level -1 A-41, Mohan Co- Operative Industrial Estate ,Mathura Road, New Delhi -110044	Amit Bansal Phone: 011-42004000, D: 011-42004033 · Mobile: +91 9717772245 · mailto:amit.b@rittal- india.com www.rittal-india.com	
	JUNCTION BOXES (NON FLAME PROOF)	13	HP08	HPL ELECTRIC AND POWER LTD.	Works Address: Village Shavella, POJabli, Teh- Kasauli, Dist-Solan, Himachal Pradesh-173209	Mr. Ashwani Kumar mailto:'ashwani@hplindia.com' M:9971127370	
ES62	TERMINAL BLOCKS	1	C01	WAGO-CONTROLS	C 27, GREATER NOIDA, SECTOR 58, C BLOCK, SECTOR 58, NOIDA, UTTAR PRADESH 201307	0120-2580409/10	
	TERMINAL BLOCKS	2	E1038	CONNECT WELL	309A/4, 3RD FLOOR, KALKAJI, OKHLA IND AREA PH-2, GOVINDPURI, NEW DELHI, DL 110019	9811881085 09871419996 011-65908877	
	TERMINAL BLOCKS	3	E1047	ELMEX CONTROLS PVT. LTD.	12,G.I.D.C. ESTATE, MUKARPURA ROAD, VADODARA-390010	9374631074	
	TERMINAL BLOCKS	4	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	
	TERMINAL BLOCKS	5	E1142	TECHNOPLAST	OPP.I.M.INTER COLLEGE, BEGUM SARAI KHURD ROAD, AMROHA - 244221, U.P.	PH:- 05922 264006 CELL NO:- 9012676000, 9319520799, 9319582467	
	TERMINAL BLOCKS	6	PME-01	M/s PHOENIX MECANO LTD.,	388 BHARE, TALUKA MULSHI, POST GHOTAWADE, PIRANGOOT, INDUSTRIAL AREA, PUNE-412115	TEL.- +912066745000 Awasthi(09971119006) Tel: ++91 20 6674 5103, Mobile: +91 90499 95985, Fax: ++91 20 6674 5126 contact person : Vishwa bandhu E- mail:d.gupta@pmipl-online.com ;admin@pmipl-online.com	
	TERMINAL BLOCKS	7	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	

Makes of sub-vendor and equipment/components (excluding luminaires) mentioned in this list are indicative and shall be subject to NTPC/BHEL approval. The bidder may propose name of additional sub-vendors makes based on their experience, which will be subject to NTPC/BHEL approval.

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**TECHNICAL SPECIFICATION FOR
OCTAGONAL GALVANIZED POLES**

SPECIFICATION NO. PE-TS-442-558-E005

VOLUME II

SECTION II

REVISION: 0

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SECTION-II**GENERAL REQUIREMENTS**



TECHNICAL SPECIFICATION FOR OCTAGONAL GALVANIZED POLES

SPECIFICATION NO. PE-TS-442-558-E005

VOLUME II

SECTION II

REVISION: 0

SHEET 2 OF 6

1.0 INTENT OF SPECIFICATION

- 1.1 The requirement of this specification shall be fully complied with.
- 1.2 The “design” shall broadly cover the selection of components, materials, sizes etc. for the equipment of supply in vendor’s scope. Complete responsibility of establishing the correctness of equipment design rests with the vendor.
- 1.3 It is not the intent to specify here 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 the required duties in a manner acceptable to Engineer / 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 as per sub vendor list (Section I) and subjected to the approval of BHEL/BHEL’s customer 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 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 Datasheet-A.
- 2.3 In case of conflict between the applicable reference standard and this specification, stringent requirement shall govern.

3 DESIGN REQUIREMENTS

3.1 LIGHTING POLES

- 3.1.1 Lighting poles as required for street lighting and flood lighting shall be of swaged/stepped tubular steel of swan neck construction as per applicable standard.
- 3.1.2 Where painted type of poles is specified (to be done at vendor’s works);
 - a) The poles shall be coated with black bituminous paint, conforming to applicable standard, throughout on the inside surface and on the outside surface up to the level which is embedded in ground.
 - b) Exposed outside surface shall be painted with two coats of red oxide and zinc chromate in synthetic compound primer.
 - c) Final painting shall be done at site after installation. Same is not in vendor’s scope.
- 3.1.3 Where galvanization of poles is specified;
 - a) All inside and outside surfaces of the pole and base plate shall be hot dip galvanised as per manufacturer’s practice.
 - b) Base plate shall be galvanised after welding to the pole base.
 - c) Weight and thickness of zinc coating shall be as per Datasheet-A.



TECHNICAL SPECIFICATION FOR OCTAGONAL GALVANIZED POLES

SPECIFICATION NO. PE-TS-442-558-E005

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- 3.1.4 Each street lighting pole shall be supplied with necessary pipe-reducer / fixing-bracket for fixing the luminaire.
- 3.1.5 Each street lighting pole shall be suitably provided with weather proof, galvanised steel junction box and two numbers fixing brackets suiting the diameter of the pole. The requirements of junction box are stipulated elsewhere. The fixing brackets shall be supplied loose.
- 3.1.6 Street lighting pole shall be provided with wiring hole. The location shall be coordinated with mounting position of street lighting pole JB. The diameter of hole shall be 20 mm. The hole shall be provided with a rubber / PVC grommet.
- 3.1.7 Flood lighting pole shall be provided with painted MS plate and shall be suitable for the number of flood lighting luminaires and controlgear boxes.
- 3.1.8 Provision for earthing shall be provided for flood / street lighting poles at a height 1 metre above the ground (MS flat size shall be informed during detailed engineering). The pole shall be earthed at two points.
- 3.1.9 Types of Lighting Poles

Exact type and designation of lighting pole is as given in Data Sheet A. Basic types are as follows:

- a) PS1 - Street Lighting Pole for one luminaire with 1200mm bracket arm.
- b) PS2 - Street Lighting Pole for one luminaire with 1800mm bracket arm.
- c) PS4 - Street Lighting Pole for two luminaires with 1800mm bracket arm each.
- d) PF1 - Flood Lighting Pole for one luminaire.
- e) PF2 - Flood Lighting Pole for two luminaires.

Details of luminaire shall be provided during detailed engineering.

3.2 POLE JUNCTION BOXES JB(S)

- 3.2.1 Junction boxes with terminals shall be supplied for branching and terminating lighting wires/cables.
- 3.2.2 Construction Features
- (a) The junction boxes shall be fabricated out of material 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.
 - (b) 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 14SWG GI earthing wires.



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- (c) The junction boxes shall be weather proof type conforming to IP-55 of IS:2147. Junction boxes for street light poles and lighting/lightning masts shall be provided with hinged doors and allen keys with bolts as locking arrangement.
- (d) The boxes and cover shall be hot dip galvanised.
- (e) The junction boxes shall be suitable for mounting on lighting poles, mast etc. The brackets, bolts, nuts, screws and any other erection accessories required for erection shall be provided along with the junction box.

3.2.3 Terminals

- (a) 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.
- (b) 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.

3.2.4 The junction boxes shall be of following types:

Type	Description
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.
JB-M	Provided with four (4) way stud type terminals, each terminal suitable for terminating upto two nos. of 4Cx16 mm ² stranded aluminium conductors & tap off of 3 nos. 2C x 2.5 sq. mm. Cu cable.

3.3 CABLE GLANDS

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

3.4 CABLE LUGS

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

3.5 TIMERS

3.5.1 Time Switch

- (a) Time switch shall be suitable for automatic switching ON and OFF of street lighting / flood lighting circuits.
- b) Time switch have 00 - 24 hrs clock base.



TECHNICAL SPECIFICATION FOR OCTAGONAL GALVANIZED POLES

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- c) Time switch shall indicate actual time and shall permit accurate time setting.
- d) Time switch shall be rugged, independent of normal fluctuations of voltage / frequency and free from maintenance.
- e) Contact rating, clock accuracy, rated voltage rating and frequency rating of timer shall be suitable to its application.
- f) Time switch shall be provided with Ni-Cd battery.
- g) Time switch shall be suitable for mounting inside the panel.

3.5.2 On Delay Timer

- (a) Timer shall be fully static and suitable for operation on normal frequency and system voltage.
- (b) Timer shall have high setting accuracy, high repeat accuracy, low reset time and low power consumption.
- (c) Timer shall have the time setting range of 24 - 240 seconds, unless mentioned otherwise in Data Sheet A.
- (d) Timer shall be suitable for mounting inside the panel.

3.6 CIRCUIT DIAGRAM / DIRECTORY PLATE

- 3.6.1 A diagram is to be prepared for fixing to the inside cover of every mast feeder panel giving details of the points controlled by each circuit.

4.12 SURFACE TREATMENT FOR PANEL

- 4.12.1 All metal parts and the surfaces (exterior & interior) of equipment 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.
- 4.12.2 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.
- 4.12.3 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.
- 4.12.4 All parts shall then be subjected to a coat of red oxide primer paint.
- 4.12.5 All inside and outside surfaces of panel shall be spray painted with synthetic enamel of the shade as per Data Sheet A.
- 4.12.6 Electrostatic or powder coating painting shall be done as specified in Data Sheet A.
- 4.12.7 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.



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4 PACKING

- 4.1 Loose items shall be packed, duly labelled in a box and sealed properly to avoid damage during transportation. Packing list shall be pasted on every box, listing the contents of the box.

6.0 INSPECTION & TESTING

- 6.1 Bidder shall confirm compliance with the BHEL Standard Quality Plan (PE-QP-999-558-E004) without any deviations. At contract stage, the successful bidder shall submit the same QP for BHEL/ ultimate customer's approval. 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.
- 6.2 All the components and completely assembled equipment shall be tested as per the latest edition of standards. Any charges for these shall be deemed to be included in equipment price.
- 6.3 All the specified tests shall be carried out to verify the rating and performance of the equipment.
- 6.4 All manufacturing processes viz. machining, sheet forming, electroplating, wire routing, cleating & crimping, assembly, surface preparation shall conform to good manufacturing practices.

7.0 TOOLS AND TACKLE

- 7.1 Tools & tackle which are essential to facilitate assembly, adjustments, erection, maintenance & dismantling of equipment shall be provided as part of equipment supplied.
- 7.2 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.
- 7.3 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.
- 7.4 Schedule of tools & tackle shall be filled up by bidder.

8.0 SPARES

- 8.1 Mandatory spares (if applicable) are indicated in BOQ-cum-price schedule.
- 8.2 Erection & commissioning spares are included in the bidder's scope of supply. Bidder to furnish list of E&C spares in the relevant schedules of the Bid Form and Price Schedules.

CAT-I with comments

UTKARSH NTPC

UTKARSH INDIA LIMITED
NH6, VILL. JANGALPUR, P.O.
ANDUL MOURI,
HOWRAH-711302

MANUFACTURER'S NAME AND ADDRESS

UTKARSH INDIA LIMITED
NH6, VILL. JANGALPUR, P.O.
ANDUL MOURI,
HOWRAH-711302

MANUFACTURING QUALITY PLAN

ITEM : OCTAGONAL POLE FOR UCHLING

CIR. SYSTEM CLASS 4

TYPE OF CHECK 3

QUANTUM OF CHECK 6M

REFERENCE OF DOCUMENT 7

ACCEPTANCE NORMS 8

FORMAT OF RECORD 9

REMARKS 11

PROJECT : KUDUSIHP-1 SUBDIVISION

PACKAGE : CONTRACT NO. CS-9579-215-2-FC-COA-5971

MAIN SUPPLIER : DATE: 11-02-16

SL. NO.	COMPONENT AND OPERATIONS	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE OF DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	REMARKS
1	2	3	4	5	6	7	8	9
1	Steel for Poles Shaft	a. Chemical composition & mechanical properties b. Thickness	Chemical & Mechanical Measurement	Sample as per mfr std Sample as per mfr std	NTPC Specification manufacturer's plant std NTPC Specification manufacturer's plant std	NTPC Specification manufacturer's plant std	TC	V
2	Poles continuously tapered, Octagonal cross Section	a. Dimension, Cross Section b. longitudinal weld c. Galvanization checks (Thickness, uniformity of coating & adhesion)	Measurement visual Measurement	100% 100% 100%	NTPC Approved Drawing NTPC Appd Dwg/ Data sheet manufacturer std NTPC Appd Dwg/ Data sheet Drawing IS 7629/IS 7633/ 8759	NTPC Approved Drawing Single defect free longitudinal weld NTPC Appd Dwg/ Data sheet Drawing	Internal Inspection Report Internal Inspection Report Internal Inspection Report	V V V
3	Brackets	a. Dimension b. Galvanization checks (Thickness, uniformity of coating & adhesion)	Measurement / verify Measurement	100% 100%	NTPC Appd Dwg NTPC Appd Dwg/ Data sheet Drawing IS 7629/ISO 13461	NTPC Appd Dwg NTPC Appd Dwg/ Data sheet Drawing	Internal Inspection Report Internal Inspection Report	V V
4	Terminal Board / MCB / Backelite Sheet	Dimension / Size / grade	Visual	100%	NTPC Specification / Material Test Certificate	as per NTPC approved Drawing	TC	V
5	Foundation Bolt	a. Mechanical Properties b. Dimension	Mechanical Measurement	100% 100%	NTPC Appd Dwg/ Data sheet BS EN 8 NTPC Appd Dwg/ Data sheet BS EN 8	NTPC Appd Dwg/ Data sheet EN 8 Grade NTPC Appd Dwg/ Data sheet BS EN 8	TC TC	V V

LEGEND: RECORDS IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIAL, INCLUDED BY SUPPLIER IN QA DOCUMENTATION. LHP: NTPC SHALL IDENTIFIED IN COLUMN "M"
M: MANUFACTURER/ SUB- SUPPLIER
C: SUPPLIER NOMINATED INSPECTION AGENCY (SUBJECT TO PRIOR ACCEPTANCE OF NTPC) N: NTPC
P: PERFORM W: WITNESS AND V: VERIFICATION AS APPROPRIATE

MANUFACTURER / SUB-SUPPLIER

SIGNATURE

FORMAT NO

IN SUPPLIER

APPROVED BY

APPROVAL SEAL

QOC NO:

FOR NTPC USE

ENGINEER / QA:



MANUFACTURER'S NAME AND ADDRESS		MANUFACTURING QUALITY PLAN						
UTKARSH INDIALIMITED, NH-6, VILL- JANGALPUR, P. O- ANDUL MOURI, HOWRAH-711302		PROJECT : PACKAGE : CONTRACT NO. : MAIN SUPPLIER :						
ITEM :	OPTIONAL POLE FOR LIGHTING	Q.P. NO. : 9573-211-QVE-Q013	REV. NO. : 1					
SUB-SYSTEM :		DATE : 11.07.16	PAGE : 1					
CLASS	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE OF DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
		CHECK	500	500				
1	a. Deflection Test	Measurement	1 Nos. per lot	Random	As per Annexures A,B,C Docs Enclosed	TR	P	W
2	b. Straightness	Measurement	1 Nos. per lot	Random	As per Annexures A,B,C Docs Enclosed	TR	P	W
3	c. Weight	Measurement	2 Nos. per lot	Random	As per IS 2713	TR	P	W
4								
5								
6	Final Testing							

LEGEND RECORDS, IDENTIFIED WITH TICK (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. CMP: NTPC SHALL IDENTIFY IN COLUMN "N"	
M - MANUFACTURER / SUB-SUPPLIER	
C - SUPPLIER NOTIFIED INSPECTION AGENCY (SUBJECT TO PRIOR ACCEPTANCE OF NTPC)	
P - PERFORM W - WITNESS AND V VERIFICATION AS APPROPRIATE	

MANUFACTURER / SUB-SUPPLIER		FOR NTPC USE		APPROVED BY		APPROVAL SEAL	
SIGNATURE		REVIEWED BY		APPROVED BY		APPROVAL SEAL	
FORMAT NO. - QS-01							

BID DPC NO		TECHNICAL SPECIFICATION		PART C		PAGE 2 of 2	