
	TP SOUTHERN ODISHA DISTRIBUTION LIMITED, BERHAMPUR		
	TECHNICAL SPECIFICATION		
Document Title	SPECIFICATION FOR REBAR LACING POLE (suspension/tangent pole)		
Document No.	ENG-MCH-086	Issue Date: 28-12-2022	
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1. SCOPE:

This specification covers the design, manufacture, type testing and supply of RLP suspension/tangent type structure. RLP will be used in cyclone prone area of Odisha and these poles should be able to withstand in 300 kmph wind speed. Scope also includes transportation & unloading of poles at store / site.

2. APPLICABLE STANDARDS:

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

IS 800	Code of practice for general construction in steel
IS 808	Dimensions for Hot Rolled Steel Beam, Column, Channel and Angle Sections
IS 802-Part 2	Code of Practice for Use of Structural Steel in Overhead Transmission Line Towers, Part 2: Fabrication, Galvanizing, Inspection and Packing
IS 802-Part 3	Code of Practice for Use of Structural Steel In Overhead Transmission Line Towers, Part 3 Testing
IS 432-Part 1	Mild Steel and Medium Tensile Steel Bars and Hard-Drawn Steel Wire for Concrete Reinforcement, Part 1: Mild Steel and Medium Tensile Steel Bars
IS 2062	Hot Rolled Medium and High Tensile Structural Steel
IS 816	Code of practice for use of metal arc welding for general construction in mild steel
IS 822	Code of procedure for inspection of welds
IS 1367- Part 3,6,13	Technical supply conditions for threaded steel fasteners Part 3: Mechanical properties of fasteners made of carbon steel and alloy steel – Bolts, Screws and Studs Part 6: Mechanical Properties and Test Methods for Nuts with Specified Proof Loads Part 13: Hot-dip galvanized coatings on threaded fasteners
IS 12427	IS 12427 (2001): Fasteners - Threaded Steel Fasteners - Hexagon Head Transmission Tower Bolts
IS 2629	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel


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IS 2633	Methods for testing uniformity of coating of zinc coated articles
IS 4759	Hot-dip zinc coatings on structural steel and other allied products
IS 6745	Method for determination of mass of zinc coating on zinc coated iron and steel articles

3. CLIMATIC CONDITIONS OF THE INSTALLATION:

1	Maximum ambient temperature	50 deg C
2	Max. Daily average ambient temp	35 deg C
3	Min Ambient Temperature	0 deg C
4	Maximum Humidity	95%
5	Average Annual Rainfall	150cm
6	Average No. of rainy days per annum	120
7	Altitude above MSL not exceeding	1000m
8	Wind Pressure	300 Km/hr
9	Earthquakes of an intensity in horizontal direction	equivalent to seismic acceleration of 0.3g
10	Earthquakes of an intensity in vertical direction	equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

TPSODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months.

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4. GENERAL TECHNICAL REQUIREMENTS:


SL NO	PARTICULAR	UNIT	TPSODL REQUIREMENT	
1	Description of Item		Rebar Lacing Pole (RLP)	
2	Type of Steel		MS(HDG)	
3	Make (Billet/Rerolling Shall not accepted)	Name	SAIL/TATA/JINDAL/RINL	
4	Type of pole		TYPE A (9.2m)	TYPE B (9.7m)
5	Voltage level	KV	11	33
6	Circuit type		Single Circuit	Single Circuit
7	Detail of main structural parts			
I.	Section - SP-1&SP-2 (Bottom leg)	MM	ISA 65x65x8 , (4Nos.)	ISA 80x80x8 , (4Nos.)
II.	Section - SP-3&SP-4 (Top leg)	MM	ISA 50x50x6 , (4Nos.)	ISA 50x50x6 , (4Nos.)
III.	Reinforced bar diameter	MM	16	16
IV.	Length of the pole (from ground level)	MM	9200	9700
V.	Standard for steel		As per IS 808:1989	As per IS 808:1989
VI.	Grade of Steel Size		E250 As per Is 2062:2011	E250 As per Is 2062:2011
VII.	Dimension Tolerance	±	As per IS 1852:1985	As per IS 1852:1985
8	Mechanical Properties For Angle (As per Is 2062:2011)			

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I.	Yield Stress	N/SqMM	250
II.	Tensile stress	N/SqMM	410
III.	Elongation	%	Min-23
IV.	Bend Test (2T)		shall Not Cracked
9	Chemical Composition For Angle (As per Is 2062:2011)		
I.	C	Percentage	Max-0.23
II.	MN	Percentage	Max-1.50
III.	S	Percentage	Max-0.045
IV.	P	Percentage	Max-0.045
V.	SI	Percentage	Max-0.40
VI.	Carbon Equivalent (Max)	Percentage	Max-0.42
VII.	Mode of Deoxidation		Semi Killed/Killed
10	Galvanization		
I.	Mass of Zinc Coating	gm/m ²	720
II.	Zinc Coating Thickness	Micron	100
III.	Uniformity	Withstood	6 dips (each dip for 1 min)

5. GENERAL CONSTRUCTION:

RLP Pole Structure: RLP structures should be able to withstand in a wind speed of 300kmph. These Pole structures are to be constructed with four parallel run of GI Angles designated as SP-1 & SP-2 for bottom part and Sp-3 & SP-4 for top portion. All the angles are separated by 400 mm distance (run through the entire length). The reinforced 16mm bar is welded on all four sides of the lattice structure uniformly except cross arm sides. For more details refer attached drawing.

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RLP will be fabricated in two pieces of ISA at top & bottom portion on each (4) sides and will have different size of ISAs. The details of fabrication of towers shall be in conformity with IS:802 (Part – II) latest amendment. The tower structures shall be accurately fabricated to bolt together easily at site without any undue strain on the bolts. Welding to be done conforming to IS 816 wherever applicable. The approved makes are SAIL, JINDAL, RINL & TATA (Billet with re rolling not allowed).

Reinforcement bar shall be mild steel conforming to IS: 432. Reinforcement bar shall be arranged by manufacturer. Cross arms and stubs are to be fabricated as per the attached detailed drawing. All the tests shall be carried out as per relevant IS.

i. POLE STRUCTURE TESTING PROCEDURE :

The procedure for conducting the pole structure test as per IS 802: part 3

Bolt Slip Test

In a bolt slip test, the test loads shall be gradually applied up to the 50% of design loads under normal condition, kept constant for two (2) minutes at that loads and then released gradually. For measurement of deflection, the initial and final readings on the scales (in transverse & longitudinal directions) before application and after the release of Loads respectively shall be taken with the help of theodolite. The difference between readings gives the values of the bolt slip.


Normal / Broken Wire Load Tests

All the loads, for a particular load-combination test, shall be applied gradually up to the full design loads in the following steps and shall also be released in the similar manner:

- a) 25 percent,
- b) 50 percent,
- c) 75 percent,
- d) 90 percent,
- e) 95 percent and
- f) 100 percent

ii. Observation Periods :

Under normal and broken wire load tests, the pole structure shall be kept under observation for sign of any failure for two minutes (excluding the time of adjustment of loads) for all intermediate

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steps of loading up to and including 95 percent of full design loads.

For normal, as well as broken wire tests, the pole structure shall be kept under observation for five (5) minutes (excluding the time for adjustment of loads) after it is loaded up to 100 percent of full design loads.

While the loading operation are in progress, the pole structure shall be constantly watched, and if it shows any tendency of failure anywhere, the loading shall be immediately stopped, released and then entire pole structure shall be inspected. The reloading shall be started only after the corrective measures are taken.

Full design loads for five (5) minutes, with no visible local deformation after unloading (such as bowing, buckling etc.) and no breakage of elements or constitute parts. The structure shall be considered to be satisfactory, if it is able to support the specified full design loads for five (5) minutes, with no visible local deformation after unloading (such as bowing, buckling etc.) and no breakage of elements or constituent parts).

Ovalization of holes and permanent deformation of bolts shall not be considered as failure.

iii. RECORDING :

The deflections of the pole structure in transverse and longitudinal directions shall be recorded at each intermediate and final stage of normal load and broken wire load tests by means of a theodolite and graduated scale. The scale shall be of about one metre long with marking upto 5 mm accuracy.

iv. DESTRUCTION TEST :


The destruction test shall be carried out under normal condition or broken wire condition. Under which load condition the destruction test is to be carried out shall sheet be intimated to the contractor at the time of approving rigging chart / test data.

The procedure for application of load for normal/broken wire test shall also be applicable for destruction test. However, the load shall be increased in steps of five (5) per cent after the full design loads have been reached.

v. Welding :

Lacing

Where lacing bars overlap the main members, the amount of lap measured along either edge of the lacing bar should be not less than four times the thickness of the bar or members, whichever is less. Welding should be sufficient to transmit the load in the bar and should in any case be

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provided along each side of the bar for the full length of lap.

Where lacing bars are fitted between the main members, they shall be connected to each member by fillet welds on each side of the bar or by full penetration butt welds. The lacing bars shall be so placed as to be generally opposite the flange or stiffening element of the main member.

Battening:


Where tie or batten plates overlap the main members, the amount of lap should not be less than four times the thickness of the plate. The length of weld connecting each edge of the batten plate to the member shall in aggregate be not less than half the depth of the batten plate. At least one-third of this welding shall be placed at each end of this edge. The length of weld and depth or batten plate shall be measured along the longitudinal axis of the main member.

For more details about welding refer IS:816 latest amendment.

vi. Galvanization:

RLP Pole shall be hot dip galvanized, are as following:

- a) All galvanizing shall be carried out by the hot dip process, in accordance with Specification IS 2629. However, high tensile steel nuts, bolts and spring washer shall be electro galvanized.
- b) The zinc coating (720 gms per sq.mt / 100Micron) shall be smooth, continuous and uniform. It shall be free from acid spot and shall not scale, blister or be removable by handling or packing.
- c) There shall be no impurities in the zinc or additives to the galvanic bath which could have a detrimental effect on the durability of the zinc coating. Purity of zinc shall be Zn 99.95% or better.
- d) In the event of damage to the galvanizing the method used for repair shall be subject to the approval of the Engineer in Charge or that of his representative. Repair of galvanization at site will not be permitted in any situation.
- e) The threads of all galvanized bolts and screwed rods shall be cleared of spelter by spinning or brushing. A die shall not be used for cleaning the threads unless specifically approved by the Engineer in Charge. All nuts shall be galvanized. The threads of nuts shall be cleaned with a tap and the threads oiled.
- f) Partial immersion of the work shall not be permitted and the galvanizing tank must therefore be sufficiently large to permit galvanizing to be carried out by one immersion.
- g) After galvanizing no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. To avoid the formation of white rust galvanized materials shall be stacked during transport and stored in such a manner as to permit adequate ventilation. Sodium dichromate treatment shall be provided to avoid

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formation of white rust after hot dip galvanization. The galvanized steel shall be subjected to test as per IS-2633.

- h) Quality of Hot Dip Galvanization should comply with IS 2629, ISO 1461 & should be guaranteed for any type of damage due to harsh climatic condition for 5 Years. These poles are to be used in coastal areas of Odisha where climate is hot, humid & saline. These areas are prone to flood & frequent rainfall.

6. MARKING:

Following distinct non-erasable embossing is to be made on each RLP Poles to be supplied to TPSODL under this Tender.

- a) ISI Mark
 - b) E-250 A
 - c) Manufacturer Name/ Trade Mark
- Engraved Marking (Punching before galvanization)
- a) "TPSODL"
 - b) P.O No and Date of Manufacturing
 - c) RLP-Type A - 9200 , RLP-Type B - 9700

7. TESTS:

The bidder shall be required to submit complete set of the following test reports along with the offer: -

7.1 ACCEPTANCE TESTS (For ISA & other parts)


- i) Chemical Composition
- ii) Mechanical Properties
- iii) Dimension Test & Weight (kg/M) Visual Examination,
- iv) Test in respect of Hot Dip Galvanization i.e. Thickness of zinc coating in microns

7.2 ROUTINE TESTS

Same as Acceptance Test

7.3 TYPE TESTS (For ISA & other parts)

- i) Chemical Composition
- ii) Mechanical Properties
- iii) Test in respect of Hot Dip Galvanization i.e. thickness of zinc coating in microns

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8. TYPE TEST CERTIFICATES:

The Bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at **CPRI / ERDA / Other Government Labs** as per relevant IS. Type tests should have been conducted during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, same shall be carried out without any cost implication to TPSODL.

9. PRE-DISPATCH INSPECTION:


The material shall be subject to inspection by a duly authorized representative of the TPSODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPSODL's representatives at all times when the work is in progress. Inspection by the TPSODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPSODL.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPSODL
- c) TPSODL Invoice in duplicate
- d) Packing list
- e) Drawings & catalogue
- f) Guarantee / Warrantee card
- g) Delivery Challan
- h) Other Documents (as applicable).

10. INSPECTION AFTER RECEIPT AT STORE:

The material received at TPSODL, Odisha store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering department. Also refer section no.14 Quality Control for additional details.

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11. GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 54 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. This includes all material, workmanship, welding, etc. Within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

Galvanization Guarantee- Quality of Hot Dip Galvanization should be guaranteed for any type of damage due to harsh climatic condition for 5 Years.

12. PACKING:

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. Preferably wooden packing to negotiate the scratches and defects during transportation. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.


13. TENDER SAMPLE:

Not Applicable


14. QUALITY CONTROL:

The RLP structures and its components shall be given by the manufacturer's routine shop tests and quality conformance tests. When specified, these tests shall be witnessed by purchaser or its representative. tests results shall be submitted to purchaser. RLP structures shall be shipped after the shipment order released by purchaser.

- I. Each component shall be inspected for conformance to the approved drawings. This inspection shall include, but not limited to:
 - a. Ultrasonic inspection of base plate more than 50mm thick prior to welding for laminations.
 - b. Visual inspection of dimensions to assure that tolerances are met.

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- c. Visual inspection of cut edges to ANSI/AWS D.1.1 criteria.
 - d. Visual inspection of bent surfaces for surface separations (supplemented by magnetic particle in questionable areas);
 - e. visual inspection of bolt holes to assure that they are cylindrical, perpendicular, free of burrs and without torn or ragged edges;
 - f. visual inspection of all welds to ANSIIAWS D1.1 Section 8 criteria;
 - g. ultrasonic inspection of all full penetration welds
 - h. ultrasonic inspection of shaft to base plate weld after galvanizing for base plate thicker than 50mm (maybe waived if routine audits show no history of defects);
 - i. visual inspection of all structural partial penetration or fillet welds, in questionable area use magnetic particle inspection according to ANSI/AWS D1.1 Section 8 criteria;
 - j. visual inspection of finish;
 - k. Magnetic thickness measurement of finish coatings.
- II. The Pole structures shall be proto type tested by the contractor at any testing station having facilities to test the structures. Testing of Pole structure shall generally conform to IS:802 (Part-III). The employer shall depute their representative at their own expense to witness the tests. The responsibility for design and successful proto type testing shall solely lie with the Supplier. At the time of proto-assembly and/ or proto testing, if any modification is required to be carried out, the same shall be carried out by the Supplier. These modifications, if any, shall also be incorporated on the fabrication shop drawings and/ or on the structural drawings.
- III. A galvanized pole structure of each type complete shall be subjected to design and destruction tests by first applying test loads applied in a manner approved by the Purchaser. The pole structure shall withstand these tests' without showing any sign of failure or permanent distortion in any part. Thereafter, the pole structure shall be subjected to destruction by increasing the loads further in an approved manner till it fails. The pole structure shall be tested for all the conditions considered for the design of pole structure.
- IV. The Bidder shall submit to the purchaser, for approval, the detailed programme and proposal for testing the pole structures showing the methods of carrying out the tests and manner of applying the loads. After the Purchaser has approved the test procedures and programmes the bidders will intimate the Employer about carrying out the tests at least 15 days in advance of the scheduled date of tests during which the purchaser will arrange to depute his representative to be present at the time of carrying out the tests. Three copies of the test reports shall be submitted. The Bidder shall submit one set of bill of materials at the time of prototype pole


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structure testing for checking the pole structure material. Further at the time of submitting test report on successful completion of testing, the contractor has to submit the final structural drawings, shop drawings and Bill of materials for purchaser's reference and record. The type testing charges shall be released only after approval of test report, structural drawings, bill of material and shop drawings of pole structure.

- V. In case of premature failure the pole structure shall be retested and steel already used in the earlier test shall not be used again. However, in case of minor failures, the bidder can replace the members with higher section and carry out the testing. The Bidder shall provide facilities to the Purchaser or their representatives for inspection of materials during manufacturing stage and also during testing of the same. In case of any premature failure even during waiting period, the pole structure is to be retested with rectified members. However, if the failure are major in nature and considerable portion of pole structure is to be re erected, in such cases all the tests which has been carried out earlier are required to be reconducted again in compliance with Specification.
- VI. Each type of pole structure to be tested shall be a full scale prototype galvanized pole structure and shall be erected vertically on rigid foundation. The pole structure erected on test bed shall not be out of plumb by more than 1 in 360.
- VII. All the measuring instruments shall be calibrated in systematic / approved manner with the help of standard weight / device. Calibration shall be done before commencing the test of each pole structure up to the maximum anticipated loads to be applied during testing.
- VIII. The tension pole structure is to be tested with strain plate as per approved design / drawings.
- IX. The sequence of testing shall be decided by the Employer at the time of approving the rigging chart / test data sheet.
- X. The Employer may decide to carry out the tensile test, bend test etc. as per the relevant IS/DIN on few members of the test pole structure after completion of the test or in case of any premature failure. The Bidder shall make suitable arrangement for the same without any extra cost to the Purchaser.

15. TESTING FACILITIES:

Supplier/ Manufacturer shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant Indian standards.

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16. MANUFACTURING FACILITIES:

The successful bidder shall submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer.

17. SPARES, ACCESSORIES AND TOOLS

Not applicable.


18. DRAWINGS AND DOCUMENTS:

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

SL NO	PARTICULAR	UNIT	To be provided by bidder	
1	Description of Item			
2	Type of Steel			
3	Make (Billet/Rerolling Shall not accepted)	Name		
4	Type of pole			
5	Voltage level	KV		
6	Circuit type			
7	Detail of main structural parts			
I.	Section - SP-1&SP-2 (Bottom leg)	MM		

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II.	Section - SP-3&SP-4 (Top leg)	MM	
III.	Reinforced bar diameter	MM	
IV.	Length of the pole	MM	
V.	Standard for steel		
VI.	Grade of Steel Size		
VII.	Dimension Tolerance	±	
8	Mechanical Properties For Angle (As per Is 2062:2011)		
I.	Yield Stress	N/SqMM	
II.	Tensile stress	N/SqMM	
III.	Elongation	%	
IV.	Bend Test (2T)		
9	Chemical Composition For Angle (As per Is 2062:2011)		
I.	C	Percentage	
II.	MN	Percentage	
III.	S	Percentage	
IV.	P	Percentage	
V.	SI	Percentage	
VI.	Carbon Equivalent (Max)	Percentage	

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VII.	Mode of Deoxidation		
10	Galvanization		
I.	Mass of Zinc Coating	gm/m2	
II.	Zinc Coating Thickness	Micron	
III.	No. of dips		

20. SCHEDULE "B" DEVIATIONS:

(TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

SL. No	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company

Signature

Designation

Document Title

SPECIFICATION FOR REBAR LACING POLE (suspension/tangent pole)

Document No.

ENG-MCH-086

Issue Date: 28-12-2022

Revision No.

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Prepared by:

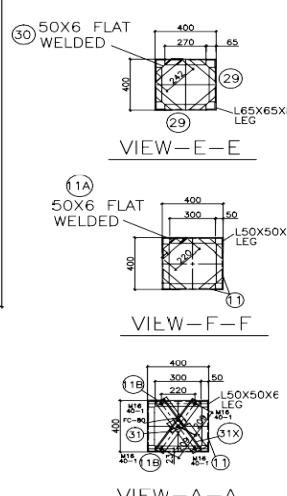
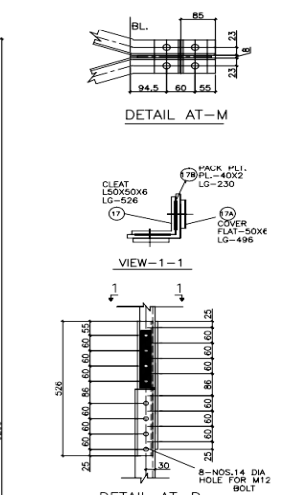
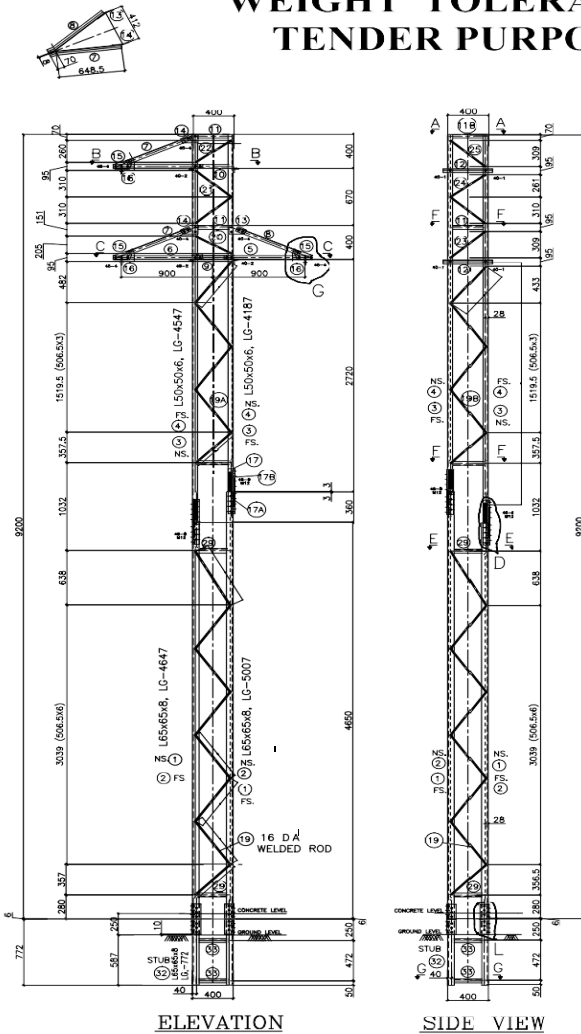
Reviewed By:

Approved By:

Issued By:

11KV S/C REBAR LACED POLE WEIGHT TOLERANCE - TENDER PURPOSE ONLY

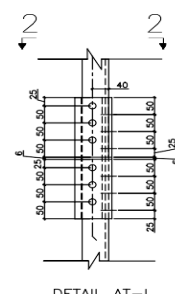
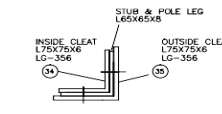
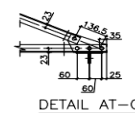
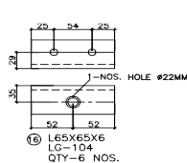
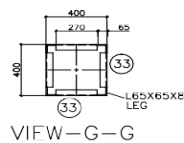
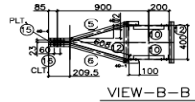
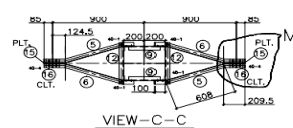
2.5%



MARK NO.	SECTION	LENGTH	UNIT WT. KGS/MTR	PCS. WEIGHT	QTY SET	TOTAL WEIGHT (KGS)
SP-1	L65X65X8	4647	7.7	35.8	2	71.6
SP-2	L65X65X8	5007	7.7	38.55	2	77.1
SP-3	L50X50X6	4547	4.5	20.5	2	41
SP-4	L50X50X6	4187	4.5	18.8	2	37.6
SP-5	L45X45X5	918	3.4	3.12	3	9.36
SP-6	L45X45X5	918	3.4	3.12	3	9.36
SP-7	L45X45X5	719	3.4	2.4	3	7.3
SP-8	L45X45X5	719	3.4	2.4	3	7.3
SP-9	L45X45X5	300	3.4	1.0	2	2.0
SP-10	L45X45X5	300	3.4	1.0	2	2.0
SP-11	L45X45X5	300	3.4	1.0	10	10.0
SP-11A	FLAT-50X6	220	2.36	0.52	8	4.16
SP-11B	L45X45X5	300	3.4	1.0	2	2.0
SP-12	L45X45X5	483	3.4	1.64	4	6.6
SP-13	PL-100X6	174	47.1	0.82	3	2.46
SP-14	PL-100X6	174	47.1	0.82	3	2.46
SP-15	PL-111X6	191	47.1	1.0	3	3.0
SP-16	L65X65X8	104	5.8	0.6	6	3.62
SP-17	L50X50X6	526	4.5	2.37	4	9.48
SP-17A	FLAT-50X6	496	2.36	1.17	8	9.36
SP-17B	PL-40X2	230	15.7	0.14	8	1.16
SP-19	16 DIA ROD	4895	1.58	7.73	4	30.92
SP-19A	16 DIA ROD	2925	1.58	4.62	2	9.24
SP-19B	16 DIA ROD	2887	1.58	4.56	2	9.12
SP-20	16 DIA ROD	401	1.58	0.63	2	1.27
SP-21	16 DIA ROD	926	1.58	1.46	2	2.93
SP-22	16 DIA ROD	405	1.58	0.68	2	1.36
SP-23	16 DIA ROD	463	1.58	0.73	2	1.46
SP-24	16 DIA ROD	895	1.58	1.41	2	2.82
SP-25	16 DIA ROD	463	1.58	0.73	2	1.46
SP-29	L45X45X5	270	3.4	0.918	8	7.34
SP-30	FLAT-50X6	242	2.36	0.57	8	4.57
SP-31/31X	L65X65X8	468	7.7	3.6	1+1	7.21
TOTAL WEIGHT OF STRUCTURAL STEEL =						398.66

MARK NO.	SECTION	LENGTH	UNIT WT. KGS/MTR	PCS. WEIGHT	QTY SET	TOTAL WEIGHT (KGS)
SP-32	L65X65X8	772	7.7	5.94	4	23.78
SP-33	L45X45X5	270	3.4	0.918	8	7.34
SP-34	L75X75X6	356	6.8	2.42	4	9.68
SP-35	L75X75X6	356	6.8	2.42	4	9.68
TOTAL WEIGHT OF STUB STR. STEEL =						50.48

SUB. TOTAL WEIGHT OF STRUCTURAL STEEL = 449.14



NOTES:-

1. ALL DIMENSIONS ARE IN MM. UNLESS SPECIFIED.
2. ALL HOLES ARE 18 DIA. FOR 16 DIA. BOLTS.
3. ALL ERECTION MARKS SHALL BE PREFIXED WITH "SP".
4. ALL STRUCTURAL STEEL SHALL CONFORM TO IS:2062 E-250, GR.-A
5. EDGE PREPARATION OF WELDING SHALL BE DONE AS PER IS:823 & WELDING AS PER IS:816
6. ALL WELDS ARE 6mm FILLET WELD UNO.
7. ALL STRUCTURAL STEEL MEMBERS & BOLT SHALL BE GALVANISED AFTER FABRICATION AS PER IS:2629 & 4759 AND ZINC COATING SHALL NOT BE LESS THAN 720gm/sq.m FOR STRUCTURAL STEEL MEMBER.

S.No	Conductor Size	Span length (mtr)
1	55 sq.mm	90
2	80 sq.mm	85
3	100 sq.mm	80