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1. SCOPE:

This specification covers the design, manufacture, testing and supply of 160mm X 152mm WPB pole, 11 mtr. & 13 mtr. long having unit weight of 30.44Kg per meter. 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 12778	Hot Rolled Parallel Flange Steel Sections for Beams, Columns and Bearing Piles - Dimensions and Section Properties
IS 2062	Hot Rolled Medium and High Tensile Structural Steel
IS 12779	Rolling and cutting tolerances for hot rolled parallel flange beam and column sections
IS 2629	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
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:

The material shall be suitable for following climatic conditions,

1. Maximum altitude above sea level 1,000m
2. Maximum ambient air temperature 50°C
3. Maximum daily average ambient air temperature 35°C
4. Minimum ambient air temperature 0°C
5. Maximum relative humidity 95%
6. Average number of thunderstorm days per annum (isokeraunic level) 70
7. Average number of rainy days per annum 120
8. Average annual rainfall 150cm
9. Earthquakes of an intensity in horizontal direction - equivalent to seismic acceleration of 0.3g

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10. Earthquakes of an intensity in vertical direction - equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)

11 .Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr.

Environmentally, some of the regions, where the work will take place includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators. Some places are in heavily industrial polluted areas.

Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere.

The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

4. GENERAL TECHNICAL REQUIREMENTS:

Sl.NO	TECHNICAL PARTICULARS	DESIRED VALUE
1	Length of Joist in mtr.	11mtr / 13mtr
2	Make	SAIL/TATA/ RINL/JINDAL **(Billet with re rolling not allowed)**
3	Weight in kg/m with ±2.5% Tolerance	30.44
4	Sectional Area (cm²)	38.8
5	Flange slope in deg	90
6	Cutting length tolerance	100 (no negative tolerance)
7	Depth(D) of Section (mm) with ±3.0 mm Tolerance	152
8	Width(B) of Flange (mm) with ±0.7mm Tolerance	160
9	Thickness of Flange (Tf) (mm) with ±1.5 mm Tolerance	9
10	Thickness of Web (Tw) (mm) with ±0.7 mm Tolerance	6
11	Corner Radius of fillet or root (R1) (mm)	15
12	Moment of Inertia	
a	Ixx (cm⁴)	1673
b	Iyy (cm⁴)	615.6
13	Radius of Gyration (cm)	
a	Rxx	6.57

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Sl.NO	TECHNICAL PARTICULARS	DESIRED VALUE
b	Ryy	3.98
14	Modulus of Section Zxx (cm³)	
a	Zyy (cm³)	220.1
b	Zxx(cm³)	76.9
15	GI Base Plate in mm	300 x 300 x 12
16	GI Stiffener Flange in mm	150 x 60 x 6
17	GI Stiffener Web in mm	150 x 100 x 6
18	**Mechanical Properties**	
a)	Grade	E-350A
b)	Yield stress in Mpa	350 Min
c)	Tensile stress in Mpa	490 min
d)	Lo= (5.65 So) Elongation %	22 min
e)	Bend test	Shall not crack
19	**Chemical properties**	
a)	Grade	E 350A
b)	Carbon	0.2 % Max
c)	Manganese	1.55 % max
d)	Sulphur	0.045 % max
e)	Phosphorous	0.045 % max
f)	Silicon	0.45 % max
g)	Carbon equivalent	0.47 % max
h)	De oxidation method	Semi killed or killed
20	Supply condition	Hot rolled
21	Galvanizing standard	IS 2633, IS 2629
22	The zinc coating *(705 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. Zinc Coating shall withstand for 6 dips(min) in Dip Test process for WPB Pole	705 gms per sq.mt / 100 Micron with 6 Dips(min)

5. GENERAL CONSTRUCTION:

The Wide Parallel Beam support structures shall be fabricated from mild steel, grade A and in lengths dictated by design parameters. Supplier has to supply Baseplate with dimension 300mm x 300mm x 12mm thickness along with Stiffener 150 x60x6 (flange) & 150x100x6 (web). Complete fabrication drawing shall be submitted for approval. Holes should be as per GA drawing provided by TPSODL. Arc welding to be used for fabrication / jointing of Base plate & stiffener to the pole. However, in case of any discrepancy between the above data & the relevant IS, the values indicated in the IS shall prevail. All the acceptance Tests / routine tests shall be carried out as per relevant IS. The approved makes are SAIL, JINDAL, RINL & TATA (Billet with re rolling not allowed).

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5.1 Galvanization:

WPB 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 (705 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 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, ISO1461 & 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 WPB Poles to be supplied to TPSODL under this Tender.

a) ISI Mark

b) WPB 160

c) E-350 A

d) Manufacturer Name/ Trade Mark

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Engraved Marking (Punching before galvanization)

a) "TPSODL"

b) P.O No and Date of Manufacturing

7. TESTS:

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

7.1 ACCEPTANCE TESTS

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

i) Chemical Composition

ii) Mechanical Properties

iii) Test in respect of Hot Dip Galvanization i.e. thickness of zinc coating in microns

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 in certified Test laboratories 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

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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.

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. 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.

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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. The bidder shall provide instructions regarding handling and storage precautions to be taken at site.

13. TENDER SAMPLE:

Not Applicable

14. QUALITY CONTROL:

The bidder shall submit QAP indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer’s/sub-supplier's works to carry out inspections.

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.

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

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manufacturing.

19. SCHEDULE- "A" GUARANTEED TECHNICAL PARTICULARS:

Sl.NO	TECHNICAL PARTICULARS	TO BE FURNISHED BY BIDDER
1	Length of Joist in mtr.	
2	Make	
3	Weight in kg/m with ±2.5% Tolerance	
4	Sectional Area (cm^2)	
5	Flange slope in deg	
6	Cutting length tolerance	
7	Depth(D) of Section (mm) with ±3.0 mm Tolerance	
8	Width(B) of Flange (mm) with ±0.7mm Tolerance	
9	Thickness of Flange (Tf) (mm) with ±1.5 mm Tolerance	
10	Thickness of Web (Tw) (mm) with ±1.0 mm Tolerance	
11	Corner Radius of fillet or root (R1) (mm)	
12	Moment of Inertia	
a	Ixx (cm^4)	
b	Iyy (cm^4)	
13	Radius of Gyration (cm)	
a	Rxx	
b	Ryy	
14	Modulus of Section Zxx (cm^3)	
a	Zyy (cm^3)	
b	Zxx(cm^3)	
15	GI Base Plate in mm	
16	GI Stiffener Flange in mm	
17	GI Stiffener Web in mm	
18	**Mechanical Properties**	
a)	Grade	
b)	Yield stress in Mpa	
c)	Tensile stress in Mpa	
d)	Lo= (5.65 So) Elongation %	
e)	Bend test	
19	**Chemical properties**	
a)	Grade	
b)	Carbon	
c)	Manganese	
d)	Sulphur	
e)	Phosphorous	
f)	Silicon	
g)	Carbon equivalent	
h)	De oxidation method	

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SI.NO	TECHNICAL PARTICULARS	TO BE FURNISHED BY BIDDER
20	Supply condition	
21	Galvanizing standard	
22	The zinc coating *(705 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. Zinc Coating shall withstand for 6 dips(min) in Dip Test process for WPB Pole	

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

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