Pre-Bid clarification cum Corrigendum				
Tender No : TPCODL/P&S/55/2020-21				
UG cabling work for shifting of 33 KV Tulashipur I & II feeder from Jobra primary S/s to Medical premises S/s due to widening of road for redevelopment of SCB Medical under CDD-I, Cuttack				
Sr. No.	**Detailed Reference to TPCODLTechnical Document. Please specify Document No / Clause No / Page No**	**Description as per Bid Document**	**Queries**	**TPCODL RESPONSE**
1	**2**	**3**	**4**	**5**
1	Page No. 17	3Cx 400 mm2 33KV XLPE Cable (Armoured) A2XFY	Scope of Supply of 3Cx 400 mm2 33KV XLPE Cable (Armoured) A2XFY is required.	Scope includes supply, installation, testing and commissioning of 3Cx 400 mm2 33KV XLPE Cable
2	Page No. 18	Loop chamber with excavation of soil with size 3.5 mtr x3.5 mtr x1.5 mtr depth. The chamber shall be filled with sand before and after looping of cable and then putting of PCC tiles on the filled sand. Finally, the chamber shall be filled by soil.	Drawing Required.	To be provided later at the time of site execution and the size of loop chamber will be designed taking the bending radius of the cable into consideration
3	Page No. 19	Earthing Device (G.I. Pipe)	Specification of G.I Pipe is Required.	The specification for GI Earthing Pipe has been changed to 100mm dia pipe. Specification for the same is attached
4	Page No-15, Clause No-7.5 Payment Terms	After completion of the installation work at site and acceptance by TPCODL, BA shall submit the certified RA bills / invoices in original in monthly basis to the concerned department. Payment shall be released within 45 days of the receipt of the invoices (RA/ Final Bills) complete in all respects.	Please clarify the % of payment against supply & erection	Attached separately
5	-	-	Road Restoration, Footpath or any other activity related to road activity is in bidder scope or any other scope?	Yes, it's in bidder's scope
6	-	-	Supply of material required for mounting arrangement of Cable is in bidder scope or not? e.g like GI Pipe, HPDE Cleat, Clamp, channel, support insulator for earthing etc.	Yes, it's in bidder's scope
7	Open Tender Notification / Clause No.3.9/Page No.12	The type tests report of the approved make specified in TPCODL specifications should have been carried out within five years prior to the date of opening of technical bids and test reports are to be submitted along with the bids. If type tests carried out are not within the five years prior to the date of bidding	These type test reports shall be submitted if we become the successful bidder. It may not be possible to furnish these reports during tyhe pre bidding stage. We shall give an undertaking that we will be submitting these reports if we are the successful bidder.	Accepted
8	BOQ/Sl No B.5/Page No.18	33 KV Disc Insulator (B&S)	Technical Specification not provided in Tender Document	specification is attached
9	BOQ/Sl No B.12/Page No.19	Assorted size nuts and bolts	Dimensions not provided	The dimension is 16mm for nuts, bolts and washers. However, the details will be finalized during the drawing approval stage
10	BOQ/Sl No B.13/Page No.19	MS Washer	Dimensions not provided. Mention the type required - plain or spring	The dimension is 16mm for nuts, bolts and washers. However, the details will be finalized during the drawing approval stage
	Please, refere the specification 100 dai earthing pipe, 25x3 GI flat, 150x150mm, 13 mtr long, 34.6 Kg/ mtr RS joist pole, 33 KV H/w fittings & 33 KV porcelain disc insulator in attachment			

Payment Terms :

7.0 Post Award Contract

7.5 Payment Terms:

A. 70% (Seventy percent) of contract price on pro-rata basis along with taxes and duties shall be paid progressively in running bill for each portion of proportionally completed items (Supply and erection at site only) of work as per the agreed Bill of Materials subject to certification by Purchaser's Engineer-in-charge.

B. Balance 30% (Thirty percent) payment of the actual executed WO shall be paid after completion of acceptance test and handing over & Taking Over of the complete systems specified in the enquiry, including clearance of Electrical Inspection (if any), compliance of final punch point and after reconciliation & adjustment of payments, if any, towards Quantities of materials issued from purchaser's stock and consumed by the contractor for expeditious completion of the job.

Payment shall be released within 45 days of the receipt of invoice in complete shape.

TPCODL	TATA POWER CENTRAL ODISHA DISTRIBUTION LIMITED, BHUBANESWAR		
	TECHNICAL SPECIFICATION		
Document Title	SPECIFICATION FOR GALVANISED IRON (GI) EARTH PIPE		
Document No.			Eff. Date:06/08/2020
Revision No.	00		Page 1 of 7
Prepared By Md Zaffir Alam	Reviewed By	Approved By	Issued By

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20. GUARANTEED TECHNICAL PARTICULARS
21. SCHEDULE OF DEVIATIONS

1.0	**SCOPE**	This specification covers technical requirements of design, manufacturing, testing, Inspection, Supply & transportation of Heavy type Galvanised Iron (GI) earth pipe electrode for TATA Power-CODL stores/site. This specification shall cover different Range of GI earth pipe, as mentioned below, 1. GI earth pipe of size Nominal Bore (NB) 40mm. 2. GI earth pipe of size Nominal Bore (NB) 65mm. 3. GI earth pipe of size Nominal Bore (NB) 100mm.
2.0	**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 confirm to the regulations of the local Statutory authorities: • IS 1239 (Part1): Specification for Steel Tubes, Tubulars & other wrought steel fittings. • IS 1239 (Part2): Specification for Steel Tubes, Tubulars & other steel fittings. • IS 228: Method for chemical analysis of steels. • IS 4736 : Specification for Hot dip zinc coating on mild steel tubes • IS 4759: Specification for Hot dip zinc coating on structural steel and other allied products. • IS 1387: General requirements for the supply of metallurgical materials. • IS 1608: Mechanical testing of metals-Tensile Strength. • IS 4711: Methods for sampling of steel pipes, tubes and fittings. • IS 4740: Code of practice for packaging of steel tubes. • IS 10748: Hot rolled steel strip for welded tubes & pipes. • IS 12278: Method for ring tensile test on metallic tubes. • IS 3043-1987: Code of practice for earthing. • IS 1367: Technical supply conditions for threaded steel fastener. • IS 14394: Industrial fasteners-Nuts of product Grade C- Hot Dip Galvanised. • IS 2016:-1997: Specification for plain washers. • IS 1730-1989: Steel plates, sheets, strips and flats for structural And general engineering purpose-Dimensions • IS 814-2004: covered electrodes for manual metal Arc welding Of carbon and carbon Manganese steel- specification.
3.0	**CLIMATIC CONDITIONS OF INSTALLATION**	a) Max. Ambient Temperature : 50 deg.C b) Max. Daily average ambient temp : 40 deg.C c) Min. Ambient Temperature : 2 deg.C d) Maximum Humidity : 100% e) Minimum Humidity : 10% f) Average No. of thunderstorm per annum : 40 g) Average Annual Rainfall : 750 mm h) Average No. of rainy days per annum : 50 i) Rainy months : June to Oct. j) Altitude not exceeding : 300 meters. k) Wind Pressure : 195 kg/sq. m up an elevation of 30m.

		Atmosphere is generally laden with mild acid and dust suspended during dry months and subjected to fog in cold months. The design of the equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1g.
4.0	**GENERAL TECHNICAL REQUIREMENTS**	

Sl. No.	Description	Units	Requirements		
1	Nominal Bore	mm	40	65	100
2	Outside Diameter	mm			
		Min.(mm)	47.9	75.3	113.1
		Max.(mm)	48.8	76.6	115
3	Wall Thickness	mm	4.0	4.5	5.4
4	Mass of tube plain end	Kg/m	4.37	7.93	14.5
5	Mass of Zinc Coating Min.	g/sq. meter	360	360	360
6	Tensile strength	N/sq. mm	320	320	320
7	Elongation	%	20	20	20
8	Length	m	3/6	3/6/9	3/6/9

5.0	**GENERAL CONSTRUCTION**	For welded and seamless plain end steel tubes intended for different use in electricity distribution utility shall comply IS 1239 (part1). Plain ends of the tube are cleanly finished by normal deburring process. For tubes of any thickness the minimum mass of zinc coating is 360 g/sq. meter. The zinc coating on the tubes shall be uniform and tested in accordance with IS 4736.Tubes. The tensile strength shall be at least 320 MPa (320 N/sq. mm).The elongation percent for nominal bore of 40mm, 65mm and 100 mm dia. is 20%.The Hot Rolled coil used for manufacturing of Galvanised Mild Steel tubes shall be of grade-2 in accordance with IS 10748.2004 and shall be strictly from approved vendors' i.e. SAIL, TATA Steel, ESSAR, JSW Steel and TATA steel BSL. Documentary evidence certifying the raw material lifted from the approved vendor, which should not be less than the ordered quantity. Similarly the zinc for galvanization shall be procured from Hindustan zinc LTD. or Vedanta LTD. And the firm shall submit the documentary evidence certifying not less than the ordered quantity of zinc lifted from the approved vendor. The hot dip galvanization shall be done only after the all fabrication and welding done. The nut bolt, & washers provided shall be as per relevant IS. Chemical compositions for G.I. Earth Pipe are in below: Carbon: 0.20% (max.) Manganese: 1.30% (max.) Phosphorous: 0.04% (max.) Sulphur: 0.04% (max.) Constructional drawings are attached as annexure-I, annexure-II, annexure-III should be followed for fabrication.
6.0		

	NAME PLATE AND MARKING	The body of the device shall be appropriately marked with "PROPERTY OF TATA POWER-CODL, BHUBANESWAR" and the RC /RO no. at suitable location such that it is permanent and does not harm the body of the device. Each tube shall be marked with class of tubes i.e. H for Heavy type. The different classes of tubes shall be distinguished by color bands: Heavy tubes: Red
7.0	**TESTS**	All routine, acceptance & type tests shall be carried out in accordance with the relevant IS.
7.i)	**TYPE TEST**	The following tests shall constitute the type tests and shall be carried out as per IS: 1239 Part-1: 2004(Latest Amendment) 1)Test for Mechanical Properties (As per 1239 Part-1: 2004 or Latest Amendment clause no.14.1 & 14.1.1) • Percentage of Elongation. • Tensile strength. 2) Mass of zinc coating. (As per 4736:1986 or Latest Amendment clause no.5.1) 3) Chemical composition. (As per 1239 Part-1: 2004 or Latest Amendment clause no.6.1.1)
7.ii)	**ROUTINE/ ACCEPTANCE TEST**	The following tests shall be got conducted in presence of purchaser representative as per IS: 1239 Part-1: 2004 (Latest Amendment) on the samples taken from the offered lot material for the purpose of acceptance of that lot of material. 1) Dimension of GI pipe. (As per IS 1239 Part-1: 2004 clause No.9.1 a & b)-Test shall be performed. 2) Chemical composition (Manufacturer's Test Certificate for raw material-Document Review only.) 3) Mass of zinc coating. (As per 4736:1986 or Latest Amendment clause no.5.1)-Test shall be performed. 4) Test for mechanical properties (Manufacturer's Test Certificate for raw material-Document Review only.)
8.0	**TYPE TEST CERTIFICATES**	The bidder shall furnish the type test certificates as mentioned as above as per the corresponding standards, if asked for by TATA Power-CODL. All type tests shall be conducted from NABL accredited Lab as per the relevant standards 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 or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TATAPOWER-CODL.
9.0	**PRE DISPATCH INSPECTION**	The Material shall be subject to inspection by a duly authorized representative of the TATA Power-DDL. 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 TATAPOWER-CODL's representatives at all times when the work is in progress. Inspection by the TATA Power-CODL 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 TATAPOWER-CODL. The pre-dispatch inspection shall be carried out as per annexure-IV

		Following documents shall be sent along with material a) Test reports b) MDCC issued by TATA POWER-CODL c) Invoice in duplicate d) Packing list e) Drawings & catalogue f) Guarantee / Warrantee card g) Delivery Challan h) Other Documents (as applicable)
10.0	**INSPECTION AFTER RECEIPT AT STORES**	The material received at TATA POWER-CODL 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 each QA and Plant Engineering group.
11.0	**GUARANTEE**	Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this 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 Purchaser up to a period of 12 months from the date of commissioning or 18 months from the date of last supplies made under the contract whichever is earlier, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Purchaser, failing which the Purchaser will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the Purchaser's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Purchaser.
12.0	**PACKING**	Bidder shall ensure that the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.
13.0	**TENDER SAMPLE**	Not Applicable
14.0	**TRAINING**	Not Applicable
15.0	**QUALITY CONTROL**	The bidder shall have a prove track of not less than 10 years in GI earth Pipe manufacturing and servicing in national or international market. The bidder shall submit with the offer Quality assurance plan 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.
16.0	**MINIMUM TESTING FACILITIES**	Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant Indian standards.
17.0	**MANUFACTURING ACTIVITIES**	The successful bidder will have to 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. This bar chart will have to be submitted within 15 days from the release of the order.
18.0	**SPARES ACCESSORIES AND TOOLS**	Not Applicable
19.0	**DRAWINGS AND DOCUMENTS**	Constructional drawings are attached as annexure-I, annexure-II, annexure-III should be followed for fabrication. Following documents shall be prepared based on TATAPOWER-CODL specifications and statutory requirements with complete BOM and shall be submitted with the bid: a) Completely filled in Technical Particulars. b) General description of the equipment and all components including brochures. c) Bill of Material d) Type test Certificates e) Experience List. After award of order Soft of all the drawing, GTP, test certificates shall be submitted for the final approval of the same to the purchaser. Following Drawings/Documents shall be submitted after the award of the contract:

Sl. No	Description	For Approval	For Review Information	Final Submission
1	General Technical Parameters	√		√
2	Manual/Catalogues/drawings for all components.		√	
3	Technical details and test certificates of the component.		√	√
4	Instructions for use		√	√
5	Transport/shipping dimension drawing		√	√
6	QA & QC Plan	√	√	√
7	Routine, Acceptance and Type test Certificates	√	√	√

All the Documents and Drawings shall be in English Language.

20.0	**GUARANTEED TECHNICAL PARTICULARS**	Clause wise compliance shall be provided by bidders

21.0	**SCHEDULE OF DEVIATIONS**	**(TO BE ENCLOSED WITH THE 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 TATA POWER-CODL's specifications:

S.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

CONTENTS

1. Scope of work
2. Standards
3. Climatic conditions
4. Rolled steel joists
5. 150x150mm rs joists
6. Applicable tolerances
7. Embossing on each RS joist
8. Chemical properties
9. Mechanical properties
10. Guaranteed Technical Particulars

TECHNICAL SPECIFICATION OF 11 &1 3 mtr, R.S Joist Poles

1.0 Scope Of Work:

This specification covers design, manufacture, testing and supply of 150mm x 150mm GI RS Joist 11 Meter.&13 Meter long having unit weight of 30.6Kg & 34.6Kg Per Meter.respectively

Thickness of the web shall be 8.4 mm for 11mtr pole & 11.8 mm for 13mtr pole respectively.. All steel structures including RS joist for Line & Outdoor structures in Substations shall be Galvanized type.

150x150mm RS joist			
1	150 x 150 mm R.S. Joist length:-11 mtr, 30.6kg/mtr	MT	0.3366
2	150 x 150 mm R.S. Joist length:-13 mtr, 34.6kg/mtr	MT	0.4498

Applicable Standards:

This specification covers the manufacturing, testing before dispatch and delivery of above R.S Joists.

2.0 Standards:

The RS JOISTS shall comply with the requirements of latest issue of IS – 2062 Gr – A except where specified otherwise.

3.0 Climatic Conditions :

Please refer chapter E3 of Technical Specification on climatic conditions.

4.0 Rolled Steel Joists

RSJ DESIGNATION	**150 x 150 mm ISHB**	
Length of Joist in Mtr with +100mm/- 0%	11mtr	13mtr
Weight kg/m with±2.5% Tolerance	30.6	34.6
Sectional Area (cm)	39	44.1

Depth(D) of Section (mm) with +3.0mm/ -2.0mm Tolerance as per IS 1852-1985	150.00	150.00
Width (B)of Flange (mm) with ±2.5mm Tolerance for116 x100mm ISMB & ±4.0mm Tolerance for 150 x 150 mm ISHB IS 1852-1985	150.00	150.00
Thickness of Flange (Tf) (mm) with±1 .5mm Tolerance	9.00	9.00
Thickness of Web(Tw) (mm) with±1 .0mm Tolerance	8.4	11.8
Corner Radius of fillet or root (R1) (mm)	8.00	8.00
Corner Radius of Tow (R2) (mm)	4.00	4.00
Moment of Inertia Ixx (cm) Iyy (cm)	 1540 460.00	 1640.00 495.00
Radius of Gyration (cm) Rxx Ryy	 6.29 3.44	 6.09 3.35
Flange Slope(a) in Degree	94.0	94.0
Tolerance in Dimension	As per IS:1852	As per IS:1852

	TATA POWER CENTRAL ODISHA LIMITED		
	TECHNICAL SPECIFICATION		
Document Title	**TECHNICAL SPECIFICATIONS OF 150X150mm Joist Poles**		
Document No.	EN		Eff. Date: 31.07.2020
Revision No.	00		Page 4 of 20
Prepared By: Rajeeva Tripathy	Reviewed By:	Approved By:	Issued By :

4.1'Dimensions and Properties
4.2 MECHANICAL PROPERTIES:

Tensile Test :	Requirement as perIS:2062/ 1999 Grade-A
Yeild Stress(MPa)	Min250
Tensile Strength(MPa)	Min410
Lo=(5.65ISo)Elongation%	Min23
Bend Test	Shall not Crack

4.3. CHEMICAL PROPERTIES:

Chemical Composition	Requirement as perIS:2062/ 1999 Grade-A	Permissible variation over the Specified Limit,Percent,Max
Grade		
Chemical Name		
Carbon(%Max.)	0.23	0.02
Manganese(%Max.)	1.5	0.05
Sulphur(%Max.)	0.050	0.005
Phosphorous(%Max.)	0.050	0.005
Silicon(%Max.)	0.40	0.03
Carbon Equivalent(%Max.)	0.42	-
De-oxidation Mode	Semi-killed or killed	-
Supply condition	As rolled	-

4.4. However, In case of any discrepancy between the above data & the relevant ISS, the values indicated in the IS shall prevail.

4.5. The Acceptance Tests shall be Carried out as per Relevant ISS.

5.0.150x150mm RS Joists:

RS Joists of Specific Weight 30.6kg/mtr with length of pole being 11 mtr pole weighing 336.6Kg or Specific Weight 34.6kg/mtr with length of pole being 13 mtr weighing 449.8Kg respectively for specified number of poles with specified weight in MT as given in the NIT table given above shall have to be supplied as per IS:2062;2006 Grade"A" , IS:808;1989/2001, IS1608:1995 & IS:12779-1989 and their latest amendment if any complying the required Dimension, Weight, Chemical & Mechanical properties confirming to the relevant IS, as per the Tolerrance given Below.

6.0 APPLICABLETOLLERANCES:

1. Length of each pole = + 100mm / - 0 % As per relevant IS: 12779- 1989(with proportionate change in no of Poles)

2. Specific Weight of RS Joists = ±2.5% As per relevant IS: 1852/1 985

3. Weight for whole lot of supply for all categories = ±3.0% As per relevant IS: 12779-1989 for both type of RS Joists.

7.0. EMBOSSING ON EACH R.S JOIST :

Following distinct non-erasable embossing is to be made on each R.S Joists a) Name & Logo of the Manufacturer.
b) B.I.S Logo (ISI Mark) if applicable.
c) Size of the R.S Joists

8.Mechanical Properties :

Tensile Test :	Requirement as perIS:2062/ 1999 Grade-A	Manufacturer's Data
Yeild Stress(MPa)	Min250	
Tensile Strength(MPa)	Min410	
Lo=(5.65ISo)Elongation%	Min23	
Bend Test	Shall not Crack	

9. **Chemical Properties :**

Chemical Composition	Requirement as perIS:2062/ 1999 Grade-A	Permissible variation over the Specified Limit,Percent,Max	Manufacturer's Data
Grade			
Chemical Name			
Carbon(%Max.)	0.23	0.02	
Manganese(%Max.)	1.5	0.05	
Sulphur(%Max.)	0.050	0.005	
Phosphorous(%Max.)	0.050	0.005	
Silicon(%Max.)	0.40	0.03	
Carbon Equivalent(%Max.)	0.42	-	
De-oxidation Mode	Semi-killed or killed	-	
Supply condition	As rolled	-	

However, In case of any discrepancy between the above data & the relevant ISS, the values indicated in the IS shall prevail.
The Acceptance Tests shall be Carried out as per Relevant ISS.
The RS Joists shall be manufactured confirming to the relevant IS with Manufacturer's name/logo & B.I.S Logo if applicable embossed on it.
Joints (6mtr + 5 mtr) , (7mtr + 4mtr), (6mtr + 7 mtr), (8mtr + 5mtr) are permissible. Jointing is to be done through nuts & bolts by using plates as per the drawings uploaded.

10.0 GUARANTEED TECHNICAL PARTICULARS:

GTP for RS Joists of sizes 150mmX150mm is furnished at chapter- **E16** of this T.S.
Bidders are requested to submit the GTP as per the format only

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Guaranteed Technical Particulars:

Sr No	Parameter	TPCODL Requirement		
1	2	3		
	Description	**Parameter (Unit)**	**Joist (150x150) 11Mtr**	**Joist (150x150)13Mtr**
1	Type of Steel	MS	MS	MS
2	Grade	E250	E250 Fe410WA	E250 Fe410WA
3	Steel Standard	IS	IS:2062 (Gr.-A),808	IS:2062 (Gr.-A),808
4	Section (D x B)	mm	150 x150	150 x150
5	Thickness (T x t)	mm	9 & 8.4	9 & 11.8
6	Radius (R_1 & R_2)	Dig	8 & 4	8 & 4
7	Moment of Intertia Ixx (cm^4) Iyy (cm^4)	cm^4	 1540 460	 1640 495
8	Radius og Gyration (cm) Rxx Ryy	cm	 6.29 3.44	 6.09 3.35
9	Yield Stress	N/sq.mm	Min250 N/mm^2	250 N/mm^2
10	Tensile Strength	N/sq.mm	Min410 N/mm^2	410 N/mm^2
11	Dimension Tolerance	±	As per IS:1852 & 12779	As per IS:1852 & 12779
12	Galvanizing Standard	IS	2629 & 2633	2629 & 2633
13	Zinc Coating	gms/sq.mtr	610	610
14	Uniformity	Withstand	Six Dips in Standard precede test	Six Dips in Standard precede test
15	Weight kg/m with±2.5% Tolerance	Kg	30.6	34.6
16	Sectional Area (cm2)	cm^2	39	44.1
17	Cutting length Tolerance As per IS 12779/1989	mm		=100 -0
18	Fabrication	One Hole 18Ø at (1) 1800 mm from root level for Earthing. (2) 100 & 200mm from top.		
19	Overall specifications as per IS:800 /2007			

Technical Specification

for

25 x 3 GI Flat for Earthing

TP Central Odisha Distribution Limited.
Network Engineering Group
2nd Floor, IDCO Tower
Janpath, Bhubaneswar- 751022

Rev No.	Description	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R0	Specification for 25 x 3 GI Flat for Earthing	Suchismita Nayak	Niranjan Khuntia	Pourush Garg
		05/08/2020	05/08/2020	05/08/2020

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1.0 SCOPE

2.0 APPLICABLE STANDARDS

3.0 GENERAL TECHNICAL REQUIREMENTS

4.0 INSPECTION & REJECTION

Rev No.	Description	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R0	Specification for 25 x 3 GI Flat for Earthing	Suchismita Nayak	Niranjan Khuntia	Pourush Garg
		05/08/2020	05/08/2020	05/08/2020

1. SCOPE:

The specification provides for design, manufacturing, testing before dispatch for Hot dip Galvanized flats of size 25X3 mm.

2. APPLICABLE STANDARDS:

MS flat shall conform to IS 2062 & its latest amendments for steel & Galvanization as per IS 4759 & its Latest amendments.

3. GENERAL TECHNICAL REQUIREMENTS:

The flat shall be coated with Zn 98 Zinc grade.

The minimum Zinc coating shall be 610 gm/sqm.

4. INSPECTION & REJECTION:

a) The representative of TPCODL shall pick up samples at random from the GI Flats offered for carrying out routine tests as per specified IS.

b) The representative shall make visual inspection on each & every GI flats.

c) The purchaser reserves the right to reject on inspection after the same is received at destination.

Sl no	Particulars	Bidders Offer
1	Location of factory or place of manufacture	
2	Maker's name,Address & country	
3	Size of G.I. Flat	25*3 mm
4	Standard length in Mtr	5 TO 13 METER
5	Glavanisation Process	IS2062, GRADE A
6	Galvanisation thickness	610 gm/m2
7	Galvanisation tests to be conducted	

Rev No.	Description	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R0	Specification for 25 x 3 GI Flat for Earthing	Suchismita Nayak	Niranjan Khuntia	Pourush Garg
		05/08/2020	05/08/2020	05/08/2020

Technical Specification

For

33KV Disc Insulator

TP Central Odisha Distribution Limited.
Network Engineering Group
2nd Floor, IDCO Tower
Janpath, Bhubaneswar- 751022

Rev No.	Description	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R0	Specification for 33KV Disc Insulator	Suchismita Nayak	Niranjan Khuntia	Pourush Garg
		05/08/2020	05/08/2020	05/08/2020

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TECHNICAL SPECIFICATION OF 90KN (B&S) DISC INSULATOR & TECHNICAL SPECIFICATION OF 45KN (B&S) DISC INSULATOR

SCOPE:

This specification provides for design, manufacture, engineering, inspection and testing before dispatch packing and delivery FOR (destination) for Indian manufacturers of disc. Insulators as per technical requirements furnished in this specification.

These insulators are to be used in suspension and tension insulators strings for the suspension and anchoring of the bus-bar conductors.

Following is the list of documents constituting this package.

(i) Technical specification.
(ii) Technical data sheet.
(iii) Drawings of insulators

All the above volumes along with amendments there of shall be read and interpreted together. However, in case of a contradiction between the —Technical Specification and any other volume, the provisions of this volume will prevail.

The insulators shall conform in all respects to high standards of engineering, design workmanship and latest revisions of relevant standards at the time of offer and purchaser shall have the power to reject any work or material which in his judgment, is not in full accordance therewith.

APPLICABLE STANDARDS:

Except as modified in this specification, the disc insulators shall conform to the following Indian Standards, which shall mean latest revisions and amendments. Equivalent International and Internally recognized standards to which some of these standards generally correspond are also listed below.

Sl. No.	Indian Standard	Title.	International Standard
1	IS: 206	Method for Chemical Analysis of Slab Zinc	
2	IS: 209	Specification for Zinc.	BS: 3436
3	IS: 731	Porcelain insulators for overhead power lines with a normal voltage greater than 1000V	BS: 137(I&II); IEC 274 IEC 383
4	IS: 2071 Part-(I) Part-(II) Part-(III)	Method of High Voltage Testing	
5	IS: 2121	Specification of Conductors and Earth	

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	(Part-I)	wire Accessories for Overhead Power lines. Armour Rods, Binding wires and tapes for conductor.	
6	IS: 2486	Specification for Insulator fittings for overhead power lines with a nominal voltage greater than 1000V.	
	Part – I	General Requirement and Tests.	BS: 3288
	Part – II	Dimensional Requirements.	IEC: 120
	Part – III	Locking devices.	IEC: 372
7	IS: 2629	Recommended practice for Hot Dip Galvanisation for iron and steel.	
8	IS: 2633.	Testing for Uniformity of Coating of Zinc coated articles	
9	IS: 3138	Hexagonal Bolts & Nuts.	ISO/R 947 & ISO/R272
10	IS: 3188	Dimensions for Disc Insulators.	IEC: 305
11	IS: 4218	Metric Screw Threads	ISO/R 681969 R 261963, R 262-1969 & R965-1969
12	IS: 6745	Determination of weight of zinc coating on zinc coated iron and steel articles.	
13	IS: 8263	Methods of RIV Test of HV insulators.	IEC 437 NEMA Publication No.107/1964 CISPR
14	IS: 8269	Methods for switching impulse test on HV insulators.	IEC: 506
15		Thermal mechanical performance test and mechanical performance test on string insulator units.	IEC: 575
16	IEC	Long Rod Insulators	IEC-433

PRINCIPAL PARAMETERS.

DETAILS OF DISC INSULATORS:

The Insulator strings shall consist of standard discs for use in three phases, 50 Hz 33/11KV S/S, 33 KV & 11KV Lines of TPCODL in a moderately polluted atmosphere. The discs shall be cap and pin, ball and socket type, radio interference and have characteristics as shown in Table-I and all ferrous parts shall be hot dip galvanized as per the latest edition of IS 2629. The zinc to be used for making sleeves shall be 99.95 % pure.

The size of disc insulator, minimum creepage distance the number to be used in different type of strings, their electromechanical strength and mechanical strength of insulator string along with hardware shall be as follows:

Sl. No	Type of String.	Size of disc. Insulator (mm)	Minimum Creepage distance of each disc(mm)	No. of standard discs 33KV	Electro-mechanical strength of insulator string fittings (KN)
1	Single suspension	255x145	430	1x3	70KN/90KN Antifog Insulator
2	Double suspension	do	do	2x3	70KN/90KN Antifog Insulator
3	Single Tension	280x170	320	1x4	70KN/90KN Normal Insulator
4	Double Tension	-do-	-do-	2x4	70KN/90KN Normal Insulator

SPECIFICATION DRAWINGS:

The specification in respect of the disc insulators are described. These specification for information and guidance of the Bidder only. The drawings to be furnished by the supplier shall be as per his own design and manufacture and in line with the specification.

GENERAL TECHNICAL REQUIREMENTS:

Porcelain:

The porcelain used in the manufacture of the shells shall be ivory white nonporous of high dielectric, mechanical and thermal strength, free from internal stresses blisters, laminations, voids, forgone matter imperfections or other defects which might render it in any way unusable for insulator shells. Porcelain shall

remain unaffected by climatic conditions ozone, acid, alkalis, zinc or dust. The manufacturing shall be by the wet process and impervious character obtained by through verification.

The insulator shall be made of highest grade, dense, homogeneous, wet-process porcelain, completely and uniformly vitrified throughout to produce uniform mechanical and electrical strength and long life service. The porcelain shall be free from warping, roughness, cracks, blisters, laminations, projecting points foreign particles and other defects, except those within the limits of standard accepted practice. Surfaces and grooves shall be shaped for easy cleaning. Shells shall be substantially symmetrical.

Porcelain glaze:

Surface to come in contact with cement shall be made rough by stand glazing. All other exposed surfaces shall be glazed with ceramic materials having the same temperature coefficient of expansion as that of the insulator shell. The thickness of the glaze shall be uniform throughout and the colour of the glaze shall be brown. The Glaze shall have a visible luster and smooth on surface and be capable of satisfactory performance under extreme tropical climatic weather conditions and prevent ageing of the porcelain. The glaze shall remain under compression on the porcelain body throughout the working temperature range.

METAL PARTS:

(i) Cap and Ball Pins:
Ball pins shall be made with drop forged steel caps with malleable cast iron. They shall be in one single piece and duly hot dip galvanized. They shall not contain parts or pieces joined together welded, shrink fitted or by any other process from more than one piece of materials. The pins shall be of high tensile steel, drop forged and heat-treated. The caps shall be cast with good quality black heart malleable cast iron and annealed. Galvanizing shall be by the hot dip process with a heavy coating of zinc of very high purity. The bidder shall specify the grade composition and mechanical properties of steel used for caps and pins. The cap and pin shall be of such design that it will not yield or distort under the specified mechanical load in such a manner as to change the relative spacing of the insulators or add other stresses to the shells. The insulator caps shall be of the socket type provided with nonferrous metal or stainless steel cotter pins and shall provide positive locking of the coupling.

(ii) Security Clips:
The security clips shall be made of phosphor bronze or of stainless steel.

FILLER MATERIAL:
Cement to be used, as a filler material be quick setting, fast curing Portland cement. It shall not cause fracture by expansion or loosening by contraction. Cement shall not react chemically with metal parts in contact with it and its thickness shall be as small and as uniform as possible.

MATERIALS DESIGN AND WORKMANSHIP:

GENERAL:
All raw materials to be used in the manufacture of these insulators shall be subject to strict raw material quality control and to stage testing/ quality control during manufacturing stage to ensure the quality of the final end product. Manufacturing shall conform to the best engineering practices adopted in the field of extra high voltage transmission. Bidders shall therefore offer insulators as are guaranteed by them for satisfactory performance on Transmission lines.

The design, manufacturing process and material control at various stages be such as to give maximum working load, highest mobility, best resistance to corrosion, good finish elimination of sharp edges and corners to limit corona and radio interference voltages.

INSULATOR SHELL:
The design of the insulator shells shall be such that stresses due to expansion and contraction in any part of the insulator shall not lead to deterioration. Shells with cracks shall be eliminated by temperature cycle test followed by mallet test. Shells shall be dried under controlled conditions of humidity and temperature.

METAL PARTS:
i. The twin ball pin and cap shall be designed to transmit the mechanical stress to the shell by compression and develop uniform mechanical strength in the insulator. The cap shall be circular with the inner and outer surfaces concentric and of such design that it will not yield or distort under loaded conditions. The head portion of the pinball shall be suitably designed so that when the insulator is under tension the stresses are uniformly distributed over the pinhole portion of the shell. The pinball shall move freely in the cap socket either during assembly of a string or during erection of a string or when a string is placed in position. ii. Metal caps shall be free from cracks, seams, shrinks, air holes, blowholes and rough edges. All metal surfaces shall be perfectly smooth with no projecting part or irregularities, which may cause corona. All load bearing surfaces shall be smooth and uniform so as to distribute the loading stress uniformly. Pins shall not show any microscopically visible cracks, inclusions and voids.

GALVANIZING:
All ferrous parts, shall be hot dip galvanized in accordance with IS: 2629. The zinc to be used for galvanizing shall conform to grade Zn 99.5 as per IS: 209. The zinc coating shall be uniform, smoothly adherent, reasonably light, continuous and free from impurities such as flux, ash, rust stains, bulky white deposits and blisters. Before ball fittings are galvanized, all die flashing on the shank and on the bearing surface of the ball shall be carefully removed without reducing the designed dimensional requirements.

CEMENTING:
The insulator design shall. Be such that the insulating medium shall not directly engaged with hard metal. The surface of porcelain and coated with resilient paint to offset the effect of difference in thermal expansions of these materials. High quality Portland cement shall be used for cementing the porcelain to the cap & pin.

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SECURITY CLIPS (LOCKING DEVICES)

The security clips to be used as locking device for ball and socket coupling shall be _R'shaped hump type to provide for positive locking of the coupling as per IS: 2486 (Part-IV). The legs of the security clips shall allow for spreading after installation to prevent complete withdrawal from the socket. The locking device shall resilient corrosion resistant and of sufficient mechanical strength. There shall be no possibility of the locking device to be displaced or be capable of rotation, which placed in position, and under no circumstances shall it allow separation of insulator units and fittings. _W'type security clips are also acceptable. The hole for the security clip shall be counter sunk and the clip shall be of such design that the eye of the clip may be engaged by a hot line clip puller to provide for disengagement under energized conditions. The force required for pulling the clip into its unlocked positions shall not be less than 50 N (5 kg.) or more than 500 N (50 kgs.).

MARKING:

Each insulator shall have the rated combined mechanical and electrical strength marked clearly on the porcelain surface. Each insulator shall also bear symbols identifying the manufacturer, month, and year of manufacture. Marking on porcelain shall be printed, not impressed, and shall be applied before firing.

BALL AND SOCKET DESIGNATION:

The dimensions of the ball and sockets for 45 and 70 KN discs shall be of 16 mm and for 120 KN and 160 KN discs shall be of 20 mm designation in accordance with the standard dimensions stated in IS: 2486 (Part-II).

DIMENSIONAL TOLERANCE OF INSULATOR DISCS:

It shall be ensured that the dimensions of the disc insulators are within the limits specified below:

a) Diameter of Disc (mm)	Standard	Maximum	Minimum
45 KN Disc	255	266	244
70 KN Disc	280	293	267
b)Ball to Ball spacing Between Discs (mm)	Standard	Maximum	Minimum
45 KN Disc	145	149	141
70 KN Disc	170	175	165

INTERCHANGEABILITY:

The insulators inclusive of the ball and socket fittings shall be of standard design suitable for use with hardware fittings of any make conforming to relevant Indian Standards.

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FREEDOM FROM DEFECTS:

Insulators shall have none of the following defects:

1) Ball pin shake.
2) Cementing defects near the pin like small blow holes, small hair cracks lumps etc.
3) Sand fall defects on the surface of the insulator.

INSULATOR STRINGS:

TYPE AND RATING:

The insulator strings shall be formed with standard discs described in this specification for use on 3 phases 33 KV 50 Hz effectively earthed systems in an atmosphere with pollution level as indicated in project synopsis. Suspension insulator strings for use with suspension/tangent supports are to be fitted with discs 70 KN EMS rating while tension insulator strings for use with Anchor / Tension towers are to be fitted with discs of 90 KN EMS level rating.

STRING SIZE:

The sizes of the disc insulator, the number to be used in different types of strings, their electro- mechanical strength and minimum nominal creep age distance shall be as given in this specification

Insulator units after assembly shall be concentric and coaxial within limits as permitted by Indian Standards.

The strings design shall be such that when units are coupled together there shall be contact between the shell of one unit and metal of the adjacent unit.

DIMENSIONAL TOLERANCE OF INSULATORS DISCS

It shall be ensured that the dimensions of the long rod insulators are within the limits as per relevant IEC/ISS.

TESTS (FOR DISC INSULATORS) :

The following tests shall be carried out on the insulator string and disc insulators.

TYPE TEST:

This shall mean those tests, which are to be carried out to prove the design, process of manufacture and general conformity of the material and product with the intents of this specification. These tests shall be conducted on a representative number of samples prior to commencement of commercial production. The Bidder shall indicate his schedule for carrying out these tests.

ACCEPTANCE TESTS:

This shall mean these tests, which are to be carried out on samples taken from each lot offered for predispatch inspection for the purpose of acceptance of the lot.

ROUTINE TESTS:

This shall mean those tests, which are to be carried out on each insulator to check the requirements, which are likely to vary during production.

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TESTS DURING MANUFACTURE:

Stage tests during manufacture shall mean those tests, which are to be carried out during the process of manufacture to ensure quality control such that the end product is of the designed quality conforming to the intent of this specification.

TEST VALUE:

For all type and acceptance tests the acceptance values shall be the value guaranteed by the bidder in the guaranteed technical particulars of the acceptance value specified in this specification of the relevant standard whichever is more stringent for that particular test.

TEST PROCEDURE AND SAMPLING NORMS:

The norms and procedure of sampling for the above tests shall be as per the relevant Indian Standard or the internationally accepted standards. This will be discussed and mutually agreed to between the supplier and purchaser before placement of order. The standards and normal according to which these tests are to be carried out are listed against each test. Where a particular test is a specific requirement of this specification, the norms land procedure for the same shall be as mutually agreed between the supplier and the purchaser in the quality assurance programme.

TYPE, ROUTINE & ACCEPTANCE TESTS:

The following type test shall be conducted on a suitable number of individual unit components, materials or complete strings

1. On complete insulator string with hardware fittings Standards BS:137(Part-I) IEC: 383
a) Power frequency voltage withstand test with corona control rings and under wet condition.
b) Impulse voltage withstand test under dry condition.
c) Mechanical strength test. As per this specification.

2. On Insulators:

a) Verification of dimensions. :IS: 731
b) Thermal mechanical performance test: : IEC:575
c) Power frequency voltage withstand and flashover
i) dry ii) wet :BS:173
d) Impulse voltage withstand flashover test (dry) : IEC: 383
e) Visible discharge test (dry) : IS:731

All the type tests given under clause No.5.14 above shall be conducted on single suspension and Double Tension insulator string along with hardware fittings.

3. ACCEPTANCE TESTS:

For insulator:
a) Visual examination : IS:731

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b) Verification of dimensions : IS:731
c) Temperature cycle test. : IS:731
d) Galvanizing test : IS:731
e) Mechanical performance tes : IEC:575
f) Test on locking device for ball and socket coupling :IEC-372
g) Eccentricity test.
h) Electro-mechanical strength test : As per this specification.
i) Puncture test. : IS:731
j) Porosity test. : IS:731

4. ROUTINE TESTS:

For insulators:
a) Visual inspection. : IS:731
b) Mechanical routine test.
c) Electrical routine test. : IEC:383

ADDITIONAL TESTS:

The purchaser reserves the right for carrying out any other tests of a reasonable nature at the works of the supplier/ laboratory or at any other recognized laboratory/ research institute in addition to the above mentioned type, acceptance and routine tests at the cost of the purchaser to satisfy that the material complies with the intent of this specification.

CO-ORDINATION FOR TESTING:

For insulator strings, the supplier shall arrange to conduct testing of their disc insulators with the hardware fittings to be supplied to the purchaser by other suppliers. The supplier is also required to guarantee overall satisfactory performance of the disc insulator with the hardware fittings.

NOTE:

In respect of electrical tests on a complete string consisting of insulators and hardware guarantee of values of responsibility of testing shall be with hardware manufacturer of RIV corona and voltage distribution test and with insulator manufacturer for all other tests.

TEST CHARGES AND TEST SCHEDULE:

TYPE TEST:

The insulator offered shall be fully type tested as per this specification. In case the equipment of the type and design offered, has already been type tested in an independent test laboratory. The bidder shall furnish four sets of type test reports along with the offer. These tests must not have been conducted earlier than five years. The purchaser reserves the right to demand repetition of some or all type tests in the presence of purchasers' carrying representative. For this purpose the bidder may quote unitrates for carrying out each type test. These prices shall be taken into consideration for bid evaluation. For any change in the design/type already type tested and the design/type offered against this specification, purchaser reserves the right to demand repetition of tests without any extra cost.

ACCEPTANCE AND ROUTINE TEST:

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All acceptance and routine tests as stipulated herein shall be carried out by the supplier in the presence of purchaser's representative.

Immediately after finalization of the programme of type/ acceptance/ routine testing, the supplier shall give sufficient advance intimation to the purchaser to enable him to depute his representative for witnessing the tests.

For type tests involving tests on a complete insulator string with hardware fittings, the purchaser will advice the supplier of the hardware fittings to provide the necessary fittings to the place of the test.

In case of failure of the complete string in any type tests, the supplier whose product has failed in the tests shall get the tests repeated at his cost. In case of any dispute, assessment of the purchaser as to the items that has caused the failure in any of the type tests shall be final and binding.

VOLTAGE DISTRIBUTION TEST:

a) The voltage across each insulator unit shall be measured by sphere gap method. The result obtained shall be converted into percentage and proportionate correction be applied as to give a total of 100% distribution.
b) The complete insulator string along with its hardware fitting excluding arcing horn corona controlling/grading ring and suspension assembly/dead end assembly shall be subject to a load equal to 50% of the specified minimum ultimate tensile strength (UTS) which shall be increased already rate to 68% of the minimum UTS specified. The load shall be held for five minutes and then removed. After removal of the load, the string components shall not show any visual deformation and it shall be possible to disassemble them by hand,. Hand tools may be used to remove cotter pins and loosen the nuts initially. The string shall then be reassembled and loaded to 50% of UTS and the load shall be further increased at a steady rate till the specified minimum UTS and held for one minute. No fracture should occur during this period. The applied load shall then be increased until the failing loads reached and the value recorded.

VIBRATION TEST:

The suspension string shall be tested in suspension mode, and tension string in tension mode itself in laboratory span of minimum 30 meters. In the case of suspensions string a load equal to 600 Kg. shall be applied along with the axis of the suspensions string by means of turn buckle. The insulators string along with hardware fittings and two sub conductors throughout the duration of the test vibration dampers shall not be used on the test span. Both the sub- conductors shall be vertically vibrated simultaneously at one of the resonance frequencies of the insulator string (more than 10Hz) by means of vibration inducing equipment. The amplitude of vibration at the antipode point nearest to the string shall be measured and the same shall not be less than 120.4 being the frequency of vibration. The insulator strings shall be vibrated for five million cycles then rotated by 90 deg and again vibrated for 5 million cycles without any failure, after the test, the disc insulators shall be examined for looseness of pins and cap or any crack in the cement. The hardware fittings shall be examined to fatigue fatter and mechanical strength test. There shall be no deterioration of properties of hardware components and disc insulators after the vibration test. The disc insulators shall be subjected to the following tests as per relevant standards.

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Test.	Percentage of disc to be tested
a)Temperature cycle test followed by Mechanical performance test.	60
b)Puncture test (for porcelain insulator only)	40

INSPECTION:

i. Purchaser and its representative shall at all times be entitled to have access to the works and to all places of manufacturer where insulators are manufactured and the supplier shall afford all facilities to them for unrestricted inspection of the works, inspection of materials, inspection of manufacturing process of insulators and for conducting necessary tests as specified herein.

ii. The supplier shall keep the purchaser informed in advance of the time of starting and of progress of manufacture of insulators in its various stages so that arrangements could be made for inspection.

iii.No material shall be dispatched from its point of manufacture unless the materials has been satisfactorily inspected and tested.

iv. The acceptance of any quantity of insulators shall in no way relieve the supplier of his responsibility for meeting all the requirement of this specification and shall not prevent subsequent rejection, if such insulators are later found to be defective.

IDENTIFICATION MARKING:

a) Each unit of insulator shall be legibly and indelibly marked with the trade mark of the supplier, the year of manufacture, the guaranteed combined mechanical and electrical strength in kilo Newton abbreviated by ‗KN' to facilitate easy identification and proper use.

b) The marking shall be on porcelain for porcelain insulators. The marking shall be printed and not impressed and the same shall be applied before firing.

QUALITY ASSURANCE PLAN:

The bidder here under shall invariably furnish following information along with his offer, failing which the offer shall be liable for rejection.

a. Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw material are tested, list of tests normally carried out on raw materials in presence of bidder's representative, copies of test certificates.
b. Information and copies of test certificates as in (i) above in respect of bought out materials.
c. List of manufacturing facilities available.
d. Level of automation achieved and lists of area where manual processing exists.

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e. List of areas in manufacturing process, where stage inspections are normally carried out in quality control and details of such tests and inspection.
f. Special features provided in the equipment to make it maintenance free.
g. List of testing equipping available with the bidder for final testing of equipment specified and test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out in schedule of deviations from specified test requirements.

The supplier shall within 15 days of placement of order submit the following information to the owner.
List of raw material and the names of sub-suppliers selected from those furnished along with the offer.

CHEMICAL ANALYSIS OF ZINC USED FOR GALVANIZING.

Samples taken from the zinc ingot shall be chemically analyzed as per IS: 209. The purity of zinc shall not be less than 99.95%.

TESTS FOR FORGINGS:

The chemical analysis hardness tests and magnetic particle inspection for forgings will be as per the internationally recognized procedures for these tests. The sampling will be based on heat number and heat treatment batch. The details regarding test will be as discussed and mutually agreed to by the supplier and purchaser in quality assurance programme.

TESTS ON CASTING:

The chemical analysis mechanical and metallographic tests and magnetic particle inspection for castings will be as per the internationally recognized procedures for these tests. The samplings will be based on heat number and heat treatment batch. The details regarding test will be as discussed and mutually agreed to by the supplier and purchaser in quality assurance programme.

HYDRAULIC INTERNAL PRESSURE TEST ON SHELLS:

The test shall be earned out on 100% shells before assembly. The details regarding test will be as discussed and mutually agreed to by the suppliers and purchaser in Quality Assurance Programme.

THERMAL MECHANICAL PERFORMANCE TEST:

The thermal mechanical performance test shall be carried out on minimum 15 number of disc insulators units as per the procedure given in IEC 575. The performance of the insulator unit shall be determined by the same standard.

ECCENTRICITY TEST:

The insulator shall be vertically mounted on a future using dummy pin and socket. A vertical scale with horizontal slider shall be used for the axial run out. The pointer shall be positioned in contact with the bottom of the outermost petticoat of the disc. The disc insulators shall be rotated with reference to the fixture and the slider shall be allowed to move up and down on the scale but always maintaining contact with the bottom of the outer most petticoats. After one full rotation of the disc the maximum and minimum position the slider has reached on the scale can be found out. Difference between the above two readings shall satisfy the guaranteed value for axial run out.

Similarly using a horizontal scale with veridical slider the radial run out shall be measured. The slider shall be positioned on the scale to establish contact with the circumstance of the disc insulator and disc insulator rotated on its future always maintaining the contact. After one full rotation of the disc the maximum and minimum position the slider has reached on the scale can be found out. Difference between the above two readings shall satisfy the guaranteed value for axial run out.

CRACK DETECTION TEST:

Crack detection test shall be carried out on each ball and pin before assembly of disc unit. The supplier shall maintain complete record of having conducted such tests on each and every piece of ball pin The bidder shall furnish full details of the equipment available with him for crack test and also indicate the test procedure in detail.

DISC INSULATOR (B&S) Type:

Bidder should offer 11KV/33 KV Disc Insulator (B & S type) suitable for overhead power line Conforming to IS:731/1971 (2nd Revision), (Amendments - 6), Reaffirmed – 1991 & Guaranteed Technical Particulars. Type test certificates from CPRI or accredited NABL laboratory should be furnished

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GUARANTEED TECHNICAL PARTICULARS DISC INSULATOR B & S TYPE

Sl. No.	Description	Unit	45KN.	70 KN	Bidder's Offer
1	Manufacture's Name & Address		To be specified by bidder	To be specified by bidder	
2	Type of Insulator		Ball T Socket	Ball T Socket	
3	Size of Ball & Socket		16B	16B	
4	Dimensions				
a)	Disc Diameter	Mm	255	280	
b)	Unit spacing	Mm	145	170	
c)	Creepage distance of single insulator	mm	430	430	
5	Electromechanical strength of single insulator	KN	45	70	
6	Materials of Shell		Porcelain	Porcelain	
7	Dry one minute power frequency withstand	Kv(rms)	80	80	
8	Wet one minute power frequency withstand.	Kv(rms)	45	45	
9	Dry power frequency flashover.	Kv(rms)	85	85	
10	Wet power frequency flashover.	Kv(rms)	50	50	
11	Dry impulse withstand positive & negative.	Kv (Peak)	170	170	
12	Impulse flashover 1.2 x 50 microsecond (Positive)	Kv (Peak)	125	125	
13	Impulse flashover 1 x 50 microsecond (Negative)	Kv (Peak)	125	125	
14	Power frequency puncture voltage	Kv	1.3 times the actual drive flashover	1.3 times the actual drive flashover	

			voltage	voltage	
15	High system voltage.	Kv	36	36	
16	Visible Discharge voltage.	Kv	27	27	
17	Weight/Unit. Kg.		To be specified by bidder	To be specified by bidder	
18	Marking	Each insulator will be legibly marked to show the following			
		(a) Name of the Purchaser :-- TPCODL			
		(b) Name or trademark			
		(c) Month & year of manufacturing			
		(d) Minimum failing load.			

PACKING: -- All insulators shall be packed suitably for easy but rough handling & acceptable for road transport. Where more than one insulator is packed in a crate, separator shall be fixed between the insulators to keep individual insulator in position without movement in the crate. NB- Every insulator should bear the marking of manufacturer's name & Purchaser's name and ISI mark.

Name & Signature of Bidder with seal

Technical Specification

For

33KV Hardware Fittings

TP Central Odisha Distribution Limited.
Network Engineering Group
2nd Floor, IDCO Tower
Janpath, Bhubaneswar- 751022

Rev No.	Description	Prepared By & Date	Checked By & Date	Approved for Issue By & Date
R0	Specification for 33KV Hardware Fittings	Suchismita Nayak	Niranjan Khuntia	Pourush Garg
		05/08/2020	05/08/2020	05/08/2020

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SCOPE:

33 KV Hard Ware fittings Ball and socket 4 bolt type 70 KN , confirming to IS: 2486 (Part-II) latest amendment

Ball & Socket type Hardware fittings(Conversional/ Performed) for B & S type Strain Insulators 70KN.

The hardware fittings (Ball and Socket type) shall be suitable for fixing on 100 mmx50 mm channel cross arms and for accommodation of 100 mm² / 232 mm² Conductor.

The set shall complete with following components

(i) Cross-arms straps with Bolts & Nuts, Brass split and Spring Washer.
(ii) Two numbers forged cotter pins,Brass split pins,Plain washer.
(iii) One number Ball Eye of malleable cast iron
(iv) One number of socket eye complete with security clips made of Phosphor bronze made cut of alluminium alloys-A/6.
(v) Halically formed Dead and Conductor grip having a Pre-fabricate loop to fit into the proved contour of the thimbles on one end and for application over the conductor at the other end for 55 mm²/100mm² conductors.
(vi) Strain clamps shall be suitable for above ACSR / AAAC. The ultimate strength of clamp should not be less than 9200 Kg and Slipping strength shall not be less than 90% of these figures.

The Tension Clamps shall be made out of aluminum alloy and of 4 pair bolted (M-16) type suitable for 232 mm² AAAC –up conductor (In case of lines it will be suitable for 100 mm² /232 mm²) The tension clamps shall not permit slipping or damage to failure of the complete conductor or any part thereof at a load less than 90% of the ultimate strength of conductor. The mechanical efficiency of tension / clamps shall not be affected by method of erection involving come / along or similar clamps or tension stringing operation during or after assembly and erection of tension clamp itself. The tension clamp shall be of a design that will ensure unrestricted flow of current without use of parallel groove clamps. The clamps shall be as light as possible.

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Tests **:**

String insulator fittings shall comply with the following tests as per IS: 2486 (Part.I)

Type Tests:

1. Visual examination test
2. Verification of dimensions
3. Slip strength test
4. Mechanical test
5. Electrical resistance test
6. Heating cycle test
7. Galvanising test.

Acceptance/ Routine Test :

i)Verification of dimensions
ii) Mechanical test
iii) Galvanising test
iv) Visual examination test
v) Routine mechanical test.

Marking :

The caps and clamps shall have marked on them as trade mark & year of manufacturing.

Packing :

All hardware fittings shall be packed in bags or boxes suitable for rough handling. Packing shall be marked with the strength and KV rating.

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Guaranteed Technical Particulars :

The bidders are required to furnish the guaranteed technical particulars duly filed in the proforma along with the bid.

GUARANTEED TECHNICAL PARTICULARS FOR 33 KV H/W FITTINGS (B&S) 70KN

Sl.No.	Description	Specified	Bidders Offer
1	Manufacturer Name & Address	To be specified by Bidder	
2	Standard Specification to which Hard ware Fittings shall confirm.	IS: 2486 (Part-I,II &II)	
3	Ultimate strength	7000 Kg (min.)	
4	Dimensions in accordance with	IS: 2486(Part-II)	
5	Material used and reference to Standard:		
I	Cross arm Strap	G.I as per IS:1570	
II	Ball Eye	Forged Steel IS:2004	
III	Socket Eye	Malleable Cast Iron IS: 2108/1962	
IV	Bolted type tension clamp & its keeper	Aluminium Alloy LM-6, IS: 617	
6	Galvanised conform to	IS 2633 , IS: 4759-1996 & IS: 6747	
7	Weight of Fittings	not less than 2.5 Kg.	
8	Tolerance in dimension if any	+ / - 5%	
9	Manufacturer trade mark to be embossed on the sets	Specified by the Bidder	
10	Specific drawing to be enclosed.	Enclosed	

NB. All ferrous fittings and the parts other than those of stainless steel , shall be galvanized.

Bidder's Signature with Seal

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