

Office of the Chief Engineer (Dist. Special Project Cell)
Maharashtra State Electricity Distribution Co. Ltd.

“Prakashgad”, 4th Floor, Station Road, Bandra (East), Mumbai - 400 051.

Tel. : 022-2658 2340 (P) 022-2647 4211 (O) Fax : 022-2647 6230 Gram : MUMBAIGRID

www.mahadiscom.in

E-mail: ce_dsp@mahadiscom.in

CE/DSPC/66 kV level Elimination/1960 / 33123

Date: 28.10.2010

To,

All Prospective Bidders of
Tender for 66 kV Level Elimination Scheme

Sub: Reply to the Queries raised by various prospective bidders of Tender for 66 kV Level Elimination Scheme during pre-bid meeting held on 21st October, 2010.

Ref: Tender No. CE/ DSPC/ 66 kV level Elimination/ T- 8/10-11

The pre-bid meeting for Tender for 66 kV Level Elimination Scheme has been conducted on dated 21st October, 2010 at “Prakashgad”. The reply to the queries raised by various prospective bidders of Tender for 66 kV Level Elimination Scheme is enclosed herewith as Annexure-I to IX.

Thanking you,

Yours sincerely,

Sd/-

Chief Engineer
(Dist.-SPC)

Copy s.w.r.to:

1. The Director (Projects), MSEDCL Mumbai.
2. The Executive Director (Projects), MSEDCL Mumbai.
3. The Chief General Manager (I/A), MSEDCL Mumbai.

Copy forwarded to:

- 1) M/s L & T ECC Division, Mumbai.
- 2) M/s Jyoti Structures Limited, Mumbai.
- 3) M/s KPTL, Gandhi Nagar, Gujrat.
- 4) M/s Sunil Hitech Eng. Ltd.
- 5) M/s Nagarjuna Construction Company Ltd.

PRE BID CLARIFICATION (PRE BID MEETING HELD ON 21/10/2010)
TENDER FOR 66 KV LEVEL ELIMINATION
Tender No. CE/DSPC/LT CAPS/T-8/10-11

Sr. No.	Volume & Section No.	Clause No.	Bidder Queries	Clarifications of MSEDCL
1)	Vol IV, Section 10		Representative of M/s Jyoti structures Ltd. & M/s Sunil High Tech stated that MSETCL has different specification than MSEDCL, when it comes to work in their premises in such case which specifications should be followed	MSEDCL will strictly adhere to the MSETCL's specifications whenever there is work in the premises of MSETCL.
2)	Vol III, Section 8	5 of Preamble	Representative of M/s L & T ECC Division stated that price variation should be allowed from the day one of the agreement instead of after six months, as mentioned in the tender document.	Suggestion not accepted
3)	Vol V, Section 13	Activity No. 311	Representative of M/s L & T ECC Division & M/s Sunil High Tech stated that the Activity shows only one cable at the railway crossing point, it is recommended to lay two cable along the path for reliability perspective.	Two cable needs to be provided at the railway crossing, the payments for the additional cable will be made as per actuals.
4)	Vol V, Section 13	Schedule 4	Representative of M/s L & T ECC Division, M/s Sunil High Tech & M/s Jyoti structures Ltd. stated that the existing Schedule shows 10 % retention of amount till successful performance and warranty obligations are fulfilled. It is suggested that this 10 % amount shall be released after completion of the work against submission of BG of the equivalent amount.	Suggestion accepted
5)	Vol V, Section 13	Activity No. 308, 312 & 317	Representative of M/s L & T ECC Division pointed out that the Activity No. 308, 312 & 317 has calculation errors and those needs to be rectified	The activities mentioned are corrected and are made available on MSEDCL website
6)	Vol IV, Section 10		Representative of M/s L & T ECC Division & M/s Sunil High Tech pointed out that the technical specification of 5 MVA & 10 MVA Transformers are not provided with the tender documents.	Technical specifications for the 5 MVA & 10 MVA transformers are provided and are made available on MSEDCL website
7)	Vol II, Section 6	14.1.4	Representative of M/s Sunil High Tech & M/s Jyoti structures Ltd. stated that what will be methodology if there is change in the quantities shown in the bidding documents	As per Clause No. 14.1.4 of Section 6 from Volume II of the tender document

Price Schedule Format

Annexure-II

Project : Elimination of 66 KV Level from EHV Sub-Station
 Tender No. CE/DSPC/66 kV level elimination/T-8/10-11

Zone Amaravati / Nagpur / Nagpur U

Schedule 1: Grand Summary

(Bidder to Carry Quoted Prices forward from Schedules 2 and 3)

Schedule Number	Description of Activity	Employer's Estimated Cost (Rs. Lakhs)
2	Civil Works	1426.51
3	Supply and Installation of Plant and Equipment:	--
a.	Part 1: Cost of Material	8482.19
b.	Part 2: Cost of Transportation, Installation, Erection, Commissioning & Guarantee	3140.53
Grand Total (Excluding Taxes)		13049.24
The Taxes chargeable to Employer will be paid as per the rates given below		
1	MVAT @ 4% on Supply of equipment produced in Maharashtra For supply of equipment produced outside Maharashtra * The Contractor has to raise an invoice on MSEDCL charging no tax stating clearly in the invoice "Sales under section 6(2)(b) of the Central Sales Tax Act. 1956-against "C" form.	
2	As per Volume -I, Section I Clause 16.2(b)	
Grand Total & Taxes		0.00
<p>I/ we hereby offer to complete the above described Works contained in the Schedules 2 and 3 together, for the Price of: _____ % (_____ percent) above / below the total tendercost of the Employer's Estimate for a total amount of: Rs. _____ Lakhs (Rupees _____ only), excluding the cost of MVAT & Service Tax.</p> <p>Signature of Bidder: _____</p> <p>Name & Designation: _____</p> <p>Company: _____</p>		

- Notes :-
- 1) The bidder should quote his % rate on the total tender estimated cost. Separate rates should not be quoted against Civil, Material & Services Components.
 - 2) The quoted rate and price must be exclusive of MVAT and Service Tax.
 - 3) Any deviation from the instructions contained in these notes shall make the offer of the bidder as non-responsive.

Price Schedule Format

Annexure-III

Project : Elimination of 66 KV Level from EHV Sub-Station
Tender No. CE/DSPC/66 kV level elimination/T-8/10-11

Zone Amaravati / Nagpur / Nagpur U

Schedule 2: Civil Works

Activity Number	Description of Activity	Unit	Quantity	Employer's Estimate	
				Unit Rate (Rs.)	Total Cost (Rs. Lakhs)
(1)	(2)	(3)	(4)	(5)	(6) = (4) x (5)
201	Supply, erection, testing & commissioning of 33 /11 KV 2 x 10 MVA S/S as specified in relevant tender document.	No	13	4925226.24	640.28
202	Supply, erection, testing & commissioning of 33 /11 KV 1 x 10 MVA S/S as specified in relevant tender document	No	4	4269836.16	170.79
203	Supply, erection, testing & commissioning of 33 /11 KV 2 x 5 MVA S/S as specified in relevant tender document	No	9	4925226.24	443.27
204	Supply, erection, testing & commissioning of 33 /11 KV 1 x 5 MVA S/S as specified in relevant tender document	No	2	4269836.16	85.40
205	Supply, erection, testing & commissioning of 33 /11 KV 2 x 10 MVA Power Transformers as specified in relevant tender document	No	2	2246921.28	44.94
206	Supply, erection, testing & commissioning of 33 /11 KV 1 x 10 MVA Power Transformers as specified in relevant tender document	No	2	655390.08	13.11
207	Supply, erection, testing & commissioning of 11 KV Out Switchgear 2 x (1+3) as specified in relevant tender document	No	2	1436141.12	28.72
Total					1426.51

Price Schedule Format

Annexure-IV

Project : Elimination of 66 KV Level from EHV Sub-Station
Tender No. CE/DSPC/66 kV level elimination/T-8/10-11

Zone Amaravati / Nagpur / Nagpur U

Schedule 3: Supply & Installation of Plant and Equipment

Activity Number	Description of Activity	Unit	Quantity	Employer's Estimate				
				Part 1: Cost of Material		Part 2: Cost of Transportation, Erection, Installation, Commissioning & Guarantee		Total for Supply & Installation
				Unit Rate (Rs.)	Total Cost (Rs. Lakhs)	Unit Rate (Rs.)	Total Cost (Rs. Lakhs)	Total Cost (Rs. Lakhs)
(1)	(2)	(3)	(4)	(5)	(6) = (4) x (5)	(7)	(8) = (4) x (7)	(9) = (6) + (8)
CAPITAL WORKS								
301	Supply, erection, testing & commissioning of 33 /11 KV 2x10 MVA S/S with RSJ structures	No	13	18605191.67	2418.67	6888572.22	895.51	3314.19
302	Supply, erection, testing & commissioning of 33 /11 KV 1x10 MVA S/S with RSJ structures	No	4	9642546.13	385.70	3570152.70	142.81	528.51
303	Supply, erection, testing & commissioning of 33 /11 KV 2x5 MVA S/S with RSJ structures	No	9	12774756.47	1149.73	4729853.58	425.69	1575.41
304	Supply, erection, testing & commissioning of 33 /11 KV 1x5 MVA S/S with RSJ structures	No	2	6710476.02	134.21	2484553.74	49.69	183.90
305	Supply, erection, testing & commissioning of 33 /11 KV 2x10 MVA Power Transformer with 33 Kv Gantry	No	2	14615580.72	292.31	5411418.76	108.23	400.54
306	Supply, erection, testing & commissioning of 33 /11 KV 1x10 MVA Power Transformer with 33 Kv Gantry	No	2	7442740.88	148.85	2755674.81	55.11	203.97
307	Supply, erection, testing & commissioning of 33 KV Overhead line on 13 m RSJ with Panthor Conductor	KM	9	820809.13	73.87	303904.58	27.35	101.22
308	Supply, erection, testing & commissioning of 33 KV Overhead line on 11 m RSJ with Dog Conductor	KM	42	583410.78	245.03	216007.84	90.72	335.76
309	Supply, erection, testing & commissioning of 33 KV Overhead line on 10 M RSJ with Dog Conductor	KM	150	473366.90	710.05	175264.09	262.90	972.95
310	Supply, erection, testing & commissioning for laying of 1KM 33KV, 3C, 300mm 2 XLPE under ground cable.	KM	114	1797590.00	2049.25	665557.70	758.74	2807.99
311	Supply, erection, testing & commissioning for laying of 1KM 33KV, 3C, 300mm 2 XLPE under ground cable for Railway Crossing.	No	4	614591.99	24.58	227552.69	9.10	33.69
312	Supply, erection, testing & commissioning for 33 KV ,Bay with Gantry Structure	No	46	982248.41	451.83	363677.47	167.29	619.13
313	Supply, erection, testing & commissioning for 11KV Outdoor Switchgear 2x(1+3),	No	2	4283629.65	85.67	1586013.88	31.72	117.39
314	Supply, erection, testing & commissioning for 11KV Take off Structure	No	1	584590.60	5.85	216444.67	2.16	8.01
315	Supply, erection, testing & commissioning for 110V Battery Set With Charger	No	3	232942.96	6.99	86247.13	2.59	9.58
316	Supply, erection, testing & commissioning of 11 KV Line on 10 M Long RSJ pole	KM	19	450451.31	85.59	166779.59	31.69	117.27
317	Supply, erection, testing & commissioning of 11 KV Line on 9 M Long RSJ pole	KM	6	342738.88	20.56	126899.07	7.61	28.18
318	Supply, erection, testing & commissioning of 11 KV Under Ground line 300 Sq. MM	Km	10.3	1054690.00	108.63	390498.97	40.22	148.85
319	Supply, erection, testing & commissioning of 11 KV Under Ground line 240 Sq. MM	KM	9	942190.00	84.80	348845.85	31.40	116.19
Grand Total (Capital Works) (Excluding Taxes)					8482.19		3140.53	11622.73

Cost data for 33 KV Line With 11 mtr. RSJ

Sr.No	Particulars	Unit	Qty.	Rate	Amount
1	RSJ 152x152, 11 m long	No.	17	15745.69	267676.73
2	RSJ 116x100, 10 m long	No.	2	8874.07	17748.14
3	MS Channel 100x50x6 mm	Kg.	132	34.92	4609.44
4	M.S.Channel 75x40x6 mm	Kg.	91	34.92	3177.72
5	33 KV Top Fitting	No.	14	257.48	3604.68
6	MS angle 50x50x6 mm	Kg.	54	34.92	1885.68
7	M.S. Flats(50 X 10mm)	Kg.	36	31.43	1131.41
8	33 kV Pin Insulators with G.I. Pins	No.	42	525.65	22077.30
9	Disc Insulator 11 KV 7000 KG.	No.	54	215.18	11619.72
10	G.I.Nut Bolts	Kg.	80	60.00	4800.00
11	Strain Hardware for Dog0.1 or Equ.AAAC.	No.	18	294.58	5302.44
12	ACSR Dog	Mtrs.	3150	46.20	145530.00
13	H.T.Stay Set	No.	6	433.57	2601.42
14	G.I.Stay Wire 7/4mm(8 SWG)	Kg.	60	50.81	3048.60
15	G.I.Wire 8 SWG/ 6 SWG	Kg.	130	46.41	6033.30
16	Slave Joints	No.	3	100.00	300.00
17	Danger Board in yard.	No.	17	40.00	680.00
18	Earthing Sets H.T	No.	17	243.33	4136.61
19	Concreting ration 1:3:6	cmt.	17.5	3344.00	58520.00
20	G.I.Barbed Wire `A' type.	Kg.	80	47.07	3765.60
21	Black bituminus paint	Ltr.	6	37.00	222.00
22	Red Oxide Paint for 2 coats	Ltr.	20	46.00	920.00
23	Aluminium Paint for 1 coat	Ltr.	9	80.00	720.00
24	Sundries	LS	LS	700.00	700.00
25	Wedge connectors				0.00
a)	DOG TO DOG	No	18	700.00	12600.00
	Cost of material				583410.78

1	Erection on material	10.00%			58341.08
2	Transportation on material	5.00%			29170.54
3	Insurance on material	1.00%			5834.11
4	Contingencies on material	3.00%			17502.32
5	T & P on material	1.50%			8751.16
6	Contractor supervision on charges on material	10.00%			58341.08
	Sub-Total -I				761351.07
7	Contractor profit on Total Project Cost i.e. on Sub-Total-I	5.00%			38067.55
	Total Cost of Estimate				799418.63

Cost data for 33 KV FEEDER BAY (Outdoor) with Gantry structure					
Sr.No.	Description of Material	Unit	Qty.	Rate	Amt.
1	33 KV Lightning Arrestors (Station type)	Set	1	10201.91	10201.91
2	33 KV Isolators with EB (800 A)	Set	1	71751.99	71751.99
3	33 KV Isolators without EB (800 Amp.)	Set	2	71751.99	143503.98
4	33 KV VCB complete 1600 Amp (O.D.)	Set	1	265762.35	265762.35
5	33 KV P.T.	No	3	16238.36	48715.08
5	CT 200-100/1-1 A , 33 KV	Nos.	3	20669.48	62008.44
6	C&R panel for 33 KV for feeder breaker	Nos.	1	85873.44	85873.44
7	Structure and foundation cables, clamps, painting etc.as per sheet (A+B+C+D+F)	L.S.	1	279929.12	279929.12
8	Marshalling Box	No	1	4500.00	4500.00
9	Earthing as per Sheet (E)	L.S.	1	10002.10	10002.10

Cost of material **982248.41**

1	Erection on material	10.00%	98224.84
2	Transportation on material	5.00%	49112.42
3	Insurance on material	1.00%	9822.48
4	Contingencies on material	3.00%	29467.45
5	T & P on material	1.50%	14733.73
6	Contractor supervision on charges on material	10.00%	98224.84

Sub-Total -I **1281834.18**

7	Contractor profit on Total Project Cost i.e. on Sub-Total-I	5.00%	64091.71
---	---	-------	----------

Sub-Total -II **1345925.88**

Total Cost of Estimate **1345925.88**

Total Cost of Estimate **13.459**

11 KV Feeder bay (Structure, Foundation, Bus bar material, Cable , Earthing Materials & Painting)

Sr.No.	Description of Material	Unit	Qty.	Rate	Amount
A)	STRUCTURE				
1	Structure for 33 KV L.A.	Kg.	250	34.92	8730.00
2	Structure for 33 KV CT	Kg.	315	34.92	10999.80
3	Structure for 33 KV PT	Kg.	315	34.92	10999.80
4	Gantry Structures	Kg.	1000	45	45000.00
5	G.I.Nut Bolts	Kg.	100	60	6000.00
6	Welding Rods	Nos.	5000	2	10000.00
				Sub Total	91729.60

B) FOUNDATION(Civil works)

1	Foundation for 33 kV Isolators with EB	Cmt.	1.3	2850	3705.00
2	Foundation for 33 kV Isolators without EB	Cmt.	1.3	2850	3705.00
3	Foundation for 33 kV C.Ts	Cmt.	1.3	2850	3705.00
4	Foundation for 33 kV P.Ts	Cmt.	1.3	2850	3705.00
5	Foundation for 33 kV Lightning Arrestor	Cmt.	1.3	2850	3705.00
6	Foundation for 33 kV Breaker	Cmt.	1.3	2850	3705.00
7	Foundation for Gantry Structures	Cmt.	2.6	2850	7410.00
				Sub Total:	29640.00

C) BUS-BAR MATERIAL

1	ACSR Panther	Mtrs.	25	104.04	2601.00
2	Wedge Connectors				0.00
a)	T-Connector for 200 sq mm conductor(Compressor)	Nos.	30	3200	96000.00
3	Breaker Clamps	Nos.	6	1610	9660.00
4	clamps for Isolator	Nos.	12	805	9660.00
5	Clamps for CTs	Nos.	6	1125	6750.00
6	Disc Insulator 11 KV 7000 KG.	Nos.	18	215.18	3873.24
7	Strain Hardware for0.2 ACSR	Nos.	6	538.63	3231.78
				Sub Total:	131776.02

D) CONTROL CABLE

1 a)	19 C X 2.5 sq mm Copper Cable	Rmt.	50	215.75	10787.50
b)	Armoured Copper control cable 2Cx2.5 sq.mm.	Rmt.	40	25.04	1001.60
c)	Control Cable 2/4 sq.mm.	Rmt.	50	70	3500.00
2	Cable Trays 2.5 Mtr. X 6" W	Nos.	10	250	2500.00
3	Cable Glands,ferules and tape etc.	L.S.	L.S.	500	500.00
4	Angle for fixing trays 50x50x6mm	Kg.	20	34.92	698.40
5	Half round cement pipe (150mm X 1mtr)	Nos.	80	78	6240.00
6	Sand	Cmt.	4	174	696.00
				Sub Total:	25923.50

E) EARTHING WORK

1	M.S. Flats(50 X 10mm)	Kg.	50	31.43	1571.50
2	M.S.Flat 25x6 mm	Kg.	20	31.43	628.60
3	Earthing Sets H.T of C.I.pipe 150 mm 3 mtr.	Nos.	1	5500	5500.00
4	Coal	Kg.	100	4	400.00
5	Salt	Kg.	100	3	300.00
6	Welding Rods	Nos.	50	2	100.00
7	Hiring of Welding machine	Nos.	1	200	200.00
8	Brick & Masonary works for earthing pit	Nos.	1	1302	1302.00
				Sub Total:	10002.10

F) PAINTING OF STRUCTURE

1	Red Oxide Paint for 2 coats	Ltrs.	10	46	460.00
2	Aluminium Paint for 1 coat	Ltrs.	5	80	400.00
				Sub Total:	860.00

CE/DSPC/66 kV Level Elimination/T-8/10-11

Cost data for 11 KV lines on 100x116 mm 9 mtr RSJ poles

(A) HT Line :

Sr.No.	Description of Material	Unit	Qty.	RT/U Rs.	Amount
1	RSJ 116x100, 9 m long	No.	17	7986.66	135773.22
2	RSJ 116x100, 8 m long	No.	2	7099.25	14198.50
3	11 kv guarding channel MS 75x40	Kg.	104	34.92	3631.68
4	M.S.Channel 75x40x6 mm	Kg.	122	34.92	4260.24
5	MS angle 50x50x6 mm	Kg.	72	34.92	2514.24
6	M.S. Flats(50 X 10mm)	Kg.	37	31.43	1162.84
7	11 KV V cross arm with clamp	No.	13	430.57	5597.43
8	11 KV Top fitting with clamp	No.	13	68.00	884.00
9	G.I.Nut Bolts	Kg.	90	60.00	5400.00
10	11 kV Pin Insulators with G.I. Pins	No.	39	94.95	3703.05
11	Disc Insulator 11 KV 7000 KG.	No.	24	215.18	5164.32
12	Strain Hardware for 55 Sq.mm AAC	Set	24	152.30	3655.20
13	AAAC 55 mm ²	Rmt	3150	22.98	72387.00
14	Sleve Joints	No.	3	100.00	300.00
15	H.T.Stay Set	Set	8	433.57	3468.56
16	Stay Wire 7/8	Kg.	80	50.81	4064.80
17	Earthing Sets H.T	Set	17	243.33	4136.61
18	G.I.Barbed Wire 'A' type.	Kg.	71	47.07	3341.90
19	Danger Board in yard.	No.	17	40.00	680.00
20	Concreting ration 1:4:8	Cmt.	18	2850.00	51300.00
21	G.I.Wire 8 SWG/ 6 SWG	Kg.	130	46.41	6033.30
22	Black Bituminus Paint	Ltr.	6	37.00	222.00
23	Red Oxide Paint for 2 coats	Ltr.	20	46.00	920.00
24	Aluminium Paint for 1 coat	Ltr.	9	80.00	720.00
25	G.I.Nut Bolts	Kg.	90	60.00	5400.00
26	Sundries	LS	1	700.00	700.00
27	Wedge connectors				0.00
a)	RABIT To RABIT	No	24	130.00	3120.00
				Cost of material	342738.88
1	Erection on material	10.00%			34273.89
2	Transportation on material	5.00%			17136.94
3	Insurance on material	1.00%			3427.39
4	Contingencies on material	3.00%			10282.17
5	T & P on material	1.50%			5141.08
6	Contractor supervision on charges on material	10.00%			34273.89
	Sub-Total -I				447274.24
7	Contractor profit on Total Project Cost i.e. on Sub-Total-I	5.00%			22363.71
	Sub-Total -II				469637.95
	Total Cost of Estimate				469637.95

Total Cost of Estimate

4.696



Maharashtra State Electricity Distribution Co. Ltd.

SPECIFICATION NO.DIST:MM-II/05/2007

TECHNICAL SPECIFICATION

OF

5 MVA, 33/11 kV, 22/11kV and 10 MVA, 33/11 kV, 33/22 kV & 22/11 kV

POWER TRANSFORMERS

SUITABLE TO

DISTRIBUTION SYSTEM

IN

MAHARASHTRA STATE

INDEX

Clause No.	Contents
1	Scope
2	System Particulars
3	Service Condition
4	Applicable Standards
5	Specific Technical requirement
6	General Technical Requirement
7	Impedance Value
8	Losses
9	Terminal Arrangement
10	Tolerance
11	Axles & Wheels
12	Fittings
13	Transformer Oil
14	Tank
15	Lifting & Haulage Facilities
16	Lifting Jacks
17	Windings
18	Minimum Clearances
19	Conservator Vessels, Oil Gauges & Breathers.
20	Bushing Insulators & Terminals
21	Gasket Joints
22	Overloading
23	Rating & Diagram Plate & Valve Schedule Plate
24	Tests & Inspection
25	Type Tests
26	Vacuum Test
27	Transformer Oil
28	Rejection
29	Stage Inspection
30	Quality Assurance
31	Drawings
32	Guaranteed Technical Particulars
33	Qualifying Requirement

34	Final Inspection
35	Challenge Testing
36	Performance Guarantee
37	COST DATA
38	SCHEDULES

MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD.

TECHNICAL SPECIFICATION FOR

5 MVA, 33/11 kV, 22/11 kV and 10 MVA 33/11 kV, 33/22 kV & 22/11 kV

POWER TRANSFORMERS

1 Scope:-

- 1.1 This specification covers design, manufacturing, testing and delivery of Oil immersed, Oil Natural Air Natural (ONAN) Outdoor Type, Three Phase, 50 Hz, 5 MVA, 33/11KV,22/11kV and 10 MVA 33/11 kV, 33/22 kV & 22/11 kV Step Down Power Transformers with On Load Tap Changer (OLTC) and Remote Tap Change Control (R.T.C.C.) panel, to be used in Sub Transmission/ Distribution systems.
- 1.2 The equipment offered shall be complete with all parts necessary for their effective and trouble-free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.
- 1.3 It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to the relevant standards and be of high quality, sturdy, robust and of good design and workmanship complete in all respects and capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements. The dimensional drawings attached with this specification and the notes thereto are generally of illustrative nature. In actual practice, notwithstanding any anomalies, discrepancies, omissions, in-completeness, etc. in these specifications and attached drawings, the design and constructional aspects, including materials and dimensions, will be subject to good engineering practice in conformity with the required quality of the product, and to such tolerances, allowances and requirements for clearances etc. as are necessary by virtue of various stipulations in that respect in the relevant Indian Standards, IEC standards, I.E. Rules, I.E.Act and other statutory provisions.
- 1.4 The Tenderer/supplier shall bind himself to abide by these considerations to the entire satisfaction of the purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.
- 1.5 Tolerances:

Tolerances on all the dimensions shall be in accordance with provisions made in the relevant Indian/IEC standards and in these specifications. Otherwise the same will be governed by good engineering practice in conformity with required quality of the product.

2 System Particulars:-

- | | | | | | |
|-----|--------------------------------------|---|--------------------------------|-------|------|
| 2.1 | Nominal System Voltage | : | 33 kV | 22 kV | 11kV |
| 2.2 | Corresponding Highest System Voltage | : | 36 kV | 24 kV | 12kV |
| 2.3 | Frequency | : | 50 Hz with ± 3 % tolerance | | |
| 2.4 | Number of Phase | : | 3 | | |
| 2.5 | Neutral earthing | : | Solidly earthed | | |

3 SERVICE CONDITIONS:

3.1 Equipment supplied against the specification shall be suitable for satisfactory operation under the following tropical conditions:-

i	Max. ambient air temperature	:	50 Deg. C
ii	Max. relative humidity	:	100 %
iii	Max. annual rainfall	:	1450 mm
iv	Max. wind pressure	:	150 kg/sq.m.
v	Max. altitude above mean sea level	:	1000 mtrs.
vi	Isoceraunic level	:	50
vii	Seismic level(Horizontal acceleration)	:	0.3 g.
viii	Climatic Condition		Moderately hot and humid tropical climate conducive to rust and fungus growth.
ix	Reference Ambient Temperature for temperature rise	:	50 deg C

3.2 The climatic conditions are prone to wide variations in ambient conditions and hence the equipment shall be of suitable design to work satisfactorily under these conditions.

4 Applicable Standards:-

4.1 Unless otherwise modified in this specification the transformers shall comply with the Indian Standard Specification IS 2026 latest or relevant International Standard such as ANSI, OSA, DIN, IEC etc., acceptable to the purchaser. The specified equipments are of standard industrial type and can be supplied by manufacturers active in the international market.

4.2 Equipment meeting with the requirements of other authentic standards, which ensure equal or better quality than the standards mentioned above, shall also be considered. Two copies of such standards, in authentic English translation shall be furnished alongwith the offer.

4.3 Equipment offered shall comply with all currently applicable statutory requirements, regulations and safety codes applicable for design, quality of material and construction, manufacture, inspection and performance.

4.4 In case of conflict arising out due to variations between the applicable standard and the standards specified herein the provisions of this specification shall prevail.

5 Specific Technical requirement:

5.1 Standard MVA Ratings:-

The standard ratings shall be 5 & 10 MVA for transformer with OLTC.

5.2 Nominal voltage ratings

i	Primary voltage	- 33 kV or 22 kV
ii	Secondary voltage	- 22 kV or 11 kV

5.3 Temperature Rise:

- i The temperature rise for top oil over an ambient temperature of 50 °C should be 45°C maximum (measured by thermometer in accordance with IS 2026 or relevant International Standard).
- ii Temperature rise for winding over an ambient temperature of 50 °C should be 50 °C maximum (measured by resistance in accordance with IS 2026 or relevant International Standard).

5.4 No load voltage ratio:-

The no load voltage ratio corresponding to the principal tapping shall be 33,000/11,000 Volts, 33000/22000 Volts or 22,000/11,000 Volts.

5.5 Flux density:-

Flux density should not be more than 1.55 Tesla at the rated voltage and frequency. Transformer core should be designed in such a way that it will not get saturated for any value of V/f (Voltage/frequency) ratio to the extent of 112.5% of rated value of V/f ratio (i.e. 11000/50, 22,000/50, 33000/50). Actual core design alongwith calculations in support of it should be enclosed with the offer.

5.6 Core Lamination:-

The grade of core laminations to be used shall be **M4 or better**.

The successful bidder, shall be required to submit the manufacturer's test report showing the Watt Loss per kg and the thickness of the core lamination , to ascertain the quality of Core materials.

The purchaser reserves the right to get sample of the core material tested at any Government recognized laboratory.

5.7 Current Density:

The current density for HV & LV windings should not exceed 2.8 A / mm² for copper conductor at any working tap including extreme tap 17 (-15% voltage).

5.8 Magnetizing Current:-

The magnetizing current at normal voltage & frequency shall be limited to 1% of full load current.

6 General Technical Requirement:-

6.1 On Load Tap Gear:

The transformers with on load taps shall have taps ranging from +5% to -15% in steps of 1.25% each on HV winding for HV variation.

The transformer shall be capable of being operated without danger on any tapping at the rated kVA with voltage variation of ±10% corresponding to the voltage of that tapping.

6.2 The equipment for local hand, local electrical and remote electrical operation shall be provided.

6.3 The Remote Control Cubicle:-

The remote control cubicle will be complete with:

- 6.3.1 Relays in the control circuit for the operation of the transformers in parallel.
- 6.3.2 Tap position indicator.
- 6.3.3 Tap change in progress lamp (white color) with circuit interrupter for blinking.
- 6.3.4 Lamps (white) showing healthy auxiliary supply from 240/110 Volts Center point earthing transformer.
- 6.3.5 Time delay contactors 1-5 Seconds with 5 Amps. contacts for tripping when a follower fails to go into steps with the master together with indication.
- 6.3.6 Oil temperature alarm with suitable cancellation device.
- 6.3.7 Winding Temperature alarm with suitable cancellation device for 10 MVA Transformer.
- 6.3.8 Signaling apparatus for out-of-step alarm.
- 6.3.9 Time delay contactors 1-5 Seconds for tripping due to incorrect coupling in master position (out of step tripping). The desired time delay for tripping will be to 50 Seconds.
- 6.3.10 Remote Push Button for Lower & Raise Tap.
- 6.3.11 Alarm cancellation Push Button.
- 6.3.12 Tap Changer Supply Isolating Switch.
- 6.3.13 Sequence Selector Switch.
- 6.3.14 Out of Step Alarm with Cancellation Push Button.
- 6.3.15 Panel Strip Heater with Switch.
- 6.3.16 Panel Lamp with Door Switch.
- 6.4 The circuit arrangement shall be flexible to provide for addition of a transformer at a later date. The scheme will be such that a selector switch can be provided so that any one transformer of the group can at a time be selected as 'Master', 'follower' or 'independent'.
 - i An out of step device shall be provided for each transformer which shall be arranged to prevent further tap changing when transformers in a group operating in parallel control are one tap out of step.
- 6.5 Tapping method:
 - i The switch position no.1 shall correspond to the maximum plus tap.
 - ii The primary winding shall be connected delta and secondary winding star as per vector group Dyn 11 (IS 2026 latest version.) so as to produce a positive displacement of 30 deg. from the primary to the secondary vector of the same phase (vector rotation assumed counter clockwise).
 - iii The neutral point of the secondary winding shall be solidly earthed and should be brought out to separate insulated terminal through an earthing current transformer for an earth leakage relay to be connected whenever required.

7 Impedance Values-

The percentage impedance at 75 ° C. shall be 7.15% for 5000 kVA and 8.35% for 10000 kVA transformers.

The impedance values refer to the principal tapping and are subject to tolerance of $\pm 10\%$. The impedance value measured on any other tapping shall not exceed the value measured on the principal tapping by more than $+ 10\%$.

8 Losses:-

8.1.1 The No Load & Full Load Losses are specified as below:

KVA	Voltage Ratio (in kV)	NO LOAD (kW)	LOAD LOSSES (kW) at 75 ° C.
5000	33/11	3.6	19.0
	22/11	3.6	19.0
10000	33/11	5.4	37.0
	33/22	5.4	37.0
	22/11	5.4	37.0

8.1.2 The above Losses have tolerance as specified in the IS: 2026 amended upto date.

9 Terminal Arrangement:-

9.1 Transformers shall be provided with bushing insulators on both HV & LV sides. The bushings shall be located on opposite sides:

9.2 The electrical characteristics of bushing insulators shall be in accordance with IS 2029 latest version or relevant International Standard.

9.3 The minimum creepage distance for all the bushings shall not be less than 25 mm per kV.

10 Tolerance:

The tolerance of guaranteed performance figures shall be as specified in the latest issue of IS 2026 or relevant International Standard except wherever specified otherwise in this specification.

11 Axles and wheels:

The transformers shall be provided with flanged wheels suitable for use on 1435 mm gauge track for 5 MVA Transformer and 1676 mm gauge for 10 MVA Transformer. These wheels shall be suitable for being turned through an angle of 90 deg. and locked in that position when the tank is jacked up.

12 Fittings:

Unless otherwise specified in the order, the following standard fittings shall be provided. The fittings shall be in accordance with the details to the extent these are specified in latest IS: 2026.

- i Inspection covers.(Thickness of inspection cover shall be same as Top of the tank)
- ii Rating plate to be riveted.
- iii Terminal marking plate.
- iv Two earthing terminals with crimping lugs.

- v Lifting lugs.
- vi Radiators. (18 SWG.) The no. of radiators/fins and heat dissipation calculation to justify the no. of radiators shall be submitted along with the offer.
- vii Explosion vent with equalizer pipe
- viii Conservator with drain plug.
- ix Dehydrating breather (Silica gel type) of 1 kg
- x Thermometer pocket.
- xi Oil level gauge indicating three positions of oil marked as under
 - a) Minimum (-) 5 ° C
 - b) 30 ° C
 - c) Maximum 98 ° C
- xii Oil filling hole with cap.
- xiii Air release device.
- xiv Pressure relief device.
- xv Gas/Oil actuated relay (Buchholz Relay) with shut off valves on either sides.
- xvi Filter valves (lower valve to be also used as drain valve).
- xvii Flanged wheels.
- xviii Jacking lugs.
- xix Sampling valve.
- xx Marshaling Box:
 - Vermin proof with required glands, locks, glass door, terminal Board, heater with switch, illumination lamp with switch, terminal connectors etc.
- xxi Oil Temperature Indicator with two contacts for alarm & Trip – 1 No.
- xxii Winding temperature Indicator with two contacts for alarm & Trip –1 No. (Only for 10 MVA Transformer)
- xxiii Surge relay for O.L.T.C. with isolating valve
- xxiv On load tap changer (make: CTR/OLG/OWN)

13 Transformer Oil

The quantity of transformer oil excluding OLTC shall not be less than 3000 Ltrs for 5 MVA Transformers and 4500 ltrs for 10 MVA Transformers.

Transformer oil to be used in all the power transformers shall comply with the requirements of latest IS 335 or relevant. In addition the oil should conform to 'Ageing Characteristics' specified below for New Oil and Oil in Transformers.

New oil - Ageing characteristics after accelerated ageing (open beaker method with copper catalyst):

- i Specific Resistance (Resistivity)
 - a) at 20 ° C :- 2.5×10^{12} Ohm-Cm (Min)

- b) at 90 ° C :- 0.2×10^{12} Ohm-Cm (Min)
- ii Dielectric dissipation factor - 0.20 (Max.tan delta) at 90 ° C.
- iii Total acidity mg/KOH/gm - 0.05 (Max)
- iv Total sludge value (%) by weight - 0.05 (Max.)
- v The method of testing these aging characteristics is given in Appendix - C of IS 335.
- vi Oil filled in Transformers:

The important characteristics of the transformer oil after it is filled in the transformer (within 3 months of filling) shall be as follows: -

Sr.No.	Characteristics	Specifications
1.	Electric Strength (Breakdown voltage)	30 kV (Min)
2.	Dielectric dissipation factor (Tan Delta) at 90 deg.C.)	0.01 (Max)
3.	Specific resistance (Resistivity) at 27 deg. C (ohm-cm)	10×10^{12}
4.	Flash Point, P.M. (closed)	140 ° C (Min)
5.	Inter facial tension at 27 ° C.	0.03N/M (Min)
	Neutralization value (total acidity)	0.05mg.KOH/gm (Max.)
7	Water content PPM	35 (Max)

14 Tank

- 14.1 The transformer tank and cover shall be fabricated from good, commercial grade, low carbon steel plate of minimum 6 and 8 mm thick for side wall and 8 and 10mm thick for top and bottom cover and suitable for welding for 5 and 10MVA transformers respectively.
- 14.2 The tank and cover shall be of welded construction. All seams shall be welded and wherever practicable, they shall be double welded. The tank weld shall be reinforced by stiffeners of structural steel for general rigidity. The tank shall have sufficient strength to withstand without permanent distortion under following conditions:
 - i Oil filling under vacuum.
 - ii Continuous internal gas pressure of 35 KPa with oil at operating level and
 - iii Normal Mechanical shock during transportation, loading and unloading operations.
- 14.3 The tank cover shall be bolted to the tank and the transformer design shall be such that the tank will not be split between the lower and upper cooler connection for unloading.
- 14.4 The tank of the transformer shall be complete with all accessories and shall be designed so as to allow the complete transformer filled with oil to be lifted by crane or jack transported by road, rail or water way without over straining any joints and without causing subsequent leakage of oil.
- 14.5 The main tank body excluding tap changing compartments, radiators and coolers shall be capable of withstanding following vacuums.

Vacuum gauge pressure (KN/sq.m.)	mm of Hg
68.0	500

- 14.6 The base of each tank shall be so designed that it shall be possible to move the complete transformer unit by skidding on plates or rails in any direction without injury.
- 14.7 Suitable guides shall be provided for positioning the core.
- 14.8 All Control cabinets and marshaling kiosks being supplied as transformer accessories, except OLTC. Remote control panel shall be preferably mounted on the transformer body. No cabinet or marshaling kiosk shall be mounted on radiators.
- 14.9 The tank cover shall be sloped towards LV side by approximately 10 cm to prevent retention of rainwater.
- 14.10 The thermometer pockets shall be fitted with captive screwed top to prevent the ingress of water.
- 14.11 The thermometer pockets shall be located in the position of maximum oil temperature at continuous Maximum rating and it shall be possible to remove the instrument bulbs without lowering the oil in the tank.
- 14.12 The tank cover and the inspection covers shall be provided with suitable lifting arrangements. Inspection covers shall not weigh more than 25 Kg. each.
- 14.13 **Cleaning and Painting.**
- i Before painting or filling with oil, the external surfaces of transformer tank and structural steel work shall be completely cleaned and made free from rust, scale and grease by applying shot blasting or sand blasting. Cavities on castings shall be filled by metal depositions.
 - ii The interior of transformer tank, other oil filled chambers and internal structural steel work shall be cleaned of all the scales and rust by application of standard approved methods. There after these surfaces shall be painted with hot-oil resistant varnish or paint.
 - iii Except for nuts, bolts and washers which may have to be removed for maintenance purposes all external surfaces shall receive minimum of four coats of paint. The total paint thickness shall be in the range of 52 to 60 microns.
 - iv The 1st and 2nd coats of painting shall be of primer and shall be applied immediately after cleaning. The 3rd coat shall be of an oil and weather resisting quality, preferably given a fungicide treatment and of a shade or color easily distinguishable from the primary coats and shall be applied after the primary coats have been touched up where necessary. The final coats shall be of glossy oil finish and weather resisting non-fading paint of shade no. 220 (Olive Green) of IS 5 or relevant International Standard. Primer paint shall be ready mix Zinc chromates as per IS 104 or relevant International Standard. Intermediate and final coat of paint shall be as per IS 2932 or relevant International Standard.
- 15 **Lifting and Haulage facilities:**
- 15.1 Lifting eyes or lugs shall be provided on all parts of the transformer, which require independent handling during loading, unloading, assembly or dismantling. In addition, the transformer tank shall be provided with lifting lugs, bosses and jacking pads properly

secured to the sides of the tank for lifting the transformer complete with oil either by crane or by jacks.

- 15.2 The transformer shall also be provided with suitable haulage holes on the four sides with suitably braced, pulling eyes for haulage of the transformer in longitudinal as well as transverse directions.

16 Lifting jacks:-

The bidder shall quote unit rates for a set of 4 (four) nos. suitably rated hydraulic type Lifting Jacks complete with all accessories, for each rating of the transformer. Prices of these jacks shall not be considered for tender evaluation. The purchaser shall decide the quantity to be ordered.

17 Windings:

- 17.1 Insulation of L.V. winding shall be adequate to withstand surge voltages appearing across them as a result of transfer due to an impulse striking on HV terminals.
- 17.2 The stacks of windings shall receive adequate shrinkage treatment before and after final assembly. Adjustable devices if necessary shall be provided for taking up possible shrinkage of coils if any, in service. The provisions made in this respect shall be clearly brought out in the Bid.
- 17.3 The conductor used for the coil shall be electrolytic grade copper conforming to the relevant Indian Standard specification.
- 17.4 The conductors shall be transposed at suitable intervals in order to minimize eddy current and to equalize the distribution of current and temperature alongwith windings.
- 17.5 The winding shall be so designed that all coil assembly of identical voltage rating shall be interchangeable and field repairs to the windings can be made without special equipments.

18 Minimum clearances:

- 18.1.1 Following minimum clearances in air and oil shall be maintained

Voltage	Phase to phase	Phase to ground Out of Oil.	Phase to ground In Oil.
11 kV	280 mm	140 mm	25 mm
22 kV	350 mm	320 mm	40 mm
33 kV	350 mm	320 mm	40 mm

19 Conservator vessels, Oil Gauges & Breathers:-

- 19.1 A conservator complete with sump and drain valves shall be provided in such a position as not to obstruct the electrical connections to the transformer, having a capacity between the highest and the lowest visible levels to meet the requirement of expansion of the total cold oil volume in the transformer and cooling equipment from the minimum ambient temperature i.e. -5 Deg. C to 98 Deg.C. The minimum indicated oil level shall be with the feed pipe from the main tank covered with not less than 25 mm depth of oil and the indicated range of oil level be from minimum to maximum.
- 19.2 Conservator will have volumetric capacity of at least 10 % of total volume of oil in the tank. Moreover the oil in conservator upto the minimum level mark on the oil level gauge

should be at least 3 % of the total volume of oil in the transformer excluding oil in the OLTC. The conservator shall also be provided with oil filling hole, cap, drain valve, 15-mm air release plug and silica gel breather. The size of the drain valve shall be 15 mm for Conservator diameter of 650 mm and below. For higher size of the Conservator, the drain valve shall be of 25 mm size. It shall be possible to completely drain the oil from Conservator when it is installed in its normal position on the transformer.

- 19.3 Equaliser pipe shall be provided.
- 19.4 The oil connection from transformer tank to the Conservator Vessel shall be arranged at a rising angle of 3 to 9° to the horizontal up to the Bucholz Relay and shall consist of 50 mm. inside diameter pipe as per latest IS 3639 or equivalent International Standard.

20 Bushing Insulators and Terminals:-

- 20.1 The transformer shall be fitted with bushing insulators having suitable characteristics. Preference will be given to vertically mounted bushings. The main winding and neutral leads shall be brought out through out-door type of bushings which shall be so located that full flash over strength will be utilized. Wherever neutral current transformers are required, accommodation for the same is required to be provided on the neutral terminal bushing and the bushing shall be so arranged that it can be removed without disturbing the current transformer, secondary terminals and other connections or pipe work.
- 20.2 Each terminal, including the neutral, shall be distinctly marked on both primary and secondary in accordance with the connection diagram fixed upon the transformer which shall conform to latest IS 2026 (Part IV).

21 Gasket Joints:-

For gasket joints wherever used, nitrite betel rubber gasket or Neoprene cork gasket shall be used. The gaskets shall be placed in properly machined grooves with adequate space for accommodating the gaskets under compression. Suitable mechanical stops shall be provided to prevent crushing of gaskets.

22 Over Loading:-

The Power transformer shall be suitable for operating under overload condition as specified in IS 6600. and a separate Over Loading chart should be submitted along with offer.

23 Rating and Diagram Plate & Valve Schedule Plate.

- 23.1 The transformer shall be provided with non-corrosive, legible rating and diagram plate of minimum 18 SWG Brass material. Rating and diagram plate shall be riveted to the transformer tank at an average height of about 1500 mm above the plinth level. The rating and diagram plate shall bear data as specified in Part-3 of IS 2026 or relevant International Standard. The plate shall also bear Name of purchaser viz. Maharashtra State Electricity Board in full.
- 23.2 A plate showing the location and function of all valves and air release cocks or plugs shall be provided.
- 23.3 In addition to the above a plan of the transformer giving the correct physical relationship of the terminals shall be clearly indicated on the rating and diagram plate.

24 Test and Inspection:-

- 24.1 Routine Tests:-

- i All transformers shall be subjected to the following routine tests at the manufacturer's works. The tests are to be carried out in accordance with the details specified in IS 2026 or as agreed upon between the purchaser and the manufacturer.
 - a) Measurement of winding resistance.
 - b) Ratio, polarity and phase relationship.
 - c) Impedance voltage.
 - d) Load losses.
 - e) No-load losses and No-load current.
 - f) Insulation resistance.
 - g) Induced over voltage withstand.
 - h) Separate source voltages withstand.
 - i) Duty cycle of On-load Tap Changer.
 - j) Oil leakage gas collection, oil surge and voltage tests on gas and oil actuated relays.
- ii All the routine tests shall be conducted in the suppliers' laboratory at their cost.
- iii Heat run test shall be arranged free of cost on the unit selected from the 1st lot by our Executive Engineer / Authorized Representative.
- iv The calculations to confirm the thermal ability as per Clause no. 9.1 of latest IS: 2026 Part-I or equivalent International Standard, shall be submitted to our Executive Engineer (IW).

25 Type Tests:-

- 25.1 The transformer offered should have been successfully type tested at NABL laboratories, in line with standard and technical specifications, within the last 5 (five) years from the date of offer. The tenderer shall furnish the following type tests reports (alongwith General arrangement drawing, Rating and Diagram Plate and Internal Constructional drawing) alongwith the offer.
 - i Impulse Voltage withstand Test on all three LV & HV phases.
 - ii Temperature Rise Test on Tap No. 17 (i.e. -15% voltage Tap)
 - iii Short circuit Test
- 25.2 In case of Temperature Rise Test, if NABL laboratories are unable to carry out test at their own laboratory, then bidder may hire services of NABL laboratories and carry out Temperature Rise Test at their works with testing equipment of NABL. Test have to be carried out by testing engineer of NABL and certification of the same have to be given on NABL.s letter head.
- 25.3 If above tests are carried out beyond 5 years, then the offer may be considered for placement of order however, successful bidders have to carry out the said type tests before commencement of supply at their own expense.
- 25.4 If above tests are carried out on higher capacity of offered type transformer, then the offer is considered for placement of order. However, successful bidders have to carry out the

said type tests on offered type transformers before commencement of supply at their own expense.

- 25.5 The purchaser reserves right to demand repetition of some or all type tests, in the presence of purchaser's representative. For this purpose, the tenderer may quote unit rates for carrying out each type test.
- 25.6 For any change in the design/type already type tested and the design/type offered against this specification, the purchaser reserves right to demand repetition of these tests without any extra cost.
- 25.7 Successful bidders have to submit a set of above type test reports after approval of the drawings to the Chief Engineer, Distribution Department, 5th floor, Prakashgad, MSEDCL, Bandra.. Original type test reports have to be made available for verification

26 **Vacuum Test: -**

The tank of a Power Transformer (excluding tap changing compartment, radiators and coolers) shall be able to withstand a vacuum gauge pressure of 68.0 KN/ sq.m. (500 mm. of Hg).

The permanent deflection of the flat plate after subjecting the transformer tank to the above vacuum for one hour shall not exceed the following values, without affecting the performance of the transformer.

Horizontal length of flat plate	Permanent deflection(mm)
Upto and including 750 mm	5.0
751 to 1250	6.5
1251 to 2000	8.5
2001 to 2250	11.0
2251 to 2500	12.5
2501 to 3000	16.0
Above 3000	19.0

27 **Transformer oil:-**

To ascertain the quality of the transformer oil, the original manufacturer's test report should be submitted at the time of inspection. Also arrangements should be made for testing of transformer oil, after taking out the sample from the manufactured transformer and tested in the presence of Board's representative or in an independent laboratory.

28 **Rejection:-**

- 28.1 Apart from rejection due to failure of the transformer to meet the specified test requirements the transformer shall be liable for rejection on any one of the following reasons.
- i No load loss exceeds the values mentioned in Sr. No.8 above.
 - ii Load loss exceeds the specified values mentioned in Sr. No. 8 above.
 - iii Impedance voltage value exceeds the Guaranteed value plus tolerances as mentioned at Sr.No.7 above.

- iv Type test are not carried out as per clause no. 25 of the specification.
- v Drawings are not submitted as per clause no. 31 of the specification.
- vi GTP not submitted as per clause no. 32 of the specification.

29 Stage Inspection:-

- 29.1 Supplier shall give 10 days' advance intimation to the Chief Engineer (Dist.) and S.E. (Store/Adm) to organize stage inspection in which assembly of core, windings and other core materials etc. would be inspected. In respect of raw materials such as core stamping, winding conductor, oil etc. successful tenderer shall use these materials manufactured/supplied by the standard manufacturers and furnish the manufacturer's test certificates, as well as, proof of purchase from those manufacturers (excise, gate passes), for the information of the department.
- 29.2 Chief Engineer (Distribution) will depute his representative at the time of stage inspection.
- 29.3 The transformer will be tested for acceptance tests at factory, in the presence of purchaser's representative, before dispatch.
- 29.4 The inspection may be carried out by the purchaser at any stage of manufacture. The successful tenderer shall grant free access to the purchaser's representatives at a reasonable time when the work is in progress. Inspection and acceptance of any equipment under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications and shall not prevent subsequent rejection if the equipment is found to be defective.

30 Quality Assurance

- 30.1 The tenderer shall invariably furnish following information along with his offer failing which his offer will be rejected.
- 30.2 Certificates of following materials.
 - i Copper conductor
 - ii Transformer oil
 - iii Core
 - iv Insulations.
 - v Porcelain Bushings
 - vi Steel Plate used for Tank
- 30.3 Names of the supplier for the raw material, list of standard according to which the raw materials are tested, list of test normally carried out on raw materials in presence of tenders' representatives, copies of type test certificates.
- 30.4 Information and copies of test certificate as in (i) above respect of bought out accessories including terminal connectors.
- 30.5 List of manufacturing facilities available. In this list the tenderer shall specifically mention whether lapping machine, vacuum drying plant, air conditioned dust free room with positive air pressure for provision of insulation and winding etc are available with him.
- 30.6 Level of automation achieved and list of areas where manual processing still exists.

- 30.7 List of areas in manufacturing process where stage inspection are normally carried out for quality control and details of such tests and inspections.
- 30.8 Special features provided in the equipments to make it maintenance free
- 30.9 The tenderer shall submit the List of testing equipment available with them for testing the transformers for acceptance and routine tests as specified in the relevant standards and the present specification. The successful tenderer shall submit the Routine Test Certificate alongwith central Excise Gate Passes for the following raw materials viz Oil, Copper for Conductors, insulating materials, Core materials, Bushing at the time of routine Testing of the fully assembled transformer.

31 Drawings:-

A. Following documents should be submitted along with offer.

1. Flux Density Calculations
2. Heat Dissipation calculation
3. Type Test Reports
 - a. Impulse Voltage withstand Test on all three LV & HV phases.
 - b. Temperature Rise Test on Tap No. 17 (i.e. -15% voltage Tap)
 - c. Short circuit Test
4. Test Certificates of following bought out materials.
 - a. Copper conductor
 - b. Transformer oil
 - c. Core
 - d. Insulations.
 - e. Porcelain Bushings
 - f. Steel Plate used for Tank
5. Names of the supplier for the raw material.
6. List of manufacturing facilities available.
7. List of testing equipment available with the tenderer..

B. A set of following drawings shall be submitted by the tenderer alongwith the offer:

- i General Dimensional drawing.
- ii Core details drawing.
- iii Rating & Diagram Plate Drawing.
- iv HV/LV Bushings
- v Marshaling Box with connection diagram.

C. The tenderer should also furnish the following O.L.T.C. drawings alongwith the offer.

- vi Tap changer phase diagram.
- vii G.A. of Tap changer control panel.
- viii Wiring diagram of tap changer control panel.

- ix Schematic diagram for group control of tap change gear.
 - x OLTC Rating Plate.
 - xi O&M Manual.
- 31.2 The drawings shall be of A-3 (420 x 297 mm) size only. The tenderer should also supply alongwith his offer the pamphlets/literatures etc. for Oil surge relay, Bucholz Relay, Breather etc.
- 31.3 The tenderer should confirm specifically that he will adhere to the design once offered during execution of the order, if placed with him and no changes shall be made without prior approval of the purchaser.
- 31.4 The successful Bidders shall submit complete set of Drawings (as listed in the clause No.31.0 B& C) of transformer in triplicate indicating dimensions to CE (Distribution) for approval and get approved it before offering I st stage inspection.

32 Guaranteed & Technical Particulars:

The bidder should fill up all the details in Annexure H1 and the statement such as “as per drawings enclosed”, “as per MSEB requirement” “as per IS” etc. shall be considered as details not furnished and such offers will be rejected..

33 Qualifying Requirement

- 33.1 The Tenderer should have proven experience of not less than 5 years in Design, Manufacture, supply and Testing at work for equipment / materials offered for equal or higher voltage class. The equipment/ material offered by tenderer should be in the successful operation, atleast for two years as on the date of submission of the tender.
- 33.2 The tenderer should have adequate in house testing facilities for conducting acceptance tests in accordance with relevant IS.
- 33.3 Tenderer should have a minimum turnover of 60% of the value of the material offered in any one financial year during the previous 3 years. However, being a commercial aspect this point may be verified by CPA.
- 33.4 The tenderer should furnish all the relevant documentary evidence to establish the fulfillment of the above requirement.
- 33.5 The bidders not meeting the requirement at clause No. 33.1 can also participate, provided they have valid ongoing collaboration with a manufacturer who has atleast 10 years experience in the Design, manufacture and testing of the equipment of the type and class offered which have been in satisfactory service for a period of atleast seven years. In such an event the bidder shall furnish alongwith the bid the documentary evidence for the same and undertaking from the bidder and collaboration accepting joint and several liability for all obligations under the contract.
- 33.6 The bidder who does not meet the above Qualifying requirement of experience (Clause No. 33.1)may be considered for a Trial Order subject to fulfilling the following requirements alongwith Clause Nos. 33.2 to 33.4.
- 33.7 The bidder should have type tested the equipment offered as per requirement of Clause No. 25.0
- 33.8 The Bidder shall have the basic infrastructure for the design, manufacture and supply of the items offered, like machinery, technical know-how , capacity etc.

33.9 The purchaser is satisfied with the designing, manufacturing, supplying and financial capacity of the bidder after inspecting the supplier's works.

33.10 Notwithstanding anything stated above, the purchaser's decision in this regard will be final.

34 Final Inspection

34.1 C.E. (Distribution) will depute his representative at the time of final inspection along with CPA's representative.

35 Challenge Testing:

The manufacturer can also request challenge testing for any test based on specification and losses. The challenger would request for testing with testing fees. The challenge test fees are proposed at least three times the cost of testing. This is likely to deter unnecessary challenges. The challenger would have the opportunity to select the sample from the store and any such challenge should be made within the guarantee period. The party challenged, challenger and the utility could witness the challenge testing.

The challenge testing would cover following tests:

1. Measurement of magnetizing current.
2. No load losses test.
3. Load losses test (at 50 % loading or as per acceptance test).
4. Temperature rise test.

The challenge test could be conducted at NABL Laboratory, like ERDA and CPRI. If the values are within the limits the products gets confirmed else not confirmed. No positive tolerances in losses is permitted. If the product is not confirmed the manufacturer would pay the challenge fee and challenger would get the fee refunded. However as a redressal system the challenger would be allowed to ask for fresh testing of two or more samples from the store and the same be tested in NABL Laboratory in presence of party challenge, challenger and the utility.

If any one of the above sample does not confirm the test, then the product is said to have failed the test. In such cases the manufacturer will be declared as unsuccessful manufacturer for the said product with wide publicity and would not allow to complete tenders of the MSEDCL for the period of three years and heavy penalty would be imposed.

36 Performance Guarantee:

All transformers supplied against this specification shall be guaranteed for a period of 66 months from the date of receipt at the consignee's Stores Center or 60 months from the date of commissioning, whichever is earlier. However, any engineering error, omission, wrong provisions, etc. which do not have any effect on the time period, shall be attended to as and when observed/ pointed out without any price implication.

37 COST DATA SHEET:-

The bidders shall submit the cost data sheets indicating the break up prices and quantity of each raw material and components along with the unit rates required for manufacture of the offered transformers along with the offer. The cost data sheet format is enclosed

herewith.. If the rates quoted are not justified with the cost data sheets, the offer shall not be considered for evaluation and placement of the order.

The cost data sheets shall be scrutinized by CPA section.

FORMAT FOR COST DATA					
ITEM ----- KVA , ----- KV POWER TRANSFORMER					
Sr. No.	PARTICULARS	UNIT	UNIT RATE S Rs.	QTY	AMT (Rs.)
1	CORE (M4 or better)	KG			
2	COPPER FOR HV WINDING	KG			
3	COPPER FOR LV WINDING				
3	INSULATION PAPER	METER			
4	OIL	LTRS			
5	TANK	NO			
6	CHANNELS	KG			
7	INSULATORS/BUSHINGS	KG			
8.	OTHERS	LUMPS UM			
				TOTAL	
	WASTAGE @ %				

38 Schedules

38.1 The bidder shall fill in the following schedules which form part of the tender specification and offer. If the schedules are not submitted duly filled in with the offer, the offer shall be rejected.

Schedule `A' -Guaranteed Technical Particulars

Schedule `B' -Schedule of Tenderer's Experience.

38.2 The discrepancies between the specification and the catalogs, Literatures and indicative drawings which are subject to change, submitted as part of the offer, shall not be considered and representation in this regard will not be entertained.

38.3 The Bidder shall submit the list of orders for similar type of equipments, executed of under execution during the last three years, with full details in the schedule of Tenderer's experience (Schedule `B') to enable the purchaser to evaluate the tender.

Schedule A

GURANTEED TECHNICAL PARTICULARS

As indicated E-Tendering GTP parameters

SCHEDULE - B
SCHEDULE OF TENDERER'S EXPERIENC

Tenderer shall furnish here a list of similar orders executed/under execution by him to whom a reference may be made by Purchaser in case he considers such a reference necessary.

Sr. No.	Name of Client & Description. order	Value of order alongwith capacity .of transformer	Period of supply and commissioning may be made	Name & Address to whom reference
---------	-------------------------------------	---	--	----------------------------------

-

NAME OF FIRM _____

NAME & SIGNATURE OF THE TENDERER _____

DESIGNATION _____

DATE _____