

**SCHEDULE - IA**  
**GUARANTEED AND OTHER PARTICULARS FOR DISTRIBUTION TRANSFORMERS**

S.N.	Particulars	MVVNL Requirement	Quoted by Bidder
A	Name of Manufacturer &	:	:
B	Place of manufacture	:	:
C	Make	:	:
1	Name of Tenderer	:	:
2	Type	Outdoor, Non Sealed Conventional/ : Outdoor type Votted Corrugated tank & sealed type transformer.	:
3	Rating		
	(a) Rated output (KVA)	: 250 KVA, Level-1	:
	(b) Rated Voltage -HV ( Volt )	: 11000	:
	(c) Rated Voltage -LV ( Volt )	: 433	:
	(d) No Load Voltage ratio	: 11000/ 433-250	:
	(e) No. of Phases	: Three	:
	(f) Frequency (c/s )	: 50 $\pm$ 5%	:
	(g) Vector Group	: Dy <sub>n</sub> -11	:
4	Method of Cooling Radiator type	: ONAN	:
5	Internal Dimensions of Tank		
	(a) Length (mm)	:	:
	(b) Breadth (mm)	:	:
	(c) Height (mm)	:	:
	(d) Thickness of tank sheets :		
	(i) Sides (mm)	: 4.00	:
	(ii) Top & Bottom (mm)	: 6.00	:
6	<u>DETAILS OF CORE</u>		
	(a) Diameter (mm)	:	:
	(b) Window Height (mm)	:	:
	(c) Limb Center (mm)	:	:
	(d) Width of the main step	:	:
	(e) Whether yoke is plain or stepped inside window	: Plain	:
	(f) Cross Sectional Area (sq.mm.)		
	(i) Gross	:	:
	(ii) Nett	:	:
	(Staking factor of 0.97 shall be taken)		
	(g) Working flux density at rated voltage & frequency (Tesla) actual as per design	: 1.69 Tesla (Max.)	:
	(h) Over fluxing without saturation (Curve to be furnished by the manufacturer in support his claim )	: 1.90 Tesla (Max.)	:
	(i) Insulation material provided for core	: Carlite	:
	(j) Grade of material & thickness of lamination used (mm)	: CRGO- M4 OR Better, 0.23 to 0.27 Or Better	:
	(k) Total min. weight stepping used in core and yoke (kg.) (Please furnish core weight calculations,details of core steps and its drawing)	: 410 (Min.)	:
7	<u>H.V. COIL CONSTRUCTION DETAILS :</u>		
	(a) Type of winding	: Cross-Over/Spiral Layer Single Coil	:
	(b) Type & Size of Conductor (Bare) mm	: Copper DPC Round Wire/Rect. Strip	:
	(c) Size of conductor insulated(mm)	:	:
	(d) Cross Sectional area of Conductor (mm <sup>2</sup> )		
	(i) Gross	:	:
	(ii) Nett	:	:
	(e) No. of Coils per Limb	: 4/Single Coil	:
	(f) Outer Diameter of Coil (mm)	:	:
	(g) Inner Diameter of Coil (mm)	:	:
	(h) Mean Diameter of Coil (mm)	:	:
	(i) Insulation of Conductor	: DPC	:

(j)	Interlayer reinforcement details		
i)	Top & bottom layer	: Kraft Paper	:
ii)	In between all layers	: Kraft Paper	:
iii)	End turn insulation	:	:
iv)	Whether wedges are provided at 50% turns of HV coil.	:	:
(k)	Current at full load (Amp)	: 13.12	:
(l)	Working current density as per your design (Amp/Sq.mm)	: 2.50 (Max.)	:
(m)	Weight of bare conductor used in one leg of H.V. (Kg.)	:	:
(n)	Weight of insulated conductor used in one leg of H.V. (Kg.)	:	:
(o)	No. of turns per leg	:	:
(p)	Length of mean turns (mm)	:	:
(q)	Resistance of winding (with 5% tolerance)		
a)	At 20 ° c (Ohm)	:	:
b)	At 75 ° c (Ohm)	:	:
(r)	I <sup>2</sup> R at 75°C.(Watt )	:	:
(s)	Axial Length (mm)	:	:
(u)	Weight of oil soaked coils in one leg ( Kg. )	:	:
8	<u>L.V. COIL CONSTRUCTION DETAILS :</u>		
(a)	Type of Winding	: Helical/Spiral	:
(b)	Type, Number and Size of bare conductor.	: Copper DPC/Rect. Strip	:
(c)	Size of insulated conductor	:	:
(d)	Cross sectional area of bare conductor (sq.mm.)		
(i)	Gross	:	:
(ii)	Net As per IS:6160	:	:
(e)	No. of coils per limb	: 1	:
(f)	Outer diameter of coil (mm)	:	:
(g)	Inner Diameter of Coil (mm)	:	:
(h)	Mean Diameter of Coil (mm)	:	:
(i)	Insulation of Conductor	: DPC	:
(j)	Inter layer reinforcement details	: Kraft paper	:
(k)	Current at full load (Amp)	: 333.34	:
(l)	Current density as per your design (A/mm <sup>2</sup> )	: 2.50 (Max.)	:
(m)	End turn insulation	:	:
(n)	Weight of bare conductor used in one leg of LV (kg)	: HV+LV = 240kg.	:
(o)	Weight of insulated conductor used in one leg of LV (kg.)	:	:
(p)	No. of turns per leg	:	:
(q)	Length of mean turns (mm)	:	:
(r)	Resistance of winding (with 5% tolerance)		
a)	At 20 ° c (Ohm)	:	:
b)	At 75 ° c (Ohm)	:	:
(s)	I <sup>2</sup> R at 75°C (Watt)	:	:
(t)	Axial Length (mm)	:	:
(u)	Weight of oil soaked coil in one leg	:	:
9.	<u>INSULATION DETAILS MATERIAL AND SIZE</u>		
(a)	H.V. Coil end packing	: Kraft Paper/Press Board	:
(b)	L.V. coil end packing	: Kraft Paper/Press Board	:
(c)	Inter coil spacer of HT sections	: Kraft Paper/Press Board	:
(d)	Bottom yoke strip insulation at foot plate	: Kraft Paper/Press Board	:
(e)	Yoke Insulation	: Kraft Paper/Press Board	:
(f)	Clamp Insulation	: Kraft Paper/Press Board	:
(g)	Inter Phase Barrier	: Kraft Paper/Press Board	:
(h)	Core Wrap	: Kraft Paper/Press Board	:
(i)	Cylindrical Insulation between H.T. & L.T.	: Kraft Paper/Press Board	:
(j)	Type of blocks used in between coils	:	:
(k)	Weight of total insulating material in one T/F (oil soaked).	:	:

10 DETAILS OF CLEARANCES (mm)

(a)	Internal clearance between inner walls of Tank & core coil assembly unit		
(i)	On length(Bushing side)	:	:
(ii)	On Breadth Side(Non bushing side)	:	:
(b)	Radial clearance between H.V.& L.V. Winding	:	:
(c)	Phase of phase clearance between H.V. Limb	:	:
(d)	Clearance from top yoke to topcover of the tank	:	:
(e)	Radial clearance of L.V. coil from core	:	:
(f)	Minimum clearance between L.V.Pole to earth	:	:
(g)	Horizontal duct between H.T.Section coil	:	:
(h)	End clearance of H.T. coil from Yoke (With angle shaped Winding)	:	:
(i)	Minimum clearance between core & tank bottom.	:	:
(j)	Angular ducts between L.T. & H.T. winding	:	:
<b>Note: Above clearances include the thickness of insulation.</b>			
11	<b><u>IMPULSE TEST VOLTAGE OF WINDING FOR 1.2/50 M.S. WAVE</u></b>		
(a)	H.V.(KVP)	: 75 KV	:
(b)	L.V.(KVP)	: Not required	:
12	Volts per coil of H.V. Winding (Volts)	: 2750	:
13	Approximate volts per layer of H.V.winding (Volts)	: 183.33	:
14	Performance reference temperature (°C)	: 75	:
15	Total Losses at 100% load at 75 °C (Watt)	: 2930 (Max.)	:
16	Total losses at 50% load at 75 °C (Watt)	: 980 (Max.)	:
	(Guaranteed value without any positive tolerance) (Watts)		
17	Magnetising (No Load) Current at		
a)	90% Voltage	:	:
b)	100% Voltage	:	:
c)	110% Voltage	:	:
18	Regulation at normal full load and		
a)	Unity P.F. and	:	:
b)	0.8 P.F.	:	:
19	Impedance voltage at rated voltage & frequency at 75°C.	: 4.50%	:
20	Percentage reactance at rated voltage & frequency at 75°C.	: 4.39	:
21	Percentage resistance at 75°C.	: 0.98	:
22	<b><u>PERCENTAGE IMPEDANCE AT 75°C.</u></b>		
(a)	With respect to high voltage	: 4.50	:
(b)	With respect to low voltage	: 4.50	:
23	Un-balance current as percentage of full load current	: 2.0	:
24	<b><u>Efficiency at 75 °C</u></b>		
a)	Unity P.F. and	<b><u>At U.P.F</u></b>	
b)	0.8 P.F.		
i)	125% load	98.67	
ii)	100% load	98.88	
iii)	75% load	99.08	
iv)	50% load	99.22	
v)	25% load	99.18	
25	Permissible duration of overload following Continuous running at normal rated load in Ambient temperature of 50°C.		
(a)	10% overload	: As per IS : 6600	:
(b)	20% overload	: As per IS : 6600	:
(c)	30% overload	: As per IS : 6600	:
26	RMS value of symmetrical short circuit current which the transformer can withstand and its duration according to 9.1of ISS:2026 or CL:1001 of BSS with latest amendment thereof.	: As per IS : 2026	:
27	Increase in temperature of winding at full load by resistance method in an ambient temperature of 50°C.	: 45.0	:

28	Increase in temperature of oil by thermometer at full load in an ambient temperature of 50°C.	: 40.0	:
29	Temperature of hottest spot in the winding at full load in an ambient temperature of 50°C.	:	:
30	Terminal arrangement of H.V. side	: As per G.A. Drg.	:
31	Terminal arrangement of L.V. side	: As per G.A. Drg.	:
32	<b><u>PARTICULARS OF H.V. BUSHING</u></b>		
	(a) Name of Manufacturer	: Genesis, Bihar, Ceramics or any reputed make	:
	(b) Type	: Outdoor	:
	(c) Confirming to ISS	: As Per relevant IS	:
	(d) Dry withstand voltage for one minute	: As Per relevant IS	:
	(e) Wet withstand voltage for 30 minutes	: As Per relevant IS	:
	(f) Voltage rating	: As Per relevant IS	:
	(g) Impulse withstand voltage 1/50 µ sec. wave :		
	(i) Positive	: As Per relevant IS	:
	(ii) Negative	: As Per relevant IS	:
	(h) Total creepage distance in air (mm)	: As Per relevant IS	:
	(i) Height of bushing above transformer tank.	: As Per relevant IS	:
	(j) Material & Size of HV terminal spends.	: As Per relevant IS	:
33	<b><u>PARTICULARS OF L.V./ NEUTRAL BUSHING</u></b>		
	(a) Name of Manufacturer	: Genesis, Bihar, Ceramics or any reputed make	:
	(b) Type	: Outdoor type porcelain	:
	(c) Confirming to ISS	: As per IS:3347 & 7421	:
	(d) Voltage rating	:	:
	(e) Dry withstand voltage for 1 minute	: As per IS:3347 & 7421	:
	(f) Wet Withstand voltage for 30 min.	: As per IS:3347 & 7421	:
	(g) Total creepage distance in air (mm)	: As per IS:3347 & 7421	:
	(h) Material and Size of LT terminal studs	:	:
34	<b><u>Time constant of transformer</u></b>		
35	<b><u>Radiation</u></b>		
	i) Heat dissipation by tank walls (excluding top & bottom)	:	:
	ii) Heat dissipation by cooling tubes	:	:
	iii) Diameter and thickness of cooling Tubes	:	:
	iv) Whether calculation sheet for selecting cooling area to ensure that the transformer is capable of giving continuous rated output without exceeding temperature rise is enclosed.	:	:
36	<b><u>TRANSFORMER OIL</u></b>		
	(a) Grade of Oil	: As Per IS:335	:
	(b) Dielectric strength	: As Per IS:335	:
	(c) Resistivity	: As Per IS:335	:
	(d) Acidity	: As Per IS:335	:
	(e) Tan Delta	: As Per IS:335	:
	(f) Name of Supplier (only reputed make shall be accepted)	: Any ISI / Reputed Make	:
37	<b><u>Quantity of transformer oil</u></b>		
	a) First filling	:	:
	b) Drained out	:	:
38	<b><u>WEIGHT OF THE FOLLOWING</u></b>		
	(a) Tank & Fitting (Kg)	:	:
	(b) Core coil assembly (Kg)	:	:
	(c) Transformer oil (Kg)	: 310	:
	(d) Total weight of transformer including oil (Kg.)	:	:
39	<b><u>OVERALL DIMENSIONS OF TRANSFORMER</u></b>		
	(a) Length (mm)	: As per GA Drg.	:

- (b) Breadth (mm) : As per GA Drg. :
- (c) Height (mm) : As per GA Drg. :
- 40 Conservator dimensions : As per GA Drg. :
- 44 Name of material, number, weight and size used for clamping of core & winding
- (a) Core clamp : :
- (b) Tie Rod : :
- (c) Core Bolt : :
- (d) Bottom Foot Plate : :
- 45 Line lead support details : Copper wire, Confirming to IS:3401 :
- 46 Silica Gel breather size: : As per specification :
- 47 Clearance in air between
- (a) Phase to Phase (H.V.side) (mm) : 255 :
- (b) Phase to Earth (H.V.side) (mm) : 140 :
- (c) Phase to Phase (L.V.side) (mm) : 75 :
- (d) Phase to Earth (L.V.side) (mm) : 40 :
- 45 TYPE TESTING
- a) Is the offered 11/4 KV Conventional Type (Level 2) Distribution Transformer Type Tested? : :
- b) If yes, when, where was it type tested? : :
- c) Is there any deviation in the technical specification of offered transformer, if yes, give details : :
- d) Details of type test report

S No	Name of Test Date of Test & test report enclosed	If yes, No of sheets	
1	Impulse Voltage withstand test		
2	Temperature Rise Test		
3	Short Circuit Test		
4	Thermal Ability Test		
5	Air Pressure Test		
6	Noise Level Test		