

# MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD



A Govt. of Maharashtra Undertaking  
CIN: U40109MH2005SGC153645

## Office of the Regional Director

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RD/Tech/GTP/Shivshakti/100 KVA-11KV/

**No - 1028**

dt:- **27 SEP 2017**

To,

M/s Shivshakti Power Device India Pvt Ltd

Sr.No.46 , Hissa No. 35,

Narhegaon ,Tal- Haveli

Pune - 411 041

**Sub:- Approval of GTP and Drawings of BIS certified 100 kVA, 11/ 0.433 kV , Three Phase, Distribution Transformers , Indoor and Outdoor Type , ONAN, Energy Efficient Level-II in r/o M/s Shivshakti Power Device India Pvt Ltd , Narhegaon, Pune for supply in Ag. Turnkey projects , DDF/ DPDC / SCP Schemes under 1.3 % supervision charges and to HT Consumers in MSEDCL network .**

- Ref:-1. MSEDCL Spec.-CE/MMC/MS-C-I/3Phase (25-200 kVA)/DT/T/2017/01, dt. 05 .01.2017.  
2. CE/Infra II/ EE-IV / Vendor / 36802 dt.16/10/2015.  
3.CE/Infra II/EE-IV/Vendor/29405 dt:-24.07.2015  
4.PNBO /CM / L-7500154813/2189 dt. 28/07/2017. (BIS Certification)  
5. The Gazette of India, (MoP-Notification) dt:- 17/02/2017.  
6. CE / MMC / Gr. XII / 000604 dt.- 23/02/2017.

Dear Sir,

In connection to above, this office is in receipt of your proposal , regarding approval of GTP & Drawings of 11/0.433 kV, 100 kVA, Three Phase Distribution Transformer, ONAN, (Indoor and Outdoor Type) of Energy Efficient Level-2, for supply in Ag. Turnkey projects, DDF/ DPDC / SCP Schemes under 1.3 % supervision charges and to HT Consumers in MSEDCL network.

Accordingly the submitted GTP, Drawings and Type Test reports of 100 kVA , 11 / 0.433 kV , Three Phase Distribution Transformers, ONAN, (Outdoor and Indoor Type) of Energy Efficiency Level-2 , are technically scrutinized as per IS:1180 , Part I: 2014 , MSEDCL Technical specifications vide. refs. 1, 2, 3 & submitted Type Test Reports (C.P.R.I.- Bhopal).

The details of drawings of 100 kVA 11/0.433 kV ,ONAN, Distribution Transformers, (Outdoor & Indoor Type) of Energy Efficiency Level-2, are as follows:-

### Details of Drawings submitted:-

The details of drawings of the 100 kVA , 11 / 0.433 kV , Energy Efficient Level-2 , Dist. Transformer are as follows :-

Sr. no.	Title of Drawings (for 100 kVA, 11/0.433 kV )	Drawing Number (Indoor and Outdoor type)
1	Rating & Diagram Plate	SPDI / 11 / 100 /NP /03 (O/D) SPDI / 11 / 100 /NP /03 (I/D)
2	General Arrangement	SPDI / 100 / 11 /GA /01 (O/D) SPDI / 100 / 11 /GA /01 (I/D)
3	Internal Construction	SPDI / 100 / 11 / CCA /02 (O/D) SPDI / 100 / 11 / CCA /02 (I/D)
4	Technical Details Drawing	SPDI / 11/ 100 / TD /04 (O/D) SPDI / 11/ 100 / TD /04 (I/D)
5	General Arrangement & Creepage of 24 kV , 250 A, HV Bushing.	SPD / 100 / 11/ HV / 05 (O/D) SPD / 100 / 11 / HV / 05 (I/D)
6	General arrangement & creepage distance of 1.1 kV ,630 A, LV Bushing.	SPD / 100 / 11 /LV/ 06 (O/D) SPD / 100 / 11 / LV / 06 (I/D)
7	Silica Gel Breather.	SPD / 100 / 11 /Silica /07 (O/D) SPD / 100 / 11 /07 (I/D)

### Details of Type Test Reports:-

The Type Test reports of 100 kVA Three Phase, 11/0.433 kV Dist. Transformer of the tests conducted at E.R.D.A.- Vadodara & C.P.R.I.- Bhopal, for Energy Efficient Level-2, submitted vide ref.no.1 is verified with original are as follows:-

Sr.No	Type Test Particulars	Type Test Report No. & date	
		11 kV , 100 kVA	Place of Testing
1	Lightening Impulse Test [IS:2026 (Part 3)]	2017/STL/766 , dt:-22/08/2017	C.P.R.I.-Bhopal
2	Temperature Rise Test	2017/STL/766 , dt:-22/08/2017	C.P.R.I.-Bhopal
3	Short Circuit withstand test	RP-1718-024353 , dt:-22.08.2017	E.R.D.A.- Vadodara
4	Pressure Test	RP-1718-025300 , dt:-28.08.2017	E.R.D.A.- Vadodara
5	Oil Leakage Test	RP-1718-025300 , dt:-28.08.2017	E.R.D.A.- Vadodara

The submitted Type Test report ( 2017/STN-1/766 , dt:- 22/8/17 ; RP-1718-024353, dt:- 22.08.17 ; RP-1718-025300 , dt:- 28.08.17) are of Energy Efficient Level-2 and as per IS:1180 (Part-I) , 2014 with amendment No.1 & 2 ; are within the stipulated validity of 5 years.

*The offered / submitted GTP and drawings were technically scrutinized as per IS:1180 , Part I: 2014 the relevant IS , submitted Type Test Report (C.P.R.I.-Bhopal) and MSEDCL Technical specifications vide ref.no.3. and are generally found in order.*

**BIS Certificate issued by BIS , Gultekdi , Pune:-**


The submitted BIS Certificate bearing License No. L-7500154813 dt. 28/07/2017. Vide ref .no. PNBO/CM/L-7500154813/2189 dt. 28/07/2017. (BIS Certification for Level-2) , valid from 26/07/2017 to 25/07/2018 , as per IS :1180 , Part-I:2014 issued by BIS ,Gultekdi, Pune is also verified.

CE (MM Cell), H.O. Mumbai vide.ref. 6 ; in continuance to Govt of India (MoP), Gazette Notification vide ref.no.5 ; has made it mandatory to procure / accept Distribution Transformers of Energy Efficient Level-2 of IS:1180 (Part I):2014 **from 1<sup>st</sup> July 2017 onwards.**

*The offered / submitted GTP and drawings were technically scrutinized as per IS:1180 , Part I: 2014 the relevant IS , submitted Type Test Report (C.P.R.I.-Bhopal), MSEDCL Technical specifications vide ref.no.1,2,3 along with BIS certification for level-2 and are generally found in order, hence accorded approval.*

However this approval shall not relieve you from the responsibility and liability to ensure correctness of the drawings and its correct interpretation for meeting the requirements as per MSEDCL Tender Technical specifications and latest amended IS Specifications. The Distribution Transformers shall conform to IS: 1180 (Part 1): 2014 amended up to date or other International Standards for equal or better performance. The design, manufacture and performance of the equipment shall comply with all currently applicable statutes, regulations and safety codes. Nothing in this specification shall be construed to relieve the bidder off his responsibilities.

This approval is accorded to M/s Shivshakti Power Device India Pvt Ltd, Narhegaon,Pune for acceptance / purchase of BIS certified 100 kVA, 11/0.433 kV, CRGO Core , ONAN , Three Phase Distribution Transformers, Indoor & Outdoor Type of Energy Efficient Level-2, as per IS:1180 (Part I): 2014 for Tenders /works; i.e. for Ag. Turnkey projects, DDF / DPDC / SCP Schemes under 1.3 % supervision charges and to HT Consumers in MSEDCL network. This Approval is not applicable to schemes / projects sanctioned under Infra plan / IPDS / DDUGJY.

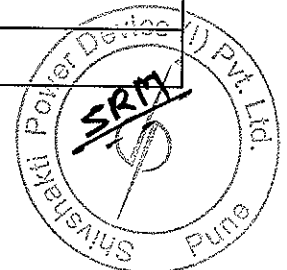
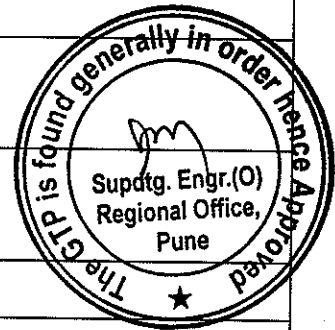
  
**Superintending Engineer (O)**  
**MSEDCL, Pune Region**

**Copy S.w.rs.to:-**

Regional Director, MSEDCL Pune / Kokan / Aurangabad / Nagpur Regions.

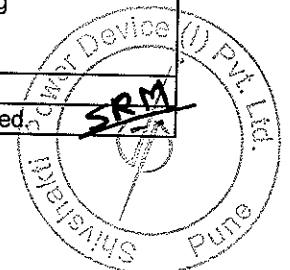
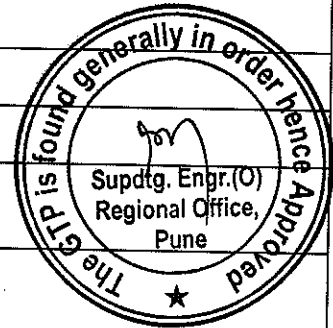
MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED.  
RATING 100 KVA 11KV/0.433 KV Level '2' DISTRIBUTION TRANSFORMER  
GUARANTEED TECHNICAL PARTICULARS

SR NO	GTP PARAMETERS	OFFERED
1	Name of Manufacturer.	M/s Shivshakti Power device (India) Pvt Ltd, Pune
2	Reference Standard	IS 1180 (Part):2014
3	MSEDCL Specification Reference	CE/MMC/MS-C-I/3Phase (25-200KVA)/DT/T/2017/01, Dated 05.01.2017
4	Whether transformer is Oil Natural Air Natural cooled type(Yes/ No)	Yes
5	Whether transformer is suitable for Indoor /Outdoor installation	outdoor
6	Type of transformer	Level-2
7	Energy Efficiency Level As per IS 1180 part: 1	Non- sealed Type Transformer
8	BIS License No.	CM/L-7500154813
9	Rating of transformer in KVA	100KVA
10	Primary Voltage in kV	11 KV
11	Highest System Voltage	12 KV
12	Frequency in HZ	50 HZ
13	Secondary Voltage in kV	0.433 KV
14	Rated Primary Current in Amp	5.24 Amp
15	Rated Secondary Current in Amp	133.34 Amp
16	Impedance Voltage at 75 degree Centigrade	4.5+/-10 % Tol As per IS.
17	Whether neutral is solidly earthed (Yes/ No)	Yes
18	Colour of transformer	Air Craft Blue Shed No 108 IS-5; Powder coated
19	Vector Group	Dyn 11
20	Rated Basic Insulation Level for Rated voltage-HV	28KVrms/75Kvp
21	Rated Basic Insulation Level for Rated voltage-LV	3 KVrms
22	Maximum Temperature rise of top oil over an Ambient Temperature of 50 Degree celcius	35 degree celcius
23	Maximum Temperature rise of winding over an Ambient Temperature of 50 Degree celcius	40 degree celcius
24	Name Plate details are as per the requirement specified in tender	Yes
25	Thickness of Name plate & material used	18 SWG / Alluminium Anodized
26	Approximate overall length of transformer in mm	1170 mm
27	Approximate overall breadth of transformer in mm	850 mm
28	Approximate overall height of transformer in mm	1550mm
29	Approximate length of transformer tank in mm	915mm
30	Approximate breadth of transformer tank in mm	350mm
31	Approximate height of transformer tank in mm HV/LV	885mm-925 mm
32	Thickness of the side of transformer Tank plate in mm	3.15 mm
33	Thickness of the bottom of transformer tank plate in mm	5mm
34	Thickness of the top of transformer tank plate in mm	5mm



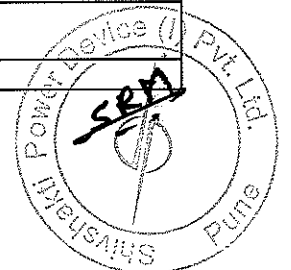
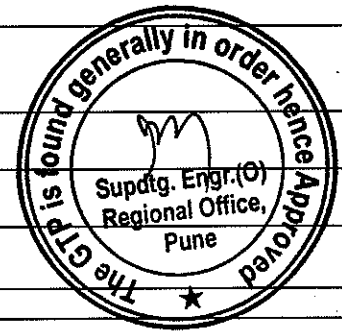
MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED.  
RATING 100 KVA 11KV/0.433 KV Level '2' DISTRIBUTION TRANSFORMER  
GUARANTEED TECHNICAL PARTICULARS

SR NO	GTP PARAMETERS	OFFERED
35	Size of reinforced welding Angle to Transformer tank in mm	50X50X5
36	Type of Tank (corrugated/conventional)	Conventional
37	In case of corrugated tank , thickness of corrugated sheet (In Mm)	NA
38	Degree of slope to the top plate of Transformer.	5 to 10 Degree
39	Shape of Transformer Tank	Rectangular
40	Weight of Tank & fittings in Kgs	152Kg
41	Total Weight of Transformer in kgs	705Kg
42	In case of corrugated tank , thickness of corrugated sheet (In Mm)	Not Applicable
43	Size of Base channel provide to tank	75x40 mm -2 nos
44	No of Roller provided to Transformer ( diameter & width)	NA
45	Marking as MSEDCL & Sr No of tranformer is engraved on transformer main tank	Yes
46	Conservator tank to the transformer with oil level indicator (showing three levels) and drain plug is provided ( Yes/ No)	Yes
47	Size of Conservator tank in mm	600X230mm
48	Total Volume of Conservator Tank	24.92Liters
49	Rating and Diagram Plate	01No
50	Eathing terminals with lugs	2No,8SWG size on opposite side
51	Lifting lugs	4Nos, 12mm-2Nos,8mm Top lifting-2Nos
52	Pullings lugs	4 Nos,8mm
53	Oil filling hole with metallic cap (on conservator)	1 No , 40mm diameter
54	Draing Valve - 32mm for all T/Fs (It shall be covered with metallic box spot welded to tank ) IS554	Yes
55	Filter Valve (32mm Dia)	yes
56	Conservator with drain plug	Yes
57	The pipe connecting the conservator to the main tank	yes,2Nos, 33mm diameter
58	Thermometer pocket with cap	yes,1No.
59	Air release device	yes,1No.
60	Explosion vent with diaphragm	yes
61	Silica Gel Breather 250/500gms with make	1No,250gram., Press _N Forge , Yashwant Scientific Industries , Ghorpade Industries , Darshan Sales , Shreeji.
62	Platform mounting channel (with hole suitable for axle of rollers)	2No, 75 x 40 mm-460mm long
63	Oil level gauge indicating 3 positions of oil marked asMinimum(-) 5deg C, Normal 30 deg C,Maximum 98 deg C	Yes, Provided as per specification.
64	HT & LT bushing and terminal connectors	3No of HT bushing & 4 No of LT bushing
65	Radiators	Yes
66	Lightening Arrestors for HT bushings	9KV,5KA Lighting arrestors-3Nos provided



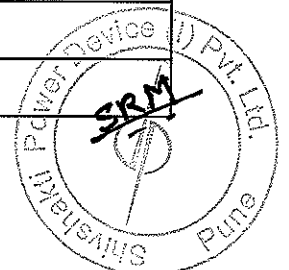
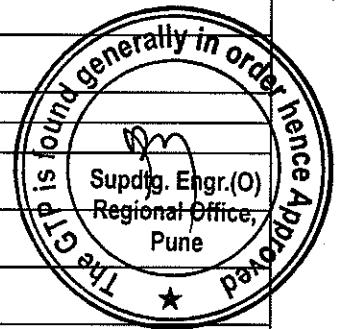
**MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED.  
RATING 100 KVA 11KV/0.433 KV Level '2' DISTRIBUTION TRANSFORMER  
GUARANTEED TECHNICAL PARTICULARS**

SR NO	GTP PARAMETERS	OFFERED
67	Rating of lightning Arrester And make thereof	9KV,5 KA, Elpro / RPG/ New Aquaria/Genesis/Shreem Electricals / Orange Power /Lamco
68	Reference Standard Of Lightning Arrester	IS:3070, 1974
69	No of radiators provided and location with arrangement	2 Nos On HV Side each having 5 fins
70	Thickness of the radiator of transformer in mm	1.25 mm
71	No of radiator fins.	10 Nos.
72	Radiating surface of transformer tank only in Sq. Mtrs.(A)	2.28Sq. Mtrs.
73	Radiating surface of Radiators in Sq. Mtrs.(B)	3.35Sq. Mtrs
74	Total Radiating surface of Transformer tank in Sq. Mtrs.(A+B)	5.635 Sq. Mtrs
75	Core material used & its grade	CRGO, M-4
76	Thickness of core lamination in mm	0.27mm
77	Type of core	Stack
78	No. of steps of core for CRGO core	11Nos.
79	Weight of Core in kgs	230Kgs
80	Weight of winding in Kg	130Kg
81	Diameter of core in mm	119.9 mm
82	Effective core area.(sq.cm)	104.47 Sq. cm
83	Flux density in Tesla	1.5Tesla
84	Material of H.V. winding	Aluminium
85	Material of L.V.Winding	Aluminium
86	Current density of H.V. winding (in Ampere/ sq.mm)	1.55A / mm <sup>2</sup>
87	Current density of L.V. Winding (in Ampere/mm <sup>2</sup> )	1.01 A / mm <sup>2</sup>
88	The temperature shall in no case reach a value that will damage the core itself, other parts or adjacent materials (Yes/No)	Yes
89	Type of connection for H.V. Winding (Delta) (Yes/ No)	Yes
90	Type of connection for L.V. Winding (Star) (Yes/ No)	Yes
91	Insulation provided to H.V winding.	D.P.C.
92	Insulation provided to L.V. Winding.	D.P.C.
93	No of LV winding turns	72 Nos
94	No of HV winding turns	3168 Nos
95	Resistance of LV winding per phase at 20 deg C in ohms	0.008156 ohm
96	Resistance of HV winding per phase at 20 deg C in ohms	18.92 ohm
97	Whether taps are provided on HV side	NA
98	Size of Wire used for HV winding in mm ( DIA)	2.1 mm
99	Cross section area of the coil used for HV winding ( sq.mm)	3.4 sq. mm
100	Size of strip used for LV winding in mm	12.6 X 5.20 mm
101	No. of conductors in parallel for LV winding	2Nos.
102	Total cross section area of LV conductor in sq. mm	131.04Sq. mm
103	No. of H.V coils /phase	4 Nos.



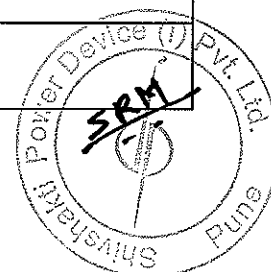
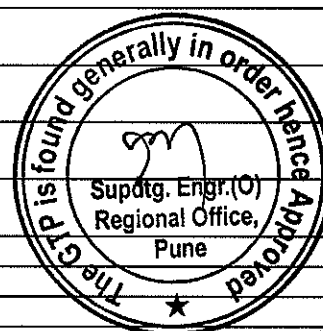
MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED.  
RATING 100 KVA 11KV/0.433 KV Level '2' DISTRIBUTION TRANSFORMER  
GUARANTEED TECHNICAL PARTICULARS

SR NO	GTP PARAMETERS	OFFERED
104	No. of L.V coils /phase	1 Nos.
105	Length of coil used in HV winding in Meter	2349mtrs /ph
106	Length of coil used in LV winding in Meter	33.7mtrs/ph
107	Clearance between Core & L.V. winding in mm	4 mm Radial
108	Clearances between L.V. & H.V. winding in mm	11mm Radial
109	Clearances between HV Phase to Phase in mm	10 mm (Min.)
110	Clearances between end insulation to Earth in mm	30 mm
111	Clearances between winding to tank in mm ( Min 30MM)	30mm
112	Weight of Aluminium in kgs	130 Kg
113	Inter layer insulation provided in H.V winding to design for Top & bottom layer	0.10 mm,EC Grade Paper
114	Inter layer insulation provided in L.V winding to design for Top & bottom layer	0.25 mm.,EC Grade Paper
115	Inter layer insulation provided in between all layer in H.V winding	0.1mm.,EC Grade Paper
116	Inter layer insulation provided in between all layer in L.V winding	0.25 mm.,EC Grade Paper
117	Thickness of LV & HV Paper Used	2 Mil For HV & 10 Mil for LV
118	Details of end insulation & Make there of	press board , Lamtex Insulation , Energy Insulation , Alco wire Industries , Star Trading , Raman Board
119	Whether wedges are Provided at 50% turns of the Coil (Yes/ No)	No
120	Insulation materials provided for core	Carlit , Hot Oil Proof Insulation
121	Thickness of locking spacers between H.V. coils ( in mm)	10mm
122	Weight of Oil in kgs	193 Kgs.
123	Volume of Oil in Ltrs	235 Ltrs.
124	Quantity of Total Oil absorption( in Liters ) in first filling	11Ltrs
125	Total Oil Volume Including Total Oil absorption in Liters	246 Ltrs
126	Breakdown Values of Oil at the time of first filling (kV/mm) considering 2.5 mm gap	60 Kv for 1 minute withstand
127	Grade of oil	EHV Grade, IS 335
128	Make of oil	Apar, Columbia, Savita, Transol, Electrol, Servo
129	Material of HV and LV Bushings and makes thereof	Porcelain, CJI/ Genesis Insulator/ Shreeji Group/ Udyog Center/ JS Insulators.
130	Reference standard of Bushings	As per IS 3347 , 8603
131	Minimum Creepage Distance of HV Bushing in mm (min.25 mm per kV)	Yes 300 mm
132	Minimum Creepage Distance of LV Bushing in mm (min.25 mm per kV)	Yes 25mm
133	Rating of H.V. Bushings ( in kV/A)	12 KV / 250 A
134	Rating of L.V. Bushing (in kV, A )	1KV / 250A
135	Min. External clearances of H.V. bushing terminals between ph. to ph. (330 mm)	255mm
136	Min. External clearances of H.V. bushing terminals between ph. to earth (230mm)	140mm
137	Min. External clearances of L.V. bushing terminals between ph. to ph. (75 mm)	75 mm
138	Min. External clearances of L.V. bushing terminals between ph. to earth (40 mm)	40 mm



**MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED.**  
**RATING 100 KVA 11KV/0.433 KV Level '2' DISTRIBUTION TRANSFORMER**  
**GUARANTEED TECHNICAL PARTICULARS**

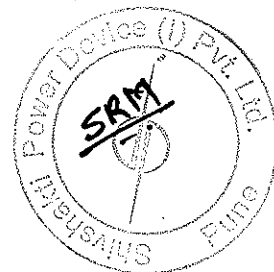
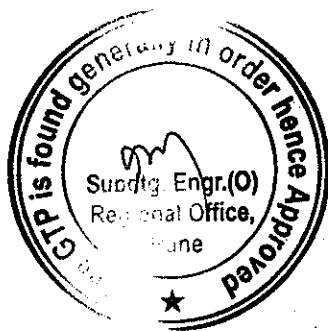
SR NO	GTP PARAMETERS	OFFERED
141	Magnetizing current (No load) in Amps and its % of full load current at rated voltage referred to L.V. side. (CI No-6.1)	5.33 Amp, 2% of LV Current
142	Magnetizing current (No load) in Amps and its % of full load current at maximum voltage (112.5% of rated voltage) referred to L.V. side. (CI No-6.1)	10.66Amps, 4% of LV Current
143	Total Losses at 50 % Loading	475watts
144	Total Losses at 100 % Loading	1650watts
145	Efficiency at 75 °C at unity P.F. at 125% load	98.35%
146	Efficiency at 75 °C at unity P.F. at 100% load	98.68%
147	Efficiency at 75 °C at unity P.F. at 75 % load	99.00%
148	Efficiency at 75 °C at unity P.F. at 50% load	99.08%
149	Efficiency at 75 °C at unity P.F. at 25% load	99.67%
150	Efficiency at 75 °C at 0.8 P.F. lag at 125% load	98.25%
151	Efficiency at 75 °C at 0.8 P.F. lag at 100 % load	98.35%
152	Efficiency at 75 °C at 0.8 P.F. lag at 75 % load	98.75%
153	Efficiency at 75 °C at 0.8 P.F. lag at 50 % load	98.85%
154	Efficiency at 75 °C at 0.8 P.F. lag at 25% load	99.58%
155	Efficiency at 75 °C at 0.8 P.F. leading at 125% load	98.25%
156	Efficiency at 75 °C at 0.8 P.F. leading at 100% load	98.35%
157	Efficiency at 75 °C at 0.8 P.F. leading at 75% load	98.75%
158	Efficiency at 75 °C at 0.8 P.F. leading at 50%load	98.85%
159	Efficiency at 75°C at 0.8 P.F. leading at 25 % load	99.58%
160	Regulation at Unity P.F (in %)	0.97
161	Regulation at 0.8 P.F. lag. (in %)	3.89
162	Regulation at 0.8 P.F. leading. (in %)	-2.2
163	Separate source power frequency withstand test for HV for 1 minute in kv(min) for Transformer	50 kV
164	Separate source power frequency withstand test for LV for 1 minute in kv(min) for Transformer	3 KV
165	Induced over voltage withstand test for 1 min. specify voltage frequency, time for test.(Transformer)	0.866 kV for 1 min at 100 Hz
166	Impulse test value (in KVp) for Transformer.	95 kVp
167	Power frequency withstand voltage dry & wet in kV(rms) for H.V Bushing	28 KV for one minute
168	Dry lightning impulse withstand voltage test in kV (peak) Stating the wave form adopted for H.V. bushing	95 KV duration of 1.2/50 micro seconds
170	BIS Licence Copy is attached with this offer	Yes
171	All type test report of type tests carried out on transformer at NABL laboratory shall be submitted along with GTP and soft copy	Yes
173	All drawings shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes
174	Oil absorption calculation sheet shall be furnished for each offered item separately along with GTP (Yes/ No)	Yes





MAHARASHTRA STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED.  
RATING 100 KVA 11KV/0.433 KV Level '2' DISTRIBUTION TRANSFORMER  
**GUARANTEED TECHNICAL PARTICULARS**

SR NO	GTP PARAMETERS	OFFERED
175	Heat dissipation calculation shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes
176	Flux density calculation sheet with no. of Primary & Secondary turns shall be furnished for each offered item separately along with this offer (Yes/ No)	Yes
177	The performance Guarantee of the transformers in years	5 yrs from the date of commissioning
NOTE 1) Weights and Dimensions are subjected to +10% tolerance. No negative tolerance applicable		
2) Efficiency and Regulation are calculated based on the nominal values of NLL,LL@75 DEG.C., %Z @75 DEG.C		



**EFFICIENCY CALCULATION SHEET**

Kva Ratio	100 11/0.433 kV	NLL		Total losses at 50% loading		Total losses at 100% loading		Watts	
		325 Watts	1166 Watts	465 Watts	1340 Watts				
		LL @ 100%		Efficiency at 0.8 PF Leading & lagging					
		Efficiency at UPF		Efficiency at 0.8 PF Leading & lagging					
Efficiency at 100% loading at UPF		Output/Output+Losses kVA/kVA*PF+(NLL+LL) 100/100+(1340) 98.6800%	0.9868	Efficiency at 100% loading	Output/Output+Losses kVA/kVA*PF+(NLL+LL) 80/80+(1340/1000) 98.35	0.983526	Efficiency at 100% loading	Output/Output+Losses kVA/kVA*PF+(NLL+LL) 100/100+(2093.75/1000) 98.2587%	0.982587
Efficiency at 125% loading at UPF		Output/Output+Losses kVA/kVA*PF+(NLL+LL) 125/125+(1.25*1.25*1340/1000) 98.3500%	0.9835	Efficiency at 125% loading	Output/Output+Losses kVA/kVA*PF+(NLL+LL) 120/120+(0.325+1.163) 98.7593%	0.987593	Efficiency at 125% loading	Output/Output+Losses kVA/kVA*PF+(NLL+LL) 120/120+(0.325+1.163) 98.7593%	0.987593
Efficiency at 75% loading at UPF		Output/Output+Losses kVA/kVA*PF+(NLL+LL) 75/75+(753.75/1000) 99.0000%	0.99	Efficiency at 75% loading	Output/Output+Losses kVA/kVA*PF+(NLL+LL) 50/50+(465/1000) 99.0800%	0.9908	Efficiency at 75% loading	Output/Output+Losses kVA/kVA*PF+(NLL+LL) 20/20+(83.75) 99.5830%	0.99583
Efficiency at 50% loading at UPF		Output/Output+Losses kVA/kVA*PF+(NLL+LL) 50/50+(465/1000) 99.0800%	0.9908	Efficiency at 50% loading	Output/Output+Losses kVA/kVA*PF+(NLL+LL) 25/25+(83.75/1000) 99.6700%	0.9967	Efficiency at 50% loading	Output/Output+Losses kVA/kVA*PF+(NLL+LL) 20/20+(83.75) 99.5830%	0.99583
Efficiency at 25% loading at UPF		Output/Output+Losses kVA/kVA*PF+(NLL+LL) 25/25+(83.75/1000) 99.6700%	0.9967	Efficiency at 25% loading			Efficiency at 25% loading		



**HEAT DISSIPATION CALCULATION**

FOR 100KVA /11000 / 433Volts DISTRIBUTION TRANSFORMER.

TANK SIZE: (MM)

LENGTH	WIDTH	HEIGHT
915	350	905

RADIATOR SIZE:

CENTRE	WIDTH	FINS/RADIATOR	NO OF RADIATORS.
700	235	5	2

CALCULATION.

$$\begin{aligned} \text{TANK AREA} &= 2(L+B) \times H \times 1/10000 = 2[915 + 350] \times 905 \times 1 / 1000000 \\ &= 2.29 \text{ SQ. MTR.} \\ &= \text{HEAT DISSIPATION @ 500 WATTS / SQ.MTS.} \end{aligned}$$

$$\begin{aligned} \text{WATTS DISSIPATED BY TANK SURFACE ONLY.} &= (\text{TANK AREA IN SQ.MTS}) \times 500 \\ &= 2.29 \times 500 \\ &= 1145 \text{ WATTS.} \end{aligned}$$

$$\begin{aligned} \text{TOTAL LOSSES OF TRANSFORMER} &= \text{NO LOAD LOSS (MAX)} + \text{LOAD LOSS. @ 75 C (MAX)} \\ &= 1650 \text{ WATTS.} \end{aligned}$$

RADIATOR HEAT DISSIPATION AS PER TABLE ATTACHED FOR 35 DEGREE = 123 WATTS  
CORRECTION FACTOR FOR RADIATOR AS PER TABLE ATTACHED .

A) NO OF FINS PER RADIATOR	5 NOS	K1	1.0
B) HORIZONTAL DISTANCE BETWEEN TWO RADIATORS	700 MM	K2	1.00
C) VERTICAL DISTANCE BETWEEN RADIATOR CENTRE AND CORE CENTRE.	100 MM	K3	0.85

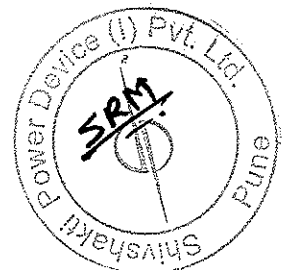
$$\begin{aligned} \text{EFFECTIVE CORRECTION FACTOR FOR RADIATOR DISSIPATION} &= K1 \times K2 \times K3 \\ &= 1.0 \times 1.00 \times 0.85 \\ &= 0.85 \end{aligned}$$

$$\begin{aligned} \text{EFFECTIVE WATTS DISSIPATED BY ONE RADIATOR FIN AFTER CORRECTION FACTOR} \\ &= \text{WATTS DISSIPATED BY RADIATOR} \times \text{CORRECTION FACTOR.} \\ E &= 123 \times 0.85 = 104.55 \text{ WATTS.} \end{aligned}$$

$$\begin{aligned} \text{WATTS DISSIPATED BY ALL RADIATOR FIN} \\ &= \text{NO OF FINS / RAD} \times \text{EFFECTIVE WATTS DISSIPATED BY RADIATOR} \\ &= 10 \times 104.55 = 1045 \text{ WATTS.} \end{aligned}$$

$$\begin{aligned} \text{TOTAL LOSS DISSIPATED BY TANK WALL SURFACE AND RADIATOR.} \\ &= 1145 + 1045.5 = 2190.5 \text{ WATTS} \end{aligned}$$

**FINAL RESULTS** HEAT DISSIPATION REQUIRED = 1650 WATTS  
HEAT DISSIPATION PROVIDED = 2190.5 WATTS



**SHIVSHAKTI POWER DEVICE INDIA PVT. LTD.**  
MANUFACTURE'S OF DISTRIBUTION TRANSFORMERS

Off : 56/2, Sai Sadan Society, Santnagar, Pune - 411 009, Tel. : 020 - 32414142, 9373366633

Factory : Sr. No. 45/35, Narhe Industrial Estate, Narhe Gaon, Pune - Maharashtra. 411 041, Tel. : 32414142, 9373344433

E-mail : shivshaktiudycg@rediffmail.com • info@shivshaktipower.com • shivshaktipowerdevice@gmail.com

FLUX DENSITY CALCULATION

**11KV/ 100KVA /0.433KV, OUT DOOR, OIL COOLED DISTRIBUTION TRASFORMER**

Details	LV Voltage	433 volts
	LV Phase Voltage	433/1.732= 250 Volts
	LV Connection	Star
	LV Turns	72 Nos
	Core Diameter	119.9mm
	Core Details:-	

Step No	Width	Stack	Area (Sq. cm)
1	115	33.9	3898.5
2	110	13.18	1449.8
3	105	10.2	1071
4	100	8.3	830
5	95	7	665
6	85	11.4	969
7	75	9	675
8	65	7.2	468
9	55	5.8	319
10	45	4.55	218.4
11	43	4.8	206.83
Total area			10770/100
Total Gross area = Sq. cm			107.70
Stacking Factor =			107.70 X0.97
Total Stacking Factor			104.47
Net Area Sq. cm			104.47

Volt / Turn (250/72) = 4.44 x F x Flux density x Net area x 10000

Flux Density = 
$$\frac{250/72 \times 10000}{4.44 \times 50 \times 104.47}$$

= 1.497 Tesla =1.5 Tesla.

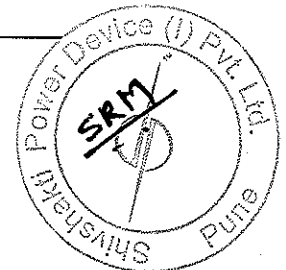
At 112.5%

Voltage = 250 X 1.125 = 281.25

V/T = 281.25/72 = 3.90

Flux Density = 
$$\frac{281.25/72 \times 10000}{4.44 \times 50 \times 104.47}$$

Flux Density = 1.684 Tesla



**SHIVSHAKTI POWER DEVICE INDIA PVT. LTD.**

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Factory : Sr. No. 46/35, Narhe Industrial Estate, Narhe Gaon, Pune - Maharashtra. 411 041. Tel. : 32414142, 9373344433

E-mail : shivshaktiudycog@rediffmail.com • info@shivshaktipower.com • shivshaktipowerdevice@ gmail.com

## Oil Absorption Calculation

Rating: 100 KVA

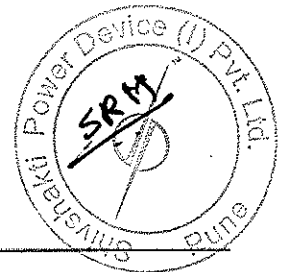
Voltage Ratio = 11000/433 V

Customer: MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LIMITED.

Sr. No.	Description	Particulars
1	First Filling of Transformer Oil Quantity (Including Conservator)	235 Ltrs
2	Core Weight	230Kgs
3	Aluminium Winding Weight	130 Kgs
4	Total Insulation used in Transformer in Kgs ( AL+Core*4%)	14.40Kgs
	<b>Total Weight in Kgs.</b>	374.40Kgs
5	Total Oil Absorption by insulation @ 2.53% in Kgs.	9.47 Kgs
6	Total Oil Absorption @ 0.86 % of insulation Weight in Ltrs	11 Ltrs
7	Total Oil in Transformer after oil absorption by Insulation in Ltrs.	224 Ltrs
	<b>Total Absorption in Ltrs.</b>	11 Ltrs

FOR:- SHIVSHAKTI POWER DEVICE INDIA PVT. LTD.

AUTHORISED SIGNATORY



**SHIVSHAKTI POWER DEVICE INDIA PVT. LTD.**  
MANUFACTURERS OF DISTRIBUTION TRANSFORMERS

Off. : 56/2, Sai Sadan Society, Santnagar, Pune - 411 009. Tel. : 020 - 32414142, 9373368633

Factory : Sr. No. 45/35, Narhe Industrial Estate, Narhe Gaon, Pune - Maharashtra. 411 041. Tel. : 32414142, 9373344433

E-mail : shivshaktiudycog@rediffmail.com • info@shivshaktipower.com • shivshaktipowerdevice@gmail.com

# DISTRIBUTION TRANSFORMER

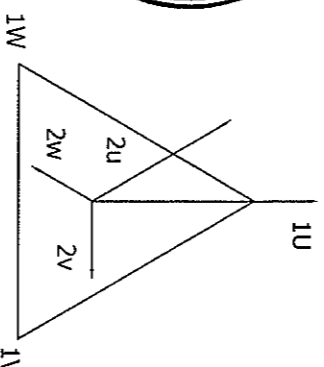
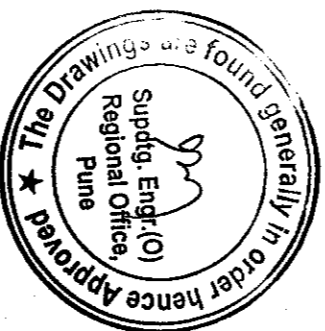
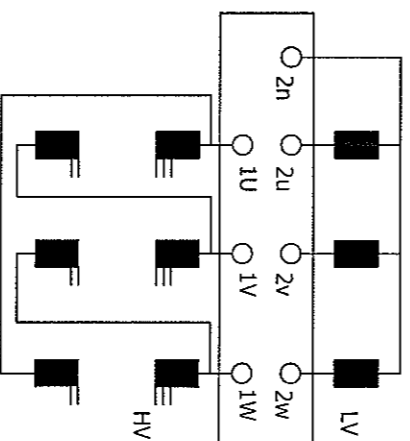
SHIVSHAKTI POWER DEVICE INDIA PVT. LTD.  
S.NO.46/35 NARHE INDUSTRIAL AREA PUNE -46

PHASE TRANSFORMER

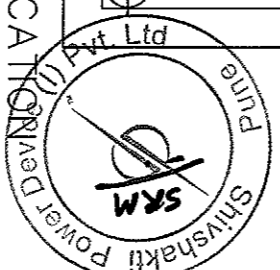
STANDARD	<input type="text" value="IS 1180(PART-1)"/>	ENERGY EFFECIENCY LEVEL	<input type="text" value="2"/>
KVA	<input type="text" value="100"/>	MAX. TOTAL LOSSES AT 50% RATED VOLTAGE	<input type="text" value="475"/>
VOLTS AT NO LOAD	HV <input type="text" value="11000"/> LV <input type="text" value="433"/>	MAX. TOTAL LOSSES AT 100% RATED VOLTAGE	<input type="text" value="1650"/>
AMPERS	HV <input type="text" value="5.24"/> LV <input type="text" value="133.34"/>	TYPE OF COOLING	<input type="text" value="ONAN"/>
FREQUENCY	<input type="text" value="50"/> HZ	TEMP. RISE	OIL °C <input type="text" value="35° C"/> WDG ° C <input type="text" value="40° C"/>
VECTOR GROUP	<input type="text" value="Dyn11"/>	VOLUME OF OIL	<input type="text" value="235"/> Ltrs.
IMPEDANCE VOLTS %	<input type="text" value="4.50 %"/>	WEIGHT OF OIL	<input type="text" value="193"/> Kg
TAPPING	<input type="text" value="NA"/>	WEIGHT OF CORE & COIL ASSEMBLY	<input type="text" value="360"/> Kg
GUARANTEE PERIOD	<input type="text" value="60 MONTHS"/>	TOTAL WEIGHT	<input type="text" value="705"/> Kg

SERIAL NO

CUSTOMER  
PO. NUMBER



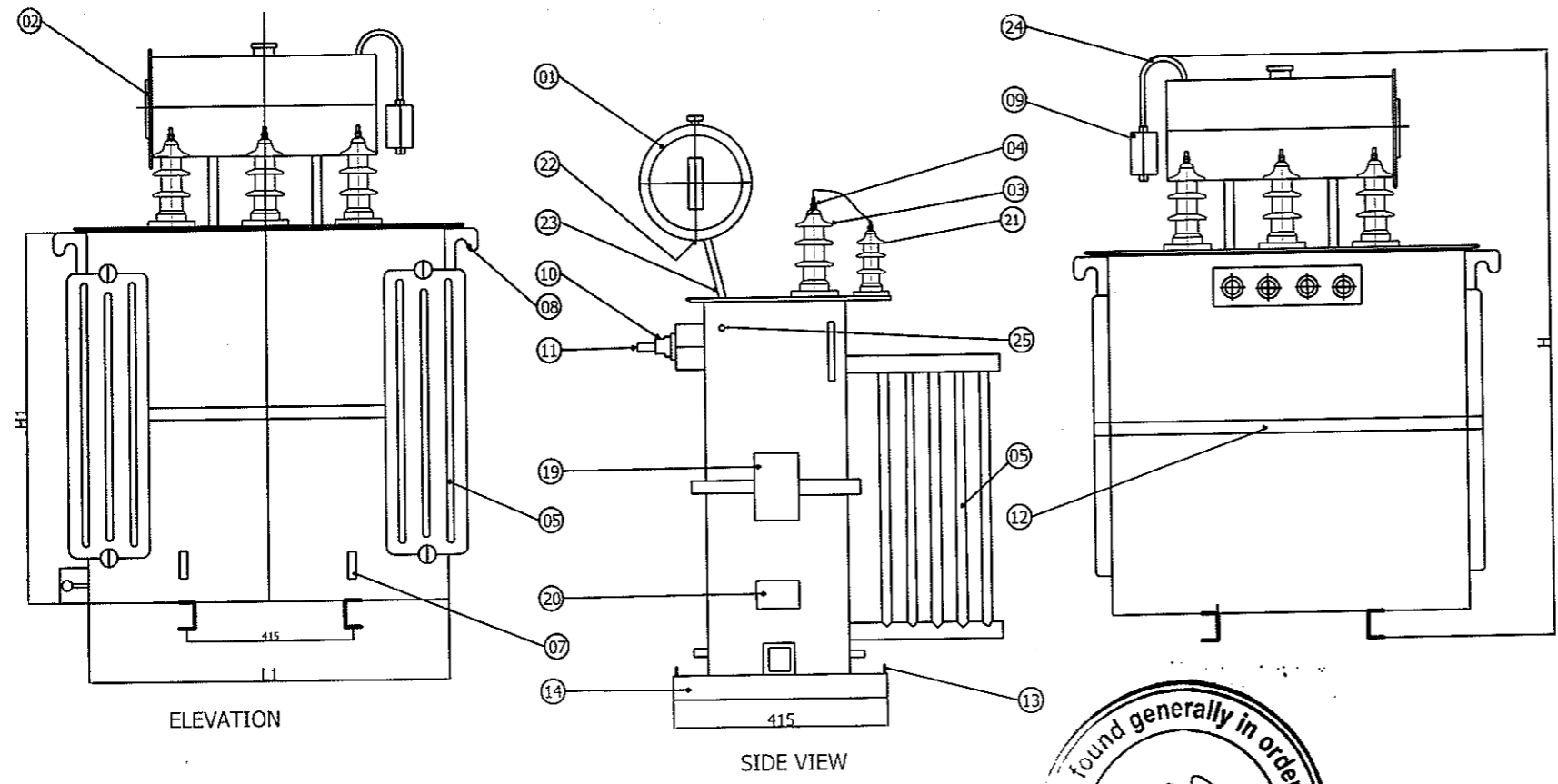
MADE IN INDIA



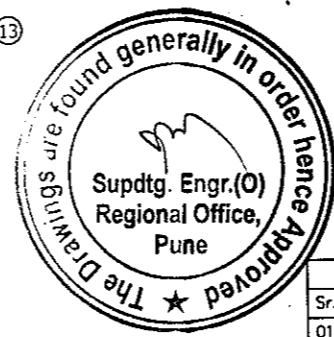
THIS 200 KVA TRANSFORMER IS MEANT ONLY FOR BIS CERTIFICATION WHICH IS COVERD UNDER BIS GROUPING GUIDELINES.

SHIVSHAKTI POWER DEVICE (I) PVT.LTD. Sr.No.46/35 Narhe Industrial Estate, Narhe Goan, Pune -411046					
	DGN	NAME	SIGN.	DATE	
	DRN				
	CHD				
	APPD				

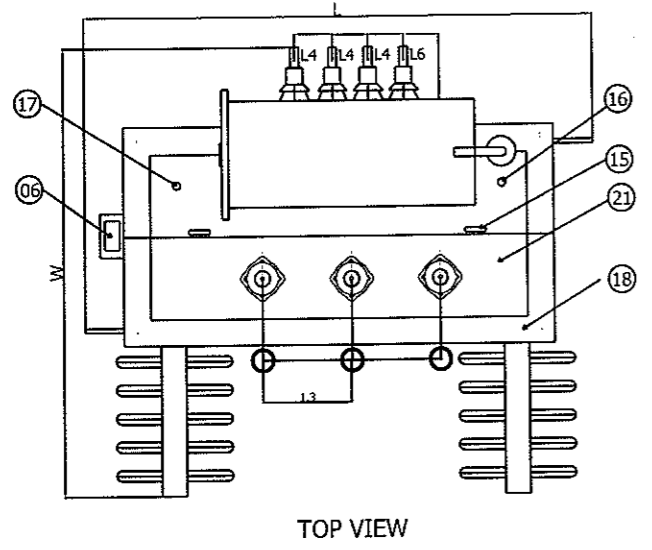
TITLE					
RATING & NAME PLATE FOR 100 KVA, 11/0.433KV, DISTRIBUTION TRANSFORMER.		SCALE : N.T.S.			
DRAWING No.		SPDI/11/100/NP/03		REV. 0	DT.



SR.NO	DESCRIPTION	MATERIAL	QTY.
1	CONSERVATOR WITH OIL FILLING HOLE 1/2" DRAIN PLUG.	M.S.	1
2	OIL LEVEL GAUGE WITH 3 POSITIONS (5,30,98)	M.S.	1
3	HV BARE BUSHINGS - 12KV, 250A	PORCELAIN	3
4	HV TERMINAL -12KV, 250AMPS.12mm.	BRASS	3
5	COOLING RADIATORS 700 C\C X236 WIDE X 05 FINS.	1.25 MM	2
6	DRAIN VALVE -32 MM	T-TYPE	01
7	TANK PULLING LUGS-6MM	M.S.	4
8	TANK PULLING LUGS-8MM	M.S.	2
9	SILICA GEL BREATHER -250 GRMS.	POLYPROPOLINE	1
10	LV BARE BUSHINGS - 1.1KV.250AMPS.	PORCELAIN	4
11	LV TERMINALS -250 AMPS.12MM	BRASS	4
12	REINFORCING ANGLES - (50X 50X 5)	M.S.	1
13	EARTHING TERMINAL 12 MM WITH LUGS 95MM	M.S.	2
14	TRANSFORMER BASE CHANNEL 75MMX 40MM.	M.S.	2
15	COVER LIFTING LUGS-8 MM	M.S.	2
16	THERMOMETER POCKET	M.S.	1
17	AIR RELEASE PLUG Ø30MM	M.S.	1
18	TANK & COVER FIXING WITH GL. BOLTS : NUTS & 14MM.	M.S.	-
19	RATING & COVER FIXING WITH GL. BOLTS:NUTS & 14MM	A/U ANODISED	1
20	TOP COVER	M.S.	1
21	LIGHTNING ARRESTER 9KV.(VRMS) 5KA.	PORCELAIN	3
22	DRAIN Ø30MM LUG FOR CONSERVATOR.	M.S.	1
23	CONSERVATOR PIPE Ø32MM	M.S.	2
24	BREATHER CONNECTION PIPE Ø20MM	M.S.	1
25	LOCKING BUSH.	M.S.	4



\* MARKED ITEM ARE NOT FITTED DURING TYPE TEST



COOLING DETAILS		
Sr.No.	TANK	RADIATOR
01.	TOTAL SURFACE AREA (TANK + RADIATOR) 2.28 Sq.M + 3.35 Sq. M =5.635 Sq.M	
02	TOTAL No. OF COOLING FINS 10 nos.	
03	H x W - OF FINS (HV SIDE) 700 x 236 x 5 FINS - 2 Nos.	

4 BUSHING CLEARANCE (MIN)			
L3 (HV)	255	PH. TO PH.	
L4 (LV)	75	PH. TO PH.	
L5 (HV)	140	PH. TO EARTH	
L6 (LV)	40	PH. TO EARTH	

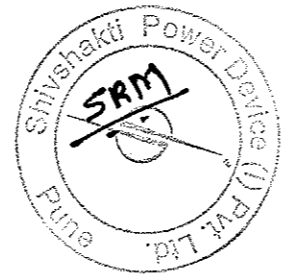
5 CONSERVATOR			
DIA - d	230	mm	
LENGTH - l	600	mm	
CAPACITY	24.92	Ltrs	

1	Sr.No.	DESCRIPTION	Wt in Kg	TRANSFORMER DIMENSIONS IN MM	
	i	CORE & WINDING	360	OVERALL	TANK(MIN)
	ii	TANK & FITTING	152	L - 1170	L1 - 915
	iii	OIL WEIGHT	193	W - 850	W1 - 350
	iv	TOTAL WEIGHT	705	H - 1550	H1 - 885/925
	v	TOTAL OIL QTY.	235 Ltrs.		

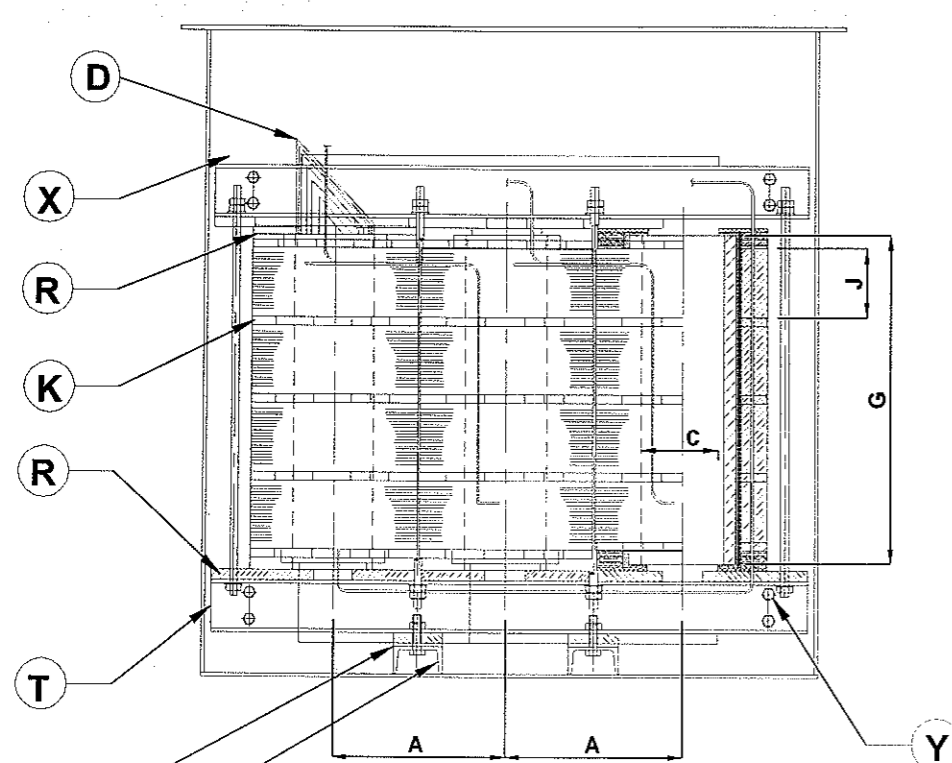
  

2	THICKNESS IN mm	DIMENSION TOLERANCE	
	TANK WALL	3.15	T/F OIL QTY ON NEG
	TOP COVER	5.0	MAIN TANK DIMENSIONS = 5%
	BOTTOM PLATE	5.0	OVERALL DIMENSIONS = 10%

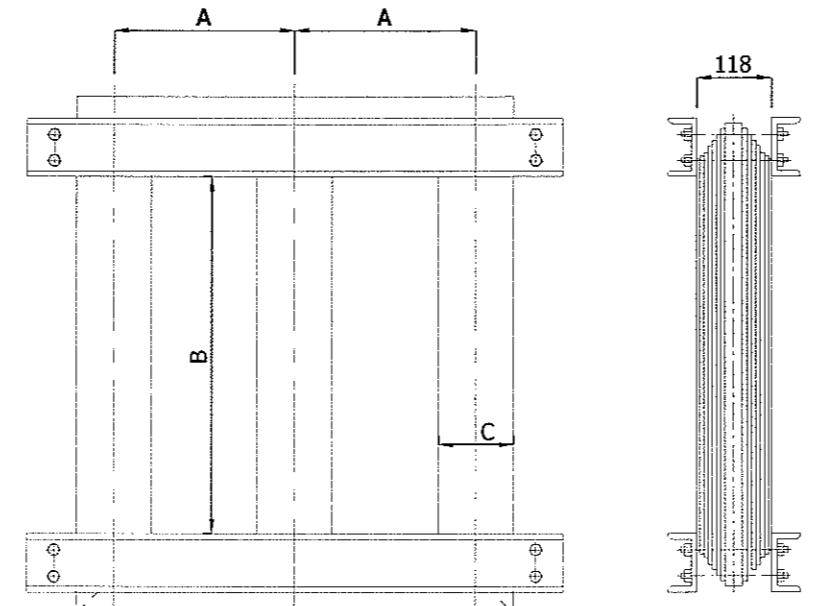
- NOTE :**
- THE PAINTING OF "MONTH & YEAR OF SUPPLY" SHALL BE DONE AS PER MAHADISCOM'S DRG. No. 63-719 AT TWO PLACES
  - NAME OF THE COMPANY ORDER No. & DATE CAPACITY MONTH & YEAR OF MFG, SHALL BE CLEARLY VISIBLE AND ENGRAVED ON
  - NEOPRENE RUBBERISED GASKET OF 5 mm THK BETWEEN TOP COVER & TANK WILL BE AS PER TYPE C OF IS 4253 PART II.
  - WIDTH OF TOP COVER BEND PLATE MIN 25 mm.
  - COLOUR : AIRCRAFT BLUE AS PER IS : 5 OF 1961. (Shade No. 108)
  - ALL INTERNAL CONNECTIONS / JOINTS ARE BREEZING & CLAMPING.
  - SLOPE OF TOWARDS LV TO HV 5°
  - MATERIAL OF TANK: MS PLATE
  - ALL DIMENSIONS ARE IN mm.
  - MAKE OF LIGHTNING ARRESTORS NEW AQUARIA / OBLEME /ORANGE
  - WELDING OPERATION TO BE CARRIED OUT BY MIG.ARP PROCESS



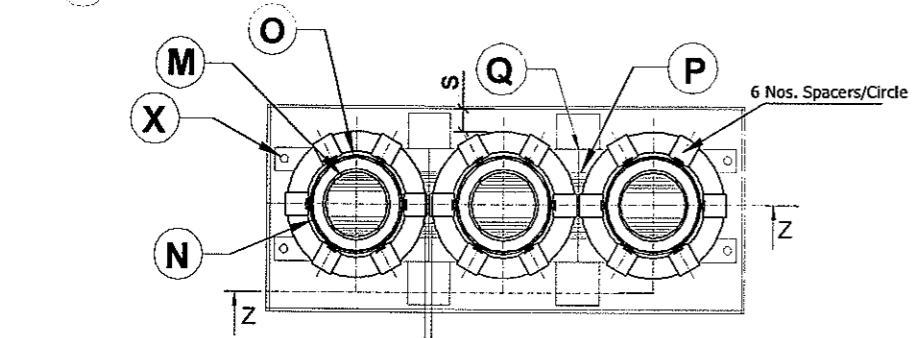
SHIVSHAKTI POWER DEVICE (I) PVT.LTD. Sr.No.46/35 Norhe Industrial Estate, Norhe Goan, Pune -411046	NAME	SIGN.	DATE
	DGN		
	DRN		
	CHD		
TITLE GENERAL ARRANGEMENT/ ASSEMBLY DRAWING FOR 100KVA, 11/0.433KV, DISTRIBUTION TRANSFORMER	APPD		
	SCALE : N.T.S.	REV. 0	
	DRAWING No.	SPD/100/11/GA/01DT.	



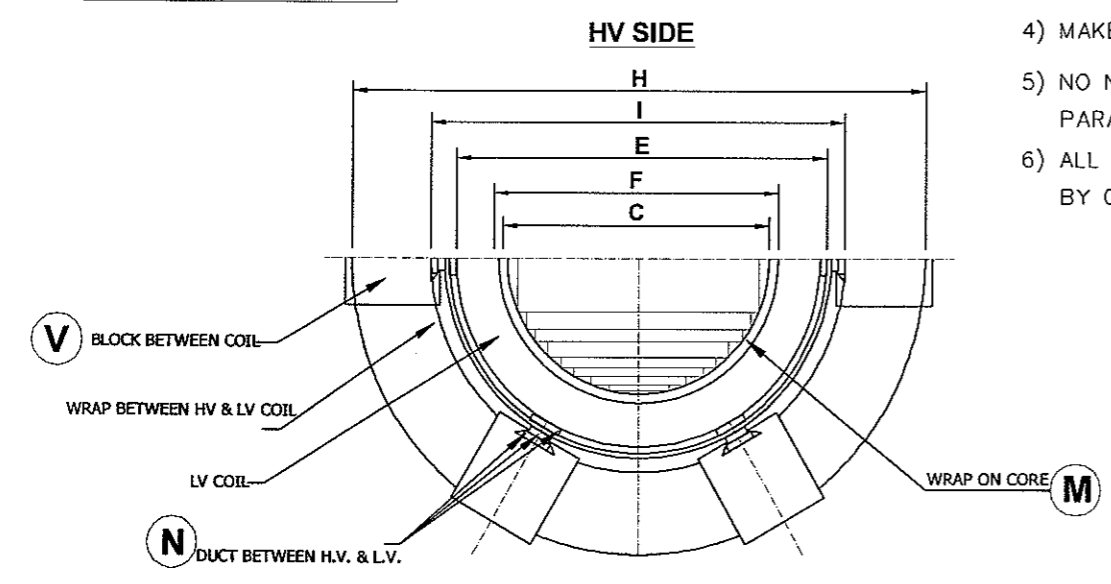
LV SIDE



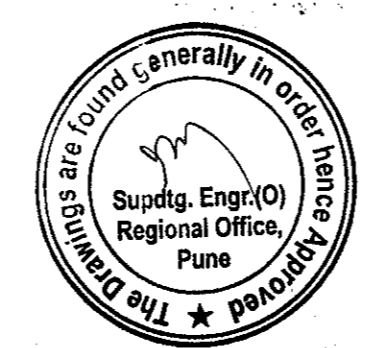
CORE ASSEMBLY  
CORE ASSEMBLY SIDE VIEW



CLEARANCE BETWEEN PHASES



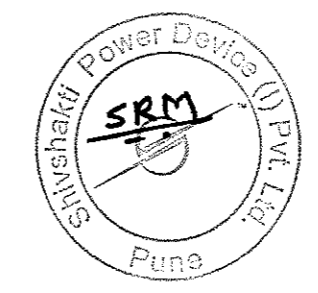
HV SIDE



NOTE: -

- 1) CORE CLAMP ARE PAINTED WITH VARNISH
- 2) ALL TOP & BOTTOM YOKE BOLTS, NUTS, TIE RODS ARE PHOSPHATED.
- 3) MAKE OF INSULATING CRAFT PAPER : - MUNKSJO PAPER - AB (SWEEDEN) / RAMAN
- 4) MAKE OF PRESS BOARD : - RAMAN / SANAPATHY.
- 5) NO NEGATIVE TOLERANCE ON MINIMUM SPECIFIED PARAMETER.
- 6) ALL HV INTER COIL CONNECTION SHALL BE DONE BY CRIMPING & BRAZING.

CORE	DESCRIPTION	AS PER OFFER 11 KV
A	LEG CENTRE	mm 287
B	WINDOW HEIGHT	mm 514
C	CORE CIRCLE	mm 119.9
D	No. OF STEPS	mm 11
	EFFECTIVE CORE AREA	cm <sup>2</sup> 104.47
<b>LV COIL</b>		
	CONDUCTOR MATERIAL	ALUMINUM
E	OUTSIDE DIAMETER	mm 173
F	INSIDE DIAMETER	mm 126
G	AXIAL LENGTH	mm 494
	CONDUCTOR CROSS-SECTION	mm <sup>2</sup> 131.04
	CONDUCTOR INSULATION	mm 12.60 X 5.20
	STRIP SIZE	mm DPC
	NO OF STRIP	mm 2
	NO OF TURNS (T/ph)	NOS. 72
<b>HV COIL</b>		
	CONDUCTOR MATERIAL	ALUMINUM
H	No. OF HV COILS PER PHASE	mm 04
I	OUTSIDE DIAMETER	mm 277
J	INSIDE DIAMETER	mm 195
	AXIAL LENGTH	mm 108.5
	CONDUCTOR CROSS-SECTION	mm <sup>2</sup> 3.40
	CONDUCTOR INSULATION	mm DPC
	CONDUCTOR SIZE	mm 2.10
	NO. OF TURNS (T/ph)	NOS. 3168
<b>INSULATION</b>		
K	CLEARANCE BETWEEN COILS	mm 10
L	BASE FLAT INSULATION	mm 03
M	WRAP ON CORE	mm 04
N	No. OF WEDGES BETWEEN HV & LV COILS	Nos. 06
O	CLEARANCE BETWEEN HV & LV COILS	mm 10
P	FRAME CHANNEL INSULATION	mm 03
Q	PHASE BARRIER	mm 2 x 2
R	END INSULATION (BLOCKS)	mm 30
S	CLEARANCE TO TANK WALL FROM H.V. WINDING	mm 30
T	TOP & BOTTOM FRAME SIZE ISMC	mm x mm 100 x 50
U	BASE CHANNEL SIZE	mm x mm 75 x 40
V	Nos OF SPACERS BETWEEN AXIAL COIL H.V.	mm 06
W	INTER PHASE CLEARANCES	mm 10
	THICKNESS OF SPACERS	mm 10
X	TIE ROD (STUD) SIZE & Nos.	8 Nos. of M12 mm
Y	KEY STUDS SIZE & Nos.	8 Nos. of M12 mm

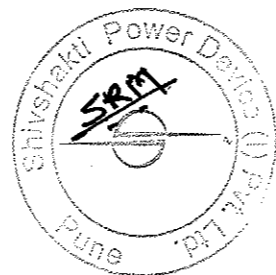
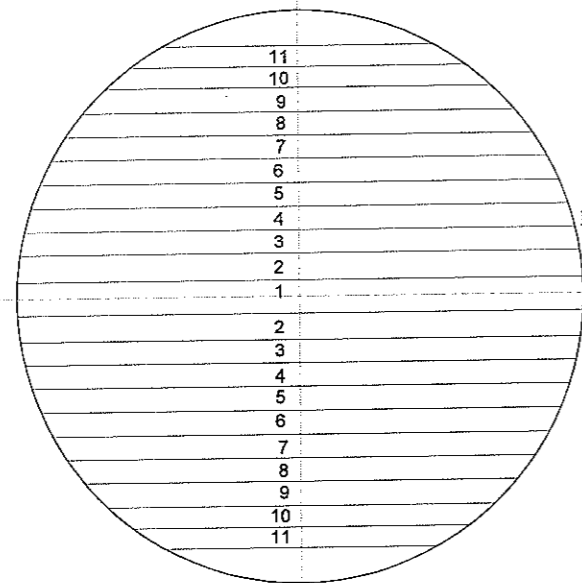


SHIVSHAKTI POWER DEVICE (I) PVT.LTD.		NAME	SIGN.	DATE
Sr.No. 46/35, Narhe Industrial Estate, Narhe Gaon, Pune-411041		DGN		
		DRN		
		CHD		
		APPD		
TITLE		SCALE : N.T.S.		
INTERNAL CONSTRUCTION DRAWING FOR 100 KVA, 11/0.433 KV, DISTRIBUTION TRANSFORMER		DRAWING No. SPD/100/11/CCA/02		
		REV. 0		
		DT.		




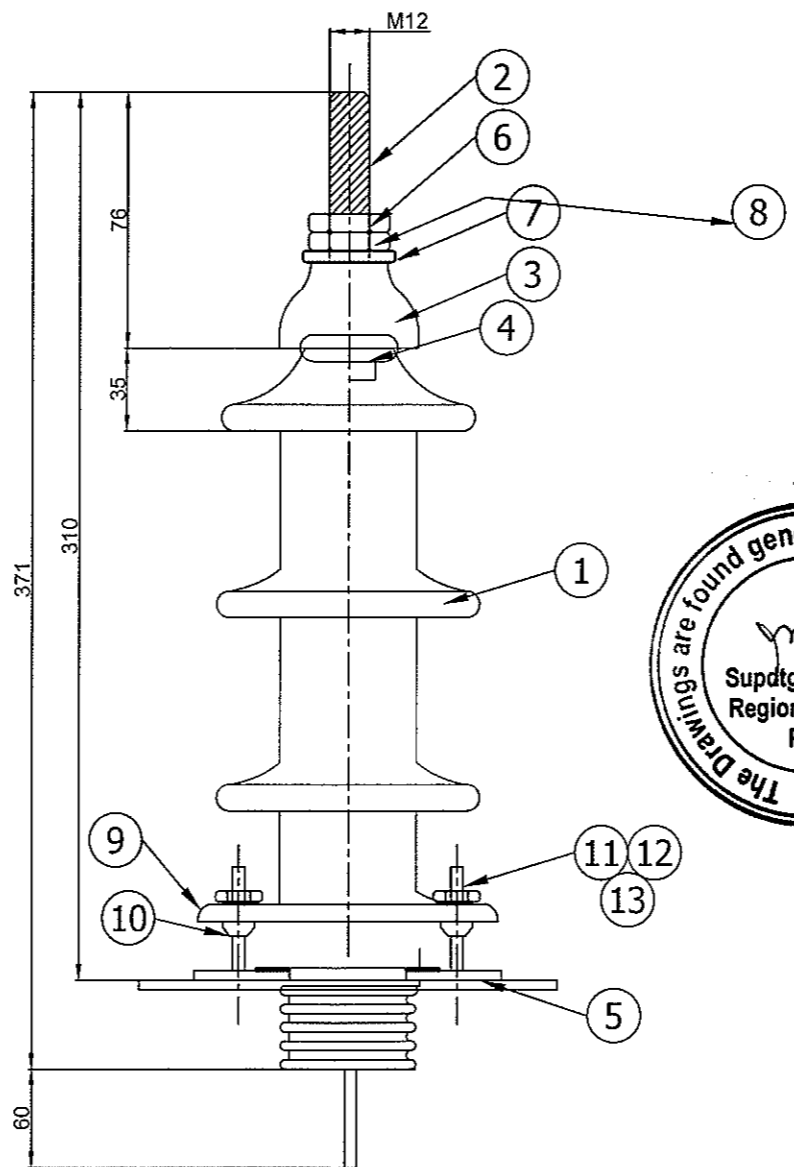
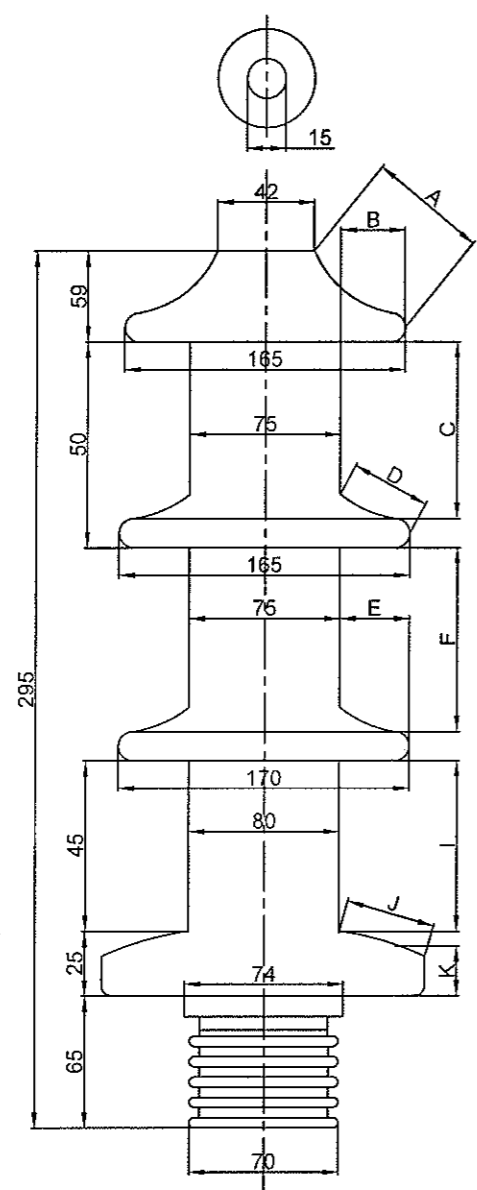
Sr.No.	DESCRIPTION	AS OFFERED
01	PRIMARY VOLTAGE	KV 11
02	SECONDARY VOLTAGE	KV 0.433
03	RATING	KVA 100
04	VECTOR GROUP	REF. Dyn11
05	CONFORMING TO IS	IS: 1180: 2014
06	PERMISSIBLE VOLTAGE FLUCTUATION %	12.5
07	TEMP. RISE OF TOP OIL (MAX)	°C 35°C
08	TEMP. RISE OF WINDING (MAX)	°C 40°C
09	CORE DETAILS	
	a) CORE MATERIAL	C.R.G.O.
	b) PRINCIPAL SOURCE OF CORE MATERIAL	IMPORTED
	c) GRADE OF LAMINATION	M4
	d) FLUX DENSITY W/m <sup>2</sup>	1.50
	e) NO. OF STEPS OF CORE (NOS.)	11
10	% IMPEDANCE	4.5% (±10% TOL)
11	CORE DIAMETER	119.9

STEP No.	01	02	03	04	05	06	07	08	09	10	11
L mm	115	110	105	100	95	85	75	65	55	45	43
W mm	33.9	13.18	10.2	8.3	7	11.4	9	7.2	5.8	4.55	4.8
CROSS SECT. MM <sup>2</sup>	3898.5	1449.8	1071	830	665	969	675	468	319	218.4	206.83
CROSS SECTION AREA CM <sup>2</sup>	= 107.70										
EFFECTIVE CROSS AREA CM <sup>2</sup>	= 107.70 x 0.97 = 104.47										



THIS 100 KVA TRANSFORMER IS MEANT ONLY FOR BIS CERTIFICATION WHICH IS COVERD UNDER BIS GROUPING GUIDELINES.

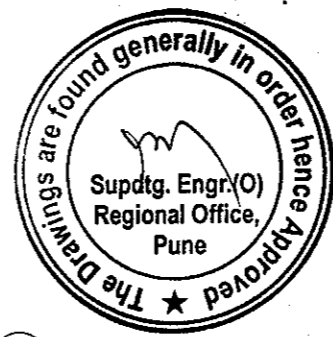
SHIVSHAKTI POWER DEVICE INDIA PVT.LTD. S.NO.46/35 NARHE INDUSTRIAL AREA PUNE -46	DGN	NAME	SIGN.	DATE
	DRN			
	CHD			
	APPD			
TITLE TECHNICAL DETAILS/CORE DRAWING FOR 200KVA, 11/0.433KV, Distribution Transformer	SCALE : N.T.S.			
	DRAWING No.		REV. 0	
	SPDI/11/100/TD/04DT.			



RATED RATING	12 KV / 250A
STANDARD APPLICABLE IS.	IS-3347(PART III)/2099
ONE MINUTE DRY P.F. VOLTAGE WITHSTAND	28 kV (RMS)
ONE MINUTE WET P.F. VOLTAGE WITHSTAND	28 kV (RMS)
1.2 /50 MICRO SEC. IMPULSE VOLTAGE WITHSTAND	75 KVP
WEIGHT OF ASSEMBLED BUSHING	3.54 KG. (APPR.)
CREEPAGE DISTANCE (AIR) 25 MM/ KV	300 mm

BUSHING ASSEMBLY AS PER IS:3347  
(PART III, SECTION 1 & 2)

No.	DESCRIPTION	QTY.
1	INSULATOR 12KV, 250 AMP.	1
2	STEM 12 MM DIA	1
3	CAP 50 MM DIA	1
4	SEALING WASHER FOR STEM	1
5	SEPARATOR	1
6	SEALING WASHER FOR GENERAL PURPOSE	1
7	HEX NUT FOR M12	3
8	PLAIN WASHER M12	2
9	CLAMPING RING	1
10	CLAMPING MEMBER	4
11	HEX NUT - M10 (HDG)	4
12	SPRING WASHER M10 (HDG)	4
13	PLAIN WASHER M10 (HDG)	4



CREEPAGE DISTANCE IN MM

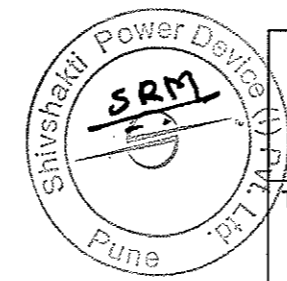
A	65
B	30
C	70
D	40
E	30
F	50
G	15
H	10
TOTAL	310
LESS 4 MM CLAMPING	
NET CREEPAGE DIST.	306

NOTE  
PERFORMANCE REQUIREMENTS OF THE BUSHING SHALL  
CONFORM TO IS: 2099-4995

MAKE:- JAIPUR/ SAMPAT CEREMICS/ SAMARAKSHANA/ BIKANER/ CJI

TOTAL CREEPAGE 310 MM  
LESS CLAMPING STRIP 4 MM  
NET CREEPAGE 306 MM

THIS 100 KVA TRANSFORMER TO MEANT  
ONLY FOR BIS CERTIFICATION WHICH IS  
COVERED UNDER BIS GROUPING  
UNDER LINES.



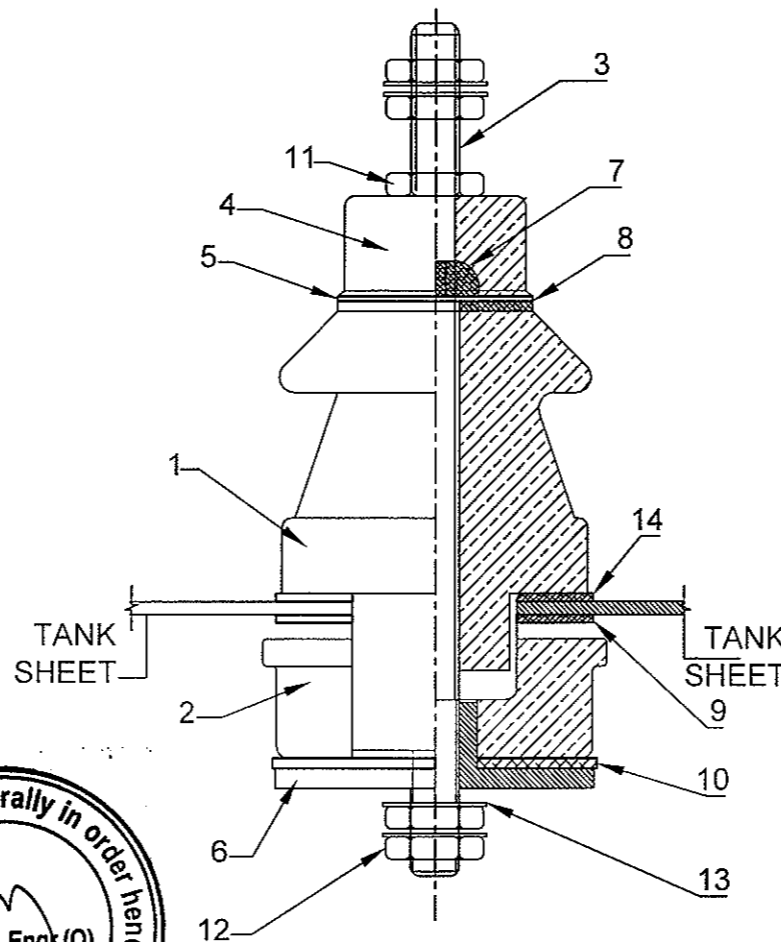
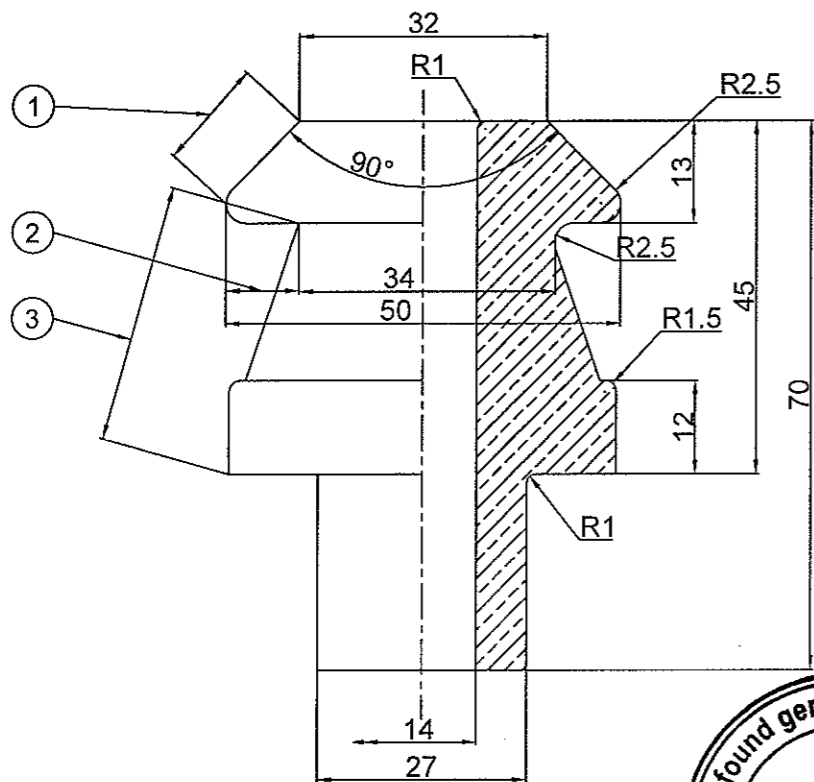
SHIVSHAKTI POWER DEVICE (I) PVT.LTD.  
Sr.No.46/35 Norhe Industrial Estate,  
Narhe Goan, Pune -411046

	NAME	SIGN.	DATE
DGN			
DRN			
CHD			
APPD			

TITLE  
HV BUSHING & CREEPAGE DISTANCE  
DRAWING FOR 100 KVA, 11/0.443KV,  
DISTRIBUTION TRANSFORMER

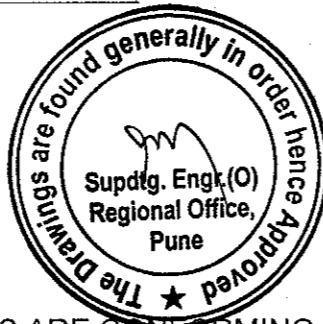
SCALE : N.T.S.

DRAWING No. SPD/100/11/HV/05  
REV. 0  
DT.



No.	DESCRIPTION	MATERIAL	QTY.
14	SEALING WASHER (TYPE-N)	NRBC	1
13	PLAIN WASHER M12 (E. TINNED)	BRASS	3
12	HEX LOCK NUT - M12x1.75 (E-TINNED)	BRASS	2
11	HEX NUT - M12x1.75 (E-TINNED)	BRASS	3
10	SEALING GASKET	NRBC	1
9	SEALING WASHER (TYPE-N)	NRBC	1
8	SEALING WASHER (TYPE-N)	NRBC	1
7	SEALING WASHER (STEM)	SYNTHETIC RUBBER	1
6	BOTTOM NUT (E-TINNED)	BRASS	1
5	STEM WASHER (E-TINNED)	BRASS	1
4	TOP END WASHER (E-TINNED)	BRASS	1
3	STEM - M20 x 1.75 (E-TINNED)	COPPER	1
2	INSULATOR LOWER	PORCELAIN	1
1	INSULATOR UPPER	PORCELAIN	1

NOTE: -  
 PERFORMANCE REQUIREMENTS OF THE BUSHING SHALL CONFORM TO IS: 3347  
 NRBC = NITRILE RUBBER BONDED CORK



**NOTE:-**

1. DIMENSIONS ARE CONFORMING TO IS:3347 (PART-I/SEC.1)-1983
2. COLUR : DARK BROWN.
3. CREEPAGE DISTANCE : 55mm (MIN.)

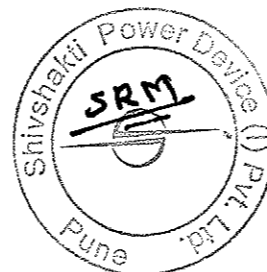
**ELECTRICAL CHARACTERISTICS: -**

1. RATED VOLTAGE: - 1 kV
2. RATED CURRENT: - 250 Amps
3. POWER FREQUENCY WITHSTAND VOLTAGE: - 3 kV

CREEPAGE DISTANCE	
PT. No.	DIM.
1	16
2	9
3	30
TOTAL = 55mm	

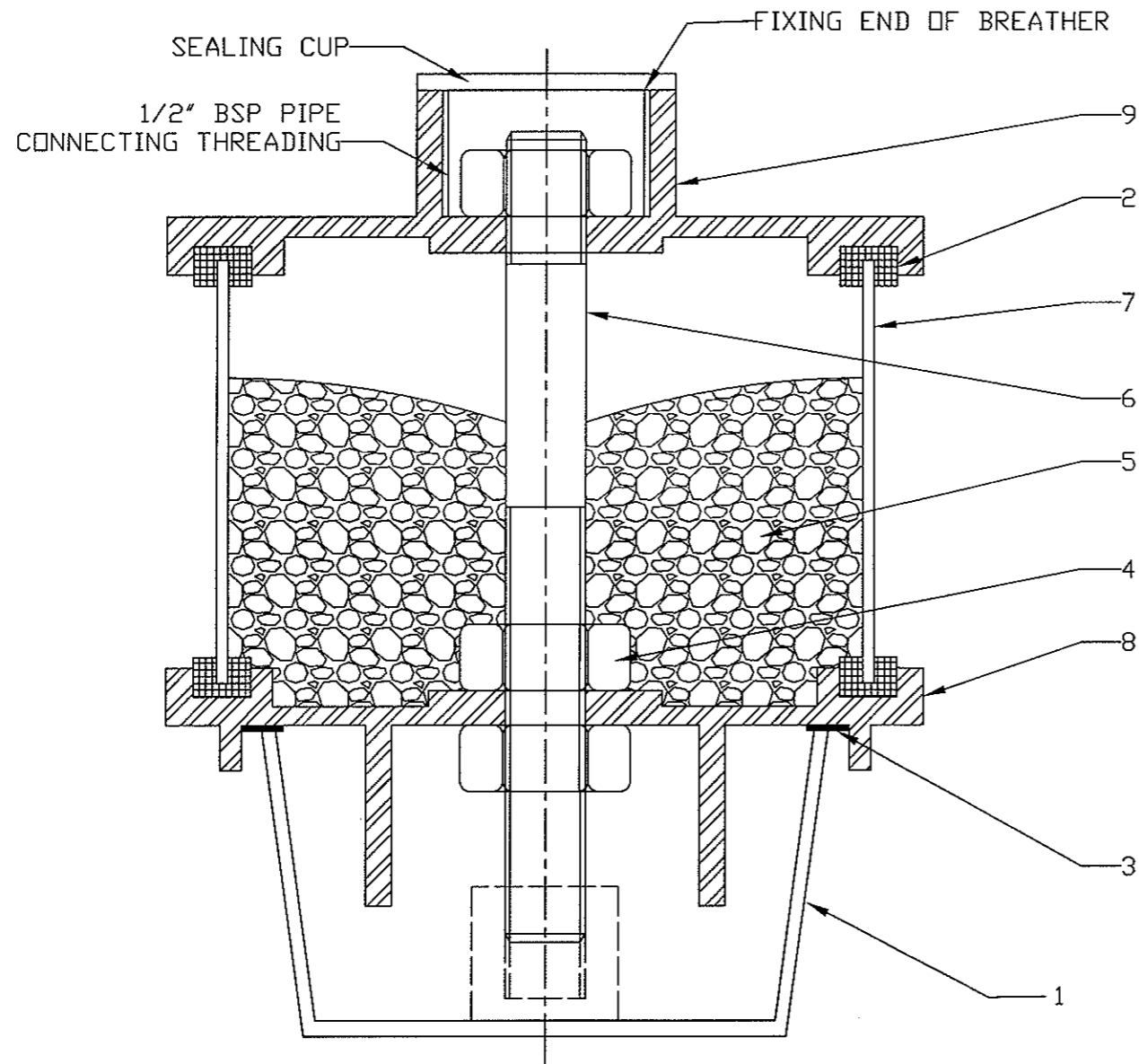
**THIS 100 KVA TRANSFORMER TO MEANT ONLY FOR BIS CERTIFICATION WHICH IS COVERED UNDER BIS GROUPING UNDER LINES.**

\* CREEPAGE DISTANCE IS MEASURED ALONG THE OTHER PORCELAIN SURFACE.



SHIVSHAKTI POWER DEVICE (I) PVT.LTD. Sr.No.46/35 Norhe Industrial Estate, Narhe Goan, Pune -411046	NAME	SIGN.	DATE
	DGN		
	DRN		
	CHD		
TITLE L.V.BUSHING & CREEPAGE DWG, 100KVA, 11/0.433 KV DISTRIBUTION TRANSFORMER	SCALE : N.T.S.		REV. 0 DT.
	DRAWING No. SPD/100/11/LV/06		

# SILICA GEL BREATHER 250g FOR 100 KVA TRANSFORMER



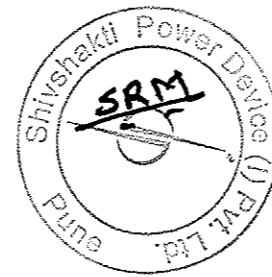
THE FOLLOWING INSTRUCTIONS TO BE FOLLOWED BEFORE FIXING SILICA GEL BREATHER:

1. REMOVE THE SEALING CAP PROVIDED AT THE FIXING END OF THE BREATHER AND ALSO PVC CAP PROVIDED AT THE END OF THE BREATHER FIXING PIPE ON THE CONSERVATOR.
2. FILL THE OIL IN THE OIL CUP TO THE LEVEL SHOWN.

No.	DESCRIPTION	MATERIAL
1	OIL CUP	SAN
2	PLAIN GASKET	NITRILE RUBBER
3	BOTTOM COVER	ALUMINIUM (LM 6)
4	LOCK NUT	M.S.
5	SILICA GEL (BLUE)	SILICA GEL
6	STUD	M.S.
7	TRANSPARENT TUBE	SAN
8	U - GASKET	NITRILE RUBBER
9	TOP COVER	ALUMINIUM (LM 6)



THIS 100 KVA TRANSFORMER TO MEANT ONLY FOR BIS CERTIFICATION WHICH IS COVERED UNDER BIS GROUPING UNDER LINES.



SHIVSHAKTI POWER DEVICE (I) PVT.LTD. Sr.No.46/35 Norhe Industrial Estate, Narhe Goan, Pune -411046	NAME	SIGN.	DATE
	DGN		
	DRN		
	CHD		
TITLE	SCALE : N.T.S.		
SILICA GEL BREATHER (250g) FOR 11/0.433KV/ 100 KVA DISTRIBUTION. TRANSFORMER	DRAWING No. SPD/100/11/SILICA/07	REV. 0	DT.