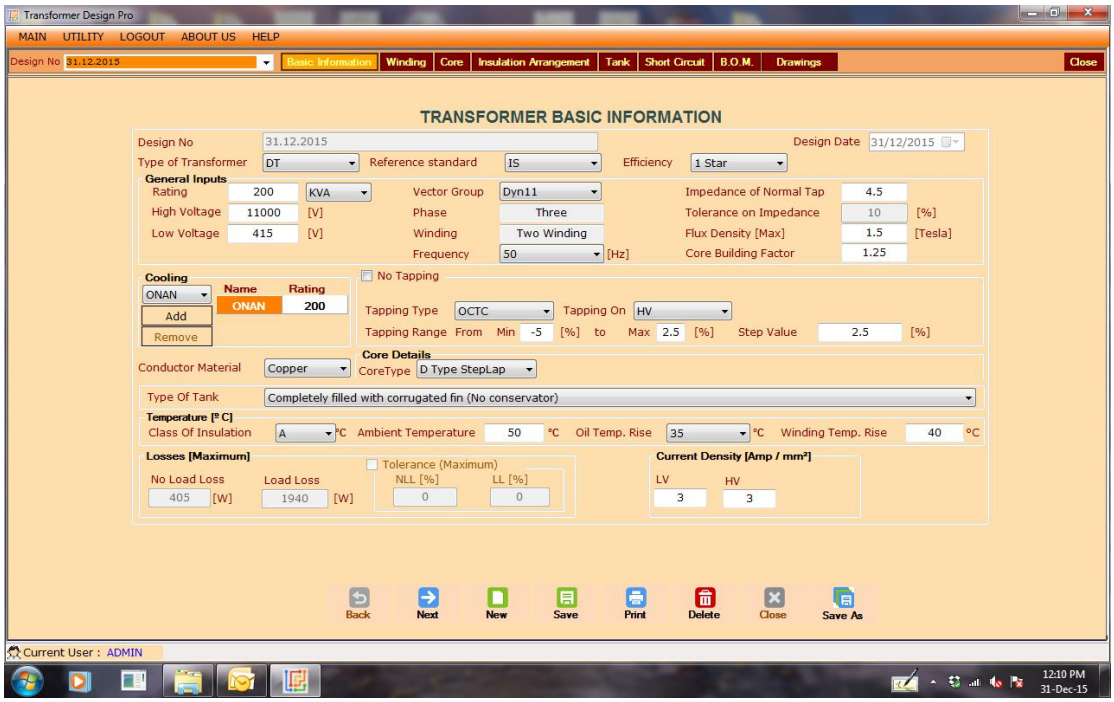
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Design No 31.12.2015
Basic Information Winding Core Insulation Arrangement Tank Short Circuit B.O.M. Drawings Close
TRANSFORMER BASIC INFORMATION
Design No 31.12.2015
Design Date 31/12/2015
Type of Transformer DT
Reference standard IS
Efficiency 1 Star
General Inputs
Rating 200 KVA
High Voltage 11000 [V]
Low Voltage 415 [V]
Vector Group Dyn11
Phase Three
Winding Two Winding
Frequency 50 [Hz]
Impedance of Normal Tap 4.5
Tolerance on Impedance 10 [%]
Flux Density [Max] 1.5 [Tesla]
Core Building Factor 1.25
Cooling
ONAN
Name Rating
ONAN 200
Add
Remove
No Tapping
Tapping Type OCTC
Tapping On HV
Tapping Range From Min -5 [%] to Max 2.5 [%] Step Value 2.5 [%]
Conductor Material Copper
Core Details
CoreType D Type StepLap
Type Of Tank Completely filled with corrugated fin (No conservator)
Temperature [° C]
Class Of Insulation A °C
Ambient Temperature 50 °C
Oil Temp. Rise 35 °C
Winding Temp. Rise 40 °C
Losses [Maximum]
No Load Loss 405 [W]
Load Loss 1940 [W]
Tolerance (Maximum)
NLL [%] 0
LL [%] 0
Current Density [Amp / mm²]
LV 3
HV 3
Back Next New Save Print Delete Close Save As
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Design No 31.12.2015
Basic Information Winding Core Insulation Arrangement Tank Short Circuit B.O.M. Drawings Close
Transformer Design Wizard [Winding]
200 KVA 11 / 0.415 KV Dyn11
PARAMETERS UNIT LV HV
Type of winding Layer CO
Winding direction R-L L-R
Minimum turns [No] 1658
Normal turns [No] 38 1745
Maximum turns [No] 1779
Rated Phase current [Amp] 278.24 6.06
Discs / Layers/ Coils [No] 2 4
Coils of Disc/ Foil [No]
Turns per Coil [No] 444.75
Layers [No] 15
Turn per Disc / Turn per Layers [No] 19 30
Insulation between Discs/ Layers (Axial) [mm] 0 9
Ducts [No] 2 0
Size of each duct [mm] 2 0
Type of conductor Rectan... Round
Medium Super Enamalled [No]
Conductor radially [No] 3 1
Conductor axially [No] 2 1
Total conductors [No] 6 1
Bare conductor width/ conductor diameter [mm] 8.26 1.98
Bare conductor thickness [mm] 2.91
Paper covering over conductor (both side) [mm] 0.4 0.4
Insulated conductor thickness [mm] 3.31 2.38
Diameter compensation of insulation [mm]
Radial thickness of winding [mm] 24 38
PARAMETERS UNIT LV HV Tap
Minimum Rated Maximum
Area [mm²] 140.94 3.08 3.08 3.08
Current Density [A/mm²] 1.97 2.07 1.97 1.93
Length Mean Turn [mm] 590 850 850 850
Conductor Length [meter] 71 4232 4454 4541
Bare Weight [Kg] 90 117 123 125
Insulated Weight [Kg] 90.33 123.38 129.71 131.84
Resistance @ 75°C [Ohms] 0.01 29.23 29.23 29.23
I²R @ 75 °C [Watt] 774.17 1189.79 1073.43 1031.34
Eddy Loss [Watt] 18.14 10.92 11.48 11.66
Gradient [°C] 4.9255 6.2246
PARAMETERS UNIT Design Value Guaranteed Value Tolerance Min Max
Reactance [%] 4.23
Impedance [%] 4.34 4.5 4.05 4.95
Total I²R @ 75°C [Watt] 1847.6
Eddy Loss [Watt] 29.62
Stray [Watt] 58.43
No Load Loss [Watt] 395.25 405
Load Loss [Watt] 1935.65 1940
Resistance [%] 0.97
Grade M0H 0.23
Flux Density (Max) 1.69 [Tesla]
Core Loss 0.914 [W / Kg]
Current Density (Max) 3.0 [A / mm²]
Core Area 168 [mm]
Core Diameter 155 [mm]
Center Length 317 [mm]
Leg Length 375 [mm]
Back Next New Save Print Delete Close
To optimize the winding design, change grade or current density or both; and then click on redesign.
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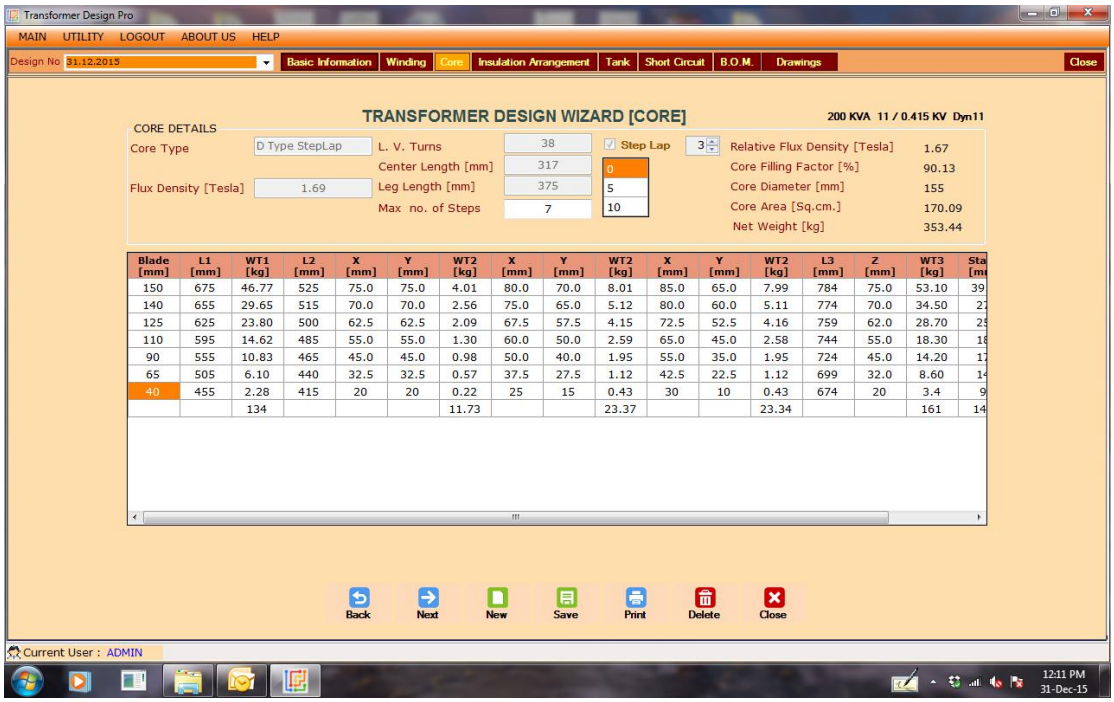
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Design No 31.12.2015
Basic Information Winding Core Insulation Arrangement Tank Short Circuit B.O.M. Drawings
Close
TRANSFORMER DESIGN WIZARD [CORE]
200 KVA 11 / 0.415 KV Dyn11
CORE DETAILS
Core Type D Type StepLap
Flux Density [Tesla] 1.69
L. V. Turns 38
Center Length [mm] 317
Leg Length [mm] 375
Max no. of Steps 7
Step Lap 3
0
5
10
Relative Flux Density [Tesla] 1.67
Core Filling Factor [%] 90.13
Core Diameter [mm] 155
Core Area [Sq.cm.] 170.09
Net Weight [kg] 353.44
Blade [mm] | L1 [mm] | WT1 [kg] | L2 [mm] | X [mm] | Y [mm] | WT2 [kg] | X [mm] | Y [mm] | WT2 [kg] | X [mm] | Y [mm] | WT2 [kg] | L3 [mm] | Z [mm] | WT3 [kg]
150 | 675 | 46.77 | 525 | 75.0 | 75.0 | 4.01 | 80.0 | 70.0 | 8.01 | 85.0 | 65.0 | 7.99 | 784 | 75.0 | 53.10
140 | 655 | 29.65 | 515 | 70.0 | 70.0 | 2.56 | 75.0 | 65.0 | 5.12 | 80.0 | 60.0 | 5.11 | 774 | 70.0 | 34.50
125 | 625 | 23.80 | 500 | 62.5 | 62.5 | 2.09 | 67.5 | 57.5 | 4.15 | 72.5 | 52.5 | 4.16 | 759 | 62.0 | 28.70
110 | 595 | 14.62 | 485 | 55.0 | 55.0 | 1.30 | 60.0 | 50.0 | 2.59 | 65.0 | 45.0 | 2.58 | 744 | 55.0 | 18.30
90 | 555 | 10.83 | 465 | 45.0 | 45.0 | 0.98 | 50.0 | 40.0 | 1.95 | 55.0 | 35.0 | 1.95 | 724 | 45.0 | 14.20
65 | 505 | 6.10 | 440 | 32.5 | 32.5 | 0.57 | 37.5 | 27.5 | 1.12 | 42.5 | 22.5 | 1.12 | 699 | 32.0 | 8.60
40 | 455 | 2.28 | 415 | 20 | 20 | 0.22 | 25 | 15 | 0.43 | 30 | 10 | 0.43 | 674 | 20 | 3.4
134 | 11.73 | 23.37 | 23.34 | 161
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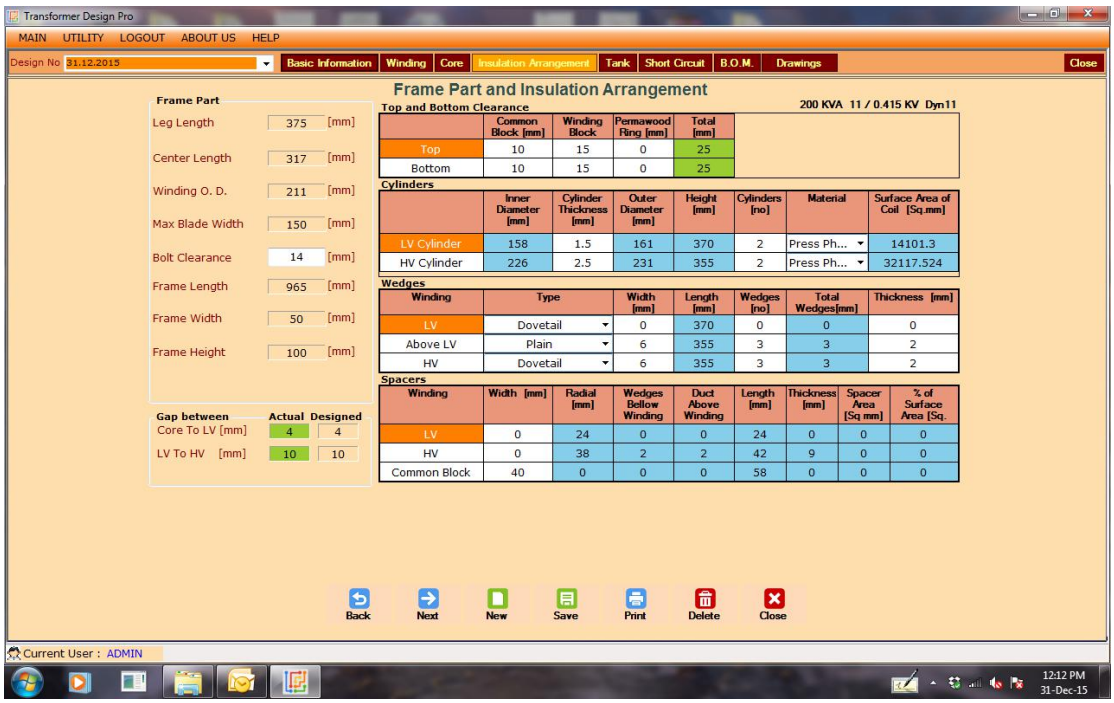
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Basic Information Winding Core Insulation Arrangement Tank Short Circuit B.O.M. Drawings
Close
Frame Part and Insulation Arrangement
200 KVA 11 / 0.415 KV Dyn11
Frame Part
Leg Length 375 [mm]
Center Length 317 [mm]
Winding O. D. 211 [mm]
Max Blade Width 150 [mm]
Bolt Clearance 14 [mm]
Frame Length 965 [mm]
Frame Width 50 [mm]
Frame Height 100 [mm]
Gap between Actual Designed
Core To LV [mm] 4 4
LV To HV [mm] 10 10
Top and Bottom Clearance
Common Block [mm] | Winding Block | Permawood Ring [mm] | Total [mm]
Top 10 15 0 25
Bottom 10 15 0 25
Cylinders
Inner Diameter [mm] | Cylinder Thickness [mm] | Outer Diameter [mm] | Height [mm] | Cylinders [no] | Material | Surface Area of Coil [Sq.mm]
LV Cylinder 158 1.5 161 370 2 Press Ph... 14101.3
HV Cylinder 226 2.5 231 355 2 Press Ph... 32117.524
Wedges
Winding | Type | Width [mm] | Length [mm] | Wedges [no] | Total Wedges[mm] | Thickness [mm]
LV Dovetail 0 370 0 0 0
Above LV Plain 6 355 3 3 2
HV Dovetail 6 355 3 3 2
Spacers
Winding | Width [mm] | Radial [mm] | Wedges Bellow Winding | Duct Above Winding | Length [mm] | Thickness [mm] | Spacer Area [Sq mm] | % of Surface Area [Sq.
LV 0 24 0 0 24 0 0 0
HV 0 38 2 2 42 9 0 0
Common Block 40 0 0 0 58 0 0 0
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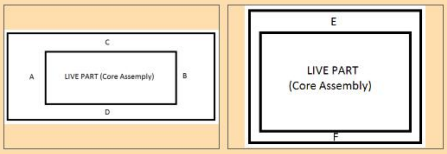
Tank, Radiator and Conservator

200 KVA 11 / 0.415 KV Dyn11

Length of Live Part (mm)	Clearance Side[A] (mm)	Clearance Side[B] (mm)	Total Tank Length (mm)
941	30	30	1001
Width of Live Part (mm)	HV Side[C] (mm)	LV Side[D] (mm)	Total Tank Width (mm)
307	80	50	437
Height of Live Part (mm)	Top Clearance[E] (mm)	Bottom Clearance[F](mm)	Total Tank Height (mm)
675	250	45	970

Length [mm] × Width [mm] × Height [mm] = Volume [Cubic mtr]

1001 × 437 × 970 = 0.424



Tank Dissipation [Watts]	1130.5
Radiator Dissipation [Watts]	1200.4
Radiator Quantity (Length Side) [mm]	2
Radiator Quantity (Breadth Side) [mm]	2
Fin height [mm]	750
Fin width [mm]	180
Distance between fin [mm]	45
Number of fin (Length Side) [mm]	38
Number of fin (Breadth Side) [mm]	16
Corrugated fin size (Length Side) [mm]	750 X 180 X 38
Corrugated fin size (Breadth Side) [mm]	750 X 180 X 16

Other Accessories

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SHORT CIRCUIT FORCE, THERMAL, OVERLOAD AND NOISE LEVEL CALCULATIONS

200 KVA 11 / 0.415 KV Dyn11

Dynamic Short Circuit Force Calculation :

Hoop Stress for HV	[max 1250]	303.94	kg/cm²
Hoop Stress for LV	[max 1250]	219.21	kg/cm²

Thermal Ability to Withstand Short Circuit Force Calculation :

Time	3	sec.
Temperature Rise of Short Circuit for LV	138.21	°C
Temperature Rise of Short Circuit for HV	143.23	°C

Hot Spot Temperature Calculation

Hot Spot Temperature Over Average Ambient Temperature of 28 °C	76.2	°C

Inrush Current Calculation

Inrush Current	71.36	Apms
Inrush Current In Terms Of Line Current	6.8	Times

Overload Calculation :

Initial Top Oil Rise	39	°C
Ratio of Load L / Rated L	1.25	
Duration of Overload	100	sec.
Ultimate Top Oil Rise After OverLoad	123.03	°C

Noise Level Calculation

Number of Fans		0	no.
Speed of Fan		0	rpm
Noise Level	[max 55]	52.81	dB

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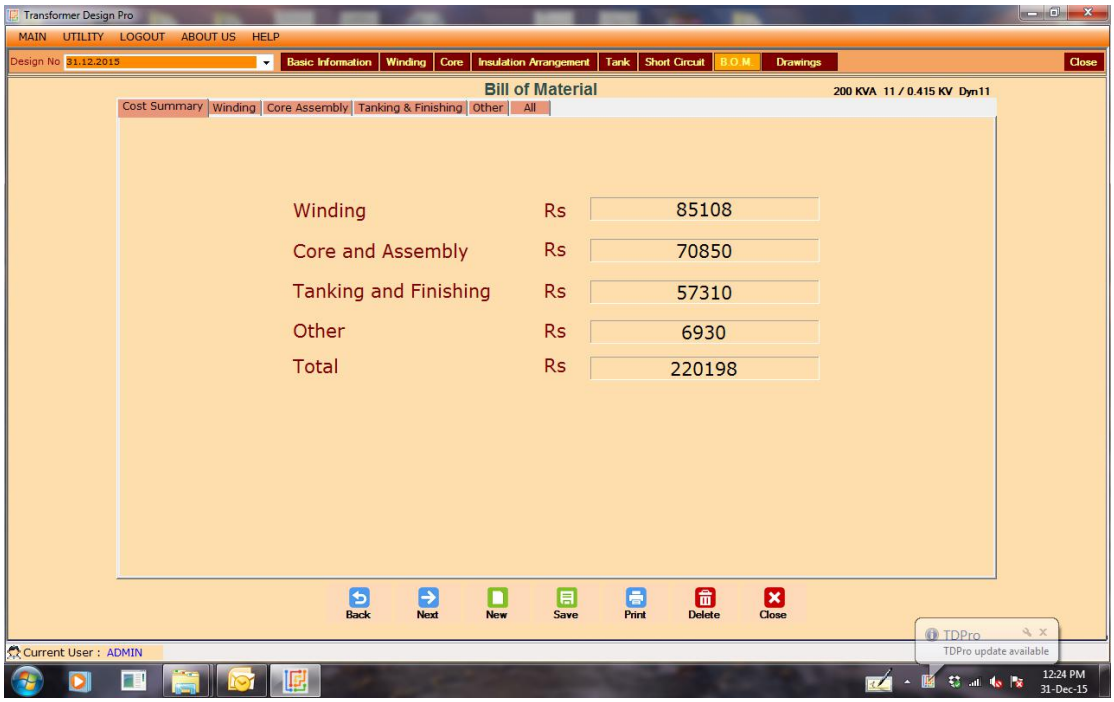

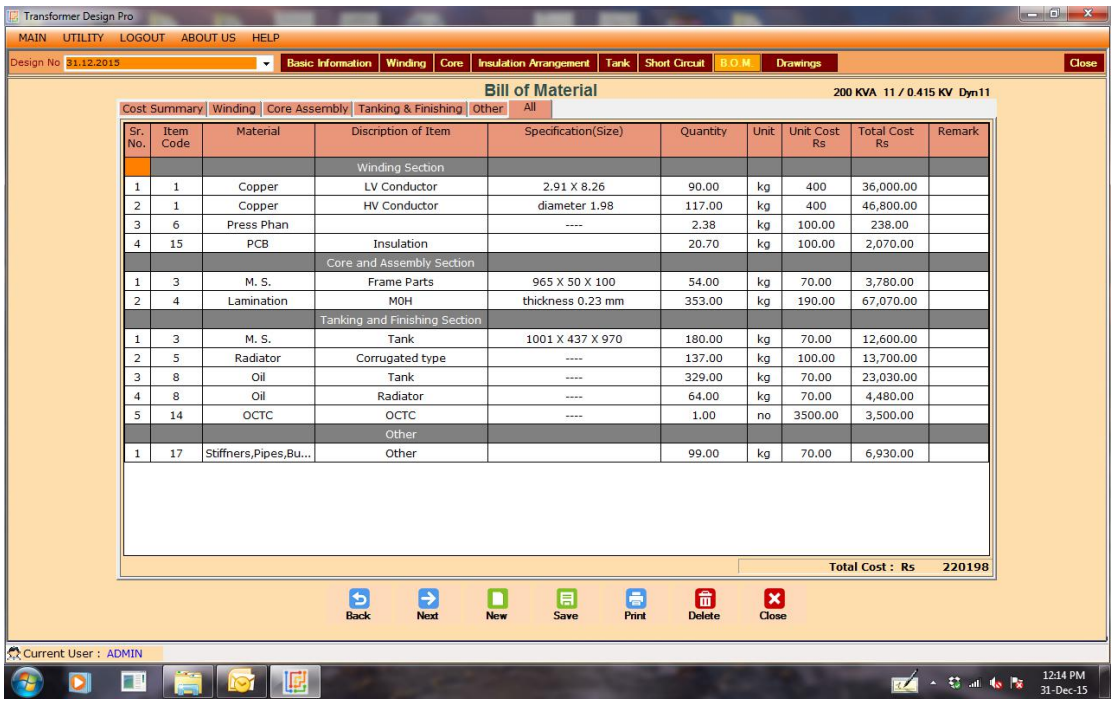

Sr. No.	Item Code	Material	Discription of Item	Specification(Size)	Quantity	Unit	Unit Cost Rs	Total Cost Rs	Remark
			Winding Section						
1	1	Copper	LV Conductor	2.91 X 8.26	90.00	kg	400	36,000.00	
2	1	Copper	HV Conductor	diameter 1.98	117.00	kg	400	46,800.00	
3	6	Press Phan		----	2.38	kg	100.00	238.00	
4	15	PCB	Insulation		20.70	kg	100.00	2,070.00	
			Core and Assembly Section						
1	3	M. S.	Frame Parts	965 X 50 X 100	54.00	kg	70.00	3,780.00	
2	4	Lamination	M0H	thickness 0.23 mm	353.00	kg	190.00	67,070.00	
			Tanking and Finishing Section						
1	3	M. S.	Tank	1001 X 437 X 970	180.00	kg	70.00	12,600.00	
2	5	Radiator	Corrugated type	----	137.00	kg	100.00	13,700.00	
3	8	Oil	Tank	----	329.00	kg	70.00	23,030.00	
4	8	Oil	Radiator	----	64.00	kg	70.00	4,480.00	
5	14	OCTC	OCTC	----	1.00	no	3500.00	3,500.00	
			Other						
1	17	Stiffners,Pipes,Bu...	Other		99.00	kg	70.00	6,930.00	