26

TRANSFORMER ENGINEERING DIVISION, COMPUTER CENTER

WO.NO.70979A17400 M/s RRVPNL JAIPUR PAGE NO.- 1 OF 6 TRECP
50/40 MVA 132/33 kV POWER TRANSFORMER

DRG NO.-14997000016

INPUT DATA - CORE TYPE TCO [BOLT-LESS CORE]

CORE DIA= 630 LEG LENGTH= 1830 CC= 1330
DISTANCE OF OUTER LEGS= 0 NO.OF BOLTS PER WINDOW= 0
YOKE BOLT PITCH= 0 NO OF DUCTS= 0 NO OF STEPS=15
EXPECTED AREA= 2860.65 SPACE FACTOR=0.975 TOP CLEARANCE=27
HOLE PUNCH DIA= 0 % SCRAP FACTOR=6.500 NO.OF OIL-DUCTS=0
GRADE OF STEEL=27ZDKH90 BLADING = 2/2

OUTPUT RESULTS

SN.	PKT-THK	LEG LAM	YOKLAM	PKT-HT	PKTCSA	TOL-REQD	TOL-AVBL
1	55	620	620	55.00	34100	.39	.90
2	23	610	610	78.00	14030	.55	.74
3	31	590	590	109.00	18290	.77	1.45
4	24	570	570	133.00	13680	.93	1.16
5	19	550	550	152.00	10450	1.07	1.62
6	17	530	530	169.00	9010	1.18	1.29
7	14	510	510	183.00	7140	1.28	1.93
8	19	480	480	202.00	9120	1.42	2.02
9	16	450	450	218.00	7200	1.53	2.45
10	15	420	420	233.00	6300	1.63	1.79
11	12	390	390	245.00	4680	1.72	2.39
12	11	360	360	256.00	3960	1.80	2.51
13	10	330	330	266.00	3300	1.86	2.33
14	11	290	290	277.00	3190	1.94	2.64
15	9	250	250	286.00	2250	2.01	3.14

GROSS-AREA,SQCM= 2934.00 NETT AREA,SQCM= 2860.65

CORE MAIN DIMENSIONS
H= 3070 W= 3310 LL= 1830 LC= 1330 YH= 620
YBP= 0 YBC= 310 CFB= 665 DFB=100
NO OF TAPE BANDS = 8 TAPE PITCH=208

REF CORE STD DRG 14997000016

FOR TOL REF STD DRG TR150035C

DATE OF RUN - 01-1[illegible]-2014 CHECKED BY 01.01.2014 APPD.BY

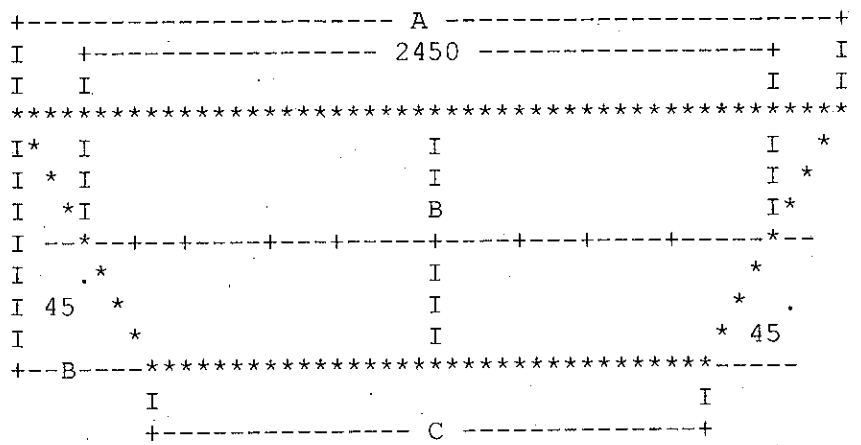
REVISION NO. 00

(विनोद जसेजा)
(VINOD JASEJA)
वरि0 प्रबंधक (ट्रां.आर.ई.)
Senior Manager (T.R.E.)
ट्रां. आर. ई. एल. झाँसी
T. R. E. L. JHANSI

TRANSFORMER ENGINEERING DIVISION, COMPUTER CENTER

50/40 MVA 132/33 kV POWER TRANSFORMER

LEG PUNCHING DRG NO.1



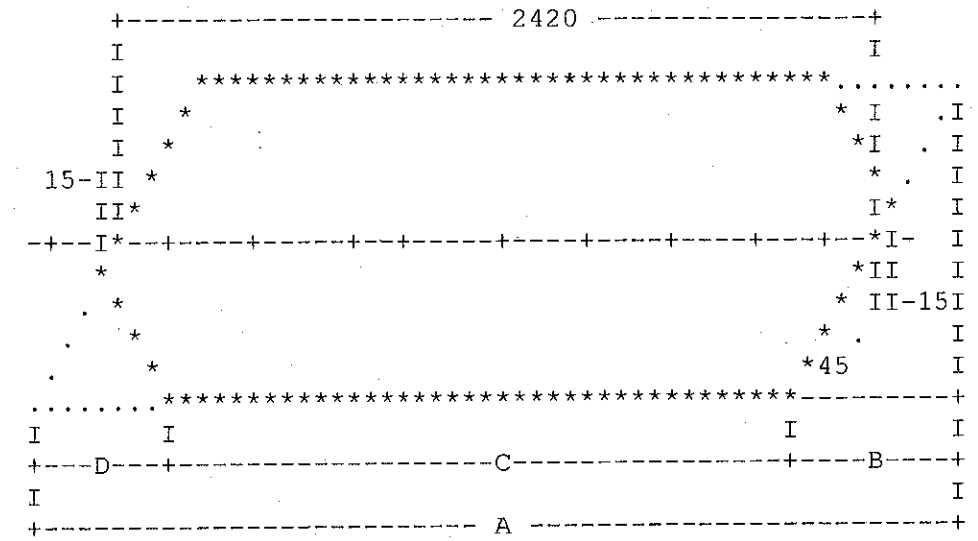
LEG PUNCHINGS DRG.NO.1 DIMENSIONS

IT	STKTHK	LAM-WIDTH	A	C	WTKG	No.OF LAM. (APPROX)
1	220	620	3070	1830	2492.57	816
2	92	610	3060	1840	1025.53	336
3	124	590	3040	1860	1336.92	464
4	96	570	3020	1880	999.95	352
5	76	550	3000	1900	763.85	288
6	68	530	2980	1920	658.59	256
7	56	510	2960	1940	521.90	208
8	76	480	2930	1970	666.63	288
9	64	450	2900	2000	526.29	240
10	60	420	2870	2030	460.50	224
11	48	390	2840	2060	342.09	176
12	44	360	2810	2090	289.46	160
13	40	330	2780	2120	241.22	144
14	44	290	2740	2160	233.18	160
15	36	250	2700	2200	164.47	128

TOTAL WT.KG- 10723.15

TRANSFORMER ENGINEERING DIVISION, COMPUTER CENTER

LEG PUNCHINGS DRG NO.2



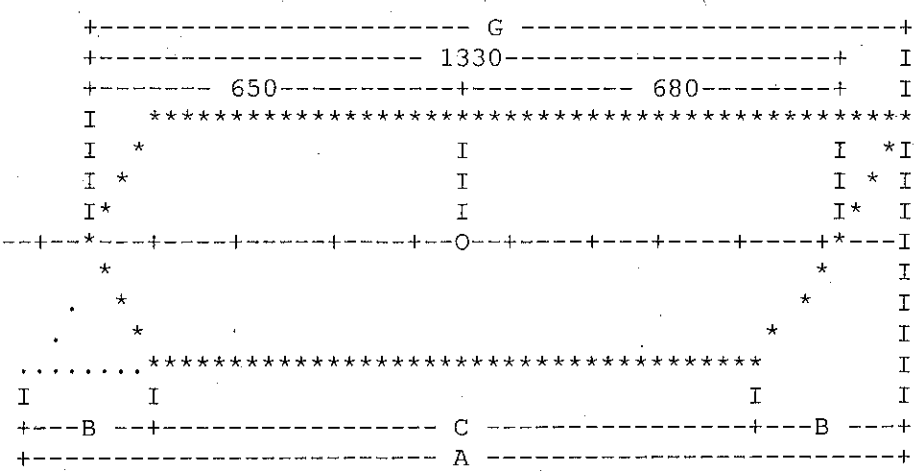
LEG PUNCHINGS DRG.NO.2 DIMENSIONS

IT	STK.THK	LAM-WIDTH	A	D	C	WT.KG	WT.KG CUT	NO.OF LAM. (APPROX)
26	110	620	3040	590	1830	1088.22	1231.02	408
27	46	610	3030	580	1840	448.78	506.49	168
28	62	590	3010	560	1860	587.76	660.28	232
29	48	570	2990	540	1880	441.65	493.85	176
30	38	550	2970	520	1900	338.93	377.25	144
31	34	530	2950	500	1920	293.56	325.26	128
32	28	510	2930	480	1940	233.70	257.76	104
33	38	480	2900	450	1970	300.54	329.24	144
34	32	450	2870	420	2000	238.87	259.92	120
35	30	420	2840	390	2030	210.42	227.43	112
36	24	390	2810	360	2060	157.35	168.95	88
37	22	360	2780	330	2090	134.02	142.96	80
38	20	330	2750	300	2120	112.42	119.13	72
39	22	290	2710	260	2160	109.61	115.16	80
40	18	250	2670	220	2200	77.98	81.23	64
				TOTAL WT.KG-		4773.8	5295.9	

TRANSFORMER ENGINEERING DIVISION, COMPUTER CENTER

WO.NO.70979A17400 M/s RRVPNL JAIPUR PAGE NO.- 4 OF 6 TRECP
50/40 MVA 132/33 kV POWER TRANSFORMER

YOKE PUNCHINGS DRG NO.3



HOLES PUNCH DIA= 0

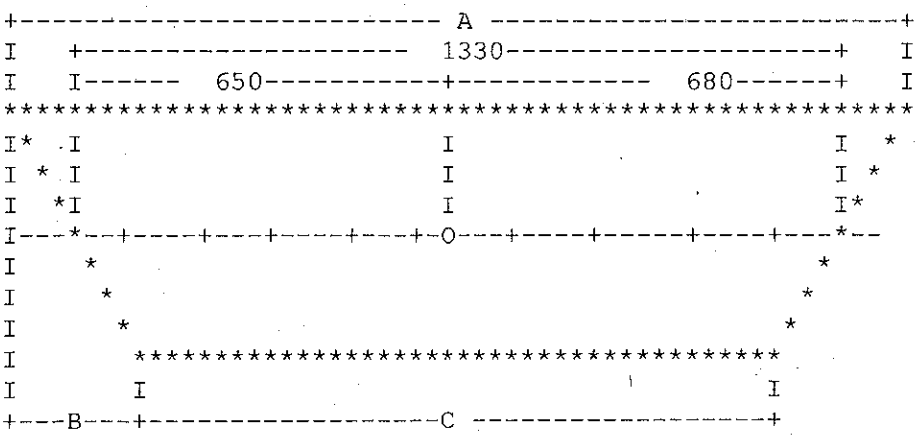
YOKE PUNCHINGS DRG.NO.3 DIMENSIONS

IT	STK.THK	LAM-WIDTH	A	C	G	WT.KG	WT.KG CUT	No.OF LAM. (APPROX)
51	220	620	1950	710	1640	1195.41	1353.11	816
52	92	610	1940	720	1635	492.88	556.72	336
53	124	590	1920	740	1625	645.27	725.76	464
54	96	570	1900	760	1615	484.67	542.83	352
55	76	550	1880	780	1605	371.79	414.66	288
56	68	530	1860	800	1595	321.90	357.52	256
57	56	510	1840	820	1585	256.16	283.32	208
58	76	480	1810	850	1570	329.24	361.89	288
59	64	450	1780	880	1555	261.53	285.70	240
60	60	420	1750	910	1540	230.25	249.99	224
61	48	390	1720	940	1525	172.09	185.70	176
62	44	360	1690	970	1510	146.50	157.13	160
63	40	330	1660	1000	1495	122.82	130.95	144
64	44	290	1620	1040	1475	119.68	126.58	160
65	36	250	1580	1080	1455	85.09	89.28	128
					TOTAL WT.KG-	5235.3	5821.1	

TRANSFORMER ENGINEERING DIVISION, COMPUTER CENTER

WO.NO.70979A17400 M/s RRVPNL JAIPUR PAGE NO.- 5 OF 6 TRECP
50/40 MVA 132/33 kV POWER TRANSFORMER

YOKE PUNCHINGS DRG NO.4



HOLES PUNCH DIA= 0

YOKE PUNCHINGS DRG.NO.4 DIMENSIONS

IT	STK.THK	LAM-WIDTH	A	C	WT.KG	No.OF LAM. (APPROX)
76	220	620	1950	710	1353.11	816
77	92	610	1940	720	556.72	336
78	124	590	1920	740	725.76	464
79	96	570	1900	760	542.83	352
80	76	550	1880	780	414.66	288
81	68	530	1860	800	357.52	256
82	56	510	1840	820	283.32	208
83	76	480	1810	850	361.89	288
84	64	450	1780	880	285.70	240
85	60	420	1750	910	249.99	224
86	48	390	1720	940	185.70	176
87	44	360	1690	970	157.13	160
88	40	330	1660	1000	130.95	144
89	44	290	1620	1040	126.58	160
90	36	250	1580	1080	89.28	128

TOTAL WT.KG- 5821.1

TRANSFORMER ENGINEERING DIVISION, COMPUTER CENTER

WO.NO.70979A17400 M/s RRVPNL JAIPUR PAGE NO.- 6 OF 6 TRECP
50/40 MVA 132/33 kV POWER TRANSFORMER

SN	LAM-WDTH	SLIT-WT	SLIT-LNGTH(MTRS) (APPROX)
1	620	6563.76	5125.492
2	610	2700.57	2143.388
3	590	3520.56	2888.914
4	570	2633.20	2236.579
5	550	2011.47	1770.625
6	530	1734.29	1584.244
7	510	1374.35	1304.671
8	480	1755.47	1770.625
9	450	1385.90	1491.053
10	420	1212.66	1397.862
11	390	900.83	1118.290
12	360	762.24	1025.099
13	330	635.20	931.908
14	290	614.03	1025.099
15	250	433.09	838.718

TOTAL SLIT WT,KG= 28237.6

NETT WT.,KG OF STEEL(AT SF=0.975)IS= 26553.39

CORE STEEL TO BE DRAWN FROM STORE, SHOP WASTAGE OF 6.5 %,
WT. IN KG.= 28280.0

COLD ROLLED GRAIN ORIENTED SHEET STEEL GR:27 L 90M

1. GENERAL:

This specification governs the quality requirements of double side insulated, cold rolled, grain oriented magnetic steel sheets of thickness 0.27mm manufactured by means of laser scribing or plasma flame irradiation or any equivalent process.

2. APPLICATION:

Used in transformer cores.

3. CONDITION OF DELIVERY:

Cold rolled and annealed.

The sheet shall be supplied in side trimmed continuous coils, with insulation coating on both sides, as specified in clause 6.

4. COMPLIANCE WITH NATIONAL STANDARDS:

There is no national standard covering this type of material.

However assistance has been drawn from ASTM A 876-03 , Condition F-5, Ductility Class 1.

5. DIMENSIONS AND TOLERANCES:

5.1 Sizes:

The steel sheet shall be supplied to the dimensions specified on the order.

5.1.1 Thickness:

The thickness of the sheet shall be 0.27 mm.

5.1.2 Width:

The nominal standard width of the coil shall be 790, 840, 915 or 1000 mm.

The order shall clearly specify the width of the coil required.

5.1.3 Weight:

The nominal weight of the coil shall be between 1800 and 2500 kg.

5.2 Tolerances:

5.2.1 Thickness:

Tolerance on thickness when measured with a contact micrometer at any location, not less than 9.5 mm from an edge shall not deviate more than ± 0.025 mm from the average thickness of the test lot or coil. The outer limits of acceptable thickness shall be within the range of 0.241 to 0.305 mm.

5.2.2 Width:

The tolerance of width for side trimmed coil shall be - 0 and + 3 mm.

5.2.3 Edge Camber:

The deviation of a side edge from a straight line over 2440 mm length or fraction thereof shall not exceed 3.2 mm.

5.3 Waviness:

Sharp, short waves and buckles are extremely detrimental to the effective use of grain oriented electrical steel in flat laminations and shall be avoided in the delivered materials.

For material of width greater than 150 mm, the deviation from flatness (Wave Factor) expressed as a percentage, shall not exceed 1.5 %.

6. MANUFACTURE:

The sheet shall be of low carbon, silicon steel having silicon content around 3.15%. High permeability and low core-loss in the direction of rolling is to be achieved by appropriate metallurgical processes.

The thermally flattened material shall be coated with an inorganic surface coating type C2 and an inorganic surface coating, type C5, applied over the inherent C2 coating to provide extra surface insulation resistance on both sides as per ASTM A 876-03, condition F5.

The steel sheets shall be uniformly coated on both sides with an insulation as stated above, as part of its manufacturing process, and the magnetic domain may be finely subdivided to achieve lower core loss by suitable means other than by mechanical scribing.

The insulation, coating shall be uniform throughout the length of the coil. There shall be no line marks, rough spots, shade difference, dots and patches etc.

7. FREEDOM FROM DEFECTS:

The material shall be clean, bright, smooth and free from dents, surface defects such as holes, scabs, pits, blisters, slivers, mill marks etc. and also free from oil, grease, dust scale and rust.

The sheet surface shall not exhibit any of these defects.

8. TEST SAMPLES:

Test samples shall be selected from the consignment as follows:

8.1 Maximum Specific Total Loss:

One from each coil.

8.2 Electrical & Mechanical Tests:

One sample per consignment/lot for Mechanical Tests and Electrical Tests (Surface Insulation Resistivity and Magnetic Permeability Tests).

8.3 The test smaples shall be sufficient in size to provide the necessary test pieces.

9. TEST METHODS:

Unless otherwise specified, the test shall be conducted in accordance with the relevant method specified in ASTM A 876-03

10. MECHANICAL TESTS:

10.1 Ductility:

Material shall possess good shearing and punching properties and shall be sufficiently ductile to permit normal working.

The bend test shall be carried on transversely cut test specimen of 60 mm long and between 10 mm and 30 mm wide.

The test specimen shall be initially bent through 90 degrees, this bend not being counted. The specimen shall then be bent backward and forward through 160 degrees. The specimen shall complete one bend without fracture.

10.2 Stacking Factor:

The surface quality of the material when measured in terms of stacking factor (viz. a minimum of 16 samples under a pressure of 0.35 MPa) shall be 94.5% minimum.

11. ELECTRICAL TESTS:

11.1 Surface Insulation Resistivity:

When tested as per ASTM A 717 - Franklin's method, the surface insulation resistivity per lamination (two surfaces) of single strip specimens (5 on each side), shall show the following readings.

Average Value - 10 ohms cm^2, Minimum.
Individual Value - 5 ohms cm^2, Minimum.

11.2 Maximum Specific Total Loss:

11.2.1 Cutting of Test Specimen:

Epstein test specimens measuring 30 mm wide and not less than 300 mm long, shall be cut from the sample with sharp shears. All the strips shall be cut parallel to the direction of rolling and without stress relief annealing or a sheet type specimen.

11.2.2 Testing:

When tested in accordance with ASTM A 343M/A804M, the specimens prepared as described in clause 11.2.1 without stress relief annealing and shall be tested at a peak magnetic flux density of 1.7 T and a frequency of 50 Hz. The specific total loss shall not be greater than 0.90 watt/kg.

11.3 Mangentic Permeability Test

When tested in accordance with ASTM A 343M, the Magnetic permeability at AC Magnetizing Force of 800 A/m shall not be less than 1880 using 25 cm Epstein Test frame on 50 Hz. or in accordance with ASTM A 804 M using single sheet specimen

Alternately the induction value at 800 A/m magnetising force shall not be less than 1.88 Tesla.

12. TYPE TEST: - Ageing*

When tested at a peak Magnetic Flux Density of 1.7T and at a frequency of 50 Hz, the specific total loss of the specimen which has been heated at a temperature of 225 deg.C for 24 hours shall not deteriorate by more than 4% of the measured specific total loss (clause 11.2) of the coil concerned.

*Note: Type tests shall be carried out when "Type Approval" to a supplier is given and repeated once in two years for the approved sources.

13. TEST CERTIFICATES:

Unless otherwise stated, three copies of certificates shall be supplied alongwith each consignment.

In addition, the supplier shall ensure to enclose one copy of the test certificate alongwith their despatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information.

BP 10985 - Rev. 02, Order No, Supplier's Name/Grade/Identification No, Size & Weight, Packet/Bundle No, Test Results of Dimensions & Tolerances, Freedom from Defects, Details of Insulation Coating, Type Test, Properties of (a) Specific Total Loss of each coil (b) Mechanical & Electrical properties for one random coil of each lot/consignment, (c) Results of chemical composition for information only.

14. PACKING AND MARKING:

The material shall be supplied preferably in coils of continuous length. However, if it becomes unavoidable, 5% of the coils of the order can be supplied with maximum of two butt weld joints, and 95% of the coils shall be in one continuous length. The supplier shall ensure than the welds are made in such a manner without causing damage to the areas of coil adjacent to the weld. The welds shall be clearly marked by suitable tags projecting outside the coil.

Sheets shall be packed vertically according to the instructions and drawings given in the Annexure.

A metal label/tag shall be securely attached with each coil or drum or bundle outside its wrapping and shall be legibly marked with the following information.

BP 10985 : Cold Rolled Grain Oriented Sheet Steel
Gr: 27 L 90 M.

BHEL Order No.

Manufacturer's/Supplier's name.

Identification/Coil No.

Size and Quantity supplied.

GENERAL INFORMATION FOR CALCULATION

Density - 7.65 Kg/dm^3.

ANNEXURE

DETAILED INSTRUCTIONS FOR PACKING

The nominal weight of each coil shall be 1800-2000 Kg.

The nominal internal diameter of coil shall be 508 mm.

Packing shall be sea-worthy and shall protect the coils from damage and rusting during transit.

The supplier's grade/reference shall be marked at every one metre intervals throughout the coil length. Coils shall be vertically packed according to the instructions and drawing given below.

1. An annular protection board shall be placed at either end of the coil.

2. The coil shall then be wrapped with waterproof anti-rust crepe kraft paper by lapping axially all around the circumference.

3. The coil shall then be covered by polyethelene sheet or asnti-rust waterproof paper and the ends sealed properly.

4. A galvanised sheet shall be wrapped on the outside of the coil and the top and bottom of the coil. Care shall be taken to ensure that the ends of the top and bottom of the coils extend sufficiently over the inside diameter of the coil.

5. A galvanised sheet shall be wrapped on the inside of the coil care shall be taken that it overlaps sufficiently over the ends of the sheet mentioned in (4) above.

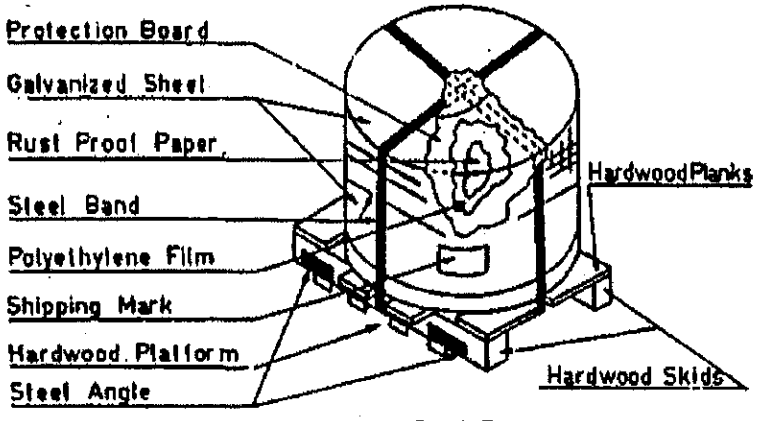
6. Steel rings made from thick angle sheets shall be placed on the rims of the inner and outer diameters at both ends of the coil. The rings shall be held at either ends at four points by steel bands.

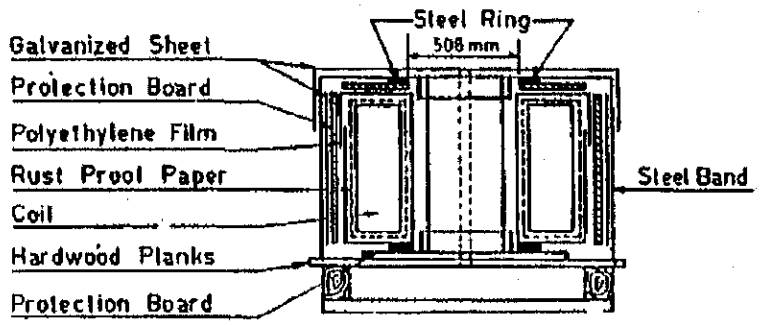
7. The coil shall then be mounted on wooden skids, held together by steel bands. Wooden skids must have cutouts to house the steel bands for tight fit and to avoid slippage.

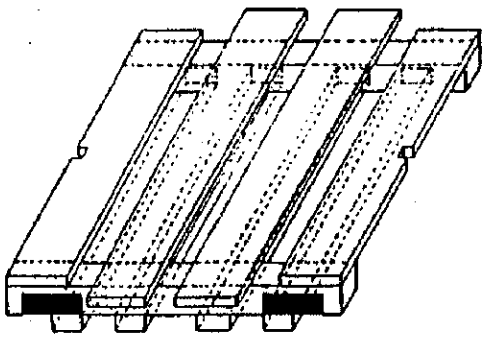
8. The packing shall ensure that there is no seepage of moisture and the sheets reach BHEL in completely rust free condition. It shall be strong enough to withstand handling at the docks, at sea and on the road.

9. Coils shall be sufficiently tight wound to prevent collapse to an extent that would preclude their being mounted on a mandrel appropriate to the ordered internal diameter.

10. Each package shall indicate the, Sling Position, for lifting without damage. It is preferable to fix a suitable size of, 'Sheet Steel Angle', at the position where the Sling Rope is to be fitted to avoid slippage/damage/ breakage of the wooden skid at four places.







	PLANT PURCHASING SPECIFICATION JHANSI	PURCHASING SPECIFICATION NO. JS 10999 Page 1 of 8

SPECIFICATION FOR COLD ROLLED GRAIN ORIENTED, MAGNETIC STEEL SHEET GR. 27 ZDKH 90

(LASER IRRADIATED/PLASMA FLAME IRRADIATED)

1. GENERAL

This specification governs the quality of 0.27 mm thick, cold rolled, grain oriented, magnetic steel sheet, coated on both sides and supplied in continuous strip.

The sheet shall be of low carbon, high silicon, steel sheets having silicon content around 3.25 percent. High permeability and low core-loss in the direction of rolling is achieved by appropriate metallurgical processes.

2. APPLICATION

Transformer cores.

3. CONDITION OF DELIVERY

Cold rolled, annealed, steel sheet shall be supplied in side trimmed coils.

The thermally flattened sheet or coiled strip shall be coated with an inorganic surface coating type C2 plus an inorganic coating type C5 applied over the inherent C2 coating to provide extra surface insulation resistance on both sides as per ASTM A 876 M, condition F5.

4. CONDITION OF SURFACE

The material shall be free from dents and surface defects such as holes, scabs, pits, blisters, slivers, mill marks etc. and shall be free oil, grease, dust, scale and rust.

Material shall be uniformly coated on both sides as part of its manufacturing process with an insulation as stated above.

The insulation coating shall be uniform throughout the length of coil. There shall not be line marks, rough spots, shade difference, dots & patches etc.

5. DIMENSIONS AND TOLERANCES :

5.1 Thickness

0.27 mm

5.2 Width

The nominal standard width of coil shall be 790, 840, 915 or 1000 mm.

The order shall clearly specify the width of the coil.

5.3 Tolerances :

5.3.1 Thickness

The tolerance on thickness when measured with a contact micrometer at any location not less than 9.5 mm from an edge shall not deviate more than ± 0.02 mm from the average thickness of the test lot or coil.

5.3.2 Width

The tolerance on with of side trimmed coil or sheet cut from side trimmed coil shall be -0 to + 3mm.

5.3.3 Edge Camber

The deviation of a side edge from a straight line over 2440 mm length or fraction there of shall not exceed 3.2 mm.

6. WAVINESS

Sharp, short waves and buckles are extremely detrimental to the effective use of grain oriented electrical steel in flat laminations and shall be avoided in the delivered product.

For material of width greater than 150 mm, the deviation from Flatness (wave factor), expressed as a percentage, shall not exceed 1.5% (BS : 6404 section 8.7).

7. SELECTION OF TEST SAMPLES

The test samples shall be selected from the consignment as follows :

Up to 30 tonnes	..... 1 Sample.
31 to 60 tonnes	..... 2 samples
above 60 tonnes	..... 3 samples

The test samples shall be of sufficient size to provide the necessary test pieces.

8. TEST METHOD

Test shall be conducted on specimens without stress relief annealing taken longitudinal to the rolling direction in accordance with IEC 404-3 for core loss & JEM-F-3007 for induction.

9. DUCTILITY

Material shall possess good-shearing and punching properties and shall be sufficiently ductile to permit normal working appropriate to its grade. Material supplied for the manufacture of strip bound cores, shall be sufficiently ductile for its application.

The bend test shall be carried on transversely cut test specimen of 60mm length and between 10mm and 30mm width.

The test specimen shall be initially bent through 90°, this bend not being counted. The test specimen shall then be bent backwards through 160°. The specimen shall complete one bend without fracture.

10. MAXIMUM SPECIFIC TOTAL LOSS

10.1 Cutting of Test specimen

Epstein test specimens measuring 30 mm wide and not less than 300 mm long, shall be cut from the sample with sharp shears. All the strips shall be cut parallel to the direction of rolling.

10.2 Testing

The specimens shall be tested at a peak magnetic flux density of 1.7 T and a frequency of 50 Hz. The specific total loss shall not be greater than 0.9 watt/kg. The assumed density shall be 7650 Kg/cu-m.

11. MAGNETIC INDUCTION TEST

Minimum induction at 800 A/m shall be 1.88 T.

12. STACKING FACTOR

The surface quality of the sheets when measured in terms of stacking factor (viz. a minimum of 16 samples under a pressure of 0.35 Mpa) shall be 96% minimum.

13. AGEING TEST (TYPE TEST)

When tested at peak Magnetic Flux Density of 1.7 T and at a frequency of 50 Hz the specific total loss of a specimen which has been heated at a temperature of 225°C for 24 hours should not deteriorate more than 4% of the measured loss (clause 10) of the coil concerned (BS:6404 section 8.7).

14. SURFACE INSULALTION RESISTIVITY

The surface insulation resistivity per lamination (two surface) of single strip specimen (5 on each side), when tested by Franklin Tester, shall show the following readings.

Average Value - 10 ohms - sq. cm Minimum

Individual Value - 5 ohms-sq. cm Minimum

15. TEST CERTIFICATE

Three copies of a test certificate shall be supplied with each consignment. The test certificate shall bear the following information.

BHEL Reference

BHEL Order No.

JS 10999 Rev. 00

Supplier's Refernce :

Coil No. or identification No.

Nominal width, thickness & weight of each coil

- Result of Tests

i) For each coil

Specific core loss

ii) For one coil selected at random from each Lot/consignment

Waviness, Ductility, stacking Factor, Ageing Test, Induction, Surface Insulation Resistivity and Chemical composition.

16. WEIGHT OF COIL

The nominal weight of a coil shall be between 1800 to 2500 kg.

17. PACKING AND MARKING

The material shall preferably be supplied in coils of continuous length. However, if it becomes unavoidable, 5% coils of the order can be supplied with maximum of three butt weld joints. 95% coils shall be in one continuous length. The supplier shall ensure that the welds are made in such a manner, so that areas of coil adjacent to the weld are not damaged . The welds shall be clearly marked by suitable tags projecting outside the coil.

The nominal internal diameter of coil shall be 508 mm.

Packing shall be sea-worthy and shall be protected to prevent damage and rusting during transit.

Sheet steel coils shall be vertically packed according to the instructions and drawings given on page 6 to 8.

A metal label/tag shall be securely attached to each coil outside its wrapping and shall be marked with the following.

Cold rolled grain oriented magnetic steel sheet. Grade 27ZDKH 90 (laser Irradiated/ Plasma Flame Irradiated)

BHEL Order No.

Manufacturer's Name, Grade and Trade Mark

Identification No. and Coil No.

Net & Gross Weight of coil.

DETAILED INSTRUCTION FOR PACKING

1. An annular protection board should be placed at either end of the coil.

2. The coil should then be wrapped with waterproof anti-rust crepe kraft paper by lapping axially all around the circumference.

3. The coil shall then be covered by polyethylene sheet or waterproof kraft paper and the ends sealed properly.

4. A galvanised sheet should be wrapped on the outside of the coil and the two ends. Care should be taken to ensure that the ends extend sufficiently over the inside diameter of the coil.

5. A galvanised sheet should be wrapped on the inside of the coil; care should be taken that it overlaps sufficiently over the ends of the sheet mentioned in (4) above.

6. Steel rings made from thick angle sheets should be placed on the rims of the inner and outer diameters at both ends of the coil. The rings should be held at either ends at four points by steel bands.

7. The coil should then be mounted on wooden skids held together by steel bands.

8. The packing should ensure that there is no seepage of moisture and the sheets reach BHEL in completely rust free condition. It should be strong enough to withstand handling at the docks, at sea and on the road.

9. Coils should be sufficently tight wound to prevent collapse to an extent that would preclude their being mounted on a mandrel appropriate to the ordered internal diameter.