



SOCIETA' ELETTROMECCANICA ARZIGNANESE S.P.A.

Transformer Test Certificate

TEST ACCORDING TO : I.E.C. 60076-11 / 2004 - DRY-TYPE TRANSFORMERS
C.E.I. 14-8 ANNO 1999 - TRASFORMATORI DI POTENZA A SECCO

CERTIFICATE N° 84273 Testing Date : 12/12/2005 Page 1

ORDER N° : (ns. VEN001933)
CUSTOMER : SENERJI MUHENDISLIK LTD -TURKEY-

Transformer type : ENCAPSULATED-WINDING DRY-TYPE TRANSFORMER Type : TTR - D
POWER : 2000.0 kVA SERIAL N° : 84273 Phase: 3 Frequency= 50 Hz
VOLTAGE RATIO : 34500 +1-4x1500V / 400 Volt
CURRENT RATIO : 33.470 / 2886.750 Ampere
CONNECTION : Dyn11 GROUP : 11

Measurements Summary

GUARANTEED RATIO : 34500/400 V

	NO LOAD LOSSES (Watt)	NO LOAD CURRENT(%)	LOAD LOSSES (Watt)	IMPEDANCE (%)
GUARANTEED VALUES	5000.0	0.95000	18000	7.5000
TOLLERANCE (%)	15.000	30.000	15.000	10.000
MEASURED VALUES	4423.7	0.38141	17840	7.5230
DIFFERENCE (%)	-11.527	-59.852	-0.88917	0.30718

REMARK CLASSES : E2 - C2 - F1
TEMPERATURE MONITORING UNIT MOD. T-154 n° T4265C028/8

DIELECTRIC TESTS

SEPARATE-SOURCE VOLTAGE WITHSTAND TEST

Highest voltage = 36 kV Testing voltage= 70 kV t. = 60 sec. Result : SATISFACTORY

SEPARATE-SOURCE VOLTAGE WITHSTAND TEST

Highest voltage = 1.1 kV Testing voltage= 3 kV t. = 60 sec. Result : SATISFACTORY

INDUCED OVERVOLTAGE WITHSTAND TEST

Supplied Voltage = 0.8 kV f= 150 Hz t= 40 sec Supplied side: L.V. Result : SATISFACTORY

MEASUREMENT OF NO-LOAD LOSSES AND CURRENT

SUPPLIED WINDING: 400 V FREQUENCY: 50.000 Hz

VOLTAGE K = 1					CURRENT K = 1				POWER K = 1				
VMuv	VMuw	VMvw	VMm	Vm(rms)	Iu	Iv	Iw	Aver. I	Wu	Wv	Ww	W tot	W corr.
401.66	402.36	398.72	400.91	401.14	11.998	9.0750	11.958	11.010	1323.5	1193.7	1909.0	4426.2	4423.7

REMARK

CUSTOMER

MANUFACTURER

per **S.E.A. S.p.A.**
TEZZE DI ARZIGNANO (VI)

SEA SOCIETA' ELETTROMECCANICA ARZIGNANESE S.P.A.

Via L. Galvani, 8 - 36070 Tezze di Arzignano VICENZA ITALY
Tel. 0444/482100 Telefax 0444/482519

Page 0. 1



SOCIETA' ELETTROMECCANICA ARZIGNANESE S.P.A.

Transformer Test Certificate

TEST ACCORDING TO : I.E.C. 60076-11 / 2004 - DRY-TYPE TRANSFORMERS
C.E.I. 14-8 ANNO 1999 - TRASFORMATORI DI POTENZA A SECCO

CERTIFICATE N° 84273 TESTING DATE 12/12/2005 PAGE 2

TRANSFORMER TYPE: ENCAPSULATED-WINDING DRY-TYPE TRANSFORMER TYPE: TTR - D
RATING: 2000.0 kVA SERIAL N° 84273 Phase : 3 Frequency= 50 Hz

MEASUREMENT OF VOLTAGE RATIO

METHOD: Barbagelata

MEASURE ON RATIO :
34500/400 Volt

TAP-CHANGER POSITION	MEASURED RATIO			NOMINAL RATIO	DIFFERENCE (%)
	1U1V/2U2N	1V1W/2V2N	1W1U/2W2N		
5-6/5-6/4-5	123.400	123.400	123.400	123.409	-0.007
5-6/4-5/4-5	129.900	129.900	129.900	129.904	-0.003
4-5/4-5/4-5	136.300	136.300	136.300	136.399	-0.073
4-5/4-5/3-4	142.800	142.800	142.800	142.894	-0.066
4-5/3-4/3-4	149.300	149.300	149.300	149.389	-0.060
3-4/3-4/3-4	155.800	155.800	155.800	155.885	-0.055

REMARK

MEASUREMENT OF WINDINGS RESISTANCE

METHOD: VOLT-AND-AMMETER Amb. Temp.= 17.0 °C

PRIMARY WINDING : 34500 V				SECONDARY WINDING : 400 V				REMARKS
TERMINALS	V (Volt)	I (Amp)	R (Ohm)	TERMINALS	V (Volt)	I (Amp)	R (Ohm)	
1U1V	10.603	3.0000	3.5343	2U2V	0.022850	50.000	0.00045700	
1V1W	10.659	3.0000	3.5530	2V2W	0.023570	50.000	0.00047140	
1W1U	10.625	3.0000	3.5417	2W2U	0.022810	50.000	0.00045620	
Average Resistance			3.5430 Ohm	Average Resistance			0.00046153 Ohm	
Average resistance 75 °C			4.3921 Ohm	Average resistance 75 °C			0.00057215 Ohm	

MEASUREMENT OF IMPEDANCE AND LOAD LOSS

Energized winding : 34500 V Frequency: 50.000 Hz Ambient Temperature= 17.0 °C

VOLTAGE K=1				CURRENT K=1				POWER K=1			
Vuv	Vuw	Vvw	Vm	Iu	Iv	Iw	Im	Wu	Wv	Ww	WM
1958.1	1956.9	1957.3	1957.4	25.320	25.190	25.330	25.280	3015.9	3011.7	2999.5	9027.1

Voltage at In (V) : 2591.6 Nominal current: 33.470 A Losses at In (W) : 15823

CALCULATION OF LOAD LOSSES AND IMPEDANCE

Ratio: 34500/400 V Primary winding in: ALLUMINIUM Secondary winding in: ALLUMINIUM

Ambient Temperature:	17.0 °C	Reference Temperature =	75 °C	Coefficient K=	1.240
Prim. wind. resistance:	3.5430 Ohm	Total ohmic losses:	14532	Watt	
Secon. wind. resistance:	0.00046153 Ohm	Additional losses:	3307.9	Watt	
Prim. wind. ohmic losses :	5953.4	Total load losses:	17840	Watt	
Secon. wind. ohmic losses :	5769.2	Inductive component XI:	7.4700	%	
Total ohmic losses :	11723	Resistive component RI:	0.89200	%	
Load losses:	15823	Impedance:	7.5230	%	
Additional losses:	4100.7	Power factor :	0.11857		

VOLTAGE DROP (%)

LOAD	Cosfi=0.8	Cosfi=1
1/1	5.3436	1.1710
3/4	3.9799	0.82594
1/2	2.6348	0.51575

EFFICIENCY (%)

LOAD	Cosfi=0.8	Cosfi=1
1/1	98.628	98.899
3/4	98.809	99.045
1/2	98.902	99.119

CUSTOMER

MANUFACTURER

per S. E. A. S.p.A.
TEZZE DI ARZIGNANO

SEA SOCIETA' ELETTROMECCANICA ARZIGNANESE S.P.A.

Via L. Galvani, 8 - 36070 Tezze di Arzignano VICENZA ITALY
Tel. 0444/482100 Telefax 0444/482519

Page 0. 2