



# 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° 84000 Testing Date : 31/10/2005 Page 1

ORDER N° : (ns. VEN001851)  
CUSTOMER : SENERJI MUHENDISLIK LTD -TURKEY-

Transformer type : ENCAPSULATED-WINDING DRY-TYPE TRANSFORMER Type : TTR - D  
POWER : 1600.0 kVA SERIAL N° : 84000 Phase: 3 Frequency= 50 Hz  
VOLTAGE RATIO : 34500 +1.4x1500V / 400 Volt  
CURRENT RATIO : 26.780 / 2309.400 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	4200.0	1.2000	14800	6.0000
TOLLERANCE (%)	15.000	30.000	15.000	10.000
MEASURED VALUES	3669.0	0.35780	13402	6.2926
DIFFERENCE (%)	-12.642	-70.183	-9.4474	4.8759

REMARK CLASSES : E2 - C2 - F1  
TEMPERATURE MONITORING UNIT TECSYSTEM T-154 -S.N. T4365C036/4-

### 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: 50.199 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.
401.10	401.20	400.30	400.87	400.77	9.4030	6.4950	8.8910	8.2630	1165.9	899.20	1603.0	3668.1	3669.0

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° 84000 TESTING DATE 31/10/2005 PAGE 2

TRANSFORMER TYPE: ENCAPSULATED-WINDING DRY-TYPE TRANSFORMER TYPE: TTR - D  
RATING: 1600.0 kVA SERIAL N° 84000 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 (%)	REMARK
	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	136.400	136.400	136.400	136.399	0.001	
4-5/4-5/3-4	142.500	142.500	142.500	142.894	-0.276	
4-5/3-4/3-4	149.400	149.400	149.400	149.389	0.007	
3-4/3-4/3-4	155.900	155.900	155.900	155.885	0.010	

### MEASUREMENT OF WINDINGS RESISTANCE

METHOD: VOLT-AND-AMMETER Amb. Temp.= 20.0 °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	10.469	2.0000	5.2345	2U2V	0.023710	50.000	0.00047420	
1V1W	10.501	2.0000	5.2505	2V2W	0.024370	50.000	0.00048740	
1W1U	10.477	2.0000	5.2385	2W2U	0.023650	50.000	0.00047300	
Average Resistance			5.2412 Ohm	Average Resistance			0.00047820 Ohm	
Average resistance 75 °C			6.4178 Ohm	Average resistance 75 °C			0.00058555 Ohm	

### MEASUREMENT OF IMPEDANCE AND LOAD LOSS

Energized winding : 34500 V Frequency: 50.200 Hz Ambient Temperature= 20.0 °C

VOLTAGE K=1				CURRENT K=1				POWER K=1			
Vuv	Vuw	Vvw	Vm	Iu	Iv	Iw	Im	Wu	Wv	Ww	WM
1284.3	1279.9	1280.7	1281.6	15.813	15.821	15.889	15.841	1344.1	1388.0	1357.9	4090.0
Voltage at In (V) : 2166.3				Nominal current: 26.776 A				Losses at In (W) : 11685			

### CALCULATION OF LOAD LOSSES AND IMPEDANCE

Ratio:	34500/400 V	Primary winding in:	ALLUMINIUM	Secondary winding in:	ALLUMINIUM
Ambient Temperature:	20.0 °C	Reference Temperature =	75 °C	Coefficient K=	1.224
Prim. wind. resistance:	5.2412 Ohm	Total ohmic losses:	11586	Watt	
Secon. wind. resistance:	0.00047820 Ohm	Additional losses:	1815.7	Watt	
Prim. wind. ohmic losses :	5636.4	Total load losses:	13402	Watt	
Secon. wind. ohmic losses :	3825.6	Inductive component XI:	6.2366	%	
Total ohmic losses :	9462.0	Resistive component RI:	0.83761	%	
Load losses:	11685	Impedance:	6.2926	%	
Additional losses:	2223.3	Power factor :	0.13311		

LOAD	Cosfi=0.8	Cosfi=1
1/1	4.5127	1.0321
3/4	3.3656	0.73760
1/2	2.2312	0.46742

LOAD	Cosfi=0.8	Cosfi=1
1/1	98.684	98.944
3/4	98.846	99.075
1/2	98.915	99.130

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. 2