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° 84157 | **Testing Date :** 25/11/2005 | **Page** 1

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

Transformer type : ENCAPSULATED-WINDING DRY-TYPE TRANSFORMER **Type :** TTR - D
POWER : 3150.0 kVA **SERIAL N° :** 84157 **Phase:** 3 **Frequency=** 50 Hz
VOLTAGE RATIO : 34500 +2-3x1500V / 400 Volt
CURRENT RATIO : 52.710 / 4546.630 Ampere
CONNECTION : Ynd5 **GROUP :** 5

Measurements Summary

GUARANTEED RATIO : 34500/400 V

	NO LOAD LOSSES (Watt)	NO LOAD CURRENT(%)	LOAD LOSSES (Watt)	IMPEDANCE (%)
GUARANTEED VALUES	6900.0	0.85000	26500	8.0000
TOLLERANCE (%)	15.000	30.000	15.000	10.000
MEASURED VALUES	6521.3	0.33109	23210	8.1917
DIFFERENCE (%)	-5.4880	-61.048	-12.416	2.3959

REMARK: CLASSES : E2 - C2 - F1
TEMPERATURE MONITORING UNIT TEC SYSTEM T154 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**

MEASURAMENT 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.
399.76	401.49	400.10	400.45	399.53	13.678	13.492	17.991	15.054	1432.3	2398.0	2676.0	6506.3	6521.3

REMARK:

CUSTOMER

MANUFACTURER

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

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CERTIFICATE N°	84157	TESTING DATE	25/11/2005	PAGE	2

TRANSFORMER TYPE: ENCAPSULATED-WINDING DRY-TYPE TRANSFORMER **TYPE:** TTR - D

RATING: 3150.0 kVA **SERIAL N°** 84157 **Phase :** 3 **Frequency=** 50 Hz

MEASURAMENT OF VOLTAGE RATIO

METHOD: Barbagelata

MEASURE ON RATIO : 34500/400 Volt

TAP-CHANGER POSITION	MEASURED RATIO 1U-n/2W-2U	1V-n/2U-2V	1W-n/2V-2W	NOMINAL RATIO	DIFFERENCE (%)
5-6/5-6/4-5	43.430	43.430	43.430	43.301	0.298
5-6/4-5/4-5	45.570	45.570	45.570	45.466	0.229
4-5/4-5/4-5	47.700	47.700	47.700	47.631	0.145
4-5/4-5/3-4	49.850	49.850	49.850	49.796	0.108
4-5/3-4/3-4	51.960	51.960	51.960	51.962	-0.004
3-4/3-4/3-4	54.130	54.130	54.130	54.127	0.006

REMARK

MEASURAMENT OF WINDINGS RESISTANCE

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

PRIMARY WINDING : 34500 V

TERMINALS	V (Volt)	I (Amp)	R (Ohm)
1U1V	8.6350	5.0000	1.7270
1V1W	8.7490	5.0000	1.7498
1W1U	8.6290	5.0000	1.7258
Average Resistance		1.7342	Ohm
Average resistance 75 °C		2.1498	Ohm

SECONDARY WINDING : 400 V

TERMINALS	V (Volt)	I (Amp)	R (Ohm)
2U2V	0.011110	50.000	0.00022220
2V2W	0.011130	50.000	0.00022260
2W2U	0.011180	50.000	0.00022360
Average Resistance		0.00022280	Ohm
Average resistance 75 °C		0.00027620	Ohm

REMARKS

MEASURAMENT 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
2003.1	2001.7	2002.1	2002.3	37.080	37.620	37.420	37.373	3676.0	3536.0	3436.0	10648

Voltage at In (V) : 2824.2 **Nominal current:** 52.715 A **Losses at In (W) :** 21184

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:	1.7342	Ohm	Total ohmic losses:	17525	Watt
Secon. wind. resistance:	0.00022280	Ohm	Additional losses:	5684.4	Watt
Prim. wind. ohmic losses :	7228.6	Watt	Total load losses:	23210	Watt
Secon. wind. ohmic losses :	6908.5	Watt	Inductive component XI:	8.1585	%
Total ohmic losses :	14137	Watt	Resistive component RI:	0.73682	%
Load losses:	21184	Watt	Impedance:	8.1917	%
Additional losses:	7046.8	Watt	Power factor :	0.089947	

VOLTAGE DROP (%)

LOAD	Cosfi=0.8	Cosfi=1
1/1	5.6697	1.0696
3/4	4.2175	0.73981
1/2	2.7885	0.45161

EFFICIENCY (%)

LOAD	Cosfi=0.8	Cosfi=1
1/1	98.834	99.065
3/4	98.975	99.178
1/2	99.031	99.224

CUSTOMER

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