NORATEL
Noratel AS - Norway

Certificate for 3 Phase Dry Type Transformer

Customer: **Jatec AS**	Your ref.:		Purchase Order: **2722287**
Type: **3HT250-23 AL**	Connection: **y, YN0**		Serial no.:
Rated power: **230000** VA	Load.: **100** %		Art. no.: **3-030-002620**
Pcs.: **1**	Total weight: **932** Kg.		
According to.: **IEC-60726/60076**	Temp. class: **F**	Amb.temp.: **45** °C	Reference temp.: **95** °C

Primary: **670-690-710** Volt — Primary: **200-194-189** Amp. — **60** Hz
Secondary: **4200-4350-4500** Volt — Secondary: **31,6-30,5-29,5** Amp.

1. Measurement of winding resistance at ambient temp.: **23** °C
Measurement resistance of primary at terminals; AB (1U-1V): **.00939** ohm, AC (1U-1W): **.00939** ohm, BC (1V-1W): **.00939** ohm
Measurement resistance of secondary at terminals; ab (2U-2V): **1.09** ohm, ac (2U-2W): **1.09** ohm, bc (2V-2W): **1.09** ohm

2. Measurement of voltage ratio and check of phase displacement
Input voltage at terminals; AB (1U-1V): **710** Volt, AC (1U-1W): **710** Volt, BC (1V-1W): **710** Volt
Measurement of voltage ratio at terminals; ab (2U-2V): **4574** Volt, ac (2U-2W): **4574** Volt, bc (2V-2W): **4574** Volt
Secondary: **4574** average Volt — Ratio: **.155**
Measurement and check of voltage vector relationship: **OK,**

3. Measurement of short-circuit impedance and load loss at ambient temp.: **23** °C
Measurement impedance voltage, Ez: **14.64** Volt at : **50** % of rated current and rated freq. The supplied current is: **94.5** average Amp.
Measurement copper loss, CuW: **500.6** Watt at : **50** % of rated current and rated frequency. Short circuitet terminals is: **2U-2V-2W**
Impedance voltage (Ez) and load loss (CuW) corrected to **100**% of the rated currrent and reference temp.: **95** °C
Short circuit resistance, Er: **1.12** % — Short circuit reaktance, Ex: **4.03** %
Short circuit impedance, Ez: **4.18** % — Copper loss at 100% load (CuW): **2565** Watt

4. Measurement of no-load loss and current
Primary rated voltage and rated frequency at terminals; AB (1U-1V): **710** Volt, AC (1U-1W): **710** Volt, BC (1V-1W): **710** Volt
Measurement of no-load current at terminals; AB (1U-1V): **.74** Amp., AC (1U-1W): **1.04** Amp., BC (1V-1W): **.98** Amp.
Primary no-load current: **.92** average Amp. — Primary no-load loss (FeW): **776.31** Watt

Total losses at 100% load and reference temperature (FeW + CuW): **3341** Watt
Percentage efficiency at Powerflow 1.0, and 1/4 load: **98.43** % — Percentage efficiency at Powerflow 1.0, and 2/4 load: **98.79** %
Percentage efficiency at Powerflow 1.0, and 3/4 load: **98.74** % — Percentage efficiency at Powerflow 1.0, and 4/4 load: **98.58** %
Percentage efficiency at Powerflow 0.8, and 1/4 load: **98.05** % — Percentage efficiency at Powerflow 0.8, and 2/4 load: **98.5** %
Percentage efficiency at Powerflow 0.8, and 3/4 load: **98.43** % — Percentage efficiency at Powerflow 0.8, and 4/4 load: **98.23** %

5. Separate-source voltage withstand test
Between LV and HV coil: **20** KV AC in: **60** sec. — Between LV and HV coil: **1** KV megger: **200** M ohm
Between HV and core/casing/frame: **20** KV AC in: **60** sec. — Between HV and core/casing/frame: **1** KV megger: **200** M ohm
Between LV and core/casing/frame: **5** KV AC in: **60** sec. — Between LV and core/casing/frame: **1** KV megger: **200** M ohm

6. Induced overvoltage withstand test — min. 2 x Rated voltage: **1.5** KV AC in: **20** sec.

DATE:	MADE BY:	DATE:	REV.:	DATE:	APPROVED:	DOC. NO.:
06.07.2015	**B.G.**					**3-030-002620-2722287-TR01**