NORATEL
Noratel AS - Norway

Certificate for 3 Phase Dry Type Transformer

Customer: **Jatec AS**	Your ref.:		Purchase Order: **2722287**
Type: **3LT30.0-23**	Connection: **y, Y0**		Serial no.:
Rated power: **23000** VA	Load.: **100** %		Art. no.: **3-010-001767**
Pcs.: **1**	Total weight: **206** Kg.		
According to.: **IEC-60726/60076**	Temp. class: **F**	Amb.temp.: **45** °C	Reference temp.: **95** °C

Primary: **670-690-710** Volt — Primary: **20.35-19.76-19.2** Amp. — **50** Hz
Secondary: **3000-3150-3300** Volt — Secondary: **4.024** Amp.

1. Measurement of winding resistance at ambient temp.: **23** °C
Measurement resistance of primary at terminals; AB (1U-1V): **.1125** ohm, AC (1U-1W): **.1125** ohm, BC (1V-1W): **.0025** ohm
Measurement resistance of secondary at terminals; ab (2U-2V): **7.92** ohm, ac (2U-2W): **7.92** ohm, bc (2V-2W): **7.92** ohm

2. Measurement of voltage ratio and check of phase displacement
Input voltage at terminals; AB (1U-1V): **670** Volt, AC (1U-1W): **670** Volt, BC (1V-1W): **670** Volt
Measurement of voltage ratio at terminals; ab (2U-2V): **3024** Volt, ac (2U-2W): **3024** Volt, bc (2V-2W): **3024** Volt
Secondary: **3024** average Volt Ratio: **.222**
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: **5.1** Volt at : **50** % of rated current and rated freq. The supplied current is: **10.2** average Amp.
Measurement copper loss, CuW: **68.43** 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: **1.52** % — Short circuit reaktance, Ex: **.95** %
Short circuit impedance, Ez: **1.8** % — Copper loss at 100% load (CuW): **350.6** Watt

4. Measurement of no-load loss and current
Primary rated voltage and rated frequency at terminals; AB (1U-1V): **670** Volt, AC (1U-1W): **670** Volt, BC (1V-1W): **670** Volt
Measurement of no-load current at terminals; AB (1U-1V): **1.15** Amp., AC (1U-1W): **1.12** Amp., BC (1V-1W): **.86** Amp.
Primary no-load current: **1.043** average Amp. — Primary no-load loss (FeW): **367.1** Watt

Total losses at 100% load and reference temperature (FeW + CuW): **717.7** Watt
Percentage efficiency at Powerflow 1.0, and 1/4 load: **93.41** % — Percentage efficiency at Powerflow 1.0, and 2/4 load: **96.12** %
Percentage efficiency at Powerflow 1.0, and 3/4 load: **96.79** % — Percentage efficiency at Powerflow 1.0, and 4/4 load: **96.94** %
Percentage efficiency at Powerflow 0.8, and 1/4 load: **91.81** % — Percentage efficiency at Powerflow 0.8, and 2/4 load: **95.17** %
Percentage efficiency at Powerflow 0.8, and 3/4 load: **96.01** % — Percentage efficiency at Powerflow 0.8, and 4/4 load: **96.2** %

5. Separate-source voltage withstand test
Between LV and HV coil: **10** KV AC in: **60** sec. — Between LV and HV coil: **1** KV megger: **200** M ohm
Between HV and core/casing/frame: **10** KV AC in: **60** sec. — Between HV and core/casing/frame: **1** KV megger: **200** M ohm
Between LV and core/casing/frame: **3** 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: **1.3** KV AC in: **20** sec.

DATE:	MADE BY:	DATE:	REV.:	DATE:	APPROVED:	DOC. NO.:
19.08.2015	**F.K.**					**3-010-001767-2722287-TR01**