KEMA

Report.

TIC 3191-11

Factory Acceptance Test On A Three Phase Power Transformer 50 MVA

Manufacturer
Shenda Electric Group Co., Ltd.
Jiangshan, China

Arnhem, 15 February 2012

INSPECTION REPORT

Report number	TIC 3191-11
Client	Shenda Electric Group Co., Ltd. No.17, Huatong, Road Jiangshan Economic Development Zone Zhejiang Province China, 324102
Reference	72130114
Concerning	Factory Acceptance Test
Date	23 November to 27 November 2011
Place	Jiangshan, China
Object	Three-phase Power Transformer 50 MVA
Manufacturer	Shenda Electric Group Co., Ltd. Jiangshan, China

TEST PROGRAMME

For the programme, specified by the client, a reference is made on page 3.
The tests were carried out in accordance with client instructions.

SUMMARY AND CONCLUSION

The results obtained relate only to the work ordered and to the material tested.
On the points examined, the requirements specified for the material tested were met.
The no-load loss and current measurement, measurement of harmonics of no-load current, load loss and short-circuit impedance measurement, measurement of zero-sequence impedance and sound level test at no-load condition were carried out at 50 Hz instead of 60 Hz. According to IEC 60076-1 and IEC 60076-10, this is a client instruction. And, the temperature rise test was carried out at 50 Hz instead of 60 Hz, which is a client instruction according to IEC 60076-2.
Also the value of these tests cannot be compared with the guaranteed value at 60 Hz.
This 60 Hz transformer was tested at 50 Hz. Except for this issue, this transformer passed all the tests successfully, without any remarks.

KEMA Nederland B.V.

S.A.M. Verhoeven
Director Testing, Inspections & Certification The Netherlands

Author E. Hanique

This report consists of:
72 pages incl. 15 annexes (59 pages)

Arnhem, 15 February 2012

Utrechtseweg 310, 6812 AR Arnhem. Telephone + 31 26 3 56 22 85. Telefax + 31 26 3 51 36 83

MATERIAL DATA

Type		S11-50000 / 69 three-phase power transformer
Manufacturer		Shenda Electric Group Co., Ltd.
Serial Number		111023-1
Year of Manufacture		2011
Insulation		Paper / oil
Rated voltages	[kV]	69 / 13,8
Tapping range	[kV]	69 +2/-2 x 2,5%
Rated frequency	[Hz]	60
Highest voltages	[kV]	72,7 / 15
Rated current	[A]	418,4 / 2091,8

	Lightning impulse	Separate source
High voltage winding (h.v.)	350	160
Low voltage winding (l.v.)	110	34
Neutral point	350	160

Rated power ONAN	[MVA]	50 / 50
Vector Group		YNd1
Cooling type		ONAN
Terminals		h.v.: H1, H2, H3 l.v.: X1, X2, X3
Standards		IEC 60076

The transformer was tested with radiators and oil preservation systems. All components and accessories were installed and connected to the marshalling box. Photos of the transformer under test are presented in annex O.

Drawings and documents

Nameplate drawing no.	S11.50000.02, annex N page 1
General outline drawing no.	S11.50000.01, annex N page 2

TEST PROGRAMME

		Kind of test [1]	Standard/ Specification	Clause
0	INSPECTION OF THE TEST-SETUP			
1	DIELECTRIC EXAMINATIONS			
1.1	Dielectric tests			
1.1.1	Separate source AC withstand voltage test	R	IEC 60076-3	11
1.1.2	Short-duration induced AC withstand voltage test	R	IEC 60076-3	5,12
1.1.3	Lightning impulse test	R	IEC 60076-3	5,13
1.2	Dielectric measurement			
1.2.1	Measurement of dissipation factor and system capacitances	S	IEC 60076-1	10.1.3.b
1.2.2	Measurement of insulation resistances	S	IEC 60076-1	10.1.3
1.2.3	Partial discharge measurement	R	IEC 60076-3	12
2	BEHAVIOUR UNDER NORMAL CONDITIONS			
2.1	Measurement of winding resistances	R	IEC 60076-1	10.2
2.2	Measurement of voltage ratios and check of phase displacement	R	IEC 60076-1	10.3
2.3	Measurement of load loss and short-circuit impedance	R	IEC 60076-1	10.4
2.4	Measurement of no-load loss and current	R	IEC 60076-1	10.5
2.5	Measurement of the harmonics of the no-load current	S	IEC 60076-1	10.6
2.6	Measurement of zero-sequence impedance	S	IEC 60076-1	10.7
2.7	Determination of sound levels	S	IEC 60076-10	
2.8	Temperature-rise test	T	IEC 60076-2	
2.9	Insulation oil test	-	Specification	
2.10	Tightness test	-	Specification	
3	FUNCTIONAL TESTS OF COMPONENTS AND AUXILARY INSTRUMENTS			
3.1	Bushings	-	Specification	
3.2	Rating plate	-	Specification	

[1] R = Routine test T = Type test S = Special test

PERSONS ATTENDING THE INSPECTION

Mr. Li Shunli	Shenda Electric Group Co., Ltd.
Mr. Jiang Guoquan	Shenda Electric Group Co., Ltd.
Mr. Yang Xia	Shenda Electric Group Co., Ltd.
Mr. Carlos Cardenas	Corpracion Electrica Ecuatoriana (CELEC)
Miss. Ivette Onate	Corpracion Electrica Ecuatoriana (CELEC)
Mr. Vicente Roeben Tessmer	Engevix Engenharia S/A

THE INSPECTION WAS CARRIED OUT BY

Mr. E. Hanique	KEMA Nederland B.V.
Mr. Gu Bin	KEMA Nederland B.V.

PURPOSE OF THE INSPECTION

Purpose of the inspection was to verify whether the material complies with the requirements.

DESCRIPTION AND RESULTS OF THE INSPECTION

0 INSPECTION OF THE TEST SET-UP

The tests were carried out in the laboratory of the manufacturer, who is therefore jointly responsible for the correctness of the results obtained. The measuring devices and the test set-up were checked by KEMA and where necessary calibrated.

Results

The results do not give rise to remarks.

1 DIELECTRIC EXAMINATIONS

1.1 Dielectric tests

1.1.1 Separate source AC withstand voltage test

This test was carried out in accordance with IEC 60076-3, clauses 11 and was performed before the lightning impulse tests, described in 1.1.3.
The tests were performed according the following table:

Voltage supplied to	Earthed	Voltage [kV]	Frequency [Hz]	Duration [s]
h.v.-winding	l.v.-winding and tank	160	50	72
l.v.-winding	h.v.-winding and tank	34	50	72

Results

The results of this test met the requirements.