

CTQC

# 检验报告

J I A N Y A N B A O G A O



国家变压器质量监督检验中心

# CTQC



检测  
CNAS L0681



(2006)国认监认字(080)号



2006000394Z



机检电(2004)07号

## CERTIFICATION OF REPORT

No: CTQC/B-08.405

**Manufacturer:** HANGZHOU QIANTANG RIVER ELECTRIC GROUP CO., LTD.  
(HANGZHOU QIANDIAN SPECIAL TRANSFORMER CO., LTD.)

**Test object name:** Dry-type power transformer

**Test object type:** SC10-20000/35

**Serial:** 081458001

**Test items:** Routine tests, type tests, measurement of sound levels, short-circuit withstand test, partial discharge measurement.

**Standards:** GB1094.11, GB/T10228-1997, GB/T1094.10-2003,  
contract requirements.

**Results:** The test results of routine tests, type tests, measurement of sound levels, short-circuit withstand test, partial discharge measurement of SC10-20000/35 are in accordance with standards and technical contract requirements. The sample passed the above tests.

**Date:** Dec.09.2008

**Period of validity:** 5 years

**Approved:** Chen kui



**China National Transformer Quality Supervision  
Testing Center**

# CTQC



TESTING  
No. L0681



(2006)国认监认字(080)号



2006000394Z



机检电(2004)07号

## TEST REPORT

No. : CTQC/B-08. 405

Apparatus: Dry-type power transformer

Manufacturer: HANGZHOU QIANTANG RIVER ELECTRIC GROUP  
CO., LTD. (HANGZHOU QIANDIAN SPECIAL  
TRANSFORMER CO., LTD.)

Kind of testing: Trust testing/ Trust inspection



CHINA NATIONAL TRANSFORMER QUALITY  
SUPERVISION TESTING CENTER



<b>Test Report</b>	<b>China National Transformer Quality Supervision Testing Center</b>	№: CTQC/B-08.405 Total 29 Page 1
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### Test Report

No: CTQC/B-08.405

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Test object name	Dry-type power transformer	Test object type	SC10-20000/35
		Brand	/
Entrusted by	HANGZHOU QIANTANG RIVER ELECTRIC GROUP CO., LTD. (HANGZHOU QIANDIAN SPECIAL TRANSFORMER CO., LTD.)	Kind of testing	Trust testing/ Trust inspection
Manufacturer	HANGZHOU QIANTANG RIVER ELECTRIC GROUP CO., LTD. (HANGZHOU QIANDIAN SPECIAL TRANSFORMER CO., LTD.)	Sampling date	/
Address	Qiantang River Electric Science & Technology Industrial Zone, Xiaoshan District, Hangzhou city, China	Serial No	081458001
Standards	GB1094.11—2007 GB/T10228—1997 GB/T1094.10—2003 Technical contract	Test items	Routine tests Type tests Measurement of sound levels Short-circuit withstand test Partial discharge measurement
Results	<p>The test results of routine tests, type tests, measurement of sound levels, short-circuit withstand test, partial discharge measurement of SC10-20000/35 are in accordance with standards and contract requirements. The sample passed the above tests.</p> <p style="text-align: right;">Signing and issuing date: Dec. 9, 2008 Period of validity 5 years</p>		
Note	Short-circuit withstand test is trust testing, the other tests are trust inspection.		

Approved by:

Checked by:

Compiled by:

Statement:

1. Testing report is invalid without test special seal.
2. Testing report is invalid without compiler, checker and approver's signature.
3. Please inform CTQC in time after received the testing report if you have some disagreement to the testing report.
4. Testing or witnessing only apply to sample.
5. Copying testing certificate or testing report is forbidden without written permission from CTQC(except for copying all the testing report).

Test Report		China National Transformer Quality Supervision Testing Center		No: CTQC/B-08.405 Total 29 Page 3		
Test results						
No	Test items	Specified values		Measured values		Conclusions
		Standards (Technical contract)		Before S.C.T.	After S.C.T.	
1	Measurement of insulation resistance (Routine test)	Providing insulation resistance (GΩ)		H-L.E: >100 L-H.E: >100 H.L-E: >100	H-L.E: >100 L-H.E: >100 H.L-E: >100	/
2	Measurement of voltage ratio and check of connection group (Routine test)	The tolerances of voltage ratio : ±0.5% Connection group: Yd11		-0.13%~-0.12% Yd11	-0.12%~-0.11% Yd11	Passed
3	Measurement of winding resistance	Maximum unbalancedness Line: ≤2%		H.V.( line): 0.55% L.V.( line): 0.27%	H.V.( line): 0.37% L.V.( line): 0.28%	Passed
4	Separate-source AC withstand voltage test (Routine test)	H.V.: 70kV; 300s L.V.: 35kV; 300s		70kV 300s 35kV 300s	70kV 300s 35kV 300s	Passed
5	Induced AC withstand voltage test (Routine test)	Applied voltage (kV): 2Ur Induced voltage (kV): 70 Duration (s): 120 (f <sub>n</sub> /f) Frequency (Hz): f>50		21 70 60 100	21 70 60 100	Passed
6	Measurement of no-load loss and current (Routine test)	I <sub>0</sub> %: 0.4 P <sub>0</sub> (kW): 23.00	+30% +15%	0.14 21.58	0.14 21.38	Passed
7	Measurement of short-circuit impedance and load loss (Routine test)	t: 145°C Z%: 10.00 P <sub>k</sub> (kW): 91.50 P <sub>0</sub> +P <sub>k</sub> (kW): 114.50	±7.5% +15% +10%	10.30 86.79 108.37	10.30 86.15 107.53	Passed
8	Partial discharge measurement (Routine test, special test)	Three-phase measurement Applied voltage (kV): 1.3Ur Duration(min): 3 Partial discharge level(pC): ≤10		H.V. L.V. 45.5 13.65 3 3 <10 <10	H.V. L.V. 45.5 13.65 3 3 <10 <10	Passed
		Single-phase measurement Applied voltage (kV): 1.0Ur Duration(min): 3 Partial discharge level(pC): ≤10		H.V. L.V. 35 10.5 3 3 <10 <10	H.V. L.V. 35 10.5 3 3 <10 <10	Passed

<h2 style="margin: 0;">Test Report</h2>	<h3 style="margin: 0;">China National Transformer Quality Supervision Testing Center</h3>	No: CTQC/B-08.405 Total 29 Page 4
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No	Test items	Specified values	Measured values	Conclu- sions
		Standards (Technical contract)		
9	Temperature-rise test  (Type test)	Winding temp. -rise limit (K): 125	H.V: 98.9 L.V.: 92.1	Passed
10	Measurement of sound levels (Special test)	Sound pressure level $L_{PA}$ (dB): Sound power level $L_{WA,SN}$ dB (A): (≤93)	60  77	Passed
11	Short-circuit withstand test (Special test)	Three times each phase Duration (s): $0.25 \pm 10\%$ Test waveshapes have no distortion Deviation of reactance before and after S.C.T. ≤2% The visual inspection shows no apparent defects. Successfully repeat routine test	3 0.24 No distortion  0.46% No apparent defects.  Passed	Passed
12	Lightning impulse test (Type test)	H.V. Full wave (kV): 170 ±3% L.V. Full wave (kV): 75 ±3%	168.73~171.97 75.01~76.81	Passed



## 1. Test object parameters

Rated power: 20000 kVA  
 Rated voltage: 35/10.5 kV  
 Rated current: 329.91/1099.7 A  
 Rated frequency: 50 Hz  
 Number of phases: 3  
 Tap range:  $(35 \pm 3 \times 2.5\%) / 10.5$  kV  
 Connection group: Yd11  
 Cooling method: AN  
 Temperature class of insulation: H  
 Insulation level: h.v. line terminal LI/AC 170/70 kV  
 l.v. line terminal LI/AC 75/35 kV

## 2. Sample condition description

Sample exterior construction and major dimensions( length, width, height) are in compliance with drawing. Measured values: length is 3800mm, width is 1850mm, height is 3460mm.

Outline dimensions	Rating plate	Transformer body assembly	Core assembly
1QB.710.1458	1QB.710.1458.MP	5QB.710.1458	5QB.640.1458
H.V. lead	L.V. lead	H.V. winding	L.V. winding
6QB.516.1458.1	5QB.516.1458	6QB.602.1458.1	6QB.602.1458.2

The design, performance data , specifications of sample rating plate are in compliance with drawing.  
 The marking of the phase sequence on high voltage and low voltage side of the sample is clear and right.  
 The surface of the sample has no collision and damage.

## 3. Standards

GB1094.11-2007 《Power transformers Part11: Dry-type power transformers》  
 GB/T10228-1997 《Specification and technical requirements for dry-type power transformers》  
 GB/T1094.10-2003 《Power transformers Part10: Measurement of sound levels》

Technical contract



Test Report		China National Transformer Quality Supervision Testing Center			No: CTQC/B-08.405 Total 29 Page 6			
4. Test items and conclusions:								
4.1 Measurement of insulation resistance (Routine test)				Test date: June 20,2008 Humidity: 58% Ambient temperature: 21.0°C				
Measurement position				Insulation resistance (GΩ)				
H. V.—L.V.&E				>100				
L.V.—H.V. &E				>100				
H.V.&L.V.—E				>100				
4.2 Measurement of voltage ratio and check of connection group (Routine test) June 20,2008								
H.V.		L.V.		Ratio	Measured deviation (%)			Conne- tion group
Tap position	Voltage (kV)	Tap position	Voltage (kV)		AB/ab	BC/bc	CA/ca	
1	37.620	/	10.5	3.583	0.16	0.15	0.16	Yd11
2	36.750			3.500	0.07	0.06	0.07	
3	35.870			3.416	-0.02	-0.02	-0.02	
4	35.000			3.333	-0.12	-0.13	-0.13	
5	34.130			3.250	0.14	0.15	0.13	
6	33.250			3.167	0.05	0.04	0.03	
7	32.380			3.084	-0.05	-0.05	-0.07	
4.3 Measurement of winding resistance (Routine test) Test date: June 20,2008 Ambient temperature: 21.0°C								
Winding	Tap position	Measured values (Ω)			Unbalancedness (%)			
		A~B a~b	B~C b~c	C~A c~a				
H.V.	1	0.2120	0.2130	0.2130	0.47			
	2	0.2069	0.2070	0.2075	0.29			
	3	0.2013	0.2020	0.2020	0.35			
	4	0.1960	0.1963	0.1965	0.25			
	5	0.1923	0.1919	0.1920	0.21			
	6	0.1860	0.1865	0.1868	0.43			
	7	0.1805	0.1812	0.1815	0.55			
L.V.	/	0.010915	0.010944	0.010940	0.27			

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4.4 Separate-source AC withstand voltage test (Routine test) Test date: June 20,2008  
Humidity: 58%; Ambient temperature: 21.0°C

Position	Applied voltage (kV)	Duration (s)	Results
H.V.—L.V.&E	70	60	Passed
L.V.—H.V.&E	35	60	

4.5 Induced AC withstand voltage test (Routine test) Test date: June 20,2008  
Humidity: 58%; Ambient temperature: 21.0°C

Tap position	Applied voltage (kV)	Induced voltage (kV)	Induced over-voltage factor	Frequency (Hz)	Duration (s)	Results
	L.V.	H.V.				
4	21	70	2	100	60	Passed

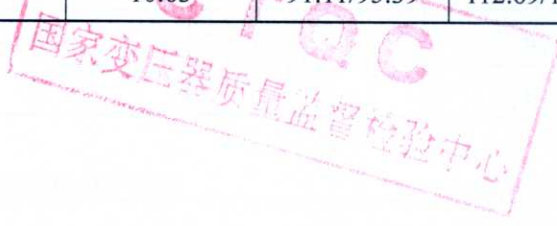
4.6 Measurement of no-load loss and current (Routine test) Test date: June 20,2008

RMS value voltage (kV)		No-load current		No-load loss (kW)	
Reading of mean value voltmeter	Reading of RMS value voltmeter	(A)	(%)	Measured value	Corrected value
10.500	10.522	1.535	0.14	21.61	21.58

Note: The reading tolerance between RMS value voltmeter and mean value voltmeter is less than 3%.

4.7 Measurement of short-circuit impedance and load loss (Routine test) Test date: June 20,2008  
Ambient temperature: 21.0°C

Winding	Tap position	Applied current I		Measured voltage (kV)	Short-circuit impedance (Each phase)		Load loss (kW)	Total loss (kW)
		(A)	I/I <sub>r</sub> (%)		Impedance (Ω)	(%)	Corrected value	Corrected value
					t=120/145°C I=I <sub>r</sub>	t=120/145°C I=I <sub>r</sub>		
H.V.   L.V.	1	161.35	52.6	2.0632	7.38	10.43	78.84/83.07	100.42/104.65
	4	171.36	51.9	1.8693	6.30	10.30	82.37/86.79	103.95/108.37
	7	185.47	52.0	1.7898	5.57	10.63	91.11/95.39	112.69/116.97



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### 4.8 Partial discharge measurement

Three phase measurement (Routine test)      Test date: June 20,2008

Frequency (Hz)	Applied voltage (kV)			Duration	Partial discharge level(pC)					
	Multiple	H.V.	L.V.		A	B	C	a	b	C
100	1.8Ur	63.0	18.90	30s	/	/	/	/	/	/
	1.3Ur	45.5	13.65	3min	<10	<10	<10	<10	<10	<10

Note: Background partial discharge level is < 4pC before and after test.

Single phase measurement (Special test)      Test circuit is given in Annex2-f      Test date: June15,2008

Frequency (Hz)	Applied voltage (kV)			Duration	Partial discharge level(pC)					
	Multiple	H.V.	L.V.		A	B	C	a	b	C
100	1.3Ur	45.5	13.65	30s	/	/	/	/	/	/
	1.0Ur	35.0	10.5	3min	<10	<10	<10	<10	<10	<10

Note: Background partial discharge level is < 5pC before and after test.

### 4.9 Temperature-rise test (Type test)      Test date: Dec. 03,2008

The test is conducted by means of simulated load method, the test duration is 24h, Applied voltage under the condition of no-load is 10.5kV, Specified current is 356.67A under the condition of on load, injected current is 356.67 A during test, Tap 7.

Test results of no-load

Winding	Measured values (Ω)		Ambient temperature (°C)		Winding temp.-rise (K)
	Hot R	Cold R	Hot R	Cold R	
H.V.	0.1758	0.1741	12.4	14.0	4.0
L.V.	0.01136	0.01062			19.0

Test results of on-load

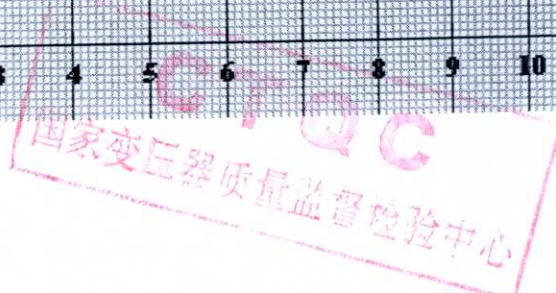
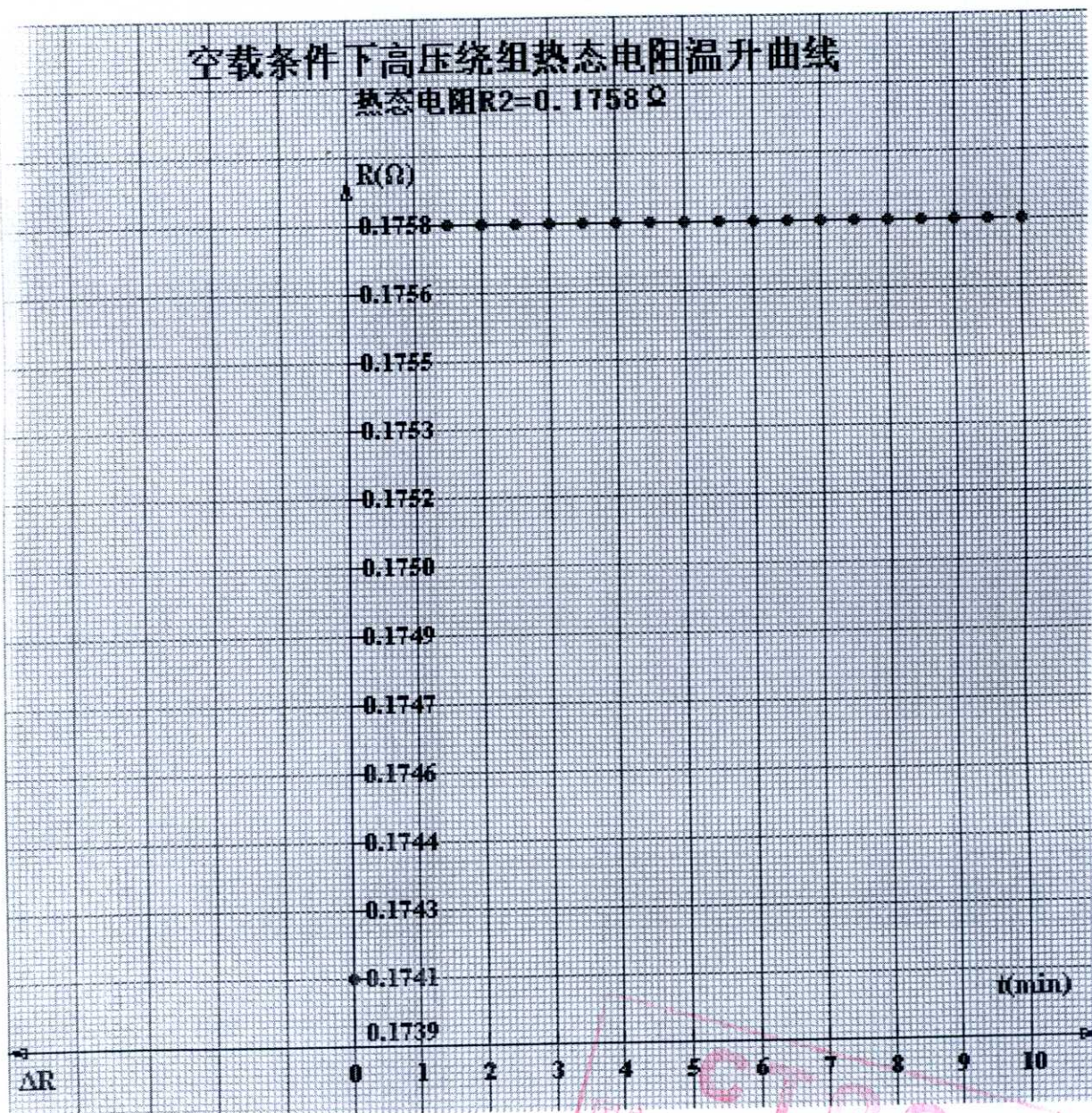
Winding	Measured values (Ω)		Ambient temperature (°C)		Winding temp.-rise (K)
	Hot R	Cold R	Hot R	Cold R	
H.V.	0.2435	0.1741	15.8	14.0	97.5
L.V.	0.01418	0.01062			81.7

Results of temperature-rise test

Winding temp.-rise (K)	H.V.	98.9
	L.V.	92.1

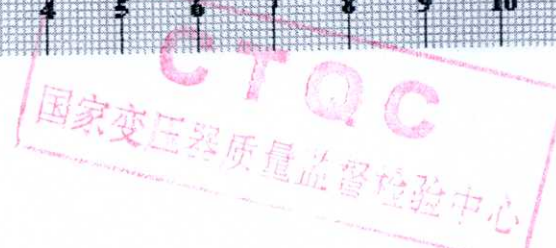
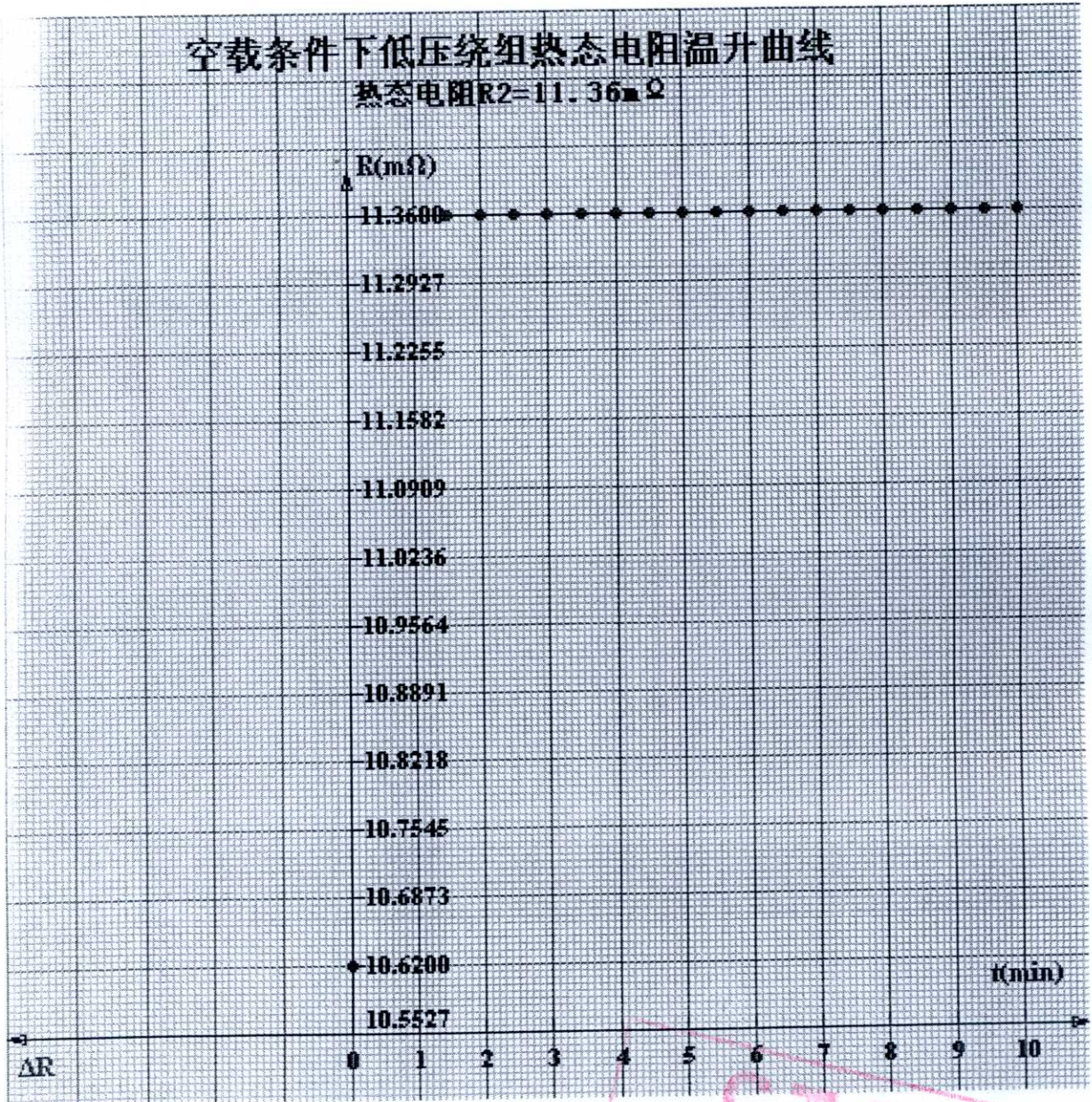


Hot resistance curve



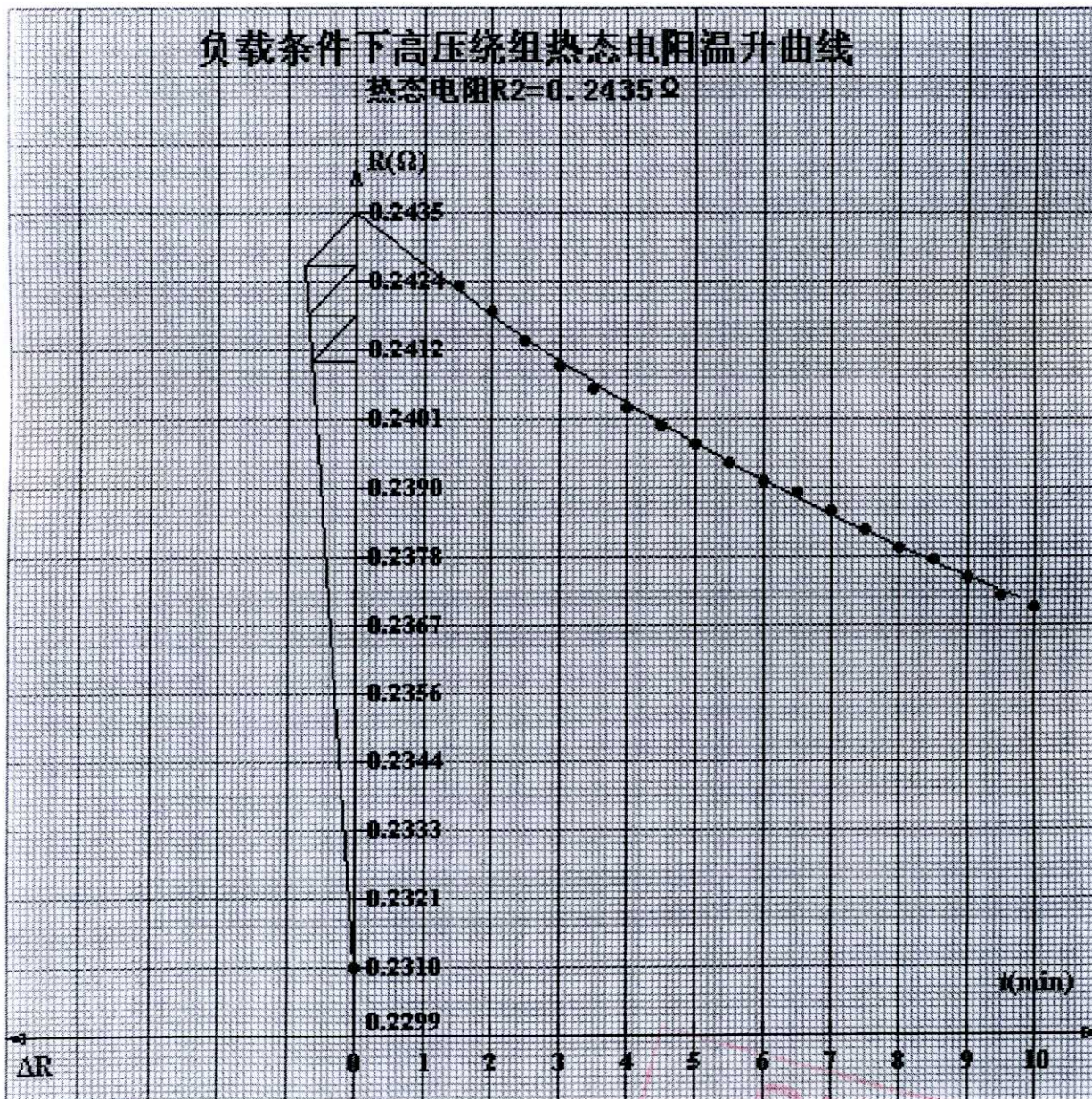
No-load

Hot resistance curve



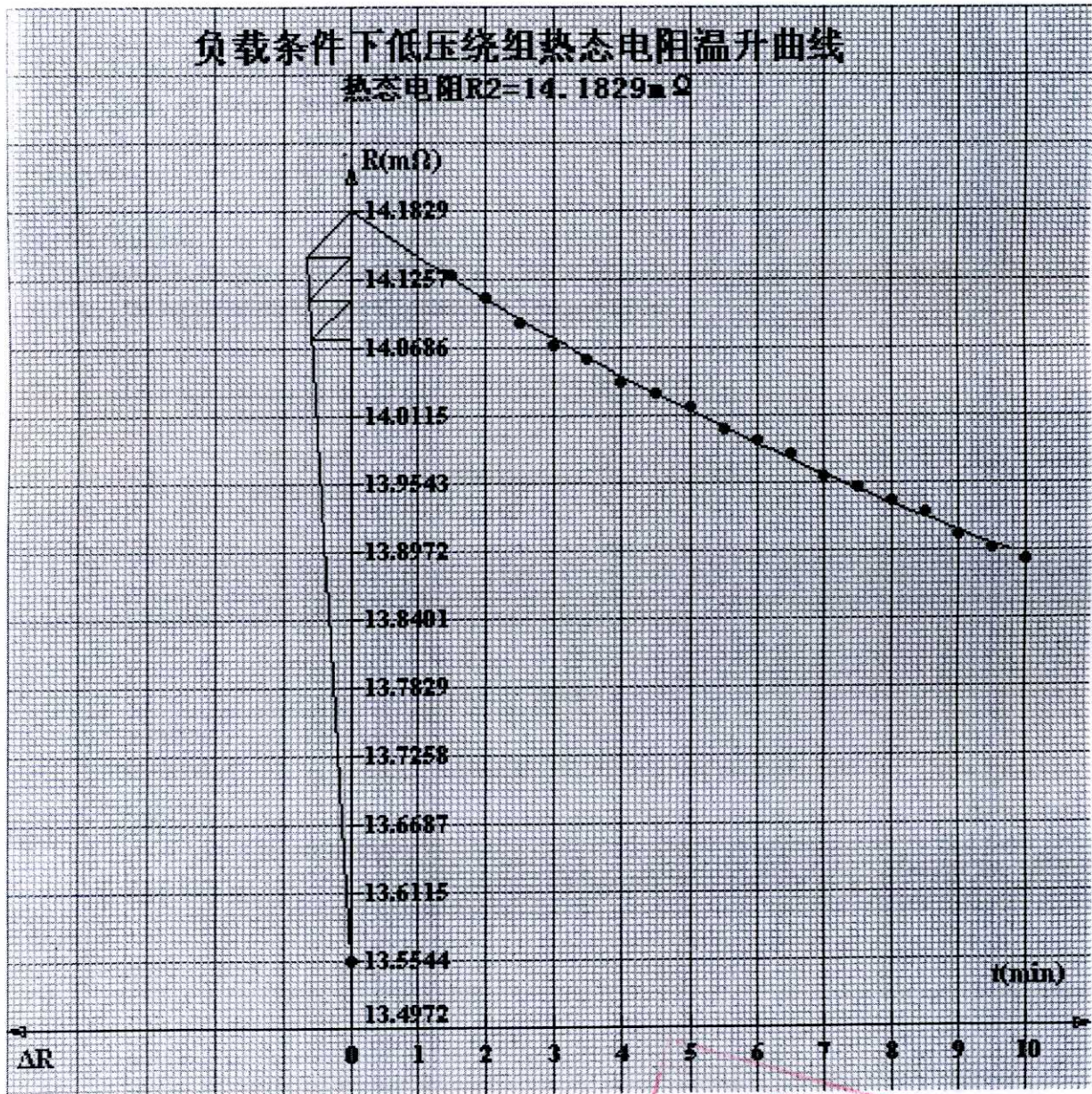
No-load

Hot resistance curve



On-load

Hot resistance curve



On-load

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4.10 Measurement of sound levels (Special test) Test date: Dec.01,2008

4.10.1 Sound power level calculation under on load current:

Calculation equation:  $L_{WA,IN} \approx 39 + 18 \lg \frac{S_r}{S_p} = 62 \text{dB (A)}$

In which:  $S_r$ —Rated power 20MVA;

$S_p$ —Reference power 1.0MVA.

$L_{WA,IN}$  is found to be 31dB below the guaranteed sound power level 93dB(A), so load current sound measurements are not appropriate.

4.10.2 Sound pressure level measurement and sound power level calculation

Transformer is energized at rated voltage. There are 20 measurement points, the measurement point interval is 0.77m, the height of measurement points are 1.17m and 2.33m.

### Environmental conditions

Area of the surface of the test room $S_v$ (m <sup>2</sup> )	Mean sound absorption coefficient $\alpha$	Sound absorption A (m <sup>2</sup> )	d (m)	Area of effective surface S (m <sup>2</sup> )	Environmental correction factor K (dB)
16200	0.15	2430	1.0	69.67	0.5

d—Distance between specified contour and principal radiating surface.

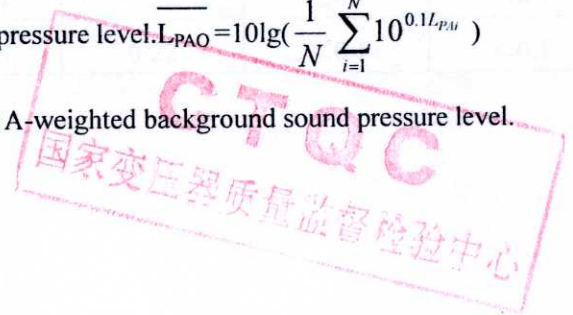
### Test results

Cooling method	The average noise level of background		The average noise level of transformer	A-weighted surface sound pressure level	A-weighted sound power level
	Before	After	L <sub>PAO</sub>	$L_{PA} = 10 \lg(10^{0.1L_{PAO}} - 10^{0.1L_{bgA}}) - K$	$L_{WA,UN} = L_{PA} + 10 \lg(S/S_0)$
AN	49.9	49.9	60.8	60	77

$L_{PAO}$ —Uncorrected average A-weighted sound pressure level.  $L_{PAO} = 10 \lg(\frac{1}{N} \sum_{i=1}^N 10^{0.1L_{PAi}})$

$L_{bgA}$ —The lower of the two calculated average A-weighted background sound pressure level.

In according to 4.10.1,  $L_{WA,SN} = 77 \text{dB}$





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4.11 Short-circuit withstand test (Special test)      Test date: June 25,2008

4.11.1 Calculated short-circuit current

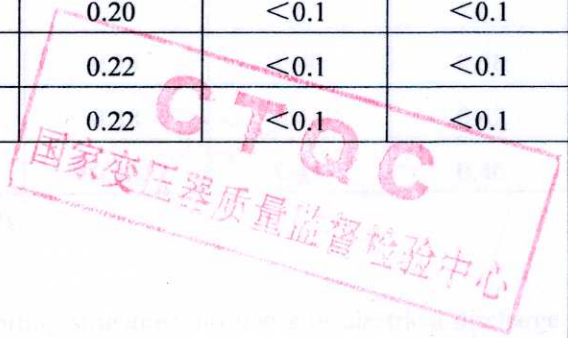
Calculated short-circuit current (Reference temperature 145°C)

Tap position	Phase peak value(A)	Phase symmetrical value(A)	Multiple ( $K\sqrt{2}$ )
1	6773	2656	2.550
4	7232	2836	2.550
7	7482	2934	2.550

4.11.2 Measurement of short-circuit current

Perform single-phase test, the single-phase supply is provided between one line terminal and the other two line terminals connected together, test waveshapes have no distortion, test oscillograms are shown in Page 25-27. The percentage of peak value and symmetrical value is the ratio of applied current to calculated current .

Tap position	Applied current terminal	No.	Current measurement					Duration (s)	Serial No.
			Peak value		Symmetrical value				
			(A)	(%)	(A)	(%)			
1	A-BC	1	6486	95.8	2594	97.7	0.24	B08405-S01-1	
		2	6701	98.9	2594	97.7	0.24	B08405-S01-2	
		3	6840	101.0	2594	97.7	0.24	B08405-S01-3	
		No.	Reactance measured						
			Measured reactance value ( $\Omega$ )			Deviation (%)			
				A	B	C	A	B	C
		before		7.353	7.295	7.400	/	/	/
		1		7.368	7.300	7.394	0.20	<0.1	<0.1
		2		7.369	7.300	7.394	0.22	<0.1	<0.1
		3		7.369	7.300	7.396	0.22	<0.1	<0.1



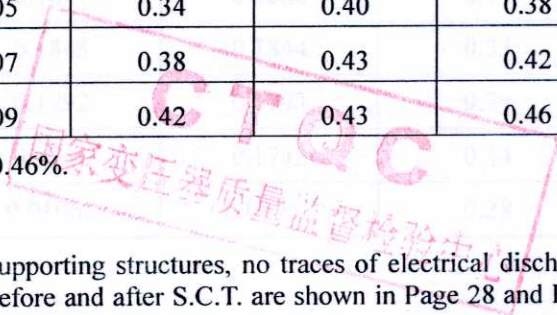
Tap position	Applied current terminal	No.	Current measurement					Duration (s)	Serial No.
			Peak value		Symmetrical value				
			(A)	(%)	(A)	(%)			
4	B-AC	1	7010	96.9	2785	98.2	0.24	B08405-S02-1	
		2	6958	96.2	2785	98.2	0.24	B08405-S02-2	
		3	7288	100.8	2785	98.2	0.24	B08405-S02-3	
		No.	Reactance measured						
			Measured reactance value (Ω)			Deviation (%)			
			A	B	C	A	B	C	
		before	6.254	6.270	6.267	/	/	/	
		1	6.271	6.289	6.274	0.27	0.30	0.11	
		2	6.270	6.290	6.273	0.26	0.32	<0.1	
		3	6.270	6.292	6.273	0.26	0.35	0.12	

Tap position	Applied current terminal	No.	Current measurement					Duration (s)	Serial No.
			Peak value		Symmetrical value				
			(A)	(%)	(A)	(%)			
7	C-AB	1	7164	95.7	2802	95.5	0.24	B08405-S03-1	
		2	7288	97.4	2802	95.5	0.24	B08405-S03-2	
		3	7514	100.4	2802	95.5	0.24	B08405-S03-3	
		No.	Reactance measured						
			Measured reactance value (Ω)			Deviation (%)			
			A	B	C	A	B	C	
		before	5.514	5.541	5.484	/	/	/	
		1	5.533	5.563	5.505	0.34	0.40	0.38	
		2	5.535	5.565	5.507	0.38	0.43	0.42	
		3	5.537	5.565	5.509	0.42	0.43	0.46	

The maximum deviation of short-circuit reactance is 0.46%.

#### 4.11.3 The visual inspection

There is no deformation of winding, connection or supporting structures, no traces of electrical discharge was found after S.C.T. The active part photos taken before and after S.C.T. are shown in Page 28 and Page 29.



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4.11.4. Repeated routine tests after short-circuit withstand test								
4.11.4.1 Measurement of insulation resistance				Test date: Dec.01,2008 Humidity: 55% Ambient temperature: 14.0°C				
Measurement position				Insulation resistance (GΩ)				
H.V.—L.V.&E				>100				
L.V.—H.V. &E				>100				
H.V.&L.V.—E				>100				
4.11.4.2 Measurement of voltage ratio and check of connection group Test date: Dec.01,2008								
H.V.		L.V.		Ratio	Measured deviation (%)			Conne- tion group
Tap position	Voltage (kV)	Tap position	Voltage (kV)		AB/ab	BC/bc	CA/ca	
1	37.620	/	10.5	3.583	0.16	0.16	0.17	Yd11
2	36.750			3.500	0.07	0.08	0.07	
3	35.870			3.416	-0.02	0.00	-0.01	
4	35.000			3.333	-0.12	-0.12	-0.11	
5	34.130			3.250	0.15	0.15	0.16	
6	33.250			3.167	0.05	0.05	0.06	
7	32.380			3.084	-0.04	-0.05	-0.05	
4.11.4.3 Measurement of winding resistance Test date: Dec.01,2008 Ambient temperature: 14.0°C								
Winding	Tap position	Measured values (Ω)			Unbalancedness (%)			
		A~B a~b	B~C b~c	C~A c~a				
H.V.	1	0.2040	0.2045	0.2046	0.29			
	2	0.1988	0.1993	0.1993	0.25			
	3	0.1934	0.1940	0.1940	0.31			
	4	0.1881	0.1887	0.1888	0.37			
	5	0.1838	0.1843	0.1844	0.33			
	6	0.1787	0.1792	0.1793	0.34			
	7	0.1736	0.1741	0.1742	0.34			
L.V.	/	0.01059	0.01062	0.01062	0.28			

<b>Test Report</b>	<b>China National Transformer Quality Supervision Testing Center</b>	No: CTQC/B-08.405 Total 29 Page 17
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4.11.4.4 Separate-source AC withstand voltage test      Test date: Dec.01,2008  
 Humidity: 55%; Ambient temperature: 14.0°C; Atmospheric pressure: 101.5kPa

Position	Applied voltage (kV)	Duration (s)	Results
H.V.—L.V.&E	70	60	Passed
L.V.—H.V.&E	35	60	

4.11.4.5 Induced AC withstand voltage test      Test date: Dec.01,2008  
 Humidity: 55%; Ambient temperature: 14.0°C; Atmospheric pressure: 101.5kPa

Tap position	Applied voltage (kV)	Induced voltage (kV)	Induced over-voltage factor	Frequency (Hz)	Duration (s)	Results
	L.V.	H.V.				
4	21	70	2	100	60	Passed

4.11.4.6 Measurement of no-load loss and current      Test date: Dec.01,2008

RMS value voltage (kV)		No-load current		No-load loss (kW)	
Reading of mean value voltmeter	Reading of RMS value voltmeter	(A)	(%)	Measured value	Corrected value
10.500	10.522	1.530	0.14	21.42	21.38

Note: The reading tolerance between RMS value voltmeter and mean value voltmeter is less than 3%.

4.11.4.7 Measurement of short-circuit impedance and load loss      Test date: Dec.01,2008  
 Ambient temperature: 14.0°C

Winding	Tap position	Applied current I		Measured voltage (kV)	Short-circuit impedance (Each phase)		Load loss (kW)	Total loss (kW)
		(A)	I/Ir (%)		H.V. impedance (Ω)	(%)	Corrected value	Corrected value
					t=120/145°C I=Ir	t=120/145°C I=Ir	t=120/145°C I=Ir	t=120/145°C I=Ir
H.V.   L.V.	1	153.53	50.0	1.9623	7.38	10.43	78.41/82.60	99.79/103.98
	4	167.44	50.8	1.8279	6.31	10.30	81.82/86.15	103.2/107.53
	7	356.24	99.9	3.4346	5.57	10.63	90.84/95.04	112.22/116.42

4.11.4.8 Partial discharge measurement      Test date: Dec.01,2008

Three phase measurement

Frequency (Hz)	Applied voltage (kV)			Duration	Partial discharge level(pC)					
	Multiple	H.V.	L.V.		A	B	C	a	b	C
200	1.8Ur	63.0	18.90	30s	/	/	/	/	/	/
	1.3Ur	45.5	13.65	3min	<10	<10	<10	<10	<10	<10

Note: Background sound level is <5pC before and after test.

<b>Test Report</b>	<b>China National Transformer Quality Supervision Testing Center</b>	No: CTQC/B-08.405 Total 29 Page 18
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4. 12 Lightning impulse test (Type test)      Test date: Dec.03,2008

Humidity: 55%; Ambient temperature: 15.0°C; Atmospheric pressure: 101.5kPa

Test items and voltage:

Tested terminals	Rated lightning full wave withstand voltage (kV)	Tap position
A、B、C	170	A: 4 B: 1 C: 7
a、b、c	75	/

Test sequence:

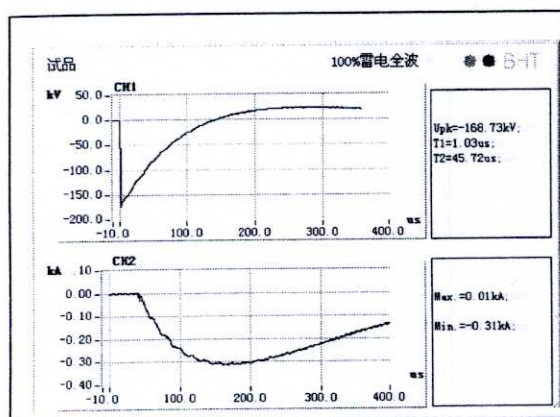
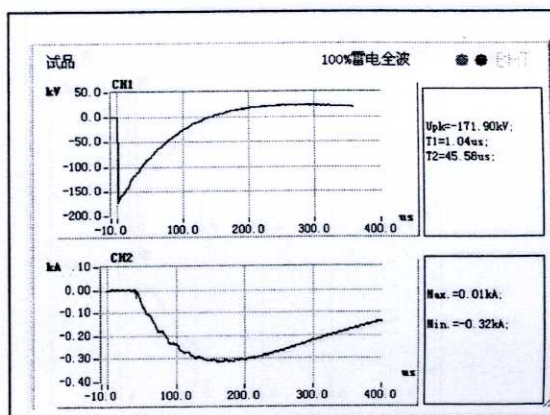
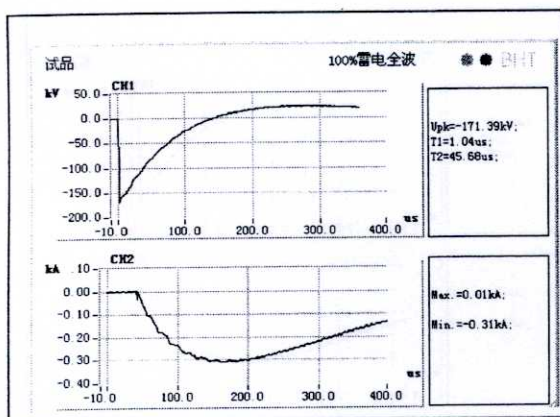
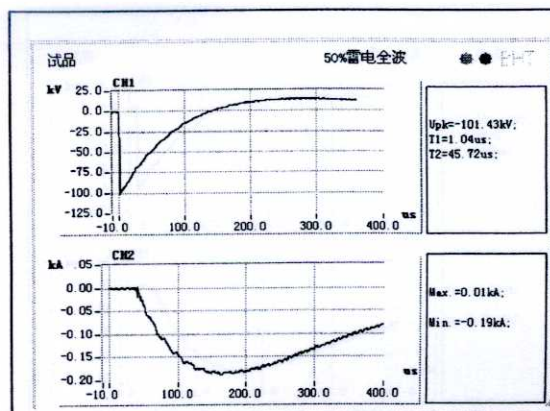
- One reduced negative polarity full wave impulse;
- Three rated negative polarity full wave impulse.

Test records:

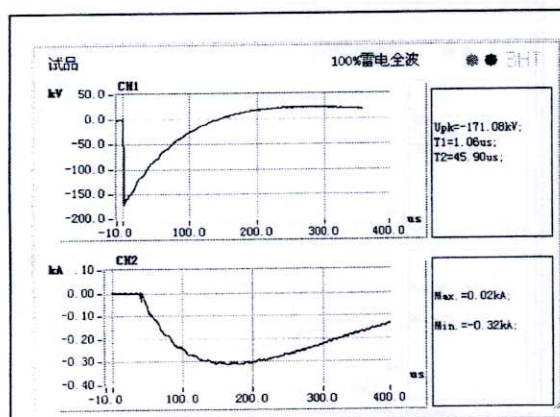
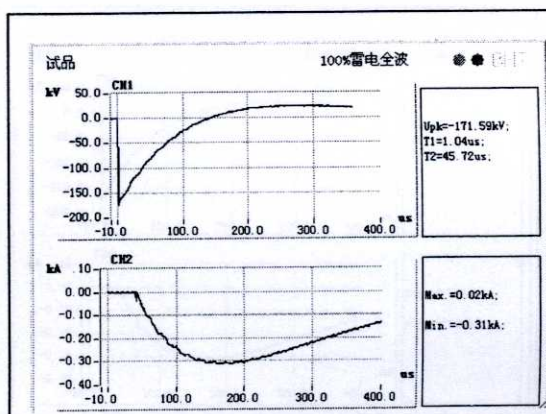
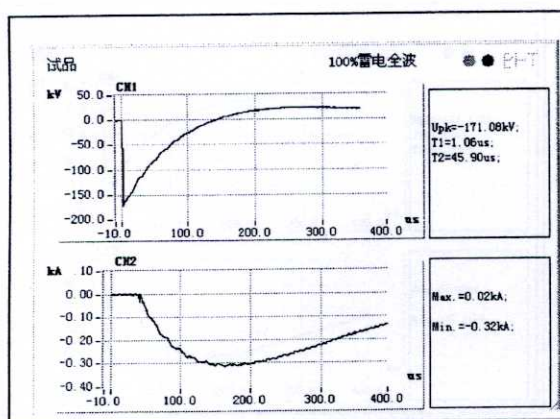
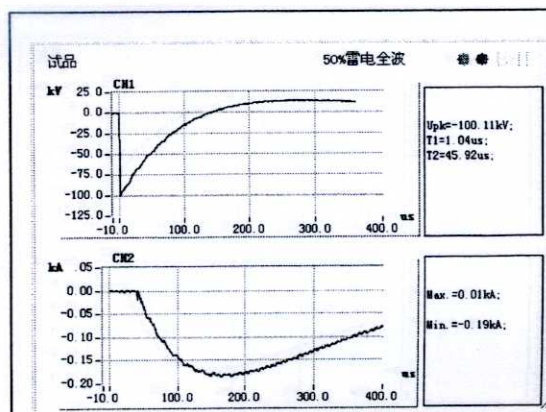
T1:Front time;      T2:Time to half value;      Up:Peak voltage



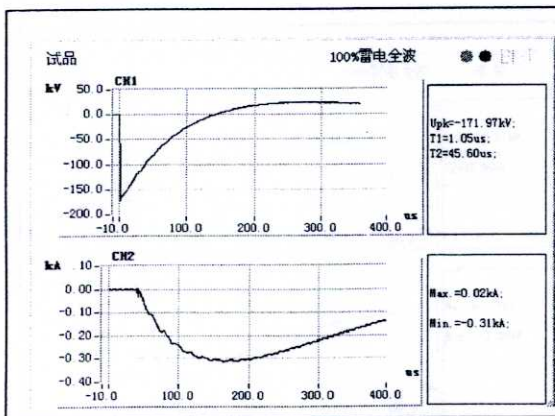
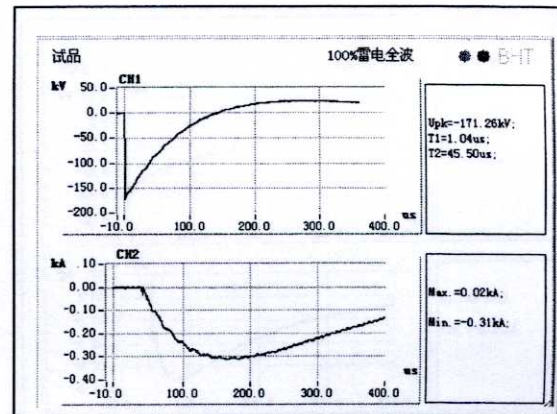
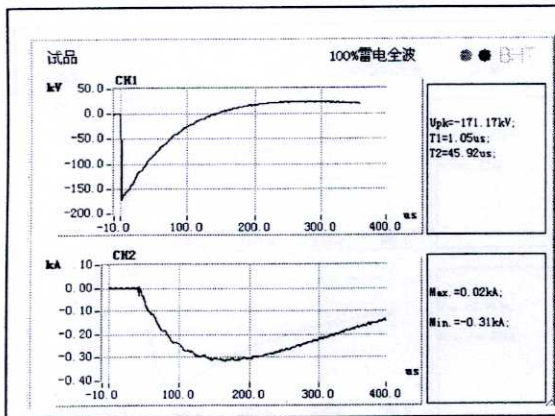
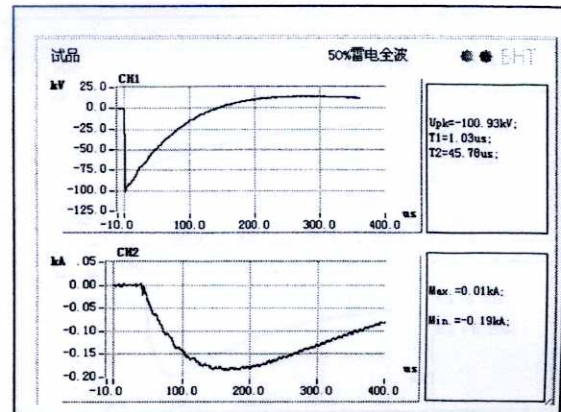
Tested terminal: A  
 Test polarity: Negative  
 CH1. Voltage records  
 CH2. Neutral current records



Tested terminal: B  
 Test polarity: Negative  
 CH1. Voltage records  
 CH2. Neutral current records

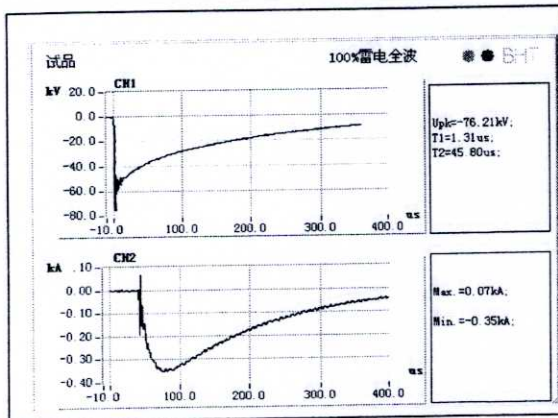
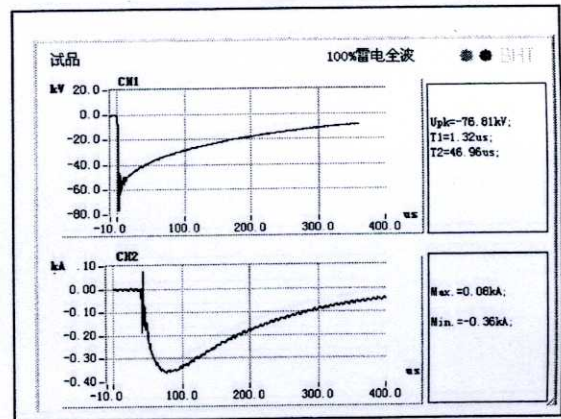
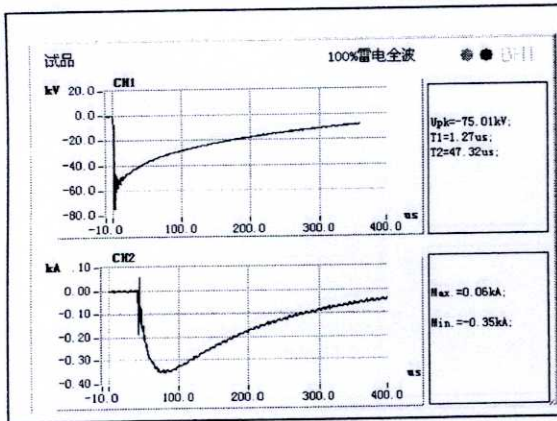
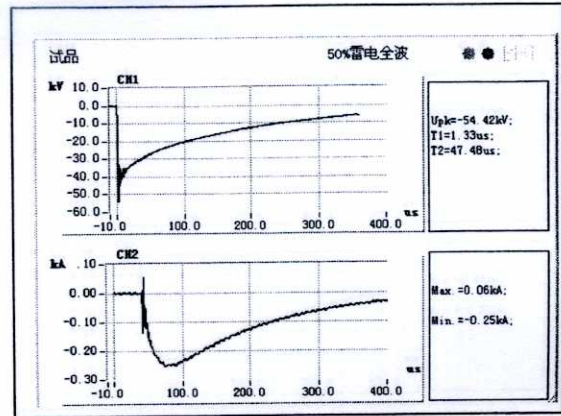


Tested terminal: C  
 Test polarity: Negative  
 CH1. Voltage records  
 CH2. Neutral current records

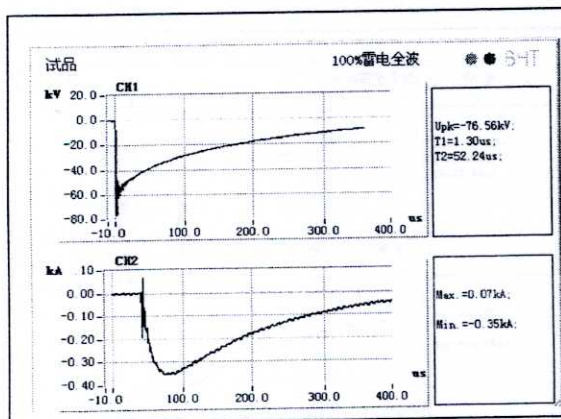
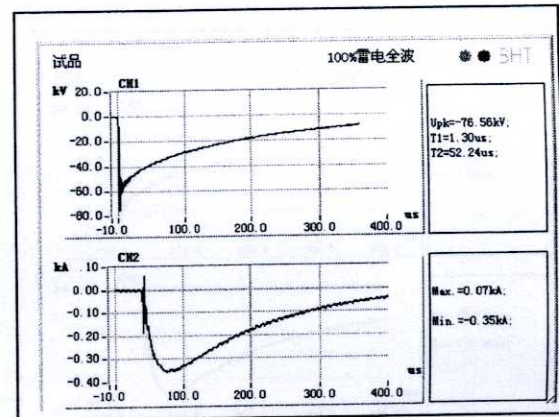
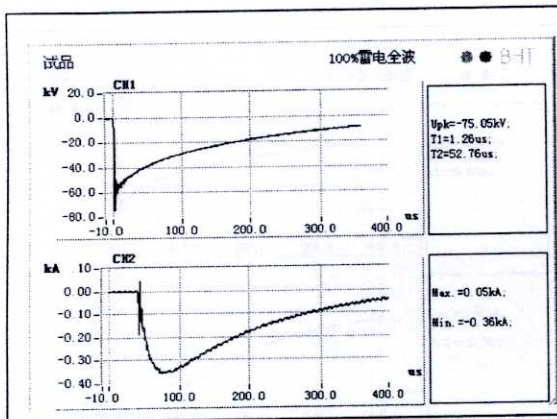
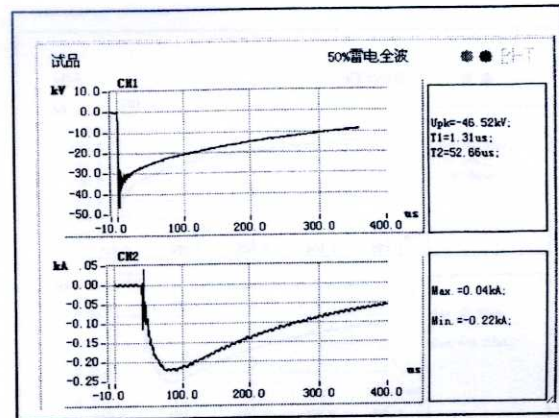




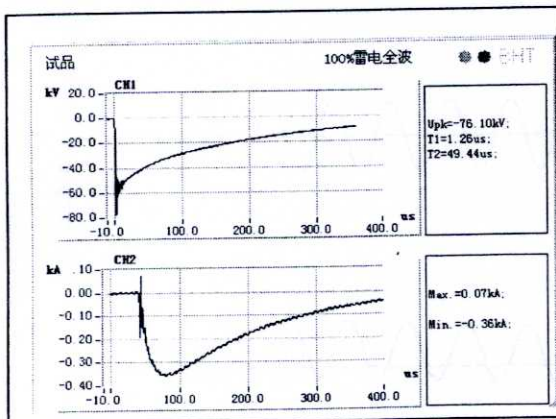
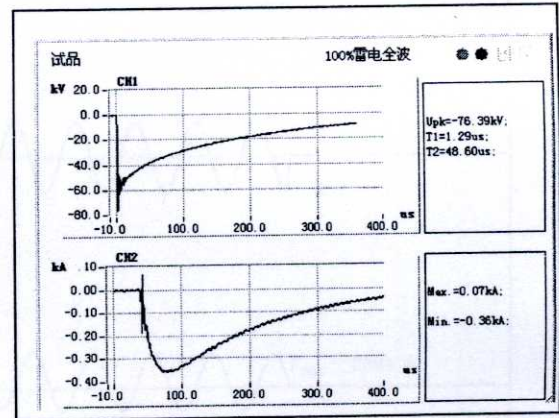
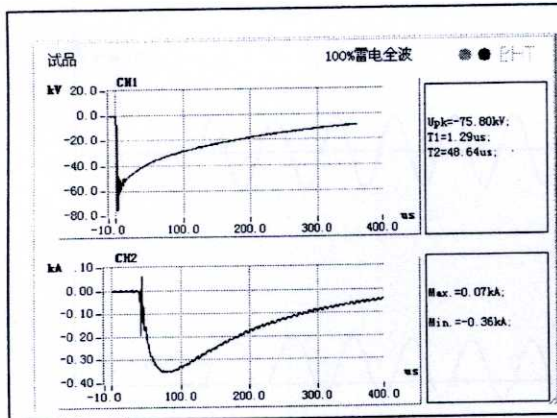
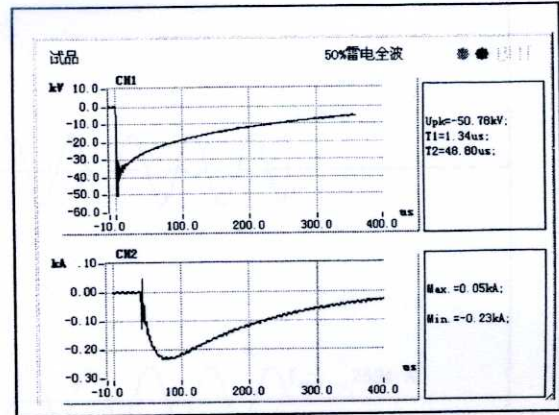
Tested terminal: a  
 Test polarity: Negative  
 CH1. Voltage records  
 CH2. Neutral current records

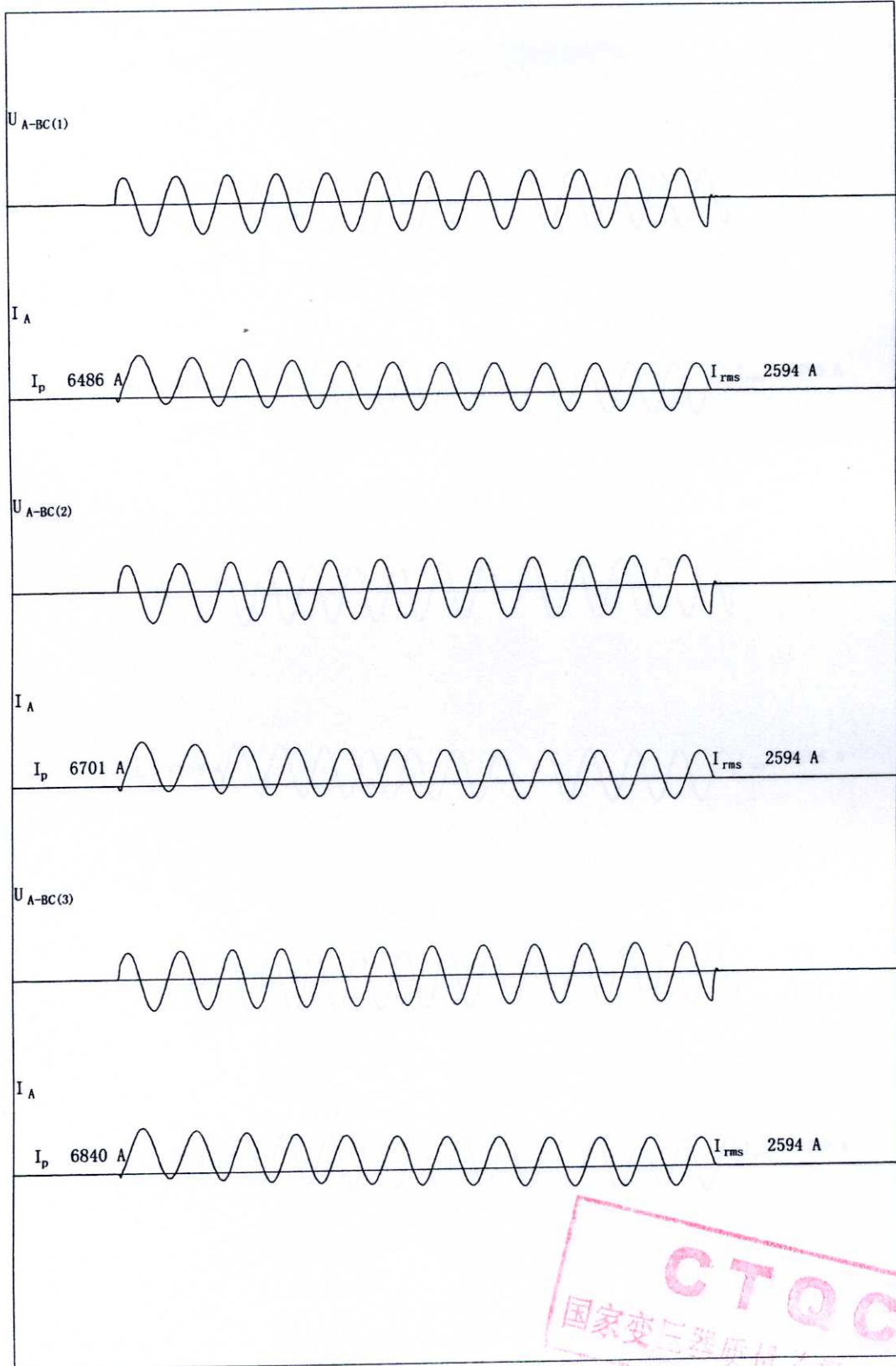


Tested terminal: b  
 Test polarity: Negative  
 CH1. Voltage records  
 CH2. Neutral current records



Tested terminal: c  
 Test polarity: Negative  
 CH1. Voltage records  
 CH2. Neutral current records

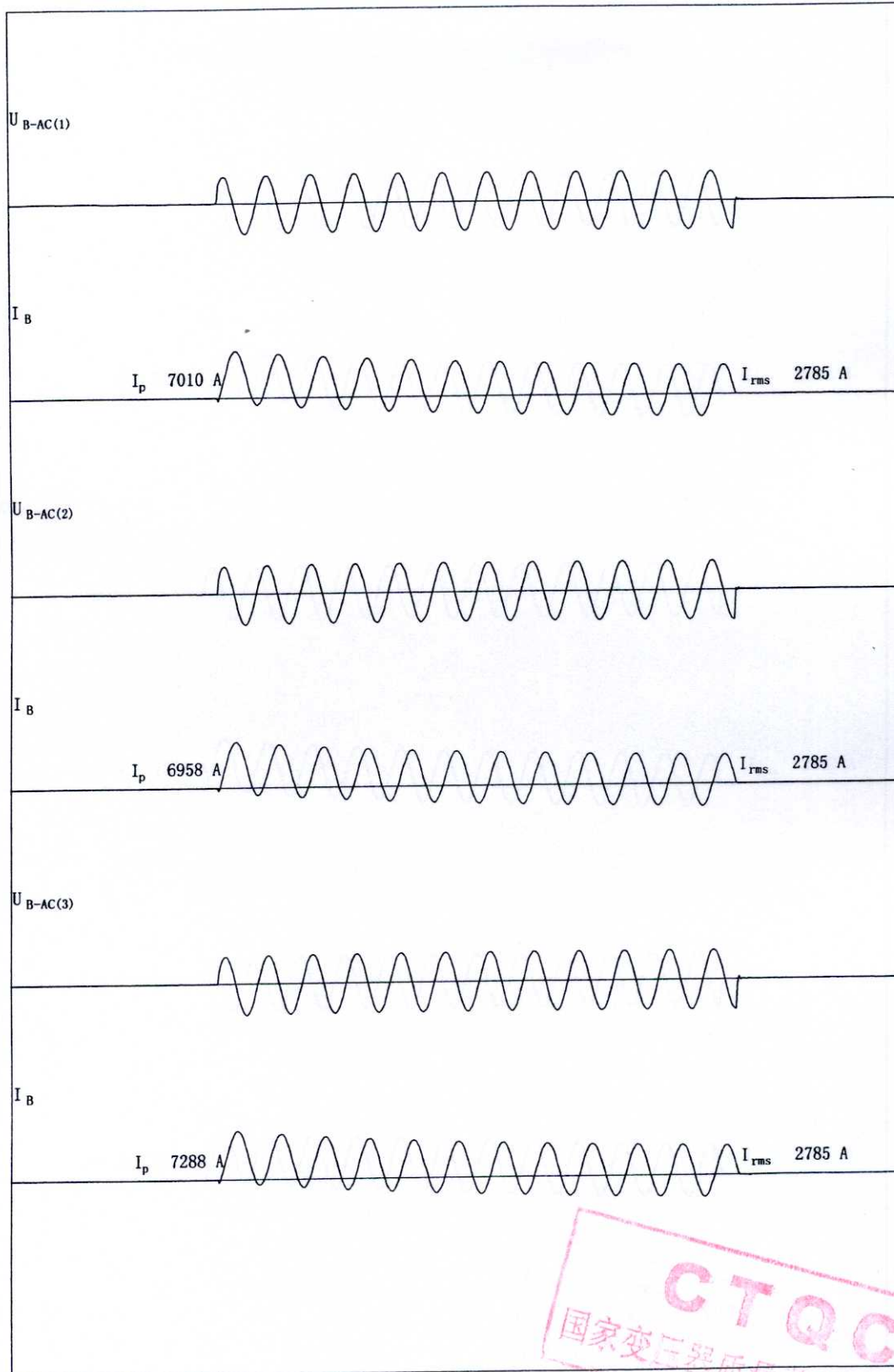




B08405-S01



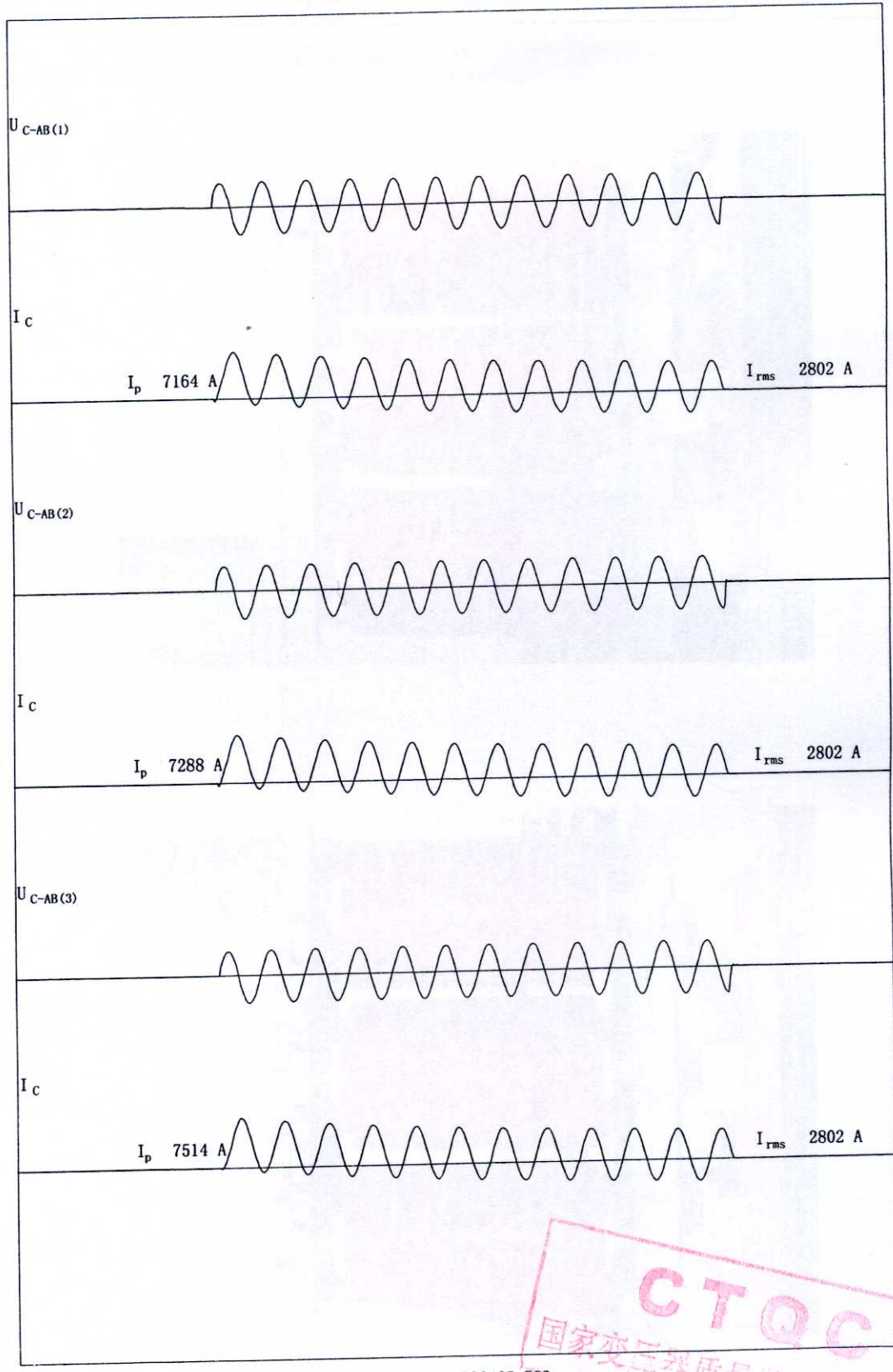
<b>Test Report</b>	<b>China National Transformer Quality Supervision Testing Center</b>	No: CTQC/B-08.405 Total 29 Page 26
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B08405-S02



<p>Test Report</p>	<p>China National Transformer Quality Supervision Testing Center</p>	<p>No: CTQC/B-08.405 Total 29 Page 27</p>
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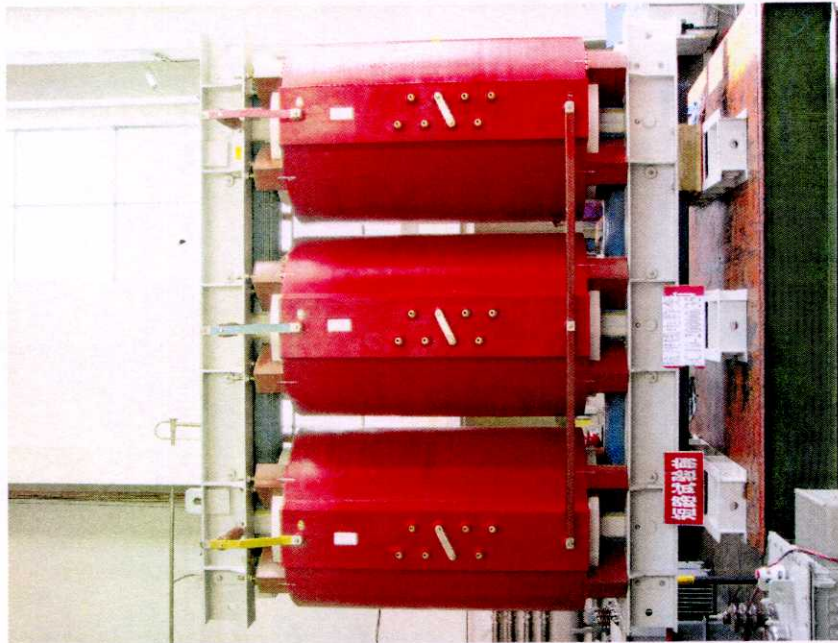


B08405-S03

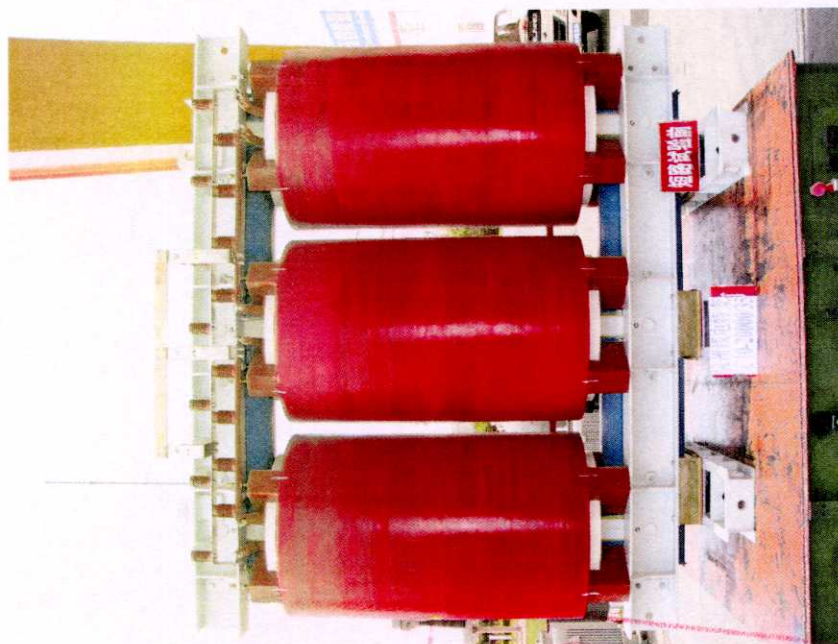


Test Report	China National Transformer Quality Supervision Testing Center	№: CTQC/B-08. 405 Total 29 Page 28
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H. V. before S. C. T. :



L. V. before S. C. T. :



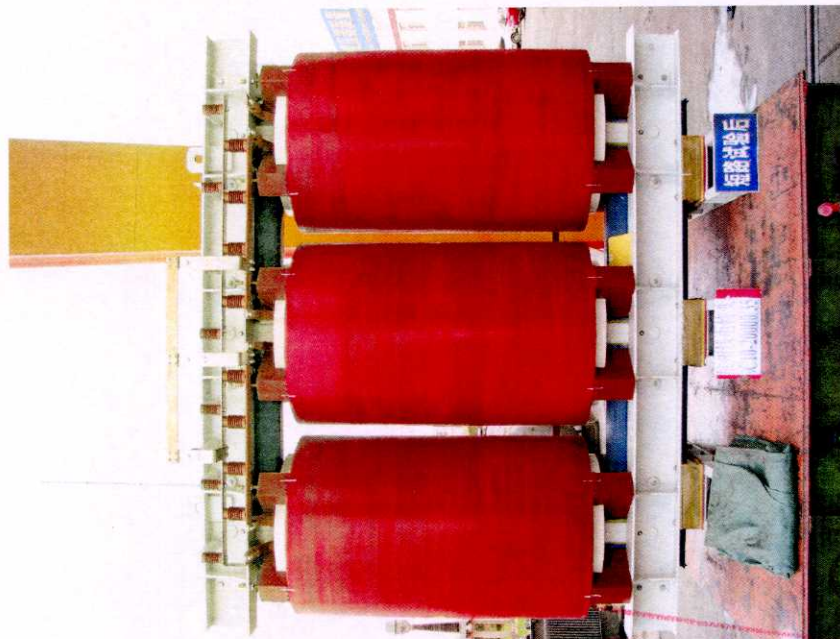
**CTQC**  
国家变压器质量监督检验中心

<p>Test Report</p>	<p>China National Transformer Quality Supervision Testing Center</p>	<p>No: CTQC/B-08. 405 Total 29 Page 29</p>
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H. V. after S. C. T. :

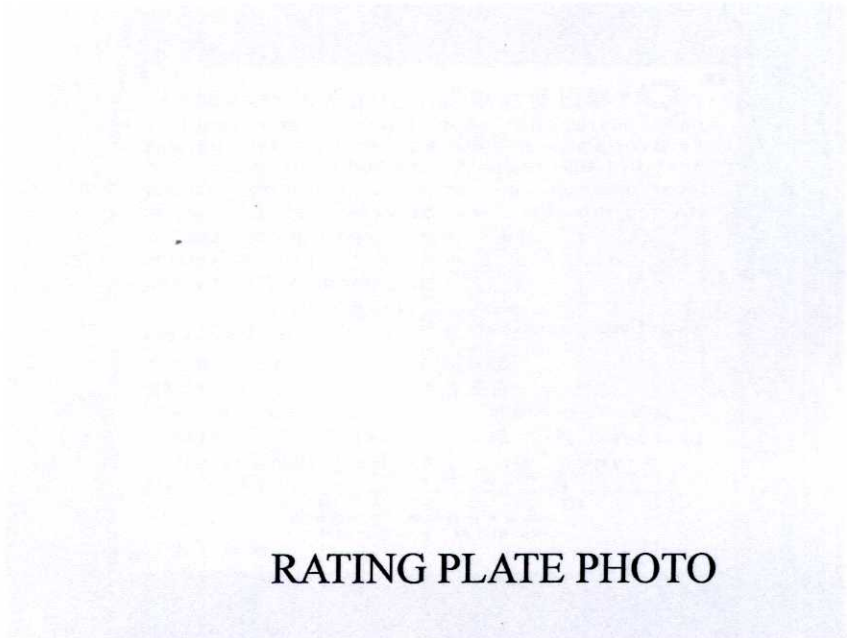


L. V. after S. C. T. :



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RATING PLATE PHOTO

**CTQC**  
国家变压器质量监督检验中心

Rating plate:

**QRE 树脂浇注干式电力变压器**

ISO9001:2000 ISO14001:2004 OHSAS18001:1999

标准代号 GB/T10228 GB1094.11 IEC60076-11  
 型号 SC10-20000/35 产品代号 1QB.710.1458

额定容量 20000 kVA 相数 3 额定频率 50 Hz  
 额定电压  $35 \pm 3 \times 2.5\%$  kV/10.5 kV 冷却方式 AN

额定电流 330.0A/1099.7A

联结组标号 Yd11

绝缘水平 L.V. LI/AC 170/70kV  
 L.V. LI/AC 75/35 kV

绝缘耐热等级 H  
 气候等级 C2  
 燃烧性能等级 F1  
 环境等级 E2

分接 联结	高压		低压	
	V	A	V	A
2-3	37620			
3-4	36750			
4-5	35870			
5-6	35000	330.0	10500	1099.7
6-7	34130			
7-8	33250			
8-9	32380			

防护等级 IP00

短路阻抗  $10.30$  % 总重 34680 kg

高压绕组短路阻抗	极限正分接	主分接	极限负分接
5.2	7.38	6.30	5.57

中华人民共和国  
 杭州钱江电气集团股份有限公司  
 (杭州钱电特种变压器有限公司)

出厂序号 081458001 2008年 03月



TRANSFORMER DRAWINGS

**CTQC**  
国家变压器质量监督检验中心

4-R5

4-05.5

**ORF** 树脂浇注干式电力变压器

ISO9001:2000 ISO14001:2004 OHSAS18001:1999

标准代号 GB/T 10228 GB 1094.11 IEC 60076-11

型号 SC10-20000/35 产品代号 1QB.710.1458

额定容量 20000 kVA 相数 3 额定频率 50 Hz

额定电压 35 ±3x2.5%kV/10.5kV 冷却方式 AN

分接	高压		低压	
	V	A	V	A
取结	2-337620			
	3-436750			
	4-535870			
	5-635000	330.0	10500	1099.7
	6-734130			
	7-833250			
	8-932380			

防护等级 IP00

总重 34680 kg

高压绕组阻抗	主分接	额定负载
短路阻抗		

中华人民共和国  
杭州钱江电气集团股份有限公司  
(杭州钱电特种变压器有限公司)

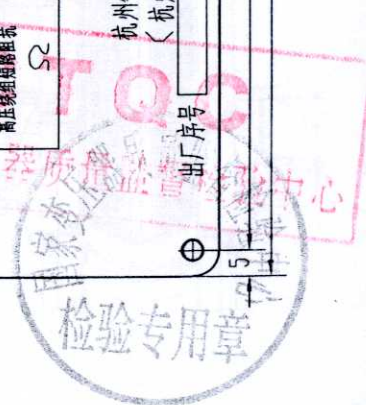
出厂序号  200 年  月  日

130  
140

技术要求

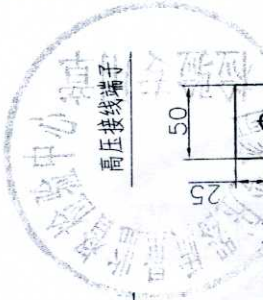
1. 白底,黑字,黑边,黑方框
2. 字体,仿宋体
3. 字体大小:产品名称8号字,国名为6号字,“过册,铭牌”四字为3.5号,其余均为5号,
4. 框高5.5mm
5. 采用法定计量单位,标准书写。
6. 字体、图形、方框下0.5mm,漆黑色氨基烘漆A0.5-9。

标记	页数	分区	更改文件号	签名	年月日	1.0 镜面不锈钢板	杭州钱江 电气集团股份有限公司
设计			标准化				
校对						标识标记	铭牌
审核						质量	
工艺						比例	
						1:1	
						共	张
						第	张
							1QB.710.1458.MP

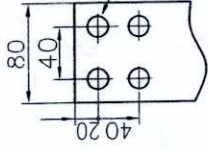


技术条件

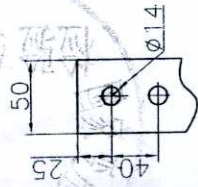
变压器符合GB 1094.11



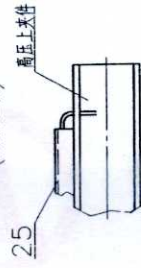
低压接线端子



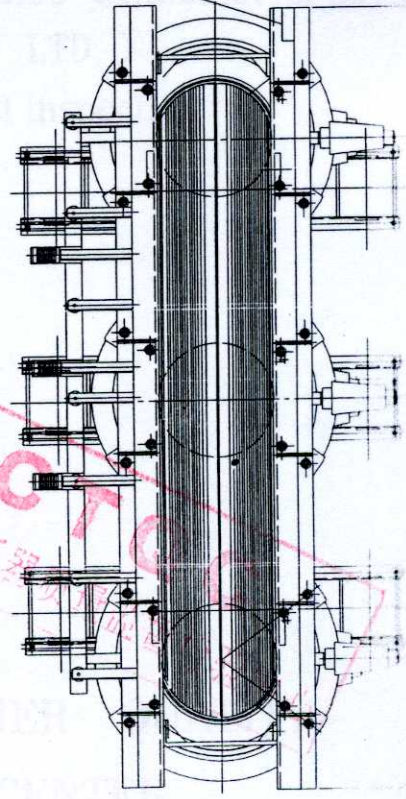
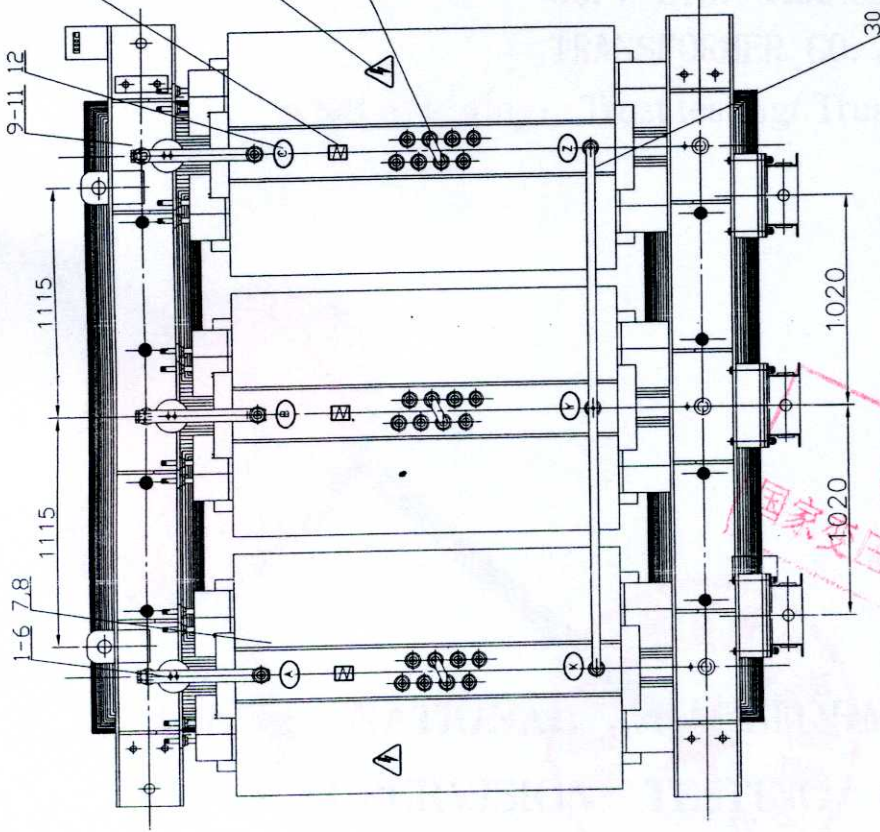
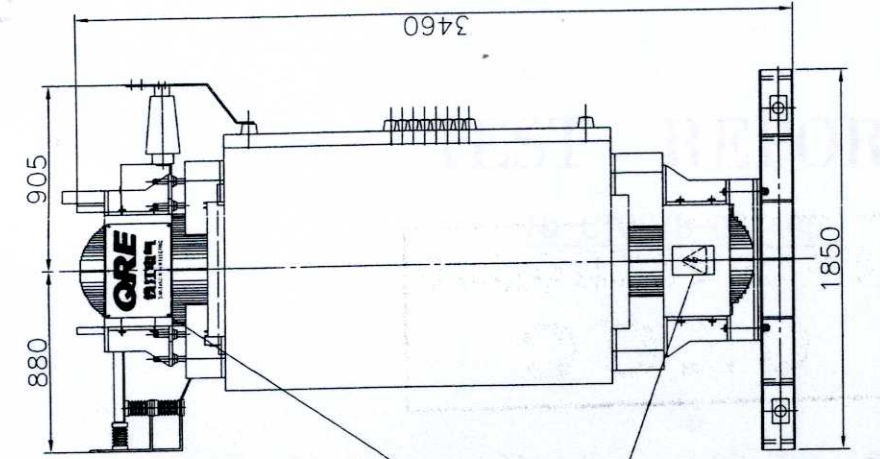
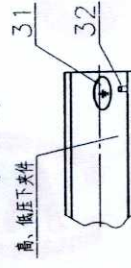
高压接线端子



温度补偿绕组固定  
(面向高压侧)



接线位置  
(面向低压侧)



杭州钱江 电气集团股份有限公司		SC10-20000/35 干式变压器	
标记	数量	分区	更改文件号
设计	审核	批准	日期
制图	工艺	材料	日期
校对	检验	包装	日期
审核	出厂	日期	日期

# CTQC



## 国家变压器质量监督检验中心

地 址：沈阳市新城子区虎石台镇

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总 机：0086-24-89874449

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网 址：[www.ctn.cn](http://www.ctn.cn)