Power Industry Quality Inspection and Testing Center for Electric Equipment and Instruments

EETC2016DL140J

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Test Report

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电力工业电气设备质量检验测试中心 检测报告专用章

1 Client

Shanghai Chardon Electrical Ltd.

2 Sample Description

Name: 42 kV/1250A IEC screened separable connector

Manufacturer: Shanghai Chardon Electrical Ltd.

Type & Size: 42-FDT1250/42-RDT1250

Manufacture Date: Jan., 2016

Sample No.: DL2016-140

Sample Number : Ten sets

Sample Status: Appearance is in good condition

Received Date: Feb. 25, 2016

3 Standards/Specifications

GB/T 12706.4—2008 Power cables with extruded insulation and their accessories for rated voltages from 1 kV (U_m=1.2 kV) up to 35 kV (U_m=40.5 kV) — Part 4: Test requirements on accessories for cables with rated voltages from 6 kV (U_m=7.2 kV)up to 35kV (U_m=40.5 kV)

4 Test Category

Type Tests

5 Test Date

25/02/2016-26/05/2016

6 Conclusion

The 42 kV/1250A IEC screened separable connectors, the type and size of which is 42-FDT1250/ 42-RDT1250 taken to test by the client's own self have passed the type tests specified in GB/T 12706.4—2008.

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Note: In the event of any difference in meanings of the text, the Chinese report shall take priority over the English version.

Tested by: ______________

Checked by: ______________

Verified by: ______________

Approved by: ______________

Date of issue: 2016-07-05

7 The Number and Installation of Combination Samples

It was required that four sets of samples to be tested were installed by the manufacturer on four cables with a cross-section of 500 sq.mm forming No.1, No.2, No.3 and No.4 combination samples on which the type tests sequence 4.1 in table 7 were carried out. In addition, another three sets of samples were installed on three cables with a cross-section of 185 sq.mm forming combination samples on which the type tests sequence 4.2 and 4.3 in table 7 were carried out. The cables used in the combination samples were XLPE insulated single-core cables with rated voltage 26/35 kV. The length of the cable in the combination samples was greater than 5 m between terminations and the samples. Other type tests listed in table 7 were carried out on other samples.

8 Test Sequence and Results

The test sequence and results were given in Table 1 (sequence 4.1), Table 2(sequence 4.2 and 4.3) and Table 3 (the other items).

Table 1

No.	Items	Requirements	Results			Evaluation
1	AC withstand voltage test	No breakdown shall occur at 117 kV for 5 min	No breakdown occurred on the combination samples at 117 kV for 5 min			Pass
2	Partial discharge test at ambient temperature	The magnitude of the discharge at 45 kV shall not exceed 10 pC	Phase	No.1& No.2	No.3& No.4	Pass
			Voltage (kV)	45	45	
			Noise background (pC)	2.4	2.4	
			Discharge (pC)	≤2.4	≤2.4	
3	Impulse withstand voltage test at 95 ℃～100 ℃	No breakdown shall occur at 10 positive and 10 negative impulses of 200 kV	No breakdown occurred on the combination samples at 10 positive and 10 negative impulses of 200 kV (See Annex B)			Pass
4	Heating cycle voltage test	No breakdown shall occur during 30 cycles in air and 30 cycles under water at the conductor temperature of 95 ℃-100 ℃ and 65 kV	No breakdown occurred on the combination samples subjected to 30 cycles in air and 30 cycles under water at the conductor temperature of 95 ℃ to 100 ℃ and 65 kV			Pass
5	Partial discharge test at 95 ℃～100 ℃	The magnitude of the discharge at 45 kV shall not exceed 10 pC	Phase	No.1& No.2	No.3& No.4	Pass
			Voltage (kV)	45	45	
			Noise background (pC)	2.0	2.0	
			Discharge (pC)	≤2.0	≤2.0	

Table 1(Continued)

No.	Items	Requirements	Results			Evaluation
6	Partial discharge test at ambient temperature	The magnitude of the discharge at 45 kV shall not exceed 10 pC	Phase	No.1& No.2	No.3& No.4	Pass
			Voltage (kV)	45	45	
			Noise background (pC)	2.2	2.2	
			Discharge (pC)	≤2.2	≤2.2	
7	Impulse withstand voltage test	No breakdown shall occur at 10 positive and 10 negative impulses of 200 kV	No breakdown occurred on the combination samples at 10 positive and 10 negative impulses of 200 kV (See Annex C)			Pass
8	AC withstand voltage test	No breakdown shall occur at 65 kV for 15 min	No breakdown occurred on the combination samples at 65 kV for 15 min			Pass
9	Examination	It is advised that the accessory be examined for signs of any of the following: (i) cracking in the filling media and/or tape or tube components; (ii) a moisture path across a primary seal; (iii) corrosion and/or tracking and/or erosion; (iv) leakage of an insulating material.	(i) No cracking in the filling media and tape or tube components; (ii) No moisture path across a primary seal; (iii) No evident corrosion, tracking and erosion; (iv) No leakage of an insulating material.			Pass

Table 2

No.	Items	Requirements	Results	Evaluation
1	AC withstand voltage test	No breakdown shall occur at 117 kV for 5 min	No breakdown occurred on the combination samples at 117 kV for 5 min	Pass
2	Thermal short-circuit test (conductor)	No visible deterioration at 23.8 kA, 2 s,twice	No visible deterioration at 24.12 kA, 2.02 s and 24.03 kA, 2.02 s (See Annex E2)	Pass
3	Dynamic short-circuit test (conductor)	No visible deterioration at 84.1 kA, not less than 10 ms	No visible deterioration at 84.55 kA, 52 ms (See Annex E1)	Pass
4	Impulse withstand voltage test	No breakdown shall occur at 10 positive and 10 negative impulses of 200 kV	No breakdown occurred on the combination samples at 10 positive and 10 negative impulses of 200 kV (See Annex D)	Pass

Table 2(Continued)

No.	Items	Requirements	Results	Evaluation
5	AC withstand voltage test	No breakdown shall occur at 65 kV for 15 min	No breakdown occurred on the combination samples at 65 kV for 15 min	Pass
6	Examination	It is advised that the accessory be examined for signs of any of the following: (i) cracking in the filling media and/or tape or tube components; (ii) a moisture path across a primary seal; (iii) corrosion and/or tracking and/or erosion; (iv) leakage of an insulating material.	(i) No cracking in the filling media and tape or tube components; (ii) No moisture path across a primary seal; (iii) No evident corrosion, tracking and erosion; (iv) No leakage of an insulating material.	Pass

Table 3

No.	Items	Requirements	Results			Evaluation
1	Screen resistance tests	Screen resistance before and after the heating period shall not exceed 5000 Ω	Type & Size	before ageing	after ageing	Pass
			42-FDT1250	273 Ω	267 Ω	
			42-RDT1250	268 Ω	248 Ω	
2	Screen leakage	Screen leakage shall not exceed 0.5 mA at 40.5 kV	Screen leakage didn't exceed 0.5 mA at 40.5 kV			Pass

Annex A List of the main equipment and instruments used in tests

No.	Name of the equipment and instruments Model / Type	Serial No.	Measuring range	Uncertainty/ Veracity	Verification /Calibration institution	Valid period
1	TRF300-0.002 AC voltage measurement system	110650	(0~300) kV	Grade 3	National high voltage measurement station	2016-07-21

Annex A (Continued)

No.	Name of the equipment and instruments Model / Type	Serial No.	Measuring range	Uncertainty/ Veracity	Verification /Calibration institution	Valid period
2	TAWF Series resonance system	312068	(0~75) kV	Class 3	National high voltage measurement station	2016-09-07
3	JFD-2H PD measurement system	20041202	(0.5~1000) pC	Class 10	National high voltage measurement station	2017-05-20
4	FY Ⅰ 900/600 Weakly damped capacitive voltage divider	11165-2-1	(0~900) kV	Class 3	National high voltage measurement station	2016-06-30
5	H-DJF-2 Data collected system	CJ06	(0~100) kA	Class 0.5	National high voltage measurement station	2020-01-03
6	LM-0.5 Current transformer	0516	(0~3000) A	Class 0.5	National high voltage measurement station	2016-10-17
7	MAS-Ⅱ digital microammeter	20001	(0-2000) uA	Class 1.5	National high voltage measurement station	2016-09-28
8	UT56 Digital voltage meter	3080099522	(0~700) V	Class 1	Hubei Institute of Measurement and Testing Technology	2016-09-24

Annex B The values and oscillograms of impulse voltages on the combination samples before heating cycles voltage test (at high temperature, 200 kV, ±3% tolerance)

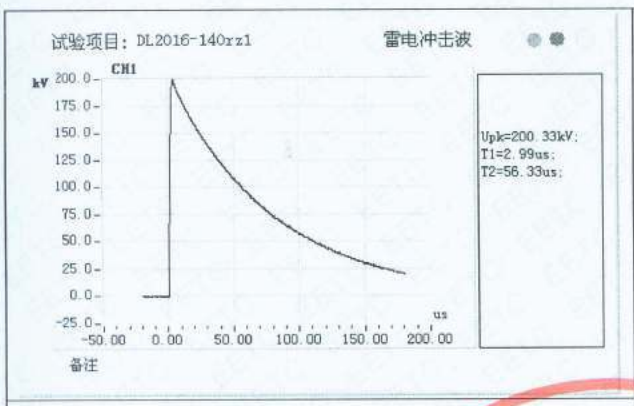
B1 The values of impulse voltages

Ambient temperature: 15.0 ℃, Relative humidity: 48 %, Atmosphere: 0.1023 MPa

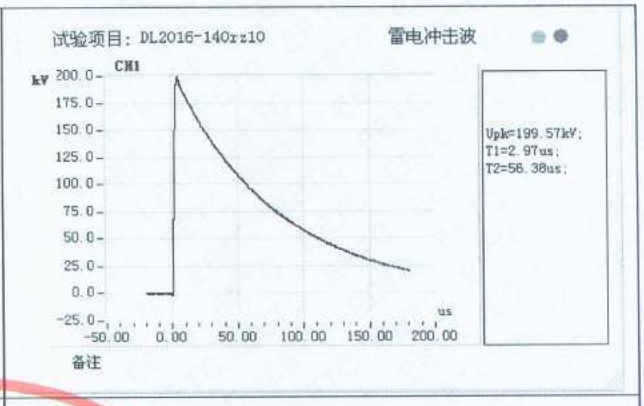
Unit: kV

Positive polarity	200	198	200	199	200	199	200	199	199	200
Negative polarity	199	199	198	200	200	198	199	199	200	198

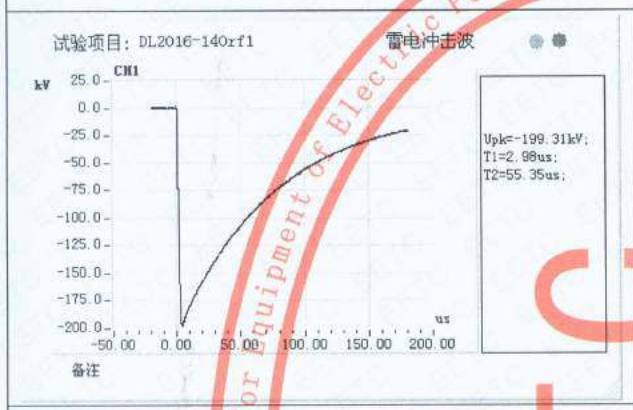
B2 Oscillograms of the impulse voltages waveform



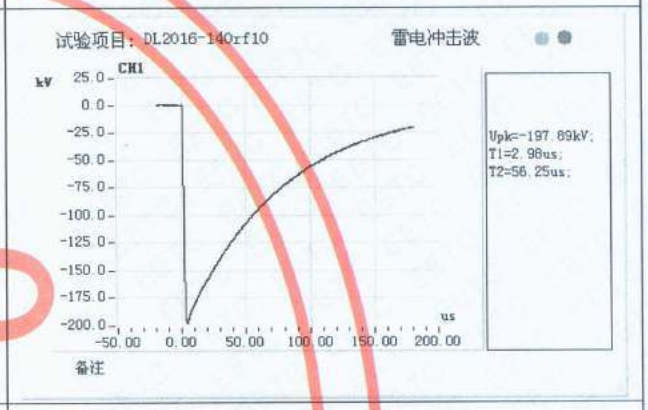
The 1st positive impulses waveform



The 10th positive impulses waveform



The 1st negative impulses waveform



The 10th negative impulses waveform

Annex C The values and oscillograms of impulse voltages on the combination samples after heating cycles voltage test (at ambient temperature, 200 kV, ±3 % tolerance)

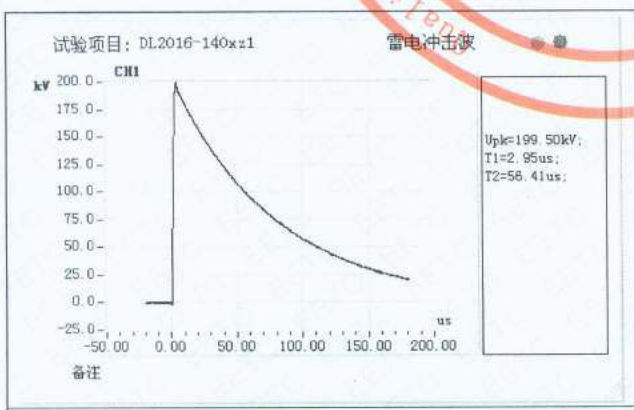
C1 The values of impulse voltages

Ambient temperature: 19.0 ℃, Relative humidity: 72 %, Atmosphere: 0.1013 MPa

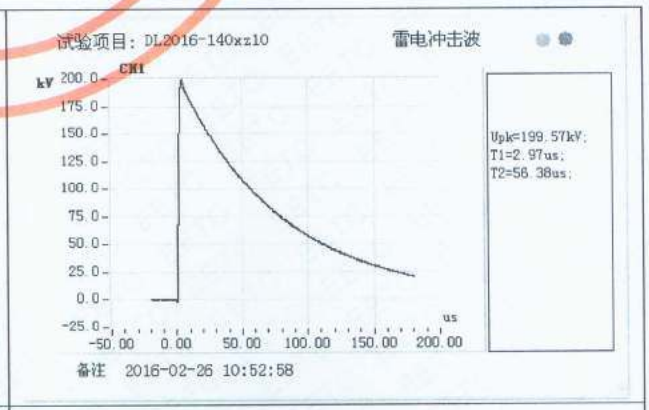
Unit: kV

Positive polarity	199	198	199	199	198	200	199	199	198	200
Negative polarity	198	199	200	200	199	199	198	199	200	200

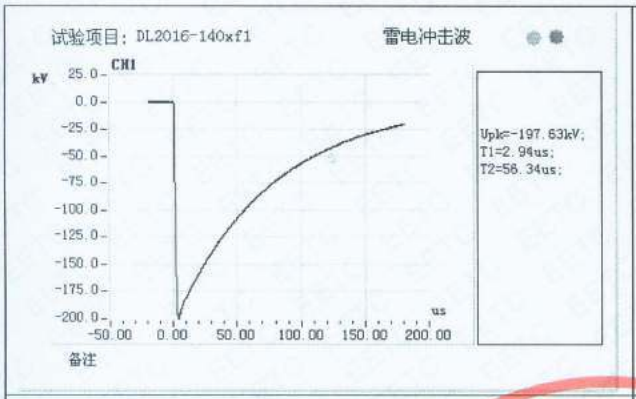
C2 Oscillograms of the impulse voltages waveform



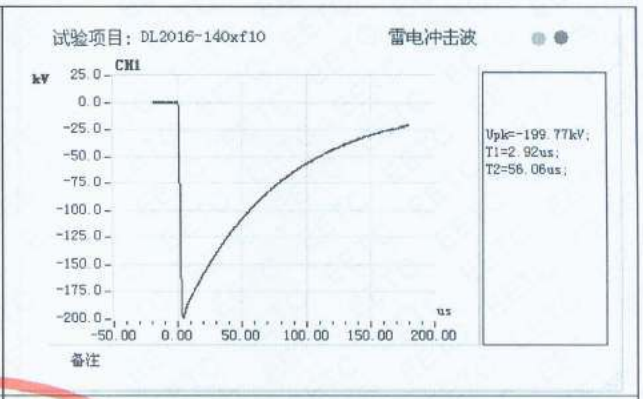
The 1st positive impulses waveform



The 10th positive impulses waveform



The 1st negative impulses waveform



The 10th negative impulses waveform

Annex D The values of impulse voltages on the combination samples after thermal short-circuit tests (at ambient temperature, 200 kV, ±3 % tolerance)

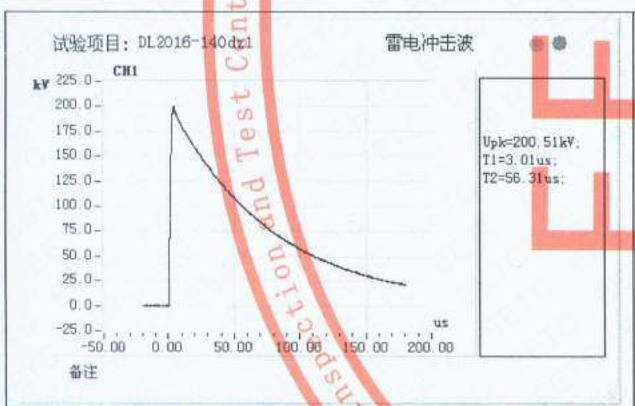
D1 The values of impulse voltages

Ambient temperature: 25.0 ℃, Relative humidity: 66 %, Atmosphere: 0.1003 MPa

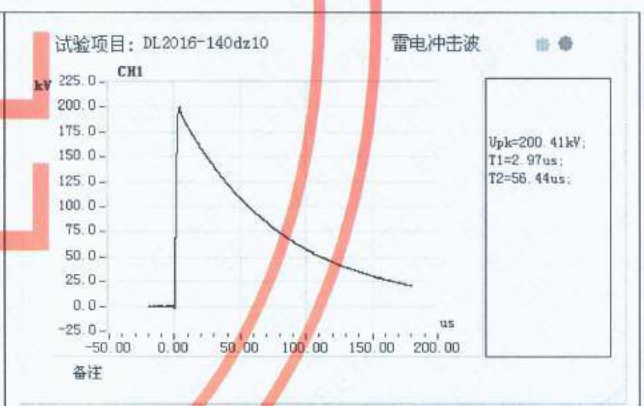
Unit: kV

Positive polarity	201	200	199	200	200	199	201	200	200	200
Negative polarity	200	199	200	200	199	200	200	199	201	199

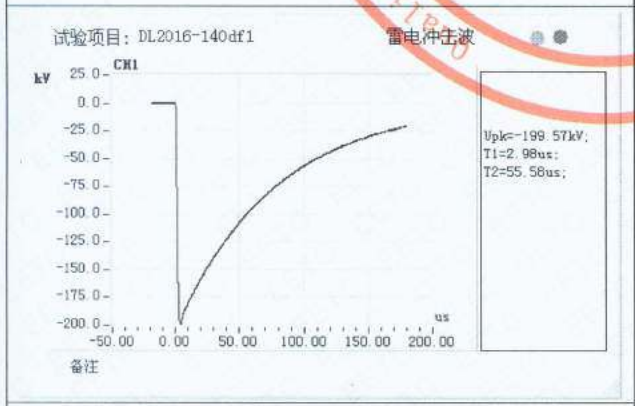
D2 Oscillograms of the impulse voltages waveform



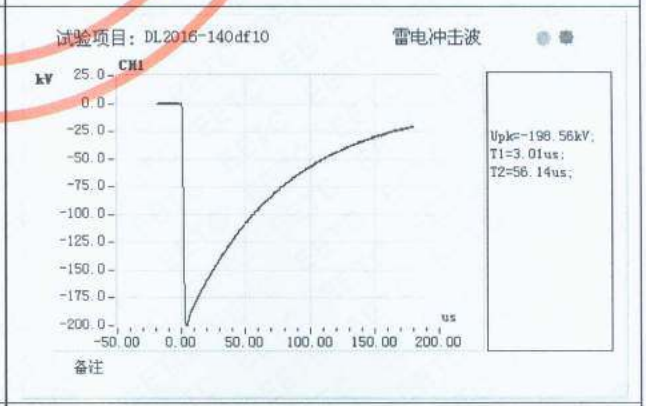
The 1st positive impulses waveform



The 10th positive impulses waveform



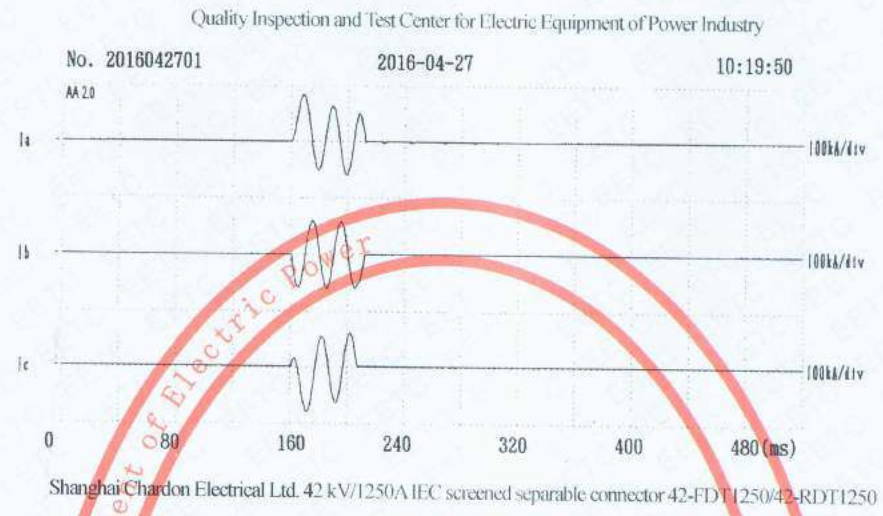
The 1st negative impulses waveform



The 10th negative impulses waveform

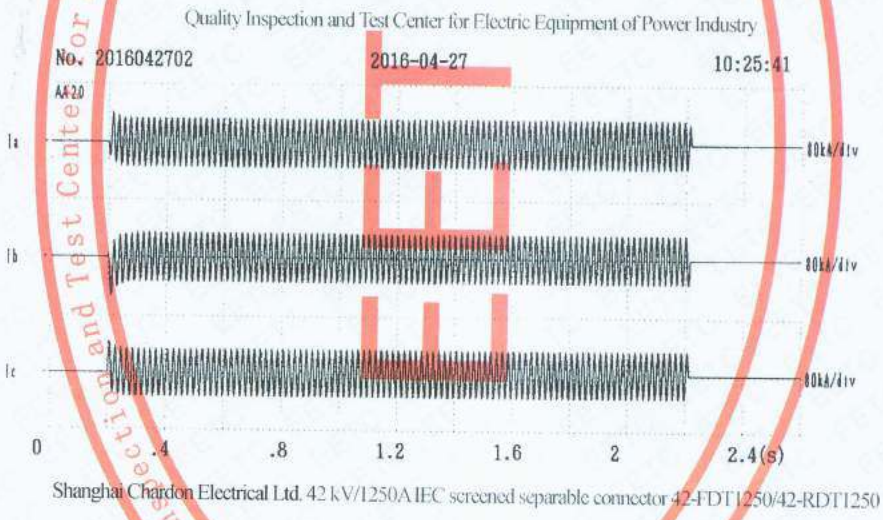
Annex E The waveform of dynamic short-circuit tests and thermal short-circuit tests of the combination sample

E1 The waveform of dynamic short-circuit tests of the combination sample(conductor)

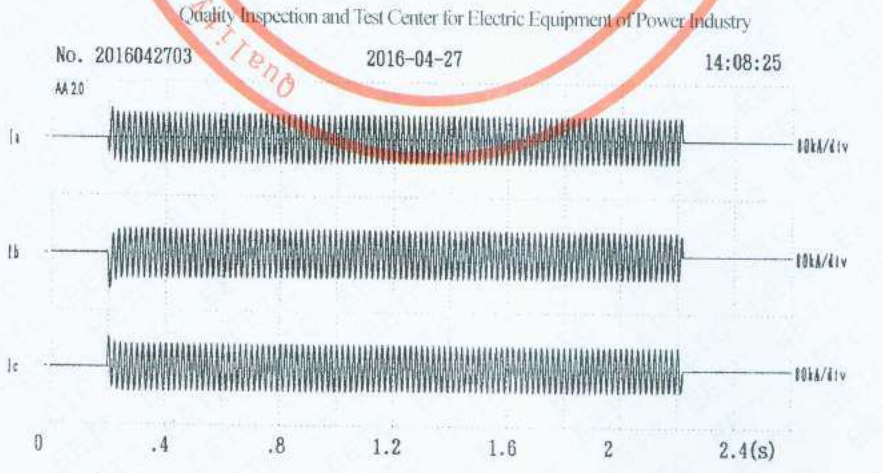


Shanghai Chardon Electrical Ltd. 42 kV/1250A IEC screened separable connector 42-FDT1250/42-RDT1250

E2 The waveform of thermal short-circuit tests of the combination sample(conductor)

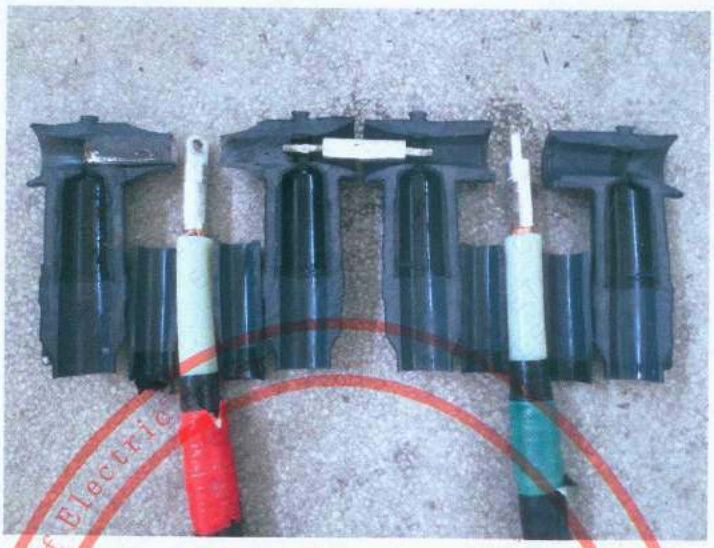


Shanghai Chardon Electrical Ltd. 42 kV/1250A IEC screened separable connector 42-FDT1250/42-RDT1250



Shanghai Chardon Electrical Ltd. 42 kV/1250A IEC screened separable connector 42-FDT1250/42-RDT1250

Annex F Photograph about examination



Annex G Photograph about test

Annex H Identification of test cable（specified in GB/T 12706.3—2008）

H1 Test cable for the type tests sequence 4.1

rated voltage $U_0/U(U_m)$		26/35(40.5) kV
construction	core	single-core
	construction of screen	single phase screen
conductor	material	copper
	type	round compact stranded
	cross section	500 mm^2
	diameter	26.8 mm
insulation	material	XLPE
	thickness	10.5 mm
	diameter	49.8 mm

screen	thickness of conductor screen	1.0 mm
	thickness of insulation screen	0.9 mm
	strippability of insulation screen	un-strippable
	diameter of insulation screen	51.7 mm
	metallic screen	copper tape
armour		/
oversheath	material	PVC
	diameter	63.4 mm
mark of cable		YJV-26/35 1×500

H2 Test cable for the type tests sequence 4.2 and 4.3

rated voltage $U_0/U(U_m)$		26/35(40.5) kV
construction	core	single-core
	construction of screen	single phase screen
conductor	material	copper
	type	round compact stranded
	cross section	185 mm^2
	diameter	16.0 mm
insulation	material	XLPE
	thickness	10.5 mm
	diameter	39.0 mm
screen	thickness of conductor screen	1.0 mm
	thickness of insulation screen	0.9 mm
	strippability of insulation screen	un-strippable
	diameter of insulation screen	40.9 mm
	metallic screen	copper tape
armour		/
oversheath	material	PVC
	diameter	48.2 mm
mark of cable		YJV-26/35 1×185