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CNAS L0699

CEPRI

TEST REPORT

CEPRI-EETC02-2022-0041 (E)

Client： ANHUI CHARDON ELECTRIC LTD.

Object：Separated Connectors 17kV/45kV(17kV/50kV)

Coupling (Rear)T-Body Surge Arrester

Type： 17-RDTA45/17-FDTA45

（17-RDTA50/17-FDTA50）

Test Category： Type Test

POWER INDUSTRY QUALITY INSPECTION AND TEST CENTER FOR ELECTRIC EQUIPMENT

Catalogue

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Test Report	Power Industry Quality Inspection and Test Center for Electric Equipment		CEPRI-EETC02-2022-0041(E) Total 21 Page 2
Client	ANHUI CHARDON ELECTRIC LTD.	Manufacturer	ANHUI CHARDON ELECTRIC LTD.
Object	Separated Connectors 17kV/45kV(17kV/50kV) Coupling(Rear)T-Body Surge Arrester	Type	17-RDTA45/17-FDTA45 （17-RDTA50/17-FDTA50） (Φ32mm×30mm)
Sampling procedure	By the client delivery	Serial No.	1arresters (001) 10 thermally prorated sections (201～210) 13 resistors (301～313) 1 housings(401) 4 dielectrically prorated section(101~104)
Test Category	Type Test	Date	2021.12.31~2022.02.28
Requirements	GB/T 11032-2020 Metal-oxide surge arresters without gaps for a.c. systems		
Conclusion	The Separated connectors 17kV/45kV(17kV/50kV) coupling(Rear)T-Body surge arrester type 17-RDTA45/17-FDTA45（17-RDTA50/17-FDTA50）have successfully passed the type test specified in GB/T 11032-2020.		
Note	Note :See appendix A for sample instruction.		

Tested by: 万克 梁菊霞

Checked by: 王陆璐 **Verified by:** 左中秋

Approved by: 王保山 **Date of issue:** 2022.03.31

Test Results

No.	Item	Requirements	Results	Evaluation
1	D.C. reference voltage test	25.0kV≤U_{1mADC}≤26.0kV	25.6kV	Pass
2	Leakage current test at 0.75 times D.C. reference voltage	I_L(0.75U_{1mADC}) ≤50μA	2μA	Pass
3	Continuous current test	Resistive current I_R≤200μA Total current I_X≤1000μA	I_x=157μA I_R=25μA	Pass
4	Power-frequency reference voltage test	Power-frequency reference voltage of the arrester≥17.0kV_p/$\sqrt{2}$	18.91kV_p/$\sqrt{2}$	Pass
5	Internal partial discharge test	1.05U_c, PD ≤10 pC	PD=2.3 pC	Pass
6	Insulation withstand tests on the arrester housing	Power-frequency voltage: Dry≥42.0kV, for 1min. Lightning impulse voltage : 75kV_p, the positive and negative 15 times respectively.	Power-frequency voltage dry:42.2kV_{rms}, 1min. Lightning impulse voltage: 75.8kV_p~76.9kV_p the positive and negative 15 times respectively.	Pass
7	Residual voltage test	Lightning impulse ≤45.0kV_p	44.70kV_p	Pass
		Switching impulse ≤38.3kV_p	34.57kV_p	
		Steep current ≤54.0kV_p	46.3kV_p	
8	Repetitive charge transfer withstand test	10 samples should withstand 20 times 8/20μs lightning impulse current and the charge value should not less than 0.2C.	0.220C ~0.233C	Pass
9	Test to verify long term stability under continuous operating voltage	The accelerated ageing test of resistors should be carried out according to the specified procedure.	P_{max}≤1.3P_{min}, $P_{all.max}$≤1.1P_{start} ; the samples fulfilled the requirements.	Pass
10	Heat dissipation behavior verification test	The test section should have a temperature higher than the complete arrester for all instants during the cooling period.	Fulfilled the requirements. See fig 2.	Pass

11	Operating duty test	Rated thermal charge injection $Q_{th} \geqslant$ 0.7 C. The residual voltage should not have changed by more than 5%.	$Q_{th} \geqslant 0.723C$ The residual voltage changed ratio is from -1.51%~-1.32%	Pass
12	Power-frequency voltage-versus-time characteristics	Supply the Power frequency voltage-versus-time characteristics for the range of voltage from $1.20U_r^*$ to $1.00U_r^*$, the range of time from 0.1s to 1200s for with prior duty, $1.20U_r^*$ to $1.00U_r^*$, the range of time from 1.1s to 1200s for without prior duty.	With prior duty test $1.20U_r^*$ 0.1s $1.15\ U_r^*$ 1.1s $1.10\ U_r^*$ 10.1s $1.00\ U_r^*$ 1200s Without prior duty test $1.20U_r^*$ 1.1s $1.00U_r^*$ 1200s	Pass
13	Test to verify the dielectric withstand of the internal components of an	1 time 65kA-4/10μs	65.2kA, no puncture, flashover, cracking or other significant damage.	Pass

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Content:

1~2D.C. reference voltage test and leakage current at 0.75 times D.C. reference voltage test

Environment temperature: 7.0℃ humidity: 73%

Samples	D.C. reference voltage U_{1mADC} kV		0.75 times D.C. reference voltage kV		Leakage current μA	
	Measured value	Specified value	Measured value	Specified value	Measured value	Specified value
001	25.6	$25.0 \leqslant U_{1mADC} \leqslant 26.0$	19.2	$0.75U_{1mADC} \pm 1\%$	2	⩽50

Note: The standard only provides the D.C. reference voltage lower limit. The upper limit declared by the manufacturer is used to determine the proportion of the arrester protection level.

Fulfilled the requirements.

3 Power-frequency reference voltage test

Sample	U_{1mAAC}, $kV_p/\sqrt{2}$	
	Measured value	Specified value
001	18.91	⩾17.0

Fulfilled the requirements.

4 Continuous current test

Sample	Resistive current I_R μA_p		Full current I_X μA_{rms}	
	Measured value	Specified value	Measured value	Specified value
001	25	⩽200	157	⩽1000

NOTE: The continuous current of the arrester under the continuous operating voltage declared by manufacturer.

Fulfilled the requirements.

5 Internal partial discharge test

Samples	U_r	U_r duration time	$1.05U_c$	$1.05U_c$ duration time	Partial discharge
	kV_{rms}	s	kV_{rms}	s	pC
001	17.1	10	14.3	60	2.3
Specified value	17.0	2～10	14.3	60	⩽10

Fulfilled the requirements.

6 Insulation withstand tests on the arrester housing

6.1 Power frequency voltage withstand test

t=8.0℃ RH=65% Atmospheric pressure:101.9kPa

Samples	Specified value	Applied voltage	Duration	Test result
	kV_{rms}	kV_{rms}	s	
401	42.0(dry)	42.2	60	No flashover

Fulfilled the requirements.

6.2 Lightning impulse voltage withstand test

t=8.0℃ RH=65% Atmospheric pressure:101.9kPa

Samples	Specified value		Applied voltage	Withstand times	Test result
	kV		kV_p		
401	(+)	75	75.8~76.8	15	No breakdown, no flashover
	(-)	75	76.1~76.9	15	No breakdown, no flashover

Fulfilled the requirements.

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7 Residual voltage test

7.1 Lightning impulse current residual voltage test

Samples			301	302	303
Residual voltage of the sections	U_{1mAAC}	kV	6.16	6.16	6.16
	8/20μs, 2.5kA	kV_p	9.80	9.78	9.80
	8/20μs, 5kA	kV_p	10.59	10.56	10.58
	8/20μs, 10kA	kV_p	11.69	11.66	11.67
Residual voltage of the arresters	Ratio, n	-	4.22	4.22	4.22
	8/20μs, 2.5kA	kV_p	41.36	41.28	41.36
	8/20μs, 5kA	kV_p	44.70	44.57	44.66
	8/20μs, 10kA	kV_p	49.34	49.21	49.26
	Lightning impulse protection level	kV_p	44.70		
	Specified value	kV_p	≤45.0		

Note 1: Shunt 0.025 V/A, divider K_d=206.8

Note 2: According to the determined residual pressure, draw the residual voltage and current curve, in the curve corresponding to the nominal discharge current read residual voltage, defined as the lightning protection lightning protection level.

7.2 Switching impulse residual voltage test

Samples			301	302	303
Resistor	Residual voltage at 250A	kV_p	8.19	8.17	8.17
Complete arrester	Test value	kV_p	34.57	34.48	34.48
	Switching impulse protection level	kV_p	34.57		
	Specified value	kV_p	≤38.3		

Note: Shunt 0.025 V/A, divider K_d=206.8

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7.3 Steep impulse current residual voltage test

Samples			301	302	303
Residual voltage of the sections	$5kA_p$ U_{res1}	kV_p	11.18	11.15	11.17
Residual voltage of metal block	$5kA_p$ U_{res2}	kV_p	0.27		
Residual voltage after correction	U_{res1}-U_{res2}	kV_p	10.91	10.88	10.90
Complete arrester	Ratio, n	-	4.22	4.22	4.22
	Residual voltage for the arrester	kV_p	46.0	45.9	46.0
	inductive voltage drop	kV_p	0.3kV/m×0.16m×5=0.24kV		
	After correction	kV_p	46.3	46.2	46.2
	Steep current impulse protection level	kV_p	46.3		
	Specified value	kV_p	≤54.0		

Note1： Shunt 0.0267V/A, divider K_d =59.8。

Note 2： U_{res2}/ U_{res1} is larger than 2%, need to correct Inductive effect.

Fulfilled the requirements. Test waveform is shown in appendix C fig C.1~ fig C.3.

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8 Repetitive charge transfer withstand

Samples:10 resistors（304～313）

Requirements of standards: The samples should withstand more than 0.2C by 8/20us current impulse for 20 times, and after test, have no breakdown or flashover or breakage, the change of residual voltage within ± 5%, the change of reference voltage within ±5%， also should withstand capability to one 8/20us current impulse of at least 0.5 kA/cm^2 peak current density or 2 times In, whichever is lower.

Test data: Fulfilled the requirements , the test waveforms were shown in appendix C fig C.4.

Samples		304	305	306	307	308	309	310	311	312	313
Before test	U_{1mAAC}, kV	4.48	4.47	4.47	4.47	4.47	4.45	4.49	4.47	4.47	4.47
	8/20μs U_{5kAp}, kV	10.59	10.57	10.55	10.56	10.57	10.53	10.59	10.55	10.56	10.56
Q_{rs}, C		Q_{rs} (Claimed repetitive charge transfer rating)× 1.1=0.22									
1st	Q_{rs}, C	0.226	0.220	0.230	0.224	0.221	0.230	0.224	0.231	0.226	0.231
2nd	Q_{rs}, C	0.228	0.230	0.222	0.232	0.226	0.226	0.227	0.223	0.231	0.224
3rd	Q_{rs}, C	0.224	0.228	0.227	0.231	0.226	0.230	0.225	0.221	0.226	0.221
4th	Q_{rs}, C	0.226	0.231	0.225	0.232	0.225	0.223	0.230	0.233	0.221	0.230
5th	Q_{rs}, C	0.225	0.226	0.220	0.226	0.223	0.231	0.224	0.229	0.231	0.227
6th	Q_{rs}, C	0.222	0.228	0.232	0.232	0.224	0.230	0.229	0.232	0.222	0.229
7th	Q_{rs}, C	0.222	0.228	0.232	0.221	0.225	0.225	0.228	0.231	0.231	0.232
8th	Q_{rs}, C	0.226	0.231	0.232	0.220	0.222	0.233	0.227	0.227	0.224	0.232
9th	Q_{rs}, C	0.225	0.225	0.225	0.229	0.230	0.224	0.226	0.223	0.224	0.221
10th	Q_{rs}, C	0.220	0.221	0.229	0.232	0.222	0.227	0.228	0.228	0.229	0.224
11th	Q_{rs}, C	0.222	0.224	0.229	0.225	0.229	0.220	0.230	0.228	0.231	0.222
12th	Q_{rs}, C	0.223	0.226	0.221	0.230	0.224	0.222	0.227	0.229	0.226	0.222
13th	Q_{rs}, C	0.223	0.221	0.230	0.222	0.233	0.231	0.226	0.222	0.232	0.231
14th	Q_{rs}, C	0.223	0.233	0.223	0.228	0.229	0.228	0.223	0.228	0.223	0.224
15th	Q_{rs}, C	0.225	0.222	0.224	0.223	0.230	0.232	0.223	0.233	0.222	0.231
16th	Q_{rs}, C	0.225	0.232	0.226	0.226	0.227	0.224	0.224	0.221	0.225	0.231
17th	Q_{rs}, C	0.223	0.229	0.220	0.228	0.226	0.224	0.221	0.230	0.223	0.227
18th	Q_{rs}, C	0.231	0.231	0.226	0.221	0.228	0.226	0.226	0.221	0.232	0.231
19th	Q_{rs}, C	0.222	0.226	0.229	0.228	0.224	0.224	0.227	0.221	0.226	0.222
20th	Q_{rs}, C	0.229	0.225	0.221	0.221	0.228	0.224	0.228	0.223	0.232	0.229

Test evaluation	One 8/20 current impulse, kA	4.02 kA （0.5kA/cm^2=0.5×3.14×(3.2/2)^2=4.02kA which is lower than 2 times I_n）								
		4.05	4.06	4.05	4.05	4.06	4.07	4.06	4.06	4.05	4.06
	U_{1mAAC}, kV	4.42	4.41	4.42	4.39	4.38	4.39	4.38	4.37	4.39	4.38
	Change rate, %	-1.34	-1.34	-1.12	-1.79	-2.01	-1.35	-2.45	-2.24	-1.09	-2.01
	8/20μs U_{5kAp}, kV	10.72	10.71	10.75	10.73	10.71	10.72	10.82	10.81	10.78	10.78
	Change rate, %	+1.23	+1.32	+1.90	+1.61	+1.32	+1.80	+2.17	+2.46	+2.08	+2.08
	Visual inspection	All the samples have no puncture, flashover or cracking.									

9 Test to verify long term stability under continuous operating voltage

Samples: 3 dielectrically prorated sections(101~103)

Requirements of standards: 3 resistors should pass the accelerated ageing test.

Test data: Fulfilled the requirements, the accelerated ageing curves were shown in fig 1.

Samples	101	102	103
U_{1mADC}, kV	6.20	6.20	6.18
U_c, kV_{rms}	3.37	3.37	3.37
Power losses P_{start}, 3h, W	0.870	0.697	0.775
Power losses P_{100h}, W	0.608	0.487	0.559
Power losses P_{200h}, W	0.589	0.479	0.531
Power losses P_{300h}, W	0.564	0.464	0.525
Power losses P_{400h}, W	0.555	0.457	0.515
Power losses P_{500h}, W	0.563	0.476	0.534
Power losses P_{600h}, W	0.552	0.438	0.512
Power losses P_{700h}, W	0.567	0.427	0.501
Power losses P_{800h}, W	0.560	0.419	0.509
Power losses P_{900h}, W	0.557	0.413	0.486
Power losses P_{end}, 1000+8h,W	0.562	0.421	0.502
P_{min}, W	0.552	0.413	0.486
Any increase of power losses from P_{min} during the remaining test period, P_{max}	0.567	0.421	0.502
$P_{all.max}$, W	0.870	0.697	0.775
P_{max} / 1.3P_{min}	0.790	0.784	0.794
$P_{all.max}$ /1.1 P_{start}	0.909	0.910	0.910

Note: （1）Because $P_{max} \leqslant 1.3P_{min}$, $P_{all.max} \leqslant 1.1P_{start}$, the samples fulfilled the requirements.

（2）The temperature of blocks:115±4 ℃.

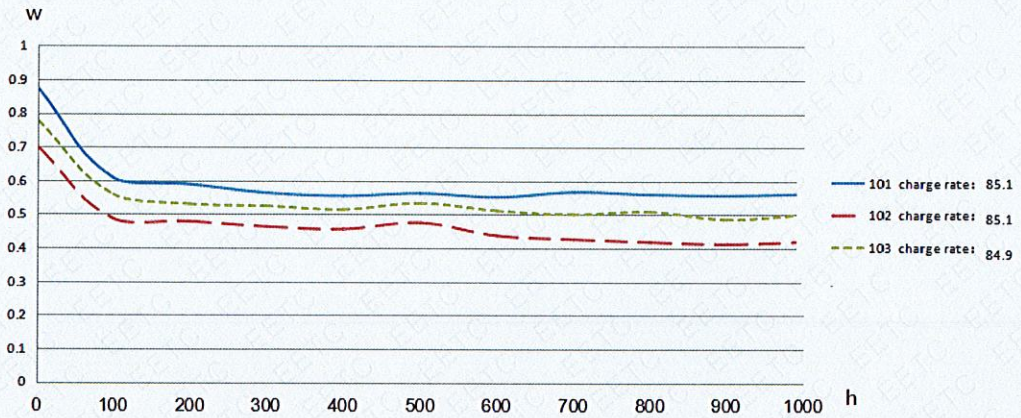

Fig 1 Accelerated ageing test curve

10 Heat dissipation behavior verification of test sample

Samples: 1 thermally prorated section (210) 1 arrester (001)

Requirements of standards: the MO resistors in the sample shall be heated to 140℃ by the application of power-frequency voltage. When the temperature is reached, the voltage source shall be disconnected and the cooling time curve shall be determined. At any time, the measured cooling curve of section falls shall above the measured cooling curve of the arrester.

Test data: Fulfilled the requirements, the test waveform was shown in fig 2. The operating duty test preheated temperature should be 85℃.

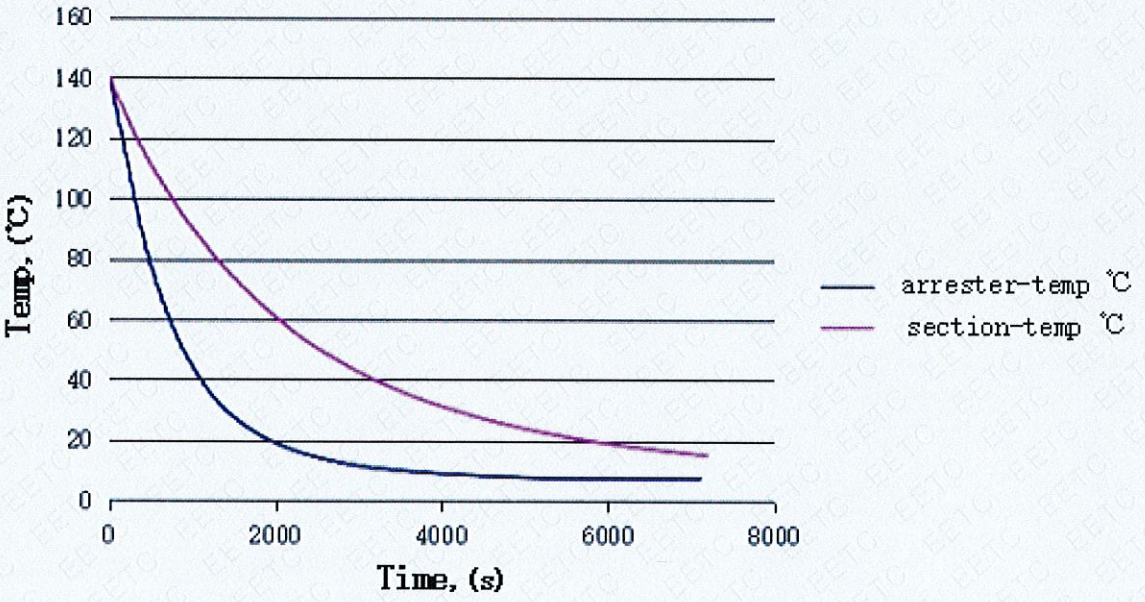

Fig 2 The cooling curve for the section and arrester

11 Operating duty test

Samples: 3 thermally prorated sections（201~203）

Requirements of standards: 3 thermally prorated sections should pass the high current impulse operating duty test.

Test data: Fulfilled the requirements, the test waveforms were shown in appendix C fig C.5～C.8.

Samples			201	202	203
U_{1mADC}，kV			6.17	6.17	6.17
U_{sr}，kV_{rms}			4.37	4.37	4.37
U_{sc}，kV_{rms}			3.50	3.50	3.50
8/20μs, U_{5kAp} ,before, kV			10.62	10.63	10.62
Conditioning test	1^{st} high current impulse，kA_p		65.1	65.2	64.8
	2^{nd} high current impulse，kA_p		65.6	64.9	65.2
preheated samples			preheated samples to 85.0℃±3℃		
Rated thermal charge transfer ,Q_{th}	Lightning current impulse	$1^{st}Q_{th}$,C	0.365	0.368	0.365
		$2^{nd}Q_{th}$,C	0.358	0.362	0.367
	Q_{th} rating (2 times) , C		0.723	0.730	0.732
Applied voltage after the 2^{nd} impulse	Time	Req.	as short as possible (within 100ms)		
		Actual	86	88	84
	Applied voltage and duration	U_{sr}^{*}，kV_{rms}	4.37	4.37	4.37
		Duration, s	10	10	10
		U_{sc}^{*}，kV_{rms}	3.50	3.50	3.50
		Duration, min	30	30	30
Power loss, W	1 s		4.52	4.26	4.67
	5 min		2.37	2.28	2.42
	10 min		1.62	1.57	1.69
	15 min		1.35	1.32	1.41
	20 min		1.03	1.01	1.07
	25 min		0.95	0.95	1.02
	30 min		0.94	0.94	1.01
Samples cooled to			cooled to ambient 20℃±15℃		
8/20μs, U_{5kAp} ,after，kV			10.47	10.49	10.46
Variability of the residual voltage，%			-1.41	-1.32	-1.51
Visual inspection			No puncture, flashover, cracking or other significant damage		

Fulfilled the requirements.

12 Power-frequency voltage-versus-time test

12.1 Power-frequency voltage-versus-time test data (with prior duty)

Samples			204	205	206	207
U_{1mADC}, kV			6.16	6.17	6.17	6.18
U_{sr}, kV_{rms}			4.36	4.37	4.37	4.38
U_{sc}, kV_{rms}			3.49	3.50	3.50	3.50
8/20μs, U_{5kAp} ,before, kV			10.61	10.63	10.62	10.65
preheated samples			preheated samples to85℃±3℃			
2ms long-duration current impulse	1st impulse	Q_{th} ,C	0.367	0.359	0.366	0.365
	2nd impulse	Q_{th},C	0.358	0.366	0.362	0.367
	Q_{th} rating (2 times) , C		0.725	0.725	0.728	0.732
Applied voltage after the 3rd impulse	Time	Req.	as short as possible (within 100ms)			
		Actual	86	88	88	84
	Applied voltage and duration	U^*_{sr}, kV_{rms}	5.24	5.03	4.81	4.38
		TOV scale	1.20	1.15	1.10	1.00
		Duration, s	0.1	1.10	10.1	1200
		U^*_{sc}, kV_{rms}	3.49	3.50	3.50	3.50
		Duration, min	30	30	30	30
Power loss, W	1 s		10.32	8.13	6.22	4.98
	5 min		7.21	4.28	4.01	2.35
	10 min		5.47	3.12	3.02	1.87
	15 min		4.22	2.35	2.05	1.56
	20 min		3.28	1.65	1.57	1.28
	25 min		2.73	1.32	1.19	1.07
	30 min		2.41	1.16	0.98	0.96
Samples cooled to			cooled to ambient 20℃±15℃			
8/20μs, U_{5kAp} ,after, kV			10.47	10.51	10.55	10.73
Variability of the residual voltage, %			-1.32	-1.13	-0.66	+0.75
Visual inspection			No puncture, flashover, cracking or other significant			

12.2 Power-frequency voltage-versus-time test data (without prior duty):

Samples			208	2209
U_{1mADC}, kV			6.18	6.18
U_{sr}, kV_{rms}			4.38	4.38
U_{sc}, kV_{rms}			3.50	3.50
8/20μs, U_{5kAp} ,before, kV			10.67	10.66
preheated samples			preheated samples to 85.0℃±3℃	
Applied voltage	Applied voltage and duration	U_{sr}^*, kV_{rms}	5.25	4.38
		TOV scale	1.20	1.00
		Duration, s	1.1	1200
		U_{sc}^*, kV_{rms}	3.50	3.50
		Duration, min	30	30
Power loss, W	1 s		3.22	2.37
	5 min		1.86	1.66
	10 min		1.52	1.27
	15 min		1.22	1.06
	20 min		1.06	0.99
	25 min		0.97	0.92
	30 min		0.96	0.91
Samples cooled to			cooled to ambient 20℃±15℃	
8/20μs, U_{5kAp} ,after, kV			10.72	10.70
Variability of the residual voltage, %			+0.47	+0.38
Visual inspection			No puncture, flashover, cracking or other significant damage	

Fulfilled the requirements, the test waveforms were shown in appendix C fig C.9.

13Test to verify the dielectric withstand of the internal components of an arrester

Samples: 1 dielectrically prorated section（104）

Requirements of standards: preheat the sample to 60℃, consists of one application of a 65kA high-current impulse. There should be no evidence of a dielectric breakdown. The test waveforms were shown in appendix C fig C.10.

Sample			104
U_{1mAAC}，kV			4.48
8/20μs, U_{5kA} ,before，kV			10.59
preheated samples			preheated samples to 60℃±3℃
high-current impulse，kA			65.2
Samples cooled to			cooled to ambient 20℃±15℃
8/20μs, U_{10kA} ,after，kV			10.65
Variability of the residual voltage，%			+0.57
Visual inspection	The block can not remove from the section	8/20μs current impulse，2 times	4.02 kA （0.5kA/cm^2=0.5×3.14×(3.2/2)^2=4.02kA which is lower than 2 times I_n）
		1st impulse，kA_p	4.06
		2nd impulse，kA_p	4.07
		Curve check	No puncture, flashover, cracking or other significant damage

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Appendix A: Object Parameters

Rated voltage U_r: 17kV　　Continuous operating voltage U_c: 13.6kV$_{rms}$

Nominal discharge current I_n: 5kA　　Lightning impulse residual voltage: U_{res}: ≤45kV$_P$

Sample instruction:

①1 arrester, number EETC02-21/11/30-0041-001, short for 001 in report; ②10 thermally prorated sections, number EETC02-21/11/30-0041-201~EETC02-21/11/30-0041-210 short for 201~210 in report; ③13 resistors, number EETC02-21/11/30-0041-301~EETC02-21/11/30-0041-313, short for 301~313 in report; ④1 housings, number EETC02-21/11/30-0041-401, short for 401 in report.; ⑤4 dielectrically prorated sections, number EETC02-21/11/30-0041-101~EETC02-21/11/30-0041-104, short for 101~104 in report.

Appendix B: Main test device

NO.	Device name	Device NO.	Measurement	Uncertainty /Accuracy	Calibration institution	Expiration date
1	impulse current generator	EETC02-0003	8/20 μs 100 kA, 20kV 4/10 μs 150 kA, 20kV 30/80 μs 50 kA, 20kV	U_{rel}=0.015 k=2 U_{rel}=0.021 k=2	National center for high voltage measurement	2023-06-23
2	impulse current generator	EETC02-0005	8/20 μs 50 kA, 20kV 30/80 μs 10 kA, 20kV	U_{rel}=0.015 k=2 U_{rel}=0.018 k=2	National center for high voltage measurement	2023-06-29
3	Steep current impulse generator	EETC02-0004	1/5μs 20kA , 20kV	U_{rel}=0.015 k=2 U_{rel}=0.018 k=2	National center for high voltage measurement	2023-06-29
4	800kV impulse voltage generator	EETC02-0007	0~800 kV	U_{rel}=0.019 k=2 U_{rel}=0.016 k=2	National center for high voltage measurement	2022-05-28
5	400kV DC high voltage generator	EETC02-0008	DC 0~400kV	U_{rel}=0.012 k=2	National center for high voltage measurement	2022-08-18
6	Operating duty test system-voltage	EETC02-0009	0~10kV	U_{rel}=0.006 k=2	Beijing Aerospace measurement and testing technology institute	2023-01-06
7	JFD-251 PD tester	EETC02-0043	/	U_{rel}=0.015 k=2	Beijing Aerospace measurement and testing technology institute	2023-01-04
8	DC reference voltage tester	EETC02-0048	DC 0~9 kV	U_{rel}=0.008 k=2	National center for high voltage measurement	2022-05-10
9	Temperature measuring system	EETC02-0053	0~150℃	U_{rel} =0.2℃k=2	Hubei province meteorological metrological verification station	2022-12-05

Appendix C: Waveforms

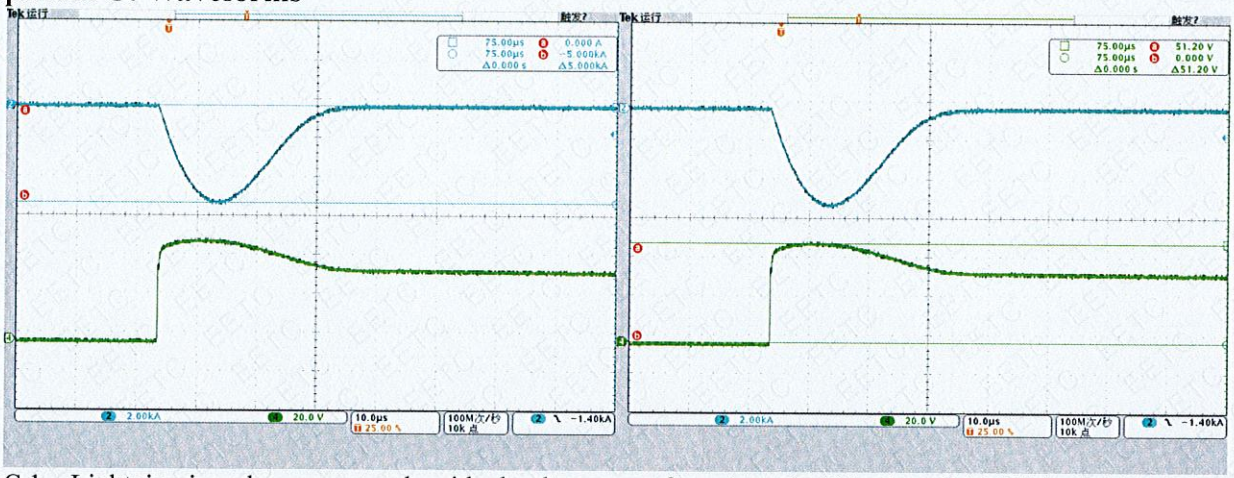


Fig C.1 Lightning impulse current and residual voltage waveform (sample 301, shunt 0.025V/A, divider K_d=206.8)

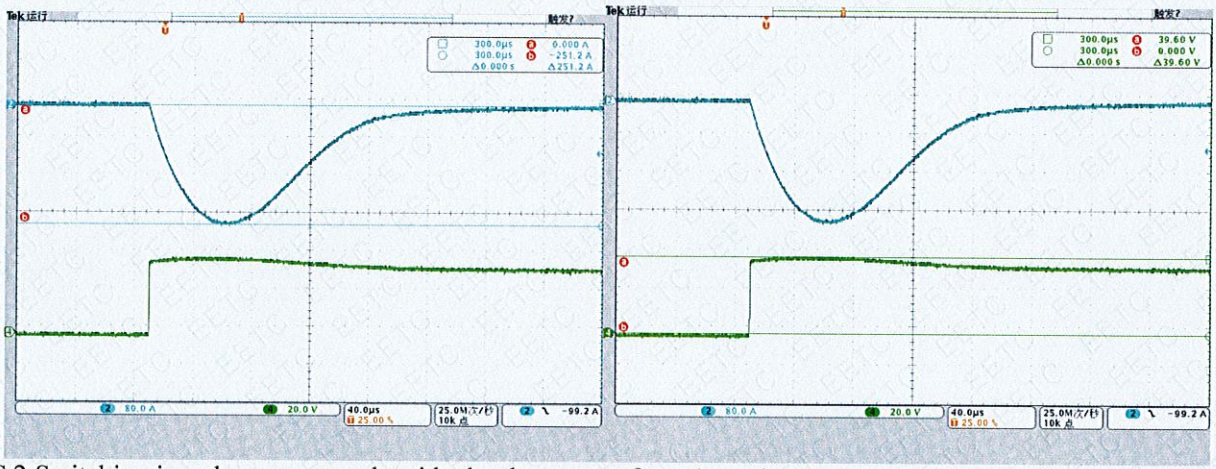


Fig C.2 Switching impulse current and residual voltage waveform (sample 301, shunt 0.025V/A, divider K_d=206.8)

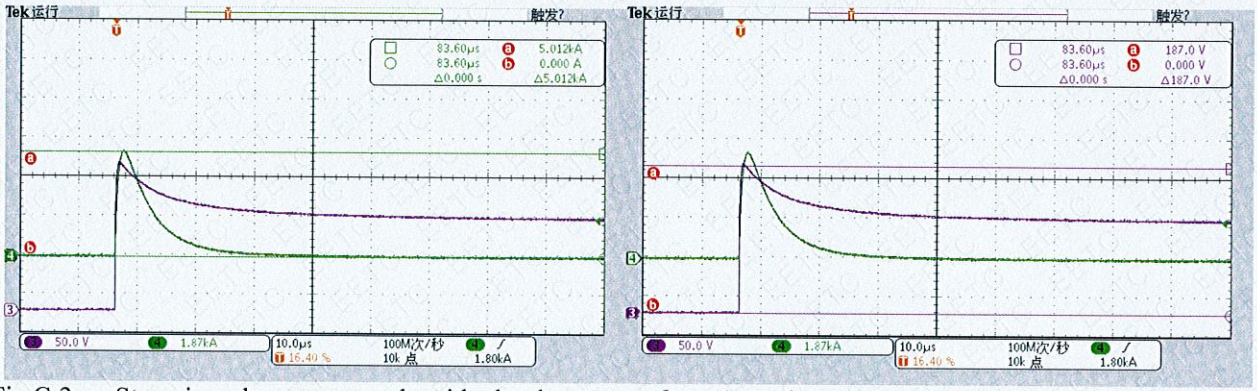


Fig C.3 Steep impulse current and residual voltage waveform (sample 301, shunt 0.0267V/A, divider K_d=59.8)

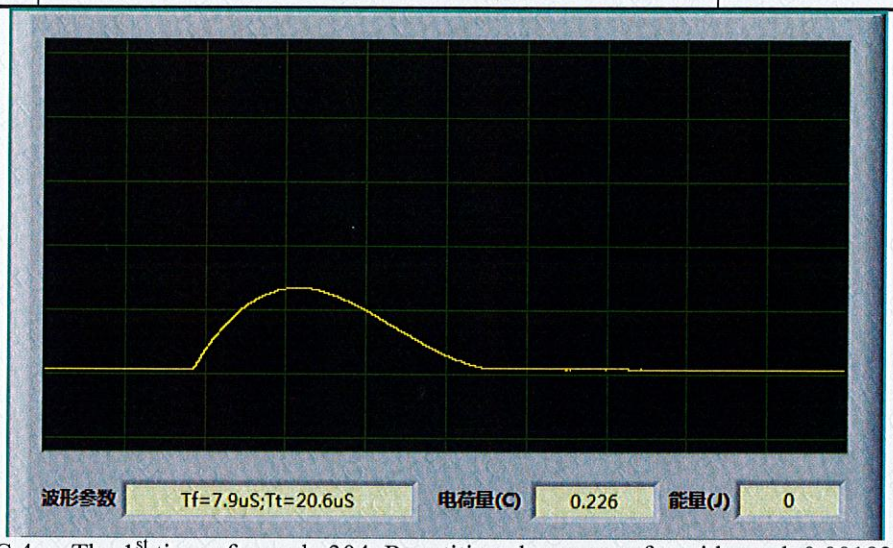


Fig C.4 The 1st time of sample 304, Repetitive charge transfer withstand, 0.00192V/A

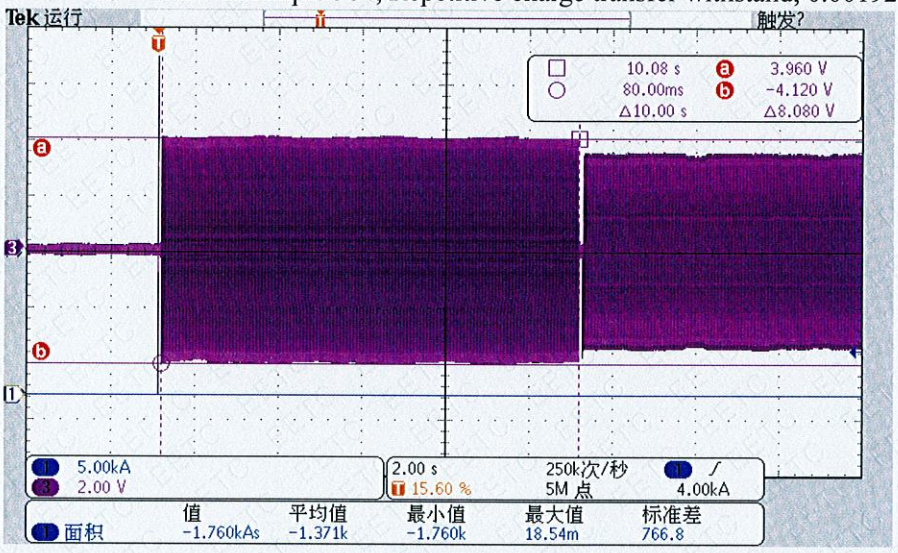


Fig C.5 Operating duty waveform, sample 201, K_d=1540

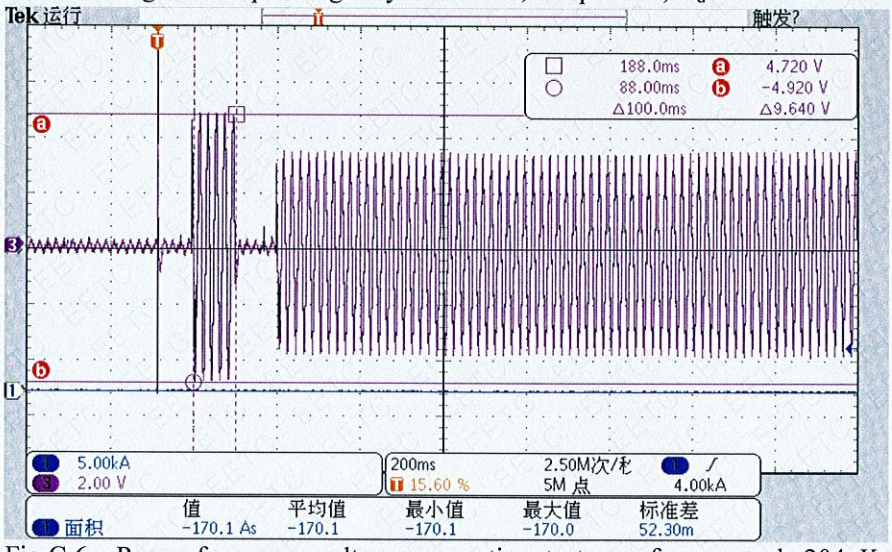


Fig C.6 Power-frequency voltage-versus-time test waveform, sample 204, K_d=1540

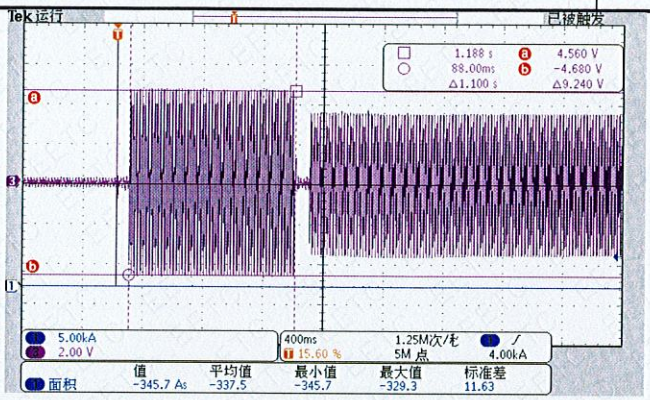


Fig C.7 Power-frequency voltage-versus-time test waveform, sample 205, K_d=1540

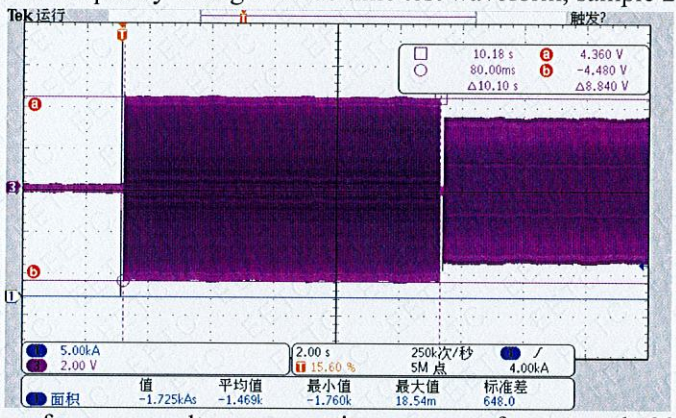


Fig C.8 Power-frequency voltage-versus-time test waveform, sample 206, K_d=1540

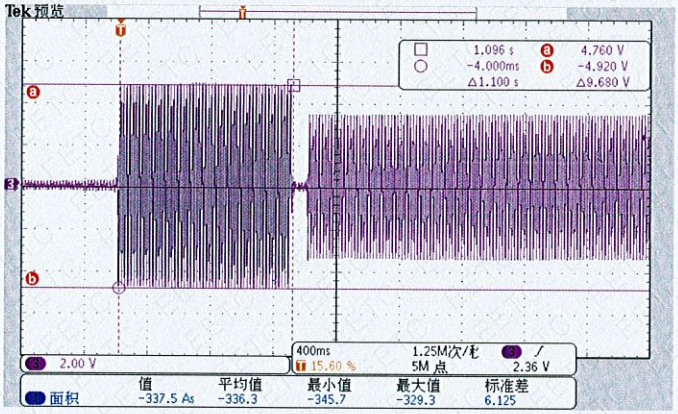


Fig C.9 Power-frequency voltage-versus-time test waveform, sample 208, K_d=1540

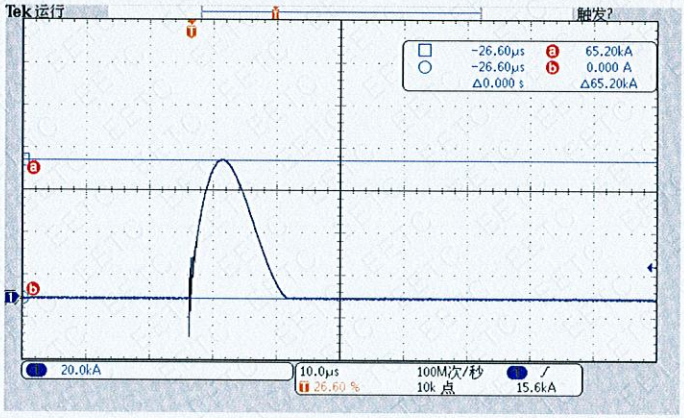
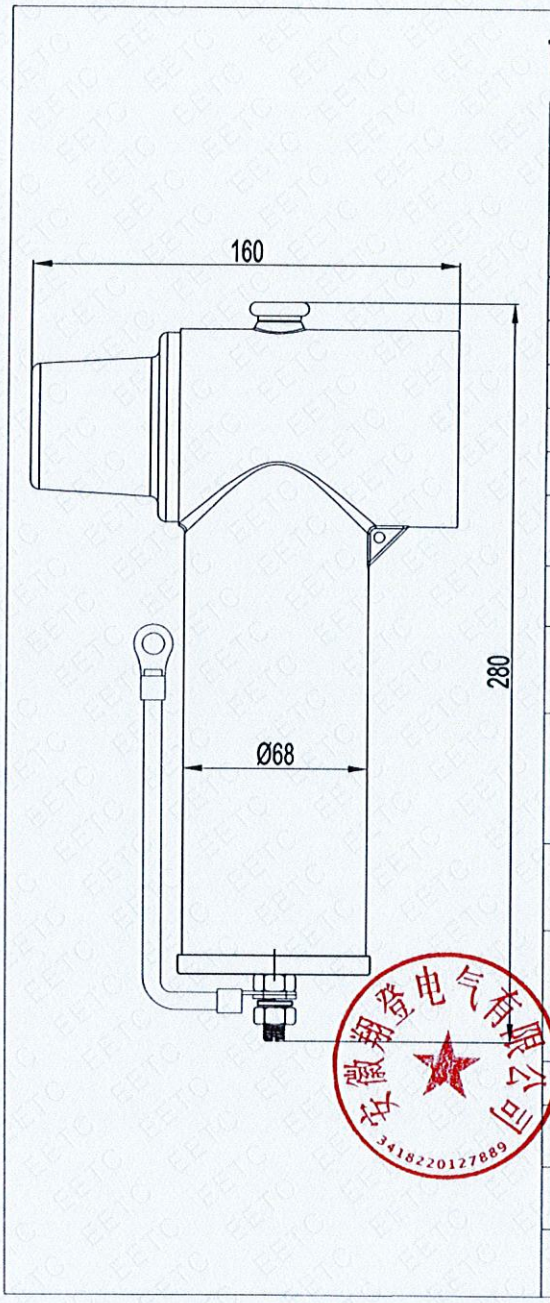


Fig C.10 Test to verify the dielectric withstand of the internal components of an arrester , sample 104

Appendix D: Visual and dimensional check

Fig D1: 17-RDTA45/17-FDTA45（17-RDTA50/17-FDTA50） type arrester and resistors



The arrester technical parameter table

No.	Item		Parameter	Unit	Remark
A	Height of Arrester		280	mm	
B	Width of Arrester		160	mm	
C	The Inner Diameter of EPDM Housing		/	mm	
D	The Outside Diameter of EPDM Housing		Ø68	mm	
E	Creep Distance		/	mm	
F	MOV Disks Diameter		Ø32	mm	Quantity:4 pieces
G	Rating Voltage		17	kV	
1	MCOV Rating		13.6	kV	
2	Nominal Discharge Current of Arrester		5	kA	
3	Minimum Corona Voltage Level(15kV)		≤10	pC	
4	Reference Voltage	Power- frequency Reference Voltage	≥17	kV	
		DC Reference Voltage	≥25	kV	1mA
5	Residual Voltage	Steep Current Impulse	≤51.8	kV	
		Lightning Current Impulse	≤45	kV	
		Switching Current Impulse	≤38.3	kV	
6	Repetitive Charge Transfer Rating		Qrs=0.2C		
7	Withstand Voltage of EPDM Housing	Power Frequency Withstand Voltage	42	kV	
		Lightning Impulse Withstand Voltage	75	kV	
8	Application Environment Altitude		≤1000	m	

Product Name	Separable Connectors 17kV/45kV(17kV/50kV) Coupling(Rear) T-Body Surge Arrester
Product Model	17-RDTA45/17-FDTA45(17-RDTA50/17-FDTA50)
Manufacturer	ANHUI CHARDON ELECTRIC LTD.

Fig D2 : Dimensional drawing of 17-RDTA45/17-FDTA45（17-RDTA50/17-FDTA50）