2018 20 1

Q/CSG

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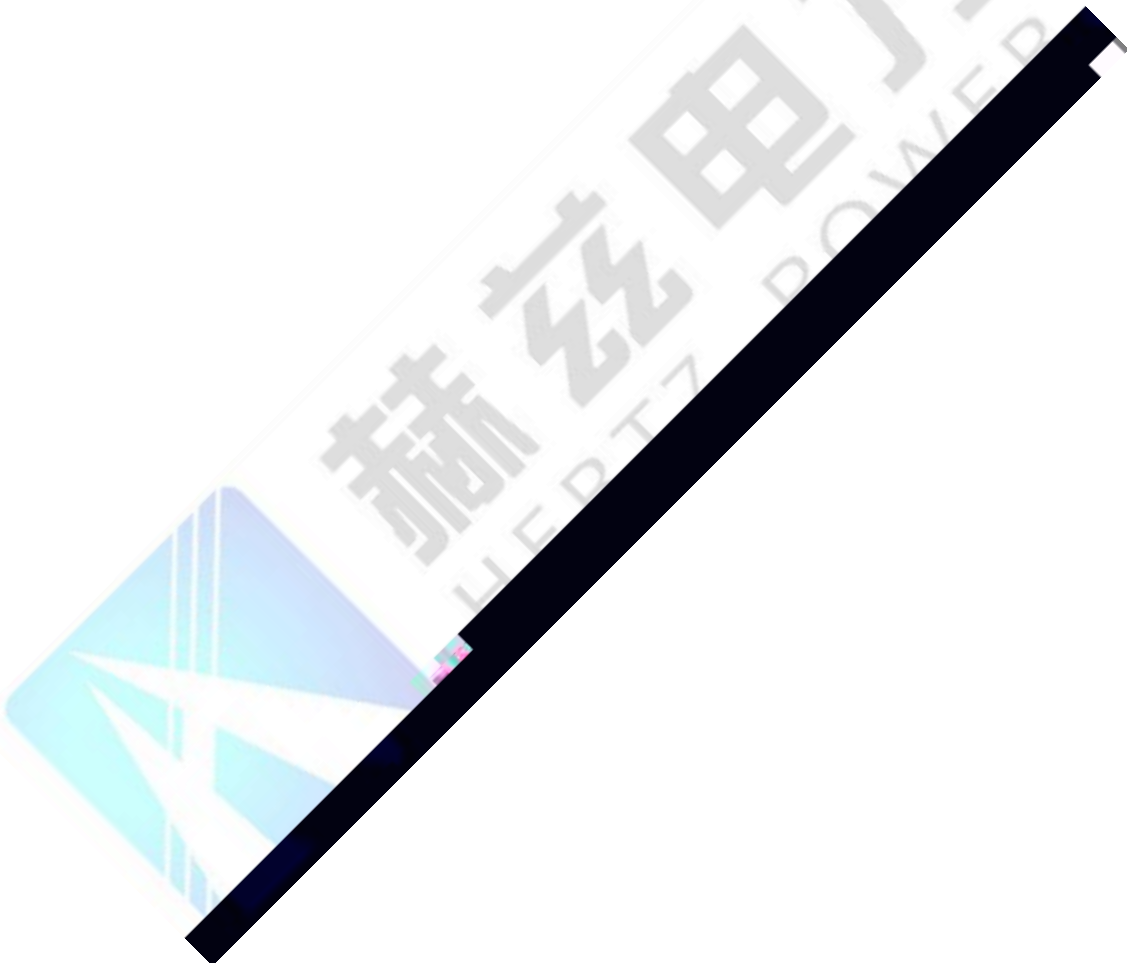
Q/CSG1205019-2018

2018-05-17 2018-05-17



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‰ 7 Ա يجِ ĭ ⅝

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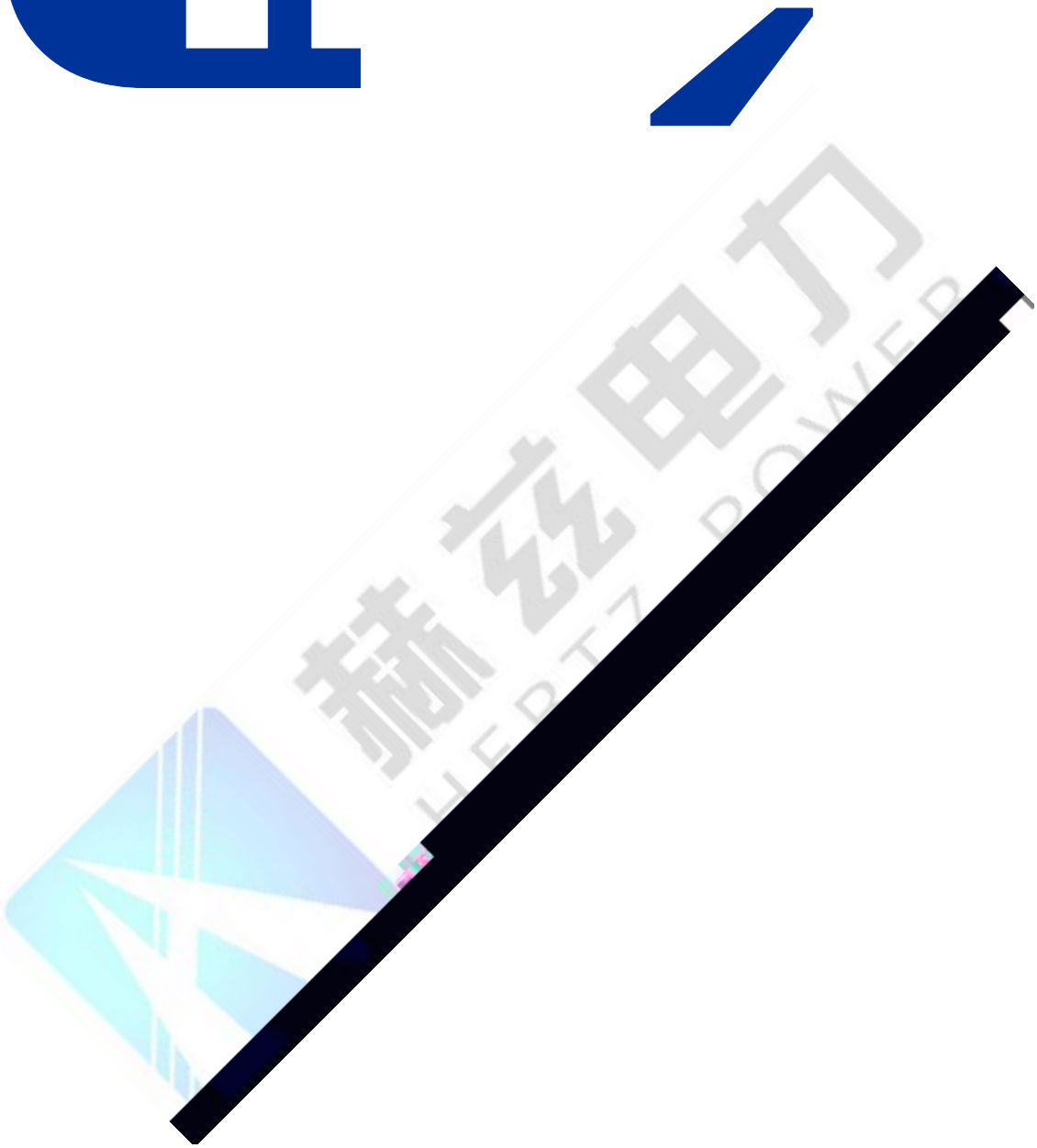
‰ضي ï̈ Ⅵ ̀Ë̃



¡*ZJ] f)^p T8rv,” ¶

GB/T 7252

GB/T 7354

GB/T 7595

GB/T 7598

GB/T 7600

GB/T 7601

GB 7674 72.5kV

GB/T 8349

GB/T 8905

GB/T 11022

GB 11023

GB/T 11024.1 1000V 1

GB 11032

GB /T 12022

GB/T 14542

GB/T 16927.1~.3

GB/T 17623

GB/T 20840.1~.8

GB/T 26218.1~.3

GB 50054

GB 50148

GB 50149

GB 50150

GB 50169

GB 50204

GB 50207

GB 50209

GB 50210

GB 50233 110kV~750kV

GB 50242

GB 50300

GB 50303

GB 50395

DL/T 4 4 15

GB 50617

DL/T 253

DL/T 264

DL/T 402

DL T 417

DL/T 1093 ɀ ΐ ง كج ΐ ∞ ↕

DL/T 1096 ΐ ง كج ṿ

DL/T 1220 كج ẽ ΐ

DL/T 1250 ˜ ↕

DL/T 1300 ˜ شي ǁ 𝒟ₚ ↕

DL/T 1366 ɀ Έ .

DL/T 1378 ῴ ضر OPGW ضر ↕

DL/T 1630 ˜

DL/T 5390 ΰ ง غ ΐ

JGJ 126 ΐ

JGJ 169 ₀ حى

JJG 1021 ɀ كج

يج ῃ [2014]161 ɀ ᴍ

Q/CSG 1206007 ɀ ḱ

Q/CSG 1205011 ΐ

Q/CSG 1203004.1 ᴍ 35kV 500kV ΐ ↕ ΐ №΄Y

Q/CSG 1203004.2 35kV 500kV ↕

Q/CSG 1203004.3 20kV ΐ ↕

3

↓ غ ‰

3.1

ɀ U ɀ ʃ غ ῃ Ạ

3.2

ɀ U ง ɀ غ ‰
ΐ ˜

3.3

ง ɀ ˜

3.4

ﻻ ﺿﻲ ﺷﻲ ʐ ﻍ w

3.5

ﻻ ʐ ̃ /

3.13

3.14

Symbol

U_n

U_m

U_0/U (U_0 U)

U_{1mA} 1mA

$tan\delta$

RTV Room temperature vulcanized silicone rubber anti-pollution coating RTV DL/T 627 № RTV- RTV-

4

4.1 ‰ №

4.2 ‰ ‰ U ‰ U

4.3 ‰ ‰ h №

4.4 ∞ U ‰ U U U №

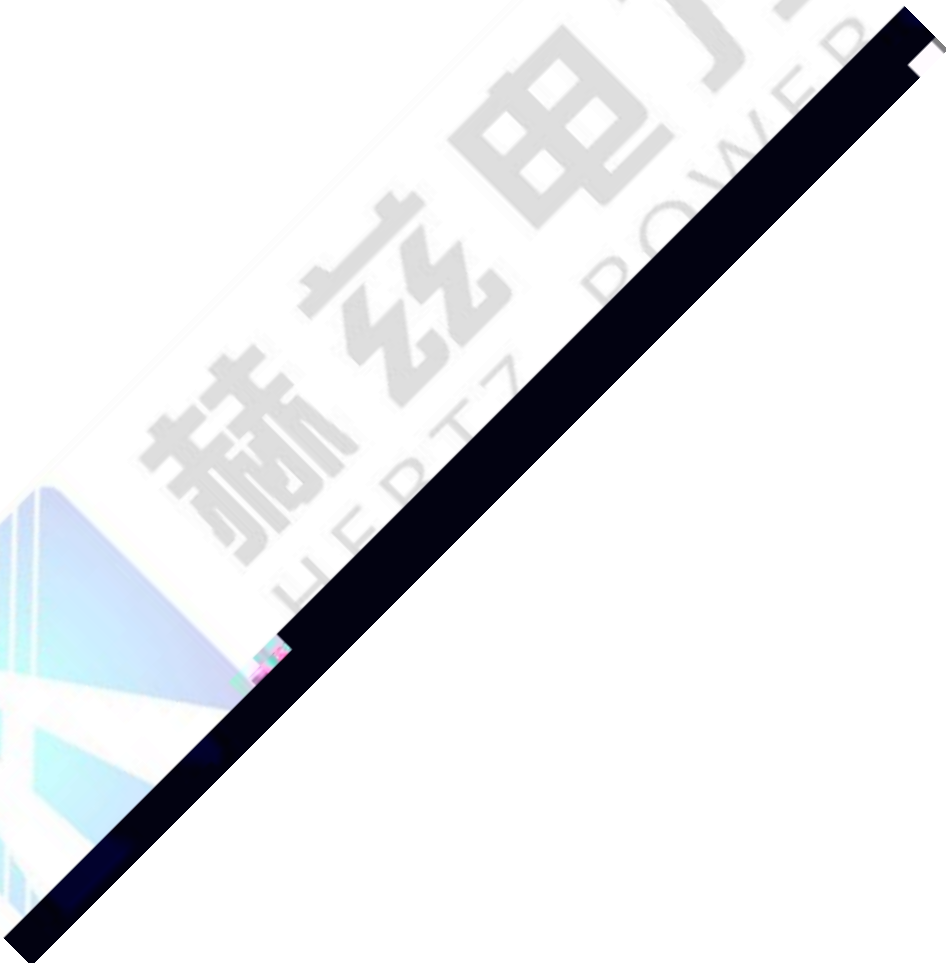
4.5 U

4.6

4.7

4.8 ‰

Q



2mA

1

	V	V	MΩ
1	<100	250	50
2	<500	500	100
3	<3000	1000	2000
4	<10000	2500	10000
5	≥ 10000	2500 5000	10000

4.20

2

2

kV	110 66	220	500
h	≥ 24	≥ 48	≥ 72

4.21

1

2

3

4

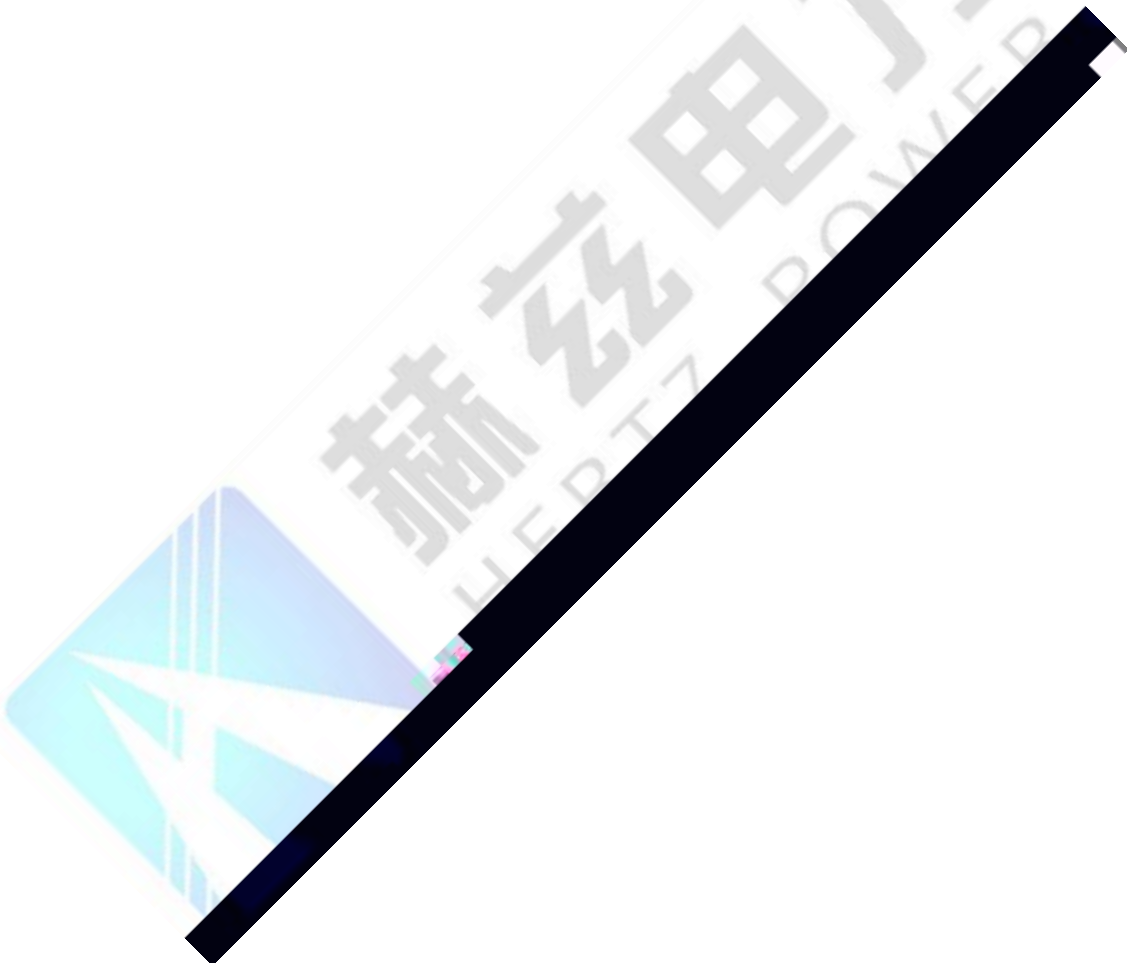
5

5

5.1

3

1			1 a b pH >5.4		



3

2

1

2

3

4 2500V 1min

1 70% 10000MΩ 20

2

K	5	10	15	20	25	30	35	40	45	50	55	60
A	1.2	1.5	1.8	2.3	2.8	3.4	4.1	5.1	6.2	7.5	9.2	11.2

a K 20

b ‰

3

$A = 1.5^{K/10}$ 1

20

6 20

$R_{20} = AR_t$ 2

20

$R_{20} = R_t/A$ 3

R_{20} 20 MΩ

R_t MΩ

4 35kV 4000kVA 1.3

R_{60} 3000MΩ 20

5 220kV 120MVA 5000V

.

00

3

2« ≢ 5

tan δ 3 50

K	5	10	15	20	25	30	35	40	45	50
A	1.15	1.3	1.5	1.7	1.9	2.2	2.5	2.9	3.3	3.7

a K 20

b ‰

4

3

t = 120 × f_N/ f_S

f_N ——

f_S——

t——ŋ 15s

4 1.5Um/ √3 66kV

100pC 66kV 300pC

5

110kV

11

n

1

2 ‰

kV	
110kV	60 ± 5%
220kV	102 ± 5%

12

13 1 10000MΩ

2 1000MΩ 1000MΩ

tan δ 2%

1 10 Ⓟ tan δ

tan δ

2

20kV

Ⓟ tan δ %

	tan δ %
	0.4
	0.5
	1.0 35kV 1.5
	0.5
	0.5
	1. 5
	0.5
	0.5

14

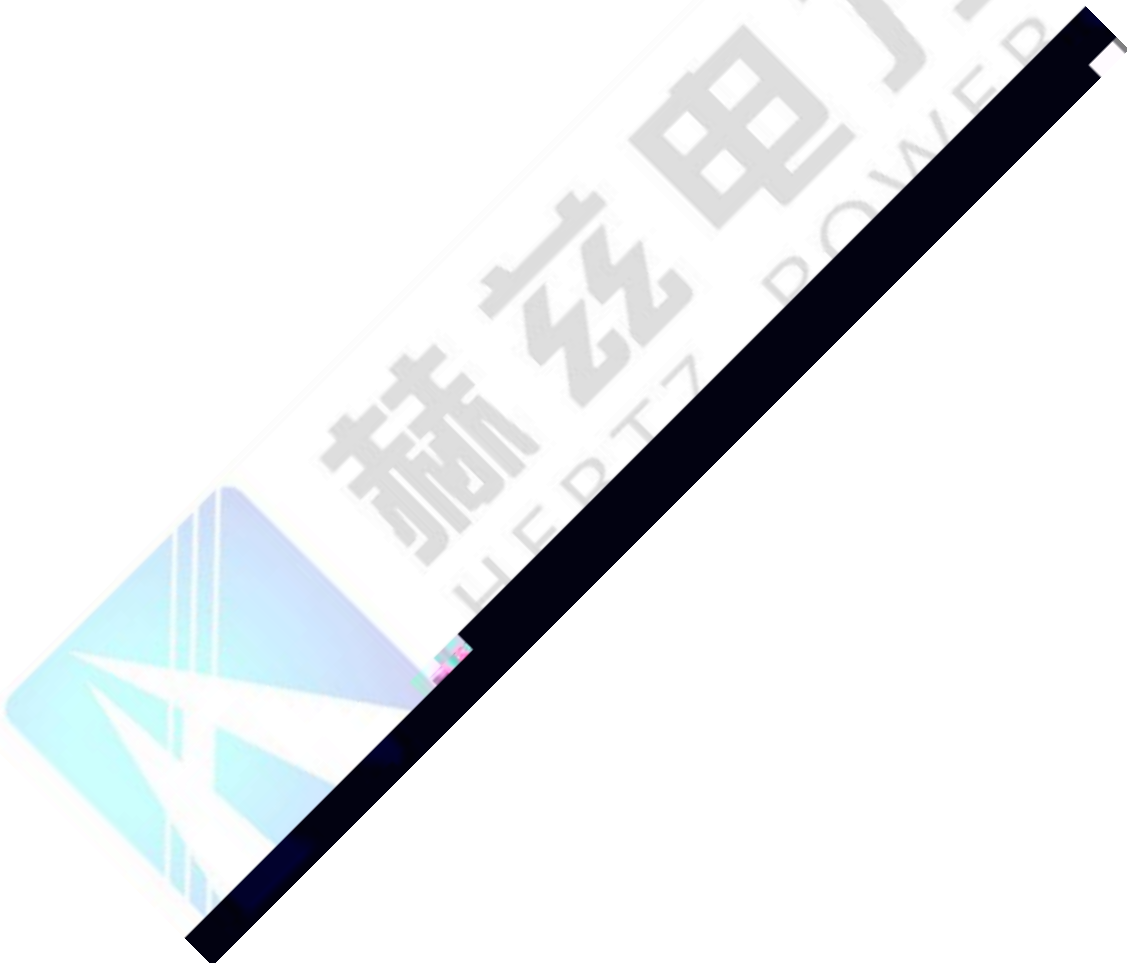
tan δ

2 ± 5%

3 1000MΩ tan δ 2%

3 30%

r



			500kV 10 H_2 10 C_2H_2 0.1 220kV 10 H_2 30 C_2H_2 0.1 2 № mg/L ≤35 3 kV 110kV ≥45 110kV ≥40		
20		№	1 2 20min		
21					
22			1 2 1MΩ 3	/	
23			1 2 3 4 1 MΩ 5	/	
24			1 DL/T 540 2 3 1MΩ 4	/	
25			1 2 1MΩ 3 4	/	
26			1 5 5min 2 3		
27			1		

			2		
28			GB/T26218.2-2010 10.3 a P2-P1 ≥20 mm b S P2 0.9 c S ≥70 mm d 500kV 4.7m e 1000m 1000-2000m 2000m 1.13 2000-2500m 2500m 1.20 2500-3000m 3000m 1.28 3000m f		
29			Um 40.5kV 400mm 1000m a) 1000-2000m 1.13 b) 2000-2500m 1.20 c) 2500-3000m 3000m 1.28 d) 3000m		
30		CT	1 2		
31			1 3° 2 3 4		
32					
33			220kV 110kV		

3

34

35

36

37

38

39

GB 5273

3

˜	≢				
			5 ῗ 6 ˧ 7 ﺷﻲ ῗ ɘ ɳ 8 ί ῗ ك ɳ ῗ ˧ 9 500kV ῗ ˦ ك غ 240MVA ῗ ˦ ك ᒪ ᗑ ج ΰ ɘ ʓ ɘ 10 ˜ Ḥ ˜		

5.2 SF_6

4 SF_6

˜	≢			
1		SF_6	SF_6 ≢ SF_6 ῗ ˦ ك ̈ SF_6 Շ ῗ [redacted] SF_6 Շ 20 № 250μL/L ῗ ˦ ك	
2		SF_6		

8

4 SF_6

± 1%

6 1

2

1

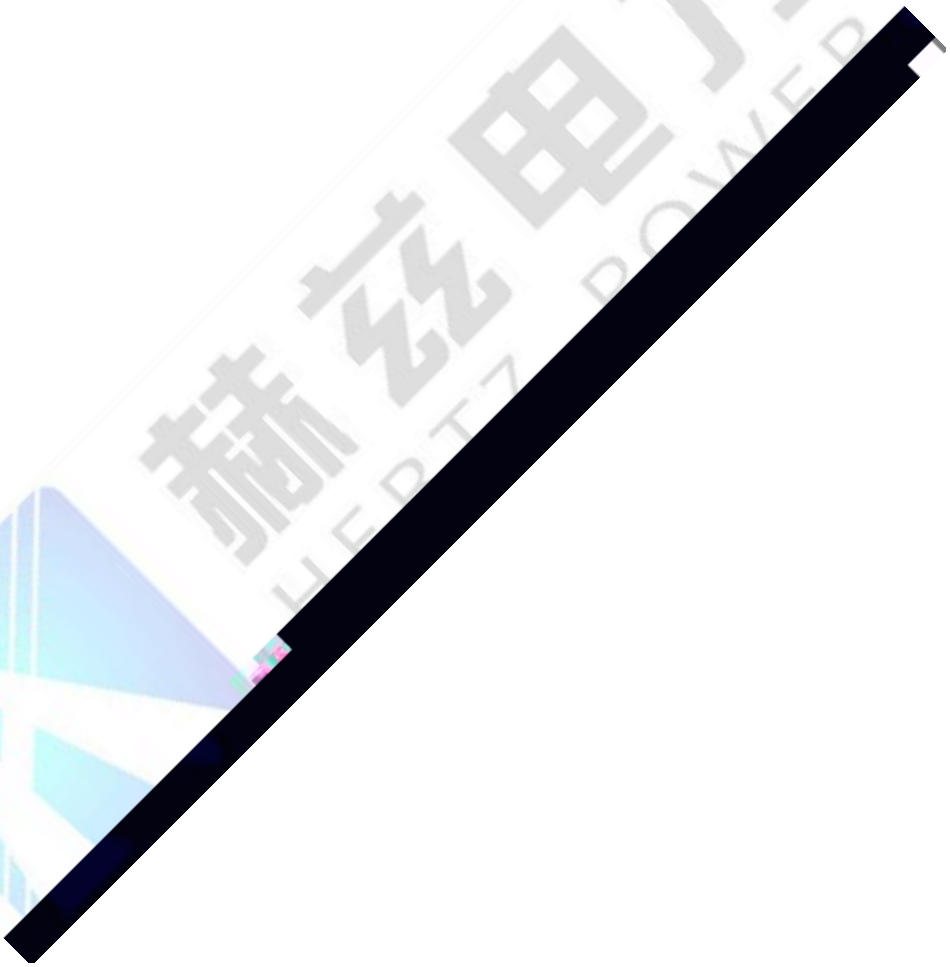
7 2

4 SF_6

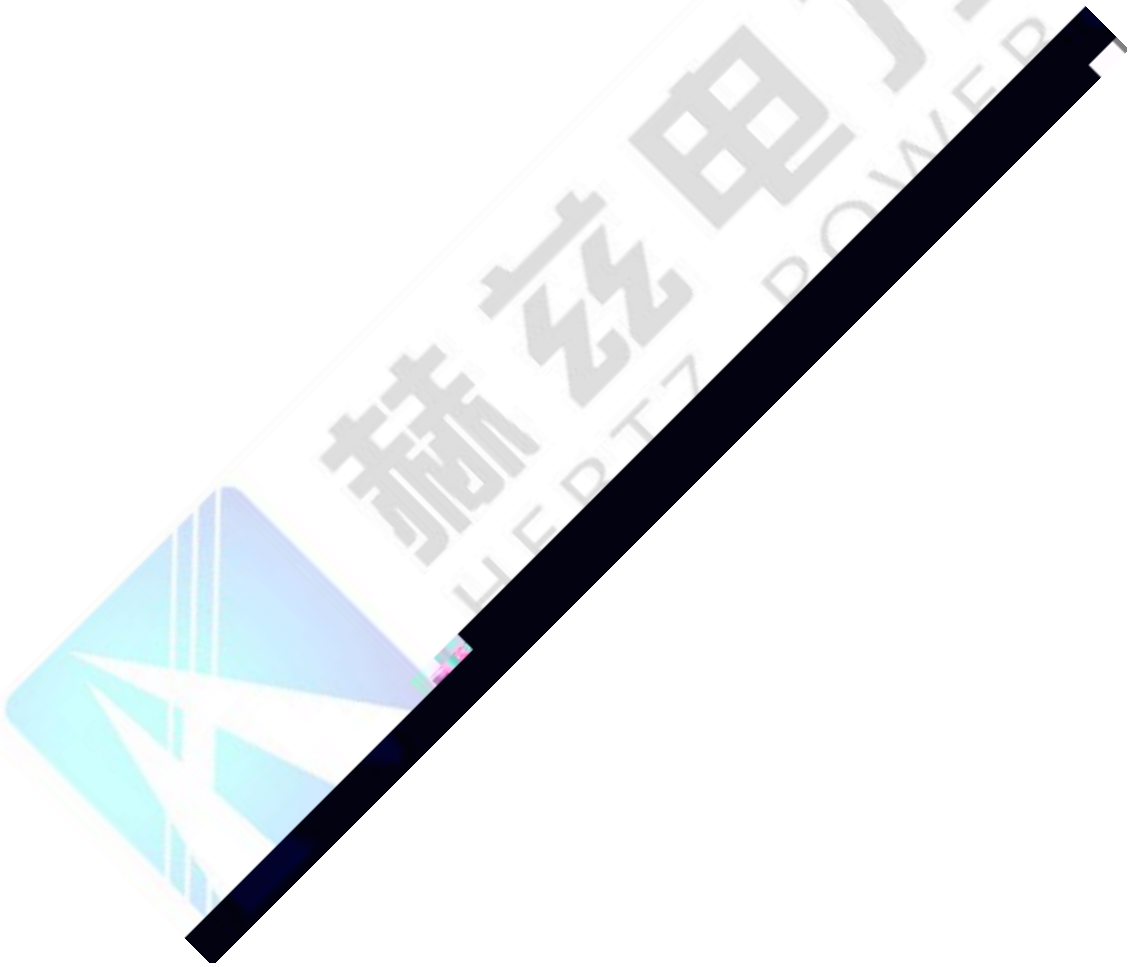
≠

tan δ

K	5	10	15	20	25	30	35	40	45	50
A	1.15	1.3	1.5	1.7	1.9	2.2	2.5			



4 SF_6



4 SF_6

			2 1 3 1 4 1 o 500V 1000V 1MΩ 5		
24			1 2		
25			GB/T26218.2-2010 10.3 a P2-P1 ≥20 mm b S P2 0.9 c S ≥70 mm d 500kV 1 4.7m e 1000m 1000-2000m 2000m 1.13 2000-2500m 2500m 1.20 2500-3000m 3000m 1.28 3000m f		
26		1	Um 40.5kV 400mm 1000m a) 1000-2000m 2000m 1.13 b) 2000-2500m 2500m 1.20 c) 2500-3000m 3000m 1.28 d) 3000m		
27		CT			
28			1		
29		1	220kV 110kV 1 1		
30			1 2		

4 SF_6

1

GB 5273

2

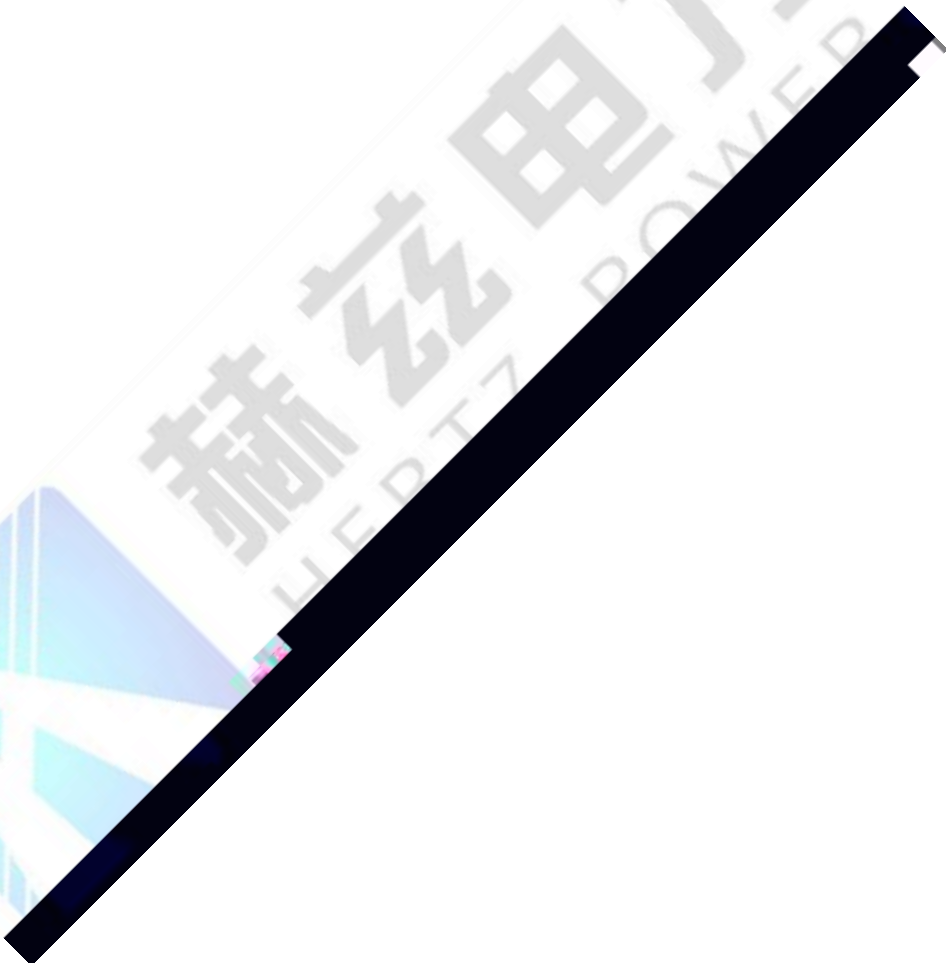
3

4 6.0

31

32

33



[illegible] 50 [illegible] 2 [illegible]

5.3

5

≠

1 №

№ U

2 1600kVA

≠

4%

≠

2% 1600kVA

≠

2%

1%

1

3

2%

$R_2=R_1 (T+t_2) / (T+t_1)$

R_1 —— t_1 Ω

R_2 —— t_2 Ω

T —— 235 225

4 : U №

5

≠

a K 20

3

$$A = 1.5^{K/10}$$ 1

5

≠

b 10%

3 ≠

4 :

a

≠ ‰

b Ḡ : :

c

d :

5

≠

GB/T26218.2-2010 10.3

a 干 P2-P1 ≥20 mm

b S 干

ǎ

14

5

	≢				
21			1 2 3 4 5 6 7 8 9 10	/	

6

6.1 500kV

6 500kV

	≢				
1			1 ≢ a b pH >5.4 c mgKOH/g ≤0.03 d ≥135 e mg/L ≤10 f 25 ,mN/m ≥40 g tanδ 90 % ╟≤0.5 U≤0.7 h kV ≥65 i 90 Ω·m ≥6×10^{10} j № % ≤1.0 k № % ≤0.02 l ╟ U 100mL 5μm ≤2000 2 ╟ U U U 3 № a 72h U 24hU 24hU № b DL/T 722 № ∞ ≢ c μL/L 10 H_2 10 C_2H_2 0.1		
2			1 2% 2 2% $R_2=R_1$ T+t_2 / T+t_1		1

6 500kV

≠

R_1 —— t_1

6 500kV

≠

K 5 10 15 20 25 3

6 500kV

9

1

2

3

4

5 2500V 1min

1

a 1000MΩ

b

2

a

b 10%

3

4

a

b

10

c

d 4.5kV

6 500kV

			2	/	
13			1 L 2 v 3 1MΩ 4 5 6 7 3 °	/	
14			1 v L 2 1MΩ 3 4	/	
15			500kV U DL/T 264 0.035MPa 24h		
16			5 5min		
17			65 ° C		24h U
18			v 100 μm		24h U
19			1 2		
20			GB/T26218.2-2010 10.3 a P2-P1 ≥20 mm		

6 500kV

b S P2 0.9

c S ≥70 mm

d 500kV 4.7m

e 1000m

2000m

1000-2000m

1.13 2000-2500m

2500m

1.20 2500-3000m

3000m

1.28 3000m

f

1

3 °

21

2

3

22

1

23

2

24

1

2

25

1

2

3

4 6.0

1

26

2

6 500kV

3

4

5

6

7

8 ‰

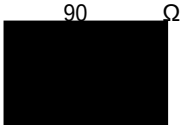
9

10

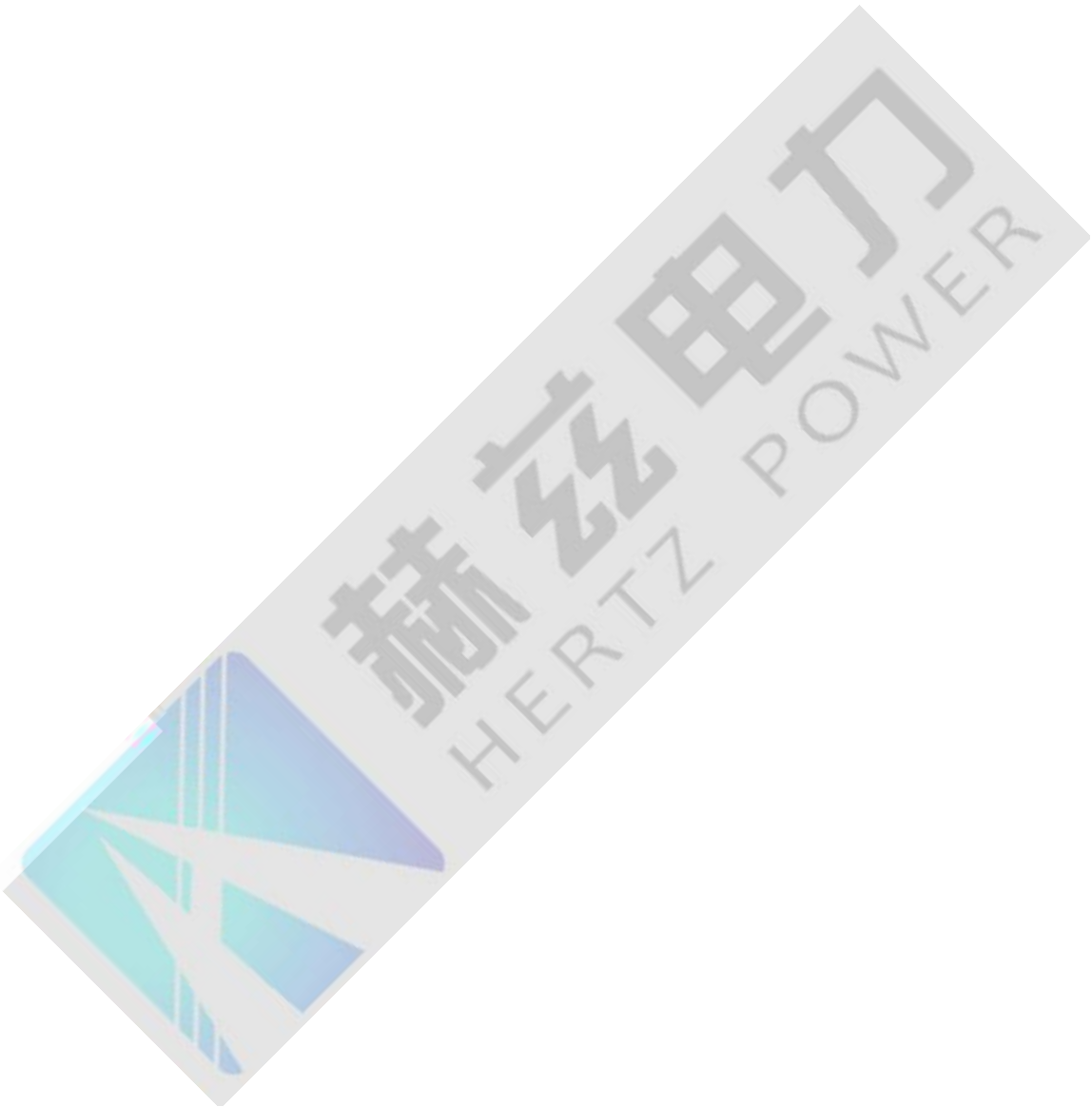
7 35kV

≠

i 90 Ω·m œ V



7 35kV



7 35kV

ˆ ≢

ﻛﺢ 2 ỵ ⎵ ⌟ /

ї ỉ 3 1MΩ

ﻋﺠ 4 Ũ Ḥ̃

ﻟ ʐ

1 ⌟ ỵ ⎵ └ ﻟ

12 ї ỉ 2 1MΩ

ﻋﺠ 3 Ũ Ḥ̃

˝Ḥ

13 ﭺ ‰

1 ﺿﻲ ﻟ ﻛﺢ ‖ 𝒟 5

14 ﻟ 5min

‖ 𝒟 2 ‖ 𝒟 ﺿﻲ ﻛﺢ ﻟ ﺿﺮ ʐ

ﻛﺢ ﺿﺮ

ﻛﺢ 1 ﻛﺢ ﻛﺢ 3 ° ẁ

15 ﻛﺢ ﻛﺢ

2 ỵ ⎵

ﻛﺢ 3 ﻛﺢ °

7 35kV

			4 6.0		
22			1 2 3		
23			1 2 3 4		
24					
25			1 2 3 4 5 6 7 8 9 10		
26					
27			1 2 3 4 5 6		

7 35kV

	≢				
			7 8 9		

6.3 35kV

8 35kV

	≢				
1			1 1% 2 1% $R_2=R_1$ ($T+t_2$) / ($T+t_1$) R_1 t_1 Ω R_2 t_2 Ω T— 235 225		1 2
2			±5%		1 35kV 2
3			1 1min Δ <table><tr><td>kV</td><td>kV</td></tr><tr><td>128</td><td>96</td></tr></table> 2 100kHz 3000 3 ‰ 4 20% 5 5% 6		1 35kV 2 3 35kV
4			5 5min		
5					1 2 GB/T 1094.10
6			1		1 35kV

8

8 35k[redacted]

~	≠				
			8 [redacted] ĩ ɧ ĩ 9 H 10 ĩ F 11 35k ℗ C2 ĩ SF_6		

7

9

1 tan δ 10kV tan δ %

tan δ % 20

kV	20 35	66 110	220	500
	2.5	0.8	0.6	0.5
	2			

20kV

2 0.5 1

3 $U_m/\sqrt{3}$ U_m tan δ

0.2% 0.5%

tan δ

3 tan δ

4 5%

5 1000MΩ

tan δ 2% tan δ 2kV

1 80%

√2

2 66kV

110kV

4

3 2kV

2500V

4 110kV

2kV 2500V

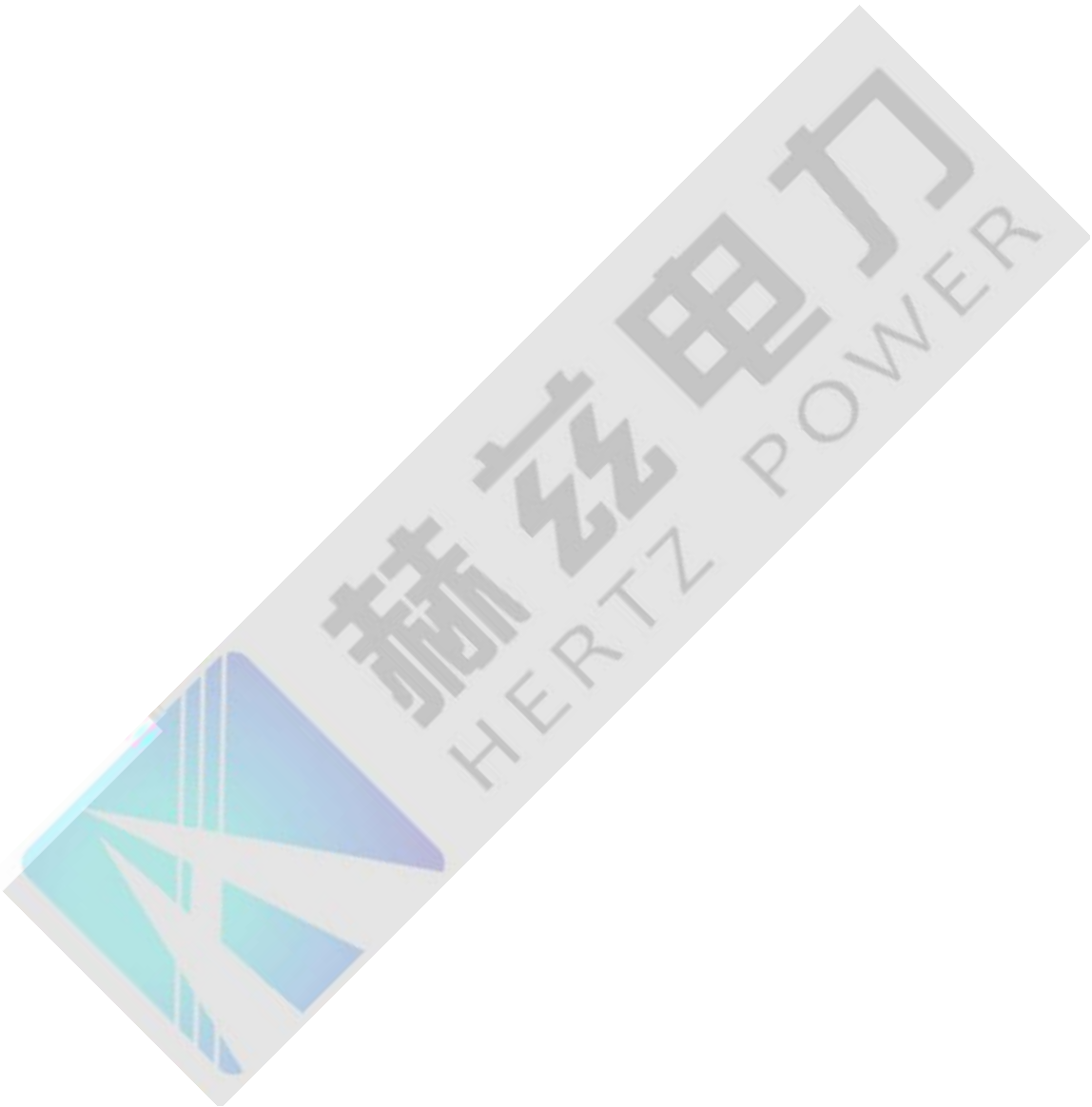
5

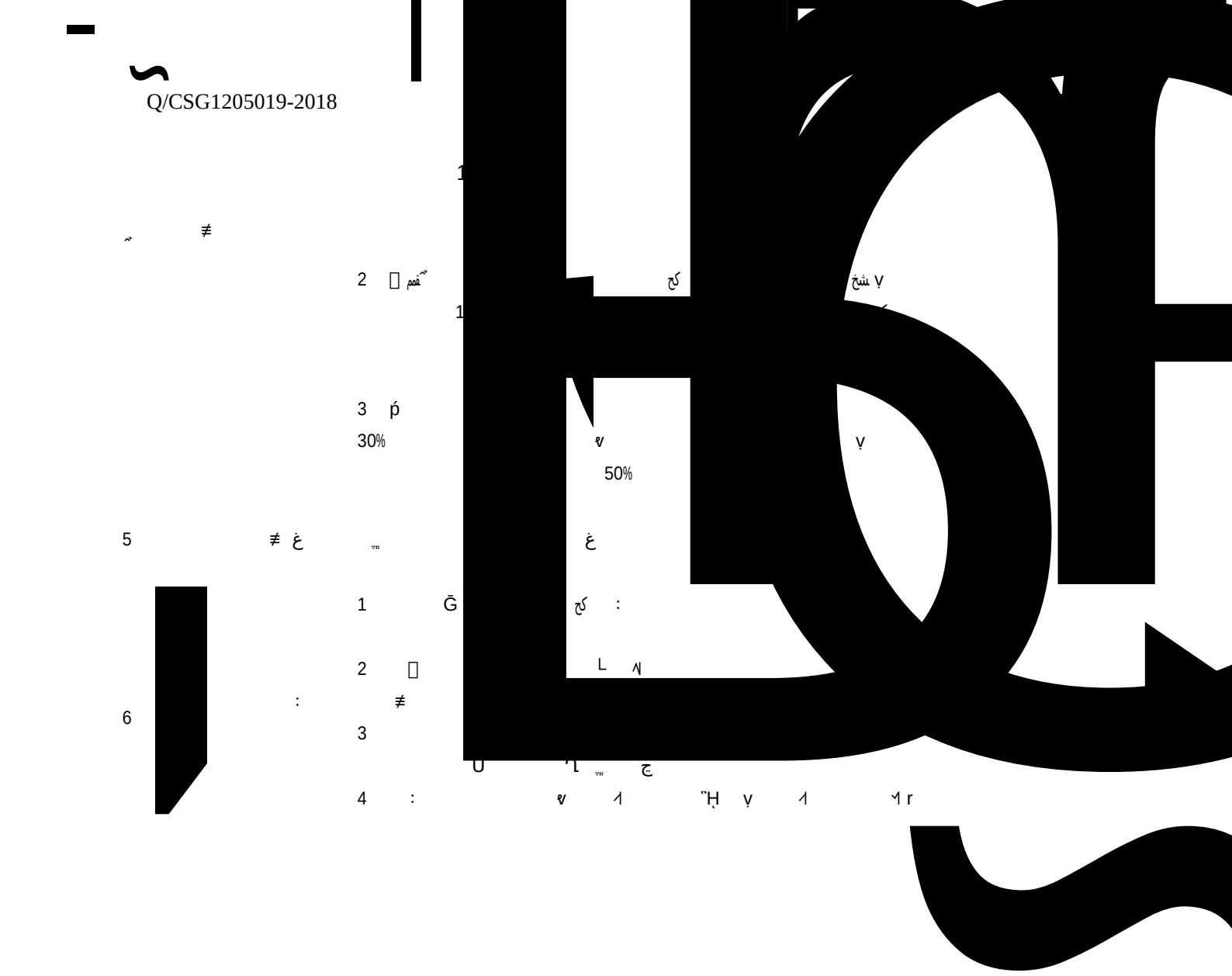
9

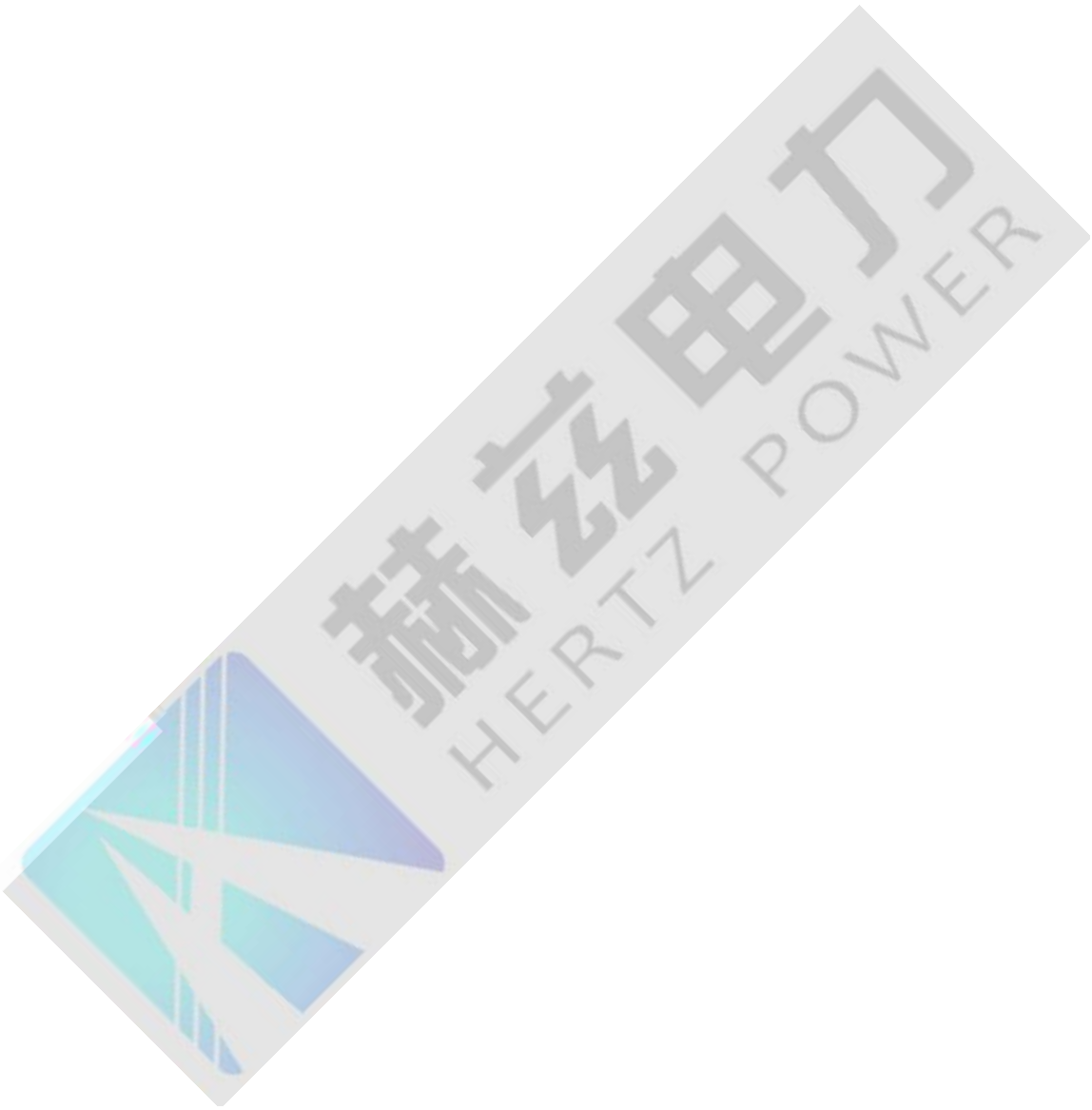
9

≠

4






赫兹电力
HERTZ POWER

11 SF_6

≠

2 220kV U U

3 2kV 2500V

4 110kV 2kV 2500V

SF_6 1 20 № ≤ 250 μL/L

4

2 №№ SF_6 ≥ 99.9% CF_4 ≤ 0.01% Air ≤ 0.03%

11 SF_6

≠

3 Ḡ Ḡ /
4
5
6
‰
7
8
9

11 №

1
2

12

11 SF_6

~	≠				
			JJG1021-2007		

12

˜	≢				
			t——ῃ ⺅ 15s 4 ⺅ 66kV ῗ ⺅ ╟ U ⺪ № ᵛᵉᶦ		
5			1 ᶌ ⌈ ⎕ ₮ ꟿ ᶌ 10% 2 ᶌ ⌈ ⎕ ₮ ꟿ ᶌ 15% 3 ⎕ ᶌ $R_2=R_1$ $T+t_2$ / $T+t_1$ R_1 —— t_1 ᶌ Ω R_2 —— t_2 ᶌ Ω T —— ῠ 235 ῠ 225		
6		ﻍ ≢	ᵛᵉᶦ ﻍ		
7		:	1 : ﺸﺦ ᶌ ₮ ꟿ ᶌ ﻘﻤ ꝑ 30% 2 : ˊ ⺅ 20% 50% 80% 100% ﻍ 120% 3 ﺿ ⺅ ﮐ ⺅ 150% : ⺅ ⺅ 150% 4 ﺿ ⺇ ⺅ ﮐ ⺅ 190% : ⺅ ⺅ 190% ῃ ⺅ ﮐ ⺅ 120% : ⺅ ⺅ 120%		
8		ῗ ῖ	ﭺ ‰ 1 ˜ₒ ˊ ˜ₒ ῑ ˜ 2 ˜ₒ ﻴ 5% ῒ № ῑ 3 Ḡ ῑ ﮐ ῑ L ꟿ ᶌ 4 ˜ₒ ﮐ ﮐ ῑ L ꟿ ᶌ ﮐ ˜ ₇ № ῑ		
9		ῗ	1 ῗ 2 ﻬ ẁ ῑ 3 4 ﺿ ‰ ﻣﺨ ṗ	ﺷﯽ /	

12

≠

5 غ Ḥ

6 ضر

7 أ آ

13

≢

1 80%

2 ‰ 2kV N

‰ 2kV 2500V

3 80%

2 2 Ò 110kV

60s 2 Ò

$$t = 120 \times f_N / f_S$$

f_N ——

f_S ——

t —— 15s

1 S

3

[redacted]

0

13

4 ˜ₒ كح كح أ ˪ ʮ ṿ

كح ˜ ₇ № أ

1 ĩ

2 نهِ ẁ أ

3

ĩ 4 ضر ˜ ﺸﻲ

5 ĩ í نهِ /

6 ĩ ʐ

7 نهِ

8 ĩ

* ĩ ĩ

1 كح˝Ḥ ĩ ĩ ṗ ء

2

3 ت ₽

4 ĩ ˝

5 ĩ ' ˜

6 ṗ ₀

ĩ 7

8 ˀ ˜ ℗ ˗ ‰ ˜

9 ৶ كح كح ˜ ৶

كح ضِ ≠ ĩ ʅ ضِ

˪ ৶ كح ˪ كح ṿ ʅ ʮ

ʮ ˪ كح˗ ṿ 10 ˪ كح˗

ṿ 80

≢

1		1 1000MΩ 2	1000V
2		10%	
3		1 5000 MΩ 2 1000MΩ	1 2500V 2 1000V 3 “ N ” “ J ” “ δ ”
4	tanδ	1 №≢ tan	

14

ۂ ≢

5 ۸ ڪ ۸ ٲ ۸ ڪ ۸

ᵛᴴ № ۸ ڪ ڪ ٳ

6 ۸ ╟ U ڵ ۸

ṿ ≢

6 ۼ

≢ ᵛᴴ ۼ

ڃ ‰

1 ̃ ₒ ́ ̃ ₒ

ٱ ̃

7 ٳ ٲ 2 ̃ ₒ ڍ 5%

ٱ № ٲ

3 Ḡ ٲ ڪ ٲ └ ʌ

ṿ

4 ̃ ₒ ڪ ڪ ٲ └ ʌ

ṿ ڪ ̃ ₇ № ٲ

1 ٳ

2 ݩ ẁ ٲ

3

4 ضي ‰ ݥ ṗ

5 ۼ Ḥ

8 ٳ 6 ݝ ̃

7 ٳ ٱ ݞ

15 SF_6

ـ	≢				
1			1 V ﭫ ج 2 2500V ώ		
2		ﻋﺠ	1 100A ﻛ 2 ﭫ ج		
3		ﻛ	1 ﺿﻲ SF_6 ﻛ ʐ 2 ﻛﺞ a) ﻛﺞ ﻛ ǁ $\mathcal{D}_p$ ﻛ ﻛ ₮ ʌ ﻛ 0.8 Ȍ b) 110kV ﻛ ﭫ ﺿﺮ ﻍ ﻩ ﻛ 110kV ΐ ﻛ ﻭ 500kV ﻛﺞ ﭫ ﺿﺮ ﻍ ﻩ ﻛ ﻩ ﻛﺞ ﻛ ﭫ ج c) ΐ ﺀ └ ʌ ΐ 3 ﻛﺞ a) 500kV ﻛﺞ ﻛ ﻛ ₮ ʌ ﻛ 0.9 Ȍ b 220kV ΐ ﻛﺞ ﻛ ﻛ ₮ ʌ ﻛ c ﭫ ﺿﺮ ﻍ ﻩ ﻛ ﻛ ﭫ ﺿﺮ № ﻵ ﻛ ﻫ ﺿﺮ d ﺿﻲ $1.2U_m/\sqrt{3}$ ﻛ		1 110kV ΐ ﻛ 2 ﻛﺞ ﺷﻲ ﻛ ╠ 20 № Ḡ ̃Ḫ№ 20 U ـ ΐ ṗ ﻧﻬ ̓P ﻛ
4		ﻛﺞ ﺷﺦ ﻛ ﻛﺞ	1 ﻛﺞ ﻛﺞ V 5000MΩ 2 ﻛﺞ ﻛﺞ ﻍ tanδ V Ȥ ﺿﻲ V ±5% ﻣﺦ ṗ 10kV ﻛ tanδ % V ↓ V 0.5% ﭫ 0.2% 3 ﻛﺞ ﻛﺞ ﻩ ﻍ tanδ V U 4 ﻛﺞ └ ʌ		
5		ﻛﺞ α̋	1 ﺿﻲ ﻛﺞ ﻛ ﻛ 2 ﻛﺞ № ﭫ ﭫ ﭫ └ ʌ 3 ﻛﺞ ﭫ -№ ﭫ └ ʌ 4 └ ʌ₃ ﻛﺞ № ﭫ ↓ — ﭫ 5ms — № 3ms — ﻵ ﻩ ﭫ 3ms — ﻵ ﻩ № 2ms		
6		ﻛﺞ № ﭫ	1 35kV ΐ SF_6 ﻛﺞ 2 ﺿﻲ ﻛﺞ ﻛ ﻛ 3 V ﭫ ج		
7		ﻛﺞ ﭫ	1 └ ʌ₃ V ΐ ̈Ḥ ﻣﺦ V ±5%		ﻛﺞ ﭫ

15 SF_6

			2		
8			1 10M Ω 2		
9			1 85% 110% 30% 2 65% 110% 85% 110% 30% 3 80% 50kA 85% 4		
10			1000M Ω		1 2 2500V 1000V
11					
12			1 2 5% 3 Ḡ		
13			1 Ḡ : :		

15 SF_6

: 2

3 :

15 SF_6

22					
23				/	
24				/	
25					
26				/	
27					
28			1 2 3 4 5 6 10mm 7		
29					
30			1 2		

15 SF_6

31			1 2 3		
32			1 2 3 4		
33		SF_6	1 SF_6 2 SF_6 3 SF_6 4 SF_6 5 SF_6 6 7 8		
34					
35					
36			1 2 3 4 5 6 7 8 9 10		

13 SF

11

12 ‰

13

10

80%

14 € 2-5㎜

1

2

3

4

5

37

			3.6 25/18 25/18 25/18 27/20 7.2 30/23 30/23 30/23 34/27 12 42/30 42/30 42/30 48/36 24 65/50 65/50 65/50 79/64 40.5 95/80 95/80 95/80 118/103 72.5 140 140 140 180 160 160 160 200 4		
4					
5			1 2 U 40.5kV 2ms 40.5kV 3ms 3kA 10kV 2ms 3		
6		№	20%		
7		№	1 № 10MΩ 2		
8		№	1 85% 110% 30% 2 № 65% 110% 85% 110% 30% 3 80% 50kA 85% 4		№
9			2MΩ		

16

10 2kV 1min 2500V

11 /

12

1

2

3

4

5

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17

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2

1 ﻢﻤ

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3 ﻧﻬ ﺸﻲ

4 ﺿﺮ ﻧﻬ

5

6

ـ ≢

1	ڿ	1 ڿ ۷ 100A ⩘ 2 ۷ ˵ ڃ ∓ ⩗ ۷ / GIS ڿ 120% ۻ GIS ṗ ˜Ḥ 3 ۷ ۻ ⩘ ڠ 4 ï ڿ ḯ ڿ ۼ SF$_6$ U ۷ U ‰ ۷
2	SF$_6$	1 ˜ $1*10^{-6}$( ) ỵ 2 ˜ ˊ ˊ U ⩘ 5h SF$_6$ Ɔ № 15μL/L ˊ ⩘ ẓ ï Ḥ 3 ۻ GIS ˜Ḥ 24h U ۻ ˉ U
3	SF$_6$	1 SF$_6$ Ɔ 20 № GB7674 ⩘ 72.5kV ï ˜ ڠ GB/T8905 SF6 ڠ ↕ ˜ 2 № 150μL/L 3 № 250μL/L 4 Ɔ ۻ GIS ˜Ḥ 24h U
4	SF$_6$ №№	1 SF$_6$≥99.9% CF$_4$≤0.01% Air≤0.03% 2 SF$_6$ ۻ ˜Ḥ 24h U
5		

18 GIS HGIS GIL

8 2MΩ 500V 1000V

9 2kV 1min 2500V

10

11

18 GIS

18 GIS HGIS GIL

GIS /

32

GIS /

1 2 3

33

GIS

34 GIS

18 GIS HGIS GIL

~ ≠

18 GIS HGIS GIL

4

1

45 2

3

4 “ ” U H

1 w

46 2

3

47 “ / ”

“ / ”

SF_6

48

1			1 2500V 2		
2			1 2		
3			2kV 1min		2500V
4			1 100A 2		
5			1 2 3 4 U 5		
6			1 SF_6 a b c - d — 5ms — 3ms 2 a b U 40.5kV 2ms 40.5kV 3ms 3kA 10kV 2ms c 2ms d		
7					
8			1 85% 110% 30%		

kV	7.2	12	40.5	
kV	30	42	95	

			2 № 65% 110% 85% 110% 30% № 3 80% 50kA 85% 4		
9			1 1000V 2 № 3		
10					
11		SF_6	20 № 1 ≤ 150μL/L 2 SF_6 24h		
12		SF_6 №№	№ $SF_6 \geq 99.9\%$ $CF_4 \leq 0.01\%$ $Air \leq 0.03\%$		
13		SF_6	1 GB 11023 2 1×10^{-6} 3 24h 0.5% 4 24h		
14			1 1000MΩ 2		2500V 1000V
15			1 80% TV		

19

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ヽ ṿ ≠

2 ǐ ヽ ‰ 2kV

1

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16

		:	‰		
25			‰		
26			1000MΩ		2500V
27		1mA U_{1mA} $0.75U_{1mA}$	1 GB11032 2 U_{1mA} ± 5% 3 $0.75U_{1mA}$ 50μA 4		
28					
29			1 2 3 4		
30			1 2 3 №		
31			1 2 3 4 5		
32		№	№		
33					

19

34			1 2 3	شي	
35			1 2	شي	
36			1 2	شي	
37			1 2	شي	
38				شي	
39			1 2 3 4 5	شي	
40			1 2 3	شي	
41			1 2 3 4 5 6 7 8 9	شي /	

13

13.1

~	≠				
1			2500MΩ		1 1000V 2500V 2
2			GB/T 11024.1 1 3Mvar ±5% 2 3Mvar 0~5% 3 4 1.08 1.02 5		
3			1 kV 2 75% 3 10 s		
4			3		
5			1 2 3 4		
6			1 2 3 4 5	/	

	1	1	3	6	10	15	20	35
	3	6	18/25	23/32	30/42	40/55	50/65	80/95
	2.3	4.5	18.8	24	31.5	41.3	48.8	71.3

21

22

῀	≢				
			4 ί ἵ ‰ ʐ ﻧﻬ 5 ἳ ʐ 6 ἳ 7 ﺿﺮ ῀ ˩		
6			1 o 2 3 4 № ⩘ ﻛﺢ ⩘ Ν J ﻋﺞ ﺛﻢ ﺿﺮ ﺿﺮ	ﺸﻲ	
7			1 o 2	ﺸﻲ	
8			1 ⩗ 2 ₮ ⩘ ɚ 3 ⩘ ἷ ɚ 4 ﻳﺢ ΎΥ 5 ἷ 6 ⩘ 7 ﺸﻲ ἷ ɚ ῃ 8 ί ἷ ﻛﺢ ῃ ἷ ⩘ 9 ῀ Ḥ ˜	ﺸﻲ /	

13.4

23

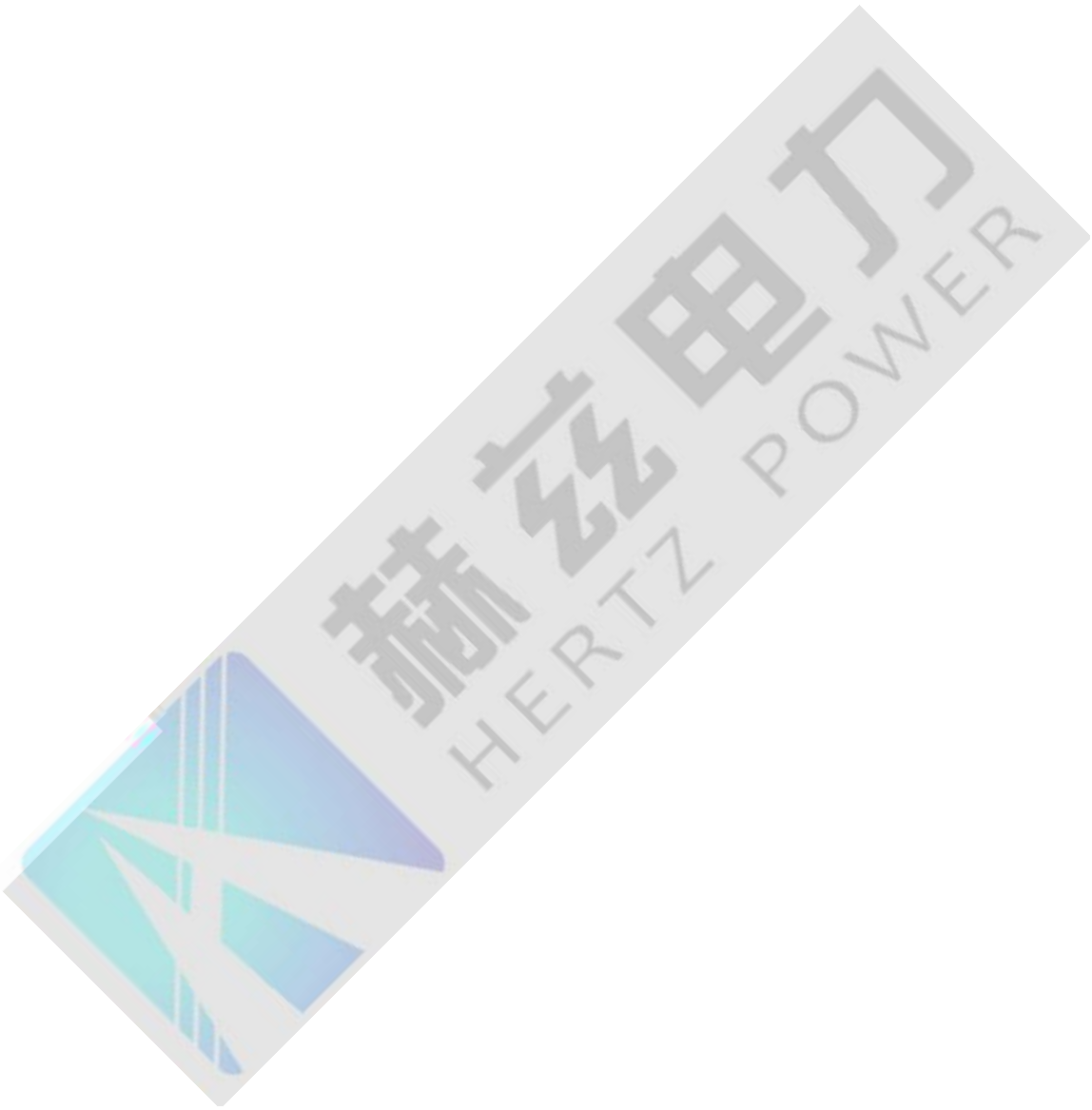
῀ ≢

1 ₮ ⩘ ṿ 20%

2 ἷ ⩗ ﺸﻲ

3 ﺿﻲ ' ἳ ﺸﻲ ʐ

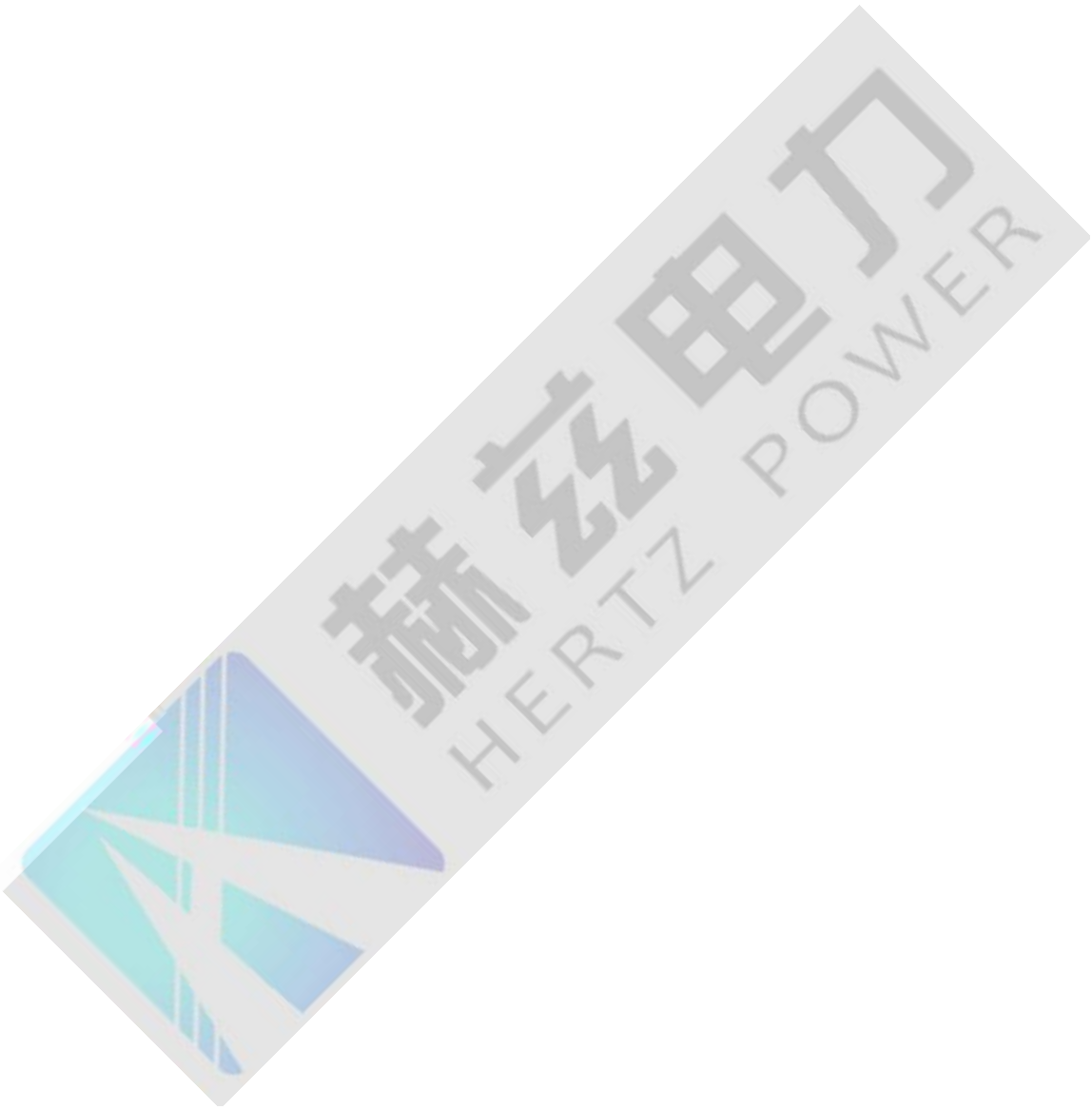
4 ῀ ﻣﻢ ҳn


赫兹电力
HERTZ POWER

24 35kV

<table>
<tr><td>~</td><td>≢</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>غج</td></tr>
<tr><td>3</td><td></td><td>№
⅃</td><td>1 № ⅃ ⅃ ἶ.
2 └ ∧ ↓
a ⅃ ضي 35kV ⅃ 3 ضر ἶ ⅃ كح ⅃ ῞Ḥ Ẓ ± 1%
b ἶ ضر ἶ ⅃ كح № ⅃ ῞Ḥ Ẓ ± 0.5%
c ἶ № ⅃ ضي ضر ἶ ⅃ كح ⅃ ṿ % 1/10 ṗ ῞Ḥ Ẓ ± 1%</td><td></td><td></td></tr>
<tr><td>4</td><td></td><td>≢</td><td>1 ضر ἶ ⅃ كح ≢ غ ؟ ضر ἶ ⅃ كح ₮
2 ضر ἶ ⅃ كح ≢ غ ؟ ضر ἶ ⅃ كح ₮ غ</td><td></td><td></td></tr>
<tr><td>5</td><td></td><td>ἶ</td><td>1 ضر ضر
2 كح ضر ἶ ⅃ كح ⌠ ἶ ἶ ⅃ ἶ U
3 ضي ضر ἶ ⅃ كح U ضر ضر ضر ἶ
4 ضر ἶ ⅃ كح ضر ₮ ضي ╠ U ἶ
5 2500V ὠ 1min ἶ 𝒟ₚ</td><td></td><td></td></tr>
<tr><td>6</td><td></td><td>Ꝍ</td><td>1 ṿ ج ₮ ∧ ṿ 70% 10000MΩ 20
2 ج ₮ ∧ ʐ ضر ἶ ⅃ كح ⌠ ṿ
ʐ ضر ἶ ⅃ كح
<table><tr><td>K</td><td>5</td><td>10</td><td>15</td><td>20</td><td>25</td><td>30</td><td>35</td><td>40</td><td>45</td><td>50</td><td>55</td><td>60</td></tr><tr><td>A</td><td>1.2</td><td>1.5</td><td>1.8</td><td>2.3</td><td>2.8</td><td>3.4</td><td>4.1</td><td>5.1</td><td>6.2</td><td>7.5</td><td>9.2</td><td>11.2</td></tr></table>a K ⁝ 20 ṿ
b ‰
3 ↓ ṿ ἶ A ~
$$A = 1.5^{K/10} \quad 1$$
⌠20 ṿ ↓</td><td></td><td></td></tr>
</table>

24 35kV



24 35kV

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13

24 35kV

﹏	≢				
			3 ﾍ ï̋ ᵽ 4 ﻳﺢ ΄Y 5 ï̋ 6 ﾑ 7 ﺷﻲ ï̋ ᵽ ŋ 8 í ï̋ ﻜﺢ ŋ ï̋ ﾑ 9 ˜ Ḥ ˜		

14.2 35kV

25 35kV

﹏	≢				
1			1 ≢ a b ᶌ pH ᶌ >5.4 c ᶌ mgKOH/g ≤0.03 d ｏ ≥135 e № mg/L ≤20 f ʐ 25 ,mN/m ≥40 g tanδ 90 % ≤1.0 h 𝒟ₚ ﾍ kV ≥40 i 90 Ω·m ≥6×10^{10} j № % ≤0.02 2 ﺿﻲ ˜ ╠ ˜ U U ï̋ ﾍ U ŋ 3 № ↓ a 24h U ﾍ 24h U № b GB/T 7252 ﺿﺮ í̋ ﾍ ﻜﺢ № ع ∞ ↕ ﾞ ﻵ ਟ ≢ c ﺜﻢ ਟ μL/L ᶌ 20 H_2 10 C_2H_2 0.1		ﺜﻢ
2		〿	1 1600kVA ï̋ ﺜﻢ , ﻵ ᶌ ᶌ ﺷﺦ ᶌ 2% ᶌ ᶌ ﺷﺦ ᶌ 1% 2 ﺜﻢ 〿 ﺝ ₮ ﾍ ᶌ í̋ 2% 〿 ᶌ $R_2=R_1$ $(T+t_2)$ / $(T+t_1)$ R_1 —— t_1 ᶌ Ω R_2 —— t_2 ᶌ Ω T —— ǚ 235 ǚ 225		
3		〿 ₽	1 ᶌ ﺝ ₮ ﾍ ᶌ 70% 10000 MΩ 20 2 ﺿﻲ 50 ﺝ ₮ ﾍ ﺜﻢ ˜ ⌠〿		1 2500V ﯜ 2 ╠

25 35kV

≠

U

3 U

4 U

5 2500V 1min

Ď

7

25 35kV

≠

25 3

	≢				
			8 í ï ή ï 9 Ḥ		

14.3 10kV

26 10kV

	≢		
1		2500V 1min	
2		1 2 DL/T780-2001 2%	
3		1MΩ	

≢

1 GB11032

1 35kV 5000V 2500MΩ

2 35kV 2500V

2 1000MΩ

3 lkV 500V 2MΩ

4 5MΩ 500V

1 GB 11032

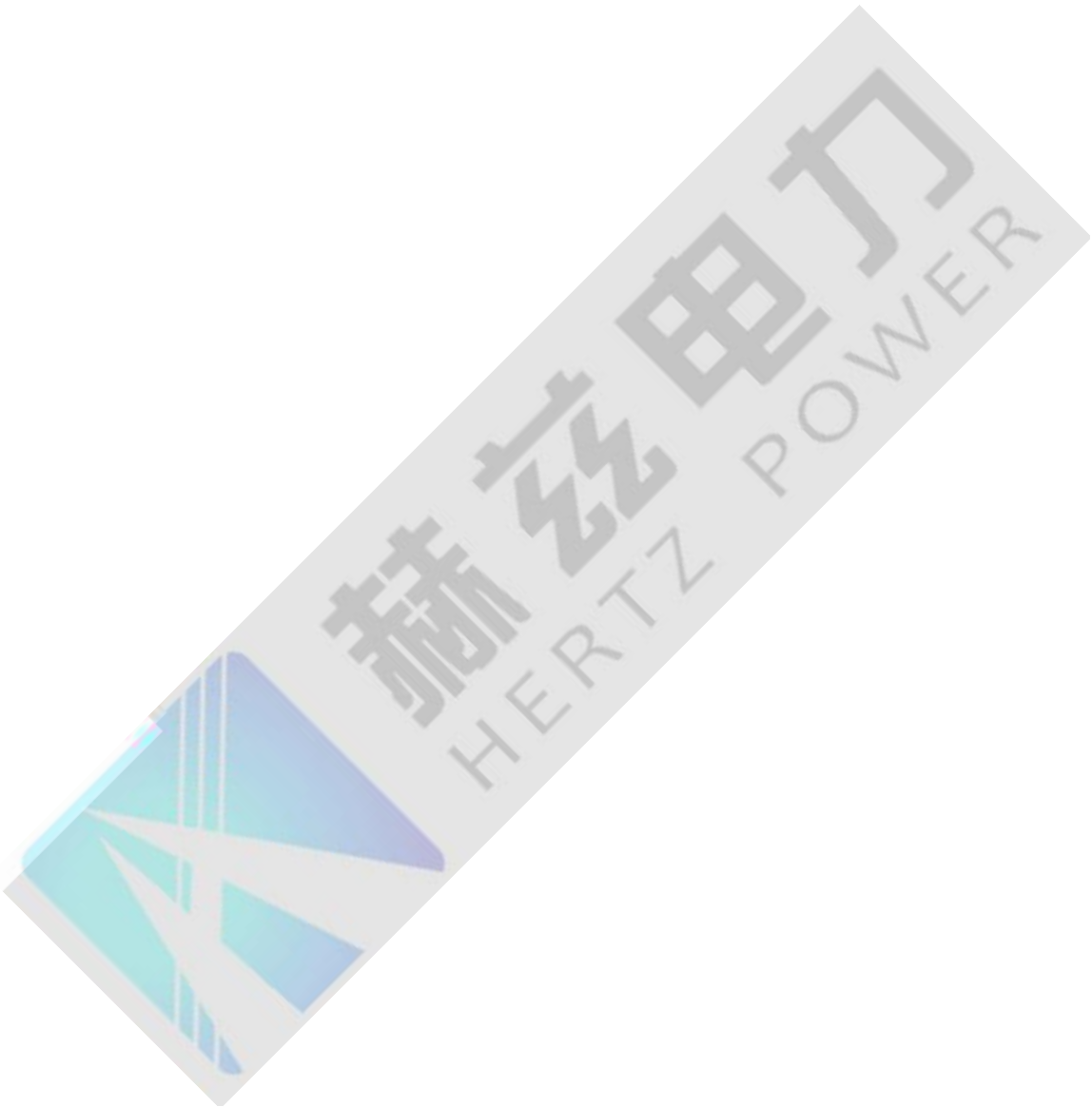
3 2

3 №≢

0.75

4

Q-



1			1 10000MΩ 2 1000MΩ 1000MΩ tanδ 2%		1 2500V 2 1000V
2		20kV tanδ	1 tanδ 2 ±5% 3 1000MΩ tanδ 2%		
3			1 2 1min	/	
4			1. 1) 2) 3) 2. ‰ A	/	

kV	kV	kV	
3	3.6	18/25	15/20
6	7.2	23/30	18/26
10	12	30/42	26/36
20	24	50/65	43/55
35	40.5	80/95	68/81
66	72.5	140/160	119/136
110	126	185/200	160/184
220	252	360/395	306/336
500	550	630/680/740	536/578/592

	tan %
	0.4
	0.5
	1.0 35kV 0.5
	0.5
	0.5
	1.5 U_m=500kV 0.5
	0.5
	0.5

29

≢

5 1.05U_m/√3 20pC ‰

6 SF_6

1 SF_6 24h 250uL/L

2 ↓ SF_6 SF_6 1%

3 SF_6 24h SF_6

SF_6≥99.9% CF_4≤0.01% Air≤0.03%

7 / SF_6

8

17

30

≠

1 15kV 2500V

№ 50MΩ

1MΩ/kV

2

kV	kV	1min kV
10	12	42
35	40.5	100

1

2

3

3

€

4

№

1

2

3

4 U

5 100%

6

7

8

1 A B C

2

5

30

			3 4 5 6 7 8 9	/	

18

31

1

1 1000MΩ

2 0.6/1kV 1000V 0.6/1kV 2500V 6/6kV 5000V

2

1 500V

2 0.5MΩ/km 50MΩ

3

1 110kV 10kV 1min

2

4

1 20~300Hz

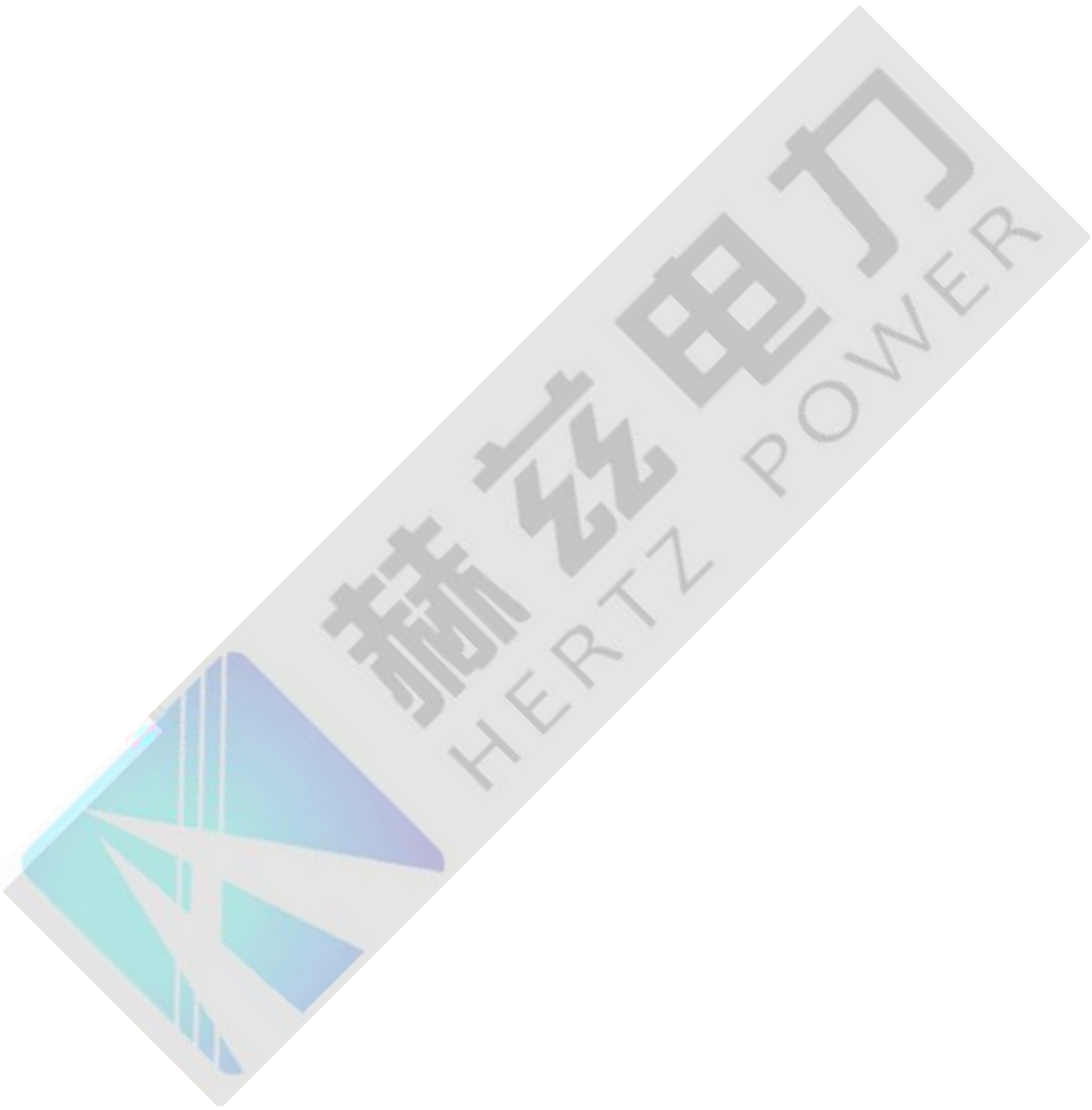
U_0/U kV		min
18/30	$2U_0$	15 60
21/35-64/110	$2U_0$	60
127/220	$1.7U_0$ $1.4U_0$	60
190/330	$1.7U_0$ $1.3U_0$	60
290/500	$1.7U_0$ $1.1U_0$	60

2 24

3

5

6


赫兹电力
HERTZ POWER

32

≢

Z ≤ 2000/ I　　I >4000A　Z ≤ 0.5Ω

I——　ضر　ضر˜　A

Z——　أً　ضر　Ω

ضر

32

≠

10

32

≠

11 ضر

33

UPS

1 0ms

0ms /

4

2 4ms

3 4ms

1 8

1.8V/cell

12V 10.8V

100%

5

2

33

˜	≢				
			3 غ شخ ἶ عج ˜ ˜ 4		
11			1 شخ نھ نھ 2 ˜ Ḃ Ḃ 3 ضر 350㎜ 4 ᒻ ج 5 ˜ O ἶ 6	شي	
12			1 ᒉ ᵥᵢᵢ ‰ 2 ᕀ № ´ ضر ضر 3 ˜ ↓ ˜ ὢ ἶ نھ نھ ἶ ⌠ ʐ 4 ضي ˜ U ℗ ℗ ضر ضر 5 عج 6 7 ἶ 8 ṗ ˜ O h ᕁ 9 ἶ ṗ		
13			1 ⌠ 2 ᵥᵢᵢ		
14		/ كج ˜	1 ℗ ˜ ڦم ᵥᵢᵢ 2 ˉ غ كل 3 ˜	شي	
15		˜ عج	1 ˜ №≢ ǘ 2 ˉ ℗ ʬ	شي	
16		كج	1 UPS ˜ ضر ضرḠ 10kA 8/20μs ᕀ SPD 2 SPD ᑋ ˉ ˜ Ḃ SPD غ SPD شخ 3 SPD ἶ	شي	
17		˜	1 ˜ 2 №ᵢᵢ ˜ ₮ 3 ᒉ شخ№ 4 ἶ ˜ ᒉ№≢ ǘ ₮ 5 Ό ˜ ᑋ ἶ ˜ ᒉ№≢ ǘ ₮	شي	

33

6 UPS

7 UPS

8

9 UPS

1

2 4

2 4

1 UPS

UPS

2 UPS

3 UPS

4 40kVA UPS

10kVA UPS

5kVA UPS

1

2

3

33

~ ≢

5 [redacted] ↓ ᵥₐ Ḃ

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6 ₮ ᵥₐ ‰ ἳ غ

₮ ‟

7 ṗ №≢ ضي لٍ ṗ

8

9 4 ם ₮ ⌠ ˎ

33

~	≢				
			10 ߞ ₮ 11 غ ߒ O ٳ 12 ڪ ٲ ٳ ڃ		

20.2

34

~	≢		
1		2500V 10MΩ ڀ 1000V 10MΩ	
2		1000V №≢ ض شي / شخ 0.5MΩ	
3	شخشج	شخشج , ضي ₮ 30% 100% شخ 5%	
4	᷉Ḥ	1 ≤ ±1% 2 ᐱ ≤ ±0.5% 3 ≤0.5% 4 ᷉Ḥ ٲ ٳ ᐱ w	
5		ᐱ ᐱ 10%	
6	L	1 ᷉Ḥ → ᐱ → ᷉Ḥ شي 2 ᷉Ḥ᷉Ḥ	
7		1 8 U ᑫ ᐩ ᐱ 1.8V/cell ᐩ ᐱ 12V 10.8V ضي ᷉Ḥ ṗ ⌠ v 100% 2 ᐱ ↕ ӥ ≢ ᐩ7 ű w U Ṗ	

34

̃	≢				
		ҏ Ḥ̃	3 Ữ 4 Ữ ̃		
10			ṗ ̃ ﺸﺠ ۲ ̋Ḥ ۲ ̋Ḥ ﻘﻤ̃ ۸ O ̤ ۷ ŋ	ﺸﻲ /	
11		₮	1 ̤ ̤ ‰ 2 ﻘﻤ̃ ̤ ɨ́ 3 ̃ ɨ̋ 4 ﺸﺦ̃ ﻨﻬ̃ ɨ̋ ﺸﺦ 5 ̃ ̃ ﺿﺮ ﺿﺮ ﻍ 6 ↓ ̤ Ḃ ﻍ 7 ₮ ̤ ‰ ɨ̀ ﻍ ₮ ̏ 8 ṗ №≢ ﺿﻲ ṗ 9 10 ₮ ⌠ ⌠ 11 ۸ № ́ 12 13 ۸ ۸ ﺝ ۸ ﺝ̃ , 14 ҏ Ḥ̃ ̃	ﺸﻲ /	
12			1 ̃Ḥ ۲ ۸ Ẕ ṿ ﺸﺦ ṿ ±0.05V 2 ۸ ۸ ṿ 0.03V	ﺸﻲ /	
13			1000V №≢ ﺿﺮ ﺸﺦ 0.5MΩ		
14			1 200Ah №≢ 2 ṗ ̃ 3 15—30 4 ữ ῴ ῴ 5 ̄ ﻘﻤ 6 ̃Ḥ Ḃ 7 8 ̃ ﻜﺢ ﺿﻲ 9	ﺸﻲ	

34

			10 h		
15			1 2 0.5% 3 1% 4 5		
16					
17			1 2 3 4		
18			1 2 3 4 5 6 7 500V 2.5mm 8 1.5mm 9 0.5mm 10 11 12		
19			1 2 B B 3 350mm 4 5 6 O 7 1 2 8		

34

20
9
1
2
3
4
5
6
7
8
9
10

21
1
2

22
1
2

23
1
2

24
1
2
3

25
1
2
3

26
1
2
3
4 0.5

27
1
2
3
4

28
1
2

34

̴	≢				
			7 1% ⏊ 0.5% 8 Ω̄ ḫ̌Ḥw 9 w № 1 10 ẽ w ˜ 3 11 w ˦ ̎Ḥ ̃ v v ǵ ⍴ 12 Ḥ ₒ 13 w ˜ GPS GPS ‰ 1ms 14 ˦ ̎Ḥ Ḥ 15 ḯ Ḡ w ̃Ḥ ᴸ ǵ ⏊ ⏊ ̃Ḥ ǖ Ŧ ⍴ Ḥ̃ Ũ Ḥ Ḥ		
29			1 2 v ⏊ 220V 25KΩ ⏊ 110V 7KΩ 3 ǖ Ŧ ῲ №≢ 4 ∞ ⏊ 5 ᴸ ⏊ ⍴ 6 7		
30			1 Ạ 2 'P 3 4 ḯ 4 Ŧₒ 2 Ồ ḯ 5 ḯ ṗ Ḡ 4		
31			1 2 3 ˜ ˜ 4 № 5 Ղ 6 ǵ № Ŧ ᴸ Ḥ̃ ǵ Ḡ ỉ ⏊ ⏊ 5%		

			7 8 9 10 11 12 13 110kV 14 110kV 15 16		
32			1 2 3 10kV 35kV 4 500kV GIS 110kV 220kV GIS 5 500kV 110kV 220kV 6 PT PT		
33			1 2 500kV 3 500kV 220kV 4 220kV		

34

ȅ ≢

کے №

5 Ό Ḡ ỉ̀

№≢ ű ▯ ṗ Ḡ ‟ Ḡ

ض Ḡ کے №

6 500kV کے Ḡ ̃ غ ̃

کے Ḡ ű ▯

7 220kV کے Ḡ ỉ̀ Ḡ ‟ ض Ḡ

کے №

8 Ḡ Ḡ ỉ̋ № Ḡ 110kV Ḡ

w̓

1 Ḡ ̤ № غ L

2 110kV ỉ̋ ́ 500kV ỉ́

ỉ̋ Ḡ

34 Ḥ

34

20.3

35

1			2500V	10MΩ	
	2		1000V	10MΩ	
	3	#1			
	4	#2			
	5	#1			
	6	#2			
1	7	#1			/
	8	#2			
	9	ATS Ⓟ			
	10	500kV		h	
	11		380V	380V	
		380V			
	1			‰	
	2				
	3				
	4				
	5				
2	6				
	7			1mm/m,	1mm/m
	8			1.5mm	2mm
	9				
	10				
	11				
	12				

35

1

2

3 O

4

7

5

6 2 2 2

O

36

≢

2 ㄘ ᾰ ᠰ № ṿ ṹ

1mA/ ضي (20±15) ṿ └

ᅀ ṿ ṿ ±5%

3 ㄘ0.75 ᾰ ᠰ ᠰ

36

≠

12 ⅞

1 U

13

2 Ḥ w

5 5

14

Q/

39

2

a

b /l

c

400cm^2 2

d

e 300mm

2

f

≠

g

h

i 2mm 5 2.5mm

1

a

b Ω h

c ṕ W

d

e

f 5-8mm 8-12mm

2

a Ω h

b ṕ

c W

d

e

f

g 20mm 10%

2 h 4-8mm.

g

3

a 0.90h 0.90h

0.8mm 0.90h

b 0.90h

c ≥ 10mm

≥ 1.5mm ≥ 1mm

d ≥ 3mm ≥ 2mm

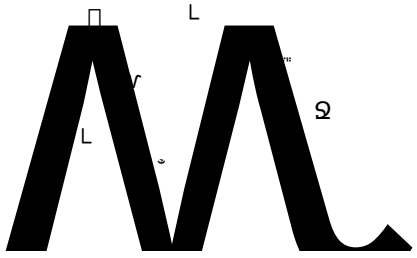
e

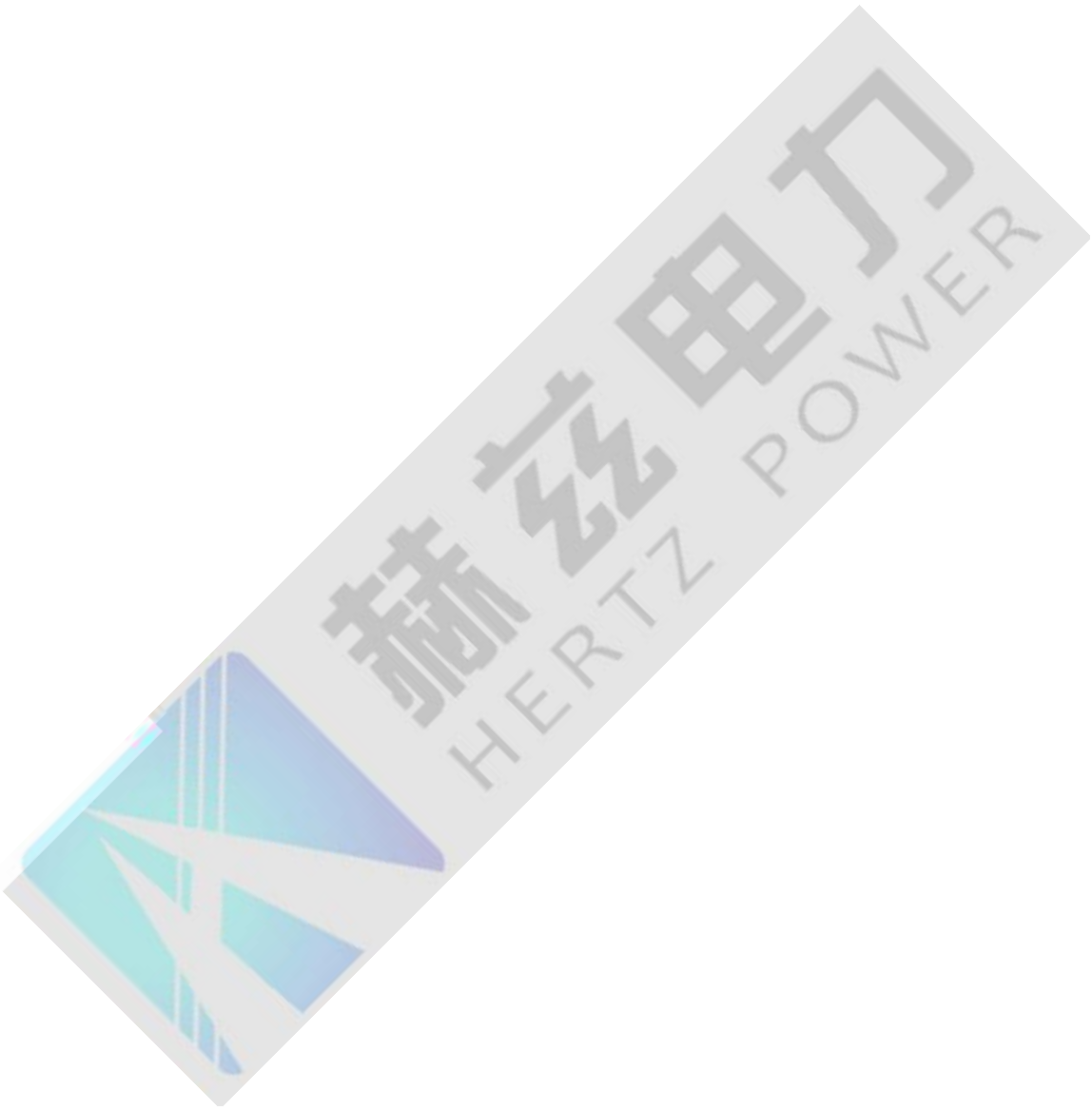
f

g Ω

h

i




赫兹电力
HERTZ POWER

6 h

7

8

9

a) 100mm

b) ≤ 100mm 8

c) ≤ 500mm²

1

2

6

3

4 5m 2mm

1

7 2

3

4 500mm 1050mm

1

a) 0.6MPa 1.5 10min 0.02MPa 1h 0.05MPa 1.15 2h 0.03MPa,

b)

‰

c) 1m 0.5m 0 15m

8

3

d)

39

			o 1.lm ±20mm 140mm U 100mm 5mm 3mm 3) a) b) c) o 24h 10min d) e) f)		

		mm
		15
		5
		0.1
	1	0.1

4
a)
4m
b) o
o
c 300mrn
2m
d h
90 ° 300mm
e
1m 3mm,5m 10mm
1m 3mm,5m 15mm
5
a)
b
c
d)
1m 3mm,5m 10mm
1m 3mm,5m 15mm
6

39

ٓ ≢

a) ضرغ نهـ ᏓᏓ ضر

50㎜

b) ﻻ ﻛﺢ ﺃ ﻹ

c) ﻻ ﻛﺢ ﺃ نهـ ﻛﺢ ﺃ

7 ﻻ ﻛﺢ ﺃ

a ﻻ ﻛﺢ ﺃ ه Ω №

b) ﻻ ﻛﺢ ﺃ Ḥ Ẓ

Ḃ ﻛﺢ ﺃ ±10㎜

ﺧ ﻛﺢ ±15㎜

9) ﻻ ﻛﺢ ﺃ

a) ﻹ ﻻ ﻛﺢ ﺃ ﺃ ه غ شخ ǚ نهـ

b) ǚ نهـ

39

k)

l)

2)

a)

b)

c)

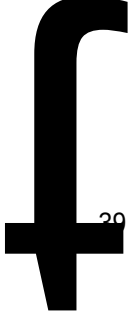
1/1000

d) ≤10㎜ ±10㎜

3

a) ‰

b)



≠

d

e) h -10mm

2

a)

b)

c)

d

e) ‰ -10mm

3

a)

b)

c) №

d /

4 Ḡ

a) Ạ Ḡ № 10m 20mm

1m № 10-20mm

e)

f 100mm 30mm

g 250mm

h

i 10m ×

1

12

39

ޏ ≢

11 ῃ ῐ ῑ ض ΐ ൫

40

ـ	≠				
			7 ̈Ḥ Ẓ ̤ ̈Ḥ Ẓ (see table below) h ضرفمي		
3			1 ̤ a) ضرفمي ضي ضي— " ضي— " Ạ̃ Ḡ ضي — " ضر V ضرفمي فمي حى 500mm فمي 700mm b) . Ė " ̸ c) ọ Ḥ \ \ ضي ضر ṗ حى ضي فمي d ỵ ṗ Ḥ ọ 450mm 250mm 450mm 350mm e ⸧ ⸧ ẓ ⸧ ẓ 1.5 Ȍ 0.6MPa ⸧ ẓ 10min ṗ ⸧ ẓ 0.05MPa U ⸧ ẓ ⸧ ẓ Ḡ ῗ ⸧ ẓ ⸧ Ih ⸧ ẓ 0.05MPa U ⸧ ẓ ⸧ ẓ Ḡ ῗ f ضي U ǁ ضي ǁ U ̸ 2 ̤ ك غ ̤ a) ⸧ ⸧ ẓ ⸧ ẓ 1.5 Ȍ 0.6MPa ⸧ ẓ 10min ṗ ⸧ ẓ 0.05MPa U ⸧ ẓ ⸧ ẓ Ḡ ῗ ; b) ضي ╠ ǁ ; c) ̤ ك غ ọ Ḃ d) غ ̤ ك ỵ ̤ ọ ̈Ḥ Ẓ ±20mm; f) ̤ ك ŋ ῒ عج غ h ῼ 3) ῒ ̤ a) ỵ ̤ ỵ b ῒ شي ỵ قمم غ ثم ̈Ḥ	شي	

		̈Ḥ Ẓ mm
شم		20
		±20
		5
	ŋ	10
ضرفمي		±2
		+20 0
	مم	5
ضرفمي		10
		+20 0
		+20 0
	مم	≤h/1200 ≤20.0

40

≢

Ẓ ± 5㎜

C . ضرشي غ ضر

40

≠

f ο ﺣﯽ ̈Ḥ Ẓ

		̈Ḥ Ẓ mm
1		≤ 5
2	/l	+20 5
3		± 20

2

a) ﻄﻢ

b) ﻨﮭ

c Ẓ

		̈Ḥ Ẓ mm
1		≤ 5
2		± 30
3		≤ 10
4	ﺷﺞ	≤ 3

1

a

b ₮ ο ο

c ο ﺣﯽ ο ﺣﯽ

d ﺿﺮ GB50208

e Ḡ ’ № 1/3,

6 24h ȫ 24h U ⌠

‶ 72h U

2) ȋ ﻛﺢ ᠰ ﺳﮭ :

a ȋ ﻛﺢ ᠰ ﺳﮭ ﺗﺠ ο 5-10㎜

ă ®

40

ـــ	≢				
			2 مخ ᵥᵢᵢ a) غ b) شج 5㎜ c		
8		ٱ تمج	1 ᵥᵢᵢ a) حى ٱ ضي h 1 h 2 b ٚ نه ⌈ ῳ c h تمج 2% تمج ≠ d) h h 5% تمج ṕ تمج ضي ₮ ๐ 2 تمج خ تمج ᵥᵢᵢ a) تمج تمج تمج ᵥᵢᵢ b) تمج خ حى – ๐ حى c) ẓ kN شخ ṿ ≥ ṿ ẓ ≥ 0.9 ṿ d) خ شخ /l ≥ ṿ 60% /l ≥ /l /l ≥ 0.5 /l e) ๐ حى ٱ /l ᵥᵢᵢ 3) تمج ᵥᵢᵢ a) تمج تمج تمج ᵥᵢᵢ b) شخ˜ طمضر . ٮ شج 25kg 200㎜ c) شج ₮ d) ضي 15㎜ ضي 0.5m e) نه f) ≤ 50mmm ≤ 30mmm 4 ๐ حى └شج تمج ᵥᵢᵢ a) ᵥᵢᵢ ٱ ‰ b) └شج ↕ c) شخ˜ شج d) تمج ≤ 10㎜ 5 حى تمج ᵥᵢᵢ a) حى ᵥᵢᵢ حى ٳ 300㎜ b) حى c) ₮ نه d) ≤ 20㎜	شي	
9			1 ٱ h ᵥᵢᵢ 2 ᵥᵢᵢ a) ᵥᵢᵢ b) /l ٱ 80%	شي	

c) 20m

ّ ≢

1 ي‍ ٍّ [redacted]
2 h ə
3 ض ٱّ غ
1

% J

42

̃ ≇

6 ̃ ṗ ï̋ ₮

7 U ̃ ẇ

8 ῴ 8㎜

ضي ضم ⅬⅬ شجتخي

9 شخ̃

ڗ

10 Ӿ سج 300g/㎡ ₮, № 100%

11 ỉ́ 4 4

12 غ̤ Ḡ ٦ ٧

13 ṗ ٳ /l /l 0.8㎜

1 3

̈Ḥ

2 شج 2 4 شخ ̈Ḥ Ẓ 1㎜

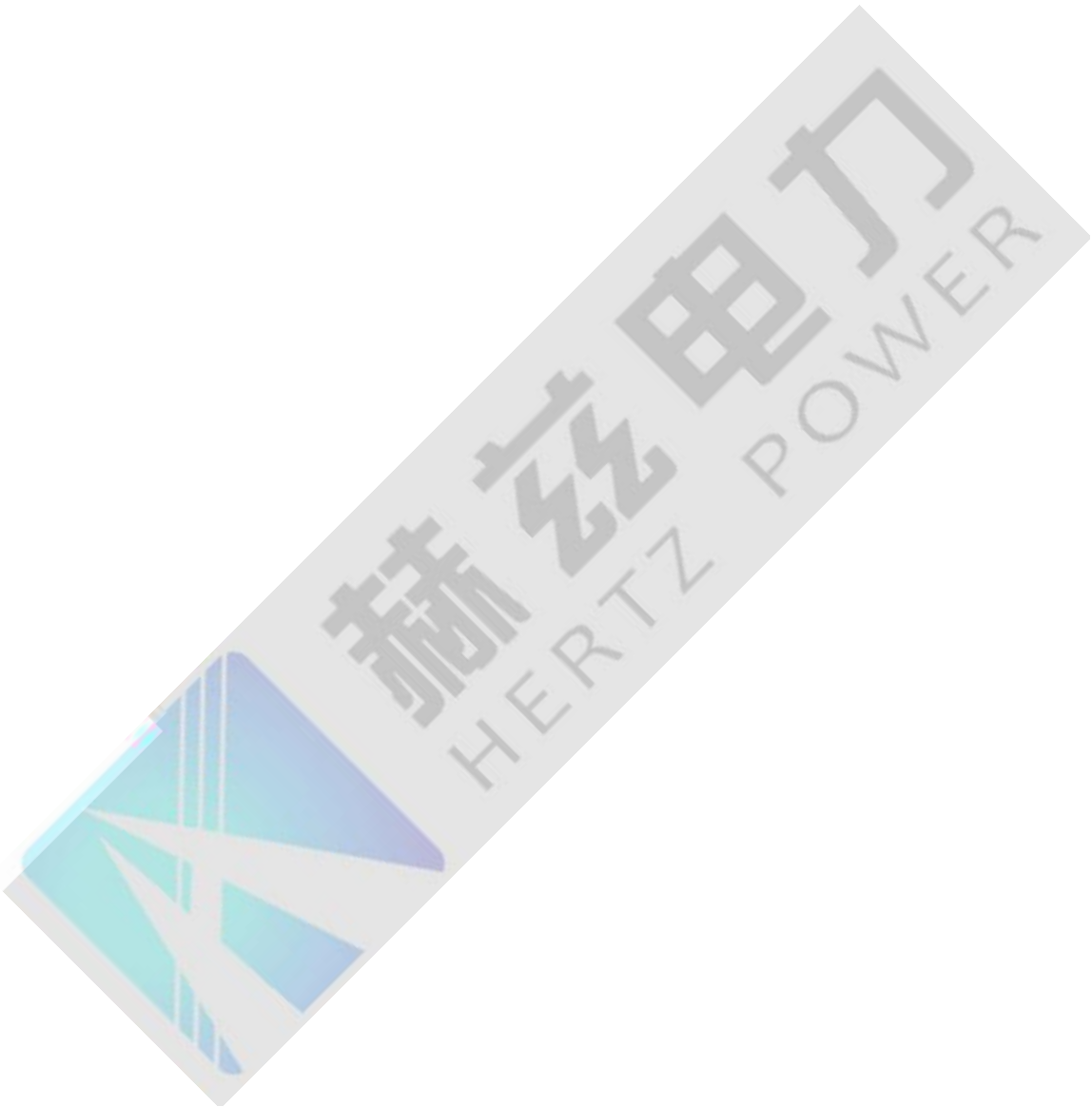
3 ῴ غ ̈Ḥ Ẓ 0.2% Ẓ 2㎜

4 ₽ شخ ṿ 0.5% ٧ ṿ 0.6% Ď

5 خم شخ

4

42



≠

15 № U

8 0.5kg 3kg

6mm 2~3

9 G

1~2

10 2.5

1~2

11 1~2

12 2

13 LED

14 h

1mm²

15 100W 1~2

16 1~2

17

18 2.4m

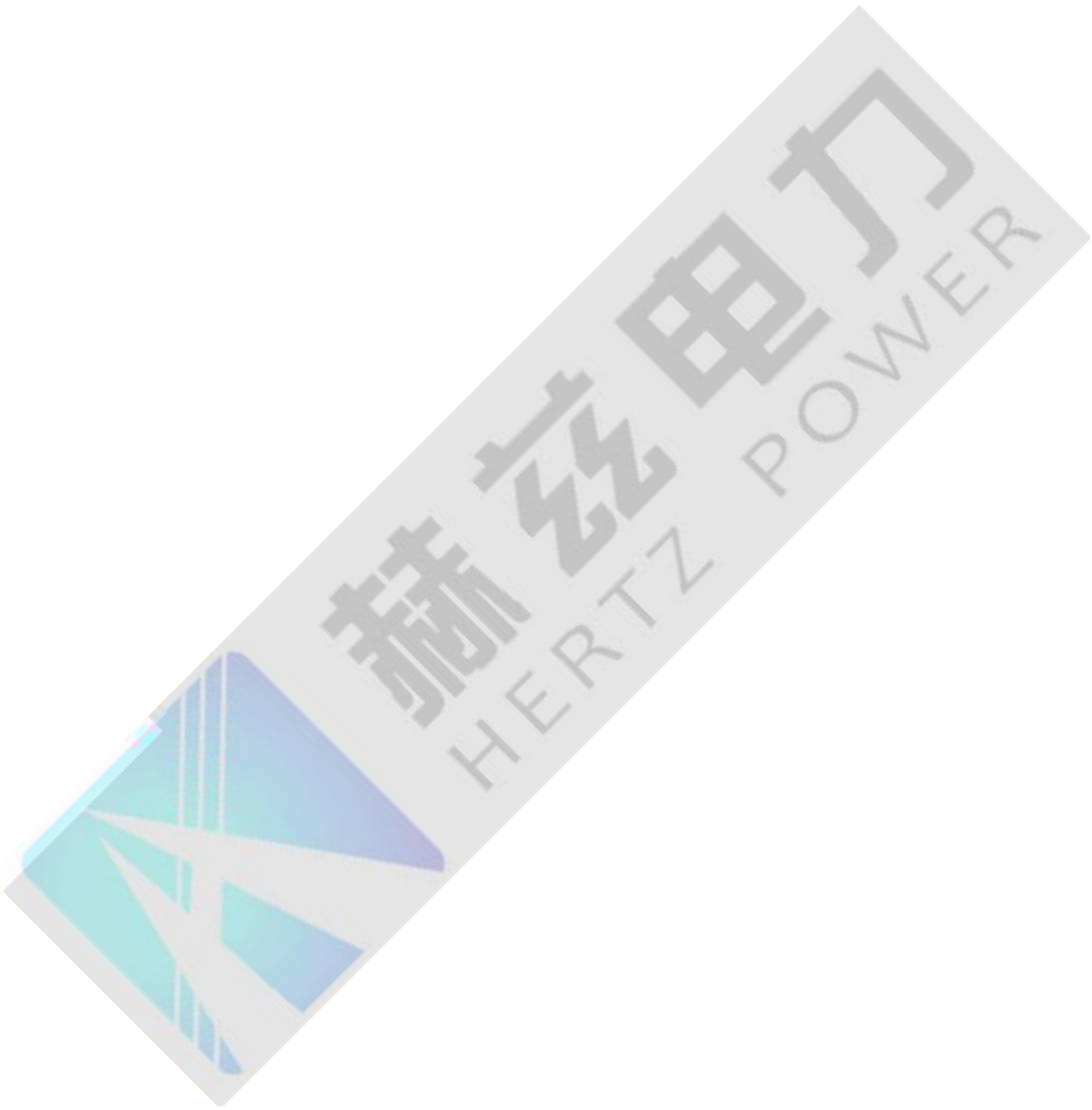
36V

1

2 50%

3

2


赫兹电力
HERTZ POWER

43

5 ṗ ῃ

2

ῃ

6 ṗ N غ Ḡ ضر PE №≢

N PE

7

8 ṗ € 2-5㎜

1

1 Ḡ

2

2 0.5lx

6

5 3 ℗ U N /

4

5 ℗ ῃ

℗ U

1 ṗ ‰ 5.7.1

Ω 30 № U

2 10

6 5 10

3 ṗ Ω 24

43

ـ	≢				
			4 ج 5 ˜ Ḥ ˜		

24.6

ṗ ´ ˝E ȋ ẇ ẇ
شخ ʎ 2 ...

44

ـ	≢				
1			1 ȋ ȉ ȋ RAL7035 ´ غ 800 ㎜ 600 ㎜ 2260 ㎜ /l 3.2㎜ ˜ 2 ṗ Ḡ 3 ṗ ŋ ≢ 4 ˜ ( ) , Ḡ ضي ṗ , ˜ 5 نه ضر ṗ ضر 100㎜^{2} ṗ ضر 4㎜^{2} ȋ ضر ضر 50㎜^{2} 6 ṗ € 2-5㎜ 7 ˜ ɥ عج عج ȉ 10% Ḃ ضر غ 8 ṗ عج غ عج ʎ غ ضر 9 ṗ ɥ 10 ṗ ȋ L	شي	ắ 10kV 500kV ȋ ȋ ‰
2		˝E ȋ	1 ضي ʎ ȋ ضي ṗ ȋ نه ≥75°/s عمم ≥50°/s ˝E ≥704×576 ≥50m ˉ / ˉ ẇ ضي L ȉ Ḳ ŋ ˝E ≥2048×1536 ȉ 2 ῳ ˝E ȋ ῳ ẽ ẇ 3 ˝E ȋ ˉ / ˉ ẇ ˜ ŋ ˝E 360 ˜ 4 ʎ ȋ ˝E ȋ ȋ ˝E . 5 ȋ ȋ L فمي ˜ ضر فمي ˜ 0.7 ضي فمي 0.5	شي /	1 ₮ ʎ ɋ 5

44

≢

1.5 Ồ ṗ

2 ضي

نه ضي 30 ỽ

€ 2-5㎜ ἳ

6 ˝E ί

ζ ṗ ش

7 ≢ ɷ ˝E ἳ w

8 ˝E └ ΰ Ḡ ىد˝E

3

44

			15 2 2 16 17 18 19 DLT634.5104-2002		
4			1 2 3 RTU 4 GA 1089-2013 5 6 2 7 2 8 RPU OSD 9 10	/	1 2 2 3 4
5			1 2 2 3 4 5 0.5M Ω		

24.7

45

˜	≢				
1		ĩ̃	1) O ˜ Ũ يـ يـ ؼ"Ḥ O ضر 2) ˉ . 3) ↕ ‥ ﺸﻲ غ Ḥ "Ḥ ₮ غ ؼ 3 4) ĩ̃ ĩ ⅋ ̀Ẽ ĩ ‰ 5) 6) 2 Ղ 7) ‥ ⅋ ̀Ẽ ĩ 8) ‥ يـ ⅋ ̀Ẽ ʐ ŋ	ﺸﻲ	
2		.	1 2 . 2 3 ≢ ≠ ⅋ ώ̤ 4 ĩ ≢ ݣ ˜ №‥ ʬ 5 U Ũ غ ĩ ŋ Ḥ ĩ غ 6 . 7 ₮	ﺸﻲ	
3			1 ݣ ⅄ ˜ Ḃ 2 ⅄ ↕ ⅋ ̀Ẽ ĩ 3 . ≠ ⅋	ﺸﻲ	
4			1 Ḡ ضي ⅄ ˜ Ḃ ĩ ⅄ ˜ 2 ⅄ ↕ ⅋ ̀Ẽ ĩ 3 . ≠ ⅋	ﺸﻲ	
5		ضر	1 ضر ضر نهˇ ضي 2 ضر غ ضر ضر ĩ ضر نه ضر ⅋ Ḃ ˜	ﺸﻲ	
6		.	1 ⅋ 2 ﻘﻤ . ˜	ﺸﻲ	
7		ʬ	ĩ ، ʬ غ ‰ غ Ḥ ‥ ≠ ώ̤	ﺸﻲ	

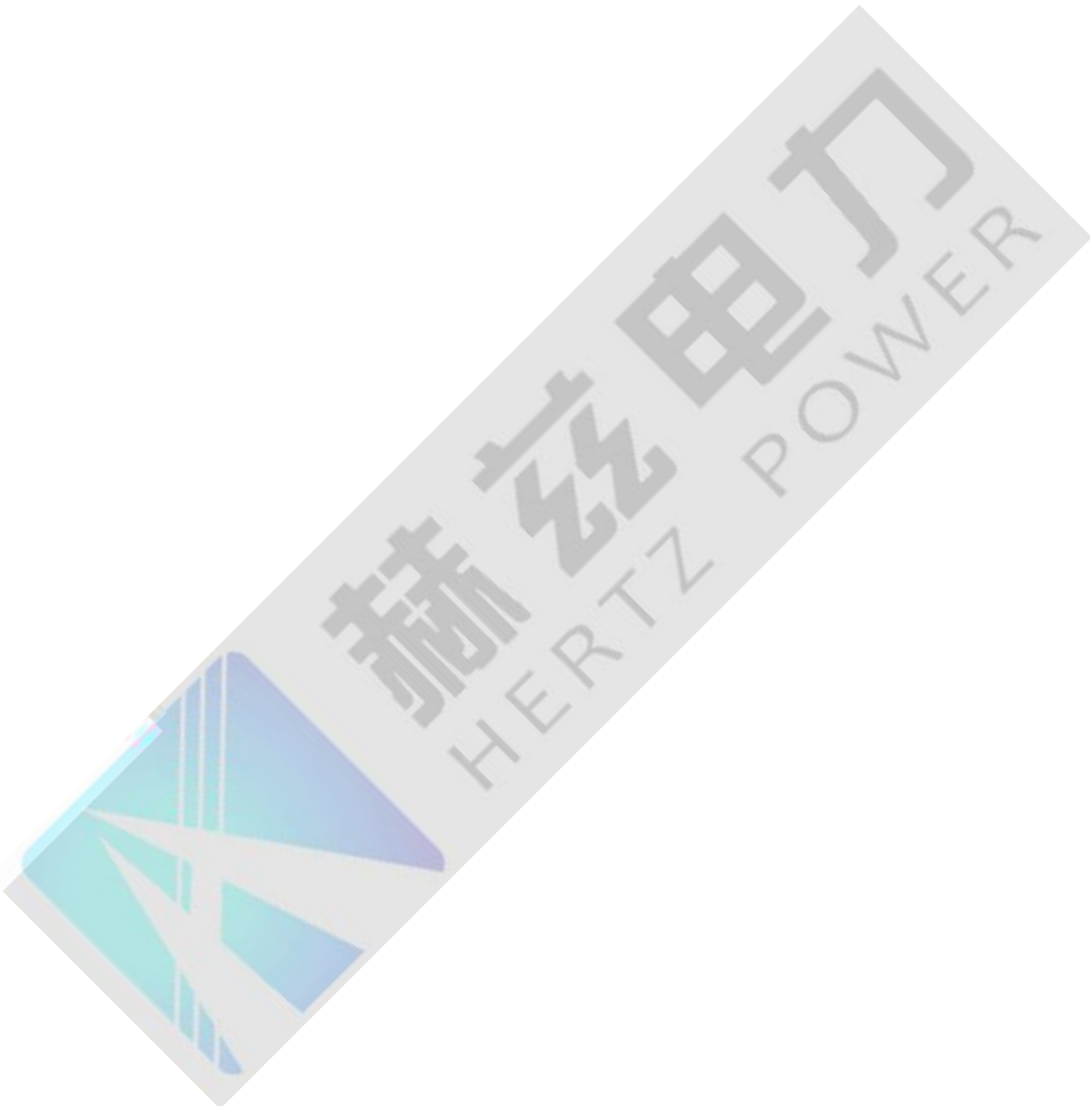
24.8

46

≠

1 ضي w ' 7 ضي

1



46

≢

6 ضر ╠ 1.2m مخ
مخ Ⅱ مخ ╠ 1m Ⅱ مخ ╠
1.8 1.2
120㎜±10㎜ 1.2m 150㎜±10㎜
7 Ⅱ مخ ╠ Ⓜ ⅞№ ≠ ‰ Ⓜ
100m
8 Ⓜ Ⓜ ἲ ʐ
9 Ⓜ Ⓜ Ⓜ ἲ ʐ Ⓜ Ⓜ ἲ ʐ Ⓜ
ἲ ʐ 25m
10 Ⓜ ṗ ضر Ⓜ Ⓜ ἲ ʐ 120
Ⓜ ἲ ʐ
11 ╠ ضي ἳ ἳ Ḡ 10cm
Ⅱ مخ h Ⅱ مخ غ 200㎜
ΰ
12 Ḥ ╠ ἶ ἳ ﻻ
2m
13 “ ” ٧ ῤ
ضي 10m ﺸﺒ
13 Ⅱ مخ ʐ

ʐ	Ⅱ مخ	
ﻻ /kV	/m	ﻌﻤ /m
10kV ἶ	2.5	2
35~110kV	5	3
220kV	7	4
330kV	9	5
500kV	9	5

14 ضي Ḡ ῃ ╠ مخ ﻹ مخ
ﻹ
25

24.9

47

˜	≢	O			
1		ŋ	1 1) ŋ يحـ 2) تم ĩ ỉ 3) شي ' ˜ ضم ấ يحـ ٧ `Ẽ ấ ẫ ‰ Q/CSG10001-2004 4) ‰ -M100 Y100 -K100 2 ɚ 1) Ш خ ῷ ӥ √ يحـ 2) ɚ ĩ ỉ 3) ɚ شي ' ˜ ضم ấ يحـ ٧ `Ẽ ấ ẫ ‰ Q/CSG10001-2004 4) ɚ ‰ - Y100 -K100 3 1) L Ạ Ŧ ˗ يحـ 2) تم ĩ ỉ 3) شي ' ˜ ضم ấ يحـ ٧ `Ẽ ấ ẫ ‰ Q/CSG10001-2004 4) ‰ - C100 -K100 4 1) h Ḥ ŋ شي يحـ 2) ĩ ỉ 3) شي ' ˜ ấ يحـ ٧ `Ẽ ấ ẫ ‰ Q/CSG10001-2004 4) ‰ - C100 Y100 -K100	شي	
2			1 ≠ ấ 2 A Y100 M20 B C100 Y100 C M100 Y100 ضي ضي ৶ 2 ấ ⁄ كخ كخ ˜ ʐ M100 Y100 3 ضر ˜ كخ ˜ ضر نه ضر 4 ˜ 5 ấ ⁄ كخ كخ ˜ ʐ ضر ˜ كخ ˜ ضر نه ضر ˜ L ˜ ⁄ ↕ يحـ ٧ `Ẽ ấ ẫ ‰ Q/CSG10001-2004 6 ˜Ḥ ŋ ῷ ⁄ U ˜	شي	

47

O

≢

Ḡ شخ̃ نه h

7 ضر ضي 15-100㎜ غ

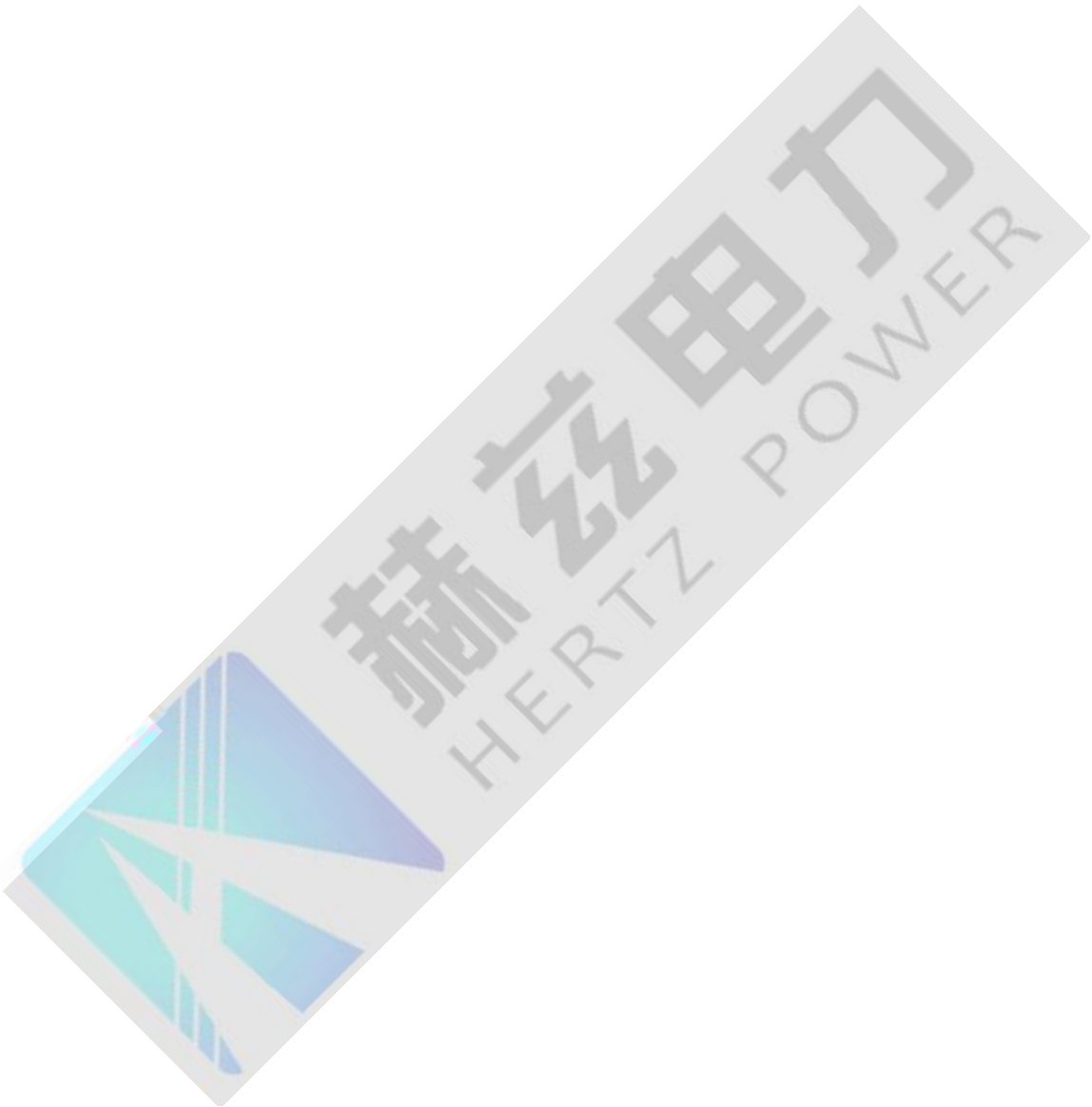
8 غ ضر 2 ῷ ΰ

9 ŋ ŋ يحËE يح لٍ

ΐ يجۦ ÈÊ ΐ ã ‰

Q/CS

47



A

A.1 A.1

A.1

		‰	
1			
2	PH	>5.4	‰ GB/T 7598
3	KOH mg/g	≤0.03	‰ GB/T 264
4		≥135	‰ GB 261 -
5	mg/L	500kV ≤10 220kV ≤15 110kV ≤20	‰ GB/T7600 № GB/T 7601 №
6	mN/m 25	≥40	‰ GB 50150 ‰
7	tanδ %	90 500kV ≤0.5 220kV ≤1.0	‰ GB/T 5654
8	kV	500kV ≥65 110kV~220kV ≥45 35kV ≥40	1. ‰ GB/T 507 2. ‰ DL/T 429.9
9	90 Ω•m	$\geq 6\times10^{10}$	‰ GB/T 5654 DL/T 421
10	% №	500kV ≤1.0	‰ DL/T 423 DL/T 703 500kV
11	% №	≤0.02	‰ GB/T 511
12	№	‰	‰ GB/T 17623 № DL/T 722 № ∞ ↕ DL/T 722 № ∞ ↕
13		500kV U 100mL 5um ≤2000	‰ DL/T 1096

A.2 A.2

A.2

≢	ݳ
Ɗρ ⩘	1. 6kV ΐ ṗ ˜ ╠ U 2. ↓ ' ˜ Ɗρ ⩘ 1 35kV ݸ ΐ 2 ‰ ̃ ΰ
. №	‰ ˜ ΐ ⩘ ݸ ݸ ݸ A-1 2 ~ 9
ῃ №	‰ A-1 ῃ

B SF_6

B.1 SF_6 DL/T1366 GB12022

GB12022

B.1 SF_6

2 1	1
2 40	2
41 70	3
[illegible]	4
1 100 ³	
2 SF_6 24h U	

B.2

1 ‰

2 ‰

B.2 SF_6

C