

风力发电用耐扭曲软电缆

Flexible and torsion resistant cables for wind turbine power generation

■ 适用范围

本产品适用于陆上及海上风电场中风力发电系统、固定安装塔内及风电场地下配电系统或其他类似场合中各种电气设备之间能量和信号的传输。产品具有阻燃、柔软、耐磨、耐扭曲、耐气候和优良的电性能等特点。

■ 执行标准

GB/T 29631-2013、NB/T 31034-2012

NB/T 31035-2012、NB/T 29631-2013

■ 使用特性

1. 额定电压：450V/750V、0.6/1kV、1.8/3kV。
2. 电缆最高工作温度：450V/750V-70℃，0.6/1kV-90℃，1.8/3kV-90℃。
3. 电缆最小弯曲半径：6D（D-电缆外径）。
4. 电缆最低敷设温度：普通型-15℃；耐寒型-30℃；耐严寒性-45℃。

■ 结构参数

电缆部分结构参数见表1。

■ 主要技术特性

电气参数及材料性能见表2、表3、表4、表5和表6。

■ 产品标识

1. 绝缘可以采用数字喷印标识或颜色标识。
2. 护套优先选用黑色，表面喷印生产厂名、型号、电压、规格、长度标记等。

■ 产品范围 Products scope

名称 Descriptions	芯数 Core number	导体标称截面 Nominal cross section area of conductor (mm ²)	额定电压 (kV) Rated voltage	导体最高额定温度 Max. rated temperature of conductors (℃)
FDEF-25 (-40) FDES-25 (-40)	1、2、3 4、3+1、5 6~36	1.5~400、1~25 1~300、1~300 4~185、1~25 1.5,2.5,4	450/750V	70
FDES-25 (-40) FDGG-40 (-55) FDEG-40 (-55) FDEH-25 (-40) FDGU-40 (-55) FDEU-40 (-55)	1、2 3、4 3+1、5 6~36	1.5~400、1~25 1~300、1~300 4~185、1~25 1.5,2.5,4	0.6/1kV	90
FDGG-40 (-55) FDEG-40 (-55) FDEH-25 (-40) FDES-25 (-40) FDGU-40 (-55) FDEU-40 (-55)	1 3	10~400 10~240	1.8/3kV	

■ Range of application

This kind of product is applied for the power and signal transmission for various of electrical devices in wind energy power generation systems on land or on sea, interior of fixed installation towers, underground power distribution systems of wind energy power generation farms and any other similar occasions. They are flame retardant, flexible, wear resistant, twist resistant, weather resistant and also with good electrical performance.

■ Executive standard

GB/T 29631-2013, NB/T 31034-2012

NB/T 31035-2012, NB/T 29631-2013

■ Operating characteristics

1. Rated voltage: 450V/750V, 0.6/1kV and 1.8/3kV.
2. Max. working temperature: 70℃ for 50V/750V, 90℃ for 0.6/1k and 1.8/3kV.
3. Min. bending radius: 6D ("D" stands for outer diameter).
4. Min. laying temperature: 15℃ for normal type, 30℃ for cold-resistant type, 45℃ for arctic-resistant type.

■ Structure parameter

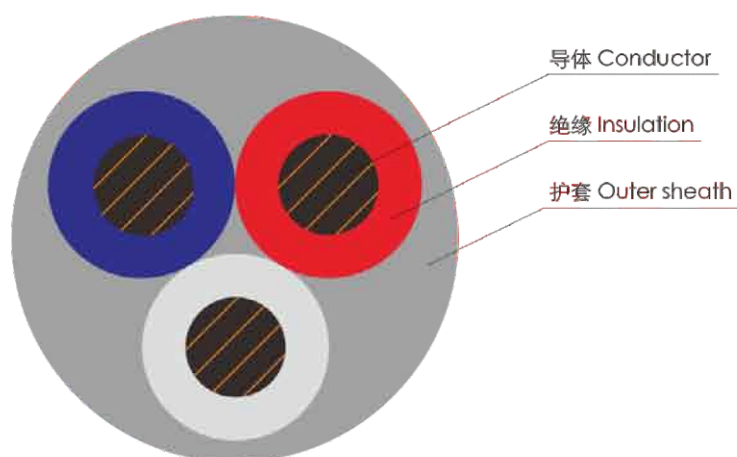
Cable structure index refers to Table 1.

■ Main technical characteristics

Electrical index and material performance refer to Table 2, 3, 4, 5 and 6.

■ Product marking

1. Digital printing or color identification are used on insulation.
2. Black color is preferred on sheath, on which the information of manufacturer name, type, voltage, specification, length, etc. are printed.



■ 代号名称 Code description

名称 Descriptions	代号 Codes
电缆系列代号 Serial code of cables 风力发电用耐扭曲软电缆系列代号 Serial code of flexible torsion resistant cable for wind energy power generation	FD
阻燃性能代号 Code of flame retarding performance 阻燃C类 Flame retardant C grade	ZC
导体材料代码 Code of conductor material 铜导体 Copper conductor	T (省略)
绝缘材料代码 Code of insulation material 乙丙橡胶绝缘或其他相当的合成弹性体绝缘 EPR insulation or other similar compound elastomer insulation 硅橡胶或其他相当的混合物绝缘 Silicon rubber or other similar compound insulation	E G
护套材料代码 Code of sheath material 硅橡胶或其他相当的混合物护套 Silicon rubber or other similar compound sheath 聚氨酯弹性体护套 Polyurethane elastomer sheath 氯磺化聚乙烯橡胶或其他相当的合成弹性体护套 Chlorinated polyethylene rubber or other similar compound elastomer sheath 氯丁橡胶或其他相当的合成弹性体护套 Chloroprene rubber or other similar compound elastomer sheath 热塑性弹性体护套 Thermoplastic elastomer	G U H F S
适应的最低环境温度代码 Code of suitable Min. ambient temperature -55℃ (耐严寒型) (Arctic resistant type) -40℃ (耐寒型) (Cold resistant type) -25℃	-55 -40 -25

表1 Table1

芯数×截面 Core number× cross section (mm ²)	FDEF-25 (-40) 450V/750V 0.6/1kV FDES-25 (-40) 450V/750V 0.6/1kV FDGG-40 (-55) 0.6/1kV FDEG-40 (-55) 0.6/1kV FDEH-25 (-55) 0.6/1kV		FDGU-40 (-55) 0.6/1kV FDEU-40 (-55) 0.6/1kV	
	计算外径 (mm) Calculated outer diameter:		计算外径 (mm) Calculated outer diameter	
	最小值 Min. value	最大值 Max. value	最小值 Min. value	最大值 Max. value
1×1.5	5.7	7.1	4.8	5.9
1×2.5	6.3	7.9	5.4	6.7
1×4	7.2	9.0	6.3	7.8
1×6	7.9	9.8	6.7	8.4
1×10	9.5	11.9	8.3	10.5
1×16	10.8	13.4	9.5	11.7
1×25	12.7	15.8	11.4	14.1
1×35	14.3	17.9	12.7	16.0
1×50	16.5	20.6	14.8	18.4
1×70	18.6	23.3	16.6	20.9
1×95	20.8	26.0	18.8	23.6
1×120	22.8	28.6	20.8	26.3
1×150	25.2	31.4	23.1	28.9
1×185	27.6	34.4	25.2	31.7
1×240	30.6	38.3	28.2	35.6
1×300	33.5	41.9	31.1	39.2
1×400	37.4	46.8	34.9	43.8
2×1	7.7	10.0	6.9	9.0
2×1.5	8.5	11.0	7.6	9.8
2×2.5	10.2	13.1	9.0	11.6
2×4	11.8	15.1	10.6	13.7
2×6	13.1	16.8	11.8	15.1
2×10	17.7	22.6	15.6	19.9
2×16	20.5	25.7	17.9	22.8
2×25	24.3	30.7	21.8	27.6

表1续 Continue with Table 1

芯数×截面 Core number× cross section (mm ²)	FDEF-25 (-40) 450V/750V 0.6/1kV FDES-25 (-40) 450V/750V 0.6/1kV FDGG-40 (-55) 0.6/1kV FDEG-40 (-55) 0.6/1kV FDEH-25 (-40) 0.6/1kV		FDGU-40 (-55) 0.6/1kV FDEU-40 (-55) 0.6/1kV	
	计算外径 (mm) Calculated outer diameter		计算外径 (mm) Calculated outer diameter	
	最小值 Min. value	最大值 Max. value	最小值 Min. value	最大值 Max. value
3×1	8.3	10.7	7.4	9.5
3×1.5	9.2	11.9	8.0	10.4
3×2.5	10.9	14.0	9.6	12.4
3×4	12.7	16.2	11.3	14.5
3×6	14.1	18.0	12.8	16.3
3×10	19.1	24.2	16.8	21.4
3×16	21.8	27.6	19.5	24.7
3×25	26.1	33.0	23.6	29.9
3×35	29.3	37.1	26.5	33.8
3×50	34.1	42.9	30.9	39.2
3×70	38.4	48.3	35.1	44.0
3×95	43.3	54.0	39.6	49.7
3×120	47.4	60.0	43.4	55.5
3×150	52.0	66.0	47.6	61.1
3×185	57.0	72.0	52.2	66.7
3×240	65.0	82.0	59.8	76.2
3×300	72.0	90.0	66.3	83.6
4×1	9.2	11.9	8.2	10.7
4×1.5	10.2	13.1	9.0	11.6
4×2.5	12.1	15.5	10.7	13.8
4×4	14.0	17.9	12.7	16.2
4×6	15.7	20.0	14.2	18.1
4×10	20.9	26.5	18.6	23.6
4×16	23.8	30.1	21.3	27.0
4×25	28.9	36.6	26.1	33.2
4×35	32.5	41.1	29.3	37.2
4×50	37.7	47.5	34.4	43.5
4×70	42.7	54.0	39.0	49.5
4×95	48.4	61.0	44.0	55.9
4×120	53.0	66.0	48.6	60.9
4×150	58.0	73.0	53.2	67.5
4×185	64.0	80.0	58.8	74.3
4×240	72.0	91.0	66.3	84.7
4×300	80.0	101.0	73.6	94.0

表1续 Continue with Table 1

芯数 × 截面 Core number × cross section (mm ²)	FDEF-25 (-40) 450V/750V 0.6/1kV FDES-25 (-40) 450V/750V 0.6/1kV FDGG-40 (-55) 0.6/1kV FDEG-40 (-55) 0.6/1kV FDEH-25 (-40) 0.6/1kV		FDGU-40 (-55) 0.6/1kV FDEU-40 (-55) 0.6/1kV	
	计算外径 (mm) Calculated outer diameter		计算外径 (mm) Calculated outer diameter	
	最小值 Min. value	最大值 Max. value	最小值 Min. value	最大值 Max. value
3×4+1×2.5	14.0	17.9	12.7	16.3
3×6+1×4	15.7	20.0	14.1	18.1
3×10+1×6	20.9	26.5	18.5	23.8
3×16+1×10	23.5	29.6	21.1	26.8
3×25+1×16	27.9	35.6	25.1	32.4
3×35+1×16	31.0	40.1	28.1	36.6
3×50+1×25	35.7	46.0	32.4	42.1
3×70+1×35	40.7	52.0	37.1	47.9
3×95+1×50	46.4	59.0	42.4	54.5
3×120+1×70	50.0	64.0	45.9	59.3
3×150+1×70	55.0	70.0	50.5	64.9
3×185+1×95	60.0	76.0	55.0	70.5
5×1	10.2	13.1	9.0	11.7
5×1.5	11.2	14.4	9.8	12.8
5×2.5	13.3	17.0	11.9	15.5
5×4	15.6	19.9	14.1	18.2
5×6	17.5	22.2	15.7	20.2
5×10	22.9	29.1	20.4	26.0
5×16	26.4	33.3	23.7	30.2
5×25	32.0	40.4	28.8	36.8
6×1.5	13.4	17.2	11.6	15.4
12×1.5	17.6	22.4	15.6	20.4
18×1.5	20.7	26.3	18.5	24.1
24×1.5	24.3	30.7	21.9	28.3
36×1.5	27.8	35.2	25.2	32.6
6×2.5	15.7	20.0	13.9	18.2
12×2.5	20.6	26.2	18.6	24.2
18×2.5	24.4	30.9	22.0	28.5
24×2.5	28.8	36.4	26.2	33.8
36×2.5	33.2	41.8	30.4	39.0
6×4	18.2	23.2	16.2	21.2
12×4	24.4	30.9	22.0	28.5
18×4	28.8	36.4	26.0	33.6

表1续 Continue with Table 1

芯数×截面 Core number× cross section (mm ²)	FDES-25 (-40) 1.8/3kV FDGG-40 (-55) 1.8/3kV FDEG-40 (-55) 1.8/3kV FDEH-25 (-40) 1.8/3kV		FDGU-40 (-55) 1.8/3kV FDEU-40 (-55) 1.8/3kV	
	计算外径 (mm) Calculated outer diameter		计算外径 (mm) Calculated outer diameter	
	最小值 Min. value	最大值 Max. value	最小值 Min. value	最大值 Max. value
1×10	11.3	13.7	10.1	12.3
1×16	12.6	15.2	11.3	13.5
1×25	14.3	17.4	13.0	15.6
1×35	15.9	19.5	14.3	17.5
1×50	17.7	21.8	16.0	19.6
1×70	19.8	24.5	17.8	22.1
1×95	22.0	27.2	20.0	24.8
1×120	24.0	29.8	22.0	27.4
1×150	26.4	32.6	24.3	30.0
1×185	28.4	35.2	26.0	32.5
1×240	31.4	39.1	29.0	36.5
1×300	33.9	42.3	31.5	39.5
1×400	37.8	47.2	35.3	44.3
3×10	23.0	28.1	20.6	25.2
3×16	25.7	32.5	23.3	28.6
3×25	29.6	36.5	27.1	33.5
3×35	32.8	40.6	30.0	37.5
3×50	36.7	45.5	33.5	42.0
3×70	41.0	50.9	37.7	47.2
3×95	45.9	56.6	42.2	52.5
3×120	50.0	62.6	46.0	58.3
3×150	54.6	68.6	50.2	63.9
3×185	58.7	73.7	53.9	68.8
3×240	66.7	83.7	54.6	78.2

■ 绝缘材料性能 Characteristics of insulation material

表2 Table2

序号 No.	试验项目 Test item	单位 Unit	技术要求 Technical requirement		
			G	IE4	EPR
1	老化前机械性能 Mechanical performance before ageing				
1.1	抗张强度, 最小中间值 Min. median of tensile strength	N/mm ²	5.0	5.0	4.2
1.2	断裂伸长率, 最小中间值 Min. median of elongation at break	%	150	200	200
2	空气烘箱老化后机械性能 Mechanical properties after ageing in air oven				
2.1	试验条件 ^{ab} : 温度 (允许偏差±2℃) Test condition: temperature (tolerance allowable ±2℃)	℃	200	100	135
	时间 Duration	h	240	168	168
2.2	抗张强度, 最小中间值 Min. median of tensile strength	N/mm ²	4.0	4.2	0
	抗张强度变化率 ^c , 最大值 Max. change rate of tensile strength	%	-	±25	±30
2.3	断裂伸长率, 最小中间值 Min. median of elongation at break	N/mm ²	4.0	4.2	0
	断裂伸长率变化率 ^c , 最大值 Max. change rate of elongation at break	%	-	±25	±30
3	空气弹老化后机械性能 Mechanical characteristic after ageing in air bomb				
3.1	试验条件 ^{ab} : 温度 (允许偏差±2℃) Test condition: temperature (tolerance allowable ±2℃)	℃	-	127	-
	时间 Duration	h	-	40	-
3.2	抗张强度, 最小中间值 Min. median of tensile strength	N/mm ²	-	-	-
	抗张强度变化率 ^c , 最大值 Max. change rate of tensile strength	%	-	±30	-
3.3	断裂伸长率变化率 ^c , 最大值 Max. change rate of elongation at break	%	-	±30	-
4	热延伸试验 Hot-set test				
4.1	试验条件: 温度 (允许偏差±3℃) Test condition: temperature (tolerance allowable ±3℃)	℃	200	200	250
	载荷时间 Load time	min	15	15	15
	机械应力 Mechanical stress	N/cm ²	0.20	0.20	0.20
4.2	试验结果: 载荷下伸长率, 最大值 Test result: Max. elongation under load	%	175	100	175
4.3	冷却后永久伸长率, 最大值 Max. permanent elongation after cooling	%	25	25	15
5	耐臭氧试验 Ozone resistance test				
5.1	试验条件: 温度 (允许偏差±2℃) Test condition: temperature (tolerance allowable ±2℃)	℃	-	25	25
	试验时间 Test period	h	-	24	24
	臭氧浓度 Ozone concentration	%	-	0.025~0.030	0.025~0.030
5.2	试样结果 Test result		-	无裂纹 no fissures	无裂纹 no fissures
6	耐臭氧试验 Ozone resistance test				
	撕裂强度, 最小值 Min. tearing strength	N/mm	4.0	-	-

a: IE4绝缘应带导体或取走不超过30%的铜丝进行老化。

a: Conductor should be included or less than 30% of copper wires can to be taken for ageing test on IE4 insulation.

b: 除非产品规范中另有规定, 橡皮混合物的老化不采用强迫鼓风烘箱。

b: Forced blasting ovens are not used for ageing test of rubber mixture, unless otherwise specified in specifications.

c: 变化率: 老化后中间值与老化前中间值之差与老化前中间值之比, 以百分比表示。

c: Change rate: the difference between median before and after ageing to the Median before ageing, which is shown by percentage.

■ 护套材料性能 Characteristics of sheath material

表3 Table3

序号 No.	试验项目 Test item	单位 Unit	技术要求 Technical requirement					
			SE4	SH	G	TPU	TPV-70	TPV-90
1	老化前机械性能 Mechanical performance before ageing							
1.1	抗张强度，最小中间值 Min. median of tensile strength	N/mm ²	10	10	6.0	20.0	10.0	10.0
1.2	断裂伸长率，最小中间值 Min. median of elongation at break	%	300	250	200	300	300	300
2	空气烘箱老化后机械性能 Mechanical properties after ageing in air oven							
2.1	试验条件 ^{ab} ：温度（允许偏差±2℃） Test condition: temperature (tolerance allowable ±2℃)	℃	70	120	200	110	100	135
	时间 Duration	h	240	168	240	168	168	168
2.2	抗张强度，最小中间值 Min. median of tensile strength	N/mm ²	-	-	5.0	-	10.0	10.0
	抗张强度变化率 ^c ，最大值 Max. change rate of tensile strength	%		-15 ^b	-30 ^b	±30	±25	±25
2.3	断裂伸长率，最小中间值 Min. median of elongation at break	%	250	-	150	300	300	300
	断裂伸长率变化率 ^c ，最大值 Max. change rate of elongation at break	%	-25 ^b	-40 ^b	-	±30	±25	±25
3	浸矿物油后的机械性能 Mechanical properties after emerging in mineral oil							
3.1	试验条件：温度（允许偏差±2℃） Test condition: temperature (tolerance allowable ±2℃)	℃	100	100	-	100	100	100
	时间 Duration	h	24	24	-	24	24	24
3.2	抗张强度变化率 ^c ，最大值 Max. change rate of tensile strength	%	±40	-40 ^b	-	±40	-40 ^b	-40 ^b
3.3	断裂伸长率变化率 ^c ，最大值 Max. change rate of elongation at break	%	±40	-40 ^b	-	±30	-40 ^b	-40 ^b
4	热延伸试验 Hot-set test							
4.1	试验条件：温度（允许偏差±3℃） Test condition: temperature (tolerance allowable ±3℃)	℃	200	200	200	-	-	-
	载荷时间 Load time	min	15	15	15	-	-	-
	机械应力 Mechanical stress	N/cm ²	0.20	0.20	0.20	-	-	-

■ 护套材料性能 Characteristics of sheath material

表3(续上页) Table 3 (Continue with last page)

4.2	试验结果: 载荷下伸长率, 最大值 Test result: Max. elongation under load	%	175	175	175	-	-	-
	冷却后永久伸长率, 最大值 Max. permanent elongation after cooling	%	25	25	25	-	-	-
5	撕裂试验 Tearing test							
	撕裂强度, 最小值 Min. tearing strength	N/mm	5.0	5.0	5.0	-	-	-
6	高温压力试验 Pressure test in high temperature							
6.1	试验条件: 温度 (允许偏差 $\pm 2^{\circ}\text{C}$) Test condition: temperature (tolerance allowable $\pm 2^{\circ}\text{C}$)	$^{\circ}\text{C}$	-	-	-	100	80	90
6.2	压痕中间值/平均厚度, 最大值 Median indentation/ median average thickness	%	-	-	-	50	50	50
7	抗开裂试验 Anti-cracking test							
7.1	试验条件: 温度 (允许偏差 $\pm 3^{\circ}\text{C}$) Test condition: temperature (tolerance allowable $\pm 3^{\circ}\text{C}$)	$^{\circ}\text{C}$	-	-	-	150	150	150
	持续时间 Duration	h	-	-	-	1	1	1
7.2	试验结果 Test result		-	-	-	无裂纹 no fissures	无裂纹 no fissures	无裂纹 no fissures
8	低温拉伸试验 Tensile test in low temperature							
8.1	试验条件: 温度 (允许偏差 $\pm 2^{\circ}\text{C}$) Test condition: temperature (tolerance allowable $\pm 2^{\circ}\text{C}$)	$^{\circ}\text{C}$	-25	-25	-25	-40	-25	-25
8.2	试验结果: 未断裂的伸长率, 最小 Test result: Min. elongation without break	%	30	30	30	30	30	30
9	低温冲击试验 Impact test in low temperature							
9.1	试验条件: 温度 (允许偏差 $\pm 2^{\circ}\text{C}$) Test condition: temperature (tolerance allowable $\pm 2^{\circ}\text{C}$)	$^{\circ}\text{C}$	-25	-25	-25	-40	-25	-25
9.2	试验结果 Test result		无裂纹 no fissures	无裂纹 no fissures	无裂纹 no fissures	无裂纹 no fissures	无裂纹 no fissures	无裂纹 no fissures

a: 变化率: 老化后中间值与老化前中间值之差与老化前中间值之比, 以百分比表示。
 a: Change rate: the difference between Median before and after ageing to the Median before ageing, which is shown by percentage.
 b: 不规定正偏差。
 b: No plus tolerance specified.
 c: 如果用于环境最低温度位 -40°C (-55°C), 低温试验温度用为 -40°C (-55°C) $\pm 2^{\circ}\text{C}$, 如用户对最低环境适应温度另有要求, 应按用户要求的温度试验。
 c: -40°C (-55°C) will be used in low temperature test if the Min. ambient temperature is 40°C (-55°C); however, if there is any other requirement on Min. ambient adaptive temperature from the customer, the customer's requirement should be followed.

■ 成品电缆性能 Characteristics of finished cables

表4 Table4

试验项目 Test items	技术要求 Technical requirement
常温扭转试验 Twist test in normal temperature	20℃常温下，成品电缆能通过扭转10000个周期的耐扭转试验。 The finished cables can withstand 10000 times of anti-twist test in temperature of 20℃.
低温扭转试验 Twist test in low temperature	在电缆适应的最低环境温度下，成品电缆能通过扭转2000个周期的耐扭转试验。 The finished cables can withstand 2000 times of anti-twist test in the Min. adaptive ambient temperature.
低温弯曲试验 Bending test in low temperature	在电缆适应的最低环境温度下，成品电缆在直径为自身直径4~5倍的试棒上卷绕，护套、绝缘表面不开裂。 There is no crack on the surface of sheath and insulation, after the finished cable being twined onto a test stick with 4-5 times of diameter of the test cable in the Min. adaptive ambient temperature.
燃烧试验 Burning test	成品电缆能通过GB/T 18380.12的单根垂直燃烧试验 The finished cable can pass the single vertical burning test in GB/T 18380.12. 成品阻燃电缆能通过GB/T 18380.35的成束垂直燃烧试验 The finished flame retardant cable can pass the bundle vertical burning test in GB/T 18380.35.
注：扭转一个周期为：先顺时针扭转1440°，然后逆时针扭转相同角度使电缆回复原状，继续逆时针扭转1440°，再顺时针扭转相同角度使电缆回复原状为1个周期。 Note: one twist period is: twist for 1440 degrees by clockwise first, then return to the original position by same degrees by anticlockwise, secondly, twist for 1440 degrees anticlockwise, then return to the original position by same degrees by clockwise.	

■ 绝缘电阻 Insulation resistance

表5 Table5

额定电压 (kV) Rated voltage	导体标称截面 Nominal cross section area of conductor (mm ²)	20℃时绝缘电阻最小值 Min. insulation resistance at 20℃ (MΩ · km)	额定工作温度时绝缘电阻最小值 Min. insulation resistance at rated working temperature (MΩ · km)
450V/750V 0.6/1kV	35及以下 35 and below	150	0.15
	50~150	100	0.10
	185~400	80	0.08
1.8/3kV	35及以下 35 and below	250	0.25
	50~150	200	0.20
	185~400	150	0.15

■ 试验电压 Test voltage

表6 Table6

额定电压 (kV) Rated voltage	试验电压 (kV) Test voltage
450V/750V	2.5
0.6/1kV	3.5
1.8/3kV	6.5

■ 载流量 Current-carrying capacity

导体最高允许工作温度：90℃

Max. allowable working temperature of conductor: 90℃

环境温度：45℃

Ambient temperature: 45℃

标称截面 Nominal cross section (mm ²)	单芯 1 core				二芯 2 cores				三芯或四芯 3 cores or 4 cores			
	连续允许 工作电流 Allowable continuous working current (A)	短时工作允许电流 Allowable working current in short-time		周期负荷 工作电流 40% Working current in periodic load 40% (A)	连续允许 工作电流 Allowable continuous working current (A)	短时工作允许电流 Allowable working current in short-time		周期负荷 工作电流 40% Working current in periodic load 40% (A)	连续允许 工作电流 Allowable continuous working current (A)	短时工作允许电流 Allowable working current in short-time		周期负荷 工作电流 40% Working current in periodic load 40% (A)
		0.5h (A)	1h (A)			0.5h (A)	1h (A)			0.5h (A)	1h (A)	
1.0	17	18	18	20	15	16	16	20	12	13	13	16
1.5	23	22	22	25	20	19	19	24	16	16	16	20
2.5	30	32	32	35	26	28	27	34	21	23	22	29
4	41	42	42	48	34	37	36	46	28	31	31	40
6	52	54	54	60	44	47	46	61	36	39	38	51
10	72	75	75	84	61	67	65	85	50	55	53	70
16	96	103	102	127	82	90	87	116	67	73	71	96
25	127	138	136	170	108	125	117	157	89	103	96	131
35	157	166	164	205	-	-	-	-	110	131	119	160
50	196	210	205	269	-	-	-	-	137	174	151	200
70	242	263	255	336	-	-	-	-	169	231	194	254
95	293	338	315	423	-	-	-	-	205	282	237	313
120	339	393	367	492	-	-	-	-	237	354	289	364
150	389	448	418	561	-	-	-	-	272	404	331	418
185	444	536	484	651	-	-	-	-	311	506	401	475
240	522	634	571	769	-	-	-	-	-	-	-	-
300	601	772	683	890	-	-	-	-	-	-	-	-

■ 不同环境空气温度下的修正系数 Correction coefficient under different ambient air temperatures

导体最高温度 Max. temperature of conductor	环境空气温度的修正系数 Correction coefficient of ambient air temperature										
℃	35℃	40℃	45℃	50℃	55℃	60℃	65℃	70℃	75℃	80℃	85℃
90	1.10	1.05	1.00	0.94	0.88	0.82	0.74	0.67	0.58	0.47	-

■ 成束电缆的修正系数 Correction coefficient of bundle cables

多回路或多芯电缆 Multiple circuit or multi-core cable						
回路数/芯数 No. of circuits/ Core No.	5	6	12	18	24	36
载流量修正系数 Correction coefficient of current carrying capacity	0.60	0.57	0.45	0.39	0.35	0.32