电气化铁路 27.5kV 单相交流交联聚乙烯绝缘电缆

27.5kV Single-phase AC XLPEInsulation Cable for Electrified Railway

本产品参照 GB/T12706.3-2008，结合 TB/T2822-1997 标准、Q/JHDG01-2010 企业标准制造，适用于额定电压 27.5kV 电气化铁路线路中，供输配电能之用。

This product according to GB/T12706.3-2008, combined with TB/T2822-1997, Q/JHDG01-2010 enterprise standards, Rated voltage 27.5kV electrified railway lines for transmission and distribution to use.

一、使用特性： Use Characteristic

1、电缆在正常运行时导体允许的长期最高温度为 90℃。

Cable in the normal run-time conductor allows long-term highest temperature is 90℃.

2、短路时（最长持续时间不超过 5s），电缆导体允许的最高温度为 250℃。

Short-circuit (the longest duration of no more than 5 seconds); the cable conductor allows maximum temperature is 250°C.

3、电缆导体最大允许故障短路电流见下表。

Maximum allowed cable conductor short-circuit faults, see the table below.

标称截面积（mm^2） Nominal section area	70	95	120	150	185	240	300	400
最大允许故障短路电流(kA) Maximum allowable fault short-circuit current	10.0	13.6	17.2	21.4	26.4	34.3	42.9	57.2

注 1：电缆短路时间为 1s；

注 2：电缆短路时起始温度按 90℃计算。

Note 1: 1 second short-circuit time cable;

Note 2: When the starting temperature of the cable circuit by 90 ℃.

4、电缆的弯曲半径 Cable bend radius

安装时电缆最小弯曲半径：电缆外径的 15 倍。

The min.bending radius of installation of cable：15 times the cable outside diameter

5、电缆敷设及使用环境 Cable laying and application environment

电缆使用环境主要由聚氯乙烯护层、阻燃聚氯乙烯护层、黑色线性低密度聚乙烯护层、黑色高密度聚乙烯护层和无卤低烟聚烯烃护层的性能确定，因此一般应符合 GB/T2952.3－2008 表 1 的规定。

The cable use environment mainly by the PVC sheath, the fire retardant PVC sheath, the black linear low density polyethylene sheath, the black high density polyethylene sheath and LSOH sheath performance determination, and therefore generally should conform to the GB/T2952.3-2008 table 1 stipulation.

5.1 适宜采用铝带铠装电缆的场所 Locales of appropriate to adopt aluminium tape armoured cable

当电缆直埋敷设需承受较大压力，需要增强电缆抗外力，或者有遭受到机械损伤的危险及人烟稠密，气候潮湿，白蚁、老鼠经常出没地带，宜采用双铝带铠装型电缆。

在地下客运、商业设施等安全性要求较高的场所，宜采用铝带铠装电缆。

小截面电缆直接在臂式支架上敷设时，宜选用双铝带铠装电缆。

When cable direct burying placing need to withstand the big pressure, needs to strengthen the electric cable anti-external force, Or has suffers mechanical damage danger and densely populated, the climate is moist, termites, the mouse should be frequented areas with suits uses the double aluminum tape armored cable.

In underground passenger transportation, commercial facilities and so on secure request high places, Suits uses the double aluminum tape armored cable.

The small section's electric cable directly lays when the arm type support, suitably selects the double aluminum tape armored cable.

5.2 适宜采用铝丝铠装电缆的场所　Locales of appropriate to adopt aluminium wire armoured cable

直埋敷设在流砂层、回填土地带等有可能出现位移的土壤中，宜采用铝丝铠装电缆。

电缆位于高落差的受力条件下，应采用铝丝铠装电缆。

Buries the placing straight, in the quick ground, the backfill land belt and so on has the possibility to present in displacement's soil, uses the aluminum wire armored cables suitably.

The cables located under the high dropping variance's stress condition, should use the aluminum wire armored cables.

5.3 各种类型外护套所适宜场所　Various types oversheath are suitable the place

环境温度在-15℃以上、露天敷设或容易受水长期浸泡的电缆可选用 PE+PVC 复合型护套电缆；

环境温度在-15℃以下、在冬季严寒、潮湿、含化学腐蚀环境的地区，或因地下水位较高电缆易受水长期浸泡的地方，宜选用聚乙烯护套型电缆；

白蚁严重危害地区，宜选用防白蚁护层级软聚乙烯护套、防白蚁阻燃护层级软聚乙烯护套型电缆；

在 60℃以上高温场所,应选用 105℃聚氯乙烯等耐热外护层型电缆；

在人员密集的公共场所　,如地铁、长距离隧道、商业设施、高层建筑等有低毒阻燃要求的场所，宜选用无卤低烟聚烯烃护套型电缆，（在没有低毒要求时，尽可能选用阻燃聚氯乙烯护套型电缆）；

明确需与环境相协调时，不采用聚氯乙烯外护层。

除有以上要求外，其他尽可能选用聚氯乙烯或阻燃聚氯乙烯护套型电缆。

The ambient temperature in - 15℃ above, the open-air laying or easily the suffers-water long-time immersion cable, may choose the PE+PVC double composite oversheath cable.

The Ambient temperature in - 15℃ below, In the winter severely cold, moist, contains the chemical etching environment area, or because the subsoil water water-level high,the cable easy suffer-water long-time immersion the place, selects the PE oversheath cable suitably.

Termite severely impair area, selects the termite-proof to sheath the grade soft-polyethylene oversheath suitably.

In 60℃ above high temperature place, Should select the temperature rank 105℃ polyvinyl-chloride and so on heat-resisting oversheath cables.

In the personnel-intensive public places, for instance the subway, the long distance tunnel, the commercial facilities, the high-rise construction and so on have the low poisonous being flame-resistant request place, selects suitably halogen-free low smoke polyolefine oversheath cable, (When not low poisonous request, selects the being fire retardant PVC oversheath's cable as far as possible).

Is clear must when is coordinated with the environment, does not use PVC oversheath.

In addition to the above requirements, other select PVC or fire retardant PVC oversheath cable as far as possible.

5.4 电缆护套绝缘性能良好，可在空气中（如电缆沟、电缆桥架）或直埋敷设使用。

Cable oversheath insulating performance is good, May lay (for example cable trench, electric cable bridge) in the air or by straight buries the way of laying use.

二、产品型号、名称、规格　Product Type, Name, Specification

电缆型号	名称	规格（mm^2）
YJY	铜芯交联聚乙烯绝缘聚乙烯护套电力电缆 Copper conductor XLPE insulated PE sheathed power cable	70～400
YJV	铜芯交联聚乙烯绝缘聚氯乙烯护套电力电缆 Copper conductor XLPE insulated PVC sheathed power cable	70～400
YJY_{62}	铜芯交联聚乙烯绝缘双铝带铠装聚氯乙烯护套电力电缆 Copper conductor XLPE insulated double aluminium tape armoured PVC oversheathed power cable	70～400
YJY_{63}	铜芯交联聚乙烯绝缘双铝带铠装黑色高密度聚乙烯护套电力电缆 Copper conductor XLPE insulated double aluminium tape armoured PE oversheathed power cable	70～400
YJY_{65}	铜芯交联聚乙烯绝缘双铝带铠装 PE+PVC 复合型护套电力电缆 Copper conductor XLPE insulated double aluminium tape armoured PE+PVC oversheathed power cable	70～400
YJY_{72}	铜芯交联聚乙烯绝缘细铝丝铠装聚氯乙烯护套电力电缆 Copper conductor XLPE insulated thin aluminium wire armoured PVC oversheathed power cable	70～400
YJY_{73}	铜芯交联聚乙烯绝缘细铝丝铠装黑色高密度聚乙烯护套电力电缆	70～400

	Copper conductor XLPE insulated thin aluminium wire armoured PE oversheathed power cable	
YJY_{75}	铜芯交联聚乙烯绝缘细铝丝铠装 PE+PVC 复合型护套电力电缆 Copper conductor XLPE insulated thin aluminium wire armoured PE+PVC oversheathed power cable	70～400
$ZB\text{-}YJY_{62}$	铜芯交联聚乙烯绝缘双铝带铠装阻燃(B 类)聚氯乙烯护套电力电缆 Copper conductor XLPE insulated double aluminium tape armoured flame-retardant （B class）PVC oversheathed power cable	70～400
$ZC\text{-}YJY_{62}$	铜芯交联聚乙烯绝缘双铝带铠装阻燃(C 类)聚氯乙烯护套电力电缆 Copper conductor XLPE insulated double aluminium tape armoured flame-retardant （C class）PVC oversheathed power cable	70～400
$ZB\text{-}YJY_{72}$	铜芯交联聚乙烯绝缘细铝丝铠装阻燃(B 类)聚氯乙烯护套电力电缆 Copper conductor XLPE insulated thin aluminium wire armoured flame-retardant （B class）PVC oversheathed power cable	70～400
$ZC\text{-}YJY_{72}$	铜芯交联聚乙烯绝缘细铝丝铠装阻燃(C 类)聚氯乙烯护套电力电缆 Copper conductor XLPE insulated thin aluminium wire armoured flame-retardant （C class）PVC oversheathed power cable	70～400
$DDZB\text{-}YJY_{62}$	铜芯交联聚乙烯绝缘双铝带铠装低烟低卤阻燃(B 类)聚氯乙烯护套电力电缆 Copper conductor XLPE insulated double aluminium tape armoured low-halogen low-smoke flame-retardant （B class）PVC oversheathed power cable	70～400
$DDZC\text{-}YJY_{62}$	铜芯交联聚乙烯绝缘双铝带铠装低烟低卤阻燃(C 类) 聚氯乙烯护套电力电缆 Copper conductor XLPE insulated double aluminium tape armoured low-halogen low-smoke flame-retardant （C class）PVC oversheathed power cable	70～400
$DDZB\text{-}YJY_{72}$	铜芯交联聚乙烯绝缘细铝丝铠装低烟低卤阻燃(B 类) 聚氯乙烯护套电力电缆 Copper conductor XLPE insulated thin aluminium wire armoured low-halogen low-smoke flame-retardant （B class）PVC oversheathed power cable	70～400
$DDZC\text{-}YJY_{72}$	铜芯交联聚乙烯绝缘细铝丝铠装低烟低卤阻燃(C 类) 聚氯乙烯护套电力电缆 Copper conductor XLPE insulated thin aluminium wire armoured low-halogen low-smoke flame-retardant （B class）PVC oversheathed power cable	70～400
$WDZA\text{-}YJY_{63}$	铜芯交联聚乙烯绝缘双铝带铠装无卤低烟阻燃(A 类)聚烯烃护套电力电 Copper conductor XLPE insulated double aluminium tape armoured halogen free low-smoke flame-retardant （A class）PO oversheathed power cable	70～400
$WDZB\text{-}YJY_{63}$	铜芯交联聚乙烯绝缘双铝带铠装无卤低烟阻燃(B 类)聚烯烃护套电力电缆 Copper conductor XLPE insulated double aluminium tape armoured halogen free low-smoke flame-retardant （B class）PO oversheathed power cable	70～400
$WDZC\text{-}YJY_{63}$	铜芯交联聚乙烯绝缘双铝带铠装无卤低烟阻燃(C 类)聚烯烃护套电力电缆 Copper conductor XLPE insulated double aluminium tape armoured halogen free low-smoke flame-retardant （C class）PO oversheathed power cable	70～400

WDZA-YJY$_{73}$	铜芯交联聚乙烯绝缘细铝丝铠装无卤低烟阻燃(A 类)聚烯烃护套电力电缆 Copper conductor XLPE insulated thin aluminium wire armoured halogen free low-smoke flame-retardant （A class）PO oversheathed power cable	70～400
WDZB-YJY$_{73}$	铜芯交联聚乙烯绝缘细铝丝铠装无卤低烟阻燃(B 类)聚烯烃护套电力电缆 Copper conductor XLPE insulated thin aluminium wire armoured halogen free low-smoke flame-retardant （B class）PO oversheathed power cable	70～400
WDZC-YJY$_{73}$	铜芯交联聚乙烯绝缘细铝丝铠装无卤低烟阻燃(C 类)聚烯烃护套电力电缆 Copper conductor XLPE insulated thin aluminium wire armoured halogen free low-smoke flame-retardant （C class）PO oversheathed power cable	70～400

三、主要技术性能　Main Technical Properties

序号 No.	性能 Performance	电气化铁路 27.5kV 单相交流交联聚乙烯绝缘电缆 27.5kV single-phase AC XLPE insulation cable for electrified railway 27.5 kV
1	导体直流电阻试验（Ω/km） D.C. conductor resistance （Ω/km）	符合 GB/T3956 规定 To comply with GB/T3956
2	局部放电试验 Partial discharge test 1.73U_0 下放电量不大于（pC） The magnitude of the discharge at 1.73U_0shall not exceed	10
3	工频耐压试验（kV） Power frequncy withstand voltage test (kV)	3.5 U_0 5 minutes 或 2.5 U_0 30 minutes
4	4h 工频耐压试验（kV） Power frequncy withstand voltage test for 4h (kV)	4U_0
5	热延伸试验 Hot set test 1、 处理条件 Treatment 空气温度（偏差±3℃）Air temperature (tolerance ±3℃) (℃) 载荷时间 Tiem under load (minutes) 机械应力 Mechanical stress (N/cm^2) 2、载荷下最大伸长率 Maximum elongation under load (%) 3、冷却后最大永久伸长率 Maximum permanent elongation After cooling (%)	200 15 20 175 15

四、电缆结构尺寸　Construction of cable

YJY_{72}、YJY_{73}、ZB-YJY_{72}、ZC-YJY_{72}、DDZB-YJY_{72}、DDZC-YJY_{72}、WDZA-YJY_{73}、WDZB-YJY_{73}、WDZC-YJY_{73}

导体标称截面 Nom.Crosssection of conductor （mm^2）	导体直径 Diameter of conductor （mm）	绝缘厚度 Insulation Thickness （mm）	护套厚度 Sheath Thickness （mm）	电缆外径（近似） o.d. of cable （Approx.） （mm）	电缆重量（近似） Cable weight （Approx.） （kg/km）	20℃时导体最大直流电阻 Max.D.C. Resistance of conductor at 20℃ （Ω/km）	电缆载流量 Current rating （A）	
							土壤敷设 Direct in ground	空气敷设 Run in air
70	10.0	12	2.9	56.46	3716.3	0.268	275	305
95	11.7	12	3.0	58.36	4115.1	0.193	335	375
120	13.1	12	3.0	59.76	4440.9	0.153	380	435
150	14.6	12	3.2	61.66	4889.1	0.124	425	490
185	16.2	12	3.2	63.46	5453.6	0.0991	485	565
240	18.4	12	3.2	65.66	6114.0	0.0754	565	665
300	20.6	12	3.2	67.86	6832.4	0.0601	635	760
400	23.8	12	3.3	71.46	8174.9	0.0470	730	890

YJY_{62}、YJY_{63}、ZB-YJY_{62}、ZC-YJY_{62}、DDZB-YJY_{62}、DDZC-YJY_{62}、WDZA-YJY_{63}、WDZB-YJY_{63}、WDZC-YJY_{63}

导体标称截面 Nom.Crosssection of conductor （mm^2）	导体直径 Diameter of conductor （mm）	绝缘厚度 Insulation Thickness （mm）	护套厚度 Sheath Thickness （mm）	电缆外径（近似） o.d. of cable （Approx.） （mm）	电缆重量（近似） Cable weight （Approx.） （kg/km）	20℃时导体最大直流电阻 Max.D.C. Resistance of conductor at 20℃ （Ω/km）	电缆载流量 Current rating （A）	
							土壤敷设 Direct in ground	空气敷设 Run in air
70	10.0	12	2.8	52.06	3062.0	0.268	275	305
95	11.7	12	2.9	53.96	3425.4	0.193	335	375
120	13.1	12	3.0	55.56	3769.9	0.153	380	435
150	14.6	12	3.2	57.46	4194.2	0.124	425	490
185	16.2	12	3.2	59.26	4726.6	0.0991	485	565
240	18.4	12	3.2	61.46	5370.4	0.0754	565	665
300	20.6	12	3.2	63.66	6058.8	0.0601	635	760
400	23.8	12	3.2	67.06	7329.7	0.0470	730	890

五、电缆的电容、电感（参考值）　Capacitance and inductance of cable（reference value）

导体标称截面 Nom.Crosssection of conductor （mm^2）	电容 Capacitance （μF/km）	电感 Inductance （mH/km）
70	0.116	0.720
95	0.126	0.697
120	0.134	0.679
150	0.143	0.661
185	0.152	0.646
240	0.165	0.627
300	0.178	0.612
400	0.196	0.593

六、电缆敷设运行条件　The installation operating condition of cable

电缆导体的长期最高工作温度：90℃。
Max.continuous operating temperature of the conductor:90℃
环境空气温度：40℃。
Ambient air temperature: 40℃.
土壤温度：25℃。
Soil temperature: 25℃.
土壤热阻系数：1.0V.m/W。
Thermal resistivity of soil: 1.0V.m/W.
平面排列，电缆中心距为 2 倍电缆直径。
flat arrangement, Cable Center distance is 2 times the cable diameter
金属屏蔽和铠装单端接地
Metal shielding and armoured one-port grounding

不同土壤温度下的载流量修正系数
Rating modulus of current rating for soil temperature

土壤温度 Soil temperature ℃	10	15	20	25	30	35
系数 Modulus	1.11	1.07	1.04	1.00	0.96	0.92

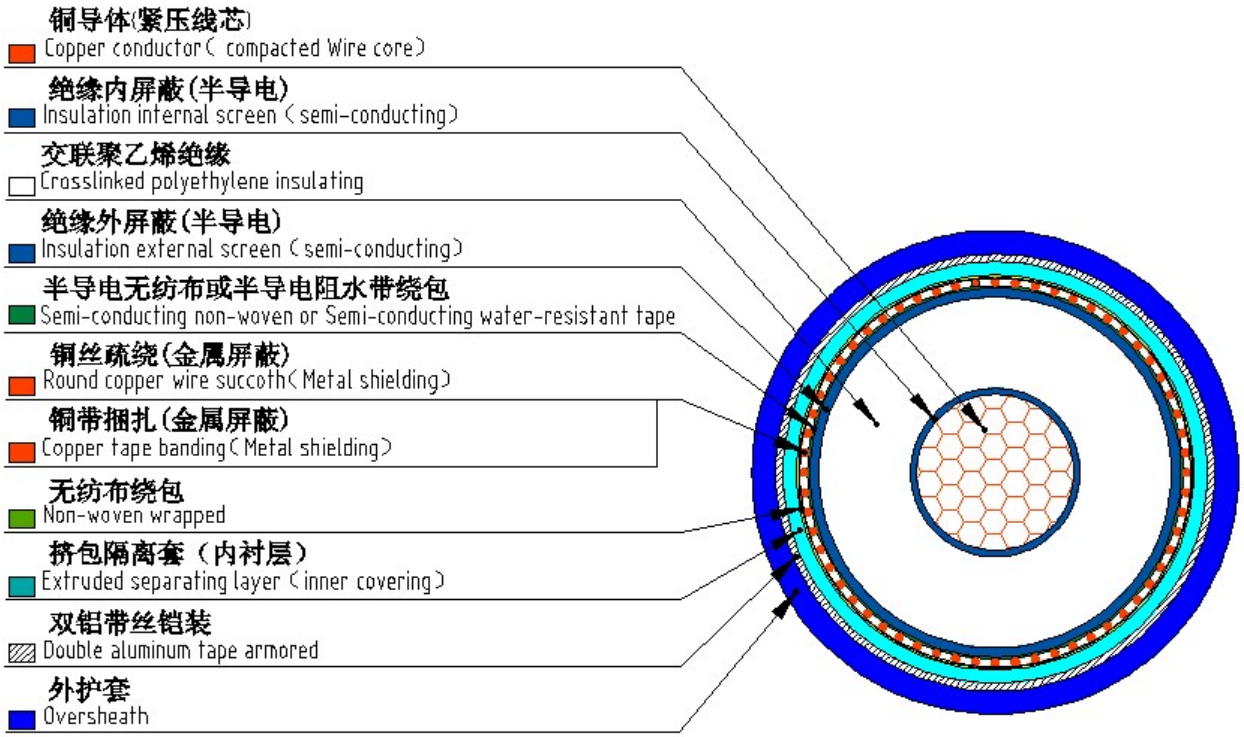
不同土壤热阻系数的载流量修正系数
Rating modulus of current rating for soil thermal temperature

土壤热阻系数 Soil thermal resistivity	0.8	1.0	1.2	1.5
系数 Modulus	1.06	1.0	0.94	0.80

不同环境温度下的载流量修正系数
Rating modulus of current rating for ambient temperature

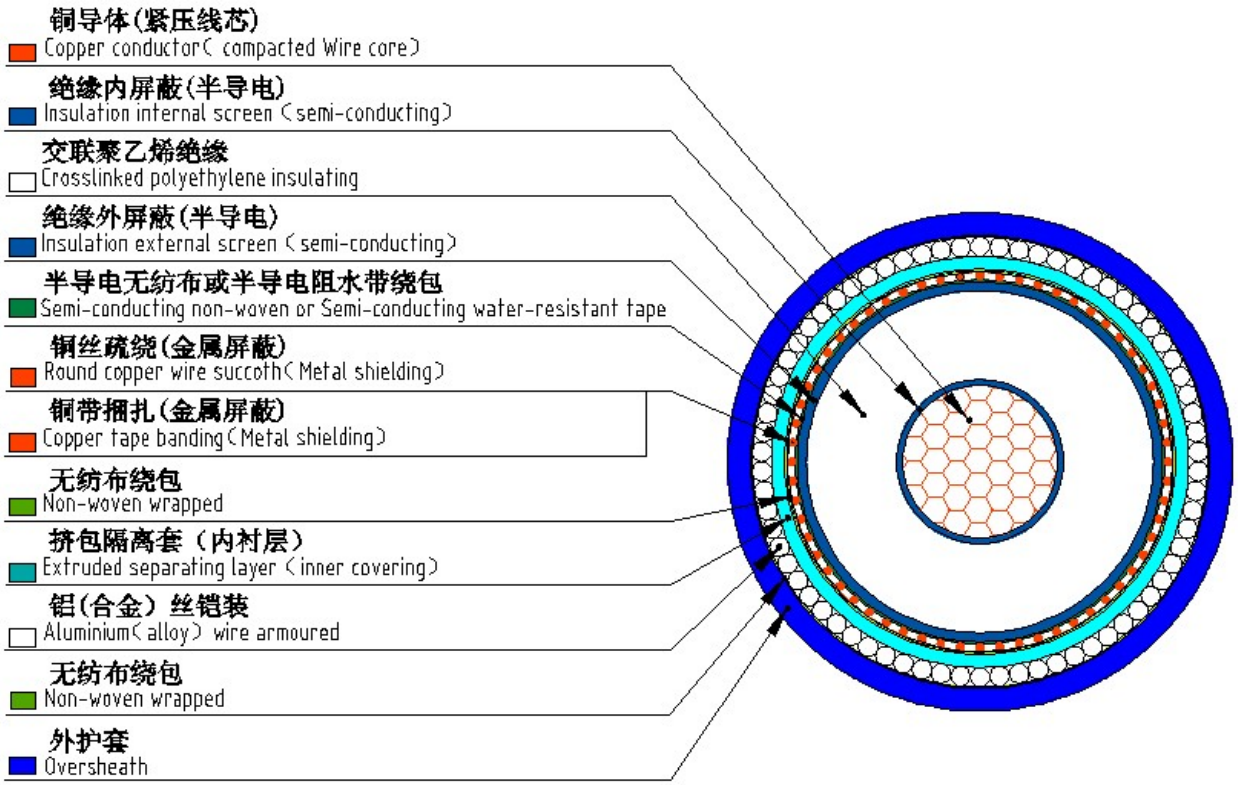
环境空气温度 Air temperature ℃	20	25	30	35	40	45	50	55
系数 Modulus	1.23	1.17	1.12	1.06	1.00	0.94	0.87	0.81

七、结构示意图　**Structural Sketch**



双铝带铠装结构示意图

Structure schematic with double aluminum tape armored



铝丝铠装结构示意图

Structure schematic with aluminium(alloy) wire armoured