

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 insulated cables for electric railway

■ 执行标准

GB/T 28427-2012

■ 适用范围

主要适用于交流单相、工频、额定电压27.5kV电气化铁路电线、自耦变压器供电线以及牵引变电所、分区所、开闭所、自耦变压器所引出的馈线等。

■ 使用特性

- 1、电缆额定电压27.5kV。
- 2、电缆在正常运行时导体允许的长期最高温度为90℃；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℃。
- 3、安装时电缆最小弯曲半径为15倍电缆外径。
- 4、低卤低烟阻燃电缆，烟气最小透光率应大于或等于30%，燃烧时释放气体的pH值应大于或等于2.5，电导率应小于或等于30μs/mm，卤酸气体逸出量应小于或等于100mg/g。
- 5、无卤低烟阻燃电缆，烟气最小透光率应大于或等于60%，燃烧时释放气体的pH值应大于或等于4.3，电导率应小于或等于10μs/mm。
- 6、电缆符合GB/T 18380.35C类阻燃特性要求。
- 7、电缆具有径向防水性能。
- 8、电缆不允许敷设在铁质管道中，允许在非磁性管道中敷设。

■ Executive standard

GB/T 28427-2012

■ Range of application

This kind of cables are mainly applied in AC single-phase, power frequency, electric railways with rated voltage 27.5kV, power supply of self-coupling transformers and feeder lines from traction substations, districts, switch stations and self coupling transformers, etc.

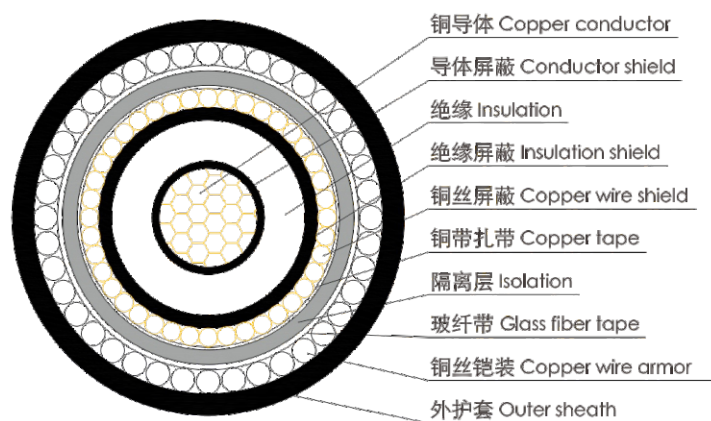
■ Operating characteristics

1. Rated voltage is 27.5kV.
2. Max. long-term allowable working temperature for cable conductor is 90℃; Max. temperature of conductor allowable for cable conductor is 250℃ in short-circuit (Max. duration less than 5s).
3. Min. bending radius is 15 times of outer diameter in cable laying.
4. For low halogen low smoke flame retardant cables, the Min. light transmittance of smoke should be no less than 30%, pH value of burning gas should be no less than 2.5, conductivity should be no more than 30μs/mm, and spill of halogen acid gas should be no more than 100mg/g.
5. For halogen free low smoke flame retardant cables, the min. light transmittance of smoke should be no less than 60%, pH value of burning gas should be no less than 4.3, conductivity should be no more than 10μs/mm.
6. Cables comply with class C flame retardant requirements in GB/T 18380.35 standard.
7. Cables have radial moisture barrier.
8. It is not allowed to lay the cables in steel pipelines, but can be laid in non-magnetic pipelines.

■ 型号及名称 Type and description

型号 Types	名称 Descriptions
TDDD-YJY72	铜芯交联聚乙烯绝缘铝丝铠装低烟低卤阻燃护套电力电缆 Cu core XLPE insulated, Al wire armored, low smoke low halogen flame retardant sheathed, power cable
TDWD-YJY73	铜芯交联聚乙烯绝缘铝丝铠装低烟无卤阻燃护套电力电缆 Cu core XLPE insulated, Al wire armored, low smoke halogen free flame retardant sheathed, power cable

■ 结构示意图 Structure diagrammatic drawing



■ 产品规格 Product specification

电缆导体截面优先值为150mm²、185mm²、240mm²、300mm²、400mm²

The prior cross sections of cable conductor are 150mm², 185mm², 240mm², 300mm² and 400mm².

■ 主要技术性能 Main technical performance

1、电缆试验电压 Test voltage

确定试验电压U ₀ 值 Fixed U ₀ value of test voltage	例行电压试验 Routine voltage test		局部放电试验 Partial discharge test	电缆4h电压试验 4h voltage test	冲击试验后工 频耐压试验 Power frequency withstand voltage test after impact test	冲击电压试验 Impact voltage test
	电压 Voltage	时间 Period				
U ₀ kV	3.5U ₀ kV	min	1.73U ₀ kV	4U ₀ kV	2.5U ₀ kV	kV
27.5	97	5	48	110	69	250

2、电缆导体最大允许短路电流 Max. allowable conductor current in short-circuit

标称截面 (mm ²) Nominal cross section	150	185	240	300	400
最大允许故障短路电流kA Max. allowable current in short-circuit	21.4	26.4	34.3	42.9	57.2
短路持续时间为1S, 短路起始温度为90℃ Short-circuit duration is 1S, and temperature starts with 90℃.					

3、电缆绝缘厚度、直流电阻、外径及重量 Insulation thickness, DC resistance, outer diameter and weight

标称截面 Nominal cross section (mm ²)	绝缘厚度 Insulation thickness (mm)	电缆近似外径 Approximate outer diameter (mm)	电缆参考重量 Reference weight (kg/km)	导体20℃直流电阻 Conductor DC resistance at 20℃ (Ω/km)
150	11.0	59.6	4701	0.124
185	11.0	61.3	5159	0.0991
240	11.0	63.5	5833	0.0754
300	11.0	66.6	6749	0.0601
400	11.0	69.8	7931	0.0470

4、不同敷设条件下电缆载流量 Current-carrying capacity under different laying conditions

4.1 电缆载流量 Current-carrying capacity

序号 No.	敷设条件 Laying conditions	单位 Unit	标称截面 (mm ²) Nominal cross section				
			150	185	240	300	400
1	1、电缆导体工作温度90℃ Working temperature of conductor 90℃ 2、环境温度40℃ Ambient temperature 40℃ 3、敷设在空气中 Laying in air 4、平面排列，电缆中心距为2倍电缆直径 Plane arrangement, central distance is 2 times of cable outer diameter. 5、金属屏蔽和铠装单端接地 Metallic shield and armor single-end earthing	A	490	565	665	760	850
2	1、电缆导体工作温度90℃ Conductor working temperature 90℃ 2、环境温度25℃ Ambient temperature 25℃ 3、敷设在土壤中，土壤热阻系数为1.0K·m/W Thermal resistance is 1.0K·m/W when laying in soil. 4、平面排列，电缆中心距为2倍电缆直径 Plane arrangement, central distance is 2 times of cable outer diameter. 5、金属屏蔽和铠装单端接地 Metallic shield and armor single-end earthing	A	425	485	585	635	730
3	1、电缆导体工作温度90℃ Working temperature of conductor 90℃ 2、环境温度40℃ Ambient temperature 40℃ 3、敷设在空气管道中 Laying in pipelines in air 4、平面排列，电缆中心距为2倍电缆直径 Plane arrangement, central distance is 2 times of cable outer diameter. 5、金属屏蔽和铠装单端接地 Metallic shield and armor single-end earthing	A	385	440	520	590	685
4	1、电缆导体工作温度90℃ Working temperature of conductor 90℃ 2、环境温度25℃ Ambient temperature 25℃ 3、敷设在土壤管道中 Laying in pipelines in soil 4、平面排列，电缆中心距为2倍电缆直径 Plane arrangement, central distance is 2 times of cable outer diameter. 5、金属屏蔽和铠装单端接地 Metallic shield and armor single-end earthing	A	370	420	490	560	640

4.2 环境空气温度不同时的载流量修正系数 Current-carrying capacity correction coefficient in different ambient air temperatures

导体工作温度 (°C) Working temperature of conductor	环境温度 (土壤中) (°C) Ambient temperature(in soil)							
	20	25	30	35	40	45	50	55
90	1.23	1.17	1.12	1.06	1.00	0.94	0.87	0.81

4.3 环境土壤温度不同时的载流量修正系数 Current-carrying capacity correction coefficient in different ambient temperatures in soil

导体工作温度 (°C) Working temperature of conductor	环境温度 (土壤中) (°C) Ambient temperature(in soil)					
	10	15	20	25	30	35
90	1.11	1.07	1.04	1.00	0.96	0.92

4.4 不同土壤热阻系数的载流量修正系数 Current-carrying capacity correction coefficient in different thermal resistance in soil

电压 (kV) Voltage	土壤热阻系数 (K·m/W) Soil thermal resistance			
	0.8	1.0	1.2	1.5
27.5	1.06	1.0	0.94	0.80