

Technical Specification for 19/33kV

Heat Shrink Cable Accessories

➤ Overview

This document specifies the construction, test requirements, package, and storage of cable accessories with rated voltage 19/33kV.

➤ Terms and definitions

1. Termination

Device fitted to the end of a cable to ensure electrical connection with other parts of the system and to maintain the insulation up to the point of connection

2. Indoor termination

Termination intended for use where it is not exposed to either solar radiation or weathering

3. Outdoor termination

Termination intended for use where it is exposed to either solar radiation or weathering or both

4. Straight joint

Accessory making a connection between two cables to form continuous circuit

➤ Standards

IEC 60502-4:2005

Power cables with extruded insulation and their accessories for rated voltages from 1kV ($U_m=1.2\text{kV}$) up to 30 kV ($U_m=36\text{kV}$) –

Part 4: Test requirements on accessories for cables with rated voltages from 6kV ($U_m=7.2\text{kV}$) up to 30 kV ($U_m=36\text{kV}$)

IEC 60502-2:2005

Power cables with extruded insulation and their accessories for rated voltages from 1kV ($U_m=1.2\text{kV}$) up to 30 kV ($U_m=36\text{kV}$) –

Part 2: Cables for rated voltages from 6kV ($U_m=7.2\text{kV}$) up to 30 kV ($U_m=36\text{kV}$)

GB/T 12706.4

Power cables with extruded insulation and their accessories for rated voltages from 1kV ($U_m=1.2\text{kV}$) up to 35 kV ($U_m=40.5\text{kV}$) –

Part 4: Test requirements on accessories for cables with rated voltages from 6kV ($U_m=7.2\text{kV}$) up to 35 kV ($U_m=40.5\text{kV}$)

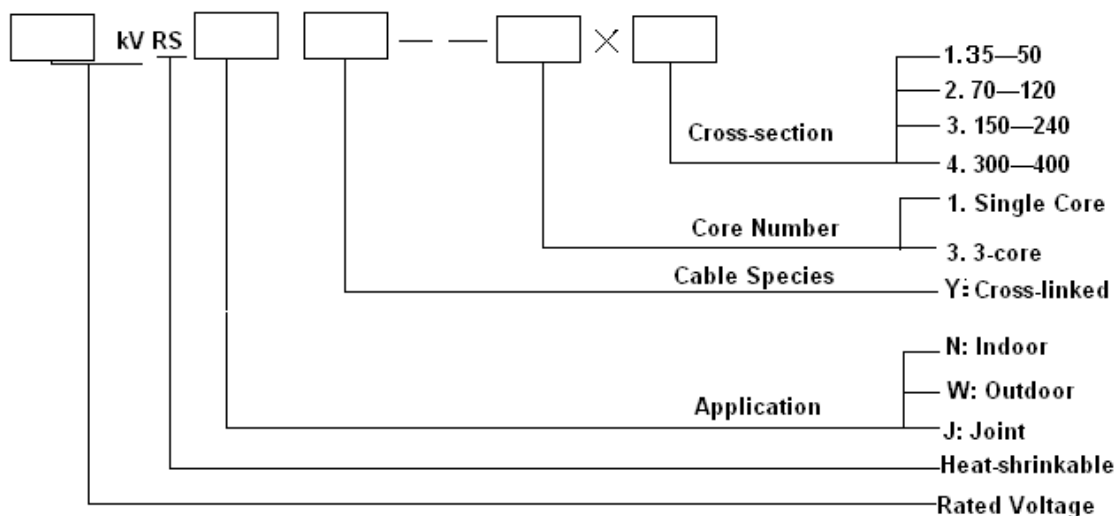
IEC 61442:2005

Test methods for accessories for power cables with rated voltages from 6kV ($U_m=7.2\text{kV}$) up to 30 kV ($U_m=36\text{kV}$)

IEC 60885

Electrical test methods for electric cables

➤ **Product Designation**



➤ **Rated Voltages**

Rated voltage $U_0/U (U_m)$: 19/33(36) kV

In the voltage designation of cables $U_0/U (U_m)$:

U_0 : Rated power frequency voltage between conductor and earth or metallic screen for which the cable is designed.

U : Rated power frequency voltage between conductors for which the cable is designed.

U_m : Maximum value of the “highest system voltage” for which the equipment may be used.

➤ **Applicable to cables with extruded insulation**

➤ **Specific creepage distance**

>3.1cm/kV (applicable to outdoor termination)

➤ **Maximum conductor temperature**

Table 1. Maximum conductor temperatures for different types of insulating compound

Insulating Compound	Maximum conductor temperature/°C	
	Normal Operation	Short Circuit (5s maximum duration)
Cross-linked polyethylene (XLPE)	90	250
Ethylene propylene rubber (EPR and HEPR)	90	250

➤ **Service conditions**

1. **Usual service conditions:**

- Environmental temperature within the range of -40°C to +40°C.
- Altitudes not exceeding 1000m above sea level.
- Long term operation temperature, over-load temperature and short-circuit temperature of cable accessories shall meet the requirements of its mating cable.



2. Unusual service conditions :

(Performances and values of cable accessories need further consideration.)

- a) Environmental temperature below -40°C , or above $+40^{\circ}\text{C}$.
- b) Altitudes exceeding 1000m above sea level.
- c) Long term operation under severe environmental conditions, such as strong vibration, strong wind, ice and snow, heavy contamination areas, etc.

➤ **Test**

1. For type test requirements, please refer to Annex.
2. Acceptance test (recommended)
 - a. Insulation resistance of cable core insulation.
 - b. AC voltage withstand test of cable core insulation (alternative to DC voltage withstand test)
After installation of cable accessories, apply 45kV AC voltage between the conductor and metal screen for 5min.

➤ **Marking, packaging, transportation, and storage**

1. Marking

The following information shall be printed with legible and durable color on the surface of cable accessories:

- a. Name of manufacturer
- b. Product name and part number
- c. Rated voltage
- d. Conductor cross-section
- e. Date of manufacturing and lot number
- f. The period of validity (applicable to some parts)

2. Packaging, transportation and storage

The packaging, transportation and storage of the products shall be conducted according to the instruction and information offered by the manufacturer.

Woer Power Division

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Annex: Type Test

No	Items ¹⁾	Standard Requirements		
		Indoor termination	Outdoor termination	Joint
1	AC voltage	5min at 85.5kV, no breakdown nor flashover		
	AC voltage (wet)	/	1min at 76kV, no breakdown nor flashover	/
2	Partial discharge	10pC max. at 33kV		
3	Impulse voltage at elevated temperature θ_t ²⁾	10 impulses of each polarity at 194kV, no breakdown nor flashover		
4	Heating cycles	60 cycles ³⁾ in air at θ_t and 48kV	30 cycles ³⁾ in air and 30 cycles ³⁾ under water at θ_t and 48kV	
5	Partial discharge at θ_t ^{2) 4)} and ambient temperature	10pC max. at 33kV		
6	Thermal short-circuit (screen) ⁵⁾	Two short-circuits at I_{SC} of the cable screen, no visible deterioration		
7	Thermal short-circuit (conductor)	Two short-circuits to raise conductor to θ_{SC} of the cable, no visible deterioration		
8	Dynamic short-circuit ⁶⁾	One short-circuit at I_d , no visible deterioration		
9	Impulse voltage	10 impulses of each polarity at 194kV, no breakdown nor flashover		
10	AC voltage	15min at 48kV, no breakdown nor flashover		
11	Humidity	300h duration at 24kV	/	/
12	Salt fog	/	1000h duration at 24kV	/

- 1) Unless otherwise specified, tests shall be carried out at ambient temperature.
- 2) θ_t is the maximum cable conductor temperature in normal operation +5K to 10K.
- 3) 8h total with ≥ 2 h steady and ≥ 3 h cooling.
- 4) Measurement is made at the end of the heating period.
- 5) This test is only required for terminations that are equipped with a connection to, or adaptor for, the metallic screen of the cable.
- 6) Only required for single-core cable accessories designed for initial peak current $I_p > 80$ kA and three-core cable accessories designed for $I_p > 63$ kA. Value of I_d shall be declared by the manufacturer.