

**SPECIFICATION****For****12/20KV-AL-CV**

12/20(24)kV

Aluminium Conductor XLPE Insulated

PVC Sheathed Power Cable

(12/20(24)kV, AL/XLPE/CTS/PVC)

BY



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Rev.	Date	Description
0	16/01/2020	Issued specification
1	17/6/2021	- Cancel code "0010" - Add "red" color sheath
2	3/3/2025	Cancel "red" color sheath

APP. \_\_\_\_\_

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CUSTOMER

Customer Document	Rev.

**Remark:**

This document is based on the Customer Document for the structure and properties of electric wire and cable only. If there are different points, will be shown in deviation table.

## **1. Scope**

This specification covers 22000V aluminium conductor cross-linked polyethylene (XLPE) insulated polyvinyl chloride (PVC) sheathed power cable.

The cable shall be in accordance with IEC 60502-2 : 2014.

Flame retardant test requirements per IEC 60332-1.

## **2. Conductor**

The conductor shall be compacted concentric stranded uncoated hard-drawn aluminium conductor in accordance with IEC 60228 : 2004, Class 2.

The direction of lay shall be right-hand (Z) lay in the outermost layer.

## **3. Conductor Shield**

The conductor shield shall be a layer of extruded semi-conducting compound.

The thickness of the conductor shield shall be approximate 0.5 mm.

## **4. Insulation**

The insulation shall be cross-linked polyethylene (XLPE) compound meet the requirements of IEC 60502-2 : 2014.

The average thickness of the insulation shall be not less than that given in Table 1.

The minimum thickness shall not fall below 90% of the nominal value in Table 1 by more than 0.1 mm.

## **5. Insulation Shield**

The insulation shield shall be a layer of extruded semi-conducting compound and shall be free stripping.

The thickness of the insulation shield shall be approximate 0.5 mm.

## **6. Metallic Shield**

The metallic shield shall be an uncoated annealed copper tape and shall be applied helically with a lap over the insulation shield.

The thickness of the copper tape shall be approximate 0.1 mm.

A suitable separator tape shall be applied helically over the metallic shield for single-core only.

## **7. Cabling (For multi-cores only)**

The individual shielded core shall be cabled together with suitable non-hygroscopic filler to give the completed cable a substantially circular cross section.

The direction of lay shall be left-hand (S) lay.

A suitable binder tape shall be applied helically over the cabled core.

## 8. Core Identification

The cores shall be identified by colors of identification tape, placed longitudinally under the metallic shield, as follow :

Single-core : Not inserted color of identification tape  
3-cores : white, red, blue

## 9. Sheath

The sheath shall be sunlight resistant polyvinyl chloride (PVC/ST2) compound meet the requirements of IEC 60502-2 : 2014.


The average thickness of the sheath shall be not less than that given in Table 1.

The minimum thickness shall not fall below 90% of the nominal value in Table 1 by more than 0.2 mm.

The color of the sheath shall be black.

## 10. Marking on Cable

The marking items shall be marked by printed at intervals not exceeding 1 meter with suitable means throughout the length of cable.

1. Manufacturer's name and/or trade mark "  YAZAKI.....TYE"
2. Year of manufacture
3. Rated circuit voltage "12/20(24)KV"
4. Type of conductor "AL"
5. Type of insulation and sheath "XLPE/PVC"
6. Type of cable "POWER CABLE"
7. Number of cores and size of conductor
8. The continuous reel length marking (in figure) shall be made on the sheath at every 1 meter

## 11. Test and Properties

The cable shall meet the requirements in Test and Inspection and Table 1, when tested in accordance with IEC 60502-2 : 2014, IEC 60228 : 2004 and IEC 60332-1.


Remark: Sunlight resistant test meet the requirement of TIS 293-2541.

## 12. Packing

The cable shall be placed on non-returnable wooden reels.

The reels shall be covered with suitable covering to provide the cable with physical protection during transportation and during ordinary storage and handling operations.

Each reel shall be clearly marked as follows.

1. Designation "12/20KV-AL-CV"
2. Number of cores and size of conductor
3. Cable length
4. Net and gross weight
5. Manufacturer's name and/or trade mark "  **YAZAKI** "
6. Rolling direction of reel

## Test and Inspection

### Routine Tests

- Maximum conductor resistance, Ohm/km..... specified in Table 1
- AC test voltage for 5 minutes, kV..... 42
- Maximum partial discharge level\*..... 10 pC or better, at 20.76 kV
- Electrical test on over sheath ..... No breakdown

\*The partial discharge level shall be no detectable discharge exceeding the declared sensitivity

### Sample Tests

- Construction..... specified in Table 1
- AC test voltage for 4 hours, kV..... 48
- Hot set test at  $200\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$  for XLPE
  - Maximum elongation under load (%) ..... 175
  - Maximum permanent elongation after cooling (%)..... 15

### Type Tests

- Flame retardant tested according to IEC 60332-1.

### Definition concerning the tests

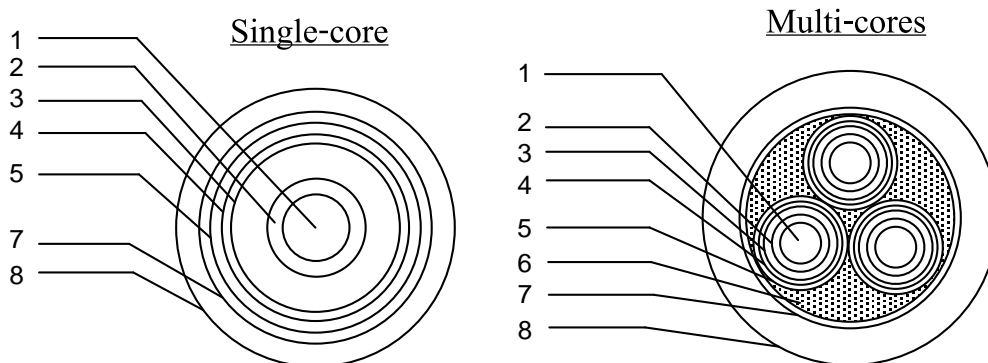
**Routine tests:** Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

**Sample tests:** Tests made by the manufacturer on samples of completed cable or components taken from a completed cable, at a specified frequency, so as to verify that the finished product meets the specified requirements.

**Type tests:** Tests made before supplying, on a general commercial basis, a type of cable covered by this standard, in order to demonstrate satisfactory performance characteristics to meet the intended application.

### Cable structure

Cross-sectional (Not scale)



No.	Structure	Material
1	Conductor	Stranded uncoated hard-drawn aluminium
2	Conductor shield	Semi-conducting compound
3	Insulation	Cross-linked polyethylene (XLPE) compound
4	Insulation shield	Semi-conducting compound
5	Metallic shield	Copper tape
6	Filler	Non-hygroscopic
7	Binder tape	Spun bond tape or suitable tape
8	Sheath	Polyvinyl chloride (PVC/ST2) compound

**Application:** Use for installation exposed, or in raceway, wet or dry location, or direct burial in ground.

Maximum conductor temperature of 90°C for normal operation and 250°C for short circuit conditions

**Table 1**

No. of cores	Size  (mm <sup>2</sup> )	Conductor  (wires/type)	Conductor diameter approx.  (mm)	Insulation thickness nominal  (mm)	Sheath thickness nominal  (mm)	Overall diameter approx.  (mm)	Conductor resistance at 20°C maximum (Ohm/km)	Weight of cable approx. (kg/km)	Standard packing length  (m)
1	35	7/Compacted	6.95	5.5	1.8	26.0	0.868	644	500
1	50	7/Compacted	8.01	5.5	1.8	27.0	0.641	713	500
1	70	19/Compacted	9.73	5.5	1.8	29.0	0.443	825	500
1	95	19/Compacted	11.40	5.5	1.9	30.5	0.320	959	500
1	120	19/Compacted	12.95	5.5	2.0	32.5	0.253	1097	500
1	150	19/Compacted	14.27	5.5	2.0	34.0	0.206	1214	500
1	185	34/Compacted	15.98	5.5	2.1	35.5	0.164	1392	500
1	240	34/Compacted	18.47	5.5	2.1	38.0	0.125	1638	500
1	300	34/Compacted	20.68	5.5	2.2	40.5	0.100	1897	500
1	400	55/Compacted	23.39	5.5	2.3	43.5	0.0778	2252	500
3	35	7/Compacted	6.95	5.5	2.7	53.0	0.868	2246	500
3	50	7/Compacted	8.01	5.5	2.8	55.5	0.641	2527	500
3	70	19/Compacted	9.73	5.5	2.9	59.5	0.443	2939	500
3	95	19/Compacted	11.40	5.5	3.0	63.5	0.320	3415	500
3	120	19/Compacted	12.95	5.5	3.1	67.0	0.253	3884	500
3	150	19/Compacted	14.27	5.5	3.2	70.0	0.206	4317	500
3	185	34/Compacted	15.98	5.5	3.3	74.0	0.164	4925	300
3	240	34/Compacted	18.47	5.5	3.5	80.0	0.125	5855	300
3	300	34/Compacted	20.68	5.5	3.7	85.0	0.100	6774	300
3	400	55/Compacted	23.39	5.5	3.9	91.5	0.0778	8023	200