

**SPECIFICATION****For****115KV-CE-CWS**

115KV

XLPE Insulated Copper Wire Screened

PE Sheathed Power Cable

(115kV, Cu/XLPE/CWS/LAT/PE)

BY



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CUSTOMER

Rev.	Date	Description
0	3/03/2021	Issued specification
1	29/05/2023	Change marking
2	25/04/2024	Change thickness sheath in Table 1
3	14/08/2024	Change thickness sheath in Table 1
4	11/02/2025	Update Table 1

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 115KV copper conductor cross-linked polyethylene (XLPE) insulated copper wire screened polyethylene (PE) sheathed power cable.

The cable shall be in accordance with TIS 2202-2547.

## **2. Conductor**

The conductor shall be compacted concentric stranded uncoated annealed copper conductor in accordance with IEC 60228: 2004, Class 2.

The direction of lay shall be left-hand (S) lay in the outermost layer.

## **3. Tape on conductor**

The semi-conductive nylon tape as a separator tape shall be longitudinally applied over the conductor.

## **4. Conductor Shield**

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

The average thickness of the conductor shield shall not be less than 1.5 mm.

The minimum thickness of the conductor shield shall not be less than 1.2 mm.

## **5. Insulation**

The insulation shall be unfilled, no carbon black, cross-linked polyethylene (XLPE) compound meet the requirements of TIS 2202-2547.

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

The minimum thickness shall not be less than 90 % of the value in Table 1.

## **6. Insulation Shield**

The insulation shield shall be a layer of extruded semi-conducting compound, over the insulation.

The average thickness of the insulation shield shall not be less than 1.5 mm.

The minimum thickness of the insulation shield shall not be less than 1.2 mm.

## **7. Synthetic Water Blocking Layer**

A semi-conductive non-biodegradable water blocking layer shall be provided under the metallic shield to provide a continuous longitudinal watertight barrier throughout the cable length.

## **8. Metallic Shield**

The metallic shield shall be consisted of plain annealed round copper wires applied helically over the water blocking layer.

The contact tape shall be an uncoated annealed copper tape and shall be applied helically with a gap over the copper wire screen.

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

## **9. Synthetic Water Blocking and Cushioning Tape**

A non-conductive non-biodegradable water blocking tape shall be applied over the metallic shield to provide a continuous longitudinal watertight throughout the cable length.

## **10. Radial Water Barrier**

A radial water barrier consisting of laminated aluminium tape having average thickness at least 0.19 mm. coated on both sides with polyethylene shall be incorporated under the non-metallic sheath.

## **11. Non metallic Sheath**

The sheath shall be sunlight resistant polyethylene (PE/ST7) compound meet the requirements of TIS 2202-2547.


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

The minimum thickness of the sheath shall not be less than 85 % of the nominal value in Table 1.

The color of sheath shall be black.

## **12. 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 "115KV"
4. Type of conductor "CU"
5. Type of insulation and sheath "XLPE/PE"
6. Size of conductor
7. TIS logo and standard number
8. The continuous reel length marking (in figure) shall be made on the sheath at every 1 meter

### 13. Test and Properties

The cable shall meet the requirements in Test and Inspection and Table 1, when tested in accordance with TIS 2202-2547 and IEC 60228 : 2004.


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

### 14. Packing

The cable shall be placed on non-returnable steel 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 on drum or label as follows.

1. Designation "115KV-CE-CWS"
2. Type of conductor "CU"
3. Type of insulation and sheath "XLPE/PE"
4. Size of conductor
5. Cable length
6. Net and gross weight
7. Year of manufacture
8. Manufacturer's name and/or trade mark "  **YAZAKI** "
9. Rolling direction of reel and cable end position
10. TIS logo and standard number

## Test and Inspection

### Routine Tests

- AC test voltage for 30 minutes, kV .....160
  - Electrical test on non-metallic sheath .....Satisfy
  - Maximum partial discharge level\* .....10 pC or better, at 96 kV
- \*The partial discharge level shall be no detectable discharge exceeding the declared sensitivity

### Sample Tests

- Construction.....specified in Table 1
- Maximum conductor resistance, Ohm/km.....specified in Table 1
- Measurement of capacitance,  $\mu\text{F}/\text{km}$ .....specified in Table 1
- 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

### Definition concerning the tests

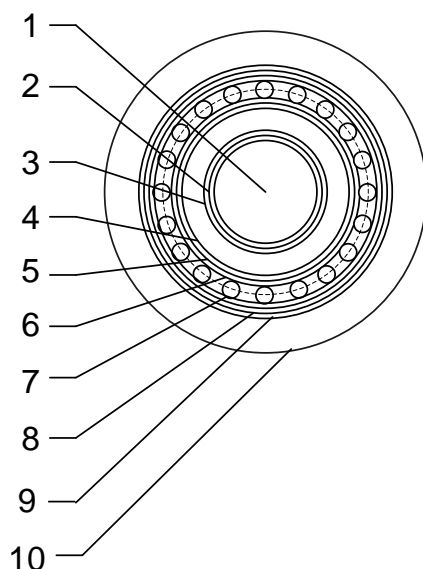
**Routine tests:** Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

**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 annealed copper
2	Nylon tape	Semi-conducting nylon tape
3	Conductor shield	Semi-conducting compound
4	Insulation	Cross-linked polyethylene (XLPE) compound
5	Insulation shield	Semi-conducting compound
6	Water blocking layer	Semi-conductive water blocking tape
7	Metallic shield	Copper wire screen with copper contact tape
8	Water blocking and cushioning tape	Non-conductive water blocking tape
9	Radial water barrier	Aluminium laminate tape
10	Sheath	Polyethylene (PE/ST7) 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 core	Size (mm <sup>2</sup> )	Conductor (wires/type)	Conductor diameter approx. (mm)	Conductor shield thickness nominal (mm)	Insulation thickness nominal (mm)	Insulation shield thickness nominal (mm)	Copper wire screen area (mm <sup>2</sup> )	Sheath thickness nominal (mm)	Overall diameter approx. (mm)	Conductor resistance at 20 °C maximum (Ohm/km)	Capacitance (μF/km)	Weight of cable approx. (kg/km)	Standard packing length (m)
1	400/95	61/Compacted	23.40	1.5	16.0	1.5	95	4.7	76.0 - 81.0	0.0470	0.176	8227	500
1	500/95	61/Compacted	26.70	1.5	16.0	1.5	95	4.6	79.0 - 84.0	0.0366	0.190	9432	500
1	630/95	61/Compacted	30.20	1.5	16.0	1.5	95	4.8	83.0 - 88.0	0.0283	0.206	11040	500
1	800/95	61/Compacted	34.00	1.5	16.0	1.5	95	4.4	86.0 - 91.0	0.0221	0.228	12698	500
1	800/120	61/Compacted	34.00	1.5	16.0	1.5	120	4.4	86.0 - 91.0	0.0221	0.228	12948	500