

**SPECIFICATION**  
**For**  
**FD-115KV-CV-CWS (0080)**

115kV XLPE Insulated Copper Wire Screened  
PVC Sheathed  
Flame Retardant Power Cable  
(115kV, Cu/XLPE/CWS/LAT/FR-PVC)

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Rev.	Date	Description
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CUSTOMER

Customer Document	Rev.
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**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.

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## **1. Scope**

This specification covers 115KV copper conductor cross-linked polyethylene (XLPE) insulated copper wire screened ribbed type polyvinyl chloride (PVC) sheathed flame retardant power cable.

The cable shall be in accordance with TIS 2202-2547. (Same IEC 60840 : 2011) and MEA's specification No. 420 (04-2018).

The finished cables shall meet the vertical tray flame test requirements per IEC 60332-3-22 ; Category A.

## **2. Conductor**

The conductor shall be compacted concentric stranded uncoated annealed copper conductor in accordance with TIS 2427-2552, Class 2. (Same 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. (Same IEC 60840 : 2011)

The average thickness of the insulation shall not be less than that given in Table 2.

The minimum thickness shall not be less than 90 % of the value in Table 2.

The thickness of insulation shall not be included that of conductor shield.

## **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.

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**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 consist 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 an polyethylene or ethylene acrylic acid adhesive co-polymer shall be incorporated under the non-metallic sheath.

**11. Non-metallic Sheath**

The sheath shall be ribbed type and have one special width rib flame retardant polyvinyl chloride (PVC/ST2) compound meet the requirements of TIS 2202-2547.  
(Same IEC 60840 : 2011)

The average thickness of the sheath shall not be less than the nominal value given in Table 2.

The minimum thickness of the sheath shall not be less than 85 % of the nominal value in Table 2.

The color of the outer sheath shall be black.

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## **12. Marking on Cable**

The marking items shall be provided throughout the cable by inserting identification tape between radial water barrier layer and outer longitudinal water blocking layer

1. Manufacturer's name and/or trade mark "  YAZAKI..... : TYE"
2. Year of manufacture
3. Flame retardant "FD"
4. Rated circuit voltage "115KV"
5. Type of conductor "CU"
6. Type of insulation and sheath "XLPE/PVC"
7. Type of cable "POWER CABLE"
8. Size of conductor
9. TIS logo and standard number
10. The purchase contract number
11. The continuous reel length marking (in figure) shall be made on special width rib on the sheath at every 1 meter

## **13. Test and Properties**

The cable shall be meet the requirements in Table 1 and Table 2, when tested in accordance with TIS 2202-2547, TIS 2427-2552 (Same IEC 60840 : 2011, IEC 60228 : 2004).

IEC 60332-3-22 ; Category A and MEA's specification No. 420 (04-2018).

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#### **14. Packing**


The cable inner end shall be greased by silicone paste and covered by heat shrinkable cap, and the cable outer end shall be connected with moisture-proof pulling eye of sufficient strength.

Cable rib shall be removed before sealing.

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 as follows.

1. Designation "FD-115KV-CV-CWS (0080)"
2. Type of conductor "CU"
3. Type of insulation and sheath "XLPE/PVC"
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. Drum number

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**Table 1**

**Routine Test**

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

**Sample Test**

The special tests shall be made on one length from each manufacturing series of the same type and size of cable, but shall be limited to not more than 10% of the number of lengths in the contract, rounded to the upper unity.

- a) Conductor examination and check of dimensions
- Maximum conductor resistance, Ohm/km ..... 0.0221
- b) Hot set test at 200 °C  $\pm$ 3 °C, 15 minutes, 20 N/cm<sup>2</sup> for XLPE
- Maximum elongation under load (%) .....175
- Maximum permanent elongation after cooling (%) .....15
- c) Measurement of capacitance,  $\mu$ F/km..... 0.228
- The capacitance shall be measured between conductor and metallic shield.
- The measured value shall not exceed the nominal value declared by the manufacturer by more than 8 %.

**Type Test**

This cable shall be tested as followed :

- Flame retardant tested according to IEC 60332-3-22; Category A.

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**Table 2**

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 area (mm <sup>2</sup> )	Sheath thickness nominal (mm)	*Overall diameter (mm)	Conductor resistance at 20 °C maximum (Ohm/km)	Weight of cable approx. (kg/km)	Packing length (m)
1	800/120	61/Compacted	34.10	1.5	16.0	1.5	120	3.5	86 - 91	0.0221	14500	500

\* Excluding rib

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