

**SPECIFICATION****For****FD-0.6/1KV-AL-CV**

0.6/1(1.2)kV Aluminium Conductor

XLPE Insulated PVC Sheathed

Flame Retardant with Protection Earthed Power Cable

(0.6/1(1.2)kV, Al/XLPE/FR-PVC)

BY 

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CUSTOMER

Rev.	Date	Description
0	30/8/2022	Issued specification
1	17/8/2023	Add size 3+PE x 185/150 mm <sup>2</sup>
2	3/5/2024	Update specification
3	16/12/2024	Update conductor diameter
4	17/1/2025	Add size 3+PE x 240/150 mm <sup>2</sup>

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 1000V aluminium conductor cross-linked polyethylene (XLPE) insulated polyvinyl chloride (PVC) sheathed flame retardant with protection earthed power cable.

The cable shall be in accordance with IEC 60502-1 : 2021.

- Flame retardant test requirements per IEC 60332-1.
- Flame propagation test requirements per IEC 60332-3-24; Category C.

## 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. Insulation

The insulation shall be cross-linked polyethylene (XLPE) compound meet the requirements of IEC 60502-1 : 2021.

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.

## 4. Cabling

The individual insulated cores shall be cabled together with 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.

## 5. Core Identification

The cores shall be identified by color, as follows :

2-cores + PE : blue, brown + green/yellow

3-cores + PE : brown, black, grey + green/yellow

4-cores + PE : blue, brown, black, grey + green/yellow

## 6. Sheath

The sheath shall be sunlight resistant and flame retardant polyvinyl chloride (PVC/ST2) compound meet the requirements of IEC 60502-1 : 2021.


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

The minimum thickness shall not fall below 80% of the nominal value in Table 1 by more than 0.2 mm.

The color of the sheath shall be black.

## 7. 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. Flame retardant "FD"
4. Rated circuit voltage "0.6/1KV"
5. Type of conductor "AL"
6. Type of insulation and sheath "XLPE/PVC"
7. Type of cable "POWER CABLE"
8. Number of cores and size of conductor
9. The continuous reel length marking (in figure) shall be made on the sheath at every 1 meter

## 8. Test and Properties


The cable shall meet the requirements in Test and Inspection and Table 1, when tested in accordance with IEC 60502-1 : 2021, IEC 60228 : 2004, IEC 60332-1 and IEC 60332-3-24 ; Category C.

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

## 9. 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 "FD-0.6/1KV-AL-CV"
2. Number of cores and size of cable
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 ..... 3.5

### Sample Tests

- Construction ..... 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

### Type Tests

- Flame retardant tested according to IEC 60332-1.
- Flame propagation test according to IEC 60332-3-24; Category C.

### Definition concerning the tests

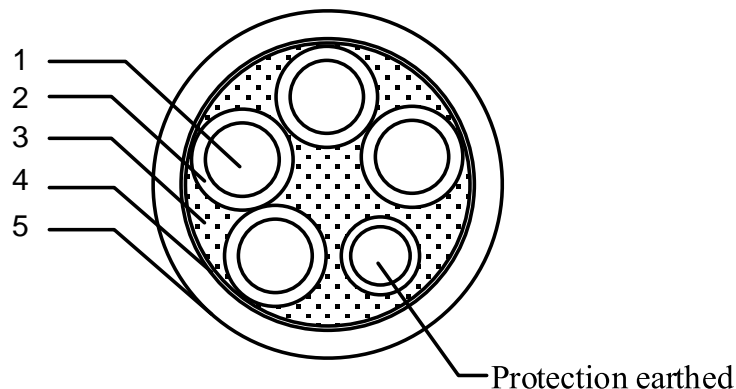
**Routine tests:** Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

**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	Insulation	Cross-linked polyethylene (XLPE) compound
3	Filler	Non-hygroscopic
4	Binder Tape	Spun bond tape or suitable tape
5	Sheath	Flame retardant polyvinyl chloride (PVC/ST2) compound

**Application:** Use for installation in open tray, conduit, underground duct trench or direct burial in ground, at wet or dry location. Maximum conductor temperature of 90 °C for normal operation and 250 °C for short circuit conditions.

**Table 1**

No. of cores and size  (core x 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)
2+PE x 10/10	7/Compacted	3.72	0.7	2.0	17.0	3.08	274	500
2+PE x 16/16	7/Compacted	4.69	0.7	2.2	19.5	1.91	378	500
2+PE x 25/16	7/Compacted	5.90	0.9	2.6	23.0	1.20	523	500
2+PE x 35/16	7/Compacted	6.95	0.9	2.8	25.5	0.868	643	500
2+PE x 50/25	7/Compacted	8.01	1.0	3.1	29.0	0.641	866	500
2+PE x 70/35	19/Compacted	9.73	1.1	3.3	33.0	0.443	1136	500
2+PE x 95/50	19/Compacted	11.40	1.1	3.4	36.5	0.320	1417	500
2+PE x 120/70	19/Compacted	12.95	1.2	3.8	41.5	0.253	1816	500
2+PE x 150/95	19/Compacted	14.27	1.4	4.0	45.5	0.206	2239	500
2+PE x 185/95	34/Compacted	15.98	1.6	4.0	49.5	0.164	2607	500
2+PE x 240/120	34/Compacted	18.47	1.7	4.0	55.0	0.125	3241	500
2+PE x 300/150	34/Compacted	20.68	1.8	4.0	60.0	0.100	3859	500
2+PE x400/240	55/Compacted	23.39	2.0	4.0	67.5	0.0778	4949	500

**Table 1 (continued)**

No. of cores and size  (core x 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)
3+PE x 10/10	7/Compacted	3.72	0.7	2.3	19.0	3.08	352	500
3+PE x 16/16	7/Compacted	4.69	0.7	2.5	21.5	1.91	486	500
3+PE x 25/16	7/Compacted	5.90	0.9	2.9	25.5	1.20	680	500
3+PE x 35/16	7/Compacted	6.95	0.9	3.2	28.5	0.868	866	500
3+PE x 50/25	7/Compacted	8.01	1.0	3.5	32.5	0.641	1140	500
3+PE x 70/35	19/Compacted	9.73	1.1	3.7	37.0	0.443	1493	500
3+PE x 95/50	19/Compacted	11.40	1.1	3.9	41.5	0.320	1900	500
3+PE x 120/70	19/Compacted	12.95	1.2	4.0	46.0	0.253	2338	500
3+PE x 150/70	19/Compacted	14.27	1.4	4.0	49.5	0.206	2718	500
3+PE x 150/95	19/Compacted	14.27	1.4	4.0	50.0	0.206	2810	500
3+PE x 185/95	34/Compacted	15.98	1.6	4.0	54.5	0.164	3324	500
3+PE x 185/150	34/Compacted	15.98	1.6	4.0	56.5	0.164	3533	500
3+PE x 240/120	34/Compacted	18.47	1.7	4.0	60.5	0.125	4123	500
3+PE x 240/150	34/Compacted	18.47	1.7	4.0	61.5	0.125	4231	500
3+PE x 300/150	34/Compacted	20.68	1.8	4.0	66.0	0.100	4984	500
3+PE x 400/240	55/Compacted	23.39	2.0	4.0	75.0	0.0778	6392	300

**Table 1 (continued)**

No. of cores and size  (core x 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)
4+PE x 10/10	7/Compacted	3.72	0.7	2.3	20.5	3.08	403	500
4+PE x 16/16	7/Compacted	4.69	0.7	2.6	23.5	1.91	577	500
4+PE x 25/16	7/Compacted	5.90	0.9	3.2	29.5	1.20	871	500
4+PE x 35/16	7/Compacted	6.95	0.9	3.7	33.0	0.868	1137	500
4+PE x 50/25	7/Compacted	8.01	1.0	3.6	36.5	0.641	1388	500
4+PE x 70/35	19/Compacted	9.73	1.1	3.8	42.0	0.443	1825	500
4+PE x 95/50	19/Compacted	11.40	1.1	4.0	47.0	0.320	2405	500
4+PE x 120/70	19/Compacted	12.95	1.2	4.0	52.0	0.253	2917	500
4+PE x 150/95	19/Compacted	14.27	1.4	4.0	56.5	0.206	3536	500
4+PE x 185/95	34/Compacted	15.98	1.6	4.0	62.0	0.164	4164	500
4+PE x 240/120	34/Compacted	18.47	1.7	4.0	69.0	0.125	5246	500
4+PE x 300/150	34/Compacted	20.68	1.8	4.0	75.5	0.100	6251	300
4+PE x400/240	55/Compacted	23.39	2.0	4.0	85.5	0.0778	7836	300



**Table 1 (continued)**

**FOR PROTECTION EARTHED CONDUCTORS**

No. of core	Size  (mm <sup>2</sup> )	Conductor  (wires/type)	Conductor diameter approx.  (mm)	Insulation thickness nominal  (mm)	Conductor resistance at 20°C maximum (Ohm/km)
1	10	7/Compacted	3.72	0.7	3.08
1	16	7/Compacted	4.69	0.7	1.91
1	25	7/Compacted	5.90	0.9	1.20
1	35	7/Compacted	6.95	0.9	0.868
1	50	7/Compacted	8.01	1.0	0.641
1	70	19/Compacted	9.73	1.1	0.443
1	95	19/Compacted	11.40	1.1	0.320
1	120	19/Compacted	12.95	1.2	0.253
1	150	19/Compacted	14.27	1.4	0.206
1	240	34/Compacted	18.47	1.7	0.125