

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

0.6/1(1.2)KV

XLPE Insulated PVC Inner Sheathed

Copper Wire Screened PVC Outer Sheathed

Flame Retardant Power Cable

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

BY



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CUSTOMER

Rev.	Date	Description
0	29/10/2020	Issued specification
1	16/02/2020	- Cancel cable code "0010" - Add 3-cores
2	27/8/2021	Add size 3x50/10, 3x95/16 mm ² and 3x120/16 mm ²
3	17/9/2021	Add size 3x240/25 mm ²
4	25/10/2021	Add size 3 x 185/95 mm ²
5	16/11/2021	Add size 3 x 150/70 mm ²
6	11/1/2022	Add size 3 x 4/4 mm ²
7	26/10/2022	Add size 3 x 70/35 mm ²
8	14/11/2022	Add size 3 x 1.5/1.5 mm ²
9	10/10/2023	Add size 3 x 150/95 mm ²
10	3/5/2024	Update specification
11	24/6/2024	Change thickness outer sheath
12	14/9/2024	Add size 4x120/70, 150/95,185/95 and 240/120 mm ²
13	15/10/2024	Change Dia. Copper tape size 3x10/10 and 3x16/16 mm ²
14	5/2/2025	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 1000V copper conductor cross-linked polyethylene (XLPE) insulated polyvinyl chloride (PVC) inner sheathed copper wire screened polyvinyl chloride (PVC) outer sheathed flame retardant 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

For size $\leq 6 \text{ mm}^2$:

The conductor shall be non-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.

For size $\geq 10 \text{ mm}^2$:

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. 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 (For multi-cores only)

The individual shielded cores 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.

5. Core Identification

The cores shall be identified by color, as follows :

Single-core : white

3-cores : brown, black, grey

4-cores : blue, brown, black, grey

(White color is natural color of XLPE insulation)

6. Inner Sheath

The inner sheath shall be polyvinyl chloride (PVC) compound applied over the insulation for single-core and over the binder tape for multi-cores.

The average thickness given in Table 1.

The color of the inner sheath shall be black.

7. Copper Wire Screen

The copper wire screen shall consist of plain annealed round copper wires applied helically over the inner sheathed.

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.

A suitable separator tape shall be applied helically over the contacted tape.

8. Outer Sheath

The outer 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 outer sheath shall be not 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 outer sheath shall be black.

9. 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 trade mark "  YAZAKI.....TYE"
2. Year of manufacture
3. Flame retardant "FD"
4. Rated circuit voltage "0.6/1KV"
5. Type of conductor "CU"
6. Type of insulation and sheath "XLPE/PVC"
7. Type of cable "SHIELD POWER CABLE"
8. Number of cores and size of conductor
9. The continuous reel length marking (in figure) shall be made on the outer sheath at every 1 meter

10. 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.

11. 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-CV-CWS"
2. Number of core 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..... 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

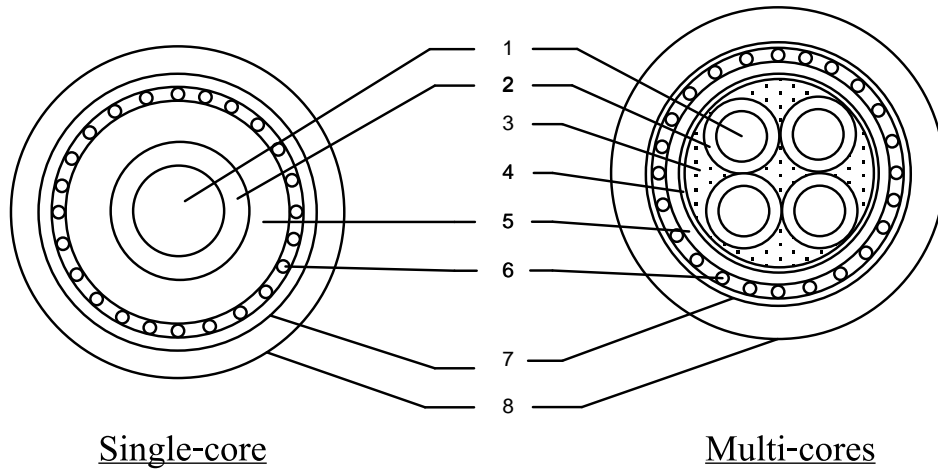
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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 annealed copper
2	Insulation	Cross-linked polyethylene (XLPE) compound
3	Filler	Non-hygroscopic
4	Binder tape	Spun bond tape or suitable tape
5	Inner sheath	Polyvinyl chloride (PVC) compound
6	Metallic shield	Copper wire screen with copper contact tape
7	Separator tape	Spun bond tape or suitable tape
8	Outer 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 core	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	Inner sheath thickness nominal (mm)	Dia. of inner sheath approx. (mm)	Copper wire area (mm ²)	Outer 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	2.5/2.5	7/Non-compacted	2.01	0.7	1.2	6.5	2.5	1.8	12.5	7.41	189	500
1	4/4	7/Non-compacted	2.55	0.7	1.2	7.0	4	1.8	13.5	4.61	230	500
1	6/6	7/Non-compacted	3.12	0.7	1.2	7.5	6	1.9	14.5	3.08	285	500
1	10/10	7/Compacted	3.70	0.7	1.2	8.0	10	1.9	15.5	1.83	375	500
1	16/10	7/Compacted	4.70	0.7	1.2	9.0	10	2.0	17.0	1.15	452	500
1	25/10	7/Compacted	5.90	0.9	1.2	11.0	10	2.3	19.0	0.727	592	500
1	35/10	7/Compacted	6.90	0.9	1.2	12.0	10	2.4	20.5	0.524	707	500
1	50/10	19/Compacted	8.20	1.0	1.2	13.5	10	2.4	22.0	0.387	850	500
1	70/10	19/Compacted	9.80	1.1	1.2	15.0	10	2.6	24.0	0.268	1097	500
1	95/16	19/Compacted	11.60	1.1	1.2	17.0	16	2.7	26.0	0.193	1441	500
1	120/16	37/Compacted	13.10	1.2	1.2	18.5	16	2.9	28.0	0.153	1742	500
1	150/25	37/Compacted	14.50	1.4	1.2	20.5	25	3.0	30.5	0.124	2063	500
1	185/25	37/Compacted	16.10	1.6	1.2	22.5	25	3.3	34.0	0.0991	2586	500
1	240/25	61/Compacted	18.60	1.7	1.2	25.5	25	3.6	36.0	0.0754	3238	500
1	240/35	61/Compacted	18.60	1.7	1.2	25.5	35	3.5	37.0	0.0754	3339	500
1	300/25	61/Compacted	20.80	1.8	1.2	28.0	25	3.8	39.0	0.0601	3874	500
1	300/35	61/Compacted	20.80	1.8	1.2	28.0	35	3.8	39.0	0.0601	3977	500
1	400/25	61/Compacted	23.40	2.0	1.2	31.0	25	4.0	42.5	0.0470	4807	500
1	400/35	61/Compacted	23.40	2.0	1.2	31.0	35	4.0	43.0	0.0470	4910	500
1	500/50	61/Compacted	26.60	2.2	1.2	34.5	50	4.0	46.5	0.0366	6176	500
1	630/50	61/Compacted	30.20	2.4	1.3	38.5	50	4.0	50.5	0.0283	7635	500
1	800/50	61/Compacted	34.00	2.6	1.4	43.0	50	4.0	55.0	0.0221	9309	300

Table 1 (continued)

No. of core	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	Inner sheath thickness nominal (mm)	Dia. of inner sheath approx. (mm)	Copper wire area (mm ²)	Outer 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	1.5/1.5	7/Non-compacted	1.59	0.7	1.2	10.5	1.5	2.6	18.0	12.1	337	500
3	2.5/2.5	7/Non-compacted	2.01	0.7	1.2	11.5	2.5	2.7	19.5	7.41	402	500
3	4/4	7/Non-compacted	2.55	0.7	1.2	12.5	4	2.9	21.0	4.61	510	500
3	6/6	7/Non-compacted	3.12	0.7	1.2	14.0	6	3.0	23.0	3.08	635	500
3	10/10	7/Compacted	3.70	0.7	1.2	15.0	10	3.0	25.0	1.83	820	500
3	16/16	7/Compacted	4.70	0.7	1.2	17.0	16	3.4	28.0	1.15	1150	500
3	25/16	7/Compacted	5.90	0.9	1.2	21.0	16	3.8	32.5	0.727	1562	500
3	35/16	7/Compacted	6.90	0.9	1.2	23.0	16	4.0	35.0	0.524	1937	500
3	50/10	19/Compacted	8.20	1.0	1.2	26.5	10	4.0	38.0	0.387	2389	500
3	50/25	19/Compacted	8.20	1.0	1.2	26.5	25	4.0	38.0	0.387	2473	500
3	70/25	19/Compacted	9.80	1.1	1.2	30.5	25	4.0	42.0	0.268	3188	500
3	70/35	19/Compacted	9.80	1.1	1.2	30.5	35	4.0	42.5	0.268	3292	500
3	95/16	19/Compacted	11.60	1.1	1.2	34.0	16	4.0	46.0	0.193	3999	500
3	95/50	19/Compacted	11.60	1.1	1.2	34.0	50	4.0	46.0	0.193	4305	500
3	120/16	37/Compacted	13.10	1.2	1.3	38.0	16	4.0	50.0	0.153	4941	500
3	120/70	37/Compacted	13.10	1.2	1.3	38.0	70	4.0	50.0	0.153	5386	500
3	150/70	37/Compacted	14.50	1.4	1.4	42.0	70	4.0	54.0	0.124	6360	500
3	150/95	37/Compacted	14.50	1.4	1.4	42.0	95	4.0	55.5	0.124	6627	500
3	185/95	37/Compacted	16.10	1.6	1.5	47.5	95	4.0	60.5	0.0991	7892	500
3	240/25	61/Compacted	18.60	1.7	1.6	53.5	25	4.0	65.0	0.0754	9120	300
3	240/120	61/Compacted	18.60	1.7	1.6	53.5	120	4.0	66.5	0.0754	10053	300
3	300/150	61/Compacted	20.80	1.8	1.7	59.0	150	4.0	73.0	0.0601	12352	300

Table 1 (continued)

No. of core	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	Inner sheath thickness nominal (mm)	Dia. of inner sheath approx. (mm)	Copper wire area (mm ²)	Outer 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	1.5/1.5	7/Non-compacted	1.59	0.7	1.2	11.0	1.5	2.8	19.0	12.1	388	500
4	2.5/2.5	7/Non-compacted	2.01	0.7	1.2	12.5	2.5	2.9	21.0	7.41	466	500
4	4/4	7/Non-compacted	2.55	0.7	1.2	13.5	4	3.0	22.5	4.61	590	500
4	6/6	7/Non-compacted	3.12	0.7	1.2	15.0	6	3.2	24.5	3.08	749	500
4	10/10	7/Compacted	3.70	0.7	1.2	16.5	10	3.3	26.5	1.83	985	500
4	16/10	7/Compacted	4.70	0.7	1.2	19.0	10	3.7	30.0	1.15	1325	500
4	25/10	7/Compacted	5.90	0.9	1.2	23.0	10	4.0	34.5	0.727	1848	500
4	35/10	7/Compacted	6.90	0.9	1.2	25.5	10	4.0	36.5	0.524	2259	500
4	50/10	19/Compacted	8.20	1.0	1.2	29.0	10	4.0	41.0	0.387	2939	500
4	70/10	19/Compacted	9.80	1.1	1.2	33.5	10	4.0	45.0	0.268	3856	500
4	95/16	19/Compacted	11.60	1.1	1.3	38.0	16	4.0	49.5	0.193	5064	500
4	120/16	37/Compacted	13.10	1.2	1.4	42.5	16	4.0	54.0	0.153	6218	500
4	120/70	37/Compacted	13.10	1.2	1.4	42.5	70	4.0	54.5	0.153	6663	500
4	150/25	37/Compacted	14.50	1.4	1.5	47.0	25	4.0	59.0	0.124	7489	500
4	150/95	37/Compacted	14.50	1.4	1.5	47.0	95	4.0	60.5	0.124	8202	500
4	185/25	37/Compacted	16.10	1.6	1.6	53.0	25	4.0	64.5	0.0991	9138	300
4	185/95	37/Compacted	16.10	1.6	1.6	53.0	95	4.0	66.0	0.0991	9828	300
4	240/35	61/Compacted	18.60	1.7	1.7	59.5	35	4.0	71.5	0.0754	11711	300
4	240/120	61/Compacted	18.60	1.7	1.7	59.5	120	4.0	72.5	0.0754	12562	300
4	300/35	61/Compacted	20.80	1.8	1.8	65.5	35	4.0	77.5	0.0601	14303	300
4	400/35	61/Compacted	23.40	2.0	2.0	73.5	35	4.0	85.5	0.0470	17864	200