

SPECIFICATION**For****FD-0.6/1KV-CCV-SWA**

0.6/1(1.2)kV XLPE Insulated

PVC Inner Sheathed Steel Wire Armored

PVC Outer Sheathed Flame Retardant Control Cable

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

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CUSTOMER

Rev.	Date	Description
0	10/5/2022	Issued specification

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 steel wire armored polyvinyl chloride (PVC) outer sheathed flame retardant control cable.

The cables shall be based on IEC 60502-1 : 2004 and Amend.1 : 2009.

The finished cables shall meet the vertical tray flame test requirements per IEC 60332-1 and IEC 60332-3-24; Category C.

2. Conductor

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.

3. Insulation

The insulation shall be cross-linked polyethylene (XLPE) compound meet the requirements of IEC 60502-1 : 2004.

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

The minimum thickness shall be not fall below the value in Table 1 by more than 10% plus 0.1 mm.

4. Cabling

The individual insulated 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 or numerals printed on the insulation, as follows :

2-cores : blue, brown

3-cores : brown, black, grey

4-cores : blue, brown, black, grey

For 5-cores to 30-cores :

The cores shall be identified by the arabic numerals printed longitudinally and continuously on the surface of white insulation.

(White color is natural color of XLPE insulation)

6. Inner Sheath

The inner sheath shall be polyvinyl chloride (PVC) compound applied over the binder tape.

The approximate thickness given in Table 1.

The color of the inner sheath shall be black.

7. Steel Wire Armor

The armor shall be galvanized round steel wire applied with a minimum gap between adjacent wires over the inner sheathed.

A suitable tape may be applied helically over the armored core.

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 : 2004.

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

The minimum thickness shall not fall below the value in Table 1 by more than 20% plus 0.2 mm.

The color of the outer sheath shall be black.

9. Marking on Cable

The marking items shall be marked 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 insulation "XLPE"

6. Type of cable "CONTROL CABLE"

7. Number of cores and size of conductor

8. 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 be meet the requirements in Test and Inspection and Table 1, when tested in accordance with IEC 60502-1 : 2004 and Amend.1 : 2009, 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-CCV-SWA "
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..... 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 and IEC 60332-3-24; Category C.

Definition concerning the tests

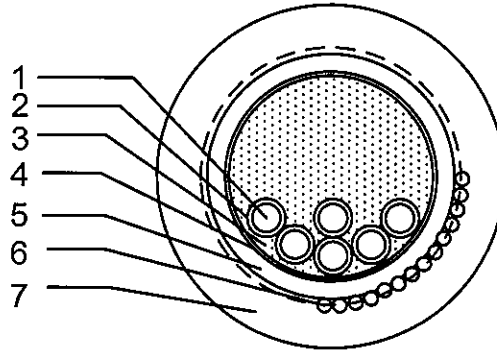
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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	Non-compacted concentric stranded annealed copper
2	Insulation	Cross-linked polyethylene (XLPE)
3	Filler	Non-hygroscopic
4	Binder Tape	Spun bond tape or suitable tape
5	Inner Sheath	Polyvinyl chloride (PVC)
6	Aarmor	Galvanized steel wire
7	Outer Sheath	Flame retardant polyvinyl chloride (PVC/ST2)

Application: For supervisory electrical equipment, station control circuits, outdoor, suitable installation in the dry or wet cable trenches. Maximum conductor temperature of 90°C for normal operation and 250°C for short circuit conditions.

Table 1

No. of cores	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	Inner sheath thickness approx. (mm)	Dia. of inner sheath approx. (mm)	Armor wire dia. nominal (mm)	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)
2	1.5	7/Non-compacted	1.59	0.7	1.2	10.0	0.80	1.8	15.5	12.1	380	300
2	2.5	7/Non-compacted	2.01	0.7	1.2	11.0	0.80	1.8	16.5	7.41	420	300
2	4	7/Non-compacted	2.55	0.7	1.2	12.0	1.25	1.8	18.5	4.61	600	300
2	6	7/Non-compacted	3.12	0.7	1.2	13.0	1.25	1.8	20.0	3.08	700	300
3	1.5	7/Non-compacted	1.59	0.7	1.2	10.5	0.80	1.8	16.0	12.1	410	300
3	2.5	7/Non-compacted	2.01	0.7	1.2	11.5	1.25	1.8	18.0	7.41	600	300
4	1.5	7/Non-compacted	1.59	0.7	1.2	11.0	1.25	1.8	18.0	12.1	550	300
4	2.5	7/Non-compacted	2.01	0.7	1.2	12.5	1.25	1.8	19.0	7.41	650	300
6	1.5	7/Non-compacted	1.59	0.7	1.2	13.0	1.25	1.8	20.0	12.1	700	300
6	2.5	7/Non-compacted	2.01	0.7	1.2	14.5	1.25	1.8	21.5	7.41	800	300
6	4	7/Non-compacted	2.55	0.7	1.2	18.0	1.60	1.8	25.5	4.61	1300	300
7	2.5	7/Non-compacted	2.01	0.7	1.2	14.5	1.25	1.8	21.5	7.41	800	300
7	4	7/Non-compacted	2.55	0.7	1.2	16.0	1.60	1.8	23.5	4.61	1100	300
7	6	7/Non-compacted	3.12	0.7	1.2	18.0	1.60	1.8	25.5	3.08	1300	300
8	1.5	7/Non-compacted	1.59	0.7	1.2	14.0	1.25	1.8	21.0	12.1	750	300
9	1.5	7/Non-compacted	1.59	0.7	1.2	15.0	1.25	1.8	22.0	12.1	800	300
9	2.5	7/Non-compacted	2.01	0.7	1.2	17.0	1.60	1.8	24.5	7.41	1100	300

Table 1 (Continued)

No. of cores	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	Inner sheath thickness approx. (mm)	Dia. of inner sheath approx. (mm)	Armor wire dia. nominal (mm)	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)
10	1.5	7/Non-compacted	1.59	0.7	1.2	16.0	1.60	1.8	23.5	12.1	1000	300
10	2.5	7/Non-compacted	2.01	0.7	1.2	18.0	1.60	1.8	25.5	7.41	1200	300
10	4	7/Non-compacted	2.55	0.7	1.2	20.0	1.60	1.8	27.5	4.61	1500	300
10	6	7/Non-compacted	3.12	0.7	1.2	22.5	2.00	1.9	31.0	3.08	2000	300
11	2.5	7/Non-compacted	2.01	0.7	1.2	18.0	1.60	1.8	25.5	7.41	1200	300
12	1.5	7/Non-compacted	1.59	0.7	1.2	17.0	1.60	1.8	24.0	12.1	1100	300
12	2.5	7/Non-compacted	2.01	0.7	1.2	19.0	1.60	1.8	26.5	7.41	1300	300
12	4	7/Non-compacted	2.55	0.7	1.2	21.0	1.60	1.8	28.5	4.61	1600	300
12	6	7/Non-compacted	3.12	0.7	1.2	23.5	2.00	1.9	32.0	3.08	2200	300
13	2.5	7/Non-compacted	2.01	0.7	1.2	20.0	1.60	1.8	27.5	7.41	1400	300
14	2.5	7/Non-compacted	2.01	0.7	1.2	20.0	1.60	1.8	27.5	7.41	1400	300
15	1.5	7/Non-compacted	1.59	0.7	1.2	18.0	1.60	1.8	25.5	12.1	1200	300
15	2.5	7/Non-compacted	2.01	0.7	1.2	20.5	1.60	1.8	28.0	7.41	1500	300
15	4	7/Non-compacted	2.55	0.7	1.2	23.0	2.00	1.9	31.5	4.61	2000	300
15	6	7/Non-compacted	3.12	0.7	1.2	25.5	2.00	2.0	34.5	3.08	2500	300
16	1.5	7/Non-compacted	1.59	0.7	1.2	18.5	1.60	1.8	26.0	12.1	1200	300
16	2.5	7/Non-compacted	2.01	0.7	1.2	21.0	1.60	1.8	28.5	7.41	1500	300
17	2.5	7/Non-compacted	2.01	0.7	1.2	22.0	1.60	1.8	29.5	7.41	1600	300

Table 1 (Continued)

No. of cores	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	Inner sheath thickness approx. (mm)	Dia. of inner sheath approx. (mm)	Armor wire dia. nominal (mm)	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)
18	1.5	7/Non-compacted	1.59	0.7	1.2	19.5	1.60	1.8	27.0	12.1	1300	300
18	2.5	7/Non-compacted	2.01	0.7	1.2	22.0	1.60	1.8	29.5	7.41	1600	300
19	1.5	7/Non-compacted	1.59	0.7	1.2	19.5	1.60	1.8	27.0	12.1	1300	300
19	2.5	7/Non-compacted	2.01	0.7	1.2	22.0	1.60	1.8	29.5	7.41	1600	300
20	1.5	7/Non-compacted	1.59	0.7	1.2	20.0	1.60	1.8	27.5	12.1	1400	300
20	2.5	7/Non-compacted	2.01	0.7	1.2	22.5	2.00	1.9	31.0	7.41	1900	300
20	6	7/Non-compacted	3.12	0.7	1.2	28.5	2.00	2.1	37.5	3.08	2900	300
21	2.5	7/Non-compacted	2.01	0.7	1.2	23.0	2.00	1.9	31.5	7.41	1900	300
22	2.5	7/Non-compacted	2.01	0.7	1.2	24.5	2.00	1.9	33.0	7.41	2100	300
23	2.5	7/Non-compacted	2.01	0.7	1.2	24.5	2.00	1.9	33.0	7.41	2100	300
24	2.5	7/Non-compacted	2.01	0.7	1.2	25.5	2.00	2.0	34.5	7.41	2200	300
25	1.5	7/Non-compacted	1.59	0.7	1.2	22.5	2.00	1.9	31.0	12.1	1800	300
30	1.5	7/Non-compacted	1.59	0.7	1.2	24.0	2.00	2.0	33.0	12.1	2000	300
30	4	7/Non-compacted	2.55	0.7	1.2	30.5	2.00	2.2	40.0	4.61	3100	300