

SPECIFICATION

For

FD-1.8/3KV-CV-SWA (VM)

1.8/3(3.6)KV

XLPE Insulated PVC Inner Sheathed

Steel Wire Armored PVC Outer Sheathed

Flame Retardant and Vermin Proof Power Cable

(1.8/3(3.6)kV, Cu/XLPE/CTS/FR-PVC/SWA/FR-VM-PVC)

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CUSTOMER

Rev.	Date	Description
0	09/05/2022	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 3300V copper conductor cross-linked polyethylene (XLPE) insulated polyvinyl chloride (PVC) inner sheathed steel wire armored polyvinyl chloride (PVC) outer sheathed flame retardant and vermin proof power cable.

The cable shall be in accordance with 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 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 plastic tape as a separator tape shall be longitudinally applied over the conductor.

4. 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 not fall below the value in Table 1 by more than 10% plus 0.1 mm.

5. 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.

6. Core Identification

The cores shall be identified by colors of identification tape, placed longitudinally applied over the insulation, as follow :

3-cores : white, red, blue

7. Insulation Shield

The insulation shield shall be semi-conducting tape and shall be applied helically over the cable core.

8. Metallic Shield

The metallic shield shall be an uncoated annealed copper tape and shall be applied helically with a gap over the insulation shield.

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

A suitable separator tape shall be applied helically over the shielded core.

9. Inner Sheath

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

The approximate thickness given in Table 1.

The color of the inner sheath shall be black.

10. Steel Wire Armor

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

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

11. Outer Sheath

The outer sheath shall be sunlight resistant, flame retardant and resistant to vermin by special chemical treated polyvinyl chloride (PVC/ST2) compound meet the requirements of IEC 60502-1 : 2004. (vermin means rat, termite).


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.

12. 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 "1.8/3(3.6)KV"

5. Type of insulation "XLPE"

6. Type of cable "POWER 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

13. Test and Properties

The cable shall 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.

14. 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-1.8/3KV-CV-SWA (VM)"
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.....6.5

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

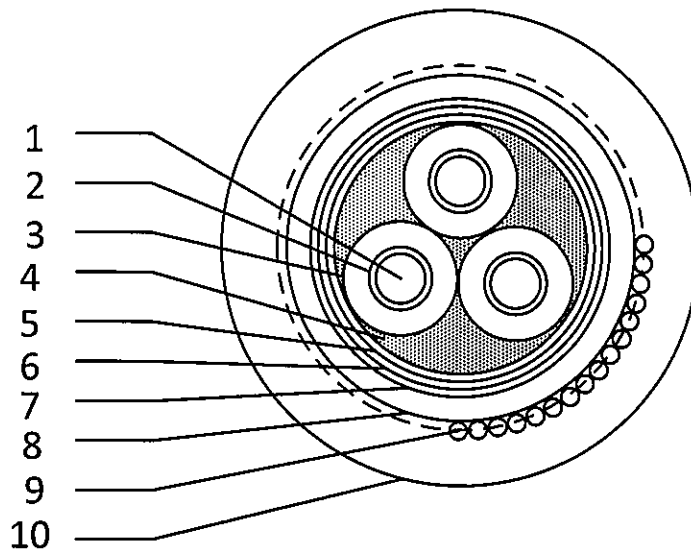
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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	Compacted concentric stranded annealed copper
2	Separator tape	PS tape or suitable tape
3	Insulation	Cross-linked polyethylene (XLPE)
4	Filler	Non-hygroscopic
5	Tape	Semi-conducting tape (if necessary)
6	Metallic shield	Copper tape
7	Separator tape	Spun bond tape or suitable tape
8	Inner sheath	Polyvinyl chloride (PVC)
9	Aarmor	Galvanized steel wire
10	Outer sheath	Flame retardant and vermin proof polyvinyl chloride (PVC/ST2)

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 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)
3	25	7/Compacted	6.00	2.0	1.2	28.0	2.00	1.9	36.5	0.727	2600	500
3	35	7/Compacted	7.10	2.0	1.2	30.5	2.00	2.1	39.5	0.524	3000	500
3	50	19/Compacted	8.30	2.0	1.2	33.0	2.00	2.2	42.5	0.387	3600	500
3	70	19/Compacted	9.90	2.0	1.2	36.5	2.50	2.3	47.0	0.268	4800	500
3	95	19/Compacted	11.70	2.0	1.3	41.0	2.50	2.4	51.5	0.193	6000	500
3	120	37/Compacted	13.20	2.0	1.3	44.0	2.50	2.5	55.0	0.153	7000	500
3	150	37/Compacted	14.60	2.0	1.4	47.5	2.50	2.6	57.5	0.124	8000	500
3	185	37/Compacted	16.30	2.0	1.5	51.5	2.50	2.8	62.0	0.0991	9500	300
3	240	61/Compacted	18.70	2.0	1.6	57.0	2.50	2.9	67.5	0.0754	11500	300
3	300	61/Compacted	20.90	2.0	1.6	61.5	3.15	3.1	73.0	0.0601	14500	300
3	400	61/Compacted	23.50	2.0	1.8	67.5	3.15	3.4	81.0	0.0470	17500	200