

SPECIFICATION

For

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

1.8/3(3.6)kV

XLPE Insulated PVC Inner Sheathed

Aluminium Wire Armored PVC Outer Sheathed

Flame Retardant and Vermin Proof Power Cable

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

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CUSTOMER

Rev.	Date	Description
0	08/09/2020	Issued specification
1	09/05/2022	Delete cable code "0010"

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 aluminium 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. Insulation Shield

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

6. 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.

7. 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.

8. Aluminium wire Armor

The armor shall be round aluminium wires and shall be applied with a minimum gap between adjacent wires over the inner sheathe.

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

9. 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.

10. 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 core and size of conductor
8. The continuous reel length marking (in figure) shall be made on the outer sheath at every 1 meter

11. 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.

12. 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-AWA (VM)"
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.....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

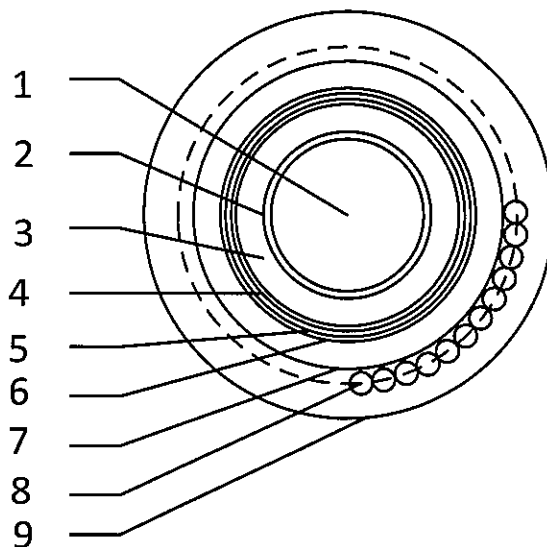
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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	Insulation shield	Semi-conducting tape
5	Metallic shield	Copper tape
6	Separator tape	Spun bond tape or suitable tape
7	Inner sheath	Flame retardant polyvinyl chloride (PVC)
8	Armor	Aluminium wire
9	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 core	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)
1	10	7/Compacted	3.80	2.0	1.2	12.5	1.25	1.8	19.0	1.83	450	500
1	16	7/Compacted	4.80	2.0	1.2	13.5	1.25	1.8	20.0	1.15	550	500
1	25	7/Compacted	6.00	2.0	1.2	14.5	1.25	1.8	21.0	0.727	650	500
1	35	7/Compacted	7.10	2.0	1.2	15.5	1.25	1.8	22.0	0.524	800	500
1	50	19/Compacted	8.30	2.0	1.2	17.0	1.25	1.8	23.5	0.387	950	500
1	70	19/Compacted	9.90	2.0	1.2	18.5	1.60	1.8	26.0	0.268	1200	500
1	95	19/Compacted	11.70	2.0	1.2	20.0	1.60	1.8	27.5	0.193	1500	500
1	120	37/Compacted	13.20	2.0	1.2	21.5	2.00	1.8	30.0	0.153	1900	500
1	150	37/Compacted	14.60	2.0	1.2	23.0	2.00	1.8	31.5	0.124	2200	500
1	185	37/Compacted	16.30	2.0	1.2	25.0	2.00	1.9	33.5	0.0991	2600	500
1	240	61/Compacted	18.70	2.0	1.2	27.0	2.00	2.0	36.0	0.0754	3200	500
1	300	61/Compacted	20.90	2.0	1.2	29.5	2.00	2.1	38.5	0.0601	3900	500
1	400	61/Compacted	23.50	2.0	1.2	32.0	2.00	2.2	41.5	0.0470	4800	500