

SPECIFICATION

For

FS/FDLH-0.6/1KV-CE-AWA

0.6/1(1.2)kV Copper Conductor Mica fire-barrier XLPE Insulated

Polyolefin Inner Sheathed Aluminium Wire Armored Polyolefin Outer Sheathed

Fire Resistant and Flame Retardant with Low Smoke and Zero Halogen Power Cable

(0.6/1(1.2)kV, Cu/Mica/XLPE/FR-LSOH/AWA/FR-LSOH)

BY



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CUSTOMER

Rev.	Date	Description
0	17/4/2020	Issued specification
1	22/3/2021	Cancel cable code "0010"
2	13/2/2024	Update Table 1
3	8/4/2024	Update marking
4	26/7/2024	Add size 500 and 630 mm ²
5	19/11/2024	Update Table 1
6	19/12/2024	Update conductor diameter

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 mica fire-barrier cross-linked polyethylene (XLPE) insulated polyolefin inner sheathed aluminium wire armored polyolefin outer sheathed fire resistant and flame retardant with low smoke and zero halogen power cable.

The cable shall be based on IEC 60502-1 : 2021.

The maximum conductor temperature shall be 90°C

Fire resistant tested according to BS 6387 Category CWZ.

Remark : Resistance to fire with water (W) and with mechanical shock (Z) ; Not all sizes or types of cable with overall diameters greater than 20 mm. can be presently accommodated with in the standard and guidance on testing these cables should be sought from the manufacturer.

- Flame retardant test requirements per IEC 60332-1.
- Flame propagation test requirements per IEC 60332-3-22; Category A, IEC 60332-3-23; Category B and IEC 60332-3-24; Category C.
- Low smoke test requirements per IEC 61034.
- Halogen gases determinations test requirements per IEC 60754-1 and IEC 60754-2.
- Extremely low toxicity gases test requirements per IEC 60684-2 and Defence Standard 02-713. (Conductor size $\leq 400 \text{ mm}^2$).

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. Fire Barrier Tape

The mica tape shall be longitudinally applied over the conductor

A suitable separator tape shall be applied helically over the fire barrier tape (for size $\geq 120 \text{ mm}^2$)

4. 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.

The color of insulation shall be white.

(White color is natural color of XLPE insulation)

5. Inner Sheath

The inner sheath shall be low smoke and zero halogen flame retardant polyolefin compound applied over the insulation.

The average thickness given in Table 1.

The color of the inner sheath shall be black.

6. Aluminium Wire Armor

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

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

7. Outer Sheath

The outer sheath shall be sunlight resistant, low smoke and zero halogen flame retardant polyolefin (ST8) compound meet the requirements of the 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 orange.

8. 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. Cable property code "FS/FDLH"
4. Rated circuit voltage "0.6/1KV"
5. Type of conductor "CU"
6. Type of insulation and sheath "XLPE/LSOH"
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 outer sheath at every 1 meter

9. 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, BS 6387 Category CWZ., IEC 60332-1, IEC 60332-3-22; Category A, IEC 60332-3-23; Category B, IEC 60332-3-24; Category C, IEC 61034, IEC 60754-1, IEC 60754-2, IEC 60684-2 and Defence Standard 02-713.


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

For longer life of cable should be avoid exposure to direct solar radiation it necessary, cover is required.

10. 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.

1. Designation "FS/FDLH-0.6/1KV-CE-AWA"
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

- Fire resistant tested according to BS 6387 Category CWZ.
- Flame retardant tested according to IEC 60332-1.
- Flame propagation test according to IEC 60332-3-22; Category A or IEC 60332-3-23; Category B or IEC 60332-3-24; Category C.
- Smoke emission tested according to IEC 61034.
- Halogen gases tested according to IEC 60754-1 and IEC 60754-2.
- Extremely low toxicity gases test according to IEC 60684-2 and Defence Standard 02-713.

Definition concerning the tests

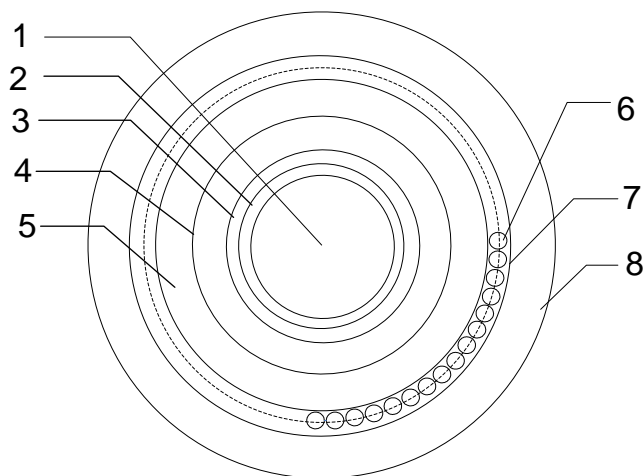
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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	Fire Barrier	Mica tape
3	Separator Tape	PS tape or suitable tape (for size $\geq 120 \text{ mm}^2$)
4	Insulation	Cross-linked polyethylene (XLPE) compound
5	Inner Sheath	Low smoke and zero halogen flame retardant polyolefin compound
6	Armor	Aluminium wire
7	Separator tape	PS tape or suitable tape
8	Outer Sheath	Low smoke and zero halogen flame retardant polyolefin (ST8) compound

Application: For installation into open tray, conduit, underground duct trench or direct burial in ground which provide flame retardant, low smoke and maintain circuit integrity in case of fire. Maximum conductor temperature of 90°C for normal operation and 250°C for short circuit condition

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)	Aarmor 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	1.5	7/Non-compacted	1.59	0.7	1.2	7.0	1.25	1.8	13.5	12.1	213	500
1	2.5	7/Non-compacted	2.01	0.7	1.2	7.0	1.25	1.8	14.0	7.41	235	500
1	4	7/Non-compacted	2.55	0.7	1.2	8.0	1.25	1.8	14.5	4.61	262	500
1	6	7/Non-compacted	3.12	0.7	1.2	8.5	1.25	1.8	15.0	3.08	298	500
1	10	7/Compacted	3.70	0.7	1.2	9.0	1.25	1.8	15.5	1.83	347	500
1	16	7/Compacted	4.70	0.7	1.2	10.0	1.25	1.8	16.5	1.15	428	500
1	25	7/Compacted	5.90	0.9	1.2	11.5	1.25	1.8	18.5	0.727	559	500
1	35	7/Compacted	6.90	0.9	1.2	12.5	1.25	1.8	19.5	0.524	671	500
1	50	19/Compacted	8.20	1.0	1.2	14.0	1.25	1.8	21.0	0.387	828	500
1	70	19/Compacted	9.80	1.1	1.2	16.0	1.60	1.8	23.5	0.268	1116	500
1	95	19/Compacted	11.60	1.1	1.2	18.0	1.60	1.8	25.5	0.193	1402	500
1	120	37/Compacted	13.10	1.2	1.2	19.5	1.60	1.8	27.0	0.153	1702	500
1	150	37/Compacted	14.50	1.4	1.2	21.5	1.60	1.8	29.0	0.124	2017	500
1	185	37/Compacted	16.10	1.6	1.2	24.0	1.60	1.9	31.5	0.0991	2419	500
1	240	61/Compacted	18.60	1.7	1.2	26.5	2.00	2.0	35.5	0.0754	3154	500
1	300	61/Compacted	20.80	1.8	1.2	29.0	2.00	2.1	38.0	0.0601	3818	500
1	400	61/Compacted	23.40	2.0	1.2	32.0	2.00	2.2	41.5	0.0470	4756	500
1	500	61/Compacted	26.60	2.2	1.2	36.0	2.00	2.4	45.5	0.0366	5946	500
1	630	61/Compacted	30.20	2.4	1.3	40.0	2.50	2.5	51.0	0.0283	7635	500
1	800	61/Compacted	34.00	2.6	1.4	44.5	2.50	2.7	56.0	0.0221	9415	300
1	1000	127/Compacted	39.40	2.8	1.5	51.0	2.50	2.9	62.5	0.0176	12120	300