

SPECIFICATION

For

FDLH-0.6/1KV-CE-AWA

0.6/1(1.2)kV XLPE Insulated Polyolefin Inner Sheathed

Aluminium Wire Armored

Polyolefin Outer Sheathed Flame Retardant

with Low Smoke and Zero Halogen Power Cable

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

BY



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CUSTOMER

Rev.	Date	Description
0	9/10/2019	Issued specification
1	22/3/2021	- Cancel cable code "0010" - Correct the value in Table 1
2	14/12/2021	Update the test standard version
3	15/2/2024	Update reference standard
4	3/7/2024	Update specification
5	20/11/2024	Update Table 1
6	20/1/2025	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 cross-linked polyethylene (XLPE) insulated polyolefin inner sheathed aluminium wire armored polyolefin outer sheathed 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.

- 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.

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.

The color of insulation shall be white

(White color is natural color of XLPE insulation)

4. 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.

5. Aluminium Wire Armor

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

A separator tape may be applied helically over the armored.

6. Outer Sheath

The outer sheath shall be sunlight resistant, low smoke and zero halogen flame retardant polyolefin (ST8) 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.

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

8. 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,

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.

9. 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 "FDLH-0.6/1KV-CE-AWA"
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 60332-3-22; 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

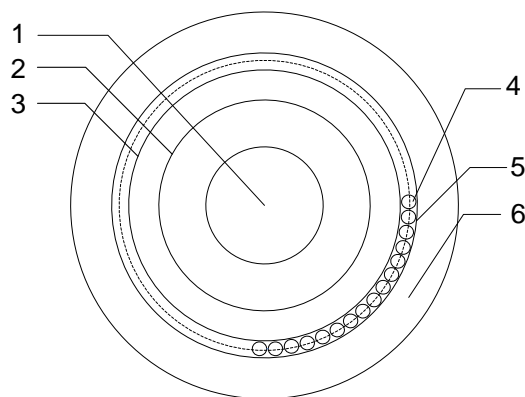
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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	Insulation	Cross-linked polyethylene (XLPE) compound
3	Inner Sheath	Low smoke and zero halogen flame retardant polyolefin compound
4	Aarmor	Aluminium wire
5	Separator Tape	PS tape or Suitable tape
6	Outer Sheath	Low smoke and zero halogen flame retardant polyolefin (ST8) compound

Application: For installed into tray, conduit, underground duct trench or direct burial in ground which provide flame retardant, low smoke and nontoxic emission under fire. 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 (wire/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	Inner sheath thickness nominal (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	1.5	7/Non-compacted	1.59	0.7	1.2	6.0	1.25	1.8	13.0	12.1	199	500
1	2.5	7/Non-compacted	2.01	0.7	1.2	6.5	1.25	1.8	13.5	7.41	218	500
1	4	7/Non-compacted	2.55	0.7	1.2	7.0	1.25	1.8	14.0	4.61	244	500
1	6	7/Non-compacted	3.12	0.7	1.2	7.5	1.25	1.8	14.5	3.08	277	500
1	10	7/Compacted	3.70	0.7	1.2	8.0	1.25	1.8	15.0	1.83	328	500
1	16	7/Compacted	4.70	0.7	1.2	9.0	1.25	1.8	16.0	1.15	406	500
1	25	7/Compacted	5.90	0.9	1.2	11.0	1.25	1.8	17.5	0.727	535	500
1	35	7/Compacted	6.90	0.9	1.2	12.0	1.25	1.8	18.5	0.524	650	500
1	50	19/Compacted	8.20	1.0	1.2	13.5	1.25	1.8	20.0	0.387	802	500
1	70	19/Compacted	9.80	1.1	1.2	15.0	1.25	1.8	22.0	0.268	1043	500
1	95	19/Compacted	11.60	1.1	1.2	17.0	1.60	1.8	24.5	0.193	1376	500
1	120	37/Compacted	13.10	1.2	1.2	18.5	1.60	1.8	26.0	0.153	1665	500
1	150	37/Compacted	14.50	1.4	1.2	20.5	1.60	1.8	28.0	0.124	1986	500
1	185	37/Compacted	16.10	1.6	1.2	22.5	1.60	1.9	30.5	0.0991	2387	500
1	240	61/Compacted	18.60	1.7	1.2	25.5	1.60	2.0	33.5	0.0754	3056	500
1	300	61/Compacted	20.80	1.8	1.2	28.0	2.00	2.1	37.0	0.0601	3786	500
1	400	61/Compacted	23.40	2.0	1.2	31.0	2.00	2.2	40.0	0.0470	4721	500
1	500	61/Compacted	26.60	2.2	1.2	34.5	2.00	2.3	44.0	0.0366	5897	500
1	630	61/Compacted	30.20	2.4	1.3	38.5	2.50	2.5	49.5	0.0283	7609	500