

SPECIFICATION**For****FDLH-0.6/1KV-AL-CE**

0.6/1(1.2)kV Aluminium Conductor XLPE Insulated Polyolefin Sheathed

Flame Retardant with Low Smoke and Zero Halogen Power Cable

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

BY 

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Rev.	Date	Description
0	22/4/2024	Issued specification
1	24/12/2024	Update conductor diameter

APP. _____

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CUSTOMER

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 aluminium conductor cross-linked polyethylene (XLPE) insulated polyolefin 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.

2. Conductor

The conductor shall be compacted concentric stranded uncoated hard-drawn aluminium conductor in accordance with IEC 60228 : 2004, Class 2.

The direction of lay shall be right-hand (Z) 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.

4. Cabling (For multi-cores only)

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, as follows :

Single-core : white

2-cores : blue, brown

3-cores : brown, black, grey

4-cores : blue, brown, black, grey

5-cores : blue, brown, black, grey, green/yellow

(White color is natural color of XLPE insulation)

6. Sheath

The sheath shall be low smoke and zero halogen flame retardant polyolefin (ST8) compound meet the requirements of the IEC 60502-1 : 2021.


The average thickness of the 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 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 "AL"
6. Type of insulation and sheath "XLPE/LSOH"
7. Type of cable "POWER CABLE"
8. Number cores and size of conductor
9. The continuous reel length marking (in figure) shall be made on the 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 and IEC 60754-2.

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-AL-CE"
2. Number of core and size of cable
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.

Definition concerning the tests

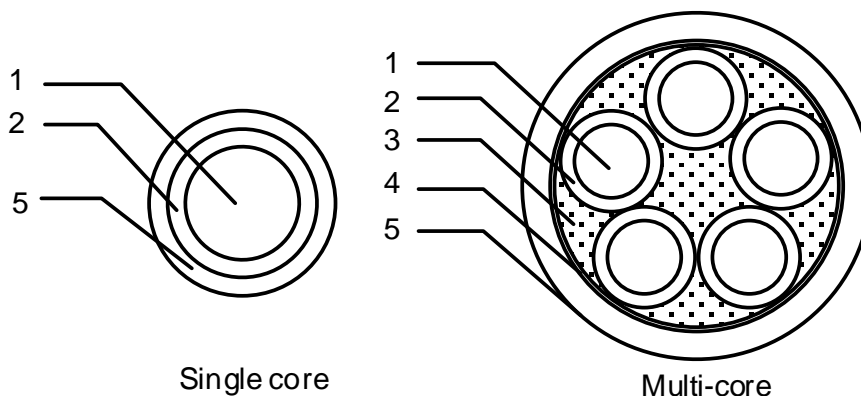
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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 uncoated hard-drawn aluminium
2	Insulation	Cross-Linked Polyethylene (XLPE) compound
3	Filler	Non-hygroscopic
4	Binder Tape	PS tape or suitable tape
5	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 non toxic 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 (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	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	3.72	0.7	1.4	8.5	3.08	87	500
1	16	7/Compacted	4.69	0.7	1.4	9.5	1.91	114	500
1	25	7/Compacted	5.90	0.9	1.4	11.5	1.20	161	500
1	35	7/Compacted	6.95	0.9	1.4	12.5	0.868	201	500
1	50	7/Compacted	8.01	1.0	1.4	13.5	0.641	253	500
1	70	19/Compacted	9.73	1.1	1.4	15.5	0.443	335	500
1	95	19/Compacted	11.40	1.1	1.5	17.5	0.320	436	500
1	120	19/Compacted	12.95	1.2	1.5	19.5	0.253	536	500
1	150	19/Compacted	14.27	1.4	1.6	21.5	0.206	654	500
1	185	34/Compacted	15.98	1.6	1.6	23.5	0.164	808	500
1	240	34/Compacted	18.47	1.7	1.7	26.5	0.125	1033	500
1	300	34/Compacted	20.68	1.8	1.8	29.0	0.100	1262	500
1	400	55/Compacted	23.39	2.0	1.9	32.5	0.0778	1595	500
1	500	55/Compacted	26.67	2.2	2.0	36.5	0.0605	2018	500

Table 1 (Continued)

No. of cores	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	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	10	7/Compacted	3.72	0.7	1.8	15.5	3.08	219	500
2	16	7/Compacted	4.69	0.7	1.8	17.0	1.91	277	500
2	25	7/Compacted	5.90	0.9	1.8	20.5	1.20	403	500
2	35	7/Compacted	6.95	0.9	1.8	23.0	0.868	495	500
2	50	7/Compacted	8.01	1.0	1.8	25.5	0.641	629	500
2	70	19/Compacted	9.73	1.1	1.8	29.5	0.443	837	500
2	95	19/Compacted	11.40	1.1	2.0	33.0	0.320	1088	500
2	120	19/Compacted	12.95	1.2	2.1	37.0	0.253	1356	500
2	150	19/Compacted	14.27	1.4	2.2	40.5	0.206	1649	500
2	185	34/Compacted	15.98	1.6	2.3	45.5	0.164	2055	500
2	240	34/Compacted	18.47	1.7	2.5	51.0	0.125	2638	500
2	300	34/Compacted	20.68	1.8	2.7	56.5	0.100	3235	500
2	400	55/Compacted	23.39	2.0	2.9	63.5	0.0778	4090	500

Table 1 (Continued)

No. of cores	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	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	10	7/Compacted	3.72	0.7	1.8	16.0	3.08	264	500
3	16	7/Compacted	4.69	0.7	1.8	18.0	1.91	337	500
3	25	7/Compacted	5.90	0.9	1.8	22.0	1.20	474	500
3	35	7/Compacted	6.95	0.9	1.8	24.5	0.868	588	500
3	50	7/Compacted	8.01	1.0	1.8	27.0	0.641	751	500
3	70	19/Compacted	9.73	1.1	1.9	31.5	0.443	1017	500
3	95	19/Compacted	11.40	1.1	2.0	35.0	0.320	1326	500
3	120	19/Compacted	12.95	1.2	2.1	39.5	0.253	1659	500
3	150	19/Compacted	14.27	1.4	2.3	43.5	0.206	2037	500
3	185	34/Compacted	15.98	1.6	2.4	48.5	0.164	2529	500
3	240	34/Compacted	18.47	1.7	2.6	55.0	0.125	3256	500
3	300	34/Compacted	20.68	1.8	2.8	60.5	0.100	4007	500
3	400	55/Compacted	23.39	2.0	3.1	68.5	0.0778	5113	500

Table 1 (Continued)

No. of cores	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	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)
4	10	7/Compacted	3.72	0.7	1.8	17.5	3.08	323	500
4	16	7/Compacted	4.69	0.7	1.8	20.0	1.91	412	500
4	25	7/Compacted	5.90	0.9	1.8	24.0	1.20	595	500
4	35	7/Compacted	6.95	0.9	1.8	26.5	0.868	748	500
4	50	7/Compacted	8.01	1.0	1.9	30.0	0.641	972	500
4	70	19/Compacted	9.73	1.1	2.0	35.0	0.443	1323	500
4	95	19/Compacted	11.40	1.1	2.1	39.0	0.320	1729	500
4	120	19/Compacted	12.95	1.2	2.3	44.0	0.253	2188	500
4	150	19/Compacted	14.27	1.4	2.4	48.0	0.206	2664	500
4	185	34/Compacted	15.98	1.6	2.6	54.0	0.164	3340	500
4	240	34/Compacted	18.47	1.7	2.8	61.0	0.125	4297	500
4	300	34/Compacted	20.68	1.8	3.0	67.5	0.100	5299	500
4	400	55/Compacted	23.39	2.0	3.3	76.0	0.0778	6744	300

Table 1 (Continued)

No. of cores	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	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)
5	10	7/Compacted	3.72	0.7	1.8	19.0	3.08	382	500
5	16	7/Compacted	4.69	0.7	1.8	21.5	1.91	492	500
5	25	7/Compacted	5.90	0.9	1.8	26.5	1.20	717	500
5	35	7/Compacted	6.95	0.9	1.9	29.5	0.868	932	500
5	50	7/Compacted	8.01	1.0	2.0	33.5	0.641	1188	500
5	70	19/Compacted	9.73	1.1	2.2	39.0	0.443	1667	500
5	95	19/Compacted	11.40	1.1	2.3	43.5	0.320	2154	500
5	120	19/Compacted	12.95	1.2	2.4	48.5	0.253	2683	500
5	150	19/Compacted	14.27	1.4	2.6	53.5	0.206	3304	500
5	185	34/Compacted	15.98	1.6	2.8	60.5	0.164	4147	500
5	240	34/Compacted	18.47	1.7	3.0	68.5	0.125	5345	500
5	300	34/Compacted	20.68	1.8	3.2	75.0	0.100	6560	300
5	400	55/Compacted	23.39	2.0	3.6	85.0	0.0778	8410	300