

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

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

Flame Retardant with Low Smoke and Zero Halogen

with Protection Earthed Power Cable

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

BY



(Wachara Sangsomritphon)

MANAGER, Cable Design Section

Rev.	Date	Description
0	31/10/2019	Issued specification
1	29/6/2020	Change code from "6610" to "0010"
2	23/09/2020	Add size 4+PEx50/35 mm ² and 4+PEx70/50 mm ²
3	17/6/2021	Cancel code "0010"
4	31/8/2022	Add size
5	26/4/2024	Update specification
6	11/9/2024	Update Table 1
7	29/11/2024	Update conductor diameter
8	6/6/2025	Add size 3+PEx95/70 mm ² and cancel size 1 mm ²

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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 copper 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

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.

4. 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.

A suitable binder tape shall be applied helically over the cabled core.

5. Core Identification

The cores shall be identified by color, as follows :

2-cores + PE : blue, brown + green/yellow

3-cores + PE : brown, black, grey + green/yellow

4-cores + PE : blue, brown, black, grey + green/yellow

6. Sheath

The 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 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 or orange.

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 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 be 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

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


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

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"
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

- 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

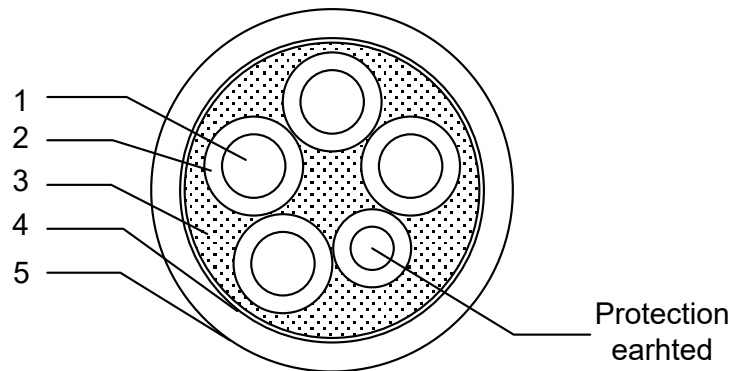
Routine Tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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 annealed copper
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 cores and size (core x 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+PE x 1.5/1.5	7/Non-compacted	1.59	0.7	1.8	11.5	12.1	152	500
2+PE x 2.5/2.5	7/Non-compacted	2.01	0.7	1.8	12.5	7.41	190	500
2+PE x 4/4	7/Non-compacted	2.55	0.7	1.8	13.5	4.61	249	500
2+PE x 6/6	7/Non-compacted	3.12	0.7	1.8	15.0	3.08	326	500
2+PE x 10/10	7/Compacted	3.70	0.7	1.8	16.0	1.83	449	500
2+PE x 16/16	7/Compacted	4.70	0.7	1.8	18.0	1.15	625	500
2+PE x 25/16	7/Compacted	5.90	0.9	1.8	21.0	0.727	835	500
2+PE x 35/16	7/Compacted	6.90	0.9	1.8	22.5	0.524	1037	500
2+PE x 50/25	19/Compacted	8.20	1.0	1.8	26.0	0.387	1411	500
2+PE x 70/35	19/Compacted	9.80	1.1	1.9	29.5	0.268	1950	500
2+PE x 95/50	19/Compacted	11.60	1.1	2.0	33.5	0.193	2614	500
2+PE x 120/70	37/Compacted	13.10	1.2	2.1	37.5	0.153	3372	500
2+PE x 150/70	37/Compacted	14.50	1.4	2.2	41.0	0.124	4005	500
2+PE x 150/95	37/Compacted	14.50	1.4	2.3	41.5	0.124	4271	500
2+PE x 185/95	37/Compacted	16.10	1.6	2.4	46.0	0.0991	5066	500
2+PE x 240/120	61/Compacted	18.60	1.7	2.8	52.0	0.0754	6639	500
2+PE x 300/150	61/Compacted	20.80	1.8	3.1	57.5	0.0601	8262	500
2+PE x 400/240	61/Compacted	23.40	2.0	3.4	65.5	0.0470	11011	300

Table 1 (continued)

No. of cores and size (core x 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+PE x 1.5/1.5	7/Non-compacted	1.59	0.7	1.8	12.0	12.1	181	500
3+PE x 2.5/2.5	7/Non-compacted	2.01	0.7	1.8	13.5	7.41	233	500
3+PE x 4/4	7/Non-compacted	2.55	0.7	1.8	14.5	4.61	306	500
3+PE x 6/6	7/Non-compacted	3.12	0.7	1.8	16.0	3.08	407	500
3+PE x 10/10	7/Compacted	3.70	0.7	1.8	17.5	1.83	565	500
3+PE x 16/16	7/Compacted	4.70	0.7	1.8	20.0	1.15	796	500
3+PE x 25/16	7/Compacted	5.90	0.9	1.8	23.0	0.727	1101	500
3+PE x 35/16	7/Compacted	6.90	0.9	1.8	25.0	0.524	1400	500
3+PE x 50/25	19/Compacted	8.20	1.0	1.8	28.5	0.387	1894	500
3+PE x 70/35	19/Compacted	9.80	1.1	2.0	33.0	0.268	2644	500
3+PE x 95/50	19/Compacted	11.60	1.1	2.1	37.5	0.193	3571	500
3+PE x 95/70	19/Compacted	11.60	1.1	2.2	38.5	0.193	3793	500
3+PE x 120/70	37/Compacted	13.10	1.2	2.3	42.0	0.153	4587	500
3+PE x 150/70	37/Compacted	14.50	1.4	2.4	45.5	0.124	5488	500
3+PE x 150/95	37/Compacted	14.50	1.4	2.4	46.5	0.124	5739	500
3+PE x 185/95	37/Compacted	16.10	1.6	2.8	51.5	0.0991	6979	500
3+PE x 240/120	61/Compacted	18.60	1.7	3.0	58.5	0.0754	9055	300
3+PE x 300/150	61/Compacted	20.80	1.8	3.4	64.5	0.0601	11338	300
3+PE x 400/240	61/Compacted	23.40	2.0	3.8	74.0	0.0470	14966	300

Table 1 (continued)

No. of cores and size (core x 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+PE x 1.5/1.5	7/Non-compacted	1.59	0.7	1.8	13.0	12.1	213	500
4+PE x 2.5/2.5	7/Non-compacted	2.01	0.7	1.8	14.5	7.41	274	500
4+PE x 4/4	7/Non-compacted	2.55	0.7	1.8	16.0	4.61	370	500
4+PE x 6/6	7/Non-compacted	3.12	0.7	1.8	17.5	3.08	489	500
4+PE x 10/10	7/Compacted	3.70	0.7	1.8	19.0	1.83	683	500
4+PE x 16/16	7/Compacted	4.70	0.7	1.8	21.5	1.15	971	500
4+PE x 25/16	7/Compacted	5.90	0.9	1.8	26.0	0.727	1380	500
4+PE x 35/16	7/Compacted	6.90	0.9	1.8	28.0	0.524	1783	500
4+PE x 50/25	19/Compacted	8.20	1.0	2.0	33.0	0.387	2408	500
4+PE x 70/35	19/Compacted	9.80	1.1	2.1	38.0	0.268	3350	500
4+PE x 95/50	19/Compacted	11.60	1.1	2.3	43.0	0.193	4619	500
4+PE x 120/70	37/Compacted	13.10	1.2	2.5	48.5	0.153	5902	500
4+PE x 150/70	37/Compacted	14.50	1.4	3.0	53.5	0.124	7239	500
4+PE x 150/95	37/Compacted	14.50	1.4	3.0	54.5	0.124	7479	500
4+PE x 185/95	37/Compacted	16.10	1.6	3.2	60.0	0.0991	9039	500
4+PE x 240/120	61/Compacted	18.60	1.7	3.6	68.0	0.0754	11831	300
4+PE x 300/150	61/Compacted	20.80	1.8	3.8	74.5	0.0601	14608	300
4+PE x 400/240	61/Compacted	23.40	2.0	4.0	85.0	0.0470	19141	200

Table 1 (continued)

FOR PROTECTION EARTHED CONDUCTOR

No. of core	Size (mm ²)	Conductor (wires/type)	Conductor diameter approx. (mm)	Insulation thickness nominal (mm)	Conductor resistance at 20°C maximum (Ohm/km)
1	1.5	7/Non-compacted	1.59	0.7	12.1
1	2.5	7/Non-compacted	2.01	0.7	7.41
1	4	7/Non-compacted	2.55	0.7	4.61
1	6	7/Non-compacted	3.12	0.7	3.08
1	10	7/Compacted	3.70	0.7	1.83
1	16	7/Compacted	4.70	0.7	1.15
1	25	7/Compacted	5.90	0.9	0.727
1	35	7/Compacted	6.90	0.9	0.524
1	50	19/Compacted	8.20	1.0	0.387
1	70	19/Compacted	9.80	1.1	0.268
1	95	19/Compacted	11.60	1.1	0.193
1	120	37/Compacted	13.10	1.2	0.153
1	150	37/Compacted	14.50	1.4	0.124
1	240	61/Compacted	18.60	1.7	0.0754