

SPECIFICATION**For****FD-0.6/1KV-CV**

0.6/1(1.2)kV XLPE Insulated
PVC Sheathed Flame Retardant
with Protection Earthed Power Cable
(0.6/1(1.2)kV, Cu/XLPE/FR-PVC)

BY



(Wachara Sangsomritphon)

MANAGER, Cable Design Section

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CUSTOMER

Rev.	Date	Description
0	11/09/2019	Issued specification
1	26/01/2021	Cancel cable code "0010"
2	1/04/2021	Add size 3+PE x 35/35 mm ²
3	26/04/2021	Add size 3+PE x 185/120 mm ²
4	13/8/2021	Add size 3+PE x 50/50 mm ²
5	10/2/2022	Add size 4+PE x 35/35, 50/50 mm ²
6	30/8/2022	Add size
7	7/11/2022	Add size 3+PE x 150/95 mm ²
8	26/1/2023	Add size 3+PE x 2.5/1.5, 70/25 and 240/185 mm ²
9	4/7/2023	Add size
10	16/1/2024	Update Table 1
11	1/3/2024	Add size 4+PE x 240/150, 400/150 mm ²
12	21/3/2024	Change marking on cable
13	3/5/2024	Update specification
14	28/11/2024	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 cross-linked polyethylene (XLPE) insulated polyvinyl chloride (PVC) sheathed flame retardant with protection earthed power cable.

The cable shall be in accordance with IEC 60502-1 : 2021.

The finished cables shall meet the vertical tray flame test requirements per IEC 60332-1 and IEC 60332-3-24 ; Category C.

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 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 and flame retardant polyvinyl chloride (PVC/ST2) compound meet the requirements of IEC 60502-1 : 2021.


The average thickness of the sheath shall not be 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. Flame retardant "FD"
4. Rated circuit voltage "0.6/1KV"
5. Type of conductor "CU"
6. Type of insulation and sheath "XLPE/PVC"
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 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 and IEC 60332-3-24 ; Category C.


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 "FD-0.6/1KV-CV"
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 and IEC 60332-3-24; Category C.

Definition concerning the tests

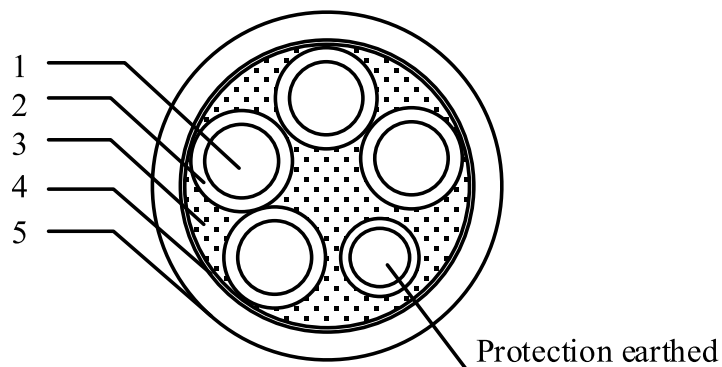
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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	Stranded annealed copper
2	Insulation	Crosslinked polyethylene (XLPE) compound
3	Filler	Non-hygroscopic
4	Binder tape	Spun bond tape or suitable tape
5	Sheath	Flame retardant polyvinyl chloride (PVC/ST2) compound

Application: Use for installation in open tray, conduit, underground duct trench or direct burial in ground, at wet or dry location. 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 1/1	7/Non-compacted	1.29	0.7	1.8	11.0	18.1	124	500
2+PE x 1.5/1.5	7/Non-compacted	1.59	0.7	1.8	12.0	12.1	150	500
2+PE x 2.5/2.5	7/Non-compacted	2.01	0.7	1.8	13.0	7.41	187	500
2+PE x 4/4	7/Non-compacted	2.55	0.7	1.8	14.0	4.61	245	500
2+PE x 6/6	7/Non-compacted	3.12	0.7	1.9	15.5	3.08	326	500
2+PE x 10/10	7/Compacted	3.70	0.7	2.1	17.0	1.83	464	500
2+PE x 16/16	7/Compacted	4.70	0.7	2.3	19.5	1.15	675	500
2+PE x 25/16	7/Compacted	5.90	0.9	2.7	23.0	0.727	934	500
2+PE x 25/25	7/Compacted	5.90	0.9	2.9	24.5	0.727	1063	500
2+PE x 35/16	7/Compacted	6.90	0.9	2.8	25.0	0.524	1155	500
2+PE x 35/25	7/Compacted	6.90	0.9	2.9	26.0	0.524	1266	500
2+PE x 35/35	7/Compacted	6.90	0.9	2.9	27.0	0.524	1366	500
2+PE x 50/25	19/Compacted	8.20	1.0	3.0	29.0	0.387	1578	500
2+PE x 70/35	19/Compacted	9.80	1.1	3.3	33.0	0.268	2171	500
2+PE x 95/50	19/Compacted	11.60	1.1	3.5	37.0	0.193	2881	500
2+PE x 120/50	37/Compacted	13.10	1.2	3.8	41.0	0.153	3508	500
2+PE x 120/70	37/Compacted	13.10	1.2	3.8	41.5	0.153	3707	500
2+PE x 150/70	37/Compacted	14.50	1.4	4.0	45.5	0.124	4401	500
2+PE x 150/95	37/Compacted	14.50	1.4	4.0	46.0	0.124	4654	500
2+PE x 185/70	37/Compacted	16.10	1.6	4.0	49.5	0.0991	5218	500
2+PE x 185/95	37/Compacted	16.10	1.6	4.0	50.0	0.0991	5460	500
2+PE x 185/120	37/Compacted	16.10	1.6	4.0	50.5	0.0991	5715	500
2+PE x 185/150	37/Compacted	16.10	1.6	4.0	51.5	0.0991	6000	500
2+PE x 240/120	61/Compacted	18.60	1.7	4.0	55.5	0.0754	6984	500
2+PE x 300/150	61/Compacted	20.80	1.8	4.0	60.0	0.0601	8545	500
2+PE x 400/240	61/Compacted	23.40	2.0	4.0	67.5	0.0470	11237	300

Table 1 (continued)

No. of core 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 1/1	7/Non-compacted	1.29	0.7	1.8	12.0	18.1	146	500
3+PE x 1.5/1.5	7/Non-compacted	1.59	0.7	1.8	12.5	12.1	176	500
3+PE x 2.5/1.5	7/Non-compacted	2.01	0.7	1.9	14.0	7.41	221	500
3+PE x 2.5/2.5	7/Non-compacted	2.01	0.7	1.9	14.0	7.41	233	500
3+PE x 4/4	7/Non-compacted	2.55	0.7	1.9	15.5	4.61	305	500
3+PE x 6/6	7/Non-compacted	3.12	0.7	2.2	17.5	3.08	427	500
3+PE x 10/10	7/Compacted	3.70	0.7	2.3	19.0	1.83	594	500
3+PE x 16/10	7/Compacted	4.70	0.7	2.5	21.0	1.15	809	500
3+PE x 16/16	7/Compacted	4.70	0.7	2.6	22.0	1.15	881	500
3+PE x 25/16	7/Compacted	5.90	0.9	3.0	26.0	0.727	1249	500
3+PE x 25/25	7/Compacted	5.90	0.9	3.2	27.5	0.727	1387	500
3+PE x 35/16	7/Compacted	6.90	0.9	3.3	28.5	0.524	1600	500
3+PE x 35/25	7/Compacted	6.90	0.9	3.3	29.5	0.524	1703	500
3+PE x 35/35	7/Compacted	6.90	0.9	3.3	30.0	0.524	1801	500
3+PE x 50/25	19/Compacted	8.20	1.0	3.4	32.5	0.387	2137	500
3+PE x 50/35	19/Compacted	8.20	1.0	3.4	33.0	0.387	2234	500
3+PE x 50/50	19/Compacted	8.20	1.0	3.4	34.0	0.387	2366	500
3+PE x 70/25	19/Compacted	9.80	1.1	3.7	36.5	0.268	2842	500
3+PE x 70/35	19/Compacted	9.80	1.1	3.7	37.0	0.268	2940	500
3+PE x 70/50	19/Compacted	9.80	1.1	3.7	38.0	0.268	3071	500
3+PE x 70/70	19/Compacted	9.80	1.1	3.7	39.0	0.268	3285	500
3+PE x 95/50	19/Compacted	11.60	1.1	4.0	42.0	0.193	3954	500
3+PE x 95/70	19/Compacted	11.60	1.1	4.0	43.0	0.193	4168	500
3+PE x 120/50	37/Compacted	13.10	1.2	4.0	45.5	0.153	4761	500
3+PE x 120/70	37/Compacted	13.10	1.2	4.0	46.5	0.153	4973	500
3+PE x 120/95	37/Compacted	13.10	1.2	4.0	47.5	0.153	5233	500
3+PE x 150/70	37/Compacted	14.50	1.4	4.0	49.5	0.124	5884	500
3+PE x 150/95	37/Compacted	14.50	1.4	4.0	50.5	0.124	6142	500
3+PE x 150/120	37/Compacted	14.50	1.4	4.0	51.5	0.124	6404	500

Table 1 (continued)

No. of core 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 185/70	37/Compacted	16.10	1.6	4.0	54.0	0.0991	7061	500
3+PE x 185/95	37/Compacted	16.10	1.6	4.0	55.0	0.0991	7320	500
3+PE x 185/120	37/Compacted	16.10	1.6	4.0	55.5	0.0991	7581	500
3+PE x 185/150	37/Compacted	16.10	1.6	4.0	56.5	0.0991	7866	500
3+PE x 185/185	37/Compacted	16.10	1.6	4.0	58.0	0.0991	8241	500
3+PE x 240/120	61/Compacted	18.60	1.7	4.0	61.0	0.0754	9368	300
3+PE x 240/185	61/Compacted	18.60	1.7	4.0	63.0	0.0754	10026	300
3+PE x 300/150	61/Compacted	20.80	1.8	4.0	66.5	0.0601	11562	300
3+PE x 400/240	61/Compacted	23.40	2.0	4.0	75.0	0.0470	15081	200

Table 1 (continued)

No. of core 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 1/1	7/Non-compacted	1.29	0.7	1.8	13.0	18.1	171	500
4+PE x 1.5/1.5	7/Non-compacted	1.59	0.7	1.9	14.0	12.1	213	500
4+PE x 2.5/2.5	7/Non-compacted	2.01	0.7	2.0	15.5	7.41	278	500
4+PE x 4/4	7/Non-compacted	2.55	0.7	2.2	17.0	4.61	388	500
4+PE x 6/6	7/Non-compacted	3.12	0.7	2.4	19.0	3.08	524	500
4+PE x 10/10	7/Compacted	3.70	0.7	2.4	20.5	1.83	721	500
4+PE x 16/10	7/Compacted	4.70	0.7	2.7	24.0	1.15	1018	500
4+PE x 16/16	7/Compacted	4.70	0.7	2.8	24.0	1.15	1085	500
4+PE x 25/16	7/Compacted	5.90	0.9	3.2	29.5	0.727	1575	500
4+PE x 25/25	7/Compacted	5.90	0.9	3.5	30.5	0.727	1708	500
4+PE x 35/16	7/Compacted	6.90	0.9	3.7	32.5	0.524	2068	500
4+PE x 35/25	7/Compacted	6.90	0.9	3.8	34.0	0.524	2189	500
4+PE x 35/35	7/Compacted	6.90	0.9	3.8	33.5	0.524	2276	500
4+PE x 50/25	19/Compacted	8.20	1.0	3.5	36.5	0.387	2670	500
4+PE x 50/35	19/Compacted	8.20	1.0	3.5	37.0	0.387	2769	500
4+PE x 50/50	19/Compacted	8.20	1.0	3.6	37.5	0.387	2903	500
4+PE x 70/25	19/Compacted	9.80	1.1	3.7	41.0	0.268	3568	500
4+PE x 70/35	19/Compacted	9.80	1.1	3.7	41.5	0.268	3668	500
4+PE x 70/50	19/Compacted	9.80	1.1	3.8	42.5	0.268	3821	500
4+PE x 70/70	19/Compacted	9.80	1.1	4.0	43.5	0.268	4112	500
4+PE x 95/50	19/Compacted	11.60	1.1	4.0	47.5	0.193	5014	500
4+PE x 95/70	19/Compacted	11.60	1.1	4.0	48.5	0.193	5228	500
4+PE x 120/50	37/Compacted	13.10	1.2	4.0	51.0	0.153	6080	500
4+PE x 120/70	37/Compacted	13.10	1.2	4.0	52.0	0.153	6294	500
4+PE x 120/95	37/Compacted	13.10	1.2	4.0	53.0	0.153	6555	500
4+PE x 150/70	37/Compacted	14.50	1.4	4.0	56.0	0.124	7528	500
4+PE x 150/95	37/Compacted	14.50	1.4	4.0	57.5	0.124	7789	500
4+PE x 150/120	37/Compacted	14.50	1.4	4.0	58.0	0.124	8053	500

Table 1 (continued)

No. of core 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 185/70	37/Compacted	16.10	1.6	4.0	61.0	0.0991	9042	300
4+PE x 185/95	37/Compacted	16.10	1.6	4.0	62.0	0.0991	9303	300
4+PE x 185/120	37/Compacted	16.10	1.6	4.0	63.0	0.0991	9566	300
4+PE x 185/150	37/Compacted	16.10	1.6	4.0	64.0	0.0991	9852	300
4+PE x 240/120	61/Compacted	18.60	1.7	4.0	69.0	0.0754	12001	300
4+PE x 240/150	61/Compacted	18.60	1.7	4.0	70.5	0.0754	12286	300
4+PE x 240/185	61/Compacted	18.60	1.7	4.0	71.5	0.0754	12657	300
4+PE x 300/150	61/Compacted	20.80	1.8	4.0	75.5	0.0601	14724	300
4+PE x400/150	61/Compacted	23.40	2.0	4.0	82.5	0.0470	18223	200
4+PE x400/240	61/Compacted	23.40	2.0	4.0	85.5	0.0470	19173	200

Table 1 (continued)

FOR PROTECTION EARTHED CONDUCTORS

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	7/Non-compacted	1.29	0.7	18.1
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	185	37/Compacted	16.10	1.6	0.0991
1	240	61/Compacted	18.60	1.7	0.0754