

SPECIFICATION
For
12/20KV-CE-CWS (0080)

12/20(24)kV XLPE Insulated
Copper Wire Screened
PE Sheathed Power Cable
(12/20(24)kV, Cu/XLPE/CWS/PE)

BY Wachara
(Wachara Sangsomritphon)

MANAGER, Cable Design Section

APP. Wachart
(Surachart Mame)

MANAGER, Development Department

Rev.	Date	Description
0	2/09/2020	Issued specification
1	20/5/2023	Add size 1 x 120 mm ²

APP. _____
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CUSTOMER

Customer Document	Rev.
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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.

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1. Scope

This specification covers 22000V copper conductor cross-linked polyethylene (XLPE) insulated copper wire screened polyethylene (PE) sheathed power cable.

The cable shall be in accordance with TIS 2143-2546. (Same IEC 60502-2) and MEA's specification No. 418 (02-2021).

2. Conductor

The conductor shall be compacted concentric stranded uncoated annealed copper conductor in accordance with TIS 2427-2552, Class 2 (Same IEC 60228 : 2004, Class 2.)

The direction of lay shall be left-hand (S) lay in the outermost layer.

3. Conductor Shield

The conductor shield shall be a semi-conducting nylon tape and shall be applied helically with a wrap over the conductor and a layer of extruded semi-conducting compound.

Size $\leq 150 \text{ mm}^2$: Applied extruded semi-conducting compound

Size $\geq 185 \text{ mm}^2$: Applied semi-conducting nylon tape and extruded semi-conducting compound

The thickness of the conductor shield shall be minimum 0.0635 mm.

4. Insulation

The insulation shall be cross-linked polyethylene (XLPE) compound meet the requirements of TIS 2143-2546. (Same IEC 60502-2)

The average thickness of the insulation shall be not less than that given in Table 1.

The minimum thickness shall be not less than 90% of the value in Table 1.

The thickness of insulation shall not be included that of conductor shield.

5. Insulation Shield

The insulation shield shall be a layer of extruded semi-conducting compound and shall be free stripping.

The thickness of the insulation shield shall be minimum 0.0635 mm.

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6. Copper Wire Screen

The copper wire screen shall consist of plain annealed round copper wires applied helically over the insulation shield.

The contact tape shall be an annealed uncoated copper tape and shall be applied helically over the copper wire screen.

The thickness of the copper tape shall be approximate 0.1 mm.

A suitable separator tape shall be applied helically over the contact tape.

7. Sheath

The sheath shall be polyethylene (PE/ST7) compound meet the requirements of TIS 2143-2546. (Same IEC 60502-2 : 2014)

The average thickness of the sheath shall be not less than that given in Table 1.

The minimum thickness shall not be less than 80% of the value in Table 1.

The color of the sheath shall be black.

8. Marking on Cable

On the surface of the sheath shall be marked legibly and durably in THAI language, at the interval of not more than 50 cm., as follow

“การไฟฟ้านครหลวง สายใต้ดินสำหรับใช้กับระบบ A เควี ขนาด B ตารางมิลลิเมตร,
สัญญาเลขที่ C : D”

Where

A : 24 for 12/20 kV cable.

B : The nominal cross-sectional area of conductor.

C : The purchase contract number

D : Manufacturer's name or trade mark.

The color of marking shall be white.

The continuous reel length marking (in figure) shall be made on the sheath at every 1 meter starting from "0"

9. Test and Properties

The cable shall meet the requirements in Test and Inspection and Table 1, when tested in accordance with TIS 2143-2546 and TIS 2427-2552

(Same IEC 60502-2 and IEC 60228 : 2004.) and MEA's specification No. 418 (04-2018).

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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.

Each reel shall be clearly marked as follows.

1. Designation "12/20KV-CE-CWS (0080)"
2. Type of conductor "CU"
3. Type of insulation and sheath "XLPE/PE"
4. Number of core and size of conductor
5. Cable length
6. Net and gross weight
7. Year of manufacture
8. Manufacturer's name and/or trade mark "  **YAZAKI**"
9. Rolling direction of reel and cable end position
10. Drum number

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Test and Inspection

Routine Tests

- Maximum conductor resistance, Ohm/km..... specified in Table 1
- AC test voltage for 5 minutes, kV..... 42
- Maximum partial discharge level*..... 10 pC or better, at 20.76 kV
- Electrical test on over sheath No breakdown

*The partial discharge level shall be no detectable discharge exceeding the declared sensitivity

Sample Tests

- Construction..... specified in Table 1
- AC test voltage for 4 hours, kV..... 48
- 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

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.

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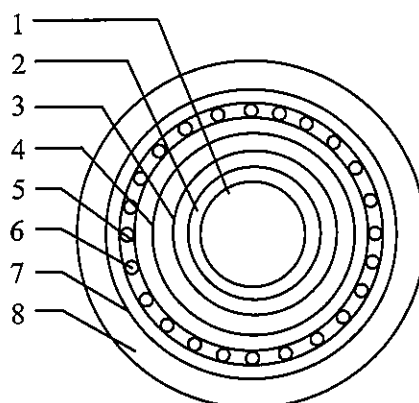
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Cable structure

Cross-sectional (Not scale)



No.	Structure	Material
1	Conductor	Stranded annealed copper
2	Nylon tape	Semi-conducting nylon tape (For size $\geq 185 \text{ mm}^2$ only)
3	Conductor shield	Semi-conducting XLPE compound
4	Insulation	Cross-linked polyethylene (XLPE)
5	Insulation shield	Semi-conducting XLPE compound
6	Metallic shield	Copper wire screen with copper contact tape
7	Binder tape	Spun bond tape or suitable tape
8	Sheath	Polyethylene (PE/ST7)

Application: Use for installation exposed, or in raceway, wet or dry location, or direct burial in ground.

Maximum conductor temperature of 90°C for normal operation and 250°C for short circuit conditions

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No. of core	Size (mm ²)	Conductor (wires/type)	Conductor diameter (mm)	Insulation thickness nominal (mm)	Copper wire area (mm ²)	Sheath thickness nominal (mm)	Overall diameter (mm)	Conductor resistance at 20 °C maximum (Ohm/km)	Weight of cable approx. (kg/km)	Standard packing length (m)
1	70/10	19/Compacted	9.73±1%	5.5	10	1.8	28.0 - 30.0	0.268	1200	500
1	120/10	37/Compacted	13.10±1%	5.5	10	2.0	32.5 - 34.5	0.153	1800	500
1	240/25	61/Compacted	18.47±1%	5.5	25	2.1	39.0 - 42.2	0.0754	3200	500
1	400/25	61/Compacted	23.39±1%	5.5	25	2.3	44.5 - 48.0	0.0470	4700	500
1	800/25	61/Compacted	34.00±1%	5.5	25	2.6	57.5 - 61.0	0.0221	9000	500