

SPECIFICATION**For****18/30KV-CV-AWA**

18/30(36)KV

XLPE Insulated PVC Inner Sheathed

Aluminium Wire Armored

PVC Outer Sheathed Power Cable

(18/30(36)kV, Cu/XLPE/CTS/PVC/AWA/PVC)

BY



(Wachara Sangsomritphon)

MANAGER, Cable Design Section

APP. _____

()

CUSTOMER

| Rev. | Date | Description |
|------|------------|---|
| 0 | 19/02/2020 | Issued specification |
| 1 | 1/10/2021 | Delete cable code "0010" |
| 2 | 23/6/2023 | Add size 1 x 35, 800 and 1000 mm ² |
| 3 | 26/1/2024 | Update Table 1 |
| 4 | 10/03/2025 | Cancel "red" color sheath |
| | | |
| | | |
| | | |
| | | |
| | | |

| 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 33000V copper conductor cross-linked polyethylene (XLPE) insulated polyvinyl chloride (PVC) inner sheathed aluminium wire armored polyvinyl chloride (PVC) outer sheathed power cable.

The cable shall be in accordance with IEC 60502-2 : 2014.

Flame retardant test requirements per IEC 60332-1.

2. Conductor

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. 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 approximate 0.5 mm.

4. Insulation

The insulation shall be cross-linked polyethylene (XLPE) compound meet the requirements of IEC 60502-2 : 2014.

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.

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 approximate 0.5 mm.

6. Metallic Shield

The metallic shield shall be an uncoated annealed copper tape and shall be applied helically with a lap over the insulation shield.

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

A suitable separator tape shall be applied helically over the shielded core.

7. Inner Sheath

The inner sheath shall be polyvinyl chloride (PVC) compound applied over the separator tape.

The average thickness given in Table 1.

The color of the inner sheath shall be black.

8. Aluminium Wire Armor

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

A suitable tape may be applied helically over the armored core.

9. Outer Sheath

The sheath shall be sunlight resistant polyvinyl chloride (PVC/ST2) compound meet the requirements of IEC 60502-2 : 2014.


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 by more than 0.2 mm.

The color of the outer sheath shall be black.

10. 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. Rated circuit voltage "18/30(36)KV"

4. Type of conductor "CU"

5. Type of insulation and sheath "XLPE/PVC"

6. Type of cable "POWER CABLE"

7. Number of cores and size of conductor

8. The continuous reel length marking (in figure) shall be made on the outer sheath at every 1 meter

11. Test and Properties

The cable shall meet the requirements in Test and Inspection and Table 1, when tested in accordance with IEC 60502-2 : 2014, IEC 60228 : 2004 and IEC 60332-1.


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

12. 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 "18/30KV-CV-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.....63
- Maximum partial discharge level*10 pC or better, at 31.14 kV
- Electrical test on over sheathNo 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.....72
- 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.

Definition concerning the tests

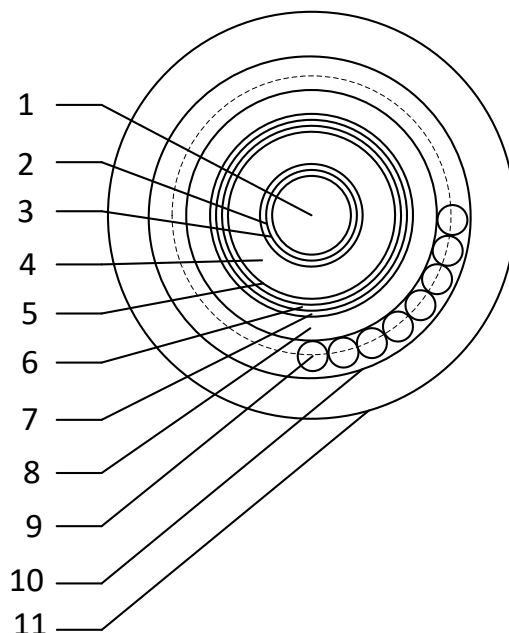
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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 | Nylon tape | Semi-conducting nylon tape (For size $\geq 185 \text{ mm}^2$ only) |
| 3 | Conductor shield | Semi-conducting compound |
| 4 | Insulation | Cross-linked polyethylene (XLPE) compound |
| 5 | Insulation shield | Semi-conducting compound |
| 6 | Metallic shield | Copper tape |
| 7 | Separator tape | Spun bond tape or suitable tape |
| 8 | Inner sheath | Polyvinyl chloride (PVC) compound |
| 9 | Aarmor | Aluminium wire |
| 10 | Separator tape | PS tape or suitable tape |
| 11 | Outer sheath | Polyvinyl chloride (PVC/ST2) compound |

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

Table 1

| No. of core | Size (mm ²) | Conductor (wires/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 | 50 | 19/Compacted | 8.20 | 8.0 | 1.2 | 31.0 | 2.00 | 2.2 | 40.0 | 0.387 | 1962 | 500 |
| 1 | 70 | 19/Compacted | 9.80 | 8.0 | 1.2 | 32.5 | 2.00 | 2.2 | 41.5 | 0.268 | 2248 | 500 |
| 1 | 95 | 19/Compacted | 11.60 | 8.0 | 1.2 | 34.0 | 2.00 | 2.3 | 43.5 | 0.193 | 2611 | 500 |
| 1 | 120 | 37/Compacted | 13.10 | 8.0 | 1.2 | 35.5 | 2.00 | 2.4 | 45.5 | 0.153 | 2952 | 500 |
| 1 | 150 | 37/Compacted | 14.50 | 8.0 | 1.3 | 37.5 | 2.50 | 2.5 | 48.5 | 0.124 | 3480 | 500 |
| 1 | 185 | 37/Compacted | 16.10 | 8.0 | 1.3 | 39.0 | 2.50 | 2.5 | 50.0 | 0.0991 | 3892 | 500 |
| 1 | 240 | 61/Compacted | 18.60 | 8.0 | 1.4 | 42.0 | 2.50 | 2.6 | 53.0 | 0.0754 | 4632 | 500 |
| 1 | 300 | 61/Compacted | 20.80 | 8.0 | 1.4 | 44.0 | 2.50 | 2.7 | 55.5 | 0.0601 | 5344 | 500 |
| 1 | 400 | 61/Compacted | 23.40 | 8.0 | 1.5 | 47.0 | 2.50 | 2.8 | 58.5 | 0.0470 | 6366 | 500 |
| 1 | 500 | 61/Compacted | 26.60 | 8.0 | 1.5 | 50.5 | 2.50 | 2.9 | 62.5 | 0.0366 | 7637 | 500 |
| 1 | 630 | 61/Compacted | 30.20 | 8.0 | 1.6 | 54.5 | 2.50 | 3.1 | 67.0 | 0.0283 | 9271 | 300 |
| 1 | 800 | 61/Compacted | 34.00 | 8.0 | 1.7 | 58.5 | 2.50 | 3.2 | 71.0 | 0.0221 | 11082 | 300 |
| 1 | 1000 | 127/Compacted | 39.40 | 8.0 | 1.8 | 64.0 | 3.15 | 3.4 | 78.5 | 0.0176 | 14162 | 300 |