

# SPECIFICATION

For

NYY

450/750V 70 °C Copper Conductor PVC Insulated PVC Inner Sheathed

PVC Outer Sheathed Power Cable

(450/750V, Cu /PVC/PVC/PVC)

BY



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CUSTOMER

| Rev. | Date       | Description                                 |
|------|------------|---|
| 0    | 10/11/2020 | Issued specification                        |
| 1    | 30/6/2021  | Add size 2C, 3C, 4C x 6, 10 mm <sup>2</sup> |
| 2    | 29/1/2024  | Update Table 1                              |
| 3    | 10/2/2025  | Update Table 1                              |
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| 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.

## 1. Scope

This specification covers 450/750V copper conductor polyvinyl chloride (PVC) insulated polyvinyl chloride (PVC) inner sheathed polyvinyl chloride (PVC) outer sheathed power cable. Maximum conductor temperature shall be 70°C.

The cable shall be in accordance with TIS 11 Part 101-2559, Table 3 and Table 4.

Flame retardant test TIS 11 Part 2-2553 (Comply with IEC 60332-1 : 2015).

## 2. Conductor

The conductor shall be solid and non-compacted concentric stranded uncoated annealed copper conductor in accordance with TIS 2427-2552, Class 1 and Class 2.

(Comply with IEC 60228 : 2004, Class 1 and Class 2).

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

## 3. Insulation

The insulation shall be polyvinyl chloride (PVC/C) compound meet the requirements of TIS 11 Part 101-2559.

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

The minimum thickness shall not fall below the value in Table 1 by more than 10% plus 0.1 mm.

## 4. Cabling (For multi-core only)

The individual insulated cores shall be cabled together with suitable length of lay or PVC rod to give the completed cable a circular cross section.

The direction of lay shall be left-hand (S) lay.

## 5. Core Identification

The cores shall be identified by colors, as follows :

Single-core : black

2-cores : blue, brown

3-cores : brown, black, grey

4-cores : blue, brown, black, grey

## 6. Inner Sheath (For multi-core only)

The inner sheath shall be polyvinyl chloride (PVC) compound applied over the cable core.

The average thickness given in Table 1.

The color of the inner sheath shall be black.

## 7. Outer Sheath

The outer sheath shall be polyvinyl chloride (PVC/ST4) compound meet the requirements of TIS 11 Part 101-2559.


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

The minimum thickness shall not fall below the value in Table 1 by more than 15% plus 0.1 mm.

The color of the outer sheath shall be black.

## 8. 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. Designation "NYY"
3. Rated voltage "450/750V "
4. Insulation and sheath material "PVC/PVC"
5. Max. operating rated temperature at conductor "70°C"
6. Number of cores and size of conductor
7. TIS logo and standard number
8. The continuous reel length marking (in figure) shall be made on the outer sheath at every 1 meter (Except single core cable the length mark on size  $\geq 6 \text{ mm}^2$ )

## 9. Test and Properties


The cable shall be meet the requirement in test and inspection and Table 1, when tested in accordance with TIS 11 Part 101-2559 and TIS 2427-2552 and TIS 11 Part 2-2553 (Comply with IEC 60332-1 : 2015).

## 10. Packing

The cable shall be placed on non-returnable wooden reels or shall be coiled and wrapped with plastic which shall be overlapped and secured.

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 on drum or label as follows.

1. Rated voltage "450/750V "
2. Max. operating rated temperature at conductor "70°C"
3. Designation "NYY"
4. Number of cores and size of conductor
5. Cable length
6. Net and gross weight
7. Month and year of manufacture
8. Rolling direction of reel (only for reel package)
9. Manufacturer's name and/or trade mark "  YAZAKI "
10. TIS logo and standard number

## Test and Inspection

### Sample Tests

- Maximum conductor resistance, Ohm/km ..... specified in Table 1
- AC test voltage for 5 minutes, kV .....2.5
- Construction.....specified in Table 1

### Type Tests

This cable shall be tested as followed :

- Minimum insulation resistance at 70 °C, MOhm-km ..... specified in Table 1
- Flame retardant tested according to TIS 11 Part 2-2553 (Comply with IEC 60332-1)

### Definition

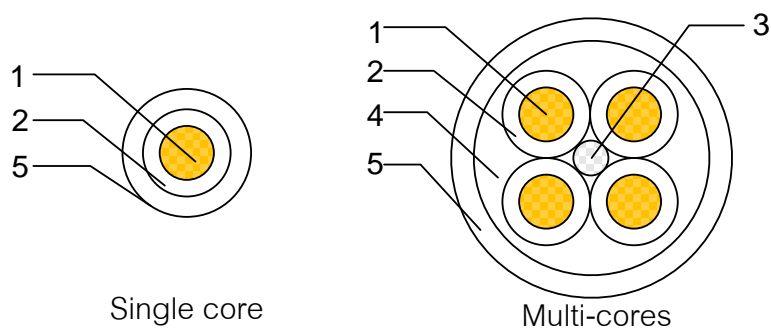
**Routine tests:** Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

**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    | Solid and Stranded annealed copper                |
| 2   | Insulation   | Polyvinyl chloride (PVC/C) compound               |
| 3   | Filler       | PVC Rod (For 4-cores size $\geq 6 \text{ mm}^2$ ) |
| 4   | Inner Sheath | Polyvinyl chloride (PVC) compound                 |
| 5   | Outer Sheath | Polyvinyl chloride (PVC/ST4) compound             |

**Application:** For installation exposed, or in raceway, wet or dry location, or direct burial in ground, Maximum conductor temperature of 70°C for normal operation and 160°C for short circuit condition.

**Table 1**

| No. of core | Size<br>(mm <sup>2</sup> ) | Conductor            |               |                          | Insulation thickness nominal<br>(mm) | Sheath thickness nominal<br>(mm) | Overall diameter maximum<br>(mm) | Conductor resistance at 20 °C maximum<br>(Ohm/km) | Insulation resistance at 70 °C minimum<br>(MOhm-km) | Weight of cable approx.<br>(kg/km) | Standard packing length<br>(m) |
|-------------|----------------------------|----------------------|---------------|--------------------------|--------------------------------------|----------------------------------|----------------------------------|---|---|------------------------------------|--------------------------------|
|             |                            | No. of wires (wires) | Type          | Diameter approx.<br>(mm) |                                      |                                  |                                  |   |   |                                    |                                |
| 1           | 1                          | 1                    | Solid         | 1.13                     | 1.5                                  | 1.8                              | 8.6                              | 18.1  | 0.0207  | 86                                 | 100/Coil                       |
| 1           | 1 (st)                     | 7                    | Non-compacted | 1.29                     | 1.5                                  | 1.8                              | 8.8                              | 18.1  | 0.0200  | 88                                 | 100/Coil                       |
| 1           | 1.5                        | 1                    | Solid         | 1.38                     | 1.5                                  | 1.8                              | 9.0                              | 12.1  | 0.0184  | 93                                 | 100/Coil                       |
| 1           | 1.5 (st)                   | 7                    | Non-compacted | 1.59                     | 1.5                                  | 1.8                              | 9.2                              | 12.1  | 0.0175  | 98                                 | 100/Coil                       |
| 1           | 2.5                        | 1                    | Solid         | 1.78                     | 1.5                                  | 1.8                              | 9.4                              | 7.41  | 0.0157  | 109                                | 100/Coil                       |
| 1           | 2.5 (st)                   | 7                    | Non-compacted | 2.01                     | 1.5                                  | 1.8                              | 9.8                              | 7.41  | 0.0146  | 115                                | 100/Coil                       |
| 1           | 4                          | 1                    | Solid         | 2.25                     | 1.5                                  | 1.8                              | 10.0                             | 4.61  | 0.0135  | 130                                | 100/Coil                       |
| 1           | 4 (st)                     | 7                    | Non-compacted | 2.55                     | 1.5                                  | 1.8                              | 10.5                             | 4.61  | 0.0124  | 137                                | 100/Coil                       |
| 1           | 300                        | 61                   | Non-compacted | 22.68                    | 2.5                                  | 2.2                              | 35.0                             | 0.0601  | 0.0032  | 3420                               | 500/Drum                       |
| 1           | 400                        | 61                   | Non-compacted | 25.65                    | 2.7                                  | 2.2                              | 38.5                             | 0.0470  | 0.0030  | 4301                               | 500/Drum                       |
| 1           | 500                        | 61                   | Non-compacted | 28.80                    | 3.1                                  | 2.4                              | 43.0                             | 0.0366  | 0.0031  | 5422                               | 500/Drum                       |

**Table 1 (continued)**

| No. of<br>cores | Size<br><br>(mm <sup>2</sup> ) | Conductor                      |               |                                 | Insulation<br>thickness<br>nominal<br><br>(mm) | Inner<br>sheath<br>thickness<br>nominal<br>(mm) | Outer<br>sheath<br>thickness<br>nominal<br>(mm) | Overall<br>diameter<br>maximum<br><br>(mm) | Conductor<br>resistance<br>at 20 °C<br>maximum<br>(Ohm/km) | Insulation<br>resistance<br>at 70 °C<br>minimum<br>(MOhm-km) | Weight<br>of<br>cable<br>approx.<br>(kg/km) | Standard<br>packing<br>length<br><br>(m) |
|-----------------|--------------------------------|--------------------------------|---------------|---------------------------------|--|---|---|--|--|--|---|--|
|                 |                                | No.<br>of wires<br><br>(wires) | Type          | Diameter<br>approx.<br><br>(mm) |  |   |   |  |  |  |   |  |
| 2               | 1                              | 1                              | Solid         | 1.13                            | 0.8  | 0.8   | 1.8   | 12.0                                       | 18.1   | 0.0141   | 163   | 100/Coil                                 |
| 2               | 1 (st)                         | 7                              | Non-compacted | 1.29                            | 0.8  | 0.8   | 1.8   | 12.5                                       | 18.1   | 0.0135   | 172   | 100/Coil                                 |
| 2               | 1.5                            | 1                              | Solid         | 1.38                            | 0.8  | 0.8   | 1.8   | 12.5                                       | 12.1   | 0.0123   | 184   | 100/Coil                                 |
| 2               | 1.5 (st)                       | 7                              | Non-compacted | 1.59                            | 0.8  | 0.8   | 1.8   | 13.0                                       | 12.1   | 0.0116   | 196   | 100/Coil                                 |
| 2               | 2.5                            | 1                              | Solid         | 1.78                            | 0.8  | 0.8   | 1.8   | 13.5                                       | 7.41   | 0.0102   | 222   | 100/Coil                                 |
| 2               | 2.5 (st)                       | 7                              | Non-compacted | 2.01                            | 0.8  | 0.8   | 1.8   | 14.0                                       | 7.41   | 0.0093   | 239   | 100/Coil                                 |
| 2               | 4                              | 1                              | Solid         | 2.25                            | 0.9  | 0.8   | 1.8   | 15.0                                       | 4.61   | 0.0094   | 287   | 100/Coil                                 |
| 2               | 4 (st)                         | 7                              | Non-compacted | 2.55                            | 0.9  | 0.8   | 1.8   | 15.5                                       | 4.61   | 0.0085   | 307   | 100/Coil                                 |
| 2               | 6                              | 7                              | Non-compacted | 3.12                            | 0.9  | 0.8   | 1.8   | 17.0                                       | 3.08   | 0.0073   | 380   | 100/Coil                                 |
| 2               | 10                             | 7                              | Non-compacted | 4.10                            | 1.1  | 0.8   | 1.8   | 19.5                                       | 1.83   | 0.0069   | 546   | 500/Drum                                 |
| 2               | 95                             | 19                             | Non-compacted | 12.60                           | 1.7  | 1.5   | 2.2   | 42.5                                       | 0.193  | 0.0038   | 3294  | 500/Drum                                 |
| 2               | 120                            | 37                             | Non-compacted | 14.21                           | 1.7  | 1.5   | 2.4   | 46.5                                       | 0.153  | 0.0034   | 4026  | 500/Drum                                 |
| 2               | 150                            | 37                             | Non-compacted | 15.75                           | 1.9  | 1.8   | 2.6   | 52.0                                       | 0.124  | 0.0034   | 4947  | 500/Drum                                 |
| 2               | 185                            | 37                             | Non-compacted | 17.64                           | 2.1  | 1.8   | 2.8   | 57.0                                       | 0.0991   | 0.0034   | 6100  | 500/Drum                                 |
| 2               | 240                            | 61                             | Non-compacted | 20.25                           | 2.3  | 2.0   | 3.0   | 64.0                                       | 0.0754   | 0.0033   | 7861  | 300/Drum                                 |
| 2               | 300                            | 61                             | Non-compacted | 22.68                           | 2.5  | 2.0   | 3.2   | 70.5                                       | 0.0601   | 0.0032   | 9661  | 300/Drum                                 |

**Table 1 (continued)**

| No. of<br>cores | Size<br><br>(mm <sup>2</sup> ) | Conductor                      |               |                                 | Insulation<br>thickness<br>nominal<br><br>(mm) | Inner<br>sheath<br>thickness<br>nominal<br>(mm) | Outer<br>sheath<br>thickness<br>nominal<br>(mm) | Overall<br>diameter<br>maximum<br><br>(mm) | Conductor<br>resistance<br>at 20 °C<br>maximum<br>(Ohm/km) | Insulation<br>resistance<br>at 70 °C<br>minimum<br>(MOhm-km) | Weight<br>of<br>cable<br>approx.<br>(kg/km) | Standard<br>packing<br>length<br><br>(m) |
|-----------------|--------------------------------|--------------------------------|---------------|---------------------------------|--|---|---|--|--|--|---|--|
|                 |                                | No.<br>of wires<br><br>(wires) | Type          | Diameter<br>approx.<br><br>(mm) |  |   |   |  |  |  |   |  |
| 3               | 1                              | 1                              | Solid         | 1.13                            | 0.8  | 0.8   | 1.8   | 12.5                                       | 18.1   | 0.0141   | 184   | 100/Coil                                 |
| 3               | 1 (st)                         | 7                              | Non-compacted | 1.29                            | 0.8  | 0.8   | 1.8   | 13.0                                       | 18.1   | 0.0135   | 190   | 100/Coil                                 |
| 3               | 1.5                            | 1                              | Solid         | 1.38                            | 0.8  | 0.8   | 1.8   | 13.0                                       | 12.1   | 0.0123   | 206   | 100/Coil                                 |
| 3               | 1.5 (st)                       | 7                              | Non-compacted | 1.59                            | 0.8  | 0.8   | 1.8   | 13.5                                       | 12.1   | 0.0116   | 221   | 100/Coil                                 |
| 3               | 2.5                            | 1                              | Solid         | 1.78                            | 0.8  | 0.8   | 1.8   | 14.0                                       | 7.41   | 0.0102   | 255   | 100/Coil                                 |
| 3               | 2.5 (st)                       | 7                              | Non-compacted | 2.01                            | 0.8  | 0.8   | 1.8   | 15.0                                       | 7.41   | 0.0093   | 274   | 100/Coil                                 |
| 3               | 4                              | 1                              | Solid         | 2.25                            | 0.9  | 0.8   | 1.8   | 15.5                                       | 4.61   | 0.0094   | 336   | 100/Coil                                 |
| 3               | 4 (st)                         | 7                              | Non-compacted | 2.55                            | 0.9  | 0.8   | 1.8   | 16.5                                       | 4.61   | 0.0085   | 358   | 100/Coil                                 |
| 3               | 6                              | 7                              | Non-compacted | 3.12                            | 0.9  | 0.8   | 1.8   | 18.0                                       | 3.08   | 0.0073   | 450   | 100/Coil                                 |
| 3               | 10                             | 7                              | Non-compacted | 4.10                            | 1.1  | 0.8   | 1.8   | 20.5                                       | 1.83   | 0.0069   | 656   | 500/Drum                                 |
| 3               | 95                             | 19                             | Non-compacted | 12.60                           | 1.7  | 1.5   | 2.4   | 46.0                                       | 0.193  | 0.0038   | 4231  | 500/Drum                                 |
| 3               | 120                            | 37                             | Non-compacted | 14.21                           | 1.7  | 1.8   | 2.6   | 50.5                                       | 0.153  | 0.0034   | 5254  | 500/Drum                                 |
| 3               | 150                            | 37                             | Non-compacted | 15.75                           | 1.9  | 1.8   | 2.8   | 56.0                                       | 0.124  | 0.0034   | 6371  | 500/Drum                                 |
| 3               | 185                            | 37                             | Non-compacted | 17.64                           | 2.1  | 2.0   | 3.0   | 61.5                                       | 0.0991   | 0.0034   | 7937  | 300/Drum                                 |
| 3               | 240                            | 61                             | Non-compacted | 20.25                           | 2.3  | 2.0   | 3.2   | 69.0                                       | 0.0754   | 0.0033   | 10160                                       | 300/Drum                                 |
| 3               | 300                            | 61                             | Non-compacted | 22.68                           | 2.5  | 2.2   | 3.4   | 76.0                                       | 0.0601   | 0.0032   | 12587                                       | 200/Drum                                 |



**Table 1 (continued)**

| No. of<br>cores | Size<br><br>(mm <sup>2</sup> ) | Conductor                      |               |                                 | Insulation<br>thickness<br>nominal<br><br>(mm) | Inner<br>sheath<br>thickness<br>nominal<br>(mm) | Outer<br>sheath<br>thickness<br>nominal<br>(mm) | Overall<br>diameter<br>maximum<br><br>(mm) | Conductor<br>resistance<br>at 20 °C<br>maximum<br>(Ohm/km) | Insulation<br>resistance<br>at 70 °C<br>minimum<br>(MOhm-km) | Weight<br>of<br>cable<br>approx.<br>(kg/km) | Standard<br>packing<br>length<br><br>(m) |
|-----------------|--------------------------------|--------------------------------|---------------|---------------------------------|--|---|---|--|--|--|---|--|
|                 |                                | No.<br>of wires<br><br>(wires) | Type          | Diameter<br>approx.<br><br>(mm) |  |   |   |  |  |  |   |  |
| 4               | 1                              | 1                              | Solid         | 1.13                            | 0.8  | 0.8   | 1.8   | 13.5                                       | 18.1   | 0.0141   | 210   | 100/Coil                                 |
| 4               | 1 (st)                         | 7                              | Non-compacted | 1.29                            | 0.8  | 0.8   | 1.8   | 14.0                                       | 18.1   | 0.0135   | 218   | 100/Coil                                 |
| 4               | 1.5                            | 1                              | Solid         | 1.38                            | 0.8  | 0.8   | 1.8   | 14.0                                       | 12.1   | 0.0123   | 239   | 100/Coil                                 |
| 4               | 1.5 (st)                       | 7                              | Non-compacted | 1.59                            | 0.8  | 0.8   | 1.8   | 14.5                                       | 12.1   | 0.0116   | 255   | 100/Coil                                 |
| 4               | 2.5                            | 1                              | Solid         | 1.78                            | 0.8  | 0.8   | 1.8   | 15.0                                       | 7.41   | 0.0102   | 299   | 100/Coil                                 |
| 4               | 2.5 (st)                       | 7                              | Non-compacted | 2.01                            | 0.8  | 0.8   | 1.8   | 16.0                                       | 7.41   | 0.0093   | 321   | 100/Coil                                 |
| 4               | 4                              | 1                              | Solid         | 2.25                            | 0.9  | 0.8   | 1.8   | 17.0                                       | 4.61   | 0.0094   | 400   | 100/Coil                                 |
| 4               | 4 (st)                         | 7                              | Non-compacted | 2.55                            | 0.9  | 0.8   | 1.8   | 17.5                                       | 4.61   | 0.0085   | 426   | 100/Coil                                 |
| 4               | 6                              | 7                              | Non-compacted | 3.12                            | 0.9  | 0.8   | 1.8   | 19.0                                       | 3.08   | 0.0073   | 549   | 500/Drum                                 |
| 4               | 10                             | 7                              | Non-compacted | 4.10                            | 1.1  | 0.8   | 2.0   | 23.0                                       | 1.83   | 0.0069   | 831   | 500/Drum                                 |
| 4               | 95                             | 19                             | Non-compacted | 12.60                           | 1.7  | 1.8   | 2.6   | 51.5                                       | 0.193  | 0.0038   | 5452  | 500/Drum                                 |
| 4               | 120                            | 37                             | Non-compacted | 14.21                           | 1.7  | 1.8   | 2.8   | 56.0                                       | 0.153  | 0.0034   | 6710  | 500/Drum                                 |
| 4               | 150                            | 37                             | Non-compacted | 15.75                           | 1.9  | 2.0   | 3.0   | 62.0                                       | 0.124  | 0.0034   | 8190  | 300/Drum                                 |
| 4               | 185                            | 37                             | Non-compacted | 17.64                           | 2.1  | 2.0   | 3.2   | 68.0                                       | 0.0991   | 0.0034   | 10142                                       | 300/Drum                                 |
| 4               | 240                            | 61                             | Non-compacted | 20.25                           | 2.3  | 2.2   | 3.4   | 76.5                                       | 0.0754   | 0.0033   | 13043                                       | 200/Drum                                 |
| 4               | 300                            | 61                             | Non-compacted | 22.68                           | 2.5  | 2.2   | 3.8   | 85.0                                       | 0.0601   | 0.0032   | 16192                                       | 200/Drum                                 |