

SPECIFICATION

For

FD-0.6/1KV-CVV-S-SWA

0.6/1(1.2)kV PVC Insulated PVC Inner Sheathed

Steel Wire Armored PVC Outer Sheathed Flame Retardant

Shielded Control Cable

(0.6/1(1.2)kV, Cu/PVC/CTS/PVC/SWA/FR-PVC)

BY



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APP. _____

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CUSTOMER

Rev.	Date	Description
0	10/10/2019	Issued specification
1	11/12/2019	Correct the detail in Cable structure
2	15/11/2022	Add the length mark
3	29/11/2024	Update Table 1

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 polyvinyl chloride (PVC) insulated polyvinyl chloride (PVC) inner sheathed steel wire armored polyvinyl chloride (PVC) outer sheathed flame retardant shielded control cable.

The cable shall be based on IEC 60502-1 : 2021.

- Flame retardant test requirements per IEC 60332-1.
- Flame propagation test requirements per IEC 60332-3-24; Category C.

2. Conductor

The conductor shall be flexible stranded uncoated annealed copper conductor in accordance with IEC 60228 : 2004, Class 5.

For size 1.5 to 4 mm² : The direction of lay shall be left-hand (S) lay in the outermost layer.

For size 6 and 10 mm² : The direction of lay shall be right-hand (Z) lay in the outermost layer.

3. Insulation

The insulation shall be polyvinyl chloride (PVC/A) 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 colors or by number printed on the insulation, as follows :

2-cores : blue, brown

3-cores : brown, black, grey

4-cores : blue, brown, black, grey

For ≥ 5 -cores :

The cores shall be identified by the arabic numerals printed longitudinally and continuously on the surface of black insulation

6. Metallic Shield

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

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

A suitable separator tape shall be applied helically over the metallic shield.

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. Steel Wire Armor

The armor shall be galvanized round steel wire applied with a minimum gap between adjacent wires over the inner sheathed.

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

9. Outer Sheath

The outer sheath shall be sunlight resistant and flame retardant polyvinyl chloride (PVC/ST1) compound meet the requirements of IEC 60502-1 : 2021.


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 in Table 1 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. Flame retardant "FD"

4. Rated circuit voltage "0.6/1KV"

5. Type of conductor "CU"

6. Type of insulation and sheath "PVC/PVC"

7. Type of cable "SHIELD CONTROL CABLE"

8. Number of cores and size of conductor

9. 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 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 and IEC 60332-3-24; Category C.


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 "FD-0.6/1KV-CVV-S-SWA"
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

Type Tests

- Flame retardant tested according to IEC 60332-1.
- Flame propagation test according to IEC 60332-3-24; Category C.

Definition concerning the tests

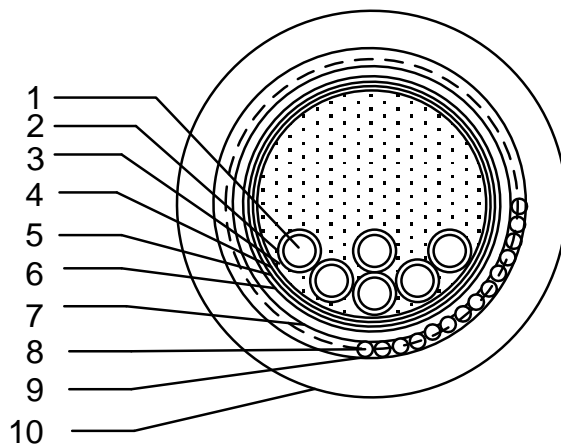
Routine tests: Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

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	Flexible stranded annealed copper
2	Insulation	Polyvinyl chloride (PVC/A) compound
3	Filler	Non-hygrosopic
4	Binder tape	Spun bond tape or suitable tape
5	Metallic shield	Copper tape
6	Separator tape	Spun bond tape or suitable tape
7	Inner Sheath	Polyvinyl chloride (PVC) compound
8	Aarmor	Galvanized steel wire
9	Separator tape	PS tape or suitable tape
10	Outer Sheath	Flame retardant polyvinyl chloride (PVC/ST1) compound

Application: For supervisory electrical equipment, station control circuits, outdoor, suitable installation in the dry or wet cable trenches. Maximum conductor temperature of 70 °C for normal operation and 160 °C for short circuit conditions.

Table 1

No. of cores	Size (mm ²)	Conductor 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)
2	1.5	Flexible	1.60	0.8	1.2	11.0	1.25	1.8	18.0	13.3	550	300
2	2.5	Flexible	2.10	0.8	1.2	12.0	1.25	1.8	19.0	7.98	622	300
2	4	Flexible	2.60	1.0	1.2	14.0	1.25	1.8	20.5	4.95	742	300
2	6	Flexible	3.40	1.0	1.2	15.5	1.25	1.8	22.0	3.30	862	300
2	10	Flexible	4.60	1.0	1.2	18.0	1.60	1.8	25.0	1.91	1218	300
3	1.5	Flexible	1.60	0.8	1.2	11.5	1.25	1.8	18.0	13.3	587	300
3	2.5	Flexible	2.10	0.8	1.2	12.5	1.25	1.8	19.5	7.98	673	300
3	4	Flexible	2.60	1.0	1.2	14.5	1.25	1.8	21.0	4.95	811	300
3	6	Flexible	3.40	1.0	1.2	16.0	1.60	1.8	23.5	3.30	1095	300
3	10	Flexible	4.60	1.0	1.2	18.5	1.60	1.8	26.0	1.91	1385	300
4	1.5	Flexible	1.60	0.8	1.2	12.5	1.25	1.8	19.0	13.3	644	300
4	2.5	Flexible	2.10	0.8	1.2	13.5	1.25	1.8	20.5	7.98	743	300
4	4	Flexible	2.60	1.0	1.2	15.5	1.25	1.8	22.5	4.95	919	300
4	6	Flexible	3.40	1.0	1.2	17.5	1.60	1.8	25.0	3.30	1251	300
4	10	Flexible	4.60	1.0	1.2	20.5	1.60	1.8	28.0	1.91	1602	300

Table 1 (continued)

No. of cores	Size (mm ²)	Conductor 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)
5	1.5	Flexible	1.60	0.8	1.2	13.5	1.25	1.8	20.0	13.3	720	300
5	2.5	Flexible	2.10	0.8	1.2	15.0	1.25	1.8	21.5	7.98	835	300
5	4	Flexible	2.60	1.0	1.2	17.0	1.60	1.8	24.5	4.95	1179	300
5	6	Flexible	3.40	1.0	1.2	19.5	1.60	1.8	27.0	3.30	1420	300
5	10	Flexible	4.60	1.0	1.2	22.5	1.60	1.9	30.5	1.91	1880	300
6	1.5	Flexible	1.60	0.8	1.2	14.5	1.25	1.8	21.0	13.3	784	300
6	2.5	Flexible	2.10	0.8	1.2	16.0	1.25	1.8	22.5	7.98	919	300
6	4	Flexible	2.60	1.0	1.2	18.5	1.60	1.8	26.0	4.95	1310	300
6	6	Flexible	3.40	1.0	1.2	21.0	1.60	1.8	28.5	3.30	1585	300
6	10	Flexible	4.60	1.0	1.2	24.5	1.60	1.9	32.5	1.91	2128	300
7	1.5	Flexible	1.60	0.8	1.2	14.5	1.25	1.8	21.0	13.3	802	300
7	2.5	Flexible	2.10	0.8	1.2	16.0	1.25	1.8	22.5	7.98	946	300
7	4	Flexible	2.60	1.0	1.2	18.5	1.60	1.8	26.0	4.95	1355	300
7	6	Flexible	3.40	1.0	1.2	21.0	1.60	1.8	28.5	3.30	1651	300
7	10	Flexible	4.60	1.0	1.2	24.5	1.60	1.9	32.5	1.91	2235	300

Table 1 (continued)

No. of cores	Size (mm ²)	Conductor 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)
8	1.5	Flexible	1.60	0.8	1.2	15.5	1.25	1.8	22.5	13.3	874	300
8	2.5	Flexible	2.10	0.8	1.2	17.0	1.60	1.8	24.5	7.98	1177	300
8	4	Flexible	2.60	1.0	1.2	20.0	1.60	1.8	27.5	4.95	1490	300
8	6	Flexible	3.40	1.0	1.2	23.0	1.60	1.9	30.5	3.30	1870	300
8	10	Flexible	4.60	1.0	1.2	26.5	2.00	2.1	36.0	1.91	2785	300
9	1.5	Flexible	1.60	0.8	1.2	16.5	1.60	1.8	24.0	13.3	1091	300
9	2.5	Flexible	2.10	0.8	1.2	18.5	1.60	1.8	26.0	7.98	1278	300
9	4	Flexible	2.60	1.0	1.2	21.5	1.60	1.8	29.0	4.95	1634	300
9	6	Flexible	3.40	1.0	1.2	24.5	1.60	1.9	32.5	3.30	2070	300
9	10	Flexible	4.60	1.0	1.2	29.0	2.00	2.1	38.0	1.91	3062	300
10	1.5	Flexible	1.60	0.8	1.2	18.0	1.60	1.8	25.5	13.3	1169	300
10	2.5	Flexible	2.10	0.8	1.2	20.0	1.60	1.8	27.0	7.98	1365	300
10	4	Flexible	2.60	1.0	1.2	23.5	1.60	1.9	31.0	4.95	1803	300
10	6	Flexible	3.40	1.0	1.2	26.5	2.00	2.0	35.5	3.30	2485	300
10	10	Flexible	4.60	1.0	1.2	31.0	2.00	2.2	40.5	1.91	3362	300

Table 1 (continued)

No. of cores	Size (mm ²)	Conductor 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)
11	1.5	Flexible	1.60	0.8	1.2	18.0	1.60	1.8	25.5	13.3	1185	300
11	2.5	Flexible	2.10	0.8	1.2	20.0	1.60	1.8	27.0	7.98	1392	300
11	4	Flexible	2.60	1.0	1.2	23.5	1.60	1.9	31.0	4.95	1844	300
11	6	Flexible	3.40	1.0	1.2	26.5	2.00	2.0	35.5	3.30	2544	300
11	10	Flexible	4.60	1.0	1.2	31.0	2.00	2.2	40.5	1.91	3465	300
12	1.5	Flexible	1.60	0.8	1.2	18.5	1.60	1.8	26.0	13.3	1234	300
12	2.5	Flexible	2.10	0.8	1.2	20.5	1.60	1.8	28.0	7.98	1481	300
12	4	Flexible	2.60	1.0	1.2	24.0	1.60	1.9	32.0	4.95	1950	300
12	6	Flexible	3.40	1.0	1.2	27.5	2.00	2.1	36.5	3.30	2729	300
12	10	Flexible	4.60	1.0	1.2	32.5	2.00	2.2	41.5	1.91	3674	300
13	1.5	Flexible	1.60	0.8	1.2	19.5	1.60	1.8	27.0	13.3	1292	300
13	2.5	Flexible	2.10	0.8	1.2	21.5	1.60	1.8	29.0	7.98	1566	300
13	4	Flexible	2.60	1.0	1.2	25.5	1.60	2.0	33.5	4.95	2084	300
13	6	Flexible	3.40	1.0	1.2	29.0	2.00	2.1	38.0	3.30	2883	300
13	10	Flexible	4.60	1.0	1.2	34.0	2.00	2.3	43.5	1.91	3942	300

Table 1 (continued)

No. of cores	Size (mm ²)	Conductor 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)
14	1.5	Flexible	1.60	0.8	1.2	19.5	1.60	1.8	27.0	13.3	1297	300
14	2.5	Flexible	2.10	0.8	1.2	21.5	1.60	1.8	29.0	7.98	1584	300
14	4	Flexible	2.60	1.0	1.2	25.5	1.60	2.0	33.5	4.95	2113	300
14	6	Flexible	3.40	1.0	1.2	29.0	2.00	2.1	38.0	3.30	2929	300
14	10	Flexible	4.60	1.0	1.2	34.0	2.00	2.3	43.5	1.91	4023	300
15	1.5	Flexible	1.60	0.8	1.2	20.0	1.60	1.8	27.5	13.3	1372	300
15	2.5	Flexible	2.10	0.8	1.2	22.5	1.60	1.9	30.0	7.98	1673	300
15	4	Flexible	2.60	1.0	1.2	26.5	1.60	2.0	34.5	4.95	2223	300
15	6	Flexible	3.40	1.0	1.2	30.0	2.00	2.2	39.0	3.30	3123	300
15	10	Flexible	4.60	1.0	1.2	35.5	2.00	2.3	45.0	1.91	4257	300
16	1.5	Flexible	1.60	0.8	1.2	20.5	1.60	1.8	28.0	13.3	1395	300
16	2.5	Flexible	2.10	0.8	1.2	22.5	1.60	1.9	30.5	7.98	1741	300
16	4	Flexible	2.60	1.0	1.2	27.0	2.00	2.0	36.0	4.95	2532	300
16	6	Flexible	3.40	1.0	1.2	30.5	2.00	2.2	40.0	3.30	3197	300
16	10	Flexible	4.60	1.0	1.2	36.0	2.00	2.4	46.0	1.91	4423	300

Table 1 (continued)

No. of cores	Size (mm ²)	Conductor 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)
17	1.5	Flexible	1.60	0.8	1.2	21.5	1.60	1.8	29.0	13.3	1494	300
17	2.5	Flexible	2.10	0.8	1.2	24.0	1.60	1.9	31.5	7.98	1845	300
17	4	Flexible	2.60	1.0	1.2	28.5	2.00	2.1	37.5	4.95	2721	300
17	6	Flexible	3.40	1.0	1.2	32.0	2.00	2.2	41.5	3.30	3443	300
17	10	Flexible	4.60	1.0	1.3	38.5	2.50	2.5	49.5	1.91	5219	300
18	1.5	Flexible	1.60	0.8	1.2	21.5	1.60	1.8	29.0	13.3	1495	300
18	2.5	Flexible	2.10	0.8	1.2	24.0	1.60	1.9	31.5	7.98	1857	300
18	4	Flexible	2.60	1.0	1.2	28.5	2.00	2.1	37.5	4.95	2731	300
18	6	Flexible	3.40	1.0	1.2	32.0	2.00	2.2	41.5	3.30	3457	300
18	10	Flexible	4.60	1.0	1.3	38.5	2.50	2.5	49.5	1.91	5262	300
19	1.5	Flexible	1.60	0.8	1.2	21.5	1.60	1.8	29.0	13.3	1513	300
19	2.5	Flexible	2.10	0.8	1.2	24.0	1.60	1.9	31.5	7.98	1884	300
19	4	Flexible	2.60	1.0	1.2	28.5	2.00	2.1	37.5	4.95	2775	300
19	6	Flexible	3.40	1.0	1.2	32.0	2.00	2.2	41.5	3.30	3520	300
19	10	Flexible	4.60	1.0	1.3	38.5	2.50	2.5	49.5	1.91	5366	300

Table 1 (continued)

No. of cores	Size (mm ²)	Conductor 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)
20	1.5	Flexible	1.60	0.8	1.2	22.0	1.60	1.8	29.5	13.3	1569	300
20	2.5	Flexible	2.10	0.8	1.2	24.5	1.60	1.9	32.0	7.98	1950	300
20	4	Flexible	2.60	1.0	1.2	29.0	2.00	2.1	38.0	4.95	2881	300
20	6	Flexible	3.40	1.0	1.2	33.0	2.00	2.3	42.5	3.30	3681	300
24	1.5	Flexible	1.60	0.8	1.2	24.5	1.60	1.9	32.5	13.3	1815	300
24	2.5	Flexible	2.10	0.8	1.2	27.5	2.00	2.1	37.0	7.98	2537	300
24	4	Flexible	2.60	1.0	1.2	33.0	2.00	2.2	42.5	4.95	3360	300
24	6	Flexible	3.40	1.0	1.3	38.0	2.50	2.5	49.0	3.30	4767	300