

# SPECIFICATION

For

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

0.6/1(1.2)kV PVC Insulated PVC Sheathed

Flame Retardant

Shielded Control Cable

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

BY 

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Rev.	Date	Description
0	16/11/2020	Issued specification
1	24/11/2020	Add size
2	31/1/2022	Cancel code "0010"
3	27/2/2024	Update specification
4	12/12/2024	Update specification

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CUSTOMER

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) sheathed flame retardant shielded control cable.

The cable shall be in accordance with 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 mm<sup>2</sup> : The direction of lay shall be left-hand (S) lay.

For size 6 and 10 mm<sup>2</sup> : The direction of lay shall be right-hand (Z) lay.

## 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 in the outer layer.

A suitable binder tape shall be applied helically over the cabled core.

## 5. Core Identification

The cores shall be identified by colors or by numbers printed on the insulation, as follows :

2-cores : blue, brown

3-cores : brown, black, grey

4-cores : blue, brown, black, grey

For 5-cores to 30-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. Sheath

The 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 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 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. 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 sheath at every 1 meter

## 9. 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.

## 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 "FD-0.6/1KV-CVV-S"
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**

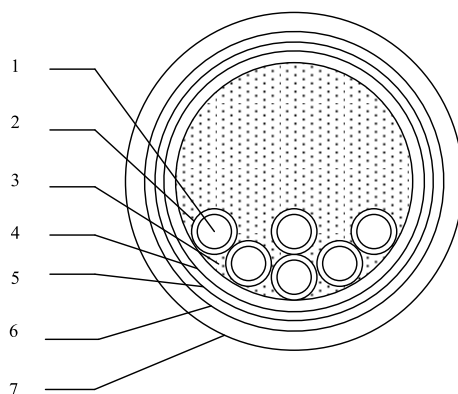
**Routine tests:** Tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements.

**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-hygroscopic
4	Binder tape	Spun bond tape or suitable tape
5	Metallic shield	Copper tape
6	Separator tape	Spun bond tape or suitable tape
7	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 <sup>2</sup> )	Conductor 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	1.5	Flexible	1.55	0.8	1.8	12.5	13.3	168	300
2	2.5	Flexible	2.00	0.8	1.8	13.5	7.98	201	300
2	4	Flexible	2.60	1.0	1.8	15.0	4.95	275	300
2	6	Flexible	3.40	1.0	1.8	17.0	3.30	346	300
2	10	Flexible	4.60	1.0	1.8	19.0	1.91	498	300
3	1.5	Flexible	1.55	0.8	1.8	13.0	13.3	192	300
3	2.5	Flexible	2.00	0.8	1.8	14.0	7.98	237	300
3	4	Flexible	2.60	1.0	1.8	16.0	4.95	330	300
3	6	Flexible	3.40	1.0	1.8	17.5	3.30	434	300
3	10	Flexible	4.60	1.0	1.8	20.0	1.91	627	300
4	1.5	Flexible	1.55	0.8	1.8	14.0	13.3	224	300
4	2.5	Flexible	2.00	0.8	1.8	15.0	7.98	281	300
4	4	Flexible	2.60	1.0	1.8	17.0	4.95	401	300
4	6	Flexible	3.40	1.0	1.8	19.0	3.30	532	300
4	10	Flexible	4.60	1.0	1.8	22.0	1.91	786	300

**Table 1 (continued)**

No. of cores	Size  (mm <sup>2</sup> )	Conductor 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)
5	1.5	Flexible	1.55	0.8	1.8	15.0	13.3	264	300
5	2.5	Flexible	2.00	0.8	1.8	16.0	7.98	327	300
5	4	Flexible	2.60	1.0	1.8	18.5	4.95	480	300
5	6	Flexible	3.40	1.0	1.8	21.0	3.30	643	300
5	10	Flexible	4.60	1.0	1.8	24.0	1.91	964	300
6	1.5	Flexible	1.55	0.8	1.8	16.0	13.3	302	300
6	2.5	Flexible	2.00	0.8	1.8	17.0	7.98	379	300
6	4	Flexible	2.60	1.0	1.8	20.0	4.95	554	300
6	6	Flexible	3.40	1.0	1.8	22.5	3.30	749	300
6	10	Flexible	4.60	1.0	1.8	26.0	1.91	1137	300
7	1.5	Flexible	1.55	0.8	1.8	16.0	13.3	320	300
7	2.5	Flexible	2.00	0.8	1.8	17.0	7.98	405	300
7	4	Flexible	2.60	1.0	1.8	20.0	4.95	598	300
7	6	Flexible	3.40	1.0	1.8	22.5	3.30	815	300
7	10	Flexible	4.60	1.0	1.8	26.0	1.91	1243	300



**Table 1 (continued)**

No. of cores	Size  (mm <sup>2</sup> )	Conductor 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)
8	1.5	Flexible	1.55	0.8	1.8	17.0	13.3	366	300
8	2.5	Flexible	2.00	0.8	1.8	18.5	7.98	465	300
8	4	Flexible	2.60	1.0	1.8	21.5	4.95	693	300
8	6	Flexible	3.40	1.0	1.8	24.0	3.30	957	300
8	10	Flexible	4.60	1.0	1.8	28.0	1.91	1442	300
9	1.5	Flexible	1.55	0.8	1.8	18.0	13.3	410	300
9	2.5	Flexible	2.00	0.8	1.8	19.5	7.98	518	300
9	4	Flexible	2.60	1.0	1.8	23.0	4.95	779	300
9	6	Flexible	3.40	1.0	1.8	26.0	3.30	1080	300
9	10	Flexible	4.60	1.0	1.9	30.5	1.91	1641	300
10	1.5	Flexible	1.55	0.8	1.8	19.5	13.3	447	300
10	2.5	Flexible	2.00	0.8	1.8	21.0	7.98	569	300
10	4	Flexible	2.60	1.0	1.8	24.5	4.95	870	300
10	6	Flexible	3.40	1.0	1.8	28.0	3.30	1187	300
10	10	Flexible	4.60	1.0	2.0	33.0	1.91	1819	300

**Table 1 (continued)**

No. of cores	Size  (mm <sup>2</sup> )	Conductor 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)
11	1.5	Flexible	1.55	0.8	1.8	19.5	13.3	463	300
11	2.5	Flexible	2.00	0.8	1.8	21.0	7.98	595	300
11	4	Flexible	2.60	1.0	1.8	24.5	4.95	910	300
11	6	Flexible	3.40	1.0	1.8	28.0	3.30	1246	300
11	10	Flexible	4.60	1.0	2.0	33.0	1.91	1922	300
12	1.5	Flexible	1.55	0.8	1.8	20.0	13.3	492	300
12	2.5	Flexible	2.00	0.8	1.8	21.5	7.98	645	300
12	4	Flexible	2.60	1.0	1.8	25.5	4.95	979	300
12	6	Flexible	3.40	1.0	1.8	29.0	3.30	1357	300
12	10	Flexible	4.60	1.0	2.0	34.5	1.91	2096	300
13	1.5	Flexible	1.55	0.8	1.8	21.0	13.3	529	300
13	2.5	Flexible	2.00	0.8	1.8	22.5	7.98	690	300
13	4	Flexible	2.60	1.0	1.8	27.0	4.95	1057	300
13	6	Flexible	3.40	1.0	1.9	30.5	3.30	1462	300
13	10	Flexible	4.60	1.0	2.1	36.5	1.91	2272	300

**Table 1 (continued)**

No. of cores	Size  (mm <sup>2</sup> )	Conductor strands  (No./mm)	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)
14	1.5	Flexible	1.55	0.8	1.8	21.0	13.3	534	300
14	2.5	Flexible	2.00	0.8	1.8	22.5	7.98	706	300
14	4	Flexible	2.60	1.0	1.8	27.0	4.95	1086	300
14	6	Flexible	3.40	1.0	1.9	30.5	3.30	1508	300
14	10	Flexible	4.60	1.0	2.1	36.5	1.91	2353	300
15	1.5	Flexible	1.55	0.8	1.8	21.5	13.3	572	300
15	2.5	Flexible	2.00	0.8	1.8	23.0	7.98	757	300
15	4	Flexible	2.60	1.0	1.8	27.5	4.95	1158	300
15	6	Flexible	3.40	1.0	1.9	31.5	3.30	1627	300
15	10	Flexible	4.60	1.0	2.1	37.5	1.91	2527	300
16	1.5	Flexible	1.55	0.8	1.8	22.0	13.3	593	300
16	2.5	Flexible	2.00	0.8	1.8	23.5	7.98	789	300
16	4	Flexible	2.60	1.0	1.8	28.5	4.95	1207	300
16	6	Flexible	3.40	1.0	1.9	32.0	3.30	1696	300
16	10	Flexible	4.60	1.0	2.1	38.0	1.91	2641	300

**Table 1 (continued)**

No. of cores	Size  (mm <sup>2</sup> )	Conductor 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)
17	1.5	Flexible	1.55	0.8	1.8	23.0	13.3	653	300
17	2.5	Flexible	2.00	0.8	1.8	25.0	7.98	865	300
17	4	Flexible	2.60	1.0	1.9	30.0	4.95	1287	300
17	6	Flexible	3.40	1.0	2.0	34.0	3.30	1801	300
17	10	Flexible	4.60	1.0	2.2	40.5	1.91	2805	300
18	1.5	Flexible	1.55	0.8	1.8	23.0	13.3	654	300
18	2.5	Flexible	2.00	0.8	1.8	25.0	7.98	876	300
18	4	Flexible	2.60	1.0	1.9	30.0	4.95	1342	300
18	6	Flexible	3.40	1.0	2.0	34.0	3.30	1882	300
18	10	Flexible	4.60	1.0	2.2	40.5	1.91	2936	300
		Flexible							
19	1.5	Flexible	1.55	0.8	1.8	23.0	13.3	671	300
19	2.5	Flexible	2.00	0.8	1.8	25.0	7.98	901	300
19	4	Flexible	2.60	1.0	1.9	30.0	4.95	1385	300
19	6	Flexible	3.40	1.0	2.0	34.0	3.30	1945	300
19	10	Flexible	4.60	1.0	2.2	40.5	1.91	3040	300

**Table 1 (continued)**

No. of cores	Size  (mm <sup>2</sup> )	Conductor 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)
20	1.5	Flexible	1.55	0.8	1.8	23.5	13.3	707	300
20	2.5	Flexible	2.00	0.8	1.8	25.5	7.98	947	300
20	4	Flexible	2.60	1.0	1.9	30.5	4.95	1461	300
20	6	Flexible	3.40	1.0	2.0	35.0	3.30	2055	300
21	1.5	Flexible	1.55	0.8	1.8	24.0	13.3	733	300
21	2.5	Flexible	2.00	0.8	1.8	26.0	7.98	988	300
21	4	Flexible	2.60	1.0	1.9	31.5	4.95	1523	300
21	6	Flexible	3.40	1.0	2.1	36.0	3.30	2159	300
22	1.5	Flexible	1.55	0.8	1.8	25.0	13.3	792	300
22	2.5	Flexible	2.00	0.8	1.8	27.0	7.98	1049	300
22	4	Flexible	2.60	1.0	2.0	33.0	4.95	1632	300
22	6	Flexible	3.40	1.0	2.1	38.0	3.30	2287	300
23	1.5	Flexible	1.55	0.8	1.8	25.0	13.3	813	300
23	2.5	Flexible	2.00	0.8	1.8	27.0	7.98	1077	300
23	4	Flexible	2.60	1.0	2.0	33.0	4.95	1679	300
23	6	Flexible	3.40	1.0	2.1	38.0	3.30	2363	300

**Table 1 (continued)**

No. of cores	Size  (mm <sup>2</sup> )	Conductor 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)
24	1.5	Flexible	1.55	0.8	1.8	26.0	13.3	849	300
24	2.5	Flexible	2.00	0.8	1.8	28.5	7.98	1125	300
24	4	Flexible	2.60	1.0	2.0	35.0	4.95	1756	300
24	6	Flexible	3.40	1.0	2.2	40.0	3.30	2487	300
25	1.5	Flexible	1.55	0.8	1.8	26.0	13.3	871	300
25	2.5	Flexible	2.00	0.8	1.8	28.5	7.98	1157	300
25	4	Flexible	2.60	1.0	2.0	35.0	4.95	1809	300
25	6	Flexible	3.40	1.0	2.2	40.0	3.30	2565	300
26	1.5	Flexible	1.55	0.8	1.8	26.0	13.3	894	300
26	2.5	Flexible	2.00	0.8	1.8	28.5	7.98	1190	300
26	4	Flexible	2.60	1.0	2.0	35.0	4.95	1863	300
26	6	Flexible	3.40	1.0	2.2	40.0	3.30	2645	300
27	1.5	Flexible	1.55	0.8	1.8	26.5	13.3	917	300
27	2.5	Flexible	2.00	0.8	1.8	29.0	7.98	1221	300
27	4	Flexible	2.60	1.0	2.0	35.5	4.95	1911	300
27	6	Flexible	3.40	1.0	2.2	41.0	3.30	2715	300

**Table 1 (continued)**

No. of cores	Size  (mm <sup>2</sup> )	Conductor 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)
28	1.5	Flexible	1.55	0.8	1.8	27.5	13.3	985	300
28	2.5	Flexible	2.00	0.8	1.9	30.5	7.98	1324	300
28	4	Flexible	2.60	1.0	2.1	37.0	4.95	2063	300
29	1.5	Flexible	1.55	0.8	1.8	27.5	13.3	976	300
29	2.5	Flexible	2.00	0.8	1.9	30.5	7.98	1315	300
29	4	Flexible	2.60	1.0	2.1	37.0	4.95	2056	300
30	1.5	Flexible	1.55	0.8	1.8	27.5	13.3	999	300
30	2.5	Flexible	2.00	0.8	1.9	30.5	7.98	1348	300
30	4	Flexible	2.60	1.0	2.1	37.0	4.95	2110	300