

No. SP 08-31-9001
Date Mar. 12, 2008

SPECIFICATION

FOR

600V ETHYLENE PROPYLENE RUBBER INSULATED
POLYCHLOROPRENE SHEATHED FLEXIBLE CABLE

Code : 600V CAR-3PNCT

Quantity

Your Ref. No.

Our Ref. No.

Signed by

Eizo Koishi

EIZO KOISHI

Manager

*Energy, Industrial & Transportation Engineering Dep.
Electric Wire & Cable Business Unit
Electric Wire & Cable Division
Cable Materials Company*

 **Hitachi Metals, Ltd.**

Issue and revision record

REV. NO.	Issue date	Item	Prepared by	Approved by
-	Mar. 12, 2008	FIRST ISSUE	<i>A. Nakamura</i>	<i>[Signature]</i>

1. Scope

This specification covers 600V Ethylene Propylene Rubber Insulated Polychloroprene Sheathed Flexible Cable, which is reference to JIS C 3327-2000 (600V Rubber Insulated Flexible Cables) and Manufacturer's Standard.

2. Construction

2.1 Conductor

Conductor shall be stranded flexible conductor consisting of tinned annealed copper wires.

A suitable separator tape shall be applied over the conductor.

2.2 Insulation

Insulation shall consist of ethylene propylene rubber compound. Nominal thickness shall be shown in the attached table.

Ave. thick : not less than 90% of the nominal thickness

Min. thick : not less than 80% of the nominal thickness

2.3 Core identification

The core identification shall be made by the colour of the insulation or the colour of the insulation surface as shown in the attached figures.

2.4 Cabling of cores

The insulated conductors shall be cabled.

Suitable rubber filler may be applied at manufacturer's discretion, if necessary.

2.5 Sheath

Sheath shall consist of black polychloroprene compound.

Nominal thickness shall be shown in the attached table.

Ave. thick : not less than 90% of the nominal thickness

Min. thick : not less than 85% of the nominal thickness

2.6 Reinforcement

Reinforcement consisting of suitable fabric tape or cotton twines shall be applied in the middle of the sheath.

2.7 Dimension

The dimension of the cable shall be in accordance with the attached table.

2.8 Marking

Manufacturer's name and year of manufacture shall be marked by suitable methods.

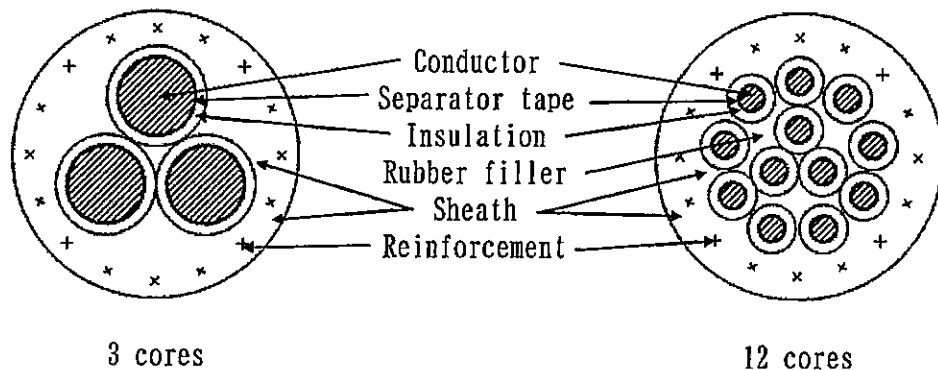


Fig.1 Cable Cross Section

3. Characteristics

The characteristics of the cable shall be as shown in the attached tables.

4. Inspection

Inspection shall be made on the following items prior to shipment, and the results shall be comply with the requirement of the attached tables.

- (1) Appearance
- (2) Construction
- (3) Conductor resistance
- (4) Dielectric strength
- (5) Insulation resistance

Table 1 : Characteristics

Item	Characteristics		Test method	
Appearance	No scratches		4.1 of JIS C 3005	
Construction	Shown in Attached Tables		4.3 of JIS C 3005	
Conductor resistance	Not more than the value in Attached Tables		4.4 of JIS C 3005	
Dielectric strength	Capable of withstanding 3000V for 1 min.		4.6 a) of JIS C 3005	
Insulation resistance	Not less than the value in Attached Tables		4.7.1 of JIS C 3005	
Insulation	Tensile strength	Min. 4MPa	4.16 of JIS C 3005	
	Elongation	Min. 300%		
Sheath	Tensile strength	Min. 13MPa		
	Elongation	Min. 300%		
Thermal aging resistance	Insulation	Tensile strength	4.17 of JIS C 3005 Heating temperature Heating time Insulation 100±2°C, 96hrs. Sheath 100±2°C, 48hrs.	
		Elongation		Not less than 80% of the value before heating
	Sheath	Tensile strength		Not less than 65% of the value before heating
		Elongation		Not less than 65% of the value before heating
Oil resistance	Sheath	Tensile strength	4.18 of JIS C 3005 Oil temperature Immersing time 120±2°C, 18hrs.	
		Elongation		Not less than 60% of the value before oil immersion. However, for the test piece less than 1mm in thickness, not less than 50%.
Flame retardant	To be extinguished naturally within 60 sec.		4.26 of JIS C 3005 Method 4.26.2 a) of JIS C 3005	
Bending resistance (38mm ² or smaller size)	No damage nor crack to develop, number of broken component wires in conductors not to exceed 30%.		4.27.1 of JIS C 3005 ≤3.5mm ² r=150, l=200 5.5mm ² ≤ r=100, l=300	
Impact resistance	No damage nor crack to develop, number of broken component wires in conductors not to exceed 30%.		4.28 of JIS C 3005 6.10 Table 5 of JIS C 3327	
Abrasion resistance	Sheath not to be so abraded as to expose the insulation.		4.29 of JIS C 3005 6.12 Table 6 of JIS C 3327	

Table 2 : Electrical properties

Nominal Cross-section area (mm ²)	Max. Conductor resistance at 20°C (Ω/km)		Min. Insulation resistance at 20°C (MΩ-km)
	single-core	multi-cores	
2	—	10.2	500
3.5	—	5.54	500
5.5	—	3.56	500
8	2.45	2.52	400
14	1.39	1.43	400
22	0.892	0.919	300
(30)	0.661	0.681	300
38	0.525	0.541	300
(50)	0.411	0.423	300
60	0.329	0.339	300
(80)	0.243	0.250	300
100	0.193	0.199	200
(125)	0.156	0.161	200
150	0.136	0.140	200
200	0.0993	0.102	200
250	0.0803	0.0827	200

5. Guide to usage

This cable is designed for carrier drum system (cable tender system) as shown below.

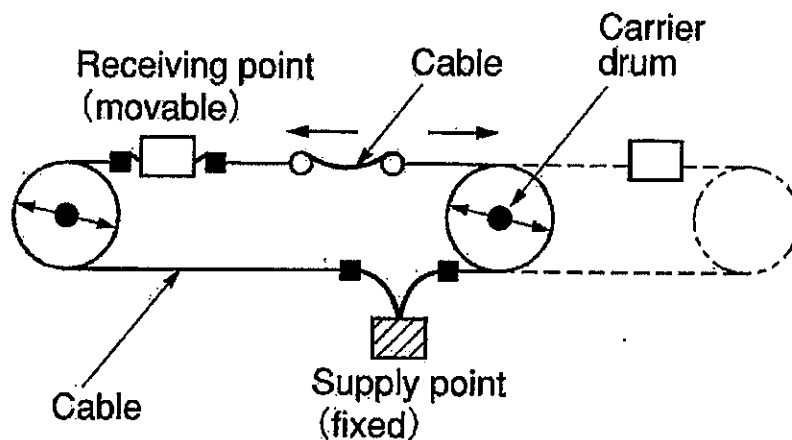


Table 3 : Dimensions
 (Code : 600V CAR-3PNCT)

No. of core	Conductor		Thick. of insulation mm	Thick. of sheath mm	Thick. of RF* mm	Approx. overall diameter mm	Approx. weight kg/km	
	size mm ²	construction No. /mm						diameter mm
	8	50/0.45	3.7	1.2	2.6	0.5	12.5	215
	14	88/0.45	4.9	1.2	2.7	0.5	14.0	300
	22	7/20/0.45	7.0	1.6	2.9	0.5	17.0	450
	(30)	7/27/0.45	8.1	1.6	3.0	0.5	18.0	545
	38	7/34/0.45	9.1	1.6	3.0	0.5	19.0	635
1	(50)	19/16/0.45	10.4	2.1	3.2	0.5	22	820
	60	19/20/0.45	11.6	2.1	3.3	0.5	23	965
	(80)	19/27/0.45	13.5	2.1	3.4	0.5	25	1,220
	100	19/34/0.45	15.2	2.1	3.5	0.5	27	1,450
	(125)	19/42/0.45	16.8	2.7	3.6	1.0	31	1,820
	150	27/34/0.45	18.7	2.7	3.7	1.0	33	2,040
	200	37/34/0.45	21.2	3.3	4.0	1.0	37	2,760
	250	37/42/0.45	23.6	3.3	4.2	1.0	40	3,290
	2	37/0.26	1.8	1.2	2.8	0.5	15.0	270
	3.5	45/0.32	2.5	1.2	2.9	0.5	17.0	350
	5.5	70/0.32	3.1	1.2	2.9	0.5	18.0	425
	8	50/0.45	3.7	1.2	3.0	0.5	19.5	515
	14	88/0.45	4.9	1.2	3.2	1.0	24	765
	22	7/20/0.45	7.0	1.6	3.6	1.0	30	1,200
	(30)	7/27/0.45	8.1	1.6	3.7	1.0	32	1,460
	38	7/34/0.45	9.1	1.6	3.9	1.0	34	1,730
2	(50)	19/16/0.45	10.4	2.1	4.2	1.0	40	2,290
	60	19/20/0.45	11.6	2.1	4.3	1.0	42	2,660
	(80)	19/27/0.45	13.5	2.1	4.6	1.0	46	3,360
	100	19/34/0.45	15.2	2.1	4.8	1.0	50	4,020
	(125)	19/42/0.45	16.8	2.7	5.1	1.0	56	5,060
	150	27/34/0.45	18.7	2.7	5.2	1.0	58	5,640
	200	37/34/0.45	21.2	3.3	5.8	1.0	68	7,740
	250	37/42/0.45	23.6	3.3	6.1	1.0	74	9,240

RF* = Reinforcement

Table 3 (continued)

No. of core	Conductor		Thick. of insulation	Thick. of sheath	Thick. of RF*	Approx. overall diameter	Approx. weight		
	size	construction						diameter	
	mm ²	No. /mm	mm	mm	mm	mm	kg/km		
3	2	37/0.26	1.8	1.2	2.8	0.5	16.0	305	
	3.5	45/0.32	2.5	1.2	2.9	0.5	17.5	400	
	5.5	70/0.32	3.1	1.2	3.0	0.5	19.0	505	
	8	50/0.45	3.7	1.2	3.1	0.5	21	620	
	14	88/0.45	4.9	1.2	3.3	1.0	25	935	
	22	7/20/0.45	7.0	1.6	3.7	1.0	31	1,470	
	(30)	7/27/0.45	8.1	1.6	3.9	1.0	34	1,810	
	38	7/34/0.45	9.1	1.6	4.0	1.0	36	2,140	
	(50)	19/16/0.45	10.4	2.1	4.3	1.0	42	2,830	
	60	19/20/0.45	11.6	2.1	4.5	1.0	45	3,330	
	(80)	19/27/0.45	13.5	2.1	4.8	1.0	49	4,240	
	100	19/34/0.45	15.2	2.1	5.0	1.0	53	5,090	
	(125)	19/42/0.45	16.8	2.7	5.3	1.0	60	6,390	
	150	27/34/0.45	18.7	2.7	5.5	1.0	63	7,170	
	200	37/34/0.45	21.2	3.3	6.1	1.0	73	9,850	
	250	37/42/0.45	23.6	3.3	6.4	1.0	79	11,800	
	4	2	37/0.26	1.8	1.2	2.9	0.5	17.0	365
		3.5	45/0.32	2.5	1.2	3.0	0.5	19.0	485
		5.5	70/0.32	3.1	1.2	3.1	0.5	21	610
		8	50/0.45	3.7	1.2	3.2	0.5	23	755
14		88/0.45	4.9	1.2	3.4	1.0	27	1,150	
22		7/20/0.45	7.0	1.6	3.9	1.0	34	1,830	
(30)		7/27/0.45	8.1	1.6	4.1	1.0	37	2,250	
38		7/34/0.45	9.1	1.6	4.2	1.0	40	2,680	
(50)		19/16/0.45	10.4	2.1	4.6	1.0	46	3,550	
60		19/20/0.45	11.6	2.1	4.8	1.0	49	4,190	
(80)		19/27/0.45	13.5	2.1	5.1	1.0	54	5,340	
100		19/34/0.45	15.2	2.1	5.4	1.0	59	6,450	
(125)		19/42/0.45	16.8	2.7	5.7	1.0	66	8,090	
150		27/34/0.45	18.7	2.7	5.9	1.0	69	9,090	
200		37/34/0.45	21.2	3.3	6.5	1.0	80	12,500	
250		37/42/0.45	23.6	3.3	6.9	1.0	87	15,000	

RF* = Reinforcement

Table 3 (continued)

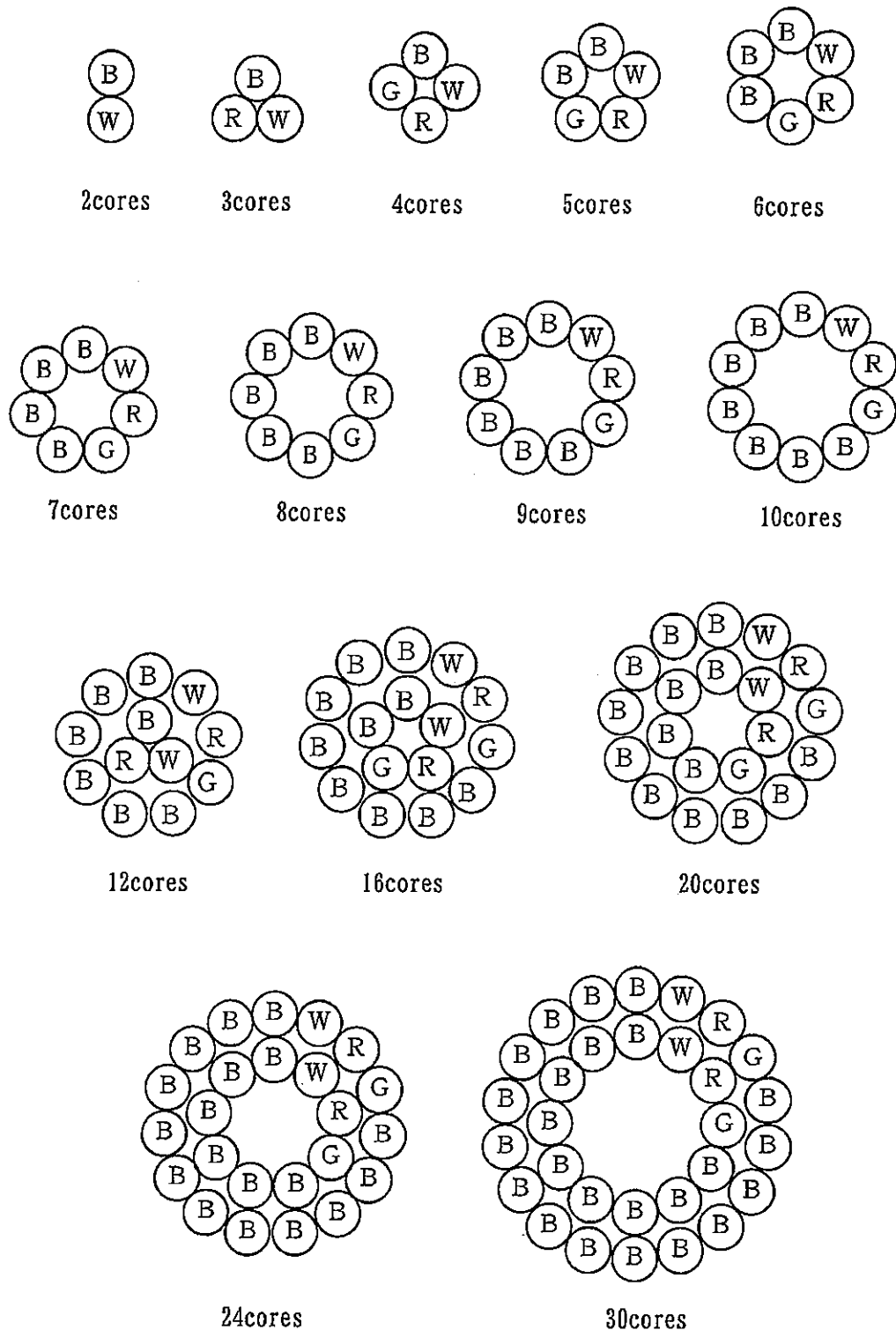
No. of core	Conductor		Thick. of insulation mm	Thick. of sheath mm	Thick. of RF* mm	Approx. overall diameter mm	Approx. weight kg/km	
	size mm ²	construction No. /mm						Diameter mm
5	2	37/0.26	1.8	1.2	3.0	0.5	18.5	430
	3.5	45/0.32	2.5	1.2	3.1	0.5	21	580
	5.5	70/0.32	3.1	1.2	3.2	0.5	23	735
	8	50/0.45	3.7	1.2	3.3	0.5	25	915
	14	88/0.45	4.9	1.2	3.5	1.0	30	1,390
	22	7/20/0.45	7.0	1.6	4.1	1.0	38	2,230
	(30)	7/27/0.45	8.1	1.6	4.3	1.0	41	2,760
	38	7/34/0.45	9.1	1.6	4.5	1.0	44	3,310
	(50)	19/16/0.45	10.4	2.1	4.9	1.0	51	4,380
	60	19/20/0.45	11.6	2.1	5.1	1.0	54	5,170
	(80)	19/27/0.45	13.5	2.1	5.4	1.0	60	6,590
	100	19/34/0.45	15.2	2.1	5.7	1.0	65	7,960
	(125)	19/42/0.45	16.8	2.7	6.1	1.0	73	10,100
	150	27/34/0.45	18.7	2.7	6.3	1.0	76	11,300
	200	37/34/0.45	21.2	3.3	7.0	1.0	89	15,500
250	37/42/0.45	23.6	3.3	7.5	1.0	97	18,700	
6	2	37/0.26	1.8	1.2	3.0	0.5	20	500
	3.5	45/0.32	2.5	1.2	3.2	0.5	23	685
	5.5	70/0.32	3.1	1.2	3.3	0.5	25	875
	8	50/0.45	3.7	1.2	3.4	0.5	27	1,090
	14	88/0.45	4.9	1.2	3.7	1.0	33	1,680
	22	7/20/0.45	7.0	1.6	4.2	1.0	41	2,680
	(30)	7/27/0.45	8.1	1.6	4.4	1.0	44	3,320
	38	7/34/0.45	9.1	1.6	4.6	1.0	48	3,980
	2	37/0.26	1.8	1.2	3.1	0.5	22	580
	3.5	45/0.32	2.5	1.2	3.3	0.5	24	795
	5.5	70/0.32	3.1	1.2	3.4	0.5	26	1,020
	8	50/0.45	3.7	1.2	3.5	0.5	29	1,270
	14	88/0.45	4.9	1.2	3.9	1.0	35	1,970
	22	7/20/0.45	7.0	1.6	4.4	1.0	44	3,140
	(30)	7/27/0.45	8.1	1.6	4.6	1.0	48	3,890
38	7/34/0.45	9.1	1.6	4.8	1.0	52	4,670	

RF* = Reinforcement

Table 3 (continued)

No. of core	Conductor		Thick. of insulation	Thick. of sheath	Thick. of RF*	Approx. overall diameter	Approx. weight		
	size	construction						diameter	
	mm ²	No. /mm	mm	mm	mm	mm	kg/km		
8	2	37/0.26	1.8	1.2	3.2	1.0	24	680	
	3.5	45/0.32	2.5	1.2	3.4	1.0	27	935	
	5.5	70/0.32	3.1	1.2	3.5	1.0	29	1,200	
	8	50/0.45	3.7	1.2	3.7	1.0	32	1,500	
	14	88/0.45	4.9	1.2	4.0	1.0	38	2,270	
	22	7/20/0.45	7.0	1.6	4.6	1.0	48	3,640	
	(30)	7/27/0.45	8.1	1.6	4.8	1.0	52	4,510	
	38	7/34/0.45	9.1	1.6	5.1	1.0	56	5,430	
	9	2	37/0.26	1.8	1.2	3.3	1.0	26	775
		3.5	45/0.32	2.5	1.2	3.5	1.0	29	1,060
5.5		70/0.32	3.1	1.2	3.6	1.0	31	1,360	
8		50/0.45	3.7	1.2	3.8	1.0	34	1,700	
14		88/0.45	4.9	1.2	4.2	1.0	40	2,600	
22		7/20/0.45	7.0	1.6	4.8	1.0	51	4,170	
(30)		7/27/0.45	8.1	1.6	5.1	1.0	56	5,190	
38		7/34/0.45	9.1	1.6	5.3	1.0	60	6,210	
10		2	37/0.26	1.8	1.2	3.4	1.0	27	875
		3.5	45/0.32	2.5	1.2	3.6	1.0	30	1,210
	5.5	70/0.32	3.1	1.2	3.8	1.0	33	1,560	
12	2	37/0.26	1.8	1.2	3.4	1.0	28	885	
	3.5	45/0.32	2.5	1.2	3.6	1.0	31	1,220	
	5.5	70/0.32	3.1	1.2	3.8	1.0	34	1,580	
16	2	37/0.26	1.8	1.2	3.6	1.0	30	1,120	
	3.5	45/0.32	2.5	1.2	3.8	1.0	34	1,560	
	5.5	70/0.32	3.1	1.2	4.0	1.0	37	2,030	
20	2	37/0.26	1.8	1.2	3.8	1.0	33	1,390	
	3.5	45/0.32	2.5	1.2	4.0	1.0	37	1,930	
	5.5	70/0.32	3.1	1.2	4.2	1.0	41	2,530	
24	2	37/0.26	1.8	1.2	3.9	1.0	36	1,660	
	3.5	45/0.32	2.5	1.2	4.2	1.0	41	2,340	
	5.5	70/0.32	3.1	1.2	4.4	1.0	45	3,060	
30	2	37/0.26	1.8	1.2	4.2	1.0	41	2,130	
	3.5	45/0.32	2.5	1.2	4.5	1.0	46	2,990	
	5.5	70/0.32	3.1	1.2	4.8	1.0	51	3,930	

RF* = Reinforcement



Note) B : Black
 W : White
 R : Red
 G : Green

Fig 2 Core identification