

LT/HT Power & Control Cables



Catalogue 2009

- HT Power Cables upto 33 kV
- 1.1 kV Power Cables
- 1.1 kV Copper Control Cables



DNV

ISO-9001
Certified



"Building customer confidence by providing a wide range of quality products and services through team work".

Introduction	1	
Manufacturing Process	2	
Manufacturing of Cables.....	3	
Advantages.....	4,5	
Cable ranges at a glance.....		
Technical detail for		
1.1 kV Single Core, PVC Insulated, Un-armoured Cables.....	6	
1.1 kV Two Core, PVC Insulated, Un-armoured Cables.....	7	
1.1 kV Three Core, PVC Insulated, Un-armoured Cables.....	8	
1.1 kV Three & Half Core, PVC Insulated, Un-armoured Cables.....	9	
1.1 kV Four Core, PVC Insulated, Un-armoured Cables.....	10	
Technical detail for		
1.1 kV Single Core, PVC Insulated, Armoured Cables.....	11	
1.1 kV Two Core, PVC Insulated, Armoured Cables.....	12	
1.1 kV Three Core, PVC Insulated, Armoured Cables.....	13	
1.1 kV Three & Half Core, PVC Insulated, Armoured Cables.....	14	
1.1 kV Four Core, PVC Insulated, Armoured Cables.....	15	
Technical detail for		
1.1 kV 1.5 sq. mm Copper Cond. PVC Insulated, Armoured Cables.....	16	
1.1 kV 2.5 sq. mm Copper Cond. PVC Insulated, Armoured Cables.....	17	
Technical detail for		
1.1 kV Single Core, XLPE Insulated, Un-armoured Cables	18	
1.1 kV Two Core, XLPE Insulated, Un-armoured Cables	19	
1.1 kV Three Core, XLPE Insulated, Un-armoured Cables	20	
1.1 kV Three & Half Core, XLPE Insulated, Un-armoured Cables	21	
1.1 kV Four Core, XLPE Insulated, Un-armoured Cables	22	
Technical detail for		
1.1 kV Single Core, XLPE Insulated, Armoured Cables	23	
1.1 kV Two Core, XLPE Insulated, Armoured Cables	24	
1.1 kV Three Core, XLPE Insulated, Armoured Cables.....	25	
1.1 kV Three & Half Core, XLPE Insulated, Armoured Cables.....	26	
1.1 kV Four Core, XLPE Insulated, Armoured Cables	27	
Technical detail for		
3.3 kV Single Core, XLPE Insulated, Armoured Cables	28	
3.3 kV Three Core, XLPE Insulated, Armoured Cables	29	
Technical detail for		
3.8/6.6 kV Single Core, XLPE Insulated, Armoured Cables	30	
3.8/6.6 kV Three Core, XLPE Insulated, Armoured Cables	31	
Technical detail for		
6.6/6.6 kV & 6.35/11 Kv Single Core, XLPE Insulated, Armoured Cables	32	
6.6/6.6 kV & 6.35/11 Kv Three Core, XLPE Insulated, Armoured Cables	33	
Technical detail for		
11/11 kV Single Core, XLPE Insulated, Armoured Cables	34	
11/11 kV Three Core, XLPE Insulated, Armoured Cables	35	
Technical detail for		
12.7/22 kV Single Core, XLPE Insulated, Armoured Cables	36	ISI & CM/L Nos.
12.7/22 kV Three Core, XLPE Insulated, Armoured Cables	37	IS:1554 (Part-1), 1988 CM/L No.: 81579 82
Technical detail for		
19/33 kV Single Core, XLPE Insulated, Armoured Cables	38	
19/33 kV Three Core, XLPE Insulated, Armoured Cables	39	IS:1554 (Part-2), 1988 CM/L No.: 82594 85
Basic assumption for current ratings & rating factors	40,41	
Selection criteria of M/VHV cable size for primary distribution	42	IS:7098 (Part-1), 1988
Standard Drum lengths of Cables	43	CM/L No.: 81896 92
Quality Control & Test	44	
Selection Guide	45	IS:7098 (Part-2), 1985
Handling & Storage	46	CM/L No.: 83683 89

Havells India Ltd., a billion-dollar-plus organization and one of the largest & India's fastest growing electrical and power distribution equipment manufacturer with products ranging from Industrial & Domestic Circuit Protection Switchgear, Cables & Wires, Motors, Fans, Power Capacitors, CFL Lamps, Luminaires for Domestic, Commercial & Industrial applications, Modular Switches & Bathfittings covering the entire gamut of household, commercial and industrial electrical needs.

Havells owns some of the prestigious global brands like Crabtree, Sylvania, Concord, Luminance, Linolite & SLI Lighting.

With 91 branches / representative offices and over 8000 professionals in over 50 countries across the globe, the group has achieved rapid success in the past few years. Its 7 state-of-the-art manufacturing plants in India located at Haridwar, Baddi, Noida, Faridabad, Bhiwadi, Alwar, Neemrana, and 9 state-of-the-art manufacturing plants located across Europe, Latin America & Africa churn out globally acclaimed products. Havells is a name synonymous with excellence and expertise in the electrical industry. Its 20000 strong global distribution network is prompt to service customers.

The company has acquired a number of International certifications, like BASEC, CSA, KEMA, CB, CE, ASTA, CPA, SEMKO, SIRIUM (Malaysia), SPRING (Singapore), TSE (Turkey), SNI (Indonesia) and EDD (Bahrain) for various products. Today, Havells and its brands have emerged as the preferred choice of electrical products for discerning individuals and industrial consumers both in India and abroad.

The essence of Havells success lies in the expertise of its fine team of professionals, strong relationships with associates and the ability to adapt quickly and efficiently, with the vision to always think ahead.



Inner view - Cable Factory



Pay-off CCV Line



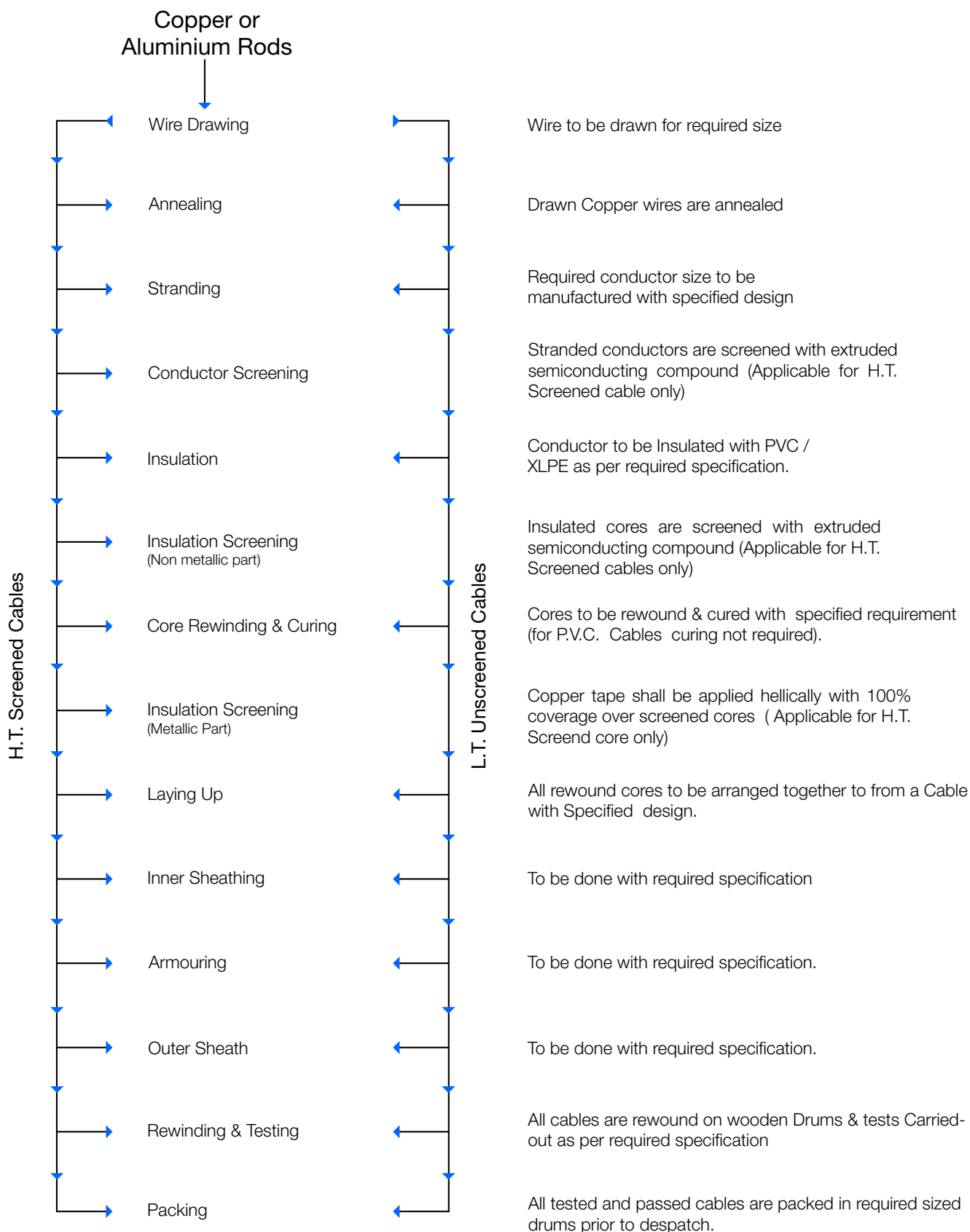
Testing Laboratory



16 Drawing Wire Machine



Triple Head Extrusion Line



Cables with Aluminium and Copper conductor and polymer insulation are manufactured at Havells India Ltd. (Cable Works) Alwar. Essentially cables comprise of conductors, insulation, inner-sheath, armour and outersheath. The brief description of the process is mentioned as under:

CONDUCTOR

Havells Cables are available with both aluminum and copper conductors. It is manufactured with solid/Stranded Circular/ Shaped Aluminium / Copper Conductor. Stranding makes Cables flexible and easy to handle while shaping makes them compact.

Compaction is provided to all stranded conductor constructions as under:

1. **Circular Conductor** With one wire in the centre conductor contains 6, 12, 18, 24, 30... wire layers in either unilay or opposite helical directions. The conductor is sized upto 92% compaction.
2. **Shaped Conductors** In all multicore cables from 16 Sq. mm size, conductors are "shaped". Compaction degree in multicore power cables is upto 92%.
3. **Segmental Conductor** As a special case Havells cables of 1600 sq. mm are made up of segmental conductors.

The conductor is manufactured in equal segments and compacted, then laid together. This reduces A.C. losses in the large sized conductor, which are due to skin and proximity effects.

Havells has special construction of conductor to suggest to its customer for meeting their specific need.

Havells copper conductor cables are of the same construction that of cables with Aluminium conductor except for high tensile strength, superior conductivity, better flexibility and ease of jointing, copper cables are used in control, instrumentation, winding, submarine, mining and ship wiring etc. etc applications.

All conductors for Havells cables are manufactured strictly in accordance with National and International specifications.

National specifications IS:8130

International specification IEC:60228 / BS:6360

DIELECTRIC INSULATION

Insulation for Havells cables is strictly as per National and International specifications.

Havells cables are designed and manufactured with polymer dielectrics to bear thermal and thermomechanical stresses safely at continuous normal and short circuit temperature conditions.

Havells cables are available with both thermoplastic & thermo setting insulations.

- PVC Cables Thermoplastic dielectric

- XLPE Cables Thermo setting dielectric

Havells PVC cables use PVC compounds that take care of over load and short circuit current with both coarse & fine protection systems.

Havells XLPE cables use XLPE compound with anti oxidant stabilizers and traces of aromatic polynuclear hydrocarbon. Thus

improving electrical treeing characteristics and mechanical strength of insulation.

Havells cables are friendly during continuous, emergency and short circuit conditions.

Though there is no change in basic design of Havells cables yet the latest manufacturing process gives improved reliability and compactness to cables. The relative thermal expansion during short circuit between dielectric and conductor is therefore limited to minimum both in PVC & XLPE, thus limiting displacement of cores in cables during short circuit.

Insulation for Havells Cables are strictly manufactured and applied over conductor in accordance with National and International specifications:

National Specification IS:5831/IS:7098

International Specifications BS:6746/BS:5467/IEC:60502

SCREENING

XLPE Cables with rated voltage over 3300V shall be provided with conductor and insulation screening as follows:

Conductor Conductor shall be screened with extruded

Screen Semiconducting compound as per is:7098 part 2.

Insulation Insulation screening shall consist of non-metallic

Screen Part in combination with metallic part. Non metallic part shall consist of either semi conducting compound tape applied hellically or extruded layer of semi conducting compound, applied directly over insulation. Over this, metallic part (copper tape) shall be applied hellically with overlap as per IS:7098 part 2.

To avoid the cavities and voids formation in dielectric particularly on bending operation of cable, perfect bonding of insulation and screening is required. To ensure this Havells applying conductor screen, insulation and insulation screen (non-metallic part) in one operation through tripple extrusion.

LAYING UP

Cores are tested on line during production both for physical and electrical characteristics. Control is observed within tight tolerance limits for dimensions in case pf PVC/XLPE insulation. For multicore cables cores are laid up on our latest laying up machine equipped with sector correction equipment. In case of XLPE insulated cores the same are cured so as to impart the requisite characteristics both electrical and mechanical and then are laid up.

INNERSHEATH

Laid up cables are provided with inner sheath with high quality of PVC which acts as bedding for steel wire / strip armouring. Wherever required, filler cords are provided to maintain the circularity to laid up cables.

Advantage

In Havells Cable-polymers used for inner sheath are softer than insulation or outer sheath & are compatible with temperature ratings of cables & do not have deleterious effect on any other component of cable.

Inner sheath is applied either with extrusion or by wrapping. In Havells Cables though the inner sheath is closely applied on the laid up cores, same can be stripped with ease without damaging insulation.

The inner sheath dimensions are maintained strictly in accordance with laid down specification.

Specification For PVC Cables IS:1554 (Part-I & II)
For XLPE Cables IS:7098 (Part-I & II)

ARMOURING

Mechanical protection to the cable is provided with armouring. Havells single core cables are armoured with Aluminium or Aluminium alloy wire/strips, thus avoiding magnetic hysteresis losses on A. C. System.

Multicore cables are provided with galvanised steel wire/strips.

Havells cables are provided with galvanised wire armouring, where cables are to run vertically and are subjected to stresses.

Havells Mining cables are armoured with steel wire and tinned copper wires, so as to provide conductivity of armour more than 75% of main conductor of cable.

Havells cables armour wires/strips are of low resistivity material and meet the requirements of IS:3975.

Havells armoured cables are with almost 95% armour coverage.

OUTER SHEATH

All Havells Cables are provided with PVC/polymer outer sheath.

Havells Cables are manufactured with various characteristics of sheathing compounds.

General purpose sheathing Compound	ST1
Heat resistant Compound for sheath (H.R.)	ST2
Fire Retardant Low	IEC 754 Part I
Smoke Compound	IEC 60332 Part I & III
(FRLS)	IEEE-383
	ASTM-2843
	ASTM-2863

Flame Retardant Compound (FR) to EIL Specn.

Ultra Violet Radiations Resistance Compound to ASTM G-53.

Anti Rodent and Anti Termite Compound.

PVC compounds used for Havells Cables are of various grades to meet specifications IS: 5831.

In order to be identified, Havells Cables have their name embossed/printed/indented on outersheath at regular intervals on the outer sheath of Havells Cables, Voltage Grade, cable size, trade name & year of manufacture are embossed, as desired.

Cables are sequentially marked for length at every metre throughout its length.

FINAL TESTING

Each Havells Cable is tested for all applicable Routine Tests.

From a lot of Cable one cable of each type is tested for Type tests, as per relevant specifications.

Havells conduct its testing at Havell's India Ltd. cable plant at Alwar for acceptance test as per specification.

Testing of Havells Cables are carried out as per Havells Work Standards for testing, besides applicable standards.

ADVANTAGES OF PVC CABLES

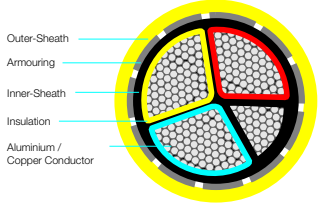
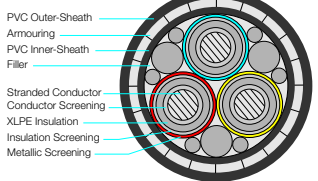
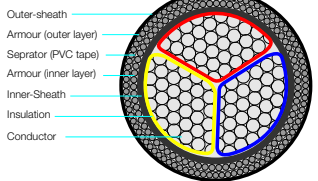
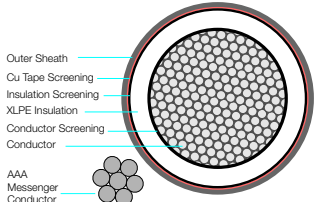
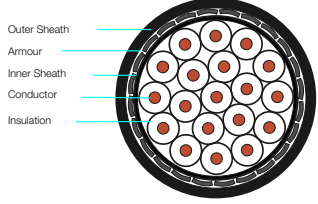
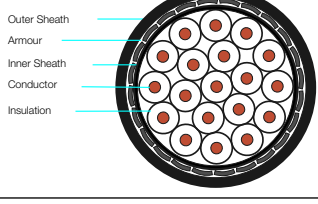
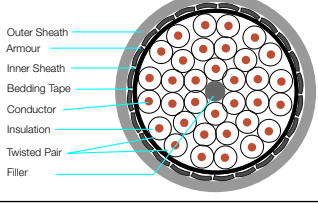
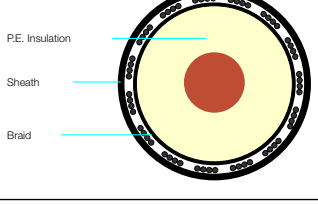
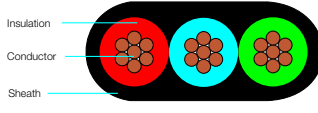
1. A non-hygroscopic insulation almost unaffected by moisture.
2. Non-migration of compound permitting vertical installation.
3. Complete protection against most forms of electrolytic and chemical corrosion.
4. A tough and resilient sheath with excellent fire - resisting qualities.
5. Good ageing characteristics.
6. Not affected by vibration.

ADVANTAGES OF XLPE CABLES

1. Higher Current Rating.
2. Higher Short Circuit Rating.
3. Longer Service Life.
4. For a short time it can withstand maximum 130°C and is favourable to endure short circuit stresses.
5. It is less sensitive to the setting of the network protection.
6. Because of the thermosetting process taking place due to the effect of cross linking, the crack resistance is increased.
7. Due to the chemical cross-linking internal stresses are reduced. Consequently the material is less sensitive during manufacturing process to the setting of the cooling gradient.
8. The thermal resistivity of cross-linked material is favourably low, compared to thermoplastic material.
9. The low dielectric loss is a significant advantage.
10. The excellent mechanical features of the insulation improves the protection against external effects.
11. The resistance of the XLPE to acids, alkalies is outstanding and is often compensating the adverse environmental influences.



Cable range at a glance

Application	Type & Size	Options	Cross Sectional View
Cables for Power Supply to Residential, Commercial & Industrial units	PVC/XLPE Power cables for 1.1 & 3.3 kv for Electrical Substations as per IS:1554 - I & 2 Sizes: Single Core 10-1000 sq. mm Multicore 6-630 sq. mm	Conductor - Stranded / Solid, Circular / Shaped Aluminium / Copper Insulation - PVC / HR PVC Inner Sheath - PVC / HR PVC / FRLS / PVC Unarmoured / Armoured - G.S. Round Wire/ Flat Strip or Aluminum Wire / Flat Strip Outer Sheath - PVC/ HR PVC/ FRLS PVC	
Heavy Duty XLPE Power cables for Power Generation Distribution	XLPE Power cables upto 19/33 kv grade 33 kv (E) as per IS:7098 - I & II Sizes : Single Core : 25 - 1000 sq. mm Multicore : 25 - 400 sq. mm	Conductor - Circular/Shaped - Aluminum/Copper Insulation - XLPE Innersheath - PVC / HR PVC / FRLS Unarmoured / Armoured - G.S Round Wire / Flat Strip or Aluminum Wire / Flat Strip Outersheath - PVC / HR PVC / FRLS	
Heavy Duty copper cables for Coal Mines	Stranded bright annealed electrolytic copper conductor, PVC/ XLPE insulated / PVC sheathed upto and including 3.3 kv as per IS: 1554 - I&II / IS: 7098 - I & II Sizes : Multicore 25 to 400 sq. mm	Conductor - Circular / Shaped Insulation - PVC / XLPE Innersheath - PVC / HR PVC / FRLS Unarmoured/Armoured - Round Wire/Flat Strip with conductivity not less than 75% of the phase Outer Sheath - PVC/ HR PVC / FRLS	
Arial Bunched / Bundled required for over head power distribution	PE/XLPE insulated 1.1 kv to 33 kv as per IS:14255 & IS:7098-II	Conductor - Stranded Circular compacted Aluminium Insulation - PE/XLPE Messenger conductor - All Aluminium Alloy-Bare/ Insulated Street Light Cond. - Stranded Circular Compacted Aluminium, Bare/Insulated	
Copper Control Cables for Power Switch yard Control / Relay Equipment	Annealed electrolytic copper conductor, PVC/XLPE insulated, PVC sheathed 650/ 1100V grade as per IS: 1554-I & IS: 7098-I Sizes : 1.5 / 2.5 sq. mm upto 61 core 4 & 6 Sq. mm upto 4 core	Conductor - Solid/Stranded, Plain /Tinned Insulation - PVC/HR PVC/XLPE Innersheath - PVC/HR PVC/FRLS/Zero Halogen Unarmoured / Armoured - G.S. Round Wire/ Flat Strip Outersheath - PVC/HR PVC/FRLS/Zero Halogen Additional Option : Overall shielding with Aluminum mylar tape with 100% coverage & 25% overlap on laid up cores for static noise rejection.	
Railway Signaling Cables	Annealed Bare Copper conductor, PVC insulated cores laid up PVC sheath as per IRS-S-63/89 RDSO & related specifications Sizes : 1.5 & 2.5 sq. mm upto 61 core 4 & 6 sq. mm upto 4 core	Screened/Unscreened - Aluminum mylar tape Unarmoured/Armoured - G.S. Round Wire / Flat Strip/Galvanised Tape Additional Option : Insulation/Inner/Outer Sheath - PVC Inner/Outer sheath - PVC	
Telecom / Switch board cables for Indoor Telephones	Annealed Copper conductor, PVC Insulated as per DOT TEC Spec No: G/WIR-06/02 Sizes : 0.4 / 0.5 / 0.6 / 0.7 / 0.9 mm	Conductor - Tinned / Plain Insulation - PVC / HR PVC / Nylon Innersheath - PVC/ HR PVC/ FRLS Zero Halogen Unarmoured / Armoured - G.S. round wire / Flat Strip Outer sheath - PVC/HR PVC/FRLS Additional Option - Individual / Overall pair/ Shielding / Screening	
Coaxial cables for Telecom / Microwave / CATV / MATV industry	Available in specified RG & UR Series as per MIL-C-17 / BS: 2316 / IS: 5608 / IS: 11967 Sizes : Suitable for Impedance of 50 / 75 / 100 / 125 ohms	Conductor - Plain / Tinned / Copper Clad Steel / Silver Plated Insulation - Solid / Foam / Semi air spaced Screen - Single / Double braid Sheath - PVC / HR PVC / FRLS / P.E	
Flat cables for Submersible Pumps & Motors	Stranded Plain copper, PVC insulated & PVC sheathed of 1.1kV grade as per IS: 694 Sizes : 3 core - 1.5 to 50 sq. mm	Insulation - PVC / HR PVC Sheathing - PVC / HR PVC	

Cable range at a glance

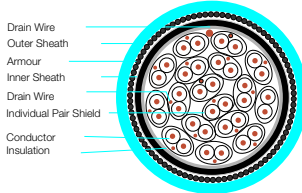
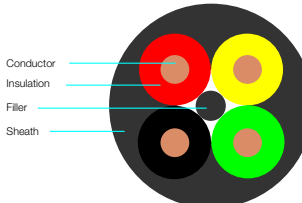
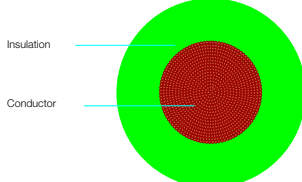
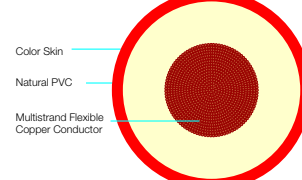
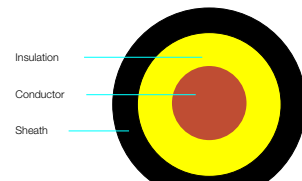
Application	Type & Size	Options	Cross Sectional View
Instrumentation Signal Cables for Process control & Instrumentation	PVC Sheathed 225/650/ 1100 V grade cables as per BS: 5308 / DIN VDE 0815 & 816 / IS: 1554 / IEC: 189 Sizes : 0.5/0.75/1.0/1.5 sq. mm	Conductor - Standed / Solid, plain / tinned Insulation - PVC / HR PVC / P.E / Zero Halogen Shielding - Individual Pair / over all pairs Drain wire - Solid Stranded Innersheath - PVC / HR PVC Zero Halogen Unarmoured/Armoured-G.S. Round Wire, Flat Strip Outsheath - PVC / HR PVC/ FRLS / Zero Halogen	
Flexible & Cord Cables for appliances, Machine Tools & Equipment Wiring	Multistrand, flexible, bright annealed electrolytic copper conductor, PVC insulated and sheathed upto 1100V as per IS:694 Sizes : Single, Two, Three or Four core upto 25 sq. mm	Insulation - PVC / HR PVC / FRLS / Zero Halogen Unsheathed /Sheathed - PVC / HR PVC / FRLS / Zero Halogen	
Wiring Cables for electrical industry	Multistrand Flexible, upto 1100V grade PVC Cables as per IS: 694 Sizes : Single core 1.0 - 630 sq. mm	Conductor - Bright Annealed Copper Insulation - PVC/ HR PVC/ FRLS PVC / Zero Halogen	
Energy Cables for Power Supply to Telephone Exchanges / UPS / Battery Backup / Equipments	PVC Flexible Cables upto 1.1kv grade as per IS:694 Sizes : 1.0 upto 240 sq. mm Single / Multi Core	Conductor - Stranded / Solid bright annealed Copper Insulation - PVC / HR PVC / FRLS / Zero Halogen	
Air Field Lighting Cables	Stranded plain annealed copper, PVC insulated & PVC sheathed of 5 kV grade Sizes : Single core 6 /16 sq.mm and 2 x 6, 16 & 25	Insulation - PVC / XLPE	



Table -1

TECHNICAL DETAIL FOR HAVELLS 1.1 KV SINGLE CORE, AL/COPPER COND., PVC INSULATED, UN-ARMoured CABLES

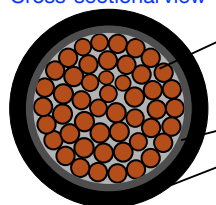
Cable Code : AYY/YY

Ref. Spec. : IS:1554Part-1

Physical Parameters

SIZE cross-sectional area (Sq MM)	Minimum No of Strand in Conductor		Nominal Thickness of Insulation) (mm)	Nominal Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Weight of cable in kg /km	
	Al	Cu				With Al Conductor Ayy	With Cooper conductor YY
4	—	1/7	1.0	1.8	8	80	105
6	1	1/7	1.0	1.8	9	100	135
10	1	6	1.0	1.8	10	120	180
16	6	6	1.0	1.8	11	160	260
25	6	6	1.2	1.8	13	210	365
35	6	6	1.2	1.8	14	250	460
50	6	6	1.4	1.8	16	300	610
70	12	12	1.4	1.8	17	400	830
95	15	15	1.6	1.8	19	500	1100
120	15	18	1.6	2.0	21	600	1350
150	15	18	1.8	2.0	23	750	1680
185	30	30	2.0	2.0	25	900	2050
240	30	34	2.2	2.0	28	1100	2600
300	30	34	2.4	2.0	30	1350	3200
400	53	53	2.6	2.2	35	1700	4200
500	53	53	3.0	2.2	38	2150	5250
630	53	53	3.4	2.4	43	2750	6650
800	53	53	3.4	2.4	48	3300	8250
1000	53	53	3.4	2.6	52	4100	10300

Cross-sectional view



1 CONDUCTOR : Material - Aluminium /Copper

*Shape : ~AL. Cond :- 6 & 10 SQMM -Solid circular, 16 sq.mm & above : Stranded compacted circular

~Copper. Cond :- 4 & 6 sq. mm-solid/ stranded non compacted circular, 10 sq. mm & above : Stranded compacted circular

2 INSULATION : PVC Type A of IS:5831 / OPTION: HR PVC (Type-C of IS-5831), Colour : Black

3 OUTER SHEATH : PVC TYPE ST-1 OF IS : 5831 '— OPTIONS : PVC Type ST-2 of IS:5831/ FR TYPE/FRLS TYPE

COLOUR OF OUTER SHEATH : BLACK . OPTIONS : any other colour as per requirement.

- Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose..

- Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		App. Reactance at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
4	—	4.61	—	5.53	0.140	0.58	—	—	—	39	38	35	0.304	0.460
6	4.61	3.08	5.53	3.70	0.127	0.68	39	37	35	49	48	44	0.456	0.690
10	3.08	1.83	3.70	2.20	0.118	0.83	51	51	47	65	64	60	0.760	1.150
16	1.91	1.15	2.29	1.38	0.110	1.01	66	65	64	85	83	82	1.220	1.84
25	1.20	0.727	1.44	0.87	0.105	1.05	86	84	84	110	110	110	1.900	2.88
35	0.868	0.524	1.04	0.63	0.100	1.22	100	100	105	130	125	130	2.660	4.03
50	0.641	0.387	0.769	0.464	0.098	1.22	120	115	130	155	150	165	3.800	5.75
70	0.443	0.268	0.532	0.322	0.091	1.43	140	135	155	190	175	205	5.320	8.05
95	0.320	0.193	0.384	0.232	0.088	1.47	175	155	190	220	200	245	7.220	10.90
120	0.253	0.153	0.304	0.184	0.086	1.62	195	170	220	250	220	280	9.120	13.80
150	0.206	0.1240	0.247	0.1488	0.085	1.62	220	190	250	280	245	320	11.40	17.30
185	0.164	0.0991	0.197	0.1189	0.084	1.62	240	210	290	305	260	370	14.10	21.30
240	0.125	0.0754	0.151	0.0912	0.082	1.72	270	225	335	345	285	425	18.20	27.30
300	0.100	0.0601	0.122	0.0733	0.080	1.74	295	245	380	375	310	475	22.80	34.50
400	0.0778	0.0470	0.0961	0.0580	0.080	1.81	325	275	435	400	335	550	30.40	46.00
500	0.0605	0.0366	0.0759	0.0459	0.079	1.86	345	295	480	425	355	590	38.00	57.50
630	0.0469	0.0283	0.0610	0.0368	0.077	1.87	390	320	550	470	375	660	47.90	72.50
800	0.0367	0.0221	0.0503	0.0303	0.077	1.98	450	380	610	530	425	725	60.80	92.00
1000	0.0291	0.0176	0.0422	0.0255	0.076	2.20	500	415	680	590	740	870	76.00	115.00

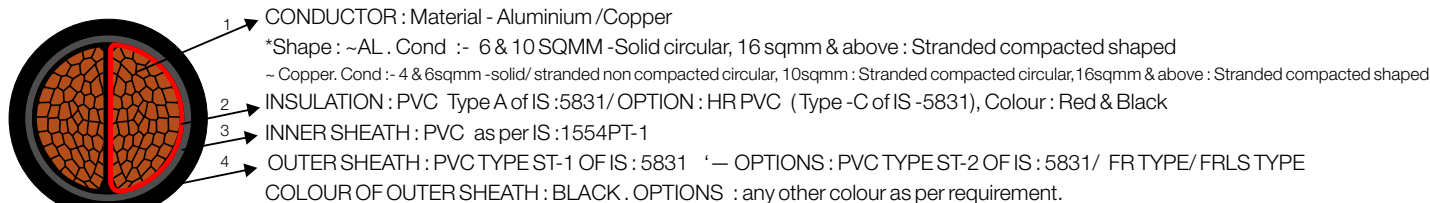
Note : Normal current ratings are given in standard conditions (as given in page no 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Cable Code : AYY/YY

Ref. Spec. : IS:1554 Part -1

Physical Parameters

SIZE Cross-sectional area (sqmm)	Minimum No of Strands in Conductor Al Cu		Nominal Thickness of Insulation (mm)	Minimum thickness of inner Sh. (mm)	Nominal thick. of OUTER Sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
							With Al cond AYY	With Cu Cond. YY
4	—	1/7	1.0	0.30	1.80	14	240	290
6	1	1/7	1.0	0.30	1.80	17	300	370
10	1	6	1.0	0.30	1.80	18	400	520
16	6	6	1.0	0.30	1.80	17	430	630
25	6	6	1.2	0.30	2.00	19	450	750
35	6	6	1.2	0.30	2.00	21	550	980
50	6	6	1.4	0.30	2.00	24	700	1300
70	12	12	1.4	0.30	2.00	26	850	1700
95	15	15	1.6	0.40	2.20	30	1150	2300
120	15	18	1.6	0.40	2.20	32	1300	2800
150	15	18	1.8	0.40	2.40	34	1600	3450
185	30	30	2.0	0.50	2.40	38	2000	4300
240	30	34	2.2	0.50	2.60	42	2500	5500
300	30	34	2.4	0.60	2.80	46	3000	6700
400	53	53	2.6	0.70	3.20	52	3800	8750
500	53	53	3.0	0.70	3.40	54	4800	11000
630	53	53	3.4	0.70	3.80	65	6000	13800

Cross- Sectional View

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		App.Reactance of cable at 50HZ in ohms/km	App.Capeitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
							Ground	Duct	Air	Ground	Duct	Air		
	Al	Cu	Al	Cu										
4	—	4.61	—	5.53	0.098	0.23	32	27	27	41	35	35	0.304	0.460
6	4.61	3.08	5.53	3.70	0.096	0.28	40	34	35	50	44	45	0.456	0.690
10	3.08	1.83	3.70	2.20	0.091	0.34	55	45	47	70	58	60	0.760	1.150
16	1.91	1.15	2.29	1.38	0.085	0.40	70	58	59	90	75	78	1.220	1.840
25	1.20	0.727	1.44	0.87	0.083	0.42	90	76	78	115	97	105	1.900	2.880
35	0.868	0.524	1.04	0.63	0.082	0.48	110	92	99	140	120	125	2.660	4.030
50	0.641	0.387	0.769	0.464	0.082	0.49	135	115	125	165	145	155	3.800	5.750
70	0.443	0.268	0.532	0.322	0.076	0.56	160	140	150	205	180	195	5.320	8.050
95	0.320	0.193	0.384	0.232	0.076	0.58	190	170	185	240	215	230	7.220	10.90
120	0.253	0.153	0.304	0.184	0.075	0.63	210	190	210	275	235	265	9.120	13.80
150	0.206	0.1240	0.247	0.1488	0.074	0.63	240	210	240	310	270	305	11.40	17.300
185	0.164	0.0991	0.197	0.1189	0.074	0.64	275	240	275	350	300	350	14.10	21.280
240	0.125	0.0754	0.151	0.0912	0.073	0.67	320	275	325	405	345	410	18.20	27.600
300	0.100	0.0601	0.122	0.0733	0.073	0.68	355	305	365	450	385	465	22.80	34.500
400	0.0778	0.0470	0.0961	0.0580	0.072	0.70	385	345	420	490	485	530	30.40	46.000
500	0.0605	0.0366	0.0759	0.0459	0.072	0.70	425	380	475	540	460	605	38.00	57.500
630	0.0469	0.0283	0.0610	0.0368	0.072	0.70	465	415	540	640	550	785	47.90	72.550

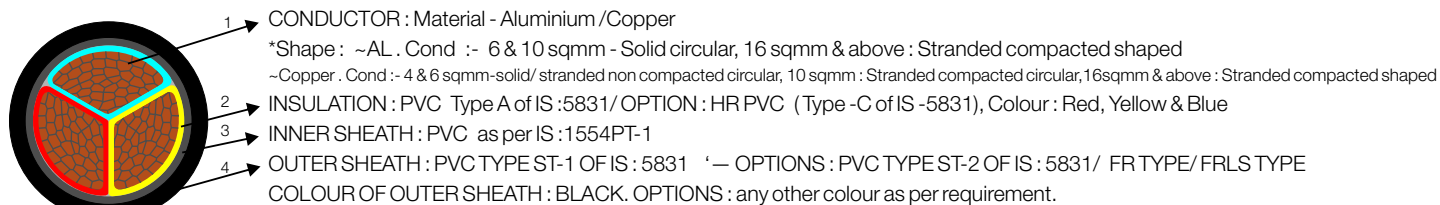
Note : Normal current ratings are given in standard conditions (as given in page no 40,41) , if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Cable Code : AYY/YY

Ref. Spec. : IS:1554PART -1

Physical Parameters

SIZE Cross-sectional area (sqmm)	Minimum No of Strands in Conductor Al Cu		Nominal thick. Thickness of Insulation) (mm)	Minimum thickness of inner Sh. (mm)	Nominal thick. of outer Sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
							With Al cond AYY	With Cu Cond. YY
4	—	1/7	1.0	0.30	1.80	16	270	340
6	1	1/7	1.0	0.30	1.80	18	360	470
10	1	6	1.0	0.30	1.80	19	440	650
16	6	6	1.0	0.30	1.80	19	460	730
25	6	6	1.2	0.30	2.00	22	620	1080
35	6	6	1.2	0.30	2.00	24	740	1400
50	6	6	1.4	0.30	2.00	27	940	1870
70	12	12	1.4	0.40	2.20	30	1200	2500
95	15	15	1.6	0.40	2.20	34	1600	3350
120	15	18	1.6	0.40	2.20	37	1900	4100
150	15	18	1.8	0.50	2.40	40	2300	5100
185	30	30	2.0	0.50	2.60	44	2750	6200
240	30	34	2.2	0.60	2.80	50	3500	7950
300	30	34	2.4	0.60	3.00	55	4300	9900
400	53	53	2.6	0.70	3.40	62	5450	12800
500	53	53	3.0	0.70	3.60	69	6900	16200
630	53	53	3.4	0.70	4.00	77	8700	20400

Cross-sectional View

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameter

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		pp.. Reactance at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
													Al	Cu
4	— —	4.61	— —	5.53	0.098	0.23	28	23	23	36	30	30	0.304	0.460
6	4.61	3.08	5.53	3.70	0.096	0.28	35	30	30	45	38	39	0.456	0.690
10	3.08	1.83	3.70	2.20	0.091	0.34	46	39	40	60	50	52	0.760	1.150
16	1.91	1.15	2.29	1.38	0.085	0.40	60	50	51	77	64	66	1.220	1.840
25	1.20	0.727	1.44	0.87	0.083	0.42	76	63	70	99	81	90	1.900	2.880
35	0.868	0.524	1.04	0.63	0.082	0.48	92	77	86	120	99	110	2.660	4.030
50	0.641	0.387	0.769	0.464	0.082	0.49	110	95	105	145	125	135	3.800	5.750
70	0.443	0.268	0.532	0.322	0.076	0.56	135	115	130	175	150	165	5.320	8.050
95	0.320	0.193	0.384	0.232	0.076	0.58	165	140	155	210	175	200	7.220	10.900
120	0.253	0.153	0.304	0.184	0.075	0.63	185	155	180	240	195	230	9.120	13.800
150	0.206	0.1240	0.247	0.1488	0.074	0.63	210	175	205	270	225	265	11.40	17.300
185	0.164	0.0991	0.197	0.1189	0.074	0.64	235	200	240	300	255	305	14.10	21.300
240	0.125	0.0754	0.151	0.0912	0.073	0.67	275	235	280	345	295	355	18.20	27.600
300	0.100	0.0601	0.122	0.0733	0.073	0.68	305	260	315	385	335	400	22.80	34.500
400	0.0778	0.0470	0.0961	0.0580	0.072	0.70	335	290	375	425	360	435	30.40	46.000
500	0.0605	0.0366	0.759	0.0459	0.072	0.70	370	320	425	470	390	520	38.00	57.500
630	0.0469	0.0283	0.0610	0.0368	0.072	0.70	405	350	480	555	470	675	47.90	72.500

Note : Normal current ratings are given in standard conditions(as given in page no- 40,41) , if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

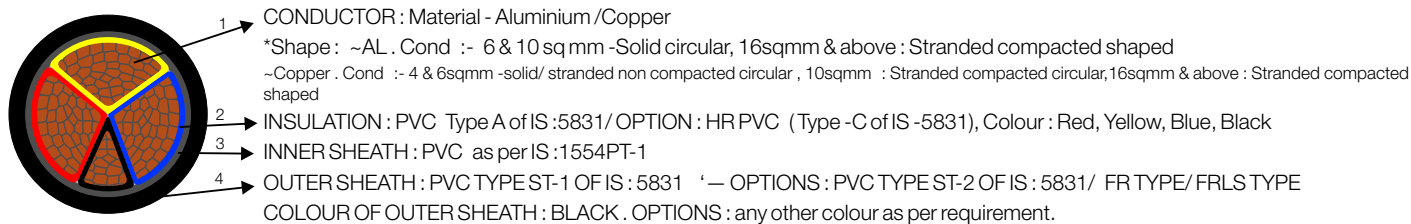
Cable Code : AYY/YY

Ref. Spec. : IS:1554PART -1

Physical Parameters

SIZE cross-sectional area (Sq MM)	Minimum nos of Strands in conductor		Nominal Thickness of Insulation) (mm) Phase / Neutral	Minimum Thickness of inner sheath (mm)	Nominal thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt. of cable (Kg/KM)	
	Phase	Neutral					With Al Conductor AYY	With Cu conductor YY
	Al	Cu						
3X25+16	6/6	6/6	1.20/1.00	0.30	2.00	24	700	1264
3X35+16	6/6	6/6	1.20/1.00	0.30	2.00	26	850	1600
3X50+25	6/6	6/6	1.40/1.20	0.30	2.00	29	1050	2100
3X70+35	12/6	12/6	1.40/1.20	0.40	2.20	32	1400	2900
3X95+50	15/6	15/6	1.60/1.40	0.40	2.20	36	1800	3900
3X120+70	15/12	18/12	1.60/1.40	0.50	2.40	40	2200	4850
3X150+70	15/12	18/12	1.80/1.40	0.50	2.40	44	2600	5800
3X185+95	30/15	30/15	2.00/1.60	0.50	2.60	48	3200	7200
3X240+120	30/15	34/18	2.20/1.60	0.60	3.00	54	4100	9300
3X300+150	30/15	34/18	2.40/1.80	0.60	3.20	62	5000	11500
3X400+185	53/30	53/30	2.60/2.00	0.70	3.40	68	6300	15000
3X500+240	53/30	53/34	3.00/2.20	0.70	3.80	77	8000	18500
3X630+300	53/30	53/34	3.40/2.40	0.70	4.00	87	10000	23500

Cross-sectional View



~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose ..

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		App.Reactance of cable at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air						
									Al	Cu	Al	Cu		
3X25+16	1.20	0.727	1.44	0.87	0.083	0.42	76	63	70	99	81	90	1.90	2.88
3X35+16	0.868	0.524	1.04	0.63	0.082	0.48	92	77	86	120	99	110	2.66	4.03
3X50+25	0.641	0.387	0.769	0.464	0.082	0.49	110	95	105	145	125	135	3.80	5.75
3X70+35	0.443	0.268	0.532	0.322	0.076	0.56	135	115	130	175	150	165	5.32	8.05
3X95+50	0.320	0.193	0.384	0.232	0.076	0.58	165	140	155	210	175	200	7.22	10.90
3X120+70	0.253	0.153	0.304	0.184	0.075	0.63	185	155	180	240	195	230	9.12	13.80
3X150+70	0.206	0.1240	0.247	0.1488	0.074	0.63	210	175	205	270	225	265	11.40	17.30
3X185+95	0.164	0.0991	0.197	0.1189	0.074	0.64	235	200	240	300	255	305	14.10	21.30
3X240+120	0.125	0.0754	0.151	0.0912	0.073	0.67	275	235	280	345	295	355	18.20	27.60
3X300+150	0.100	0.0601	0.122	0.0733	0.073	0.68	305	260	315	385	335	400	22.80	34.50
3X400+185	0.0778	0.0470	0.0961	0.0580	0.072	0.70	335	290	375	425	360	435	30.40	46.00
3X500+240	0.0605	0.0366	0.0759	0.0459	0.072	0.70	370	320	425	470	390	520	38.00	57.50
3X630+300	0.0469	0.0283	0.0610	0.0368	0.072	0.70	405	350	480	555	470	675	47.90	72.50

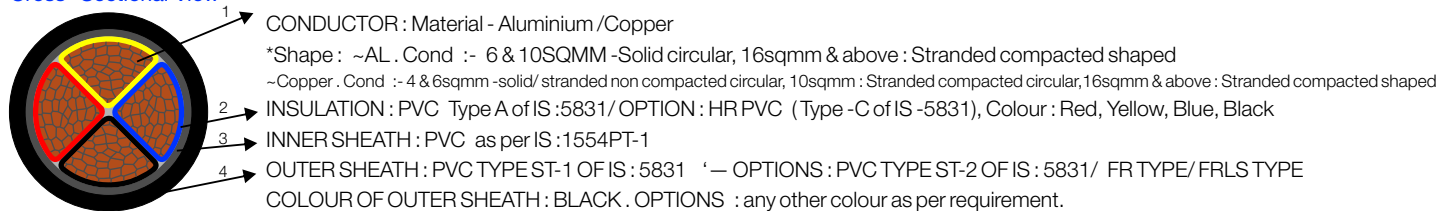
Note : Normal current ratings are given in standard conditions (as given in page no- 40,41) , if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Cable Code : AYY/YY

Ref. Spec. : IS :1554PART -1

Physical Parameters

SIZE cross-sectional area (sq mm)	Minimum No of Strand in Conductor		Nominal Thickness of Insulation) (mm)	Minimum Thickness of inner sheath (mm)	Nominal thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt. of cable (Kg/KM)	
							With Al Conductor	With Cu
	Al	Cu					AYY	YY
4	—	1/7	1.0	0.30	1.80	16	300	400
6	1	1/7	1.0	0.30	1.80	18	390	540
10	1	6	1.0	0.30	1.80	20	540	788
16	6	6	1.0	0.30	2.00	23	560	950
25	6	6	1.2	0.30	2.00	26	750	1370
35	6	6	1.2	0.30	2.00	30	940	1800
50	6	6	1.4	0.40	2.20	34	1250	2500
70	12	12	1.4	0.40	2.20	38	1550	3300
95	15	15	1.6	0.40	2.40	43	2050	4400
120	15	18	1.6	0.50	2.40	46	2400	5380
150	15	18	1.8	0.50	2.60	51	2950	6670
185	30	30	2.0	0.60	2.80	55	3650	8250
240	30	34	2.2	0.60	3.00	60	4600	10550
300	30	34	2.4	0.70	3.40	66	5500	12950
400	53	53	2.6	0.70	3.60	73	6800	16720
500	53	53	3.0	0.70	4.00	82	8600	21000
630	53	53	3.4	0.70	4.00	92	11000	26000

Cross- Sectional View

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose ..

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		App.Reactance of cable at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps			
							With Aluminium cond.			With Copper cond.						
	Ground	Duct	Air	Ground			Duct	Air								
									Al	Cu	Al	Cu				
4	—	—	4.61	—	—	5.53	0.098	0.23	28	23	23	36	30	30	0.304	0.460
6	4.61	3.08	5.53	3.70	0.096	0.28	35	30	30	45	38	39	0.456	0.690		
10	3.08	1.83	3.70	2.20	0.091	0.34	46	39	40	60	50	52	0.760	1.150		
16	1.91	1.15	2.29	1.38	0.085	0.40	60	50	51	77	64	66	1.220	1.840		
25	1.20	0.727	1.44	0.87	0.083	0.42	76	63	70	99	81	90	1.900	2.880		
35	0.868	0.524	1.04	0.63	0.082	0.48	92	77	86	120	99	110	2.660	4.030		
50	0.641	0.387	0.769	0.464	0.082	0.49	110	95	105	145	125	135	3.800	5.750		
70	0.443	0.268	0.532	0.322	0.076	0.56	135	115	130	175	150	165	5.320	8.050		
95	0.320	0.193	0.384	0.232	0.076	0.58	165	140	155	210	175	200	7.220	10.900		
120	0.253	0.153	0.304	0.184	0.075	0.63	185	155	180	240	195	230	9.120	13.800		
150	0.206	0.1240	0.247	0.1488	0.074	0.63	210	175	205	270	225	265	11.400	17.300		
185	0.164	0.0991	0.197	0.1189	0.074	0.64	235	200	240	300	255	305	14.100	21.300		
240	0.125	0.0754	0.151	0.0912	0.073	0.67	275	235	280	345	295	355	18.200	27.600		
300	0.100	0.0601	0.122	0.0733	0.073	0.68	305	260	315	385	335	400	22.800	34.500		
400	0.0778	0.0470	0.0961	0.0580	0.072	0.70	335	290	375	425	360	435	30.400	46.000		
500	0.0605	0.0366	0.0759	0.0459	0.072	0.70	370	320	425	470	390	520	38.000	57.500		
630	0.0469	0.0283	0.0610	0.0368	0.072	0.70	405	350	480	555	470	675	47.900	72.500		

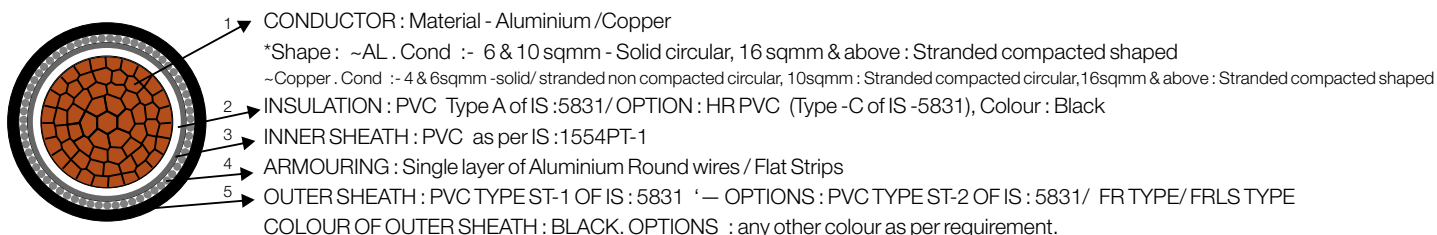
Note : Normal current ratings are given in standard conditions (as given in page no 40,41) , if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Cable Code : AYFaY/ YFaY, AYWaY/ YWaY

Ref. Spec. : IS:1554PART -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of Strands in Conductor Al Cu		Nominal Thickness of Insulation) (mm)	ARMOURING WITH FLAT STRIP (AYFaY/ YFaY)					ARMOURING WITH ROUND WIRES (AYWaY/ YWaY)				
				Nominal Thickness of armour (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)		Nominal Diameter of wire (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
							With Al cond AYFaY	With Cu Cond. YFaY				With Al cond AYWaY	With Cu Cond. YWaY
4	—	1/7	1.3	N/A	N/A	N/A	N/A	N/A	1.40	1.24	11	150	180
6	1	1/7	1.3	N/A	N/A	N/A	N/A	N/A	1.40	1.24	12	180	210
10	1	6	1.3	N/A	N/A	N/A	N/A	N/A	1.40	1.24	13	200	260
16	6	6	1.3	N/A	N/A	N/A	N/A	N/A	1.40	1.24	14	250	350
25	6	6	1.5	N/A	N/A	N/A	N/A	N/A	1.40	1.24	15	300	450
35	6	6	1.5	N/A	N/A	N/A	N/A	N/A	1.40	1.24	16	350	560
50	6	6	1.7	N/A	N/A	N/A	N/A	N/A	1.40	1.24	18	450	750
70	12	12	1.7	N/A	N/A	N/A	N/A	N/A	1.40	1.40	20	550	980
95	15	15	1.9	0.80	1.40	21	650	1230	1.60	1.40	22	700	1300
120	15	18	1.9	0.80	1.40	23	750	1500	1.60	1.40	24	800	1550
150	15	18	2.1	0.80	1.40	24	900	1830	1.60	1.40	26	950	1880
185	30	30	2.3	0.80	1.40	27	1050	2200	1.60	1.40	29	1100	2250
240	30	34	2.5	0.80	1.40	30	1300	2800	1.60	1.56	32	1400	2900
300	30	34	2.7	0.80	1.56	32	1600	3450	1.60	1.56	33	1650	3500
400	53	53	3.0	0.80	1.56	37	1950	4400	2.00	1.56	39	2100	4580
500	53	53	3.4	0.80	1.56	40	2400	5500	2.00	1.72	42	2700	5800
630	53	53	3.9	0.80	1.72	45	3100	7000	2.00	1.88	48	3300	7200
800	53	53	3.9	0.80	1.88	49	3700	8650	2.00	1.88	52	4000	8950
1000	53	53	3.9	0.80	2.04	55	4600	10800	2.50	2.04	59	4900	11000

Cross- Sectional View

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		App.Reactance of cable in at 50HZ ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air	Al	Cu
4	7.41	4.61	8.89	5.53	0.157	0.48	31	30	27	39	38	35	0.304	0.460
6	4.61	3.08	5.53	3.70	0.148	0.56	39	37	35	49	48	44	0.456	0.690
10	3.08	1.83	3.70	2.20	0.138	0.67	51	51	47	65	64	60	0.760	1.150
16	1.91	1.15	2.29	1.38	0.128	0.81	66	65	64	85	83	82	1.220	1.840
25	1.20	0.727	1.44	0.87	0.120	0.87	86	84	84	110	110	110	1.900	2.880
35	0.868	0.524	1.04	0.63	0.114	1.00	100	100	105	130	125	130	2.660	4.030
50	0.641	0.387	0.769	0.464	0.110	1.03	120	115	130	155	150	165	3.800	5.750
70	0.443	0.268	0.532	0.322	0.103	1.21	140	135	155	190	175	205	5.320	8.050
95	0.320	0.193	0.384	0.232	0.101	1.27	175	155	190	220	200	245	7.220	10.90
120	0.253	0.153	0.304	0.184	0.096	1.42	195	170	220	250	220	280	9.120	13.80
150	0.206	0.1240	0.247	0.1488	0.094	1.42	220	190	250	280	245	320	11.400	17.30
185	0.164	0.0991	0.197	0.1189	0.092	1.44	240	210	290	305	260	370	14.100	21.30
240	0.125	0.0754	0.151	0.0912	0.090	1.53	270	225	335	345	285	425	18.200	27.60
300	0.100	0.0601	0.122	0.0733	0.088	1.56	295	245	380	375	310	475	22.800	34.50
400	0.0778	0.0470	0.0961	0.0580	0.088	1.59	325	275	435	400	335	550	30.400	46.00
500	0.0605	0.0366	0.076	0.0459	0.087	1.67	345	295	480	425	355	590	38.000	57.50
630	0.0469	0.0283	0.0610	0.0368	0.086	1.67	390	320	550	470	375	660	47.880	72.50
800	0.0367	0.0221	0.0503	0.0303	0.083	1.75	450	380	610	530	423	725	60.800	92.00
1000	0.0291	0.0176	0.0422	0.0255	0.082	1.94	500	414	680	590	471	870	76.000	115.00

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41) , if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

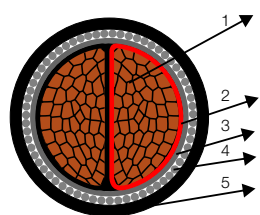
**TECHNICAL DETAIL FOR HAVELLS 1.1 KV
TWO CORES, AL/COPPER COND., PVC INSULATED,
GALVANIZED STEEL WIRE/STRIP ARMoured CABLES**

Cable Code : AYFY/YFY, AYWY/YWY

Ref. Spec. : IS :1554 PART -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of Strands in Conductor		Nominal Thickness of Insulation) (mm)	Minimum Thickness of inner Sh. (mm)	ARMOURING WITH FLAT STRIP (AYFY/YFY)					ARMOURING WITH ROUND WIRES (AYWY/YWY)				
					Nominal Thickness of armour (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)		Nominal Diameter of armour (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
	Al	Cu						With Al cond	With Cu Cond.				With Al cond	With Cu Cond.
								AYFY	YFY				AYWY	YWY
4	—	1/7	1.0	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	18	600	650
6	1	1/7	1.0	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	19	660	730
10	1	6	1.0	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	20	750	870
16	6	6	1.0	0.30	0.80	1.40	18	580	780	1.60	1.40	20	750	950
25	6	6	1.2	0.30	0.80	1.40	20	700	1000	1.60	1.40	22	900	1200
35	6	6	1.2	0.30	0.80	1.40	22	800	1230	1.60	1.40	23	1030	1450
50	6	6	1.4	0.30	0.80	1.40	25	1000	1620	1.60	1.56	26	1300	1900
70	12	12	1.4	0.30	0.80	1.56	27	1200	2050	1.60	1.56	29	1500	2350
95	15	15	1.6	0.40	0.80	1.56	30	1550	2720	2.00	1.56	33	2050	3200
120	15	18	1.6	0.40	0.80	1.56	32	1800	3290	2.00	1.72	35	2400	3900
150	15	18	1.8	0.40	0.80	1.72	35	2100	3970	2.00	1.72	37	2760	4600
185	30	30	2.0	0.50	0.80	1.88	38	2500	4800	2.00	1.88	41	3200	5500
240	30	34	2.2	0.50	0.80	2.04	43	3100	6080	2.50	2.04	47	4200	7200
300	30	34	2.4	0.60	0.80	2.20	48	3700	7400	2.50	2.20	50	5000	8700
400	53	53	2.6	0.70	0.80	2.36	53	4500	9450	3.15	2.52	58	6600	11500
500	53	53	3.0	0.70	0.80	2.68	56	5600	11800	3.15	2.84	64	8000	14000
630	53	53	3.4	0.70	0.80	2.84	66	6900	14700	4.00	3.00	72	11000	18800

Cross- Sectional View

CONDUCTOR : Material - Aluminium /Copper

*Shape : ~AL . Cond :- 6 & 10SQMM -Solid circular, 16sqmm & above : Stranded compacted shaped

~Copper. Cond :- 4 & 6 sqmm-solid/ stranded non compacted circular, 10sqmm : Stranded compacted circular, 16sqmm & above : Stranded compacted shaped

INSULATION : PVC Type A of IS :5831/ OPTION : HR PVC (Type -C of IS -5831), Colour : Red & Black

INNER SHEATH : PVC as per IS:1554PT-1

ARMOURING : Single layer of Galvanized steel Round wires / Flat Strips

OUTER SHEATH : PVC TYPE ST-1 OF IS : 5831 ' — OPTIONS : PVC TYPE ST-2 OF IS : 5831/ FR TYPE/ FRLS TYPE

COLOUR OF OUTER SHEATH : BLACK . OPTIONS : any other colour as per requirement.

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		App.Reactance of cable at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec. duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air	Al	Cu				
4	---	4.61	---	5.53	0.098	0.23	32	27	27	41	35	35	0.304	0.460
6	4.61	3.08	5.53	3.70	0.096	0.28	40	34	35	50	44	45	0.456	0.690
10	3.08	1.83	3.70	2.20	0.091	0.34	55	45	47	70	58	60	0.760	1.150
16	1.91	1.15	2.29	1.38	0.085	0.40	70	58	59	90	75	78	1.220	1.840
25	1.20	0.727	1.44	0.87	0.083	0.42	90	76	78	115	97	105	1.90	2.880
35	0.868	0.524	1.04	0.63	0.082	0.48	110	92	99	140	120	125	2.66	4.030
50	0.641	0.387	0.769	0.464	0.082	0.49	135	115	125	165	145	155	3.80	5.750
70	0.443	0.268	0.532	0.322	0.076	0.56	160	140	150	205	180	195	5.32	8.050
95	0.320	0.193	0.384	0.232	0.076	0.58	190	170	185	240	215	230	7.22	10.90
120	0.253	0.153	0.304	0.184	0.075	0.63	210	190	210	275	235	265	9.12	13.80
150	0.206	0.1240	0.247	0.1488	0.074	0.63	240	210	240	310	270	305	11.40	17.30
185	0.164	0.0991	0.197	0.1189	0.074	0.64	275	240	275	350	300	350	14.10	21.30
240	0.125	0.0754	0.151	0.0912	0.073	0.67	320	275	325	405	345	410	18.20	27.60
300	0.100	0.0601	0.122	0.0733	0.073	0.68	355	305	365	450	385	465	22.80	34.50
400	0.0778	0.0470	0.0961	0.0580	0.072	0.70	385	345	420	490	485	530	30.40	46.00
500	0.0605	0.0366	0.0759	0.0459	0.072	0.70	425	380	475	540	460	605	38.00	57.50
630	0.0469	0.0283	0.0610	0.0368	0.072	0.70	465	415	540	640	550	785	47.90	72.50

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

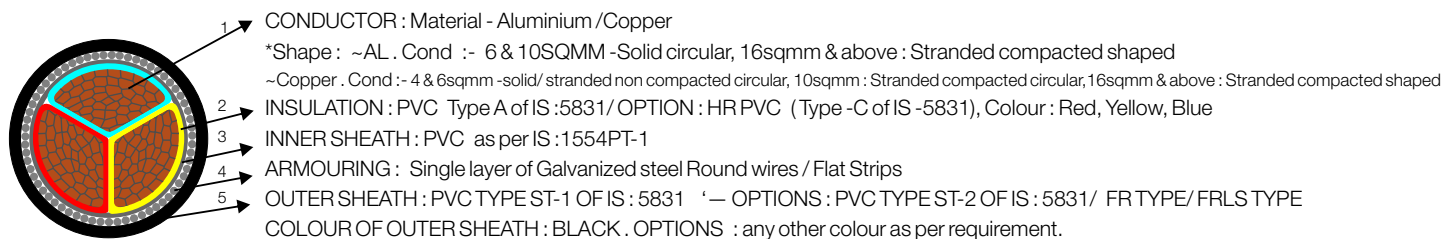
**TECHNICAL DETAIL FOR HAVELLS 1.1 KV
THREE CORES, AL/COPPER COND., PVC INSULATED,
GALVANIZED STEEL WIRE/STRIP ARMoured CABLES**

Cable Code : AYFY/YFY, AYWY/YWY

Ref. Spec. : IS :1554 PART -1

Physical Parameters

SIZE Cross- sectional area (sq mm)	Minimum No of Strands in Conductor Al Cu		Nominal Thickness of Insulation (mm)	Minimum Thickness of inner Sh. (mm)	ARMOURING WITH FLAT STRIP (AYFY/YFY)					ARMOURING WITH ROUND WIRES (AYWY/YWY)				
					Nominal Thick. of armour strip (mm)	Minimum Thick. of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)		Nominal Diameter of wire (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
								With Al cond AYFY	With Cu Cond YFY				With Al cond AYWY	With Cu Cond YWY
4	--	1/7	1.0	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	18	600	650
6	1	1/7	1.0	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	19	700	810
10	1	6	1.0	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.40	21	900	1100
16	6	6	1.0	0.30	0.80	1.40	20	700	1000	1.60	1.40	21	950	1250
25	6	6	1.2	0.30	0.80	1.40	23	900	1350	1.60	1.40	23	1100	1550
35	6	6	1.2	0.30	0.80	1.40	24	1000	1650	1.60	1.40	26	1300	1950
50	6	6	1.4	0.30	0.80	1.56	27	1300	2230	1.60	1.56	29	1600	2530
70	12	12	1.4	0.40	0.80	1.56	31	1600	2900	2.00	1.56	33	2150	3450
95	15	15	1.6	0.40	0.80	1.56	35	2000	3750	2.00	1.72	37	2650	4400
120	15	18	1.6	0.40	0.80	1.72	37	2400	4630	2.00	1.72	39	3000	5200
150	15	18	1.8	0.50	0.80	1.88	41	2800	5600	2.00	1.88	43	3550	6300
185	30	30	2.0	0.50	0.80	1.88	46	3400	6840	2.50	2.04	49	4600	8000
240	30	34	2.2	0.60	0.80	2.20	51	4200	8650	2.50	2.20	54	5600	10000
300	30	34	2.4	0.60	0.80	2.36	56	5050	10630	2.50	2.36	59	6600	12000
400	53	53	2.6	0.70	0.80	2.52	63	6300	13740	3.15	2.68	68	8700	16000
500	53	53	3.0	0.70	0.80	2.84	70	7800	17100	3.15	3.00	75	11000	20000
630	53	53	3.4	0.70	0.80	3.00	78	9700	21418	4.00	3.00	84	14000	25500

Cross- Sectional View

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		App.Reactance at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
4	—	4.61	—	5.53	0.098	0.23	28	23	23	36	30	30	0.304	0.460
6	4.61	3.08	5.53	3.70	0.096	0.28	35	30	30	45	38	39	0.456	0.690
10	3.08	1.83	3.70	2.20	0.091	0.34	46	39	40	60	50	52	0.760	1.150
16	1.91	1.15	2.29	1.38	0.085	0.40	60	50	51	77	64	66	1.220	1.840
25	1.20	0.727	1.44	0.87	0.083	0.42	76	63	70	99	81	90	1.900	2.880
35	0.868	0.524	1.04	0.63	0.082	0.48	92	77	86	120	99	110	2.660	4.030
50	0.641	0.387	0.769	0.464	0.082	0.49	110	95	105	145	125	135	3.800	5.750
70	0.443	0.268	0.532	0.322	0.076	0.56	135	115	130	175	150	165	5.320	8.050
95	0.320	0.193	0.384	0.232	0.076	0.58	165	140	155	210	175	200	7.220	10.900
120	0.253	0.153	0.304	0.184	0.075	0.63	185	155	180	240	195	230	9.120	13.800
150	0.206	0.1240	0.247	0.1488	0.074	0.63	210	175	205	270	225	265	11.400	17.300
185	0.164	0.0991	0.197	0.1189	0.074	0.64	235	200	240	300	255	305	14.100	21.300
240	0.125	0.0754	0.151	0.0912	0.073	0.67	275	235	280	345	295	355	18.200	27.600
300	0.100	0.0601	0.122	0.0733	0.073	0.68	305	260	315	385	335	400	22.800	34.500
400	0.0778	0.0470	0.0961	0.0580	0.072	0.70	335	290	375	425	360	435	30.400	46.000
500	0.0605	0.0366	0.0759	0.0459	0.072	0.70	370	320	425	470	390	520	38.000	57.500
630	0.0469	0.0283	0.0610	0.0368	0.072	0.70	405	350	480	555	470	675	47.900	72.500

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

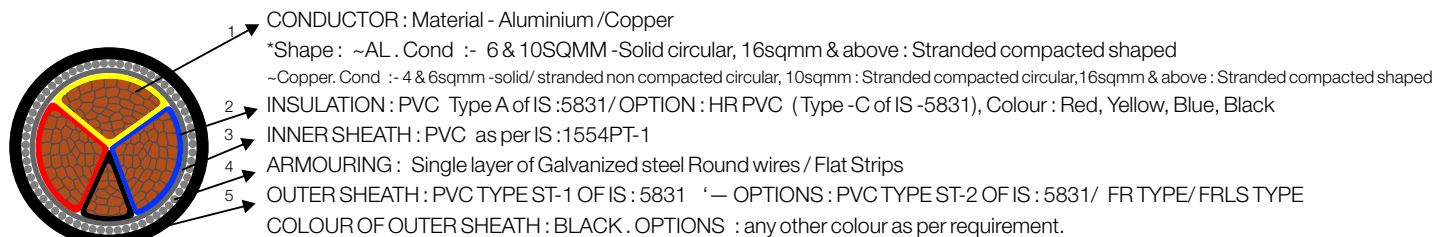
**TECHNICAL DETAIL FOR HAVELLS 1.1 KV
THREE AND HALF CORES, AL/CUCOPPER COND.,
PVC INSULATED, GALVANIZED STEEL WIRE/STRIP ARMoured CABLES**

Cable Code : 3.5 Core - AYFY / YFY, AYWY / YWY

Ref. Spec. : IS :1554PART -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum Nos of Strands in Conductor		Nominal Thickness of Insulation) (mm)	Minimum Thickness of inner Sh. (mm)	ARMOURING WITH FLAT STRIP (AYFY/YFY)					ARMOURING WITH ROUND WIRES (AYWY/YWY)				
					Nominal Thickness Strip (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)		Nominal Diameter of wire (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
	With Al cond	With Cu Cond.						With Al cond	With Cu Cond.					
	AYFY	YFY						AYWY	YWY					
3X25+16	6/6	6/6	1.20/1.00	0.30	0.80	1.40	24	1000	1550	1.60	1.40	26	1300	1850
3X35+16	6/6	6/6	1.20/1.00	0.30	0.80	1.40	26	1200	1950	1.60	1.40	28	1450	2150
3X50+25	6/6	6/6	1.40/1.20	0.30	0.80	1.56	30	1500	2600	1.60	1.56	31	1800	2800
3X70+35	12/6	12/6	1.40/1.20	0.40	0.80	1.56	34	1800	3300	2.00	1.56	36	2400	3800
3X95+50	15/6	15/6	1.60/1.40	0.40	0.80	1.56	37	2300	4350	2.00	1.72	39	3000	5000
3X120+70	15/12	18/12	1.60/1.40	0.50	0.80	1.72	41	2800	5450	2.00	1.88	43	3500	6100
3X150+70	15/12	18/12	1.80/1.40	0.50	0.8	1.88	45	3200	6400	2.00	1.88	47	4000	7200
3X185+95	30/15	30/15	2.00/1.60	0.50	0.80	2.04	49	3900	7900	2.50	2.04	53	5200	9200
3X240+120	30/15	34/18	2.20/1.60	0.60	0.80	2.20	55	4800	10000	2.50	2.30	58	6400	11500
3X300+150	30/15	34/18	2.40/1.80	0.60	0.80	2.36	61	5800	12300	3.15	2.52	65	8200	14500
3X400+185	53/30	53/30	2.60/2.00	0.70	0.80	2.68	69	7300	15800	3.15	2.63	75	9900	18400
3X500+240	53/30	53/34	3.00/2.20	0.70	0.80	2.84	77	9000	19500	4.00	3.00	84	13500	24000
3X630+300	53/30	53/34	3.40/2.40	0.70	0.80	3.00	87	11500	25000	4.00	3.00	92	16000	28500

Cross- Sectional View

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		App..Reactance at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air						
									Al	Cu	Al	Cu		
3X25+16	1.20	0.727	1.44	0.87	0.083	0.42	76	63	70	99	81	90	1.90	2.88
3X35+16	0.868	0.524	1.04	0.63	0.082	0.48	92	77	86	120	99	110	2.66	4.03
3X50+25	0.641	0.387	0.769	0.464	0.082	0.49	110	95	105	145	125	135	3.80	5.75
3X70+35	0.443	0.268	0.532	0.322	0.076	0.56	135	115	130	175	150	165	5.32	8.05
3X95+50	0.320	0.193	0.384	0.232	0.076	0.58	165	140	155	210	175	200	7.22	10.90
3X120+70	0.253	0.153	0.304	0.184	0.075	0.63	185	155	180	240	195	230	9.12	13.80
3X150+70	0.206	0.1240	0.247	0.1488	0.074	0.63	210	175	205	270	225	265	11.40	17.30
3X185+95	0.164	0.0991	0.197	0.1189	0.074	0.64	235	200	240	300	255	305	14.10	21.30
3X240+120	0.125	0.0754	0.151	0.0912	0.073	0.67	275	235	280	345	295	355	18.20	27.60
3X300+150	0.100	0.0601	0.122	0.0733	0.073	0.68	305	260	315	385	335	400	22.80	34.50
3X400+185	0.0778	0.0470	0.0961	0.0580	0.072	0.70	335	290	375	425	360	435	30.40	46.00
3X500+240	0.0605	0.0366	0.0759	0.0459	0.072	0.70	370	320	425	470	390	520	38.00	57.50
3X630+300	0.0469	0.0283	0.0610	0.0368	0.072	0.70	405	350	480	555	470	675	47.90	72.50

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Table -10

TECHNICAL DETAIL FOR HAVELLS 1.1 KV FOUR CORE, AL/CUCOPPER COND., PVC INSULATED, GALVANIZED STEEL WIRE/STRIP ARMoured CABLES

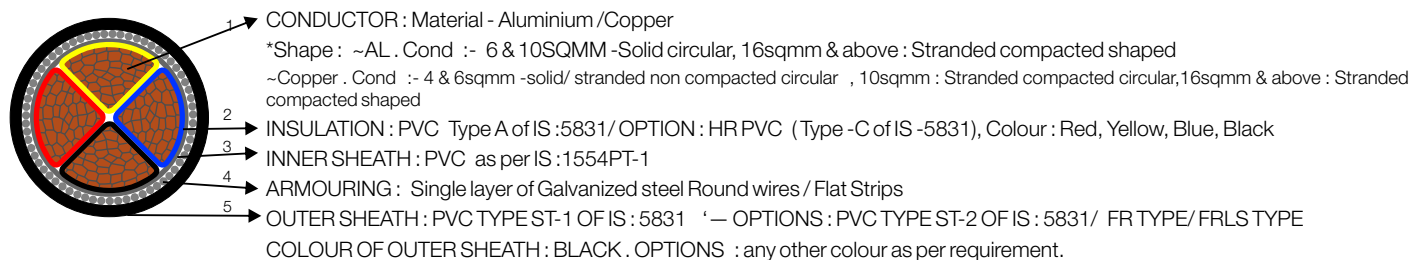
Cable Code : AYFY/YFY, AYWY/YWY

Ref. Spec. : IS:1554PT -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of Strands in Conductor		Nominal Thickness of Insulation) (mm)	Minimum Thickness of inner Sh. (mm)	ARMOURING WITH FLAT STRIP (AYFY/YFY)					ARMOURING WITH ROUND WIRES (AYWY/YWY)				
					Nominal Thickness of armour (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)		Nominal Diameter of armour (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
	Al	Cu						With Al cond	With Cu Cond.				With Al cond	With Cu Cond.
								AYFY	YFY				AYWY	YWY
4	—	1/7	1.0	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	18	650	800
6	1	1/7	1.0	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	21	880	1030
10	1	6	1.0	0.30	0.8	1.40	21	750	998	1.60	1.40	22	900	1150
16	6	6	1.0	0.30	0.8	1.40	22	860	1260	1.60	1.40	23	1120	1520
25	6	6	1.2	0.30	0.8	1.40	25	1100	1720	1.60	1.40	27	1400	2020
35	6	6	1.2	0.30	0.8	1.40	28	1300	2170	1.60	1.56	30	1600	2470
50	6	6	1.4	0.40	0.8	1.56	32	1600	2850	2.00	1.56	34	2200	3445
70	12	12	1.4	0.40	0.8	1.56	35	2000	3740	2.00	1.56	37	2650	4390
95	15	15	1.6	0.40	0.8	1.72	40	2600	5000	2.00	1.72	42	3300	5660
120	15	18	1.6	0.50	0.8	1.88	43	3050	6030	2.00	1.88	47	3850	6830
150	15	18	1.8	0.50	0.8	1.88	48	3600	7325	2.5	2.04	51	4850	8575
185	30	30	2.0	0.60	0.8	2.04	52	4300	8890	2.5	2.20	56	5800	10390
240	30	34	2.2	0.60	0.8	2.36	59	5400	11355	2.50	2.36	62	7000	12960
300	30	34	2.4	0.70	0.8	2.52	67	6600	14050	3.15	2.68	70	9200	16650
400	53	53	2.6	0.70	0.8	2.84	74	8200	18128	3.15	2.84	76	11000	20930
500	53	53	3.0	0.70	0.8	3.00	80	10500	22900	4.00	3.00	86	15000	27400
630	53	53	3.4	0.70	0.8	3.00	90	13000	28625	4.00	3.00	96	18000	33630

Cross- Sectional View



~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading &unloading purpose ..

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 70°C in Ohm/km		App.Reactance of cable at 50HZ in ohms/km	App. Capacitance of cable in micro F/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
													Al	Cu
4	— —	4.61	— —	5.53	0.098	0.23	28	23	23	36	30	30	0.304	0.460
6	4.61	3.08	5.53	3.70	0.096	0.28	35	30	30	45	38	39	0.456	0.690
10	3.08	1.83	3.70	2.20	0.091	0.34	46	39	40	60	50	52	0.760	1.150
16	1.91	1.15	2.29	1.38	0.085	0.40	60	50	51	77	64	66	1.220	1.840
25	1.20	0.727	1.44	0.87	0.083	0.42	76	63	70	99	81	90	1.900	2.880
35	0.868	0.524	1.04	0.63	0.082	0.48	92	77	86	120	99	110	2.660	4.030
50	0.641	0.387	0.769	0.464	0.082	0.49	110	95	105	145	125	135	3.800	5.750
70	0.443	0.268	0.532	0.322	0.076	0.56	135	115	130	175	150	165	5.320	8.050
95	0.320	0.193	0.384	0.232	0.076	0.58	165	140	155	210	175	200	7.220	10.900
120	0.253	0.153	0.304	0.184	0.075	0.63	185	155	180	240	195	230	9.120	13.800
150	0.206	0.1240	0.247	0.1488	0.074	0.63	210	175	205	270	225	265	11.40	17.300
185	0.164	0.0991	0.197	0.1189	0.074	0.64	235	200	240	300	255	305	14.10	21.300
240	0.125	0.0754	0.151	0.0912	0.073	0.67	275	235	280	345	295	355	18.20	27.600
300	0.100	0.0601	0.122	0.0733	0.073	0.68	305	260	315	385	335	400	22.80	34.500
400	0.0778	0.0470	0.0961	0.0580	0.072	0.70	335	290	375	425	360	435	30.40	46.000
500	0.0605	0.0366	0.0759	0.0459	0.072	0.70	370	320	425	470	390	520	38.00	57.500
630	0.0469	0.0283	0.0610	0.0368	0.072	0.70	405	350	480	555	470	675	47.90	72.500

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

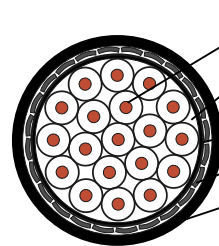
Cable Code : YY/YFY/YWY

Ref. Spec. : IS :1554PART -1

Physical Parameters

No of Cores	Minimum Thick. of inner Sheath (mm)	Norm thick. of outer Sheath (mm)	UNARMoured (YY)				ARMoured WITH FLAT STRIPS (YFY)						ARMoured WITH ROUND WIRES (YWY)					
			Approx. Overall Diameter (mm)		Approx. Net Wt of cable (Kg/KM)		Nominal Thickness of Armour strip (mm)	Minimum Thickness of out sh. (mm)	Approx. Overall Diameter (mm)		Approx. Net Wt of cable (Kg/KM)		Nominal Dia of Armour wire (mm)	Minimum Thickness of out sh. (mm)	Approx. Overall Diameter (mm)		Approx. Net Wt of cable (Kg/KM)	
			Solid cond.	Std. Cond.	Solid cond.	Std. Cond.			Solid cond.	Std. Cond.	Solid cond.	Std. Cond.			Solid cond.	Std. Cond.	Solid cond.	Std. Cond.
2	0.30	1.8	12	12	180	180	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	13	14	400	420
3	0.30	1.8	12.5	13	200	210	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	14	14	450	450
4	0.30	1.8	13	14	230	250	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	15	15	500	500
5	0.30	1.8	14	14	250	250	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	16	16	520	550
6	0.30	1.8	15	15	290	300	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	17	17	580	600
7	0.30	1.8	15	15	310	320	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	17	17	650	680
10	0.30	1.8	18	19	420	450	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.40	20	21	800	840
12	0.30	1.8	19	20	470	500	0.80	1.24	19	20	700	745	1.60	1.40	21	22	940	970
14	0.30	1.8	20	20	530	550	0.80	1.40	20	21	800	820	1.60	1.40	22	23	1000	1050
16	0.30	1.8	21	21	600	600	0.80	1.40	21	22	850	900	1.60	1.40	23	24	1100	1100
19	0.30	2.0	22	23	700	720	0.80	1.40	22	23	950	1000	1.60	1.40	24	25	1200	1250
24	0.30	2.0	25	26	850	900	0.80	1.40	25	27	1150	1200	1.60	1.40	27	28	1450	1500
27	0.30	2.0	26	27	920	995	0.80	1.40	26	27	1250	1300	1.60	1.40	28	29	1500	1550
30	0.30	2.0	27	28	1000	1050	0.80	1.40	27	28	1330	1400	1.60	1.40	29	30	1650	1700
37	0.30	2.0	28	29	1200	1240	0.80	1.40	29	30	1530	1600	1.60	1.40	30	32	1850	1950
40	0.30	2.0	29	30	1270	1300	0.80	1.40	30	31	1650	1750	1.60	1.56	32	35	2000	2100
44	0.30	2.0	31	33	1400	1450	0.80	1.56	32	34	1850	1950	1.60	1.56	34	36	2200	2300
52	0.40	2.0	33	35	1650	1700	0.80	1.56	34	35	2050	2150	2.00	1.56	36	38	2700	2800
61	0.40	2.2	35	37	1850	1950	0.80	1.56	35	37	2300	2450	2.00	1.56	38	40	3000	3100

Cross- Sectional View



- 1 CONDUCTOR : MATERIAL : Annealed bare copper / option - Tinned Construction : SOLID / STRANDED
- 2 INSULATION MATERIAL : PVC Type A of IS :5831/ OPTION : HR PVC (Type -C of IS -5831) Nominal insulation thickness - 0.80mm
- 3 Cores identification : Up to 5Cores by colour coding & more than 5 cores 5cores : By colour coding / Nos. printing on cores as per IS :1554pt-1
- 4 INNER SHEATH : Extruded PVC as per IS :1554PT-1
- 5 ARMOURING : Single layer of Galvanized steel Round wires / Flat Strips as applicable
- OUTER SHEATH : PVC TYPE ST-1 OF IS : 5831' — OPTIONS : PVC TYPE ST-2 OF IS : 5831/ FR TYPE/ FRLS TYPE
- COLOUR OF OUTER SHEATH : BLACK . OPTIONS : any other colour as per requirement

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose .

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

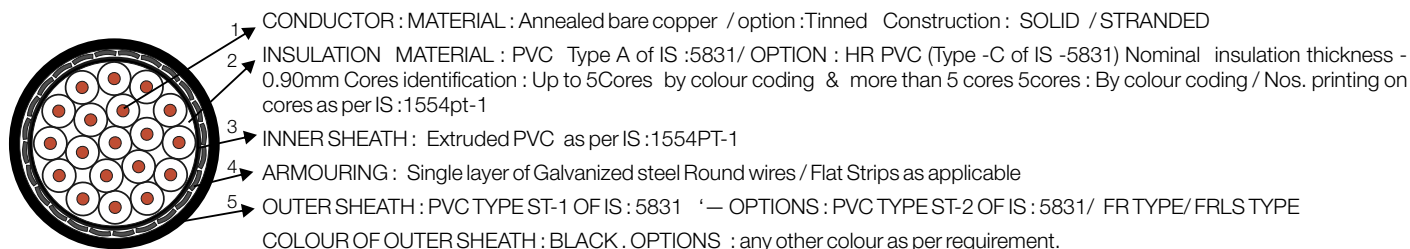
	Max. Cond. D.C. Resistance at 20°C in Ohm/km	App. Cond. A.C. Resistance at in Ohm/km		Reactance of cable at 50Hz in ohms/km	Appro Capcitanace of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration With Gen. Purpose With Heat Resis.	
						With general insulation			With H.R. insulation				
		at 70°C	at 85°C			Ground	Duct	Air	Ground	Duct	Air		
												Insulation	Insulation
2	12.10	14.52	15.2	0.112	0.20	23	20	20	26	24	24	0.173	0.156
3	12.10	14.52	15.2	0.112	0.20	21	17	17	24	21	21	0.173	0.156
4	12.10	14.52	15.2	0.112	0.20	21	17	17	24	21	21	0.173	0.156
5	12.10	14.52	15.2	0.112	0.20	21	17	17	24	21	21	0.173	0.156
6	12.10	14.52	15.2	0.112	0.20	15	13	13	17	16	16	0.173	0.156
7	12.10	14.52	15.2	0.112	0.20	14	13	13	16	15	15	0.173	0.156
10	12.10	14.52	15.2	0.112	0.20	13	11	11	15	13	13	0.173	0.156
12	12.10	14.52	15.2	0.112	0.20	12	10	10	14	12	12	0.173	0.156
14	12.10	14.52	15.2	0.112	0.20	11	10	10	13	12	12	0.173	0.156
16	12.10	14.52	15.2	0.112	0.20	11	9	9	13	11	11	0.173	0.156
19	12.10	14.52	15.2	0.112	0.20	10	9	9	11	11	11	0.173	0.156
24	12.10	14.52	15.2	0.112	0.20	9	8	8	10	10	10	0.173	0.156
27	12.10	14.52	15.2	0.112	0.20	9	8	8	10	10	10	0.173	0.156
30	12.10	14.52	15.2	0.112	0.20	9	7	7	10	8	8	0.173	0.156
37	12.10	14.52	15.2	0.112	0.20	8	7	7	9	8	8	0.173	0.156
40	12.10	14.52	15.2	0.112	0.20	8	7	7	9	8	8	0.173	0.156
44	12.10	14.52	15.2	0.112	0.20	7	7	7	8	7	7	0.173	0.156
52	12.10	14.52	15.2	0.112	0.20	6	6	6	7	7	7	0.173	0.156
61	12.10	14.52	15.2	0.112	0.20	6	6	6	7	7	7	0.173	0.156

Note : Normal current ratings are given in standard conditions (as given in page no -40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Physical Parameters

No of Cores	Minimum Thick. of inner Sheath (mm)	Nom thick. of outer Sheath (mm)	UNARMoured (YY)				ARMoured WITH FLAT STRIPS (YFY)				ARMoured WITH ROUND WIRES (YWY)							
			Approx. Overall Diameter (mm)		Approx. Net Wt of cable (Kg/KM)		Nominal Thickness of armour strip (mm)	Minimum Thickness of out. sth. (mm)	Approx. Overall Diameter (mm)		Approx. Net Wt of cable (Kg/KM)		Minimum Dia of wire (mm)	Minimum Thickness of Armour (mm)	Approx. Overall outer sheath		Approx. Net Wt of cable (Kg/KM)	
			Solid cond.	Std. Cond.	Solid cond.	Std. Cond.			Solid cond.	Std. Cond.	Solid cond.	Std. Cond.			Solid cond.	Std. Cond.	Solid cond.	Std. Cond.
2	0.30	1.8	13	13	220	240	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	14	15	480	500
3	0.30	1.8	14	14	260	270	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	15	16	530	550
4	0.30	1.8	15	15	310	320	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	16	17	600	620
5	0.30	1.8	16	16	340	350	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	17	18	640	680
6	0.30	1.8	17	17	390	420	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	19	20	730	750
7	0.30	1.8	17	17	424	440	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	19	20	760	790
10	0.30	1.8	20	21	570	600	0.80	1.40	21	22	850	900	1.60	1.40	23	24	1100	1150
12	0.30	2.0	21	22	670	700	0.80	1.40	22	23	950	1000	1.60	1.40	24	25	1180	1250
14	0.30	2.0	22	24	750	800	0.80	1.40	23	24	1050	1035	1.60	1.40	25	26	1300	1350
16	0.30	2.0	24	25	840	900	0.80	1.40	24	25	1120	1150	1.60	1.40	26	27	1400	1450
19	0.30	2.0	25	26	950	1000	0.80	1.40	25	26	1250	1330	1.60	1.40	27	28	1550	1620
24	0.30	2.0	28	30	1200	1260	0.80	1.40	29	30	1550	1630	1.60	1.56	31	32	1900	2000
27	0.30	2.0	29	31	1300	1350	0.80	1.40	30	31	1650	1750	1.60	1.56	32	33	2050	2100
30	0.30	2.0	30	32	1400	1500	0.80	1.56	31	32	1800	1920	1.60	1.56	33	34	2200	2250
37	0.40	2.2	33	34	1700	1800	0.80	1.56	34	35	2100	2225	2.00	1.56	36	37	2800	2900
40	0.40	2.2	34	36	1850	1900	0.80	1.56	35	36	2300	2400	2.00	1.56	37	39	2950	3100
44	0.40	2.2	36	38	2000	2100	0.80	1.56	37	37	2500	2600	2.00	1.56	40	41	3200	3350
52	0.40	2.2	38	40	2350	2450	0.80	1.56	39	41	2850	2950	2.00	1.72	42	43	3600	3700
61	0.40	2.2	40	43	2700	2800	0.80	1.56	41	43	3250	3350	2.00	1.72	44	46	4000	4200

Cross- Sectional View



~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose .

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

	Max. Cond. D.C. Resistance at 20°C in Ohm/km	App. Cond. A.C. Resistance at in Ohm/km		Reactance of cable at 50HZ in ohms/km	Appro Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration	
						With general insulation			With H. R. insulation				
		Ground	Duct			Air	Ground	Duct	Air	General Insulation	Heat Insulation		
2	7.41	8.89	9.34	0.107	0.22	32	27	27	38	32	32	0.288	0.260
3	7.41	8.89	9.34	0.107	0.22	27	24	24	30	28	28	0.288	0.260
4	7.41	8.89	9.34	0.107	0.22	27	24	24	30	28	28	0.288	0.260
5	7.41	8.89	9.34	0.107	0.22	27	24	24	30	28	28	0.288	0.260
6	7.41	8.89	9.34	0.107	0.22	21	18	18	24	21	21	0.288	0.260
7	7.41	8.89	9.34	0.107	0.22	20	17	17	22	20	20	0.288	0.260
10	7.41	8.89	9.34	0.107	0.22	18	15	15	20	16	16	0.288	0.260
12	7.41	8.89	9.34	0.107	0.22	17	14	14	19	16	16	0.288	0.260
14	7.41	8.89	9.34	0.107	0.22	16	13	13	18	15	15	0.288	0.260
16	7.41	8.89	9.34	0.107	0.22	15	13	13	17	15	15	0.288	0.260
19	7.41	8.89	9.34	0.107	0.22	14	12	12	16	14	14	0.288	0.260
24	7.41	8.89	9.34	0.107	0.22	13	11	11	14	13	13	0.288	0.260
27	7.41	8.89	9.34	0.107	0.22	12	10	10	13	12	12	0.288	0.260
30	7.41	8.89	9.34	0.107	0.22	12	10	10	13	12	12	0.288	0.260
37	7.41	8.89	9.34	0.107	0.22	11	9	9	12	10	10	0.288	0.260
40	7.41	8.89	9.34	0.107	0.22	11	9	9	12	10	10	0.288	0.260
44	7.41	8.89	9.34	0.107	0.22	10	9	9	11	10	10	0.288	0.260
52	7.41	8.89	9.34	0.107	0.22	9	8	8	10	10	10	0.288	0.260
61	7.41	8.89	9.34	0.107	0.22	8	8	8	9	9	9	0.288	0.260

Note : Normal current ratings are given in standard conditions (as given in page no -40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Table -13

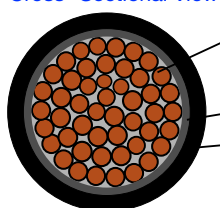
**TECHNICAL DETAIL FOR HAVELLS 1.1 KV SINGLE CORE,
AL/COPPER COND., XLPE INSULATED, UN-ARMoured CABLES**

Cable Code : A2XY/2XY

Ref. Spec. : IS:7098PT-1

Physical Parameters

SIZE cross-sectional area (Sq MM)	Minimum No of Strand in Conductor		Nominal Thickness of Insulation) (mm)	Nominal Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Weight of cable in kg /km	
	Al	Cu				With Al Conductor A2XY	With Cooper conductor 2XY
4	—	1/7	0.7	1.8	8	70	95
6	1	1/7	0.7	1.8	9	80	120
10	1	6	0.7	1.8	10	100	160
16	6	6	0.7	1.8	11	130	230
25	6	6	0.9	1.8	12	180	335
35	6	6	0.9	1.8	13	230	450
50	6	6	1.0	1.8	15	300	610
70	12	12	1.1	1.8	16	370	800
95	15	15	1.1	1.8	18	460	1050
120	15	18	1.2	1.8	20	550	1300
150	15	18	1.4	2.0	22	620	1550
185	30	30	1.6	2.0	24	820	1950
240	30	34	1.7	2.0	27	1000	2500
300	30	34	1.8	2.0	30	1200	3050
400	53	53	2.0	2.2	33	1550	4000
500	53	53	2.2	2.2	36	1900	5000
630	53	53	2.4	2.2	40	2400	6300
800	53	53	2.6	2.4	47	3000	7950
1000	53	53	2.8	2.6	51	3750	9950

Cross- Sectional View

CONDUCTOR : Material - Aluminium /Copper

*Shape : ~AL . Cond :- 6 & 10 SQMM -Solid circular, 16 sq.mm & above : Stranded compacted circular

~Copper. Cond :- 4 & 6 sq. mm-solid/ stranded non compacted circular, 10 sq. mm & above : Stranded compacted circular

INSULATION : Crosslinked Polyethylene (XLPE) (Natural colour)

OUTER SHEATH : PVC TYPE ST-2 OF IS : 5831 ' — OPTIONS : FR TYPE/ FRLS TYPE

COLOUR OF OUTER SHEATH : BLACK . OPTIONS : any other colour as per requirement.

- Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose..

- Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App. Reactance at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air						
									Al	Cu	Al	Cu		
4	—	4.61	—	5.90	0.136	0.29	—	—	—	48	47	45	0.376	0.572
6	4.61	3.08	5.90	3.94	0.128	0.34	48	45	45	60	59	57	0.564	0.858
10	3.08	1.83	3.94	2.34	0.118	0.42	62	62	61	80	78	77	0.940	1.430
16	1.91	1.15	2.44	1.47	0.108	0.50	81	80	83	104	102	106	1.504	2.288
25	1.20	0.727	1.54	0.931	0.102	0.52	99	90	115	130	115	145	2.350	3.575
35	0.868	0.524	1.11	0.671	0.097	0.60	117	110	135	155	140	175	3.290	5.005
50	0.641	0.387	0.820	0.495	0.092	0.63	138	125	170	185	165	215	4.700	7.150
70	0.443	0.268	0.567	0.343	0.088	0.68	168	155	210	225	200	270	6.580	10.01
95	0.320	0.193	0.411	0.248	0.085	0.79	204	185	255	265	235	330	8.930	13.59
120	0.253	0.153	0.325	0.197	0.082	0.79	230	210	300	300	265	380	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.082	0.79	265	230	342	335	300	430	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.082	0.79	295	260	385	380	335	495	17.39	26.46
240	0.125	0.0754	0.162	0.0976	0.079	0.84	340	300	450	435	385	590	22.56	34.32
300	0.100	0.0601	0.130	0.0778	0.078	0.86	390	335	519	490	430	670	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.077	0.88	450	380	605	550	480	780	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.076	0.90	500	430	700	610	530	900	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.075	0.94	555	485	809	680	590	1020	59.22	90.09
800	0.0367	0.0221	0.0530	0.0319	0.075	0.97	625	530	935	740	630	1140	75.20	114.40
1000	0.0291	0.0176	0.0444	0.0268	0.068	1.01	690	570	1065	780	660	1250	94.00	143.00

Note : Normal current ratings are given in standard conditions (as given in page no -40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

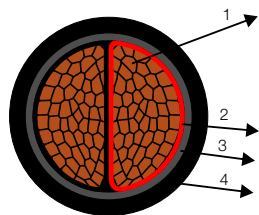
Cable Code : A2XY/ 2XY

Ref. Spec. : IS :7098PART -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of Strands in Conductor		Nominal Thickness of Insulation) (mm)	Minimum Thickness of inner sheath (mm)	Nominal Thickness of OUTER sheath (mm)	Approx. overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
	Al	Cu					With Al Cond A2XY	With Cu Cond. 2XY
4	—	1/7	0.7	0.30	1.80	13	200	250
6	1	1/7	0.7	0.30	1.80	14	330	400
10	1	6	0.7	0.30	1.80	17	350	470
16	6	6	0.7	0.30	1.80	17	310	500
25	6	6	0.9	0.30	2.00	19	400	700
35	6	6	0.9	0.30	2.00	20	480	900
50	6	6	1.0	0.30	2.00	22	590	1200
70	12	12	1.1	0.30	2.00	25	760	1630
95	15	15	1.1	0.40	2.20	28	1000	2200
120	15	18	1.2	0.40	2.20	31	1200	2700
150	15	18	1.4	0.40	2.20	33	1400	3300
185	30	30	1.6	0.50	2.40	37	1750	4000
240	30	34	1.7	0.50	2.60	41	2000	5000
300	30	34	1.8	0.60	2.80	44	2700	6400
400	53	53	2.0	0.60	3.00	48	3350	8300
500	53	53	2.2	0.70	3.40	54	4200	10400
630	53	53	2.4	0.70	3.60	62	5300	13000

Cross- Sectional View



CONDUCTOR : Material - Aluminium /Copper

*Shape : ~AL . Cond :- 6 & 10 sqmm -Solid circular, 16sqmm & above : Stranded compacted shaped

~Copper . Cond :- 4 & 6 sqmm -solid/ stranded non compacted circular, 10 sqmm : Stranded compacted circular, 16 sqmm & above : Stranded compacted shaped

INSULATION : Crosslinked Polyethylene (XLPE) (Red & Black colour)

INNER SHEATH : PVC as per IS :7098PT-1

OUTER SHEATH : PVC TYPE ST-2 OF IS:5831' -- OPTIONS: FR TYPE/FRLS TYPE

COLOUR OF OUTER SHEATH : BLACK, OPTIONS : any other colour as per requirement.

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App.Reactance at 50HZ in ohms/km	App. Capecitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
			With Aluminium cond.				With Copper cond.							
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
4	—	4.61	—	5.90	0.098	0.11	34	28	30	44	37	39	0.376	0.572
6	4.61	3.08	5.90	3.94	0.090	0.13	43	37	40	55	47	50	0.564	0.858
10	3.08	1.83	3.94	2.34	0.084	0.16	57	48	53	74	61	67	0.940	1.430
16	1.91	1.15	2.44	1.47	0.080	0.18	78	61	70	94	78	85	1.50	2.29
25	1.20	0.727	1.54	0.931	0.080	0.20	95	80	99	120	100	125	2.35	3.58
35	0.868	0.524	1.11	0.671	0.080	0.23	116	94	117	145	120	155	3.29	5.01
50	0.641	0.387	0.820	0.495	0.078	0.24	140	110	140	170	145	190	4.70	7.15
70	0.443	0.268	0.567	0.343	0.077	0.26	170	140	176	210	175	235	6.58	10.01
95	0.320	0.193	0.411	0.248	0.084	0.29	200	165	221	250	210	290	8.93	13.59
120	0.253	0.153	0.325	0.197	0.072	0.29	225	185	258	285	240	330	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.072	0.29	255	210	294	315	270	375	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.072	0.29	285	235	339	355	300	435	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.072	0.31	325	270	402	410	350	510	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.071	0.33	370	305	461	460	390	590	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.070	0.33	435	350	542	520	440	670	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.070	0.34	481	405	624	580	480	750	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.069	0.36	537	470	723	680	575	875	59.22	90.09

Note : Normal current ratings are given in standard conditions (as given in page no -40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

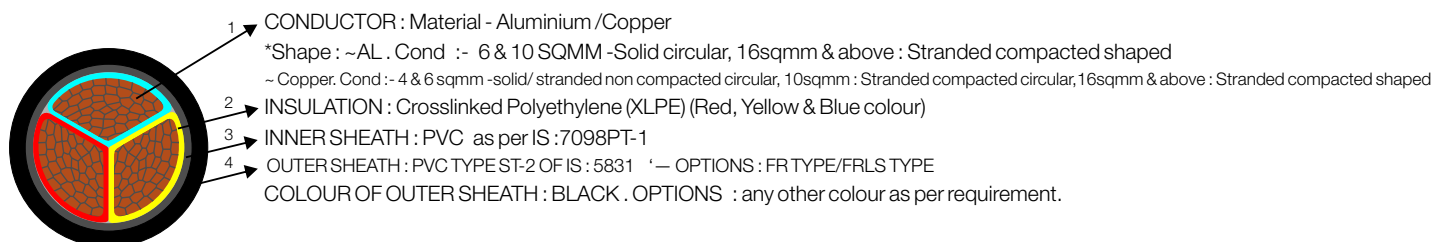
Cable Code : A2XY/2XY

Ref. Spec. : IS:7098 PART -1

Physical Parameters

SIZE Cross-sectional area (sqmm)	Minimum No of Strands in Conductor		Nominal thickness of Insulation) (mm)	Minimum thickness of inner Sh. (mm)	Nominal thick. of outer Sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
	Al	Cu					With Al cond A2XY	With Cu Cond. 2XY
4	—	1/7	0.7	0.30	1.80	14	225	300
6	1	1/7	0.7	0.30	1.80	16	330	440
10	1	6	0.7	0.30	1.80	18	400	580
16	6	6	0.7	0.30	1.80	18	400	700
25	6	6	0.9	0.30	2.00	21	530	1000
35	6	6	0.9	0.30	2.00	22	640	1300
50	6	6	1.0	0.30	2.00	25	800	1700
70	12	12	1.1	0.40	2.20	30	1100	2400
95	15	15	1.1	0.40	2.20	32	1350	3100
120	15	18	1.2	0.40	2.20	35	1650	3800
150	15	18	1.4	0.50	2.40	39	2050	4800
185	30	30	1.6	0.50	2.60	43	2500	5950
240	30	34	1.7	0.60	2.80	49	3150	7600
300	30	34	1.8	0.60	3.00	53	3850	9400
400	53	53	2.0	0.70	3.20	59	4850	12000
500	53	53	2.2	0.70	3.60	66	6100	15000
630	53	53	2.4	0.70	3.80	73	7650	19000

Cross- Sectional View



~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading &unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

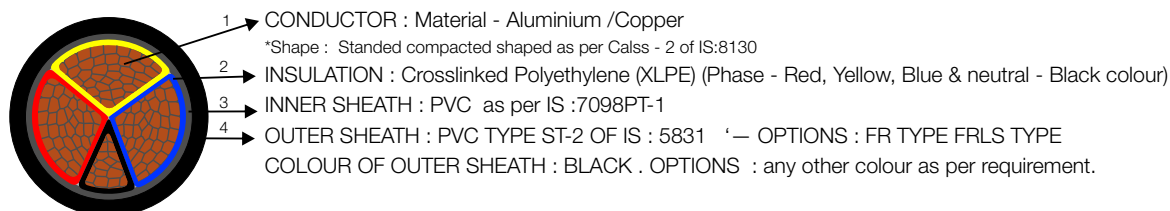
SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App. Reactance of cable at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air	Al	Cu
4	—	4.61	—	5.90	0.098	0.11	34	28	30	44	37	39	0.376	0.572
6	4.61	3.08	5.90	3.94	0.090	0.13	43	37	40	55	47	50	0.564	0.858
10	3.08	1.83	3.94	2.34	0.084	0.16	57	48	53	74	61	67	0.940	1.430
16	1.91	1.15	2.44	1.47	0.080	0.18	78	61	70	94	78	85	1.50	2.29
25	1.20	0.727	1.54	0.931	0.080	0.20	95	80	99	120	100	125	2.35	3.58
35	0.868	0.524	1.11	0.671	0.080	0.23	116	94	117	145	120	155	3.29	5.01
50	0.641	0.387	0.820	0.495	0.078	0.24	140	110	140	170	145	190	4.70	7.15
70	0.443	0.268	0.567	0.343	0.077	0.26	170	140	176	210	175	235	6.58	10.01
95	0.320	0.193	0.411	0.248	0.074	0.29	200	165	221	250	210	290	8.93	13.59
120	0.253	0.153	0.325	0.197	0.072	0.29	225	185	258	285	240	330	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.072	0.29	255	210	294	315	270	375	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.072	0.29	285	235	339	355	300	435	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.072	0.31	325	270	402	410	350	510	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.071	0.33	370	305	461	460	390	590	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.070	0.33	435	350	542	520	440	670	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.070	0.34	481	405	624	580	480	750	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.069	0.36	537	470	723	680	575	875	59.22	90.09

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of strands in conductor Phase / Neutral		Nominal Thickness of Insulation) Phase / Neutral (mm)	Minimum Thickness of inner sheath (mm)	Nominal thickness of OUTER Sheath (mm)	Approx. overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
							With Al cond	With Cu Cond.
	Al	Cu					A2XY	2XY
3X25+16	6/6	6/6	0.90/0.70	0.30	2.00	22	600	1150
3X35+16	6/6	6/6	0.90/0.70	0.30	2.00	24	700	1450
3X50+25	6/6	6/6	1.00/0.90	0.30	2.00	27	900	2000
3X70+35	12/6	12/6	1.10/0.90	0.40	2.20	31	1200	2700
3X95+50	15/6	15/6	1.10/1.00	0.40	2.20	34	1500	3600
3X120+70	15/12	18/12	1.20/1.10	0.40	2.20	38	1900	4500
3X150+70	15/12	18/12	1.40/1.10	0.50	2.40	43	2300	5500
3X185+95	30/15	30/15	1.60/1.10	0.50	2.60	46	2800	6800
3X240+120	30/15	34/18	1.70/1.20	0.60	2.80	52	3600	8700
3X300+150	30/15	34/18	1.80/1.40	0.60	3.00	57	4400	10800
3X400+185	53/30	53/30	2.00/1.60	0.70	3.40	65	5600	14000
3X500+240	53/30	53/34	2.20/1.70	0.70	3.60	73	7000	17500
3X630+300	53/30	53/34	2.40/1.80	0.70	4.00	82	8900	22000

Cross- Sectional View



~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App. Reactance of cable at 50HZ in ohms/km	App. Capacitance of cable in micro F/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
3X25+16	1.20	0.727	1.54	0.931	0.080	0.20	95	80	99	120	100	125	2.35	3.58
3X35+16	0.868	0.524	1.11	0.671	0.080	0.23	116	94	117	145	120	155	3.29	5.01
3X50+25	0.641	0.387	0.820	0.495	0.078	0.24	140	110	140	170	145	190	4.70	7.15
3X70+35	0.443	0.268	0.567	0.343	0.077	0.26	170	140	176	210	175	235	6.58	10.01
3X95+50	0.320	0.193	0.411	0.248	0.074	0.29	200	165	221	250	210	290	8.93	13.59
3X120+70	0.253	0.153	0.325	0.197	0.072	0.29	225	185	258	285	240	330	11.28	17.16
3X150+70	0.206	0.1240	0.265	0.159	0.072	0.29	255	210	294	315	270	375	14.10	21.45
3X185+95	0.164	0.0991	0.211	0.127	0.072	0.29	285	235	339	355	300	435	17.39	26.46
3X240+120	0.125	0.0754	0.162	0.098	0.072	0.31	325	270	402	410	350	510	22.56	34.32
3X300+150	0.100	0.0601	0.130	0.078	0.071	0.33	370	305	461	460	390	590	28.20	42.90
3X400+185	0.0778	0.0470	0.1023	0.0618	0.070	0.33	435	350	542	520	440	670	37.60	57.20
3X500+240	0.0605	0.0366	0.0808	0.0489	0.070	0.34	481	405	624	580	480	750	47.00	71.50
3X630+300	0.0469	0.0283	0.0648	0.0391	0.069	0.36	537	470	723	680	575	875	59.22	90.09

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Table -17

TECHNICAL DETAIL FOR HAVELLS 1.1 KV FOUR CORE, AL/COPPER COND., XLPE INSULATED, UN-ARMOURED CABLES

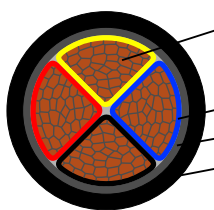
Cable Code : A2XY/2XY

Ref. Spec. : IS :7098PART -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of Strands in Conductor		Nominal Thickness of (Insulation) (mm)	Minimum Thickness of inner sheath (mm)	Minimum Thickness of outer sheath (mm)	Approx. over all Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
							With Al cond	With Cu Cond.
	Al	Cu					A2XY	2XY
4	—	1/7	0.7	0.30	1.80	17	250	350
6	1	1/7	0.7	0.30	1.80	18	350	500
10	1	6	0.7	0.30	1.80	20	400	650
16	6	6	0.7	0.30	1.80	20	450	850
25	6	6	0.9	0.30	2.00	24	660	1300
35	6	6	0.9	0.30	2.00	26	800	1700
50	6	6	1.0	0.30	2.00	29	1000	2200
70	12	12	1.1	0.40	2.20	34	1400	3100
95	15	15	1.1	0.40	2.20	37	1700	4000
120	15	18	1.2	0.50	2.40	41	2150	5150
150	15	18	1.4	0.50	2.60	45	2650	6350
185	30	30	1.6	0.50	2.80	50	3250	7850
240	30	34	1.7	0.60	3.00	56	4100	10000
300	30	34	1.8	0.70	3.20	63	5050	12050
400	53	53	2.0	0.70	3.60	70	6400	16000
500	53	53	2.2	0.70	3.80	79	8000	20000
630	53	53	2.4	0.70	4.00	88	10000	26000

Cross- Sectional View



CONDUCTOR : Material - Aluminium /Copper

*Shape : ~AL . Cond :- 6 & 10SQMM -Solid circular, 16sqmm & above : Stranded compacted shaped

~Copper . Cond :- 4 & 6sqmm -solid/ stranded non compacted circular , 10sqmm : Stranded compacted circular, 16sqmm & above : Stranded compacted shaped

INSULATION : Crosslinked Polyethylene (XLPE) (Red, Yellow, Blue & Black colour)

INNER SHEATH : PVC as per IS :7098PT-1

OUTER SHEATH : PVC TYPE ST-2 OF IS : 5831 ' — OPTIONS : FR TYPE/ FRLS TYPE

COLOUR OF OUTER SHEATH : BLACK . OPTIONS : any other colour as per requirement.

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App. Reactance of cable at 50HZ in ohms/km	App. Capecitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
													Al	Cu
4	—	4.61	—	5.90	0.098	0.11	34	28	30	44	37	39	0.376	0.572
6	4.61	3.08	5.90	3.94	0.090	0.13	43	37	40	55	47	50	0.564	0.858
10	3.08	1.83	3.94	2.34	0.084	0.16	57	48	53	74	61	67	0.940	1.430
16	1.91	1.15	2.44	1.47	0.080	0.18	78	61	70	94	78	85	1.50	2.29
25	1.20	0.727	1.54	0.931	0.080	0.20	95	80	99	120	100	125	2.35	3.58
35	0.868	0.524	1.11	0.671	0.080	0.23	116	94	117	145	120	155	3.29	5.01
50	0.641	0.387	0.820	0.495	0.078	0.24	140	110	140	170	145	190	4.70	7.15
70	0.443	0.268	0.567	0.343	0.077	0.26	170	140	176	210	175	235	6.58	10.01
95	0.320	0.193	0.411	0.248	0.074	0.29	200	165	221	250	210	290	8.93	13.59
120	0.253	0.153	0.325	0.197	0.072	0.29	225	185	258	285	240	330	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.072	0.29	255	210	294	315	270	375	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.072	0.29	285	235	339	355	300	435	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.072	0.31	325	270	402	410	350	510	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.071	0.33	370	305	461	460	390	590	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.070	0.33	435	350	542	520	440	670	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.070	0.34	481	405	624	580	480	750	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.069	0.36	537	470	723	680	575	875	59.22	90.09

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

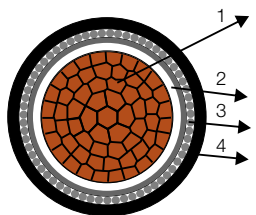
Cable Code : A2XFAY/2XFAY, A2XWY/2XWY

Ref. Spec. : IS:7098PART -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of Strands in Conductor Al Cu		Nominal Thickness of Insulation) (mm)	ARMOURING WITH FLAT STRIP (A2XFAY/2XFAY)					ARMOURING WITH ROUND WIRES (A2XWY/2XWY)				
				Nominal Thickness Strip (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)		Nominal Diameter of wire (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
							With Al cond.	With Cu Cond.				With Al cond.	With Cu Cond.
							A2XFAY	2XFAY				A2XWY	2XWY
4	—	1/7	1.0	N/A	N/A	N/A	N/A	N/A	1.40	1.24	10	90	130
6	1	1/7	1.0	N/A	N/A	N/A	N/A	N/A	1.40	1.24	11	130	170
10	1	6	1.0	N/A	N/A	N/A	N/A	N/A	1.40	1.24	12	160	222
16	6	6	1.0	N/A	N/A	N/A	N/A	N/A	1.40	1.24	13	200	300
25	6	6	1.2	N/A	N/A	N/A	N/A	N/A	1.40	1.24	14	300	455
35	6	6	1.2	N/A	N/A	N/A	N/A	N/A	1.40	1.24	15	350	567
50	6	6	1.3	N/A	N/A	N/A	N/A	N/A	1.40	1.24	17	420	730
70	12	12	1.4	N/A	N/A	N/A	N/A	N/A	1.40	1.24	19	520	954
95	15	15	1.4	0.80	1.40	21	600	1195	1.60	1.40	22	650	1235
120	15	18	1.5	0.80	1.40	23	700	1450	1.60	1.40	24	750	1494
150	15	18	1.7	0.80	1.40	24	800	1730	1.60	1.40	25	850	1780
185	30	30	1.9	0.80	1.40	26	950	2100	1.60	1.40	28	1000	2147
240	30	34	2.0	0.80	1.40	30	1200	2690	1.60	1.40	30	1250	2738
300	30	34	2.1	0.80	1.56	32	1400	3270	1.60	1.56	33	1500	3360
400	53	53	2.4	0.80	1.56	36	1750	4230	2.00	1.56	38	1900	4380
500	53	53	2.6	0.80	1.56	39	2150	5250	2.00	1.56	41	2350	5450
630	53	53	2.8	0.80	1.72	44	2700	6610	2.00	1.72	46	2900	6806
800	53	53	3.1	0.80	1.72	48	3350	8320	2.00	1.88	51	3600	8560
1000	53	53	3.3	0.80	1.88	54	4100	10300	2.50	2.04	56	4600	10800

Cross- Sectional View



CONDUCTOR : Material - Aluminium /Copper

*Shape : ~AL . Cond :- 6 & 10SQMM -Solid circular, 16 sqmm & above : Stranded compacted shaped circular

~Copper. Cond :- 4 & 6sqmm -solid/ stranded non compacted circular , 10sqmm : Stranded compacted circular

INSULATION : Crosslinked Polyethylene (XLPE) (Natural colour)

ARMOURING : Single layer of Aluminium Round wires / Flat Strips

OUTER SHEATH : PVC TYPE ST-2 OF IS : 5831 ' — OPTIONS : PVC TYPE

COLOUR OF OUTER SHEATH : BLACK . OPTIONS : any other colour as per requirement.

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose ..

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App. Reactance of cable at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
							Ground	Duct	Air	Ground	Duct	Air		
	Al	Cu	Al	Cu										
4	—	4.61	—	5.90	0.152	0.22	—	—	—	48	47	45	0.376	0.572
6	4.61	3.08	5.90	3.94	0.144	0.26	45	45	40	60	59	57	0.56	0.858
10	3.08	1.83	3.94	2.34	0.133	0.31	59	62	53	80	78	77	0.94	1.43
16	1.91	1.15	2.44	1.47	0.122	0.40	76	80	73	104	102	106	1.50	2.29
25	1.20	0.727	1.54	0.931	0.116	0.40	99	90	115	130	115	145	2.35	3.58
35	0.868	0.524	1.11	0.671	0.110	0.47	117	110	140	155	140	175	3.29	5.01
50	0.641	0.387	0.820	0.495	0.103	0.50	138	125	170	185	165	215	4.70	7.15
70	0.443	0.268	0.567	0.343	0.099	0.55	168	155	210	225	200	270	6.58	10.01
95	0.320	0.193	0.411	0.248	0.097	0.64	204	185	255	265	235	330	8.93	13.59
120	0.253	0.153	0.325	0.197	0.093	0.67	230	210	300	300	265	380	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.091	0.67	265	230	342	335	300	430	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.090	0.67	295	260	385	380	335	495	17.39	26.46
240	0.125	0.0754	0.162	0.0976	0.086	0.72	340	300	450	435	385	590	22.56	34.32
300	0.100	0.0601	0.130	0.0778	0.085	0.75	390	335	519	490	430	670	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.085	0.75	450	380	605	550	480	780	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.083	0.77	500	430	700	610	530	900	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.082	0.81	555	485	809	680	590	1020	59.22	90.09
800	0.0367	0.0221	0.0530	0.0319	0.081	0.88	625	530	935	740	630	1140	75.20	114.40
1000	0.0291	0.0176	0.0444	0.0268	0.081	0.88	690	570	1065	780	660	1250	94.00	143.00

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Table -19

TECHNICAL DETAIL FOR HAVELLS 1.1 KV TWO CORES, AL/COPPER COND., XLPE INSULATED, GALVANIZED STEEL WIRE/STRIP ARMoured CABLES

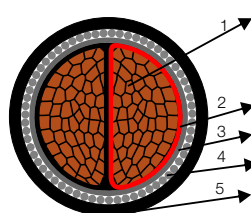
Cable Code : A2XFY/2xFY, A2XWY/ 2XWY

Ref. Spec. : IS :7098 PART -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of Strands in Conductor		Nominal Thickness of Insulation) (mm)	Minimum Thickness of inner Sh. (mm)	ARMOURING WITH FLAT STRIP (A2XFY/ 2XFY)					ARMOURING WITH ROUND WIRES (A2XWY/ 2XWY)				
					Nominal Thickness of armour (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)		Nominal Diameter of wire (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
	Al	Cu						With Al cond	With Cu Cond.				With Al cond	With Cu Cond.
								A2XFY	2XFY				A2XWY	2XWY
4	—	1/7	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	15	500	550
6	1	1/7	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	16	550	600
10	1	6	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	18	650	770
16	6	6	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.40	19	700	900
25	6	6	0.9	0.30	0.80	1.40	20	650	950	1.60	1.40	21	850	1150
35	6	6	0.9	0.30	0.80	1.40	21	750	1200	1.60	1.40	23	950	1400
50	6	6	1.0	0.30	0.80	1.40	23	900	1500	1.60	1.40	25	1100	1700
70	12	12	1.1	0.30	0.80	1.56	26	1100	1950	1.60	1.56	28	1400	2250
95	15	15	1.1	0.40	0.80	1.56	29	1350	2500	2.00	1.56	31	1850	3000
120	15	18	1.2	0.40	0.80	1.56	31	1600	3100	2.00	1.56	34	2150	3600
150	15	18	1.4	0.40	0.80	1.72	34	1900	3750	2.00	1.72	37	2450	4300
185	30	30	1.6	0.50	0.80	1.72	37	2250	4500	2.00	1.88	40	2900	5200
240	30	34	1.7	0.50	0.80	1.88	42	2800	5800	2.50	2.04	45	3850	6800
300	30	34	1.8	0.60	0.80	2.04	45	3300	7000	2.50	2.20	49	4450	8200
400	53	53	2.0	0.60	0.80	2.36	50	4100	9050	2.50	2.36	52	5350	10300
500	53	53	2.2	0.70	0.80	2.52	55	5000	11000	3.15	2.68	60	7100	13300
630	53	53	2.4	0.70	0.80	2.68	63	6100	14000	3.15	2.84	66	8500	16300

Cross- Sectional View



CONDUCTOR : Material - Aluminium /Copper

*Shape : ~AL . Cond :- 6 & 10SQMM -Solid circular, 16sqmm & above : Stranded compacted shaped

~Copper. Cond :- 4 & 6 sqmm -solid/ stranded non compacted circular, 10 sqmm : Stranded compacted circular, 16sqmm & above : Stranded compacted shaped

INSULATION : Crosslinked Polyethylene (XLPE) (Red & Black colour)

INNER SHEATH : PVC as per IS : 7098PT-1

ARMOURING : Single layer of galvanized steel round wires / flat strips

OUTER SHEATH : PVC TYPE ST-2 OF IS : 5831 '— OPTIONS : FR TYPE/ FRLS TYPE

COLOUR OF OUTER SHEATH : BLACK. OPTIONS : any other colour as per requirement.

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading &unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App.Reactance at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec. duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
													Al	Cu
4	---	4.61	---	5.90	0.098	0.11	34	28	30	44	37	39	0.376	0.572
6	4.61	3.08	5.90	3.94	0.090	0.13	43	37	40	55	47	50	0.564	0.858
10	3.08	1.83	3.94	2.34	0.084	0.16	57	48	53	74	61	67	0.940	1.430
16	1.91	1.15	2.44	1.47	0.080	0.18	78	61	70	94	78	85	1.50	2.29
25	1.20	0.727	1.54	0.931	0.080	0.20	95	80	99	120	100	125	2.35	3.58
35	0.868	0.524	1.11	0.671	0.080	0.23	116	94	117	145	120	155	3.29	5.01
50	0.641	0.387	0.820	0.495	0.078	0.24	140	110	140	170	145	190	4.70	7.15
70	0.443	0.268	0.567	0.343	0.077	0.26	170	140	176	210	175	235	6.58	10.1
95	0.320	0.193	0.411	0.248	0.074	0.29	200	165	221	250	210	290	8.93	13.59
120	0.253	0.153	0.325	0.197	0.072	0.29	225	185	258	285	240	330	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.072	0.29	255	210	294	315	270	375	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.072	0.29	285	235	339	355	300	435	17.39	26.46
240	0.125	0.0754	0.162	0.0976	0.072	0.31	325	270	402	410	350	510	22.56	34.32
300	0.100	0.0601	0.130	0.0778	0.071	0.33	370	305	461	460	390	590	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.070	0.33	435	350	542	520	440	670	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.070	0.34	481	405	624	580	480	750	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.069	0.36	537	470	723	680	575	875	59.22	90.09

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

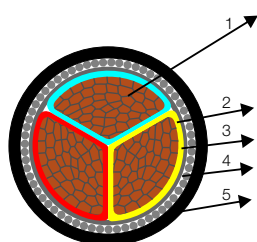
Cable Code : A2XFY/2XFY, A2XWY/2XWY

Ref. Spec. : IS :7098 PART -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of Strands in Conductor		Nominal Thickness of Insulation) (mm)	Minimum Thickness of inner Sh. (mm)	ARMOURING WITH FLAT STRIP (A2XFY/2XFY)					ARMOURING WITH ROUND WIRES (A2XWY/2XWY)				
					Nominal Thickness of armour strip (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)		Nominal Diameter of wire (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
	Al	Cu						With Al cond.	With Cu Cond.				With Al cond.	With Cu Cond.
								A2XFY	2XFY				A2XWY	2XWY
4	—	1/7	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	18	600	670
6	1	1/7	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	19	650	770
10	1	6	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	20	750	930
16	6	6	0.7	0.30	0.8	1.24	19	600	900	1.60	1.40	20	800	1100
25	6	6	0.9	0.30	0.8	1.40	21	800	1200	1.60	1.40	23	1000	1450
35	6	6	0.9	0.30	0.8	1.40	23	950	1500	1.60	1.40	25	1200	1850
50	6	6	1.0	0.30	0.8	1.40	26	1100	2000	1.60	1.56	29	1450	2300
70	12	12	1.1	0.40	0.8	1.56	29	1450	2700	2.00	1.56	32	2000	3300
95	15	15	1.1	0.40	0.8	1.56	32	1750	3500	2.00	1.56	35	2350	4100
120	15	18	1.2	0.40	0.8	1.56	35	2100	4200	2.00	1.72	39	2750	4900
150	15	18	1.4	0.50	0.8	1.72	42	2500	5200	2.00	1.88	43	3250	6000
185	30	30	1.6	0.50	0.8	1.88	44	3000	6300	2.50	2.04	48	4200	7500
240	30	34	1.7	0.60	0.8	2.04	49	3750	8200	2.50	2.20	53	5100	9500
300	30	34	1.8	0.60	0.8	2.20	54	4500	10000	2.50	2.36	58	6000	11300
400	53	53	2.0	0.70	0.8	2.52	60	5600	13000	3.15	2.68	65	7950	15200
500	53	53	2.2	0.70	0.8	2.68	66	6900	16000	3.15	2.84	72	9500	18500
630	53	53	2.4	0.70	0.8	2.84	74	8550	20000	4.00	3.00	81	12600	23700

Cross- Sectional View



CONDUCTOR : Material - Aluminium /Copper

*Shape : ~AL . Cond :- 6 & 10 SQMM -Solid circular, 16 sqmm & above : Stranded compacted shaped

~Copper. Cond :- 4 & 6 sqmm -solid/ stranded non compacted circular, 10 sqmm : Stranded compacted circular, 16 sqmm & above : Stranded compacted shaped

INSULATION : Crosslinked Polyethylene (XLPE) Red, Yellow, Blue)

INNER SHEATH : PVC as per IS :7098PT-1

ARMOURING : Single layer of Galvanized steel Round wires / Flat Strips

OUTER SHEATH : PVC TYPE ST-2 OF IS : 5831 '— OPTIONS : FR TYPE/ FRLS TYPE

COLOUR OF OUTER SHEATH : BLACK. OPTIONS : any other colour as per requirement.

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading & unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App.Reactance at 50HZ in ohms/km	App. Capecitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec. duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
													Al	Cu
4	---	4.61	---	5.90	0.098	0.11	34	28	30	44	37	39	0.376	0.572
6	4.61	3.08	5.90	3.94	0.090	0.13	43	37	40	55	47	50	0.564	0.858
10	3.08	1.83	3.94	2.34	0.084	0.16	57	48	53	74	61	67	0.940	1.430
16	1.91	1.15	2.44	1.47	0.080	0.18	78	61	70	94	78	85	1.50	2.29
25	1.20	0.727	1.54	0.931	0.080	0.20	95	80	99	120	100	125	2.35	3.58
35	0.868	0.524	1.11	0.671	0.080	0.23	116	94	117	145	120	155	3.29	5.01
50	0.641	0.387	0.820	0.495	0.078	0.24	140	110	140	170	145	190	4.70	7.15
70	0.443	0.268	0.567	0.343	0.077	0.26	170	140	176	210	175	235	6.58	10.01
95	0.320	0.193	0.411	0.248	0.074	0.29	200	165	221	250	210	290	8.93	13.59
120	0.253	0.153	0.325	0.197	0.072	0.29	225	185	258	285	240	330	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.072	0.29	255	210	294	315	270	375	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.072	0.29	285	235	339	355	300	435	17.39	26.46
240	0.125	0.0754	0.162	0.0976	0.072	0.31	325	270	402	410	350	510	22.56	34.32
300	0.100	0.0601	0.130	0.0778	0.071	0.33	370	305	460	460	390	590	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.070	0.33	435	350	542	520	440	670	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.070	0.34	481	405	624	580	480	750	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.069	0.36	537	470	723	680	575	875	59.22	90.09

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

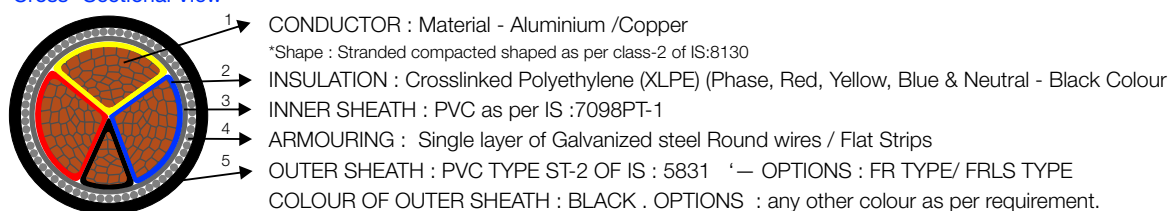
**TECHNICAL DETAIL FOR HAVELLS 1.1 KV THREE AND HALF CORES,
AL/CUCOPPER COND.,
XPLE INSULATED, GALVANIZED STEEL WIRE/STRIP ARMoured CABLES**

Cable Code : 3.5 Core - A2XFY / 2XFY, A2XWY / 2XWY

Ref. Spec. : IS :7098PART -1

Physical Parameters

SIZE Cross- -sectional area (sqmm)	Minimum No of Strands in Conductor		Nominal Thickness of Insulation) (mm)	Minimum Thickness of inner Sh. (mm)	ARMOURING WITH FLAT STRIP (A2XFY/ 2XFY)ARMOURING WITH ROUND WIRES (A2XWY/ 2XWY)					Nominal Diameter of wire (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
					Nominal Thickness of Armr. Strip (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)						
	With Al cond	With Cu Cond.						With Al cond	With Cu Cond.					
	A2XFY	2XFY			A2XWY	2XWY								
3X25+16	6/6	6/6	0.90/0.70	0.30	0.80	1.40	23	900	1400	1.60	1.40	25	1100	1700
3X35+16	6/6	6/6	0.90/0.70	0.30	0.80	1.40	25	1000	1800	1.60	1.40	27	1300	2000
3X50+25	6/6	6/6	1.00/0.90	0.30	0.80	1.40	28	1200	2300	1.60	1.56	30	1600	2700
3X70+35	12/6	12/6	1.10/0.90	0.40	0.80	1.56	32	1600	3200	2.00	1.56	35	2200	3700
3X95+50	15/6	15/6	1.10/1.00	0.40	0.80	1.56	35	2000	4100	2.00	1.56	38	2600	4600
3X120+70	15/12	18/12	1.20/1.10	0.40	0.80	1.72	39	2400	5100	2.00	1.72	42	3100	5700
3X150+70	15/12	18/12	1.40/1.10	0.50	0.80	1.72	43	2800	6000	2.00	1.88	46	3600	6800
3X185+95	30/15	30/15	1.60/1.10	0.50	0.80	1.88	47	3400	7400	2.50	2.04	51	4700	8700
3X240+120	30/15	34/18	1.70/1.20	0.60	0.80	2.04	53	4300	9500	2.50	2.20	56	5700	10500
3X300+150	30/15	34/18	1.80/1.40	0.60	0.80	2.20	57	5000	11500	2.50	2.36	60	6700	13000
3X400+185	53/30	53/30	2.00/1.60	0.70	0.80	2.52	66	6400	14500	3.15	2.68	71	9000	17000
3X500+240	53/30	53/34	2.20/1.70	0.70	0.80	2.68	74	7900	18000	3.15	2.84	79	11000	21500
3X630+300	53/30	53/34	2.40/1.80	0.70	0.80	3.00	82	9900	23000	4.00	3.00	88	14500	28000

Cross- Sectional View

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading &unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App..Reactance at 50HZ in ohms/km	App. Capecitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
													Al	Cu
3X25+16	1.20	0.727	1.54	0.931	0.080	0.20	95	80	99	120	100	125	2.35	3.58
3X35+16	0.868	0.524	1.11	0.671	0.080	0.23	116	94	117	145	120	155	3.29	5.01
3X50+25	0.641	0.387	0.820	0.495	0.078	0.24	140	110	140	170	145	190	4.70	7.15
3X70+35	0.443	0.268	0.567	0.343	0.077	0.26	170	140	176	210	175	235	6.58	10.01
3X95+50	0.320	0.193	0.411	0.248	0.074	0.29	200	165	221	250	210	290	8.93	13.59
3X120+70	0.253	0.153	0.325	0.197	0.072	0.29	225	185	258	285	240	330	11.28	17.16
3X150+70	0.206	0.1240	0.265	0.159	0.072	0.29	255	210	294	315	270	375	14.10	21.45
3X185+95	0.164	0.0991	0.211	0.127	0.072	0.29	285	235	339	355	300	435	17.39	26.46
3X240+120	0.125	0.0754	0.162	0.098	0.072	0.31	325	270	402	410	350	510	22.56	34.32
3X300+150	0.100	0.0601	0.130	0.078	0.071	0.33	370	305	461	460	390	590	28.20	42.90
3X400+185	0.0778	0.0470	0.1023	0.0618	0.070	0.33	435	350	542	520	440	670	37.60	57.20
3X500+240	0.0605	0.0366	0.0808	0.0489	0.070	0.34	481	405	624	580	480	750	47.00	71.50
3X630+300	0.0469	0.0283	0.0648	0.0391	0.069	0.36	537	470	723	680	575	875	59.22	90.09

Note : Normal current ratings are given in standard conditions (as given in page no -40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

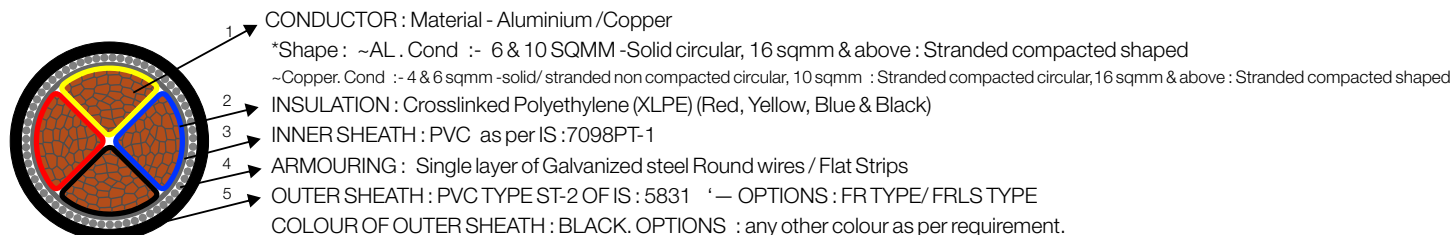
**TECHNICAL DETAIL FOR HAVELLS 1.1 KV FOUR CORES,
AL/COPPER COND.,
XLPE INSULATED, GALVANIZED STEEL WIRE/STRIP ARMoured CABLES**

Cable Code : A2XFY/2XFY, A2XWY/2XWY

Ref. Spec. : IS :7098 PART -1

Physical Parameters

SIZE Cross- sectional area (sqmm)	Minimum No of Strands in Conductor		Nominal Thickness of Insulation (mm)	Minimum Thickness of inner Sh. (mm)	ARMOURING WITH FLAT STRIP (A2XFY/2XFY)					ARMOURING WITH ROUND WIRES (A2XWY/2XWY)				
					Nominal Thickness of armour strip (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)		Nominal Diameter of wire (mm)	Minimum Thickness of outer sheath (mm)	Approx. Overall Diameter (mm)	Approx. Net Wt of cable (Kg/KM)	
	Al	Cu						With Al cond.	With Cu Cond.				With Al cond.	With Cu Cond.
								A2XFY	2XFY				A2XWY	2XWY
4	—	1/7	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	18	550	650
6	1	1/7	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.24	19	600	750
10	1	6	0.7	0.30	N/A	N/A	N/A	N/A	N/A	1.40	1.40	21	670	950
16	6	6	0.7	0.30	0.80	1.40	20	700	1100	1.60	1.40	22	925	1300
25	6	6	0.9	0.30	0.80	1.40	24	900	1500	1.60	1.40	26	1200	1770
35	6	6	0.9	0.30	0.80	1.40	27	1100	2000	1.60	1.40	28	1450	2200
50	6	6	1.0	0.30	0.80	1.56	30	1400	2500	1.60	1.56	32	1750	2850
70	12	12	1.1	0.40	0.80	1.56	34	1800	3400	2.00	1.56	37	2400	4000
95	15	15	1.1	0.40	0.80	1.56	37	2200	4400	2.00	1.72	40	2900	5150
120	15	18	1.2	0.50	0.80	1.72	41	2700	5600	2.00	1.88	44	3500	6300
150	15	18	1.4	0.50	0.80	1.88	46	3200	6800	2.50	2.04	49	4500	8000
185	30	30	1.6	0.50	0.80	2.04	51	3900	8300	2.50	2.20	54	5200	9700
240	30	34	1.7	0.60	0.80	2.20	57	4850	10500	2.50	2.36	65	6400	12000
300	30	34	1.8	0.70	0.80	2.36	63	5850	13000	3.15	2.52	68	8300	15400
400	53	53	2.0	0.70	0.80	2.68	71	7320	17000	3.15	2.84	76	10000	19500
500	53	53	2.2	0.70	0.80	2.84	79	9000	21000	4.00	3.00	86	13500	25000
630	53	53	2.4	0.70	0.80	3.00	88	11000	27000	4.00	3.00	94	16000	30500

Cross- Sectional View

~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading &unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		App.Reactance at 50HZ in ohms/km	App. Capacitance of cable in microF/KM	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec. duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air	Al	Cu
4	—	4.61	—	5.90	0.098	0.11	34	28	30	44	37	39	0.376	0.572
6	4.61	3.08	5.90	3.94	0.090	0.13	43	37	40	55	47	50	0.564	0.858
10	3.08	1.83	3.94	2.34	0.084	0.16	57	48	53	74	61	67	0.940	1.430
16	1.91	1.15	2.44	1.47	0.080	0.18	78	61	70	94	78	85	1.50	2.29
25	1.20	0.727	1.54	0.931	0.080	0.20	95	80	99	120	100	125	2.35	3.58
35	0.868	0.524	1.11	0.671	0.080	0.23	116	94	117	145	120	155	3.29	5.01
50	0.641	0.387	0.820	0.495	0.078	0.24	140	110	140	170	145	190	4.70	7.15
70	0.443	0.268	0.567	0.343	0.077	0.26	170	140	176	210	175	235	6.58	10.01
95	0.320	0.193	0.411	0.248	0.074	0.29	200	165	221	250	210	290	8.93	13.59
120	0.253	0.153	0.325	0.197	0.072	0.29	225	185	258	285	240	330	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.072	0.29	255	210	294	315	270	375	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.072	0.29	285	235	339	355	300	435	17.39	26.46
240	0.125	0.0754	0.162	0.0976	0.072	0.31	325	270	402	410	350	510	22.56	34.32
300	0.100	0.0601	0.130	0.0778	0.071	0.33	370	305	460	460	390	590	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.070	0.33	435	350	542	520	440	670	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.070	0.34	481	405	624	580	480	750	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.069	0.36	537	470	723	680	575	875	59.22	90.09

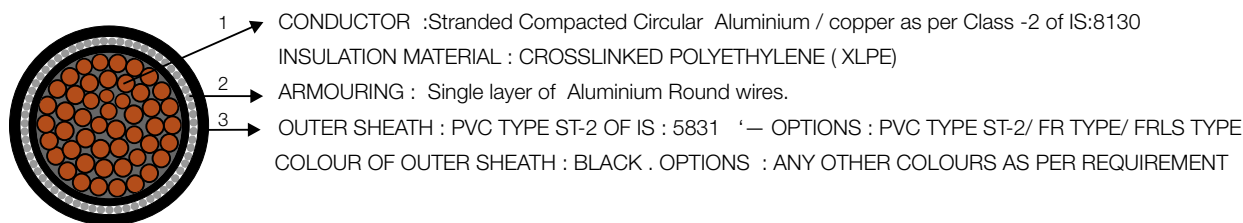
Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Cable Code : A2XWaY/2XWaY (3.3KV-EARTHED/UNEARTHED GRADE)

Ref. Spec. : IS :7098PART -2

Physical Parameters

SIZE cross- Sectional area(Sqmm)	Nominal Insulation thickness (mm)	Nominal Diameter of Armour Wire (mm)	Minimum Thickness of Outer Sheath (mm)	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
					With Al.	With Cu
					Cond.	Cond.
25	2.5	1.40	1.24	18	350	500
35	2.5	1.40	1.24	19	400	600
50	2.5	1.40	1.40	21	500	800
70	2.5	1.60	1.40	23	650	1100
95	2.5	1.60	1.40	25	750	1350
120	2.5	1.60	1.40	26	850	1600
150	2.5	1.60	1.40	28	950	1900
185	2.5	1.60	1.40	29	1100	2250
240	2.5	1.60	1.56	32	1350	2850
300	2.5	1.60	1.56	34	1550	3400
400	2.8	2.00	1.56	39	2000	4500
500	2.8	2.00	1.56	42	2400	5500
630	3.0	2.00	1.72	47	3000	6900
800	3.3	2.00	1.88	52	3650	8600
1000	3.5	2.50	2.04	56	4500	10700

Cross- Sectional View

~ Tabulated approx. net weights of cables are only for guidelines for transportation /loading/ unloading purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		Reactance of cable at 50HZ in ohms/km (Approx).	Capecitance of cable in microF/KM (Approx).	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
													Al	Cu
25	1.20	0.727	1.54	0.931	0.133	0.25	100	91	110	130	115	145	2.35	3.58
35	0.868	0.524	1.11	0.671	0.126	0.29	120	110	135	155	140	175	3.29	5.00
50	0.641	0.387	0.820	0.495	0.122	0.33	140	125	165	185	165	215	4.70	7.15
70	0.443	0.268	0.567	0.343	0.116	0.38	175	155	210	225	200	270	6.58	10.00
95	0.320	0.193	0.410	0.248	0.111	0.44	205	185	255	265	235	330	8.93	13.59
120	0.253	0.153	0.325	0.197	0.106	0.49	235	210	295	300	265	380	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.103	0.53	260	230	335	335	300	430	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.100	0.58	295	260	390	380	335	495	17.39	26.45
240	0.125	0.0754	0.162	0.098	0.097	0.67	340	300	460	435	385	590	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.095	0.73	385	335	530	490	430	670	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.093	0.84	440	380	620	550	480	780	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.091	0.86	495	430	730	610	530	900	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.090	0.88	560	485	840	680	590	1020	59.22	90.10
800	0.0367	0.0221	0.0530	0.0319	0.088	0.94	620	530	960	740	630	1140	75.20	114.40
1000	0.0291	0.0176	0.0444	0.0268	0.086	0.99	670	570	1070	780	660	1250	94.00	143.00

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

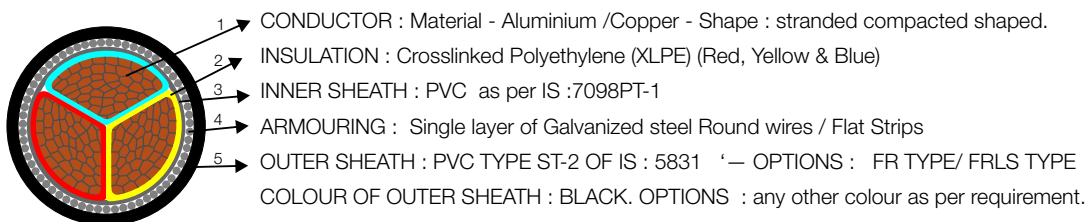
Cable Code : A2XFY/2XFY, A2XWY/2XWY (3.3KV UE/E)

Ref. Spec. : IS :7098PART -2

Physical Parameters

SIZE cross- sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	FLAT STRIP ARMURED					Nominal diameter of armour wire (mm)	ROUND WIRES ARMURED			
			Nominal	Minimum	Approx.	Approx.			Minimum	Approx.	Approx.	
			Armour strip thickness mm	outer Sheath thickness mm	Over all Diameter (mm)	cable wt (kg /km)			outer Sheath thickness mm	Over all Diameter (mm)	cable wt (kg /km)	
						With Al.	With Cu				With Al.	With Cu
						Cond.	Cond.				Cond.	Cond.
25	2.2	0.3	0.8	1.40	28	1100	1550	1.60	1.56	30	1450	1900
35	2.2	0.3	0.8	1.56	31	1300	1950	1.60	1.56	33	1600	2250
50	2.2	0.4	0.8	1.56	33	1500	2450	2.00	1.56	35	2100	3050
70	2.2	0.4	0.8	1.56	36	1800	3100	2.00	1.56	38	2400	3700
95	2.2	0.4	0.8	1.72	39	2150	3900	2.00	1.72	42	2850	4600
120	2.2	0.5	0.8	1.72	42	2500	4750	2.00	1.88	45	3300	5550
150	2.2	0.5	0.8	1.88	44	2850	5650	2.50	2.04	48	4100	6900
185	2.2	0.5	0.8	2.04	48	3350	6800	2.50	2.04	51	4650	8100
240	2.2	0.6	0.8	2.20	52	4100	8550	2.50	2.20	56	5450	9900
300	2.2	0.6	0.8	2.20	56	4750	10350	2.50	2.36	60	6300	11900
400	2.2	0.7	0.8	2.36	62	5750	13200	3.15	2.68	67	8350	15800

Cross- Sectional View



~ Tabulated approx. net wt. of cables are only guidelines for transportation, loading &unloading purpose.

~ Please ref page no 43 for normal delivery lengths & packing details.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at		Approx. Cond. A.C. Resistance at		pp.. Reactance at 50HZ in ohms/km (APPROX.)	App. Capacitance of cable in microF/KM (APPROX.)	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
	20°C in		90°C in				With Aluminium cond.			With Copper cond.				
	Al	Ohm/km Cu	Al	Ohm/km Cu			Ground	Duct	Air	Ground	Duct	Air		
	Al													
25	1.20	0.727	1.54	0.931	0.098	0.25	94	80	99	120	100	125	2.35	3.58
35	0.868	0.524	1.11	0.671	0.094	0.29	115	95	120	145	120	155	3.29	5.00
50	0.641	0.387	0.820	0.495	0.086	0.33	135	110	145	170	145	190	4.70	7.15
70	0.443	0.268	0.567	0.343	0.084	0.38	165	140	185	210	175	235	6.58	10.01
95	0.320	0.193	0.410	0.248	0.081	0.44	195	165	225	250	210	290	8.93	13.59
120	0.253	0.153	0.325	0.197	0.078	0.49	220	185	255	285	240	330	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.076	0.53	245	210	295	315	270	375	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.075	0.58	280	235	340	355	300	435	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.073	0.67	320	270	400	410	350	510	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.072	0.73	360	305	460	460	390	590	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.071	0.84	410	350	535	520	440	670	37.60	57.20

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Table -25 TECHNICAL DETAIL FOR HAVELLS 3.8/6.6 KV SINGLE CORE, AL/COPPER COND., XLPE INSULATED, ARMoured CABLES

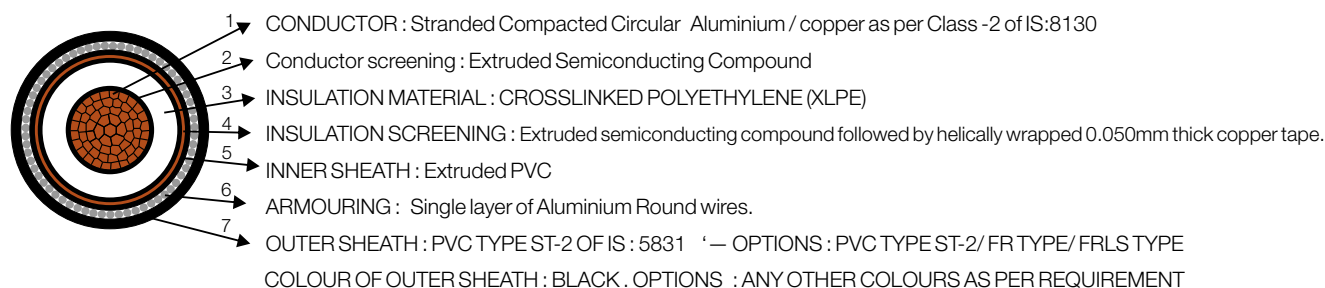
Cable Code : A2XWwY/2XWwY (6.6KV-EARTHED GRADE)

Ref. Spec. : IS :7098PART -2

Physical Parameters

SIZE cross-Sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	Nominal Diameter of Armour Wire (mm)	Minimum Thickness of Outer Sheath (mm)	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al.	With Cu
						Cond.	Cond.
25	2.8	0.3	1.60	1.40	23	600	750
35	2.8	0.3	1.60	1.40	24	650	850
50	2.8	0.3	1.60	1.40	25	700	1000
70	2.8	0.3	1.60	1.40	27	800	1250
95	2.8	0.3	1.60	1.40	28	950	1550
120	2.8	0.3	1.60	1.40	30	1050	1800
150	2.8	0.3	1.60	1.56	32	1200	2100
185	2.8	0.3	1.60	1.56	34	1400	2550
240	2.8	0.4	2.00	1.56	37	1700	3200
300	3.0	0.4	2.00	1.56	39	2000	3850
400	3.3	0.4	2.00	1.72	44	2450	4900
500	3.5	0.5	2.00	1.72	47	2800	5900
630	3.5	0.5	2.00	1.88	51	3400	7300
800	3.5	0.5	2.50	2.04	57	4300	9200
1000	3.6	0.5	2.50	2.20	61	5100	11300

Cross- Sectional View



~ Tabulated approx. net weights of cables are only for guidelines for transportation / Loading/ Unloading Purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		Reactance of cable at 50HZ in ohms/km (Approx).	App. Capacitance of cable in microF/KM (Approx).	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air						
									Al	Cu	Al	Cu		
25	1.20	0.727	1.54	0.931	0.149	0.21	100	90	120	130	115	155	2.35	3.58
35	0.868	0.524	1.11	0.671	0.142	0.24	120	105	145	155	140	185	3.29	5.00
50	0.641	0.387	0.820	0.495	0.133	0.27	140	125	170	185	160	220	4.70	7.15
70	0.443	0.268	0.567	0.343	0.127	0.31	175	155	215	225	195	275	6.58	10.01
95	0.320	0.193	0.410	0.248	0.121	0.36	205	180	260	265	235	340	8.93	13.59
120	0.253	0.153	0.325	0.197	0.116	0.39	235	205	305	300	265	390	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.113	0.43	260	230	345	335	295	440	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.109	0.47	295	260	395	380	330	510	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.105	0.53	340	300	470	435	380	600	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.104	0.54	385	335	540	490	425	680	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.102	0.57	440	380	630	550	480	790	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.100	0.60	495	430	730	610	530	910	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.096	0.67	560	480	840	680	580	1030	59.22	90.10
800	0.0367	0.0221	0.0530	0.0319	0.094	0.76	620	530	960	740	630	1140	75.20	114.40
1000	0.0291	0.0176	0.0444	0.0268	0.092	0.82	680	580	1070	790	670	1250	94.00	143.00

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no.. 42

Table -26 TECHNICAL DETAIL FOR HAVELLS 3.8/6.6 KV THREE CORES, AL/COPPER COND., XLPE INSULATED, ARMOURED CABLES

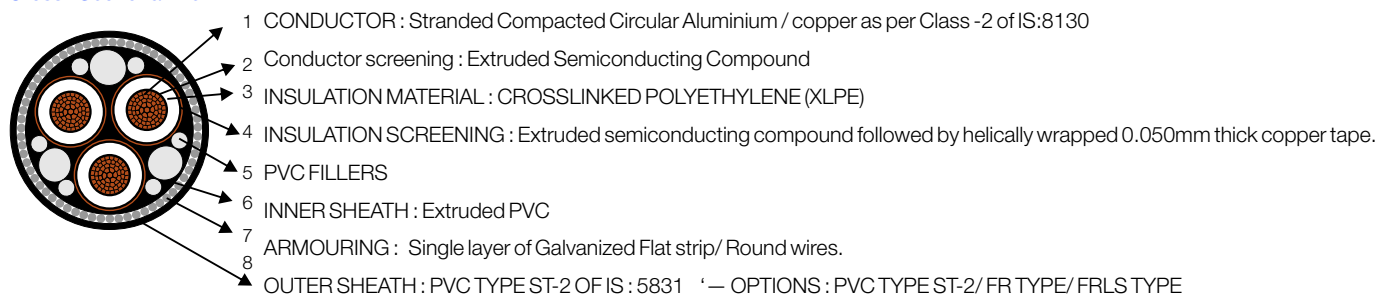
Cable Code : A2XFY/2XFY, A2XWY/2XWY (6.6KVE)

Ref. Spec. : IS :7098PART -2

Physical Parameters

SIZE cross- sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	FLAT STRIP ARMOURED					Nominal diameter of armour wire (mm)	ROUND WIRES ARMOURED			
			Nominal Armour strip thickness mm	Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)			Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al.	With Cu				With Al.	With Cu
25	2.8	0.4	0.8	1.56	37	1800	2250	2.00	1.72	40	2500	2950
35	2.8	0.4	0.8	1.72	39	2000	2650	2.00	1.72	42	2800	3450
50	2.8	0.5	0.8	1.72	42	2300	3250	2.00	1.88	45	3200	4150
70	2.8	0.5	0.8	1.88	46	2800	4100	2.00	1.88	49	3700	5000
95	2.8	0.5	0.8	1.88	50	3300	5050	2.50	2.04	54	4700	6450
120	2.8	0.6	0.8	2.04	54	3800	6050	2.50	2.20	58	5400	7650
150	2.8	0.6	0.8	2.20	58	4300	7100	2.50	2.20	61	5900	8700
185	2.8	0.6	0.8	2.20	61	4800	8250	2.50	2.36	65	6600	10050
240	2.8	0.7	0.8	2.36	67	5900	10350	3.15	2.52	72	8400	12850
300	3.0	0.7	0.8	2.52	72	6800	12400	3.15	2.68	77	9700	15300
400	3.3	0.7	0.8	2.84	82	8500	15950	4.00	3.00	88	13000	20450

Cross- Sectional View



COLOUR OF OUTER SHEATH : BLACK . OPTIONS : ANY OTHER COLOURS AS PER REQUIREMENT

~ Tabulated approx. net weights of cables are only for guidelines for transportation / Loading/ Unloading Purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at		Approx. Cond. A.C. Resistance at		Reactance of cable at 50HZ in ohms/km (APPROX.)	Capcitanace of cable in microF/KM (APPROX.)	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
	20°C in Ohm/km		90°C in Ohm/km				With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
													Al	Cu
25	1.20	0.727	1.54	0.931	0.126	0.21	95	82	105	120	105	135	2.35	3.58
35	0.868	0.524	1.11	0.671	0.120	0.24	115	97	125	145	125	165	3.29	5.01
50	0.641	0.387	0.820	0.495	0.114	0.27	130	115	150	170	150	195	4.70	7.15
70	0.443	0.268	0.567	0.343	0.107	0.31	160	140	190	210	180	240	6.58	10.01
95	0.320	0.193	0.410	0.248	0.102	0.36	190	165	230	250	215	295	8.93	13.59
120	0.253	0.153	0.325	0.197	0.098	0.39	220	190	260	280	240	335	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.095	0.43	245	210	295	310	270	380	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.093	0.47	275	240	335	350	305	430	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.090	0.53	315	275	395	400	350	500	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.090	0.54	355	310	450	445	390	570	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.087	0.57	400	350	520	500	440	650	37.60	57.20

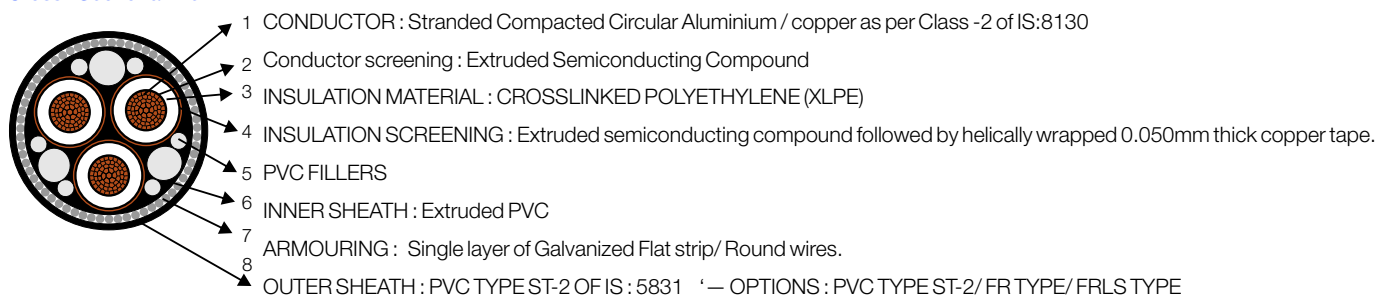
Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Cable Code : A2XWaY/2XWaY (6.6KV -UNEARTHED OR 11KV EARTHED GRADE)

Ref. Spec. : IS :7098PART -2

Physical Parameters

SIZE cross-Sectional area (Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	Nominal Diameter of Armour Wire (mm)	Minimum Thickness of Outer Sheath (mm)	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al.	With Cu
						Cond.	Cond.
25	3.6	0.3	1.60	1.40	24	650	800
35	3.6	0.3	1.60	1.40	25	700	900
50	3.6	0.3	1.60	1.40	26	800	1100
70	3.6	0.3	1.60	1.40	28	900	1300
95	3.6	0.3	1.60	1.40	30	1050	1650
120	3.6	0.3	1.60	1.56	32	1200	1950
150	3.6	0.3	1.60	1.56	33	1300	2200
185	3.6	0.4	2.00	1.56	36	1600	2750
240	3.6	0.4	2.00	1.56	39	1850	3350
300	3.6	0.4	2.00	1.56	41	2050	3900
400	3.6	0.5	2.00	1.72	44	2500	5000
500	3.6	0.5	2.00	1.72	47	2900	6000
630	3.6	0.5	2.00	1.88	51	3450	7350
800	3.6	0.5	2.50	2.04	57	4300	9250
1000	3.6	0.5	2.50	2.20	61	5100	11300

Cross- Sectional View

COLOUR OF OUTER SHEATH : BLACK . OPTIONS : ANY OTHER COLOURS AS PER REQUIREMENT

~ Tabulated approx. net weights of cables are only for guidelines for transportation / Loading/ Unloading Purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		Reactance of cable at 50HZ in ohms/km (Approx)	Capacitance of cable in microF/KM (Approx)	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air	Al	Cu				
25	1.20	0.727	1.54	0.931	0.164	0.18	100	90	120	130	115	155	2.35	3.58
35	0.868	0.524	1.11	0.671	0.156	0.20	120	105	145	155	140	185	3.29	5.00
50	0.641	0.387	0.820	0.495	0.147	0.22	140	125	170	185	160	220	4.70	7.15
70	0.443	0.268	0.567	0.343	0.139	0.26	175	155	215	225	195	275	6.58	10.01
95	0.320	0.193	0.410	0.248	0.133	0.29	205	180	260	265	235	340	8.93	13.59
120	0.253	0.153	0.325	0.197	0.127	0.32	235	205	305	300	265	390	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.124	0.35	260	230	345	335	295	440	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.120	0.38	295	260	395	380	330	510	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.117	0.43	340	300	470	435	380	600	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.113	0.46	385	335	540	490	425	680	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.110	0.53	440	380	630	550	480	790	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.107	0.59	495	430	730	610	530	910	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.104	0.66	560	480	840	680	580	1030	59.22	90.10
800	0.0367	0.0221	0.0530	0.0319	0.100	0.74	620	530	960	740	630	1140	75.20	114.40
1000	0.0291	0.0176	0.0444	0.0268	0.098	0.82	680	580	1070	790	670	1250	94.00	143.00

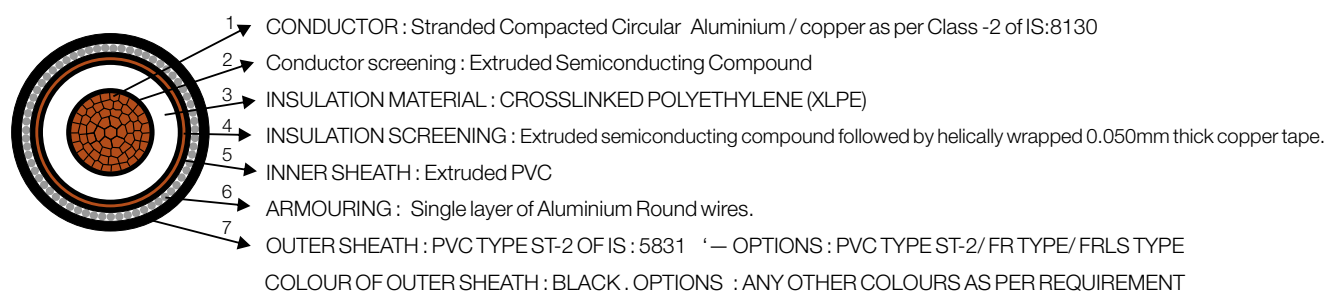
Note : Normal current ratings are given in standard conditions (as given in page no -40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Cable Code : A2XFY/2XFY, A2XWY/2XWY (6.6KV UE / 11KV E)

Ref. Spec. : IS :7098PART-2

Physical Parameters

SIZE cross- sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	FLAT STRIP ARMoured				ROUND WIRES ARMoured					
			Nominal Armour strip thickness mm	Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)		Nominal diameter of armour wire (mm)	Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al. Cond.	With Cu Cond.				With Al. Cond.	With Cu Cond.
25	3.6	0.4	0.8	1.72	41	2100	2550	2.00	1.72	43	2800	3250
35	3.6	0.5	0.8	1.72	43	2350	2950	2.00	1.88	46	3200	3850
50	3.6	0.5	0.8	1.88	46	2700	3650	2.50	2.04	50	4000	4950
70	3.6	0.5	0.8	1.88	50	3100	4400	2.50	2.04	54	4500	5800
95	3.6	0.6	0.8	2.04	54	3700	5450	2.50	2.20	58	5200	6950
120	3.6	0.6	0.8	2.20	58	4200	6450	2.50	2.20	62	5800	8050
150	3.6	0.6	0.8	2.20	61	4700	7500	2.50	2.36	65	6400	9200
185	3.6	0.7	0.8	2.36	65	5300	8750	3.15	2.52	70	7900	11350
240	3.6	0.7	0.8	2.52	71	6300	10750	3.15	2.68	76	9000	13500
300	3.6	0.7	0.8	2.68	75	7200	12800	3.15	2.84	80	10000	15600
400	3.6	0.7	0.8	2.84	83	8700	16150	4.00	3.00	90	13500	20500

Cross- Sectional View

~ Tabulated approx. net weights of cables are only for guidelines for transportation / Loading/ Unloading Purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		Reactance at 50HZ in ohms/km (APPROX.)	App. Capacitance of cable in microF/KM (APPROX.)	Normal* Current Rating in Amps						Short Circuit Current	
							With Aluminium cond.			With Copper cond.			Rating for 1Sec.duration	
	Ground	Duct	Air	Ground			Duct	Air	in K. Amps					
									Al	Cu				
25	1.20	0.727	1.54	0.931	0.133	0.18	95	82	105	120	105	135	2.35	3.58
35	0.868	0.524	1.11	0.671	0.126	0.20	115	97	125	145	125	165	3.29	5.01
50	0.641	0.387	0.820	0.495	0.118	0.22	130	115	150	170	150	195	4.70	7.15
70	0.443	0.268	0.567	0.343	0.116	0.26	160	140	190	210	180	240	6.58	10.01
95	0.320	0.193	0.410	0.248	0.107	0.29	190	165	230	250	215	295	8.93	13.59
120	0.253	0.153	0.325	0.197	0.102	0.32	220	190	260	280	240	335	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.099	0.35	245	210	295	310	270	380	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.097	0.38	275	240	335	350	305	430	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.084	0.43	315	275	395	400	350	500	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.093	0.46	355	310	450	445	390	570	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.089	0.53	400	350	520	500	440	650	37.60	57.20

Note : Normal current ratings are given in standard conditions (as given in page no -40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Table -29 TECHNICAL DETAIL FOR HAVELLS 11/11 KV SINGLE CORE, AL/COPPER COND., XLPE INSULATED, ARMoured CABLES

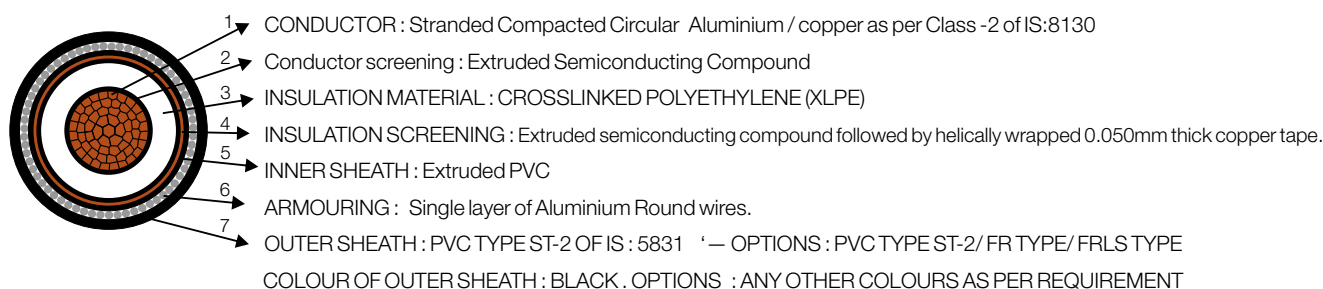
Cable Code : A2XWaY/2XWaY (11KV - UN-EARTHED GRADE)

Ref. Spec. : IS :7098PART-2

Physical Parameters

SIZE cross- Sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	Nominal Diameter of Armour Wire (mm)	Minimum Thickness of Outer Sheath (mm)	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al. Cond.	With Cu Cond.
25	5.5	0.3	1.60	1.40	28	900	1050
35	5.5	0.3	1.60	1.40	29	950	1150
50	5.5	0.3	1.60	1.56	31	1100	1400
70	5.5	0.3	1.60	1.56	33	1200	1650
95	5.5	0.3	1.60	1.56	34	1400	2000
120	5.5	0.4	2.00	1.56	37	1600	2350
150	5.5	0.4	2.00	1.56	38	1700	2600
185	5.5	0.4	2.00	1.56	40	1900	3050
240	5.5	0.4	2.00	1.72	43	2200	3700
300	5.5	0.4	2.00	1.72	44	2500	4350
400	5.5	0.5	2.00	1.88	48	2900	5400
500	5.5	0.5	2.50	1.88	53	3500	6600
630	5.5	0.5	2.50	2.04	56	4100	8000
800	5.5	0.6	2.50	2.20	61	4900	9900
1000	5.5	0.6	2.50	2.20	65	5700	11900

Cross- Sectional View



~ Tabulated approx. net weights of cables are only for guidelines for transportation / Loading/ Unloading Purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		Reactance of cable at 50HZ in ohms/km (Approx).	Capecitance of cable in microF/KM (Approx).	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu		Ground	Duct	Air	Ground	Duct	Air			
												Al	Cu	
25	1.20	0.727	1.54	0.931	0.164	0.14	100	90	120	130	115	155	2.35	3.58
35	0.868	0.524	1.11	0.671	0.156	0.16	120	105	145	155	140	185	3.29	5.00
50	0.641	0.387	0.820	0.495	0.147	0.17	140	125	170	185	160	220	4.70	7.15
70	0.443	0.268	0.567	0.343	0.139	0.20	175	155	215	225	195	275	6.58	10.01
95	0.320	0.193	0.410	0.248	0.132	0.21	205	180	260	265	235	340	8.93	13.59
120	0.253	0.153	0.325	0.197	0.126	0.23	235	205	305	300	265	390	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.124	0.25	260	230	345	335	295	440	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.120	0.26	295	260	395	380	330	510	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.116	0.29	340	300	470	435	380	600	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.112	0.32	385	335	540	490	425	680	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.109	0.35	440	380	630	550	480	790	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.105	0.39	495	430	730	610	530	910	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.102	0.43	560	480	840	680	580	1030	59.22	90.10
800	0.0367	0.0221	0.0530	0.0319	0.097	0.50	620	530	960	740	630	1140	75.20	114.40
1000	0.0291	0.0176	0.0444	0.0268	0.096	0.56	680	580	1070	790	670	1250	94.00	143.00

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Table -30 TECHNICAL DETAIL FOR HAVELLS 11/11KV THREE CORES, AL/COPPER COND., XLPE INSULATED, ARMoured CABLES

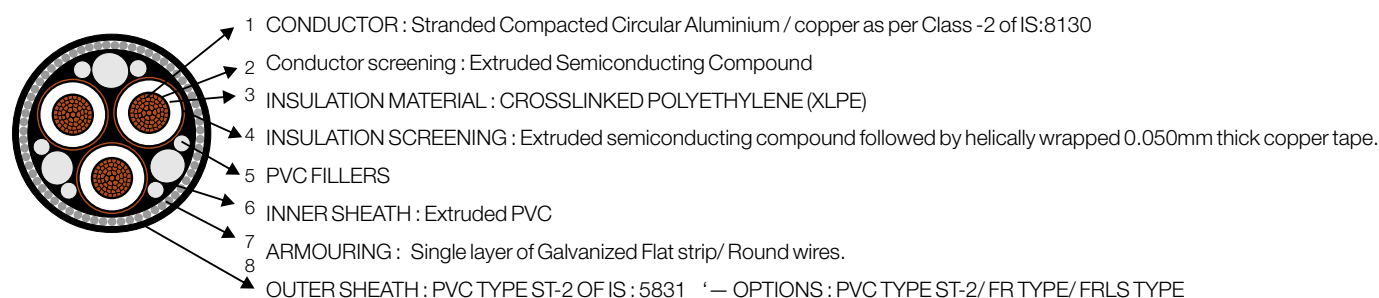
Cable Code : A2XFY/2XFY, A2XWY/2XWY (11KVUE)

Ref. Spec. : IS :7098PART -2

Physical Parameters

SIZE cross- sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	FLAT STRIP ARMoured					Nominal diameter of armour wire (mm)	ROUND WIRES ARMoured			
			Nominal Armour strip thickness mm	Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)			Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al.	With Cu				With Al.	With Cu
25	5.5	0.5	0.8	1.88	50	3000	3500	2.50	2.04	54	4300	4750
35	5.5	0.5	0.8	2.04	53	3200	3850	2.50	2.20	57	4700	5350
50	5.5	0.6	0.8	2.20	56	3700	4600	2.50	2.20	60	5100	6050
70	5.5	0.6	0.8	2.20	60	4100	5400	2.50	2.36	64	5800	7100
95	5.5	0.6	0.8	2.36	64	4800	6567	3.15	2.52	69	7300	9100
120	5.5	0.7	0.8	2.52	68	5400	7632	3.15	2.52	73	8000	10250
150	5.5	0.7	0.8	2.52	71	5900	8690	3.15	2.68	76	8600	11400
185	5.5	0.7	0.8	2.68	75	6500	9950	3.15	2.84	80	9400	12850
240	5.5	0.7	0.8	2.84	81	7600	12050	3.15	3.00	85	11000	15500
300	5.5	0.7	0.8	3.00	85	8600	14200	4.00	3.00	91	13000	18600
400	5.5	0.7	0.8	3.00	93	10000	17500	4.00	3.00	98	15000	22450

Cross- Sectional View



Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at		Approx. Cond. A.C. Resistance at		Reactance of cabe at 50HZ in ohms/km (APPROX.)	App. Capacitance of cable in microF/KM (APPROX.)	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration	
	20°C in Ohm/km		90°C in Ohm/km				With Aluminium cond.			With Copper cond.				
	Al	Cu	Al	Cu			Ground	Duct	Air	Ground	Duct	Air		
													Al	Cu
25	1.20	0.727	1.54	0.931	0.145	0.14	95	82	105	120	105	135	2.35	3.58
35	0.868	0.524	1.11	0.671	0.138	0.16	115	97	125	145	125	165	3.29	5.01
50	0.641	0.387	0.820	0.495	0.129	0.17	130	115	150	170	150	195	4.70	7.15
70	0.443	0.268	0.567	0.343	0.124	0.20	160	140	190	210	180	240	6.58	10.01
95	0.320	0.193	0.410	0.248	0.116	0.21	190	165	230	250	215	295	8.93	13.59
120	0.253	0.153	0.325	0.197	0.112	0.23	220	190	260	280	240	335	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.108	0.25	245	210	295	310	270	380	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.105	0.26	275	240	335	350	305	430	17.39	26.46
240	0.125	0.0754	0.162	0.0976	0.102	0.29	315	275	395	400	350	500	22.56	34.32
300	0.100	0.0601	0.130	0.0778	0.0999	0.32	355	310	450	445	390	570	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.0954	0.35	400	350	520	500	440	650	37.60	57.20

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

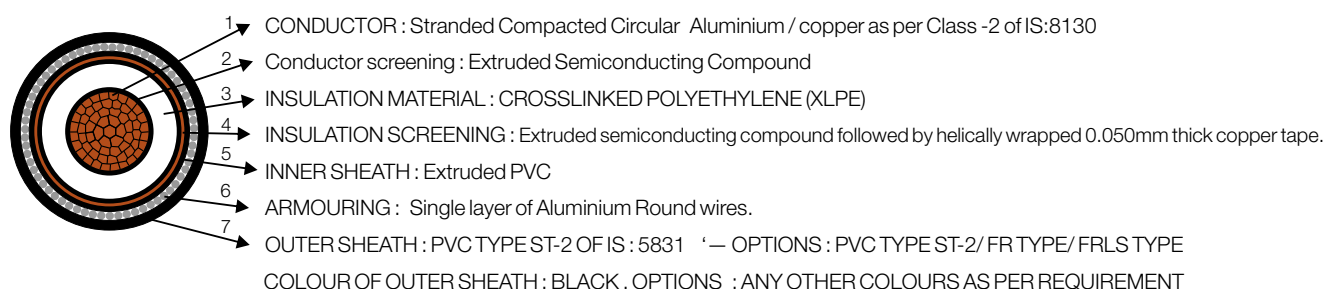
Cable Code : A2XWwY/2XWwY (22KV - EARTHED GRADE)

Ref. Spec. : IS :7098PART-2

Physical Parameters

SIZE cross- Sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	Nominal Diameter of Armour Wire (mm)	Minimum Thickness of Outer Sheath (mm)	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al.	With Cu
						Cond.	Cond.
25	6.0	0.3	1.60	1.40	29	950	1100
35	6.0	0.3	1.60	1.40	31	1050	1250
50	6.0	0.3	1.60	1.56	32	1150	1500
70	6.0	0.3	1.60	1.56	34	1300	1750
95	6.0	0.4	2.00	1.56	36	1600	2200
120	6.0	0.4	2.00	1.56	38	1700	2450
150	6.0	0.4	2.00	1.56	39	1800	2750
185	6.0	0.4	2.00	1.56	41	2000	3150
240	6.0	0.4	2.00	1.72	44	2300	3800
300	6.0	0.4	2.00	1.72	46	2600	4500
400	6.0	0.5	2.00	1.88	50	3000	5500
500	6.0	0.5	2.50	1.88	53	3600	6700
630	6.0	0.5	2.50	2.04	57	4300	8200
800	6.0	0.6	2.50	2.20	62	5000	9950
1000	6.0	0.6	2.50	2.36	66	5800	12000

Cross- Sectional View



~ Tabulated approx. net weights of cables are only for guidelines for transportation / Loading/ Unloading Purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		Reactance of cable at 50HZ in ohms/km (APPROX.)	App. Capecitance of cable in microF/KM (APPROX.)	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air						
									Al	Cu	Al	Cu		
25	1.20	0.727	1.54	0.931	0.166	0.13	100	90	120	130	115	155	2.35	3.58
35	0.868	0.524	1.11	0.671	0.158	0.15	120	105	145	155	135	185	3.29	5.00
50	0.641	0.387	0.820	0.495	0.149	0.16	140	120	175	180	155	225	4.70	7.15
70	0.443	0.268	0.567	0.343	0.140	0.18	170	150	220	215	190	280	6.58	10.01
95	0.320	0.193	0.410	0.248	0.134	0.20	200	175	265	255	220	335	8.93	13.59
120	0.253	0.153	0.325	0.197	0.130	0.22	225	195	300	285	245	380	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.126	0.23	250	215	340	310	270	430	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.122	0.25	280	240	385	345	300	485	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.118	0.27	315	275	450	390	335	560	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.113	0.30	345	300	500	420	360	620	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.110	0.32	385	330	570	455	395	690	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.107	0.36	415	360	640	480	415	750	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.103	0.40	450	385	720	510	440	820	59.22	90.10
800	0.0367	0.0221	0.0530	0.0319	0.0997	0.46	485	415	790	540	460	840	75.20	114.40
1000	0.0291	0.0176	0.0444	0.0268	0.097	0.52	510	435	850	550	475	940	94.00	143.00

Note : Normal current ratings are given in standard conditions (as given in page no- 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Table -32 TECHNICAL DETAIL FOR HAVELLS 12.7/22 KV THREE CORES, AL/COPPER COND., XLPE INSULATED, ARMoured CABLES

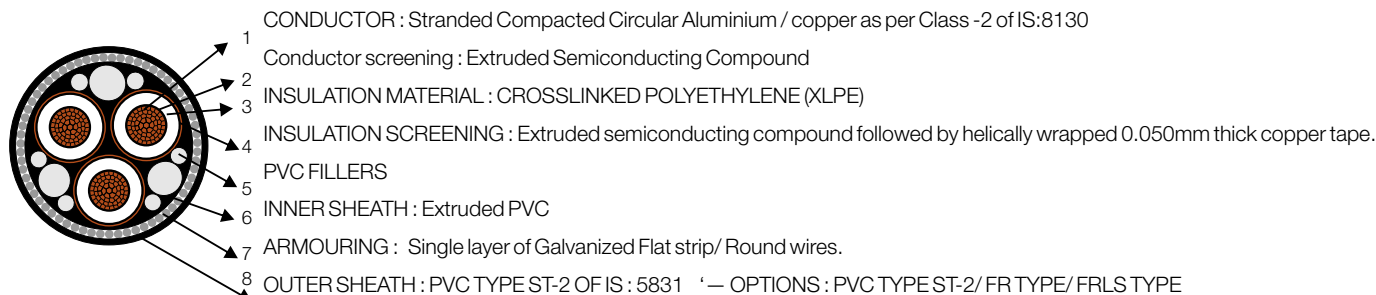
Cable Code : A2XFY/2XFY, A2XWY/2XWY (22KV- E)

Ref. Spec. : IS :7098PART -2

Physical Parameters

SIZE cross- sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	FLAT STRIP ARMoured					Nominal diameter of armour wire (mm)	ROUND WIRES ARMoured			
			Nominal Armour strip thickness mm	Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt kg /km)			Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al. Cond.	With Cu Cond.				With Al. Cond.	With Cu Cond.
25	6.0	0.5	0.8	2.04	53	3200	3650	2.50	2.20	56	4600	5050
35	6.0	0.6	0.8	2.04	56	3500	4150	2.50	2.20	59	5000	5650
50	6.0	0.6	0.8	2.20	59	3900	4850	2.50	2.36	61	5400	6350
70	6.0	0.6	0.8	2.36	63	4400	5700	2.50	2.36	65	6100	7400
95	6.0	0.7	0.8	2.36	67	5000	6800	3.15	2.52	72	7600	9350
120	6.0	0.7	0.8	2.52	70	5700	7950	3.15	2.68	75	8300	10550
150	6.0	0.7	0.8	2.68	74	6200	9000	3.15	2.68	78	9000	11800
185	6.0	0.7	0.8	2.68	77	6800	10250	3.15	2.84	83	9800	13250
240	6.0	0.7	0.8	2.84	83	7900	12350	4.00	3.00	90	12500	16950
300	6.0	0.7	0.8	3.00	88	8900	14500	4.00	3.00	93	13500	19100
400	6.0	0.7	0.8	3.00	95	10500	17950	4.00	3.00	102	15500	22950

Cross- Sectional View



COLOUR OF OUTER SHEATH : BLACK . OPTIONS : ANY OTHER COLOURS AS PER REQUIREMENT

~ Tabulated approx. net weights of cables are only for guidelines for transportation / Loading/ Unloading Purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		Reactance of cable at 50HZ in ohms/km (APPROX.)	Capecitance of cable in microF/KM (APPROX.)	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air						
									Al	Cu	Al	Cu		
25	1.20	0.727	1.54	0.931	0.148	0.13	90	85	110	120	100	135	2.35	3.58
35	0.868	0.524	1.11	0.671	0.141	0.15	110	100	130	145	120	165	3.29	5.01
50	0.641	0.387	0.820	0.495	0.132	0.16	130	115	155	170	150	200	4.70	7.15
70	0.443	0.268	0.567	0.343	0.125	0.18	160	140	190	205	180	245	6.58	10.01
95	0.320	0.193	0.410	0.248	0.119	0.20	190	170	230	245	215	300	8.93	13.59
120	0.253	0.153	0.325	0.197	0.114	0.22	215	190	265	275	245	340	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.111	0.23	240	215	300	305	275	385	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.107	0.25	270	240	340	345	305	435	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.104	0.27	310	275	400	395	350	510	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.102	0.30	350	310	455	440	390	580	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.097	0.32	395	355	530	495	440	660	37.60	57.20

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Table -33 TECHNICAL DETAIL FOR HAVELLS 19/33 KV SINGLE CORE, AL/COPPER COND., XLPE INSULATED, ARMoured CABLES

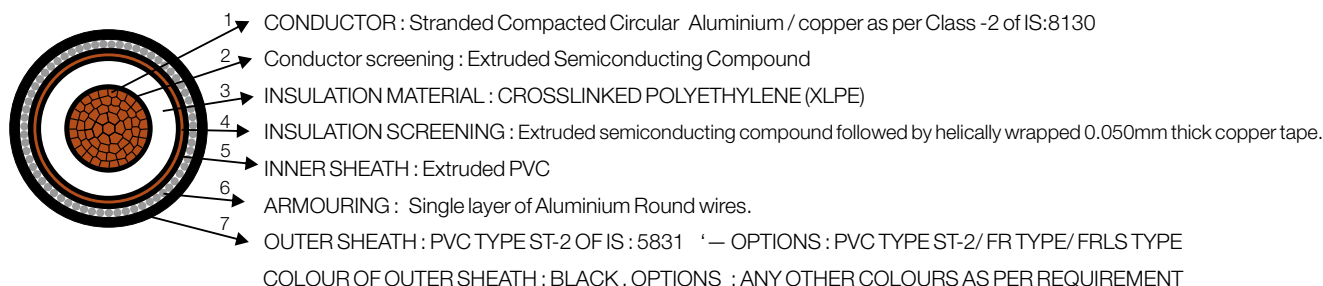
Cable Code : A2XWaY/2XWaY (33KV - EARTHED GRADE)

Ref. Spec. : IS :7098PART -2

Physical Parameters

SIZE cross- Sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	Nominal Diameter of Armour Wire (mm)	Minimum Thickness of Outer Sheath (mm)	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al.	With Cu
						Cond.	Cond.
25	8.80	0.40	2.00	1.56	36	1400	1450
35	8.80	0.40	2.00	1.56	38	1500	1600
50	8.80	0.40	2.00	1.56	39	1600	1800
70	8.80	0.40	2.00	1.56	40	1800	2100
95	8.80	0.40	2.00	1.72	43	2000	2500
120	8.80	0.40	2.00	1.72	44	2100	2700
150	8.80	0.40	2.00	1.72	46	2300	3130
185	8.80	0.50	2.00	1.72	47	2500	3550
240	8.80	0.50	2.00	1.88	50	2800	4200
300	8.80	0.50	2.50	2.04	53	3300	5050
400	8.80	0.50	2.50	2.04	57	3800	6200
500	8.80	0.60	2.50	2.20	60	4300	7300
630	8.80	0.60	2.50	2.20	64	4900	8800
800	8.80	0.60	3.15	2.36	70	6000	10500
1000	8.80	0.70	3.15	2.52	74	6900	13000

Cross- Sectional View



~ Tabulated approx. net weights of cables are only for guidelines for transportation / Loading/ Unloading Purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Condt. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		Reactance of cable at 50HZ in ohms/km (Approx).	Capecitance of cable in microF/KM (Approx).	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air						
									Al	Cu	Al	Cu		
25	1.20	0.727	1.54	0.931	0.175	0.10	100	90	120	130	115	155	2.35	3.58
35	0.868	0.524	1.11	0.671	0.169	0.11	120	105	145	155	135	185	3.29	5.00
50	0.641	0.387	0.820	0.495	0.161	0.12	140	120	175	180	155	225	4.70	7.15
70	0.443	0.268	0.567	0.343	0.152	0.14	170	150	220	215	190	280	6.58	10.00
95	0.320	0.193	0.410	0.248	0.145	0.15	200	175	265	255	220	335	8.93	13.59
120	0.253	0.153	0.325	0.197	0.140	0.16	225	195	300	285	245	380	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.135	0.18	250	215	340	310	270	430	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.130	0.19	280	240	385	345	300	485	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.126	0.21	315	275	450	390	335	560	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.122	0.23	345	300	500	420	360	620	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.117	0.25	385	330	570	455	395	690	37.60	57.20
500	0.0605	0.0366	0.0808	0.0489	0.113	0.27	415	360	640	480	415	750	47.00	71.50
630	0.0469	0.0283	0.0648	0.0391	0.111	0.29	450	385	720	510	440	820	59.22	90.10
800	0.0367	0.0221	0.0530	0.0319	0.105	0.34	485	415	790	540	460	840	75.20	114.40
1000	0.0291	0.0176	0.0444	0.0268	0.102	0.37	510	435	850	550	475	940	94.00	143.00

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

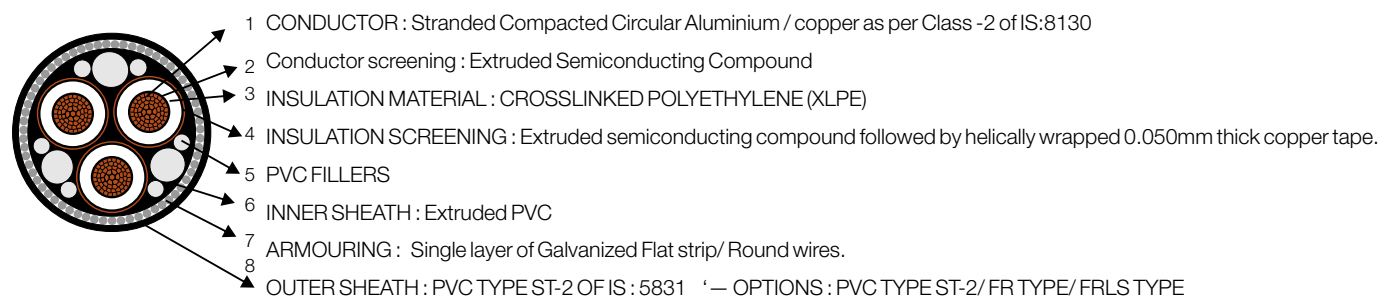
Cable Code : A2XFY/2XFY, A2XWY/2XWY (33KV E)

Ref. Spec. : IS :7098PART -2

Physical Parameters

SIZE cross- sectional area(Sqmm)	Nominal Insulation thickness mm	Minimum Inner Sheath thickness mm	FLAT STRIP ARMoured					Nominal diameter of armour wire (mm)	ROUND WIRES ARMoured			
			Nominal Armour strip thickness mm	Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)			Minimum outer Sheath thickness mm	Approx. Over all Diameter (mm)	Approx. cable wt (kg /km)	
						With Al. Cond.	With Cu Cond.				With Al. Cond.	With Cu Cond.
25	8.80	0.70	0.8	2.36	67	4700	5150	3.15	2.68	72	7400	7850
35	8.80	0.70	0.8	2.52	70	5100	5750	3.15	2.68	75	7800	8450
50	8.80	0.70	0.8	2.52	72	5500	6450	3.15	2.68	77	8200	9150
70	8.80	0.70	0.8	2.68	76	6100	7400	3.15	2.84	81	9000	10300
95	8.80	0.70	0.8	2.84	80	6800	8550	3.15	3.00	86	10000	11750
120	8.80	0.70	0.8	2.84	84	7500	9750	4.00	3.00	90	12000	14250
150	8.80	0.70	0.8	3.00	87	8100	10900	4.00	3.00	94	12700	15500
185	8.80	0.70	0.8	3.00	90	8800	12250	4.00	3.00	97	13500	16950
240	8.80	0.70	0.8	3.00	95	9900	14350	4.00	3.00	103	15000	19450
300	8.80	0.70	0.8	3.00	100	11000	16600	4.00	3.00	106	16000	21600
400	8.80	0.70	0.8	3.00	108	12500	19950	4.00	3.00	114	18000	25450

Cross- Sectional View



COLOUR OF OUTER SHEATH : BLACK . OPTIONS : ANY OTHER COLOURS AS PER REQUIREMENT

~ Tabulated approx. net weights of cables are only for guidelines for transportation / Loading/ Unloading Purpose.

Electrical Parameters

SIZE cross-sectional area (Sq MM)	Max. Cond. D.C. Resistance at 20°C in Ohm/km		Approx. Cond. A.C. Resistance at 90°C in Ohm/km		Reactance of cable at 50HZ in ohms/km (APPROX.)	Capecitance of cable in microF/KM (APPROX.)	Normal* Current Rating in Amps						Short Circuit Current Rating for 1Sec.duration in K. Amps	
							With Aluminium cond.			With Copper cond.				
	Ground	Duct	Air	Ground			Duct	Air						
	Al	Cu	Al	Cu										
25	1.20	0.727	1.54	0.931	0.160	0.10	90	85	110	120	100	135	2.35	3.58
35	0.868	0.524	1.11	0.671	0.153	0.11	110	100	130	145	120	165	3.29	5.01
50	0.641	0.387	0.820	0.495	0.146	0.12	130	115	155	170	150	200	4.70	7.15
70	0.443	0.268	0.567	0.343	0.138	0.14	160	140	190	205	180	245	6.58	10.01
95	0.320	0.193	0.410	0.248	0.130	0.15	190	170	230	245	215	300	8.93	13.59
120	0.253	0.153	0.325	0.197	0.125	0.16	215	190	265	275	245	340	11.28	17.16
150	0.206	0.1240	0.265	0.159	0.122	0.18	240	215	300	305	275	385	14.10	21.45
185	0.164	0.0991	0.211	0.127	0.118	0.19	270	240	340	345	305	435	17.39	26.46
240	0.125	0.0754	0.162	0.098	0.113	0.21	310	275	400	395	350	510	22.56	34.32
300	0.100	0.0601	0.130	0.078	0.111	0.23	350	310	455	440	390	580	28.20	42.90
400	0.0778	0.0470	0.1023	0.0618	0.106	0.25	395	355	530	495	440	660	37.60	57.20

Note : Normal current ratings are given in standard conditions (as given in page no - 40,41), if site conditions are different, current rating should be multiplied by rating factor as given in page no. 42

Basic assumption for current ratings & rating factors

1. SCOPE

The current ratings of cables as indicated in various tables have been calculated on certain assumed conditions.

In actual practice these conditions may be different. Therefore to determine the actual current ratings as per installation conditions, the tabulated ratings shall be multiplied with appropriate factors

a) Basic assumption for current ratings

- i) Maximum permissible temperature - 90°C for XLPE insulation, 70°C for general purpose PVC, 85°C for HR PVC
- ii) Ground/Duct temperature - 30°C
- iii) Ambient temperature - 40°C
- iv) Thermal resistivity of soil - 150°C cm/W
- v) Thermal resistivity of Dielectric 650°C cm/W for PVC, 350°C cm/W for XLPE
- vi) Depth of laying - for 1.1KV cables - 750mm, 3.3KV to 11KV-900MM, Above 11KV-1050mm
- vii) Single core cables installed in one circuit in following arrangement
OR
- viii) Multicore cables installed in single circuit

b) RATING FACTORS

i) Rating factors related to variation in ambient air temperature

Air temperature in Deg. C20		25	30	35	40	45	50	55	
	Normal PVC	1.32	1.25	1.16	1.09	1.00	0.90	0.80	0.80
Rating factors	HRPVC	1.22	1.17	1.12	1.06	1.00	0.94	0.87	0.80
	XLPE	1.20	1.16	1.11	1.06	1.00	0.95	0.88	0.81

ii) Rating factors related to variation in ground temperature

Air temperature in Deg. C15		20	25	30	35	40	45	50	
	Normal PVC	1.17	1.12	1.06	1.00	0.94	0.	0.79	0.71
Rating factors	HRPVC	1.13	1.09	1.04	1.00	0.95	0.90	0.85	0.80
	XLPE	1.12	1.08	1.04	1.00	0.96	0.91	0.87	0.82

iii) Rating factors related to variation in ground thermal resistivity of soil for 3 single core cables laid direct in ground. (Average value)

Thermal Res. in °C.Cm/W		100	120		150	200		250	300
Rating factors		1.20	1.10		1.00	0.90		0.81	0.74

iv) Rating factors related to variation in ground thermal resistivity of soil for multi core cables laid direct in ground. (Average value)

Thermal Res. in °C.Cm/W		100	120		150	200		250	300
Rating factors		1.16	1.08		1.00	0.90		0.82	0.76

v) Rating factors related to variation in depth of laying for 1.1kv cables

For cross-sectional area of conductor < 25sqmm

Depth of laying (cm) >	75	90	105	120	150	180 & ABOVE
Rating factors	1.00	0.99	0.98	0.97	0.96	0.95

For cross-sectional area of conductor 25 to 300sqmm

Depth of laying (cm) >	75	90	105	120	150	180 & ABOVE
Rating factors	1.00	0.98	0.97	0.96	0.94	0.93

For cross-sectional area of conductor above 300sqmm

Depth of laying (cm) >	75	90	105	120	150	180 & ABOVE
Rating factors	1.00	0.97	0.96	0.95	0.92	0.91

vi) Rating factors related to variation in depth of laying for 3.3kv to 11kv cables

Depth of laying (cm) >	75	90	105	120	150	180 & ABOVE
Rating factors	—	1.00	0.99	0.98	0.96	0.95

vii) Rating factors related to variation in depth of laying for above 11kv cables

Depth of laying (cm) >	75	90	105	120	150	180 & ABOVE
Rating factors	—	—	1.00	0.99	0.98	0.96

GROUP RATING FACTORS

1. Cable laid direct in Ground

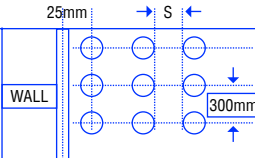
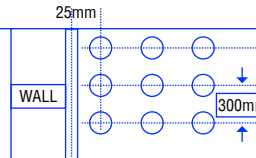
No of cables/ circuits in groups	Multicore cables in horizontal formation					Single cables in horizontal formation				
	Touching	S=15CM	S=30CM	S=45CM	S=60CM	Touching	S=15CM	S=30CM	S=45CM	S=60CM
2	0.8	0.84	0.87	0.90	0.91	0.80	0.85	0.90	0.92	0.95
3	0.68	0.74	0.79	0.83	0.86	0.70	0.78	0.85	0.88	0.91
4	0.62	0.69	0.75	0.80	0.83	0.64	0.73	0.81	0.86	0.89
5	0.58	0.65	0.72	0.77	0.80	0.59	0.70	0.79	0.84	0.88
6	0.55	0.62	0.69	0.75	0.78	0.55	0.67	0.77	0.83	0.87
7	0.52	0.59	0.67	0.73	0.77	0.53	0.65	0.76	0.82	0.86
8	0.5	0.57	0.66	0.72	0.75	0.51	0.64	0.76	0.82	0.86
9	0.48	0.55	0.65	0.71	0.75	0.49	0.63	0.74	0.81	0.85
10	0.46	0.54	0.64	0.70	0.74	0.48	0.63	0.74	0.81	0.85
11	0.45	0.53	0.63	0.70	0.74	0.47	0.62	0.73	0.80	0.84
12	0.44	0.52	0.62	0.69	0.73	0.46	0.61	0.73	0.80	0.84

S = axial spacing of cable

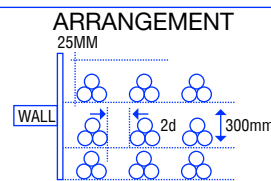
No. of cables/ circuits in groups	No. of Tier	Multicore cables in Tier formation				
		Touching	S=15CM	S=30CM	S=45CM	S=60CM
2	1	0.80	0.84	0.87	0.90	0.91
3	1	0.68	0.74	0.79	0.83	0.86
4	2	0.6	0.66	0.73	0.77	0.79
5	2	0.55	0.61	0.68	0.71	0.73
6	2	0.51	0.57	0.63	0.67	0.69
7	3	0.48	0.54	0.59	0.63	0.64
8	3	0.46	0.51	0.56	0.6	0.61
9	3	0.44	0.48	0.53	0.57	0.58
10	4	0.42	0.47	0.52	0.55	0.56
11	4	0.41	0.46	0.50	0.54	0.55
12	4	0.4	0.45	0.49	0.53	0.54

1 Cable laid direct in open racks in air

MULTICORE CABLES IN OPEN RACKS IN AIR

No. of racks										
	No. of cables per rack					No. of cables per rack				
	1	2	3	6	9	1	2	3	6	9
1	1.00	0.98	0.96	0.93	0.92	1.00	0.84	0.80	0.75	0.73
2	1.00	0.95	0.93	0.90	0.89	1.00	0.80	0.76	0.71	0.69
3	1.00	0.94	0.92	0.89	0.88	1.00	0.78	0.74	0.70	0.68
6	1.00	0.93	0.90	0.87	0.86	1.00	0.76	0.72	0.65	0.66

SINGLE CORE CABLES IN OPEN RACKS IN AIR

			
ARRANGEMENT			
No. of Racks	No. of Circuit Racks (3 single cores) per rack		
	1	2	6
1	1.00	0.98	0.96
2	1.00	0.95	0.93
3	1.00	0.94	0.92
4	1.00	0.93	0.90

S = axial spacing of cable

No. of cables/ circuits in groups	No. of Tier	Multicore cables in Tier formation										
		Touching	S=15CM	S=30CM	S=45CM	S=60CM						
2	1	0.80	0.84	0.87	0.90	0.91						
3	1	0.68	0.74	0.79	0.83	0.86						
4	2	0.60	0.66	0.73	0.77	0.79						
5	2	0.55	0.61	0.68	0.71	0.73						
6	2	0.51	0.57	0.63	0.67	0.69						
7	3	0.48	0.54	0.59	0.63	0.64						
8	3	0.46	0.51	0.56	0.60	0.61						
9	3	0.44	0.48	0.53	0.57	0.58						
10	4	0.42	0.47	0.52	0.55	0.56						
11	4	0.41	0.46	0.50	0.54	0.55						
12	4	0.40	0.45	0.49	0.53	0.54						
No. co cables/ circuits in group	Multicore cable (Touching) No of cables in racks				Multicore cables (spacing of cable equal to dia meter of cable No of cables in racks				S/core cables in trefoil touching formation spacing between circuits equal to twice the diameter of cable) No of cables in racks			
	1		3	4	1	2	3	4	1	2	3	4
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	0.84	0.80	0.78	0.76	0.98	0.95	0.94	0.93	0.98	0.95	0.94	0.93
3	0.80	0.76	0.74	0.72	0.96	0.93	0.92	0.90	0.96	0.93	0.92	0.90
4	0.76	0.71	0.70	0.68	0.93	0.90	0.89	0.87	—	—	—	—

Estimated Voltage Drops in PVC/XLPE Aluminium Cables For A.C. System

(Voltage drop - Volts/Km/Amps)				
Nominal area of conductor (sq. mm)	P.V.C. Cables		XLPE Cables	
	Single Phase	Three Phase	Single Phase	Three System
1.5	43.44	37.62	46.34	40.13
2.5	29.04	25.15	30.98	26.83
4	17.78	15.40	18.98	16.44
6	11.06	9.58	11.80	10.22
10	7.40	6.41	7.88	6.82
16	4.58	3.97	4.9	4.24
25	2.89	2.50	3.08	2.67
35	2.10	1.80	2.23	1.94
50	1.55	1.30	1.65	1.44
70	1.10	0.94	1.15	1.00
95	0.79	0.68	0.83	0.70
120	0.63	0.55	0.66	0.56
150	0.52	0.46	0.55	0.48
185	0.42	0.37	0.44	0.40
240	0.34	0.30	0.35	0.30
300	0.28	0.26	0.30	0.26
400	0.24	0.22	0.24	0.22
500	0.23	0.20	0.23	0.20
630	0.20	0.18	0.21	0.18
800	0.19	-	0.20	-
1000	0.18	-	0.18	-

**Above voltage drops (volts/km/amps) shall be multiplied with rated current & length of Cable in K.M. to calculate total voltage drop in particular length and size of cables.

* Selection criteria of MV/HV cable size for primary distribution

1 SCOPE

The conductor size in the cables for any installation is also governed by its ability to carry short circuit current of system. For L.V. distribution cable may be selected on the basis of continuous load current. But in case of MV/HV distribution it is always safer to select the cable on the basis of ability of conductor to carry expected short circuit current. Short circuit current rating of cable should in line with short circuit capacity of damping apparatus such as circuit breakers, Transformers & reactor etc. beside its capacity to carry desired load current. Short circuit ratings of cables each size are given in relevant tables & have been calculated on the basis of IEC-949 & IEC-986 & on the following assumption

a) Temperature of conductor just prior to short circuit

- i) With XLPE insulation - 90 Deg. C ii) With PVC insulation - 70 Deg. C

b) Maximum permissible conductor temperature during short circuit

- i) With XLPE insulation - 250 Deg. C ii) With PVC insulation - 160 Deg. C

c) Volumetric specific heat of the conductor

- i) With Aluminium conductor - 2.5×10^{-3} J/Deg. C/MM³ ii) With Copper conductor - 3.45×10^{-3} J/Deg. C/MM³

d) Reciprocal of temperature co-efficient of resistance at 9 Deg. C

- i) With Aluminium conductor - 228 ii) With Copper conductor - 234.5

Short circuit current rating at different duration may be calculated as

Ish (for t duration) = Ish (for 1 Sec.) t = Time duration required to be calculated of short circuit in Sec.

SELECTION CRITERIA OF H.V./MV CABLES FOR PRIMARY DISTRIBUTION

REQUIRED DATAS

- Nominal System voltage at H.T. Side
- Short circuit level for H.T. system
- Fault withstand time for H.T. CBs
- Formula for calculating H.T. cable size

$$\text{With Aluminium cond./XLPE insulated cable} = \frac{I_{sh} X \sqrt{t}}{0.094} = \frac{25 X \sqrt{0.5}}{0.094} = 188$$

With Copper cond./XLPE insulated cable =

$$\frac{I_{sh} X \sqrt{t}}{0.143} = \frac{25 X \sqrt{0.5}}{0.143} = 124$$

Hence nearest higher size 150sqmm is required

ELECTRICAL FORMULAS FOR CALCULATING A.C. LOAD CURRENT

Load current in Amps when KVA is given	for Single phase (A.C.) $\frac{KVA \times 1000}{V}$	for Three phase (A.C.) $\frac{KVA \times 1000}{1.732 X V}$
Load current in Amps when Kilo Watt is given	for Single phase (A.C.) $\frac{KW \times 1000}{V X pf}$	for Three phase (A.C.) $\frac{KW \times 1000}{1.732 X V X pf}$
Load current in Amps when H.P. is given	for Single phase (A.C.) $\frac{H.P. \times 746}{V X \%EFF X pf}$	for Three phase (A.C.) $\frac{H.P. \times 746}{1.732 X V X \%EFF X pf}$

V = Nominal system voltage in Volts, pf = Power factor, KVA = Kilo Volts Ampere, H.P. = Horse Power

Standard drum lengths of cables

STANDARD LENGTH (MTS) WITH +5% TOLERANCE			
DESCRIPTION OF CABLE	UN-ARMOURED	STRIP ARMOURED	ROUND WIRE ARMOURED
1.1KV PVC/XLPE CABLES WITH ALUMINIUM			
~ SINGLE CORE	UP TO 150SQMM-1000 185 TO 1000sqmm-500	UP TO 150SQMM-1000 185 to 1000sqmm-500	UP TO 150SQMM-1000 185 to 1000sqmm-500
~ TWO CORE	UP TO 50SQMM-1000 70 to 630sqmm-500	UP TO 50SQMM-1000 70 to 630sqmm-500	UP TO 50SQMM-1000, 70 TO 500sqmm 500, 630sqmm-250
~ THREE CORE	UP TO 50SQMM-1000 70 to 630sqmm-500	UP TO 50SQMM-1000 70 to 500sqmm-500 630sqmm-250	UP TO 50SQMM-1000, 70 TO 300sqmm 500, 500 to 630sqmm-250
~ THREE & HALF CORE	UP TO 50SQMM-1000 70 to 630sqmm-500	UP TO 50SQMM-1000 70 to 400sqmm-500 500 to 630sqmm-250	UP TO 50SQMM-1000, 70 TO 300sqmm 500, 400-630sqmm-250
' FOUR CORE	UP TO 50SQMM-1000 70 to 500sqmm-500 630sqmm-250	UP TO 50SQMM-1000 70 to 400sqmm-500 500 to 630sqmm-250	UP TO 50SQMM-1000, 70 to 240sqmm 500, 300 to 630sqmm-250
1.1KV PVC/XLPE CABLES			
WITH COPPER CONDUCTOR			
~ SINGLE CORE	UP TO 150SQMM-1000 185 TO 630sqmm-500 800 to 1000sqmm-250	UP TO 150SQMM-1000 185 to 630sqmm-500 800 to 1000sqmm-250	UP TO 150SQMM-1000 185 to 630sqmm-500 800 to 1000sqmm-250
~ TWO CORE	UP TO 10SQMM-1000 16 to 300sqmm-500 400 to 630sqmm-250	UP TO 10SQMM-1000 16 to 300sqmm-500 400 to 630sqmm-250	UP TO 10SQMM-1000, 70 TO 500sqmm 500 500, 300 to 630sqmm-250
~ THREE CORE	UP TO 10SQMM-1000 300 to 400sqmm-250	UP TO 10SQMM-1000 16 to 240sqmm-500 240sqmm-400sqmm-250	UP TO 10SQMM-1000, 16 TO 185sqmm 16 to 185sqmm-500 500, 240 to 400sqmm-250
~ THREE & HALF CORE	UP TO 10SQMM-1000 300 to 400sqmm-250	UP TO 10SQMM-1000 16 to 240sqmm-500 240 to 400sqmm-250	UP TO 10SQMM-1000, 16 TO 150sqmm 16 to 185sqmm-500 500, 185 to 400sqmm-250
' FOUR CORE	UP TO 10SQMM-1000 16 to 240sqmm-500 300 to 400sqmm-250	UP TO 10SQMM-1000 16 to 150sqmm-500 240 to 400sqmm-250	UP TO 10SQMM-1000, 16 to 150sqmm 500, 185 to 400sqmm-250

~ Control cables more than FOUR CORES shall be supplied in 500 mts length

DESCRIPITON OF CABLE	6.35/11KV GRADE	1/11KV GRADE	19/33KV GRADE
H.T. XLPE CABLES WITH ALUMINIUM CONDUCTOR			
~ SINGLE CORE-A2XWαY	UP TO 150SQMM-1000 185 to 1000sqmm-500	UP TO 150SQMM-1000 185 to 1000sqmm-500	UP TO 150SQMM-1000 185 to 1000sqmm-500
~ THREE CORE-A2XFY	25 TO 300SQMM-500 400sqmm-250	25 TO 185SQMM-500 240 to 400sqmm-250	25 TO 95SQMM-500 120 to 400sqmm-250
~ THREE CORE-A2XWY	25 TO 150SQMM-500 185 to 300sqmm-250 400sqmm-200	25 TO 95SQMM-500 120 to 240sqmm-250 300 to 400sqmm-200	25 TO 50SQMM-250 70 to 120sqmm-250 185 to 400sqmm-200

It has been rightly said that "Quality is never an accident, it is always the result of intelligent efforts".

In the manufacture of cables, intelligent efforts are incorporated to achieve quality. For a quality end products, control starts from proper design of the product. All raw materials are selected carefully and only materials of high quality are used in production. Having done this, stage wise inspection is done to ensure conformity with the requirements of relevant Indian Standards where these apply.

Stage - Wise Inspection

- | | |
|--|--|
| i) Wire-Drawing | : Wire diameter
Surface
Shape
Quality of joints in the wire |
| ii) Stranding of Wires: | : Quality of joints in the wires
Compaction of conductor
Shape of Conductor
Dimensions
Resistance of Conductor |
| iii) Insulation : | : Dimension over Insulation,
Thickness of Insulation, |
| iv) Curing
(for XLPE Insulation) | : Hot set test, Tensile strength &
elongation test. |
| v) Screening
(for H.T. Screened cables) | : Dimension over screen, thick of
screen visual examination of
surface/defects. |
| v) Laying Up | : Sequence of Cores
Direction of lay
Diameter over laid up cores
Circularity |
| vi) Inner Sheath | : Thickness of Sheath
Diameter over Sheath
Surface Uniformity
Circularity
Porosity |
| vii) Armouring | : Diameter of Wires/
Dimensions of Strips
Direction of lay
Coverage
Quality of Joints of Wires |
| viii) Outer Sheath | : Thickness of Sheath Diameter
over Sheath Tightness of Sheath
Eccentricity Porosity, Embossing |



RM Testing Lab

The tests on cables have been classified broadly in four categories as follows :

Routine Tests :

Tests carried out on each cable to check the requirements which are likely to vary during production.

Type Tests :

Tests carried out to prove conformity with the specification. These are intended to prove the general qualities and design of a given type of cable.

Acceptance Tests :

Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

Optional Tests :

Special tests to be carried out when required by agreement between the purchaser and the manufacturer.

Special tests required for FRLS Cables can also be carried out at our works i.e. Halogen gas generation test to IEC - 754 Part - I, Smoke generation test to ASTM D 2843, Oxygen index test and Temperature index test to ASTM D - 2863, Flammability test to (1) IEC-332-1, (2) Swedish Chimney test to SS-4241475 Class F3 & (3) IEC-332-3, Flame resistance test to IEEE-383.

Together with the most advanced equipment available, we are able to offer to our valued customers assurances of highest quality and strict adherence to the required specification. As a third party guarantee, our cables have passed rigorous tests at various Government recognized test laboratories such as CPRI, Shri Ram Test House, ERDA Baroda, National Test House, ERTL, RTC.

Routine Tests, Type Tests, Acceptance Tests and Optional Tests as per the Indian Standard Specification for Power and Control Cables with PVC insulation, Cross linked Polyethylene insulation and Special Tests are given in the Annexure.

Tensile Testing Machine



Selection guide

List of Tests as per IS:1554(Part - I): 1988, IS:1554 (Part- II):1988, IS:7098 (Part - I):1988 and IS:7098 (Part-II) : 1985

1. Routine Tests :

- Conductor Resistance Test
- High Voltage Test
- Armour Resistance Test for mining Type Cables
- Partial Discharge test (for H.T. Screened cable)

2. Type Tests :

- Tensile Test (for Aluminium Conductor)
- Wrapping Test (for Aluminium Conductor)
- Annealing Test (for Copper Conductor)
- Conductor Resistance Test
- Test for Armour Wires/Strips
- Test for thickness of Insulation & Sheath
- Physical Test for Insulation & Outer Sheath
- Test for Bleeding & Blooming of Pigments
- Insulation Resistance Test
- High Voltage Test
- Flammability Test
- Hot Set Test - (For XLPE Insulation only)
- Partial Discharge test (for H.T. Screened cable)
- Bending test (for H.T. Screened cable)
- Dielectric Power factor test (for H.T. Screened cable with rated voltage 6.35/11KV & above)
- Heating cycle test (for H.T. Screened cable)
- Impulse withstand test (for H.T. Screened cable)

3. Acceptance Tests :

- Tensile Test (For Aluminium Conductor)
- Wrapping Test (For Aluminium Conductor)
- Annealing Test (For Copper Conductor)
- Conductor Resistance Test
- Test for thickness of Insulation & Sheath
- High Voltage Test
- Insulation Resistance Test
- Tensile Strength & Elongation at break test for Insulation and Sheath
- Hot Set Test - (for XLPE Insulation only)
- Partial Discharge test (for H.T. Screened cable)

4. Optional Tests :

- Cold Bend Test
- Cold Impact Test
- Armour Resistance Test (for other than Mining Type Cables)

5. Special Tests (As Applicable) :

- Oxygen Index Test as per ASTM D - 2863-77
- Temp. Index Test as per ASTM D - 2863-77
- Smoke Generation Test as per ASTM D - 2843-77
- Acid Gas Generation Test as per IEC - 754-1
- Flammability Test as per IEC - 332-1, IEEE-383, SS-4241475 Class F3 and IEC - 332-3
- Water absorption test (by Electrical Method)
- Ultra violet resistance to ASTM-G-53
- Dielectric Strength retention test
- Test for Antirodent & Antitermite property

For selection of a cable, a first hand knowledge of the system in which the cable is to be used, and the installation conditions under which the cable has to operate, is necessary. A knowledge of statutory restrictions and the manufacturing facilities available in the country will help in finding out as to what type of cable will be available for particular usage. The environmental conditions under which the cable has to operate will decide its protective covering. Thus once voltage grade of the cable, number of cores, conductor material, type of insulation and protective coverings are known, size of conductor remains to be decided. The first and foremost criteria for the size of conductor is continuous current rating for the present load. There after the same should be checked for short circuit, voltage drop, over load capacities and future expansions. Once decided the selection of next higher size compared to what is essential for the requirement, will always be worthwhile.

Economic considerations are also necessary.

INFORMATION REQUIRED WITH ENQUIRY & ORDER

The following information should be included in an enquiry :

- Voltage Grade.
- Whether cable is to be used on Earthed or Unearthed system (for voltages above 3.3 KV).
- Type of installation whether in air or in ducts or in ground.
- If cables are grouped together, then number of cables in group and vertical and horizontal spacing between them.
- Required value and duration of short circuit current.

Following further informations are also required for offering the exact type of cable for any specific purpose :

- The normal ambient or operating temperature.
- The maximum temperature to which the PVC will be exposed and the duration and frequency of such exposures.
- The material with which the PVC will be in contact i.e. oil, gases, acids, alkalies etc. at normal and maximum temperature.
- If special flame retardent property is required.
- If any special electrical characteristics needed.



Handling & Storage

Handling (Unloading at site) : On receipt of cable drums visual inspection of drums should be made ensuring drum packing is original. While unloading the cables certain precautions are to be taken to ensure the safety of the cables.

1. The cable drums should not be dropped or thrown from railway wagons or trucks during unloading operations as the shock may cause serious damage to cable layers. A crane should be used for unloading cable drums. When lifting drums with the crane, it is recommended that the lagging should be kept in place to prevent the flanges from crushing on to the cable. If the crane is not available, a ramp should be prepared with approximate inclination of 1:3 or 1:4. The cable drum should be rolled over the ramp by means of ropes and winches. Additionally a sand bed at the foot of the ramp may be prepared to brake the rolling the cable drum.
2. Cable should not be dragged along the earth surface.
3. Cable ends should always be sealed by means of suitable end sealing materials to prevent moisturisation of cores and armour.
4. Drums should be rolled in direction of arrow marked on the drum.

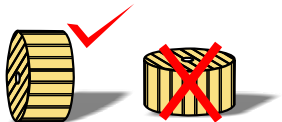
Storage :

Roll this way

Cables should be stored in a dry covered place to prevent exposure to climatic conditions and wear and tear of wooden drums and it should preferably on a concrete surface/firm surface which will not cause the drums to sink and thus lead to flange rot and extreme difficulty in moving the drums.

All drums should be stored in such a manner as to leave sufficient space between them for air circulation. It is desirable for drums to stand on battens placed directly under the flanges.

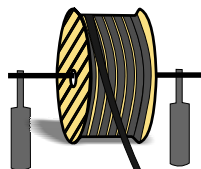
In no case should the drums be stored, "On the Flat", i.e., with flange horizontal.



Laying :

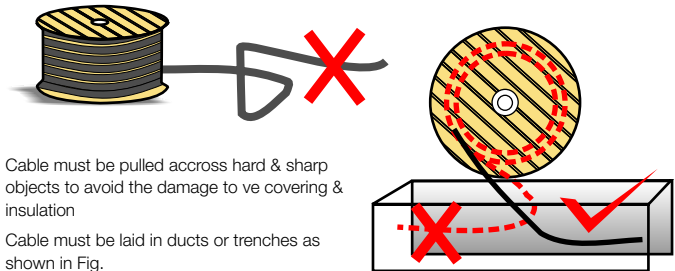
For laying of cables special cares to be taken to prevent sharp bending, kinking, twisting. Cable should be unwound from drum by proper mounting the cable drum on a cable wheel making sure the spindle is strong enough to carry the weight without bending and that it is lying horizontally in the bearings so as to prevent the drum creeping to one side or the other while it is rotating.

Provision should be made to break the drum to avoid further rolling & buckling of cable during sudden stop. A simple wooden plank can server this purpose



This is incorrect way of pulling the cable & will cause kinks & twist in cable. Shall be avoided at all

Cable must be pulled from the top



Cable must be pulled across hard & sharp objects to avoid the damage to ve covering & insulation

Cable must be laid in ducts or trenches as shown in Fig.

However, following salient points are to be considered during laying procedure of cables laid in racks and in built-in trenches.

1. For laying of cables power cables to be placed at the bottom most layer and control cables at top most layer.
2. Single core power cable for use on A.C. system shall be laid in delta formation supported by non-magnetic material. Trefoil clamps of suitable size are to be placed at regular intervals but preferably not more than 800 mm. Axial spacing of two circuits in delta formation shall not be less than 4 times the cable dia.

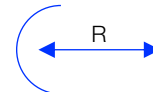
In case of multicore power cables, cables shall be laid side by side, with spacings not less than one cable diameter. However derating factors for cables laid on trenches are to be referred.

Multicore power cables and single core D.C. circuits may be clamped by means of galvanised mild steel saddles but 1.1 KV single core cables should be clamped by means of non-magnetic saddles. The saddles shall not be placed at intervals more than 1500 mm. for horizontal and 1200 mm. for vertical runs.

3. Multicore control cables can be laid touching each other on cable racks and wherever required may be taken in two layers. They should be clamped by means of PVC straps both for horizontal and vertical runs (alternatively, fabricated aluminium clamps may be used) at regular intervals.
4. a) If the cables are buried directly in ground I.S. 1255 is to be followed for code of practice. However, generally cables are laid 1000 mm. below finished ground level at any point of cable run and 75 mm. of sand cushioning to be provided.
4. b) In loose soil concrete pillar should be provided for as support and hence pipes are recommended to the used for cable path.
5. If there is a possibility of mechanical damage, cables should be protected by means of mild steel covers placed on racks.
6. While laying cables, special care to be taken at bends. Followings are the recommended bending radius for power and control cables.

Voltage Rating KV	PVC and XLPE Cables	
	Single Core	Multi Core
Upto 1.1	15 D	12 D
Above 1.1 but upto 11 K.V.	15 D	15 D
Above 11 K.V.	20 D	15 D

Where 'D' is overall diameter of cable.



7. Maximum safe pulling force (when pulled by pulling eye)
Aluminium Conductor Cables : 3.0 Kg/mm² Copper Conductor Cables : 5.0 Kg/mm² Proper method of pulling of cable should be used.

TESTING

INSULATION RESISTANCE MEASUREMENT OF CABLE

The voltage rating of I.R. Tester (Megger) should be chosen as following table :

Voltage grade of cable	Rating of IR Tester (Megger)	Voltage grade of cable	Rating of IR Tester (Magger)
1.1 KV	500 V	11 KV	1000 V
3.3 KV	1000 V	22 KV	2500 V
6.6 KV	1000 V	33 KV	2500 V

Testing during laying :

All new cables shall be megger-tested before jointing. After jointing is completed all LV Cables shall be megger-tested.

End Terminations & Jointing :

Termination and jointing of Power & Control Cables shall be done by means of compression methods using solderless tinned copper/ Aluminium terminal lugs. For control cables terminations, ring tongue or reducer pin type terminal lug can also be used to suit the purpose.



A view of dispatch yard