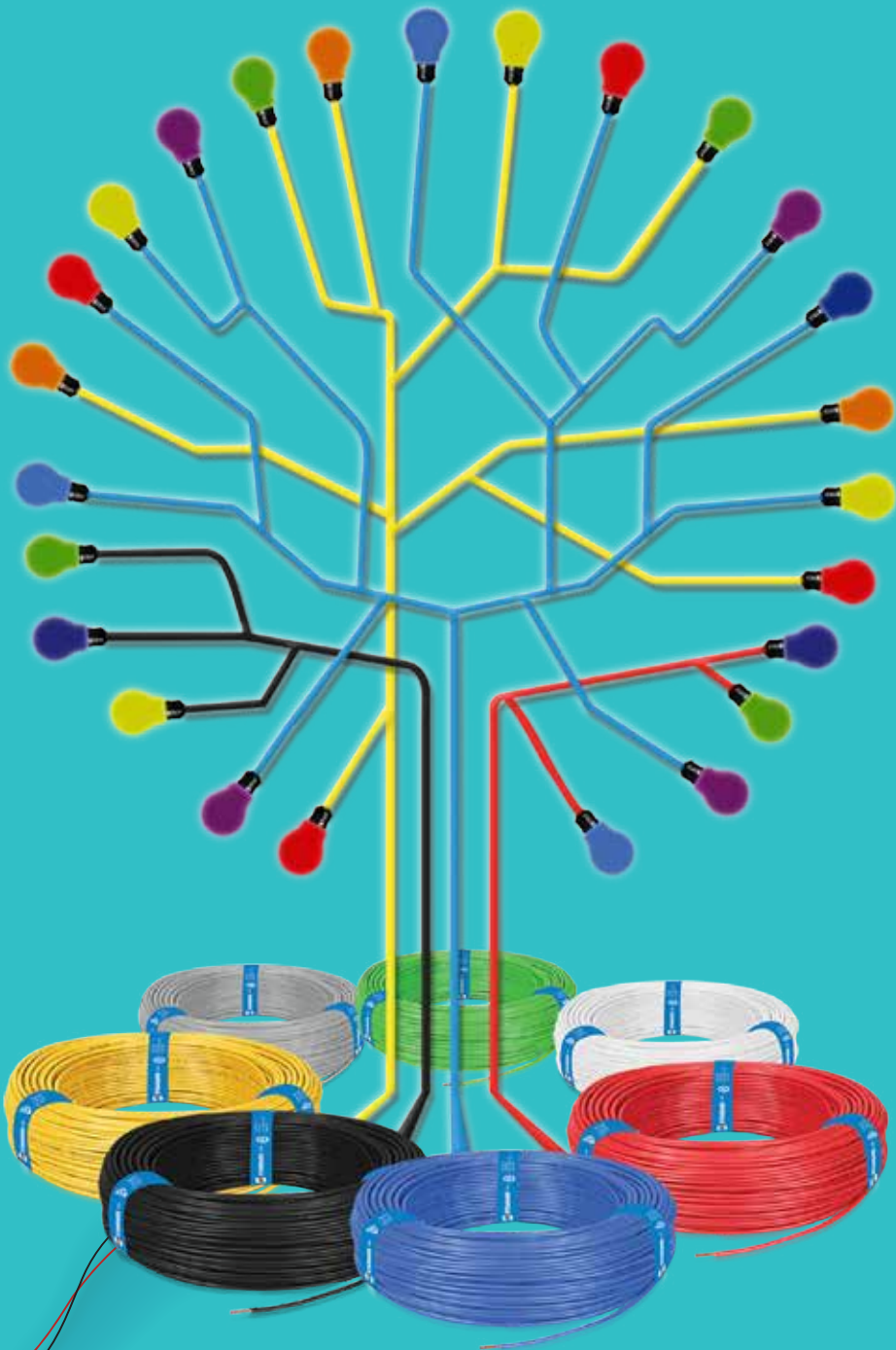




STANDARD



WIRES & CABLES

Kitna bhi load ley ley.

MANUFACTURING

Wire Drawing & Stranding

Wire is often reduced to the desired diameter and properties by repeated drawing through progressively smaller dies, or traditionally holes in draw plates. A copper rod of 8 mm dia EC is used for this process. As the wire is pulled through the die, its volume remains the same, so as the diameter decreases, the length increases. Usually the wire will require more than one draw, through successively smaller dies, to reach the desired size. The smaller sizes drawn are called strands.

Annealing

After wire drawing, the drawn become harder due to cold drawing Process. The electrical resistivity increases with drawing process. In order to regain the properties i.e to become more flexible and More conductive, annealing process is established. In annealing Process, the drawn wires are heated by passing a large current through the wire for a fraction of a second and raising its temperature near to 400 °C. Oxidation of the wire is prevented by passing through steam.

Bunching

The annealed strands are twisted and bunched in the next stage. Bunch strand wire contains any number of strands in random pattern. Twisted in one operation, all strands have the same lay direction and same lay length. The number of strands is determined by the size of the individual strands and the total cross-sectional area required.

Finishing, jacketing, and insulating

The insulation/coatings for wires and cables are typically mixed with two or more components at the intake of a single or twin screw extruder.

The insulation or coating material is applied via a crosshead die.

In this way the cable core or cable is fed through a special pipe.

The polymer is entered on the side of this pipe and covers the cable core in a distribution area.

After extrusion, the insulated wire or coated cable is cooled by a water bath and is then sent to a haul-off and cutting station before being wound up.



TESTING

The cables manufactured are tested 100% through various parameter.

- Raw Material & Packaging Material testing
- In-process testing
- Dimension inspection
- On-line HV Spark tester
- Routine Test & Type Test as per IS 694 & BIS
- Smoke density
- Flammability test
- Halogen acid (HCL gas generation)



NABL Testing Laboratory

Company has emphasised on product quality by demonstrating quality evaluation for wires & cables at international level by obtaining NABL (National accreditation board for calibration & testing Laboratories) for testing & DSIR recognised technology center at cable division. NABL is an autonomous body which is working under the Department of Science & Research Industry (Govt. of India).

National accreditation board for testing and calibration to boast of, it is the first-of-its-kind private facility in india.The lab fully equipped as per international standard to test XLPE cables upto 66 kV grade, PVC cables, Flexible cables, aerial bunched cables, photovoltaic cables, instrumentation cables, fire survival cables.

The lab cover indian standards, British standard, International electrotechnical commission (IEC) standards, TUV-Germany standards, American society for testing and material (ASTM) standards and institute of electrical & electronics engineers (IEEE) standards along with eight type of different fire test to demonstrate fire-retardant behavior in cable.

HIGH INSULATION RESISTANCE

In all cables, there is generally leakage of current from the live conductor through the insulation. In case of inferior quality of insulation, the current leakage increases. This is unsafe and can cause damage to installations as well as become a threat to life.

Low Leakage Current – STANDARD Cables have an allowable current-leakage limit that is 50 times lower than the prescribed international safety norms.

International safety standards specifies that current leakage limit in hand held equipment is considered to be safe if the value is not more than 0.75 mA. Standard cables, with S³ technology, incorporate insulation of high quality which ensures that current leakage level is as low as 0.01 mA, which is much below the prescribed limit. Standard cables have been certified by the Central Power and Research Institute (CPRI) - a premier laboratory recognised by the Government of India.

Nominal area of conductor sq. mm	Leakage current mA
0.50	0.008
0.75	0.009
1.00	0.009
1.50	0.010
2.50	0.011
4.00	0.013
6.00	0.015

Safety from electrical shocks – Electric shock occurs when a body-part comes in contact with a bare conductor of poor insulated wire. Higher insulation resistance protects against electric shock.

RoHS COMPLIANT

Release of certain harmful substances such as lead, mercury, cadmium and chromium etc. in the plastics/equipment are dangerous to the environment and health. European Union has adopted a directive on the restriction of the use of certain hazardous substances in electrical and electronics equipment commonly referred to as Restriction of Hazardous Substances directive or RoHS.

Standard cables are certified by Bureau Veritas for RoHS compliance as per directive 2006/95/EC. This ensures that release of hazardous substances are eliminated to provide safety for human health and to give us green environment.

BEST COPPER USED

Standard wire use ETP grade annealed copper which is more than 99.95% pure and therefor ensures 101% conductivity (IACS).

STANDARD HTR TECHNOLOGY

What is HTR FR (High Temperature Resistant Flame Retardant.)

Electrical wires are being used as electrical path for Industrial and household power applications. In general, excessive voltage drops/ fluctuation in service line results lower voltage at receiving end .Due to this lower voltage, current drawn and passing through the electric wires are higher than normal resulting higher temperature rise in the conductor. As such normal wires can not sustain with such system abnormalities and may leads to risk of short circuit and serious fire hazards. To fight with such conditions, STANDARD HTR-FR wires have been developed with special technology which is rated for 10% higher current carrying capacity with Energy saving, extra safety and longer life can sustain with high temperature rise even worst condition of overloading.

Insulation

- "A" grade PVC compound & Raisin
- Excellent Electric properties High Grade Copper (From HINDALCO & STERLITE)
- Flame Retardant
- Heat Resistant
- Abrasion Resistant
- The excellent mechanical features and outstanding resistance to moisture, acids & alkalies, improves the protection against external effects and adverse environmental influences



EXTRA SAFETY

Extra Safety During Overloading and Short Circuit

Overloading and Short Circuit are the two main and common electrical hazard generating the excessive heat & risk of fire that can damage the equipments and also loss of human life. Short-circuit can be caused by a host of reasons such as faulty wiring, broken insulation due to inferior quality of insulation, circuit-overload, and defective plugs, switches, cords, receptacles, etc. STANDARD Cables ensure superior insulation and conductor characteristics to prevent short-circuit due to wiring. STANDARD Cables are Certified the Heat Shock Test at 200 °C by CPRI under Overloading / Short Circuit Conditions.

EXTRA SAFE DURING INSTANT OVERLOADING & SHORT CIRCUIT STANDARD WIRES CERTIFIED AT 200 °C FOR ONE HOUR FROM CPRI



TEST REPORT

Test Report No.: CPRINOACABMISC1819T0070

Dated : 29.06.2018

TEST RESULTS

1.1. HEAT SHOCK TEST:

Treatment		Temperature	Duration
		200 ±2°C	1 hour
Sl. No	Core Identification	Visual Examination	
		Observation	Specified
1	Single core	No cracks or scales found	No signs of cracks or scales

Conclusion: The test results comply with the requirement of customer as per general procedure followed in of Sl. No. iii, (c) 5 of Table-1 of IS: 694 /2010.

(Dr. Neha Adhikari)

Test Engineer

केन्द्रीय विद्युत अनुसंधान संस्थान
CENTRAL POWER RESEARCH INSTITUTE
असम प्रदेश परीक्षण प्रयोगशाला
Regional Testing Laboratory
प्लॉट नं०-3A, इन्डस्ट्रियल एरिया, कोलकाता-700062, भारत-201309
Plot No.-3A, Industrial Area, C/o-62, Kolkata-201309 (U.P.)



STANDARD WIRE



NORMAL WIRE

HOME SHIELD FR PVC CABLES



Single Core HTR FR PVC Insulated Industrial Grade Copper Conductor (Unsheathed) Flexible Cables, 1100 Volt

Basic Code	Nominal Cross Sectional area of conductor	Number/Nom. Dia of cond. strands	Thickness of Insulation (Nom)	Approx. Overall Diameter	Current Carrying Capacity 2 Cables Single Phase		Max. Conductor Resistance per km at 20 °C
					Conduit/Trunking	Unenclosed clipped directly to a surface or on cable trays	
HOME SHIELD	sq. mm	mm	mm	mm	Ampere	Ampere	Ohm
WSFFDN...A1X507	0.5 sq. mm	16 N / 0.20 mm	0.6 mm	2.1 mm	5 A	5 A	39.00 Ω
WSFFDN...A1X757	0.75 sq. mm	24 N / 0.20 mm	0.6 mm	2.3 mm	9 A	9 A	26.00 Ω
WSFFDN...A11X07	1.0 sq. mm	32 N / 0.20 mm	0.6 mm	2.7 mm	13 A	15 A	19.50 Ω
WSFFDN...A11X57	1.5 sq. mm	30 N / 0.25 mm	0.6 mm	3.0 mm	17 A	19 A	13.30 Ω
WSFFDN...A12X57	2.5 sq. mm	50 N / 0.25 mm	0.7 mm	3.6 mm	23 A	26 A	7.98 Ω
WSFFDN...A14X07	4.0 sq. mm	56 N / 0.30 mm	0.8 mm	4.1 mm	32 A	35 A	4.95 Ω
WSFFDN...A16X07	6.0 sq. mm	84 N / 0.30 mm	0.8 mm	4.6 mm	43 A	47 A	3.30 Ω

...Fill the colour code i.e. B = Blue ... / K = Black ... etc...

Note: Available in 90 metre length in carton packaging.

* In **HOME SHIELD** all size of Conductor class V as per IS:8130.

* The number and diameter of conductor strands are for reference only. Conductor resistance as per IS:8130 is the governing criteria.

Colour : Red/Yellow/Blue/Black/Green

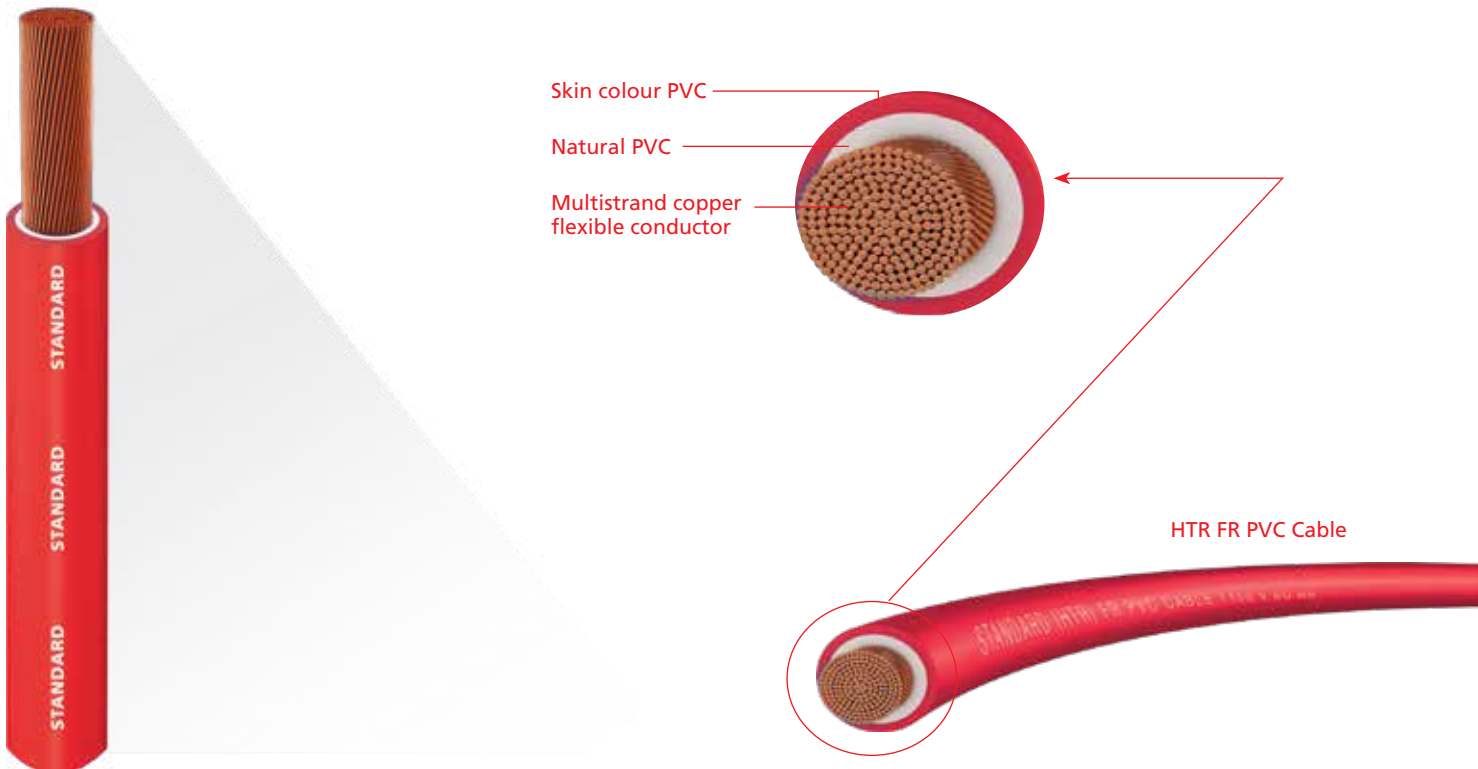
Any other colour on specific request can also be supplied.

Construction :-

Conductor : Plain annealed copper conductor as per IS:8130

Insulation : Primary - Natural HR PVC with FR property

Secondary - Skin colour coated HR PVC with FR property



HEAT SHIELD FR PVC CABLES



Single Core HTR FR PVC Insulated Industrial Grade Copper Conductor (Unsheathed) Flexible Cables, 1100 Volt

Basic Code	Nominal Cross Sectional area of conductor	Number/Nom. Dia of cond. strands	Thickness of Insulation (Nom)	Approx. Overall Diameter	Current Carrying Capacity 2 Cables Single Phase		Max. Conductor Resistance per km at 20 °C
					Conduit/Trunking	Unenclosed clipped directly to a surface or on cable trays	
HEAT SHIELD	sq. mm	mm	mm	mm	Ampere	Ampere	Ohm
WSFFDN...A1X50	0.5 sq. mm	16 N / 0.20 mm	0.6 mm	2.1 mm	5 A	5 A	39.00 Ω
WSFFDN...A1X75	0.75 sq. mm	24 N / 0.20 mm	0.6 mm	2.3 mm	9 A	9 A	26.00 Ω
WSFFDN...A11X0	1.0 sq. mm	14 N / 0.30 mm	0.7 mm	2.7 mm	15 A	16 A	18.10 Ω
WSFFDN...A11X5	1.5 sq. mm	22 N / 0.30 mm	0.7 mm	3.0 mm	19 A	21 A	12.10 Ω
WSFFDN...A12X5	2.5 sq. mm	36 N / 0.3 mm	0.8 mm	3.6 mm	25 A	28 A	7.41 Ω
WSFFDN...A14X0	4.0 sq. mm	56 N / 0.30 mm	0.8 mm	4.1 mm	32 A	35 A	4.95 Ω
WSFFDN...A16X0	6.0 sq. mm	84 N / 0.3 mm	0.8 mm	4.6 mm	43 A	47 A	3.30 Ω

...Fill the colour code i.e. B = Blue ... / K = Black ... etc...

Note: Available in 90 metre length in carton packaging.

* In **HEAT SHIELD** Conductor class-II for 1.0 sq. mm, 1.5 sq. mm & 2.5 sq. mm & for other size class V as per IS:8130.

* The number and diameter of conductor strands are for reference only. Conductor resistance as per IS:8130 is the governing criteria.

Colour : Red/Yellow/Blue/Black/Green

Any other colour on specific request can also be supplied.

Construction :-

Conductor : Plain annealed copper conductor as per IS:8130

Insulation : Primary - Natural HR PVC with FR property

Secondary - Skin colour coated HR PVC with FR property



HIGHER SIZE FR PVC CABLES

HIGHER SIZE Single Core FR PVC Insulated Industrial Grade Copper Conductor (Unsheathed) Flexible Cables, 1100 Volt

Basic Code	Nominal Cross Sectional area of conductor	Number/Nom. Dia of cond. strands	Thickness of Insulation (Nom)	Approx. Overall Diameter	Current Carrying Capacity 2 Cables Single Phase	Max. Conductor Resistance per km at 20 °C
					Unenclosed clipped directly to a surface or on cable trays	
FR	sq. mm	mm	mm	mm	Ampere	Ohm
WSFFDN...B1010	10 sq. mm	80 N / 0.4 mm	1.0 mm	6.1 mm	59 A	1.91 Ω
WSFFDN...B1016	16 sq. mm	126 N / 0.4 mm	1.0 mm	7.0 mm	79 A	1.21 Ω
WSFFDN...B1025	25 sq. mm	196 N / 0.4 mm	1.2 mm	8.6 mm	93 A	0.780 Ω
WSFFDN...B1035	35 sq. mm	276 N / 0.4 mm	1.2 mm	9.7 mm	113 A	0.554 Ω
WSFFDN...B1050	50 sq. mm	396 N / 0.4 mm	1.4 mm	11.5 mm	153 A	0.386 Ω
WSFFDN...B1070	70 sq. mm	360 N / 0.5 mm	1.4 mm	13.0 mm	238 A	0.272 Ω
WSFFDN...B1095	95 sq. mm	475 N / 0.5 mm	1.6 mm	15.1 mm	289 A	0.206 Ω

...Fill the colour code i.e. B = Blue ... / K = Black ... etc...

Note: Conductor as per class V of IS : 8130 confirming to IS : 694. 100 metre in polywrap packing & in bigger packing on request"

*The number and diameter of conductor strands are for reference only.
Conductor resistance as per IS:8130 is the governing criteria.
Progressive sequential length marking on every metre.

Construction :-

Conductor : Plain annealed copper conductor as per IS:8130

Insulation : Primary - Natural PVC with FR property
Secondary - Skin colour coated PVC with FR property

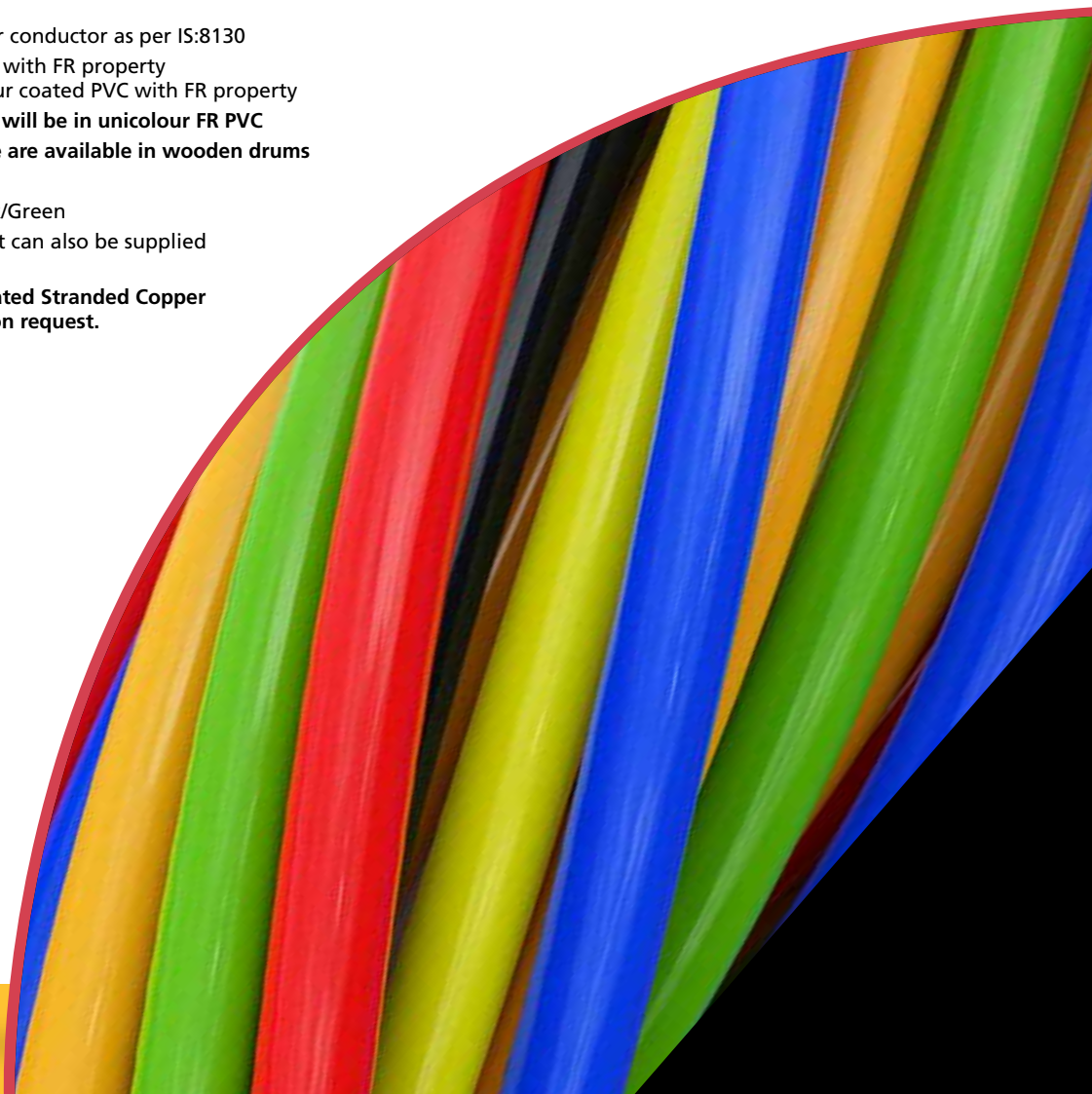
Note : 25 sq. mm and above will be in unicolour FR PVC

Note : 70 sq. mm and above are available in wooden drums

Colour : Red/Yellow/Blue/Black/Green

Any other colour on specific request can also be supplied subject to economical run.

Note : Single core PVC insulated Stranded Copper Conductor available on request.



FR LSH PVC CABLES

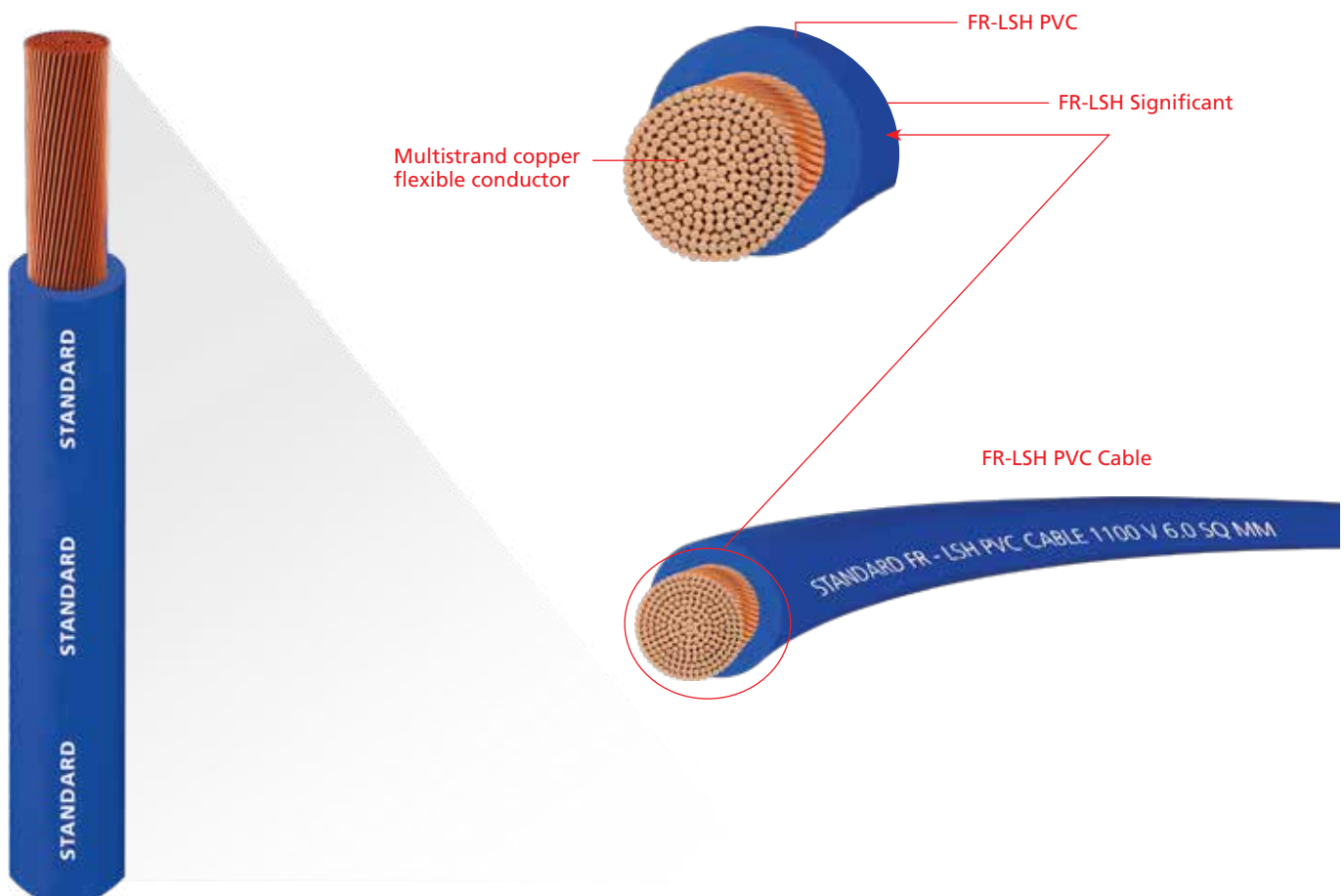
STANDARD FR LSH Superior protection for human safety

FRLSH was developed and introduced for commercial building and specially for those buildings where exits and ventilation is restricted (Like - Cinema Halls), being in case of fire in these types of building most of the people become victims due to suffocation and non-visibility which occurs due to burning of PVC because PVC emits lots of black smoke and toxic gases while burning. Therefore FR LSH insulation was developed in a way that while burning of PVC having FR-LSH feature should emit lesser smoke and toxic gases (halogen).

- Specially formulated insulation that restrict toxic gases and smoke. The oxygen index is 30% for FR LSH insulation .i.e. the STANDARD FR-LSH insulation can catch the flame only if oxygen level in atmosphere or air is more than 30% whereas it known fact that in atmosphere oxygen level is 21% only. Higher the index value, greater the non combustibility. STANDARD FR-LSH wire emits at least 50% less smoke against specified value of 60% than comparable wires with even lesser amount of corrosive halogen acid & toxic gases i.e. 16% against specified value of 20%.
- Having self-extinguishing property which do not allow the fire to spread.
- Suitable for use in conduit and for fixed protected installation in fire-prone areas like residential and commercial complexes, high-rise buildings, hotels, hospitals, multiplex, schools, colleges etc where density of people is high.

Save the environment

Every day thousand tonnes of Hazardous Halogen gases are released in the environment resulting in depletion of the earth's ozone layer (which protects us from cancer causing UV radiations of the Sun) a phenomenon popularly known as green house effect. STANDARD FR-LSH PVC insulated industrial cables are practically halogen free and therefore are environment friendly. So when you sell/buy these cables you not only protect your near & dear ones but also your future generations against the Green House Effect.



180 METRE PVC CABLES

Project Packaging 180 metre Single Core PVC Insulated Industrial Grade Cables

Today the scenario is changing fast from individual house/shops to small societies/factories – large scale projects challenge is to meet the surge in need for electrical wiring of longer length with enhanced flexibility.

Moving with philosophy and to meet the rapidly changing consumer requirements, we have induced a new range 180 metre PVC flexible cable which has been developed for use in applications where enhanced flexibility is required. The new range is in conformance with IS 694.

These wires provide easy of installation and have the best quality due to its electrical, mechanical and thermal properties.

- This longer length is more economical as less leftover pieces are generated from each coil after wiring thereby reducing scrap and saving in inventory.
- In case of bigger construction projects, longer connections are required.....due to longer length the number of joints are reduced ensuring safe and jointless wiring installations.
- Since each coil is of longer length and more compact, more wires can be accommodated in the same storage area thus making optimum usage of available storage space.
- In case of bigger construction projects, getting space is a challenge in panels and conduits.....due to enhanced flexibility and higher bending radius the Lifeline is ideal for wiring in closed confined spaces.
- Lifeline FR PVC compound has a high oxygen index and temperature index. These properties help in restricting fire even at high temperatures.

Basic Code		Nominal Cross Sectional area of conductor	Number/ Nom. Dia of cond. strands*	Thickness of Insulation (Nom)	Approx. overall Diameter	Current Carrying Capacity 2 Cables Single Phase		Max. Conductor Resistance per km at 20 °C
						Conduit / Trunking	Unenclosed clipped directly to a surface or on cable trays	
FR	FR-LSH	sq. mm	mm	mm	mm	Ampere	Ampere	Ohm
WSFFDN...L1X757		0.75 sq. mm	24 N / 0.20 mm	0.6 mm	2.3 mm	9 A	9 A	26.00 Ω
WSFFDN...L11X07	WSFFFN...L11X07	1.0 sq. mm**	32 N / 0.20 mm	0.6 mm	2.7 mm	12 A	14 A	19.50 Ω
WSFFDN...L11X57	WSFFFN...L11X57	1.5 sq. mm**	30 N / 0.25 mm	0.6 mm	3.0 mm	15 A	17 A	13.30 Ω
WSFFDN...L12X57	WSFFFN...L12X57	2.5 sq. mm**	50 N / 0.25 mm	0.7 mm	3.6 mm	21 A	23 A	7.98 Ω
WSFFDN...L14X07	WSFFFN...L14X07	4.0 sq. mm	56 N / 0.30 mm	0.8 mm	4.1 mm	29 A	32 A	4.95 Ω
WSFFDN...L16X07	WSFFFN...L16X07	6.0 sq. mm	84 N / 0.30 mm	0.8 mm	4.6 mm	39 A	43 A	3.30 Ω

...Fill the colour code i.e. B = Blue ... / K = Black ... etc...

Note: FR & FR-LSH 180 metre project length is available in carton packaging.

**Conductor Shall be class-V as per IS:8130.

*The number and diameter of conductor strands are for reference only. Conductor resistance as per IS:8130 is the governing criteria.

Construction :-

Conductor : Plain annealed copper conductor as per IS:8130

Construction : Primary - Natural PVC with FR property

Secondary - Skin colour coated FR property

Colour : Red/Yellow/Blue/Black/Green

Any other colour on specific request can also be supplied.

Features of STANDARD Flexible Cables

Short-Circuit Protection

Fire caused due to short-circuit is the most common electrical mishap. Short-circuit can be caused by a host of reasons such as faulty wiring, broken insulation due to inferior quality of insulation, circuit-overload, and defective plugs, switches, cords, receptacles, etc. STANDARD Cables ensure superior insulation and conductor characteristics to prevent short-circuit due to wiring.

Energy Efficient Cables

STANDARD Cable provide highest level of electrical conductivity at in the world at 101% copper conductivity, exceeding the parameter indicated by the International Annealed Copper Standards (IACS). This ensures minimum loss throughout the length of the cable which translated to saving of 2-3% in the electricity bill. It also provides additional protection against voltage fluctuations.

Low Voltage Drop

Drop in voltage from point of supply to the end receiving point is called voltage drop. High Voltage drop across conductor is undesirable as it reduces the supplied energy. STANDARD Cables and cables have adequate conductor diameter to ensure low voltage drop and higher efficiency while using electrical equipment.

Higher Di-Electric Strength

Di-electric strength represents the magnitude of voltage endured by a test-piece of wire when a specified voltage is passed through it for a specified duration of time. Higher di-electric strength means better electrical characteristics. STANDARD has an in-house PVC compound manufacturing unit where PVC is blended to offer high di-electric strength to prevent electric breakdown in PVC.

Higher Convection of Heat

Convection is the flow of heat from hot to cool region. Lubricants like wax are required to prevent PVC-melt from sticking to hot extruder surface, which ensures a good heat transfer within the melt. Higher convective heat dissipation capability of STANDARD technology compound enables STANDARD cables to carry more current in overload conditions.

Water Proof and UV resistant

In many building, construction concrete may itself not be water-tight. Contact with water caused deterioration of the cable's electrical and mechanical properties. Exposure to cable polymer to UV radiation induces chemical processes that cause polymer damage like chalking, loss of impact or tensile strength and a host of other chemical changes. All this can greatly reduce the service life of the cable and expose people to electrical shocks.

STANDARD has developed a high-quality thermoplastic insulation compound made of single carbon-bond polymer chain. This makes STANDARD cables impermeable to water, ultra violet (UV) radiation and chemicals, thereby significantly enhancing the life and safety of STANDARD cable.

Comparative Technical Features

S.No	Feature	Normal (FR) Range	Standard (HTR) Range
1	Insulation Material	FR PVC	Special PVC
2	Insulation property	Good	Very Good
3	Temperature Rating	70 °C	85 °C
4	Thermal stability	80 min	100 min
5	Flame Retardancy	Very Good	Excellent
6	Short circuit Temperature	160 °C	250 °C
7	Abrasion Resistance During Installation	Good	Very Good
8	Life of Product	Normal	20% more than Normal
9	Rated current	Normal	10% higher than Normal
10	Leakage current at operating temp.	Normal	10% less than Normal

ROUND MULTICORE CABLE

STANDARD manufacture and supply premium quality multi core flexible cables with copper conductor for various industrial and domestic applications like electrically operated Machines & Equipment's (eg. Air-Conditioners/ Refrigerators/motors etc.)

Multicore round PVC insulated industrial grade copper conductor and PVC sheathed flexible cables, 1.1 kV as per IS:694 The sheathing material provides resistance to oil, and moisture and superior mechanical strength without losing its flexibility. These cables can also be made available with FR-LSH & HTR-FR compound on request.

Basic Code	Nominal Cross Sectional area of conductor	Number Nom. Dia of cond. strands*	Thick-ness of Insula-tion (Nom)	Nominal Thickness of Sheath			Appx. Overall Diameter			Current Rating AC	Voltage Drop/ Amp/Metre		Max. Conductor Resistance per km at 20 °C
				2 Core	3 Core	4 Core	2 Core	3 Core	4 Core		DC or Single Phase AC	3 Phase AC	
	sq. mm	mm	mm	mm	mm	mm	mm	mm	mm	Ampere	mV	mV	Ohm
WSMFDSKB_X50	0.5 sq. mm	16 N / 0.20 mm	0.6 mm	0.9	0.9	0.9	6.2	6.5	7.0	4 A	83	72	39.0 Ω
WSMFDSKB_X75	0.75 sq. mm	24 N / 0.20 mm	0.6 mm	0.9	0.9	0.9	6.6	6.9	7.5	7 A	56	48	26.0 Ω
WSMFDSKB_1X0	1.0 sq. mm	32 N / 0.20 mm	0.6 mm	0.9	0.9	0.9	6.9	7.3	7.9	11 A	43	37	19.5 Ω
WSMFDSKB_1X5	1.5 sq. mm	30 N / 0.25 mm	0.6 mm	0.9	0.9	1.0	7.4	7.8	8.7	13 A	31	26	13.3 Ω
WSMFDSKB_2X5	2.5 sq. mm	50 N / 0.25 mm	0.7 mm	1.0	1.0	1.0	8.8	9.4	10.2	18 A	18	16	7.98 Ω
WSMFDSKB_4X0	4.0 sq. mm	56 N / 0.30 mm	0.8 mm	1.0	1.0	1.0	10.2	10.9	11.9	24 A	11	9.6	4.95 Ω
WSMFDSKB_6X0	6.0 sq. mm	84 N / 0.30 mm	0.80 mm	1.1	1.1	1.2	11.5	12.2	13.6	31 A	8	7	3.30 Ω



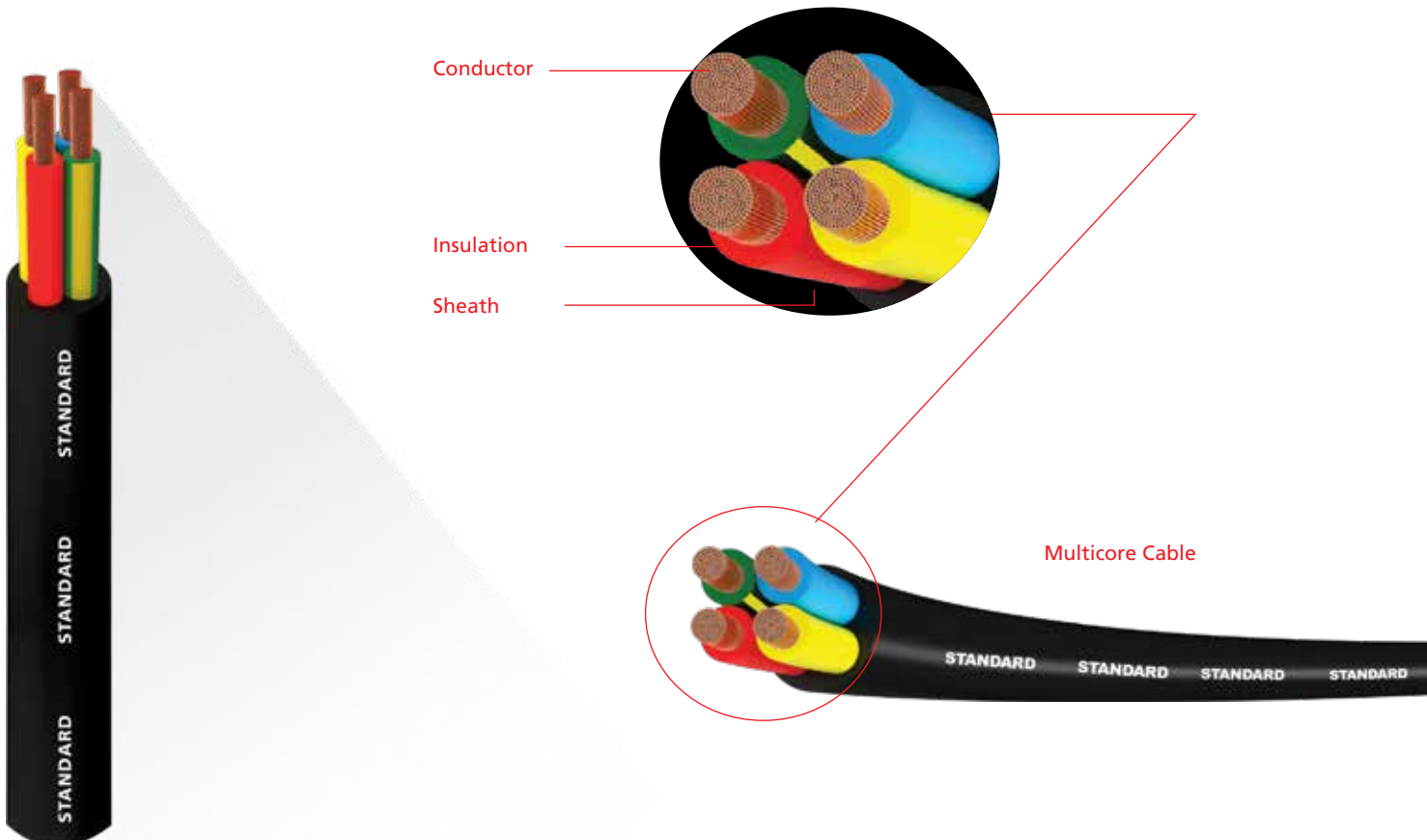
2 Core



3 Core



4 Core



Multicore Round PVC Insulated Copper Conductor and PVC Sheathed Flexible Industrial Cables, 1100 Voltage Grade

Basic Code	Nominal Cross Sectional area of conductor	Number Nom. Dia of cond. strands*	Thickness of Insulation (Nom)	Nominal Thickness of Sheath					Appx. Overall Diameter					Max. Conductor Resistance per km at 20 °C	
				5 Core	6 Core	7 Core	8 Core	10 Core	5 Core	6 Core	7 Core	8 Core	10 Core		
	sq. mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Ohm
WSMFDSKB_X50	0.5	16 N / 0.20 mm	0.6	0.9	0.9	0.9	1.0	1.0	7.8	8.2	8.2	9.4	11.0	39.0 Ω	
WSMFDSKB_X75	0.75	24 N / 0.20 mm	0.6	0.9	1.0	1.0	1.0	1.1	8.3	9.4	9.4	10.4	11.8	26.0 Ω	
WSMFDSKB_1X0	1.0	32 N / 0.20 mm	0.6	1.0	1.0	1.0	1.0	1.1	9.0	9.8	9.8	10.9	12.5	19.50 Ω	
WSMFDSKB_1X5	1.5	30 N / 0.25 mm	0.6	1.0	1.0	1.0	1.1	1.1	9.8	10.7	10.7	12.0	13.7	13.30 Ω	
WSMFDSKB_2X5	2.5	50 N / 0.25 mm	0.7	1.0	1.1	1.1	1.2	1.3	11.8	12.8	12.8	14.0	16.8	7.98 Ω	
WSMFDSKB_4X0	4.0	56 N / 0.30 mm	0.8	1.1	1.2	1.2	1.3	1.4	13.8	15.8	15.8	16.8	20.4	4.95 Ω	

Basic Code	Nominal Cross Sectional area of conductor	Number Nom. Dia of cond. strands*	Thickness of Insulation (Nom)	Nominal Thickness of Sheath				Appx. Overall Diameter				Max. Conductor Resistance per km at 20 °C	
				12 Core	14 Core	16 Core	19 Core	12 Core	14 Core	16 Core	19 Core		
	sq. mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Ohm
WSMFDSKB_X50	0.5	16 N / 0.20 mm	0.6	1.0	1.1	1.1	1.1	11.6	12.0	12.7	13.2	39.0 Ω	
WSMFDSKB_X75	0.75	24 N / 0.20 mm	0.6	1.1	1.1	1.2	1.2	12.4	12.8	13.8	14.3	26.0 Ω	
WSMFDSKB_1X0	1.0	32 N / 0.20 mm	0.6	1.1	1.1	1.2	1.3	12.9	13.7	14.4	15.1	19.50 Ω	
WSMFDSKB_1X5	1.5	30 N / 0.25 mm	0.6	1.1	1.2	1.2	1.3	14.2	14.8	15.8	16.6	13.30 Ω	
WSMFDSKB_2X5	2.5	50 N / 0.25 mm	0.7	1.3	1.3	1.4	1.4	17.3	18.0	19.5	20.4	7.98 Ω	
WSMFDSKB_4X0	4.0	56 N / 0.30 mm	0.8	1.4	1.4	1.5	1.5	20.6	22.0	23.8	25.2	4.95 Ω	

Note: Available in 100 metre length with black outer sheath & in bigger packing on request.

Any colour on specific request can be supplied, in economical run.

*The number and diameter of conductor strands are for reference only.

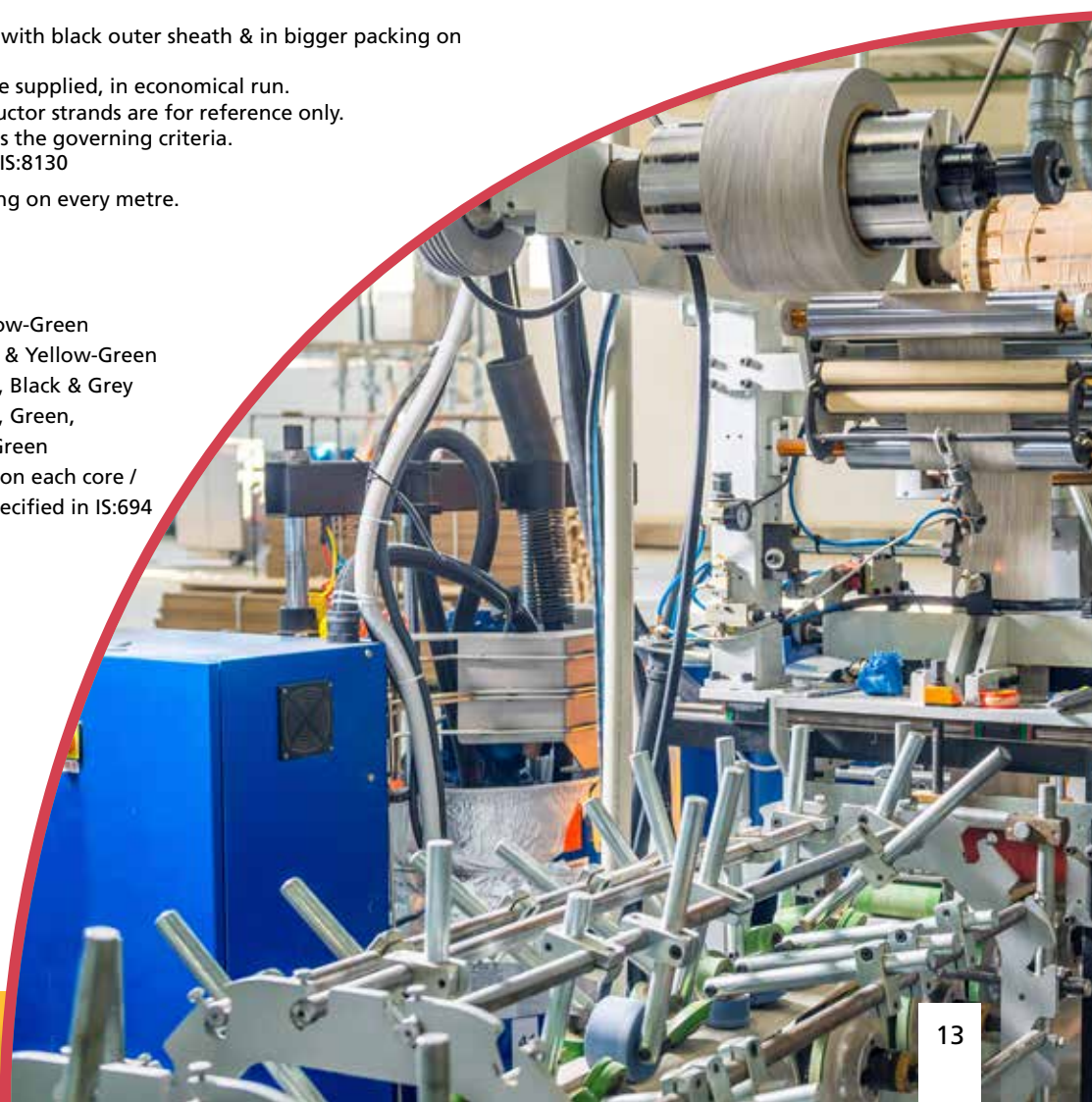
Conductor resistance as per IS:8130 is the governing criteria.

Conductor shall be of Class-V as per IS:8130

Progressive sequential length marking on every metre.

Core Identification:

- 2 CORE : Red & Black
- 3 CORE : Red, Black & Yellow-Green
- 4 CORE : Red, Yellow, Blue & Yellow-Green
- 5 CORE : Red, Yellow, Blue, Black & Grey
- 6 CORE : Red, Yellow, Blue, Green, White & Yellow-Green
- 7 CORE & Above : Number printing on each core / Colour code as specified in IS:694



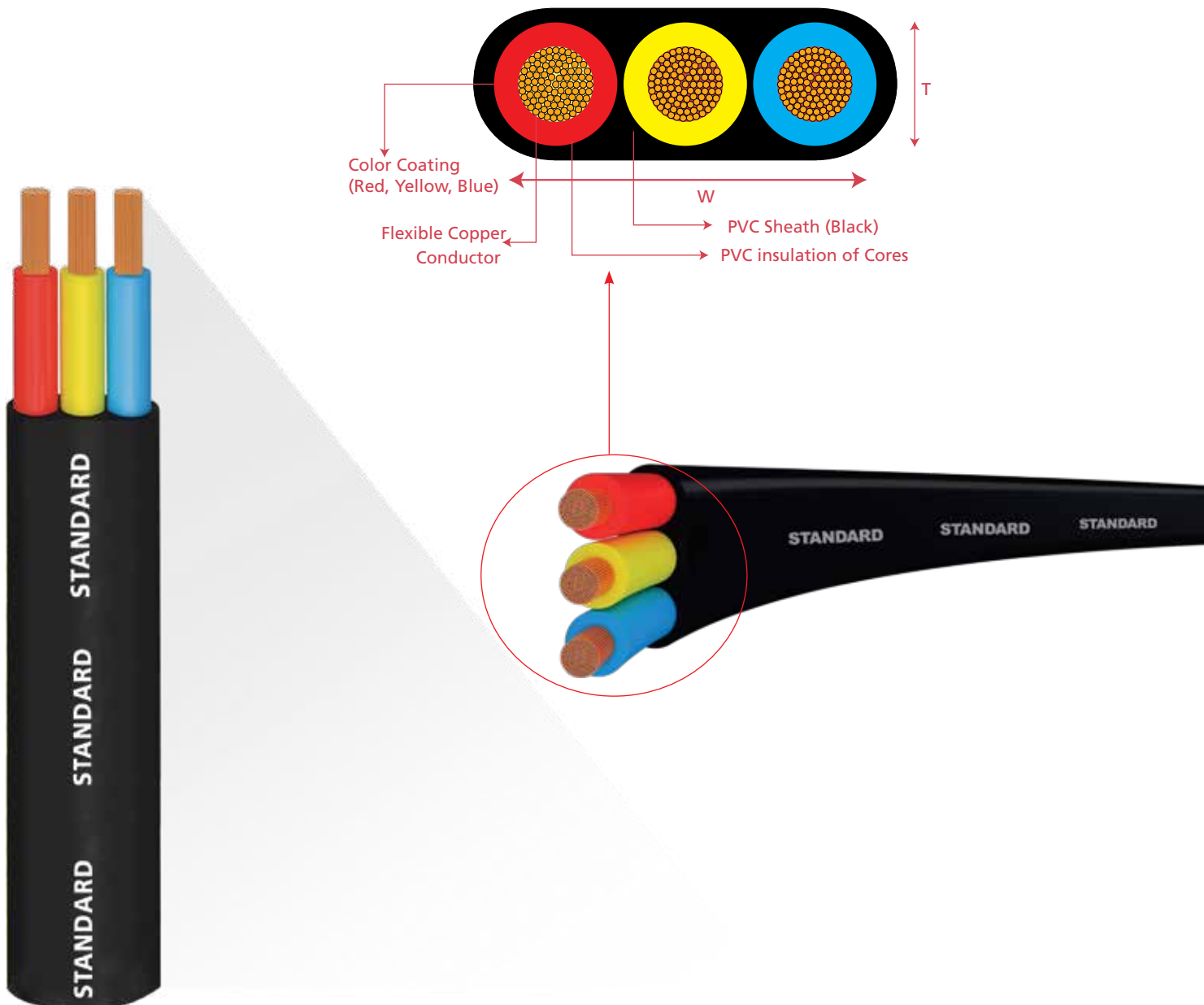
FLAT SUBMERSIBLE CABLE

Application

STANDARD Flat cable basically used to pump underground water, these cables are also used to pump sewage water and flood water. Designed for excellent performance even under fully submerged condition, these cables withstand the impact of corrosive liquids and abrasion

Features

- Excellent electrical & mechanical properties.
- Outer sheath consists of highly abrasion resistant PVC compound impervious to grease, oil and water etc
- Good insulation properties when submerged in water
- Progressive sequential length marking on every metre.



Three Core Flat PVC Insulated Industrial Grade Cable for Submersible use, 1100 Volt

Size	Conductor		Insulation			Sheath				CR at 20 °C Ω/km (Max.)	Current carrying capacity at 40 °C (A)	
	No. of Strands	Wire Dia Nom.	Thickness Nom.	Core Dia		Thickness Nom.	Width		Width			
				Min.	Max.		Min.	Max.	Min.			Max.
sq. mm	N	mm	mm	mm	mm	mm	mm	mm	mm	mm	Ω/km	Ampere
3 x 1.5	30	0.25	0.6	2.66	2.69	0.90	9.78	9.94	4.46	4.55	13.30	13 A
3 x 2.5	50	0.25	0.7	3.28	3.32	1.00	11.85	12.03	5.28	5.38	7.98	18 A
3 x 4.0	56	0.30	0.8	3.98	4.03	1.00	13.94	14.15	5.98	6.09	4.95	24 A
3 x 6.0	84	0.30	0.8	4.52	4.56	1.10	15.75	15.96	6.72	6.83	3.30	31 A
3 x 10	80	0.40	1.0	5.83	5.89	1.40	20.30	20.56	8.63	8.78	1.91	42 A
3 x 16	126	0.40	1.0	6.82	6.88	1.40	23.25	23.51	9.62	9.76	1.21	57 A
3 x 25	196	0.40	1.2	8.40	8.47	2.00	29.20	29.53	12.40	12.59	0.780	72 A
3 x 35	276	0.40	1.2	9.52	9.59	2.00	32.55	32.89	13.52	13.71	0.554	90 A

Note: Available in 500 metre ± 5% metre packing in drums. Also available in 100 metre packing on request.

*The number and diameter of conductor strands are for reference only. Conductor resistance as per IS:8130 is the governing criteria. Conductor shall be of Class-V as per IS:8130



CO-AXIAL TV CABLES

Application

Used in cable TV operations, Computer net-working etc.

Construction

Solid annealed bare copper conductor polythelene insulated shielded with polyester backed aluminium tape and additional shielding with fine aluminium braid protected with polyester tape wrapping and sheathed with PVC.

Construction Parametre

S. No.	Type Foam	RG-11 Foam	RG-6 Foam	RG-59 Foam	RG 6 CCS Foam
1	Inner Conductor	Solid Bare Copper	Solid Bare Copper	Solid Bare Copper	Copper Coated Steel
2	Nom. Diameter (mm)	1.63 mm ± 0.03 mm	1.02 mm ± 0.03 mm	0.80 mm ± 0.03 mm	1.02 mm ± 0.03 mm
3	Dielectric	Foam PE	Foam PE	Foam PE	Foam PE
4	Nom. Diameter (mm)	7.11 mm	4.57 mm	3.55 mm	4.57 mm
5	Outer Conductor - First	Bonded AL Tape	Bonded AL Tape	Bonded AL Tape	Bonded Al Tape
6	Outer Conductor - Second	AL Braid	AL Braid	AL Braid	Al Braid
7	Nom. Coverage (%)	60 %	60 %	60 %	60 %
8	Jacket	PVC (Black)	PVC (Black)	PVC (Black)	PVC (Black)
9	Nom. Diameter (mm)	10.00 mm ± 0.20 mm	6.5 mm ± 0.10 mm	6.00 mm ± 0.10 mm	6.5 mm ± 0.10 mm



Standard Co-Axial TV Cables

Electrical Parametre

S. No.	Type	RG-11 Foam	RG-6 Foam	RG-59 Foam
1	Inner Conductor			
	Max. Resistance (Ω /km) @ 20 °C	0.84 Ω /km	2.13 Ω /km	3.55 Ω /km
2	Inner Conductor			
	Loop Resistance (Ω /km) @ 20 °C	1.66 Ω /km	2.78 Ω /km	4.64 Ω /km
3	Nom. Capacitance (pF/m)	53 pF/m	53 pF/m	53 pF/m
4	Nom. Impedance (Ω)	75 Ω	75 Ω	75 Ω
5	Nom. Velocity Ratio (%)	85 %	85 %	85 %
6	Nom. Attenuation @ 25° (dB/100 m)			
	@55 MHz	2.82 dB	1.95 dB	6.73 dB
	@83 MHz	3.87 dB	6.20 dB	8.04 dB
	@187 MHz	5.74 dB	9.15 dB	11.81 dB
	@211 MHz	6.23 dB	9.50 dB	12.47 dB
	@250 MHz	6.72 dB	10.50 dB	13.45 dB
	@300 MHz	7.38 dB	11.50 dB	14.60 dB
	@350 MHz	7.94 dB	12.45 dB	15.71 dB
	@400 MHz	8.53 dB	13.30 dB	16.73 dB
	@450 MHz	9.02 dB	14.35 dB	17.72 dB
	@500 MHz	9.51 dB	14.95 dB	18.70 dB
	@550 MHz	9.92 dB	15.70 dB	19.52 dB
7	Structural Return Loss (dB/100 m)			
	From 30 MHz to 300 MHz	> 26 dB	> 28 dB	> 30 dB
	From 300 MHz to 550 MHz	> 24 dB	> 22 dB	> 24 dB
	Bending Radius, min (mm)	75 mm	65 mm	65 mm

Note: RG 6 also available in CCS.

Technical Data

S. No.	Type	
1	Size	RG-59, RG-6, RG-11
2	Inner Conductor	Solid Copper
3	Insulation	Gas Injected Physical Foamed Polyethylene
4	Outer Conductor	Bonded polyaluminium Tape, Braided with Aluminium Alloy Wire
5	Outer Jacket	UV Resistant Black PVC Jacket
6	Marking	Progressive Sequential Length Marking on Every Metre



COMPUTER LAN CABLES

Introduction

STANDARD Networking Cables allows device to access high-speed networks / Internet data. The Cables are verified to the performance requirements of ISO/IEC 11801, TIA/EIA 568C.2. Unshielded twisted pair (UTP) cable is used in many home and business-based Ethernet networks. It has four pairs of wires that are housed inside of the lining of the cable. Each pair is twisted to prevent interference from other devices on the network.

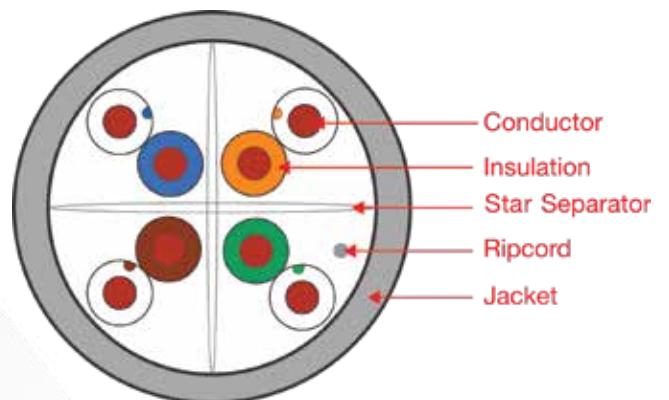
CAT 6 (with star separator)

Category 6 cable, commonly referred to as Cat 6, is a standardized twisted pair cable for Gigabit Ethernet and other network physical layers that is backward compatible with CAT5/5e.

Cat 6 features more stringent specifications for crosstalk and system noise. The cable standard provides performance of up to 250 MHz

Features

- Exceptional material properties and cable design
- High ACR values-providing low BER (Bit Error-Rate)
- Exceeds cat 6 Best transmission performance.
- Extremely high pair-balance-providing excellent EMC (Electromagnetic compatibility)
- Maximum noise immunity.
- ISO/IEC - 11801 Class E.
- UL-94V0 rated Plastics.
- ETL Verified
- Longer Cable segment Length.
- High speed data access
- Total end-to-end horizontal cabling solution
- Backwards compatible with Standard Category 6 systems – ensuring support for legacy applications
- Unshielded Twisted Cable
- Cable supports frequencies up to 250 MHz
- Cable supports data transfer speeds up to 1000 Mb/s - Gigabit
- Available in 305 m Box packaging



Colour Code

- Pair 1 - White – Blue and Blue
- Pair 2 - White – Orange and Orange
- Pair 3 - White – Green and Green
- Pair 4 - White – Brown and Brown

Computer LAN Cables - Complete Networking Solution

Transmission Parameter as per 100 Metre.

Frequency (Hz)	Insertion Loss (dB/100 m)	NEXT (dB)	PSNEXT (dB)	ELFEXT	PSELFEXT (dB)	RL (dB)	ACR (dB)
1 Hz	2.00	74.3	72.3	67.8	64.8	20.0	72.3
4 Hz	3.90	65.3	63.3	55.8	52.8	23.0	61.5
8 Hz	5.30	60.8	58.8	49.7	46.7	24.5	55.5
10 Hz	6.00	59.3	57.3	47.8	44.8	25.0	53.3
16 Hz	7.60	56.2	54.2	43.7	40.7	25.0	48.6
20 Hz	8.50	54.8	52.8	41.8	38.8	25.0	46.3
25 Hz	9.50	53.3	51.3	39.8	36.8	24.3	43.8
31.25 Hz	10.70	51.9	49.9	37.9	34.9	23.6	41.2
62.50 Hz	15.40	47.4	45.4	31.9	28.9	21.5	32.0
100 Hz	19.80	44.3	42.3	27.8	24.8	20.1	24.5
200 Hz	29.0	39.8	37.8	21.8	18.8	18.0	10.8
250 Hz	32.8	38.3	36.3	19.8	16.8	17.3	5.5

Electrical characteristics

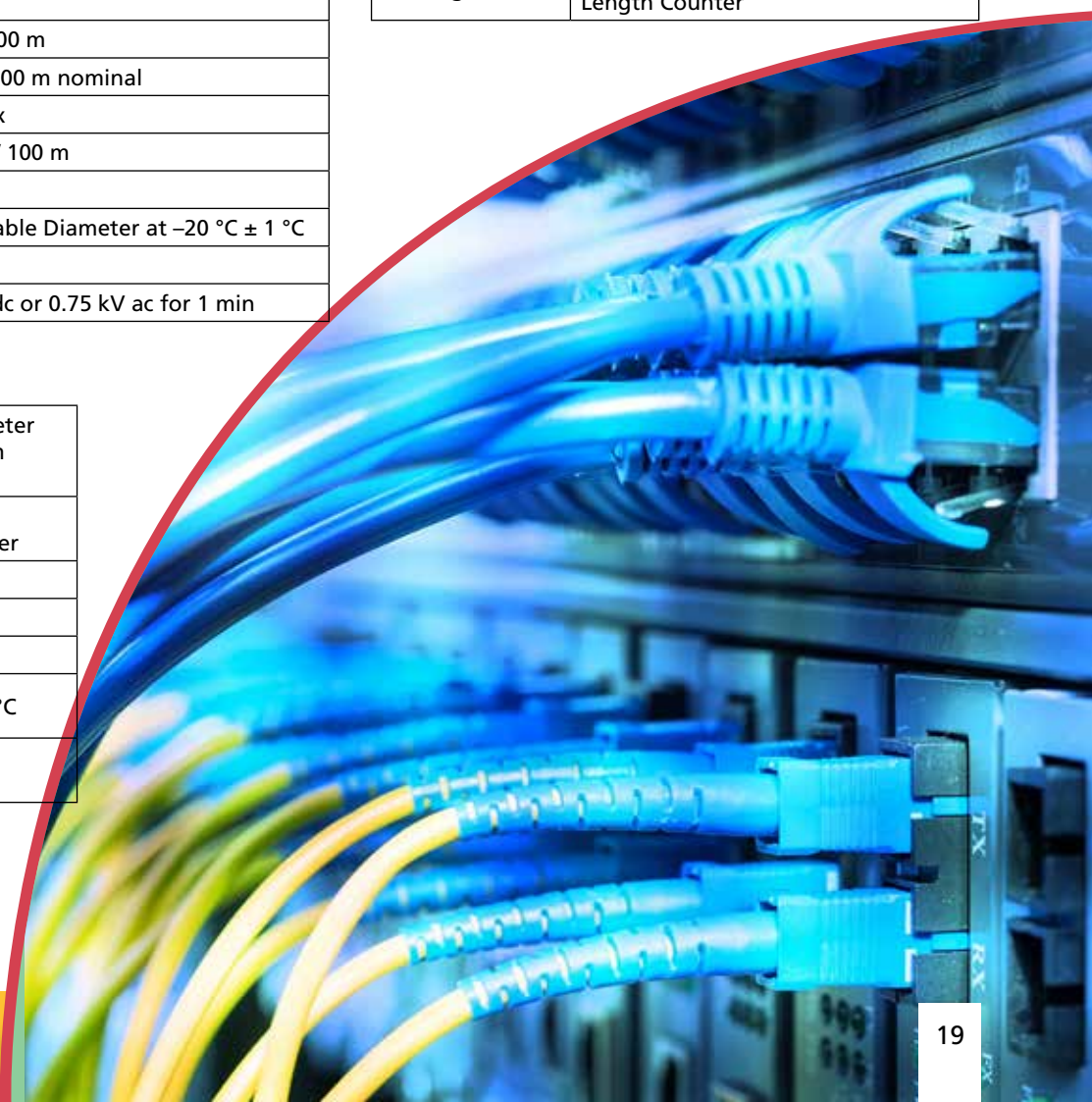
Characteristic Impedance	100 Ω \pm 6 Ω @ 1-250 MHz
DC Resistance	72 Ω /km (max)
Voltage Rating	72 Vdc max
Dielectric Strength	1500 V / 1 min MHz
Insulation Resistance	500 M Ω /km (min) @500 Vdc
Nominal Velocity of Propagation (%)	69%
Conductor Resistance	<7.20/100 m
Mutual Capacitance	5.6 nF/100 m nominal
Resistance Unbalance	5% Max
Capacitance Unbalance	330 pF / 100 m
Delay Skew	< 45 ns
Bending Radius	< 4 X Cable Diameter at -20 $^{\circ}$ C \pm 1 $^{\circ}$ C
Operating Voltage	72 V
Dielectric Strength	1.0 kV dc or 0.75 kV ac for 1 min

Technical Requirement

Conductor Metal	23 AWG Solid Bare Copper
Insulation	High Density Polyethylene
Pairs	2 Insulated conductors twisted together
Sheath	PVC
Cable Diameter	6 mm \pm 0.3 mm
Printing	Each meter printed with sequential Length Counter

Mechanical Properties

Outer Diameter	Nominal Diameter 6 mm \pm 0.3 mm 4 twisted pair
Conductor Type	23 AWG bare annealed copper
Jacket Material	PVC
Standard Colour	Grey
Pulling Force	11.5 kg
Operating Tem. Ran.	-20 $^{\circ}$ C to + 70 $^{\circ}$ C
Storage Tem. Ran.	0 $^{\circ}$ C to + 50 $^{\circ}$ C



CCTV CABLES

Introduction

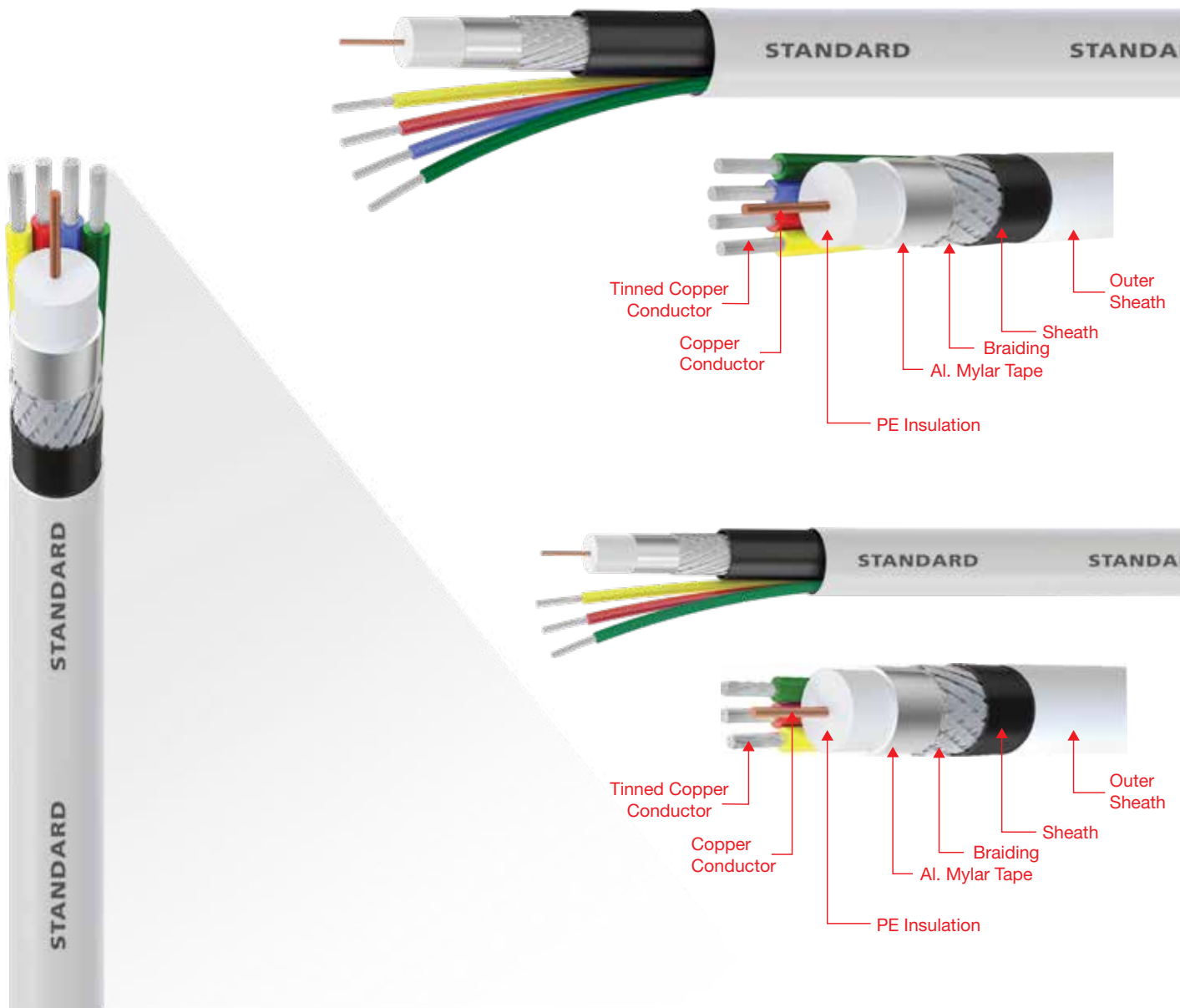
STANDARD CCTV Cables are offered in two types namely 4+1 CCTV Cable and 3+1 CCTV Cable. Coaxial cables form the carrier for video signal and the other '4 cores' or '3 cores' form the carriers for power. Coaxial cables are designed to transmit the complete video frequency range with minimum distortion or attenuation, making them an excellent choice for CCTV.

STANDARD CCTV cables are designed to optimize the quality of video signals, which are transmitted through the Coaxial cable in the CCTV.

The Coaxial cable consists of solid annealed bare copper conductor of electrolytic grade which is insulated with foamed dielectric, aluminium foil taped, jelly flooded, braided with Al. Alloy and then jacketed with UV PVC.

Topmost quality of construction of coaxial cable in STANDARD CCTV cables ensures distortion free video signals and thus a clear picture over complete low frequency bandwidth of transmission in such applications.

The Impedance of Coaxial Cable is 75Ω which matches the CCTV equipment. This matching ensures adequate signal strength, no reflection and best picture quality.



STANDARD CCTV Cables - Complete Security Solution

Technical Requirement of CCTV Cable			
S.No.	Particular	3+1 CCTV Cable	4+1 CCTV Cable
Co-Axial Cable			
1	Conductor		
	Material	Annealed Bare Copper	Annealed Bare Copper
	No. of Wire/Diameter of Wire	1 N / 0.60 mm \pm 0.02 mm	1 N / 0.60 mm \pm 0.02 mm
2	Insulation		
	Material	Polyethylene	Polyethylene
	Nominal Thickness of Insulation	0.35 mm	0.35 mm
	Diameter of Insulation	1.30 mm \pm 0.10 mm	1.30 mm \pm 0.10 mm
3	Overall Shielded		
	First Shield Material	Polyester Backed Al. Foil - 100%	Polyester Backed Al. Foil - 100%
	Second Shield Material	Aluminium Alloy Wire	Aluminium Alloy Wire
	Coverage	55%	55%
Coaxial Outer Sheath			
	Material	PVC	PVC
	Diameter of Sheath	2.80 mm \pm 0.20 mm	2.80 mm \pm 0.20 mm
Power Core			
1	Conductor		
	Material	Annealed Bare Copper	Annealed Bare Copper
	No. of Wire/Diameter of Wire	7 N / 0.15 mm \pm 0.01 mm	7 N / 0.15 mm \pm 0.01 mm
2	Insulation		
	Material	PVC Type-A	PVC Type-A
	Nominal Thickness of Insulation	0.40 mm	0.40 mm
	Diameter of Insulation	1.30 mm \pm 0.10 mm	1.30 mm \pm 0.10 mm
Outer Sheath			
1	Outer Sheath		
	Material	FR PVC	FR PVC
	Nominal Thickness of Sheath	0.70 mm \pm 0.10 mm	0.70 mm \pm 0.10 mm

TELECOM SWITCH BOARD CABLES

Standard Telecom Switch Board Cable

Application

Cables used for Indoor Telephones, Telephone Exchanges, Industrial Plant Communication Systems, EPBAX Systems, Closed Circuit Security Systems, In-House Telephone wiring and various other equipments involving telephones.

Standard

Cables are generally made as per TEC Specification No. G/WIR-06/03 or as per customer specification.

Construction

Solid annealed tinned copper conductor, PVC insulated cores suitably colour coded for distinct identification, twisted to form pairs, pairs laid up, PVC sheathed.

Design / Material

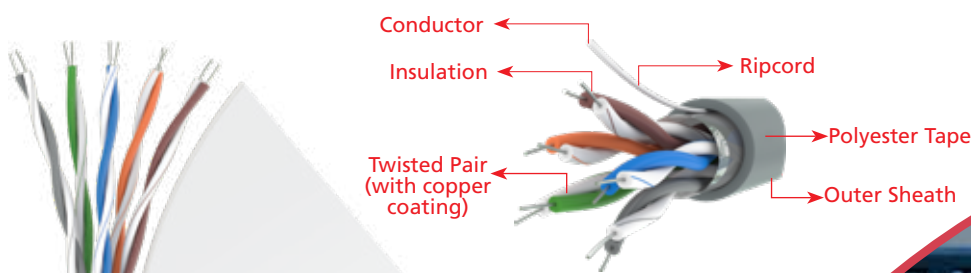
- Conductor : Tinned copper
- Insulation : PVC
- Shielding : Over all shielded with polyester tape (Manufactured against customer's orders only for economical runs.)
- Sheathing : PVC
- Conductor size Cable: 0.4 mm
- Configuration : 1p, 2p, 3p, 4p, 5p, 10p, 20p

Note: Telephone Cable can also be made available with bare copper, polythelene insulation FR-LSH/polythelene sheathing & conductor sizes of 0.5 mm, 0.6 mm on request.

Salient Features for Telephone Cable

- Hard grade PVC insulation is used for long life and stable properties of cables.
- Staggered lays of twisted pairs are used to ensure minimum cross talk.
- Sizing and processing of conductor and insulated cores is done in precisely controlled manner on automatic modern machines to have optimum values of capacitance, capacitance unbalance, image and cross talk attenuation and characteristic impedance.
- Shielding is done to protect from outside / inter pair interference as per specific needs.

Note: Available in 90 metre length in carton packaging & 180 metre project length in polywrap packaging.



SPEAKER CABLES

Standard Speaker Cables

Introduction

Speaker Cable use to make connection between loudspeaker and audio amplifiers with in various sound instruments. In today's constructions, the new Building Code (Like for Airports, Railway platforms, Auditoriums, Offices, High-rise apartments and Hospitals etc.), Installation of speaker cables ensure a clear and distortion free voice with very low dB loss.

"STANDARD" twin parallel Speaker cables are manufactured with multi wire, bright annealed flexible bare electrolytic grade copper conductor, each core designed to easy identification with Insulation of specially formulated and in house manufactured FR (Fire Retardant) PVC compound with high value of oxygen and temperature index.

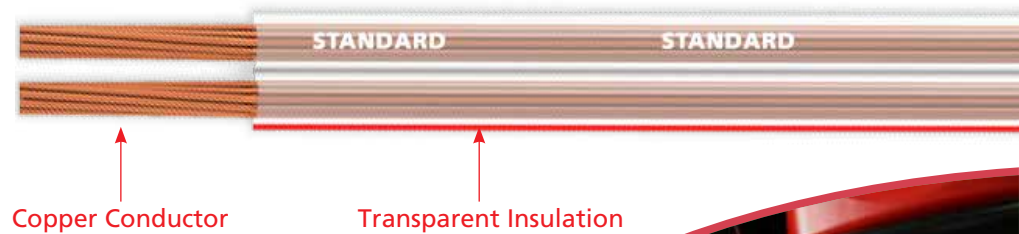
Packaging: Transparent Polywrapping in 100 metre.

Technical Requirement

Size (sq.mm)	CR at 20 °C Ω /km (Max.)	INSULATION				
		Thickness (mm)	Width (mm)		Height (mm)	
			Nom.	Min.	Max.	Min.
2 x 0.50 sq.mm	39.00 Ω /km	0.6 mm	4.1 mm	4.3 mm	2.05 mm	2.10 mm
2 x 0.75 sq.mm	26.00 Ω /km	0.6 mm	4.5 mm	4.6 mm	2.24 mm	2.28 mm
2 x 1.0 sq.mm	19.50 Ω /km	0.7 mm	5.3 mm	5.4 mm	2.60 mm	2.70 mm
2 x 1.5 sq.mm	13.30 Ω /km	0.8 mm	6.2 mm	6.4 mm	3.06 mm	3.11 mm

Construction Details: The twin parallel cable have the following construction with different coloring of insulation.

Cross Section View



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Actual products may vary in colour, design, description and colour combination etc.

Although every effort has been made to ensure accuracy in the compilation of the technical detail within this publication. Specifications & performance data are constantly changing. Current details should therefore be checked with Havells Group.

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Instruction Manual



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Customer Care No. 08045 77 1313 (All Connections)

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