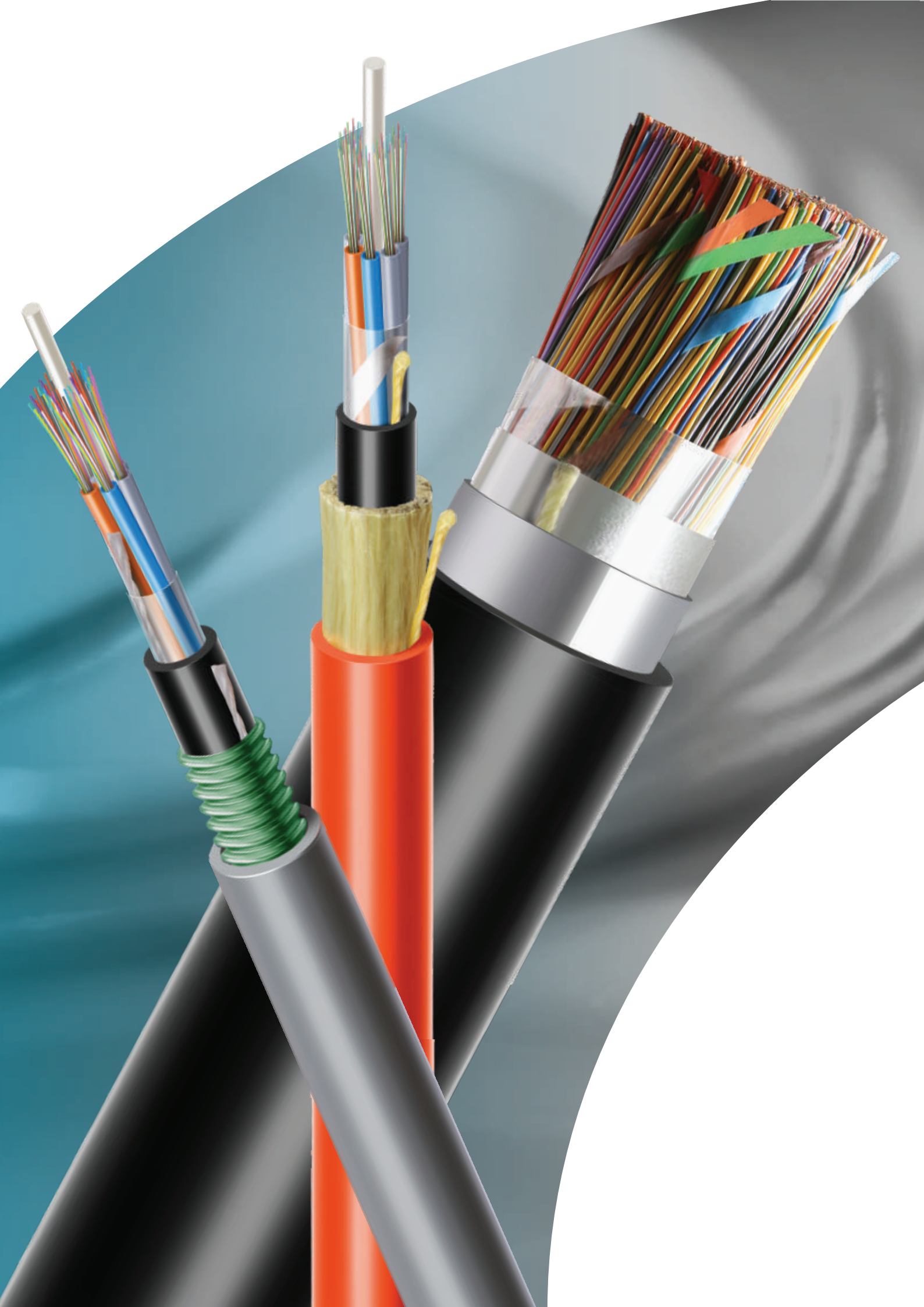
MP BIRLA GROUP

Integrating Global Communications . . .

Vindhya Telelinks Ltd.
Redefining Connectivity

BIRLA CABLE LTD.
(Formerly Birla Ericsson Optical Ltd.)



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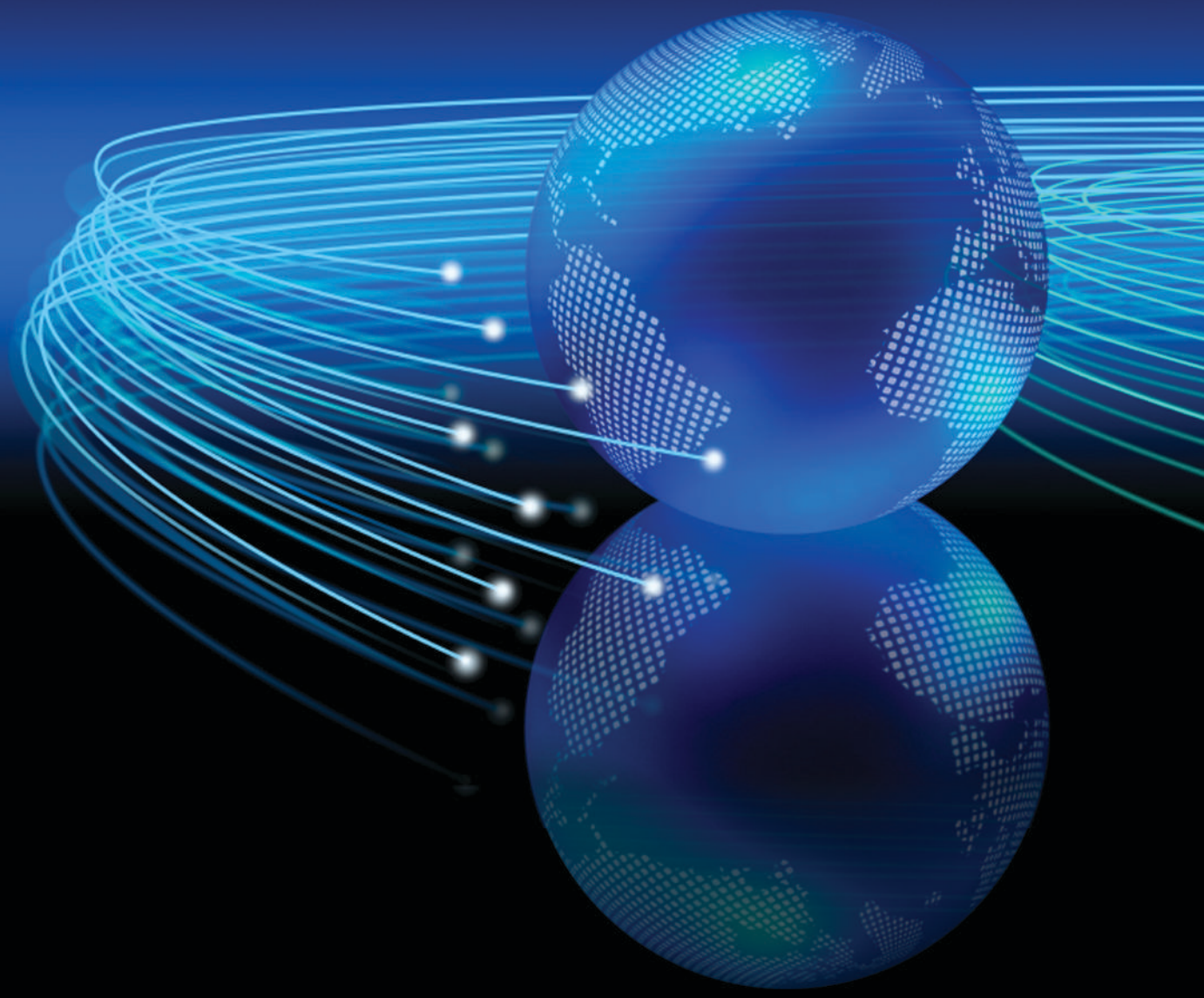
MP BIRLA GROUP



M. P. Birla Group

Profile

The M. P. Birla Group came into being with the establishment of its flagship venture in 1919, Birla Jute Manufacturing (better known today as Birla Corporation Ltd. or Birla Corp). From these humble beginnings, over the last 90 years the M. P. Birla Group has branched out into various industries which include textiles, man made fibres, cables, automobiles, shipping, etc. This ever growing industrial giant already has over 500 factories which manufacture a host of products like cement, sugar, paper, jute, telecommunications cables, aluminium, copper, fertilizers, chemicals, etc.

Today, thanks to the vision, commitment and effort of its late Chairman Madhav Prasad Birla and the able team under him, the M. P. Birla Group has become one of India's largest industrial houses. It has even made its mark in the international business scenario with over 40 joint ventures and management contracts across the globe.

Some of the major companies that fall under the umbrella of the M. P. Birla Group are:

COMPANY	PRODUCT
Birla Corporation Limited	Cement, Jute, Carbide, etc.
Birla Cable Limited (Formely Birla Ericsson Optical Limited)	Optical and Copper Telecommunication Cables, etc.
Vindhya Telelinks Limited	Copper and Optical Telecommunication Cables, etc.
Universal Cables Limited	EHV, HT and LT Power Cables and Capacitators, etc.
Birla Furukawa Fibre Optics Limited	Optical Fibres
Hindustan Gum and Chemicals Limited	Guar Gum and Allied Products
Birla Financial Corporation Limited	Non-Banking Financial Services
Birla DLW Limited	Linoleum Floor Covering

The M. P. Birla Group emphasizes its commitment to quality and customer satisfaction, with every company in the group holding an ISO 9001:2008 Certification for Quality Management Systems. Focussing on continuous improvement and technological innovation, the M. P. Birla Group companies continue to collaborate with major industrial players of international repute in order to develop the latest, most advanced products.

All the M. P. Birla Group companies take corporate social responsibility very seriously. A major portion of the group's CSR initiatives revolve around maintaining a healthy ecological balance and a secure work environment, in keeping with all the statutory requirements of the ISO 14001:2004 Certification for Environmental Management Systems.

The group is also known for its contributions to philanthropic and educational activities, donating millions every year in support of institutions, relief funds, hospitals and not-for-profit organisations.

The M. P. Birla Group is the perfect example of how a responsible, modern day leader can change the course of industry in our great nation, thereby changing the course of life for the millions who stand for India – a shining jewel amongst the countries of the world.

Birla Cable Limited

(Formerly Birla Ericsson Optical Ltd.)

Profile

Birla Cable Limited (Formerly known as Birla Ericsson Optical Limited) is a premier company in the field of Telecommunication Cables, which offers one of widest portfolio of Copper and Fibre Optic cables under its umbrella. A division under India's one of the most trusted M. P. Birla Group, Birla Cable Limited has come a long way to establish itself as one of the most admirable player in Global arena among users of Telecom cables due to its superior product quality, stringent quality control systems and flawless performance across all the segments of Telecom users.

It all started in the year 1992, having technology collaboration and financial partnership with globally renowned Ericsson Network Technologies AB of Sweden as a Joint Venture Company. This Cable manufacturing company of M.P. Birla Group has crossed leaps and bounds during the last, almost 3 decades of association with Ericsson, in not only equipping itself as one of the versatile cable manufacturing and total solutions providing company but also kept abreast with latest technology trends from time to time on a continuous basis. This unique and disruptive approach followed by the company catapulted it as a qualified globally certified company having various approvals with renowned certifying bodies and institutions in the field of Oil & Gas, Power and Telecom segments.

By way of acquiring the shares of Ericsson recently, Birla Cable Limited has become a truly global Indian Company which has a reach of more than 60 countries, fully capable to cater to all the needs of communication cables across the segments. A competent team in all functional areas backed up by strong and experienced management, sound financial and technical strength makes Birla Cable Limited, a trusted name among the users of Telecom Cables.

The company possess all the required quality certifications like Quality Management System, Environment and Health & Safety Management Systems in an integrated manner with its state of the art cable manufacturing facilities located in Rewa, Madhya Pradesh, India and always on the drive to expand its Product base and Market reach.

Vindhya Telelinks Limited

Profile

Jelly-filled telecommunication cable manufacturing as well as optic fibre cable manufacturing is a crucial sector for the Indian telecommunication industry. When the M. P. Birla Group chose to set up its specialised manufacturing unit in this sector in 1983, the intention was to make it a stalwart in the industry, a trendsetter, a benchmark for other companies. Today, Vindhya Telelinks Limited (VTL) is proud to be the leader in the fiercely competitive communications sector within the Indian market.

Vindhya Telelinks Limited is a major supplier to a variety of highly reputed clients like BSNL, MTNL, NTPC, SAIL and other leading user organisations in various industries - like the railways, the defence sector, coalfields and atomic power plants. It also supplies cables to private sector telecom players such as Bharti Telecom, Tata Teleservices, Reliance Communications and many others.

VTL's main facility, located in Rewa (Madhya Pradesh), is equipped with the most advanced technology, sourced from internationally renowned cable and machinery manufacturers. VTL, with its state-of-the-art manufacturing facility is capable of producing the full range of optical fibre cables (OFC).

VTL specialises in the production of complete range of copper telecommunications cables. The facility is fully capable of manufacturing ranging up to 2400 pairs. VTL also manufactures world-class optic fibre ribbon which is used in manufacturing of high count optical cable.

The EPC (Engineering, Procurement, Contract), division of VTL started in order to provide customers with comprehensive turnkey solutions such as trenching, laying, jointing, installation and other such activities which are required in telecom networking.

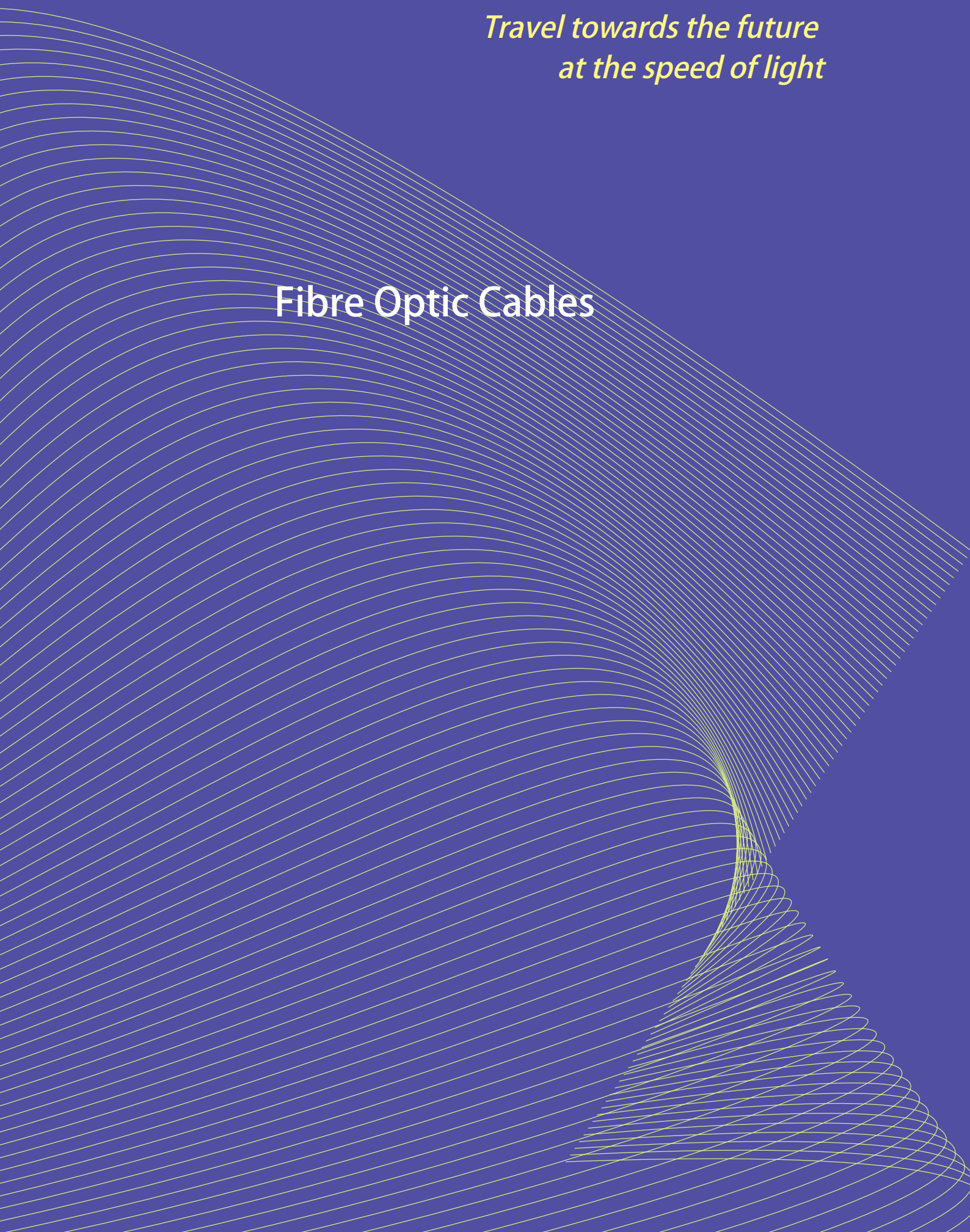
VTL has received IS/ISO 9001:2008 and IS/ISO-14001:2004 certification and is an organisation that consistently adheres to a sophisticated, world-class quality assurance system that covers every stage of the manufacturing process. At every stage, rigorous quality testing ensures complete customer satisfaction.

World standard manufacturing facilities, a robust distribution system, and a well-trained, qualified and committed workforce are the backbone of this organisation. Through its dedication to excellence, Vindhya Telelinks Limited has successfully exceeded all expectations, setting the bar high with superior quality products and excellent service standards.

Vindhya Telelinks Ltd.
Redefining Connectivity

Travel towards the future
at the speed of light

Fibre Optic Cables



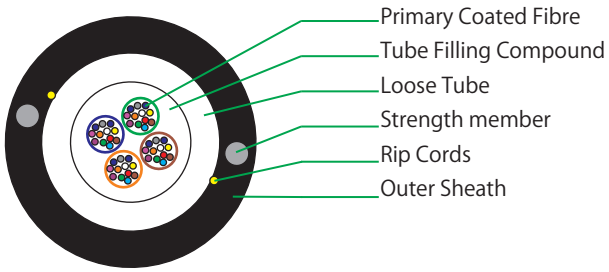
CENTRAL-TUBE UNARMOURED CABLE (2-48 F)

Water blocked | Outdoor | Underground | Metro | RoHS compliant

Applications

- Suitable for Duct Installation
- For CATV application, aerial application along with messanger wire

Typical Cross section of 48 Fibre



Cable Construction Details

- Up to 48 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- Metallic, anti-buckling Steel rod as Strength Member. embedded in outer sheath (also available with non metallic strength member, FRP rod)
- Loose buffer tube fully filled and Centrally placed in the cable
- UV Stablized PE outer sheath, black (also available with HFFR / FR PVC)

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 12F	6.0	40	1000	500	15D	20D	-10° to +50° C	-40° to +70° C
24F	8.0	60	1000	500	15D	20D	-10° to +50° C	-40° to +70° C
48F	9.5	80	1000	500	15D	20D	-10° to +50° C	-40° to +70° C

Color Coding - Fibre

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

* For Fibre count more than 12F, bundles in multiple of 12F will be formed with color identification binder (Blue, Orange, Green & Brown)

Special Features

Lighter weight cable for faster and easier installation

Drum Length

2000/ 3000/ 4000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, r= 20 X D, 5 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	1000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 100 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	10 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5B)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

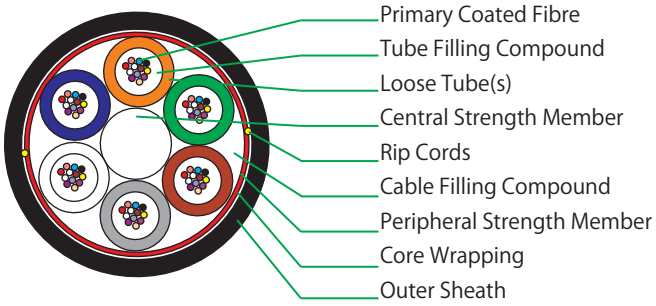
MULTI-TUBE SINGLE SHEATH UNARMOURED CABLE (2-144 F)

Water blocked | Outdoor | Underground | Metro | RoHS compliant

Applications

- Suitable for Duct Installation, pulled & blown

Typical Cross section of 72 Fibre



Cable Construction Details

- Up to 144 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- 2/4/6/8/12 fibre per tube combinations are available in 6/8/12 element construction
- Non metallic, anti-buckling FRP rod as Central Strength Member (also available with steel rod).
- Loose buffer tubes fully filled, S-Z Stranded
- Cable core fully filled with jelly (also available in dry core)
- Glass yarn can be used as peripheral strength member
- S-Z core wrapped with polyester tape / water swellable tape
- UV Stablized PE outer sheath, black (also available with FR PVC & HFFR

Technical Characteristics

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
			Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 48F	9.2	74	1500	750	15D	20D	-10° to +50°C	-40° to +70°C
72F	9.6	80	1500	750	15D	20D	-10° to +50°C	-40° to +70°C
96F	10.9	100	1500	750	15D	20D	-10° to +50°C	-40° to +70°C
144F	13.4	150	2000	1000	15D	20D	-10° to +50°C	-40° to +70°C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Single layer S-Z stranded construction
- Flexible buffer tubes provide easy fibre routing inside closure
- Light in weight, hence easy to install

Drum Length

2000/ 3000/ 4000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, r= 20 X D, 5 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	2000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	10 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5B)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

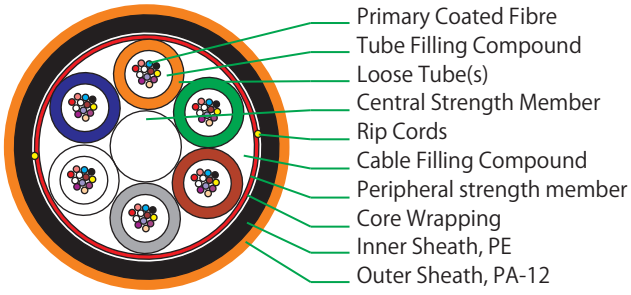
MULTI-TUBE DOUBLE SHEATH UNARMOURED CABLE (2-144 F)

Water blocked | Outdoor | Underground | Metro | RoHS compliant

Applications

- Suitable for Duct Installation, pulled & blown

Typical Cross section of 72 Fibre



Cable Construction Details

- Up to 144 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- 2/4/6/8/12 fibre per tube combinations are available in 6/8/12 element construction
- Non metallic anti-buckling FRP rod as Central Strength Member (also available with Steel rod)
- Loose buffer tubes fully filled , S-Z Stranded
- Cable core fully filled with jelly (also available in dry core)
- Glass yarn can be used as peripheral strength member
- S-Z core wrapped with polyester tape / water swellable tape
- UV Stablized HDPE inner sheath, Black
- Insect & termite resistant PA-12 outer sheath, Orange

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 48F	10.2	90	1500	750	15D	20D	-10° to +50°C	-40° to +70°C
72F	10.6	95	1500	750	15D	20D	-10° to +50°C	-40° to +70°C
96F	11.9	120	1500	750	15D	20D	-10° to +50°C	-40° to +70°C
144F	14.4	170	2000	1000	15D	20D	-10° to +50°C	-40° to +70°C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Single layer S-Z stranded construction
- Flexible buffer tubes provide easy fibre routing inside closure
- Light in weight, hence easy to install
- Insect & termite resistant

Drum Length

2000/ 3000/ 4000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, r= 20 X D, 5 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	2500 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	10 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5B)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

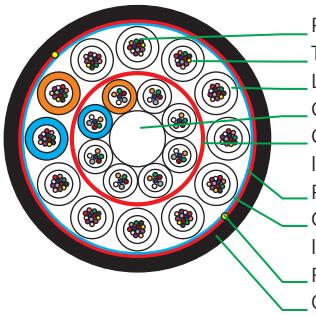
MULTI-TUBE DOUBLE LAYER UNARMOURED CABLE (192-288F)

Water blocked | Outdoor | Underground | Metro | RoHS compliant

Applications

- Suitable for Duct Installation, pulled & blown

Typical Cross section of 240 Fibre



Cable Construction Details

- Upto 288 enhance low water peak single mode fibers in full compliance with ITU-T-G.652.D
- Non-metallic anti-buckling FRP rod as Central Strength Member.
- Loose buffer tubes fully filled, S-Z Stranded in two layers
- Cable core fully filled (also available in dry core)
- S-Z core wrapped with polyester tape / water swellable tape
- UV Stablized PE Outer sheath, black (also available with FR PVC & HFFR

Technical Characteristics

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
			Installation	Operating	Temporary	Permanent	Installation	Operating
192F	13.9	160	1000	2000	15D	20D	-10^{0} to $+50^{0}$C	-40^{0} to $+70^{0}$C
288F	16.3	225	1500	3000	15D	20D	-10^{0} to $+50^{0}$C	-40^{0} to $+70^{0}$C

Color Coding - Fibre

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

* Tube coding: Blue (Marker), Orange(Tracer), remaining all natural

Special Features

- Double layer S-Z stranded construction
- Flexible buffer tubes provide easy fibre routing inside closure

Drum Length

2000/ 3000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, r= 20 X D, 5 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	2000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	15 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5B)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

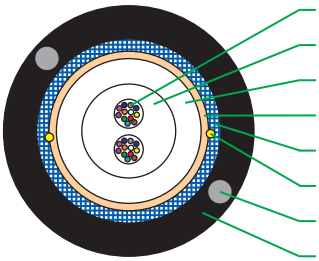
CENTRAL-TUBE ARMOURED CABLE (2 - 48F)

Water blocked | Rodent resistant | Outdoor | Underground | Metro | Impact resistant | RoHS compliant

Applications

- In areas where high mechanical load is required
- Suitable in area of rodent menace
- Direct burial & Inside duct - PE Outer Sheath
- Inside duct - FR PVC / HFFR / LSZH Outer Sheath

Typical Cross section of 24 Fibre



Cable Construction Details

- Up to 48 enhanced low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- Metallic anti-buckling steel rod as strength member. Embedded in outer sheath (also available with non metallic strength member FRP rod)
- Loose buffer tube fully filled and centrally placed in the cable
- Water blocking tape wrapping
- Electrolyte chrome plated, corrugated steel tape armoured
- UV Stablized PE Outer sheath, black (also available with FR PVC & HFFR

Technical Characteristics

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
			Installation	Operating	Temporary	Permanent	Installation	Operating
12F	8.3	75	1500	750	15D	20D	-10° to +50°C	-40° to +70°C
24F	9.8	100	1500	750	15D	20D	-10° to +50°C	-40° to +70°C
48F	11.3	130	1500	750	15D	20D	-10° to +50°C	-40° to +70°C

Color Coding - Fibre

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

* For Fibre count more than 12F, bundles in multiple of 12F will be formed with color identification binder (Blue, Orange, Green & Brown)

Special Features

- Lighter weight cable for faster and easier installation
- Robust construction.
- Corrugated steel tape acts as protection against rodents and mechanical protection

Drum Length

2000/ 3000/ 4000meters ± 5%

Mechanical Characteristics

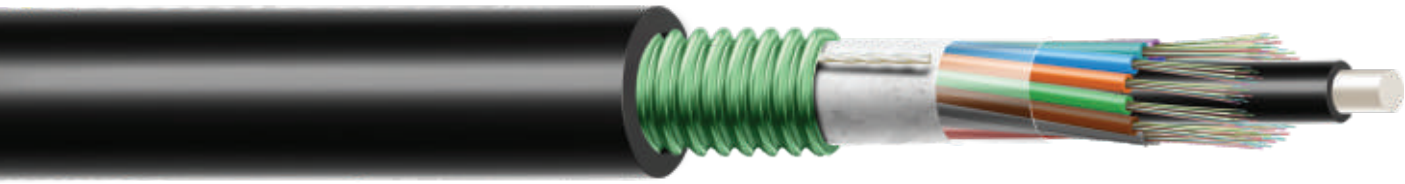
Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, r= 20 X D, 5 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	2500 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	10 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5B)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

MULTI-TUBE SINGLE SHEATH ARMOURED CABLE (2 - 144F)

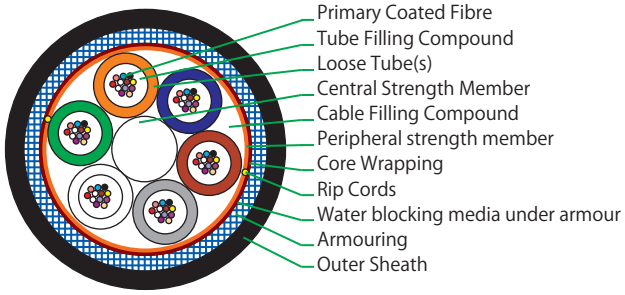
Water blocked | Rodent resistant | Outdoor | Underground | Metro | Impact resistant | RoHS compliant

Applications

- In areas where high mechanical load is required
- Suitable in area of rodent menace
- Direct burial & Inside duct - PE Outer Sheath
- Inside duct - FR PVC / HFFR / LSZH Outer Sheath



Typical Cross section of 72 Fibre



Cable Construction Details

- Up to 144 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- 2/4/6/8/12 fibre per tube combinations are available in 6/8/12 element construction
- Non metallic anti-buckling FRP rod as Central Strength Member. (also available with metallic strength member)
- Loose buffer tubes fully filled , S-Z Stranded
- Cable core fully filled with Thixotropic jelly (also available in dry core design)
- Glass yarn can be used as peripheral strength member
- Cable core is wrapped with polyester tape & water swellable tape
- Electrolytic chrome plated & Corrugated steel tape armouring
- UV Stablized HDPE outer sheath, black (also available with FR PVC & HFFR)

Technical Characteristics

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
			Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 48F	10.9	120	2500	1250	15D	20D	-10° to +50° C	-40° to +70° C
72F	11.3	125	2500	1250	15D	20D	-10° to +50° C	-40° to +70° C
96F	12.6	155	2500	1250	15D	20D	-10° to +50° C	-40° to +70° C
144F	15.1	210	3000	1500	15D	20D	-10° to +50° C	-40° to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Single layer S-Z stranded construction
- Corrugated steel tape acts as protection against rodents and mechanical damage.
- Robust construction
- Flexible buffer tubes provide easy fibre routing inside closure

Drum Length

2000/ 3000/ 4000meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, r= 20 X D, 5 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	3000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	10 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5B)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

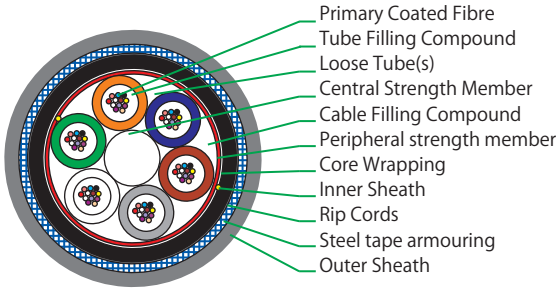
MULTI-TUBE DOUBLE SHEATH, ARMOURED CABLE (2-144 F)

Water blocked | Rodent resistant | Outdoor | Underground | Metro | Impact resistant | RoHS compliant

Applications

- In areas where high mechanical load is required
- Suitable in area of rodent menace
- Direct burial & Inside duct - PE Outer Sheath
- Inside duct - FR PVC / HFFR / LSZH Outer Sheath

Typical Cross section of 72 Fibre



Cable Construction Details

- Up to 144 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- 2/4/6/8/12 fibre per tube combinations are available in 6/8/12 element construction
- Non metallic anti-buckling FRP rod as Central Strength Member (also available with metallic strength member)
- Loose buffer tubes fully filled , S-Z Stranded
- Cable core fully filled with jelly (also available in dry core design)
- Glass yarn can be used as peripheral strength member
- S-Z core wrapped with polyester tape /water swellable tape
- Electrolytic chrome plated & Corrugated steel tape armouring
- UV Stablized HDPE outer sheath, black (also available with FR PVC & HFFR)

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 48F	12.6	155	2750	1375	15D	20D	-10° to +50° C	-40° to +70° C
72F	13.0	165	2750	1375	15D	20D	-10° to +50° C	-40° to +70° C
96F	14.3	195	2750	1375	15D	20D	-10° to +50° C	-40° to +70° C
144F	16.8	260	3250	1625	15D	20D	-10° to +50° C	-40° to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Single layer S-Z stranded construction
- Corrugated steel tape acts as protection against rodents and mechanical damage.
- Robust construction
- Flexible buffer tubes provide easy fibre routing inside closure

Drum Length

2000/ 3000/ 4000meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, r= 20 X D, 10 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 10 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	4000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 10 Nos
Kink Resistance (IEC 60794-1-2-E10)	10 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5B)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

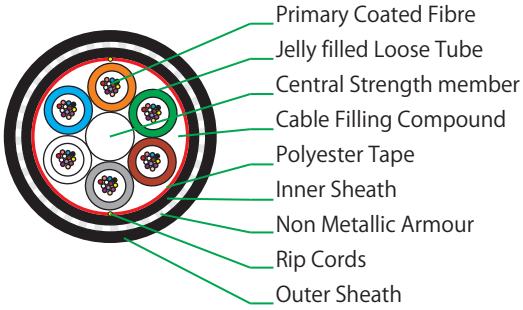
DIELECTRIC RODENT PROTECTED CABLE (2-144 F)

Water blocked | Outdoor | Underground | Metro | Rodent resistant | RoHS compliant

Applications

- Direct burial / Inside Duct
- In areas with particularly high mechanical loads
- In areas with rodents

Typical Cross Section of 72F



Cable Construction Details

- Upto 144 enhance low water peak single mode fibers in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- 2/4/6/8/12 fibre per tube combinations are available in 6/8/12 element construction
- Non-metallic and anti-buckling element FRP rod used as Central Strength Member.
- Loose buffer tubes fully filled Thixotropic Jelly
- Loose buffer tubes S-Z Stranded
- Cable core is fully filled with Thixotropic Jelly (also available in dry core design)
- Cable core is wrapped with Polyester Tape / Water swellable tape
- UV Stabilized PE inner sheath, Black
- Glass Yarns used as dielectric armour
- UV Stabilized PE outer sheath, Black

MULTI TUBE DESIGN

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 48F	12.6	135	3000	2000	15D	20D	-10° to +50°C	-40° to +70°C
72F	13.8	160	3000	2000	15D	20D	-10° to +50°C	-40° to +70°C
96F	15.3	195	3000	2000	15D	20D	-10° to +50°C	-40° to +70°C
144F	18.3	270	3000	2000	15D	20D	-10° to +50°C	-40° to +70°C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Single layer stranded construction
- Particularly robust cable
- Flexible buffer tubes provide easy fibre routing inside closure
- All dielectric armoured

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, r= 20 X D, 10 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 10 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	2500 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	10 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5B)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

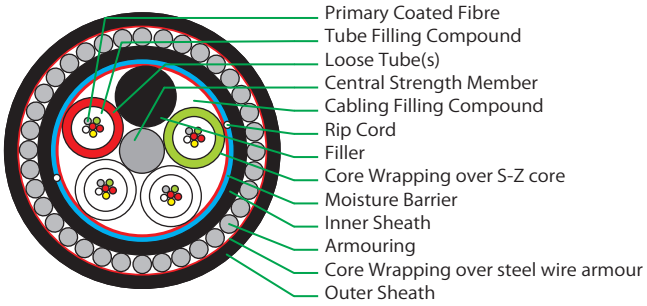
MULTI-TUBE STEEL WIRE ARMOURED CABLE (2-144 F)

Water blocked | Rodent resistant | Outdoor | Underground | Metro | Impact resistant | RoHS compliant

Applications

- In areas where high pulling force is required
- In areas where complex cable run is required
- Direct burial & Inside duct - PE Outer Sheath
- Inside duct - FR PVC / HFFR / LSZH Outer Sheath

Typical Cross section of 48 Fibre



Cable Construction Details

- Up to 144 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- Phosphate coated metallic anti-buckling steel rod as central strength member (also available with non metallic strength member, FRP rod)
- 2/4/6/8/12 fibre per tube combinations are available in 5/6/8/12 element constructions
- Loose buffer tubes fully filled S-Z Stranded
- Cable core fully filled with jelly
- PE coated Aluminium foil as moisture barrier
- UV Stablized PE inner sheath, black
- Galvanised Steel wire armour, wrapped with polyester tape
- UV stabilized HDPE outer sheath, black (also available with FR PVC & HFFR)

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 60F	14.5	350	6000	3000	15D	20D	-10° to +50° C	-40° to +70° C
72F	15.0	375	6000	3000	15D	20D	-10° to +50° C	-40° to +70° C
96F	17.0	425	6000	3000	15D	20D	-10° to +50° C	-40° to +70° C
144F	18.7	520	10000	5000	15D	20D	-10° to +50° C	-40°0 to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Single layer S-Z stranded construction.
- Phosphate coating over steel wire CSM prevent Hydrogen generation.
- Aluminium Foils provides excellent protection against Moisture.
- Rugged & robust design

Drum Length

2000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, 20 X D, 10 Kg Load, D = Cable D
Crush Resistance (IEC 60794-1-2-E3)	6000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 10 Nos at Different Place
Kink Resistance (IEC 60794-1-2-E10)	20 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

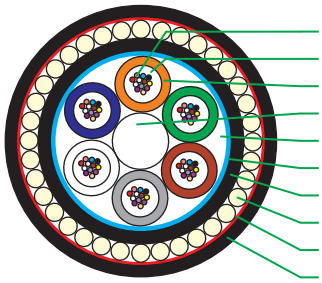
MULTI-TUBE FRP ROD ARMOURED CABLE (2-144 F)

Water blocked | Rodent resistant | Outdoor | Underground | Metro | Impact resistant | RoHS compliant

Applications

- In areas where high pulling force is required
- In areas where complex cable run is required
- Direct burial & Inside duct - PE Outer Sheath
- Inside duct - FR PVC / HFFR / LSZH Outer Sheath

Typical Cross section of 72 Fibre



Cable Construction Details

- Up to 144 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- 2/4/6/8/12 fibre per tube combinations are available in 6/8/12 element construction
- Non-metallic anti-buckling FRP rod as Central Strength Member.
- Loose buffer tubes fully filled, S-Z Stranded
- Cable core is fully filled with Thixotropic Jelly (also available in dry core design)
- Cable core is wrapped with Polyester Tape and water swellable tape
- UV Stablized PE inner sheath, black
- FRP rods for armouring
- UV stabilized PE outer sheath, black (also available with FR PVC & HFFR)

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 48F	14.0	180	5000	2500	15D	20D	-10° to +50° C	-40° to +70° C
72F	15.0	210	5000	2500	15D	20D	-10° to +50° C	-40° to +70° C
96F	16.5	240	5000	2500	15D	20D	-10° to +50° C	-40° to +70° C
144F	19.5	340	5000	2500	15D	20D	-10° to +50° C	-40° to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Single layer S-Z stranded construction.
- Completely dielectric construction
- Rugged & robust design

Drum Length

2000/ 3000/ 4000 meters ± 5%

Mechanical Characteristics

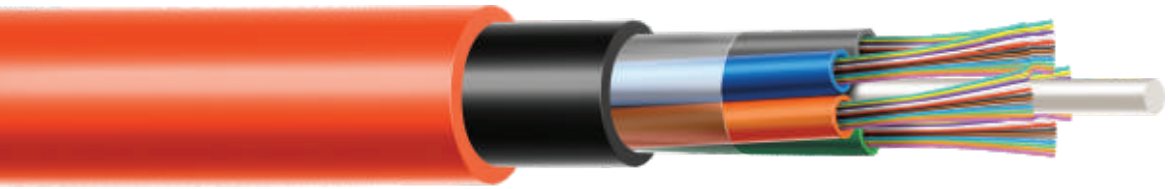
Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, 20 X D, 10 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	3000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 10 Nos at Different Place
Kink Resistance (IEC 60794-1-2-E10)	20 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

MULTI-TUBE RIBBON TYPE CABLE (48-576 F)

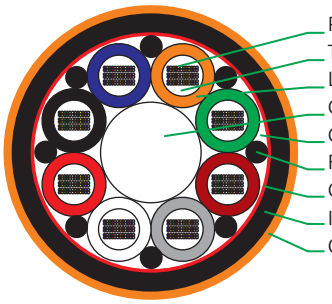
Water blocked | Rodent resistant | Outdoor | Underground | Metro | RoHS compliant

Applications

- Suitable for Duct Installation, pulled & blown



Typical Cross section of 288 Fibre



Cable Construction Details

- Up to 576 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D in 4/8/12 Fibre Ribbon (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- Non metallic and anti-buckling FRP rod as Central Strength Member
- Loose buffer tubes fully filled, S-Z Stranded
- Cable core is fully filled with Thixotropic Jelly (also available in dry core design)
- S-Z core wrapped with polyester tape/water swellable tape
- UV Stablized PE Inner sheath, Black
- Insect & termite resistance PA-12 outer sheath, Orange

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 96F	19.0	280	3000	1500	15D	20D	-10° to +50° C	-40° to +70° C
144F	20.5	340	3000	1500	15D	20D	-10° to +50° C	-40° to +70° C
288F	24.0	525	3000	1500	15D	20D	-10° to +50° C	-40° to +70° C
576F	30.0	740	3000	1500	15D	20D	-10° to +50° C	-40° to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

* Identification of ribbon in loose tube - 1 ribbon 1, 2 ribbon 2, 3 ribbon 3.....

Special Features

- Single layer S-Z stranded construction
- Flexible buffer tubes provide easy fibre routing inside closure
- Insect & Termite resistant

Drum Length

2000/ 3000/ 4000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, r= 20 X D, 10 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 360°) 10 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	2500 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	10 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5B)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

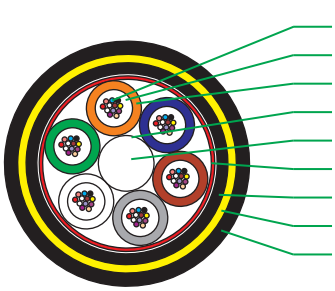
ALL DI-ELECTRIC SELF SUPPORTING AERIAL CABLE (2-144 F)

Water blocked | Aerial | Outdoor | Shotgun resistant | Track resistant (25 kV) | RoHS compliant

Applications

- Suitable for self supporting aerial installation with rigorous load conditions, including heavy wind and ice
- Suitable for span length of 100 mtrs (also available for other span length)

Typical Cross section of 72 Fibre



Cable Construction Details

- Up to 144 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- Non metallic anti-buckling FRP rod as Central Strength Member
- Loose buffer tubes fully filled, S-Z Stranded
- Cable core fully filled (also available in dry core design)
- Cable core is wrapped with Polyester Tape/water swellable tape
- UV Stablized PE inner sheath, Black
- High modulus, Aramid yarn peripheral strength member
- UV Stablized PE Outer sheath, Orange

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 48F	12.5	125	5000	2000	15D	20D	-10° to +50° C	-40° to +70° C
UPTO 72F	13.5	145	5000	2000	15D	20D	-10° to +50° C	-40° to +70° C
96F	15.0	180	5000	2000	15D	20D	-10° to +50° C	-40° to +70° C
144F	18.0	250	5000	2000	15D	20D	-10° to +50° C	-40° to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Single layer S-Z stranded construction
- Offers exceptional strength and corrosion resistance for aerial application
- Flexible buffer tubes provide easy fibre routing inside closure

Drum Length

2000/ 3000/ 4000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, 20 X D, 5 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 180°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	3000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	20 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

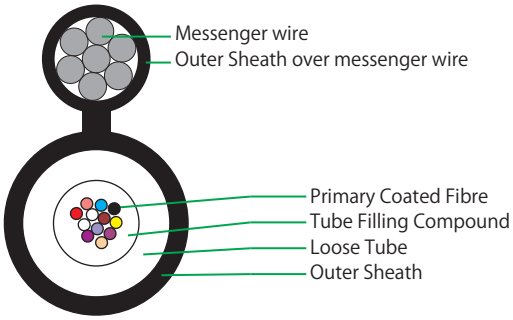
SINGLE-TUBE FIGURE-8 TYPE AERIAL CABLE (2-24 F)

Water blocked | Aerial | Outdoor | RoHS compliant

Applications

- Lashed aerial installation with rigorous load conditions, including heavy wind and ice
- Suitable for span length of 100 mtrs

Typical Cross section of 12 Fibre



Cable Construction Details

- Upto 48F enhance low water peak single mode fibers in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- Loose buffer tubes fully filled
- High tensile, galvanised, stranded steel wire used as integrated messenger wire
- UV Stablized PE outer sheath, black

Technical Characteristics

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
			Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 12F	6.5x6.0	100	2000	1000	15D	20D	-10° to +50° C	-40° to +70° C
16/24F	7.5x6.0	110	2000	1000	15D	20D	-10° to +50° C	-40° to +70° C
48F	10.0x6.0	150	2000	1000	15D	20D	-10° to +50° C	-40° to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

* For Fibre count more than 12F, bundles in multiple of 12F will be formed with color identification binder (Blue, Orange, Green & Brown)

Special Features

- Central Loose tube construction
- Offers exceptional strength and corrosion resistance for aerial application
- Integrated High tensile messenger for superior strength and corrosion resistance.

Drum Length

2000/ 3000/ 4000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, 20 X D, 10 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 180°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	1000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	20 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

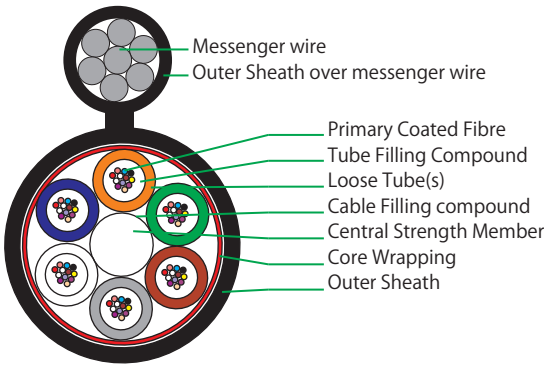
MULTI-TUBE FIGURE-8 TYPE AERIAL CABLE (2-144 F)

Water blocked | Aerial | Outdoor | RoHS compliant

Applications

- Lashed aerial installation with rigorous load conditions, including heavy wind and ice
- Suitable for span length of 100 mtrs

Typical Cross section of 72 Fibre



Cable Construction Details

- Upto 144 enhance low water peak single mode fibers in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- 2/4/6/8/12 fibre per tube combinations are available in 6/8/12 element construction
- Non-metallic anti-buckling FRP rod as Central Strength Member.
- Loose buffer tubes fully filled, S-Z Stranded
- Cable core fully filled (also available in dry core)
- S-Z core wrapped with polyester tape / water swelleble tape
- UV Stablized PE outer sheath, black
- High tensile, galvanised, stranded steel wire used as integrated messenger wire

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 72F	10.6/6.5	170	6000	2500	15D	20D	-10° to +50° C	-40° to +70° C
96F	12.3/6.5	200	8000	4000	15D	20D	-10° to +50° C	-40° to +70° C
144F	14.7/6.5	250	9000	5000	15D	20D	-10° to +50° C	-40° to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Single layer S-Z stranded construction
- Offers exceptional strength and corrosion resistance for aerial application
- Integrated High tensile messenger for superior strength and corrosion resistance.
- Flexible buffer tubes provide easy fibre routing inside closure

Drum Length

2000/ 3000/ 4000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, 20 X D, 5 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 180°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	2000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos
Kink Resistance (IEC 60794-1-2-E10)	20 x D, D = Cable D
Water Penetration (IEC 60794-1-2-F5)	1 Mtr Water Head, 3 Meter Cable Sample, 24 Hours

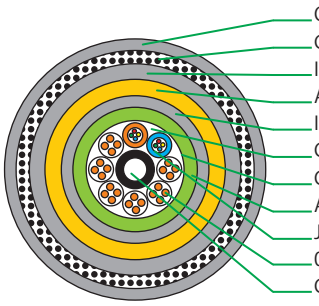
HYBRID (OPTICAL & COPPER)

Water blocked | Outdoor | Aerial | Metro | RoHS compliant

Applications

- Suitable for Under Ground Armoured Cable Upto 24F
- Axle Counting
- Signaling

Typical Cross section of Hybrid Cable



Cable Construction Details

Central Strength Member	Upcoated Fibre Reinforced Plastic-FRP (Non metallic)
Loose tube	2 No. PBT Loose tube filled with Thixotropic Jelly
No. of Quads	6 Quads with Identification binders
Core wrapping	Polyester Tape applied helically
Moisture Barrier	Aluminium Foil
Inner Sheath	PE Inner Sheath
Screening	Aluminium wire screening
Tape	Barrium Chromate Tape
Intermediate Sheath	PE Intermediate Sheath
Armouring	Double Steel tape armouring
Outer Sheath	PE Outer Sheath

Color Coding - Fibre & Tube

Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Voilet	Pink	Aqua

Special Features

- Suitable for underground installation on pathways or roads
- Rodent & Termite proof.
- Robust under all conditions of operation, adjustment, replacement, storage and transport.
- Suitable for lightning prone areas.
- Better tensile strength.

Drum Length

1000 meters ± 5%

Mechanical Characteristics

Tensile strength	: 5000 N
Cable Bend Test	: 20D
Repeated Bending test	: 5 kg, 30 Cycles
Torsion Test	: 400 N
Crush Resistance	: 4000 N, 600 Sec
Impact Test	: 50 N, 10 Impact
Kink Test	: 20 D
Operating Temp.	: -20°C to +70°C
Water Penetration Test	: 3mtrs sample, 1mtr Height

Physical Characteristics

Cable Outer Diameter	: 30.0 + 4.0 mm
Nominal Cable Weight	: 1500 Kg/KM

Color Coding for Quad :

No1 - White, Orange, Red , Green No2 - White, Blue, Red , Green

No3 - White, Brown, Red , Green No4 - White, Green, Red , Green

No5 - White, Yellow, Red , Green No6 - White, Black, Red , Green

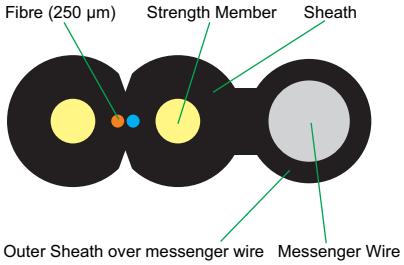
DROP CABLE (1/2 F)

Outdoor Aerial Metro RoHS compliant

Applications

- Drop Cable suitable for aerial application.

Typical Cross section of 2 Fibre



Cable Construction Details

- Up to 2 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- FRP / ARP rod as strength member
- Steel wire as integrated messenger wire
- LSZH shealth

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
2F	2.0 X 5.0	20	130	50	30	50	-20° to +70°C	-40° to +70°C

Color Coding - Fibre

Blue Orange

Special Features

- Easy access to the fibres
- Quick Cable Entry & Easy-Peel
- Easy Seal in Closures
- Low insertion and back reflection loss
- Good durability
- High Return Loss
- High temperature stability
- Clean, Gel-Free, Dry Design

Mechanical Characteristics

Torsion Resistance (IEC 60794-1-2-E11)	50 N (± 180°) 10 Cycles
Impact Resistance (IEC 60794-1-E4)	Height 1 mtr., Weight = 0.3 Kg, 3 Nos at different location

Drum Length

500 meters ± 5%

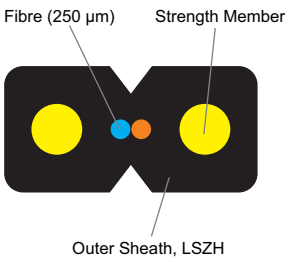
INDOOR DROP CABLE (1/2 F)

Flame resistant | Indoor | Metro | RoHS compliant

Applications

- Low bending Cable suitable for Indoor Application.

Typical Cross section of 2 Fibre



Cable Construction

- Up to 2 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- FRP / ARP rod as strength member
- LSZH shealth

TECHNICAL CHARACTERISTICS

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
			Installation	Operating	Temporary	Permanent	Installation	Operating
2F	2.0 X 3.0	8	40	20	30	50	-20^0 to $+70^0$ C	-40^0 to $+70^0$ C

Color Coding - Fibre

Blue | Orange

Special Features

- Easy access to the fibres
- Fast Installation
- Quick Cable Entry & Easy-Peel
- Easy Seal in Closures
- Maximization of Duct Space
- Flame Retardant Sheath
- Good durability
- Clean, Gel-Free, Dry Design

Mechanical Characteristics

Torsion Resistance (IEC 60794-1-2-E1)	40 N (± 180°) 10 Cycles
Impact Resistance (IEC 60794-1-E4)	Height 1 mtr., Weight = 0.3 Kg, 3 Nos at different location

Drum Length

500 meters ± 5%

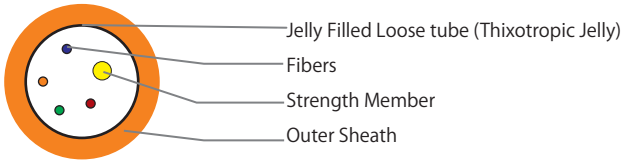
CENTRAL-TUBE AIRBLOWN MICRO CABLE (2-12F)

Outdoor Metro Underground RoHS compliant

Applications

- Inside building, suitable for Indoor use

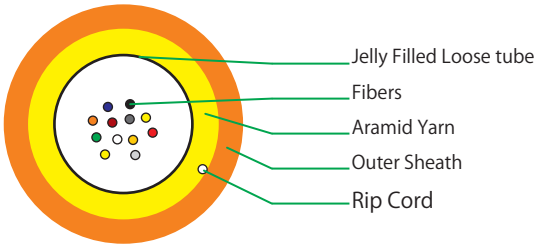
Typical Cross Section Of 4 F Air Blown Cable



Cable Construction Details

- Up to 4 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre)
- Loose buffer tube fully filled
- ARP/KRP/FRP rod as a strength member inside the loose tube
- Insect & Termite resistance PA-12 outer sheath, Orange

Typical Cross Section Of 12f Unitube Micro Cable



Cable Construction Details (Available in 2.5mm & 3.8mm Dia)

- Up to 12 enhance low water peak single mode fibres in full compliance with ITU-T-G.652.D (also available with G655 / G656 / G657 SM Fibre)
- Loose buffer tubes fully filled
- Aramid yarns as flexible peripheral strength member
- Rip cords for ripping outer jacket
- Insect & Termite resistance PA-12 outer sheath, Orange

Technical Characteristics-Air Blown & Unitube Micro Cable

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)		CRUSH RESISTANCE (N)
			Installation	Operating	Temporary	Permanent	Installation	Operating	(IEC 60794-1-2-E3)
2F	1.7	2.3	40	20	10D	20D	-20° to +50° C	-40° to +70° C	100 N/(10x10cm)
4F	1.9	2.9	40	20	10D	20D	-20° to +50° C	-40° to +70° C	100 N/(10x10cm)
UP TO 12F	2.5	6	150	75	10D	20D	-20° to +50° C	-40° to +70° C	500 N/(10x10cm)
UP TO 12F	3.8	12	200	100	10D	20D	-20° to +50° C	-40° to +70° C	1000 N/(10x10cm)

Color Coding - Fibre

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Completely dielectric cable / non metallic cable immune to electromagnetic interferences
- Suitable for Micro duct Installation

Drum Length

2000/3000/4000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, 20 X D, 1 Kg Load, D = Cable Diameter
Torsion Resistance (IEC 60794-1-2-E7)	2 Cycle (± 180°) 1 Kg Weight, L= 2 Mtr
Kink Resistance (IEC 60794-1-2-E10)	15 x D, D = Cable D

MICRO CABLE

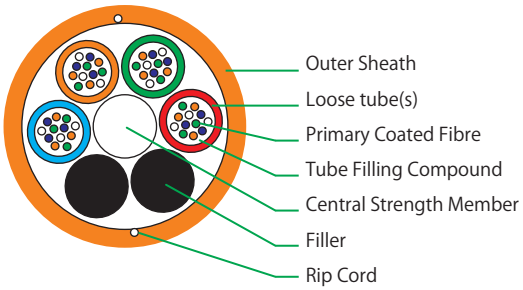
Multitube Design (24-144F)

Outdoor | Metro | Underground | RoHS compliant

Applications

- Suitable for installation in Micro Ducts

Typical Cross Section of 48 F



Cable Construction

- Upto 144 fibers in full compliance with ITU-T-G 652 D (also available with G655 / G656 / G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- Non metallic, anti-buckling FRP rod as Central Strength Member (PE upcoated for 144 F)
- Loose buffer tubes fully filled, S-Z Stranded
- Rip cords for easy stripping
- Insect and Termite resistant PA-12 outer sheath, Orange (also available with PE outer sheath)

Technical Characteristics

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
			Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 72F	5.7	27	650	400	15D	20D	-20° to +70° C	-40° to +70° C
96F	6.8	45	1500	1000	15D	20D	-20° to +70° C	-40° to +70° C
144F	8.9	70	1500	1000	15D	20D	-20° to +70° C	-40° to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Completely dielectric cable / non metallic cable immune to electromagnetic interferences
- High level bend capacity
- Low friction jacket design
- Easy access and breakout of Fibers

Drum Length

2000/ 3000/ 4000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, 20 X D, 1 Kg Load, D = Cable Diameter
Torsion Resistance (IEC 60794-1-2-E7)	2 Cycle (± 360°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	1000 N (100 X 100 mm) for 600 sec
Kink Resistance (IEC 60794-1-2-E10)	15 x D, D = Cable D

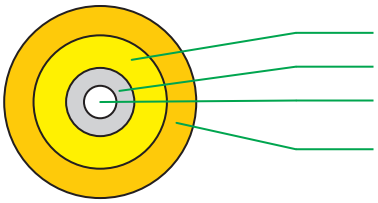
INTERCONNECT CABLES

Indoor | Metro | Flame resistant | RoHS compliant

Applications

- Communication racks and wiring closets, walls, ceilings, floor ducts, etc
- In the final connection to terminal devices such as workstation and computer terminals for high speed voice, video, data, and FTTx applications
- Short run office & computer room cabling
- Patch cords, Pigtails & Jumpers

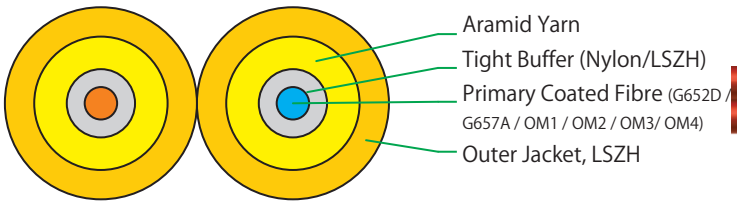
Typical Cross Section of Simplex



Cable Construction Details - Simplex

A single optical fibre is tight buffered and surrounded by aramid yarn strength member and jacketed with riser or plenum or LSZH grade jacketing to 2.0/3.0 mm diameter.

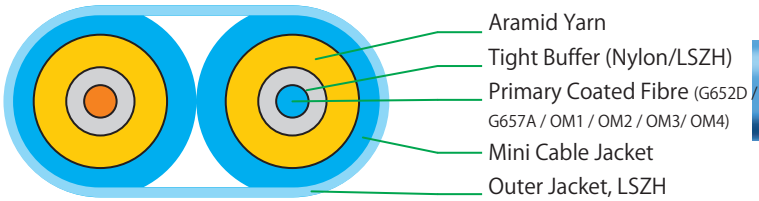
Typical Cross Section of Duplex



Cable Construction Details - Duplex

Two Simplex cables 2.0/3.0 mm are joined as a figure-8 design

Typical Cross Section of Flat Twin



Cable Construction Details - Flat Twin

Duplex Zip cable (2.0/3.0 mm) is jacketed with riser, plenum or LSZH grade jacketing.

Drum Length

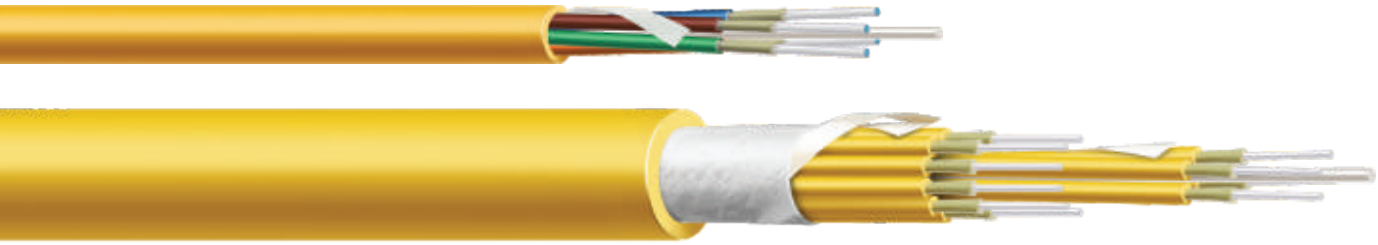
1000/ 2000 meters ± 5%

BREAKOUT TIGHT BUFFER UNARMOURED OPTICAL FIBRE CABLE (2-16F)

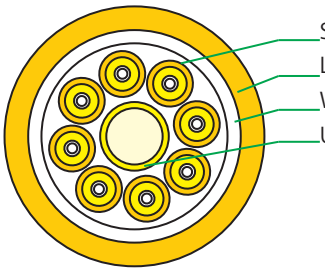
Indoor | Metro | Flame resistant | RoHS compliant

Applications

- Rugged multi fibre cross connect
- Intra building backbone
- Fibre backbone to communication closets



Typical Cross Section of 8F



Cable Construction Details

- 4/6/8/12/16 Fibre of Single mode fibre in full compliance with ITU-T G652D (also available with G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- FRP and Aramid Yarns as Strength Member
- PA-12 tight coating on Fibre
- LSZH Compound for sheathing for simplex subunits & outer sheath of cable

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
4F	8.0	60	800	400	15D	20D	-20° to +70° C	-40° to +70° C
6F	9.0	79	800	400	15D	20D	-20° to +70° C	-40° to +70° C
8F	10.2	95	800	400	15D	20D	-20° to +70° C	-40° to +70° C
12F	12.0	120	800	400	15D	20D	-20° to +70° C	-40° to +70° C
16F	13.5	160	800	400	15D	20D	-20° to +70° C	-40° to +70° C

Special Features

- Individual cores are printed at every 200 mm for identification
- Tight buffer & simplex jacket are available in variety of colours.
- Easy access to the fibres
- Quick Cable Entry

Mechanical Characteristics

Torsion Resistance (IEC 60794-1-2-E7)	2 Cycle (± 360°) 1 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	1000 N (100 X 100 mm) for 60 sec
Kink Resistance (IEC 60794-1-2-E10)	15 x D, D = Cable D

Drum Length

1000 meters ± 10%

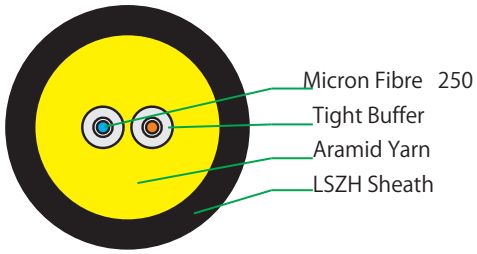
FANOUT TIGHT BUFFER UNARMOURED OPTICAL FIBRE CABLE (2-48F)

Indoor | Metro | Flame resistant | RoHS compliant

Applications

- Rugged multi fibre cross connect
- Intra building backbone
- Fibre backbone to communication closets

Typical Cross Section of 2F



Cable Construction Details

- Upto 48 Fibre of Single mode fibre in full compliance with ITU-T G652D (also available with G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- Aramid Yarns as Strength Member
- PA-12 / LSZH tight coating on Fibre
- LSZH Compound for outer sheathing

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
UPTO 6F	5.0	25	500	300	15D	20D	-10° to +70° C	-40° to +70° C
8/12F	6.8	32	500	300	15D	20D	-10° to +70° C	-40° to +70° C
36/48F	16.5	215	2000	1000	15D	20D	-10° to +70° C	-40° to +70° C

Color Coding - Fibre

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

* For Fibre count more than 12F, bundles in multiple of 9/12F will be formed with color identification binder (Blue, Orange, Green & Brown)

Special Features

- Tight buffer & jacket are available in variety of colours.
- Easy access to the fibres
- Quick Cable Entry

Mechanical Characteristics

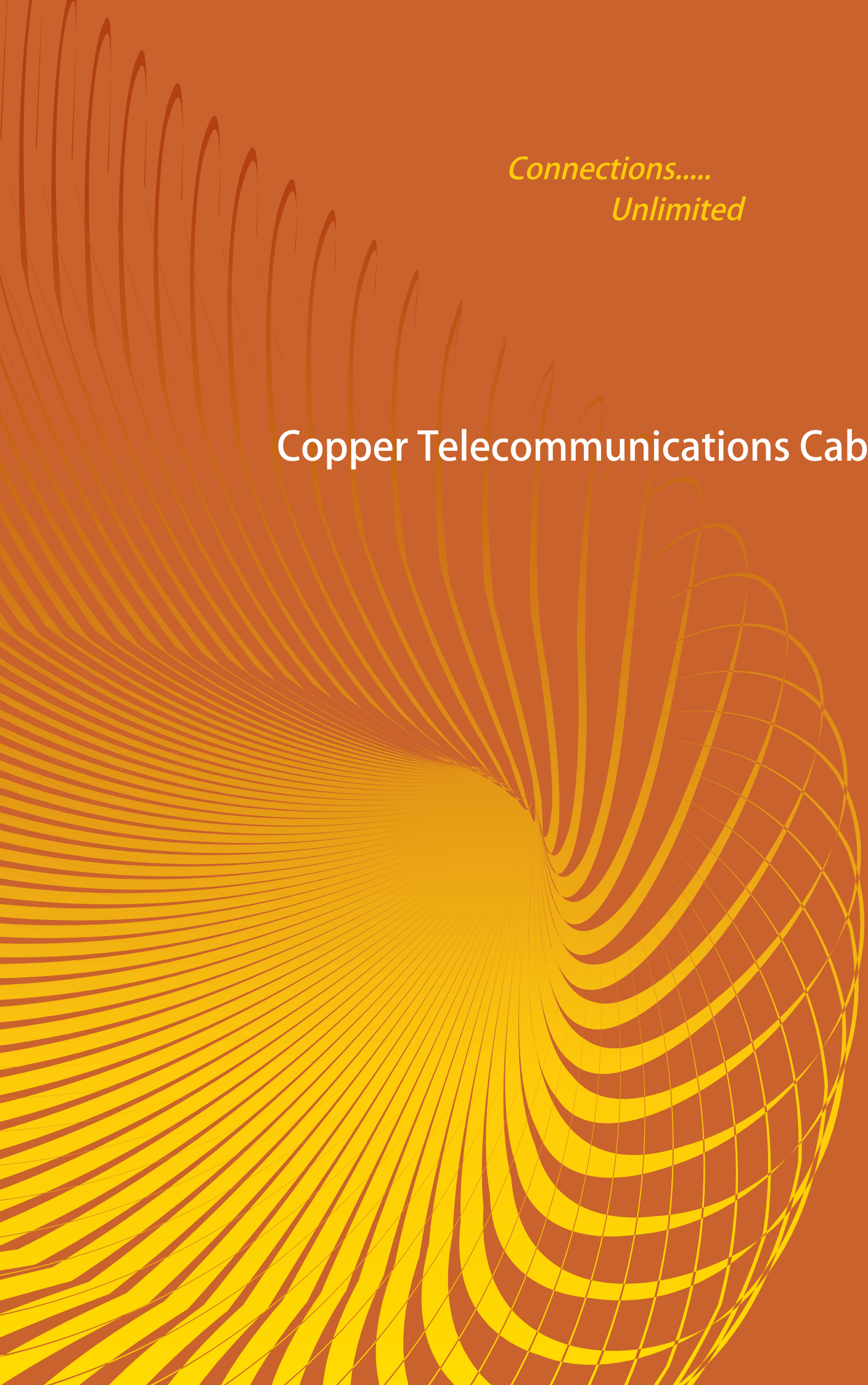
Torsion Resistance (IEC 60794-1-2-E7)	2 Cycle (± 360°) 1 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	1000 N (100 X 100 mm) for 600 sec

Drum Length

1000 meters ± 10%

Connections.....
Unlimited

Copper Telecommunications Cables



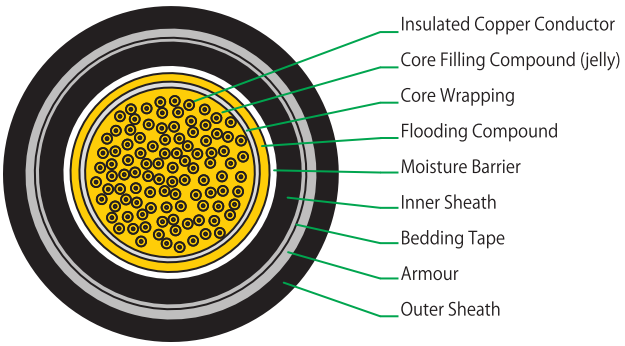
FOAM SKIN / SOLID PE INSULATED JELLY FILLED TELEPHONE CABLE

Outdoor Underground RoHS compliant

Applications:

- Local distribution networks - Primary & Secondary
- Junction between exchanges

Typical Cross section for Armoured Cable



Features:

- Armoured & Unarmoured construction
- Availability of standard conductor sizes ranging from 0.4 mm to 0.9 mm diameter.
- Available in sizes up to 2400 pairs
- Suitable for installation in ducts
- Direct Burial application for armoured cable

Technical Details

Conductor Diameter	Conductor Resistance at 20°C (Solid or Foam Skin Cable)	Attenuation at 150KHz.
0.40 mm	135 ± 8 Ω/Km	12.00 dB/Km (max.avg.)
0.50 mm	86 ± 6 Ω/Km	8.25 dB/Km (max. avg.)
0.63 mm	58 ± 4 Ω/Km	6.30 dB/Km (max. avg.)
0.90 mm	28 ± 2 Ω/Km	4.40 dB/Km (max. avg.)

Mutual Capacitance	Capacitance Unbalance	
52 +/- 3 nF/Km (avg.)	Pair to Pair	Pair to Earth
52 +/- 4.5 nF/Km	50 pF/Km (Max. Avg.)	750 pF/Km (max. avg.)
(individual)	200 pF/Km (Max.)	3000 pF/Km (max.)

Insulation Resistance : 5000 mega ohms / Km (Min.)	
ELFEXT :55 dB/Km (min) at 150 KHz	NEXT : 55 dB (min.) at 150 KHz.
67.8 dB/Km (RMS) at 150 KHz.	

Cable Construction Details

Conductor — Conductor - Each conductor consists of a round wire of annealed high conductivity copper.

Insulation — Each conductor is insulated with Foam Skin / Solid PE insulation. Foam Skin insulation consists of an extruded inner layer of uncoloured foam, covered by an extruded outer layer of coloured skin with required colours to meet the specification. For Solid insulation each conductor is insulated with Solid medium/high density polyethylene insulation.

Twinning — Two insulated conductors are twisted with uniform lay to form a pair. The length of the lay of the pairs is so choses that the cross talk is minimum.

Units & Super Units — No's of twisted pairs are laid up to form a group which constitutes a unit.

Stranding — Twisted pairs/ super units are stranded to form a cable core.

Filling — The cable core is fully filled with water resistant compound which is compatible with the polythene insulation of the conductors.

Core Wrapping & Screening — The filled cable core is wrapped with at least one helical or longitudinal plastic tape. Thereafter one aluminium tape, coated with copolymer on both sides is applied longitudinally over the cable core with a specified overlap.

Sheathing — The screened cable core is sheathed with black polythene compound grade 03C as per BS:6234.

Bedding tape — If the cable is required to be armoured, two helical lapping of polythene bedding tape is applied over the polythene sheath.

Armouring — The cable is then armoured with two applications of galvanized steel tape each applied helically with a specified gap. The second tape covers the gap left by the first tape.

Jacketing — The armoured cable is finally jacketed with black polythene compound grade 03C of BS:6234.

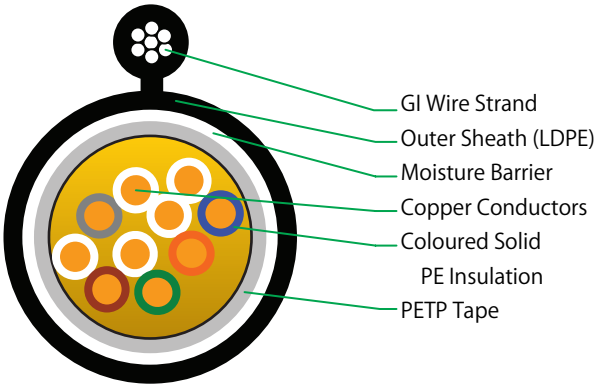
SELF SUPPORTING AERIAL (FIGURE 8 TYPE) TELEPHONE CABLE

Outdoor Aerial RoHS compliant

Applications:

- Suitable for Aerial Installation
- Local distribution networks - Secondary networks

Typical Cross section for Armoured Cable



Features:

- Availability of standard conductor sizes of 0.4, 0.5, 0.6 & 0.9mm diameter
- Figure-8 construction
- Availability upto 200 pairs
- Suitable for installation in Hilly areas/areas where digging is not possible

Technical Details

Conductor Diameter	Conductor Resistance at 20°C (Solid or Foam Skin Cable)	Attenuation at 105KHz.
0.40 mm	135 ± 8 Ω/Km	12.00 dB/Km (max.avg.)
0.50 mm	86 ± 6 Ω/Km	8.25 dB/Km (max. avg.)
0.63 mm	58 ± 4 Ω/Km	6.30 dB/Km (max. avg.)
0.90 mm	28 ± 2 Ω/Km	4.40 dB/Km (max. avg.)

Mutual Capacitance	Capacitance Unbalance	
52 ± 3 nF/Km (avg.)	Pair to Pair	Pair to Earth
52 ± 4.5 nF/Km (individual)	50 pF/Km (Max. Avg.) 200 pF/Km (Max.)	750 pF/Km (max. avg.) 3000 pF/Km (max.)

Insulation Resistance : 2500 mega ohms / Km (Min).	
ELXT : 55 dB/Km (min)at 150 KHz	NEXT : 55 dB (min.) at 150 Khz.
67.8 dB/Km (RMS) at 150 KHz.	

Cable Construction Details

Conductor Each conductor consists of a round wire of annealed high conductivity copper.

Insulation Each conductor is insulated with solid medium/high density polyethylene insulation.

Twinning Two insulated conductors are twisted with uniform lay to form a pair. The length of the lay of the pairs is so chosen that the cross-talk is minimum.

Units & Super Units 10 or 20 No's of twisted pairs are laid up to form a group which constitutes a unit. Each unit should have an overlapping for color ID. In case of cables having more than 100 pairs, 5 units of 10 pairs or 20 pairs are laid up to constitute 50 or 100 pairs of super units respectively.

Stranding For cable upto 20 pairs the required number of twisted pairs are stranded to form a cable core. For cables having 50 and 100 pairs, 5 numbers of 10 pair or 20 pair units are stranded to form 50 and 100 pair cables respectively. For cables having higher than 100 pairs, required number of super units are stranded to form a cable core.

Core Wrapping & Screening The cable core is wrapped with at least one helical or longitudional plastic tape. Thereafter one aluminium tape ,coated with co-polymer on both sides is applied longitudinally over the cable core with a specified overlap. The tape is sealed and bonded to the inner surface of the polythene sheath.

Suspension Wire / Strand A Suspension Wire / Strand is provided.

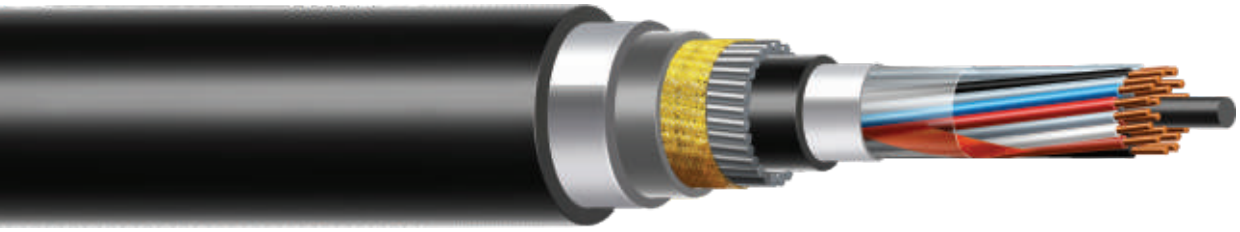
Sheathing The screened cable core along with suspension wire as an integral part with the cable is sheathed with black polythene compound to form figure-8

UNDERGROUND JELLY FILLED QUAD CABLES

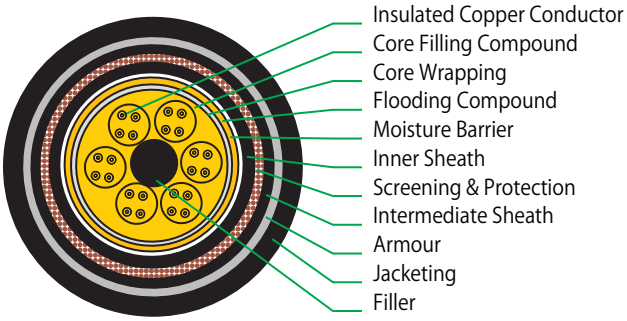
Outdoor Underground RoHS compliant

Applications

- Axle counter
- Signalling



Typical Cross section for Armoured Cable



Technical Details

Conductor Diameter	Conductor Resistance at 20°C	Attenuation at 20°C
0.90mm	28 (Each Core) Ω/Km (Max) 56 (loop) Ω/Km (Max)	4.40 dB/Km (Max. Avg.) at 150KHz 2 dB/Km (Max. Avg.)at 300-3400 Hz
1.4mm	11.6 (Each Core) Ω/Km (Max) 23.2 (loop) Ω/Km (Max)	0.3 dB/Km (Max. Avg.) at 0.8KHz 0.8 dB/Km (Max. Avg.) at 5KHz 1.3 dB/Km (Max. Avg.) at 21KHz 2.5 dB/Km (Max. Avg.) at 150KHz

Mutual Capacitanc	Capacitance Unbalance (800 Hz to 1000 Hz)	
50 ± 2.5 nF/ Km (avg.) 50 ±6 nF/Km (individual)	Pair to Pair 300 pF/Km (max.)	Pair to Earth 1500 pF/Km (max. avg.)

Insulation Resistance 5000 mega Ωs / Km (min.)

0.90 mm	ELFEXT : 150 KHz 55 dB/Km Ind. (Min.) 67.8 dB/Km (RMS) (Min.)	NEXT : 55 dB (min.) at 150 KHz
1.4 mm	ELFEXT : at 0.8KHz, 5KHz 21 KHz & 150 KHz 60.0 dB/Km Ind. (Min.) 70.8 dB/Km (RMS) (Min.)	NEXT : 55 dB (min.) at 0.8 KHz, 5 KHz, 21 KHz & 150 KHz

Reduction Factor (Field intensity of 50v to 450v) : 0.10 (Max)
Characteristic Impedance (Ω)

0.90 mm	470 +/- 15% Ω at 0.8KHz 195 +/- 15% Ω at 5.0 KHz
1.4 mm	310 +/- 15% Ω at 0.8KHz 150 +/- 15% Ω at 5.0 KHz 110 +/- 15% Ω at 21.0 KHz 100 +/- 15% Ω at 150.0 KHz

Color Coding for Quad :

No1 - White, Orange, Red , Green No2 - White, Blue, Red , Green
No3 - White, Brown, Red , Green No4 - White, Green, Red , Green
No5 - White, Yellow, Red , Green No6 - White, Black, Red , Green

Cable Construction Details

Conductor	Round wire of annealed high conductivity copper
Insulation	Each conductor is insulated with solid PE
Quadding	Four insulated conductors stranded to form a star quad.
Laying Up	The quads are assembled to form a symmetrical core with a right hand lay. Polyethylene strings of required diameter may be used as fillers, if necessary.
Filling & core wrapping	The cable core is fully filled with water -resistant compound and wrapped with polyethylene.
Moisture Barrier	Aluminium tape coated with co-polymer on both sides is applied longitudinally over the cable core with a specified overlap.
Sheathing	The screened cable core is sheathed with black polythene compound as per BS:6234.
Screening & protection	The cable core with inner sheath is surrounded by a reasonably close fitted screen of Aluminium in the form of wires/ strips . The aluminium screen is wrapped with a single layer of woven tape impregnated with Barium chromate with overlap.
Intermediate sheath	Further protection of screening is provided by extruded PVC/PE sheath over screening.
Armouring	Armouring with two applications of Galvanized steel tape each applied helically with a specified gap.
Jacketing	The armoured cable is finally jacketed with black PVC/PE compound.

Features:

- Suitable for Direct burial application
- Armoured construction
- Availability of standard conductor sizes of 0.9 mm & 1.4 mm diameter.
- Available in 4 and 6 quads.
- Suitable for use on AC systems (earthed or unearthed) for rated voltage up to and including 1100 volts.
- These cables may be used on DC systems for rated voltages up to and including 1500 volts on earth.

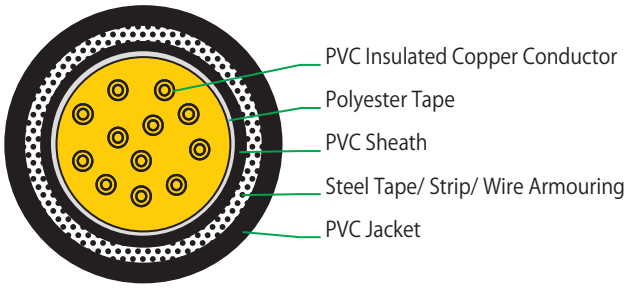
SIGNALING CABLES

Outdoor Underground RoHS compliant

Applications

- Railway Signalling

Typical Cross section for Armoured Cable



Technical Details

Nominal Cross Sectional Area	No. of Wires in Conductors	Nom. Dia of Wire	Max. Resistance at 20°C		Nom. Thickness of Insualtion	
			Single Core	Multi Core	Single Core	Multi Core
Sqmm	No(s)	mm	Ω/Km	Ω/Km	mm	mm
1.0	1	1.13	17.689	18.04	1.5	0.8
1.5	1	1.4	11.54	11.77	1.5	0.8
2.5	1	1.80	6.978	7.118	1.5	0.9
2.5	3	1.06	6.843	6.980	1.5	0.9
4	1	2.24	4.506	4.596	1.5	1.0
4	7	0.85	4.591	4.683	1.5	1.0
6	1	2.8	2.884	2.942	1.5	1.0
10	7	1.4	1.660	1.693	1.5	1.0
16	7	1.70	1.124	1.149	1.5	1.0
25	7	2.24	0.6484	0.6614	1.5	1.2
35	7	2.50	0.5205	0.5309	1.5	1.2
50	19	1.8	0.3706	0.3780	1.5	1.4

Insulation Resistance (M-Ω/Km) (Dry) (500 V DC for 1 Min. at 50° C)	10 M-Ω/Km upto 2.5 mm^2 Conductor 5 M-Ω/Km More than 2.5 mm^2 Conductor
Insulation Resistance (M-Ω/Km) (Wet) (500 V DC for 1 Min. at 50° C	7.5 M-Ω/Km upto 2.5 mm^2 Conductor 5 M-Ω/Km More than 2.5 mm^2 Conductor
HV Test at Room Temp.	4 KV AC (rms) or 12 KV DC (for 5 Min.)

Cable Construction Details

Conductor Each conductor shall consist of a solid round/stranded wire(s) of annealed high conductivity copper, smoothly drawn, nominally circular in section , uniform in quality and resistance and free from defects.

Insulation Insulation shall be of PVC Compound conforming to requirements of Type-A compound of IS 5831:1984. Insulation color shall be as per customer specification.

Core Formation The insulated cores shall be laid up together with suitable lay. The outer most layer shall have right hand lay and the successive layers shall be laid with opposite lay. A polyester tape of suitable thickness shall be helically applied normally in cables with double steel tape with suitable overlap.

Inner Sheath The inner sheath shall be of PVC Compound conforming to requirements of Type- ST1 as per IS 5831:1984.

Armouring Armouring shall consist of the either Galvanised Round Wire strip/Double Steel Tape.

Jacket The outer sheath shall be of PVC Compound conforming to requirements of Type- ST1 as per IS 5831:1984.

Features:

- Availability of conductor sizes ranging from 1.13 mm to 2.80 mm diameter. Cable size ranging from 2 core to 100 cores with 1.0 Sqmm to 50 Sqmm.
- Suitable for use on AC systems (Earthed or unearthed) for rated voltage upto 1100 volts
- Suitable for use on DC systems for rated voltage upto 1500 volts

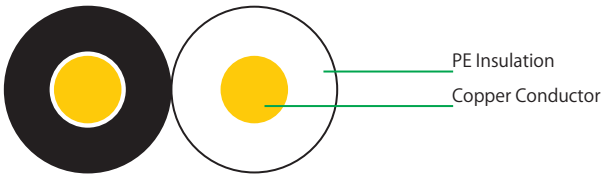
JUMPER WIRE

Indoor Outdoor RoHS compliant

Applications

- Indoor Telephone wiring & Signal distribution

Typical Cross section for Armoured Cable



Cable Construction Details

Conductor Each conductor shall consist of a solid round wire of annealed high conductivity copper, smoothly drawn, nominally circular in section , uniform in quality and resistance and free from defects. The quality of copper shall confirm to IEC-28 or IS-12444.

Insulation Each conductor shall be insulated with solid polyethylene.

Pairing Two Insulated conductors shall be twisted together with uniform lay to form a pair.

Electrical Parameters At 20°c

For 0.50 mm Jumper Wire

Parameter	Limit	Tol.	Remarks
Resistance (Ω/Km)	89	+/- 4	
Re. Unbalance %	Ind 2.5 Ω/Km (Max.)		
Insulation Resistance	Min 500 (Ω/Km)		For 1 Minutes with 250-500 V DC
Dielectric Strength	10KVDC		For 3 Seconds

For 0.65 mm Jumper Wire

Parameter	Limit	Tol.	Remarks
Resistance (Ω/Km)	62	+/- 4	
Re. Unbalance %	Ind 2.5O/Km (Max.)		
Insulation Resistance	Min 500 (Ω/Km)		For 1 Minutes with 250-500 V DC
Dielectric Strength	10KVDC		For 3 Seconds

Length & Tolerance :

500 Mtrs.(± 5 %)

Packing :

In Coils, wrapped with polyethylene sheets, packed in Cartons or Plastic Reels

Colour Code For Conductor Insulation(*)

Cond. Size Insulation	Colour 1st Wire(Tip)	Colour 2nd Ring	Dia Over
0.50 mm	Black	White	1.40 mm (Nom.)
0.60 mm	Black	White	1.10 mm (Nom.)

(*) or as desired by the customer

ELECTROPLATED TINNED COPPER WIRE

RoHS compliant

Applications

- Copper wire armouring & soldering power sectors
- Screening applications in telecom & signaling cables

Data Sheet

A) Electroplated Tinned Wires Suitable for Drawing to Fine Wire [UN-ANNEALED]

WIRE SIZE	PARAMETER	SPECIFIED VALUES	UOM
2.80 mm	Diameter (Mom)	2.80	mm
	Tin Coating (Min)	As per Requirement*	Microns
	Pershulphate Test	Should Pass	
WIRE SIZE	**PARAMETER**	**SPECIFIED VALUES**	**UOM**
1.60 mm	Diameter (Mom)	1.60	mm
	Tin Coating (Min)	As per Requirement*	Microns
	Pershulphate Test	Should Pass	

*Depends on the Tin Coating Thickness required at finely Drawn Copper Wire

Above Sizes Shall be packed in Returnable MS Baskets.

B) Drawn Tinned Copper [ANNEALED]

WIRE SIZE	PARAMETER	SPECIFIED VALUES	UOM
0.50 mm	Resistance (max)	91	Ω/Km
	Diameter (Nom)	0.492	mm
	Elongation (Min)	20	%
	Tin Coating (Min)	1	Microns
	Pershulphate Test	Should Pass	
WIRE SIZE	**PARAMETER**	**SPECIFIED VALUES**	**UOM**
0.40 mm	Resistance (max)	142	Ω/Km
	Diameter (Nom)	0.392	mm
	Elongation (Min)	18	%
	Tin Coating (Min)	1	Microns
	Pershulphate Test	Should Pass	

Above Sizes Shall be packed in Returnable 630 mm MS Reels.

Pershulphate Test : Shall be done as per IS 10810 Part 4 : 1994

We can make as per customer specifications

Note: Tinned copper wire of other specific wire sizes also available on request.

Advantages of Electro-tinned Wire Over Hot Dip Tinned Wire

- Uniform & Controlled Tin coating
- Better tin bonding with base metal i.e. copper
- Uniform wire elongation
- Re-drawable to finer sizes offering flexibility to customer

Powering the world

Power Cables

L.T. AERIAL BUNCHED CABLE

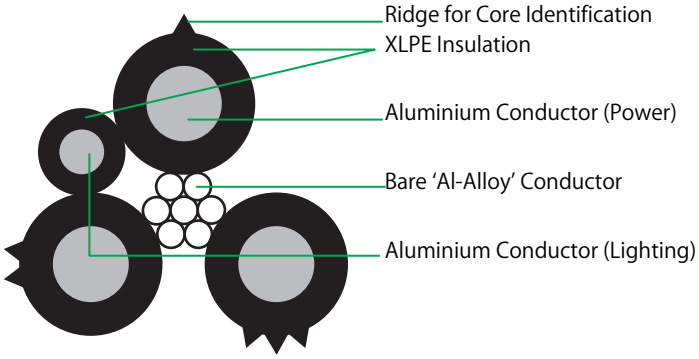
Outdoor Aerial RoHS compliant

Applications:

Aerial Bunched Cables are suitable for the following fuctions:

- In power theft prone areas.
- As replacement of bare lines in rural areas, in woods, other localities & narrow street where space is limited.
- As replacement of bare lines where reliability of supply is of prime importance and where high degree of stability of supply voltage is of importance.
- In hilly terrains where cost of erection of overhead lines of under ground cable becomes very high.
- Where space is limited like those in densely populated area, dense forests.
- As reinforcement of existing system without increasing voltage.
- For temporary supplies.

Typical Cross section for Armoured Cable



Cable Construction Details

Conductor The phase conductor and neutral/street lighting conductors is of H2 or H4 grade aluminium complying with the requirements of IS 8130:1984 and conforms to flexibility class 2 of IS 8130:1984. The size of the street lighting conductor is16 mm^2.

Messenger (Neutral Conductor or Otherwise) The conductor is heat treated aluminium-magnesium-silicon alloy wire conforming to IS 398 (Part 4):1979. It is either stranded circular or compacted circular type and has minimum 7 strands with smooth surface.

Insulation The conductor is insulated with crosslinked polyethylene applied by extrusion. The insulation so applied fits closely on the conductor and it is possible to remove without damaging the conductor. The color of insulation is black, offering UV protection.

Core Identification The phase conductors is provided with one, two or three 'ridges' and outer neutral insulated conductor, if provided, has four 'ridges' for quick identification. The street lighting conductor and messenger conductor (if insulated) does not have any identification mark.

Assembly (Laying up) The required number of insulated phase conductors, one insulated neutral conductor (if required) and a street lighting conductor (if required) is twisted around the bare (or insulated) as required messenger conductor without fillers with a lay not exceeding 35times the diameter of the insulated phase conductor. The direction of lay is right hand.

Outdoor Aerial RoHS compliant

Technical Particulars (as Per Is: 14255 - 1995)

Phase Conductor (Aluminium) As per IS 8130 : 1984			Street Lighting Conductor (Aluminium) As per IS 8130 : 1984			Messenger Conductor Aluminium Alloy As per IS 398 (Part-4) : 1979		
Nom. Area	Max. D.C. Conductor Resistance at 20°C	Nom. Thickness of Insulation XLPE/PE	Nom. Area	Max. D.C. Conductor Resistance at 20°C	Nom. Thickness of Insulation XLPE/P	Nom. Area	Max. D.C. Conductor Resistance at 20°C	Min. Breaking Load
Sqmm	Ω/Km	mm	Sqmm	Ω/Km	mm	Sqmm	Ω/Km	KN
16	1.910	1.2	16	1.91	1.2	25	1.380	7.0
25	1.200	1.2	16	1.91	1.2	25	1.380	7.0
35	0.868	1.2	16	1.91	1.2	25	1.380	7.0
50	0.641	1.5	16	1.91	1.2	35	0.986	9.8
70	0.443	1.5	16	1.91	1.2	50	0.689	14.0
95	0.320	1.5	16	1.91	1.2	70	0.492	19.7
120	0.253	1.5	16	1.91	1.2	95	0.357	26.5

Composition & Designation Of L.t. Aerial Bunched Cables

Designation	Complete Bunched Cable	
	Approx. Overall Dia mm	Approx. Total Mass Kg/Km
3C x 16 mm^2 + 25 mm^2 + 16 mm^2	20	320
3C x 25 mm^2 + 25 mm^2 + 16 mm^2	23	410
3C x 35 mm^2 + 25 mm^2 + 16 mm^2	25	500
3C x 50 mm^2 + 35 mm^2 + 16 mm^2	30	690
3C x 70 mm^2 + 50 mm^2 + 16 mm^2	34	915
3C x 95 mm^2 + 70 mm^2 + 16 mm^2	39	1195
3C x 120 mm^2 + 70 mm^2 + 16 mm^2	44	1485

Notes

We can manufacture Aerial Bunched cable as per customer's requirement meeting the National/ International specifications.

Advantages

Aerial Bunched Cables Lines have very high reliability in maintaining services because conductors are insulated with the best dielectric. The benefits of using this line are:

- Safest system because phase conductors are insulated, no risk of danger of accidental touching live conductor.
- Less fault rage on account of good protection against line and ground fault by high winds or falling trees or bird especially in hilly areas & forests as encountered in rural distribution networks.
- High insulation resistance to earth in all seasons and polluted atmospheres. Negligible leakage currents and low losses.
- Multiple circuits of power and telephone cables could be strung in the same set of poles or any other supports like walls etc.
- Better adaptability to run concurrently with existing over-head bare conductor system without any interference.
- High capacitance and low inductance leading to low impedance of lines.
- Total lines costs are reduced and maintenance is very easy.
- Insulation of conductors also helps in preventing corrosion of the conductor.
- Cores being insulated, the chances of power thefts are eliminated.
- These are cheaper than underground power cables.
- Life of Transformers increased as the supply interruptions are minimized.

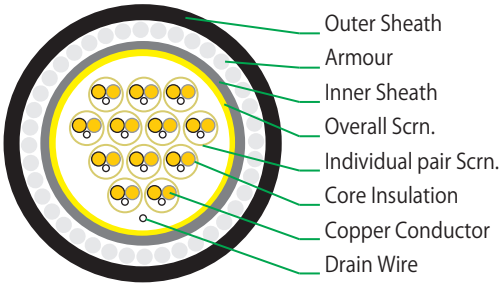
INSTRUMENTATION CABLE

Generally to BS:5308 Part-1 (Polyethylene Insulation)

Power Cable

RoHS compliant

Typical Cross section for Armoured Cable



Cable Construction Details

Operating Voltage: 300/500V

Size: Available in following no of pairs : 1, 2 (1 Quad), 5, 10, 15, 20, 30 and 50 Pairs

Conductor: Solid/Stranded/Flexible Annealed Bare/Tinned copper class 1/2/5 to BS:6360

Insulation: Conductors are insulated with solid

& Pairing/ Quading Polyethylene Type 03 as per BS:6234, uniformly twisted together to form a pair / quad with a max. lay length of 100 mm, and colour coded for identification.

Colour Code: As per BS:5308 Part-1

Pair shield: (for individual pair Shielded cables only) Each twisted pair shielded with aluminium backed polyester tape and a tinned copper drain wire of size 0.5mm^2 .

Assembly Twister pairs are cabled with non-hygroscopic fillers if necessary

Overall shield: The entire assembly is shielded with aluminium polyester tape and a tinned copper drain wire of size 0.5mm^2.

Bedding: (applicable for Type 2 Cables) Extruded Black Polyethylene Type 2 C or 03 as per BS:6234.

Wire Armouring: (applicable for Type 2 Cables) A serving of round galvanized steel wires as per BS:1442 is applied.

Sheath: Type - 1 & 2 Extruded Black PVC Type TM1 of BS:6746.

Resistance, as per BS 6360

Cross Sectional Area	Maximum Resistance at 20°C/Km					
	Class - 1 Solid Copper Conductor		Class - 2 Stranded Copper Conductor		Class - 5 Flexible Copper Conductor	
Sqmm	Plain	Tinned	Plain	Tinned	Plain	Tinned
0.50	36.0	36.7	36.0	36.7	39.0	40.1
0.75	24.5	24.8	24.5	24.8	26.0	26.7
1.00	18.1	18.2	18.1	18.2	19.5	20.0
1.50	12.1	12.2	12.1	12.2	13.3	13.7

Max. Mutual Capacitance

Cross Sectional Area	Requirment as per BS:5308 Part - 1		
	Cable without screen	Cables with only collective screen (except 1 & 2 pair)	1 Pair & 2 Pair with collective screen & all cables with individual pair screen
Sqmm	(nF/Km)	(nF/Km)	(nF/Km)
0.5	75	75	115
1.0	75	75	115
1.5	85	85	120

L/R ratio (Max):

1.5 Sqmm - 40 Micro Henry/Ω

0.5/0.75/1.0 Sqmm - 25 Micro Henry/Ω

Note :

1. Type 1 – Unarmoured,
2. Type 2 – Armoured
3. Other conductor Sizes and Types, Alternative Colour Codes, Higher Pair Count and Sheath Material – FR/FRLS/Zero Halogen compounds are available on request.
4. As an alternate, armoured cables shall be supplied with Flat Strip/ Double Steel Tape/ Wire Braided as per customer requirement.

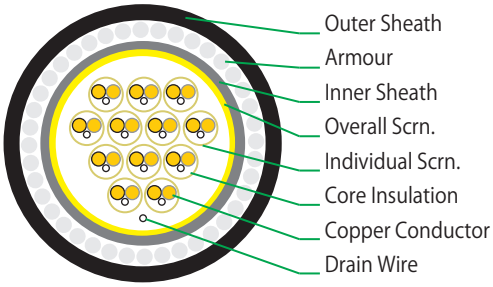
INSTRUMENTATION CABLE

Generally to BS:5308 Part-2 (PVC Insulation)

Power Cable

RoHS compliant

Typical Cross section for Armoured Cable



Resistance, as per BS 6360

Cross Sectional Area	Maximum Resistance at 20°C/Km					
	Class - 1 Solid Copper Conductor		Class - 2 Stranded Copper Conductor		Class - 5 Flexible Copper Conductor	
Sqmm	Plain	Tinned	Plain	Tinned	Plain	Tinned
0.50	36.0	36.7	36.0	36.7	39.0	40.1
0.75	24.5	24.8	24.5	24.8	26.0	26.7
1.00	18.1	18.2	18.1	18.2	19.5	20.0
1.50	12.1	12.2	12.1	12.2	13.3	13.7

Max. Mutual Capacitance at 1 kHz.

Core to Core : 250 nF/Km

Core to Screen : 450 nF/Km

L/R ratio (Max):

1.5 Sqmm - 40 Micro Henry/Ω

0.5/0.75/1.0 Sqmm - 25 Micro Henry/Ω

Cable Construction Details

Operating Voltage: 300/500V

Size: Available in following no of pairs : 1, 2 (1 Quad), 5, 10, 15, 20, 30 and 50 Pairs

Conductor: Solid/Stranded/Flexible Annealed Bare/Tinned copper class 1/2/5 to BS:6360

Insulation: Conductors are insulated with solid

& Pairing/ Quading Polyethylene Type 03 as per BS:6234, uniformly twisted together to form a pair / quad with a max. lay length of 100 mm, and colour coded for identification.

Colour Code: As per BS:5308 Part-1

Pair shield: (for individual pair Shielded cables only) Each twisted pair shielded with aluminium backed polyester tape and a tinned copper drain wire of size 0.5mm^2 .

Assembly Twister pairs are cabled with non-hygroscopic fillers if necessary

Overall shield: The entire assembly is shielded with aluminium polyester tape and a tinned copper drain wire of size 0.5mm^2.

Bedding: (applicable for Type 2 Cables) Extruded Black Polyethylene Type 2 C or 03 as per BS:6234.

Wire Armouring: (applicable for Type 2 Cables) A serving of round galvanized steel wires as per BS:1442 is applied.

Sheath: Type - 1 & 2 Extruded Black PVC Type TM1 of BS:6746.

Note :

1. Type 1 – Unarmoured,
2. Type 2 – Armoured
3. Other conductor Sizes and Types, Alternative Colour Codes, Higher Pair Count and Sheath Material – FR/FRLS/Zero Halogen compounds are available on request.
4. As an alternate, armoured cables shall be supplied with Flat Strip/ Double Steel Tape/ Wire Braided as per customer requirement.

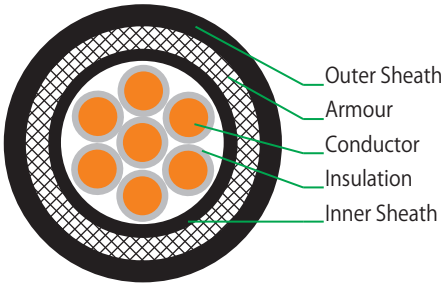
CONTROL CABLE

As per IS:1554 (Part-1):1988

Power Cable

RoHS compliant

Typical Cross section for Armoured Cable



1.1 KV 1.5/2.5 Sqmm (Solid) Multicore Unarmoured PVC Control Cables Conforming to IS : 1554 (Pt - I) - 1988

No. of Cores & Cross Sectional Area	Thickness of PVC Insulation (Nom.)	Thickness of PVC Inner Sheath (min.) Extruded	Thickness of PVC Outer Sheath (Nom.)	Approx. O.D.	Approx. Net Weight of Cable	Standard Delivery Length in	Current Rating	
							Direct in Ground	In Air/ Duct
No x mm2	mm	mm	mm	mm	Kg/Km	Mtrs	Amps.	Amps.
2 x 1.5	0.8	0.3	1.8	11.5	155	500/1000	23	20
3 x 1.5	0.8	0.3	1.8	12.0	177	500/1000	21	17
4 x 1.5	0.8	0.3	1.8	13.0	208	500/1000	21	17
5 x 1.5	0.8	0.3	1.8	14.0	243	500/1000	16	14
6 x 1.5	0.8	0.3	1.8	15.0	261	500/1000	15	13
7 x 1.5	0.8	0.3	1.8	15.0	271	500/1000	14	13
10 x 1.5	0.8	0.3	1.8	18.0	368	500/1000	13	11
12 x 1.5	0.8	0.3	1.8	18.5	416	500/1000	12	10
14 x 1.5	0.8	0.3	1.8	19.0	466	500/1000	11	10
16 x 1.5	0.8	0.3	1.8	20.0	521	500/1000	11	9
19 x 1.5	0.8	0.3	2.0	21.5	607	500/1000	10	9
24 x 1.5	0.8	0.3	2.0	24.5	749	500/1000	9	8
27 x 1.5	0.8	0.3	2.0	25.0	817	500/1000	9	8
30 x 1.5	0.8	0.3	2.0	26.0	890	500/1000	9	7
37 x 1.5	0.8	0.3	2.0	28.0	1058	500/1000	8	7
2 x 2.5	0.9	0.3	1.8	13.0	200	500/1000	32	27
3 x 2.5	0.9	0.3	1.8	13.5	234	500/1000	27	24
4 x 2.5	0.9	0.3	1.8	14.5	281	500/1000	27	24
5 x 2.5	0.9	0.3	1.8	15.5	331	500/1000	23	19
6 x 2.5	0.9	0.3	1.8	16.5	356	500/1000	21	18
7 x 2.5	0.9	0.3	1.8	16.5	374	500/1000	20	17
8 x 2.5	0.9	0.3	1.8	18.0	434	500/1000	19	16
9 x 2.5	0.9	0.3	1.8	19.0	492	500/1000	18	15
10 x 2.5	0.9	0.3	1.8	20.5	512	500/1000	18	15
12 x 2.5	0.9	0.3	2.0	21.5	602	500/1000	17	14
14 x 2.5	0.9	0.3	2.0	22.5	680	500/1000	16	14
16 x 2.5	0.9	0.3	2.0	23.5	764	500/1000	15	13
19 x 2.5	0.9	0.3	2.0	24.5	870	500/1000	14	12
24 x 2.5	0.9	0.3	2.0	28.5	1077	500/1000	13	11
27 x 2.5	0.9	0.3	2.0	29.0	1182	500/1000	12	10
30 x 2.5	0.9	0.3	2.0	30.0	1292	500/1000	12	10
37 x 2.5	0.9	0.4	2.2	32.5	1588	500/1000	11	9

Cable Construction Details

Voltage : These cables can be used on AC voltage up to & Including 1100 V or DC up to & including 1500 V.

Size : 1.5 Sq.mm. & 2.5 Sq.mm. upto 37 Cores

Conductor: Annealed Bare Electrolytic Copper/ Aluminum Conductor conforming to IS:8130:1984.

Insulation: Conductors are insulated with PVC Compound as per IS:5831:1984.

Colour of Cores: Cores are identified with a colour scheme as per IS:1554 (pt-1):1988 as under

2 Cores - Red & Black

3 Cores - Red, Yellow & Blue

3½ & 4 Cores - Red, Yellow, Blue & Black (Reduced Neutral Core in case of 3½ Core).

5 Cores - Red, Yellow, Blue, Black and Grey

In case of cable exceeding five cores, two adjacent (counting and direction cores) in each layer shall be colored Blue, Yellow and remaining cores grey, or identification by numbers printed over insulation as per IS:1554 (pt-1):1988

Laying of Cores: Cores are laid up with a suitable lay. The final layer direction shall be kept right hand lay.

Inner Sheath: The Inner Sheath is applied over laid up of cores by extrusion/wrapping of thermoplastic material.

Armouring: It is applied over inner sheath. It may consist of galvanized Round Steel wires or galvanized Flat Steel Strips conforming to IS 3975. Round Wire armouring is provided, where the calculated diameter under armour is 13.0 mm. Above this, armouring is either round wire/steel strip.

Outer Sheath: A final covering of PVC Compound, conforming to IS:5831:1984, is applied over Armouring in case of Armoured Cable or over Inner Sheath in case of Unarmoured cable, called as "Outer Sheath".

The Insulation, Inner Sheath or Outer Sheath can be HR PVC, FRLS PVC or FRHF Compound , depending upon their application.

Construction Variants

1. Solid / Stranded annealed copper conductor &Tinned / Bare
2. General Purpose / HR PVC insulation
3. Cores laid up (filled if needed)
4. FRLS / General Purpose PVC inner sheath
5. FRLS / General purpose PVC Outersheath

Max. Conductor D.C. Resistance at 20 Deg C - Conductor Size :

1.5 sq.mm - 12.1 Ω / km (Bare), 12.2 Ω / km (Tinned)
2.5 sq.mm - 7.41 Ω / km (Bare), 7.56 Ω / km (Tinned)

Power Cable

RoHS compliant

1.1 KV 1.5/2.5 Sqmm (Solid) Multicore Armoured PVC Control Cables
Conforming to IS : 1554 (Pt - I) - 1988

No. of Cores & Cross Sectional Area	Thickness of PVC Insulation (Nom.)	Thickness of PVC Inner Sheath (min.) Extruded	Round Wire Dia	Flat Strip	Thickness of PVC Outer Sheath (Min.)	Approx. O.D.	Approx. Net Weight of Cable	Standard Delivery Length in	Current Rating	
									Direct in Ground	In Air/ Duct
No x mm2	mm	mm	mm	mm	mm	Mtrs	Kg/Km	Mtrs	Amps.	Amps.
2 x 1.5	0.8	0.3	1.4		1.24	13.5	357	500/1000	23	20
3 x 1.5	0.8	0.3	1.4		1.24	14.0	390	500/1000	21	17
4 x 1.5	0.8	0.3	1.4		1.24	14.5	446	500/1000	21	17
5 x 1.5	0.8	0.3	1.4		1.24	15.5	491	500/1000	16	14
6 x 1.5	0.8	0.3	1.4		1.24	16.5	534	500/1000	15	13
7 x 1.5	0.8	0.3	1.4		1.24	16.5	544	500/1000	14	13
10 x 1.5	0.8	0.3	1.4		1.40	20.0	726	500/1000	13	11
12 x 1.5	0.8	0.3		4.0 x 0.8	1.24	19.0	632	500/1000	12	10
14 x 1.5	0.8	0.3		4.0 x 0.8	1.40	20.0	724	500/1000	11	10
16 x 1.5	0.8	0.3		4.0 x 0.8	1.40	21.0	778	500/1000	11	9
19 x 1.5	0.8	0.3		4.0 x 0.8	1.40	22.0	871	500/1000	10	9
24 x 1.5	0.8	0.3		4.0 x 0.8	1.40	25.0	1060	500/1000	9	9
27 x 1.5	0.8	0.3		4.0 x 0.8	1.40	25.5	1127	500/1000	9	8
30 x 1.5	0.8	0.3		4.0 x 0.8	1.40	26.5	1225	500/1000	9	7
37 x 1.5	0.8	0.3		4.0 x 0.8	1.40	28.0	1416	500/1000	8	7
2 x 2.5	0.9	0.3	1.4		1.24	14.5	438	500/1000	32	27
3 x 2.5	0.9	0.3	1.4		1.24	15.0	483	500/1000	27	24
4 x 2.5	0.9	0.3	1.4		1.24	16.0	554	500/1000	27	24
5 x 2.5	0.9	0.3	1.4		1.24	17.5	628	500/1000	23	19
6 x 2.5	0.9	0.3	1.4		1.24	18.5	676	500/1000	21	18
7 x 2.5	0.9	0.3	1.4		1.24	18.5	694	500/1000	20	17
8 x 2.5	0.9	0.3	1.4		1.40	20.0	793	500/1000	19	16
9 x 2.5	0.9	0.3		4.0 x 0.8	1.40	20.0	750	500/1000	18	15
10 x 2.5	0.9	0.3		4.0 x 0.8	1.40	21.0	795	500/1000	18	15
12 x 2.5	0.9	0.3		4.0 x 0.8	1.40	22.0	866	500/1000	17	14
14 x 2.5	0.9	0.3		4.0 x 0.8	1.40	23.0	969	500/1000	16	14
16 x 2.5	0.9	0.3		4.0 x 0.8	1.40	24.0	1051	500/1000	15	13
19 x 2.5	0.9	0.3		4.0 x 0.8	1.40	25.0	1181	500/1000	14	12
24 x 2.5	0.9	0.3		4.0 x 0.8	1.40	29.0	1459	500/1000	13	11
27 x 2.5	0.9	0.3		4.0 x 0.8	1.40	29.5	1564	500/1000	12	10
30 x 2.5	0.9	0.3		4.0 x 0.8	1.56	30.5	1723	500/1000	12	10
37 x 2.5	0.9	0.4		4.0 x 0.8	1.56	33.0	2014	500/1000	11	9

Construction Variants

1. Solid / Stranded annealed copper conductor &Tinned / Bare
2. General Purpose / HR PVC insulation
3. Cores laid up (filled if needed)
4. FRLS / General Purpose PVC inner sheath
5. Armouring round Galvanised Steel wires / strips
6. FRLS / General purpose PVC Outersheath

Max. Conductor D.C. Resistance at 20 Deg C - Conductor Size :

1.5 sq.mm - 12.1 Ω / km (Bare), 12.2 Ω / km (Tinned)
2.5 sq.mm - 7.41 Ω / km (Bare), 7.56 Ω / km (Tinned)

PVC INSULATED INDUSTRIAL CABLE (UNSHEATHED)

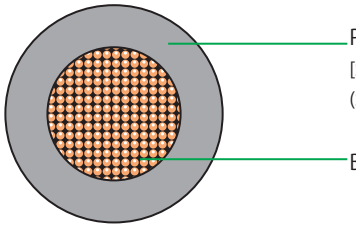
These are Single cables/cords with rigid as well as flexible annealed bare/tinned copper and aluminium conductors, insulated with PVC.

Indoor | Flame Resistant | RoHS compliant

Applications

These wires are rated for voltages upto and including 450/750 V AC, 50Hz and used for electric power and lighting including cables for outdoor and low temperature use. These cables may be used on DC system for rated voltages upto and including 1500 V to earth.

Typical Cross section



Features:

- Categories of Cables: Indoor, Outdoor, FR and FR-LSH.
- Temperature Range: -10° C to +70° C or +85° C.
- Available in different colors and stripes.
- Available in Leaded or Lead free grades.
- Packed in Coils of suitable standard lengths.
- BIS Certification vide IS 694 Licence No. CM/L 3050333

Technical Details

Nominal Cross Section Sq mm	Diameter of Single Wire Max mm	Maximum Electrical Resistance @ 20°C (Ω/Km)		Insulation Wall Thickness Nominal. mm	Cable Outer Diameter	
		Plain Wires	Tinned Wires		Nominal	Maximum
0.50	0.21	39.0	40.1	0.60	2.3	2.6
0.75	0.21	26.0	26.7	0.60	2.5	2.8
1.0	0.21	19.5	20.0	0.60	2.7	3.0
1.5	0.26	13.30	13.70	0.70	3.1	3.4
2.5	0.26	7.98	8.21	0.80	3.8	4.1
4.0	0.31	4.95	5.09	0.80	4.3	4.8
6.0	0.31	3.30	3.39	0.80	4.9	5.3
10.0	0.41	1.91	1.95	1.00	6.2	7.0
16.0	0.41	1.21	1.24	1.00	7.3	8.1
25.0	0.41	0.41	0.780	1.20	9.0	10.2
35.0	0.41	0.554	0.565	1.20	10.2	11.7
50.0	0.41	0.386	0.393	1.40	12.2	13.9

Note:

Cables upto 300 Sqmm with Flexible conductor (Class 5 of Copper Conductor as per IS 8130) can be supplied.

Cables upto 630 Sqmm with Rigid conductor (Class 1 or 2 of Copper or Aluminium Conductor as per IS 8130) can be supplied.

PVC INSULATED INDUSTRIAL CABLE (SHEATHED)

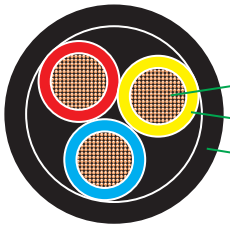
These are Single and multicore cables/cords with rigid as well as flexible annealed bare/tinned copper and aluminium conductors, insulated and sheathed with PVC.

Indoor | Flame Resistant | RoHS compliant

Applications

These wires are rated for voltages upto and including 450/750 V AC, 50Hz and used for electric power and lighting including cables for outdoor and low temperature use. These cables may be used on DC system for rated voltages upto and including 1500 V to earth.

Typical Cross section



Copper Conductor
PVC Insulation Type A IS 5831
PVC Sheath ST-1 IS 5831 Black

Technical Details

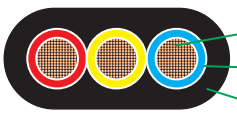
Nominal Cross Section Sq mm	Diameter of Single Wire Max mm	Maximum Electrical Resistance @ 20°C (Ω/Km)		Insulation Wall Thickness Nominal mm.	Sheath Thickness	Cable Outer Diameter	
		Plain Wires	Tinned Wires		Nominal mm.	Nominal	Maximum
0.50	0.21	39.0	40.1	0.60	0.90	7.0	7.3
0.75	0.21	26.0	26.7	0.60	0.90	7.4	7.7
1.0	0.21	19.50	20.0	0.60	0.90	7.8	8.1
1.5	0.26	13.30	13.70	0.60	0.90	8.3	9.4
2.5	0.26	7.98	8.21	0.70	1.00	9.9	10.9
4.0	0.31	4.95	5.09	0.80	1.00	11.5	12.4
6.0	0.31	3.30	3.39	0.80	1.20	13.1	13.8
10.0	0.41	1.91	1.95	1.00	1.40	16.5	17.69
16.0	0.41	1.21	1.24	1.00	1.40	18.8	20.6
25.0	0.41	0.780	0.795	1.20	1.50	22.6	25.6
35.0	0.41	0.554	0.565	1.20	1.60	25.3	29.3
50.0	0.41	0.386	0.393	1.40	2.00	30.2	34.6

Note:

a) Multicore Cables upto 120 Sqmm with Rigid conductor (Class 1 or 2 of Copper or Aluminium Conductor as per IS 8130) can be supplied

b) Multicore Cables upto 300 Sqmm with Flexible conductor (Class 5 Copper Conductor as per IS 8130) can be supplied.

Typical Cross section



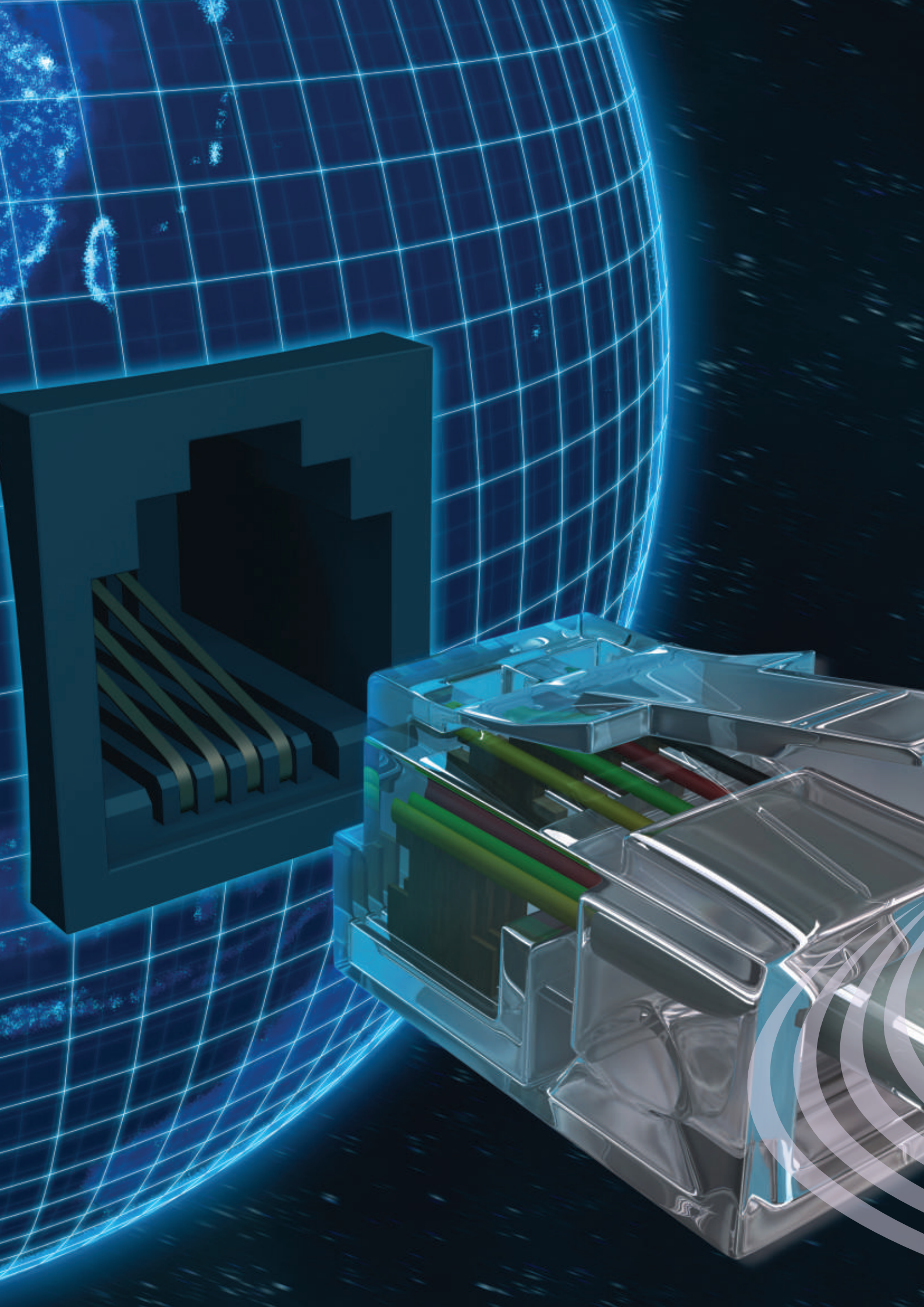
Copper Conductor
PVC Insulation Type A IS 5831
PVC Sheath ST-1 IS 5831 Black

Technical Details

Nominal Cross Section Sq mm	Diameter of Single Wire Max mm	Maximum Electrical Resistance @ 20°C (Ω/Km)		Insulation Wall Thickness Min. mm	Sheath Thickness Nominal	Cable Outer Diameter mm
		Plain Wires	Tinned Wires			
0.50	0.21	39.0	40.1	0.60	0.90	9.6x4.9
0.75	0.21	26.0	26.7	0.60	0.90	10.5x5.2
1.0	0.21	19.5	20.0	0.60	0.90	11.0x5.4
1.5	0.26	13.30	13.70	0.70	0.90	10.7x5.3
2.5	0.26	7.98	8.21	0.80	1.00	13.0x6.2

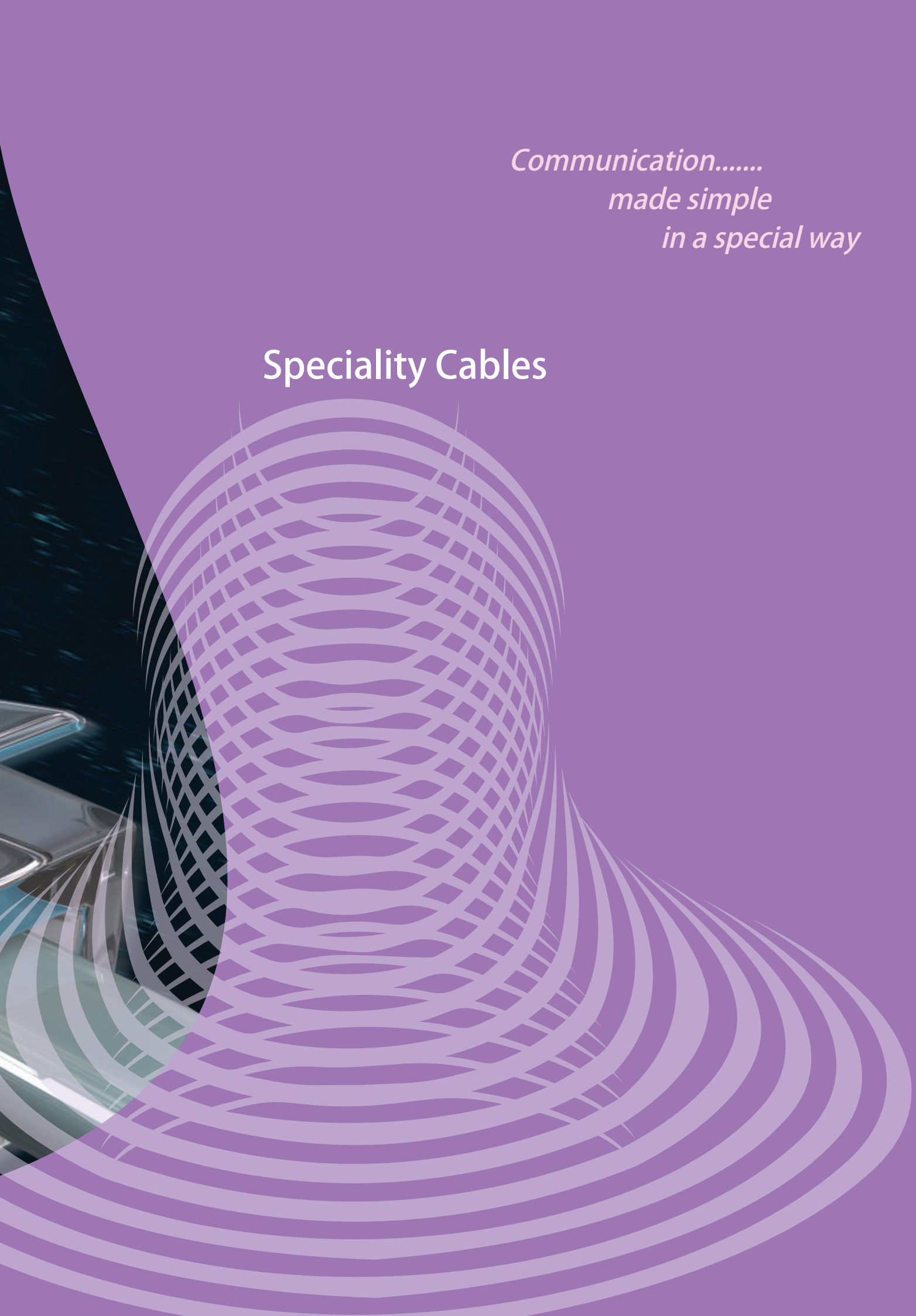
Features:

- Categories of Cables: Indoor, Outdoor, FR and FR-LSH.
- Temperature Range: -10° C to +70° C or +85° C.
- Available in different colors and stripes.
- Available in Leaded or Lead free grades.
- Packed in Coils of suitable standard lengths.
- BIS Certification vide IS 694 Licence No. CM/L 3050333



Communication.....
made simple
in a special way

Speciality Cables



STAINLESS STEEL WIRE ARMOURED TACTICAL CABLE FOR MILITARY APPLICATION

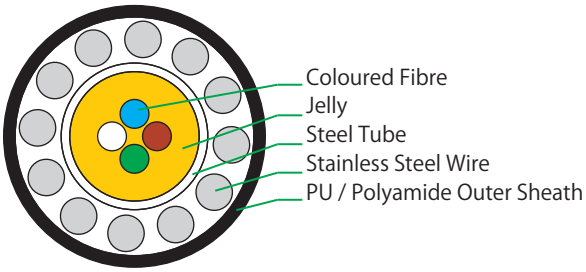
Tactical Optical Fibre Cables

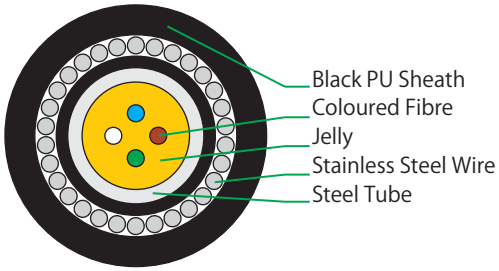
Water blocked | Flame resistant | Aerial | Outdoor | Shotgun resistant | Track resistant (25 kV) | RoHS compliant

Applications

- Indoor / Outdoor
- Suitable for rapid deployment in extreme environmental conditions.
- For military application
- Temporary robust communication lines and mobile applications with Rodent protection

Typical Cross section of 4 Fibre





Technical Characteristics

FIBRE COUNT	SHEATH	DIAMETER (mm)	WEIGHT (Kg./Km)	BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
		Max.	Nominal	Temporary	Permanent	Installation	Operating
UPTO 6F	Double Sheath	6.0	70	15D	20D	-10° to +50° C	-40° to +70° C
12F	Double Sheath	7.0	95	15D	20D	-10° to +50° C	-40° to +70° C
UPTO 6F	Single Sheath	6.0	45	15D	20D	-10° to +50° C	-40° to +70° C

Color Coding - Fibre & Tube

Blue | Orange | Green | Brown | Grey | White | Red | Black | Yellow | Voilet | Pink | Aqua

Special Features

- Cut resistant, Polyurethane outer jacket
- Flexible construction for multiple deployment
- Performance in wide temp range
- High permissible tensile strength
- Excellent protection against rodents and termites
- Durable in high traffic areas
- Ruggedized cable and easy to use in the field
- High impact and crush resistance

Mechanical Characteristics

Tensile Strength Permanent	900 N max.
Crush Strength	1000 N/cm
Impact Resistance	200 (Min.)
Flex Resistance	2000 Cycle (Min.)
Storage Temperature	-30° C to +65° C
Breaking Load	>3500 N
Water Pressure	>500 Bar

Drum Length

500/ 1000/ 2000 meters ± 5%

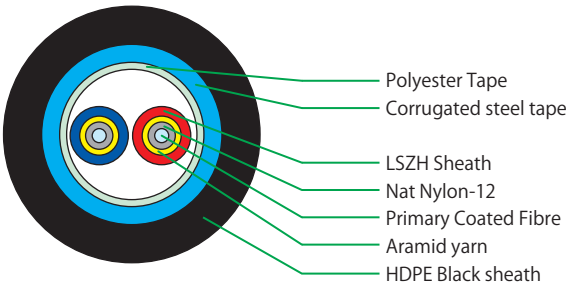
FIBRE TO ANTENNA, FTTA SOLUTIONS FOR RADIO BASED STATIONS

Outdoor Metro RoHS compliant

Applications

- For connection of radio based stations

Typical Cross section of 2 Fibre



Cable Construction Details

- Enhance low water peak single mode fibers in full compliance with ITU-T-G.652.D (also available with G657 SM Fibre and OM1 / OM2 / OM3 & OM4 MM Fibre)
- Tight coated fiber with Ny-12/LSZH
- Aramid Yarn over tight coated fiber
- LSZH Sheath over Aramid yarn
- Polyester tape wrapping
- Corrugated Steel tape armouring
- Outer Sheath of UV resistant PE, Black

Technical Characteristics

FIBRE COUNT	DIAMETER (mm)	WEIGHT (Kg./Km)	TENSILE STRENGTH (N)		BENDING RADIUS (mm)		TEMPERATURE RANGE (IEC 60794-1-2-F1)	
	Nominal	Nominal	Installation	Operating	Temporary	Permanent	Installation	Operating
2F	8.5	70	350	300	15D	20D	-20^{0} to $+50^{0}$C	-40^{0} to $+70^{0}$C

Special Features

- Fiber-fed remote radios (RRs) offer significant power savings
- Reduces wind and weight load on towers; avoid costly tower upgrades.
- Reduces installation cost through fewer cables sheaths (70% less) compared to coax.
- Reduces installation time through fewer cable sheaths.
- Fast and easy connection and upgrade via tower-top terminal.
- Pre-provision for future equipment additions (spare ports).
- Ruggedized cable with corrugated steel tape armoured providing termite resistance, protection against rodents, birds, squirrels & monkey bite.

Drum Length

1000/2000 meters ± 5%

Mechanical Characteristics

Repeated Bending (IEC 60794-1-2-E6)	30 Cycle, 20 X D, 5 Kg Load, D = Cable D
Torsion Resistance (IEC 60794-1-2-E7)	10 Cycle (± 180°) 5 Kg Weight, L= 2 Mtr
Crush Resistance (IEC 60794-1-2-E3)	2000 N (100 X 100 mm) for 600 sec
Impact Resistance (IEC 60794-1-2-E4)	Height 500 mm, Weight = 5 Kg, 3 Nos at different points
Kink Resistance (IEC 60794-1-2-E10)	20 x D, D = Cable D

4 PAIR UTP CAT 5e CABLE

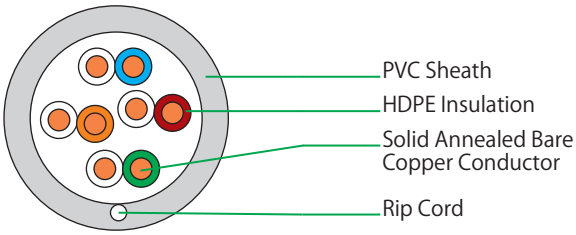
4 Pair Unshielded Twisted Pair (UTP) Data Cable,
24 AWG (0.5mm) Solid Bare Copper Conductors,
Polyethylene Insulation, PVC Jacket, Rip Cord.

Indoor | Flame Resistant | RoHS compliant | UL

Applications

These are structured cables suitable for Ethernet Applications and compatible with all known connection systems.

Typical Cross section



Characteristics Impedance :

Conductor Resistance	Max. 9.38 Ω/100m
Conductor Resistance Unbalance	Max. 5 %
Mutual Capacitance	Max. 5.6 nF/100m
Capacitance Earth Unbalance	Max. 330 pF/100m
Propagation Delay @ 1 MHZ, 10 MHz & 100 MHz	Max. 570, 545, 538 ns/100 m
Propagation Delay Skew 1 – 100 MHz	Max. 45 ns/100 m

Features:

- Fully Complies to the requirements of TIA/EIA 568 C.2.
- Enhanced performance specification up to 100 MHZ.
- Cables verified for performance with UL Certification and shipped with UL authorized markings and Labels

Colour Code:

Pair 1 : White/Blue -Blue;
Pair 2 : White/Orange -Orange;
Pair 3 : White/Green -Green;
Pair 4 : White/Brown -Brown

Cable Diameter , Standard Length & Packing:

Cable Diameter	: 5.5 ± 0.5 mm
Available Packaging	: 305 mtr Pull box Or 500 / 1000 mtr spool
Available Colour	: Grey or As Per Customer Requirement

Technical Details

Freq (MHZ)	Return Loss (dB)	Insertion Loss (dB/100m)	NEXT (dB)	PSNEXT (dB)	ACRF ELFEXT (dB)	PSACRF [PSELFEXT] (dB)
	Min.	Max.	Min.	Min.	Min.	Min.
1.0	20.0	2.0	65.3	62.3	63.8	60.8
4.0	23.0	4.1	56.3	53.3	51.8	48.8
8.0	24.5	5.8	51.8	48.8	45.7	42.7
10.0	25.0	6.5	50.3	47.3	43.8	40.8
16.0	25.0	8.2	47.2	44.2	39.7	36.7
20.0	25.0	9.3	45.8	42.8	37.8	34.8
25.0	24.3	10.4	44.3	41.3	35.8	32.8
31.25	23.6	11.7	42.9	39.9	33.9	30.9
62.5	21.5	17.0	38.4	35.4	27.9	24.9
100	20.1	22.0	35.3	32.3	23.8	20.8

Note:

Bi-directional Testing for Return Loss, NEXT & PSNEXT

4 PAIR FTP CAT 5e CABLE

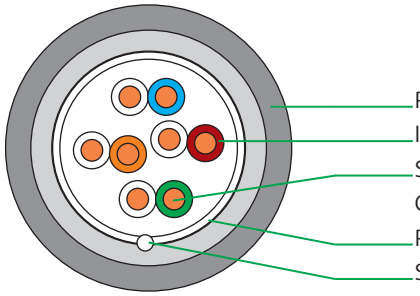
4 Pair Foil Screened Twisted Pair (FTP) Data Cable, 24 AWG (0.5mm) Solid Bare Copper Conductors, Polyethylene Insulation, Overall 100% Screened, PVC Sheath

Indoor | Flame Resistant | RoHS compliant

Applications

- Local area network
- Wide area network
- Broadband Connectivity

Typical Cross section



Electrical Characteristics:

Conductor Resistance	Max. 9.38 Ω/100m
Conductor Resistance Unbalance	Max. 5 %
Mutual Capacitance	Max. 5.6 nF/100m
Capacitance Earth Unbalance	Max. 330 pF/100m
Propagation Delay @ 1 MHZ, 10 MHz & 100 MHz	Max. 570, 545, 538 ns/100 m
Propagation Delay Skew 1 – 100 MHz	Max. 45 ns/100 m

Colour Code:

Pair 1 : White/Blue -Blue;
Pair 2 : White/Orange -Orange;
Pair 3 : White/Green -Green;
Pair 4 : White/Brown -Brown

Standard Length & Packing:

Cable Diameter : 6.0 ± 0.5 mm

Available Packaging : 305 mtr Pull box Or 500 / 1000 mtr spool

Technical Details

Freq (MHZ)	Return Loss (dB)	Insertion Loss (dB/100m)	NEXT (dB)	PSNEXT (dB)	ACRF ELFEXT (dB)	PSACRF [PSELFEXT] (dB)
	Min.	Max.	Min.	Min.	Min.	Min.
1.0	20.0	2.0	65.3	62.3	63.8	60.8
4.0	23.0	4.1	56.3	53.3	51.8	48.8
8.0	24.5	5.8	51.8	48.8	45.7	42.7
10.0	25.0	6.5	50.3	47.3	43.8	40.8
16.0	25.0	8.2	47.2	44.2	39.7	36.7
20.0	25.0	9.3	45.8	42.8	37.8	34.8
25.0	24.3	10.4	44.3	41.3	35.8	32.8
31.25	23.6	11.7	42.9	39.9	33.9	30.9
62.5	21.5	17.0	38.4	35.4	27.9	24.9
100	20.1	22.0	35.3	32.3	23.8	20.8

Note:

Bi-directional Testing for Return Loss, NEXT & PSNEXT

4 PAIR SFTP CAT 5E CABLE

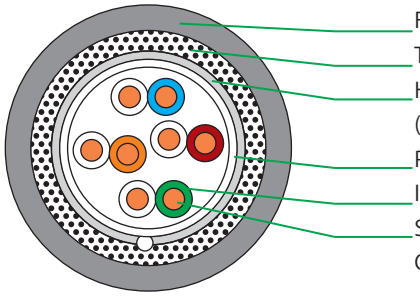
4 Pair Foil & Braid Screened Twisted Pair (SFTP) Data Cable,
24 AWG (0.5mm) Solid Bare Copper Conductors,
Polyethylene Insulation, Overall 100% Screened,
Braided with Tinned Copper PVC Sheath

Indoor | Flame Resistant | RoHS compliant

Applications

These are structured cables suitable for Ethernet Applications and compatible with all known connection systems.

Typical Cross section



Electrical Characteristics:

Conductor Resistance	Max. 9.38 Ω/100m
Conductor Resistance Unbalance	Max. 5 %
Mutual Capacitance	Max. 5.6 nF/100m
Capacitance Earth Unbalance	Max. 330 pF/100m
Propagation Delay @ 1 MHZ, 10 MHz & 100 MHz	Max. 570, 545, 538 ns/100 m
Propagation Delay Skew 1 – 100 MHz	Max. 45 ns/100 m

Colour Code:

Pair 1 : White/Blue -Blue;
Pair 2 : White/Orange -Orange;
Pair 3 : White/Green -Green;
Pair 4 : White/Brown -Brown

Cable Diameter , Standard Length & Packing:

Cable Diameter	: 7.0 ± 0.5 mm
Standard Length	: 500mtr ± 10% spools
Available Packaging	: Spools packed in carton box

Technical Details

Freq (MHZ)	Return Loss (dB)	Insertion Loss (dB/100m)	NEXT (dB)	PSNEXT (dB)	ACRF ELFEXT (dB)	PSACRF [PSELFEXT] (dB)
	Min.	Max.	Min.	Min.	Min.	Min.
1.0	20.0	2.0	65.3	62.3	63.8	60.8
4.0	23.0	4.1	56.3	53.3	51.8	48.8
8.0	24.5	5.8	51.8	48.8	45.7	42.7
10.0	25.0	6.5	50.3	47.3	43.8	40.8
16.0	25.0	8.2	47.2	44.2	39.7	36.7
20.0	25.0	9.3	45.8	42.8	37.8	34.8
25.0	24.3	10.4	44.3	41.3	35.8	32.8
31.25	23.6	11.7	42.9	39.9	33.9	30.9
62.5	21.5	17.0	38.4	35.4	27.9	24.9
100	20.1	22.0	35.3	32.3	23.8	20.8

Note:
Bi-directional Testing for Return Loss, NEXT & PSNEXT

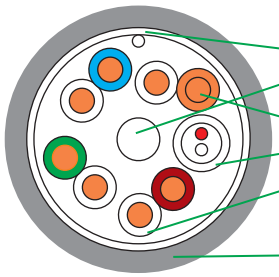
HYBRID CABLE
4 PAIR UTP CAT 5e WITH 2 NO. OF G-652D FIBRE

4 Pair Unshielded Twisted Pair (UTP) 100 Ohm Data Cable, 24 AWG (0.5mm) Solid Bare Copper Conductors, Polyethylene Insulation along with 2 Fibre as per G-652 D Rec placed inside loose tube made of PBTP filled with thixotropic jelly, Core wrapped with polyester tape, PVC /FRLSZH Jacket, Rip Cord.

Applications

The cable is particularly suitable for indoor star –network and internal wiring in connector. Suitable for Ethernet Applications and compatible with all known connection systems.

Typical Cross section



Features:

- Copper pairs fully Complies to the requirements of TIA/EIA 568 C.2.
- Enhanced performance specification up to 100 MHz.
- Available in Lead Free form as well.
- Fibre used fully complies to ITU-T Rec G652D

Colour Code:

CU. Pair		Fibre
Pair 1	: White/Blue	Fibre 1: White
Pair 2	: White/Orange	Fibre 2: Red
Pair 3	: White/Green	
Pair 4	: White/Brown	

Cable Diameter , Standard Length & Packing:

Cable Diameter	: 6.0 ± 0.5 mm
Cable Weight	: 40 Kg/Km Nominal
Available Packaging	: 500 mtr spool ± 10%
Available Colour	: Grey or As Per Customer Requirement

Electrical Characteristics:

Conductor Resistance	Max. 9.38 Ω/100m
Conductor Resistance Unbalance	Max. 5 %
Mutual Capacitance	Max. 5.6 nF/100m
Capacitance Earth Unbalance	Max. 330 pF/100m
Propagation Delay @ 1 MHZ, 10 MHz & 100 MHz	Max. 570, 545, 538 ns/100 m
Propagation Delay Skew 1 – 100 MHz	Max. 45 ns/100 m

Optical Characterisitics:

Attenuation @ 1310 nm	Max. 0.38 dB/Km
Attenuation @ 1550 nm	Max. 0.25 dB/Km
Dispersion, 1288 – 1339 nm	Max 3.5 ps/nm.km
Dispersion, 1550 nm	Max 18 ps/nm.km
PMD	Max 0.2 ps/sqrt(km)

Other Characterisitics:

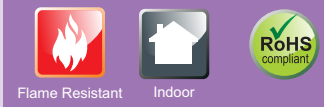
Tensile Force Installation	Max. 0.20 KN
Tensile Force Installed	Max. 0.10 KN
Temperature range – Operation	-40° C to + 60° C
Temperature range – Storage	-40° C to + 70° C
Temperature range – Installation	-15° C to + 40° C

Technical Details

Freq (MHZ)	Return Loss (dB)	Insertion Loss (dB/100m)	NEXT (dB)	PSNEXT (dB)	ACRF ELFEXT (dB)	PSACRF [PSELFEXT] (dB)
	Min.	Max.	Min.	Min.	Min.	Min.
1.0	20.0	2.0	65.3	62.3	63.8	60.8
4.0	23.0	4.1	56.3	53.3	51.8	48.8
8.0	24.5	5.8	51.8	48.8	45.7	42.7
10.0	25.0	6.5	50.3	47.3	43.8	40.8
16.0	25.0	8.2	47.2	44.2	39.7	36.7
20.0	25.0	9.3	45.8	42.8	37.8	34.8
25.0	24.3	10.4	44.3	41.3	35.8	32.8
31.25	23.6	11.7	42.9	39.9	33.9	30.9
62.5	21.5	17.0	38.4	35.4	27.9	24.9
100	20.1	22.0	35.3	32.3	23.8	20.8

4 PAIR UTP CAT 5e ARMOURED LSZH CABLE

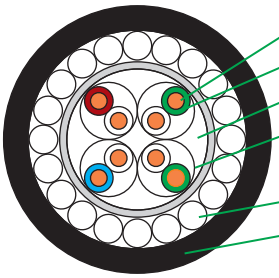
4 Pair Unshielded Twisted Pair (UTP) 100 Ohm Data Cable,
24 AWG (0.5mm) Solid Bare Copper Conductors,
Polyethylene Insulation, LSZH Sheath, Steel Wire Armour, LSZH Jacket



Applications

These are structured cables suitable for Ethernet Applications and compatible with all known connection systems.

Typical Cross section



Conductor 24AWG ABC
Insulation HDPE
Core Wrap (Optional)-PET
Inner Sheath: LSZH Grey
(0.5 mm Nominal Thickness)
Armour: Galvanized Steel Wire
Outer Sheath: LSZH Black
(1.0 mm Nominal Thickness)

Electrical Characteristics:

Conductor Resistance	Max. 9.38 Ω/100m
Conductor Resistance Unbalance	Max. 5 %
Mutual Capacitance	Max. 5.6 nF/100m
Capacitance Earth Unbalance	Max. 330 pF/100m
Propagation Delay @ 1 MHZ, 10 MHz & 100 MHz	Max. 570, 545, 538 ns/100 m
Propagation Delay Skew 1 – 100 MHz	Max. 45 ns/100 m

Features:

- Fully Complies to the transmission requirements of TIA/EIA 568 C.2.
- Enhanced performance specification up to 100 MHZ.
- Excellent Mechanical protection with Galvanised Steel Wire Armouring

Colour Code:

Pair 1 : White/Blue -Blue;
Pair 2 : White/Orange -Orange;
Pair 3 : White/Green -Green;
Pair 4 : White/Brown -Brown

Cable Diameter , Standard Length & Packing:

Cable Diameter : 9.0 ± 0.5 mm

Available Packaging : 500 mtr ± 10%

Technical Details

Freq (MHZ)	Return Loss (dB)	Insertion Loss (dB/100m)	NEXT (dB)	PSNEXT (dB)	ACRF ELFEXT (dB)	PSACRF [PSELFEXT] (dB)
	Min.	Max.	Min.	Min.	Min.	Min.
1.0	20.0	2.0	65.3	62.3	63.8	60.8
4.0	23.0	4.1	56.3	53.3	51.8	48.8
8.0	24.5	5.8	51.8	48.8	45.7	42.7
10.0	25.0	6.5	50.3	47.3	43.8	40.8
16.0	25.0	8.2	47.2	44.2	39.7	36.7
20.0	25.0	9.3	45.8	42.8	37.8	34.8
25.0	24.3	10.4	44.3	41.3	35.8	32.8
31.25	23.6	11.7	42.9	39.9	33.9	30.9
62.5	21.5	17.0	38.4	35.4	27.9	24.9
100	20.1	22.0	35.3	32.3	23.8	20.8

Note:

Bi-directional Testing for Return Loss, NEXT & PSNEXT

4 PAIR UTP CAT 6 CABLE

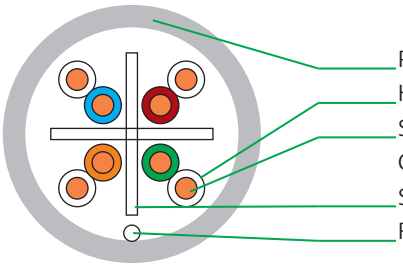
4 Pair Unshielded Twisted Pair (UTP) Data Cable,
23 AWG (0.56mm) Solid Bare Copper Conductors,
Polyethylene Insulation, Separator, PVC Jacket, Rip cord

Indoor | Flame Resistant | RoHS compliant | UL

Applications

These are structured cables for campus, riser and horizontal installations. Suitable for Ethernet Applications and compatible with all known connection systems. Ideal for high performance workstation applications including voice/ data systems, digital video, broadband and voice over internet protocol, etc.

Typical Cross section



Electrical Characteristics:

Conductor Resistance	Max. 9.38 Ω/100m
Conductor Resistance Unbalance	Max. 5 %
Mutual Capacitance	Max. 5.6 nF/100m
Capacitance Earth Unbalance	Max. 330 pF/100m
Propagation Delay @ 1,10,100,250MHz	Max. 570, 545, 538 & 536 ns/100 m
Propagation Delay Skew 1 – 250 MHz	Max. 45 ns/100 m

Features:

- Fully Complies to the requirements of TIA/EIA 568 C.2.
- Enhanced performance specification up to 250 MHz.
- Cables verified for performance with UL Certification and shipped with UL authorized markings an Labels

Colour Code:

Pair 1 : White/Blue -Blue;
Pair 2 : White/Orange -Orange;
Pair 3 : White/Green -Green;
Pair 4 : White/Brown -Brown

Cable Diameter , Standard Length & Packing:

Cable Diameter	: 6.35 mm (Max.)
Available Packaging	: 305 mtr Pull box Or 500 / 1000 mtr spool
Available Colour	: Grey or As Per Customer Requirement

Technical Details

Freq (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PSNEXT (dB)	ACRF (ELFEXT) (dB)	PSACRF [PSELFEXT] (dB)	Return Loss (dB)	TCL (dB)	ETCL (dB)
	Max.	Min.	Min.	Min.	Min.	Min.	Min	Min
1.0	2.0	74.3	72.3	67.8	64.8	20.0	40.0	35.0
4.0	3.8	65.3	63.3	55.8	52.8	23.0	40.0	23.0
8.0	5.3	60.8	58.8	49.7	46.7	24.5	40.0	16.9
10.0	6.0	59.3	57.3	47.8	44.8	25.0	40.0	15.0
16.0	7.6	56.2	54.2	43.7	40.7	25.0	38.0	10.9
20.0	8.5	54.8	52.8	41.8	38.8	25.0	37.0	9.0
25.0	9.5	53.3	51.3	39.8	36.8	24.3	36.0	7.0
31.25	10.7	51.9	49.9	37.9	34.9	23.6	35.1	5.5@
62.5	15.4	47.4	45.4	31.9	28.9	21.5	32.0	30MHz
100	19.8	44.3	42.3	27.8	24.8	20.1	30.0	-
200	29.0	39.8	37.8	21.8	18.8	18.0	27.0	
250	32.8	38.3	36.3	19.8	16.8	17.3	26.0	

Note:

Bi-directional Testing for Return Loss, NEXT & PSNEXT

2 / 4 PAIR CAT 5 DROP CABLE (SINGLE SHEATH)

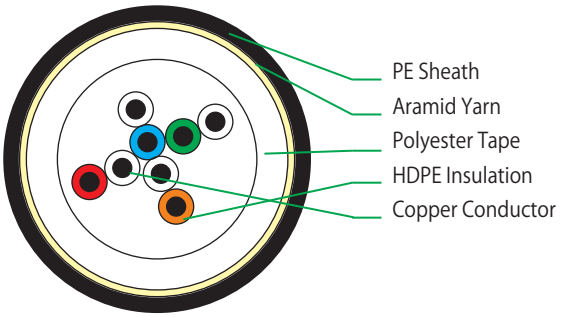
2 / 4 Pair Unshielded twisted pair (UTP) drop Cable, 24 AWG (0.5mm)
Solid bare copper conductors, Polyethylene Insulation, PE Jacket,
Rip Cord.

Outdoor Underground RoHS compliant

Applications

These are drop cables used for broadband connectivity in residential buildings/houses, inter building cabling etc.

Typical Cross section



Electrical Characteristics:

Conductor Resistance	86 ± 6 Ω/Km
Conductor Resistance Unbalance	Max. 5 % (Individual), Max. 2% (Average)
Mutual Capacitance	Max. 56 nF/Km
Capacitance Earth Unbalance	Max. 330 pF/100m
Characteristics Impedance at 1-100 MHz	100 ± 15Ω
Propagation Delay Skew 1-100 MHz	Max. 45 ns/100m

Features:

- Good Mechanical Protection
- Suitable for use outside buildings with UV resistant sheath
- Enhanced performance specification upto 100 MHz

Colour Code:

Pair 1 : White -Blue;
Pair 2 : White -Orange;
Pair 3 : White -Green;
Pair 4 : White -Brown

Cable Diameter , Standard Length & Packing:

Cable Diameter : 4 Pair 5.7 ± 0.5 mm
2 Pair 4.5 ± 0.5 mm

Available Packaging : 305 mtr Pull box Or 500 / 1000 mtr spool

Technical Details

Freq (MHz)	Attenuation (dB/100m) Max.	NEXT (dB) Min.	Return Loss (dB) Min.
1.0	2.0	62	20
4.0	4.1	53	23
8.0	5.8	48	23
16.0	8.2	44	23
20.0	9.3	42	23
25.0	10.4	41	22
100	22.0	32	16

Note:
Bi-directional Testing for Return Loss, NEXT & PSNEXT

2 / 4 PAIR CAT 5 DROP CABLE (DOUBLE SHEATH)

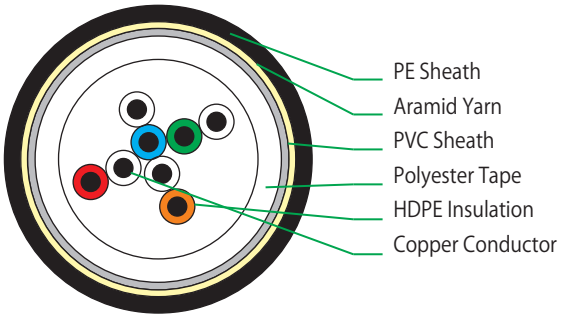
2 / 4 Pair Unshielded twisted pair (UTP) drop Cable, 24 AWG (0.5mm) Solid bare copper conductors, Polyethylene Insulation, PVC Sheath, Aramid Yarns, PE Jacket, Rip Cord.

Outdoor Underground RoHS compliant

Applications

These are drop cables used for broadband connectivity in residential buildings/houses, inter building cabling etc.

Typical Cross section



Electrical Characteristics:

Conductor Resistance	86 ± 6 Ω/Km
Conductor Resistance Unbalance	Max. 5 % (Individual), Max. 2% (Average)
Mutual Capacitance	Max. 56 nF/100m
Capacitance Earth Unbalance	Max. 330 pF/100m
Propagation Delay Skew 1-100 MHz	Max. 45 ns/100m

Features:

- Good Mechanical Protection
- Suitable for use outside buildings with UV resistant sheath
- Enhanced performance specification upto 100 MHz

Colour Code:

Pair 1 : White -Blue;
Pair 2 : White -Orange;
Pair 3 : White -Green;
Pair 4 : White -Brown

Cable Diameter , Standard Length & Packing:

Cable Diameter	4 Pair: 7.0 ± 0.5 mm
	2 Pair: 5.9 ± 0.5 mm
Available Packaging	: 305 mtr Pull box Or 500 / 1000 mtr spool

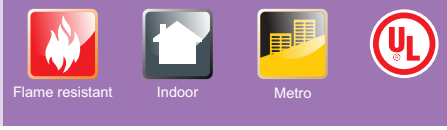
Technical Details

Freq (MHz)	Attenuation (dB/100m) Max.	NEXT (dB) Min.	Return Loss (dB) Min.
1.0	2.0	62	20
4.0	4.1	53	23
8.0	5.8	48	23
16.0	8.2	44	23
20.0	9.3	42	23
25.0	10.4	41	22
100	22.0	32	16

Note:
Bi-directional Testing for Return Loss, NEXT & PSNEXT

2 Pair / 4 Pair Data Communication Cable

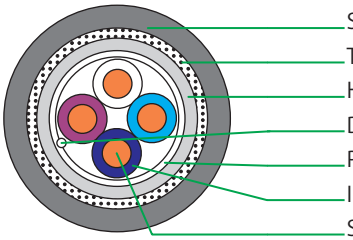
These are PE Insulated 0.4mm Annealed Tinned Copper Conductor, Overall Screened, Tinned Copper Braid and Halogen Free Flame Retardant Sheathed Communication Cables.



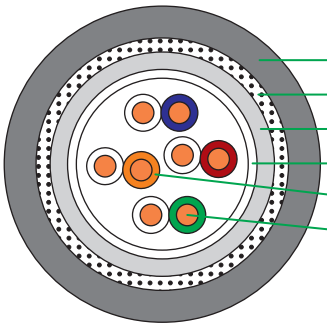
Applications

- Halogen Free cable intended for Indoor use for data communication

Typical Cross section 2 Pair



Typical Cross section 4 Pair



Features:

- UL Approved Cable (UL 444 Listed)
- Excellent level of fire retardancy (Meets UL CMR requirements)
- Good Flexibility
- RoHS Compliant

Mechanical & Environmental Properties:

	2 Pair	4 Pair
Bending Radius	Min. 27 mm	Min. 22 mm
Pulling Force	Max. 25 N	Max. 50 N
Operating Temperature	- 20°C to + 75°C	- 20°C to + 75°C
Fire Properties	UL 1685 Ft4, IEC 60332-3 C	UL 444 CMR
Cable Diameter	4.5 mm ± 0.5mm	5.5 mm ± 0.5mm

Colour Code:

Pair 1 : White-Blue;
Pair 2 : White-Orange;
Pair 3 : White-Green;
Pair 4 : White-Brown

Standard Length & Packing:

600 mtrs ± 10% OR in further multiples of 150 mtrs

Electrical Characteristics:

	2 Pair	4 Pair
Conductor Resistance	Max. 153 Ω/Km	Max. 153 Ω/Km
Conductor Resistance Unbalance	Max 2 %	Max 4 %
Mutual Capacitance	Nom. 49 nF/Km	Nom. 53 nF/Km
Capacitance Earth Unbalance	Max. 3000 pF/Km	Max. 1600 pF/Km
Insulation Resistance	Min. 5000 MΩKm	Min. 5000 MΩKm
Dielectric Strength Conductor to Conductor Conductor to Shield	2.5 KV, 2 Sec 2.5 KV, 2 Sec	
Characteristics Impedance at 1	Mhz120 ± 15 Ω	100 ± 10 Ω
Attenuation at 1 MHz	Max. 3.3 dB/100m	
Attenuation at 1, 4, 10 16, 31.2, 62.5, 100MHz		Max. 3.2, 6.5, 10,13 17, 23, 30dB/100m
Near End Cross Talk at 1 MHZ	Min. 52 dB	
Near End Cross Talk at 1, 4, 10, 16, 31.2 62.5, 100MHz		Min. 62, 53, 47, 44 40, 35, 32dB
Far End Cross Talk at 1 MHz	Min 56 dB @ 100m	
Propagation Delay		Min. 4.7ns/m; Max.5.05 ns/m

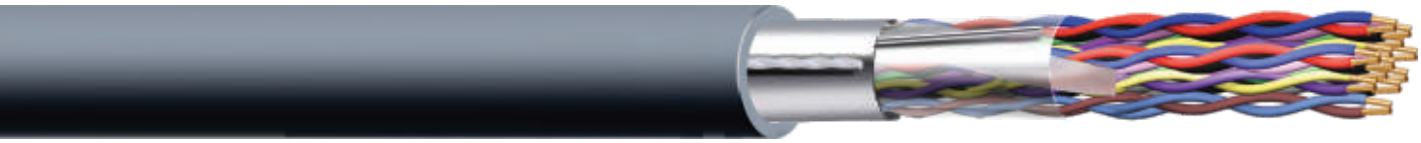
24 PAIR DATA COMMUNICATION CABLE

24 Pair Screened Cables with 0.4 mm Copper Conductor,
HDPE Insulation, Core Wrap, Screened,
PVC Sheathed Communication Cables.

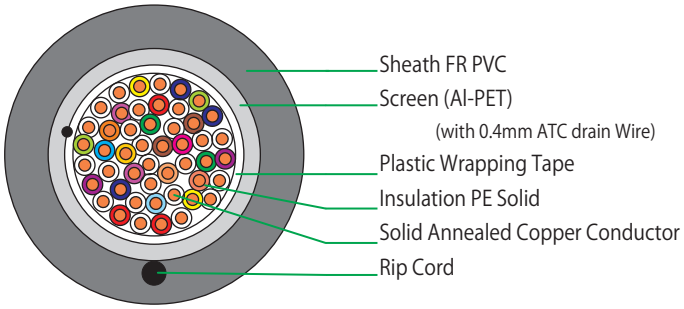
Indoor | Flame Resistant | RoHS compliant

Applications

- This is a Screened Cable used for Linking ADSL Netwroks



Typical Cross section



Electrical Characteristics:

Conductor Resistance	Max. 148 Ω/Km
Mutual Capacitance	Max. 56 nF/Km
Capacitance Unbalance (Pair to Pair)	Max. 500 pF/Km
Capacitance Earth Unbalance	Max. 1500 pF/Km
Dielectric Strength	1.0 KV DC, 1 Minute
Characteristics Impedance at 1 MHz to 16 Mhz	100 ± 15 Ω
Attenuation at 1, 2, 3, 8, 10, 16 MHz	Max. 2.8, 3.9, 4.5, 7.5, 8.6, 10.5 dB/100m
Near End Cross Talk at 1, 2, 3, 8, 10, 16 MHz	Min. 55, 50, 46, 41, 40, 37 dB

Features:

- Low Cross talk and excellent Electromagnetic Compatibility
- Easy to Install
- Guaranteed data speeds through enhanced electrical performance upto 16 MHz
- RoHS Compliant
- Working temperature from –20° C to +75° C

Mechanical & Environmental Properties:

Jacket Cold Bend	No crack after 4 Hrs test (-20° C)
Operating Temperature	- 20° C to + 75° C
Cable Diameter	9.5 ± 0.5 mm

Standard Length & Packing:

500 mtrs ± 10%

Wound & Packed in Wooden Drums

Colour Code:

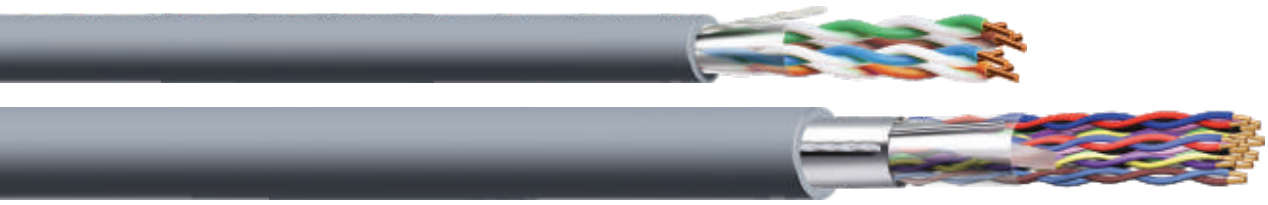
Pair 1:	White – Blue
Pair 2:	White – Orange
Pair 3:	White – Green
Pair 4:	White – Brown
Pair 5:	White – Grey
Pair 6:	Red – Blue
Pair 7:	Red – Orange
Pair 8:	Red – Green
Pair 9:	Red – Brown
Pair 10:	Red – Grey
Pair 11:	Black – Blue
Pair 12:	Black – Orange
Pair 13:	Black – Green
Pair 14:	Black – Brown
Pair 15:	Black – Grey
Pair 16:	Yellow – Blue
Pair 17:	Yellow–orange
Pair 18:	Yellow– Green
Pair 19:	Yellow– Brown
Pair 20:	Yellow– Grey
Pair 21:	White/Blue –Blue
Pair 22:	White/Blue – Orange
Pair 23:	White/Blue – Green
Pair 24:	White/Blue – Brown

SWITCHBOARD CABLES (SCREENED / UNSCREENED)

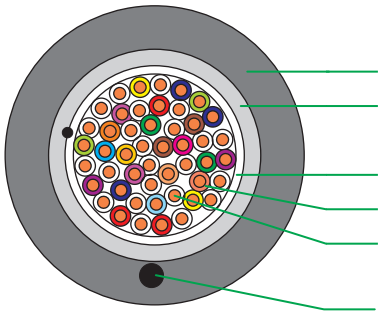
Indoor Flame Resistant RoHS compliant

Applications

These Cables are used for Internal wiring in Telephone Exchanges , bay-to-bay wiring, equipment to MDF wiring etc and in subscriber offices in large buildings.



Typical Cross section for Armoured Cable



Colour Code:

For Insulation of
1 Pair / 2 Pair/ 3 Pair / 4 Pair / 5 Pair / 10 Pair / 20 Pair Unit

Pair 1:	White-Blue	Pair 11:	Black-Blue
Pair 2:	White-Orange	Pair 12:	Black-Orange
Pair 3:	White-Green	Pair 13:	Black-Green
Pair 4:	White-Brown	Pair 14:	Black-Brown
Pair 5:	White-Grey	Pair 15:	Black-Grey
Pair 6:	Red-Blue	Pair 16:	Yellow-Blue
Pair 7:	Red-Orange	Pair 17:	Yellow-Orange
Pair 8:	Red-Green	Pair 18:	Yellow-Green
Pair 9:	Red-Brown	Pair 19:	Yellow-Brown
Pair 10:	Red-Grey	Pair 20:	Yellow-Grey

For Insulation Of 8 Pair

Pair 1:	White-Blue	Pair 5:	Red-Blue
Pair 2:	White-Orange	Pair 5:	Red-Orange
Pair 3:	White-Green	Pair 7:	Red-Green
Pair 4:	White-Brown	Pair 8:	Red-Brown

For 8 Pair Sub-unit Binder Colours of 32 Pair

Binder 1:	Blue	Pair 3:	Green
Binder 2:	Orange	Pair 4:	Brown

For 32 Pair Unit Binder Colours of 128 Pair

Binder 1:	White	Pair 3:	Black
Binder 2:	Red	Pair 4:	Yellow

Features:

- Available in standard conductor sizes of 0.4mm, 0.5mm & 0.6mm Diameter.
- Available in 1 Pair to 128Pair & more if required.
- Meets the flammability test requirement as per IEC 332 (Part-1)
- TEC approved cable as per GR/WIR-06/03 Mar 2002

Electrical Characteristics:

Conductor Resistance 0.4mm	Max. 143 Ω/Km
0.5mm	Max 92.2 Ω/Km
0.6mm	Max 64.0 Ω/Km
Capacitance Unbalance (Pair to Pair)	Max. 230 pF/Km
Insulation Resistance at 50° C	Min. 50 M Ω Km
Dielectric Strength	3.0 KV DC, 1 Minute

Environmental Properties:

Operating Temperature	- 20° C to + 75° C
Flameability	IEC 332 (Part 1)

Standard Length & Packing:

As per customer requirement.

Wound & Packed in Wooden Drums / Coils / Spools as per size and standard length

SCREENED PCM CABLES

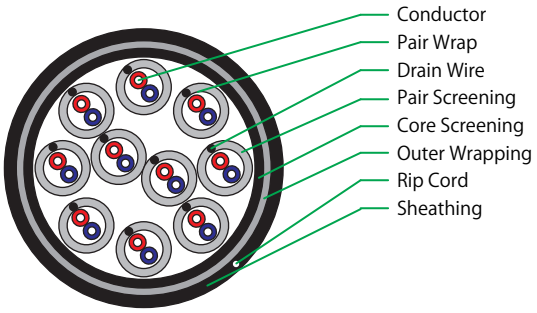
Solid / Foam Skin Insulated, Individual Screened Twisted Pairs, PVC Sheathed, Overall Screened Telecommunication Cables

Indoor Metro RoHS compliant

Applications:

- Digital equipment wiring to work up to 2 M bits/sec.

Typical Cross section for Armoured Cable



Electrical Characterisitics:

Resistance	
Conductor Resistance at 20°C (Ω/Km)	86 ± 3
Resistance Unbalance (%)	2.5 (Max. Indiv.) 1.0(Max. Avg.)
Insulation Resistance at 500 V Dc(M Ω Km)	10,000
Dielectric Strength	
4. 2.4 KV Dc for 3 seconds	With stands
Capacitance	
Mutual capacitance at 1 KHz (nF/Km)	45 ± 5
Earth capacitance unbalance (pF/500m)	2000 (Max.)
Impedance	
Characteristics impedance at 1 MHZ (Ω)	120 ± 10
Attenuation	
Attenuation at 20° c at 1 MHz (dB/Km)	20 dB/Km (Max.)
Cross Talk [pair to pair within unit]	
Near end cross talk at 1 MHZ (dB)	85 (Min.)
Far end cross talk at 1 MHZ (dB/Km)	67 (Min.)

Features:

- Available in standard conductor sizes of 0.5mm diameter.
- Available in 1 Pair to 16 Pair and more if required.
- Meets the flammability test requirement as per IEC 332 (Part-1)
- TEC approved cable as per GR/WIR-04/02 Nov 2001
- Excellent protection to cross-talk and Electromagnetic Induction

Colour Coding

Each pair shall be Red for Wire-1 and Blue for Wire-2, with serial number of the pair viz. 1 to 10/16, marked at regular interval, on the outer surface of the Aluminium film used for Pair Screening.

Cable Diameter , Standard Length & Packing:

Cable Diameter	: 10 P: 15 mm (Maximum) 16 P: 18 mm (Maximum)
Standard Length	: 500 mtr ± 10%
Packing	: Wound and packed in wooden drums

50 Ohm COAXIAL CABLE

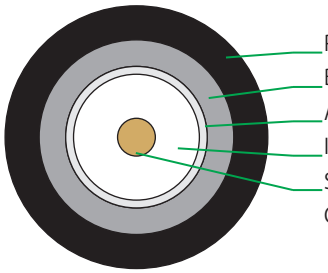
Foamed PE insulated copper conductor, Al foil shield & braid screened Coaxial cable, PE outer sheathed.

Outdoor Underground RoHS compliant

Applications

This is a 50 Ohm Coaxial Cable for telecommunication intended for outdoor use with the frequency range of 4 Ghz.

Typical Cross section



Electrical Characteristics:

Characteristics Impedence	50 ± 2Ω
Velocity of propagation	85%
Capacitance	78 nF/ Km
Loop Resistance	Max. 19.0Ω/ Km
Attenuation at 140, 350, 900, 1800 & 2000 MHz	⩽12, 18, 23, 32 ,34 dB /100 Mtr.
Dielectric Strength	Withstands 1.5 KV, 2 sec.

Cable Diameter , Standard Length & Packing:

Cable Diameter	: 7.60 mm (Nominal)
Available Packaging	: 500 mtr ± 10% spools

AUTOMOBILE WIRES

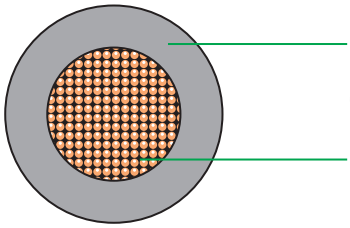
These are PVC Insulated Single Core Thin-Wall type Low Voltage and Light Weight Auto Wires conforming to International DIN, JIS & JASO Standards. Range of Cables includes FLRY, AV, AVS and AVSS types.

Indoor | Flame Resistant | RoHS compliant

Applications

These wires are used in manufacturing of Wiring Harness for Automobile Industry where high flexibility, thermo and mechanical strength are required.

Typical Cross section



Features:

Manufactured within the Quality System certified as per TS 16949:2002

- Resistant to heat, oil, abrasion and cold.
- Excellent flexibility.
- Temperature Range of DIN Wires: –40° C to +105° C.
- Temperature Range of JIS & JASO Wires : –40° C to +85° C.
- Available in different colors and stripes.
- Available in Leaded or Lead free grades.
- Packed in Coils of suitable standard lengths.

FLRY-B Type Wires (DIN 72551 Part 5 & 6)

Nominal Cross Section Sq mm	No. of Strands	Diameter of Single Wire Max mm	Diameter of Cond-uctor Max mm	Electrical Resistance @ 20°C mΩ/m	Insulation Wall Thickness Min. mm	Cable Outer Diameter mm	Cable Weight Approx. Kg/Km
0.35	12	0.21	0.90	47.8 - 52.0	0.20	1.2 – 1.4	4.5
0.50	16	0.21	1.00	34.1 - 37.1	0.22	1.4 – 1.6	6.6
0.75	24	0.21	1.20	22.7 - 24.7	0.24	1.7 – 1.9	9.0
1.0	32	0.21	1.35	17.0 - 18.5	0.24	1.9 – 2.1	11.0
1.5	30	0.26	1.70	11.7 - 12.7	0.24	2.2 – 2.4	16.0
2.5	50	0.26	2.20	7.0 - 7.6	0.28	2.7 – 3.0	26.0
4.0	56	0.31	2.75	4.32 - 4.70	0.32	3.4 – 3.7	42.0
6.0	84	0.31	3.30	2.85 - 3.10	0.32	4.0 – 4.3	61.0
10.0	80	0.41	4.40	1.82 (Max)	0.48	5.5 – 6.0	109.0
16.0	126	0.41	5.50	1.16 (Max)	0.48	7.0 – 7.5	178.0

AVS Type Wires (JASO D 611)

Nominal Cross Section Sq mm	No. of Strands	Diameter of Single Wire Max mm	Diameter of Cond-uctor Max mm	Electrical Resistance @ 20°C mΩ/m	Insulation Wall Thickness Min. mm	Cable Outer Diameter mm	Cable Weight Approx. Kg/Km
0.5	7	0.32	1.0	32.7	0.32	2.1	8.1
1.25	16	0.32	1.5	14.3	0.32	2.6	15.2
1.25f	50	0.18	1.5	14.7	0.32	2.6	14.9
2.00	26	0.32	1.9	8.81	0.32	3.1	23.3
3.00	41	0.32	2.4	5.59	0.40	3.8	37.6
5.00	65	0.32	3.0	3.52	0.48	4.6	58.6

AVSS Type Wires (JASO D 611)

Nominal Cross Section Sq mm	No. of Strands	Diameter of Single Wire Max mm	Diameter of Cond-uctor Max mm	Electrical Resistance @ 20°C mΩ/m	Insulation Wall Thickness Min. mm	Cable Outer Diameter mm	Cable Weight Approx. Kg/Km
0.35	7	0.26	0.8	50.2	0.24	1.5	4.8
0.50	7	0.32	1.0	32.7	0.24	1.7	6.9
0.5f	19	0.19	1.0	34.6	0.24	1.7	6.7
0.75	7	0.39	1.8	22.3	0.24	1.8	9.4
0.75f	19	0.23	1.2	23.6	0.24	1.9	9.2
0.85	7	0.40	1.1	20.8	0.24	1.9	10.0
1.25	19	0.29	1.5	14.9	0.24	2.2	13.9
2.00	19	0.37	1.9	9.0	0.32	2.8	23.0
2.00 f	37	0.26	1.8	9.5	0.32	2.7	21.6

AV Type Wires (JIS C 3406)

Nominal Cross Section Sq mm	No. of Strands	Diameter of Single Wire Max mm	Diameter of Cond-uctor Max mm	Electrical Resistance @ 20°C mΩ/m	Insulation Wall Thickness Min. mm	Cable Outer Diameter mm	Cable Weight Approx. Kg/Km
0.5f	20	0.18	1.0	36.7	0.48	2.4	8.7
0.75f	30	0.18	1.20	24.4	0.48	2.6	11.0
0.85	11	0.32	1.20	20.8	0.48	2.6	12.0
2.00	26	0.32	1.90	8.81	0.48	3.4	24.9
3.00	41	0.32	2.40	5.59	0.56	4.1	39.6
5.00	65	0.32	3.00	3.52	0.64	4.9	60.0
8.00	50	0.45	3.70	2.32	0.72	5.8	89.5
10.0	65	0.45	4.25	1.80	0.80	6.5	115.7

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Power Sector

- EHV Cabling Projects.
- Rural Electrification projects.
- Transmission Lines.
- Transmission and Distribution substations.
- Lighting Projects.

Strength beyond Imagination

FRP Rods

Fiber Reinforced Plastic (FRP Rod)

Used as Di electric composite strength member in Optic Fibre Cables

Applications

- It is a di-electric composite cable strength member widely known as FRP/ GRP rod.
- It is designed to provide excellent tensile strength performance while maintaining high degree of stiffness, preventing cable buckling over its entire service life.
- It is most suited for loose tube, uni-tube, slotted core or ribbon cable, typically used as central or peripheral reinforcement in fiber optic cables.
- FRP rods serve a dual purpose.
- It provides cable reinforcement during installation, reduces tension on signal carrying optic fiber/ conductor.
- The lightweight FRP prevents the cable from sagging in aerial installations and its rigidity and strength takes on the load of cable.
- FRP combines the properties of high performance glass fibers and polymer resin to give a cost effective and superior strength member for cables.
- FRP strength members are also widely used in various copper cables for last mile connectivity as well as power transmission.

Features:

- Light Weight & Excellent Tensile Strength
- Prevent Cable buckling
- Most Suited for Multi-Loose Tube, Uni Tube, Slotted Core & Ribbon Cable Designs.
- Used as central or peripheral reinforcement in fibre optic cable
- Dual Advantage : Reinforcement during installation as well as reduce stress on signal carrying optic fibre /conductor
- Prevent sagging in aerial installation
- Cost effective solution as a strength member

Description

It is manufactured using E-glass fibre with heat resistant thermal resin system. It is available in various coatings including EAA, Tuff, Mega Bond and HDPE, which allows easy handling, Tuff coating provides very smooth surface, whereas Mega bond is suitable for where high adhesion to up jacketing is desired

Product Range

Available diameter:

0.4 mm up to 5.0 mm (0.4, 0.8, 0.9, 1.0, 1.1, 1.2, 1.5, 1.6, 1.8, 2.0, 2.1, 2.2, 2.3, 2.5, 2.7, 2.8, 3.0, 3.5, 4.0, 4.5, 5.0).

Physical Property	
Glass content	75 to 85% by weight
Density	2.05 to 2.15 gms/ cc
Diameter stability	±0.05 mm of ordered diameter
Ovality	<(=)0.05 mm
Splices	None

Mechanical Property			
Property	Unit	Specification	Test Method
Tensile Strength at Break	Kg/mm²	> 140	ASTM D 3916
Tensile modulus	Kg/mm²	> 5000	ASTM D 3916
Elongation at break	%	> 2.5% & < 4%	ASTM D 3916
Flexural modulus	Kg/mm²	> 5000	ASTM D 790
Flexural Strength	Kg/mm²	> 70	ASTM D 790
Water Absorption			
after 24 hrs.	%	< 0.1	ASTM D 570
Min. Bending			
Radius at 25° C	mm	(=) <25 D	

Typical Packing				
Description	Spool Dimensions in mm			
Flange Dia	630	800	950	1000
Barrel Dia	315	400	400	450
Traverse	450	550	550	620
O.A Width	510	610	610	680
Centre Bore	80	80	80	80
CB to DPC	120	120	120	120
FRP Rod	Length in K.M			
0.8 mm to 1.2 mm	50			
1.5 mm to 2.0 mm		50		
2.1 mm to 2.5 mm		25	50	
2.5 mm to 3.5 mm			12.6	25.2
3.6 mm to 5.0 mm				12.6

Fibre Properties

Specification of Multi Mode Optical fibre					
Transmission Properties	**Unit**	**OM1(62.5/125 μm) Values**	**OM2(50/125 μm) Values**	**(OM3) Values**	**(OM4) Values**
Attenuation at 850 nm	dB/km	< / = 3.0	< / = 2.9	< / = 2.9	< / = 2.9
Attenuation at 1300 nm	dB/km	< / = 0.7	< / = 0.9	< / = 0.9	< / = 0.9
Bandwidth at 850 nm	MHzKm	> / = 200	> / = 500	> / = 1500	> / = 3500
Bandwidth at 1300 nm	MHzKm	> / = 500	> / = 500	> / = 500	> / = 500
Numerical Aperture		0.275 ± 0.015	0.200 ± 0.015	0.200 ± 0.015	0.200 ± 0.015

Geometrical Properties	**Unit**	**Values**	**Values**	**Values**	**Values**
Core diameter	μm	62.5 ± 2.5	50.0 ± 3.0	50.0 ± 3.0	50.0 ± 3.0
Cladding diameter	μm	125 ± 1	125 ± 2	125 ± 2	125 ± 2
Core noncircularity	%	< / = 5	< / = 5	< / = 5	< / = 5
Cladding noncircularity	%	< / = 1	< / = 2	< / = 2	< / = 2
Core concentricity error	μm	< / = 1.5	< / = 2.0	< / = 2.0	< / = 2.0
Primary coating diameter	μm	245 ± 10	245 ± 10	245 ± 10	245 ± 10

Mechanical properties	**Unit**	**Values**	**Values**		
Proof test for minimum strain level and Duration of proof test	kpsi, Sec	> / = 100	> / = 100	> / = 100	> / = 100
Change in Attenuation with Bending					
100 Turns on 75mm Dia. Mandrel at 850	dB	< / = 0.50	< / = 0.50	< / = 0.50	< / = 0.50
100 Turns on 75mm Dia. Mandrel at 1300	dB	< / = 0.50	< / = 0.50	< / = 0.50	< / = 0.50
Strippability force to remove primary coating of fibre	Newton	1.3 to 8.9	1.3 to 8.9	1.3 to 8.9	1.3 to 8.9
Fibre Curl	Radius of curve	> / = 4 Mtr	> / = 4 Mtr	> / = 4 Mtr	> / = 4 Mtr
Dynamic tensile strength (unaged)	kpsi	> / = 550	> / = 550	> / = 550	> / = 550
Dynamic tensile strength (Aged)	kpsi	> / = 440	> / = 440	> / = 440	> / = 440
Dynamic Fatigue		> / = 18	> / = 18	> / = 18	> / = 18

Environmental Properties	**Unit**	**Values**	**Values**	**Values**	**Values**
Induced attenuation at 850 nm & 1300 nm for Temp. & Humidity cycle from -10°C to +85°C at 98 % humidity (min), ref temp 23°C	dB/Km	< / = 0.15	< / = 0.15	< / = 0.15	< / = 0.15
Induced attenuation at 850 nm & 1300 nm for Temperature cycle from -60°C to +85°C, ref temp 23°C	dB/Km	< / = 0.15	< / = 0.15	< / = 0.15	< / = 0.15
Induced attenuation at 850 nm & 1300 nm for Water Immersion at 23 ± 2°C	dB/Km	< / = 0.15	< / = 0.15	< / = 0.15	< / = 0.15
Induced attenuation at 850 nm & 1300 nm for Accelerated Ageing (Temperature) at 85 ± 2°C, ref temp 23°C	dB/Km	< / = 0.15	< / = 0.15	< / = 0.15	< / = 0.15

Specification of Single Mode Matched Clad Type & Non Zero Dispersion Optical fibre				
Transmission Properties	**Unit**	**ITU-T Rec. G-652.D Values**	**ITU-T Rec. G-655 Values**	**ITU-T Rec. G-657.A/IEC B6 Values**
Attenuation at 1310 nm	dB/km	< / = 0.35	-	< / = 0.35
Attenuation at 1550 nm	dB/km	< / = 0.22	< / = 0.24	< / = 0.22
Attenuation at 1625 nm	dB/km	< / = 0.25	< / = 0.26	< / = 0.25
Attenuation at 1383± 3 nm	dB/km	< / = 0.32	-	< / = 0.32
Point discontinuity	dB	< / = 0.05	< / = 0.05	< / = 0.05
Difference in maximum attenuation in the range from 1285 to 1330 nm w.r.t attenuation at 1310 nm	dB/km	< / = 0.03	-	< / = 0.03
Difference in maximum attenuation in the range from 1530 to 1570 nm w.r.t attenuation at 1550 nm	dB/km	< / = 0.02	< / = 0.03	< / = 0.02
Max. chromatic dispersion at 1285-1330 nm wavelength range	ps/nm.km	< / = 3.5	-	< / = 3.5
Max. chromatic dispersion at 1270-1340 nm wavelength range	ps/nm.km	< / = 5.3	-	< / = 5.3
Max. chromatic dispersion at 1530-1565 nm wavelength range	ps/nm.km	-	2.0 to 6.0	-
Max. chromatic dispersion at 12650-1625 nm wavelength range	ps/nm.km	-	4.5 to 11.2	-
Chromatic dispersion at 1550 nm	ps/nm.km	< / = 18.0	-	< / = 18.0
Zero dispersion wavelength	nm	1302 to 1322	-	1302 to 1322
Zero dispersion slope	nm^2.km	< / = 0.092	-	< / = 0.092
PMD at 1310 & 1550 nm (individual)	ps/sqrt.km	< / = 0.20	< / = 0.20	< / = 0.20
Link PMD	ps/sqrt.km	< / = 0.06	< / = 0.04	< / = 0.06
Fibre cut-off wavelength	nm	< / = 1320	-	< / = 1320
Mode field diameter range at 1310 nm	μm	9.2 ± 0.4	-	9.2 ± 0.4
Mode field diameter range at 1550 nm	μm	10.5 ± 0.5	9.6 ± 0.4	10.5 ± 0.5

Geometrical Properties	**Unit**	**Values**	**Values**	**Values**
Cladding diameter	μm	125 ± 0.7	125 ± 0.7	125 ± 0.7
Cladding noncircularity	%	< / = 0.7	< / = 0.7	< / = 0.7
Primary coating diameter (uncoloured)	μm	245 ± 5	242 ± 5	245 ± 5
Core/Clad concentricity error	μm	< / = 0.5	< / = 0.5	< / = 0.5
Coating / Cladding Concentricity error	μm	< / = 10	< / = 12	< / = 10

Mechanical properties	**Unit**	**Values**	**Values**	**Values**
Proof test for minimum strain level and Duration of proof test	kpsi, Sec	> 100	> 100	> 100
Change in Attenuation with Bending				
100 Turns on 60mm Dia. Mandrel at 1310	dB	< / = 0.05	-	-
100 Turns on 60mm Dia. Mandrel at at 1550	dB	< / = 0.05	< / = 0.05	< / = 0.01
100 Turns on 60mm Dia. Mandrel at at 1625	dB	-	< / = 0.01	< / = 0.05
1 Turn on 32 mm Dia. Mandrel at 1310	dB	< / = 0.5	-	-
1 Turn on 32 mm Dia. Mandrel at 1550	dB	< / = 0.5	< / = 0.5	-
1 Turn on 32 mm Dia. Mandrel at 1625	dB	-	< / = 0.5	-
1 Turn on 10 mm Dia. Mandrel at 1550	dB	-	-	< / = 0.2
1 Turn on 10 mm Dia. Mandrel at 1625	dB	-	-	< / = 0.5
Strippability force to remove primary coating of fibre	Newton	1.3 < F < 8.9	1.0 < F < 8.9	1.3 < F < 8.9
Fibre Curl	Radius of curve	> / = 4 Mtr	> / = 4 Mtr	> / = 4 Mtr
Dynamic tensile strength (unaged)	kpsi	> / = 550	> / = 550	> / = 550
Dynamic tensile strength (Aged)	kpsi	> / = 440	> / = 440	> / = 440
Dynamic Fatigue	-	> / = 20	> / = 20	> / = 20

Environmental Properties	**Unit**	**Values**	**Values**	**Values**
Induced attenuation at 1310 nm & 1550 nm for Temp. & Humidity cycle from -10°C to +85°C at 98 % humidity (min), ref temp 23°C	dB/Km	< / = 0.05	< / = 0.05	< / = 0.05
Induced attenuation at 1310 nm & 1550 nm for Temperature cycle from -60°C to +85°C, ref temp 23°C	dB/Km	< / = 0.05	< / = 0.05	< / = 0.05
Induced attenuation at 1310 nm & 1550 nm for Water Immersion at 23 ± 2°C	dB/Km	< / = 0.05	< / = 0.05	< / = 0.05
Induced attenuation at 1310 nm & 1550 nm for Accelerated Ageing (Temperature) at 85 ± 2°C, ref temp 23°	dB/Km	< / = 0.05	< / = 0.05	< / = 0.05

Note : Other values of G655 Fibre such as Dispersion and MFD can also be provided on request.

OPTICAL FIBRE CABLE HANDLING, INSTALLATION & SAFETY INSTRUCTION

Optical fibre cables can be easily damaged if they are improperly handled or installed. It is imperative that certain procedure be followed during Handling & Installation of these cables to avoid damage. Optical fibre cable requires special care during Handling & Installation to ensure reliable operation. This information given in the document is for Handling drum at various places from receiving in stores till shipment to the site for installation. Proper handling of cable drum decreases probability of accidental damage of cable and personnel. This document also contain some of the basic safety information applicable to Optical fiber cable. Personnel involved in Optical Fiber Cable installation must be aware of all the applicable occupational and health safety regulations and local regulations along with the company safety practices. Failure to follow the same can lead to fatal consequences to them as well as people in the vicinity.

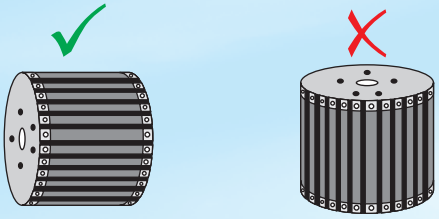
A) Some of the basic guidelines for Cable Drum Handling

Unloading the Cable Drums:

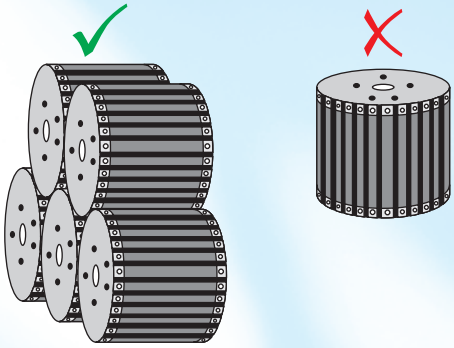
Cable drums should be properly unloaded from the truck/container. It is important that cable drum should not be dropped on tiers or floor. If cable drums are dropped on tiers or floor, due the weight of cable and wooden drum, flange of cable drum may get damage and also there are chances that cable will also get damage. The cable drum must be rolled from truck /container on to receiving platform, which is at the same height as the tailgate of truck/container or use forklift to unload drums from truck/container. If inclined ramps are used don't allow drums to roll out of control. Cable drums should be rolled in the direction as indicated on the flange of the drum to avoid any loosing of cable winding. Never step in front of drum rolling down a ramp. Roll each drum away from the bottom of the ramp before handling the next drum otherwise drum may collide to each other.

Storage of Cable Drums:

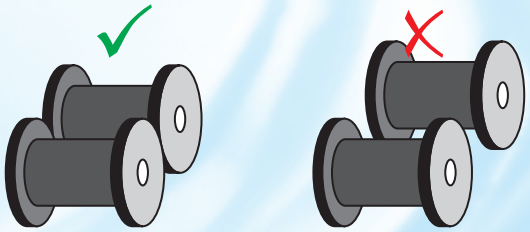
The drums should always be stored in an upright position i,e on the drum flange edge and not considering flange as base. Storage of drums in an alternative position can lead to winding defects.



Also follow the below shown figure for stacking the cable drums.



If many drums are opened at a time for inspection / testing, they should be arrange in such a way that flange of first drum should touch the flange of next drum. If this is not followed then there is chance that cable may get damage (flange of first drum may hit the cable on next drum). Correct way of arranging the opened cable drums is shown below.



B) Some of the basic guide line for Cable Installation

Drum Opening:

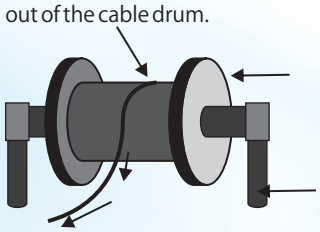
Cable drum are packed using wooden packing material. Packing material is nailed on the flange of cable drums. To further strengthen the packing, steel tape is nailed in circumference pattern over both the flanges. To open the cable drum, first cut the steel tape at 8 to 10 places. Remove the entire steel tape. Remove the nails with proper tools and remove the packing material. Nails should be bend to avoid injury to person handling it. Carry out visible inspection of the cable. Before starting installation check for attenuation value.

Packaging Pictures

OPTICAL FIBRE CABLE HANDLING, INSTALLATION & SAFETY INSTRUCTION

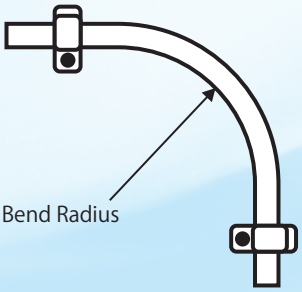
Mounting Drum on Pay-off:

For proper installation mount the cable properly on the pay off as shown below. This pay off should be properly lubricated. Height of the payoff should be suitably adjusted so the there is no problem is observed while pulling the cable out of the cable drum.

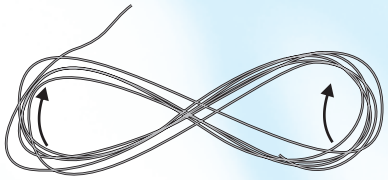


Pulling Technique:

Always use pulling grip to pull the cable. Pulling grip should be fixed with anti twist device (swivel pulling eye) so that cable is not twisted while pulling. Putting the twist in the cable can stress the fibres. If possible monitor the tension being applied to the cable while pulling. In no case the pulling tension should exceed the maximum rated pulling tension of the cable. If possible, use automated puller with tension control or at at least a breakaway-pulling eye. Use cable guide to maintain the recommended bend radius. Do not exceed the cable bend radius, exceeding the bend radius harms the fibres. It may not be immediate, it may even take a few years but eventually by exceeding the recommended bend radius of the cable, useful life of the cable reduces. In general the bending radius of a cable is greater than 20D, where D is the diameter of cable.



Before blowing the cable inside the duct or directly burring inside the ground, lay out the cable in figure 8 pattern as shown below. Turns the figure 8 cable 360 degree (upside down) before continuing. Pull the cable in opposite direction.



(C) Some of the basic safety guideline

1) Never look into a fiber having a laser coupled to it. If eye is accidentally exposed to LASER beam, immediately rush for medical assistance.

2) Do not drop fiber pieces on the floor where they will stick in carpets or shoes and be carried elsewhere. These fibre pieces are extremely sharp and can easily penetrate the skin. And any delay in taking the fiber out of body could lead to infection, which is dangerous. Therefore utmost care must be taken to depose the broken ends of fibers created during termination and splicing.

3) Various chemical cleaners and adhesives are used during preparation of Optical Fibre cable for splicing. The safety instructions defined as defined in MSDS (Material Safety Data Sheet) of these materials should be followed.

4) Electric arc is generated in fusion splicer while splicing of fibre. It should be ensured that there are no flammable gasses in the vicinity.

5) Only work in well ventilated areas.

6) Keep all food and beverages out of the work area. If fiber particles are ingested they can cause internal hemorrhaging

7) Do not touch your eyes while working with fiber optic systems until they have been thoroughly washed.

Packaging Pictures

DNV

DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

VINDHYA TELELINKS LIMITED

ISO 9001:2008

DESIGN, MANUFACTURE AND SUPPLY OF COPPER COMMUNICATION CABLES (PAIRED / QUAD), SIGNALLING CABLES & LT POWER DISTRIBUTION CABLES

DNV

DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

VINDHYA TELELINKS LIMITED

OFC UNIT

ISO 9001:2008

DNV

DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

VINDHYA TELELINKS LIMITED

ISO 14001:2004

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OHSAS 18001:2007

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DNV

DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

VINDHYA TELELINKS LIMITED

OFC UNIT

OHSAS 18001:2007

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

Birla Ericsson Optical Limited

has been found to conform to the Quality Management System standard:
ISO 9001:2008

This certificate is valid for the following scope:
Design, development, manufacture and supply of optical fibre cables, ribbon type optical fibre cables, polyethylene insulated jelly filled telecommunication cables, copper communication cables, insulated wires & cables, electric conductors and supply of accessories for optical fibre cables & copper cables

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

Birla Ericsson Optical Limited

has been found to conform to the Environmental Management System standard:
ISO 14001:2004

This certificate is valid for the following scope:
Design, development, manufacture and supply of optical fibre cables, ribbon type optical fibre cables, polyethylene insulated jelly filled telecommunication cables, copper communication cables, insulated wires & cables, electric conductors and supply of accessories for optical fibre cables & copper cables

DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

Birla Ericsson Optical Limited

has been found to conform to the Occupational Health and Safety Management System standard:
OHSAS 18001:2007

This certificate is valid for the following scope:
Design, development, manufacture and supply of optical fibre cables, ribbon type optical fibre cables, polyethylene insulated jelly filled telecommunication cables, copper communication cables, insulated wires & cables, electric conductors and supply of accessories for optical fibre cables & copper cables

Certified by Telcordia

GR-20-CORE CONFORMANCE CERTIFICATE

Certification Type:	Product Conformance
Testing Criteria:	Telcordia GR-20-CORE Issue 4
Manufacturer:	Birla Ericsson Optical Limited P.O. CHORHATA, REWA - 486 006 (M.P.) INDIA: Tel: +91 7662 400 400 Email: info@birlaericsson.com Web: www.birlaericsson.com
Product:	Optical Cable Loose Tube, All Di-Electric
Testing Completion Date:	June 2010
Certificate Number:	150004

Telcordia has completed an analysis of Birla Ericsson All Di-Electric Loose Tube Cable. Product is deemed to conform with all relevant requirements.

For details on the scope of the analysis and results, please refer to Telcordia Report DA-2009, *Analysis of the Birla Ericsson GA52D Optical Fiber and Birla Ericsson Single Sheath Dual Optical Cable (GA52D) Family Against GR-20-CORE, Issue 4*, available from Birla Ericsson.

Richard G. Riege
Engineering Manager
Telcordia Network Infrastructure Solutions (NIS)

Statement of Confirmation

TÜV

Client's reference – Technical File Number:

Name & Address of the Manufacturer:

Birla Ericsson Optical Ltd.

Product Nomenclature: Optical Fibre Cables

Type/Model:

Drop Cable	Direct Buried Cable
FTTx Cable	Aerial (Fig 8) Cable
Micro Cable	ADSS Cable
Tactical Cable	Indoor Cable
Duct Cable	Fiber To Antenna (FTA) Cable
Customized Cable	

Review Results/Observations:
The Technical File referenced above submitted by the manufacturer has been reviewed for its document contents.
The Technical File generally covers the documentation content requirements of the European Directives:

- RoHs Regulation : 2011/65/EU

Standards Referred to: IEC 62321

Other Standards Referred to: EN 60974-1:18, EN 60974-1:22, EN 60974-1:23

Document Issued by the Manufacturer: Declaration of Conformity

Marking on the Product: CE

Date of Review: 20th October 2015

K.M. Deshmukh
Senior Manager - Product Certifications.

N.S. Gade
Head – Homologation & Product Certification.

Page 1 of 2

UNDERWRITERS LABORATORIES INC.

INSPECTION REPORT - Type L Service

PRODUCT DOCUMENTS / PRODUCTION READY VISIT

SAMPLE DOCUMENTS

MP BIRLA GROUP

Vindhya Telelinks Ltd.
Redefining Connectivity

BIRLA CABLE LTD.
(Formerly Birla Ericsson Optical Ltd.)

Registered Office & Works :
Udyog Vihar, P.O. Chorhata, Rewa, Madhya Pradesh - 486006 INDIA

Contact For Enquiries:
Sharda Terraces, 9th Floor, Plot No. 65, Sector-11,
CBD Belapur, Navi Mumbai - 400614 INDIA
Tel: +91 22 4126 8855 / 2756 0463 / 2756 0464. Fax: +91 22 4126 8899
Email: info@birlacable.com, info@vtlrewa.com

Branches:

New Delhi:
605 & 608, DDA Bldg. No. 2, District Centre,
Janakpuri, New Delhi - 110 058 INDIA

Kolkata:
27-B, Camac Street, 5th Floor,
Kolkata - 700 016 INDIA

Hyderabad:
839/E, Road No. 42, Jubilee Hills,
Hyderabad - 500 033 INDIA

Chennai:
No.76, Nelson Manikem Road, 1st Floor, Aminjikarai,
Chennai - 600 029 INDIA

Bangalore:
No.287, R.M.V. Extn., 15th Main Road, Nr. Nagasena School,
Bangalore - 560 080 INDIA