

Introduction

HTL Ltd., is erstwhile Government of India Undertaking Company of HFCL Group, is strategically in heart of Chennai, close to Airport and has put up modern state of art Optical Fiber Cable Manufacturing unit to cater to the growing needs of Indian Digital Revolution. HFCL Group is one of the largest infrastructure supplier of Telecom operators in India and is engaged in Manufacturing Optical Fiber

HTL is an ISO accredited Company with highly sophisticated and automated, well equipped plant to produce Duct/Micro Duct /Indoor/ Outdoor/ Wire Armoured/ CST Armoured / Aerial/ FTTH/ High fiber count Ribbon cables or any customized cables to suit different client needs.

Its high-tech instrumentation for analysis and a rigorous quality check ensures the highest industry standards. High safety factor and narrow tolerance band guarantee the production of 1,71,000 km of high precision optical fibre

cables in one single year. The company offers a complete range of cables for telecommunications. Our products meet all the international standards and specifications. Supported by its own R&D facility, the company has delivered custom-designed fibre optic cables with superior performance in compliance as per ITU-T Standards.

Cables are designed with high safety factor to ensure very low strain i.e. 0.1% as against required level of 0.25% on the optical fibre. It has High technology computerized controlled machine with laser dia-measuring controllers, lump detectors, tension measuring equipment ensures self correcting measures at all stages of production to get high performance close tolerance cable. Cable is designed to meet IEC, EIA/TIA and Bellcore standards. The fibre used in the cables meets relevant ITU-T specifications.

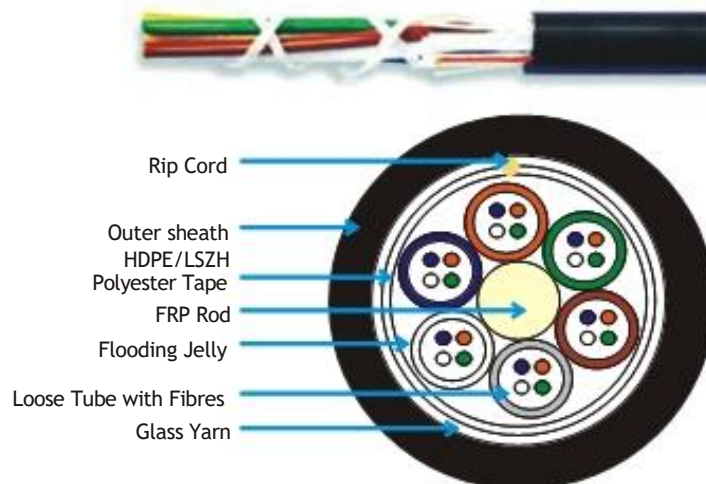


Multi - Tube Design

Duct Cables

PRODUCT DESCRIPTION

Loose tube cables are the product of choice as the backbone in Outside Plant (OSP) environments. The loose tube design offers reliable transmission performance over a broad Temperature range. Optical fibres and water-blocking elements are placed inside buffer tubes. The core is constructed by stranding the buffer tubes around FRP rod, the central strength member. The core is wrapped with flexible strength members covered with a water-blocking tape, then encased with a black jacket. A rip cord is included under the jacket for ease of entry.



APPLICATIONS

- Underground duct and lashed aerial
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Available with upto 144 Fibre
- Multiple Fibre types including hybrids
- Central strength members available in metallic or dielectric
- Dry core standard (Optional)
- Standard tube size for all fibre counts

SPECIFICATIONS

Fibre Count	Available from 2F to 144F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

ADVANTAGES

- High Fibre density
- Multiple network applications
- Metallic option offers ease of location, dielectric design eliminates grounding issues
- Reduces cable prep and installation time
- Reduces the number of tools required •
- Speeds fibre access and cleanup

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-24	10.0	80	2000	1000	2000	100	200
26-48	10.2	85	2000	1000	2000	102	204
50-72	10.5	90	2000	1000	2000	105	210
74-96	11.5	120	3000	1500	3000	115	230
98-120	13.0	155	3000	1500	3000	130	260
122-144	14.5	180	3000	1500	3000	145	290

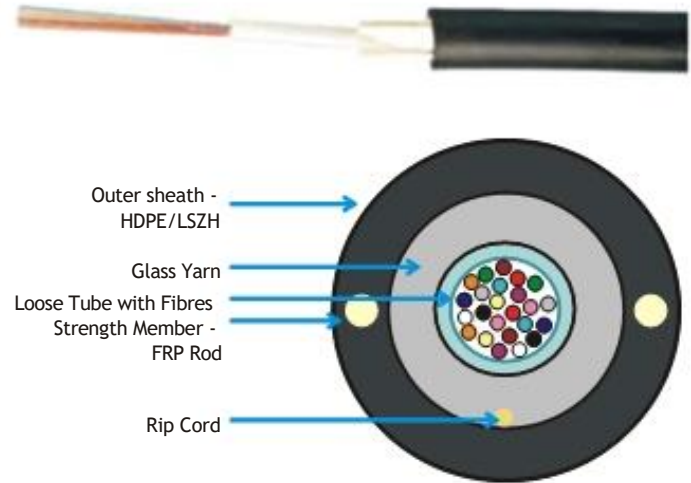
The above shown cable designs are our standard designs, however, customised designs can also be offered on specific request.

Uni - Tube Design

Duct Cables

PRODUCT DESCRIPTION

Single Loose tube cables offer a low cost alternative to traditional stranded loose tube cables. The loose tube design offers reliable transmission performance over a broad temperature range. The rugged single loose tube design features optical fibres placed inside a single gel-filled tube. The core tube includes up to 24 distinctly colored fibres. The core tube is then helically wrapped with water-blocking strength members, then encased with a black jacket. A rip cord is included under the jacket to provide ease of access to the core tube.



APPLICATIONS

- Underground duct and lashed aerial
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Available with upto 24 fibres
- Multiple Fibre types including hybrids
- Outer Strength members available in metallic or dielectric
- Small Cable Diameter

SPECIFICATIONS

Fibre Count	Available from 2F to 24F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

ADVANTAGES

- High fibre density
- Multiple network applications
- Reduces cable preparation and installation time
- Reduces cost
- Installation of more fibres in less space

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-12	8.0	50	1000	800	2000	80	160
16-24	9.0	65	1000	800	2000	90	180

Multi - Tube Ribbon Design

Duct Cables

PRODUCT DESCRIPTION

Stranded Tube Ribbon Cable is designed for Outside Plant (OSP) applications, specifically lashed aerial and underground duct installations. Our industry leading optical Fibre ribbons are manufactured with high dimensional precision and low planarity which equates to low losses during mass fusion splicing. The stranded tube design features optical Fibres ribbons placed inside gel-filled tubes. Each tube contains up to 12 discretely identified, 12-fibre ribbons for maximum design load capacity of 576 optical fibres. The core is helically wrapped with water-blocking strength members. Rip cords are included under the inner sheath for ease of entry. A Nylon-12 outer jacket protects the cable from rodent.



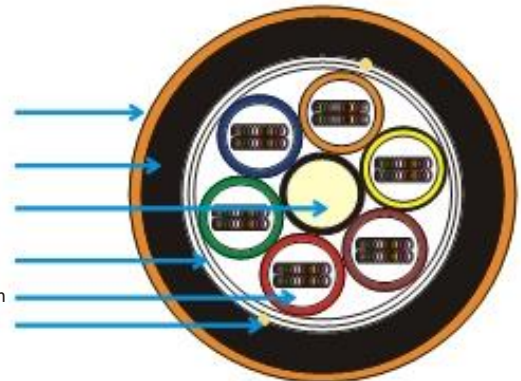
Outer Jacket - Nylon

Inner Sheath -
HDPE/LSZH
Central Strength
Member (FRP)

Polyester Tape

Loose Tube with Ribbon

Rip Cord



APPLICATIONS

- Underground duct and lashed aerial
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul network
- Broadband network

FEATURES

- Multiple Fibre types available
- Ribbon Fibre
- Multiple stranded tubes

SPECIFICATIONS

Fibre Count	Available from 48F to 576F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +60 Degree Celsius

ADVANTAGES

- High Fibre density
- Multiple network applications
- Individual Tube Access
- Compressive strength, rodent protection and ease of location
- Saves labour cost by offering mass fusion splicing

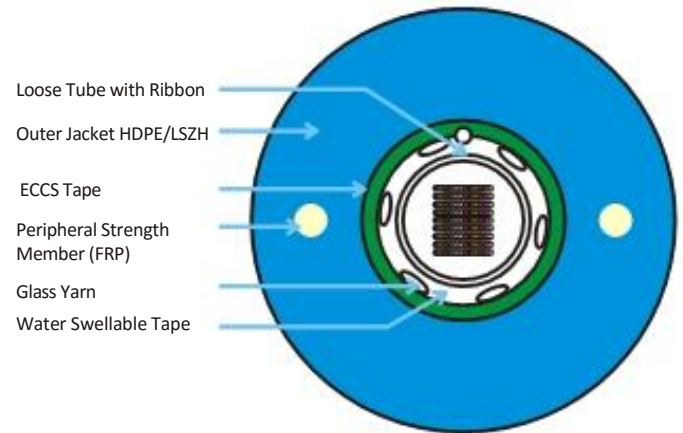
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
48	19.0	280	7000	4000	2000	190	380
96	19.0	280	7000	4000	2000	190	380
144	20.5	340	8000	4500	2000	205	410
288	22.0	525	12000	6000	2000	220	440
576	30.0	740	12000	6000	2000	300	600

Uni - Tube Ribbon Design

Duct Cables

PRODUCT DESCRIPTION

Unitube Ribbon Cable is designed for Outside Plant (OSP) applications in underground duct installations. Our industry leading optical Fibre ribbons are manufactured with high dimensional precision and low planarity which equates to low losses during mass fusion splicing. The Unitube design consists of optical fibres ribbons placed inside a gel-filled tube. Each tube contains up to 12 discretely identified, 12-Fibre ribbons for maximum design load capacity of 144 optical fibres. Glass yarn used provides the necessary tensile strength. Rip cords are included under the outer sheath for ease of entry. Armoring is provided for rodent protection. An outer HDPE sheath embedded with FRP rods as additional strength members completes the cable.



APPLICATIONS

- Underground duct and direct buried
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul network
- Broadband network

FEATURES

- Available with up to 144 Fibre
- Multiple Fibre types available
- Ribbon Fibre

SPECIFICATIONS

Fibre Count	Available from 24F to 144F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +60 Degree Celsius

ADVANTAGES

- High Fibre density
- Multiple network applications
- Compressive strength, rodent protection and ease of location
- Saves labour cost by offering mass fusion splicing

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
24	11.5	125	2500	1800	2000	115	230
48	12.5	150	2500	1800	2000	125	250
96	13.0	160	2800	2000	2000	130	260
144	14.5	210	2800	2000	2000	145	290

Multi - Tube Ribbon Design

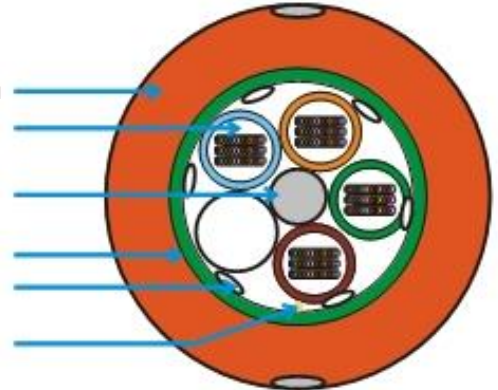
Duct / Armoured Cables

PRODUCT DESCRIPTION

Stranded Tube Armored Ribbon Cable is designed for Outside Plant (OSP) applications in underground duct or direct buried installations. Our industry leading optical Fibre ribbons are manufactured with high dimensional precision and low planarity which equates to low losses during mass fusion splicing. The stranded tube design features optical fibres ribbons placed inside gel-filled tubes. Each tube contains up to 12 discretely identified, 12-fibre ribbons for maximum design load capacity of 576 optical fibres. The core is helically wrapped with water-blocking strength members. Rip cords are included under the outer sheath for ease of entry. Armoring below outer sheath provides rodent protection.



Outer Jacket HDPE/LSZH
Loose Tube with Ribbon
Central Strength Member (Steel Rod)
ECCS Tape
Glass Yarn
Ripcords



APPLICATIONS

- Underground duct and direct buried
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul network
- Broadband network

FEATURES

- Available with upto 576 fibres
- Multiple Fibre types available
- Ribbon Fibre
- Multiple stranded tubes

SPECIFICATIONS

Fibre Count	Available from 48F to 576F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +60 Degree Celsius

ADVANTAGES

- High Fibre density
- Multiple network applications
- Individual Tube Access
- Compressive strength, rodent protection and ease of location
- Saves labour cost by offering mass fusion splicing

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
48	16.0	250	3000	1000	2000	190	380
96	16.0	250	3000	1000	2000	190	380
144	18.0	300	3000	1000	2000	205	410
288	19.8	360	3000	1000	2000	198	396
576	22.0	480	4000	1000	2000	220	440

Multi - Tube Design

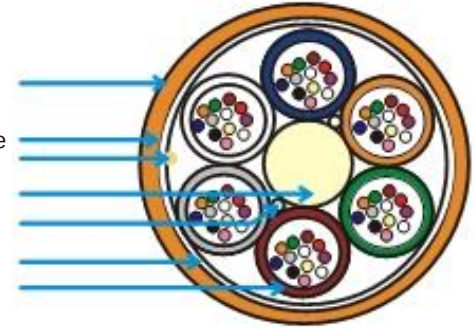
Micro Duct Cables

PRODUCT DESCRIPTION

Loose Tube Micro duct cables are the product of choice as the backbone in Outside Plant (OSP) environments. Its small outer diameter and the required rigidity for blowing/pushing through ducts offers lower minimum bending radius. The outer jacket of Nylon-12 performs extremely low co-efficient of friction while blowing through the micro ducts and also provides termite resistance. Optical Fibres and water-blocking elements are placed inside buffer tubes. The core is constructed by stranding the buffer tubes around the FRP central strength member. The core is wrapped with a water-blocking tape, then encased with a Nylon-12 jacket. A rip cord is included under the jacket for ease of entry.



Outer Jacket -
Nylon/HDPE/LSZH
Water Blocking Tape
Rip Cord
FRP Rod
WS Yarn
Binder Yarn
Loose Tube with
Fibres



APPLICATIONS

- Underground blowing/pushing in ducts
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul network
- Broadband network

FEATURES

- Multiple Fibre types available
- Multiple stranded tubes
- Dry Core Standard (Optional)

SPECIFICATIONS

Fibre Count	Available from 2F to 144F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +60 Degree Celsius

ADVANTAGES

- High fibre density in small outer diameter • Multiple network applications
- Individual Tube Access
- Compressive strength, rodent protection and ease of location

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-48	6.0	25	500	200	500	60	120
50-72	7.2	35	1000	500	500	72	142
74-96	7.5	50	1000	500	500	75	150
98-144	9.2	70	1500	750	500	92	184

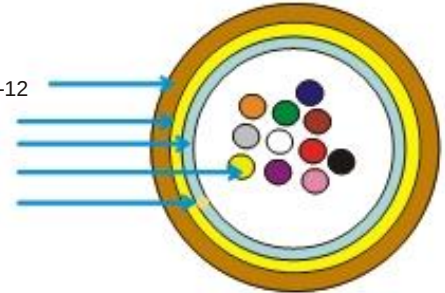
SPECIFICATIONS

Fibre Count	Available from 2F to 24
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

Outer Sheath - Nylon-12
Aramid Yarn
Loose Tube
Optical Fibres
Rip Cord



FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-12	3.8	11	800	400	1000	38	76
14-24	5.6	24	1000	500	1000	56	112

Uni - Tube Design (Mini)

SPECIFICATIONS

Fibre Count	Available from 2F to 4F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +60 Degree Celsius

Outer Sheath Nylon - 12
Soft Inner Tube
Optical Fibres
Rip Cord
Aramid strength member



FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2	1.7	2.3	40	20	100	40	60
4	1.9	2.7	40	20	100	40	60

Loose tube cables are the product of choice as the backbone in Indoor/Outdoor environments. The rugged loose tube design offers reliable transmission performance over a broad temperature range. Optical Fibres are placed inside filled buffer tubes containing gel. The core is constructed by stranding the buffer tubes around a central strength member. The core is wrapped with flexible strength members covered with a water-blocking tape. Glass Yarns and an HDPE outer jacket are applied. Rip cords are included under outer jacket for ease of entry.

Rip Cord

Outer sheath
HDPE/LSZH
Polyester Tape
FRP
Flooding Jelly

Loose Tube with Fibres
Glass Yarn Armouring

- Underground duct, Aerial and Direct Burial •
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

Fibre Count

Standards Compliance

Available from 2F to 144F
Telecordia GR-20, IEC 60794,
EIA/TIA, ITU-T, EN187000,
RUS1755.900

- Available with upto 144 fibres
- Multiple Fibre types including hybrid
- Dry core standard (Optional)
- Uni-tube designs are also available upto 24 Fibres.

Operation / Storage

Installation

-40 to +70 Degree Celsius

-30 to +75 Degree Celsius

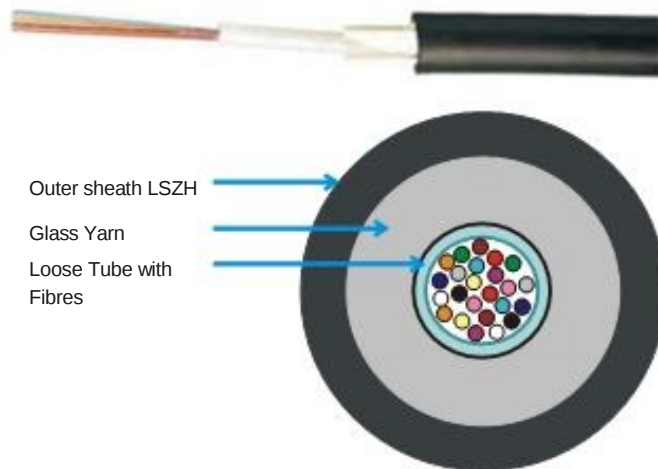
- High fibre density
- Multiple network applications
- Dielectric design eliminates grounding issues

- Reduces cable preparation and installation time •
- Reduces the number of tools required
- Speeds fibre access and cleanup

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-24	10.5	90	2000	1000	2000	105	210
26-48	10.8	92	2000	1000	2000	108	216
50-72	11.5	110	2000	1000	2000	115	230
74-96	14.5	175	4000	2000	2000	145	290
98-120	15.5	205	4000	2000	3000	155	310
122-144	17.0	255	4000	2000	3000	170	340

PRODUCT DESCRIPTION

Single Loose tube cables offer a low cost alternative to traditional stranded loose tube cables. The loose tube design offers reliable transmission performance over a broad temperature range. The rugged single loose tube design features optical fibres placed inside a single gel-filled tube. The core tube includes up to 24 distinctly colored fibers. The core tube is then helically wrapped with water-blocking strength members, then encased with an HDPE jacket.



APPLICATIONS

- Indoor and Outdoor
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Multiple Fibre types including hybrids
- Small cable diameter

SPECIFICATIONS

Fibre Count	Available from 2F to 24F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-20 to +60 Degree Celsius
Installation	-15 to +65 Degree Celsius

ADVANTAGES

- High fibre density
- Multiple network applications
- Reduces cable preparation and installation time
- Reduces cost
- Installation of more fibres in less space

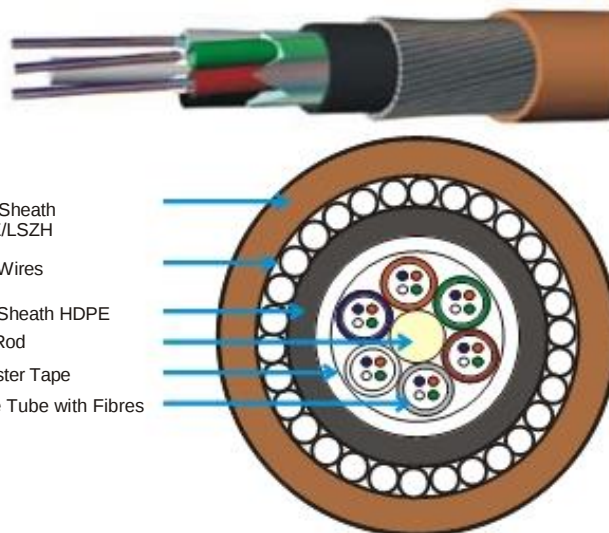
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-12	9.0	62	2000	1000	2000	90	180
12-24	10.0	80	2000	1000	2000	100	200

Multi - Tube Design

Wire Armoured Cables

PRODUCT DESCRIPTION

Wire armoured cables are used in harsh environmental conditions requiring greater tensile strength, higher crush and impact resistance than standard steel tape armoured cables. The cable core consists of fiber filled buffer tubes stranded around the central strength member. The core is water blocked using suitable water blocking elements . An inner sheath is provided over the core and galvanised steel wire armouring is provided over it. An outer HDPE sheath is extruded over this armouring.



APPLICATIONS

- Suitable for duct or buried installations such as tunnels. • Excellent mechanical features.
- High anti-rodent protection.

FEATURES

- Multiple Fibre types available
- Galvanised Steel Wire Armouring
- High strength
- High crush & impact resistance

SPECIFICATIONS

Fibre Count	Available from 2F to 144F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +60 Degree Celsius

ADVANTAGES

- High Fibre density
- Multiple network applications
- Improves Compressive strength and rodent protection

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-12	14.5	295	19000	10000	4000	145	290
12-24	14.5	295	19000	10000	4000	145	290
26-36	14.5	295	19000	10000	4000	145	290
38-48	16.0	350	22000	12000	4000	160	320
50-72	16.0	350	22000	12000	4000	160	320
74-96	17.5	415	23000	13000	4000	175	350
98-144	20.5	560	25000	14000	4000	205	410

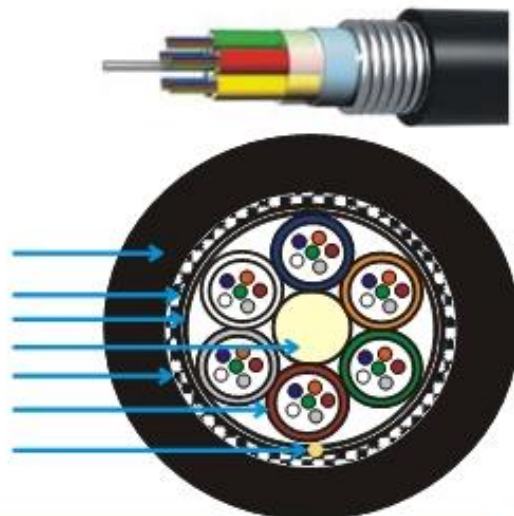
Multi - Tube Single Sheath Design

CST Armoured Cables

PRODUCT DESCRIPTION

Loose tube cables are the product of choice as the backbone in Outside Plant (OSP) environments. The rugged loose tube design offers reliable transmission performance over a broad temperature range. Optical fibres and water-blocking elements are placed inside buffer tubes. The core is constructed by stranding the buffer tubes around a central strength member. The core is wrapped with flexible strength members covered with a polyester tape. A corrugated steel armor is applied and then encased with a black jacket. Rip cords are included under the armor for ease of entry.

Outer sheath
HDPE/LSZH
Polyester Tape
Glass Yarn
FRP Rod
Corrugated Steel Tape
Loose Tube with Fibres
Rip Cord



APPLICATIONS

- Direct buried, underground duct
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Multiple Fibre types including hybrid
- Dry core standard (Optional)
- Corrugated Steel Armour

SPECIFICATIONS

Fibre Count	Available from 2F to 144F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

ADVANTAGES

- High Fibre density
- Multiple network applications
- Reduces cable preparation and installation time
- Reduces the number of tools required
- Improves compressive strength and rodent protection

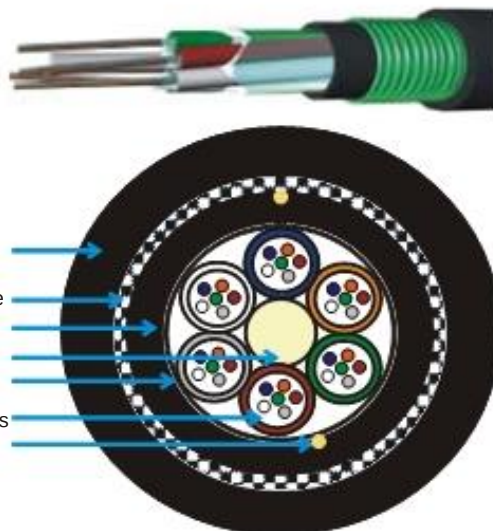
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-24	11.5	130	4000	2000	4000	115	230
26-48	11.8	135	4000	2000	4000	118	236
50-72	12.5	160	4000	2000	4000	125	250
74-96	13.8	185	5000	2500	4000	138	276
98-120	15.5	235	5000	2500	4000	155	310
122-144	16.5	270	5000	2500	4000	165	330

Multi - Tube Double Sheath Design

CST Armoured Cables

PRODUCT DESCRIPTION

Loose tube cables are the product of choice as the backbone in Outside Plant (OSP) environments. The rugged loose tube design offers reliable transmission performance over a broad temperature range. Optical fibres and water-blocking elements are placed inside buffer tubes. The core is constructed by stranding the buffer tubes around a central member. The core is wrapped with flexible strength members covered with a polyester tape then encased with a black inner jacket. A corrugated steel armor is applied and a black outer jacket completes the cable construction. Rip cords are included under the inner jacket and armor for ease of entry.



APPLICATIONS

- Direct bury, underground duct and lashed aerial
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Multiple fibre types including hybrid
- Dry core standard (Optional)
- Corrugated Steel Armour

SPECIFICATIONS

Fibre Count	Available from 2F to 144F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

ADVANTAGES

- High Fibre density
- Multiple network applications
- Reduces cable preparation and installation time
- Improves compressive strength and rodent protection
- Speeds fibre access and cleanup

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-24	13.8	170	2670	1500	4000	138	276
26-48	14.5	195	2670	1500	4000	145	290
50-72	15.0	200	2670	1500	4000	150	300
74-96	16.0	240	3000	2000	4000	160	320
98-120	17.5	285	3000	2000	4000	175	350
122-144	18.5	320	3000	2000	4000	185	370

Uni- Tube Design

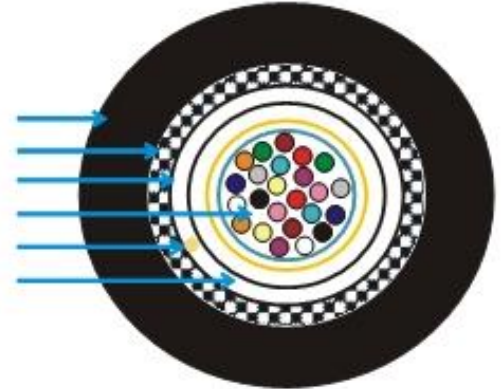
CST Armoured Cables

PRODUCT DESCRIPTION

Single Loose tube cables offer a low cost alternative to traditional stranded loose tube cables. Armored cables are designed for improved mechanical and rodent protection in direct buried applications. The loose tube design offers reliable transmission performance over a broad temperature range. The rugged single loose tube design features optical fibres placed inside a single gel-filled tube. The core tube includes up to 24 distinctly colored fibers. The core is wrapped with flexible strength members and covered with a water-blocking tape. A corrugated steel armor is applied and then encased with a black jacket. Rip cords are included under the armor for ease of access to the core tube.



Outer sheath
HDPE/LSZH
Corrugated Steel Tape
W S Tape
Fibre Bundles in tube
Rip Cord
Glass Yarn



APPLICATIONS

- Direct buried and underground duct
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Multiple Fibre types
- Corrugated Steel Armour
- Highly flexible

SPECIFICATIONS

Fibre Count	Available from 2F to 24F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

ADVANTAGES

- Multiple network applications
 - Reduces cable preparation and installation time •
 - Reduces cost
 - Improves compressive strength and rodent protection
- Easy Handling

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
6	8.8	90	1500	750	4000	88	176
12	8.8	90	1500	750	4000	88	176
24	10.5	100	1500	750	4000	105	210

Multi - Tube ADSS Double Sheath Design

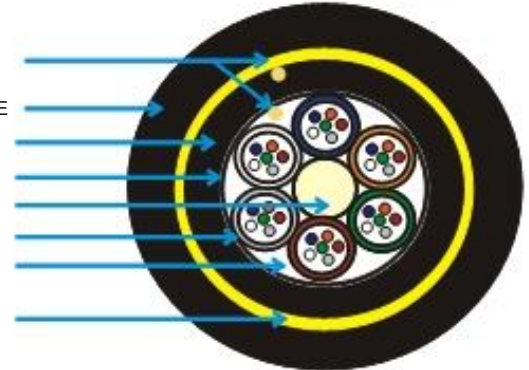
Aerial Cables

PRODUCT DESCRIPTION

ADSS (All Dielectric Self Supporting) cables are designed for installation on poles in distribution and transmission environment mainly where live wire installation is required. Optical fibres inside gel filled tubes are stranded around a central strength member. The core is water blocked by use of suitable water blocking elements. Inner PE sheath is provided over which a layer of Aramid yarn is uniformly distributed that provides the necessary tensile strength. The outer sheath is then extruded over this core. Ripcords facilitate access to the cable core. ADSS cables are suitable for use in harsh environment. These cables are designed based on the required span length and the prevailing environmental conditions.



Rip Cord
Outer sheath - HDPE
Inner Sheath - PE
Polyester Tape
FRP Rod
Loose Tube with
Fibres
Flooding Jelly
Aramid Yarn



APPLICATIONS

- Aerial, Underground duct and Direct Burial
- Trunk, distribution and feeder cable
- Power utilities

FEATURES

- Anti-tracking resistance
- Multiple fiber types including Hybrids
- Self supporting
- Unitube designs available

SPECIFICATIONS

Fibre Count	Available from 2F to 144F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900, IEEE.P-1222

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

ADVANTAGES

- Live power line installation
- Multiple network applications
- Dielectric design eliminates grounding issues
- Increase in lifetime due to anti-tracking property

- Reduces number of tools required due to absence of messenger

Note: Custom designs for various span lengths available upon request.

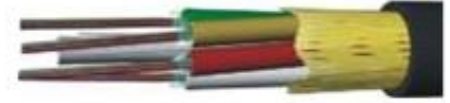
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-24	13.5	140	4000	2500	2000	135	270
26-48	13.5	140	4000	2500	2000	135	270
50-72	14.5	160	5000	3000	2000	145	290
74-96	15.5	180	6000	4000	2000	155	310
98-120	17.0	220	6000	4000	2000	170	340
122-144	18.5	260	6000	4000	2000	185	370

Multi - Tube ADSS Single Sheath Design

Aerial Cables

PRODUCT DESCRIPTION

ADSS (All Dielectric Self Supporting) cables are designed for installation on poles in distribution and transmission environment mainly where live wire installation is required. Optical fibres inside gel filled tubes are stranded around a central strength member. The core is water blocked by use of suitable water blocking elements. A layer of Aramid yarn uniformly distributed provides the necessary tensile strength. The outer sheath is extruded over this core. Ripcords facilitate access to the cable core. ADSS cables are suitable for use in harsh environment. These cables are designed based on the required span length and the prevailing environmental conditions.



Rip Cord

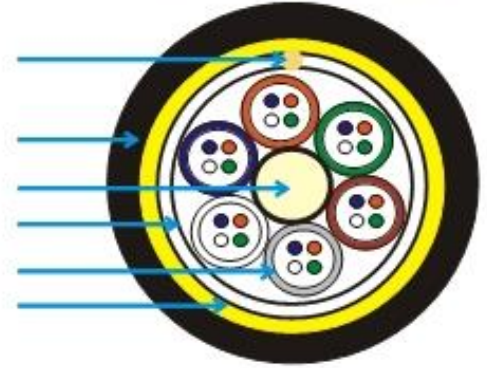
Outer sheath HDPE

FRP Rod

Water Blocking Tape

Loose Tube with Fibres

Aramid Yarn



APPLICATIONS

- Aerial , Underground duct and Direct Burial •
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Available with upto 144 fibres
- Multiple Fibre types including hybrids
- Dry core standard (Optional)
- Uni-tube designs are also available upto 24 Fibres

SPECIFICATIONS

Fibre Count	Available from 2F to 144F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

ADVANTAGES

- High fibre density
- Multiple network applications
- Dielectric design eliminates grounding issues
- Reduces cable preparation and installation time •
- Reduces the number of tools required
- Speeds fibre access and cleanup

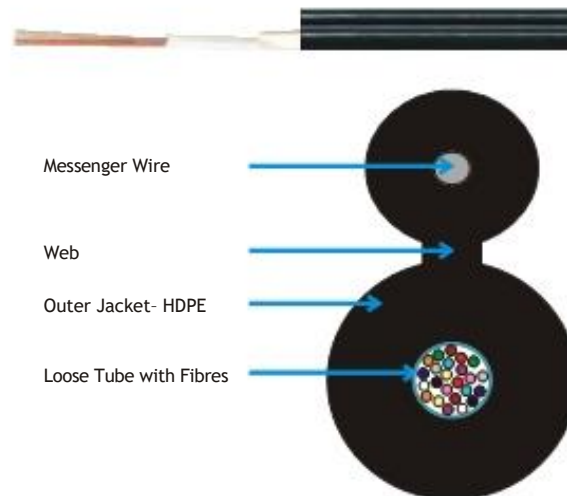
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-24	11.5	120	3000	1500	2000	115	230
26-48	11.5	130	3000	1500	2000	115	230
50-72	12.5	150	3000	1500	2000	125	250
74-96	13.5	180	4000	2000	2000	135	270
98-144	16.5	195	4000	2000	2000	165	330

Uni - Tube Figure-8 Design

Aerial Cables

PRODUCT DESCRIPTION

Figure of 8 self support cables are design for use in aerial applications as an alternative to lashing. An integrated messenger wire support provides the necessary tensile strength and outer HDPE jacket is provided in the form of figure of 8.



APPLICATIONS

- Aerial self support medium span installations • Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Multiple Fibre types
- Confirms to standard pole attachment hardware • Small diameter and light weight

SPECIFICATIONS

Fibre Count	Available from 2F to 24F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

ADVANTAGES

- Light weight and compact
- Multiple network applications
- Standard installation practices

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-24	6.5 X 11.0	65	2000	1000	2000	500	110

Multi - Tube Figure-8 Design

Aerial Cables

PRODUCT DESCRIPTION

Figure of 8 cable design offers an alternative for aerial cable installations in stringent environmental conditions. The optical fibers are placed inside gel-filled buffer tubes. The core is constructed by stranding the buffer tubes around a central strength member and covered with suitable water blocking elements and then sheathed with an outer jacket and an integrated steel messenger. A rip cord is provided for easy access to the cable core. A stranded messenger wire is sheathed along with the core in the form of figure of 8.



APPLICATIONS

- Aerial self support
- Trunk, distribution and feeder cable
- Local loop, metro, long-haul and broadband network

FEATURES

- Available upto 144 fibres
- Multiple Fibre types including hybrids
- Wet core (Optional)
- Confirms to standard pole attachment hardware
- Uni-tube designs are also available upto 24Fibres.

SPECIFICATIONS

Fibre Count	Available from 2F to 144F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +75 Degree Celsius

ADVANTAGES

- High fibre density
- Multiple network applications
- Reduces cable preparation and installation time
- Reduces the number of tools required
- Speeds fibre access and cleanup
- Standard installation practices

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-24	10.0 X 17.0	130	5000	2500	2000	100	200
26-48	10.0 X 17.0	130	5000	2500	2000	100	200
50-72	11.0 X 17.5	145	6000	3000	2000	110	220
74-96	12.2 X 18.5	175	6000	3000	2000	122	244
98-120	14.0 X 20.5	200	6000	3000	2000	140	280
122-144	15.5 X 22.0	230	6000	3000	2000	155	310

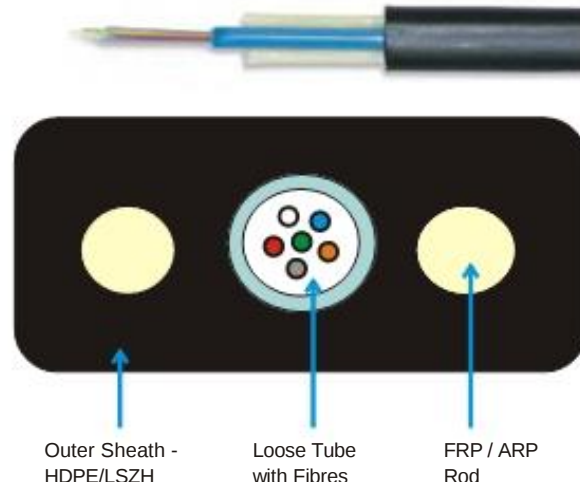
Flat Type Drop Cable

FTTH Cables

PRODUCT DESCRIPTION

HTL offers the most complete solution for the FTTH application. The Flat Type Drop Cable is designed for use in Aerial and duct/conduit environments. The single tube contains gel which provides ease of clean up. Dielectric strength members (FRP/ARP) placed parallel to single loose tube, one on each side, to provide necessary longitudinal strength.

This product is available with G657A optical Fibre also and provides increased bend performance.



APPLICATIONS

- FTTH Aerial and Duct/Conduit
- Local loop, Broadband network

FEATURES

- Available with upto 12 fibres
- Multiple Fibre types including bend resistant
- Strength members available in metallic also

SPECIFICATIONS

Fibre Count	Available from 2F to 12F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-10 to +70 Degree Celsius

ADVANTAGES

- Easy Drop
- Multiple network applications
- Reduces cable preparation and installation time
- Reduces cost
- Easy Installation

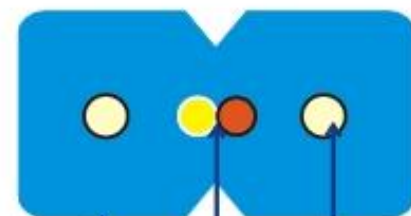
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-12	7.2 x 3.5	60	1200	600	2000	100	200

High Bend Flexi Drop Cable

FTTH Cables

PRODUCT DESCRIPTION

The high bend flexi drop cable is designed for use in aerial and duct/conduit environments. The optical fibers are embedded in the sheath. Dielectric strength members (FRP/ARP rods) placed parallel to optical fibres provide the necessary longitudinal strength.



Outer Sheath - HDPE/LSZH Optical Fibres FRP / ARP Rod

APPLICATIONS

- FTTH Aerial and Duct/Conduit
- Local loop
- Broadband network

FEATURES

- Available upto 4 fibres
 - Multiple Fibre types including bend resistant G 657A •
- Metallic strength members also available

SPECIFICATIONS

Fibre Count	Available from 2F to 4F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-10 to +70 Degree Celsius

ADVANTAGES

- Easy Drop
- Multiple network applications
- Reduces cable preparation and installation time
- Reduces cost
- Easy installation

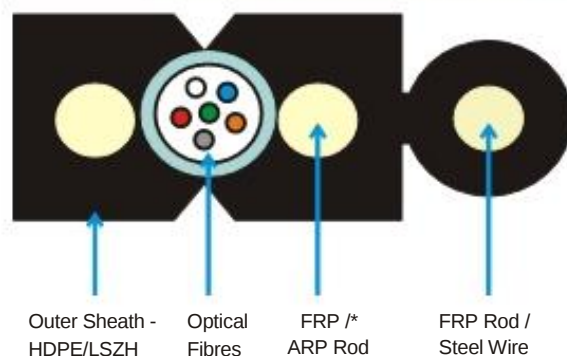
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2	2.0 x 3.1	10	200	100	500	30	60
4	2.2 x 3.5	11	200	100	500	30	60

Figure-8 Type Drop Cables

FTTH Cables

PRODUCT DESCRIPTION

The Flat type Figure of 8 Drop cable is designed for use in aerial applications. The optical fibers are placed inside a single gel-filled tube and sheathed with an outer jacket in figure of 8 form. Dielectric strength members (FRP/ARP rod) placed 180° apart, provide the necessary longitudinal strength and a steel wire/FRP rod as messenger also serves as an additional strength member.



APPLICATIONS

- FTTX
- Aerial
- Local loop
- Broadband network

FEATURES

- Multiple Fibre types including bend resistant
- Strength members available in metallic also

SPECIFICATIONS

Fibre Count	Available from 2F to 12F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-30 to +70 Degree Celsius
Installation	-25 to +75 Degree Celsius

ADVANTAGES

- Easy Drop
- Multiple network applications
- Reduces cable preparation and installation time
- Reduces cost
- Easy Installation

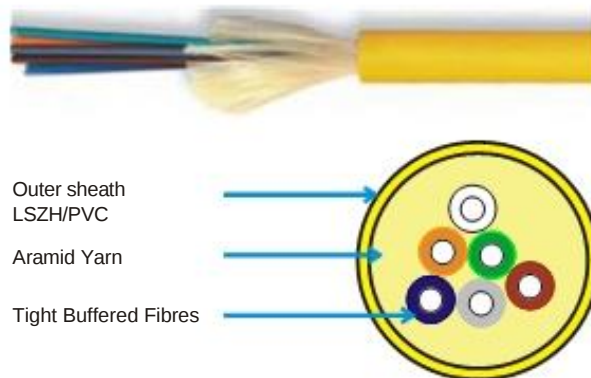
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
2-6	6.8 x 3.0	23	1200	600	1000	60	120
8-12	7.0 x 3.0	25	1200	600	1000	60	120

Distribution Cables

Indoor Cables

PRODUCT DESCRIPTION

Tight buffered cables are designed perfectly for inter-equipment connections in indoor applications. These cables have high strength and good bend performance. Individual fibers are tight buffered with Nylon-12/PVC up to 900 microns which are surrounded with Aramid Yarn and overall jacketed with LSZH/PVC compound. The tight buffered construction is ideal for direct termination of connectors consequently saving on installation time.



APPLICATIONS

- Indoor, Ducts/Conduits
- Local loop, Broadband network

FEATURES

- Multiple Fibre types
- Outer jacket PVC (Optional)

SPECIFICATIONS

Fibre Count	Available from 2F to 24F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-30 to +70 Degree Celsius
Installation	-25 to +75 Degree Celsius

ADVANTAGES

- Good bending performance
- High tensile strength, tight structure, light weight
- Small Dimension
- Facilitates flexible installations
- Easy to operate and splice.

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
1-4	5.0	26	1000	500	500	50	100
6-8	5.8	32	1000	500	500	58	116
10-12	6.2	36	1000	500	500	62	124
14-16	7.5	52	1200	600	500	75	150
18-24	8.0	60	1200	600	500	80	160

Simplex/Duplex Cables

Indoor Cables

PRODUCT DESCRIPTION

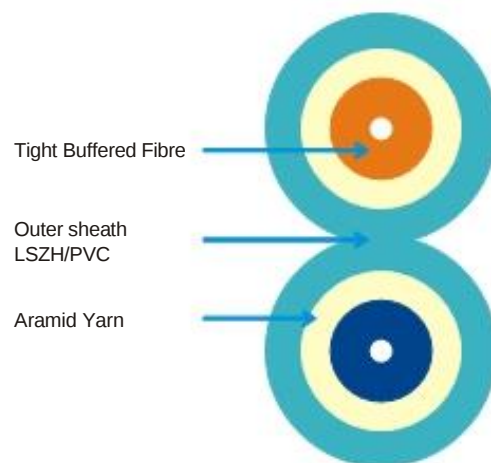
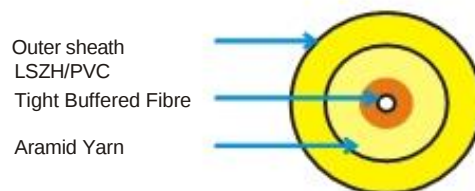
HTL's Simplex/Duplex cables are designed to withstand all the requirements in a premise environment. Simplex cable consists of a single Nylon/ PVC tight buffered fiber surrounded by Aramid Yarn and jacketed with LSZH/ PVC. Duplex cable is like two simplex cables jointed by a thin web. Simplex cables are used for one way data transfer while duplex / zipcord enables bidirectional data transfer. The tight buffered construction is ideal for direct termination of connectors thus saving on installation time.

SPECIFICATIONS

Fibre Count	Available in 1F & 2F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-30 to +70 Degree Celsius
Installation	-25 to +75 Degree Celsius



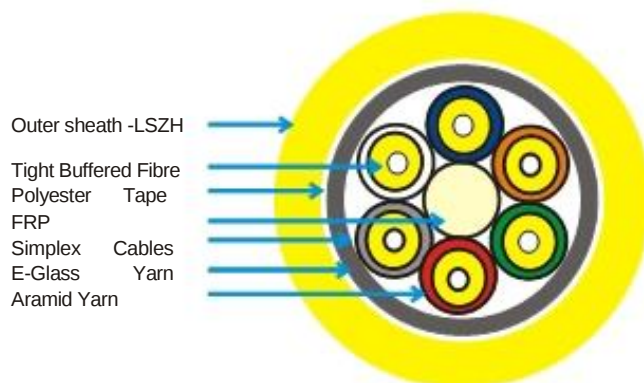
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
Simplex	3.0	8	300	150	500	30	60
Duplex Maxizip)	6.0	16	600	300	500	30	60
Simplex	2.0	4	200	100	500	30	60
Duplex Minizip)	4.0	8	400	200	500	30	60

Breakout Cables

Indoor Cables

PRODUCT DESCRIPTION

The optical fibre breakout Cable is designed considering Central office (CO) connectivity. The cable consists of interconnect cable subunits surrounding a central strength element. The subunits are surrounded by strength members and a common flame retardant PVC jacket. Each subunit is ideally suited to be attached to small form factor connectors.



APPLICATIONS

- Indoor; Riser, Plenum
- Ducts/Conduits
- Local loop
- Broadband network

FEATURES

- Individual fiber unit accessible
- Designed for convenient installation of optical connectors

SPECIFICATIONS

Fibre Count	Available from 1F to 6F
Standards Compliance	Telecordia GR-20, IEC 60794, EIA/TIA, ITU-T, EN187000, RUS1755.900

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-30 to +70 Degree Celsius
Installation	-25 to +75 Degree Celsius

ADVANTAGES

- High tensile strength and light weight
- Facilitates flexible installations
- Easy to operate and splice
- Compatible with standard central office equipment.

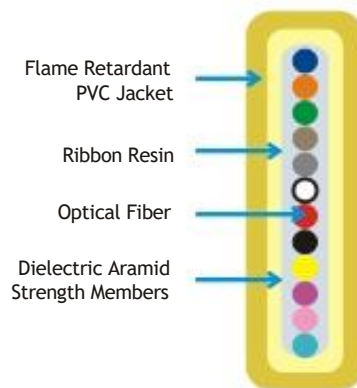
FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		CRUSH RESISTANCE (N/10cm)	BENDING RADIUS (mm)	
			Installation	Operation		Temporary	Permanent
1-4	7.5	55	600	300	500	75	150
6	8.5	72	600	300	500	85	160

Ribbon Interconnect Cable

Indoor Cables

PRODUCT DESCRIPTION

The optical fibre ribbon interconnect cable is designed to be attached directly to 12-fibre array connectors, like MPO or MTP. Use it with array connectors on either side for a ribbon jumper cable, or as a transition cable with the array connector on one side and a high fibre count cable on the other. The cable consists single ribbon of 8/12 fibres surrounded by aramid yarns and provided with an outer PVC jacket which is flame retardant



APPLICATIONS

- MPO/MTP 12 fibre array connectors

FEATURES

- Multiple fibre types available
- Riser rated design

SPECIFICATIONS

Fibre Count	12F
Standards Compliance	ANSI /ICEA S-83-596, GR-409-CORE

ENVIRONMENTAL SPECIFICATIONS (TEMPERATURE)

Operation / Storage	-40 to +70 Degree Celsius
Installation	-30 to +60 Degree Celsius

ADVANTAGES

- Trouble free installation
- To be directly attached to MTO/MTP 12 fibre array connectors
- Fire rated cable

FIBRE COUNT	DIAMETER (mm) Nominal	WEIGHT (Kg./Km) Nominal	TENSILE STRENGTH (N)		BENDING RADIUS (mm)	
			Installation		Temporary	Permanent
12	4.2 x 2.2	10.0	200	100	25	50

Strength Member - FRP Rods



Features

- Superior dimensional stability
- High tensile modulus
- Designed for all-dielectric or metallic cable applications
- Provides anti-buckling properties and protection during installation
- Inexpensive way to increase diameter to accommodate designs with high fibre counts increases equipment uptime and productivity
- Long, splice-free lengths
- Consistent diameter and shape
- Adhesion to upjacketing materials

Standard Lengths

> 50 kms splice free lengths

Manufacturing Capability

1.0 mm to 4.0 mm with very close diameter

- Matches desired length specifications

Typical Product Characteristics Physical Properties

- Glass content: > 80 % by weight • Density: 2.1 gm/cc
- Diameter stability : + 0.05 mm • Ovality: < 0.05 mm

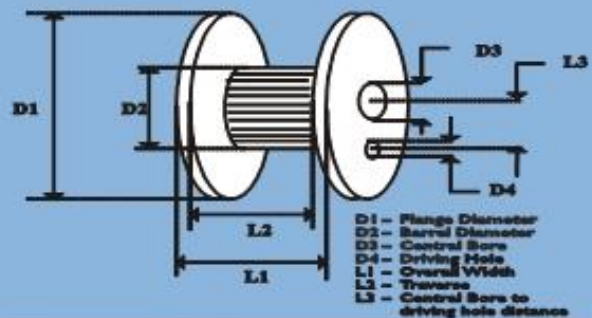
PRODUCT DESCRIPTION

Fibre glass Reinforced Plastic (FRP) rods are used as strength members in optical fibre cables. The FRP rod is produced by pultrusion process. Fibre glass reinforcements are pultruded with unique resin formulations to produce a final thermoset FRP rod.

The round rods located in the centre of fibre optic cables, combine the high performance properties of glass reinforcements with unique resin formulations to produce strong and cost efficient cable reinforcement. *The long, splice-free lengths enhance productivity in cabling operations.* Central strength members are common in outdoor cables and some high fibre counts indoor cables.

Mechanical Properties		
Ultimate tensile strength	≥ 1.50 GPa	ASTM D 3916
Tensile modulus	≥ 50 GPa	ASTM D 3916
Elongation @ break	≥ 2.5 %	ASTM D 638
Min. bend radius	25 x D @ 23°C	
Heat stress tolerance (bend radius)	8 Days @ 100°C, 50 X D	
Coefficient of thermal expansion	5.2 X 10 ⁻⁶ /°C	ASTM D 696
Shrinkage	0%	
Flexural modulus	≥ 50 GPa	ASTM D790
Water absorption after 24 hrs	≤ 0.1 %	ASTM D 570

Reel Dimensions & Capacities



FRP size in mm	D1 mm	D2 mm	D3 mm	D4 mm	L1 mm	L2 mm	L3 mm	Length/ Reel km
1.0	625	315	80	30	614	450	120	60.4
1.6	800	400	80	30	614	450	120	60.4
2.03	935	400	80	30	614	550	120	60.4
2.3	800	400	80	30	664	490	120	25.2
3.8	935	400	80	30	614	550	120	16.8