

Fiber Optic Cables

OPTRAL

HIGH PERFORMANCE
OPTICAL CABLES

OPTRAL

From 1988 Optral design, manufacture and commercialize optical cables as well optoelectronic equipments for audio, video and data signals.

Our philosophy is to supply the best cable for each application, within the shortest possible delivery time and with no minimum length limit.

We are specialized in design and manufacture of cables according to the strict needs of our customers.

We are proud to be the manufacturer with the best service in Europe, replying to any demand of our customers quickly, giving the shorter delivery times and delivering to the expected date.

We strive to keep our customers' satisfaction, more of them being customers from Optral foundation date.

Legend



Low Smoke Emission



Totally Dielectric



Ultraviolet Resistance



Aerial



High Rodent Resistance



Flame Retardant



Moisture Protected



Watertight



Rodent Protected



Br breakout window



Flexible



Halogen free



Low Friction



Medium Rodent Resistance



Fire Resistance



CPR B2ca



CPR Cca

Summary

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Tight Buffer Cables: CPS / Mini CPS

Patchcord

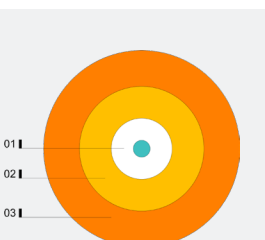
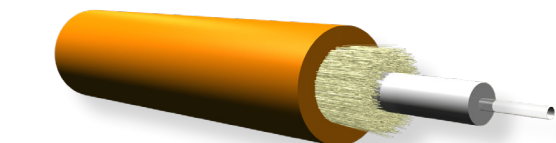
Specifications				
	CPS	Mini-CPS-25	Mini-CPS-21	Mini-CPS-16
Fibres	1			
Strength members	Aramid Yarns			
Outer Jacket	LSZH ¹			
Identification ²	ORG (RAL2003) MM62 / BLU (RAL5015) MM50-OM2 / AQU (RAL6027) OM3 / VIO (RAL 4003) OM4 / LIME GREEN OM5 / YLW (RAL1021) OSI/OS2			
Weight (Kg/Km)	7.5	6	4.5	3
Outer ø (mm)	2.9 ±0.1	2.5 ±0.1	2.1 ±0.1	1.6 ±0.1
Max. Tensile Load (N)	200 (Operating) / 350 (Installation) - (IEC 60794-1-21 E1)	150 / 250	120 / 200	40 / 70
Max. Crush (N/dm)	500 (IEC 60794-1-21 E3)	500	300	300
Temperature Range	-5°C to +60°C (IEC 60794-1-22 F1)			
Min. Bending Radius	15 x Outer Ø (IEC 60794-1-21 E11)			
Max. Length (m)	2000			

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

¹ LSZH - Halogen free, low smoke emission and flame retardant compound.

² For singlemode fibre G.657 the jacket colour is ivory.



01. TIGHT BUFFER FIBRE (0.9 MM)
02. STRENGTH MEMBERS
03. OUTER JACKET

Fire resistance

- Halogen Free (IEC 60754-1/-2)
- Flame retardant (IEC 60332-1)
- Low smoke emission (IEC 61034-2)

Applications

- Indoor
- Pigtail and jumper connections
- Direct connection to terminal equipments
- Based on DIN VDE 0888 Part 4

Options

- Easy-Strip Buffer
- Special Colour Code

Advantages

Flexible / Resilient / Totally dielectric / Direct connectorization.

Tight Buffer Cables: FLAT / Mini FLAT

Patchcord

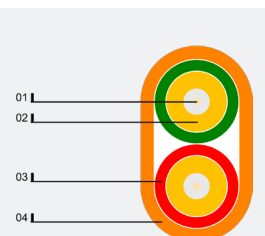
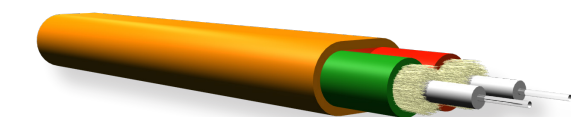
Specifications				
	FLAT	Mini-FLAT-25	Mini-FLAT-21	Mini-FLAT-16
Fibres	2			
Strength members	Aramid Yarns			
Inner jacket	LSZH ¹			
Subcables Ø (mm)	2.9 ±0.1	2.5 ±0.1	2.1 ±0.1	1.6 ±0.1
Outer jacket	LSZH ¹			
Identification ²	ORG (RAL2003) MM62 / BLU (RAL5015) MM50-OM2 / AQU (RAL6027) OM3 / VIO (RAL 4003) OM4 / LIME GREEN OM5 / YLW (RAL1021) OSI/OS2			
Weight (Kg/Km)	15	23	16	11
Outer Ø (mm)	4.0 x 6.7 ±0.3	3.5 x 6.0 ±0.1	2.9 x 5.0 ±0.1	2.4 x 4.0 ±0.1
Tensile Load Perm / Inst (N)	400 (Operating) / 700 (Installation) (IEC 60794-1-21 E1)	300 / 500	240 / 400	80 / 130
Max. Crush (N/dm)	500 (IEC 60794-1-21 E3)	750	500	500
Temperature Range	-5°C to +60°C (IEC 60794-1-22 F1)			
Min. Bending Radius (mm)	15 x Outer Ø (IEC 60794-1-21 E11)			
Max. Length (m)	2000			

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22. Inner jacket colour: Red - Green.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.

² For singlemode fibre G.657 the jacket colour is ivory.



01. TIGHT BUFFER FIBRE (0.9 MM)
02. STRENGTH MEMBERS
03. INNER JACKET
04. OUTER JACKET

Fire resistance

- Flame retardant (IEC 60332-1)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

- Indoor
- Direct connection to terminal equipments
- Based on DIN VDE 0888 Part 6

Options

- Easy-Strip Buffer
- Special colour code

Advantages

Flexible / Resilient / Totally dielectric / Direct connectorization.

Tight Buffer Cables: ZIPCORD / Mini ZIPCORD

Specifications

	Zipcord	Mini ZIP-16	Mini ZIP-21	Mini ZIP-25
Fibres	2			
Identification	Colours			
Strength Members	Aramid Yarns			
Outer Jacket	LSZH ¹			
Identification ²	ORG (RAL2003) MM62 / BLU (RAL5015) MM50-OM2 / AQU (RAL6027) OM3 / VIO (RAL 4003) OM4 / LIME GREEN OM5 / YLW (RAL1021) OSI/OS2			
Weight (Kg/Km)	15	5.5	9	12.2
Outer Ø (mm)	2.8 x 5.7 ±0.15	1.6 x 3.4 ±0.1	2.1 x 4.4 ±0.1	2.5 x 5.3 ±0.1
Max. Tensile Load (N)	400 / 700	80 / 130	240 / 400	300 / 500
Max. Crush (N/dm)	500	300	300	500
Temperature Range	-5 °C to +60 °C			
Min. Bending Radius	15 x Outer Ø			
Max. Length (m)	2000 m			

Standards

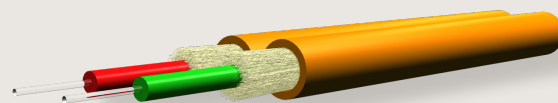
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-2.2
Inner jacket colour: Red - Green.

¹ LSZH - Halogen free, low smoke and flame retardant thermoplastic compound.

² For singlemode fibre G.657 the jacket colour is ivory.



Patchcord



Fire resistance

- Flame retardant (IEC 60332-1)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

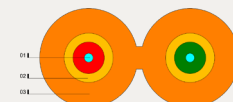
- Indoor
- Jumper and pigtail connections
- Direct connection to terminal equipments
- Based on DIN VDE 0888 part 4

Options

- Easy-Strip Buffer
- Special Colour Code

Advantages

Flexible / Resilient / Totally dielectric / Direct connectorization.



01. TIGHT BUFFER FIBRE (0.9 MM)
02. STRENGTH MEMBERS
03. OUTER JACKET

Tight Buffer Cables: CP-DC

Specifications

	CP-DC-1.4	CP-DC-2.8	CP-DC-3.0	CP-DC-3.6
Fibres	2	2	12	24
Strength Members	Aramid Yarns			
Outer Jacket	LSZH ¹			
Outer Jacket Colour	ORG (RAL2003) MM62 / BLU (RAL5015) MM50-OM2 / AQU (RAL6027) OM3 / VIO (RAL 4003) OM4 / LIME GREEN OM5 / YLW (RAL1021) OSI/OS2			
Weight (Kg/Km)	2	6.5	7	10
Outer Ø (mm)	1.4 ±0.1	2.8 ±0.1	3.0 ±0.1	3.6 ±0.1
Tensile Load Perm / Inst (N)	90 / 160	120 / 220		
Temperature Range	0°C to +60°C (IEC 60794-1-22 F1)			
Min. Bending Radius	5 x Outer Ø (Operation) / 15 x Outer Ø (Installation) – (IEC 60794-1-21 E11)			
Max. Length (m)	2000			

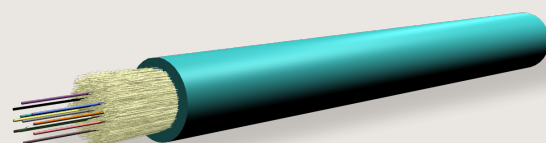
Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.
Fibres colour code: Red – Green – Grey – Yellow – Blue – Turquoise – White – Brown – Violet – Orange – Pink – Black.
With black ring: Red – Green – Grey – Yellow – Blue – Turquoise – White – Brown – Violet – Orange – Pink – Black.

¹ LSZH – Halogen free, low smoke emission, flame retardant compound.



Patchcord



Fire resistance

- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

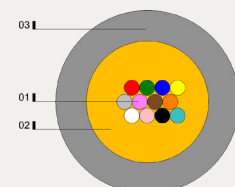
• Indoor / Data Center
Suitable for LC™ Uniboot Duplex fibre connectors (2 FO) Suitable for multifibre connectors (MPO™ and MTP™) according to IEC 61754-7-1 (12/24 FO)

Options

Special Colour Code

Advantages

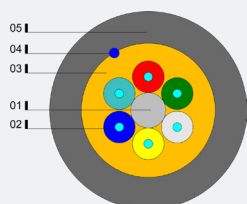
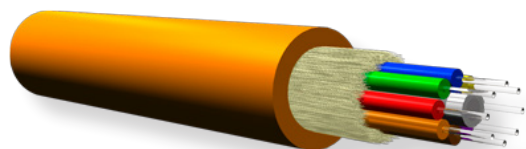
Flexible / Resilient / Totally dielectric / Direct connectorization / Dry



01. OPTICAL FIBRES (0.25 MM)
02. ARAMID
03. OUTER JACKET

Tight Buffer Cables: CDI

Indoor



01. CENTRAL ELEMENT (GRP)
02. TIGHT BUFFER FIBRE (0.9 MM)
03. STRENGTH MEMBERS
04. RIPCORD
05. OUTER JACKET

Fire Resistance

- Flame retardant (IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

- Indoor
- Based on DIN VDE 0888 part 6

Options

- Jackets: PVC / PU
- Special colour code

CPR Classification (Euroclass)

Reacción al Fuego: Dca, s1, d1, a1
Código de Declaración: DOP02001

Advantages

Compact / Lightweight / Flexible
/ Easy to strip (gel free) / Totally dielectric / Reduced diameter / Direct connectorization / Saves installation costs.

Specifications

Fibres	2	4	6	8	12
Central Element	NO	NO	YES	YES	YES
Strength Members	Aramid Yarns				
Outer Jacket	LSZH ¹				
Colour ²	ORG (RAL2003) MM62 / BLU (RAL5015) MM50-OM2 / AQU (RAL6027) OM4 / LIME GREEN OM5 / YLW (RAL1021) OS1/OS2				
Weight (Kg/Km)	20	24	31	40	54
Outer Ø (mm)	4.5 ±0.3	4.9 ±0.3	5.6 ±0.3	6.3±0.3	7.3±0.3
Max. Tensile Load Perm / Inst (N)	400 / 700		500 / 850		600 /1000
Max. Crush (N/dm)	1000 (IEC 60794-1-21 E3)				
Temperature Range	-10°C to + 60°C (IEC 60794-1-22 F1)				
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)				
Maximum Length (m)	4200 ±5%				

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red – Green – Grey – Yellow – Blue – Turquoise – White – Brown – Violet – Orange – Pink – Black.

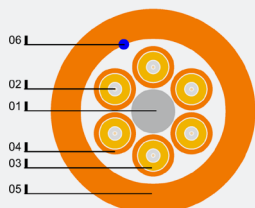
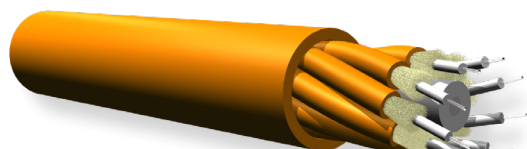
¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.

² For singlemode fibre G.657 the jacket colour is ivory.



Tight Buffer Cables: CDIR

Indoor



01. CENTRAL ELEMENT (GRP)
02. TIGHT BUFFER FIBRE (0.9 MM)
03. STRENGTH MEMBERS
04. INDIVIDUAL JACKET (2.5 MM)
05. OUTER JACKET
06. RIPCORD

Fire resistance

- Flame retardant (IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

- Indoor
- Direct connection to terminal equipments
- Based on DIN VDE 0888 part 6

Options

- Jackets: PVC / PU
- Special colour code

CPR Classification (Euroclass)

Reaction to Fire: Dca, s2, d2, a1
Declaration Code: DOP02100

Advantages

Compact / Resilient / Tough / Excellent mechanical resistance / Easy to strip (gel free) / Totally dielectric / Direct connectorization.

Specifications

Fibres	2	4	6	8	12	16
Subcables strength members	Aramid Yarns					
Subcables ø (mm)	2.5					
Subcables Jacket	LSZH ¹					
Identification	Numbers					
Outer Jacket	LSZH ¹					
Colour	ORG (RAL2003) MM62 / BLU (RAL5015) MM50-OM2 / AQU (RAL6027) OM4 / LIME GREEN OM5 / YLW (RAL1021) OS1/OS2					
Weight (Kg/Km)	56	56	84	123	153	186
Outer ø (mm)	8.1 ±0.3	8.1 ±0.3	9.6 ±0.3	11.5 ±0.5	15.0 ±0.5	14.8 ±0.5
Tensile Load Perm / Inst (N)	600/1000	800/1350	1200/2050	1600/2700	2400/3500	3200/3500
Max. Crush (N/dm)	2000 (IEC 60794-1-21 E3)					
Temperature Range	-20 °C to +70 °C (IEC 60794-1-22 F1)					
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)					

Standards

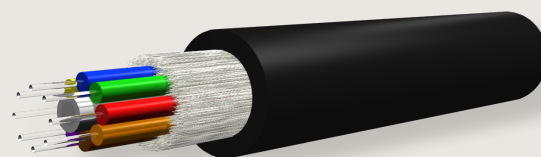
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Tight Buffer Cables: CDG (2 - 12)

Indoor / Outdoor



Fire resistance

- Flame retardant (IEC 60332-3 and 60332-1)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

Universal (Indoor / Outdoor)

Rodent Protection

Rodent Protected

Options

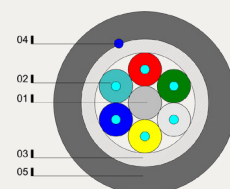
- Outer jacket: PVC / PU
- Special colour code

CPR Classification (Euroclass)

- Reaction to Fire: Dca, s1, d1, a1
- Declaration Code: DOP02002

Advantages

Compact / Lightweight / Flexible / Easy to strip (gel free) / Totally dielectric / Reduced diameter / Direct connectorization / Saves installation costs / Rodent protected.



- 01. CENTRAL ELEMENT (GRP)
- 02. TIGHT BUFFER FIBRE (0.9 MM)
- 03. STRENGTH MEMBERS
- 04. RIPCORD
- 05. OUTER JACKET

Specifications

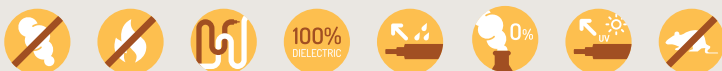
Fibre count	2	4	6	8	12
Central Element	NO	NO	YES	YES	YES
Strength Members	Reinforced Fibreglass Yarns WB				
Outer jacket	LSZH ¹				
Colour	Black				
Weight (Kg/Km)	35	39	44	59	72
Outer ø (mm)	6.0 ±0.3	6.3 ±0.3	6.5 ±0.3	7.5 ±0.3	8.3 ± 0.3
Max. Tensile Load (N)	650 (Operating) / 1100 (Installation)			850 (Operating) / 1450 (Installation)	
Max. Crush (N/100mm)	1300 (IEC 60794-1-21 E3)				
Temperature range	-20°C to + 70°C (IEC 60794-1-22 F1)				
Min. Bending radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)				
Maximum Length (m)	4200				

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

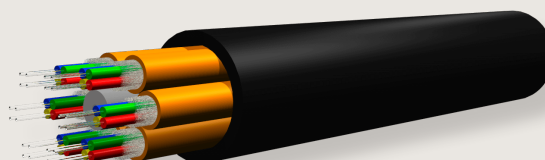
Fibre standard colour coding: Red – Green – Grey – Yellow – Blue – Turquoise – White – Brown – Violet – Orange – Pink – Black.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Tight Buffer Cables: CDG (16-72)

Indoor / Outdoor



Fire Resistance

- Flame retardant (IEC 60332-3 and 60332-1-2)
- Halogen free (IEC 60754-1)
- Low smoke emission (IEC 61034-1/-2)

Applications

- Universal (Indoor / Outdoor)
- Light rodent protection

Options

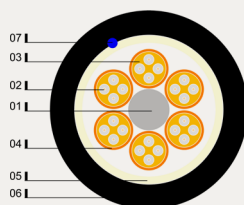
- Jackets: PVC
- Special colour code ¹

CPR Classification (Euroclass)

Reaction to Fire: Dca, s2, d1, a1
Declaration Code: DOP02051

Advantages

Compact / Easy to strip (gel free) / Totally dielectric / Direct connectorization / Saves installation costs / Rodent protected.



- 01. CENTRAL ELEMENT (GRP)
- 02. TIGHT BUFFER FIBRE (0.9 MM)
- 03. STRENGTH MEMBERS
- 04. JACKET (SUBCABLES)
- 05. DIELECTRIC ARMOUR
- 06. OUTER JACKET
- 07. RIPCORD

Specifications

Fibres	16	24	32	36	48	64	72
Strength Members	Reinforced Fibreglass Yarns						
Subcables with 4 F.O.	4	6	8	9	10+(2+2R)	12+(4+2R)	12+6
Cubierta subcables	LSZH ²						
Identificación	Numbers						
Color subcables	ORG (RAL2003) MM62 / BLU (RAL5015) MM50 / AQU (RAL6027) OM3 / VIO (RAL4003) OM4 / YLW (RAL1021) OS-1/2						
Outer Jacket	LSZH ²						
Colour	Black						
Weight (Kg/Km)	120	182	241	287	311	397	404
Outer ø (mm)	11.4 ±0.5	13.7 ±0.5	16.0 ±0.5	17.3 ±0.5	18.8 ±0.5	21.0 ±0.5	21.0 ±0.5
Max. Tensile Strength (N)	1600	2400	3200	3600	4800	6400	6400
Temperature Range	-20°C to +70°C (IEC 60794-1-22 F1)						
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)						
Maximum Length (m)	1500 m						

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

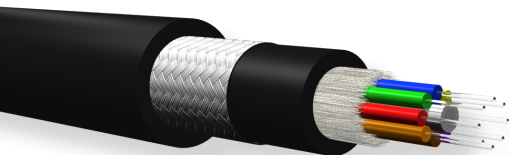
Fibres standard colour coding: Red – Green – Grey – Yellow.

¹ Colour coding EIA/TIA-598: Blue – Orange – Green – Brown.

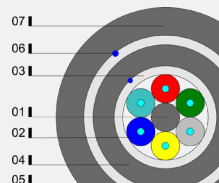
² LSZH - Halogen free, low smoke emission and flame retardant thermoplastic compound.



CDAD The authentic universal fibre optic cable



Indoor / Outdoor



01. CENTRAL ELEMENT (GRP)
02. TIGHT BUFFER FIBRE (0.9 MM)
03. STRENGTH MEMBERS
04. INNER JACKET
05. DIELECTRIC ARMOUR
06. RIPCORD
07. OUTER JACKET

Specifications					
Fibres	2	4	6	8	12
Central Element	NO		YES		
Strength Members	Reinforced Fibreglass Yarns WB				
Inner Jacket	LSZH ¹				
Armour	Fibreglass Braid				
Outer Jacket	LSZH ¹				
Colour	Black				
Weight (Kg/Km)	92	97	103	130	149
Outer ø (mm)	9.0 ±0.3	9.3 ±0.3	9.5 ±0.3	10.7 ±0.5	11.5 ±0.5
Tensile Load Perm / Inst (N)	600 / 1100		700 / 1250		800 / 1800
Max. Crush (N/100mm)	1500 (IEC 60794-1-21 E3)				
Temperature Range	-20°C to + 70°C (IEC 60794-1-22 F1)				
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)				
Max. Production Length	4200 m				

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red – Green – Grey – Yellow – Blue – Turquoise – White – Brown – Violet – Orange – Pink – Black.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.

Fire Resistance

- Flame retardant (IEC 60332-1 / IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)
- Fire resistant (IEC 60331-25; 180 min; 750°C)

Aplicaciones

- Universal (Indoor / Outdoor)

Rodent protection

Rodent resistant

Options

- Jackets: PVC / PU
- Special colour code

CPR Classification (Euroclass)

- Reaction to Fire: Dca, s1, d1, a1
- Declaration Code: DOP02301

Advantages

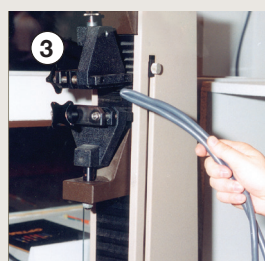
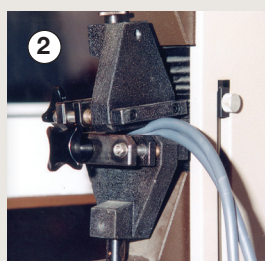
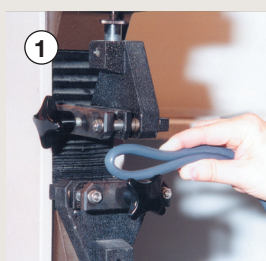
Compact / Lightweight / Flexible / Tough / Resistant / Easy to strip (gel free) / Totally dielectric / Reduced diameter / Direct connectorization / Saves installation costs / Rodents protected / Guaranteed circuit integrity.



Strong and Flexible

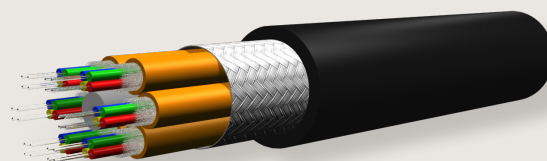
As seen in the accompanying images, our CDAD cable, despite its great flexibility, comfort and simple economy installation, is, above all, an extremely strong and resistant cable.

1. CDAD bent on itself, between the jaws of a dynamometer.
2. Cable subjected to a pressure of 500 Kg.
3. Cable after pressure exerted.
4. Despite the tremendous effort received, the fibres remains unchanged.



Tight Buffer Cables: CDAD (16-48)

Indoor / Outdoor



Fire Resistance

- Flame retardant (IEC 60332-1 / IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)
- Fire resistance (IEC 60331-25)

Applications

- Universal (Indoor / Outdoor)

Options

- Jackets: PVC / PU
- Special colour code

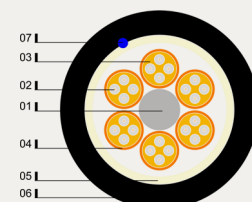
CPR Classification (Euroclass)(*)

- Reaction to Fire: Dca, s2, d2, a1
- Declaration Code: DOP02351

(*) Available up to 24 FO

Advantages

Compact / Tough / Resistant / Easy to strip (gel free) / Totally dielectric / Direct connectorization / Saves installation costs / Rodent protected.



- 01. CENTRAL ELEMENT (GRP)
- 02. TIGHT BUFFER FIBRE (0.9 MM)
- 03. STRENGTH MEMBERS
- 04. JACKET (SUBCABLES)
- 05. DIELECTRIC ARMOUR
- 06. OUTER JACKET
- 07. RIPCORD

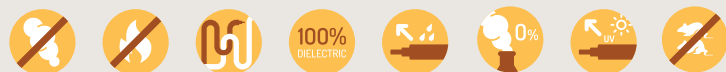
Specifications

Fibres	16	24	32	36	48
Strength Members	Aramid Yarns				
Subcables / FO in Subc.	4/4	6/6	4/8	3 + 1 / 12	4 / 12
Subcables jacket	LSZH ¹				
Identification	Numbers				
Armour	Fibreglass Braid				
Outer jacket	LSZH ¹				
Colour	Black				
Weight (Kg/Km)	128	181	199	221	240
Outer ø (mm)	11.6 ±0.5	13.6 ±0.5	15.5 ±0.5	16.60 ±0.5	16.80 ±0.5
Tensile Load Perm/ Inst (N)	800/1450	1100/2000	1400/2500	1550 /2800	2200/3950
Max. Crush (N/10cm)	1500 (IEC 60794-1-21 E3)				
Temperature Range	-20°C to +70°C (IEC 60794-1-22 F1)				
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)				
Maximum Length	1800 m				

Standards

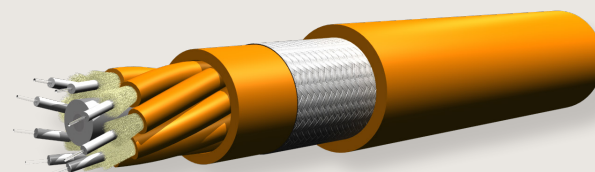
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.
Fibres colour code: Red – Green – Grey – Yellow – Blue – Natural – White – Brown – Violet – Orange – Pink – Black.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Tight Buffer Cables: CDIR-AD

Indoor / Outdoor



Fire Resistance

- Flame retardant (IEC 60332-1 / IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

- Universal (Indoor / Outdoor)
- Direct connection to terminal equipments

Rodent protection

- Rodent resistant

Options

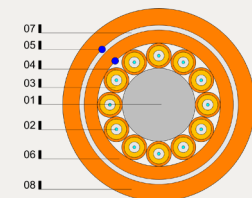
- Jackets: PVC / PU
- Special colour code
- Buffer Easy-Strip

CPR Classification (Euroclass)

- Reaction to Fire: Dca, s2, d2, a1
- Declaration Code: DOP02201

Advantages

Compact / Flexible / Resilient / Tough / Excellent mechanical resistant / Easy to strip (gel free) / Totally dielectric / Direct connectorization / Rodent protected.



- 01. CENTRAL ELEMENT (GRP)
- 02. TIGHT BUFFER FIBRE (0.9 MM)
- 03. STRENGTH MEMBERS
- 04. INDIVIDUAL JACKET (Ø 2.5 MM)
- 05. RIPCORD
- 06. INNER JACKET
- 07. DIELECTRIC ARMOUR
- 08. OUTER JACKET

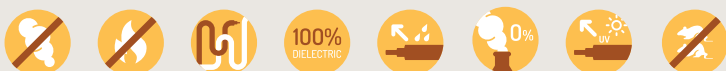
Specifications

Fibres	2	4	6	8	12	16
Subcables strength members	Aramid Yarns					
Subcables ø (mm)	2.5					
Subcables Jacket	LSZH ¹					
Identification	Numbers					
Inner Jacket	LSZH ¹					
Armour	Fiberglass Braid					
Outer Jacket	LSZH ¹					
Colour	Orange (MM62) / Blue (MM50) / Yellow (SM)					
Weight (Kg/Km)	122	123	174	226	352	321
Outer ø (mm)	11.1 ±0.5	11.1 ±0.5	13.1 ±0.5	14.9 ±0.5	18.5 ±0.5	18.2 ±0.5
Tensile Load Perm / Inst (N)	800/1450	1000/1800	1400/2500	1800/3250	2600/4000	3000/4000
Max. Crush (N/dm)	2000 (IEC 60794-1-21 E3)					
Temperature Range	-20°C to +70°C (IEC 60794-1-22 F1)					
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)					

Standards

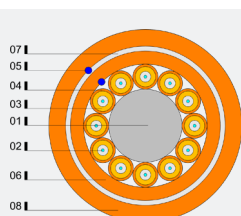
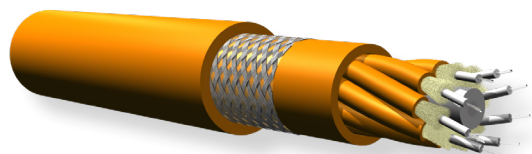
Mechanical and Environmental tests according to IEC 60794-1-21, IEC 60794-1-22.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Tight Buffer Cables: CDIR-AM

Indoor / Outdoor



Fire Resistance

- Flame retardant (IEC 60332-1 / IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

- Outdoor
- Direct connection to terminal equipments

Rodent protection

Excellent rodent resistance

Options

- Jackets: PVC / PU
- Special colour code
- Buffer Easy-Strip

CPR Classification (Euroclass)

- Reaction to Fire: Dca, s2, d2, a1
- Declaration Code: DOP02200

Advantages

Compact / Flexible / Resilient / Tough / Excellent mechanical resistance / Easy to strip (gel free) / Direct connectorization / Excellent rodent protection.

Specifications

Fibres	2	4	6	8	12	16
Subcables strength members	Aramid Yarns					
Subcables ø (mm)	2.5					
Subcables jacket	LSZH ¹					
Colour	Orange (MM62) / Blue (MM50) / Yellow (SM)					
Identification	Numbers					
Inner jacket	LSZH ¹					
Armour	Steel Wires Braid					
Outer jacket	LSZH ¹					
Colour	Orange (MM62) / Blue (MM50) / Yellow (SM)					
Weight (Kg/Km)	136	137	190	246	380	356
Outer ø (mm)	11.1 ±0.5	11.1 ±0.5	13.1 ±0.5	14.9 ±0.5	18.5 ±0.5	18.4 ±0.5
Tensile Load Perm / Inst (N)	900/1600	1100/2000	1500/2700	1900/3400	2700/4000	3000/4000
Max. Crush (N/dm)	2000 (IEC 60794-1-21 E3)					
Temperature Range	-20 °C to +70 °C (IEC 60794-1-22 F1)					
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)					

Standards

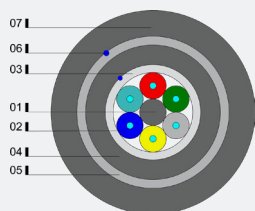
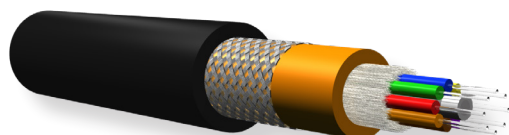
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Tight Buffer Cables: CDAM

Indoor / Outdoor



Fire Resistance

- Flame retardant (IEC 60332-1 / IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

Universal (Indoor / Outdoor)

Rodent protection

Excellent rodent resistance

Options

- Jackets: PVC / PU
- Special colour code

CPR Classification (Euroclass)

- Reaction to Fire: Dca, s1, d1, a1
- Declaration Code: DOP02300

Advantages

Compact / Lightweight / Flexible / Tough / Resistant / Easy to strip (gel free) / Reduced diameter / Direct connectorization / Saves installation costs / Excellent rodent protection.

Specifications

Fibres	2	4	6	8	12
Central Element	NO		YES		
Strength Members	Reinforced Fiberglass Yarns WB				
Inner Jacket	LSZH ¹				
Armour	Steel Wires Braid				
Outer Jacket	LSZH ¹				
Colour	Black				
Weight (Kg/Km)	98	104	111	138	157
Outer ø (mm)	9.0 ±0.3	9.3 ±0.3	9.5 ±0.3	10.7 ±0.5	11.5 ±0.5
Tensile Load Perm / Inst (N)	700 / 1250		800 / 1450		900 / 1600
Max. Crush (N/dm)	1500 (IEC 60794-1-21 E3)				
Temperature Range	-20°C to + 70°C (IEC 60794-1-22 F1)				
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)				
Maximum Length	4200 m				

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

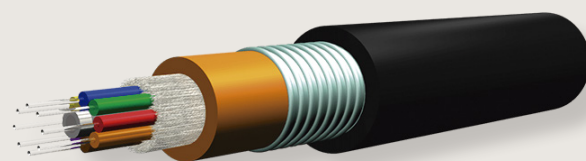
Fibres colour code: Red – Green – Grey – Yellow – Blue – Turquoise – White – Brown – Violet – Orange – Pink – Black.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Tight Buffer Cables: CDAS

Indoor / Outdoor



Fire resistance

- Flame retardant (IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

Universal (Indoor / Outdoor)

Rodent protection

Excellent rodent resistance

Options

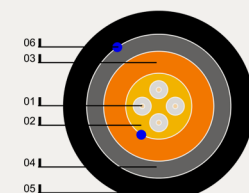
- Jackets: PE, LSZH(RH)², LSZH(MUD)³
- Special colour code

CPR Classification (Euroclass)

Reaction to Fire: Dca, s1, d1, a1
Declaration Code: DOP02300

Advantages

Compact / Lightweight / Tough
/ Resistant / Easy to strip (gel free) / Reduced diameter / Direct connectorization / Saves installation costs / Excellent rodent protection.



- 01. TIGHT BUFFER FIBRE (0.9 MM)
- 02. STRENGTH MEMBERS
- 03. INNER JACKET
- 04. ARMOUR
- 05. OUTER JACKET
- 06. RIPCORD

Specifications

Fibres	2	4	6	8	12
Strength Members	Reinforced Fibreglass Yarns WB				
Inner Jacket	LSZH ¹				
Armour	Corrugated Steel Armour				
Outer Jacket	LSZH ¹				
Colour	Black				
Weight (Kg/Km)	160			177	227
Outer ø (mm)	11.6 ±0.3			12.1 ±0.5	13.8 ±0.5
Max. Tensile Load (N)	1200 (Operating) / 2150 (Installation) – (IEC 60794-1-21 E1)				
Max. Crush (N/dm)	1500 (IEC 60794-1-21 E3)				
Temperature Range	-20 °C to +70 °C (IEC 60794-1-22 F1)				
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)				
Maximum Length	4200 m				

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.
Fibres colour code: Red – Green – Grey – Yellow – Blue – Natural – White – Brown – Violet – Orange – Pink – Black.

¹ LSZH: Halogen free, low smoke emissions and flame retardant thermoplastic compound.

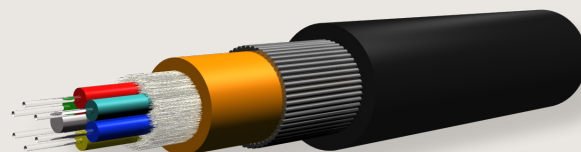
² LSZH(RH): LSZH compound, resistant to oils.

³ LSZH(MUD): LSZH compound. Mud, oils and hydrocarbons resistant.



Tight Buffer Cables: CDAW

Indoor / Outdoor



Fire performance

- Flame retardant (IEC 60332-1)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

Universal (Indoor / Outdoor)

Rodent protection

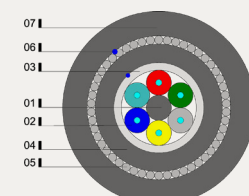
Excellent rodent resistance

Options

Special colour code

Advantages

Tough / Resistant / Easy to strip (gel free) / Reduced diameter / Direct connectorization / Saves installation costs / Excellent rodent protection.



- 01. CENTRAL ELEMENT
- 02. TIGHT BUFFER FIBRE (0.9 MM)
- 03. STRENGTH MEMBERS
- 04. INNER JACKET
- 05. METALLIC ARMOUR
- 06. RIPCORD
- 07. OUTER JACKET

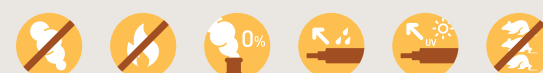
Specifications

Fibres	2	4	6	8	12
Central Element	NO		YES		
Strength Members	Reinforced Fiberglass Yarns WB				
Inner Jacket	LSZH ¹				
Armour	Steel Wires Crown (SWA) – 0,8mm Galvanized steel				
Outer Jacket	LSZH ¹ - Black				
Weight (Kg/Km)	203	213	223	261	292
Outer ø (mm)	10.6 ±0.5	10.9 ±0.5	11.1 ±0.5	12.1 ±0.5	12.9 ±0.5
Tensile Load Perm / Inst (N)	700 / 1250		800 / 1450		900 / 1600
Max. Crush (N/dm)	3000 (IEC 60794-1-21 E3)				
Max. Impact (J)	5 (EC 60794-1-21 E4)				
Temperature Range	-30°C to +70°C (IEC 60794-1-22 F1)				
Min. Bending Radius (mm)	15 x Outer Ø (Operating) / 20 x Outer Ø (Installation) - (IEC 60794-1-21 E11)				

Standards

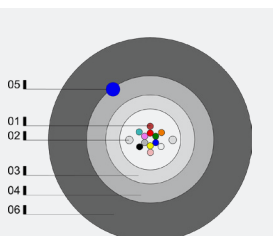
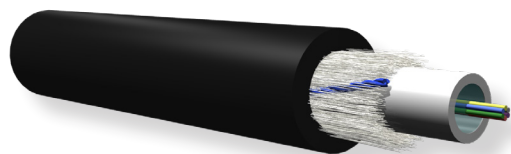
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.
Fibres colour code: Red – Green – Grey – Yellow – Blue – Turquoise – White – Brown – Violet – Orange – Pink – Black.

¹ LSZH – Halogen free, low smoke emissions and flame retardant thermoplastic compound.



Loose Tube Cables: NEXO-DP

Outdoor



- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. STRENGTH MEMBERS
- 05. RIPCORD
- 06. OUTER JACKET

Applications

Outdoor

Rodent protection

Rodent protected

Options

- Strength Members = Aramid (KP Type)
- Special colour code (TIA 598, FRT and others on request)

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03100

Advantages

Compact / Tough / Resistant / Totally dielectric / Excellent resistance to friction / Suitable for "blown air" system.

Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
ø Central Tube (mm)	3.5 ± 0.2	4.2 ± 0.2
Strength members	Reinforced Fibreglass Yarns WB	
Outer jacket	Polyethylene	
Colour	Black	
Weight (Kg/Km)	40	50
Outer ø (mm)	7.2 ± 0.3	7.9 ± 0.3
Max. Tensile Load (N)	1000 (Operating) / 1800 (Installation) - (IEC 60794-1-21 E1)	
Max. Crush (N/dm)	2000 (IEC 60794-1-21 E3)	
Max. Impact (J)	5 (IEC 60794-1-21 E4)	
Temperature Range	-40°C to +70°C (Operating) / -10°C to +50°C (Installation) - (IEC 60794-1-22 F1)	
Min. Bending Radius	15 x Outer Ø (Operating) / 20 x Outer ø (Installation) - (IEC 60794-1-21 E11)	
Maximum Length (m)	4000	

Standards

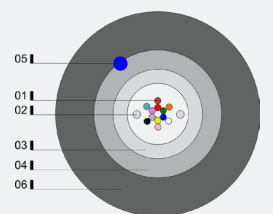
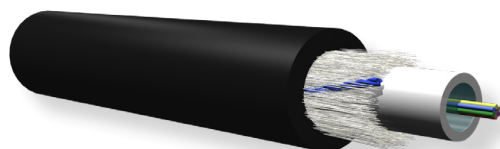
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. Tubes colour code: Red - Green - Natural... - Natural. Passive tubes colour Black.



Loose Tube Cables: NEXO-DT

Indoor / Outdoor



- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. STRENGTH MEMBERS
- 05. RIPCORD
- 06. OUTER JACKET

Fire Resistance

- Flame retardant (IEC 60332-1)
- Fire retardant (IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

Universal (Indoor / Outdoor)

Rodent protection

Rodent protected

Options

- Strength Members = Aramid (KP Type)
- Special colour code (TIA 598)

CPR Classification (Euroclass)

- Reaction to Fire: Eca
- Declaration Code: DOP01001
- Available in Dca (NEXO - FTTH)

Advantages

Compact / Lightweight / Flexible / Tough / Resistant / Totally dielectric / Watertight / Reduced diameter / Rodent protected.

Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
ø Central Tube (mm)	3.5 ± 0.2	4.2 ± 0.2
Strength members	Reinforced Fibreglass Yarns WB	
Outer jacket	LSZH ¹	
Colour	Black	
Weight (Kg/Km)	53	60
Outer ø (mm)	7.2 ± 0.3	7.9 ± 0.3
Max. Tensile Load (N)	1000 (Operating) / 1800 (Installation) - (IEC 60794-1-21 E1)	
Max. Crush (N/dm)	2000 (IEC 60794-1-21 E3)	
Temperature Range	-30°C to +70°C (IEC 60794-1-22 F1)	
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)	

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

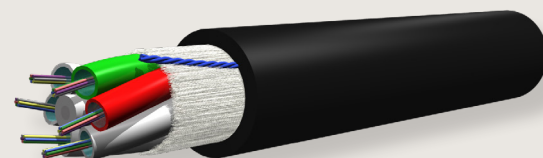
Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. With black stripe: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Loose Tube Cables: DP

Outdoor



Applications

Outdoor

Rodent protection

Rodent protected

Options

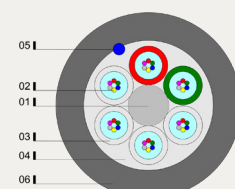
- Strength Members = Aramid (KP Type)
- Special colour code (TIA 598, FRT and others on request)

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03100

Advantages

Compact / Tough / Resistant / Totally dielectric / Excellent resistance to friction / Suitable for "blown air" system.



- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. STRENGTH MEMBERS
- 05. RIPCORD
- 06. OUTER JACKET

Specifications

Fibre Count	2 - 12	16	24	32	36	48	64	72	96	128	144
Fibres per Tube	2 - 12	4	6	8	6	12	8	12	12	8	12
Total Tubes	4	4	4	4	6	4	8	6	8	18	12
Active Tubes	1	4	4	4	6	4	8	6	8	16	12
Strength Members	Reinforced Fibreglass Yarns WB										
Outer Jacket	Polyethylene										
Colour	Black										
Weight (Kg/Km)	58	58	58	69	76	80	127	111	148	181	165
Outer ø (mm ^{±0.5})	8.8	8.8	8.8	9.8	10.0	10.5	12.7	12.1	13.8	16.2	14.0
Máx. Tracción (N)	1000 (Operation) / 1800 (Installation)						1500 (Operation) / 2700 (Installation)				
Max. Crush (N/dm)	2000 (IEC 60794-1-21 E3)										
Water tightness	According (3m, 1m, 24h, Optical Core, IEC 60794-1-22 F5B)										
Temperature Range	-40°C to +70°C (Operating) / -10°C to +50°C (Installation) - (IEC 60794-1-22 F1)										
Min. Bending Radius	15 x Outer Ø (Operating) / 20 x Outer ø (Installation) - (IEC 60794-1-21 E11)										
Maximum Length (m)	4200	4200	4200	3100	4200	2100	3100	2100	2100	3100	2100

Standards

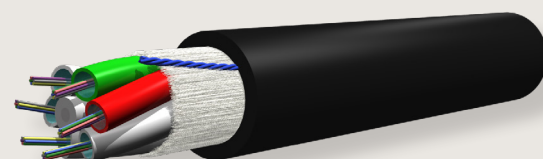
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise.
Tubes colour code: Red - Green - Natural... - Natural. Passive tubes colour Black.



Loose Tube Cables: DT

Indoor / Outdoor



Fire resistance

- Flame retardant (IEC 60332-1 / IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

Universal (Indoor / Outdoor)

Rodent protection

Rodent protected

Options

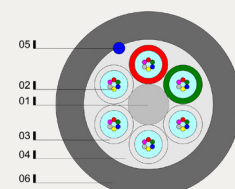
- Strength Members = Aramid (KT Type)
- Special colour code (TIA 598)

CPR Classification (Euroclass)

- Reaction to Fire: Eca
- Declaration Code: DOP01050
- Available in Dca (DT - FTTH)

Advantages

Compact / Tough / Resistant / Totally dielectric.



- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. FIBERGLASS REINFORCEMENTS - WB
- 05. RIPCORD
- 06. OUTER JACKET

Specifications

Fibre Count	2-12	16	24	32	36	48	64	72	96	128	144	192
Fibres per Tube	2-12	4	6	8	6	12	8	12	12	8	12	12
Total Tubes	4	4	4	4	6	4	8	6	8	18	12	18
Active Tubes	1	4	4	4	6	4	8	6	8	16	12	16
Strength Members	Reinforced Fibreglass Yarns WB											
Outer Jacket	LSZH ¹ - Black											
Weight (Kg/Km)	76	76	76	89	97	102	154	137	178	217	200	222
Outer ø (mm ^{±0.5})	8.8	8.8	8.8	9.8	10.0	10.5	12.7	12.1	13.8	16.2	14.0	16.2
Max. Tensile Load (N)	1000 (Operation) / 1800 (Installation)						1500 (Operation) / 2700 (Installation)					
Aplastamiento (N/dm)	2000 (IEC 60794-1-21 E3)											
Máx. Impacto (J)	5 (IEC 60794-1-21 E4)											
Temperature Range	-30°C to +70°C (Operating) / -10°C to +50°C (Installation) - (IEC 60794-1-22 F1)											
Min. Bending Radius (mm)	15 x Outer ø (Operating) / 20 x Outer ø (Installation) - (IEC 60794-1-21 E11)											
Water tightness	According (3m, 1m, 24h, Optical Core, IEC 60794-1-22 F5B)											
Maximum Length (m)	4200	4200	4200	3100	4200	2100	3100	2100	2100	3100	2100	3100

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. Tubes colour code: Red - Green - Natural... - Natural. Passive tubes colour Black.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Loose Tube Cables: TENAX-DP

Outdoor

Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
Central Tube ϕ (mm)	3.5 ± 0.2	4.2 ± 0.2
Strength members	Fibreglass Yarns WB	
Outer jacket	Polyethylene - Black	
Weight (Kg/Km)	67	77
Outer ϕ (mm)	8.5 ± 0.3	8.8 ± 0.3
Max. Tensile Load (N)	3000 (Operation) / 4000 (Installation) - (IEC 60794-1-21 E1)	
Max. Crush (N/10cm)	2500 (IEC 60794-1-21 E3)	
Temperature Range	-40°C to +70°C (Operation and Storage) / -5°C to +50°C (Installation)	
Min. Bending Radius (mm)	20 x Outer ϕ (IEC 60794-1-21 E11)	
Max. Length (m)	4000	2000

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise/Natural.
With black stripe: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.



Application

- Outdoor
- Aerial Installation

Rodent Protection

Rodent Protected

Options

Special colour code (TIA 598)

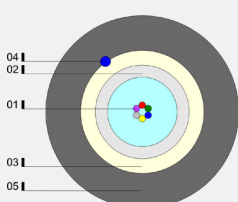
CPR Classification (Euroclass)

Reaction to Fire: Fca

Declaration Code: DOP03100

Advantages

Compact / Lightweight / Flexible / Tough / Resistant / Watertight / Excellent mechanical resistance / Completely Dielectric / Small diameter / Excellent resistance to friction / Suitable for "air blowing" systems / Rodent protected / Aerial installation.



- 01. FIBRE OPTICS
- 02. CENTRAL TUBE (JELLY FILLED)
- 03. STRENGTH MEMBERS
- 04. RIPCORD
- 05. OUTER JACKET

Loose Tube Cables: TENAX-DT

Indoor / Outdoor

Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
Central Tube ϕ (mm)	3.5 ± 0.2	4.2 ± 0.2
Strength members	Fibreglass Yarns WB	
Outer jacket	LSZH ¹	
Colour	Black	
Weight (Kg/Km)	85	96
Outer ϕ (mm)	8.5 ± 0.3	8.8 ± 0.3
Max. Tensile Load (N)	3000 (Operating) / 4000 (Installation) - (IEC 60794-1-21 E1)	
Max. Crush (N/100mm)	2500 (IEC 60794-1-21 E3)	
Temperature Range	-30°C to +70°C (IEC 60794-1-22 F1)	
Min. Bending Radius (mm)	20 x Outer ϕ (IEC 60794-1-21 E11)	
Maximum Length (m)	4000	2000

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise/Natural.
With black stripe: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Applications

Universal (Indoor / Outdoor)

Rodent Protection

Rodent Protected

Options

Special colour code (TIA 598)

CPR Classification (Euroclass)

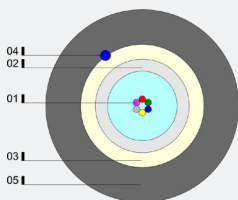
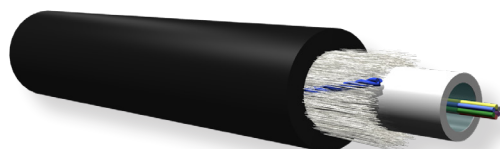
- Reaction to Fire: Eca
- Declaration Code: DOP01001

Fire Resistance

- Flame retardant (IEC 60332-1)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Advantages

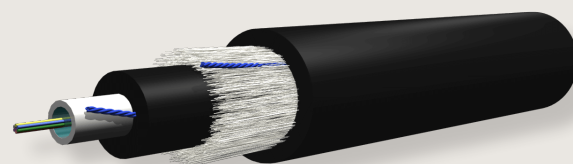
Compact / Lightweight / Flexible / Tough / Resistant / Watertight / Excellent mechanical resistance / Totally dielectric / Reduced diameter / Rodent protected.



- 01. FIBRE OPTICS
- 02. CENTRAL TUBE (JELLY FILLED)
- 03. STRENGTH MEMBERS
- 04. RIPCORD
- 05. OUTER JACKET

Loose Tube Cables: PDP-1

Outdoor



Applications

- Outdoor
- Direct-buried cable

Options

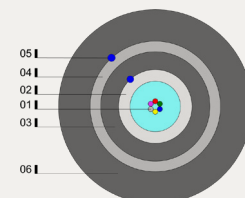
- Strength Members = Aramid (PKP-1)
- Special colour code (EIA/TIA 598)

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03100

Advantages

Excellent mechanical resistance / Totally dielectric / Robust / Resistant / Rodent protected / Excellent resistance to friction.



- 01. FIBRE OPTIC
- 02. CENTRAL TUBE (JELLY FILLED)
- 03. INNER JACKET
- 04. FIBREGLASS REINFORCEMENTS
- 05. RIPCORD
- 06. OUTER JACKET

Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
Central Tube ø (mm)	3.5	4.2
Identification Fibres	Colour Code	
Inner Jacket	Polyethylene - Black	
Strength Members	Reinforced Fibreglass Yarns WB	
Outer Jacket	Polyethylene - Black	
Weight (Kg/Km)	65	79
Outer ø (mm)	9.2 ±0.5	10.0 ±0.5
Max. Tensile Load (N)	1000 (Operation) / 1800 (Installation) - (IEC 60794-1-21 E1)	
Max. Crush (N/10cm)	2500 (IEC 60794-1-21 E3)	
Max. Impact (J)	5 (IEC 60794-1-21 E4)	
Temperature Range	-30°C to +70°C (Operation) / -10°C to +50°C (Installation) - (IEC 60794-1-22 F1)	
Water tightness	Conforme (3m / 1m / 24h / IEC 60794-1-22 F5B)	
Min. Bending Radius (mm)	15 x Outer ø (Operation) / 20 x Outer ø (Installation) - (IEC 60794-1-21 E11)	

Standards

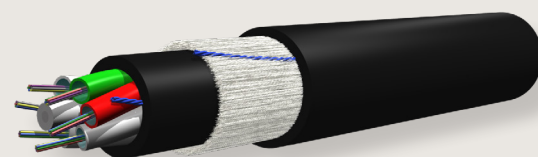
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise.
With black stripe: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.



Loose Tube Cables: PDP

Outdoor



Applications

- Outdoor
- Direct-buried installation

Rodent Protection

Rodent Protected

Options

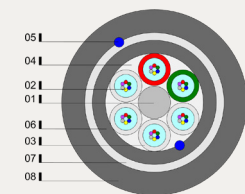
- Strength Members = Aramid (PKP-1)
- Special colour code (TIA 598)

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03100

Advantages

Excellent mechanical resistance / Totally dielectric / Resistant / Tough / High density of fibres / Excellent resistance to friction / Rodent protected.



- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. WATERBLOCKING ELEMENTS
- 05. RIPCORDS
- 06. INNER JACKET
- 07. STRENGTH MEMBERS
- 08. OUTER JACKET

Specifications

Fibres	4	6	8	12	16	24	32	36	48	64	72	96	128	144
Fibres per Tube	4	2	4	4	4	6	8	6	12	8	12	12	8	12
Total Tubes	4	4	4	4	4	4	4	6	4	8	6	8	18	12
Active Tube	1	3	2	3	4	4	4	6	4	8	6	8	16	12
Inner Jacket	Polyethylene - Black													
Strength Members	Reinforced Fiberglass Yarns WB													
Outer Jacket	Polyethylene - Black													
Weight (Kg/Km)	85	85	86	86	86	87	101	118	112	173	157	196	254	317
Outer ø (mm±0.5)	10.5	10.5	10.5	10.5	10.5	10.5	11.5	12.1	12.1	14.5	14.0	15.5	18.4	19.5
Max. Tensile Load (N)	1000 (Permanent) / 2000 (Installation)									1500 (Perm.) / 2700 (Inst.)				
Max. Crush (N/dm)	2500 (IEC 60794-1-21 E3)													
Max. Impact (J)	5 (IEC 60794-1-21 E4)													
Water penetration	Pass (3m / 24h / 1m / IEC 60794-1-22 F5B)													
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)													
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)													

Standards

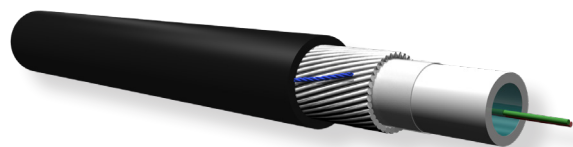
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. Tubes colour code: Red - Green - Natural - ... - Natural. Passive Tubes colour Black.



Loose Tube Cables:

DRA-1



Fire Performance

- Flame retardant (IEC 60332-1/-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

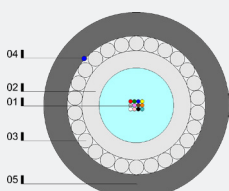
Universal (Indoor/Outdoor)

Rodent protection

Excellent rodent resistance

Advantages

Compact / Tough / Resistant / Reduced diameter / Watertight / Excellent rodent resistance.



- 01. FIBRE OPTICS
- 02. LOOSE TUBE (JELLY FILLED)
- 03. ARMOUR
- 04. RIPCORD
- 05. OUTER JACKET

Indoor / Outdoor

Specifications

Fibres	2 – 24
Tube ø (mm)	3.5 ±0.1
Armour	Rodent Protected GRP Rods Crown
Outer Jacket	LSZH ¹ - Black
Outer ø (mm)	8.5 ±0.5
Weight (Kg / Km)	103
Max. Tensile Load (N)	2500 (Installation; IEC 60794-1-21 E1)
Max. Crush (N/10cm)	1500 (IEC 60794-1-21 E3)
Max. Impact (J)	5 (IEC 60794-1-21 E4)
Water Penetration	According (3m / 1m / 24h / Optical core / IEC 60794-1-22 F5B)
Temperature Range	-30°C to +70°C (Operation) / -10°C to +50°C (Installation) – (IEC 60794-1-22 F1)
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

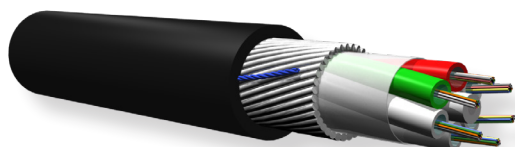
Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. With black ring: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.

¹ LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Loose Tube Cables:

DRA



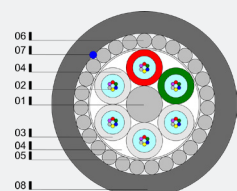
Applications

Universal (Indoor/Outdoor)

Rodent Protection

Rodent Protected

- Oil and Hydrocarbons resistant (IEC 60811-2-1, UIC 895/OR)
- Flame retardant (IEC 60332-3-24)
- Low smoke emission (IEC 61034-2)
- Halogen Free (IEC 60754-1/-2)



- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. WATERBLOCKING ELEMENTS
- 05. TAPE
- 06. DIELECTRIC ARMOUR
- 07. RIPCORD
- 08. OUTER JACKET

Indoor / Outdoor

Specifications

Total Fibres	6	8	16	24	32	64	128	144
Total Tubes	6	6	6	6	6	8	18	12
Tubos Activos	1	2	4	4	4	8	16	12
Active Tubes	6	4	4	6	8	8	8	12
Loose Tube Nom. Diameter	2.5 mm (Gel filled)							
Identificación fibras y tubos	Colour code ¹							
Central Element	GRP (Nominal Diameter = 2.6mm)							
Crown	Rodent protected GRP Rods 1mm							
Outer Jacket	LSZH-RH - Black ²							
Nom. Outer Diameter	12.6	12.6	12.6	12.6	12.6	14.4	18.6	17.5
Weight(Kg/Km)	171	171	171	174	175	218	312	346
Min. Bending Radius	20 x Outer Diameter (mm) - (IEC 60794-1-21 E11)							
Temperature Range (Operation)	-20°C to +70°C (IEC 60794-1-22 F1)							
Max. Tensile Load (N)	1500 (IEC 60794-1-21 E1)							
Max. Crush (N/dm)	1000 (IEC 60794-1-21 E3)							

Standards

¹ Fibres: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. Tubes: Red - Green - Natural - ... - Natural.

128FO: Layer1: Red - Green - Natural - Natural - Filler - Filler. Layer2: Red - Green - Natural - ... - Natural.

Filler tubes colour Black.

² LSZH-RH: Halogen free, low smoke emission, flame retardant and oil resistant thermoplastic compound.

Loose Tube Cables: DPMP-1

Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
ø Central Tube (mm)	3.5 ± 0.2	4.2 ± 0.2
Strength Members	Reinforced Fiberglass WB	
Inner Jacket	Polyethylene	
Armour	Steel Wire Braid	
Outer Jacket	Polyethylene	
Colour	Black	
Weight (Kg/Km)	101	117
Outer ø (mm)	10.1 ± 0.5	11.1 ± 0.5
Max. Tensile Load (N)	1300 (Operation) / 2350 (Installation) – (IEC 60794-1-21 E1)	
Max. Crush (N/dm)	2000 (IEC 60794-1-21 E3)	
Temperature Range	-40° C to +70° C (IEC 60794-1-22 F1)	
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)	
Maximum Length (m)	4000 / 3000 (12 FO)	2000

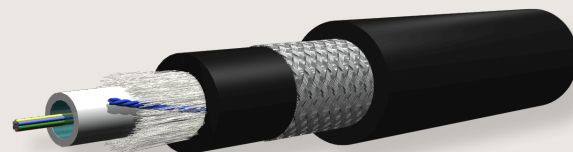
Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise/Natural.
With black stripe: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.



Outdoor



Applications

- Outdoor
- Direct Burial

Rodent protection

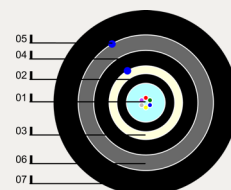
- Excellent rodent resistance

Options

- Strength Members = Aramid (KPMP-1)
- Special colour code (TIA 598)

Advantages

Compact / Lightweight / Flexible / Tough / Resistant / Reduced diameter / Watertight / Excellent Resistance to Friction / Suitable for “blown air” system / Excellent rodent resistance.



- 01. FIBRE OPTICS
- 02. CENTRAL LOOSE TUBE (JELLY FILLED)
- 03. STRENGTH MEMBERS
- 04. INNER JACKET
- 05. RIPCORDS
- 06. METALLIC ARMOUR
- 07. OUTER JACKET

Loose Tube Cables: DPMP

Specifications

Fibres	16	24	32	36	48	64	72	96	128	144
Fibres per Tube	4	6	8	6	12	8	12	12	8	12
Total Tubes	4	4	4	6	4	8	6	8	18	12
Active Tubes	4	4	4	6	4	8	6	8	16	12
Strength Members	Reinforced Fiberglass Yarns WB									
Inner Jacket	Polyethylene									
Armour	Steel wire braid									
Outer Jacket	Polyethylene									
Colour	Black									
Weight (Kg/Km)	128	128	144	153	158	223	205	257	259	274
Outer ø (mm)	11.9 ± 0.5	11.9 ± 0.5	12.8 ± 0.5	13.1 ± 0.5	13.6 ± 0.5	15.8 ± 0.5	15.2 ± 0.5	16.9 ± 0.5	16.9 ± 0.5	16.9 ± 0.5
Max. Tensile Load (N)	1300 (Operation) / 2350 (Installation)					1800 (Operation) / 3250 (Inst.)				
Max. Crush (N/dm)	3000 (IEC 60794-1-21 E3)									
Maximum Length (m)	4200	4200	3100	4200	2100	3100	2100	2100	2100	2100
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)									
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)									

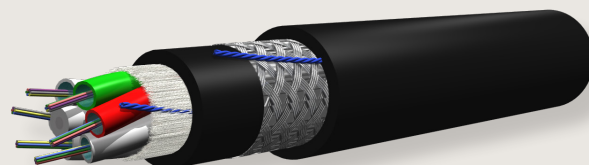
Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise.
Fibres colour code: Red - Green - Natural - ... - Natural. Passive tubes: black.



Outdoor



Applications

- Outdoor
- Direct burial

Rodent protection

- Excellent rodent resistance

Options

- Strength Members = Aramid (KPMP)
- Special colour code (TIA 598)

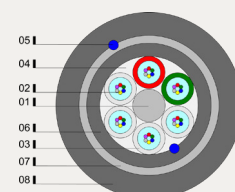
CPR Classification (Euroclass)

Reaction to Fire: Fca

Declaration Code: DOP03150

Advantages

Compact / Tough / Resistant / Excellent Resistance to Friction / Suitable for “blown air” system / Excellent rodent protection.

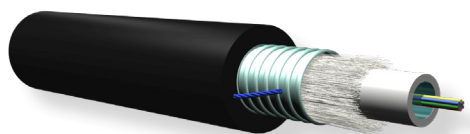


- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. STRENGTH MEMBERS
- 05. RIPCORDS
- 06. INNER JACKET
- 07. METALLIC ARMOUR
- 08. OUTER JACKET

Loose Tube Cables:

DSP-1

Outdoor



Applications

Outdoor

Rodent protection

- Excellent rodent resistance

Options

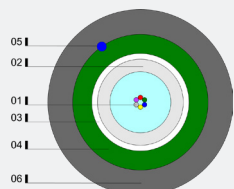
- Strength Members = Aramid (KSP-1 Type)
- Special colour code (TIA 598)

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03150

Advantages

Compact / Tough / Resistant / Reduced diameter / Excellent resistance to friction / Suitable for “blown air” system / Excellent resistance to rodents.



- 01. FIBRE OPTICS
- 02. CENTRAL TUBE (JELLY FILLED)
- 03. STRENGTH MEMBERS
- 04. METALLIC ARMOUR
- 05. RIPCORD
- 06. OUTER JACKET

Specifications

Fibres	2 / 4 / 6 / 8 / 12 / 16 / 24
Central Tube ø (mm)	4.5 ±0.2
Strength Members	Reinforced Fibreglass Yarns WB
Armour	Corrugated Steel Armour
Outer Jacket	Polyethylene
Colour	Black
Weight (Kg/Km)	88
Outer ø (mm)	9.6 ±0.3
Max. Tensile Load (N)	1000 (Operation) / 1800 (Installation) – (IEC 60794-1-21 E1)
Max. Crush (N/dm)	2500 (IEC 60794-1-21 E3)
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)
Maximum Length (m)	4000

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

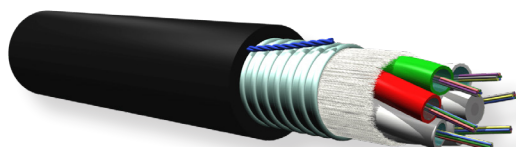
Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. With black stripe: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.



Loose Tube Cables:

DSP

Outdoor



Applications

- Outdoor

Rodent protection

- Excellent rodent resistance

Options

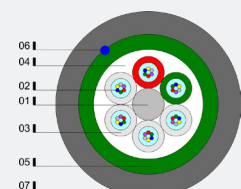
- Special colour code (TIA 598)

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03150

Advantages

Compact / Tough / Resistant / Excellent resistance to friction / Suitable for “blown air” system / Excellent rodent protection.



- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. STRENGTH MEMBERS
- 05. METALLIC ARMOUR
- 06. RIPCORD
- 07. OUTER JACKET

Specifications

Fibres	12	16	24	32	36	48	64	72	96	128	144
Fibres per Tube	12	8	12	8	12	12	8	12	12	8	12
Total Tubes	6	6	6	6	6	6	8	6	8	18	12
Active Tubes	1	2	2	4	3	4	8	6	8	16	12
Strength Members	Reinforced Fibreglass Yarns WB										
Armour	Corrugated Steel Armour										
Outer Jacket	Polyethylene HD										
Colour	Black										
Weight (Kg/Km)	135	135	136	136	136	137	156	138	161	224	238
Outer ø (mm ^{±0.5})	12.0	12.0	12.0	12.0	12.0	12.0	13.5	12.0	13.5	16.5	16.0
Max. Tensile Load (N)	1000 (Permanent) / 1800 (Installation)								1500 / 2700		
Max. Crush (N/dm)	2500 (IEC 60794-1-21 E3)										
Maximum Length (m)	4200	4200	4200	4200	4200	4200	4200	4200	4200	3200	3200
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)										
Min. Bending Radius	15 x Outer Ø (Service) / 20 x Outer Ø (Installation) – (IEC 60794-1-21 E11)										

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. Tubes colour code: Red - Green - Natural... - Natural. Passive Tubes in Black.



Loose Tube Cables: DPSP-1

Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
Central Tube ø (mm)	3.0 ± 0.2	4.2 ± 0.2
Strength Members	Reinforced Fibreglass WB	
Inner Jacket	Polyethylene - Black	
Armour	Corrugated Steel Armour	
Outer Jacket	Polyethylene HD	
Colour	Black	
Weight (Kg/Km)	95	135
Outer ø (mm)	9.6 ± 0.5	12.3 ± 0.5
Max. Tensile Load (N)	1000 (Operation) / 1800 (Installation) - (IEC 60794-1-21 E1)	
Max. Crush (N/dm)	2500 (IEC 60794-1-21 E3)	
Water penetration	Pass (3m / 24h / 1m / Optical Core / IEC 60794-1-22 F5B)	
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)	
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)	
Maximum Length (m)	4000	2000

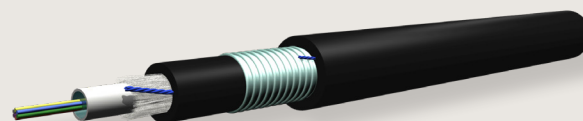
Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. With black stripe: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.



Outdoor



Applications

- Outdoor
- Direct Burial

Rodent protection

- Excellent rodent resistance

Options

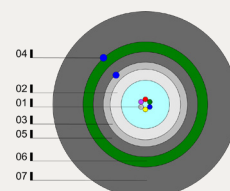
- Strength Members = Aramid (KPSP-1 Type)
- Special colour code (TIA 598)

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03150

Advantages

Compact / Tough / Resistant / Watertight / Excellent resistance to friction / Suitable for "blown air" system / Excellent resistance to rodents.



- 01. FIBRE OPTICS
- 02. CENTRAL TUBE (JELLY FILLED)
- 03. STRENGTH MEMBERS
- 04. RIPCORD
- 05. INNER JACKET
- 06. METALLIC ARMOUR
- 07. OUTER JACKET

Loose Tube Cables: DPSP

Specifications

Fibres	12	16	24	32	36	48	64	72	96	128	144
Fibres per Tube	12	8	12	8	12	12	8	12	12	8	12
Total Tubes	6	6	6	6	6	6	8	6	8	18	12
Active Tube	1	2	2	4	3	4	8	6	8	16	12
Strength Members	Reinforced Fibreglass Yarns WB										
Inner Jacket	Polyethylene - Black										
Armour	Corrugated Steel Armour										
Outer Jacket	Polyethylene HD										
Colour	Black										
Weight (Kg/Km)	176	176	177	177	177	178	203	179	209	293	299
Outer ø (mm±0.5)	14.0	14.0	14.0	14.0	14.0	14.0	15.5	14.0	15.5	18.5	18.0
Max. Tensile Load (N)	1000 (Operating) / 1800 (Installation)								1500 / 2700		
Máx. Aplastamiento (N/dm)	3000 (IEC 60794-1-21 E3)										
Maximum Length (m)	4200	4200	4200	4200	4200	4200	4200	4200	4200	3000	3000
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)										
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)										

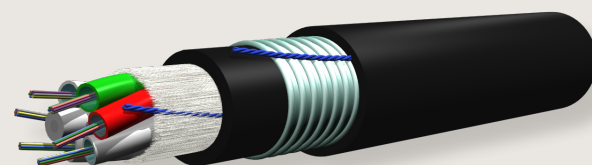
Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. Tubes colour code: Red - Green - Natural - ... - Natural. Passive tubes colour Black.



Outdoor



Applications

- Outdoor
- Direct Burial

Rodent protection

- Excellent rodent resistance

Options

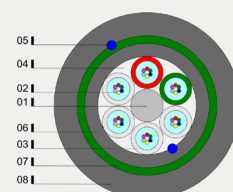
- Strength Members = Aramid (KPSP Type)
- Special colour code (TIA 598)

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03150

Advantages

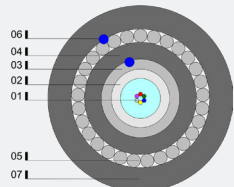
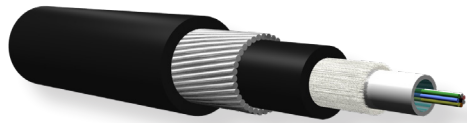
Compact / Tough / Resistant / Excellent resistance to friction / Suitable for "blown air" system / Excellent rodent protection.



- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. STRENGTH MEMBERS
- 05. RIPCORD
- 06. INNER JACKET
- 07. METALLIC ARMOUR
- 08. OUTER JACKET

Loose Tube Cables: SWA-1

Indoor / Outdoor



Fire Resistance

- Flame retardant (IEC 60332-1/-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

- Universal (Indoor/Outdoor)
- Direct Burial
- Offshores

Rodent protection

- Excellent rodent resistance

Options

- Jacket: PE / PA / MUD
- Strength Members: Aramid
- Special colour code: EIA/TIA 598

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03150

Advantages

Compact / Tough / Resistant / Reduced diameter / Watertight / Excellent rodent resistance

Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
Central Tube ø (mm)	3.5 ±0.2	4.5 ±0.2
Strength Members	Reinforced Fibreglass WB	
Inner Jacket	LSZH ¹ - Black	
Armour	Steel Wire Armour	
Outer Jacket	LSZH ¹ - Black	
Weight (Kg/Km)	217 ± 10%	240 ± 10%
Outer ø (mm)	11.1 ±0.5	12.3 ±0.5
Max. Tensile Load (N)	3500 (Operating) / 4500 (Installation)	4500 (Operating) / 6000 (Installation)
Max. Crush (N/10cm)	3500 (IEC 60794-1-21 E3)	4000 (IEC 60794-1-21 E3)
Max. Impact (J)	5 (IEC 60794-1-21 E4)	
Repeated bending	25 cycles (IEC 60794-1-21 E6, r = 220mm, 4Kg)	
Torsion	10 Turns (IEC 60794-1-21 E7, 2m, ±180°, 4Kg)	
Water tightness	Conforme (3m / 1m / 24h / Núcleo óptico / IEC 60794-1-22 F5B)	
Temperature Range	-40°C to +70°C (Operation) / -5°C to +50°C (Installation) - (IEC 60794-1-22 F1)	
Min. Bending Radius (mm)	15 x Outer Ø (Operation) / 20 x Outer ø (Installation) - (IEC 60794-1-21 E11)	

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

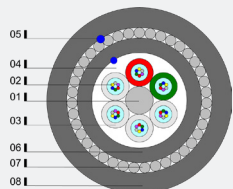
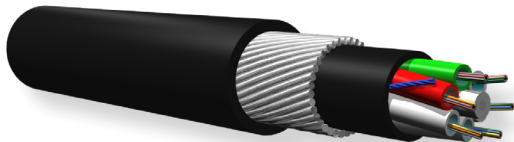
Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. With black stripe: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.

¹ LSZH: Halogen free, low smoke and flame retardant thermoplastic compound.



Loose Tube Cables: SWA

Indoor / Outdoor



Fire Resistance

- Flame retardant (IEC 60332-1/-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

- Universal (Indoor/Outdoor)

Rodent protection

- Excellent rodent resistance

Options

- Special colour code (TIA 598)
- Jackets: PVC / PE / PA
- Dry Tubes

CPR Classification (Euroclass)

- Reaction to Fire: Fca
- Declaration Code: DOP03150

Advantages

Compact / Tough / Resistant / Reduced diameter / Watertight / Excellent rodent resistance

Specifications

Fibres	12	24	36	48	72	96	144
Total / Active Tubes	6 / 1	6 / 2	6 / 3	6 / 4	6 / 6	8 / 8	12 / 12
Fibres per Tube	12						
Strength Members	Reinforced Fibreglass Yarns WB						
Inner Jacket	LSZH ¹ - Black						
Armour	Steel Wire Armour						
Outer Jacket	LSZH ¹ - Black						
Outer ø (mm)	14.0 ±0.5	14.0 ±0.5	14.0 ±0.5	14.0 ±0.5	14.0 ±0.5	15.3 ±0.5	19.5 ±0.5
Weight (Kg / Km)	318	319	320	321	322	375	593
Max. Tensile Load (N)	4500 (Operating) / 6000 (Installation) - (IEC 60794-1-21 E1)						
Max. Crush (N/10cm)	3000 (IEC 60794-1-21 E3)						
Max. Impact (J)	10 (IEC 60794-1-21 E4)						
Water Penetration	According (3m / 1m / 24h / Optical core / IEC 60794-1-22 F5B)						
Temperature Range	-40°C to +70°C (Operation) / -10°C to +50°C (Installation) - (IEC 60794-1-22 F1)						
Min. Bending Radius (mm)	15 x Outer Ø (Operation) / 20 x Outer ø (Installation) - (IEC 60794-1-21 E11)						

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. Tubes colour code: Red - Green - Natural - ... - Natural. Passive tubes colour Black.

¹ LSZH: Halogen free, low smoke and flame retardant thermoplastic compound.



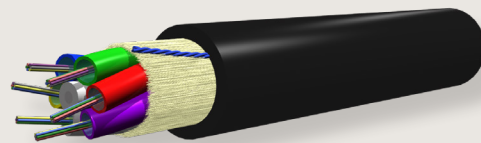
Aerial Loose Tube Cable: ADSS-U 50/80/120

Applications

- Aerial Installations

Options

- Ballistic Protection
- Special Colour Code (TIA 598)



Aerial Installation Conditions (1)

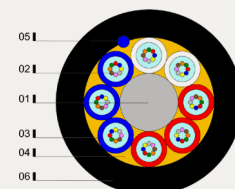
Wind (Km/h)	Ice (mm)	50	Span (m) 80	120
100	0	90	130	180
0	10	80	120	160
0	15	45	65	90
60	10	60	90	120

NESC Aerial Installation Conditions (1)

	50	Span 80	120
NESC Light	80	130	170
NESC Medium	55	85	115

Advantages

Excellent mechanical resistance / Totally dielectric / Tough / Resistant / High density of fibres / Self-supported aerial applications.



- 01. CENTRAL ELEMENT (GRP)
- 02. FIBRE OPTICS
- 03. LOOSE TUBE (JELLY FILLED)
- 04. ARAMID YARNS
- 05. RIPCORD
- 06. OUTER JACKET

Specifications

50 / 80								
Fibres	12	24	36	48	64	72	96	
Fibres per Tube	2	4	6	8	8	12	12	
Total Tubes	6	6	6	6	8	6	8	
120								
Fibres	12	24	36	48	64	72	96	144
Fibres per Tube	2	4	6	8	8	12	12	12
Total Tubes	6	6	6	6	8	6	8	12
50 / 80 / 120								
Strength Members	Aramid Yarns							
Outer Jacket	Polyethylene HD							
Colour	Black							
50								
Weight (Kg/Km)	73	73	74	92	119	94	121	
Outer ø (mm ±0.5)	9.7 ±0.5	9.7 ±0.5	9.7 ±0.5	10.9 ±0.5	12.4 ±0.5	10.9 ±0.5	12.4 ±0.5	
Maximum Length (m)	3200	3200	3200	2100	2100	2100	2100	
MAT (N)	2000							
EDS (N)	800							
80								
Weight (Kg/Km)	74	74	75	93	120	95	122	
Outer ø (mm ±0.5)	9.7 ±0.5	9.7 ±0.5	9.7 ±0.5	10.9 ±0.5	12.4 ±0.5	10.9 ±0.5	12.4 ±0.5	
Maximum Length (m)	3200	3200	3200	2100	2100	2100	2100	
MAT (N)	3000							
EDS (N)	1200							
120								
Weight (Kg/Km)	75	75	76	94	121	96	123	217
Outer ø (mm ±0.5)	9.7	9.7	9.7	10.9	12.4	10.9	12.4	15.6
Maximum Length (m)	3200	3200	3200	2100	2100	2100	2100	2100
MAT (N)	4000							
EDS (N)	1600							
50 / 80 / 120								
Max. Impact (J)	5 (IEC 60794-1-21 E4)							
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)							
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)							

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

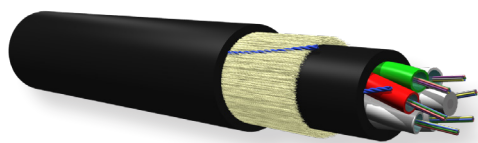
Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise.

Max. Induced Voltage = 12 KV

(1) Typical values for a 48 fibres cable.

Aerial Loose Tube Cable:

ADSS 80/120/150/200



Applications

- Aerial Installations

Options

- Anti-Tracking Jacket² (IEEE-1222:2011)
- Ballistic Protection
- Special Colour Code (TIA 598)

Aerial Installation Conditions (1)

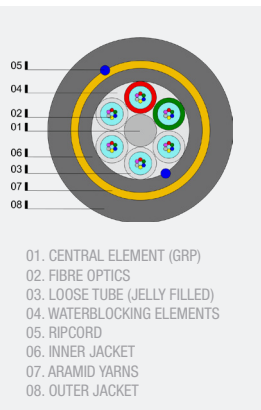
Wind (Km/h)	Ice (mm)	Span (m)			
		80	120	150	200
100	0	100	135	195	250
0	10	100	140	205	270
0	15	60	80	115	155
60	10	80	105	150	200

NESC Aerial Installation Conditions (1)

	80	Span 120	150	200
NESC Light	100	135	190	255
NESC Medium	80	105	150	200

Advantages

Excellent mechanical resistance / Totally dielectric / Tough
/ Resistant / High density of fibres / Self-supported aerial
applications..



Specifications

Fibres	12	24	36	48	64	72	96
Fibres per Tube	2	4	6	8	8	12	12
Total Tubes	6	6	6	6	8	6	8
Inner Jacket	Polyethylene						
Strength Members	Aramid Yarns						
Outer Jacket	Polyethylene HD						
Colour	Black						
Max. Impact (J)	5 (IEC 60794-1-21 E4)						
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)						
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)						
80							
Weight (Kg/Km)	120	120	121	139	175	141	177
Outer ø (mm ±0.5)	12.4	12.4	12.4	13.3	15.0	13.3	15.0
MAT (N)	3000						
EDS (N)	1200						
120							
Weight (Kg/Km)	122	123	123	142	177	143	179
Outer ø (mm ±0.5)	12.4	12.4	12.4	13.3	15.0	13.3	15.0
MAT (N)	4000						
EDS (N)	1600						
150							
Weight (Kg/Km)	127	128	128	147	182	148	184
Outer ø (mm ±0.5)	12.7	12.7	12.7	13.6	15.3	13.6	15.3
MAT (N)	6000						
EDS (N)	2400						
200							
Weight (Kg/Km)	132	132	133	151	186	153	188
Outer ø (mm ±0.5)	12.8	12.8	12.8	13.7	15.3	13.7	15.3
MAT (N)	8000						
EDS (N)	3200						

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise. Tubes colour code: Red - Green - Natural - ... - Natural. Passive tubes colour Black.

Max. Induced Voltage = 12 kV

¹ Typical values for a 48 fibres cable.

² Anti-Tracking Jacket: Max. Induced Voltage = 25 kV.

Loose Tube Cables: Micromodule I/O-FT

Applications

- Universal
- Indoor/Outdoor Facade Buildings

Options

Special Colour Code

CPR Classification (Euroclass)

- Reaction against Fire: Dca, s2, d2, a1
- Declaration Code: DOP01053

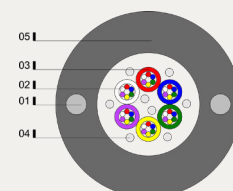
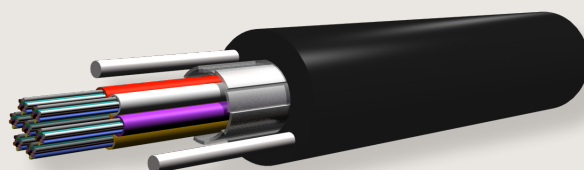
Advantages

Compact/ Resistant / Totally dielectric / Easy stripping/ Flexible Tubes / Breakout window / Easy-to-access fibre core / High density of fibres.

Colour code (FRT)

Fibres: Red - Blue - Green- Yellow - Violet - White - Orange - Grey - Brown - Black - Turquoise - Pink

Tubes: Red - Blue - Green- Yellow - Violet - White - Orange - Grey - Brown - Black - Turquoise - Pink



- 01. FRP STRENGTH MEMBER
- 02. FIBRE OPTICS
- 03. MICRO TUBE (FLEXIBLE)
- 04. TENSILE ELEMENTS
- 05. OUTER JACKET



Specifications

MOD-04 (4 fibres/tube)							MOD-06 (6 fibres/tube)					
Fibres	4	8	12	24	36	48	6	12	24	36	48	72
Tubes	1	2	3	6	9	12	1	2	4	6	8	12
Tensile Elements	WB glass yarns											
Outer Jacket	LSZH											
Colour	Black											
Weight (kg/km)	45	62	63	82	102	107	46	63	66	84	105	134
Outer Ø (mm)	6,5	8,0	8,0	9,0	10,5	10,5	6,5	8,0	8,0	9,0	10,5	12,0
Max. Tensile Load (N)	360	720	720	900	1100	1100	360	720	720	900	1100	1300
Max. Crush (N/dm)	1500	1500	1500	2000	2000	2000	1500	1500	1500	2000	2000	2000

MOD-12 (12 fibres/tube)							
Fibres	12	24	36	48	72	96	144
Tubes	1	2	3	4	6	8	12
Tensile Elements	WB glass yarns						
Outer Jacket	LSZH						
Colour	Black						
Weight (kg/km)	47	79	80	82	104	107	142
Outer Ø (mm)	6,5	9,0	9,0	9,0	10,5	10,5	12,0
Max. Tensile Load (N)	360	900	900	900	1100	1100	1300
Max. Crush (N/dm)	1500	2000	2000	2000	2000	2000	2000
Max. Impact (J)	5 (IEC 60794-1-21 E4)						
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)						
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)						

Standards

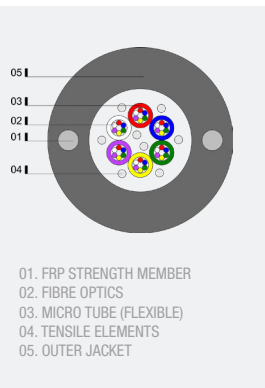
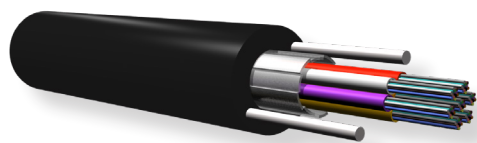
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Halogen Free (IEC 60754-1/-2); Flame Retardant (IEC 60332-1); Low Smoke emission (IEC 61034-2)

Indoor / Outdoor

Loose Tube Cables:

Micromodule 0-FT



Applications

- Outdoor
- Ductable
- Outdoor Facade Buildings

Options

- Special Colour Code
- Outer Jacke: LSZH

CPR Classification (Euroclass)

- Reaction against Fire: Fca
- Declaration Code: DOP03100

Advantages

Compact/ Resistant / Totally dielectric / Easy stripping/ Flexible Tubes / Breakout window / Easy-to-access fibre core / High density of fibres.

Colour code (FRT)

Fibres: Red - Blue - Green- Yellow - Violet - White - Orange - Grey - Brown - Black - Turquoise - Pink

Tubes: Red - Blue - Green- Yellow - Violet - White - Orange - Grey - Brown - Black - Turquoise - Pink

Specifications

	MOD-02 (2 fibres/tube)/MOD-04 (4 fibres/tube)						MOD-06 (6 fibres/tube)					
Fibres (Mod02 / Mod04)	2/4	4/8	6/12	12/24	18/36	24/48	6	12	24	36	48	72
Tubes	1	2	3	6	9	12	1	2	4	6	8	12
Tensile Elements	WB Glass Yarns											
Outer Jacket	Polyethylene											
Colour	Black											
Weight (kg/km)	35	45	47	59	78	81	30	41	44	54	68	97
Outer Ø (mm)	6,5	8,0	8,0	9,0	10,5	10,5	6,5	8,0	8,0	9,0	10,5	12,0
Max. Tensile Load (N)	360	720	720	1100	1300	1300	700	1200	1200	1200	1500	1800
Max. Crush (N/dm)	2000	2000	2000	3000	3000	3000	2000	2000	2000	3000	3000	3000

	MOD-08 (8 fibres/tube) / MOD-12 (12 fibres/tube)						
Fibres (Mod08 / Mod12)	8 / 12	16 / 24	24 / 36	32 / 48	48 / 72	64/96	96/144
Tubes	1	2	3	4	6	8	12
Tensile Elements	WB Glass Yarns						
Outer Jacket	Polyethylene						
Color	Black						
Weight (kg/km)	32	45	47	57	70	72	94
Outer Ø (mm)	6,5	9,0	9,0	9,0	10,5	10,5	12,0
Max. Tensile Load (N)	700	1200	1200	1200	1500	1500	1800
Max. Crush (N/dm)	2000	3000	3000	3000	3000	3000	3000
Max. Impact (J)	5 (IEC 60794-1-21 E4)						
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)						
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)						

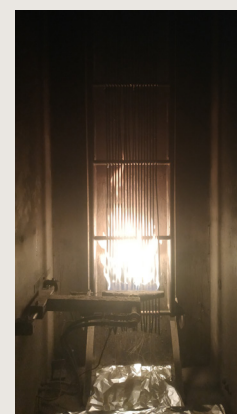
Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.



FIRE PERFORMANCE - CPR

	CLASS	CLASSIFICATION CRITERIA				ADDITIONAL CLASSIFICATION (Only for class B1 _{ca} , B2 _{ca} , C _{ca} y D _{ca})			
		Power Heat EN ISO 1716	Heat emission and fire growth rate EN 50399	Propagation of Fire EN 50399	Propagation of Flame EN 60322-1-2	Smoke Production EN 50399	Smoke transmittance EN 61034-2	Fall of inflated particles EN 50399	Acidity EN 60754-2
- CONTRIBUTION TO THE DEVELOPMENT OF FIRE	A _{ca}	●							
	B1 _{ca}		●	●	●	s1 ó s2 ó s3	s1a ó s1b	d0 ó d1 ó d2	a1 ó a2 ó a3
	B2 _{ca}		●	●	●				
	C _{ca}		●	●	●				
	D _{ca}		●		●				
+	E _{ca}				●				
	F _{ca}				●				



In compliance with Regulation 305/2011 / EU of the European Parliament and of the Council of March 9, 2011 (the Regulation of construction products or CPR), this certificate applies to the construction product: POWER, CONTROL AND COMMUNICATION CABLES. CABLES FOR GENERAL APPLICATIONS IN CONSTRUCTION WORKS SUBJECT TO REACTION TO FIRE REQUIREMENTS.

CPR Cables: XTREMEFIRE® - Euroclass



Tight Buffer Cables:



Loose Tube Cables:



Specifications

	CDG XtremeFire	CDAD XtremeFire	NEXO XtremeFire	DT XtremeFire
Euroclass	Cca, s1a, d0, a1	Cca, s1a, d1, a1	Cca, s1a, d0, a1	Cca, s1a, d1, a1
Fibres	Up to 12	Up to 12	Up to 24	Up to 96 (12F8T)
Tensile Elements	WB Glass Yarns	WB Glass Yarns	WB Glass Yarns	WB Glass Yarns
Outer Jacket	LSZH-XF	LSZH-XF	LSZH-XF	LSZH-XF



Loose Tube Armoured Cables:



XTREMEFIRE+®:



Specifications

	TDT XtremeFire	DTST XtremeFire	DT-DC XtremeFire+	FLAT XtremeFire+
Euroclass	Cca, s1b, d1, a1	Cca, s1a, d1, a1	B2ca, s1a, d0, a1	B2ca, s1a, d0, a1
Fibres	Up to 144 (12T12F)	Up to 72 (8T12F)	Up to 96 (12F8T)	2 subunits
Armour type	WB Glass Yarns	Corrugated Steel Tape	WB Glass Yarns	Aramid
Jackets in/out	LSZH-XF / LSZH-XF	LSZH-XF / LSZH-XF	LSZH-XF	LSZH-XF

FIRE RESISTANCE – FR 750

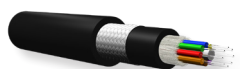
The importance that communications in a fire can be maintained for a period of time in order to notify the authorities, firefighters and health workers, is very important to avoid a catastrophe. The fire resistant cables guarantee their service for a determined period of time that can be between 30 and 180 minutes with the fire acting on the cables.

The IEC 60331-25 standard establishes what the behavior of the cables should be under the action of fire and that they maintain communication, this test is carried out so that during the application of the fire for the chosen time and at conditions indicated in the standard, the optical signal must be kept registering to check whether or not there is breakage of the fibers and that the signal level is optimal for communication.

FR 750 Cables



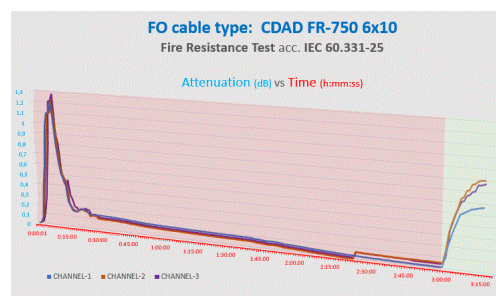
Tight Buffer Cable:



Specifications	
	CDAD
Temperature - Time	FR 750° - 180'
Fibres	Up to 12
Protection Elements	Glass Yarns
Outer Jacket	LSZH

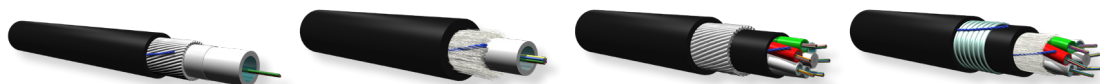


Cable under test



Fibres in transmission detail

Loose Tube Cables:



Specifications	Mini-DRA	TENAX	SWA	DTST
Temperature - Time	FR 750° - 90'	FR 750° - 90'	FR 750° - 90'	FR 750° - 90'
Fibres	Up to 12	Up to 24	Up to (6T12F)	Up to 144 (12T12F)
Protection Elements	Glass Yarns	Glass Yarns	Steel Wires	Corrugated Steel Tape
Outer Jacket	LSZH	LSZH	LSZH	LSZH

* Other features in the product specifications at www.optral.com

Loose Tube Cables:

QFCI / QFCI-FV

Specifications

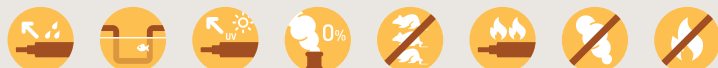
Fibre Count	4	8	12	24	36	48
Fibres per Tube	4	8	12	12	12	12
Total Tubes / Active Tubes	4 / 1	4 / 1	4 / 1	4 / 2	4 / 3	4 / 4
Fire Protection (in each tube)	Mica Tape					
Strength Members	Reinforced Fiberglass Yarns WB					
Inner Sheath	LSZH ¹ - Black					
Armour	Galvanized steel wire braid					
Outer Sheath	LSZH ¹ - Black					
Weight (Kg/Km)	290	291	291	305	318	331
Outer ø (mm)	15.0 ±0.5					
Max. Tensile Load (N)	500 (Operation) / 1500 (Installation) – (IEC 60794-1-21 E1)					
Crush (N/10cm)	3000 (IEC 60794-1-21 E3)					
Impact (J)	5 (IEC 60794-1-21 E4)					
Temperature Range	-40°C ~ +70°C (Operation) / -10°C ~ +70°C (Installation) / -40°C ~ +70°C (Storage)					
Min. Bending Radius	20 x Outer Ø (IEC 60794-1-21 E11)					

Standards

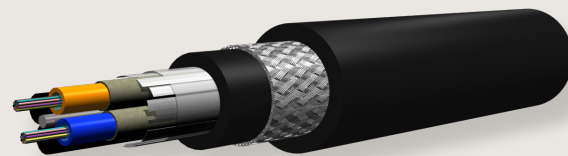
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code (TIA/EIA 598): Blue – Orange – Green – Brown – Grey – White – Red – Black – Yellow – Violet – Pink – Turquoise. Tubes colour code (TIA/EIA 598): Blue – Orange – Green – Brown. Passive tubes = Black

¹ LSZH - Halogen free, low smoke and flame retardant thermoplastic compound (IEC 60092 – 359 / SHF1).



Indoor / Outdoor



Applications

- Emergency systems
- Marine and Offshore applications
- Commercial marine vessels
- Harsh environments

Norms / Approvals

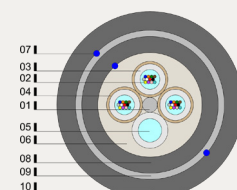
NEK606 – Type F1 QFCI
TAE00000UH – DNV-GL Type Approval

Fire Performances

Flame Propagation (IEC60332-1)
Fire Propagation (IEC60332-3)
Fire Resistance (IEC60331-25) – 90' @ 750°C Halogen free (IEC 60754-1/-2)
Low smoke emission (IEC 61034-1/-2)

Features

Superior resistance to moisture and sunlight
Excellent mechanical resistance
Excellent Rodent Protection
Mineral oils IRM 902 (IEC60811-2-1) - 4h@70°C Diesel - IRM 903 (IEC60811-2-1) - 4h@70°C



01. CENTRAL ELEMENT
02. FIBRE OPTICS
03. LOOSE TUBE (JELLY FILLED)
04. FIRE PROTECTION (IN EACH TUBE)
05. FILLERS
06. REINFORCED FIBERGLASS YARNS – WB
07. RIPCORDS
08. INNER JACKET
09. METALLIC ARMOUR
10. OUTER JACKET

Loose Tube Cables Monotube:

QFAI-2-UNI

Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
ø Central Tube (mm)	3.5 ± 0.1	4.2 ± 0.1
Fire barrier	Mica tape over active tubes	
Inner Jacket	LSZH ¹ - Black	
Strength Members	Fibreglass Reinforcements WB	
Outer Jacket	LSZH ¹ - Black	
Weight (Kg/Km)	100	110
Outer ø (mm)	9.5 ± 0.5	10.2 ± 0.5
Max. Tensile Load (N)	2500 (IEC 60794-1-21 E1)	
Max. Crush (N/dm)	3000 (IEC 60794-1-21 E3)	
Max. Impact (J)	5 (IEC 60794-1-21 E4)	
Temperature Range	-40°C to +70°C (Operation) / -10°C to +50°C (Installation) - (IEC 60794-1-22 F1)	
Min. Bending Radius	15 x Outer Ø (IEC 60794-1-21 E11)	

Standards

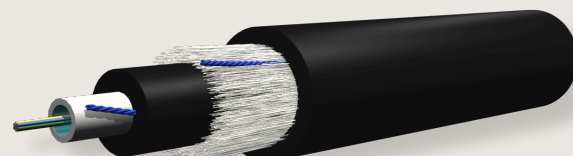
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red – Green – Blue – Yellow – Gray – Violet – Brown – Orange – White – Pink – Black – Turquoise. With black ring: Red – Green – Blue – Yellow – Gray – Violet – Brown – Orange – White – Pink – Natural – Turquoise.

¹ LSZH - Halogen free, low smoke and flame retardant thermoplastic compound (IEC 60092 – 359 / SHF1).



Indoor / Outdoor



Applications

Universal (Indoor / Outdoor)

Options

Special colour code (EIA/TIA 598)

Features

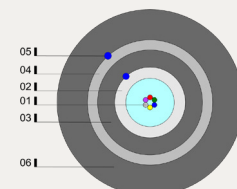
Mineral oils IRM 902 (IEC60811-2-1) - 4h@70°C Diesel - IRM 903 (IEC60811-2-1) - 4h@70°C

Fire Performance

- Flame retardant (IEC 60332-1)
- Fire retardant (IEC 60332-3-22)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)
- Fire resistant (IEC 60331-25)

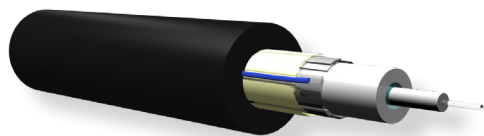
Advantages

Excellent mechanical resistance / Totally dielectric / Robust / Resistant / Rodent protected



01. FIBRE OPTICS
02. CENTRAL TUBE (JELLY FILLED) + FIRE BARRIER
03. INNER JACKET
04. STRENGTH MEMBERS
05. RIPCORD
06. OUTER JACKET

Loose Tube Cables: DROP CABLE



Applications

- Universal (Indoor/Outdoor)
- Horizontal / Vertical Drop Cable

Fire Resistance

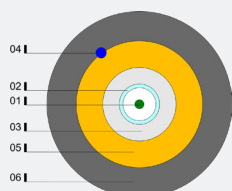
- Flame retardant (IEC 60332-1)
- Halogen free (IEC 60754-1)
- Low smoke emission (IEC 61034-1/-2)

CPR Classification (Euroclass)

Reaction to Fire: Dca, s2, d2, a1
Declaration Code: DOP01002

Advantages

Compact / Tough / Resistant



- 01. TIGHT BUFFER FIBRE (0.9 MM)
- 02. JELLY FILLED
- 03. LOOSE TUBE
- 04. RIPCORD
- 05. STRENGTH MEMBERS
- 06. OUTER JACKET

Indoor / Outdoor

Specifications

Fibre Count	1
Fibre Colour (250 µm)	Green
Buffer Type	0.9
Buffer Colour	White
Loose Tube	2,0 ± 0.05
Loose Tube Colour	Natural
Strength Members	Reinforced Fibreglass Yarns WB + Aramid Yarns
Outer Sheath	LSZH ¹
Outer Sheath Colour	Black
Weight (Kg/Km)	28 ± 5
Outer ø (mm)	5,05 ± 0.2
Max. Tensile Load (N)	1200 (1 minute) – (IEC 60794-1-21 E1)
Max. Crush (N/10cm)	800 (15 minutes) – (IEC 60794-1-21 E3)
Max. Impact (J)	2 (IEC 60794-1-21 E4)
Water Tightness	According (3m / 1m / 24h / IEC 60794-1-22 F5B)
Temperature Range	-25°C to +70°C (Operation) – (IEC 60794-1-22 F1)
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)

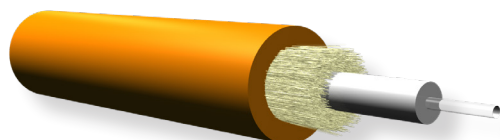
Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

¹LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Loose Tube Cables: CAS / S1



Aplicaciones

- Indoor
- Pigtail and jumper connections
- Direct connection to terminal equipments FTTx

Options

- Fibre type
- Special colour code
- Jacket colour
- Special packaging “Reel in a Box”¹

Fire Resistance

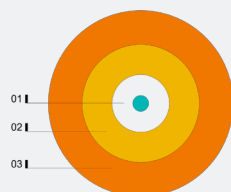
- Flame retardant (IEC 60332-1)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

CPR Classification (Euroclass)

Reaction to Fire: Dca, s1, d1, a1
Declaration Code: DOP02003

Advantages

Flexible / Dielectric / Direct connectorization.



- 01. TIGHT BUFFERED FIBRE
- 02. STRENGTH MEMBERS
- 03. OUTER JACKET

Indoor

Specifications

Type	S100	S105	S110	S115	S115-ICT ²
Fibre Count	1	2	1	2	2
Buffer Diameter (mm)	0.9	0.6	0.9	0.9	0.9
Fibre Type	G.657A				G.657A2
Strength Members	Aramid Yarns				
Outer Jacket	LSZH ³				
Jacket Colour	Ivory				
Weight (Kg/Km)	7	7	14	14	15
Outer ø (mm)	2.9 ± 0.1	2.9 ± 0.2	3.6 ± 0.1	3.6 ± 0.2	4.0 ± 0.2
Tensile Load Perm. / Instal. (N)	200 / 350	200 / 350	350 / 650	350 / 650	450 / 800
Max. Crush (N/100mm)	500	500	700	700	700
Temperature Range	-10°C to + 70°C (IEC 60794-1-22 F1)				
Min. Bending Radius (mm)	5 x Outer Ø (IEC 60794-1-21 E11)				

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.
Fibres colour code : 1 FO: Natural / 2 FO: Red – Green.

¹ Consult available lengths.

² According to regulation ICT (RD 346/2011)

³ LSZH – Halogen free, low smoke emission, flame retardant compound.

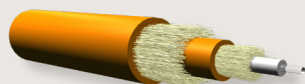


ICT SOLUTIONS / FTTx

Telecom market is undergoing a very important change, growing gradually year after year. Great demand for services such as TV on demand, Internet content, 3G, 4G, 5G telephony, etc., has fueled the deployment of fiber optics in the home (FTTH). In this section, we offer some of these cables for deployment of fiber optic networks for home environments, from the trunk cable branch to the subscriber point. They are known as DROP cables.



Tight buffer Cables:



Specifications	CAR-R100	CAR-R105	CAR-R200	CAR-R205
Fibres / Ø buffer (mm)	1 / 0,9	2 / 0,6	1 / 0,9	2 / 0,6
Tensile Elements	Aramid	Aramid	Aramid	Aramid
Inner Jacket	LSZH	LSZH	---	---
Outer Jacket	LSZH	LSZH	LSZH	LSZH
Weight (kg/km)	21	21	13	13
Outer Ø (mm)	4,6	4,6	2,5 x 5,2	2,5 x 5,2
Max. Tensile Load (N)	900	900	400	400
Max. Crush (N/dm)	800	800	600	600
Temperature Range	-10°C to +70°C	-10°C to +70°C	-20°C to +80°C	-20°C to +80°C
Min. Bending Radius (mm)	5 x Outer Ø	5 x Outer Ø	5 x Outer Ø	5 x Outer Ø
CPR Euroclass	Dca, s1, d1, a1	Dca, s1, d1, a1	Fca	Fca



Flat cables:



Specifications	Indoor	Outdoor	Aerial Installation Conditions		
	CAS FLAT F100	ADSS FLAT F200	WIND (km/h)	ICE (mm)	SPAN (m)
Fibres	2	Up to 12	100	0	80
Buffer type	Loose tube	Loose tube	0	10	65
Tensile Elements	FRP	FRP	0	15	35
Outer Jacket	LSZH	Polyethylene HD	60	10	40
Weight (kg/km)	7,6	30	SPAN (m)		
Outer Ø (mm)	2,0 x 3,0	3,8 x 6,8			
Max. Tensile Load (N)	100	1200	NESC Light	80	
Max. Crush (N/dm)	1000	2000	NESC Medium	50	
Temperature Range	-30°C to +70°C	-40°C to +70°C			
Min. Bending Radius (mm)	15 x Outer Ø	20 x Outer Ø			
CPR Euroclass	Dca, s1, d1, a1	Fca			

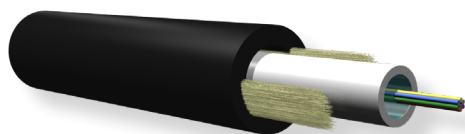


* Other features in the product specifications at www.optral.com

Microducts Cables:

ABD-01 / MiniABD-01

Outdoor Blowing



Applications

- Outdoor
- Blowed in microducts *

Options

- Jacket LSZH (Indoor/Outdoor)
- Jacket PA12 (Lower friction)

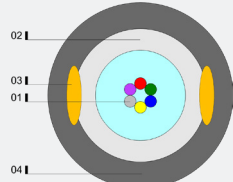
CPR Classification (Euroclass)

- Reaction against Fire: Fca
- Declaration Code: DOP03100

Advantages

Compact / Strong / Resistent / Low Friction coeficent / Totally Dielectric

*Optral recommends the use of driven belts cable feeder for installation.



- 01 FIBRES OPTICS
- 02 LOOSE TUBE JELLY FILLED
- 03 ARAMID
- 04 OUTER JACKET

Specifications

	ABD-01	MiniABD-01
Fibres	2 / 4 / 6 / 8 / 12	
Tensile Elements	Aramid	
Actives Tubes	Polyethylene HD	
Outer Jacket / Colour	Black	
Weight (kg/km)	12	5
Outer Ø (mm)	3,9 ± 0,1	2,5 ± 0,2
Max. Tensile Load. (N)	220	150
Max. Crush (N/dm)	1200 (IEC 60794-1-21 E3)	500 (IEC 60794-1-21 E3)
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)	
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)	
Inner Duct ø ¹ (mm)	5,5	3,5

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Tensile Strength according to IEC 60794-1-21 E1;

Fibres Colour Code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise

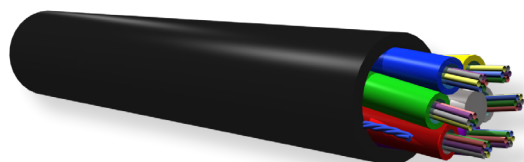
¹ Inner Diameter recommended for ductable instalations (Other dimensions under request).



Microducts Cables:

ABD

Outdoor Blowing



Applications

- Outdoor
- Blowed in microducts *

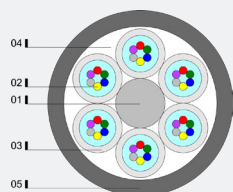
Options

- Jacket LSZH (Indoor/Outdoor)
- Jacket PA12 (Lower friction)

Advantages

Compact / Strong / Resistent / Low Friction coeficent / Totally Dielectric

*Optral recommends the use of driven belts cable feeder for installation.



- 01 CENTRAL ELEMENT (GRP)
- 02 FIBRES OPTICS
- 03 LOOSE TUBES JELLY FILLED
- 04 WB ELEMENTS
- 05 OUTER JACKET

Specifications

Fibres	24	36	48	72	96	144
Tensile Elements	6	6	6	6	8	12
Actives Tubes	2	3	4	6	8	12
Outer Jacket / Colour	Polyethylene HD / Black					
Weight (kg/km)	30	31	32	33	52	79
Outer Ø (mm)	5.8 ± 5%				7.2 ± 5%	8.7 ± 5%
Max. Tensile Load. (N)	500				1300	
Max. Crush (N/dm)	500 (IEC 60794-1-21 E3)					
Temperature Range	-40°C to +70°C (IEC 60794-1-22 F1)					
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)					
Inner Duct ø ¹ (mm)	8				10	12

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Tensile Strength according to IEC 60794-1-21 E1;

Fibres and Tubes Colour Code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise

¹ Recommended inner diameter for installation in Duct (contact us for other duct diameters).



* Other features in the product specifications at www.optral.com

Microducts Cables: Mini-ABD

Specifications

	MiniABD (12F x Tube)					
Fibres	24	48	72	96	144	288
Tensile Elements	6	6	6	8	12	24
Actives Tubes	2	4	6	8	12	24
Outer Jacket / Colour	Polyethylene HD / Black					
Weight (kg/km)	26	26	26	36	52	80
Outer Ø (mm)	5,4 ± 0,2			6,1 ± 0,2	7,9 ± 0,2	9,3 ± 0,2
Max. Tensile Load. (N)	600 (IEC 60794-1-21 E1)					
Max. Crush (N/dm)	500 (IEC 60794-1-21 E3)					
Temperature Range	-30°C to +70°C (IEC 60794-1-22 F1)					
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)					
Inner Duct ø ¹ (mm)	8 ~ 12				10 ~ 14	12 ~ 16

Standards

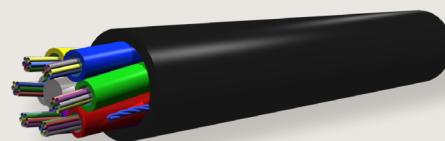
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres and Tubes Colour Code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise

¹ Recommended inner diameter for installation in Duct (contact us for other duct diameters).



Outdoor Blowing



Applications

- Outdoor
- Blowed in microducts *

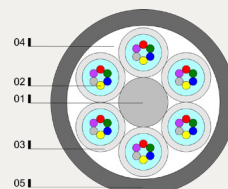
Options

- Jacket PA12 (Lower friction)

Advantages

Compact / Strong / Resistent / Low Friction coefficient / Totally Dielectric

*Optral recommends the use of driven belts cable feeder for installation.



- 01 CENTRAL ELEMENT (GRP)
- 02 FIBRES OPTICS
- 03 LOOSE TUBES JELLY FILLED
- 04 WB ELEMENTS
- 05 OUTER JACKET

Microducts Cables: Micro-ABD Fibra 200µm

Specifications

	MicroABD (24F x Tube)					
Fibres	48	72	96	144	192	288
Tensile Elements	6	6	6	6	8	12
Actives Tubes	2	3	4	6	8	12
Outer Jacket / Colour	Polyethylene HD / Black					
Weight (kg/km)	43	45	46	48	82	128
Outer Ø (mm)	6,7 ± 0,3				8,0 ± 0,3	10,2 ± 0,5
Max. Tensile Load. (N)	800 (IEC 60794-1-21 E1)					
Max. Crush (N/dm)	500 (IEC 60794-1-21 E3)					
Temperature Range	-30°C to +70°C (IEC 60794-1-22 F1)					
Min. Bending Radius (mm)	20 x Outer Ø (IEC 60794-1-21 E11)					
Inner Duct ø ¹ (mm)	8 ~ 12				10 ~ 14	12 ~ 16

Standards

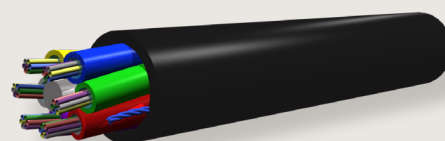
Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres and Tubes Colour Code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise

¹ Recommended inner diameter for installation in Duct (contact us for other duct diameters).



Outdoor Blowing



Applications

- Outdoor
- Blowed in microducts *

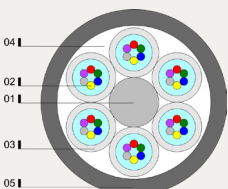
Options

- Jacket PA12 (Lower friction)

Advantages

Compact / Strong / Resistent / Low Friction coefficient / Totally Dielectric

*Optral recommends the use of driven belts cable feeder for installation.

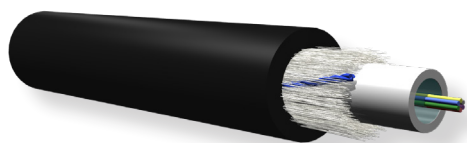


- 01 CENTRAL ELEMENT (GRP)
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* Other features in the product specifications at www.optral.com

Loose Tube Cables: NEXO-FTTH

Indoor / Outdoor



Fire Resistance

- Flame retardant (IEC 60332-1)
- Fire retardant (IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

- Universal (Indoor / Outdoor)

Rodent protection

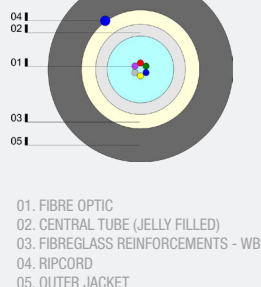
- Rodent protected

CPR Classification (Euroclass)

- Reaction to Fire: Dca, s2, d2, a1
- Declaration Code: DOP01002

Advantages

Compact / Lightweight / Flexible / Tough
/ Resistant / Totally dielectric / Watertight
/ Reduced diameter / Rodent protected.



Specifications

Fibres	2 / 4 / 6 / 8 / 12	16 / 24
Strength members	Reinforced Fibreglass Yarns WB	
Outer Jacket	LSZH ¹	
Colour	Black	
Weight (Kg/Km)	57	74
Outer ø (mm)	7.0 ± 0.3	8.0 ± 0.3
Max. Tensile Load (N)	1000 (Operating) / 1800 (Installation) - (IEC 60794-1-21 E1)	
Max. Crush (N/dm)	2000 (IEC 60794-1-21 E3)	
Max. Impact (J)	5 (IEC 60794-1-21 E4)	
Temperature Range	-30°C to +70°C (Operation) - (IEC 60794-1-22 F1)	
Min. Bending Radius (mm)	15 x Outer Ø (IEC 60794-1-21 E11)	
Water tightness	According (3m / 1m / 24h / IEC 60794-1-22 F5B)	

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

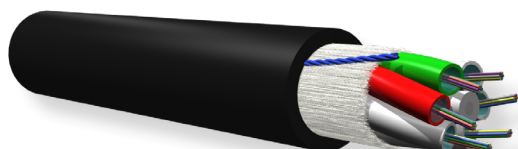
Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise.
With black stripe: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Natural - Turquoise.

¹LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Loose Tube Cables: DT-FTTH

Indoor



Fire Resistance

- Flame retardant (IEC 60332-1 / IEC 60332-3)
- Halogen free (IEC 60754-1/-2)
- Low smoke emission (IEC 61034-2)

Applications

- Indoor
- Data Centres

Rodent protection

- Rodent protected

Options

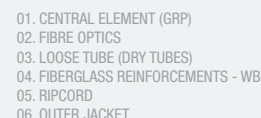
- Outer jacket colour code
- Fibres and tubes colour code

CPR Classification (Euroclass)

- Reaction to Fire: Dca, s2, d2, a1
- Declaration Code: DOP01052

Advantages

Compact / Flexible / Small diameter /
Small bending radius / Tough / Resistant
/ Totally dielectric / Gel free



Specifications

Fibre count	12	24	32	36	48	64	72	96	144
Fibres per Tube	12	12	8	12	12	8	12	12	12
Total Tubes	6	6	6	6	6	8	6	8	12
Active Tubes	1	2	4	3	4	8	6	8	12
Strength Members	Reinforced Fibreglass Yarns WB								
Outer Jacket	LSZH ¹								
Colour	Black								
Weight (Kg/Km)	64	64	65	65	66	97	67	98	137
Outer ø (mm)	8.3 ±0.5	8.3 ±0.5	8.3 ±0.5	8.3 ±0.5	8.3 ±0.5	9.8 ±0.5	8.3 ±0.5	9.8 ±0.5	11.5 ±0.5
Max. Tensile Load (N)	1500 (Operation) / 2000 (Installation)					1800 / 2700	1500 / 2700	1800 / 2700	
Max. Crush (N/10cm)	1500 (IEC 60794-1-21 E3)								
Temperature Range	-20°C to +70°C (Operación) / -10°C to +50°C (Instalación) - (IEC 60794-1-22 F1)								
Min. Bending Radius	10 x Outer Ø (Operation) / 20 x Outer ø (Installation) - (IEC 60794-1-21 E11)								

Standards

Mechanical and Environmental tests according to IEC 60794-1-21 and IEC 60794-1-22.

Fibres colour code: Red - Green - Blue - Yellow - Grey - Violet - Brown - Orange - White - Pink - Black - Turquoise.
Tubes colour code: Red - Green - Natural - ... - Natural. Passive tubes colour Black.

¹LSZH – Halogen free, low smoke and flame retardant thermoplastic compound.



Plastic Optical Fibre:

POF



Step index plastic optical fibre. This fibre provides optimum performance at 650 nm. Suitable to use in short distances, industrial environments and low speed data transmission.

These fibres are available in two grades, Standard and Premium. The Premium Grade offers lower attenuation coefficient for improved transmission.

Specifications

	Standard	Premium
Core Material	Polymethyl Methacrylate	Polymethyl Methacrylate
Cladding Material	Fluorinated Polymer	Fluorinated Polymer
Index Profile	Step Index	Step Index
Diameter (mm)	1.0 ± 0.06	1.0 ± 0.06
Attenuation (650 nm)	≤ 0.20 dB / m	≤ 0.15 dB / m
Numerical Aperture	0.50	0.50
Bending Radius	> 20 mm	> 20 mm
Temperature Range	-40 °C - +70 °C	-40 °C - +70 °C

Optical specifications for uncabled fibre

Multimode Optical Fibre:

PCF



Step Index multimode optical fibre 200/230 micron. This fibre is designed for its use at the wavelengths of 650 nm and 850 nm. Suitable for short haul data and video communications, sensing systems (medical and industrial) and illumination.

Specifications

Core / Cladding Material	Silica / Acrylate
Coating Material	Fluorinated Polymer
Index Profile	Step Index
Core Diameter	200 \pm 4 μ m
Cladding Diameter	230 +0/-10 μ m
Coating Diameter	500 \pm 30 μ m
Attenuation (650 nm)	≤ 7 dB / Km
Attenuation (850 nm)	≤ 6 dB / Km
Bandwidth (850 nm)	≥ 20 MHz x Km
Numerical Aperture (nominal)	0.37
Bending Radius	> 20 mm
Temperature Range	-40°C - +80°C

Optical specifications for uncabled fibre

Multimode Optical Fibre:
MM62

Graded-Index multimode optical fibres 62,5/125 micron.The fibres are designed for its use at the wavelengths of 850 nm and 1300 nm. These fibres are suitable for use in premises wiring applications, like Local Area Networks (LAN) with video, data and voice using LED, VCSEL or Laser Fabry Perot sources.These fibres comply with IEC 60793-2-10 A1b.

Geometrical and mechanical characteristics		Values			
Core diameter	62.5 ± 2.5 µm				
Core non-circularity	≤ 6%				
Core / Cladding concentricity error	≤ 1.5 µm				
Cladding diameter	125 ± -2 µm				
Cladding non-circularity	≤ 1%				
Primary coating diameter	245 ± 10 µm				
Coating non-circularity	≤ 6%				
Coating concentricity error	≤ 12.5 µm				
Proof Test	≥ 8.8 N / ≥ 1 % / ≥ 100 Kpsi				

Optical characteristics		OM1	OM2	Giga
Attenuation Coefficient (db/Km)	850 nm	≤ 3.0	≤ 3.0	≤ 3.0
	1300 nm	≤ 0.7	≤ 0.7	≤ 0.7
Bandwidth (MHz x Km)	850 nm	≥ 200	≥ 500	≥ 200
	1300 nm	≥ 500	≥ 500	≥ 500
Link Distance (m)	1000Base-SX	275	550	500
	1000Base-LX	550	550	1000
Numerical Aperture		0.275 ± 0.015		
Group Index of Refraction	850 nm	1.496		
	1300 nm	1.491		

Geometrical and mechanical characteristics according to IEC 60793-2-10.

Optical properties according to IEC 60793-2-10, ISO/IEC 11801, EN 50173, ANSI/TIA/EIA-492AAAA-A and ANSI/EIA/TIA 568-C.

Multimode Optical Fibre:
MM50

Geometrical and mechanical characteristics	Values
Core diameter	50 ± 2.5 µm
Core non-circularity	≤ 5 %
Core / Cladding concentricity error	≤ 1.5 µm
Cladding diameter	125 ± 1.0 µm
Cladding non-circularity	≤ 1.0 %
Primary coating diameter	245 ± 10 µm
Coating concentricity error	≤ 12.0 µm
Proof Test	≥ 8.8 N / ≥ 1 % / ≥ 100 Kpsi

Geometrical and mechanical characteristics according to IEC 60793-2-10.

Graded-Index multimode optical fibres 50/125 micron. The fibres are designed for use at 850 and 1300 nm. These fibres are suitable for use in premises wiring applications, like Local Area Net- works (LAN) with video, data and voice using LED, VCSEL or Laser Fabry Perot sources. These fibres comply or exceed the standards IEC 60793-2-10 A1a.1, A1a.2, A1a.3, TIA/ EIA- 492AAAB, TIA/EIA-492AAAC-A, TIA/EIA- 492AAAD, Telcordia GR-20-CORE, GR-409-CORE, TIA/EIA 568C.

Optical characteristics		OM2	OM3	OM4	OM5
Attenuation Coefficient (db/Km)	850 nm	≤ 2.4	≤ 2.4	≤ 2.4	≤ 2.4
	953 nm	-	-	-	≤ 1.8
	1300 nm	≤ 0.7	≤ 0.7	≤ 0.7	≤ 0.6
Bandwidth (MHz x Km)	850 nm	≥ 500	≥ 1500	≥ 3500	≥ 3500
	953 nm	-	-	-	≥ 1850
	1300 nm	≥ 500	≥ 500	≥ 500	≥ 500
Link Distance (m)	1000Base-SX	550	900	1100	1000
	1000Base-LX	550	550	550	600
	10GBASE-SX	82	300	550	400
	40G Base-SR4	-	100	150	150
	100G Base-SR10	-	100	150	100
Numerical Aperture		0.200 ± 0.015			
Group Index of Refraction	850 nm	1.482			
	1300 nm	1.477			

Optical properties according to IEC 60793-2, ISO/IEC 11801, EN 50173,TIA/EIA-492AAAB,TIA/EIA-492AAAC-A,TIA/EIA-492AAAD,Telcordia GR-20-CORE, GR-409-CORE,TIA/EIA 568C.

Singlemode Optical Fibre SMF G.652.D / G.655 & 656

Step index singlemode optical fibres. G652, G655 fibres provide optimum performance in the 1310 and 1550 nm wavelength. They can be used on metropolitan and access networks, CATV and premises applications in telecom. These fibres comply or exceed the standards IEC 60793-2-50, ITU-T G.652.B, G.652.D, Telcordia GR-20-CORE, ANSI/ICEA S-87- 640, RUS 7CFR 1755.900, ANSI/TIA/EIA- 492CAAA.

Geometrical and mechanical characteristics	G.652.D	G.655 & 656
Cladding Diameter	125 ± 0.7 µm	125 ± 1 µm
Core / Cladding Concentricity	≤ 0.5 µm	≤ 0.6 µm
Cladding Non-Circularity	≤ 0.7 %	≤ 1.0 %
Primary Coating Diameter	242±7 µm	242±7 µm
Coating / Cladding Concentricity	≤ 5 %	≤ 5 %
Coating Non-Circularity	≤ 12 µm	≤12 µm
Proof Test	≥8.8N/≥1%/≥100 Kpsi	8

Optical characteristics		G.652 D	G.655 & 656
Mode Field Diameter (µm)	1310 nm	9.0 ± 0.4	-
	1550 nm	10.1 ± 0.5	9.2 ± 0.5
Attenuation Coefficient (dB / Km)	1310 nm	≤ 0,35	≤ 0,40
	1383 nm	≤ 0,35	≤ 1,00
	1460 nm	≤ 0,25	-
	1550 nm	≤ 0,21	≤ 0,25
	1625 nm	≤ 0,23	≤ 0,28
Chromatic Dispersion Coefficient (ps / nm.Km)	1310 nm	-	-6
	1530 - 1565 nm	-	de 5.5 a 10
	1285 - 1330 nm	≤ 3	de -10 a -3
	1565 - 1625 nm	-	de 7.5 a 13.8
	1550 nm	≤ 18	8
	1625 nm	≤ 22	12
Zero Dispersion Wavelength (nm)		1300 -1322	≤ 1440
Zero Dispersion Slope (ps / nm2 Km)		≤ 0,090	≤ 0,052
Effective Area (µm)2		-	63
Group Index of Refraction	1310 nm	1.467	1.4682
	1550 nm	1.468	1.4683
Cable Cut-off Wavelength (nm)		≤ 1260	≤ 1300
PMD (ps / √Km)	1550 nm	≤ 0,1	≤ 0,2

Characteristics according to ITU-T G.652, IEC 60793-2-50, ISO/IEC 11801, EN 50173, Telcordia GR-20-CORE, ANSI/ICEAS-87-640, RUS 7CFR 1755.900, ANSI/TIA/EIA-492CAAA.

Singlemode Optical Fibre SMF - G.657

Low macrobending sensitive fibre (G657) provides high resistance to additional losses due to macrobending. Ideal for cable mounting inside buildings, patchcords and/or interconnection cables. It offers significant added value in Fibre-to-the-Home access networks.

The fibre fully comply with or exceeds the IEC 60793-2-50, ITU G.652.D, G.657.A&B, Telcordia GR-20-CORE, ANSI/ IECA S-87-640.

Geometrical and mechanical characteristics	G.657.A1	G.657.A2/B2	G.657.B3
Cladding Diameter	125 ± 0.7 µm		125 ± 0.4 µm
Core / Cladding Concentricity	≤ 0.5 µm		≤ 0.3 µm
Cladding Non-Circularity	≤ 0.7 %		≤ 0.3 %
Primary Coating Diameter	242 ± 0.7 µm		242 ± 0.5 µm
Coating / Cladding Concentricity	≤ 12 µm	≤ 10 µm	≤ 12 µm
Coating Non-Circularity		≤ 5 %	
Proof Test	≥ 8.8 N / ≥ 1 % / ≥ 100 Kpsi		≥ 200 Kpsi

Optical characteristics		G.657.A1	G.657.A2/B2	G.657.B3
Attenuation with Bending (1550 nm)	1 turn / Mandril 10mm	≤ 0.75	≤ 0.10	≤ 0.03
	10 turns / Mandril 15mm	≤ 0.25	≤ 0.03	
	1 turn / Mandril 7,5mm			≤ 0.08
	10 turns / Mandril 5mm			≤ 0.15
Mode Field Diameter (µm)	1310 nm	9.0 ± 0.4	8.5 - 9.3	8.8 ± 0.4
	1550 nm	10.1 ± 0.5	9.4 - 10.4	9.8 ± 0.5
Attenuation Coefficient (dB/Km)	1310 nm	≤ 0.35		≤ 0.35
	1383 nm	≤ 0.35		≤ 0.35
	1460 nm	≤ 0.25		
	1550 nm	≤ 0.21		≤ 0.22
	1625 nm	≤ 0.23		≤ 0.24
Chromatic Dispersion Coefficient (ps/nm.Km)	1285 - 1330 nm		≤ 3	
	1550 nm		≤ 18	
	1625 nm		≤ 22	
Zero Dispersion Wavelength (nm)		1300 - 1322		1300 - 1324
Zero Dispersion Slope (ps / nm2 Km)		≤ 0.090	≤ 0.092	≤ 0.092
Cable Cut-off Wavelength (nm)			≤ 1260	
PMD (ps / √Km)	1550 nm		≤ 0.1	



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