

OPTICAL FIBRE CABLES

Unarmoured

- Unitube – TOU ZvE
- Unitube flame retardant – TOU ZvZ1
- Unitube anti-rodent – TOU ZrE
- Unitube anti-rodent, flame retardant – TOU ZrZ1
- Multitube – TON ZvE
- Multitube flame retardant – TON ZvZ1
- Multitube anti-rodent – TON ZrE
- Multitube anti-rodent, flame retardant – TON ZrZ1
- Multitube double jacket – TON EZaE • PKP
- Multitube double jacket, fire retardant – TON Z1ZaZ1 • TKT

Armoured

- Unitube – TOU ZvE2AE
- Unitube fire retardant – TOU ZvZ12AZ1
- Multitube – TON ZvE2AE
- Multitube fire retardant – TON ZvZ12AZ1
- Multitube – TON Zv2AE
- Multitube double jacket, jelly filled – PESP-DR • fire retardant TEST-DR
- Multitube double jacket, jelly filled, tensile reinforced – PKESP-DR • fire retardant TEST-DR

Aerial

- TON ES – 8 figure short span
- ADSS – short span
- ADSS – medium span

APPLICATION

Unitube cable, loose type, non-metallic, low dimensions, lightweight, watertight.
Designed for indoor/outdoor applications in ducts. Cable installation by pulling or blowing.
Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Loose Tube

PBT – tube with optical fibres and filled with gel.

Mechanical reinforcement

Glass fibre yarns.

Ripcord

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise
13 · White / Black	14 · Yellow / Black	15 · Orange / Black	16 · Red / Black



MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. pulling force		Mechanical resistance		Minimum bending radius	
				Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
2	2	6,0	30	550	200	100	0,5	110	85
4	4	6,0	30	550	200	100	0,5	110	85
6	6	6,0	30	550	200	100	0,5	110	85
8	8	6,0	30	550	200	100	0,5	110	85
12	12	6,0	30	550	200	100	0,5	110	85
16	16	6,5	35	700	250	100	0,5	120	90

Temperature: Storage and transport: - 10°C up to 60°C.
Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Unitube cable, loose type, non-metallic, low dimensions, lightweight, flame retardant and with a LSHF oversheath. Designed for indoor/outdoor applications in ducts. Cable installation by pulling or blowing. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Loose Tube

PBT – tube with optical fibres and filled with gel.

Mechanical reinforcement

Glass fibre yarns.

Ripcord

Oversheath

LSHF – Low Smoke Halogen Free thermoplastic compound, flame retardant.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise
13 · White / Black	14 · Yellow / Black	15 · Orange / Black	16 · Red / Black

GENERAL CHARACTERISTICS

Flame retardant	IEC 60332-1-2 • EN 60332-1-2 (cable vertically mounted, length of charred cable ≤ 540 mm)
Halogen free	
Low smoke	IEC 61034-2 • EN 61034-2 (cable light transmittance ≥ 60%)
Low toxicity	IEC 60754-1 • EN 50267-2-1 (halogen acid gas content ≤ 0,5%)
Low corrosivity	IEC 60754-2 • EN 50267-2-3 (pH ≥ 4,3 • conductivity ≤ 10µS/mm)



MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. pulling force		Mechanical resistance		Minimum bending radius	
				Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
4	4	6,0	40	700	250	100	0,5	110	85
6	6	6,0	40	700	250	100	0,5	110	85
8	8	6,0	40	700	250	100	0,5	110	85
12	12	6,0	40	700	250	100	0,5	110	85
16	16	6,5	45	800	300	100	0,5	120	90

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Unitube cable, loose type, non-metallic, low dimensions, lightweight.
Designed for indoor/outdoor applications, in duct installations in environments with presence of rodents.
Cable installation by pulling or blowing. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.
Single-mode NZD – ITU-T Rec. G.655.
Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.
Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Loose Tube

PBT – tube with optical fibres and filled with gel.

Mechanical reinforcement

Compacted layer of glass yarns. Also provide resistance to rodents.

Ripcord

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black.
Oversheath marked at regular intervals with the following information:
<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise
13 · White / Black	14 · Yellow / Black	15 · Orange / Black	16 · Red / Black



MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. pulling force		Mechanical resistance		Minimum bending radius	
				Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
4	4	6,0	40	1 000	350	100	0,5	110	85
6	6	6,0	40	1 000	350	100	0,5	110	85
8	8	6,0	40	1 000	350	100	0,5	110	85
12	12	6,0	40	1 000	350	100	0,5	110	85
16	16	6,5	45	1 100	400	100	0,5	120	90

Temperature: Storage and transport: - 10°C up to 60°C.
Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Unitube cable, loose type, non-metallic, low dimensions, lightweight, flame retardant and with a LSHF over-sheath. Designed for indoor/outdoor applications in duct installation in environments with presence of rodents. Cable installation by pulling or blowing. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652

Single-mode NZD – ITU-T Rec. G.655

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b)

Loose Tube

PBT – tube with optical fibres and filled with gel.

Mechanical reinforcement

Compacted layer of glass yarns. Also provide resistance to rodents.

Ripcord

Oversheath

LSHF – Low Smoke Halogen Free thermoplastic compound, flame retardant.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise
13 · White / Black	14 · Yellow / Black	15 · Orange / Black	16 · Red / Black

GENERAL CHARACTERISTICS

Flame retardant	IEC 60332-1-2 • EN 60332-1-2 (cable vertically mounted, length of charred cable ≤ 540 mm)
Halogen free	
Low smoke	IEC 61034-2 • EN 61034-2 (cable light transmittance ≥ 60%)
Low toxicity	IEC 60754-1 • EN 50267-2-1 (halogen acid gas content ≤ 0,5%)
Low corrosivity	IEC 60754-2 • EN 50267-2-3 (pH ≥ 4,3 • conductivity ≤ 10µS/mm)



MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. pulling force		Mechanical resistance		Minimum bending radius	
				Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
4	4	6,0	50	1 000	350	100	0,5	110	85
6	6	6,0	50	1 000	350	100	0,5	110	85
8	8	6,0	50	1 000	350	100	0,5	110	85
12	12	6,0	50	1 000	350	100	0,5	110	85
16	16	6,5	55	1 100	400	100	0,5	120	90

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Multitube cable, loose type, non-metallic, dry core, low dimensions, lightweight, watertight. Designed for indoor/outdoor applications in ducts. Cable installation by pulling or blowing. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Mechanical reinforcement

Glass fibre yarns.

Ripcord

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise

Colour of filling elements

Black

Tubes colour code

Up to 12 tubes

1 · Red	2 up to 11 · Natural	12 · Green
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16 tubes

1 st jacket	White	Red	Blue	Green
2 nd jacket	3 White	3 Red	3 Blue	3 Green



Tubes colour code

18 tubes

1 st jacket	2 White	2 Red	2 Blue	
2 nd jacket	3 White	3 Red	3 Blue	3 Green

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.° of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. Pulling force		Mechanical resistance		Minimum bending radius	
					Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
12	5	6	10,0	70	1 150	650	300	1	180	140
24	5	6	10,0	70	1 150	650	300	1	180	140
24	5	8	10,0	70	1 150	650	300	1	180	140
24	5	12	10,5	75	1 350	750	300	1	190	145
32	5	8	10,0	70	1 150	650	300	1	180	140
36	6	6	10,0	75	1 250	650	300	1	180	140
36	5	12	10,5	75	1 350	750	300	1	190	145
48	6	8	10,0	75	1 250	650	300	1	180	140
48	5	12	10,5	75	1 350	750	300	1	190	145
60	5	12	10,5	75	1 350	750	300	1	190	145
64	8	8	12,0	105	1 550	800	300	1	215	170
72	9	8	12,5	115	1 900	950	300	1	225	175
72	6	12	11,0	85	1 750	850	300	1	198	154
96	12	8	14,5	160	2 450	1000	300	1	260	205
96	8	12	12,5	115	1 750	950	300	1	225	175
120	10	12	14,0	145	2 250	1 150	300	1	250	195
128	16	8	15,0	170	2 550	1 050	300	1	270	210
144	18	8	15,0	170	2 550	1 050	300	1	270	210
144	12	12	15,5	180	2 850	1 400	300	1	280	215

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Multitube cable, loose type, non-metallic, dry core, low dimensions, lightweight, flame retardant and with a LSHF oversheath. Designed for indoor/outdoor applications in duct installation. Cable installation by pulling or blowing. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Mechanical reinforcement

Glass fibre yarns.

Ripcord

Oversheath

LSHF – Low Smoke Halogen Free thermoplastic compound, flame retardant.

COLOUR AND CABLE MARKING

Black. Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise

Colour of filling elements

Black

Tubes colour code

Up to 12 tubes

1 · Red	2 up to 11 · Natural	12 · Green
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16 tubes

1 st jacket	White	Red	Blue	Green
2 nd jacket	3 White	3 Red	3 Blue	3 Green



Tubes colour code

18 tubes

1 st jacket	2 White	2 Red	2 Blue	
2 nd jacket	3 White	3 Red	3 Blue	3 Green

GENERAL CHARACTERISTICS

Flame retardant	IEC 60332-1-2 • EN 60332-1-2 (cable vertically mounted, length of charred cable ≤ 540 mm)
Oversheath halogen free	
Low toxicity	IEC 60754-1 • EN 50267-2-1 (halogen acid gas content ≤ 0,5%)
Low corrosivity	IEC 60754-2 • EN 50267-2-2 (pH ≥ 4,3 • conductivity ≤ 10μS/mm)

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.° of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. Pulling force		Mechanical resistance		Minimum bending radius	
					Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
24	5	6	10,0	90	1 400	850	300	1	180	140
24	5	8	10,0	90	1 400	850	300	1	180	140
24	5	12	10,5	100	1 550	1 000	300	1	190	145
32	5	8	10,0	90	1 400	850	300	1	180	140
36	6	6	10,0	100	1 500	850	300	1	180	140
36	5	12	10,5	100	1 550	1 000	300	1	190	145
48	6	8	10,0	100	1 500	850	300	1	180	140
48	5	12	10,5	100	1 550	1 000	300	1	190	145
60	5	12	10,5	100	1 550	1 000	300	1	190	145
64	8	8	12,0	135	2 100	1 250	300	1	215	170
72	9	8	12,5	150	2 250	1 050	300	1	225	175
72	6	12	11,0	110	1 750	850	300	1	198	154
96	12	8	14,5	205	3 100	1 200	300	1	260	205
96	8	12	12,5	150	2 300	1 200	300	1	225	175
120	10	12	14,0	180	2 750	1 450	300	1	250	195
128	16	8	15,0	210	3 200	1 350	300	1	270	210
144	18	8	15,0	210	3 200	1 350	300	1	270	210
144	12	12	15,5	225	3 400	1 650	300	1	280	215

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Multitube cable, loose type, non-metallic, dry core, low dimensions, lightweight, watertight.
Designed for indoor/outdoor applications, in duct installations in environments with presence of rodents.
Cable installation by pulling or blowing. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Mechanical reinforcement

Glass fibre yarns.

Ripcord

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black. Oversheath marked at regular intervals with the following information:
CABELTE <tipo de cable> <composición> <año de fabricación> <marcado métrico>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise
13 · White / Black	14 · Yellow / Black	15 · Orange / Black	16 · Red / Black

Colour of filling elements

Black

Tubes colour code

Up to 12 tubes

1 · Red	2 up to 11 · Natural	12 · Green
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16 tubes

1 st jacket	White	Red	Blue	Green
2 nd jacket	3 White	3 Red	3 Blue	3 Green



Tubes colour code

18 tubes

1 st jacket	2 White	2 Red	2 Blue	
2 nd jacket	3 White	3 Red	3 Blue	3 Green

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. Pulling force		Mechanical resistance		Minimum bending radius	
					Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
24	5	6	10,0	90	3 500	1 850	300	1	180	140
24	5	8	10,0	90	3 500	1 850	300	1	180	140
24	5	12	10,5	100	4 100	2 200	300	1	190	145
32	5	8	10,0	90	3 500	1 850	300	1	180	140
36	6	6	10,0	105	3 900	1 800	300	1	180	140
36	5	12	10,5	100	4 100	2 200	300	1	190	145
48	6	8	10,0	105	3 900	1 800	300	1	180	140
48	5	12	10,5	100	4 100	2 200	300	1	190	145
60	5	12	10,5	100	4 100	2 200	300	1	190	145
64	8	8	12,0	135	4 500	2 200	300	1	215	170
72	9	8	12,5	150	4 750	2 150	300	1	225	175
72	6	12	11,0	115	4 500	2 200	300	1	198	154
96	12	8	14,5	200	5 850	2 550	300	1	260	205
96	8	12	12,5	150	5 150	2 750	300	1	225	175
120	10	12	14,0	185	5 900	2 900	300	1	250	195
128	16	8	15,0	205	5 650	2 700	300	1	270	210
144	18	8	15,0	205	5 650	2 700	300	1	270	210
144	12	12	15,5	225	6 900	3 300	300	1	280	215

Temperature: Storage and transport: - 10°C up to 60°C.
Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Multitube cable, loose type, non-metallic, dry core, flame retardant and with a LSHF oversheath. Low dimensions and lightweight. Designed for indoor/outdoor applications in duct installation in environments with presence of rodents. Cable installation by pulling or blowing. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652

Single-mode NZD – ITU-T Rec. G.655

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b)

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Mechanical reinforcement

Glass fibre yarns.

Ripcord

Oversheath

LSHF – Low Smoke Halogen Free thermoplastic compound, flame retardant.

COLOUR AND CABLE MARKING

Black. Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise

Colour of filling elements

Black

Tubes colour code

Up to 12 tubes

1 · Red	2 up to 11 · Natural	12 · Green
---------	----------------------	------------

16 tubes

1 st jacket	White	Red	Blue	Green
2 nd jacket	3 White	3 Red	3 Blue	3 Green



Tubes colour code

18 tubes

1 st jacket	2 White	2 Red	2 Blue	
2 nd jacket	3 White	3 Red	3 Blue	3 Green

GENERAL CHARACTERISTICS

Flame retardant IEC 60332-1-2 • EN 60332-1-2 (cable vertically mounted, length of charred cable ≤ 540 mm)

Oversheath halogen free

Low toxicity IEC 60754-1 • EN 50267-2-1 (halogen acid gas content ≤ 0,5%)

Low corrosivity IEC 60754-2 • EN 50267-2-2 (pH ≥4,3 • conductivity ≤ 10µS/mm)

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. Pulling force		Mechanical resistance		Minimum bending radius	
					Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
24	5	6	10,0	115	3 500	1 850	300	1	180	140
24	5	8	10,0	115	3 500	1 850	300	1	180	140
24	5	12	10,5	125	4 100	2 200	300	1	190	145
32	5	8	10,0	115	3 500	1 850	300	1	180	140
36	6	6	10,0	130	3 900	1 800	300	1	180	140
36	5	12	10,5	125	4 100	2 200	300	1	190	145
48	6	8	10,0	130	3 900	1 800	300	1	180	140
48	5	12	10,5	125	4 100	2 200	300	1	190	145
60	5	12	10,5	125	4 100	2 200	300	1	190	145
64	8	8	12,0	165	4 500	2 200	300	1	215	170
72	9	8	12,5	180	4 750	2 150	300	1	225	175
72	6	12	11,0	140	4 500	2 200	300	1	198	154
96	12	8	14,5	240	5 850	2 550	300	1	260	205
96	8	12	12,5	180	5 150	2 750	300	1	225	175
120	10	12	14,0	220	5 900	2 900	300	1	250	195
128	16	8	15,0	240	5 650	2 700	300	1	270	210
144	18	8	15,0	240	5 650	2 700	300	1	270	210
144	12	12	15,5	265	6 900	3 300	300	1	280	215

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Multitube cable, loose type, non-metallic, double jacketed, up to 144 fibres.

Loose tubes, dry core, longitudinal water sealing, double jacket, resistant to crush, impact and abrasion.

Recommended for duct or directly buried installation. Cable installation by pulling or blowing. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Inner jacket

Polyethylene.

Mechanical reinforcement

Aramid fibre yarns placed around the optical core.

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · Green	2 · Red	3 · Blue	4 · Yellow
5 · Grey	6 · Violet	7 · Brown	8 · Orange

Tubes colour code

6 tubes

2 White	2 Red	2 Blue
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8 tubes

2 White	2 Red	2 Blue	2 Green
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Tubes colour code

12 tubes

3 White	3 Red	3 Blue	3 Green
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18 tubes

1 st jacket	2 White	2 Red	2 Blue	
2 nd jacket	3 White	3 Red	3 Blue	3 Green

GENERAL CHARACTERISTICS

Construction standards

ADIF TE-038.003 · Telefonica ER.f6.205:Dec.2003

MECHANICAL AND DIMENSIONAL CHARACTERISTICS – ADIF CONSTRUCTION

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. pulling force (N)	Mechanical resistance		Minimum bending radius	
						Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
16	8	2	13,5	135	3 200	260	5	270	205
32	6	8	14,5	155	3 200	260	5	290	220
64	6	5(12)+1(4)	14,5	155	3 200	260	5	290	220
96	12	8	19,0	270	3 200	260	5	380	285
128	18	8	20,5	285	3 200	260	5	410	310

MECHANICAL AND DIMENSIONAL CHARACTERISTICS – TELEFÓNICA CONSTRUCTION

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. pulling force (N)	Mechanical resistance		Minimum bending radius	
						Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
6	6	2	14,5	155	4 200	260	5	290	220
8	6	2	14,5	155	4 200	260	5	290	220
12	6	2	14,5	155	4 200	260	5	290	220
16	6	4	14,5	155	4 200	260	5	290	220
24	6	4	14,5	155	4 200	260	5	290	220
32	6	8	14,5	155	4 200	260	5	290	220
48	6	8	14,5	155	4 200	260	5	290	220
64	8	8	15,5	175	4 200	260	5	310	310
96	12	8	18,5	255	4 200	260	5	370	280
128	18	8	19,5	265	4 200	260	5	390	295
144	18	8	19,5	265	4 200	260	5	390	295

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

Unarmoured · Double jacket · Fire retardant

APPLICATION

Multitube cable, loose type, non-metallic, flame retardant, halogen free double jacket, up to 256 fibres. Loose tubes, dry core, longitudinal water sealing, double jacket, resistant to crush, impact and abrasion. Recommended for duct or directly buried installation. Cable installation by pulling or blowing. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Inner jacket

LSHF – Low Smoke Halogen Free thermoplastic compound, flame retardant.

Mechanical reinforcement

Aramid fibre yarns placed around the optical core.

Oversheath

LSHF – Low Smoke Halogen Free thermoplastic compound, flame retardant.

COLOUR AND CABLE MARKING

Yellow or Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · Green	2 · Red	3 · Blue	4 · Yellow
5 · Grey	6 · Violet	7 · Brown	8 · Orange

Colour of filling elements

Black

Tubes colour code

6 tubes

2 White	2 Red	2 Blue
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8 tubes

2 White	2 Red	2 Blue	2 Green
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12 tubes

3 White	3 Red	3 Blue	3 Green
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Tubes colour code

18 tubes

1 st jacket	2 White	2 Red	2 Blue	
2 nd jacket	3 White	3 Red	3 Blue	3 Green

GENERAL CHARACTERISTICS

Construction standards ADIF TE-038.003 • Telefonica ER.f6.210:Dec.2006

Flame retardant IEC 60332-1-2 • EN 60332-1-2 (cable vertically mounted, length of charred cable ≤ 540 mm)

Fire retardant IEC 60332-3-24 • EN 60332-3-24 (bunch of cables vertically mounted on a ladder, length of charred cable ≤ 2,5 m)

Halogen free

Low smoke IEC 61034-2 • EN 61034-2 (cable light transmittance ≥ 50%)

Low toxicity IEC 60754-1 • EN 50267-2-1 (LSHF sheaths: halogen acid gas content ≤ 0,5%)

Low corrosivity IEC 60754-2 • EN 50267-2-3 (LSHF sheaths: pH ≥4,3 • conductivity ≤ 10µS/mm)

MECHANICAL AND DIMENSIONAL CHARACTERISTICS – ADIF CONSTRUCTION

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. pulling force (N)	Mechanical resistance		Minimum bending radius	
						Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
32	6	8	14,5	210	3 200	260	5	290	220
64	6	5(12)+1(4)	14,5	210	3 200	260	5	290	220
96	12	8	19,0	340	3 200	260	5	380	285
128	18	8	20,5	365	3 200	260	5	410	310

MECHANICAL AND DIMENSIONAL CHARACTERISTICS – TELEFÓNICA CONSTRUCTION

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. pulling force (N)	Mechanical resistance		Minimum bending radius	
						Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
6	6	2	13,0	180	4 200	260	5	290	220
8	6	2	13,0	180	4 200	260	5	290	220
12	6	2	13,0	180	4 200	260	5	290	220
16	6	4	13,0	180	4 200	260	5	290	220
24	6	4	13,0	180	4 200	260	5	290	220
32	6	8	13,0	180	4 200	260	5	290	220
48	6	8	13,0	180	4 200	260	5	290	220
64	8	8	15,0	220	4 200	260	5	310	310
96	12	8	18,0	300	4 200	260	5	370	280
128	18	8	18,5	315	4 200	260	5	390	295
144	18	8	18,5	315	4 200	260	5	390	295
256	18	16	20,0	350	4 200	260	5	400	300

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Superior fibre protection by the use of a double jacket and an armour. Unitube cable, loose type, low dimensions and lightweight, design for outdoor applications, in ducts or directly buried and in environments with presence of rodents. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Loose Tube

PBT – tube with optical fibres and filled with gel.

Mechanical reinforcement

Glass fibre yarns.

Inner jacket

Polyethylene.

Ripcord

Metallic protection

Corrugated coated steel tape.

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise
13 · White / Black	14 · Yellow / Black	15 · Orange / Black	16 · Red / Black



MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. Pulling force		Mechanical resistance		Minimum bending radius	
				Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
4	4	10,0	115	1 100	350	200	1	200	160
6	6	10,0	115	1 100	350	200	1	200	160
8	8	10,0	115	1 100	350	200	1	200	160
12	12	10,0	115	1 100	350	200	1	200	160
16	16	11,0	130	1 350	450	200	1	220	175

Temperature: Storage and transport: - 10°C up to 60°C.
Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Superior fibre protection by the use of a double jacket and an armour. Unitube cable, loose type, flame retardant and halogen free, low dimensions and lightweight, design for outdoor applications, in ducts or directly buried and in environments with presence of rodents. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652

Single-mode NZD – ITU-T Rec. G.655

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b)

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Mechanical reinforcement

Glass fibre yarns.

Ripcord

Inner jacket

LSHF – Low Smoke Halogen Free thermoplastic compound, flame retardant.

Metallic protection

Corrugated coated steel tape.

Oversheath

LSHF – Low Smoke Halogen Free thermoplastic compound, fire retardant.

COLOUR AND CABLE MARKING

Black

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise
13 · White / Black	14 · Yellow / Black	15 · Orange / Black	16 · Red / Black



GENERAL CHARACTERISTICS

Flame retardant	IEC 60332-1-2 • EN 60332-1-2 (cable vertically mounted, length of charred cable ≤ 540 mm)
Fire retardant	IEC 60332-3-24 • EN 60332-3-24 (bunch of cables vertically mounted on a ladder, length of charred cable ≤ 2,5 m)
Halogen free	
Low smoke	IEC 61034-2 • EN 61034-2 (cable light transmittance ≥ 50%)
Low toxicity	IEC 60754-1 • EN 50267-2-1 (LSHF sheaths: halogen acid gas content ≤ 0,5%)
Low corrosivity	IEC 60754-2 • EN 50267-2-2 (LSHF sheaths: pH ≥ 4,3 • conductivity ≤ 10µS/mm)

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. Pulling force		Mechanical resistance		Minimum bending radius	
				Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
4	4	10,0	140	1 400	350	200	1	200	160
6	6	10,0	140	1 400	350	200	1	200	160
8	8	10,0	140	1 400	350	200	1	200	160
12	12	10,0	140	1 400	350	200	1	200	160
16	16	11,0	155	1 550	450	200	1	220	175

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Superior fibre protection by the use of a double jacket and an armour. Multitube cable, loose type, low dimensions and lightweight, design for outdoor applications, in ducts or directly buried and in environments with presence of rodents. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Mechanical reinforcement

Glass fibre yarns.

Inner jacket

Polyethylene.

Ripcord

Metallic protection

Corrugated coated steel tape.

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise

Colour of filling elements

Black.

Tubes colour code

Up to 12 tubes

1 · Red	2 up to 11 · Natural	12 · Green
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16 tubes

1 st jacket	White	Red	Blue	Green
2 nd jacket	3 White	3 Red	3 Blue	3 Green



We reserve the right to modify, at any time, without any obligation and without prior notice, the specifications and other technical data in this document, which must be confirmed when ordering.



Tubes colour code

18 tubes

1 st jacket	2 White	2 Red	2 Blue	
2 nd jacket	3 Black	3 Red	3 Blue	3 Green

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. Pulling force		Mechanical resistance		Minimum bending radius	
					Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
24	5	6	14,5	180	1 950	1 050	450	5	350	275
24	5	8	14,5	180	1 950	1 050	450	5	350	275
24	5	12	14,5	190	1 950	1 050	450	5	350	275
32	5	8	14,5	180	1 950	1 050	450	5	350	275
36	6	6	14,5	200	2 050	950	450	5	350	275
36	5	12	14,5	190	1 950	1 050	450	5	350	275
48	6	8	14,5	200	2 050	950	450	5	350	275
48	5	12	14,5	190	1 950	1 050	450	5	350	275
60	5	12	14,5	190	1 950	1 050	450	5	350	275
64	8	8	16,5	240	2 450	1 250	450	5	400	315
72	9	8	16,5	250	2 550	1 200	450	5	400	315
72	6	12	15,5	215	2 200	1 100	450	5	375	300
96	12	8	18,5	315	3 150	1 400	450	5	450	350
96	8	12	16,5	250	2 550	1 400	450	5	400	315
120	10	12	18,5	300	3 000	1 500	450	5	450	350
128	16	8	19,5	330	3 350	1 400	450	5	470	370
144	18	8	19,5	330	3 350	1 400	450	5	470	370
144	12	12	19,5	340	3 450	1 700	450	5	470	370

Temperature: Storage and transport: - 10°C up to 60°C.
Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Superior fibre protection by the use of a double jacket and an armour. Multitube cable, loose type, fire retardant and halogen free, design for outdoor applications, in ducts or directly buried and in environments with presence of rodents. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Mechanical reinforcement

Glass fibre yarns.

Inner jacket

LSHF – Low Smoke Halogen Free thermoplastic compound, flame retardant.

Ripcord

Metallic protection

Corrugated coated steel tape.

Oversheath

LSHF – Low Smoke Halogen Free thermoplastic compound, fire retardant.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise

Colour of filling elements

Black.

Tubes colour code

Up to 12 tubes

1 · Red	2 up to 11 · Natural	12 · Green
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Tubes colour code
16 tubes

1 st jacket	White	Red	Blue	Green
2 nd jacket	3 White	3 Red	3 Blue	3 Green

18 tubes

1 st jacket	2 White	2 Red	2 Blue	
2 nd jacket	3 White	3 Red	3 Blue	3 Green

GENERAL CHARACTERISTICS

Flame retardant	IEC 60332-1-2 • EN 60332-1-2 (cable vertically mounted, length of charred cable ≤ 540 mm)
Fire retardant (frt)	IEC 60332-3-24 • EN 60332-3-24 (bunch of cables vertically mounted on a ladder, length of charred cable ≤ 2,5 m)
Halogen free	
Low smoke	IEC 61034-2 • EN 61034-2 (cable light transmittance ≥ 50%)
Low toxicity	IEC 60754-1 • EN 50267-2-1 (halogen acid gas content ≤ 0,5%)
Low corrosivity	IEC 60754-2 • EN 50267-2-3 (pH ≥ 4,3 • conductivity ≤ 10µS/mm)

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.° of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. Pulling force		Mechanical resistance		Minimum bending radius	
					Installed (N)	In service (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
24	5	6	14,5	240	2 450	1 300	450	5	350	275
24	5	8	14,5	240	2 450	1 300	450	5	350	275
24	5	12	14,5	245	2 500	1 400	450	5	350	275
32	5	8	14,5	240	2 450	1 300	450	5	350	275
36	6	6	14,5	250	2 500	1 200	450	5	350	275
36	5	12	14,5	245	2 500	1 400	450	5	350	275
48	6	8	14,5	250	2 500	1 200	450	5	350	275
48	5	12	14,5	245	2 500	1 400	450	5	350	275
60	5	12	14,5	245	2 500	1 400	450	5	350	275
64	8	8	16,5	300	3 050	1 550	450	5	400	315
72	9	8	16,5	315	3 200	1 500	450	5	400	315
72	6	12	15,5	275	2 800	1 400	450	5	375	300
96	12	8	18,5	385	3 850	1 800	450	5	450	350
96	8	12	16,5	315	3 200	1 750	450	5	400	315
120	10	12	18,5	370	3 750	1 900	450	5	450	350
128	16	8	19,5	405	4 050	2 050	450	5	470	370
144	18	8	19,5	405	4 050	2 050	450	5	470	370
144	12	12	19,5	420	4 200	2 100	450	5	470	370

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Multitube cable, loose type, armoured, small diameter, design for outdoor applications, in ducts or directly buried and in environments with presence of rodents. Easy handling and installation.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 μm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 μm – IEC 60793-2 (A1.b)

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Mechanical reinforcement

Glassfibres yarns.

Ripcord

Metallic protection

Corrugated coated steel tape.

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black.

Oversheath will be marked, at regular intervals, with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise

Colour of filling elements

Black.

Tubes colour code

Up to 12 tubes

1 · Red	2 up to 11 · Natural	12 · Green
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MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Max. pulling force		Mechanical resistance		Minimum bending radius	
					Installation (N)	Permanent (N)	Crush (N/cm)	Impact (J)	Installation (mm)	Permanent (mm)
12	5	6	12,5	160	1 600	550	200	5	300	240
24	5	6	12,5	160	1 600	550	300	5	300	240
36	5	12	13,5	180	1 800	600	300	5	325	255
48	5	12	13,5	180	1 800	600	300	5	325	255
72	6	12	14,5	190	2 000	700	300	5	350	275
96	8	12	15,5	230	2 300	800	300	5	370	295
144	12	12	18,5	320	3 200	1 100	300	5	445	350

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to + 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Superior fibre protection by the use of a double jacket and an armour. Multitube cable, loose type, design for outdoor applications, in ducts or directly buried and in environments with presence of rodents.

PESP-DR – Polyethylene oversheath.

TEST-DR – LSZH oversheath, flame retardant and halogen free.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Inner Sheath

Polyethylene or LSHF – Low smoke halogen free thermoplastic compound – flame retardant.

Ripcord

Metallic protection

Corrugated coated steel tape.

Oversheath

Polyethylene or LSHF – Low smoke halogen free thermoplastic compound – fire retardant.

COLOUR AND CABLE MARKING

PESP-DR: Black.

TEST-DR: Black or Yellow.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · Green	2 · Red	3 · Blue	4 · Yellow
5 · Grey	6 · Violet	7 · Brown	8 · Orange
9 · White	10 · Rose	11 · Black	12 · Turquoise

Colour of filling elements

Black.



Tubes colour code

1 tube – White

2 tubes – White-Red

3 tubes – White-Red-Green

4 tubes – 1st jacket White-White-Red-Green

n tubes – White-...-White-Red-Green

GENERAL CHARACTERISTICS FOR TON GZ12AZ1 • TEST-DR

Flame retardant	IEC 60332-1-2 • EN 60332-1-2 (cable vertically mounted, length of charred cable ≤ 540 mm)
Fire retardant	IEC 60332-3-24 • EN 60332-3-24 (bunch of cables vertically mounted on a ladder, length of charred cable ≤ 2,5 m)
Halogen free	
Low smoke	IEC 61034-2 • EN 61034-2 (cable light transmittance ≥ 60%)
Low toxicity	IEC 60754-1 • EN 50267-2-1 (LSHF sheaths: halogen acid gas content ≤ 0,5%)
Low corrosivity	IEC 60754-2 • EN 50267-2-3 (LSHF sheaths: pH ≥ 4,3 • conductivity ≤ 10µS/mm)

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)		Max. pulling force (N)	Mechanical resistance		Minimum bending radius	
				PESP-DR	TEST-DR		Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
8	6	4	14,5	240	270	2 350	450	5	350	275
12	6	6	14,5	240	270	2 350	450	5	350	275
16	6	4	14,5	240	270	2 350	450	5	350	275
18	6	6	14,5	240	270	2 350	450	5	350	275
24	6	8	14,5	240	270	2 350	450	5	350	275
32	6	8	14,5	240	270	2 350	450	5	350	275
36	6	6	14,5	240	270	2 350	450	5	350	275
48	6	8	14,5	240	270	2 350	450	5	350	275
64	8	8	17,0	275	310	2 450	450	5	410	325
80	10	8	18,0	330	370	2 450	450	5	435	345
96	8	12	18,0	330	370	2 050	450	5	435	345

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

Maximum pulling force 2600N (LASE 1%).

OPTICAL FIBRE CABLES

APPLICATION

Superior fibre protection by the use of a double jacket and an armour. Multitube cable, loose type, design for outdoor applications when it necessary high tensile strength for cable pulling into ducts. Suitable also for directed buried and in environments with presence of rodents.

PKESP – polyethylene oversheath.

TKEST – LSZH oversheath, flame retardant, halogen free.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652

Single-mode NZD – ITU-T Rec. G.655

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b)

Central strength member

PBT – tube with optical fibres and filled with a water tightness compound.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Inner Sheath

Polyethylene or LSHF – Low smoke halogen free thermoplastic compound – flame retardant.

Peripheral strength member

Aramid yarns around cable core.

Ripcord

Metallic protection

Corrugated coated steel tape.

Oversheath

Polyethylene or LSHF – Low smoke halogen free thermoplastic compound – fire retardant.

COLOUR AND CABLE MARKING

PKESP: Black.

TKEST: Black or Yellow.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · Red	2 · Green	3 · Blue	4 · Yellow
5 · Violet	6 · Orange	7 · Brown	8 · Grey
9 · Black	10 · Rose	11 · Turquoise	12 · White

Colour of filling elements

Black.

Tubes colour code

6 tubes

2 White	2 Red	2 Blue
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Tubes colour code
8 tubes

2 White	2 Red	2 Blue	2 Green
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12 tubes

3 White	3 Red	3 Blue	3 Green
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18 tubes

1 st jacket	2 White	2 Red	2 Blue	
2 nd jacket	3 White	3 Red	3 Blue	3 Green

GENERAL CHARACTERISTICS FOR TON Z1Za2AZ1 • TEST-DR

Construction standards	ADIF TE-038.003
Flame retardant	IEC 60332-1-2 • EN 60332-1-2 (cable vertically mounted, length of charred cable ≤ 540 mm)
Fire retardant	IEC 60332-3-24 • EN 60332-3-24 (bunch of cables vertically mounted on a ladder, length of charred cable ≤ 2,5 m)
Halogen free	
Low smoke	IEC 61034-2 • EN 61034-2 (cable light transmittance ≥ 50%)
Low toxicity	IEC 60754-1 • EN 50267-2-1 (LSHF sheaths: halogen acid gas content ≤ 0,5%)
Low corrosivity	IEC 60754-2 • EN 50267-2-2 (LSHF sheaths: pH ≥ 4,3 • conductivity ≤ 10μS/mm)

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)		Max. pulling force (N)	Mechanical resistance		Minimum bending radius	
				PKESP	TKEST		Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
32	6	8	16,5	235	290	3 200	260	5	415	330
64	6	5(12)+1(4)	16,5	235	290	3 200	260	5	415	330
96	12	8	22,0	370	460	3 200	260	5	550	440
128	18	8	22,5	400	485	3 200	260	5	565	450

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

Multitube loose tube cable, low dimensions and lightweight, watertight. Suitable to for aerial installations, in figure-8.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 μm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 μm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Messenger wire

Metallic messenger of galvanized steel.

7 wires with 1mm diameter/each.

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

CABELTE <tipo de cable> <composición> <año de fabricación> <marcado métrico>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise

Colour of filling elements

Black.

Tubes colour code

1 · Red	2 · Natural	3 · Natural	4 · Natural	5 · Green
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MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.º of elements	Fibres per tube	Optical cable diameter (mm)	Cable total height (mm)	Cable weight (Kg/Km)	Maximum pulling force (N)	Mechanical resistance		Minimum bending radius	
							Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
12	5	12	11	19	160	2 350	300	1	265	210
24										
36										
48										
60										

Temperature: Storage and transport: - 10°C up to 60°C.
Temperature: Operation: - 20°C up to 60°C.
Minimum breaking load of steel messenger 7 x 1: 6 600 N.

OPTICAL FIBRE CABLES

APPLICATION

All dielectric self-supported cable, suitable to be installed aerially in short spans. Loose tube design, dry core.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Mechanical reinforcement

Aramid yarns lay around cable core.

If anti-shotgun (antiballistic) protection is required, an aramid tape is applied.

Oversheath

Polyethylene.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise

Colour of filling elements

Natural.

Tubes colour code

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow		



GENERAL CHARACTERISTICS

Mechanical characteristics	
Maximum load EDS	1150 N
Maximum allowable tension under worst conditions	1600 N
Resistant cross-sectional area	7,6 mm ²
Young's modulus	71 kN/mm ²
Coefficient of thermal expansion	9,4 x 10 ⁻⁶ °C ⁻¹
Minimum cable sag at installation	2 %
Maximum span (depending on the installation conditions)	80 m

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Breaking Load	Mechanical resistance		Minimum bending radius	
					Minimum (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
12	6	12	11	90	11 000	250	1,5	190	145
24									
36									
48									
60									
72									

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.

OPTICAL FIBRE CABLES

APPLICATION

All dielectric self-supported cable, suitable to be installed aerially in middle spans.
Loose tube design, dry core.

CONSTRUCTION CHARACTERISTICS

Optical fibres (at choice)

Single-mode (Dispersion unshifted) – IEC 60793-2 and ITU-T Rec. G.652.

Single-mode NZD – ITU-T Rec. G.655.

Multi-mode type 50/125 µm – IEC 60793-2 (A1.a) and ITU-T Rec. G.651.

Multi-mode type 62,5/125 µm – IEC 60793-2 (A1.b).

Central strength member

Glass fibre reinforced plastic rod (FRP).

Loose Tubes

PBT – tube with optical fibres and filled with gel.

Core watertightness

Dry – waterblocking swelling tape and yarns.

Inner jacket

Polyethylene.

Mechanical reinforcement

Two layers of aramid yarns around cable core.

If anti-shotgun (antiballistic) protection is required, an aramid tape is applied.

Oversheath

Polyethylene.

In case of installation on HV transmission lines, the outer jacket provides antitracking protection.

COLOUR AND CABLE MARKING

Black.

Oversheath marked at regular intervals with the following information:

<CABELTE> <type of cable> <composition> <year of manufacture> <metric marking>

FIBRES IDENTIFICATION

Fibres colour code inside tube

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow	7 · Orange	8 · Grey
9 · Brown	10 · Rose	11 · Violet	12 · Turquoise

Colour of filling elements

Natural.

Tubes colour code

1 · White	2 · Red	3 · Green	4 · Blue
5 · Black	6 · Yellow		



GENERAL CHARACTERISTICS

Mechanical characteristics	
Maximum load EDS	3 600 N
Maximum allowable tension under worst conditions	9 500 N
Resistant cross-sectional area	21,4 mm ²
Young's modulus	98 kN/mm ²
Coefficient of thermal expansion	2,14 x 10 ⁻⁶ °C ⁻¹
Minimum cable sag at installation	2 %
Maximum span (depending on the installation conditions)	300 m

MECHANICAL AND DIMENSIONAL CHARACTERISTICS

Fibres count per cable	N.º of elements	Fibres per tube	Cable diameter (mm)	Cable weight (kg/km)	Breaking Load	Mechanical resistance		Minimum bending radius	
					Minimum (N)	Crush (N/cm)	Impact (J)	Installed (mm)	In service (mm)
12	6	12	16	220	52 000	250	1,5	280	210
24									
36									
48									
60									
72									

Temperature: Storage and transport: - 10°C up to 60°C.

Temperature: Operation: - 20°C up to 60°C.