VALUE
INNOVATION

Optical fiber cable range

Stranded Loose Tube

Value Innovation for advanced telecommunications networks

Regular & Premium Range part of full Product Program

Draka

Value Innovation

Value Innovation is a way of looking at the world. What we can do to help our customers do more, make more, save more and achieve more? A lot. We help our customers to stay ahead. By combining market insight with technological know-how and building strong, long-lasting relationships, we add value to their business with advanced communication solutions and services that are designed to last.

No matter how complex your challenge, we have a product or solution that will do more than meet your needs. And if for some reason we don't, we'll make it for you. New applications, breakthrough cables, custom connectors or complete network designs – it's all part of what we call Value Innovation, and it's what drives us.

Fiber Optics is our business

More and more telecom operators find themselves needing to upgrade or extend their optical fiber networks. With our family of Regular and Premium optical fiber cables, we offer the options you need.

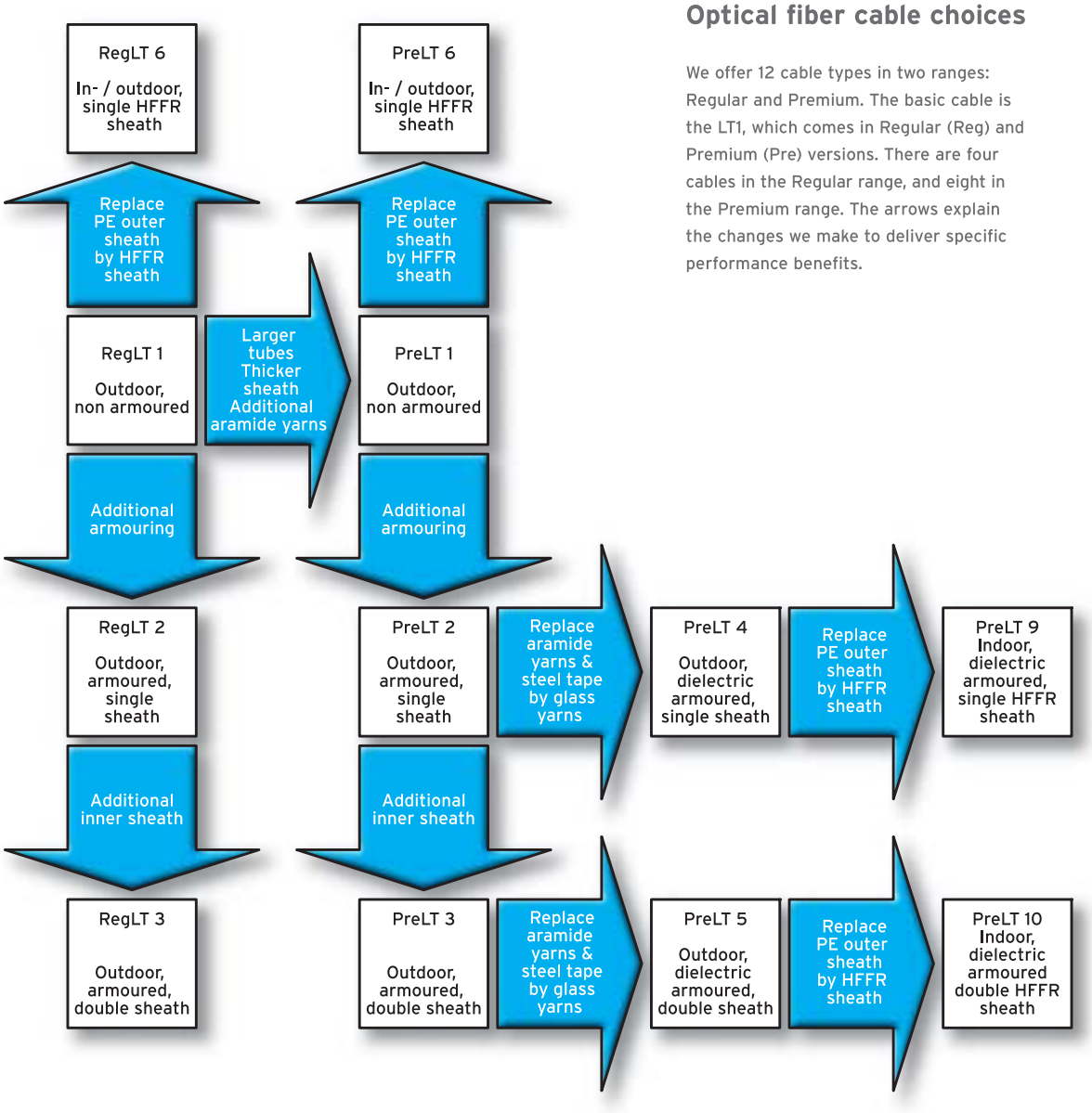
Draka Communications is Europe's largest manufacturer of optical fiber and optical fiber cables. We have production facilities and offices across the continent. And every day, we talk with telecom network operators about their markets, their challenges and their needs, so that we understand them too.

The result of this has been the development of a family of Regular and Premium ready-to-go optical fiber cables that meet the most common needs. Cables for indoor or outdoor use. For direct-buried or duct installation. In armoured and non-armoured versions. And if you need something really advanced, we have that too. Fully dielectric cables? Extra-tough sheathing? Breakthrough high-performance yarns? We offer all these as well.

Our experience tells us that for most situations, our ready-to-go cables are often all you need. And they are available right now.

Optical fiber cable choices

We offer 12 cable types in two ranges: Regular and Premium. The basic cable is the LT1, which comes in Regular (Reg) and Premium (Pre) versions. There are four cables in the Regular range, and eight in the Premium range. The arrows explain the changes we make to deliver specific performance benefits.



Draka optical fiber

Besides producing cutting-edge optical cables, Draka Communications also has its own fiber-making division and is a leader in advanced production techniques.

Draka Communications Optical Fiber is committed to developing solutions that not only answer today's bandwidth requirements but also anticipate the needs and technologies of tomorrow.

Unique processes

Thanks to unique in-house processes like PCVD (Plasma-Activated Chemical Vapour Deposition) and APVD (Advanced Plasma Vapour Deposition), and a strong commitment to R&D, Draka Communications Optical Fiber has everything needed to provide customers with the right product for their needs. Draka Communications Optical Fiber products include Single-mode fibers, Multimode fibers and Specialty fibers. For more information, please visit our website www.drakafiber.com.

Global presence

Draka Communications Optical Fiber operates worldwide, so we're where our customers are. In addition to various research and development facilities and local sales offices, we have six factories in the Netherlands, France, the United States, China, Japan and Brazil, covering Europe, Asia and the Americas respectively.

Draka single mode optical fiber

All Draka optical fiber is made of a high grade doped silica core surrounded by a silica cladding. This is finished with a dual layer, UV-cured acrylate coating.

Standards and Norms			G652D
IEC / EN 60793-2-50			Category B1.3
ITU-T Recommendation			G.652. D and C, B, A
IEEE			802.3 – 2002 incl. 802.3ae
EN 50 173-1: 2007			Cat. OS1 and OS2
ISO / IEC 11801: 2002			Cat. OS1
ISO / IEC 24702: 2006			Cat. OS2 and OS1
Attenuation (cabled fibers)			**IEC 60793-1-40**
1310 nm			< 0.35 dB/km
1383 nm			< 0.35 dB/km
1460 nm			< 0.26 dB/km
1550 nm			< 0.22 dB/km
1625 nm			< 0.24 dB/km
Max. attenuation change in interval 1285-1330 nm (ref. 1310 nm)			< 0.03 dB/km
Max. attenuation change in interval 1525-1575 nm (ref. 1550 nm)			< 0.02 dB/km
Point discontinuity at 1310 and 1550 nm			< ± 0.05 dB/km
Group index of refraction			**IEC 60793-1-22**
Effective group index at 1310 nm			1.467
Effective group index at 1550 and 1625 nm			1.468
Fiber properties according to IEC			**IEC 60793-1**
Mode field diameter at 1310 nm	IEC/EN 60793-1-45	µm	9.0 ± 0.4
Mode field diameter at 1550 nm	IEC/EN 60793-1-45	µm	10.1 ± 0.5
Chromatic dispersion coefficient:	IEC/EN 60793-1-42		
Interval 1285 – 1310 nm		ps/km•nm	< | 3 |
At 1550 nm		ps/km•nm	< 18.0
At 1625 nm		ps/km•nm	< 22.0
Zero dispersion wavelength, λ0		Nm	
Zero dispersion slope		ps/(nm2•km)	< 0.090
Cut-off wavelength	IEC/EN 60793-1-44	λcc nm	< 1260
Polarisation mode dispersion (PMD) coefficient, max. uncabled	IEC/EN 60793-1-48	ps/√km	< 0.1
PMDQ Link Design Value (calculated with Q=0.01%)	IEC/EN 60794-3	ps/√km	< 0.06
Fiber curl radius	IEC/EN 60793-1-34	m	> 4
Strip force (peak)	IEC/EN 60793-1-32	N	1.2 <Fpeaks.strip < 8.9
Dynamic fatigue resistance, aged and unaged (Nd)	IEC/EN 60793-1-33		> 20
Static fatigue resistance (Ns)	IEC/EN 60793-1-33		> 23

Cladding diameter, Cladding non-circularity, Core - cladding concentricity error, Primary coating non circularity, Primary coating - cladding concentricity error, Macrobending loss, Proof stress level, all comply to the international standards.

Regular optical fiber cables

Each cable in our Regular range has been designed with a focus on achieving an economic trade-off between cost and performance, ensuring an optimal fit-for-purpose cable that more than meets 'standard' requirements.

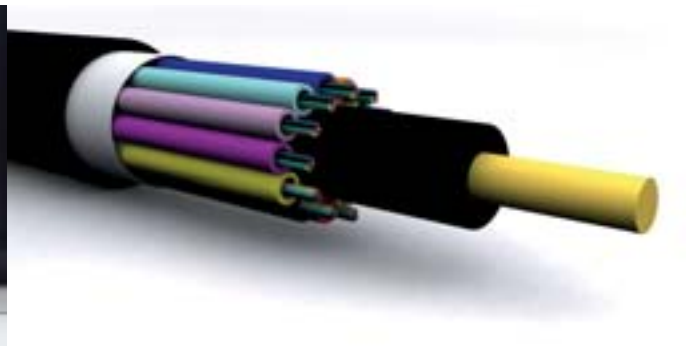
Our Regular range comprises four cable choices: one non-armoured dielectric; two armoured cables (with one or two sheaths); and one in-/outdoor type, sheathed to outdoor-use standard.

All our Regular cables are available immediately from stock. Our logistical support includes on-site, just-in-time deliveries, tailored cable lengths and cable-drum pick up.

Stranded Loose Tube Cables

	Core						Sheath Options			
	Fiber count of Cable	Fiber count per Tube	Buffer / Tube Diameter	Minimum Temp. (0,05 dB/km)	Tensile Strength	Thickness Sheath	Outdoor, Non Armoured	Outdoor, Armoured, Single Sheath	Outdoor, Armoured, Double Sheath	In- / Outdoor, single HFFR sheath
	Qty	Qty	(mm)	(oC)	(N)	(mm)	(RegLT 1) OD (mm)	(RegLT 2) OD (mm)	(RegLT 3) OD (mm)	(RegLT 6) OD (mm)
Regular (RegLT)	12	12	2,2	-3º	1,5*W/1500	1,3	9,5	11,5	13,0	9,5
	24	12	2,2	-3º	1,5*W/1500	1,3	9,5	11,5	13,0	9,5
	36	12	2,2	-3º	1,5*W/1500	1,3	9,5	11,5	13,0	9,5
	48	12	2,2	-3º	1,5*W/1500	1,3	9,5	11,5	13,0	9,5
	72	12	2,2	-3º	1,5*W/1500	1,3	9,5	11,5	13,0	9,5
	96	12	2,2	-3º	1,5*W/1500	1,3	11,0	13,0	14,0	11,0
	144	12	2,2	-3º	1,5*W/1500	1,3	14,0	16,5	17,5	14,0

RegLT 1 – Outdoor, non armoured



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Non Armoured - Dielectric - Dry Core

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
2 Ripcords: Underneath sheath.
Outer Sheath: LDPE.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.2	2.2	2.2	2.2	2.2	2.2	2.2
CSM – Ø	mm	2.3	2.3	2.3	2.3	2.3	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	3.7	6.7
Outer Sheath Thickness	mm	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Cable Diameter	mm	9.5	9.5	9.5	9.5	9.5	11.0	14.0
Cable Weight	kg / km	70	70	70	70	70	95	155

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 30 to + 70°C

Minimum Bending Radius

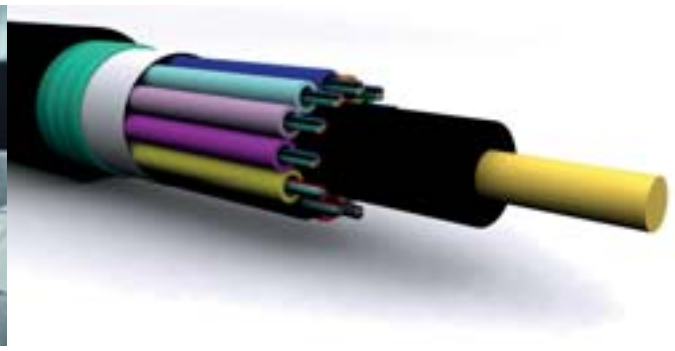
Under Maximum Tension:	20 x Cable-Ø
Without Tension:	10 x Cable-Ø

Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 1500 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	0.5 * W [N], min. 500 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	2000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	12 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-30°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

RegLT 2 – Outdoor, armoured, single sheath



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Armoured - Dry Core - Single

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Armour: both sides copolymer coated corrugated steel tape with overlap, water swellable elements.
Steel thickness: 0.15 mm.
2 Ripcords: Underneath sheath.
Outer Sheath: HDPE.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.2	2.2	2.2	2.2	2.2	2.2	2.2
CSM – Ø	mm	2.3	2.3	2.3	2.3	2.3	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	3.7	6.7
Outer Sheath Thickness	mm	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Cable Diameter	mm	11.5	11.5	11.5	11.5	11.5	13.0	16.5
Cable Weight	kg / km	130	130	130	130	130	155	240

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 30 to + 70°C

Minimum Bending Radius

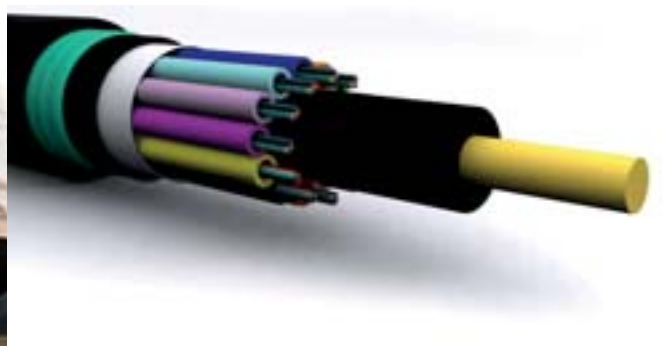
Under Maximum Tension:	20 x Cable-Ø
Without Tension:	15 x Cable-Ø

Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 1500 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	0.5 * W [N], min. 700 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	3000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	25 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-30°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

RegLT 3 – Outdoor, armoured, double sheath



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Armoured - Dry Core - Double Sheath

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Inner Sheath: PE, 2 ripcord.
Armour: both sides copolymer coated corrugated steel tape with overlap, water swellable elements.
Steel thickness: 0.15 mm.
2 Ripcords: Underneath sheath.
Outer Sheath: HDPE.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.2	2.2	2.2	2.2	2.2	2.2	2.2
CSM – Ø	mm	2.3	2.3	2.3	2.3	2.3	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	3.7	6.7
Outer Sheath Thickness	mm	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Cable Diameter	mm	13.0	13.0	13.0	13.0	13.0	14.0	17.5
Cable Weight	kg / km	155	155	155	155	155	190	275

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 30 to + 70°C

Minimum Bending Radius

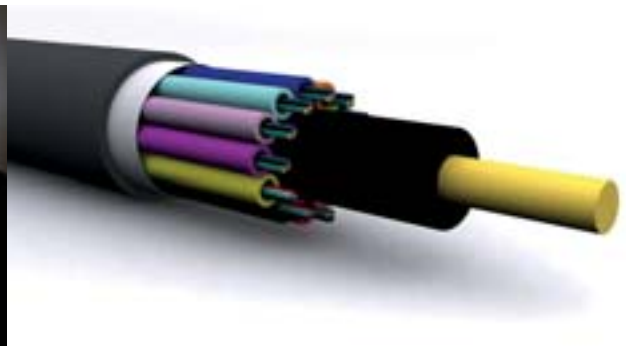
Under Maximum Tension:	20 x Cable-Ø
Without Tension:	15 x Cable-Ø

Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 1500 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	0.5 * W [N], min. 700 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	4000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	30 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-30°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	Sample=3m, water column=1m	no water leakage in 24h

RegLT 6 – Indoor / Outdoor, single HFFR sheath



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Non Armoured - Dry Core - Single HFFR Sheath

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
2 Ripcords: Underneath sheath.
Outer Sheath: HFFR.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.2	2.2	2.2	2.2	2.2	2.2	2.2
CSM – Ø	mm	2.3	2.3	2.3	2.3	2.3	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	3.7	6.7
Outer Sheath Thickness	mm	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Cable Diameter	mm	9.5	9.5	9.5	9.5	9.5	11.0	14.0
Cable Weight	kg / km	90	90	90	90	90	115	175

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 30 to + 70°C

Minimum Bending Radius

Under Maximum Tension:	20 x Cable-Ø
Without Tension:	10 x Cable-Ø

Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 1500 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	0.5 * W [N], min. 700 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	2000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	12 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-30°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

Fire Performance

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Single Cable Test	IEC 60332-1	unburnt cable length	> 50 mm
Smoke Density	IEC 61034	transmission of light	> 60 %
Halogen Content	IEC 60754-1	halogen content	< 0.5 %
Corrosivity of Smoke Gases	IEC 60754-2	pH-value	≥ 4.3
Conductivity of Smoke Gases	IEC 60754-2	conductivity	> 10 µS

Premium optical fiber cables

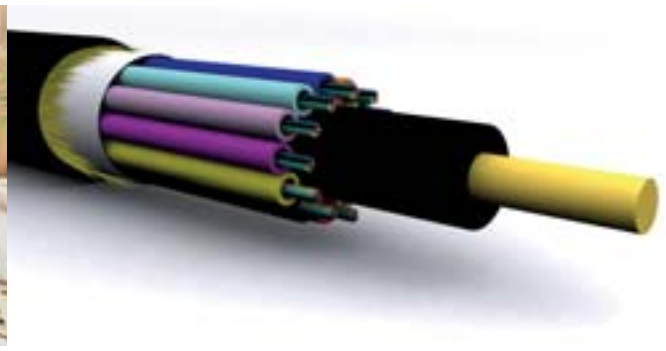
Our Premium optical fiber cable range offers higher levels of performance, a choice of specialist cables and an unmatched technical specification for an extra-long operational life.

The Premium range comprises eight product types: one non-armoured dielectric; four armoured (one or two sheaths and metallic or dielectric armour); one in-outdoor type and two special-dielectric-armoured for protection against rodents.

All our Premium cables are available immediately from stock. Our logistical support includes on-site, just-in-time deliveries, tailored cable lengths and cable-drum pick up.

Stranded Loose Tube Cables

	Core						Sheath Options							
	Fiber count of Cable	Fiber count per Tube	Buffer / Tube Diameter	Minimum Temp. (0,05 dB/km)	Tensile Strength	Thickness Sheath	Outdoor, Non Armoured	Outdoor, Armoured, Single Sheath	Outdoor, Armoured, Double Sheath	Outdoor, Dielectric Armoured, Single Sheath	Outdoor, Dielectric Armoured, Double Sheath	In- / Outdoor, single HFFR sheath	Indoor, Dielectric Armoured, Single HFFR Sheath	Indoor, Dielectric Armoured, Double HFFR Sheath
	Qty	Qty	(mm)	(oC)	(N)	(mm)	(PreLT 1) OD (mm)	(PreLT 2) OD (mm)	(PreLT 3) OD (mm)	(PreLT 4) OD (mm)	(PreLT 5) OD (mm)	(PreLT 6) OD (mm)	(PreLT 9) OD (mm)	(PreLT 10) OD (mm)
Premium (PreLT)	12	12	2,5	-4º	1,5*W/2700	1,5	11,0	12,5	14,0	11,5	13,5	11,0	11,5	13,5
	24	12	2,5	-4º	1,5*W/2700	1,5	11,0	12,5	14,0	11,5	13,5	11,0	11,5	13,5
	36	12	2,5	-4º	1,5*W/2700	1,5	11,0	12,5	14,0	11,5	13,5	11,0	11,5	13,5
	48	12	2,5	-4º	1,5*W/2700	1,5	11,0	12,5	14,0	11,5	13,5	11,0	11,5	13,5
	72	12	2,5	-4º	1,5*W/2700	1,5	11,5	13,0	14,5	12,0	14,0	11,5	12,0	14,0
	96	12	2,5	-4º	1,5*W/2700	1,5	12,5	14,5	16,5	13,5	16,0	12,5	13,5	16,0
	144	12	2,5	-4º	1,5*W/2700	1,5	16,0	18,0	19,5	17,0	19,0	16,0	17,0	19,0



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Non Armoured - Dielectric - Dry Core

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Peripheral Strength Elements: aramide yarns (if required).
2 Ripcords: Underneath sheath.
Outer Sheath: LDPE.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5
CSM – Ø	mm	2.1	2.1	2.1	2.1	2.6	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	4.2	7.5
Outer Sheath Thickness	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Cable Diameter	mm	11.0	11.0	11.0	11.0	11.5	12.5	16.0
Cable Weight	kg / km	85	85	85	85	95	120	190

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 40 to + 70°C

Minimum Bending Radius

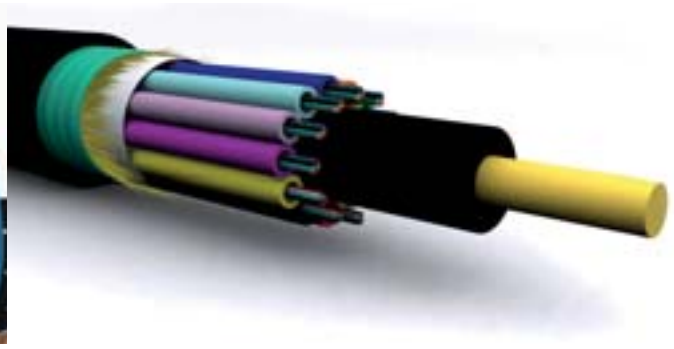
Under Maximum Tension:	20 x Cable-Ø
Without Tension:	10 x Cable-Ø

Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 2700 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	0.5 * W [N], min. 900 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	2000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	15 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-40°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

PreLT 2 – Outdoor, armoured, single sheath



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Armoured - Dry Core - Single Sheath

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Peripheral Strength Elements: aramide yarns (if required).
Armour: both sides copolymer coated corrugated steel tape with overlap, water swellable elements.
Steel thickness: 0.15 mm.
2 Ripcords: Underneath sheath.
Outer Sheath: HDPE.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
DDesign		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5
CSM – Ø	mm	2.1	2.1	2.1	2.1	2.6	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	4.2	7.5
Outer Sheath Thickness	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Cable Diameter	mm	12.5	12.5	12.5	12.5	13.0	14.5	18.0
Cable Weight	kg / km	135	135	135	135	150	190	290

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 40 to + 70°C

Minimum Bending Radius

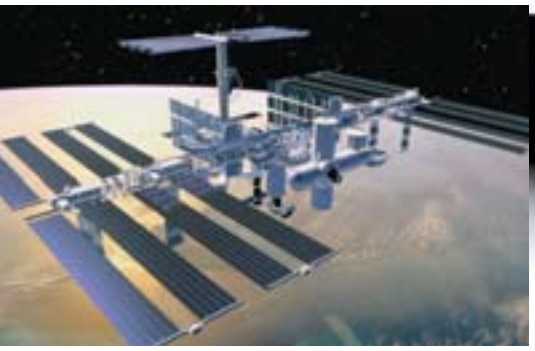
Under Maximum Tension:	20 x Cable-Ø
Without Tension:	15 x Cable-Ø

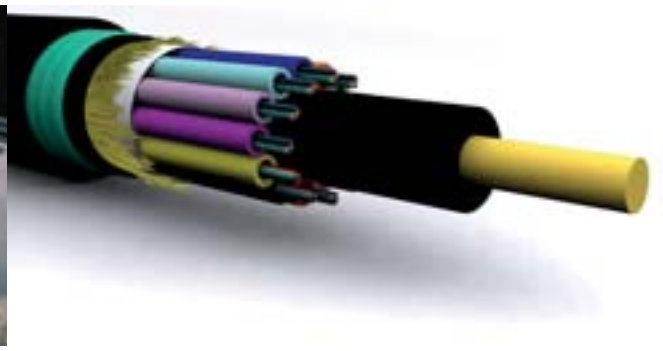
Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 2700 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	0.5 * W [N], min. 900 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	4000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	30 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-40°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

PreLT 3 - Outdoor, armoured, double sheath





Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Dielectric Armoured - Dry Core - Double Sheath

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Peripheral Strength Elements: aramide yarns (if required).
Inner Sheath: PE, 2 ripcord.
Armour: both sides copolymer coated corrugated steel tape with overlap, water swellable elements. Steel thickness: 0.15 mm.
2 Ripcords: Underneath sheath.
Outer Sheath: HDPE.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5
CSM – Ø	mm	2.1	2.1	2.1	2.1	2.6	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	4.2	7.5
Outer Sheath Thickness	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Cable Diameter	mm	14.0	14.0	14.0	14.0	14.5	16.5	19.5
Cable Weight	kg / km	175	175	175	175	195	245	345

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 40 to + 70°C

Minimum Bending Radius

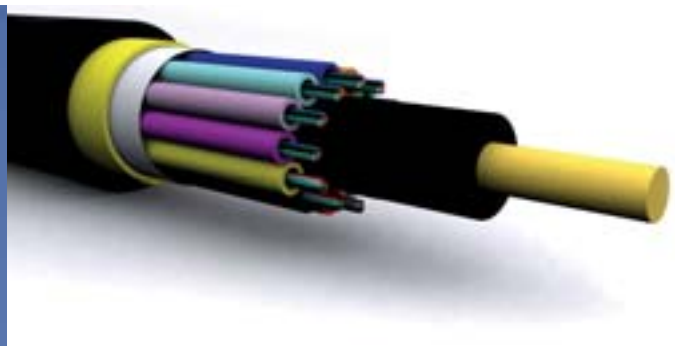
Under Maximum Tension:	20 x Cable-Ø
Without Tension:	10 x Cable-Ø

Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 2700 N	$\Delta\alpha$ reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	0.5 * W [N], min. 900 N	no fiber strain, $\Delta\alpha \leq 0.05$ dB
Crush	IEC 60794-1-2-E3	5000 N / 100 mm, max. 15 min	$\Delta\alpha \leq 0.05$ dB, no damage
Impact	IEC 60794-1-2-E4	40 Nm, 3 impacts, R= 300 mm	$\Delta\alpha \leq 0.05$ dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	$\Delta\alpha \leq 0.05$ dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	$\Delta\alpha \leq 0.05$ dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-40°C to +70°C	$\Delta\alpha \leq 0.05$ dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

PreLT 4 - Outdoor, dielectric armoured, single sheath



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Dielectric armoured - Dry Core - Single Sheath

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Peripheral Strength Elements and Non Metallic Armour: glass yarns.
2 Ripcords: Underneath sheath.
Outer Sheath: HDPE.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5
CSM – Ø	mm	2.1	2.1	2.1	2.1	2.6	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	4.2	7.5
Outer Sheath Thickness	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Cable Diameter	mm	11.5	11.5	11.5	11.5	12.0	13.5	17.0
Cable Weight	kg / km	105	105	105	105	120	150	230

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 40 to + 70°C

Minimum Bending Radius

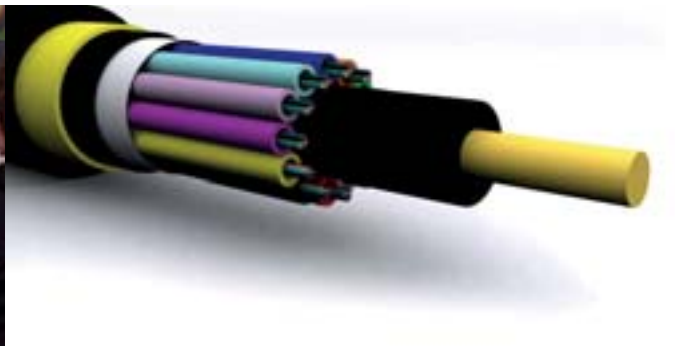
Under Maximum Tension:	20 x Cable-Ø
Without Tension:	15 x Cable-Ø

Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	3 * W [N], min. 2700 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 900 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	4000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	30 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-40°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	Sample=3m, water column=1m	no water leakage in 24h

PreLT 5 – Outdoor, dielectric armoured, double sheath



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Dielectric Armoured - Dry Core - Double Sheath

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Inner Sheath: PE, 2 ripcords
Peripheral Strength Elements and Non Metallic Armour: glass yarns.
2 Ripcords: Underneath sheath.
Outer Sheath: HDPE.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5
CSM – Ø	mm	2.1	2.1	2.1	2.1	2.6	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	4.2	7.5
Outer Sheath Thickness	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Cable Diameter	mm	13.5	13.5	13.5	13.5	14.0	16.0	19.0
Cable Weight	kg / km	145	145	145	145	160	200	290

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 40 to + 70°C

Minimum Bending Radius

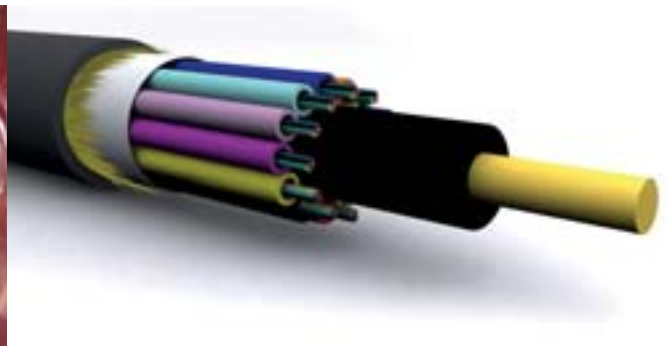
Under Maximum Tension:	20 x Cable-Ø
Without Tension:	10 x Cable-Ø

Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	3 * W [N], min. 5000 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 2500 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	5000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	30 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-40°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

PreLT 6 – Indoor / Outdoor, single HFFR sheath



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Non Armoured - Dry Core - Single HFFR Sheath

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Peripheral Strength Elements: glass yarns, when needed.
2 Ripcords: Underneath sheath.
Outer Sheath: HFFR.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5
CSM – Ø	mm	2.1	2.1	2.1	2.1	2.6	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	4.2	7.5
Outer Sheath Thickness	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Cable Diameter	mm	11.0	11.0	11.0	11.0	11.5	12.5	16.0
Cable Weight	kg / km	110	110	110	110	120	150	230

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 40 to + 70°C

Minimum Bending Radius

Under Maximum Tension:	20 x Cable-Ø
Without Tension:	10 x Cable-Ø

Main Mechanical and Environmental Characteristics

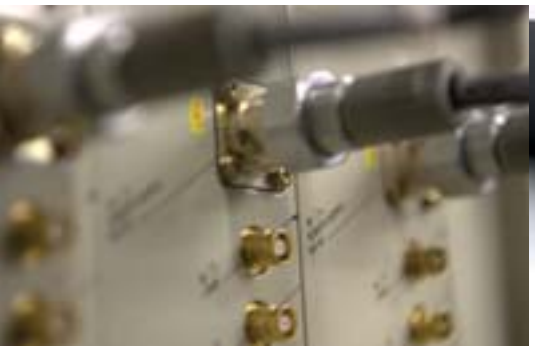
All optical measurements at 1550 nm.

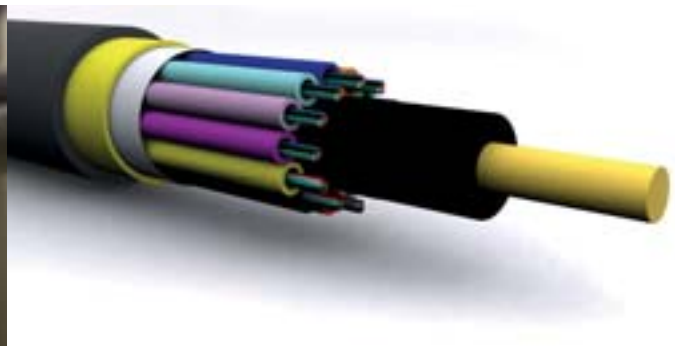
Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 2700 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	0.5 * W [N], min. 900 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	2000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	15 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-40°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

Fire Performance

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Single Cable Test	IEC 60332-1	unburnt cable length	> 50 mm
Smoke Density	IEC 61034	transmission of light	> 60 %
Halogen Content	IEC 60754-1	halogen content	< 0.5 %
Corrosivity of Smoke Gases	IEC 60754-2	pH-value	≥ 4.3
Conductivity of Smoke Gases	IEC 60754-2	conductivity	> 10 µS

PreLT 9 – Indoor, dielectric armoured, single HFFR sheath





Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Dieletric Armoured - Dry Core - Single HFFR Sheath

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Peripheral Strength Elements and Non Metallic Armour: glass yarns.
2 Ripcords: Underneath sheath.
Outer Sheath: HFFR.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5
CSM – Ø	mm	2.1	2.1	2.1	2.1	2.6	3.0	3.5
CSM-Oversheathing - Ø	mm	-	-	-	-	-	4.2	7.5
Outer Sheath Thickness	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Cable Diameter	mm	11.5	11.5	11.5	11.5	12.0	13.5	17.0
Cable Weight	kg / km	130	130	130	130	145	185	270

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 40 to + 70°C

Minimum Bending Radius

Under Maximum Tension:	20 x Cable-Ø
Without Tension:	10 x Cable-Ø

Main Mechanical and Environmental Characteristics

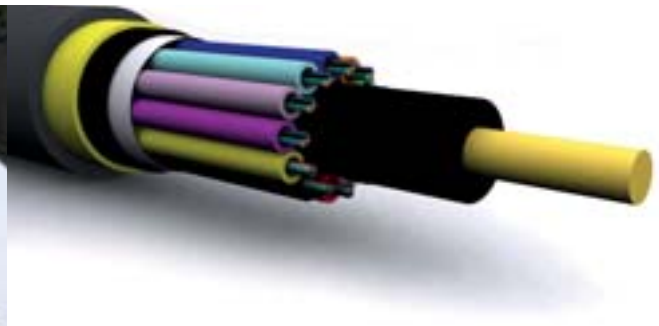
All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	3 * W [N], min. 5000 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 2500 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	4000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	30 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-40°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

Fire Performance

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Single Cable Test	IEC 60332-1	unburnt cable length	> 50 mm
Smoke Density	IEC 61034	transmission of light	> 60 %
Halogen Content	IEC 60754-1	halogen content	< 0.5 %
Corrosivity of Smoke Gases	IEC 60754-2	pH-value	≥ 4.3
Conductivity of Smoke Gases	IEC 60754-2	conductivity	> 10 µS

PreLT 10 – Indoor, dielectric armoured, double HFFR sheath



Cable Design

Acc. to IEC 60794-3-10

Loose Tube Fiber Optic Cable - Dielectric Armoured - Dry Core - Double HFFR Sheath

Central Strength Member (CSM): glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed.
Loose Tube: thermoplastic material, containing up to 12 fibers and filled with a suitable water tightness compound.
Filler Elements: thermoplastic rods, where needed.
Stranding: loose tubes (and fillers), SZ stranded around the CSM.
Longitudinal Water Tightness: dry core with water swellable elements.
Inner Sheath: HFFR. 2 ripcords.
Peripheral Strength Elements and Non Metallic Armour: glass yarns.
2 Ripcords: Underneath sheath
Outer Sheath: HFFR.

Configuration

No. of Fibers		**12**	**24**	**36**	**48**	**72**	**96**	**144**
Design		1x12	2x12	3x12	4x12	6x12	8x12	12x12
Loose Tube / Filler - Ø	mm				2.5			
CSM – Ø	mm			2.1		2.6	3.0	3.5
CSM-Oversheathing - Ø	mm			-		-	4.2	7.5
Outer Sheath Thickness	mm				1.5			
Cable Diameter	mm			13.5		14.0	16.0	19.0
Cable Weight	kg / km			190		205	255	355

Application

Temperature Range

Transportation & Storage:	- 40 to + 70°C
Installation:	- 30 to + 60°C
Operation:	- 40 to + 70°C

Minimum Bending Radius

Under Maximum Tension:	20 x Cable-Ø
Without Tension:	10 x Cable-Ø

Main Mechanical and Environmental Characteristics

All optical measurements at 1550 nm.

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Max. Installation Tension	IEC 60794-1-2-E1	3 * W [N], min. 5000 N	Δα reversible, fiber strain ≤ 0.33%
Max. Operation Tension	IEC 60794-1-2-E1	1.5 * W [N], min. 2500 N	no fiber strain, Δα ≤ 0.05 dB
Crush	IEC 60794-1-2-E3	5000 N / 100 mm, max. 15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	40 Nm, 3 impacts, R= 300 mm	Δα ≤ 0.05 dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	Δα ≤ 0.05 dB, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20x D, 100 N, 35 cycles	no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns, 3 cycles	Δα ≤ 0.05 dB, no damage
Temperature Cycling	IEC 60794-1-2-F1	-40°C to +70°C	Δα ≤ 0.05 dB/km
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h

Fire Performance

Test	**Test Standard**	**Specified Value**	**Acceptance Criteria**
Single Cable Test	IEC 60332-1	unburnt cable length	> 50 mm
Smoke Density	IEC 61034	transmission of light	> 60 %
Halogen Content	IEC 60754-1	halogen content	< 0.5 %
Corrosivity of Smoke Gases	IEC 60754-2	pH-value	≥ 4.3
Conductivity of Smoke Gases	IEC 60754-2	conductivity	> 10 µS