

LIGHTWIN® MICRO DUCT CABLE WITH NYLON SHEATH FOR INSTALLATION BY BLOWING

LTMC 288 A1CH24X12PA

DESCRIPTION

Lightwin® mini cable, A-DQ(ZN)4Y PA, 288 fibres, G.657.A1
 Sheath material: Polyamide - better injection properties than HDPE
 Fiber: Singlemode, bend insensitive G.657A1 fiber
 Bundling: 24x12
 outer diameter: 9,3mm
 weight/km: 80kg
 optimal for installation by blowing into microduct systems
 Cable Sheath Marking:
 LIGHTWIN - LTMC 24x12 SM G.657.A1 (24x12) 250µm PA COATING {Batch} {Länge}
 Colour code fibres and bundles according to data sheet
 Length on drum: 6km



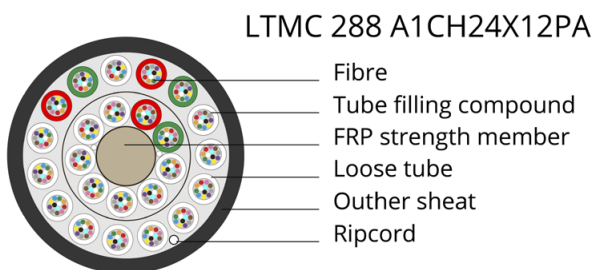
Note: Colour code of tubes following colour table in this datasheet

GENERAL DESIGN

Optical fibers are housed in loose tubes that are made of high-modulus plastic and filled with waterproof compounds. FRP is applied as central strength member. Loose tubes are SZ-stranded around the strength member. Water blocking yarns are used in and over the cable core to prevent it from water ingress. Nylon 12 sheath is applied over the cable core as the outer sheath.

CONSTRUCTION

Cross Section of Cable



SUITABLE FOR FOLLOWING MICRODUCT DIAMETERS



EAN number	9120072486487
Packaging	Disposable wooden drum
Weight	80 kg/km

PART NUMBER

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GENERAL

This specification covers the design and performance of the single mode optical cables to be used in air blown micro duct application.

CABLE DESCRIPTION

- 12/24/36/48/72/96/144/192/216/288 /432/576 G657A1 SM-fibers.
- Loose tubes SZ-stranded.
- Suitable for air blown installation in micro-duct .

QUALITY

LIGHTWIN ensures a continuing level of quality in our cable products through several programs including ISO 9001.

RELIABILITY

LIGHTWIN ensures product reliability through rigorous qualification testing of each product family. Both initial and periodic qualification testing are performed to assure the cable's performance and durability in the field environment.

REFERENCE

ITU-T G.657A1	Characteristics of a single-mode optical fiber
IEC 60794-1-1	Optical fiber cables- part1-1-Generic specification-General
IEC 60794-1-2	Optical fiber cables- part1-2-Generic specification-Basic optical cable test procedure
IEC 60794-3	Optical fiber cables- part3-Sectional specification- Outdoor cables
IEC 60794-5	Optical fiber cables- part5-Sectional specification- Microduct cabling for installation by blowing

WORKING CONDITION

Transportation and storage temperature:	-30°C~+70°C
Installation temperature:	-10°C~+50°C
Operation temperature:	-30°C~+70°C

MINIMUM ALLOWABLE BENDING RADIUS

Static:	10D (D is the out diameter of the cable)
Dynamic:	20D (D is the out diameter of the cable)

LIFE TIME

Optical fiber cables supplied in compliance with the specifications can be capable of withstanding the typical service condition for a period of twenty-five (25) years without detriment to the transmission or operation and maintenance characteristics of the cable.

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OPTICAL FIBER IN CABLE(ITU-G.657A1)

Optical properties of the SM fiber are achieved through a germanium doped silica based core with a pure silica cladding which meets ITU-T G.657A1, UV curable acrylate protective coating is applied over the glass cladding to provide the necessary maximum fiber lifetime. Geometrical, optical, and mechanical characteristics of fiber in cable as the following table:

Category	Description	Specification	
		Before cable	After cable
Geometrical Characteristics	Cladding diameter	125.0 ± 1 µm	
	Cladding non-circularity	≤ 1.0 %	
	Core concentricity error	≤ 0.6µm	
	Coating diameter	245± 10 µm(Before Colored) 250 ± 15 µm (Colored)	
	Coating/cladding concentricity error	≤ 12µm	
Optical Characteristics	Mode field diameter at 1310 nm	8.8 ± 0.4 µm	
	Point discontinuity		
	Attenuation at 1310 nm	≤ 0.34 dB/km	≤ 0.36 dB/km
	Attenuation at 1383 nm	≤ 0.34 dB/km	≤ 0.34 dB/km
	Attenuation at 1550 nm	≤ 0.21 dB/km	≤ 0.21 dB/km
	Dispersion in 1288 – 1339 nm	≤ 0.23 dB/km	
	Dispersion in 1271 – 1360 nm	≤ 3.5 ps/(nm·km)	
	Dispersion at 1550 nm	≤ 5.3 ps/(nm·km)	
	Zero dispersion wavelength	≤ 18 ps/(nm·km)	
	Zero dispersion slope	1300 – 1324 nm	
	Cable cut-off wavelength	≤ 0.092 ps/(nm ² ·km)	
	Polarization mode dispersion individual fiber	≤ 1260 nm	
	Polarization mode dispersion design link value (M=20, Q=0.01%)	≤ 0.2 ps/√km	
Macro-bend loss (100 turns, 30mm radius, 1550/1625nm)	≤ 0.1 ps/√km		
Mechanical Specification	Proof stress level	≤ 100kpsi (0.69 GPa)	
	Coating strip force(peak value)	1.3~8.9N	
	Fiber curl (Radius)	≥ 4 m	

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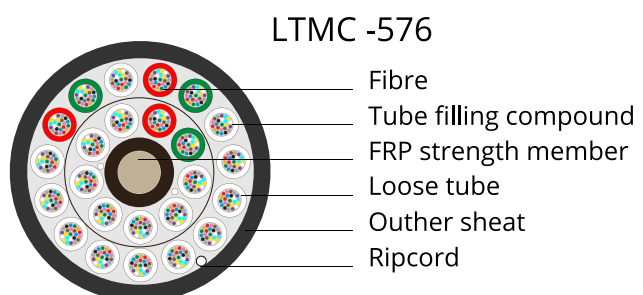
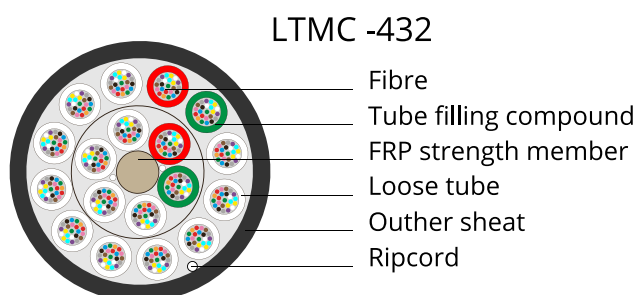
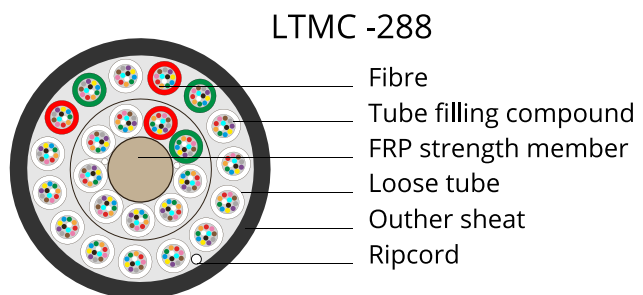
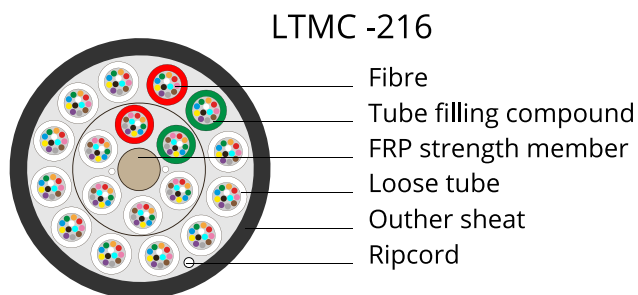
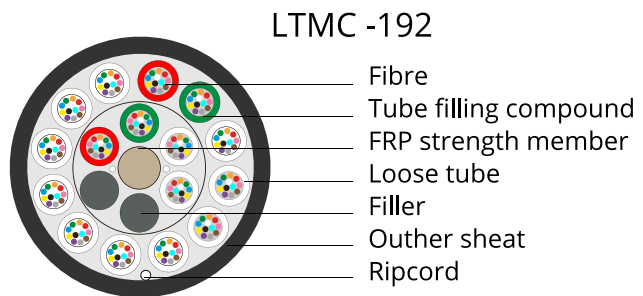
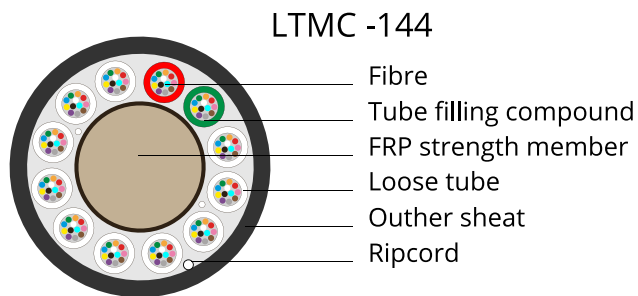
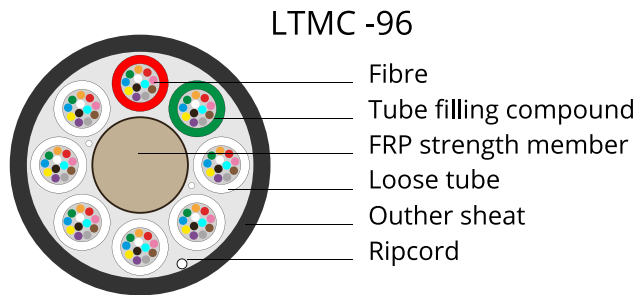
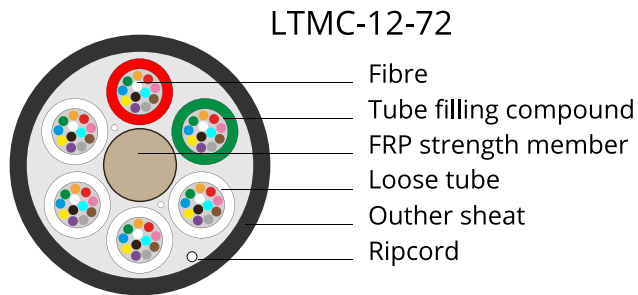
Loose tubes are SZ-stranded around the strength member.

Water blocking yarns are used in and over the cable core to prevent it from water ingress.

Polyethylene sheath is applied over the cable core as the outer sheath.

CONSTRUCTION

Cross Section of Cable



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DIMENSIONS AND DESCRIPTIONS OF CABLE CONSTRUCTIONS

Item	contents	Value																
		12	24	36	24	48	72	96	144	192	216	288	144	192	288	432	576	
Loose tube	Number	2	4	6	2	4	6	8	12	16	18	24	6	8	12	18	24	
	Outer diameter ±0.1mm	1.2			1.45						2.1							
Filler	Number	4	2	0	4	2	0	0	0	2	0	0	0					
fiber counts per tube	G.657.A1	6			12						24							
Central strength member	Material	FRP																
	Diameter (mm)	1.2			1.6			2.4	2.4	1.6	2.8	2.25	2.8	2.8	2.25	2.8		
	Diameter of PE lay	/			/			/	4.1	/	/	/	3.5	6.1	/	4.1		
Outer sheath	Material	Nylon 12																
	Color	Black or orange																
	Thickness (mm)	Approx.0.45																
Cable diameter(±0.2mm)		4.5			5.4			6.1	7.9			9.3	7.3	8.8	11.4	11.5	13.4	
For micro -duct inside (mm)		6-8			8-12			8-12	10-14			12-14	10-14	12-14	14-16		16-20	
Max. tensile strength (N)		200			600			800		600		1000	800	1000	1200	1000	1200	
Crush(N/100mm)		Short term: 500 Long term: 200																
Cable weight(kg/km) Approx.		16			26			36	52	52		80	42	76	110	105	140	

CABLE SHEATH MARKING

Unless otherwise specified, the cable sheath marking shall be as follows:

- Color: white or black
- Contents: LIGHTWIN, the year of manufacture, the type of cable, length marking
- Interval: 1m

REEL LENGTH

Standard reel length
 12-144 Fiber cable 4 km/drum
 192-288 Fiber cable 6km / drum
 432 & 576 Fiber cable 6km / drum
 Other lengths available on request

CABLE DRUM

The cables are packed in wooden drums

LABELING

The direction of rotation of the color scheme is shown by marking the clockwise and anti-clockwise ends with red and green adhesive tape respectively.

The markings are on both sides of the flanges as follows:

- Cable Type/Size
- Cable Length
- Gross Weight
- Production date
- Charge number

CABLE PACKING

Both cable ends are provided with protections against water penetration and firmly secured to the drum, so the cable cannot move and the turns cannot slide when it is moved, handled or laid. the inner end is available for testing.

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COLOR CODE OF THE FIBER

Each fiber can be identifiable throughout the length of the cable in accordance with the following color sequence. Fiber color in each tube starts from No. 1 Red.

Color code of Fibers according to Swisscom color code. Installer could also make the DIN color code, because the colors are the same. Just a different sequence.

No.	1	2	3	4	5	6	7	8	9	10	11	12
Color	Red	Green	Yellow	Blue	White	Violett	Orange	Black	Grey	Brown	Pink	Aqua
No.	13	14	15	16	17	18	19	20	21	22	23	24
Color	Red	Green	Yellow	Blue	White	Violett	Orange	Black	Grey	Brown	Pink	Aqua

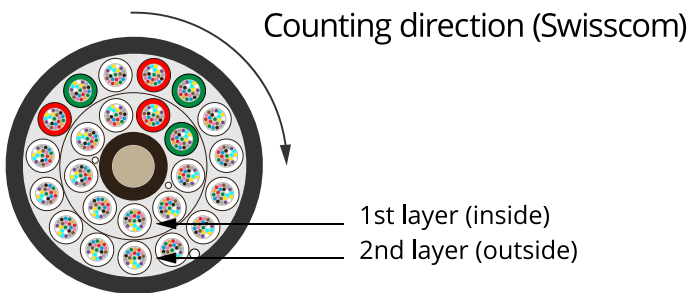
Ring marks width 2 ± 1.5 mm, Color ring intervals 60 ± 10 mm.

COLOR CODE OF THE LOOSE TUBE

According to following Color code

No.	1	2	3	4	5	6	7	8	9	10	11	12
Color	Red	Green	White	White	White	White	White	White	White	White	White	White

COUNTING DIRECTION OF THE LOOSE TUBES



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MECHANICAL, ELECTRICAL AND ENVIRONMENTAL TEST CHARACTERISTICS

The finished cables can be subjected to the following mechanical, electrical and environmental conditions.

Item	Test Method	Requirements
Tensile performance	IEC 60794-1-2-E1 Load: according to short term tensile described in 3.2.2 Cable length under tension: Not less than 50m. Duration of load sustain: 1min. Velocity of transfer device: 10mm/min	The maximum fiber strain less than 0.6% under maximum tensile short term load. The maximum increase in attenuation less than 0.1dB. No change in attenuation after test at 1550nm. Under visual examination without magnification, no damage to the sheath or to the cable elements after test.
Crush	IEC 60794-1-2-E3 Load: 500N Duration of load: 1min	No change in attenuation after test at 1550nm. Under visual examination without magnification, no damage to the sheath or to the cable elements. The imprint of the striking surface on the sheath is not considered mechanical damage.
Bend	IEC 60794-1-2-E11A Mandrel radius: 10 times cable diameter Turns:10 Cycles:5	No change in attenuation at 1550nm after test. Under visual examination without magnification, no damage to the sheath or to the cable elements.
Repeated bending	IEC 60794-1-2-E6 Bending radius: 20 times cable diameter Cycles: 25 Load: 25N Duration of cycle: Approximately 2s.	No change in attenuation at 1550nm after test. Under visual examination without magnification, no damage to the sheath or to the cable elements.
Torsion	IEC 60794-1-2-E7 Cycles:5 Length under test: 1m Turns: $\pm 180^\circ$ Load: 40N	The variation on attenuation for each fiber less than 0.05dB at 1550nm Under visual examination without magnification, no damage to the sheath or to the cable elements. No permanent change in attenuation after test
Temperature cycling	IEC 60794-1-2-F1 Sample length: at least 1000m Temperature range: -30°C+70°C Cycles: 2 Temperature cycling test dwell time: 12 hours	There is no change in attenuation coefficient at 1550nm after the test.
Water Penetration	IEC 60794-1-2-F5B Time : 24 hours Sample length : 3m Water height : 1m	No water leakage
Compound flow	IEC 60794-1-2-E14 Sample count:5 Sample length:300 ± 5 mm, Remove length: 130 $\pm 2,5$ mm, Time:24h	No filling compound dripped.
Other parameters	According to IEC 60794 ,YD/T 1460.4-2006	

Remark: "No attenuation changes" is considered as the attenuation changes ≤ 0.05 dB.