Z-XOTKtsd 12 - 192 Optical Fibre

Spec. No. 2557/1/6/3 MB

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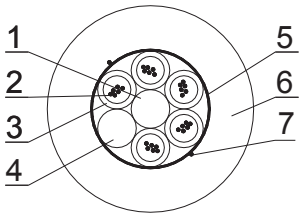
Type: outdoor, fully dielectric



Cable construction:

1. Central element, non-metallic
2. Optical fibres
3. Loose tube
4. Filler
5. Waterblocking yarn
6. Outer sheath
7. Ripcord

CONSTRUCTION				
Element	**Type**	**Material**	**Dimensions**	
Fibres	ITU-T G.652D , ITU-T G.657A or according to the attached specifications			
Identification of fibres	Comply to IEC EN 60304 : Red; Green; Blue; White; Violet; Orange; Grey; Yellow; Brown; Pink; Black; Turquoise fibres above 12 in tube: Red; Green; Blue; White; Violet; Orange; Grey; Yellow; Brown; Pink; Natural; Turquoise with black ring			
Identification of tubes/elements	for each of the layers: First tube - Red, second tube - Green, other tube - natural, filler (when needed) - black			
Central support member	straight rod	Fibre Reinforced Plastic	ϕ 1.8 mm for 12, 24, 48, 72 fibres ϕ 2.3 mm for 96 and 144 fibres ϕ 3.0 mm for 192 fibres	
Secondary coating	loose tube - thermoplastic material 12 or 24 fibres	PBT	ϕ 1.8 mm for 12, 24, 48, 72 fibres 250µm ϕ 2.2 mm for 96 and 144 fibres 250µm ϕ 1.8 mm for 192 fibres 200µm	
Filling of the tube	gel	tixotropic gel		
Interstitial waterblocking	dry sealed	swelling yarn		
Outer sheath	black	HDPE	Thickness for 12, 24, 48, 72 fibres: minimum spot average	 0.40 mm 0.55 mm
			Thickness for 96 and 144 fibres: minimum spot average	 0.45 mm 0.60 mm
			Thickness for 192 fibres: minimum spot average	 0.55 mm 0.70 mm
Attenuation @1310 nm	≤ 0.36 dB/km			
Attenuation @1550 nm	≤ 0.23 dB/km			
Marking/Printing:	**TF Kable 1 cavo ottico Z-XOTKtsd 24 J (2x12) INF-ING-ST-007-18 4.0** ***year of production*** (or according to the agreement). Length marking every meter			
Standard delivery lengths	4200 ± 100 m on wooden drums			

*) Max attenuation for SMF in cable - other parameters of the fibre according to the attached specifications

Z-XOTKtsd 12 - 192 Optical Fibre

Spec. No. 2557/1/6/3 MB

PARAMETERS

No. of fibres in a cable	Outer diameter of tube [mm]	No. of elements in a cable (tubes/filers)	Cable dimensions		Mechanical properties			
			Outer diameter [mm]	Cable weight [kg/km]	Max. tensile load [N]		Min. bending radius [mm]	
					Dynamic (during installation)	Static (during the operation)	Dynamic (during installation)	Static (during the operation)
12 (1x12 250µm)	1.8	1T + 5F	6.5	35	1000	500	15 x outer diameter	20 x outer diameter
24 (2x12 250µm)	1.8	2T + 4F	6.5	35	1000	500	15 x outer diameter	20 x outer diameter
48 (4x12 250µm)	1.8	4T + 2F	6.5	35	1000	500	15 x outer diameter	20 x outer diameter
72 (6x12 250µm)	1.8	6T	6.5	35	1000	500	15 x outer diameter	20 x outer diameter
96 (4x24 250µm)	2.2	4T + 2F	8.0	52	1500	750	15 x outer diameter	20 x outer diameter
144 (6x24 250µm)	2.2	6T	8.0	52	1500	750	15 x outer diameter	20 x outer diameter
192 (8x24 200µm)	1.8	8T	8.0	58	1500	750	15 x outer diameter	20 x outer diameter

ADDITIONAL MECHANICAL PROPERTIES

Test	Standard	Value	Acceptance criteria
Crush	IEC 60794-1-2-E3	1000 N; t =15 min	Δα ≤ 0.05 dB, no damage
Impact	IEC 60794-1-2-E4	3 Nm, 3 impacts	Δα ≤ 0.05 dB after the test
Repeated bending	IEC 60794-1-2-E6	R=20×D; F=100 N 100 cycles, 90 °, 15 cycles/min	Δα ≤ 0.1 dB, no damage
Torsion	IEC 60794-1-2-E7	100 N, 5 cycles, 360	Δα ≤ 0.05 dB, no damage

ENVIRONMENTAL SPECIFICATIONS

Water penetration	IEC 60794-1-2-F5B	sample 1 m, water head 1 m, 24 hours	
Temperature range		- transport/storage	-40/+70 °C
		- installation	-15/+60 °C
		- operation	-30/+70 °C

FEATURES

- fully dielectric
- resistant to electromagnetic interferences
- secured from longitudinal water penetration
- resistant to abrasion, UV and stress corrosion

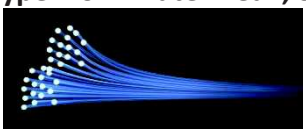
APPLICATIONS

Cable is designated for a long distance transmission of digital and analogue signals within the whole optical bandwidth used in wide and local telecom networks of any spatial configuration. Suitable for use in primary and secondary cable ducts or in the proximity to HV lines.

Single Mode Fiber

ITU-T G652(Tables A,B,C,D) and ITU-T G.657.A1
IEC Specifications 60793-2-50

Type: Low Water Peak, Single Mode



CONSTRUCTION

Characteristic	Low water peak single mode optical fiber, which enables customers to construct high performance wired networks for voice , video, and/or data transmission. The fiber made of germanium doped silica core and a silica cladding is in compliance with ITU-T G.657.A1 and ITU-T G.652A,B,C and D. A dual layer acrylate is coated over the cladding to provide high product reliability and allows easy splicing throughout the cable life. Its low water peak characteristics and excellent stability performace against hydrogen provide broad-range operational bandwith while maintaining fully compatibility with conventional SMF with higher proof testing , the fiber gives much tolerance in cabling and installation.
Type of primary coating	dual layer UV cured acrylate
Core material composition	germanium doped silica, no boron, no phosphorous
The optical fibres inside the cable do not contain splices.	

DIMENSIONS

mode field diameter @ 1310 nm	9.2 ± 0.4 µm
mode field diameter @ 1550 nm	10.4 ± 0.5 µm
Core/Clad concentricity error	≤ 0.5 µm
cladding diameter	125 ± 0.7 µm
cladding non-circularity	≤ 0.5 %
coating diameter (Colored)	250 ± 15 µm
coating/cladding eccentricity	≤ 12 µm

OPTICAL PERFORMANCE

Attenuation	Typical Values	Max. Values
- @ 1310 nm	0.33-0.35 dB/km	0.40 dB/km
- @ 1550 nm	0.19-0.22 dB/km	0.25 dB/km
- @ 1625 nm	0.20-0.24 dB/km	0.40 dB/km
- @ 1383 nm	0.31-0.35 dB/km	0.40 dB/km

Chromatic dispersion @ 1550 nm	$\leq$ 18 ps/nm/km)
Cut-off wavelength (λcc)	$\leq$ 1260 nm
Zero dispersion wavelength (λ_0)	$1300 < \lambda_0 < 1324$nm
Polarization mode dispersion max. individual fiber	<=0.1ps/√km
Polarization mode dispersion link value	<=0.04ps/√km

Single Mode Fiber

ITU-T G652(Tables A,B,C,D) and ITU-T G.657.A1
IEC Specifications 60793-2-50

PERFORMANCE CHARACTERISTICS		
Effective group index of refraction	1.466	@1310 nm/1383 nm
	1.467	@1550 nm
	1.470	@1625 nm

MECHANICAL PROPERTIES	
prooftest entire length	1.2 %
strippability; stripping force	1.3 – 8.9 N

BENDING INDUCED ATTENUATION			
Mandrel Radius	Number of Turns	Wavelength	Attenuation
10 mm	1	1550 nm	≤ 0.75 dB
10 mm	1	1625 nm	≤ 1.5 dB
15 mm	10	1550 nm	≤ 0.25 dB
15 mm	10	1625 nm	≤ 1.0 dB
16 mm	1	1550 nm	≤ 0.05 dB
25 mm	100	1310/1550 nm	≤ 0.05 dB
30 mm	100	1625 nm	≤ 0.05 dB

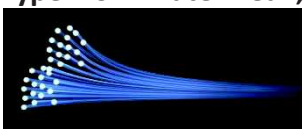
ENVIRONMENTAL SPECIFICATIONS		
Test	Test Condition	Induced attenuation @1310, 1550 & 1625 nm
Temperature humidity cycling	-10 to + 85°C up to 98%RH	≤0.05 dB/km
Temperature dependen	-60 to + 85°C	≤0.05 dB/km

Single Mode Fiber

ITU-T G.657.A1

IEC Specifications 60793-2-50 Type B1.3

Type: Low Water Peak, Single Mode, Reduced diameter



CONSTRUCTION	
Characteristic	Low water peak single mode optical fiber in 200µm coating diameter for a reduced cable diameter design, which enables customers to construct high performance wired networks for voice , video, and/or data transmission. The fiber made of germanium doped silica core and a silica cladding is in compliance with ITU-T G.657A and ITU-T G.652A,B,C and D. A dual layer acrylate is coated over the cladding to provide high product reliability and allows easy splicing throughout the cable life. The fiber supports access networks including last one -mile application such like FTTH due to its excellent bending performance while maintaining compatibility with conventional SMF.
Type of primary coating	dual layer UV cured acrylate
Core material composition	germanium doped silica, no boron, no phosphorous
The optical fibres inside the cable do not contain splices.	

DIMENSIONS	
mode field diameter @ 1310 nm	8,6 ± 0,4 µm
Core/cladding concentricity error	≤ 0,5 µm
cladding diameter	125 ± 0,7 µm
cladding non-circularity	≤ 0,5 %
coating diameter (uncoloured fibre)	205 ± 7 µm
coating/cladding eccentricity	≤ 12 µm

OPTICAL PERFORMANCE		
Attenuation	Typical Values (99% fibres in cable)	Max. Values
- @ 1310 nm	0,33-0,35 dB/km	0,40 dB/km
- @ 1550 nm	0,19-0,22 dB/km	0,25 dB/km
- @ 1625 nm	0,20-0,24 dB/km	0,30 dB/km
- @ 1383 nm	0,30-0,35 dB/km	0,40 dB/km
Chromatic dispersion		
- @ 1550 nm	≤ 18 ps/(nm*km)	
- @ 1625nm	≤ 22 ps/(nm*km)	
Polarization mode dispersion	≤ 0,2 ps/km^2	
Fiber PMD link design value	≤ 0,08 ps/km^2	
Cut-off wavelength (λcc)	≤ 1260 nm	
Zero dispersion wavelength (λ_0)	1300 < λ_0 < 1324nm	

Single Mode Fiber

ITU-T G.657.A1

IEC Specifications 60793-2-50 Type B1.3

MECHANICAL PROPERTIES		
prooftest entire length	0,86 GPa	1,2 %
strippability; stripping force		1,3 – 8,9 N

Bending induce attenuation:

MECHANICAL PROPERTIES			
Mandrel radius [mm]	Number of turns	Wavelength [nm]	Attenuation dB
10	1	1550	≤ 0,75
10	1	1625	≤ 1,5
15	10	1550	≤ 0,25
15	10	1625	≤ 1,0
16	1	1550	≤ 0,05
25	100	1310/1550	≤ 0,05
30	100	1625	≤ 0,05

ENVIRONMENTAL SPECIFICATIONS		
Test	Test Condition	Induced attenuation @1310, 1550 & 1625 nm
Temperature humidity cycling	-10 to + 85°C up to 98%RH	≤0,05 dB/km
Temperature dependen	-60 to + 85°C	≤0,05 dB/km

PERFORMANCE CHARACTERISTICS		
Effective group index of refraction	@1310nm / 1383nm	1,466
	@1550 nm	1,467
	@1625 nm	1,470

Sławomir Dybczak; TELE-FONIKA Kable S.A.

Elektronicznie podpisany przez Sławomir Dybczak; TELE-FONIKA Kable S.A.
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