

## MULTITUBE OPTICAL FIBRE CABLES - TKEST TYPE



Optic Fiber



Rodent resistant



UV resistant



Impact resistant



Low smoke emission



Fire retardant



Zero halogen



ROHS compliant

## STANDARDS

Construction: ADIF 03.366.780.9 –5<sup>th</sup> Edition.

Fibre: ITU-T G652D

## DESCRIPTION AND APPLICATION

“Loose tube” singlemode optical fibre cables from 16 to 128 fibres for installation in tunnels or indoors with double, fire resistant, halogen-free TKEST armoured sheath. Protected against rodents.

## CONSTRUCTION

- **Central reinforcing element:** Dielectric fibreglass (FRP).
- **Loose tubes:** 4, 8 or 12 singlemode optical fibres in PBT loose tubes filled with thixotropic compound. Colour coding of tubes and fibres according to tables 1 and 2.
- **Core formation:** Loose tubes stranded in SZ. Swellable yarns and tapes to avoid water penetration and make the cable waterproof.
- **Inner sheath:** Fire retardant thermoplastic, low smoke emission and halogen free.
- **Reinforcement:** Aramid yarns as reinforcing element.
- **Armour:** Longitudinal copolymer steel armour, corrugated and rodent resistant.
- **Outer sheath:** Black fire retardant thermoplastic, low smoke emission and halogen free.
- **Sheath marking :** The cable sheath will be marked with white ink at regular intervals with the following information :
  - *CABLESCOM/year/No.fibres/Batch number/singlemode fibre*
  - *MN/sheath type /length markings/ADIF*
  - *Other sheath marks available upon request*



## OPTICAL FIBRE CHARACTERISTICS

The parameters of the optical fibres are compliant with the ITU-T G.652D recommendation.

See our fibre product sheet for the characteristics of the fibre

**Optical transmission characteristics of cabled fibre :**

Attenuation coefficient:

Average / maximum at 1310 nm: 0,36 / 0,37 dB/km

Average / maximum at 1550 nm: 0,22 / 0,24 dB/km

PMD individual  $\leq 0,30 \text{ ps/km}^{1/2}$ , PMD average  $\leq 0,20 \text{ ps/km}^{1/2}$ , PMD link  $\leq 0,10 \text{ ps/km}^{1/2}$

Cut-off wavelength ( $\lambda_{cc}$ )  $\leq 1250 \text{ nm}$

All drawings, designs, specifications and particulars of weights, dimensions, etc. in this documentation are only indicative and must not be considered contractual.

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TABLE 1: LOOSE TUBES COLOUR CODE

		No fibres in the cable					
		Tube	16	32	64	96	128
1st Layer	1	White	White	White	White	White	White
	2	White	Red	White	White	White	White
	3	Red	Blue	Red	White	Red	Red
	4	Red	Green	Red	Red	Red	Red
	5	Blue	Black	Blue	Red	Blue	Blue
	6	Blue	Black	Blue	Red	Blue	Blue
	7	Green			Blue		
	8	Green			Blue		
	9				Blue		
	10				Green		
	11				Green		
	12				Green		
2nd Layer	1					White	White
	2					White	White
	3					Red	Red
	4					Red	Red
	5					Blue	Blue
	6					Blue	Blue
	7					Green	Green
	8					Green	Green
	9					Grey	Grey
	10					Grey	Grey
	11					Black	Black
	12					Black	Black
Fibres per tube		2	8	5 of 12 1 of 4	8	8	8

\*Note: Black tubes are fillers

TABLE 2: OPTICAL FIBERS COLOUR CODE

Fibre	1	2	3	4	5	6	7	8	9	10	11	12
Colour	Red	Green	Blue	Yellow	Violet	Orange	Brown	Grey	Black	Pink	Turquoise	White
Abrev.	R	G	Bl	Y	Vi	Or	Br	G	B	Pk	Tq	W

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MECHANICAL AND ENVIRONMENTAL CHARACTERISTICS	Methods	Test conditions
<i>Tensile strength</i> ( $\Delta\epsilon_f=0\%$ , $\Delta\alpha<0.05$ dB)	UNE-EN 60794-1-2 E1	3200 N
<i>Maximum tensile strength without breaking fibres</i>	UNE-EN 60794-1-2 E1	6200 N
<i>Torsion test</i> ( $\Delta\alpha<0.05$ dB)	UNE-EN 60794-1-2 E7	$\pm 360^\circ$ , L=1m, 50 cycles
<i>Repeated bending</i> ( $\Delta\alpha<0.05$ dB)	UNE-EN 60794-1-2 E6	50 cycles, $\pm 180^\circ$
<i>Crush resistance</i> ( $\Delta\alpha<0.05$ dB)	UNE-EN 60794-1-2 E3	2600 N, plate 10cm x 10cm
<i>Static bending</i> ( $\Delta\alpha<0.05$ dB)	UNE-EN 60794-1-2 E11	D= 15 x $\phi$ , 10 cycles
<i>Temperature cycling</i> (operation, $\Delta\alpha<0.05$ dB)	UNE-EN 60794-1-2 F1	-20°C / 70°C
<i>Water penetration</i>	UNE-EN 60794-1-2 F5	LP <sub>water</sub> $\leq$ 1 m (14 days)
<i>Vertical flame spread</i>	UNE-EN 60332	pass
<i>Vertical fire spread</i>	UNE-EN 50266	pass
<i>Corrosivity of the emitted gases</i>	UNE-EN 50267-2-1	pH $\geq$ 4,3 y $\sigma \leq$ 10 $\mu$ S/mm
<i>Density of smoke</i>	UNE-EN 50268	Transmittance $\geq$ 60 %

## DIMENSIONS AND WEIGHT

Code	No. fibres	Diameter (mm)	Nominal Weight (kg/km)
EE5106D00001600N	16	15,0	275
EE5106D00003200N	32	16,2	310
EE5106D00006400N	64	16,2	310
EE5106D00009600N	96	21,3	505
EE5106D00001280N	128	22,2	505

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