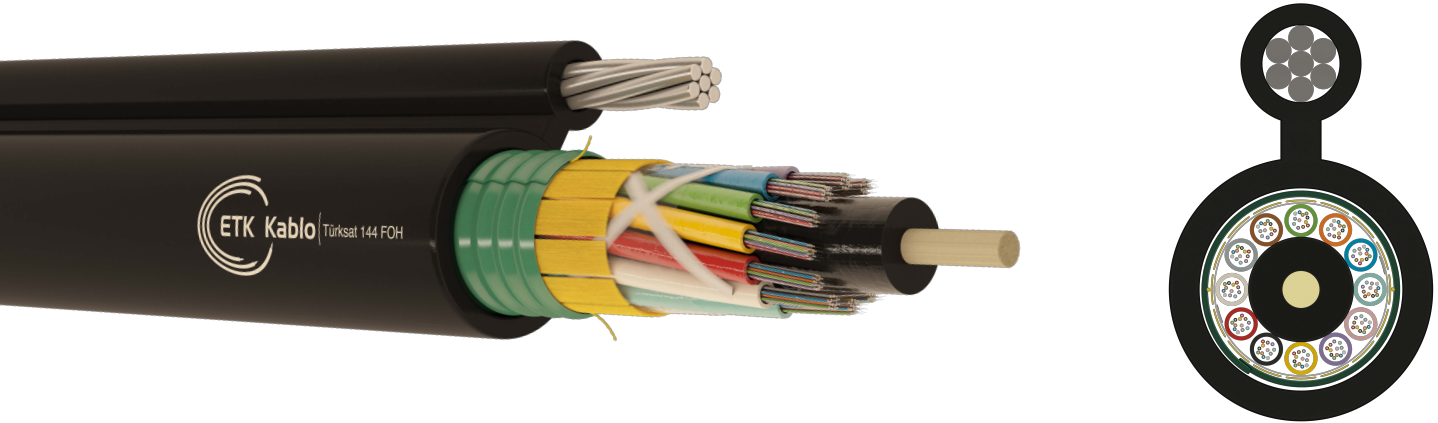


ETK Kablo Technical Datasheet

SM-MLT-SA-SJ-A-(AY45)-144FO(12x12) Türksat
Single-mode, Multi Loose Tube, Single Armor, Single Jacket, Aerial, Aramid Yarns with 4500 Newtons, 144
Optical Fiber Cores 12 Tube x 12 Optical Fiber Cores) Türksat

Fiber Optic Cable Image



• Not to scale.

Fiber Optic Cable Tube and Fiber Core Colors

Tube Color Scheme

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

Fiber Optic Core Color Scheme

1	2	3	4	5	6	7	8	9	10	11	12
Red	Yellow	Green	Blue	Violet	Brown	Black	Orange	Rose	Slate	Aqua	Natural
											

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Optical Fiber Cores 12 Tube x 12 Optical Fiber Cores) Türksat

Characteristics	
Universal Fiber Optic Cable Designation Code	A-DF(ZN)(SR)T2Y
Optical Fiber Core Type	SM: ITU-T G.652.D
Central Strength Member	
• Material	Polyethylene Coated Reinforced Glass Fiber
• Diameter	6.9 mm (0.272 inch)
Total Optical Fiber Count	144
Tube Type	Multi Loose Tube
Tube	
• Material	Polybutylene Terephthalate (PBT)
• Diameter	2.26 mm (0.089 inch)
• Filling Compound Material	Thixotropic Jelly
Optical Fibers per Tube	12
Number of Tube Positions	12
Active Tube Count	12
Tube Assembly	
• Tube Layout	Tubes are stranded around the central strength member symmetrically.
• Stranding Type	Tubes are stranded with SZ stranding method.
Dielectric Tensile Strength Member	Aramid Yarn
Newton	≥ 4500 N·m (3319.03 lb·f)
Cable Filling Compound	
• Material	Jelly Filling
• Core Wrapping	Polyester Tape
Ripcord Material and Count	1 Aramid Ripcord
Armoring	
• Material	Copolymer Coated Corrugated Steel Tape
• Thickness	255 µm (10.039 thou)
Outer Jacket	
• Material	Black MDPE UV Resistant.
• Thickness	2.2 mm (With armor.)
Messenger Wire Steel Core Count and Diameter	7x1.12 mm
Identification Tape	Polyester or paper identification tape under the cable core.
Cable Diameter (mm)	16.866 mm (0.664 inch)
Net Cable Weight (kg/km)	415.326 kg/km (279.09 lb/1000 ft)
Reel Length	4000 meters ± 5%.
Length Marking	With hot foil stamping or inkjet printing with one meter intervals.
Cable Printing Identification	Name of the manufacturer, year, type designation, length marking in meters. Example: ET0417 <4 Digit Core No.> <1 Digit Reel No.> Türksat 144FO-H Optik Kablo ETK Kablo TKS-FOM-XX07112013001 <Length marking in meters>

ET0417 <4 Digit Core No.> <1 Digit Reel No.> Türksat 144FO-H Optik Kablo ETK Kablo TKS-FOM-XX07112013001 <Length marking in meters>

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SM-MLT-SA-SJ-A-(AY45)-144FO(12x12) Türksat
Single-mode, Multi Loose Tube, Single Armor, Single Jacket, Aerial, Aramid Yarns with 4500 Newtons, 144 Optical Fiber

Cores 12 Tube x 12 Optical Fiber Cores) Türksat

Mechanical Characteristics (Cabled)			
Test	Reference Standard	Specified Value	Acceptance Criteria
Maximum Tensile Strength (Short Term)	IEC 60794-1-2-E1(A-B)	≥ 4500 N·m (3319.03 lb·f)	$\Delta\alpha \leq 0.05$ dB/km
Maximum Tensile Strength Long Term)	IEC 60794-1-2-E1(A-B)	≥ 1500 N·m (1106.34 lb·f)	$\Delta\alpha \leq 0.05$ dB/km
Repeated Bending	IEC 60794-1-2-E6	R=20xD 100 N, 35 cycles	No sheath damage.
Crush Resistance	IEC 60794-1-2-E3	100 N to 4000 N/100 mm (10 minutes)	$\Delta\alpha \leq 0.05$ dB, no damage.
Impact Resistance	IEC 60794-1-2-E4	3 impacts, R= 10mm, 10 Nm hammer impact energy.	No sheath damage. No permanent change in attenuation.
Torsion	IEC 60794-1-2-E7	100N, +/- 1, 1000 mm, 10 cycles	$\Delta\alpha \leq 0.10$ dB, no damage.
Kink	IEC 60794-1-2-E18	300 mm loop, T=20°C	No kink shall occur.
Cable Bend	IEC 60794-1-2-E11	R=20xD mm, 4 turns	$\Delta\alpha \leq 0.05$ dB, no damage.
Temperature Cycling	IEC 60794-1-2-F1	-40 °C to 80 °C (-40°F to 140 °F)	Maximum 0.10 dB/km
Water Penetration	IEC 60794-1-2-F5B	Sample=1 m, Water Column=1 m	No water leakage in 24 hours.

Chemical Characteristics

RoHS	Free of hazardous substances according to RoHS regulation.
REACH	Safe to use according to REACH regulation.

Temperature Range (Cabled)

Transportation	-40 °C to 80 °C (-40 °F to 176 °F)
Storage	-40 °C to 70 °C (-40 °F to 158 °F)
Installation	-40 °C to 80 °C (-40 °F to 176 °F)
Operation	-40 °C to 80 °C (-40 °F to 176 °F)

Fiber Optic Core Attenuations (Cabled)

G.652.D	Property	Value
	Maximum attenuation at 1310 nm	0.36
Maximum attenuation at 1550 nm	0.22	

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Fiber Cores 12 Tube x 12 Optical Fiber Cores) Türksat

Optical Fiber Core Specification
Low Water Peak Single-Mode Optical Fiber
Standard, ITU-T G.652.D (Uncolored Fiber)

Structural Specifications		
Fiber Materials		
• Core Material		Silica (SiO ₂) Doped with Germanium Dioxide (GeO ₂)
• Cladding Material		Pure silica (SiO ₂)
• Coating Material		Dual layers of UV-cured acrylate. The 3 rd layer of color-coded UV-cured Acrylate.
Dimensions		
• Mode Field Diameter	at 1310 nm	9.2 ± 0.4 ± m
	at 1550 nm	10.4 ± 0.5 ± m
• Cladding Diameter		125.0 ± 0.7 µm
• Coating Diameter (Uncolored)		240 ± 5 µm
Core Concentricity Error		≤ 0.6 µm
Cladding Non-circularity		≤ 0.7 %
Coating - Cladding Concentricity Error		≤ 12 µm
Fiber Curl Radius		≥ 4.0 m
Optical Specifications		
Attenuation		
• Attenuation Coefficient	Attenuation Coefficient at 1310 nm	≤ 0.34 dB/km
	Attenuation Coefficient at 1383 nm	≤ 0.32 dB/km ¹
	Attenuation Coefficient at 1550 nm	≤ 0.192 dB/km
	Attenuation Coefficient at 1625 nm	≤ 0.22 dB/km
• Attenuation vs. Wavelength ²	1285 nm – 1330 nm, ref. λ of 1310 nm	α ≤ 0.03 dB/km
	1525 nm – 1575 nm, ref. λ of 1550 nm	α ≤ 0.02 dB/km
• Macrobending ³	Φ=32 mm, 1 turn at 1550 nm	≤ 0.05 dB
	Φ=50 mm, 100 turns at 1310 nm	≤ 0.05 dB
	Φ=50 mm, 100 turns at 1550 nm	≤ 0.05 dB
	Φ=60 mm, 100 turns at 1625 nm	≤ 0.05 dB
• Point Discontinuity		No point discontinuity greater than 0.05 dB at either 1310 nm or 1550 nm in the OTDR trace.
Cut-off Wavelength		
• Cable Cut-off Wavelength λ _{cc}		λ _{cc} ≤ 1260 nm
Chromatic Dispersion		
• Chromatic Dispersion Coefficient	at 1285-1330 nm	≤ 3.5 ps/(nm.km)
	at 1550 nm	≤ 17 ps/(nm.km)
	at 1625 nm	≤ 22 ps/(nm.km)
• Zero-dispersion Wavelength λ ₀		1302nm ≤ λ ₀ ≤ 1324 nm
• Zero-dispersion Slope S ₀		S ₀ ≤ 0.089 ps/(nm ² .km)
Polarization Mode Dispersion (PMD) ⁴		
Uncabled Fiber PMD Coefficient		≤ 0.15 ps/√km
Link Design Value PMD ₀		≤ 0.06 ps/√km
Mechanical Specifications		
Proof Test ⁵		≥ 1% (100 kpsi or 0.7 GPa)
Environmental Specifications		
Environmental Specifications Induced attenuation at both 1310 nm, 1550 nm and 1625 nm		
Temperature Dependence ⁶	-60 °C to 85 °C	≤ 0.05 dB/km
Water Immersion	at 23 °C ± 2 °C	≤ 0.05 dB/km
Dry Heat ⁶	at 85 °C ± 2 °C	≤ 0.05 dB/km
Damp Heat	85 °C at 85% R. H.	≤ 0.05 dB/km
Performance Characteristics		
Core Diameter		8.3 µm
Zero Dispersion Wavelength		1315 nm
Zero Dispersion Slope		0.086 ps/(nm ² .km)
Refractive Index Profile		Matched clad, step index profile
Refractive Index Difference Δ		Δ=0.36%
Effective Group Index of Refraction N _{eff}	at 1310 nm	1.4675
	at 1550 nm	1.4681
Dynamic Stress Corrosion Susceptibility Parameter (n _d)		≥ 20
Coating Strippability F		1.3N ≤ F ≤ 8.9N

¹ The attenuation at 1383nm after hydrogen aging in accordance with IEC60793-2-50.

² The attenuation in a given wavelength range does not exceed the attenuation of the reference wavelength (λ) by more than the value α.

³ The induced attenuation due to fiber wrapped around a mandrel of a specified diameter (Φ).

⁴ This characteristic is guaranteed under the free tension condition only.

⁵ The entire optical fiber length is tested with regard to the tensile strength.

⁶ Reference Temperature = 23 °C.