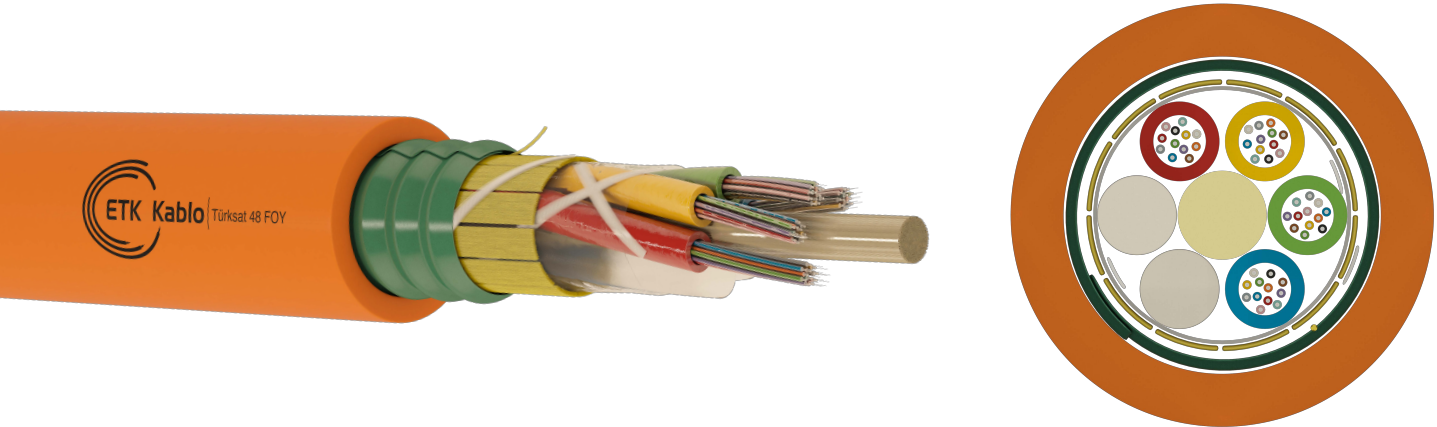


# ETK Kablo Technical Datasheet

**SM-MLT-SA-SJ-(AY27)-48FO(4x12) Türksat**  
**Single-mode, Multi Loose Tube, Single Armor, Single Jacket, Aramid Yarns with 2700 Newtons, 48 Optical Fiber Cores 4 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
Red	Yellow	Green	Blue
			

### 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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Characteristics	
Universal Fiber Optic Cable Designation Code	A-DF(ZN)(SR)2Y
Optical Fiber Core Type	SM: ITU-T G.652.D
Central Strength Member	
• Material	Reinforced Glass Fiber
• Diameter	2.5 mm (0.098 inch)
Total Optical Fiber Count	48
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	6
Active Tube Count	4
Filler Count	2
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	≥ 2700 N·m (1991.42 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	Orange MDPE UV Resistant.
• Thickness	2.2 mm (With armor.)
Identification Tape	Polyester or paper identification tape under the cable core.
Cable Diameter (mm)	12.5 mm (0.492 inch)
Net Cable Weight (kg/km)	177.808 kg/km (119.48 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 48FO-Y Optik Kablo ETK Kablo TKS-FOM-XX07112013001 <Length marking in meters>

**ET0417 <4 Digit Core No.> <1 Digit Reel No.> Türksat 48FO-Y Optik Kablo ETK Kablo TKS-FOM-XX07112013001 <Length marking in meters>**



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SM-MLT-SA-SJ-(AY27)-48FO(4x12) Türksat

Single-mode, Multi Loose Tube, Single Armor, Single Jacket, Aramid Yarns with 2700 Newtons, 48 Optical Fiber Cores 4 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)	$\geq 2700 \text{ N}\cdot\text{m}$ (1991.42 lb·f)	$\Delta\alpha \leq 0.05 \text{ dB/km}$
Maximum Tensile Strength Long Term)	IEC 60794-1-2-E1(A-B)	$\geq 900 \text{ N}\cdot\text{m}$ (663.81 lb·f)	$\Delta\alpha \leq 0.05 \text{ dB/km}$
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)	$\Delta\alpha \leq 0.05 \text{ dB}$ , 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	$\Delta\alpha \leq 0.10 \text{ dB}$ , 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	$\Delta\alpha \leq 0.05 \text{ dB}$ , 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	
	Property	Value
	Maximum attenuation at 1310 nm	0.36
Maximum attenuation at 1550 nm	0.22	

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**SM-MLT-SA-SJ-(AY27)-48FO(4x12) Türksat**  
**Single-mode, Multi Loose Tube, Single Armor, Single Jacket, Aramid Yarns with 2700 Newtons, 48 Optical Fiber Cores 4**  
**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 <sub>2</sub> ) Doped with Germanium Dioxide (GeO <sub>2</sub> )
• Cladding Material		Pure silica (SiO <sub>2</sub> )
• Coating Material		Dual layers of UV-cured acrylate. The 3 <sup>rd</sup> 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 <sup>1</sup>
	Attenuation Coefficient at 1550 nm	≤ 0.192 dB/km
	Attenuation Coefficient at 1625 nm	≤ 0.22 dB/km
• Attenuation vs. Wavelength <sup>2</sup>	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 <sup>3</sup>	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 <sub>cc</sub>		λ <sub>cc</sub> ≤ 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 <sub>0</sub>		1302nm ≤ λ <sub>0</sub> ≤ 1324 nm
• Zero-dispersion Slope S <sub>0</sub>		S <sub>0</sub> ≤ 0.089 ps/(nm <sup>2</sup> .km)
Polarization Mode Dispersion (PMD) <sup>4</sup>		
Uncabled Fiber PMD Coefficient		≤ 0.15 ps/√km
Link Design Value PMD <sub>0</sub>		≤ 0.06 ps/√km
Mechanical Specifications		
Proof Test <sup>5</sup>		≥ 1% (100 kpsi or 0.7 GPa)
Environmental Specifications		
Environmental Specifications Induced attenuation at both 1310 nm, 1550 nm and 1625 nm		
Temperature Dependence <sup>6</sup>	-60 °C to 85 °C	≤ 0.05 dB/km
Water Immersion	at 23 °C ± 2 °C	≤ 0.05 dB/km
Dry Heat <sup>6</sup>	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 <sup>2</sup> .km)
Refractive Index Profile		Matched clad, step index profile
Refractive Index Difference Δ		Δ=0.36%
Effective Group Index of Refraction N <sub>eff</sub>	at 1310 nm	1.4675
	at 1550 nm	1.4681
Dynamic Stress Corrosion Susceptibility Parameter (n <sub>d</sub> )		≥ 20
Coating Strippability F		1.3N ≤ F ≤ 8.9N

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

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

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

<sup>4</sup> This characteristic is guaranteed under the free tension condition only.

<sup>5</sup> The entire optical fiber length is tested with regard to the tensile strength.

<sup>6</sup> Reference Temperature = 23 °C.