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## TECHNICAL DATA SHEET

### CABLE CONSTRUCTION

#### SM-MLT-SA-SJ 216FO

#### **216 CORES BURIED & DUCT TYPE**

#### **SINGLE MODE FIBER OPTIC CABLES with SINGLE JACKET and STEEL ARMOR**

Characteristics	Offered by the Tenders
<b>1. No of tubes / No of Fibers per tube</b> 216 FO	Fiber and Tube colors are according to Customer's technical specification. (18Tx12F)
<b>2. Central Strength member</b> -Material -Diameter	- Reinforced Glass Fiber -2,7 mm
<b>3. Loose tubes</b> -Material -Type of filling compound - Diameter -Thickness	- Polybuteneterepheteleta (PBT) - Thixotropic - 2,25 mm -0.4 ± 0.05 mm
<b>4. Tube assembly</b> -Tube layout  -Stranding type	-Tubes will be stranded around Cent. Strength Member with symmetrically - Tubes will strand with SZ stranding method
<b>5. Flooding compound</b> -Material	- Jelly Filling
<b>6. Core wrapping</b> -Material	Core covering tape - Polyester Tape
<b>7. Dielectric Tensile Strength Member</b>	- Aramid Yarn
<b>8. Rip cords</b>	Rip cord will be applied longitudinally to open cable easily
<b>9. Identification tape</b>	- Tape will be applied underneath corrugated steel tape longitudinally. Printings: "Company Name, production month year,Cable Type, TÜRKSAT A.Ş."
<b>10. Armoring</b> -Material -Thickness (nom.)	- Copolymer coated Corrugated steel tape - 0,155 micron
<b>11. Outer Sheath</b> -Material -Thickness -Color	- MDPE (UV RESISTANCE ) - Approx. 2,2±0,2 mm - ORANGE COLOR (RAL 2008)
<b>12. Length marking</b>	BLACK, Hot Stamping "Meter, telephone symbol, Drum Core Number, TÜRKSAT A.Ş., 216 FO-Y Optical Cable , ETK Kablo, phone symbol,Meter"
<b>13. Drum Length</b>	2000 meters ± 5 %
<b>14. Cable weight (kg/km)</b> 216 FO	Approx. 295 kg/km
<b>15. Outer Diameter of cable</b> 216 FO	Approx. 17.5mm





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**16. Test results of Mechanical characteristics**

Test	Test Standard	Specified Value	Acceptance Criteria
-Tensile Strength Short Term	IEC 60794-1-2-E1(A-B)	Min $\geq 4500$ N	$\Delta\alpha$ reversible, fiber strain $\leq 0.33\%$ no fiber strain, $\Delta\alpha \leq 0.05$ dB
Max. Instalation Tensile Strength	IEC 60794-1-2-E1(A-B)	Min $\geq 1500$ N	$\Delta\alpha$ reversible, fiber strain $\leq 0\%$ no fiber strain, $\Delta\alpha \leq 0.05$ dB
Crush	IEC 60794-1-2-E3	4000 N / 100 mm	$\Delta\alpha \leq 0.05$ dB, no damage
Impact	IEC 60794-1-2-E4	30 Nm, 3 impacts, R= 300 mm	$\Delta\alpha \leq 0.05$ dB after the test
Torsion	IEC 60794-1-2-E7	100N, +/- 180°, 10 cycles	$\Delta\alpha \leq 0.05$ dB, no damage
Cable Bend	IEC 60794-1-2-E11	R=20x D, 4 turns	$\Delta\alpha \leq 0.05$ dB, no damage
Repeat Cable Bend	IEC 60794-1-2-E6	R=20x D, 100N,35 turns	no damage
Temperature Cycling	IEC 60794-1-2-F1	-40°C to +70°C 36 hours, two period	Max. %10 dB/km
Water Penetration	IEC 60794-1-2-F5B	Sample=1m, water column=1m	no water leakage in 24h

Transport & Stok : -40°C to +70°C

Instalations : -20°C to +60°C

Working : -40°C to +70°C

**TECHNICAL DATA SHEET**

**SECTION 2**

**Attenuation for cable**

Ref (nm)	Max.
1310	0,36 dB/km
1550	0,22 dB/km

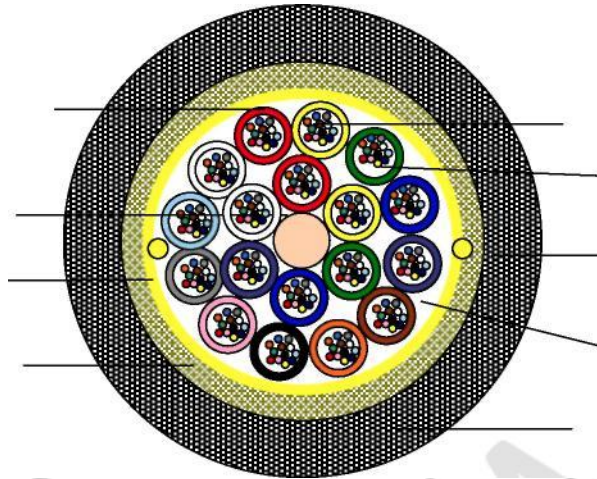




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**TECHNICAL DATA SHEET**  
**SECTION 3**  
**TECHNICAL DRAWING**

**216FO**



- 1 Outer Sheath
- 2 Corrugated Steel Tape\*
- 3 Aramid Yarn
- 4 Core Wrapping (Polyester)
- 5 Central Strength Member
- 6 Jelly Filling
- 7 Buffer Material (PBT)
- 8 Thixotropic Jelly
- 9 216 Fibers per Cable

\*Two (2) ripcords will be applied longitudinally.





**TECHNICAL DATA SHEET**  
**SECTION 4**  
**OPTICAL FIBERS and TUBES COLORS\***

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Tube Color Scheme	
Tube No.	Color
1 (First layer)	Red
2 (First layer)	Yellow
3 (First layer)	Green
4 (First layer)	Blue
5 (First layer)	Violet
6 (First layer)	White
7 (Second layer)	Red
8 (Second layer)	Yellow
9 (Second layer)	Green
10 (Second layer)	Blue
11 (Second layer)	Violet
12 (Second layer)	Brown
13 (Second layer)	Black
14 (Second layer)	Orange
15 (Second layer)	Pink
16 (Second layer)	Grey
17 (Second layer)	Light Green
18 (Second layer)	White

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Fiber Color Scheme	
Fiber No.	Color
1	Red
2	Yellow
3	Green
4	Blue
5	Violet
6	Brown
7	Black
8	Orange
9	Pink
10	Grey
11	Light Green
12	Naturel

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**TECHNICAL DATA SHEET**

**SECTION 5**

**OPTICAL FIBER CORE SPECIFICATIONS G.652.D**

<b>Full Length Average Attenuation:</b>		
@ 1310 nm	dB/km	≤0.34
@ 1550 nm	dB/km	≤0.21
@ 1625 nm	dB/km	≤0.22
<b>Macro Bending – additional induced bending:</b>		
32 mm dia./ 1 turn /@1550 nm	dB	≤0.05
50 mm dia. /100 turns/ @ 1310 nm and 1550nm	dB	≤0.05
60 mm dia. /100 turns/ @ 1550 nm and 1625nm	dB	≤0.05
<b>Other Optical Properties:</b>		
Zero dispersion wavelength $-(\lambda_0)$	nm	1300 to 1322
Dispersion slope $(S_0)$ @ $\lambda_0$	ps/(nm <sup>2</sup> *km)	≤0.089
Chromatic Dispersion @1285-1330 nm; @1550 nm; @1625 nm;	ps/nm.km	≤3.2
	ps/nm.km	≤17.0
	ps/nm.km	≤22.0
Mode field diameter @1310 nm @1550 nm	μm	9.2±0.4
	μm	10.4±0.5
Cut-off wavelength $\lambda_{cc}$ – cable	nm	≤1260
Fiber Polarization Mode Dispersion (PMD), Link Design Value PMD <sub>q</sub> Tension free conditions for uncabled fiber	ps/vkm ps/vkm	≤0.08 ≤0.2
Change in attenuation vs. wavelength 1285 – 1330nm, ref. $\lambda$ of 1310nm 1525 – 1575nm, ref. $\lambda$ of 1550nm	dB/km	≤0.03
	dB/km	≤0.02
<b>Geometrical Properties:</b>		
Cladding diameter	μm	125.0±0.7
Cladding non-circularity	%	≤0.6
Core/Cladding Concentricity err.	μm	≤0.5
Coating diameter	μm	245±10
Coating/Cladding concentricity err.	μm	≤12
<b>Mechanical Specifications</b>		
Proof Test IEC 60793-1-30	0.7 GPa or 8.4N Load	≥ 1%

