



Cable Design

Buffer Tube Optical Fiber Cable-Non Armored-Dielectric-Dry Core-G657A1Fiber

- ◆ **Central Strain-support Element (CE):** glass fiber reinforced plastic rod (FRP), with PE sheath covering when needed.
- ◆ **Loose Tube:** containing 12/24 fibers and filled with a suitable water tightness compound.
- ◆ **Filler Elements:** Nature plastic rods, when needed.
- ◆ **Stranding:** loose tubes (and fillers), SZ stranded around the CE.
- ◆ **Longitudinal Water Tightness:** dry core with water swellable elements.
- ◆ **Ripcord(s):** 1 red ripcord under sheath.
- ◆ **Outer Sheath:** Black HDPE

Cable Specification

Cable Cores	144	288	288	576	576
No. of Tubes	12	24	24	24	24
No. of Fillers	0	0	0	0	0
Fiber Counts in Tube	12(250u)	12(250u)	12(200u)	24(200u)	24(200u)
Tube/Filler- Φ (mm)	1.4	1.4	1.2	1.7	1.4
CE- Φ (mm)	2.5	2.4	2.3	2.5	2.0
CE with PE - Φ (mm)	4.2	2.8	/	3.4	2.7
Thickness of Outer PE Sheath (mm)	0.5				
Nominal Cable Diameter (mm)	8.0±0.3	9.6±0.3	8.0±0.3	10.8±0.3	9.5±0.3
Cable Weight(kg/km)	52	77	54	109	92
Tensile Force (N)	1000				

Cable Application

Cable Application Temperature Range		Minimum Bend Radius	
Transportation & Storage	-30~+70°C	Load	20×D
Operation	-30~+70°C	Unload	10×D

Main Mechanical and Environmental Characteristics

Test	Test Standard	Specified Value	Acceptance Criteria
Tensile	IEC 60794-1-2-E1	Tensile Force, 1min	$\Delta\alpha\leq 0.10\text{dB/km}$, no damage
Crush	IEC 60794-1-2-E3	1000N/10cm, 1min	$\Delta\alpha$ reversible, no damage
Impact	IEC 60794-1-2-E4	1J, R=300mm	$\Delta\alpha$ reversible, no damage
Repeated Bending	IEC 60794-1-2-E6	R=20D, 25N, 25cycles	$\Delta\alpha$ reversible, no damage
Bend	IEC 60794-1-2-E11	R=15D, 10turns, 5cycles	$\Delta\alpha$ reversible, no damage
Torsion	IEC 60794-1-2-E7	40N, 5cycles, +/- 1800	$\Delta\alpha$ reversible, no damage
Temperature Cycling	IEC 60794-1-2-F1	-20~+70°C, 12h	$\Delta\alpha\leq 0.15\text{dB/km}$, no damage
Water Penetration	IEC 60794-1-2-F5	3m cable, 1m water, 24h	No water leakage

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Fiber and Tube Color

Color Identification of Fiber

Number	1	2	3	4	5	6	7	8	9	10	11	12
Color	Red	Green	Blue*	Yellow	White	Grey	Brown	Violet	Aqua	Black	Orange	Pink
Number	13	14	15	16	17	18	19	20	21	22	23	24
Color	Red*	Green*	Blue*	Yellow*	White*	Grey*	Brown*	Violet*	Aqua*	Nature*	Orange*	Pink*

* if the color number is more than 12, the fiber color code will be repeated again with black ring except black fiber which is nature color instead.

Color Identification of Tube

Number	1	2	3	4	5	6	7	8	9	10	11	12
Color	Red	Green	Blue*	Yellow	White	Grey	Brown	Violet	Aqua	Black	Orange	Pink
Number	13	14	15	16	17	18	19	20	21	22	23	24
Color	Red*	Green*	Blue*	Yellow*	White*	Grey*	Brown*	Violet*	Aqua*	Black*	Orange*	Pink*

Cabled Fiber Performance (G.657A1 250μm)

Characteristics		Acceptance Value
Attenuation	@1310nm	≤0.35dB/km
	@1383nm	≤0.34dB/km
	@1550nm	≤0.21dB/km
	@1625nm	≤0.23dB/km
Mode Field Diameter	@1310nm	8.8±0.6μm
	@1550nm	9.8±0.5μm
Dispersion	@1300 +30/-15nm	≤3.5ps/(nm·km)
	@1550nm	≤18ps/(nm·km)
	@1625nm	≤22ps/(nm·km)
Zero-Dispersion Wavelength		1300nm~1324nm
Zero-Dispersion Slope		≤0.092ps/(nm ² ·km)
Cable Cutoff Wavelength λ _c (nm)		≤1260nm
Macrobend loss	15mm radius, 10 turn, @1550	≤0.25dB
	15mm radius, 10 turn, @1625	≤1.00dB
	10mm radius, 1 turn, @1550	≤0.25dB

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Macrobend loss	10mm radius, 1 turn, @1625	$\leq 1.5\text{dB}$
Cladding Diameter		$125\pm 0.7\mu\text{m}$
Cladding Non-circularity		$\leq 0.7\%$
Core/Cladding Concentricity Error		$\leq 0.5\mu\text{m}$
Fiber diameter with coating (colored)		$250\pm 15\mu\text{m}$
Proof Test		$\geq 0.69\text{ GPa (100psi)}$
Dynamic Fatigue		≥ 20

Cabled Fiber Performance (G.657A1 200 μm)

Characteristics		Acceptance Value
Attenuation	@1310nm	$\leq 0.35\text{dB/km}$
	@1383nm	$\leq 0.34\text{dB/km}$
	@1550nm	$\leq 0.21\text{dB/km}$
	@1625nm	$\leq 0.23\text{dB/km}$
Mode Field Diameter	@1310nm	$8.8\pm 0.6\mu\text{m}$
	@1550nm	$9.8\pm 0.5\mu\text{m}$
Dispersion	@1300 +30/-15nm	$\leq 3.5\text{ps}/(\text{nm}\cdot\text{km})$
	@1550nm	$\leq 18\text{ps}/(\text{nm}\cdot\text{km})$
	@1625nm	$\leq 22\text{ps}/(\text{nm}\cdot\text{km})$
Zero-Dispersion Wavelength		1300nm ~ 1324nm
Zero-Dispersion Slope		$\leq 0.092\text{ps}/(\text{nm}^2\cdot\text{km})$
Cable Cutoff Wavelength $\lambda_c(\text{nm})$		$\leq 1260\text{nm}$
Macrobend loss	15mm radius, 10 turn, @1550	$\leq 0.25\text{dB}$
	15mm radius, 10 turn, @1625	$\leq 1.00\text{dB}$
	10mm radius, 1 turn, @1550	$\leq 0.25\text{dB}$
	10mm radius, 1 turn, @1625	$\leq 1.5\text{dB}$
Cladding Diameter		$125\pm 0.7\mu\text{m}$
Cladding Non-circularity		$\leq 0.7\%$
Core/Cladding Concentricity Error		$\leq 0.5\mu\text{m}$
Fiber diameter with coating (colored)		$250\pm 15\mu\text{m}$
Proof Test		$\geq 0.69\text{ GPa (100psi)}$
Dynamic Fatigue		≥ 20

Sheath Marking - The outer sheath is marked in 1 meter intervals.

Delivery Lengths - Standard delivery length will be 4/6 km with -1%/3% tolerance.