

SPECIFICATION

Optical Fiber Cable

CST Corrugated Steel Tape (GYFTS)

Loose tube, Dry core,

Armored cable

1. General

1.1 This specification covers the requirements for the supply of single-mode optical fiber cables.

1.2 The single mode optical fiber cables comply with the requirements of this specification and generally meet any latest relevant ITU-T Recommendation G.652D.

2. Fiber characteristics

2.1 G.652

2.1.1 Geometric characteristics

Item		Construction
Mode field diameter	At 1310nm	$9.2 \pm 0.4 \mu\text{m}$
Cladding diameter		$125 \pm 1 \mu\text{m}$
Core concentricity error		$\leq 0.6 \mu\text{m}$
Cladding non-circularity		$\leq 1.0\%$
Cut-off wavelength (λ_{cc}) (for cable)		$\leq 1260\text{nm}$
Cut-off wavelength (λ_c) (for fiber)		1180nm~1330nm
Primary coating diameter	(Not included color layer)	$245 \pm 10 \mu\text{m}$
Coating-cladding concentricity error		$\leq 12.5 \mu\text{m}$
Fiber curl radius		$\geq 4\text{m}$

2.1.2 Transmission characteristics

Item		Performance
Attenuation	At 1310nm	$\leq 0.36\text{dB/km}$
	At 1550nm	$\leq 0.23\text{dB/km}$
Macro bending loss	$\Phi=60\text{mm}$, 100turns at 1550nm	$\leq 0.1\text{dB}$
PMD	Link Design Value	$\leq 0.2\text{ps/km}^{1/2}$
Chromatic dispersion	Within 1288~1339nm	$\leq 3.5\text{ps/nm}\cdot\text{km}$
	At 1550nm	$\leq 18\text{ps/nm}\cdot\text{km}$
Zero dispersion wavelength		1300~1324nm
Zero dispersion slope		$\leq 0.092\text{ps/nm}^2\cdot\text{km}$

2.2 G657A1

2.2.1 Geometric characteristics

Item		Construction
Mode field diameter	At 1310nm	$8.8 \pm 0.3 \mu\text{m}$
Cladding diameter		$125 \pm 1 \mu\text{m}$
Core concentricity error		$\leq 0.6 \mu\text{m}$
Cladding non-circularity		$\leq 1.0\%$
Cut-off wavelength (λ_{cc}) (for cable)		$\leq 1260\text{nm}$
Primary coating diameter	Colored layer not included	$245 \pm 10 \mu\text{m}$
Coating-cladding concentricity error		$\leq 12.5 \mu\text{m}$
Fiber curl radius		$\geq 4\text{m}$

2.2.2 Transmission characteristics

Item		Performance
Attenuation	At 1310nm	$\leq 0.36\text{dB/km}$
	At 1550nm	$\leq 0.22\text{dB/km}$
Macro bending loss	$\Phi=30\text{mm}$, 10turns at 1550nm	$\leq 0.25\text{dB}$
Chromatic dispersion	Within 1285~1340nm	$\leq 3.5\text{ps/nm}\cdot\text{km}$
	At 1550nm	$\leq 18\text{ps/nm}\cdot\text{km}$
Zero dispersion wavelength		1300~1324nm
Zero dispersion slope		$\leq 0.092\text{ps/nm}^2\cdot\text{km}$

2.3 OM2-D

2.3.1 Geometric characteristics

Item		Construction
Core diameter		$50 \pm 2.5 \mu\text{m}$
Cladding diameter		$125 \pm 2 \mu\text{m}$
Core/cladding concentricity error		$\leq 1.5 \mu\text{m}$
Cladding non-circularity		$\leq 2.0\%$
Primary coating diameter		$245 \pm 10 \mu\text{m}$

2.3.2 Transmission characteristics

Item		Performance
Attenuation	At 850nm	$\leq 3.0\text{dB/km}$
	At 1300nm	$\leq 1.0\text{dB/km}$
Macro bending loss	$\Phi=75\text{mm}$, 100turns at 1300nm	$\leq 0.5\text{dB}$
Overfilled Launch Bandwidth	At 850nm	$\geq 200\text{MHz}\cdot\text{km}$
	At 1300nm	$\geq 400\text{MHz}\cdot\text{km}$

2.4 OM3 150

2.4.1 Geometric characteristics

Item	Construction
Core diameter	$50\pm 2.5\mu\text{m}$
Cladding diameter	$125\pm 2\mu\text{m}$
Core/cladding concentricity error	$\leq 1.5\mu\text{m}$
Cladding non-circularity	$\leq 2.0\%$
Primary coating diameter	$245\pm 10\mu\text{m}$

2.4.2 Transmission characteristics

Item		Performance
Attenuation	At 850nm	$\leq 3.0\text{dB/km}$
	At 1300nm	$\leq 1.0\text{dB/km}$
Macro bending loss	$\Phi=75\text{mm}$, 100turns at 1300nm	$\leq 0.5\text{dB}$
Overfilled Launch Bandwidth	At 850nm	$\geq 950\text{ MHz} \cdot \text{km}$
	At 1300nm	$\geq 500\text{ MHz} \cdot \text{km}$

2.5 OM4

2.5.1 Geometric characteristics

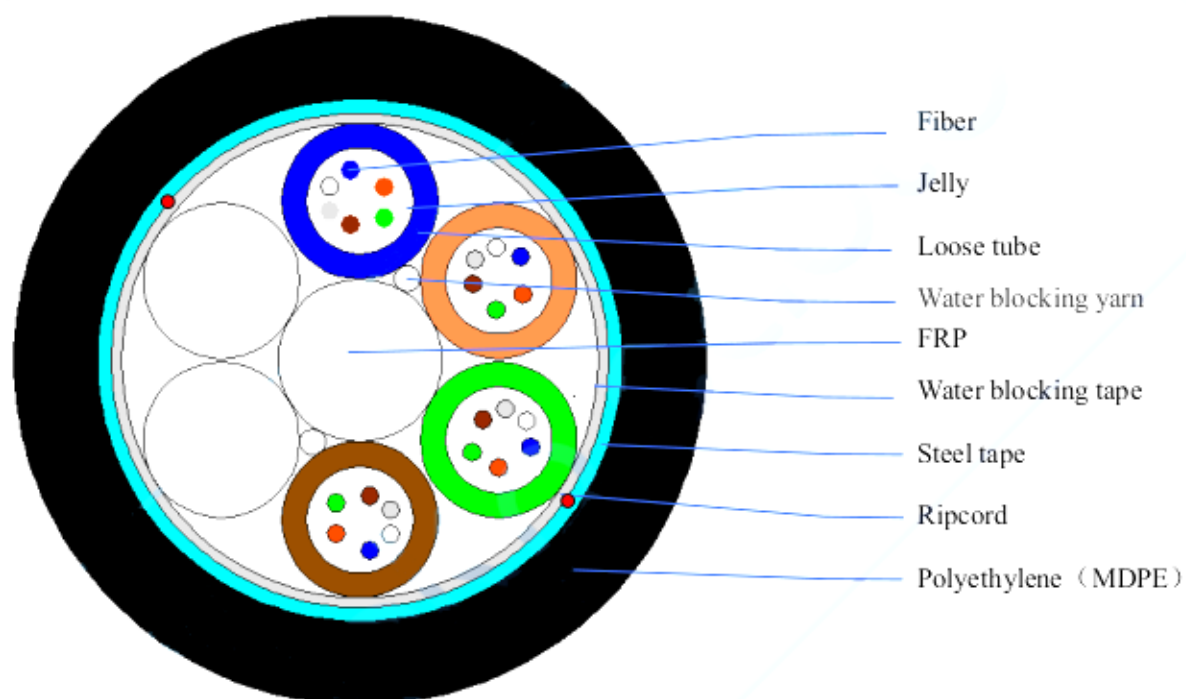
Item	Construction
Core diameter	$50\pm 2.5\mu\text{m}$
Cladding diameter	$125\pm 2\mu\text{m}$
Core/cladding concentricity error	$\leq 1.5\mu\text{m}$
Cladding non-circularity	$\leq 2.0\%$
Primary coating diameter	$245\pm 10\mu\text{m}$

2.5.2 Transmission characteristics

Item		Performance
Attenuation	At 850nm	$\leq 3.0\text{dB/km}$
	At 1300nm	$\leq 1.0\text{dB/km}$
Macro bending loss	$\Phi=75\text{mm}$, 100turns at 1300nm	$\leq 0.5\text{dB}$
Overfilled Launch Bandwidth	At 850nm	$\geq 3500\text{ MHz} \cdot \text{km}$
	At 1300nm	$\geq 500\text{ MHz} \cdot \text{km}$

3 Optical Fiber Cable

3.1 Cross section



3.2 Dimension of the cable

Amount of fiber	Max. no. of the fiber per tube	No. of tube positions	Loose tube diameter	*Nom. thickness of sheath	Diameter (Appr.)	Weight (Appr.)
			mm	mm	mm	Kg/km
4-24	6	6	1.7	1.8	10.4	98

*Note: The minimum thickness of the sheath is 1.5mm.

3.3 Performance

NO	ITEM	TEST METHOD	SPECIFICATION
1	Tensile performance IEC60794-1-21-E1	- Load: 1000N - Time: 5 minutes	- Loss change ≤ 0.1 dB @1550 nm (after test) - Fiber strain ≤ 0.6 % - No sheath damage
2	Crush test IEC60794-1-21-E3	- Load: 1000 N /100mm - Time: 5 minute - Length: 100 mm	- Loss change ≤ 0.1 dB @1550 nm (during test) - No sheath damage
3	Impact test IEC60794-1-21-E4	- Impact hight: 1m - Impact weight:300g - Points of impact: 3 - Times of per point: 1	- No fiber break - No sheath damage
4	Repeated bending IEC60794-1-21-E6	- Bending radius: $20 \times D$ - Load: 250N - Flexing rate: 2sec/cycle - No. of cycle: 25	- No fiber break - No sheath damage
5	Water penetration IEC60794-1-22-F5B	- Height of water: 1m - Sample length: 3 m - Time: 24 hr	- No drip through the cable core assembly
6	Twist / Torsion IEC60794-1-21-E7	- Length: 1 m - Load: 250N - Twist rate: ≤ 60 sec/cycle - Twist angle: $\pm 90^\circ$ - No. of cycle: 5	- No fiber break - No sheath damage
7	Temperature Cycling IEC60794-1-22-F1	- Temperature step: $+20^\circ\text{C} \rightarrow -30^\circ\text{C} \rightarrow +70^\circ\text{C} \rightarrow +20^\circ\text{C}$ - Number of cycle: 2 turns - Time per each step: 12 hrs	- Average Loss change $\leq 0.10\text{dB/km}$ (90%) - Maximum Loss change $\leq 0.15\text{dB/km}$ (100%)@1550 nm - No fiber degradation - No sheath damage

D*: Cable diameter

3.4 Color Coding of Loose Tubes and Fibers

Fiber color code

Position	Fiber color
1	Blue
2	Orange
3	Green
4	Brown
5	Grey
6	White

Color codes for Loose Tube

Position	Loose tube color
1	Blue
2	Orange
3	Green
4	Brown

4. Sheath marking

