



LSW series Steel Wire Armored Outdoor Fiber Cable

Fire Performances

General

Flame Retardant	IEC60332-1, IEC60332-2, IEC60332-3
Oxygen Index Testing Method	ASTMD-2863
Halogen Free	IEC60754-1

Specifications

General

Flame Rating	LSZH					
Fiber Category	Singlemode / Multimode					
Fiber Count	6-96					
Temperature Range :	Installation	-20°C to +50°C				
	Operation	-40°C to +70°C				
	Storage	-50°C to +70°C				
Cable Bending Radius	10 x cable diameter (static)					
	20 x cable diameter (dynamic)					
Cable Design						
Fiber Number	6	8	12	24	48	96
Max. Number of Fibers per Tube	6	8	12	12	12	12
Number of Total Unit (LT + FR)	5(1LT+4FR)	5(1LT+4FR)	5(1LT+4FR)	5(2LT+3FR)	5(4LT+1FR)	8LT
CSM-Diameter Steel Wire (+PE sheath)	1.6mm	1.6mm	1.6mm	1.6mm	1.6mm	3.2 (2mm steel wire +2*0.6mm PE)
Sheath Thickness (Nominal*)	0.8/ 1.8 i/o mm	0.8/ 1.8 i/o mm	0.8/ 1.8 i/o mm	0.8/ 1.8 i/o mm	0.8/ 1.8 i/o mm	0.8/ 1.8 i/o mm
Outer Diameter (Nominal**)	13.5mm	13.5mm	13.5mm	13.5mm	13.5mm	15.3mm
Steel wire diameter	0.8mm					
Steel wire Number	35pcs for fiber under 48F, 42pcs for 96F					
Loose tube	2.1mm					
Loose tube thickness	0.30mm					

* The nominal sheath thickness may vary by ±0.2mm.

** The nominal outer diameter may vary by ±0.4mm.

Fiber Specifications (Singlemode)

Characteristics		G652D	G657A1	G657A2
Optical Characteristics *				
Attenuation	1310nm	≤ 0.40 dB/km	≤ 0.40 dB/km	≤ 0.40 dB/km
	1383nm	≤ 0.34 dB/km	≤ 0.35 dB/km	≤ 0.35 dB/km
	1460nm	-	≤ 0.25 dB/km	≤ 0.25 dB/km
	1490nm	-	-	≤ 0.23 dB/km
	1550nm	≤ 0.30 dB/km	≤ 0.30 dB/km	≤ 0.30 dB/km
	1625nm	≤ 0.23 dB/km	≤ 0.23 dB/km	≤ 0.23 dB/km
Attenuation vs. Wavelength	1285-1330nm	≤ 0.03 dB/km	≤ 0.03 dB/km	≤ 0.03 dB/km
Max. α difference	1525-1575nm	≤ 0.02 dB/km	≤ 0.02 dB/km	≤ 0.02 dB/km
Dispersion coefficient	1285-1340nm	≥ -3.4 ≤ 3.4 ps/(nm · km)	≥ -3.4 ≤ 3.4 ps/(nm · km)	-
	1550nm	≤ 18 ps/(nm · km)	≤ 18 ps/(nm · km)	-
	1625nm	≤ 22 ps/(nm · km)	≤ 22 ps/(nm · km)	-
Zero dispersion wavelength		1312±12 nm	1300-1324 nm	1300-1324 nm
Zero dispersion slope		≤ 0.091 ps/nm ² · km	≤ 0.092 ps/nm ² · km	≤ 0.092 ps/nm ² · km
Typical value		0.086 ps/nm ² · km	0.086 ps/nm ² · km	0.04 ps/nm ² · km
PMD				
Maximum Individual Fibre		≤ 0.1 ps/√km	≤ 0.1 ps/√km	≤ 0.1 ps/√km
Link Design Value(M=20,Q=0.01%)		≤ 0.06 ps/√km	≤ 0.06 ps/√km	≤ 0.06 ps/√km
Typical value		0.04 ps/√km	0.04 ps/√km	0.04 ps/√km
Cable cutoff wavelength λ _{cc}		≤ 1260 nm	≤ 1260 nm	≤ 1260 nm
Mode field diameter(MFD)	1310nm	8.7-9.5 μm	8.4-9.2μm	8.4-9.2 μm
	1550nm	9.9-10.9 μm	9.3-10.3 μm	9.3-10.3 μm
Effective group index of refraction(Neff)	1310nm	1.466	1.466	1.466
	1550nm	1.467	1.467	1.467
Point discontinuities	1310nm	≤ 0.05 dB	≤ 0.05 dB	≤ 0.05 dB
	1550nm	≤ 0.05 dB	≤ 0.05 dB	≤ 0.05 dB
Geometrical Characteristics				
Fiber Core Diameter		9 +/-1μm	9 +/-1μm	9 +/-1μm
Cladding diameter		125.0±0.7 μm	125.0±0.7 μm	125.0±0.7 μm
Cladding non-circularity		≤ 1.0 %	≤ 0.7 %	≤ 0.7 %
Coating diameter		245.0±7 μm	245.0±5 μm	245.0±5 μm
Coating-cladding concentricity error		≤ 12.0 μm	≤ 12.0 μm	≤ 12.0 μm
Coating non-circularity		≤ 6.0 %	≤ 6.0 %	≤ 6.0 %
Core-cladding concentricity error		≤ 0.6 μm	≤ 0.5 μm	≤ 0.5 μm
Curl(radius)		≥ 4 m	≥ 4 m	≥ 4 m
Delivery length		2.1 to 50.4 km/reel	2.1 to 50.4 km/reel	2.1 to 50.4 km/reel

*Attenuation loss of barefiber

Fiber Specifications (Multimode)

Characteristics		62.5/125 (OM1)	50/125 (OM2)	OM3/OM4	OM5
Geometry Characteristics					
Core Diameter		62.5±2.5 μm	50±2.5 μm	50±2.5 μm	50±2.5 μm
Core Non-circularity		≤ 5.0 %	≤ 5.0 %	≤ 5.0 %	≤ 5.0 %
Cladding Diameter		125.0±1.0 μm	125.0±1.0 μm	125.0±1.0 μm	125.050±1.0 μm
Cladding Non-circularity		≤ 1.0 %	≤ 1.0 %	≤ 0.6 %	≤ 0.6 %
Coating Diameter		245±7 μm	245±7 μm	245±7 μm	245±7 μm
Coating/Cladding Concentricity Error		≤ 10.0 μm	≤ 10.0 μm	≤ 10.0 μm	≤ 10.0 μm
Coating Non-circularity		≤ 6.0 %	≤ 6.0 %	≤ 6.0 %	≤ 6.0 %
Core/Cladding Concentricity Error		≤ 1.5 μm	≤ 1.5 μm	≤ 1.0 μm	≤ 1.0 μm
Delivery Length		up to 17.6 km/reel	up to 17.6 km/reel	up to 8.8 km/reel	up to 8.8 km/ reel
Optical Characteristics *					
Attenuation	850nm	≤ 3.5 dB/km	≤ 3.5 dB/km	≤ 3.5 dB/km	≤ 3.5 dB/km
	953nm	-	-	-	≤ 1.7 dB/km
	1300nm	≤ 1.5 dB/km	≤ 1.5 dB/km	≤ 1.5 dB/km	≤ 1.5 dB/km
Overfilled Modal Bandwidth	850nm	≥ 200 MHz · km	≥ 500 MHz · km	≥ 1500/ ≥ 3500 MHz · km	≥ 3500 MHz · km
	953nm	-	-	-	≥ 1850 MHz · km
	1300nm	≥ 500 MHz · km	≥ 500 MHz · km	≥ 500/ ≥ 500 MHz · km	≥ 500 MHz · km
Effective Modal Bandwidth	850nm	-	-	≥ 2000/ ≥ 4700 MHz · km	≥ 4700 MHz · km
	953nm	-	-	-	≥ 2470 MHz · km
10Gb/sWDM		-	-	-100/150 m	150 m
40Gb/sWDM		-	-	300/500 m	440 m
40GBASE-SR4 / 100GBASE SR10	850nm	-	-	1000/1100 m	200 m
10GBASE-SR	850nm	-	150 m	300/550m	-
1000BASE-SR	850nm	-	750 m	1000/1100m	-
DMD Specification					
Numerical Aperture		0.275±0.015	0.200±0.015	0.200±0.015	0.200±0.015
Group Refractive index		1,496	1,482	1,482	1,482
		1,491	1,477	1,477	1,477
Zero Dispersion Wavelength, λ ₀		1320-1365 nm	1295-1340 nm	1295-1340 nm	1297-1328 nm
Zero Dispersion Slope,S ₀		-	-	-	≤ 4(-103)/(840λ√840) ⁴)
		-	-	-	ps/nm ² · km
Zero Dispersion Slope,S ₀ 1295nm ≤ λ ₀ ≤ 1310nm		-	≤ 0.105 ps/nm ² · km	≤ 0.105 ps/nm ² · km	-
1310nm ≤ λ ₀ ≤ 1340nm		-	≤ 0.000375(1590-λ ₀) ps/nm ² · km	-	-
1320nm ≤ λ ₀ ≤ 1348nm		≤ 0.11 ps/nm ² · km	-	≤ 0.000375(1590-λ ₀)ps/nm ² · km	-
1348nm ≤ λ ₀ ≤ 1365nm		≤ 0.001(1458-λ ₀) ps/nm ² · km	-	-	-

*Attenuation loss of barefiber

Fiber Color Code

No .	1	2	3	4	5	6
Color	Blue	Orange	Green	Brown	Gray	White
No .	7	8	9	10	11	12
Color	Red	Black	Yellow	Violet	Pink	Aqua

Loose tube (LT) & filler rod (FR) color code

Fiber number	Element no.											
	1	2	3	4	5	6	7	8	9	10	11	12
6	LT					--	--	--	--	--	--	--
8	LT					--	--	--	--	--	--	--
12	LT					--	--	--	--	--	--	--
24	LT	LT				--	--	--	--	--	--	--
48	LT	LT	LT	LT	FR	--	--	--	--	--	--	--
96	LT	LT	LT	LT	LT	LT	LT	LT	LT	--	--	--

Mechanical & Environmental Characteristics

Item	Test Method	Acceptance Condition
Tensile Strength IEC 794-1-E1	Load: 9,000 N Length: 50m	Loss change ≤ 0.1 dB @1550 nm No fiber break and no sheath damage
Crush Test IEC 794-1-E3	Load: 4,000 N/100mm	Loss change ≤ 0.1 dB @1550 nm No fiber break and no sheath damage.
Impact Resistance IEC 794-1-E4	Points of impact: 5 Times of per point: 5 Impact energy: 1,000g \times 1m Radius of hammer head: 12.5mm Impact rate: 2sec/cycle	Loss change ≤ 0.1 dB @1550 nm No fiber break and no sheath damage.
Repeated Bending IEC 794-1-E6	Bending radius: 20 x OD Load: 250 N Flexing rate: 3 sec/cycle No. of cycle: 30	Loss change ≤ 0.1 dB @1550 nm No fiber break and no sheath damage.
Torsion IEC 794-1-E7	Length: 1 m Load: 250 N Twist rate: 1 min/cycle Twist angle: $\pm 90^\circ$ No. of cycle: 10	Loss change ≤ 0.1 dB @1550 nm No fiber break and no sheath damage.
Water Penetration Test IEC 794-1-F5B	Height of water: 1 m Sample length: 3 m Test time: 24 hours	No water shall have leaked from the opposite end of cable.
Temperature Cycling Test IEC 794-1-F1	Temperature step: +20°C \rightarrow -40°C \rightarrow +70°C \rightarrow +20°C Time per each step: 24 hrs Number of cycle: 2	Loss change ≤ 0.1 dB @1550 nm No fiber break and no sheath damage.
Compound Flow IEC 794-1-E14	Sample length: 30 cm Temp: 70°C \pm 2°C Time: 24 hours	No compound flow
Sheath High Voltage Test	On line test 9t KV (t-sheath thickness)	No sheath breakdown

Ordering Information

* Ordering Code Example

