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Supersedes None

SPECIFICATION
FOR
COLORED SINGLEMODE OPTICAL FIBER
(FutureGuide®-LWP)

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FUJIKURA'S SPECIFICATION FOR COLORED SINGLE-MODE OPTICAL FIBER (Fujikura Designation: FutureGuide®-LWP)

1. General

This specification covers a colored single-mode optical fiber optimized at a wavelength of 1310nm and 1550nm region, but also can be used in the wavelength of 1380nm region, complying with the subcategory G.652.D in the ITU-T recommendation G.652 June 2005.

Unless otherwise stated, the following characteristics are measured at ambient temperature ($25 \pm 5^\circ\text{C}$).

2. Structural specifications

Typical fiber structure is shown in Fig. 1.

No.	Item	Specified value	Reference standard
2.1	Fiber materials		
2.1.1	Core material	Silica (SiO ₂) doped with germanium dioxide (GeO ₂)	
2.1.2	Cladding material	Pure silica (SiO ₂)	
2.1.3	Coating material	Dual layers of UV-cured acrylate The 3 rd layer of color-coded UV-cured Acrylate.	
2.2	Dimensions		
2.2.1	Mode field diameter at 1310nm at 1550nm	$9.2 \pm 0.4 \mu\text{m}$ $10.4 \pm 0.8 \mu\text{m}$	IEC60793-1-45, First edition 2001-07
2.2.2	Cladding diameter	$125.0 \pm 1.0 \mu\text{m}$	IEC60793-1-20, First edition 2001-09
2.2.3	Coating diameter	$255 \pm 10 \mu\text{m}$	IEC60793-1-21, First edition 2001-08
2.3	Core Concentricity Error	$\delta 0.5 \mu\text{m}$	IEC60793-1-20, First edition 2001-09
2.4	Cladding Non-Circularity	$\delta 1.0 \%$	IEC60793-1-20, First edition 2001-09
2.5	Coating /Cladding Concentricity Error	$\delta 12 \mu\text{m}$	IEC60793-1-21, First edition 2001-08
2.6	Fiber Curl	$\epsilon 4.0 \text{ m}$	IEC60793-1-34, First edition 2001-07
2.7	Coloring	The following colors are available. Blue, Yellow, Green, Red, Pink, Purple, Orange, Brown, Grey, Sky Blue, Black and White (12 colors)	

3. Optical specifications

No.	Item	Specified value	Reference standard
3.1	Attenuation		
3.1.1	Attenuation coefficient at 1310nm at 1550nm at 1383nm	δ 0.35 dB/km δ 0.20 dB/km δ 0.31 dB/km*1	IEC60793-1-40, First edition 2001-07
3.1.2	Attenuation uniformity	No point discontinuity greater than 0.1dB at 1310nm or at 1550nm in the OTDR trace.	IEC60793-1-40, First edition 2001-07
3.1.3	Attenuation vs. wavelength*2 1285 - 1330nm, ref. λ of 1310nm 1525 - 1575nm, ref. λ of 1550nm Macrobending *3	\langle δ 0.05 dB/km \langle δ 0.05 dB/km	IEC60793-1-40; First edition 2001-07
3.1.4	λ =32mm, 1 turns at 1550nm λ =50mm, 100 turns at 1310nm λ =50mm, 100 turns at 1550nm	δ 0.50 dB δ 0.05 dB δ 0.1 dB	IEC60793-1-47, First edition 2001-07
3.2	Cut off wavelength		
3.2.1	Cable cut-off wavelength λ_{cc}	λ_{cc} δ 1260 nm	IEC60793-1-44, First edition 2001-07
3.3	Chromatic dispersion		
3.3.1	Chromatic dispersion coefficient at 1285 - 1330nm at 1550nm	δ 3.5ps/(nm \oplus km) δ 18 ps/(nm \oplus km)	IEC60793-1-42, First edition 2001-07
3.3.2	Zero-dispersion wavelength λ_0	1302nm δ λ_0 δ 1322nm	
3.3.3	Zero-dispersion slope S_0	S_0 δ 0.092 ps/(nm ² \oplus km)	
3.4	Polarization mode dispersion (PMD) *4 PMD Link Design Value at 1550nm	δ 0.08 ps/ \square km	IEC/TS 61941, First edition 2000-02

Notes:

- *1. The attenuation at 1383nm after hydrogen aging in accordance with IEC60793-2, First edition 2001-10.
- *2. The attenuation in a given wavelength range does not exceed the attenuation of the reference wavelength (λ) by more than the value \langle .
- *3. The induced attenuation due to fiber wrapped around a mandrel of a specified diameter (λ).
- *4. This characteristic is only guaranteed under the free tension condition.

4. Mechanical specifications

No.	Item	Specified Value	Reference Standard
4.1	Proof Stress*	ϵ 1% (100kpsi or 0.7GPa)	IEC60793-1-30, First edition 2001-07
4.2	Dynamic Fatigue Resistance Parameter (Nd)	> 20	IEC60793-1-31, First edition 2001-07
4.3	Coating Strip Force (F)	4.0 N (Typical)	IEC60793-1-32, First edition 2001-07

Note:

- * The entire optical fiber length shall be tested with regard to the tensile strength.

5. Environmental specifications

No.	Item	Specified value	Reference standard
5.1	Environmental specifications	Induced attenuation at both 1310nm and 1550nm	
5.1.1	Temperature dependence -60 to 85°C	δ 0.05 dB/km	IEC60793-1-52, First edition 2001-07
5.1.2	Temperature-humidity cycling -10 to 85°C and 4 to 98%R.H.	δ 0.05 dB/km	TIA/EIA-455-73, 1997-07
5.1.3	Water immersion at 23°C	δ 0.05 dB/km	IEC60793-1-53, First edition 2001-07
5.1.4	Dry heat at 85°C	δ 0.05 dB/km	IEC60793-1-51, First edition 2001-07
5.2	Storage environment (On the shipping spool)	-40 to +55°C, at < 98% R.H.	

6. Typical Values

No.	Item	Typical value	Remark
6.1	Refractive index profile	Matched clad, step index profile	Shown in Fig.3
6.2	Refractive index difference Δ	$\Delta=0.36\%$	
6.3	Effective group index of refraction N_{eff} at 1310nm at 1550nm	1.4675 1.4681	

Note:

These characteristics are typical values, therefore Fujikura do not guarantee.

7. Packing

The available reel lengths are as follows.

Length(km)	25.2	29.4	33.6	37.8	50.4

Other lengths are also available upon request.

The reel size shall be standardized by Fujikura Ltd. as shown in Fig. 4 and Fig. 5.

A Fujikura label(s) with the manufacture's name, the production No., the type of fiber and the fiber length shall be shown on each reel.

8. Measurement data

If so requested by the customer, fiber data shall be transmitted electrically and precede each shipment (Microsoft Windows, diskette, electric-mail, etc.). The fiber data basically consist of the following characteristics.

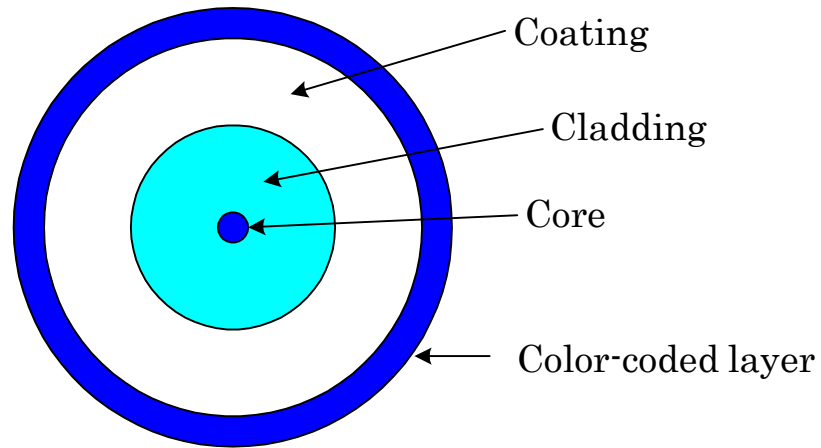


Fig. 1. Structure of Colored FutureGuide[∇]-LWP

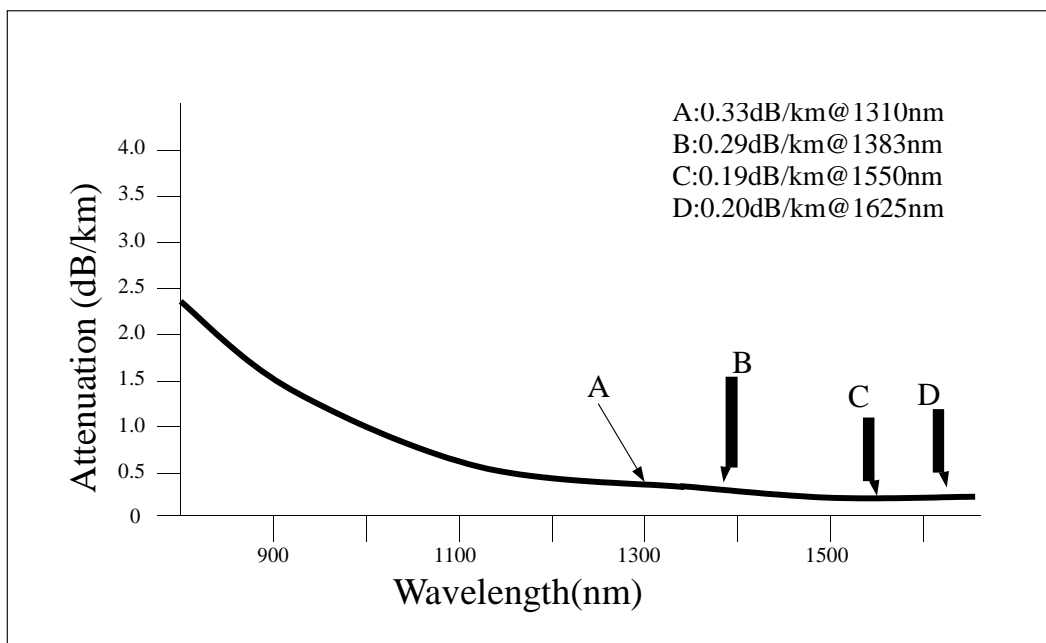


Fig.2 Spectral attenuation (Typical fiber)

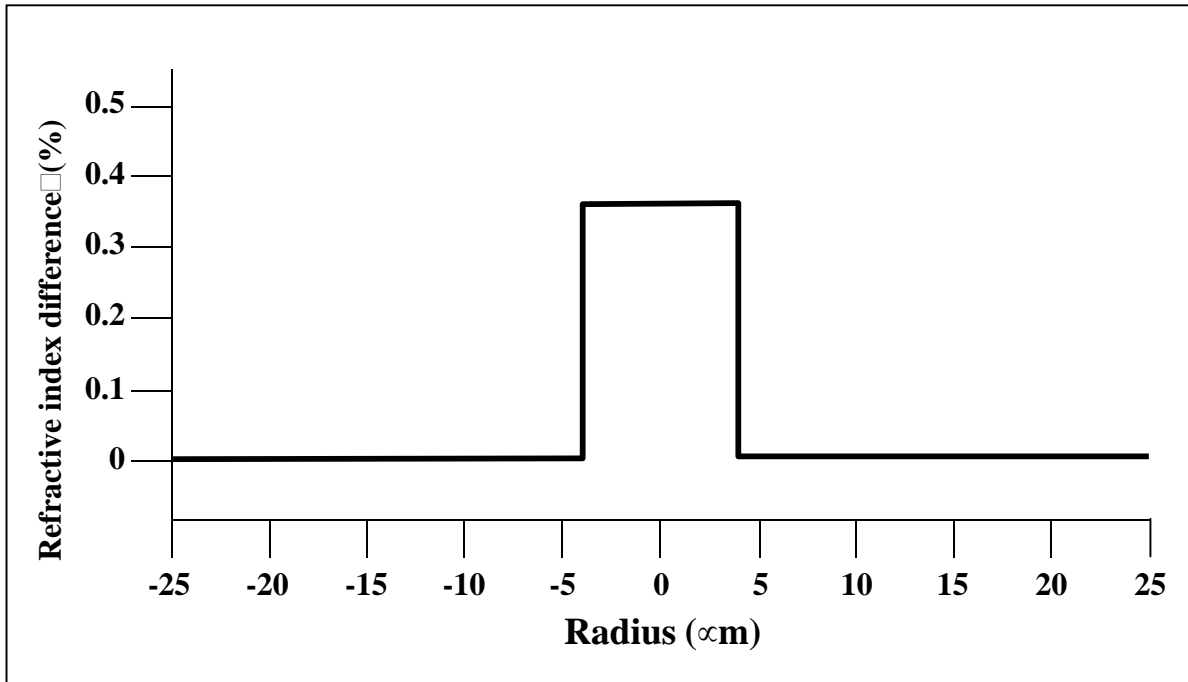


Fig.3 Refractive index profile (Typical fiber)

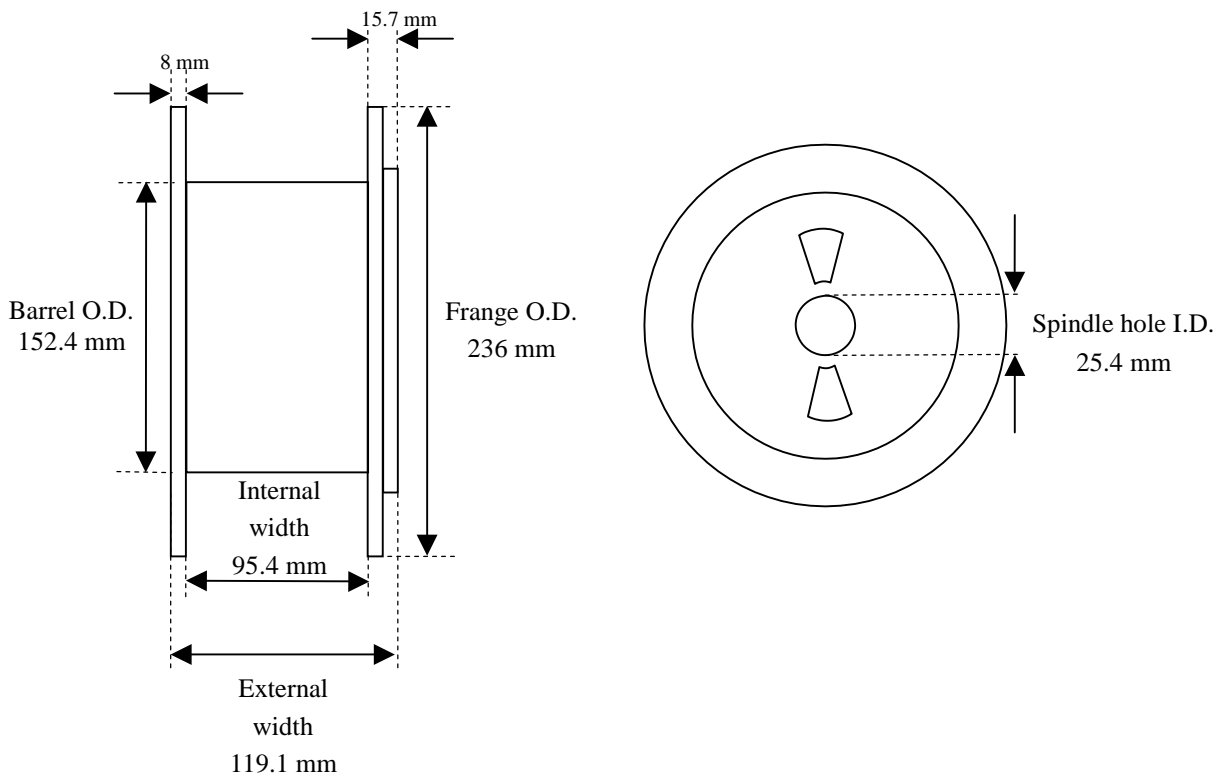


Fig. 4. Fiber reel (for up to 25.2km)

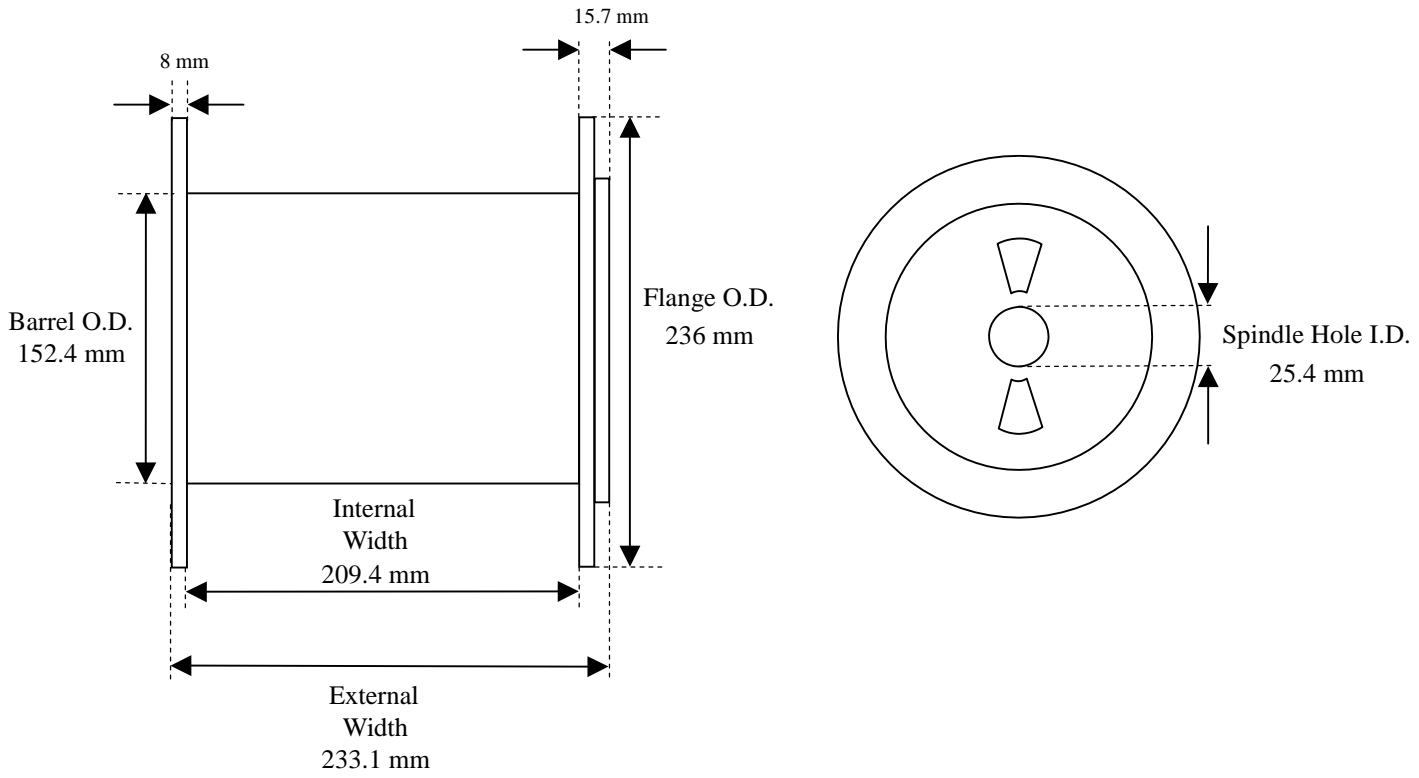


Fig. 5. Fiber Reel (for 50.4 km)

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