## **FinOptic - LBLF**

FinOptic-LBLF(G657A1) is a Low Bend Loss Singlemode fiber designed for transmission systems over the entire range from 1260 to 1625 nm range. FinOptic-LBLF (G657A1) has excellent bending performance and also result in lower attenuation in challenging applications & it is optimised for use in Fibre To The Home (FTTH) operations. FinOptic-LBLF meets or exceeds ITU Recommendations G657(Category A), IEC 60793-2-50(TypeB1.3)

#### SPECIFICATIONS - FINOPTIC / LBLF(G657A1) / 07 / 13

<b>MAX ATTENUATION (dB/km)</b> At 1310 nm At 1550 nm At 1490 nm At 1625 nm	≤ 0.34 dB/Km ≤0.21 dB/Km ≤0.24 dB/Km ≤0.23 dB/Km	<b>MECHANICAL PROPERTIES</b> Proof Test - The entire fiber length is subjected to tensile stress of 100Kpsi (0.7 Gpa). This is equivalent to 1% strain	
<b>POINT DISCONTINUITY</b> At 1310 nm At 1550 nm	≤0.05 dB ≤0.05 dB	<b>DYNAMIC TENSILE STRENGTH</b> Un-aged Aged Fiber Curl	≥ 550 Kpsi (3.80 Gpa) ≥ 440 Kpsi ( 3.00 Gpa) ≥ 4.0 mts
SPECTRAL ATTENUATION Bet 1285-1360 nm Bet 1360-1480 nm Bet 1480-1525 nm Bet 1525-1625 nm Attenuation at 1380 to 1390* *Attenuation value at this wavelength represents post hydrogen aging performance	$\leq$ 0.37dB/Km $\leq$ Atten at 1310 dB/Km $\leq$ 0.34 dB/Km $\leq$ 0.23 dB/Km $\leq$ Atten at 1310 dB/Km	MACRO BEND LOSS: (Mandrel Dia/Turn/Wavelength) 30mm/10 turn/ 1550 nm 30mm/10 turn/ 1625 nm 20mm/1turn/ 1625 nm 20mm/1turn/ 1625 nm Coating Strip Force (Average) Dynamic Fatigue Typical (nd) Static Fatigue Typical (ns)	≤0.25 dB ≤1.0 dB ≤ 0.75 dB ≤1.5 dB 1.3 TO 8.9 N ≥20 ≥20
CHROMATIC DISPERSION 1285-1330 nm 1270-1340 nm At 1550 nm At 1625 nm Zero Dispersion wavelength Zero Dispersion Slope	≤ 3.5ps/nm.km ≤ 5.3ps/nm.km ≤ 18ps/nm.km ≤ 22ps/nm.km 1300 to 1324 nm ≤ 0.092 ps/nm ^ 2.Km	ENVIORNMENTAL CHARACTERISTICS Temperature Dependance(-60 deg C to + 85 deg C) Induced Attenuation At 1550,1625 nm Temperature Humidity Cycling (- 10 deg C to + 85 degC at 95% RH) Induced Attenuation At	$\leq$ 0.05 dB/Km $\leq$ 0.05 dB/Km
<b>MAX PMD INDIVIDUAL FIBER</b> At 1310 nm At 1550 nm	≤ 0.1 ps/sqrt Km ≤ 0.1 ps/sqrt Km	1550,1625 nm Water immersion (23 $\pm$ 2 deg C) induced attenuation At 1550,1625 Heat Aging (85 $\pm$ 2 deg C)	$\leq$ 0.05 dB/Km $\leq$ 0.05 dB/Km
FIBER PMD Link Design Value* *The cable process can affect the PMD link property strongly	≤ 0.06 ps/sqrt Km	induced attenuation At 1550,1625 nm EFFECTIVE GROUP INDEX OF REFRACTION*	
<b>CUT-OFF WAVELENGTH</b> Cabled Cut-off wavelength.	≤1260 nm	Effective Group Index of Refraction at 1310nm Effective Group Index of	1.4674
MODE FIELD DIAMETER At 1310 nm	$8.8\pm0.6\mu$ m	Effective Group Index of Refraction at 1550nm Effective Group Index of Refraction at 1625nm *Typical Values	1.4679
GEOMETRICAL PARAMETERS Clad Diameter Cladding Non Circularity Mode Field Concentricity Error Coating Diameter Coating/Cladding Concentricity Error	$125 \pm 0.7 \mu m$ $\leq 0.80 \%$ $\leq 0.50 \mu m$ $242 \pm 7 \mu m$ $\leq 12 \mu m$	Fiber Length Per Reel Fiber with enhanced properties/customized specifications can be provided on request	≤ 50.4

For purposes of determining conformance to any specifications an observed or calculated value shall be rounded "to the nearest unit" in the last right-hand digit used in expressing the specification limit, in accordance with the rounding method of ASTM Practice E29, "Using Significant Digits in Test Data to Determine Conformance with Specifications."

## **FinOptic – NZDSF**

FinOptic-NZDSF fiber is designed to operate across a window of wavelengths near 1550nm with small amount of dispersion.FinOptic-NZDSF fibre is optimized for use in national long haul backbone networks.Due to its lower dispersion in the 1550nm window it is an ideal and cost effective solution for DWDM operations.FinOptic-NZDSF meets or exceeds ITU Recommendations G655.

### **FinOptic-NZDSF**

MAX ATTENUATION (dB/km)	< 0.00 dP///m	Fiber Curl	$\geq$ 4.0 mts
AL 1550 IIII	$\leq 0.22 \text{ uD/KIII}$	MACDO DEND LOSS.	
AL 1020 IIII	$\leq 0.24 \text{ uD/KIII}$	(Mondrol Dio /Turn (Mouslongth)	
	$\leq 0.40$ ud/KIII	(Manurei Dia/Turii/Wavelengiii)	
vavelength represents post		6011111/100 lu11/ 1550 1111	≤ 0.05 dB
hydrogen aging performance		60mm/100 turn/ 1625 nm	$\leq 0.1 \text{ dB}$
		32mm/1turn/ 1550 nm	$\leq 0.50 \text{ dB}$
POINT DISCONTINUITY		Coating Strip Force (Average)	1 to 5 N
At 1550 nm	$\leq 0.1 \text{ dB}$	Dynamic Fatigue Typical (nd)	$\geq 20$
At 1625 nm	$\leq 0.1 \text{ dB}$	Static Fatigue Typical (ns)	≥ 20
CHROMATIC DISPERSION		ENVIORNMENTAL	
1530-1565	2.0 - 6.0 ps/nm.km		
1565-1625	4 5 - 11 2 ns/nm km	deg C to $\pm$ 85 deg C) Induced	
		Attenuation	
POLARIZATION MODE		At 1550 nm	< 0.05 dB/Km
DISPERSION*		At 1625 nm	$\leq 0.05  dB/Km$
PMD Individual Fiber at 1550 nm	≤ 0.2 ps/sqrt Km	Temperature Humidity Cycling	
Cabled Fiber at 1550 nm		(-10  deg C to  + 85  deg C at)	
*The cable process can affect	$\leq$ 0.3 ps/sqrt Km	98%RH) Induced Attenuation	
the PMD link property strongly		At 1550 nm	$\leq$ 0.05 dB/Km
		At 1625 nm	$\leq$ 0.05 dB/Km
CUT-OFF WAVELENGTH		Water immersion (23 $\pm$ 2 deg	
Cable Cut-off Wavelength	≤ 1450nm	C) induced attenuation	
		At 1550 nm	$\leq$ 0.05 dB/Km
MODE FIELD DIAMETER		At 1625 nm	$\leq$ 0.05 dB/Km
At 1550 nm	9.6 <u>+</u> 0.4µm	Heat Aging ( 85 deg C) Induced Attenuation	
GEOMETRICAL PARAMETERS		At 1550 nm	$\leq$ 0.05 dB/Km
Clad Diameter	<125 + 0.7 µm	At 1625 nm	
Cladding Non Circularity	< 0.80 %	Damp Heat ( 30 days,85 deg C	
Mode Field Concentricity Error	$< 0.50 \mu m$	at 85 % RH) Induced Attenuation	
Coating Diameter	$242 + 7\mu m$	At 1550 nm	< 0.05 dB/Km
Coating Cladding Concentricity	$< 120 \mu m$	At 1625 nm	
Error	= 12.0µm		
Coating Non Circularity	≤ 4 %	EFFECTIVE GROUP INDEX OF REFRACTION*	
		Effective Group Index of	1.4690
Eiber Droof Test for minimum		Refraction at 1550nm	4 4000
strain level	1%	Refraction at 1625nm	1.4690
		*Typical Values	
DYNAMIC TENSILE STRENGTH		Fiber Length Per Reel	≤ 50.4
Tensile Strength(Median) for 0.5mts specimen length- Un-	≥ 550 Kpsi (3.80 Gpa)	Fiber with enhanced	
ayou	> 440 Kpgi (2.00 Cpg)	properties/customised	
0.5mts specimen length- Aged	≥ 440 KpSI (3.00 Gpa)	specifications can be provided on request	
Tensile Strength(Median) for 10mts specimen length- Un- aged	≥ 500 Kpsi (3.45 Gpa)		

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## **FinOptic - LWPF**

FinOptic - LWPF fibre is designed for transmission systems over the entire wavelength range from 1260 to 1625 nm, and is characterized by attenuation at 1380 - 1386nm band being less than attenuation at 1310 nm.FinOptic - LWPF is optimized for use in metropolitian, local and access networks for long distances due to low attenuation across the entire band and low PMD.It is an ideal & cost effective solution for CWDM operations.It provides outstanding long term reliability due to its immunity to hydrogen aging.FinOptic - LWPF meets or exceeds ITU Recommendations G652(Categories C & D), IEC60793-1-51, IEC60793-1-52

#### SPECIFICATIONS - FINOPTIC / LWPF / A / 05 / 07/ 16

	MAX. ATTENUATION AT 1310 nm	$\leq 0.34 \text{ dB/Km}$	Coating/Cladding Concentricity Error	$\leq$ 12 $\mu$ m
	AT 1550 nm	$\leq 0.21 \text{ dB/Km}$		
	AT 1490 nm	$\leq 0.24 \text{ dB/Km}$	MECHANICAL PROPERTIES	
	AT 1625 nm	≤ 0.23 dB/Km	Proof lest - The entier fiber length	
	AT 1383 nm*	$\leq$ Attenuation at 1310 nm*	stress of 100Kpsi/0 7Gpa) This is	
			equivalent to 1% Strain	
	*Attn value at this wavelength			
I	represents post hydrogen		DYNAMIC TENSILE STRENGTH	
i	aging performance strongly		Unaged	≥ 550 Kpsi (3.80Gpa)
	ATTENUATION V. WAVELENOTU		Aged	≥ 440 Kpsi (3.00 Gpa)
	ATTENUATION VS WAVELENGTH		Fiber Curl	$\geq$ 4.0 Meter
	reference to 1310nm)	$\leq$ 0.03 dB/Km		
	Between 1525 to 1575nm (with	0.00 10 ///	MACRO BEND LOSS:	
I	reference to 1550nm)	$\leq$ 0.02 dB/Km	(Mandrel Dia/Turn/Wavelength)	
			32mm/1 turn/ 1550 nm	$\leq 0.5 \text{ dB}$
I	POINT DISCONTINUITY		50mm/100 turn/ 1310 nm	$\leq 0.05 \text{ dB}$
I	Point Discontinuity at 1310 nm	≤ 0.05 dB	60mm/100 turn/ 1550 nm	$\leq 0.05 \text{ dB}$
	Point Discontinuity at 1550 nm	≤ 0.05 dB	60mm/100 turn/ 1625 nm	$\leq 0.10 \text{ dB}$
			Coating Strip Force	1.3N to 8.9N
	CHROMATIC DISPERSION		Dynamic Fatigue Typical (nd)	≥20
	Between 1285 to 1330 nm	$\leq$ 3.5 ps/nm.km	Static Fatigue Typical (ns)	≥20
	Between 1270 to 1340 nm	$\leq$ 5.3 ps/nm.km		
	AI 1550 nm	≤ 18 ps/nm.km	ENVIRONMENTAL	
	AT 1625 nm	≤ 22.0 ps/nm.km	Temperature Dependance(-60 deg	< 0.05 dB/Km
	Zero Dispersion Wavelength	1300 nm to 1324 nm	C  to  + 85  deg C Induced	
,	zero Dispersion Slope	$\leq$ 0.092 ps/nm ^ 2.Km	Attenuation At 1550,1625 nm	
			Temperature Humidity Cycling	$\leq$ 0.05 dB/Km
	At 1310 nm		(- 10 deg C to $+$ 85 degC at	
ĺ	At 1550 nm	≤0.2 ps/sqrt Km	95% RH) Induced Attenuation At	
í	FIBER PMD Link Design Value*	≤0.2 ps/sqrt Km	Water immersion (23 $\pm$ 2 deg C)	< 0.05 dB/Km
	*The cable process can affect the	≤0.1 ps/sqrt Km	induced attenuation At	
I	PMD link property strongly		1550,1625 nm	
			Heat Aging (85 $\pm$ 2 deg C)	$\leq$ 0.05 dB/Km
1	CUTOFF WAVELENGTH	1000	induced attenuation At 1550,1625	
	Cable Cut-off Wavelength	≤ 1260 nm	EFFECTIVE GROUP INDEX OF	
			REFRACTION*	
			Effective Group Index of	1.4674
4	At 1510 nm	9.2 <u>+</u> 0.4µm	Refraction at 1310nm	1 4070
	AL 1550 IIII	10.4 <u>+</u> 0.5µm	Refraction at 1550nm	1.4079
	GEOMETRICAL PROPERTIES		Effective Group Index of	1.4679
	Clad Diameter	105	Retraction at 1625nm	
	Cladding Non Circularity	$125 \pm 1.0 \mu m$	^ lypical values	< 50 4 Km
	Node Field Concentricity Error	$\leq 0.0 \%$	Fiber length per reel	≤ 50.4 KM
	Coating Diameter	$\leq 0.3 \mu \text{III}$	Fiber with enhanced properties /	
		2 <del>π</del> 2 <u>Τ</u> /μ	be provided on request	

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# **FinOptic - LWPF PREMIUM**

FinOptic - LWPF Premium fibre is designed for transmission systems over the entire wavelength range from 1260 to 1625 nm, and is characterized by attenuation at 1380 to 1386nm band being less than attenuation at 1310 nm. FinOptic - LWPF Premium is optimized for use in metropolitian, local and access networks due to low attenuation across the entire band and low PMD.It is an ideal & cost effective solution for CWDM operations.It provides outstanding long term reliability due to its immunity to hydrogen aging. FinOptic - LWPF Premium fibre meets or exceeds ITU Recommendations G652(Categories C & D), IEC60793-1-51, IEC60793-1-52, IEC60793-1-53

### SPECIFICATIONS - FinOptic - LWPF Premium / B / 05 / 07 / 16

MAX. ATTENUATION AT 1310 nm AT 1550 nm AT 1490 nm AT 1625 nm AT 1383 nm*	≤ 0.34 dB/Km ≤ 0.21 dB/Km ≤ 0.24 dB/Km ≤ 0.23 dB/Km ≤ 0.31*dB/Km	MECHANICAL PROPERTIES Proof Test - The entier fiber length is subjected to a tensile stress of 100Kpsi(0.7Gpa).This is equivalent to 1% Strain DYNAMIC TENSILE STRENGTH	
*Attn value at this wavelength represents post hydrogen aging performance strongly		Unaged Aged Fiber Curl	≥ 550 Kpsi (3.80Gpa) ≥ 440 Kpsi (3.00 Gpa) ≥ 4.0 Meter
ATTENUATION Vs WAVELENGTH Between 1285 to 1330 nm (with reference to 1310nm)	$\leq$ 0.03 dB/Km	MACRO BEND LOSS:	
Between 1525 to 1575nm (with reference to 1550nm)	$\leq$ 0.02 dB/Km	32mm/1 turn/ 1550 nm 50mm/100 turn/ 1310 nm	$\leq 0.05 \text{ dB}$ $\leq 0.05 \text{ dB}$
POINT DISCONTINUITY	< 0.05 dB	60mm/100 turn/ 1550 nm 60mm/100 turn/ 1625 nm	$\leq 0.05 \text{ dB}$ < 0.10 dB
Point Discontinuity at 1310 nm Point Discontinuity at 1550 nm	$\leq 0.05 \text{ dB}$ $\leq 0.05 \text{ dB}$	Coating Strip Force Dynamic Fatigue Typical (nd) Static Fatigue Typical (ns)	1.3N  to  8.9N $\ge 20$ > 20
CHROMATIC DISPERSION Between 1285 to 1330 nm	$\leq$ 3.5 ps/nm.km		
Between 1270 to 1340 nm	$\leq$ 5.3 ps/nm.km	ENVIRONMENTAL CHARACTERISTICS	
AT 1550 nm	$\leq$ 17.5 ps/nm.km	Temperature Dependance(-60 deg	$\leq$ 0.05 dB/Km
AT 1625 nm	$\leq 22.0 \text{ ps/mm.km}$ 1302 nm to 1322 nm	C t0 + 85 deg C) Induced Attenuation At 1550 1625 nm	
Zero Dispersion Wavelength Zero Dispersion Slope	$\leq 0.090 \text{ ps/nm}^2.\text{Km}$	Temperature Humidity Cycling	< 0.05 dB/Km
		(- 10 deg C to + 85 deg C at	
MAX PMD INDIVIDUAL FIBER	<0.1 pc/cart Km	95% RH) Induced Attenuation At 1550 1625 nm	
At 1310 nm	≤0.1 ps/sqrt Km ≤0.1 ps/sqrt Km	Water immersion (23 $\pm$ 2 deg C)	≤ 0.05 dB/Km
FIBER PMD Link Design Value*	≤0.06 ps/sqrt Km	Induced attenuation At	
*The cable process can affect the PMD link property strongly		Heat Aging (85 $\pm$ 2 deg C) induced attenuation At 1550,1625	$\leq$ 0.05 dB/Km
CUTOFF WAVELENGTH	< 1000 nm	EFFECTIVE GROUP INDEX OF REFRACTION*	
	≤ 1200 IIII	Effective Group Index of Refraction at 1310nm	1.4674
MODE FIELD DIAMETER At 1310 nm	$92 \pm 0.4 \mu m$	Effective Group Index of	1.4679
At 1550 nm	$10.4 \pm 0.5 \mu$ m	Effective Group Index of Refraction at 1625nm	1.4679
<b>GEOMETRICAL PROPERTIES</b>	105 . 0.7	*Typical values	
Clad Diameter	125 <u>+</u> 0.7μm < 0.8 %	Fiber length per reel	≤ 50.4 Km
Cladding Non Circularity	$\leq 0.5 \mu$ m	Fiber with enhanced properties / customized specifications can	
Coating Diameter	242 <u>+</u> 7µm	be provided on request	
Coating/Cladding Concentricity	$\leq 12 \mu m$		

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