

Suggested P802.3cu SMF specification

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IEEE P802.3cu Ad hoc, July 3, 2019

Single-mode fiber types specified by ITU-T

1984
CCITT
Blue Book

OS1 →
Obsolete

OS2 →

Transitioning
away from
G.652.D (OS2)

1988

2000

2003

2006/
2009

2012

ITU-T Spec	IEC	Description	OFS	Corning	Prysmian
1988 1 G.652.A	B1.1	"Standard" SMF w/ ZDW ~1310nm.	AllWave	SMF-28	
2000 2 G.652.B		"Standard" SMF w/ ZDW ~1310nm, 1625nm Atten, low PMD.	AllWave		SSMF
3 G.652.C	B1.3	"Standard" SMF w/ ZDW ~1310nm, LWP	AllWave		
4 G.652.D	B1.3	"Standard" SMF w/ ZDW ~1310nm, LWP, low PMD.	AllWave, AllWave FLEX	SMF-28e SMF-28e+	ESMF
5 G.653.A	B2	Dispersion -Shifted SMF.	Not branded. Offered upon request.		
6 G.653.B		Dispersion -Shifted SMF, Low PMD.	Not branded. Offered upon request.		
7 G.654.A	-	Cutoff-Shifted SMF.	Obsolete		
8 G.654.B	B1.2_b	Cutoff-Shifted SMF, med MFD, low PMD.	TeraWave		
9 G.654.C	B1.2_c	Cutoff-Shifted SMF, low PMD.	TeraWave		
10 G.654.D	-	Cutoff-Shifted SMF, high MFD, low PMD.	TeraWave Ocean SLA+ / ULA	Vascade	LongLine
11 G.655.C	B4_c	Non-Zero Dispersion Shifted SMF	TrueWave RS, TrueWave REACH, TrueWave LA (Large Area)	Leaf	
12 G.655.D	B4_d	Non-Zero Dispersion Shifted SMF, low 1625nm bend.	TrueWave RS, TrueWave LA (Large Area)	Leaf	
13 G.655.E	B4_e	Non-Zero Dispersion Shifted SMF, positive dispersion, low 1625nm bend.	TrueWave REACH		TeraLight, TeraLight Ultra
14 G.656	B5	Non-Zero Dispersion Shifted SMF for Wideband.	TrueWave REACH		TeraLight, TeraLight Ultra
2006/2009 15 G.657.A1	B6_a	Bending-Loss Insensitive SMF, r =10mm, G.652.D compliant.	AllWave+	ClearCurve XB	Bendbright
16 G.657.A2	B6_a	Bending-Loss Insensitive SMF, r =7.5mm, G.652.D compliant.	AllWave FLEX+	ClearCurve LBL	BendBright-XS
17 G.657.B2	B6_b	Bending-Loss Insensitive SMF, r =7.5mm	AllWave FLEX Max	ClearCurve LBL	BendBright-XS
2012 18 G.657.B3	B6_b	Bending-Loss Insensitive SMF, r =5mm	AllWave FLEX Max, EZ-Bend (r=2.5mm)	ClearCurve ZBL	BrendBright Elite

CCITT – International Telegraph and Telephone Consultative Committee

ITU – International Telegraph Union (1864), Now known as International Telecommunications Union. First agency of the United Nations

Current 802.3cd single-mode fiber specification

139.10.1 Optical fiber cable

The fiber optic cable requirements are satisfied by cables containing IEC 60793-2-50 type B1.1 (dispersion unshifted single-mode), type B1.3 (low water peak single-mode), or type B6_a (bend insensitive) fibers or the requirements in Table 139–13 where they differ.



60793-2-50 © IEC:2008

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Table 6 – Requirements common to class B fibres

Attributes	Unit	Limits
Polarization mode dispersion (PMD) coefficient link design value (PMD_Q)	ps/ $\sqrt{\text{km}}$	^a
^a A maximum value of PMD_Q on uncabled fibre shall be specified to satisfy the primary requirement of cable PMD, given in IEC 60794-3.		



IEC 60794-3

4.5 Polarization mode dispersion (PMD)

Cabled single-mode fibre PMD shall conform to IEC 60794-1-1.



IEC 60794-1-1

➔ 6.1.6 Polarization mode dispersion (PMD)

Cabled single-mode fibre PMD shall be characterized on a statistical basis, not on an individual fibre basis, as described in IEC TR 61282-3. Measurements on individual cabled fibres shall be performed in accordance with IEC 60793-1-48. Measurements on uncabled fibre can be used to generate cabled fibre statistics when the design and processes are stable and the relationship between the PMD coefficients of uncabled and cabled fibre are known. The manufacturer shall supply a PMD link design value, PMDQ, that serves as a statistical upper bound PMD coefficient of the concatenated optical fibre cables within a possible optical link. Unless otherwise specified in the detail specification, the PMDQ value shall be less than 0.5 ps/√km with a probability of 10⁻⁴ that this value be exceeded for a numerical concatenation of at least 20 cables.

IEC 60793-2-50

Needs to be updated

The requirements in Table 139-13 where they differ.

Table 139–13—Optical fiber and cable characteristics

Description	Value	Unit
Nominal fiber specification wavelength	1310	nm
Cabled optical fiber attenuation (max)	0.43 ^a or 0.5 ^b	dB/km
Zero dispersion wavelength (λ_0)	$1300 \leq \lambda_0 \leq 1324$	nm
Dispersion slope (max) (S_0)	0.093	ps/nm ² km

^aThe 0.43 dB/km at 1304.5 nm attenuation for optical fiber cables is derived from Appendix I of ITU-T G.695.

^bThe 0.5 dB/km attenuation is provided for Outside Plant cable as defined in ANSI/TIA 568-C.3. Using 0.5 dB/km may not support operation 10 km for 50GBASE-LR.

Comparison of Standards

IEC 60793-2-50: fiber specs only

Attributes	Unit	Limits		
		B1.1	B1.3	B6_a
Attenuation coefficient at 1 310 nm	dB/km	≤0,40	≤0,40	Specified as same as B1.3
Attenuation coefficient at 1 383 nm ± 3 nm	dB/km	Unspecified (high attenuation)	≤0,40	≤0,40
Attenuation coefficient at 1 550 nm dB/km	dB/km	≤0,30	≤0,30	≤0,30
Attenuation coefficient at 1 625 nm	dB/km	≤0,40	Unspecified	≤0,40
Zero dispersion wavelength, λ ₀	nm	1 300 ≤ λ ₀ ≤ 1 324	1 300 ≤ λ ₀ ≤ 1 324	1 300 ≤ λ ₀ ≤ 1 324
Zero dispersion slope	ps/nm ² km	≤0,092	≤0,092	≤0,092
Nominal MFD range at 1 310 nm ^a	mm	8,6 – 9,5	8,6 – 9,5	8,6 – 9,5
MFD tolerance	mm	±0,6	±0,6	±0,4
Cable cut-off wavelength	nm	≤1 260	≤1 260	≤1 260
Macrobending loss at 1 625 nm, 100 turns on a 30 mm radius mandrel	dB/km	≤0,1	≤0,1	10 turns on 15 mm ≤0,25
PMD coefficient	M	Specifies Max PMD _Q to meet cable PMD given in IEC 60794-3 Standard re-directs you to 60794-1-1 Max PMD _Q = 0,50 ps/vkm		
	Q			
	Max PMD _Q			

ITU fiber + cable specs

B6_a
ITU-T G.657.A1/A2
≤0,40
≤0,40
≤0,30
≤0,40
1 300 ≤ λ ₀ ≤ 1 324
≤0,092
8.6-9.5
±0,4
≤1 260
See ITU-T G.657
20 cables 0.01% 0,20 ps/vkm

Suggested 802.3 SMF specification

Optical fiber cable

The fiber optic cable requirements are satisfied by cables specified as ITU-T G.652.D (low water peak dispersion unshifted single-mode), or ITU-T G.657 category A (bend insensitive) fibers.

Table x – optical fiber cable characteristics

Attributes	Unit	Limits
Attenuation coefficient at 1 310 nm	dB/km	≤0,40
Attenuation coefficient at 1 383 nm ± 3 nm ^a	dB/km	≤0,40
Attenuation coefficient at 1 550 nm dB/km	dB/km	≤0,30
Attenuation coefficient at 1 625 nm	dB/km	≤0,40
Zero dispersion wavelength, λ_0	nm	$1\ 300 \leq \lambda_0 \leq 1\ 324$
Zero dispersion slope	ps/nm ² km	≤0,092
Nominal MFD range at 1 310 nm ^a	mm	8.6-9.5
MFD tolerance	mm	±0,4
Cable cut-off wavelength	nm	≤1 260
PMD coefficient	M	20 cables
	Q	0.01%
	Max PMDQ	0,20 ps/vkm

^aTypes G.652.a/b SMF not recommended. These fibers have high PMD and high water peak attenuation and recommended obsolete.