

PureAdvance™ series

Data sheet

Optical fiber

P1..... PureAdvance™-80
(G.654.C/G.652.B)



P3..... PureAdvance™-110
(G.654.E)

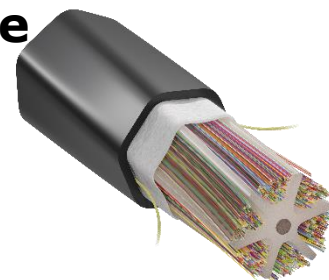


P4..... PureAdvance™-125
(G.654.E)



High fiber count optical cables

**P5..... Ultra-low loss and large-core
optical fiber cable
with PureAdvance™-110**
(G.654.E)





G.654.C

PureAdvance™-80

Pure Silica Core Single Mode Optical Fiber



- Low attenuation of ≤ 0.17 dB/km and MFD compatible with standard G.652 SMFs
- For terrestrial metro and long-haul networks
- Applicable for high-density terrestrial cables

PureAdvance™-80 (G.654.C)

General

Effective Area

Typical effective area at 1550 nm	85 μm^2
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Attenuation

Typical Attenuation at 1550 nm	0.165 dB/km
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Core Glass

Pure Silica

Optical Characteristics

Attenuation

Attenuation at 1550 nm	≤ 0.17 dB/km
Attenuation at 1625 nm	≤ 0.20 dB/km
Point discontinuity at 1550 nm	≤ 0.05 dB

Mode Field Diameter (MFD)

MFD at 1550 nm	10.1 ± 0.7 μm
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Chromatic Dispersion

Chromatic dispersion at 1550 nm	≤ 20 ps/nm/km
Chromatic dispersion slope at 1550nm	≤ 0.070 ps/nm ² /km

Cable Cutoff Wavelength (λ_{cc})

λ_{cc}	≤ 1530 nm
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Polarization Mode Dispersion (PMD)

Individual fiber PMD ^{*1)}	≤ 0.1 ps/r-km
Fiber PMD link design value ^{*2)}	≤ 0.06 ps/r-km

Geometrical Characteristics

Glass Geometry

Core-cladding concentricity error	≤ 0.8 μm
Cladding diameter	125.0 ± 1.0 μm
Cladding non-circularity	≤ 2.0 %
Fiber curl radius	≥ 4 m

Coating Geometry

Coating diameter (Natural)	245 ± 10 μm
Coating diameter (Colored)	250 ± 15 μm
Coating-cladding concentricity error	≤ 12 μm

Mechanical Characteristics

Proof Test

Proof stress level	1.2% (0.86GPa)
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Macrobending Loss

Bending radius	Number of turns	Wavelength	Induced Attenuation
30 mm	100	1550 nm	≤ 0.1 dB
30 mm	100	1625 nm	≤ 0.1 dB

Dynamic Fatigue (Nd)

Nd	20
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Environmental Tests

Condition	Induced Attenuation Change at 1550 nm and 1625 nm
-60 to +85°C temperature cycling (IEC60793-1-52)	≤ 0.05 dB/km
-10 to +85°C/98%RH temperature humidity cycling	≤ 0.05 dB/km
+23°C water immersion (IEC60793-1-53)	≤ 0.05 dB/km
+85°C heat aging (IEC60793-1-51)	≤ 0.05 dB/km
+85°C/85%RH damp heat (IEC60793-1-50)	≤ 0.05 dB/km

Packaging

Delivery Length

6.3 – 50.4 km

Performance Characteristics

Effective Group Index of Refraction

Effective group index of refraction at 1550 nm	1.463
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*1) Measured on fiber with free tension.

*2) Since PMD value may change when fiber is cabled, actual PMD link design value in a cable shall be confirmed by cable manufacturer. Under appropriate cable design, PureAdvance-80 specification supports network design requirements for a 0.20 ps/r-km of maximum cable PMD link design value recommended by ITU-T G.654.C.

This document states a standard specification. Upon request, alternative value offerings will be available.



G.652.B

PureAdvance™-80

Pure Silica Core Single Mode Optical Fiber



- **Low attenuation of ≤ 0.17 dB/km and MFD compatible with standard G.652 SMFs**
- **For terrestrial metro and long-haul networks**
- **Applicable for high-density terrestrial cables**

PureAdvance™-80 (G.652.B)

General

Effective Area

Typical effective area at 1550 nm	85 μm^2
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Attenuation

Typical attenuation at 1550 nm	0.165 dB/km
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Core Glass

Pure Silica

Optical Characteristics

Attenuation

Attenuation at 1310 nm	≤ 0.31 dB/km
Attenuation at 1550 nm	≤ 0.17 dB/km
Attenuation at 1625 nm	≤ 0.20 dB/km
Point discontinuity at 1550 nm	≤ 0.05 dB

Mode Field Diameter (MFD)

MFD at 1310 nm	9.0 ± 0.5 μm
MFD at 1550 nm	10.1 ± 0.7 μm

Chromatic Dispersion

Zero dispersion wavelength	1300-1324 nm
Zero dispersion slope	≤ 0.092 ps/nm ² /km
Chromatic dispersion at 1550 nm	≤ 18.0 ps/nm/km
Chromatic dispersion at 1625 nm	≤ 22.0 ps/nm/km

Cable Cutoff Wavelength (λ_{cc})

λ_{cc}	≤ 1260 nm
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Polarization Mode Dispersion (PMD)

Individual fiber PMD ^{*1)}	≤ 0.1 ps/r-km
Fiber PMD link design value ^{*2)}	≤ 0.06 ps/r-km

Geometrical Characteristics

Glass Geometry

Core-cladding concentricity error	≤ 0.6 μm
Cladding diameter	125.0 ± 1.0 μm
Cladding non-circularity	≤ 1.0 %
Fiber curl radius	≥ 4 m

Coating Geometry

Coating diameter (Natural)	245 ± 10 μm
Coating diameter (Colored)	250 ± 15 μm
Coating-cladding concentricity error	≤ 12 μm

Mechanical Characteristics

Proof Test

Proof stress level	1.2% (0.86GPa)
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Macrobending Loss

Bending radius	Number of turns	Wavelength	Induced Attenuation
30 mm	100	1550 nm	≤ 0.1 dB
30 mm	100	1625 nm	≤ 0.1 dB

Dynamic Fatigue (Nd)

Nd	20
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Environmental Tests

Condition	Induced Attenuation Change at 1550 nm and 1625 nm
-60 to +85°C temperature cycling (IEC60793-1-52)	≤ 0.05 dB/km
-10 to +85°C/98%RH temperature humidity cycling	≤ 0.05 dB/km
+23°C water immersion (IEC60793-1-53)	≤ 0.05 dB/km
+85°C heat aging (IEC60793-1-51)	≤ 0.05 dB/km
+85°C/85%RH damp heat (IEC60793-1-50)	≤ 0.05 dB/km

Packaging

Delivery Length

6.3 – 50.4 km

Performance Characteristics

Effective Group Index of Refraction

Effective group index of refraction at 1550 nm	1.464
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*1) Measured on fiber with free tension.

*2) Since PMD value may change when fiber is cabled, actual PMD link design value in a cable shall be confirmed by cable manufacturer. Under appropriate cable design, PureAdvance-80 specification supports network design requirements for a 0.20 ps/r-km of maximum cable PMD link design value recommended by ITU-T G.652.B.

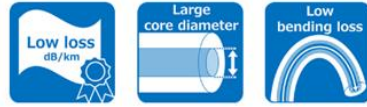
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G.654.E

PureAdvance™-110

Advanced Pure Silica Core Single Mode Optical Fiber



- Ultra-low attenuation of ≤ 0.16 dB/km and optimally enlarged effective area of $110 \mu\text{m}^2$
- For terrestrial long-haul 100 Gbit/s, 200 Gbit/s, 400 Gbit/s and beyond digital coherent transmission systems
- Applicable for high-density terrestrial cables

General

Effective Area

Typical effective area at 1550 nm	110 μm^2
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Attenuation

Typical attenuation at 1550 nm	0.156 dB/km
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Core Glass

Pure Silica

Optical Characteristics

Attenuation

Attenuation at 1550 nm	≤ 0.16 dB/km
Attenuation at 1625 nm	≤ 0.19 dB/km
Point discontinuity at 1550 nm	≤ 0.05 dB

Mode Field Diameter (MFD)

MFD at 1550nm	$11.7 \pm 0.7 \mu\text{m}$
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Chromatic Dispersion

Chromatic dispersion at 1550 nm	17–23 ps/nm/km
Chromatic dispersion slope at 1550 nm	0.050–0.070 ps/nm ² /km

Cable Cutoff Wavelength (λ_{cc})

λ_{cc}	≤ 1530 nm
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Polarization Mode Dispersion (PMD)

Individual fiber PMD ^{*1)}	≤ 0.1 ps/r-km
Fiber PMD link design value ^{*2)}	≤ 0.06 ps/r-km

Geometrical Characteristics

Glass Geometry

Core-cladding concentricity error	$\leq 0.8 \mu\text{m}$
Cladding diameter	$125.0 \pm 1.0 \mu\text{m}$
Cladding non-circularity	$\leq 2.0 \%$
Fiber curl radius	≥ 4 m

Coating Geometry

Coating diameter (Natural)	$245 \pm 10 \mu\text{m}$
Coating diameter (Colored)	$250 \pm 15 \mu\text{m}$
Coating-cladding concentricity error	$\leq 12 \mu\text{m}$

Mechanical Characteristics

Proof Test

Proof stress level	1.2% (0.86GPa)
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Macrobending Loss

Bending radius	Number of turns	Wavelength	Induced Attenuation
30 mm	100	1550 nm	≤ 0.1 dB
30 mm	100	1625 nm	≤ 0.1 dB

Dynamic Fatigue (Nd)

Nd	20
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Environmental Tests

Condition	Induced Attenuation Change at 1550 nm and 1625 nm
-60 to +85°C temperature cycling (IEC60793-1-52)	≤ 0.05 dB/km
-10 to +85°C/98%RH temperature humidity cycling	≤ 0.05 dB/km
+23°C water immersion (IEC60793-1-53)	≤ 0.05 dB/km
+85°C heat aging (IEC60793-1-51)	≤ 0.05 dB/km
+85°C/85%RH damp heat (IEC60793-1-50)	≤ 0.05 dB/km

Packaging

Delivery Length

6.3 – 50.4 km

Performance Characteristics

Effective Group Index of Refraction

Effective group index of refraction at 1550 nm	1.462
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*1) Measured on fiber with free tension.

*2) Since PMD value may change when fiber is cabled, actual PMD link design value in a cable shall be confirmed by cable manufacturer. Under appropriate cable design, PureAdvance-110 specification supports network design requirements for a 0.20 ps/r-km of maximum cable PMD link design value recommended by ITU-T G.654.E.

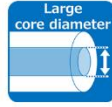
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G.654.E

PureAdvance™-125

Advanced Pure Silica Core Single Mode Optical Fiber



- Ultra-low attenuation of ≤ 0.16 dB/km and enlarged effective area of $125 \mu\text{m}^2$
- For terrestrial long-haul 100 Gbit/s, 200 Gbit/s, 400 Gbit/s and beyond digital coherent transmission systems

General

Effective Area

Typical effective area at 1550 nm	125 μm^2
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Attenuation

Typical attenuation at 1550 nm	0.156 dB/km
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Core Glass

Pure Silica

Optical Characteristics

Attenuation

Attenuation at 1550 nm	≤ 0.16 dB/km
Attenuation at 1625 nm	≤ 0.19 dB/km
Point discontinuity at 1550 nm	≤ 0.05 dB

Mode Field Diameter (MFD)

MFD at 1550nm	$12.5 \pm 0.7 \mu\text{m}$
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Chromatic Dispersion

Chromatic dispersion at 1550 nm	17–23 ps/nm/km
Chromatic dispersion slope at 1550 nm	0.050-0.070 ps/nm ² /km

Cable Cutoff Wavelength (λ_{cc})

λ_{cc}	≤ 1530 nm
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Polarization Mode Dispersion (PMD)

Individual fiber PMD ^{*1)}	≤ 0.1 ps/r-km
Fiber PMD link design value ^{*2)}	≤ 0.06 ps/r-km

Geometrical Characteristics

Glass Geometry

Core-cladding concentricity error	$\leq 0.8 \mu\text{m}$
Cladding diameter	$125.0 \pm 1.0 \mu\text{m}$
Cladding non-circularity	$\leq 2.0 \%$
Fiber curl radius	≥ 4 m

Coating Geometry

Coating diameter (Natural)	$245 \pm 10 \mu\text{m}$
Coating diameter (Colored)	$250 \pm 15 \mu\text{m}$
Coating-cladding concentricity error	$\leq 12 \mu\text{m}$

Mechanical Characteristics

Proof Test

Proof stress level	1.2% (0.86GPa)
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Macrobending Loss

Bending radius	Number of turns	Wavelength	Induced Attenuation
30 mm	100	1550 nm	≤ 0.1 dB
30 mm	100	1625 nm	≤ 0.1 dB

Dynamic Fatigue (Nd)

Nd	20
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Environmental Tests

Condition	Induced Attenuation Change at 1550 nm and 1625 nm
-60 to +85°C temperature cycling (IEC60793-1-52)	≤ 0.05 dB/km
-10 to +85°C/98%RH temperature humidity cycling	≤ 0.05 dB/km
+23°C water immersion (IEC60793-1-53)	≤ 0.05 dB/km
+85°C heat aging (IEC60793-1-51)	≤ 0.05 dB/km
+85°C/85%RH damp heat (IEC60793-1-50)	≤ 0.05 dB/km

Packaging

Delivery Length

6.3 – 50.4 km

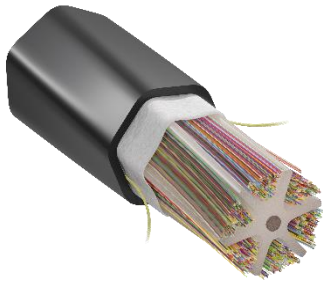
Performance Characteristics

Effective Group Index of Refraction

Effective group index of refraction at 1550 nm	1.462
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*1) Measured on fiber with free tension.

*2) Since PMD value may change when fiber is cabled, actual PMD link design value in a cable shall be confirmed by cable manufacturer. Under appropriate cable design, PureAdvance-125 specification supports network design requirements for a 0.20 ps/r-km of maximum cable PMD link design value recommended by ITU-T G.654.E.



Ultra-low loss and large-core optical fiber cable with PureAdvance™-110

The growth of 5G and FTTx services, along with the explosion of online content requires continuous expansion in data capacity. The PureAdvance™ series offers high speed and high transmission capacity in long-haul and high traffic applications at minimum total cost.

Features

- Ultra-low attenuation of ≤ 0.17 dB/km (Typ.) and optimally enlarged effective area of $110 \mu\text{m}^2$
- Optimized for terrestrial long-haul 100 Gbit/s, 200 Gbit/s, 400 Gbit/s and beyond for digital coherent transmission systems
- Gel-free structure provides easier handling, and so reduces installation time and cost.

Solutions



**CAPEX/OPEX
Saving**



**Contribute to
sustainability**



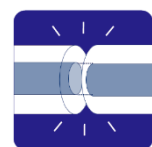
Data security



Low latency

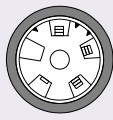
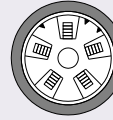
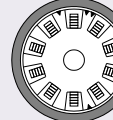



Space saving



**Excellent
connectivity**

Specifications

Fiber type *1	PureAdvance-110™ G.654.E			
Fiber count	40	100	200	288
Cross Section				
Unit type	4 fiber ribbon *2			Single fiber *3
Tension Member	Steel			FRP
Nominal Cable Diameter	11.5mm	13.5mm	15.5mm	14.0mm
Attenuation (1550nm)	Typ. ≤ 0.17 dB			
Application	Duct and Sub-Duct			

*1: Hybrid type (Combination with other type of optical fibers) are also available.

*2: Suitable for splicing ribbon to ribbon, or splitting ribbon into single fibers

*3: 12 single fibers are bundled by color coded tapes for easy identification.

This document states our standard specification. Customized specifications can be provided upon request.