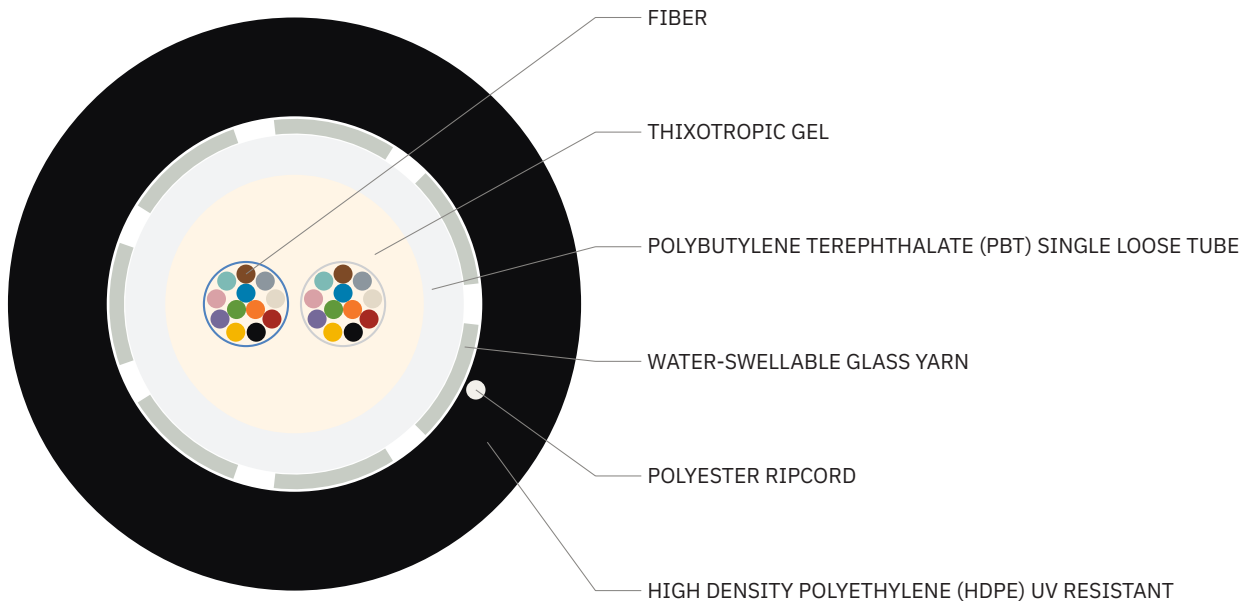


OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

FIBER OPTIC CABLE DRAWING

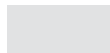


FIBER OPTIC CABLE TUBE AND FIBER CORE COLORS

Tube Color Scheme

1

Natural



FIBER OPTIC CORE COLOR SCHEME

Fiber Optic Core Colors with White Separator

1	2	3	4	5	6	7	8	9	10	11	12
Blue	Orange	Green	Brown	Slate	White	Red	Black	Yellow	Violet	Rose	Aqua

Fiber Optic Core Colors with Black Separator

1	2	3	4	5	6	7	8	9	10	11	12
Blue	Orange	Green	Brown	Slate	White	Red	Black	Yellow	Violet	Rose	Aqua

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

CHARACTERISTICS

Optical Fiber Core and Tube Color Standard	ANSI/TIA 598-D Color Coding
Optical Fiber Type	G.652.D
Optical Fiber Dimensions	9/125/245/260 µm
Optical Fiber Count	12
Optical fiber identification method	Multi Loose Tube
Number of Bundles	2
Cable Type	Single Loose Tube
Tube Material	Polybutylene Terephthalate (PBT)
Tube Diameter (mm)	3.4
Tube Filling Compound Material	Thixotropic Gel
Active Tube Count	1
Single Loose Tube Tube Color	Natural
Tensile Strength	1200 N
Dielectric Tensile Strength Member	Water-swellaable Glass Yarn
Jacket Strip Method	1 Polyester Ripcord
Jacket Material	High Density Polyethylene (HDPE) UV resistant
Jacket Color	Black
Jacket Wall Thickness	1,35 mm
Outer Jacket Marking Method	Inkjet marking
Outer Jacket Marking Area	One side
Outer Jacket Marking Application	Applied in one meter intervals
Nominal Cable Diameter (mm)	7,3
Net Cable Weight (kg/km)	43
Reel Length	2000 meters %±5

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

MECHANICAL CHARACTERISTICS (CABLED)

Test	Reference Standard	Specified Value
Maximum Tensile Strength	IEC 60794-1-21-E1	≥ 1200 N
Crush Resistance	IEC 60794-1-21-E3	1500 N/100 mm (15 minutes)

CHEMICAL CHARACTERISTICS

RoHS	Free of hazardous substances according to RoHS regulation
REACH	Safe to use according to REACH regulation

TEMPERATURE RANGE (CABLED)

Transportation	-40 °C to 70 °C
Storage	-40 °C to 70 °C
Installation	-30 °C to 60 °C
Operation	-40 °C to 70 °C

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

Low water peak single-mode optical fiber, made by the vapor phase axial deposition (VAD) method, which enables customer to construct high performance wired network for voice, video and/or data transmission.

The fiber, made of a germanium doped silica core and a silica cladding, is in compliance with ITU-T G.652 A, B, C and D.

FIBER MATERIALS

Core Material	Silica (SiO ₂) Doped with Germanium Dioxide (GeO ₂)
Cladding Material	Pure silica (SiO ₂)
Coating Material	Dual layers of UV-cured acrylate

DIMENSIONS

Mode Field Diameter	at 1310 nm	9.2 ± 0.4 μm
	at 1550 nm	10.3 ± 0.5 μm
Cladding Diameter	125.0 ± 0.5 μm	
Coating Diameter (Uncolored)	245 ± 5 μm	
Core/Cladding Concentricity Error	≤ 0.4 μm	
Cladding Non-circularity	≤ 0.5 %	
Coating - Cladding Concentricity Error	≤ 12 μm	
Fiber Curl Radius	≥ 4.0 m	

OPTICAL CHARACTERISTICS

Attenuation Coefficient	at 1310 nm	≤ 0.334 dB/km
	at 1383 nm	≤ 0.314 dB/km ¹
	at 1550 nm	≤ 0.194 dB/km
	at 1625 nm	≤ 0.224 dB/km
Point Discontinuity	at 1310 nm / 1550 nm	≤ 0.05 dB
Cable Cut-off Wavelength (λ _{cc})	< 1260 nm	
Zero-dispersion Wavelength (λ _o)	1300nm ≤ λ _o ≤ 1324 nm	
Zero-dispersion Slope (S _o)	≤ 0.09 ps/(nm ² ·km)	
Chromatic Dispersion Coefficient	at 1310 nm	≤ 3.5 ps/(nm·km)
	at 1550 nm	≤ 17 ps/(nm·km)
	at 1625 nm	≤ 22 ps/(nm·km)
Maximum Individual Fiber PMD	≤ 0.2 ps/√km	
Fiber PMD Link Design Value	≤ 0.08 ps/√km	

1. ATTENUATION INCREASE DUE TO HYDROGEN AGING AT THIS WAVELENGTH WILL BE 0.01 DB/KM OR LESS IN ACCORDANCE WITH IEC IEC60793-2-50 TEST PROCEDURE

• THE IMAGES ARE FOR ILLUSTRATIVE PURPOSES ONLY

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

MECHANICAL CHARACTERISTICS

Proof Stress Level	0.86 GPa (1.2%, 120 kpsi)	
Cladding Material	Ø=32 mm, 1 turn at 1550 nm	≤ 0.05 dB
	Ø=50 mm, 100 turns at 1310 nm	
	Ø=50 mm, 100 turns at 1550 nm	
	Ø=60 mm, 100 turns at 1625 nm	
Coating Strip Force (F)	peak	1.3 N ≤ F ≤ 8.9 N
	average	1.0 N ≤ F ≤ 5.0 N
Dynamic Tensile Strength	median; 0.5 m, unaged	≥3.8 Gpa (550 kpsi)
	median; 0.5 m, aged	≥3.0 Gpa (440 kpsi)
Fatigue	nominal value	20

ENVIRONMENTAL CHARACTERISTICS ²

Temperature Cycling	-60 °C to 85 °C	≤ 0.05 dB/km
Temperature Humidity Cycling	-10 °C to 85 °C at 85% R. H.	
Water Immersion	at 23 °C ± 2 °C	
Heat Aging	at 85 °C ± 2 °C	
Damp Heat	85 °C at 85% R. H.	

PERFORMANCE CHARACTERISTICS

Effective Group Index of Refraction N_{eff}	at 1310 nm / 1383 nm	1.466
	at 1550 nm	1.467
	at 1625 nm	1.470

2. INDUCED ATTENUATION AT 1310 NM, 1550 NM AND 1625 NM
• THE IMAGES ARE FOR ILLUSTRATIVE PURPOSES ONLY

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

Non-Zero dispersion shifted (NZ-DSF) single-mode optical fiber, made by the vapor phase axial deposition (VAD) method, which enables customer to construct high-capacity, ultra long haul WDM system.

This fiber allows for easier deployment of WDM in metropolitan areas, and increases the capacity of fiber in WDM systems throughout the wavelength region between 1460nm and 1625nm (S, C, L-bands).

NZ-DSF has the ability to increase transmission speeds of systems up to 10 Gb/s and 40 Gb/s and also has superior polarization mode dispersion performance.

FIBER MATERIALS

Core Material	Germanium doped silica
Cladding Material	Silica, step index and matched clad type
Coating Material	Dual layers of UV-cured acrylate

DIMENSIONS

Mode Field Diameter	at 1550 nm	$9.2 \pm 0.4 \mu\text{m}$
Cladding Diameter	$125.0 \pm 0.7 \mu\text{m}$	
Coating Diameter (Uncolored)	$242 \pm 5 \mu\text{m}$	
Core/Cladding Concentricity Error	$\leq 0.5 \mu\text{m}$	
Cladding Non-circularity	$\leq 0.7 \%$	
Coating - Cladding Concentricity Error	$\leq 12 \mu\text{m}$	
Fiber Curl Radius	$\geq 4.0 \text{ m}$	

OPTICAL CHARACTERISTICS

Attenuation Coefficient	at 1550 nm	$\leq 0.22 \text{ dB/km}$
	at 1625 nm	$\leq 0.25 \text{ dB/km}$
Point Discontinuity	at 1550 nm	$\leq 0.05 \text{ dB}$
Cable Cut-off Wavelength (λ_{cc})	$\leq 1450 \text{ nm}$	
Chromatic Dispersion Coefficient	at 1530 ~ 1565 nm	$2.0 \sim 6.0 \text{ ps}/(\text{nm} \cdot \text{km})$
	at 1565 ~ 1625 nm	$4.5 \sim 11.5 \text{ ps}/(\text{nm} \cdot \text{km})$
Fiber PMD Value	for individual value	$\leq 0.15 \text{ ps}/\sqrt{\text{km}}$
	for link value	$\leq 0.1 \text{ ps}/\sqrt{\text{km}}$

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

MECHANICAL CHARACTERISTICS

Proof Stress Level	0.86 GPa (1.2%, 120 kpsi)	
Bending Induced Attenuation	Ø=32 mm, 1 turn at 1550 nm	≤ 0.5 dB
	Ø=32 mm, 1 turn at 1625 nm	
	Ø=60 mm, 100 turns at 1550 nm	
	Ø=60 mm, 100 turns at 1625 nm	
Coating Strip Force (F)	peak	1.3 N ≤ F ≤ 8.9 N
Dynamic fatigue resistance parameter	≥ 20	

ENVIRONMENTAL CHARACTERISTICS ¹

Temperature Cycling	-60 °C to 85 °C	≤ 0.5 dB
Temperature Humidity Cycling	85 °C at 85% R. H.	
Water Immersion	at 23 °C	
Heat Aging	at 85 °C	

1. INDUCED ATTENUATION AT 1350NM AND 1550 NM

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

FIBER MATERIALS

Core Material	Silica (SiO ₂) Doped with Germanium Dioxide (GeO ₂)
Cladding Material	Pure silica (SiO ₂)
Coating Material	Dual layers of UV-cured acrylate

DIMENSIONS

Mode Field Diameter	at 1310 nm	9.0 ± 0.4 μm
	at 1550 nm	10.1 ± 0.5 μm
Cladding Diameter	125.0 ± 0.7 μm	
Coating Diameter (Uncolored)	242 ± 7 μm	
Core/Cladding Concentricity Error	≤ 0.5 μm	
Cladding Non-circularity	≤ 0.7 %	
Coating - Cladding Concentricity Error	≤ 12 μm	
Coating Non-circularity	≤ 5 %	
Fiber Curl Radius	≥ 4.0 m	

OPTICAL CHARACTERISTICS

Attenuation Coefficient	at 1310 nm	0.33 – 0.35 dB/km
	at 1383 nm ¹	0.32 – 0.35 dB/km
	at 1550 nm	0.19 – 0.21 dB/km
	at 1625 nm	0.20 – 0.23 dB/km
Point Discontinuity	at 1310 nm / 1550 nm	≤ 0.05 dB
Cable Cut-off Wavelength (λ _{cc})	< 1260 nm	
Zero-dispersion Wavelength (λ _o)	1300nm ≤ λ _o ≤ 1322 nm	
Zero-dispersion Slope (S _o)	≤ 0.09 ps/(nm ² ·km)	
Chromatic Dispersion Coefficient	at 1310 nm	≤ 3 ps/(nm·km)
	at 1550 nm	≤ 18 ps/(nm·km)
	at 1625 nm	≤ 22 ps/(nm·km)
Maximum Individual Fiber PMD	≤ 0.1 ps/√km	
Fiber PMD Link Design Value	≤ 0.06 ps/√km	

1. ATTENUATION INCREASE DUE TO HYDROGEN AGING AT THIS WAVELENGTH WILL BE 0.01 DB/KM OR LESS IN ACCORDANCE WITH IEC IEC60793-2-50 TEST PROCEDURE
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OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

MECHANICAL CHARACTERISTICS

Proof Stress Level	0.70 GPa (1.0%, 100 kpsi)	
Bending Induced Attenuation	Ø=10 mm, 1 turn at 1550 nm	≤ 0.75 dB
	Ø=10 mm, 1 turn at 1625 nm	≤ 1.50 dB
	Ø=15 mm, 10 turns at 1550 nm	≤ 0.25 dB
	Ø=15 mm, 10 turns at 1625 nm	≤ 1.00 dB
Coating Strip Force (F)	peak	1.2 N ≤ F ≤ 8.9 N
	average	1.0 N ≤ F ≤ 3.0 N
Dynamic Tensile Strength	median; 0.5 m, unaged	≥ 3.8 Gpa (550 kpsi)
	median; 0.5 m, aged	≥ 3.8 Gpa (550 kpsi)
Fatigue	nominal value	20

ENVIRONMENTAL CHARACTERISTICS ²

Temperature Cycling	-60 °C to 85 °C	≤ 0.05 dB/km
Temperature Humidity Cycling	-10 °C to 85 °C at 98% R. H.	
Water Immersion	at 23 °C, 14 days	
Dry Heat	at 85 °C, 30 days	
Damp Heat	85 °C at 85% R. H., 30 days	

PERFORMANCE CHARACTERISTICS

Effective Group Index of Refraction N_{eff}	at 1310 nm	1.467
	at 1550 nm	1.468
	at 1625 nm	

2. INDUCED ATTENUATION AT 1310 NM, 1550 NM AND 1625 NM
• THE IMAGES ARE FOR ILLUSTRATIVE PURPOSES ONLY

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

FIBER MATERIALS

Core Material	Silica (SiO ₂) Doped with Germanium Dioxide (GeO ₂)
Cladding Material	Pure silica (SiO ₂)
Coating Material	Dual layers of UV-cured acrylate

DIMENSIONS

Mode Field Diameter	at 1310 nm	8.8 ± 0.4 μm
	at 1550 nm	9.8 ± 0.5 μm
Cladding Diameter	125.0 ± 0.7 μm	
Coating Diameter (Uncolored)	242 ± 7 μm	
Core/Cladding Concentricity Error	≤ 0.5 μm	
Cladding Non-circularity	≤ 0.7 %	
Coating - Cladding Concentricity Error	≤ 12 μm	
Coating Non-circularity	≤ 5 %	
Fiber Curl Radius	≥ 4.0 m	

OPTICAL CHARACTERISTICS

Attenuation Coefficient	at 1310 nm	0.33 – 0.35 dB/km
	at 1383 nm ¹	0.32 – 0.35 dB/km
	at 1550 nm	0.19 – 0.20 dB/km
	at 1625 nm	0.20 – 0.23 dB/km
Point Discontinuity	at 1310 nm / 1550 nm	≤ 0.05 dB
Cable Cut-off Wavelength (λ _{cc})	≤ 1260 nm	
Zero-dispersion Wavelength (λ _o)	1300nm ≤ λ _o ≤ 1324 nm	
Zero-dispersion Slope (S _o)	≤ 0.092 ps/(nm ² ·km)	
Chromatic Dispersion Coefficient	at 1310 nm	≤ 3 ps/(nm·km)
	at 1550 nm	≤ 18 ps/(nm·km)
	at 1625 nm	≤ 22 ps/(nm·km)
Maximum Individual Fiber PMD	≤ 0.1 ps/√km	
Fiber PMD Link Design Value ²	≤ 0.06 ps/√km	

1. INCLUDING HYDROGEN AGING ACCORDING TO IEC 60793-2-50, TYPE B.1.3

2. ACCORDING TO IEC 60794 –3, ED 3 (Q=0.01%)

• THE IMAGES ARE FOR ILLUSTRATIVE PURPOSES ONLY

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

MECHANICAL CHARACTERISTICS

Proof Stress Level	0.70 GPa (1.0%, 100 kpsi)	
Bending Induced Attenuation	Ø=7.5 mm, 1 turn at 1625 nm	≤ 1.00 dB
	Ø=7.5 mm, 1 turn at 1550 nm	≤ 0.50 dB
	Ø=10 mm, 1 turn at 1625 nm	≤ 0.20 dB
	Ø=10 mm, 1 turn at 1550 nm	≤ 0.10 dB
	Ø=15 mm, 10 turns at 1625 nm	
	Ø=15 mm, 10 turns at 1550 nm	≤ 0.03 dB
Coating Strip Force (F)	peak	1.2 N ≤ F ≤ 8.9 N
	average	1.0 N ≤ F ≤ 3.0 N
Dynamic Tensile Strength	median; 0.5 m, unaged	≥3.8 Gpa (550 kpsi)
	median; 0.5 m, aged	≥3.8 Gpa (550 kpsi)
Fatigue	Dynamic, aged*** - unaged	20
	Static, aged ³	23

ENVIRONMENTAL CHARACTERISTICS ³

Temperature Cycling	-60 °C to 85 °C	≤ 0.05 dB/km
Temperature Humidity Cycling	-10 °C to 85 °C at 98% R. H.	
Water Immersion	at 23 °C, 14 days	
Dry Heat	at 85 °C, 30 days	
Damp Heat	85 °C at 85% R. H., 30 days	

PERFORMANCE CHARACTERISTICS

Effective Group Index of Refraction N_{eff}	at 1310 nm	1.467
	at 1550 nm	
	at 1625 nm	1.468

3. AGING AT 85°C, 85% RH, 30 DAYS

4. INDUCED ATTENUATION AT 1310 NM, 1550 NM AND 1625 NM

• THE IMAGES ARE FOR ILLUSTRATIVE PURPOSES ONLY

OS2-PE-12

SINGLE LOOSE TUBE, NON-METALLIC ARMOR, POLYETHYLENE JACKET, FIBER OPTIC CABLE

1300 nm bandwidth optimized multi-mode optical fiber.

FIBER MATERIALS

Core Material	Silica (SiO ₂) Doped with Germanium Dioxide (GeO ₂)
Cladding Material	Pure silica (SiO ₂)
Coating Material	Dual layers of UV-cured acrylate

DIMENSIONS

Core Diameter	62.5 ± 2.5 µm
Core Non-circularity	≤ 5 %
Core/Cladding Concentricity Error	≤ 1.0 µm
Cladding Diameter	125.0 ± 1.0 µm
Cladding Non-circularity	≤ 0.7 %
Coating Diameter (Uncolored)	242 ± 5 µm
Coating Non-circularity	≤ 5 %
Coating/Cladding Concentricity Error	≤ 10 µm

OPTICAL CHARACTERISTICS

Attenuation Coefficient	at 1310 nm	0.33 – 0.35 dB/km
	at 1383 nm ¹	0.32 – 0.35 dB/km
Numerical Aperture	0.275 ± 0.015	
Zero-dispersion Wavelength (λ _o)	1300 nm ≤ λ _o ≤ 1365 nm	
Zero-dispersion Slope (S _o)	1320 nm ≤ λ _o ≤ 1348 nm	≤ 0.11 ps/nm ² ·km
	1348 nm ≤ λ _o ≤ 1365 nm	≤ 0.001 (1458 - λ _o) ps/nm ² ·km
Overfilled Modal Bandwidth ¹	at 850 nm	≥ 160 MHz·km
	at 1300 nm	≥ 500 MHz·km
Bending Induced Attenuation	Ø=75 mm, 100 turn at 850 nm	≤ 0.5 dB
	Ø=75 mm, 100 turn at 1300 nm	

1. THE MODAL BANDWIDTH IS LINEARLY NORMALIZED TO 1 KM, ACCORDING TO IEC 60793-2-10

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