OPTOMAGIC

Optical Fiber Specialist
OPTOMAGIC

VAD Process

Total Optical Fiber Solution by OPTOMAGIC.

OPTOMAGIC Co., Ltd, with the investment of its parent company, TAIHAN Electric Wire Co., Ltd. (TEC), became an independent company on July 2000. Since 1978 **OPTOMAGIC**, with its focus on optical fiber research in addition to mass production, has become the leader in optical communication and cable industry. The optical fiber developed by **OPTOMAGIC** uses VAD (Vapour Phase Axial Deposition) Process, which provides high efficiency and superior characteristics of its product. The industrial complex at Ansan city, equipped with state of the art facilities with mass production capabilities, allows **OPTOMAGIC** to supply the highest-quality product with competitive prices. The production of Low Water Peak and Bend-Insensitive optical fiber has given **OPTOMAGIC** the opportunity to show its accumulation of technical prowess and expertise in the field of fiber optics and to receive praise not only in the domestic market but in the international market as well. For the past 25 years **OPTOMAGIC** has been an enterprise that has specialized in continuous research, development, and production of optical fiber. Currently **OPTOMAGIC** supplies a wide range of products such as Preform, conventional SMF (G.652.B), ZWPF (G.652.D), NZ-DSF (G.655.A, G.655.C), Ribbon fiber (4, 8, 12, 24 core), Stainless Steel Loose Tube with fiber for OPGW and specialty fiber. **OPTOMAGIC** Co., Ltd. will continue its pursuit in providing total solution to all of your optical fiber needs.

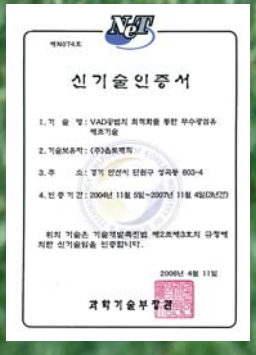
OPTOMAGIC

History

1978	TEC/KIST/LG Cable: Development of optical fiber using MCVD process
1980~1983	TEC: Production of optical fiber using MCVD Process
1982	Korea Fiber Optic Company (KFOC) Established (TEC/LG/KIST::40/40/20)
1984	TEC: Production of Optical Fiber using VAD Process
	"Technical Agreement (TLA) with Sumitomo Electric Industries, Ltd."
1984	All Synthetic VAD + Quartz Tube
1988	All Synthetic VAD (100 f.km/preform)
1996	All Synthetic VAD (300 f.km/preform)
2000	All Synthetic VAD (1,000 f.km/preform)
2001	OPTOMAGIC CO., LTD. Established (spin-off from TEC)
2002	Completion of Ansan facility/plant of OPTOMAGIC CO., LTD.
2004	Development of Low Water Peak Fiber (LWPF)
2004	All Synthetic VAD (1,200 f.km/preform)
2005	Development of Zero Water Peak Fiber (ZWPF)
2006	Development of Bending Loss Insensitive Fiber

Awards

No.	Award	Presented By	Date
1	KT Mark	KOITA	1999.12
2	OSK Outstanding Paper Award	Optical Society Korea	2000.05
3	Technology Award	KIEEME	2002.11
4	ISO 9001 Certificate	SGS	2004.04
5	Jang Young Shil Award ("Low Water Peak Fiber for optical communication")	KOITA	2004.09
6	NET Certificate ("Fabrication of Technology for Zero Water Peak Fiber by Optimization of VAD Process")	Ministry of Commerce, Industry And Energy	2004.11
7	Export Award (US$ 20 million)	Korea International Trade Association	2004.11
8	Technology Award	Optical Society Korea	2005.02
9	Presidential Award	Government Administration and Home Affairs	2005.11
10	Korea's 10 Best New Technologies Award	Ministry of Commerce, Industry And Energy	2005.12
11	NET Certificate ("Fabrication Technologies of bending insensitive holey fiber")	Ministry of Science Technology	2006.12



Research and development

OPTOMAGIC Co., Ltd. focuses its efforts in new product development through its research & development center along with researchers with abundant experience in optical fiber manufacturing technology. The research & development center develops core of the optical communication technology, which serves as the backbone of the IT industry, through the use of cutting-edge technology.

Preform (VAD Process)

OPTOMAGIC Co., Ltd. offers preform of single mode optical fiber produced by the Vapour Phase Axial Deposition (VAD) method, which enables the construction of high performance networks for voice, video and/or data transmission. Preform made of germanium doped silica core and cladding, meets international standards such as ITU-T G.652. The single mode optical fiber to be drawn is step index and matched clad type operating in the wavelength regions from 1280 nm to 1625 nm.

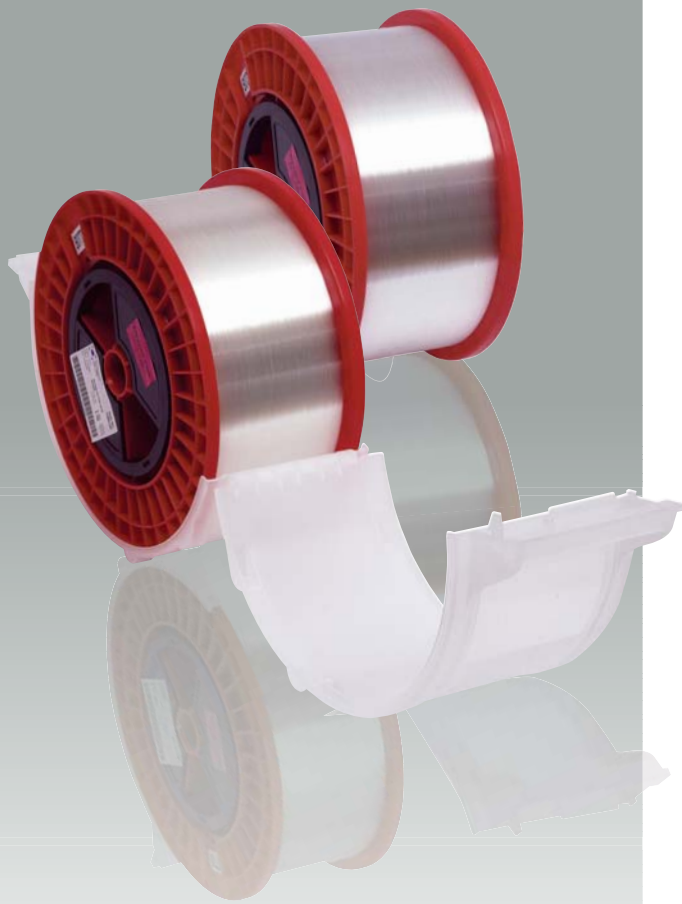
Core Compositon	SiO_2 + GeO_2
Cladding Composition	SiO_2
Refractive Index Profile	Step Index & Matched Clad Type
Refractive Index Delta	0.36 ± 0.03 %
Preform Diameter	65 ~ 100 mm (Larger diameter available)
Preform Length	700 ~ 1,400 mm

* Preform made of germanium doped silica core and silica cladding meets international standard ITU-T G.652.D

SMF ITU-T G.652.B

Single Mode Optical Fiber (VAD Process)

OPTOMAGIC's single mode optical fiber is manufactured by the Vapour Axial Deposition (VAD) process to produce the highest quality glass with excellent geometry, high strength characteristics and attenuation level that approaches the theoretical minimum, operating at 1,310 nm and 1,550 nm.



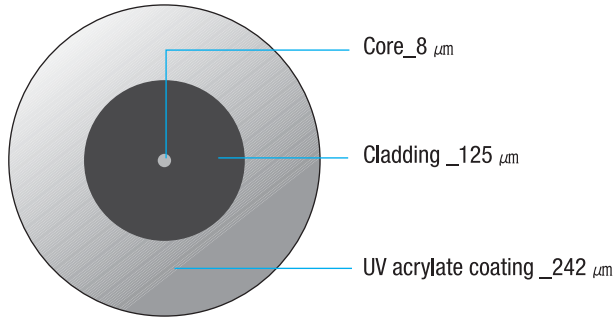
Features

- Remarkably lower attenuation and dispersion
- Superior bending performance
- Mechanically strippable coating
- Attenuation at 1383±3 nm: less than 0.31 dB/km (Before H_2 aging)
- Excellent geometric properties for low splicing loss
- Transmission capacity at 1,310 nm and 1,550 nm

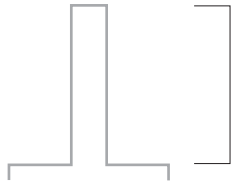
Benefit/Application

- FTTH network cable
- Metro network cable
- Superior performance for local area network and access
- Excellent long term reliability
- Unparalleled durability resulting in lower maintenance

Structure



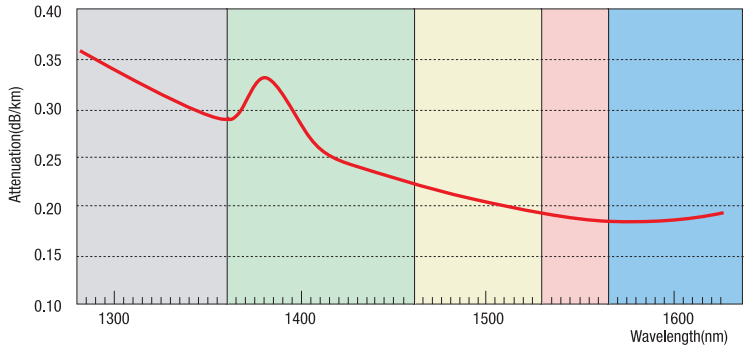
Refractive Index Profile



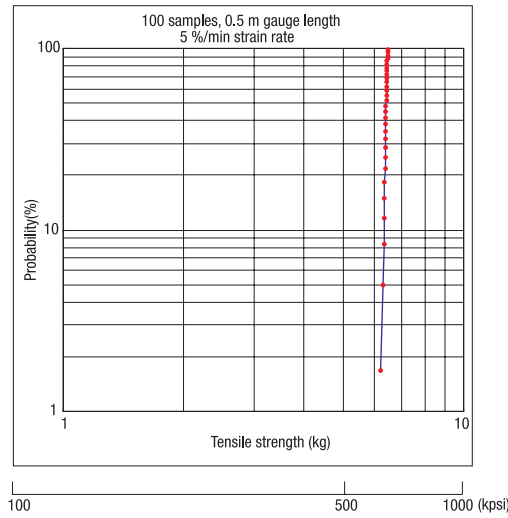
0.36% _ Refractive Index Profile

Environmental Characteristics	Test		Attenuation Change @1550 nm [dB/km]
	Temperature Cycling Performance	-60 ˚C to + 85 ˚C	≤ 0.05
	Temperature Humidity Cycling	+85 ˚C /98% RH 30 days	≤ 0.05
	Water Immersion	23 ˚C	≤ 0.05
	Heat Aging	85 ˚C	≤ 0.05

Spectral Attenuation



Weibull Parameter



Performance Specification

Geometrical Characteristics	Performance	Characteristic
	Mode field diameter	9.2 ± 0.4 ㎛ at 1310 nm
		10.4 ± 0.5 ㎛ at 1550 nm
	Cladding diameter	125.0 ± 0.7 ㎛
	Core/cladding concentricity error	≤ 0.5 ㎛
	Cladding non-circularity	≤ 0.8 %
	Fiber curl radius	≥ 4 m
	Primary coating diameter (for uncoloredfiber)	242 ± 5 ㎛
	Primary coating diameter (for colored fiber)	250 ± 10 ㎛
	Coating/cladding concentricity error	≤ 12 ㎛

Optical Characteristics		
	Attenuation at 1310 nm	≤ 0.334 dB/km
	at 1550 nm	≤ 0.194 dB/km
	at 1383±3 nm	≤ 0.35 dB/km
	Attenuation change at 1285~1330 nm	≤ 0.05 dB/km (1310 nm reference)
	at 1525~1575 nm	≤ 0.05 dB/km (1550 nm reference)
	Point discontinuity at 1310 nm and 1550 nm	≤ 0.05 dB
	Zero dispersion wavelength	≤ 1300~1322 nm
	Zero dispersion slope	≤ 0.092 ps/(nm^2.km)
	Chromatic dispersion at 1285~1330 nm	≤ 3.5 ps/(nm.km)
	at 1550 nm	≤ 18 ps/(nm.km)
	Cable cut-off wavelength (λ cc)	≤ 1260 nm
	PMD for individual value (uncabled fiber)	≤ 0.15 ps/√km
	for link value	≤ 0.1 ps/√km

Packaging			
	Fiber length		25.2 / 50.4 km
	Spool dimension	Flange diameter	234.5 / 265 mm
		Barrel diameter Nom.	152.0 / 170 mm
		Inner width Nom.	96.0 / 150 mm
		Outer width Nom.	116.0 / 175 mm
		Bore diameter Nom.	25.4 / 25.4 mm

* Spec No: OPT-S06-001(A)

ZWPF ITU-T G.652.D

Zero Water Peak Single Mode Fiber (VAD Process)

OPTOMAGIC'S Zero Water Peak Fiber manufactured by the Vapour Axial Deposition (VAD) process enables the use of the entire optical fiber spectrum (1270 ~ 1625 nm) including 1360 ~ 1460 nm due to a manufacturing process that virtually eliminates hydroxyl (OH-) absorption in the fiber. Also, it offers high reliability of attenuation against hydrogen aging.

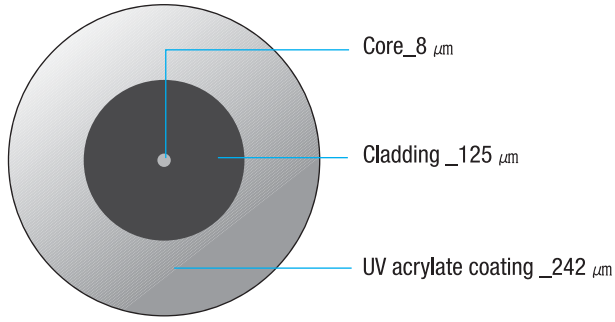
Features

- Categorized as ITU-T G. 652.D
- Low 1383 nm attnuation permits full utilization of broad-range wavelengtth
- Attenuation at 1383±3 nm : 0.28 dB/km (nom.)
- Stabilized hydrogen sensitivity
- Low PMD

Benefit/Application

- Fully compatible with conventional SMF
- Lower optical attenuation
- Long term reliability for attenuation
- Available transmission wavelength increase up to 200%
- Effective WDM system support

Structure

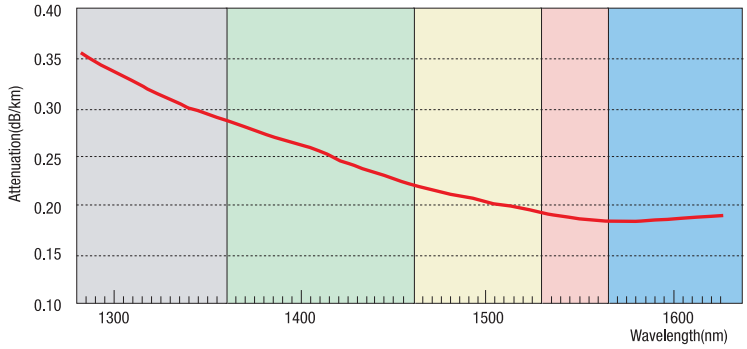


Refractive Index Profile

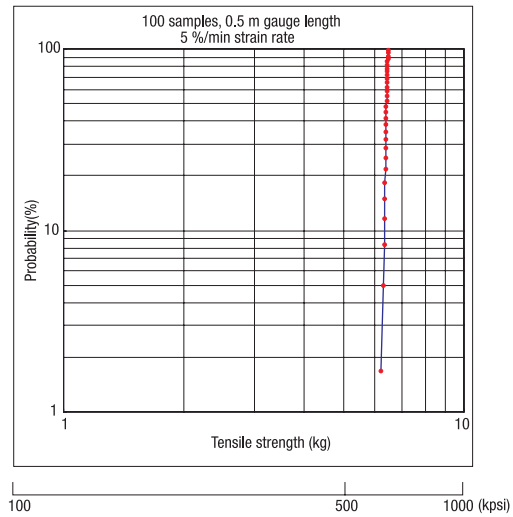
0.36% _ Refractive Index Profile

Environmental Characteristics	Test		Attenuation Change @1550 nm [dB/km]
	Temperature Cycling Performance	-60 ˚C to + 85 ˚C	≤ 0.05
	Temperature Humidity Cycling	+85˚C / 98% RH 30 days	≤ 0.05
	Water Immersion	23 ˚C	≤ 0.05
	Heat Aging	85 ˚C	≤ 0.05

Spectral Attenuation



Weibull Parameter



Performance Specification

Geometrical Characteristics	Performance		Characteristics
	Mode field diameter		9.2 ± 0.4 μm at 1310 μm 10.4 ± 0.5 μm at 1550 μm
	Cladding diameter		125.0 ± 0.7 μm
	Core/cladding concentricity error		≤ 0.5 μm
	Cladding non-circularity		≤ 0.7 %
	Fiber curl radius		≥ 4 m
	Primary coating diameter (for uncolored fiber)		242 ± 5 μm
	Primary coating diameter (for colored fiber)		250± 10 μm
	Coating/cladding concentricity error		≤ 12 μm
Optical Characteristics			
	Attenuation	at 1310 μm	≤ 0.334 dB/km
		at 1550 nm	≤ 0.194 dB/km
		at 1383 ± 3 nm	≤ 0.31 dB/km (After H_2 Aging)
	Attenuation change	at 1285~1330 nm	≤ 0.03 dB/km (1310 nm reference)
		at 1525~1575 nm	≤ 0.02 dB/km (1550 nm reference)
	Point discontinuity at 1310 nm and 1550 nm		≤ 0.05 dB
	Zero dispersion wavelength		1302~1322 nm
	Zero dispersion slope		≤ 0.090 ps/(nm^2.km)
	Chromatic dispersion at 1285~1330 nm		≤ 3.5 ps/(nm.km)
		at 1550 nm	≤ 18 ps/(nm.km)
		at 1625 nm	≤ 22 ps/(nm.km)
	Cable cut-off wavelength (λ cc)		≤ 1260 nm
	PMD for individual value (uncabled fiber)		≤ 0.15 ps/√km
	for link value		≤ 0.1 ps/√km
Packaging			
	Fiber length		25.2 / 50.4 km
	Spool dimension	Flange diameter Nom.	234.5 / 265 mm
		Barrel diameter Nom.	152.0 / 170 mm
		Inner width Nom.	96.0 / 150 mm
		Outer width Nom.	116.0 / 175 mm
		Bore diameter Nom.	25.4 / 25.4 mm

* Spec No: OPT-A06-001(A)

Strong Bend Fiber ITU-T G.657

Bending Loss Insensitive Fiber ITU-T G.657 (VAD Process)

OPTOMAGIC's Strong Bend Fiber manufactured by the Vapour Axial Deposition (VAD) process enables the use of the entire optical fiber spectrum (1280 ~ 1625 nm) including 1360 ~ 1460 nm due to a manufacturing process that virtually eliminates hydroxyl (OH-) absorption in the fiber. Its low sensitivity to macrobending results in lower attenuation levels in the 1600 nm wavelength region.

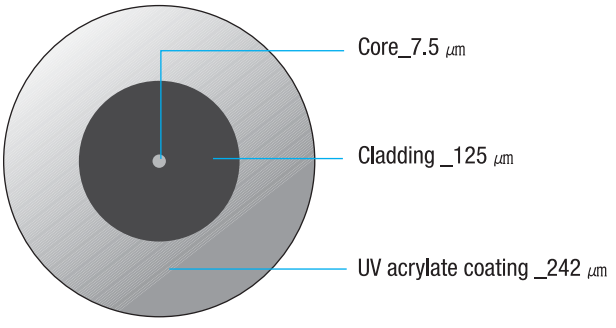
Features

- Fully compliant with ITU-T G.652.D & G.657
- Allowable bending diameter : 20 mm
- 1/3 Bending radius compared to Conventional SMF (30 mm)
- Good splicing with conventional SMF or ZWPF

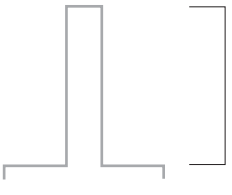
Benefit/Application

- Full compatibility with conventional SMF
- Low attenuation in 1600 nm wavelength region
- Minimized construction space
- FTTH / Premise / LAN Cables
- Air Blown Fiber
- Optical Cord

Structure



Refractive Index Profile



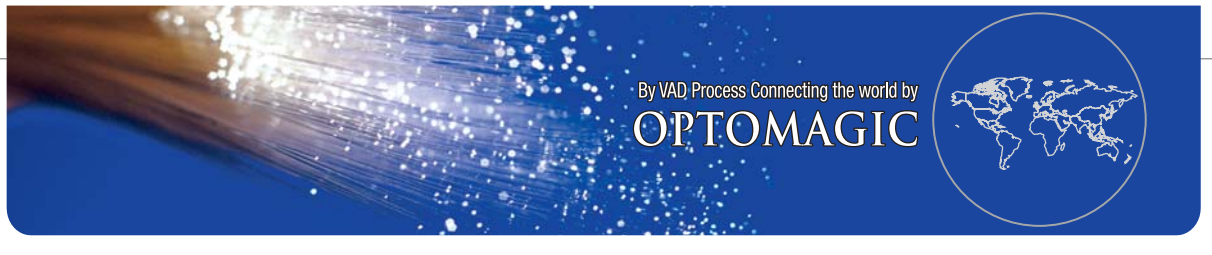
0.44% _ Refractive Index Profile

Environmental Characteristics	Test	Attenuation Change @1310 nm and 1550 nm[dB/km]
Temperature Cycling Performance	-60 ℃ to + 85 ℃	≤ 0.05
Temperature Humidity Cycling	+85℃/ 98% RH 30 days	≤ 0.05
Water Immersion	23 ℃	≤ 0.05
Heat Aging	85 ℃	≤ 0.05

Performance Specification

Geometrical Characteristics	Performance		Characteristics
	Mode field diameter		8.6 ± 0.4 μm at 1310 μm
	Cladding diameter		125.0 ± 0.7 μm
	Core/cladding concentricity error		≤ 0.5 μm
	Cladding non-circularity		≤ 0.7 %
	Primary coating diameter		242 ± 5 μm
Optical Characteristics			
	Attenuation	at 1310 nm	≤ 0.34 dB/km
		at 1550 nm	≤ 0.20 dB/km
		at 1625 nm	≤ 0.23 dB/km
		at 1383 ± 3 nm	≤ 0.31 dB/km (After H_2 Aging)
	Attenuation change	at 1285~1330 nm	≤ 0.05 dB/km (1310 nm reference)
		at 1525~1565 nm	≤ 0.03 dB/km (Max. -Min.)
		at 1565~1610 nm	≤ 0.03 dB/km (Max. -Min.)
	Point discontinuity at 1310 nm and 1550 nm		≤ 0.05 dB
	Zero dispersion wavelength		1300~1324 nm
	Zero dispersion slope		≤ 0.092 ps/(nm^2.km)
	Chromatic dispersion at 1290~1330 nm		≤ 3.0 ps/(nm.km)
		at 1550 nm	≤ 18 ps/(nm.km)
	Cable cut-off wavelength (λ cc)		≤ 1260 nm
	PMD for individual value (uncabled fiber)		≤ 0.15 ps/√km
	for link value		≤ 0.1 ps/√km
Packaging			
	Fiber length		6.3 ~ 25.2 km in multiples of 2.1
	Spool dimension	Flange diameter Nom.	234.5 mm
		Barrel diameter Nom.	152.0 mm
		Inner width Nom.	96.0 mm
		Outer width Nom.	116.0 mm
		Bore diameter Nom.	25.4 mm
Mechanical Characteristics			
	Fiber proof test level		≥ 120 kpsi (1.2% strain)
	Macrobending loss		
	for 100 turns at a 50 mm mandrel diameter		≤ 0.05 dB @ 1625 nm
	for single bend (20 mm diameter one turn)		≤ 0.15 dB @1625 nm
	Coating strip force		1.3 ~ 8.9 N

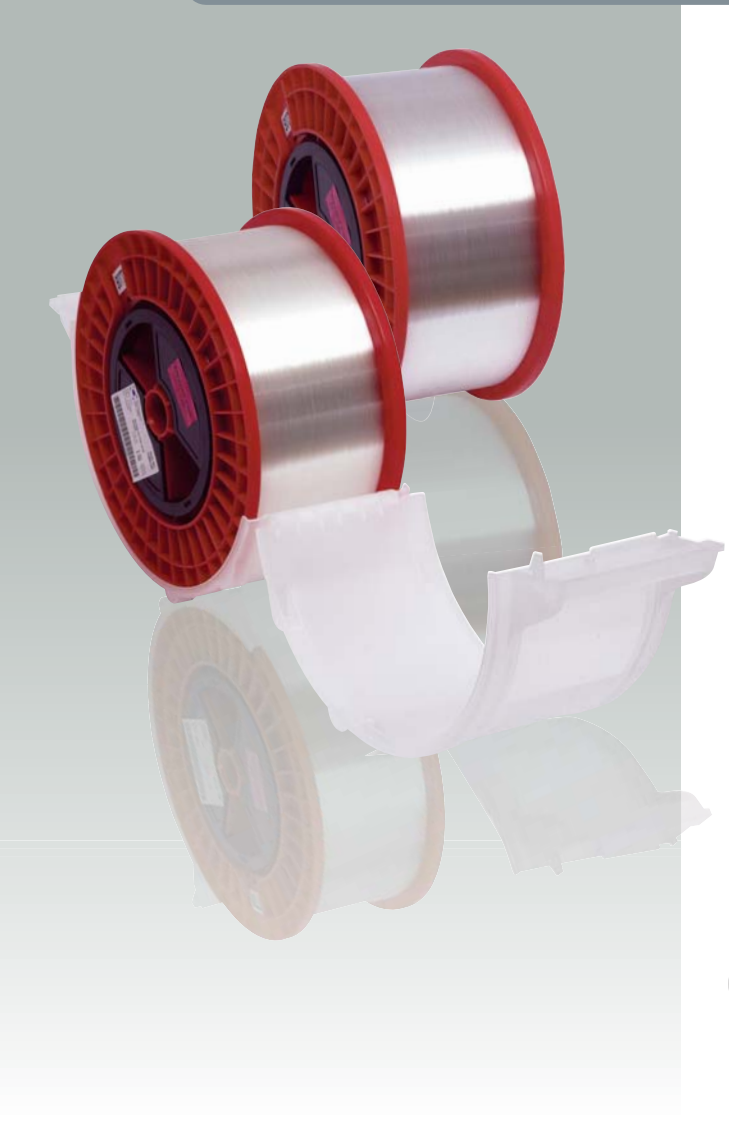
* Spec No: OPT-LM06-001(D)



NZ-DSF ITU-T G.655.A, G.655.C

Non-Zero Dispersion Shifted Optical Fiber (VAD Process)

OPTOMAGIC'S Non-Zero Dispersion Shifted Optical Fiber (NZ-DSF) is used in deployment of high performance networks in metro & long haul systems. NZ-DSF provides cost effective solution in WDM networks with its ability to work with all bands. Its lower slope and large effective area (A_{eff}) reduces four-wave mixing (FWM) and cross-phase modulation over a wide wavelength range. NZ-DSF is compliant with the latest ITU-T G.655.A & G.655.C standards.



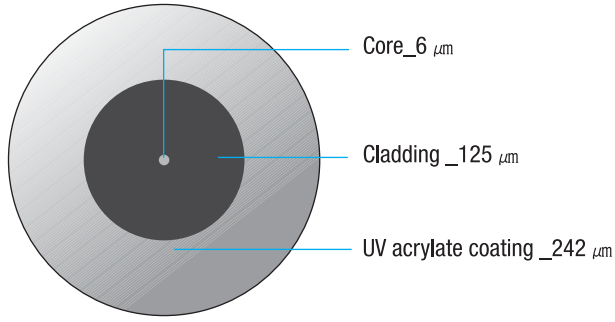
Features

- Categorized as ITU-T G.655.A & G.655.C standard
- Effective WDM system application for metropolitan and long haul transmission
- Low Cost for long haul transmission (Eliminating or reducing dispersion compensation)
- 10 Gbps, 40 Gbps and higher data rates

Benefit/Application

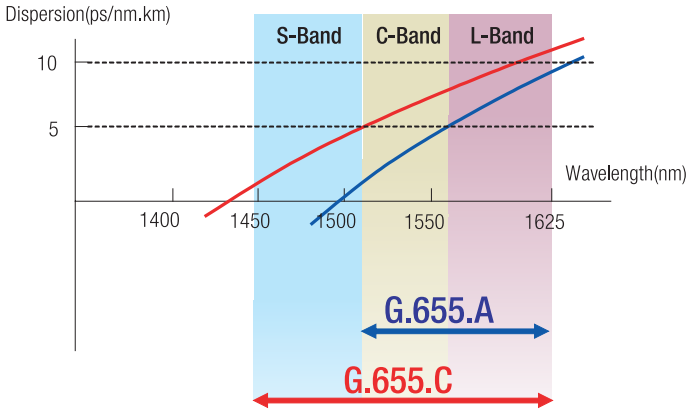
- Optimized for effective operation of WDM system
- Superior performance for long haul networks
- Increased capacity and more efficient bandwidth deployment: 320 channels in C, L and S bands at 100 Gbps
- Excellent long term reliability (1.2% proof test level)
- Broad-range low attenuation characteristics
- Potential ability for future capacity increase
- WDM System throughout 1460 ~ 1625 nm wavelength region (G.655.C)

Structure

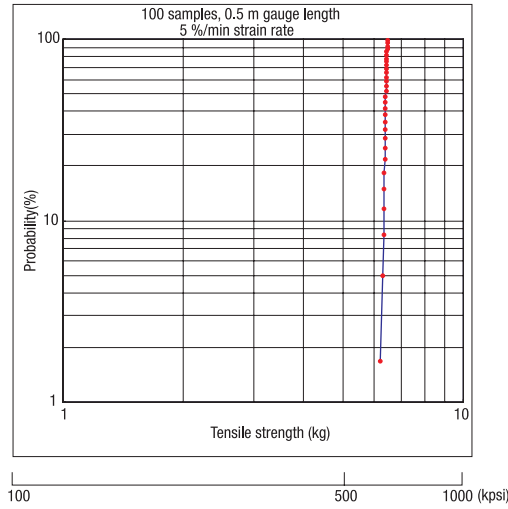


Environmental Characteristics	Test	Attenuation Change @1310 nm and 1550 nm[dB/km]
Temperature Cycling Performance	-60℃ to + 85℃	≤ 0.05
Temperature Humidity Cycling	+ 85℃/ 98% RH 30 days	≤ 0.05
Water Immersion	23℃	≤ 0.05
Heat Aging	85℃	≤ 0.05

Dispersion Characteristics



Weibull Parameter

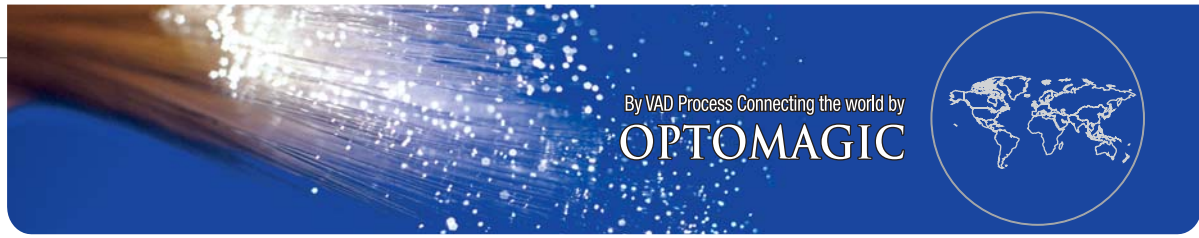


Performance Specification

Geometrical Characteristics	Performance	Characteristics	
		ITU-T G.655.A	ITU-T G.655.C
	Mode field diameter	8.2 ± 0.5 μm at 1550 nm	9.2 ± 0.5 μm at 1550 nm
	Cladding diameter	125.0 ± 0.7 μm	125.0 ± 0.7 μm
	Core/cladding concentricity error	≤ 0.5 μm	≤ 0.5 μm
	Cladding non-circularity	≤ 0.7 %	≤ 0.7 %
	Fiber curl radius	≥ 4 m	≥ 4 m
	Primary coating diameter	242 ± 5 μm	242 ± 5 μm
	Coating/cladding concentricity error	≤ 12 μm	≤ 12 μm
Optical Characteristics			
	Attenuation at 1550 nm	≤ 0.22 dB/km	≤ 0.22 dB/km
	at 1625 nm	≤ 0.25 dB/km	≤ 0.25 dB/km
	Point discontinuity at 1550 nm	≤ 0.10 dB	≤ 0.10 dB
	Chromatic dispersion	2.0~6.0 ps/(nm.km) at 1530~1565 nm 4.0~10.0 ps/(nm.km) at 1565~1625 nm	5.5~10 ps/(nm.km) at 1530~1565 nm 7.5~13.5 ps/(nm.km) at 1565~1625 nm
	Cable cut-off wavelength (λ cc)	≤1300 nm	≤ 1450 nm
	PMD for individual value (uncabled fiber)	≤ 0.1 ps/√km	≤ 0.1 ps/√km

Packaging		
Fiber length		25.2 km
Spool dimension	Flange diameter Nom.	234.5 mm
	Barrel diameter Nom.	152.0 mm
	Inner width Nom.	96.0 mm
	Outer width Nom.	116.0 mm
	Bore diameter Nom.	25.4 mm

* Spec No: OPT-NZB05-001(A)



Tight Buffered Fiber

Tight Buffered Fiber

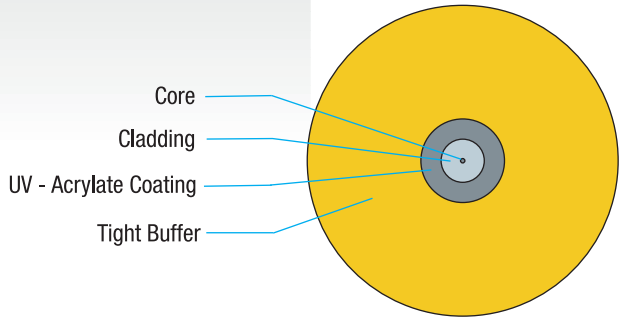
OPTOMAGIC' S Tight Buffered Optical Fiber is used in inter-equipment, fiber optic transmission system requiring fiber optic cable. Tight buffered fiber is color coded for easy identification allowing improved cable management in routing and termination in indoor cable applications. It is suitable for use in computer data links, terminal links, inter-frame, and internal connections.

Features

- 12 color coding
- Available in single mode and multi-mode fibers
- Highly flexible and light weight for easy handling
- Easy stripping for quick splicing
- Various coating material available
- Diameter up to 900 µm

Benefit/Application

- Easy identification for improved cable management in routing and termination
- Non-conductive design
- Flame-retardant design
- Inter-equipment connections that are indoors or in controlled environments
- Computer data links, terminal links, inter-frame, internal connections

Buffered Dimension & Materials	Buffered Construction	Standard Diameter	Tight Buffer Material
		• 500 µm (Ø 0.50 mm) or • 900 µm (Ø 0.90 mm)	• UV-Acrylate or • UV-Silicon

Performance Specification

Cabled Attenuation

Fiber Types	Maximum Attenuation (dB/km)	Typical Attenuation (dB/km)
SMF (9/125) (Single Mode Fiber) 1310 nm / 1550 nm	0.45 / 0.30	0.35 / 0.20
MMF (50/125) (Multi-Mode Fiber) 850 nm / 1330 nm	3.8 / 2.0	2.5 / 0.6
MMF (62.5/125) (Multi-Mode Fiber) 850 nm / 1300 nm	4.2 / 2.0	3.0 / 1.0

Ordering Information

1. Select Fiber Type

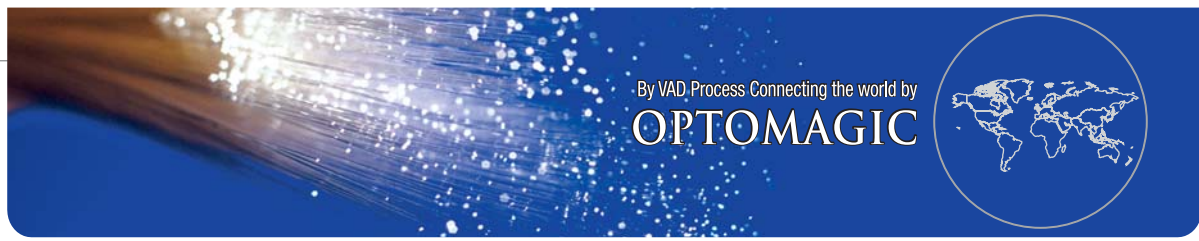
9/125 SMF (Single Mode Fiber)
50/125 MMF (Multi-mode Fiber)
62.5/125 MMF (Multi-mode Fiber)

2. Select Buffer Materials

UV-Acrylate
UV-Silicon

3. Select Inner Jacket Materials

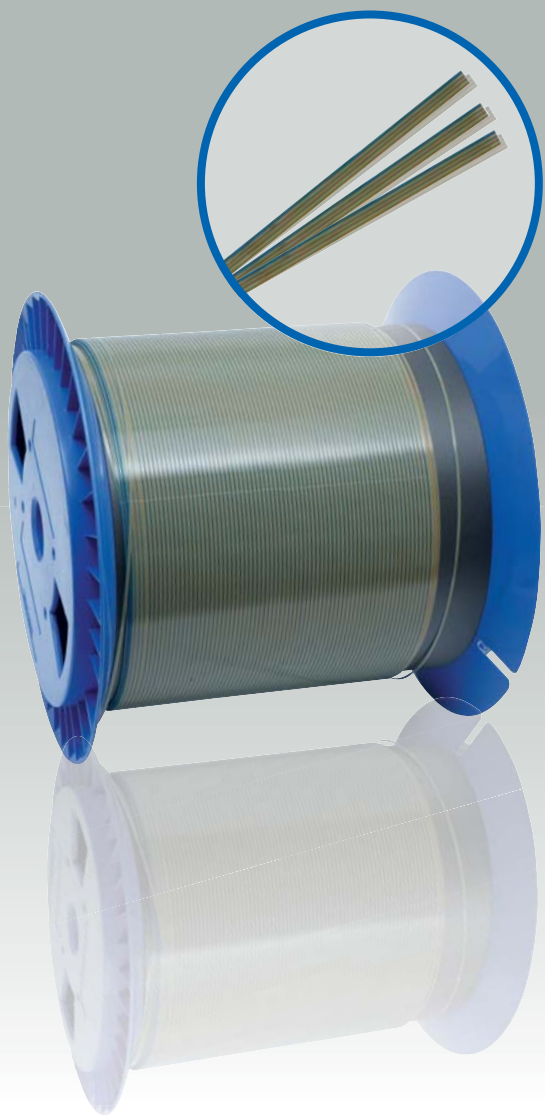
500 µm Buffer Diameter
900 µm Buffer Diameter



Ribbon Optical Fiber

Ribbon Optical Fiber

OPTOMAGIC' S ribbon optical fiber is available in standard counts of 4, 8, 12, 24 fibers to meet a wide variety of applications. Ribbon fiber is used in applications requiring high communication rate and high fiber density in small area. Also ribbon fiber offers precise fiber geometries for mass precision splicing and multi-fiber array. Its high performance is achieved through a germanium doped double silica cladding produced by the Vapour Phase Axial Deposition (VAD) method.



Features

- Small diameter cable by high density fiber
- Precise fiber geometry
- Easily accessible individual fibers
- Reduce the installation cost by easy handling and low weight

Benefit/Application

- Easy handling, installation and shipping
- Reduces installation costs and cable weight
- Available for distribution of dense metropolitan area

Construction

4 Fiber

① ② ③ ④

8 Fiber

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

12 Fiber

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

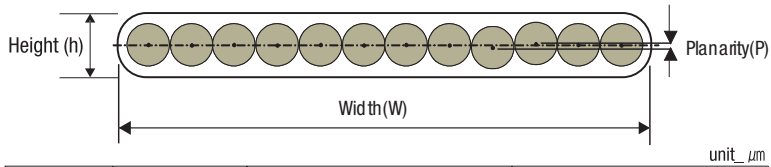
24 Fiber

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

Fig 1:Cross-section of 4-24 optical fiber ribbon

Environmental Characteristics	Test	Attenuation Change @1550 nm[dB/km]
	Temperature Cycling Test (TIA / EIA 455-3)	≤ 0.05 dB/km (-40 ℃ to +70 ℃)
	Aging Test (85 ℃, 85 %RH, 30 days)	≤ 0.10 dB/km
	Water Immersion (+23 ℃, 14 days) (Bellcore GR-20)	≤ 0.10 dB/km (+23 ℃)

Dimension



unit_ μm

Fiber Count	Height (h)	Width (w)		Planarity (p)	
		Typical	MAX.	Typical	MAX.
4	310 ± 20	1100	1150	15	25
8	310 ± 20	2150	2200	20	30
12	310 ± 20	3150	3200	25	35
24	310 ± 20	6200	6400	-	50

Performance Specification

Composition	Performance	Characteristic
	Core	Germanium doped silica
	Cladding	Silica, step index and matched clad type
	Coating	Dual layers of UV-cured acrylate
Geometrical Characteristics		
	Mode field diameter	9.2 ± 0.4 μm at 1310 nm 10.4 ± 0.5 μm at 1550 nm
	Cladding diameter	125.0 ± 0.7 μm
	Core/cladding concentricity error	≤ 0.5 μm
	Cladding non-circularity	≤ 0.7 %
	Primary coating diameter	242 ± 5 μm
	Coating/cladding concentricity error	≤ 12 μm
	Fiber proof test level	120 kpsi (1.2% strain)
Optical Characteristics		
	Attenuation at 1310 nm	≤ 0.34 dB/km
	at 1550 nm	≤ 0.20 dB/km
	at 1383 nm	≤ 0.33 dB/km
	Attenuation with bending	
	for 100 turns at a 75 mm mandrel diameter	≤ 0.10 dB at 1550 nm
	for 1 turn at a 32 mm mandrel diameter	≤ 0.50 dB at 1550 nm
	Zero dispersion wavelength	1300~1322 nm
	Zero dispersion slope	≤ 0.092 ps(nm^2.km)
	Chromatic dispersion at 1285~1330 nm	≤ 3.5 ps/(nm.km)
	at 1550 nm	≤ 18 ps/(nm.km)
	Cut-off wavelength of cabled fiber	≤ 1260 nm
	PMD for individual value	≤ 0.2 ps√km
Mechanical Characteristics		
	Residual twist (TIA / EIA-455-131)	≤ 8 cm
	Strippability (Bellcore GR-20)	> 25 mm
	Peelability (Bellcore GR-20)	Fully peelable

Packaging

5.1 Delivery length of each ribbon bobbin shall be in multiples of 2 km. Maximum length shall be changed upon special agreement to within the maximum take-up length specified in Table.1.

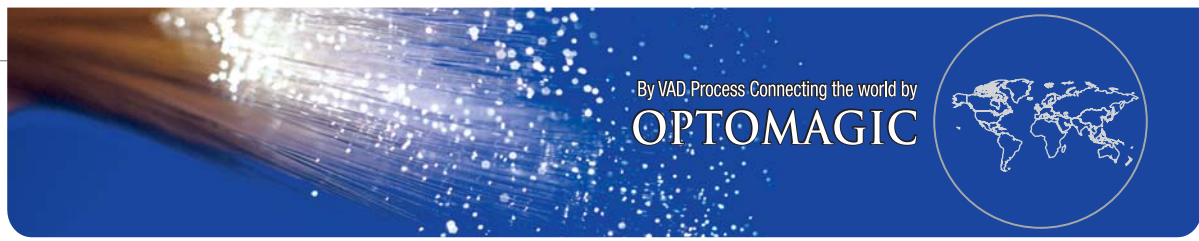
5.2 Dimensions of ribbon bobbin are specified in Table. 1.

5.3 Ribbon bobbin shall be packaged with anti-moisture, anti-vibration and anti-shock to maintain the ribbon's performance.

<Table. 1>

Type	Flange Diameter	Barrel Diameter	Outside Width	Inside Width	Axial hole Diameter	* Maximum Take-up Length
A	410	310	170	102	Ø 25.5 or 50.9	12 km
B	410	310	390	322	Ø 25.5 or 50.9	35 km

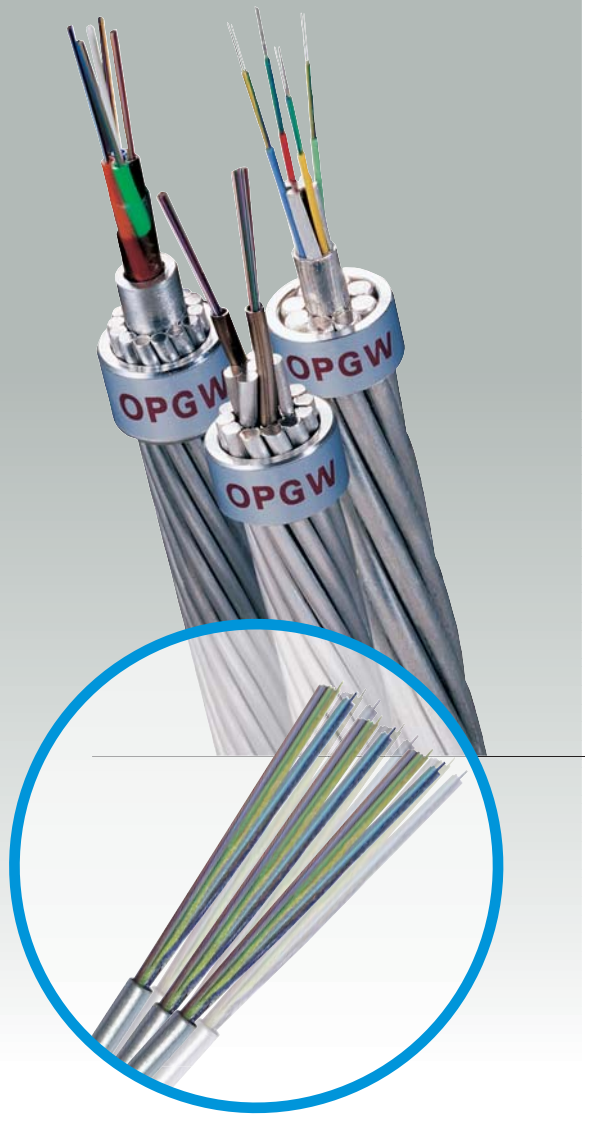
* Maximum take-up length is based on 4 optical fiber ribbon



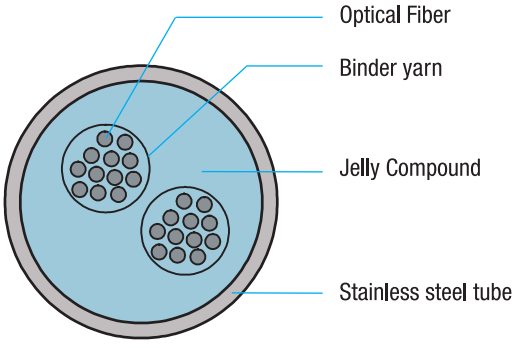
SSLT

Stainless Steel Loose Tube, FIST

OPTOMAGIC'S Stainless Steel Loose Tube provides a new form of telecommunication and power lines. The protection of optical fiber against mechanical and electrical damage is provided by laser welding of the stainless steel tube. Stainless steel loose tube cable may be installed in duct, direct burial, aerial, indoor, water submarine and other special situations.



Structure



Application

OPGW (Overhead Power Ground Wire)

- Submarine cable
- Temperature sensor cable
- Subscriber cable
- Sewerage cable
- Uni -Tube buried, duct & aerial cable.etc

Advantage

- Small diameter
- Light weight cable
- Excellent crush and impact properties
- Rodent resistance
- Excellent flexible structure for special situations, etc

Construction

Optical fiber

- Single Mode (G.652.B)
- Zero Water Peak Single Mode Fiber (G.652.D)
- Non-Zero Dispersion Shifted Fiber (G.655.A, G.655.C)

Identification

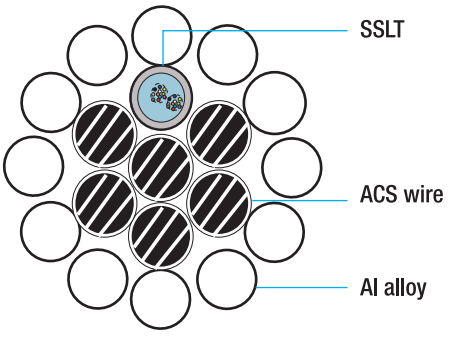
- Every fiber in SSLT identified by a different color
- Binder yarns are applied
- Fibers shall be ring marked according to customer specification

Filling compound

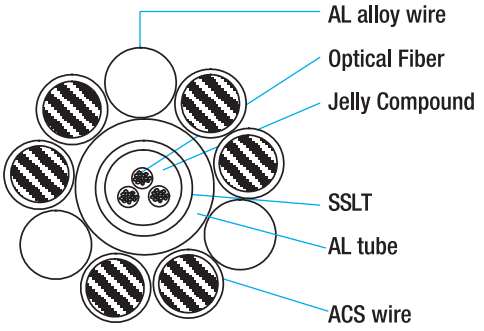
The jelly compound is filled in tube for water resistance

Cross Section for optical Cable

OPGW



Unit Tube Cable



The scope of manufacture

<table>
<tr><th>O.D (mm)</th><th>I.D (mm)</th><th>12Fibers</th><th>24Fibers</th><th>36Fibers</th><th>48Fibers</th></tr>
<tr><td>2.4
2.5
2.6</td><td>2.0
2.1
2.2</td><td>Excess Length:0-0.6 %,
Jelly Filling Ratio:0-90 %</td><td>Excess Length:0-0.6 %,
Jelly Filling Ratio:<80 %</td><td>–</td><td rowspan="2">–</td></tr>
<tr><td>2.7
2.8
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3.0
3.1
3.2</td><td>2.3
2.4
2.5
2.6
2.7
2.8</td><td colspan="2">Excess Length:0-0.6 %,
Jelly Filling Ratio:0-90 %</td><td>Excess Length:0-0.6 %,
Jelly Filling Ratio:< 80 %</td></tr>
<tr><td>3.3
3.4
3.5</td><td>2.9
3.0
3.1</td><td colspan="4">Excess Length:0-0.6 %,
Jelly Filling Ratio:0-90 %</td></tr>
<tr><td>3.6
3.7
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4.4</td><td>3.2
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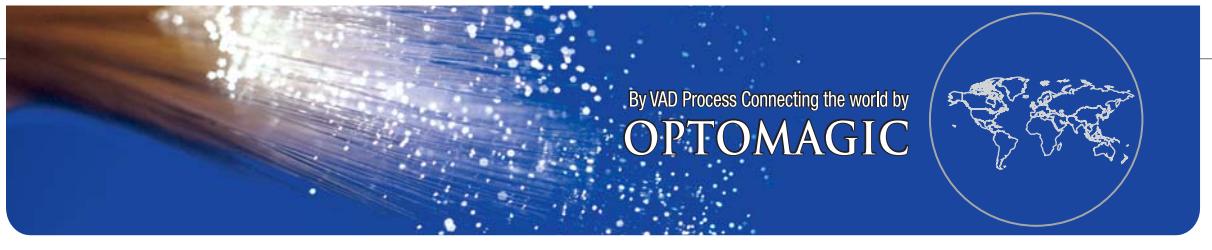
3.4
3.5
3.6
3.7
3.8
3.9
4.0</td><td>Excess Length:0-0.6 %,
Jelly Filling Ratio:0-90 %</td><td colspan="3">Excess Length:0-0.5 %,
Jelly Filling Ratio:0-90 %</td></tr>
</table>

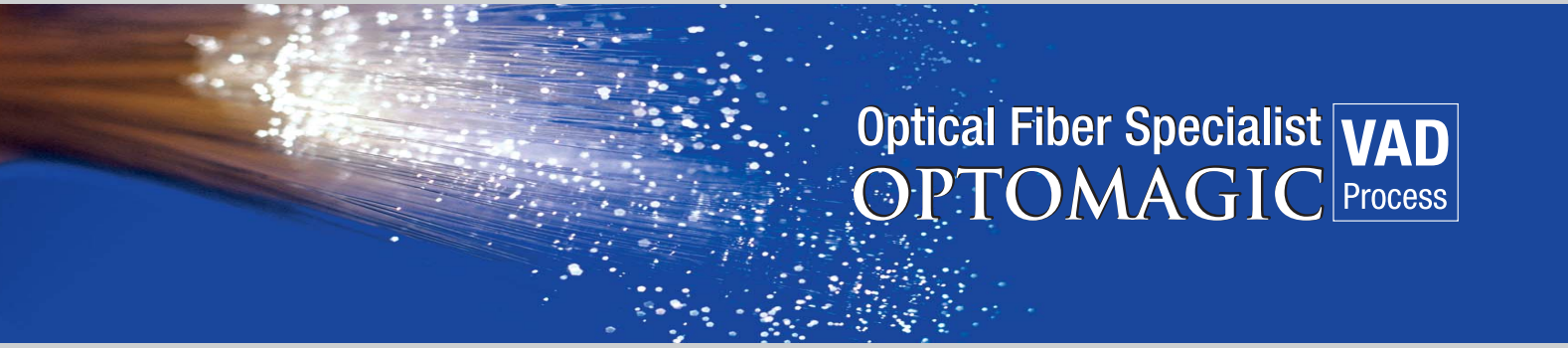
Testing carry out the following

Optical characteristics
Mechanical characteristics
Visual inspection of cable
Attenuation (Single mode at 1310 /1550nm)
Outside diameter
Coloring of fibers

The mechanical characteristics and visual inspection shall be carried out with a frequency of 1 out of 4 drums, starting with the first drum. The first drum shall always be checked when the quantity is less than 4 drums.

Certified test results are provided upon customer request.
If testing and inspection to be carried out by third parties required, such parties will be nominated and paid by the purchaser.





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