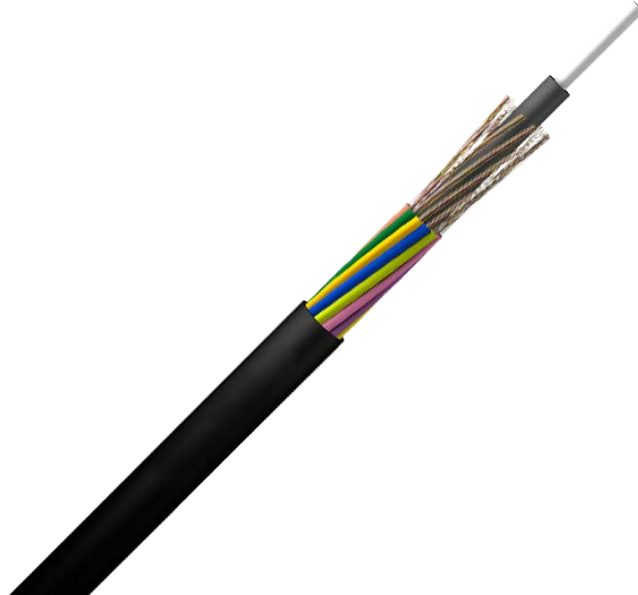


# Microfiber Cable - 250um

1 of 11

12F, 24F, 48F, 72F, 96F, 144F, 192F, 216F, 288F



Rendering is for Schematic Purposes Only

## Part Numbers:

- 10-21002.02A - 12F Microfiber Cable
- 10-21008.02A - 24F Microfiber Cable
- 10-21017.02A - 48F Microfiber Cable
- 10-21022.02A - 72F Microfiber Cable
- 10-21027.02A - 96F Microfiber Cable
- 10-21031.02A - 144F Microfiber Cable
- 10-21036.02A - 288F Microfiber Cable

## CONTACT & INFORMATION:

Tel: (920) 328-1020 Email: [sales@raddnetwork.com](mailto:sales@raddnetwork.com) Website: [RaDDNetwork.com](http://RaDDNetwork.com)



## General

This specification covers the design and performance of the single mode optical cables to be used in air blown micro duct application.

## Cable Description

- 12/24/48/72/96/144/192/216/288 G.652D or G657A1 SM-fibers.
- Loose tubes SZ-stranded.
- Suitable for air blown installation in micro-duct .

## Quality

RaDD ensures a continuing level of quality in our cable products through several programs including ISO 9001.

## Reliability

RaDD ensures product reliability through rigorous qualification testing of each product family. Both initial and periodic qualification testing are performed to assure the cable's performance and durability in the field environment.

## Reference

ITU-T G.652 ITU-T G.657	Characteristics of a single-mode optical fiber
IEC 60794-1-1	Optical fiber cables- part1-1-Generic specification-General
IEC 60794-1-2	Optical fiber cables- part1-2-Generic specification-Basic optical cable test procedure
IEC 60794-3	Optical fiber cables- part3-Sectional specification- Outdoor cables
IEC 60794-5	Optical fiber cables- part5-Sectional specification- Microduct cabling for installation by blowing

## Working Condition

Transportation and storage temperature: -30°C ~ +70°C  
 Installation temperature: -10°C ~ +50°C  
 Operation temperature: -30°C ~ +70°C

## Minimum Allowable Bending Radius

Static: 10D  
 Dynamic: 20D  
 D is the out diameter of the cable

## Life Time

Optical fiber cables supplied in compliance with the specifications can be capable of withstanding the typical service condition for a period of twenty-five (25) years without detriment to the transmission or operation and maintenance characteristics of the cable.

## Optical Fiber In Cable

Optical properties of the SM fiber are achieved through a germanium doped silica based core with a pure silica cladding which meets ITU-T G652D, UV curable acrylate protective coating is applied over the glass cladding to provide the necessary maximum fiber lifetime.

Geometrical, optical, and mechanical characteristics of fiber in cable as the following table:

Category	Description	Specification	
		Before cable	After cable
Geometrical Characteristics	Cladding diameter	$m\mu 1 \pm 125.0$	
	Cladding non-circularity	$\leq 1.0 \%$	
	Core concentricity error	$m\mu 0.6 \leq$	
	Coating diameter	245 $\pm$ 10 $\mu$ m (Before Colored) 250 $\pm$ 15 $\mu$ m (Colored)	
	Coating/cladding concentricity error	$m\mu 12 \leq$	
Optical Characteristics	Mode field diameter at 1310 nm	8.8~9.6 $\mu$ m	
	Point discontinuity	$\leq 0.05$ dB	
	Attenuation at 1310 nm	$\leq 0.34$ dB/km	$\leq 0.36$ dB/km
	Attenuation at 1383 nm	$\leq 0.34$ dB/km	$\leq 0.35$ dB/km
	Attenuation at 1550 nm	$\leq 0.21$ dB/km	$\leq 0.22$ dB/km
	Dispersion in 1288 - 1339 nm	$\leq 3.5$ ps/(nm·km)	
	Dispersion in 1271 - 1360 nm	$\leq 5.3$ ps/(nm·km)	
	Dispersion at 1550 nm	$\leq 18$ ps/(nm·km)	
	Zero dispersion wavelength	1300 - 1324 nm	
	Zero dispersion slope	$\leq 0.092$ ps/(nm <sup>2</sup> ·km)	
	Cable cut-off wavelength	$\leq 1260$ nm	
	Polarization mode dispersion individual fiber	$\leq 0.2$ ps/ $\sqrt$ km	
	Polarization mode dispersion design link value (M=20, Q=0.01%)	$\leq 0.1$ ps/ $\sqrt$ km	
Macro-bend loss (100 turns, 30mm radius, 1550/1625nm)	$\leq 0.1$ dB		
Mechanical Specification	Proof stress level	$\geq 100$ kpsi (0.69 GPa)	
	Coating strip force (peak value)	1.3~8.9 N	
	Fiber curl (Radius)	$\geq 4$ m	

### Optical Fiber In Cable(ITU-G657A1)

Optical properties of the SM fiber are achieved through a germanium doped silica based core with a pure silica cladding which meets ITU-T G657, UV curable acrylate protective coating is applied over the glass cladding to provide the necessary maximum fiber lifetime.

Geometrical, optical, and mechanical characteristics of fiber in cable as the following table:

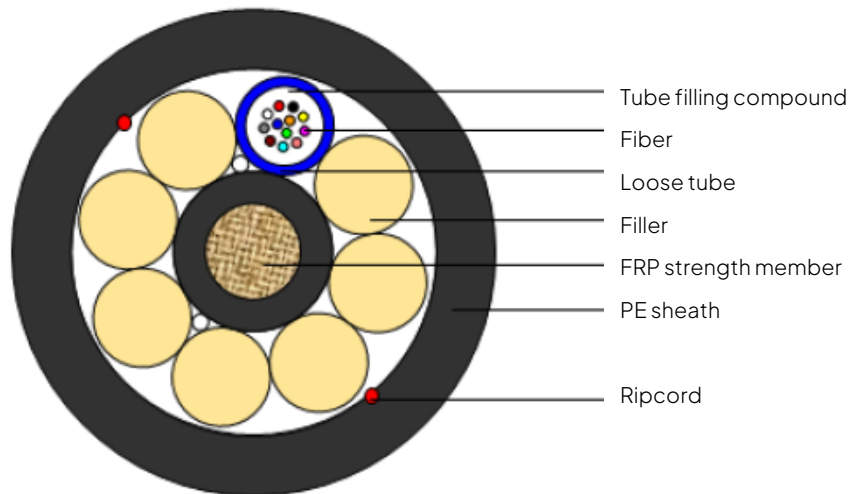
Category	Description	Specification	
		Before cable	After cable
Geometrical Characteristics	Cladding diameter	$m\mu 0.7 \pm 125.0$	
	Cladding non-circularity	$\leq \%0.7$	
	Core concentricity error	$m\mu 0.5 \leq$	
	Coating diameter	245±5 μm(Before Colored) 250 ±15μm (Colored)	
	Coating/cladding concentricity error	$m\mu 12 \leq$	
Optical Characteristics	Mode field diameter at 1310 nm	8.4~9.2 μm	
	Point discontinuity	$\leq 0.05\text{dB}$	
	Attenuation at 1310 nm	$\leq 0.35\text{ dB/km}$	$\leq 0.36\text{ dB/km}$
	Attenuation at 1383 nm	$\leq 0.35\text{ dB/km}$	$\leq 0.35\text{ dB/km}$
	Attenuation at 1550 nm	$\leq 0.21\text{ dB/km}$	$\leq 0.22\text{ dB/km}$
	Dispersion in 1285 - 1340 nm	$\leq 3.4\text{ ps}/(\text{nm}\cdot\text{km})$	
	Dispersion at 1550 nm	$\leq 18\text{ ps}/(\text{nm}\cdot\text{km})$	
	Dispersion at 16250 nm	$\leq 22\text{ ps}/(\text{nm}\cdot\text{km})$	
	Zero dispersion wavelength	1300 - 1324 nm	
	Zero dispersion slope	$\leq 0.092\text{ ps}/(\text{nm}^2\cdot\text{km})$	
	Cable cut-off wavelength	$\leq 1260\text{ nm}$	
	Polarization mode dispersion individual fiber	$\leq 0.2\text{ ps}/\sqrt{\text{km}}$	
	Polarization mode dispersion design link value (M=20, Q=0.01%)	$\leq 0.1\text{ ps}/\sqrt{\text{km}}$	
Macro-bend loss (10 turns, 30 mm radius, 1550 nm)	$\leq 0.25\text{ dB}$		
Mechanical Specification	Proof stress level	$\geq 100\text{kpsi}(0.69\text{ GPa})$	
	Coating strip force(peak value)	1.3~8.9N	
	Fiber curl (Radius)	$\geq 4\text{ m}$	

## Optic Cable General Design

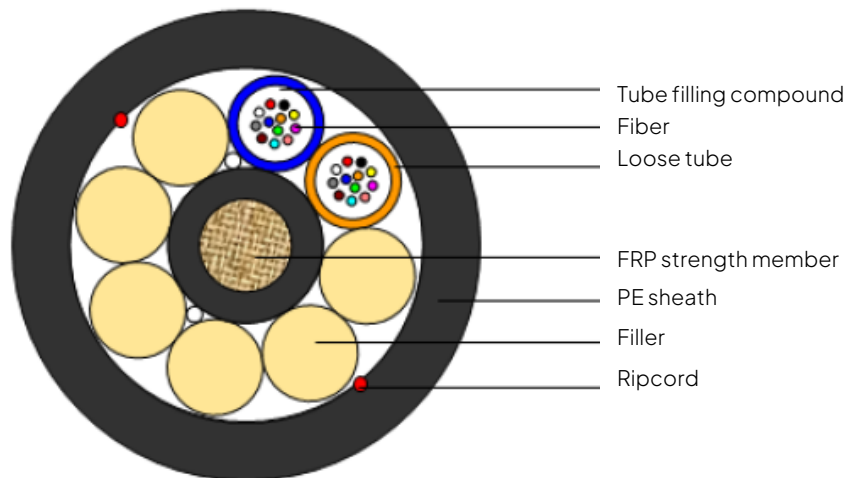
- Optical fibers are housed in loose tubes that are made of high-modulus plastic and filled with waterproof compounds.
- FRP is applied as central strength member.
- Loose tubes are SZ-stranded around the strength member.
- Water blocking yarns are used in and over the cable core to prevent it from water ingress.
- Polyethylene sheath is applied over the cable core as the outer sheath.

## Construction of Cross Section of Cable

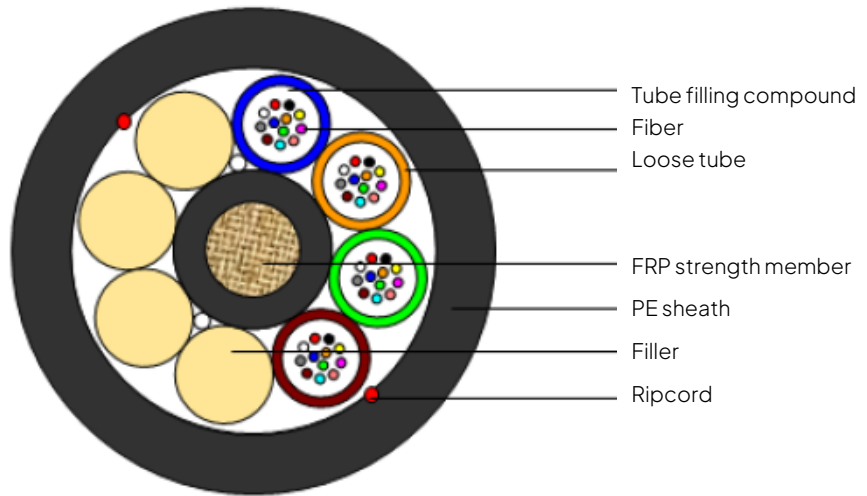
12F



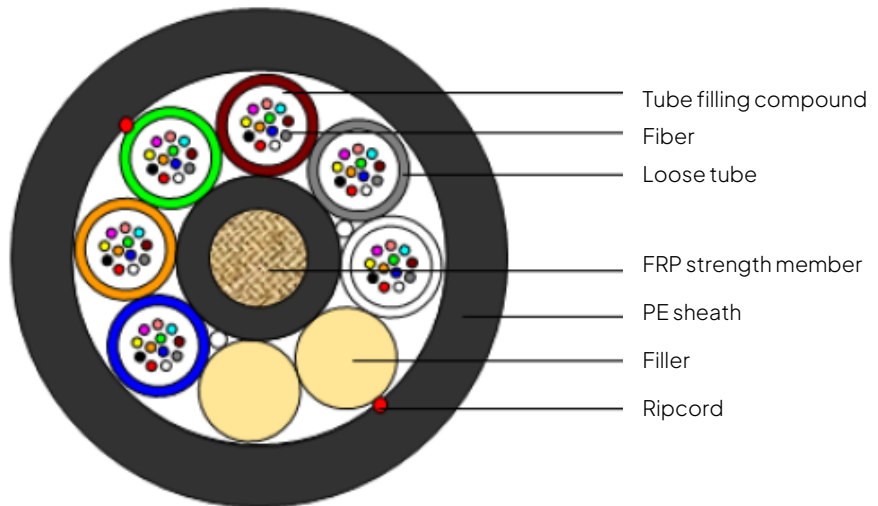
24F



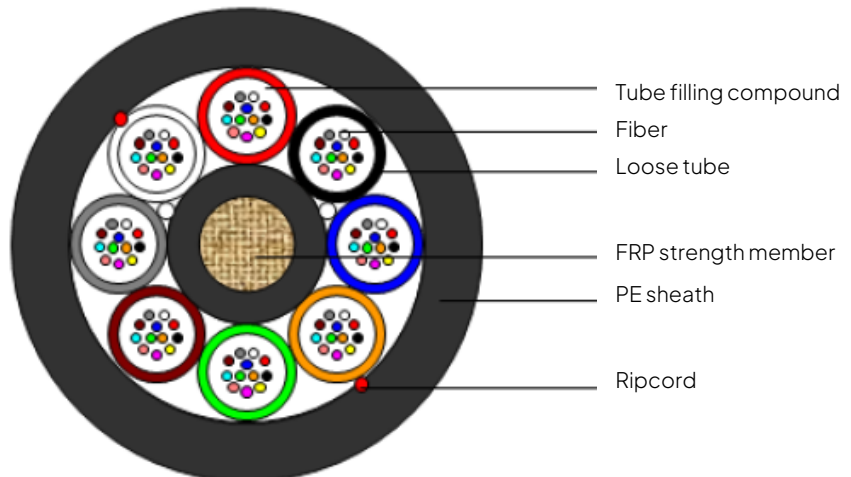
48F



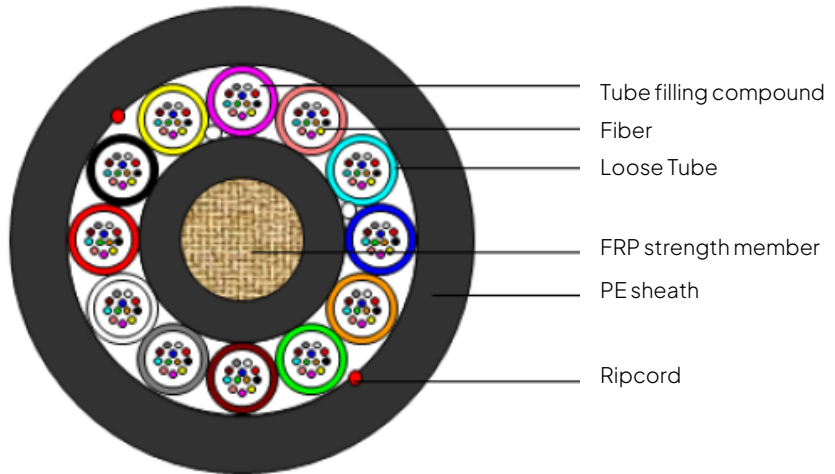
72F



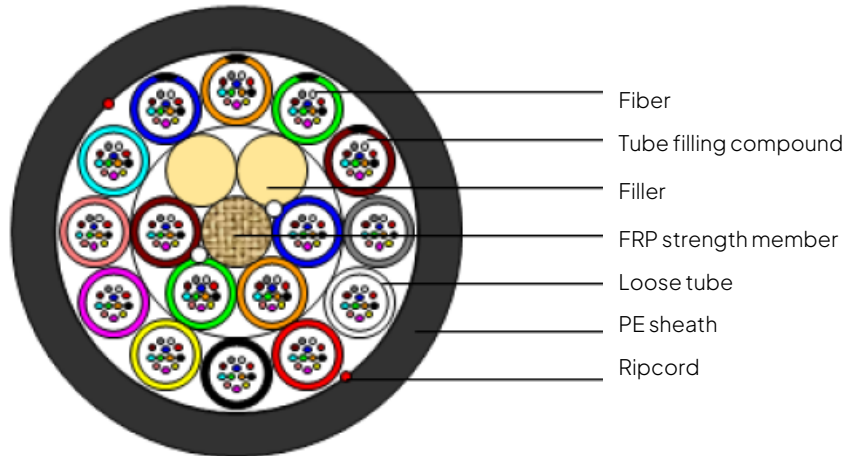
96F



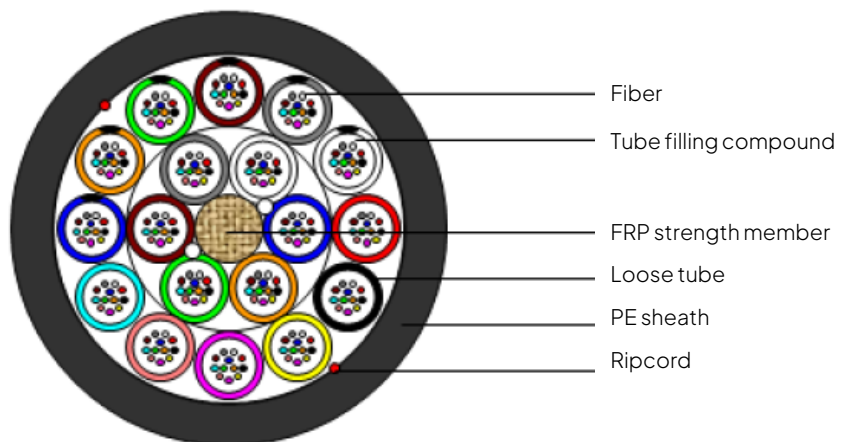
144F



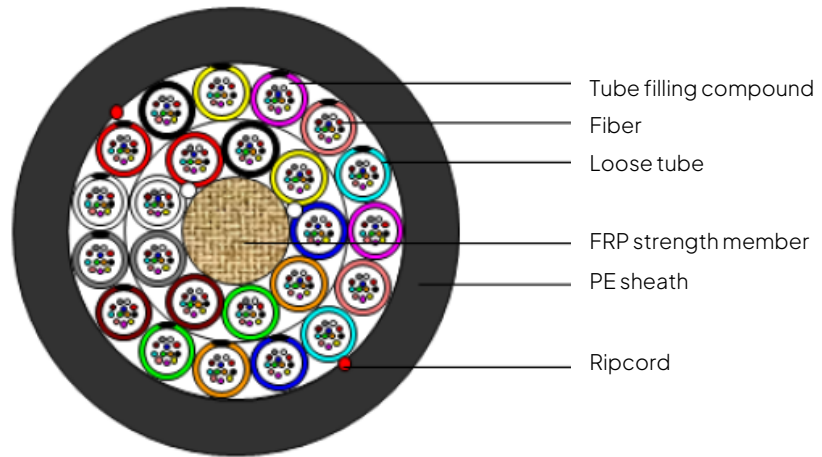
192F



216F



288F



### Dimensions and Descriptions of Cable

Item	Contents	Value									
		12	24	48	72	96	144	192	216	288	
Loose tube	Number	1	2	4	6	8	12	16	18	24	
	Material	PBT									
	Outer diameter(mm)	1.8					1.5				
Filler	Number	7	6	4	2	0	0	2	0	0	
Max. fiber counts per tube	G652D	12									
Central strength member	Material	FRP									
	Diameter(mm)	2.4					2.4	1.6		2.8	
	Diameter of PE layer(mm)	3					4.1	/		/	
Peripheral strength member	Material	Aramid yarn									
Outer sheath	Material	HDPE									
	Color	Black									
	Thickness(mm)	Approx.0.5									
Ripcord	Number/Color	2/Red									
Cable diameter mm)		7.6					7.9	8.2		9.3	
For micro -duct inside (mm)		10~14								12~14	
Max. tensile strength (N)		800					1000	600		1000	
Long term tensile strength (N)		267					333	200		333	
Crush(N/100mm)		Short term: 500 Long term: 200									
Cable weight(kg/km) Approx.		45					52	52		80	

### Color Code of the Fiber

Each fiber can be identifiable throughout the length of the cable in accordance with the following color sequence. Fiber color in each tube starts from No. 1 Blue.

Fibre color code	1	2	3	4	5	6
	Blue	Orange	Green	Brown	Slate	White
	7	8	9	10	11	12
	Red	Black	Yellow	Purple	Pink	Aqua

### Color Code of the Loose Tube and Filler

The loose tubes will be identifiable in accordance with the following color sequence.

Tube color code (≤12 tubes)	1	2	3	4	5	6
	Blue	Orange	Green	Brown	Slate	White
	7	8	9	10	11	12
	Red	Black	Yellow	Purple	Pink	Aqua

Tube color code (24 tubes)	Inner1	Inner 2	Inner 3	Inner 4	Inner 5	Inner 6
	Blue	Orange	Green	Brown	Slate	White
	Inner7	Inner 8	Inner 9	Outer1	Outer 2	Outer 3
	Red	Black	Yellow	Purple	Pink	Aqua
	Outer 4	Outer 5	Outer 6	Outer 7	Outer 8	Outer 9
	Blue with yellow Stripe	Orange with black Stripe	Green with black Stripe	Brown with black Stripe	Slate with black Stripe	White with black Stripe
	Outer10	Outer11	Outer12	Outer13	Outer 14	Outer 15
Red with black Stripe	Black with yellow Stripe	Yellow with black Stripe	Purple with black Stripe	Pink with black Stripe	Aqua with black Stripe	

The color of the fillers will be natural.

## Mechanical, Electrical and Environmental Test Characteristics

The finished cables can be subjected to the following mechanical, electrical and environmental conditions.

Item	Test Method	Requirements
Tensile performance	IEC 60794-1-2-E1 Load: according to short term tensile described in 3.2.2 Cable length under tension: Not less than 50m. Duration of load sustain: 1min. Velocity transfer device: 10mm/min	The maximum fiber strain less than 0.6% under maximum tensile short term load. The maximum increase in attenuation less than 0.1dB. No change in attenuation after test at 1550nm. Under visual examination without magnification, no damage to the sheath or to the cable elements after test.
Crush	IEC 60794-1-2-E3 Load: 500N Duration of load: 1min	No change in attenuation after test at 1550nm. Under visual examination without magnification, no damage to the sheath or to the cable elements. The imprint of the striking surface on the sheath is not considered mechanical damage.
Bend	IEC 60794-1-2-E11A Mandrel radius: 10 times cable diameter Turns:10 Cycles:5	No change in attenuation at 1550nm after test. Under visual examination without magnification, no damage to the sheath or to the cable elements.
Repeated bending	IEC 60794-1-2-E6 Bending radius: 20 times cable diameter Cycles: 25 Load: 25N Duration of cycle: Approximately 2s.	No change in attenuation at 1550nm after test. Under visual examination without magnification, no damage to the sheath or to the cable elements.
Torsion	IEC 60794-1-2-E7 Cycles:5 Length under test: 1m Turns: ±180° Load: 40N	The variation on attenuation for each fiber less than 0.05dB at 1550nm Under visual examination without magnification, no damage to the sheath or to the cable elements. No permanent change in attenuation after test
Temperature cycling	IEC 60794-1-2-F1 Sample length: at least 1000m Temperature range: -30°C~+70°C Cycles: 2 Temperature cycling test dwell time: 12 hours	There is no change in attenuation coefficient at 1550nm after the test.
Water Penetration	IEC 60794-1-2-F5B Time : 24 hours Sample length : 3m Water height : 1m	No water leakage

Compound flow	IEC 60794-1-2-E14 Sample count:5 Sample length:300 ±5 mm, Remove length: 130 ±2,5 mm, Time:24h	No filling compound dripped.
Other parameters	According to IEC 60794 ,YD/T 1460.4-2006	

Remark: "No attenuation changes" is considered as the attenuation changes  $\leq 0.05$  dB.

### Cable Sheath Marking

Unless otherwise specified, the cable sheath marking shall be as follows:

- Color: white
- Contents: RaDD, the year of manufacture, the type of cable, length marking
- Interval: 1m

### Packaging and Shipping

#### Reel Length

Standard reel length: 10,000 & 20,000 ft/reel

#### Cable Drum

The cables are packed in wooden drums

#### Labeling

The direction of rotation of the color scheme is shown by marking the clockwise and anti-clockwise ends with red and green adhesive tape respectively.

The markings are on both sides of the flanges as follows:

- Cable Type/Size
- Cable Length
- Gross Weight.
- YOFC.
- Shipping mark.

#### Cable Packing

Both cable ends are provided with protections against water penetration and firmly secured to the drum, so the cable cannot move and the turns cannot slide when it is moved, handled or laid. the inner end is available for testing.