Optical Fibre Cable Technical Specification

Optical Fiber Cable S.M (G.652.D)

Duct or Direct Buried

Customer Approval			
	Name	**Signature**	**Date**
Approved by			

1. General

1.1 Scope

This Specification covers the design requirements and performance standard for the supply of optical fibre cable in the industry. UnitekFiber ensures a stable quality control system for our cable products through several programs including ISO 9001, ISO 14001 and ROHS.

Cable type	Application
GYFTY53-10、24、36、64、196B1.3	Duct or Direct Buried

1.2 Reference

The cables offered by UnitekFiber are designed, manufactured and tested according to the standards as follows:

ASTM B 736	Standard specification for alumimum,aluminum alloy and aluminum clad steel cable shielding stock
ASTM D 566	Standard test method for dropping point of lubricating grease.
ASTM D 974	Standard test method for acid and base number by colour indicator titration
ASTM D 1248	Standard specification for polyethylene plastics moulding and extrusion materials
ASTM D 1603	Test method for Carbon Black in Olefin Plastics
ITU-T G.652	Characteristics of single-mode optical fibres
IEC 60793	Optical Fibres Part 2 – Product Specification
IEC 60794	Optical Fibre Cables, Part 1 Generic Specification.
ISO 9002	Quality systems Model for quality assurance in production and installation
TIA/EIA-598-A	Fibre colour coding

1.3 Life Time

Optical fibre cables supplied in compliance with this specifications is capable to withstand the typical service condition for a period of twenty-five (25) years without detriment to the operation characteristics of

the cable.

1.4 Application

Item	Value
Operation temperature	-20 ºC ～+70 ºC
Installation temperature	-20 ºC ～+70 ºC
Storage temperature	-20 ºC ～+70 ºC
Static bending radius	10 times the cable diameter
Dynamic bending radius	20 times the cable diameter

2. Optical Fibre

Optical Fibres supplied in this specification meet the requirements of ITU-T G.652D

Parameter	Specification
MFD (1310nm)	9.5 ±0.4um
MFD (1550nm)	10.0 ±0.7um
Cladding diameter	125±0.8um
Fiber diameter	235~255um, with UV coating, and colored to : 250±15um
Core/cladding concentricity error	≤ 0.6um
Coating/cladding concentricity error	≤ 12.0um
Cladding non circularity	≤ 1.0%
Cut-off wavelength	≤ 1260nm
Macro bend loss	Radius:30 mm; Number of turns:100; Maximum at 1550 nm ≤0.1 dB
Proof stress	≤0.69Gpa
Fiber cut-off wavelength	1150nm≤λ 0≤1280nm
Cable cut-off wavelength	≤1260nm
Zero-dispersion slope	S 0≤0.092 ps/nm 2 × km
Attenuation coefficient	1310nm: 0.35dB/km max after cabling 1550nm: 0.21dB/km max after cabling
Bending-loss performance of optical fiber @1310nm&1550nm	≤0.05dB (100 turns around a mandrel of 50mm diameter)

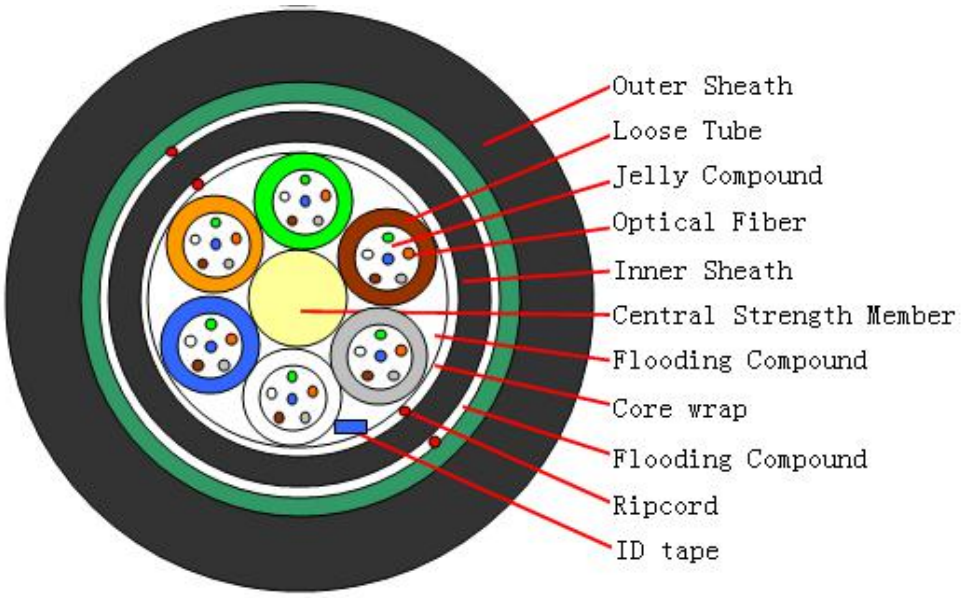
PMD coefficient	M:20 cables Q:0.01% Maximum PMDQ≤ 0. 2 ps/√km
Refractive Index	1310 nm:1.4677 1550 nm:1.4682
Zero-dispersion slope	≤0.092ps/nm2·km

3. Optical Cable

3.1 Technical Characteristics

- The unique second coating and stranding technology provide the fibres with enough space and bending endurance, which ensure good optical property of the fibres in the cable
- Accurate process control ensures good mechanical and temperature performance
- High quality raw material guarantees the long service life of cable

3.2 Cross Section of Cable



Schematic for reference only

3.3 Fibre and Loose Tube Identification

The color code of fibres and loose tube will be identification in accordance with the following color sequence, other sequence also is available.

Color Code	1	2	3	4	5	6
	Blue	Orange	Green	Brown	Grey	White
	7	8	9	10	11	12

	Red	Black	Yellow	Purple	Pink	Aqua

3.4 Dimensions and Descriptions

The standard optical cable structure is shown in the following table, other structure and fibre count are also available according to customer requirements.

Item	Contents	Value				
		10	24	36	64	196
Structure	Type	1+6	1+6	1+6	1+6	1+6+12
Loose tube	Fiber counts/tube	2	4	6	12	12
	Outer diameter (mm)	2.1±0.1				
Central strength member	Material	FRP				
	Diameter (mm)	2.2±0.05				
Water blocking	Material	Flooding Compound				
Core Wrapping	Material	Water Blocking Tape				
ID tape	No	1				
Inner Sheath	Material	MDPE				
	Thickness (mm)	1.0±0.1				
Armor	Material(mm)	Steel tape				
	Thickness (mm)	0.25±0.02				
	Shield overlap (mm)	≥3.0				
Ripcord	Material	Nylon				
	No.	4				
Sheath	Material	HDPE				
	Color	Black				
	Thickness (mm)	1.9±0.1				
Cable diameter(mm)		13.5±0.2				17.9±0.2
Cable weight(kg/km) Approx.		170±10				280±10

4. Mechanical, Physical and Environmental Test Characteristics

The mechanical and environmental performance of the cable are in accordance with the following table. Unless otherwise specified, all attenuation measurements required in this section shall be performed at

1550nm.

Items	Test Method	Requirements
Tension	**IEC 60794-1-2-E1** Load: According to 2000N Sample length: Not less than 50m. Duration time: 1min	Fibre strain: ≤0.33% Additional attenuation: ≤0.1dB after test No damage to outer jacket and inner elements
Crush	**IEC 60794-1-2-E3** Load: According to 3000N/100mm Duration of load: 1h	Additional attenuation: ≤0.05dB after test No damage to outer jacket and inner elements
Impact	**IEC 60794-1-2-E4** Impact high：1m Impact weight: 2kg	Additional attenuation: ≤0.05dB No damage to outer jacket and inner elements
Repeated bending	**IEC 60794-1-2-E6** Bending radius: 20*D Cycles: 25times Load: 25kg Bend angle:90 degree	Additional attenuation: ≤0.1dB No damage to outer jacket and inner elements
Torsion	**IEC 60794-1-2-E7** Cycles:10time Length under test: 1000m Turns: 180° Load:25kg	Additional attenuation: ≤0.05dB No damage to outer jacket and inner elements
Water Penetration	**IEC 60794-1-2-F5B** Time : 24 hours Sample length : 3m Water height : 1m	No water leakage.
Temperature cycling	**IEC 60794-1-2-F1** Sample length: at least 1000m Temperature range:-20 ℃~+70 ℃ Cycles:5 Temperature cycling test dwell time: 24 hours	The change in attenuation coefficient shall be less than 0.1 dB/km at 1550nm.
Other parameters	According to **IEC 60794-1**	

5. Packaging and Drum

5.1 Length Marking

The length number shall be marked at regular instervals of one meter along the outer sheath of the entire cable length.

The accuracy of the marking shall be held within a limit of ±1%。

Each cable shall have the following information clearly marked between the numbers marked:

A. Name of manufacturer

B. Year of manufacturer

C. Code of cable

5.2 Reel Length

Standard reel length: 4 km/reel, other length is also available.

5.3 Cable Drum

The cables are packed in fumigated wooden drums or other discs allowed for export.

5.4 Cable Packing

Both ends of the cable will be sealed with suitable plastic caps to prevent the entry of moisture during shipping, handling and storage. The inner end is available for testing.