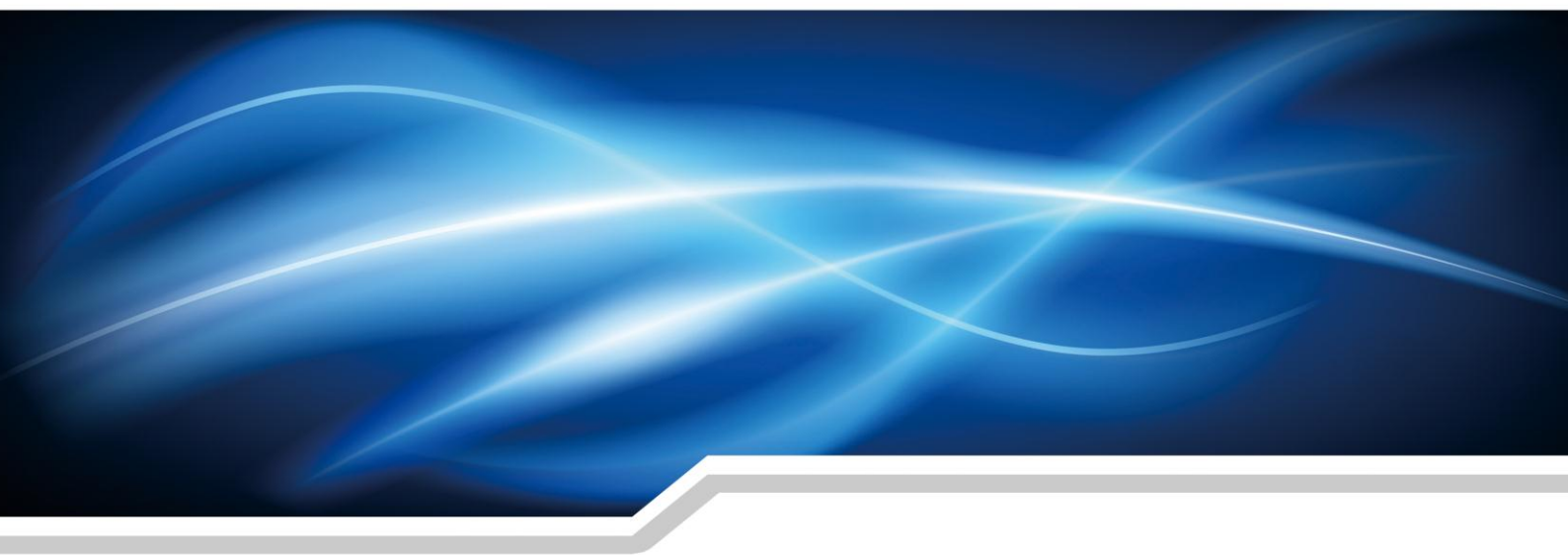


TECHNICAL SPECIFICATION

Duct Optical Fiber Cable



Revision	Date	Prepared	Checked	Approved	Remarks
1	2017-2-24	Robert	Erica	Felix	

Jiangsu Zhongtian Technology Co., Ltd.

No.5 Zhongtian Road, NEATA, Nantong City, Jiangsu province, China Tel: +86-513-8919 1138 Fax: +86-513- 8539 9670

1. General

1.1 Scope

This listed specification covers the design requirements and performance standard for the supply of optical fiber cable in the industry. It also includes ZTT premium designed cable with optical, mechanical and geometrical characteristics.

Cable type	Application
OFC-12G.652D-CGStD-S1	Duct installation cable

1.2 Cable Description

ZTT cable possesses high tensile strength and flexibility in compact cable sizes. At the same time, it provides excellent optical transmission and physical performance.

1.3 Quality

Excellent quality control is achieved through intense in-house quality check and stringent audit acceptance by ISO 9001.

1.4 Reliability

Initial and periodic product qualification tests for performance and durability are performed rigorously to ensure product reliability.

1.5 Reference

The cable which ZTT offered are designed, manufactured and tested according to international standards as follows:

IEC 60793-1	Optical fiber Part 1: Generic specifications
IEC 60793-2	Optical fiber Part 2: Product specifications
IEC 60794-3-10	Optical fiber cables- Part 3-10: outdoor cables-family specification for duct and directly buried optical telecommunication cables
ITU-T G.650	Definition and test methods for the relevant parameters of single-mode fibers
ITU-T G.652	Characteristics of a single-mode optical fiber and cable

2. Optical Fiber

The optical fiber is made of high pure silica and germanium doped silica. UV curable acrylate material is applied over fiber cladding as optical fiber primary protective coating. The detail data of optical fiber performance are shown in the following table.

ITU/T G.652 optical fiber uses special spun device to successfully control the value of PMD to ensure stability during cabling.

G.652D Fiber

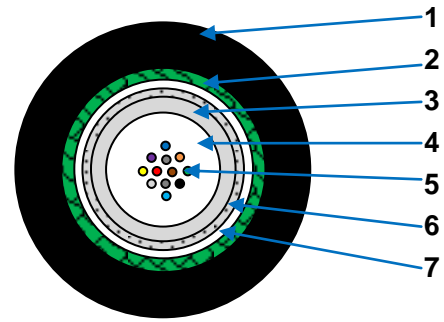
Category	Description	Specifications	
		Before cabling	After cabling
Optical Specifications	Attenuation @ 1310 nm	≤0.34 dB/km	≤0.36 dB/km
	Attenuation @ 1550 nm	≤0.20 dB/km	≤0.22 dB/km
	Zero Dispersion Wavelength	1300~1324 nm	
	Zero Dispersion Slope	≤0.092 ps/nm ² ·km	
	PMD	≤0.2 ps/√km	
	Cable Cutoff Wavelength (λ_{cc})	≤1260 nm	
	Macro bending Loss (100 turns; Φ 50 mm) @ 1550 nm	≤ 0.05 dB	
	(100 turns; Φ 50 mm) @ 1625 nm	≤ 0.10 dB	
Mode Field Diameter @ 1310 nm	9.2±0.4 μ m		
Dimensional Specifications	Cladding Diameter	125 ±1 μ m	
	Core/clad concentricity error	≤0.6 μ m	
	Cladding Non-Circularity	≤1.0%	
Mechanical Specifications	Proof stress	≥0.69Gpa	

3. Cable Structure

3.1 Cable Type: OFC-12G.652D-CGStD-S1



Picture is only for reference



Technical Characteristics

- The unique extruding technology provides the fibers in the tube with good flexibility and bending endurance
- The unique fiber excess length control method provides the cable with excellent mechanical and environmental properties
- Multiple water blocking material filling provides dual water blocking function

Construction:

1. Outer sheath (MDPE black)
2. Armor tape (Steel tape)
3. Loose tube
4. Jelly
5. Fiber
6. Strength member (Glass yarns)
7. Water blocking tape

Dimension and Properties

Physical	Fiber count	12G.652D
	Loose tube diameter	2.8-3.0±3%mm
	Strength member	Glass yarns
	Aarmor	PE coated corrugated steel tape
	Outer sheath thickness	Nom.:1.2mm
	Cable OD	8.9mm±5%
	Cable weight	80kg/km±15%
	Operation temperature range	-40 deg C to + 70 deg C
	Installation temperature range	-40 deg C to + 70 deg C
	Transport and storage temperature range	-40 deg C to + 70 deg C
Mechanical	Max. tensile load	Short term: 1000N; long term: 700N
	Crush resistance	2000N/10cm
	Minimal installation bending radius	20 x OD
	Minimal operation bending radius	15 x OD

Color code scheme:

Fiber color	red	green	yellow	blue	white	violet	orange	black	grey	brown	pink	turquoise
Tube color	natural											

4. Test Requirements

Approved by various professional optical and communication product institution, ZTT also conduct various in-house testing in its own Laboratory and Test Center. ZTT also conduct test with special arrangement with the Chinese Government Ministry of Quality Supervision & Inspection Center of Optical Communication Products (QSICO). ZTT possess the technology to keep its fiber attenuation loss within Industry Standards.

The cable is in accordance with applicable standard of cable and requirement of customer. The following test items are carried out according to corresponding reference.

Routine tests of optical fiber

Mode field diameter	IEC 60793-1-45
Mode field Core/clad concentricity	IEC 60793-1-20
Cladding diameter	IEC 60793-1-20
Cladding non-circularity	IEC 60793-1-20
Attenuation coefficient	IEC 60793-1-40
Chromatic dispersion	IEC 60793-1-42
Cable cut-off wavelength	IEC 60793-1-44

Test list

4.1 Tension Loading Test

Test Standard	IEC 60794-1-2 E1
Sample length	No less than 50 meters
Load	1000N
Duration time	1 minute
Test results	Fiber strain: $\leq 0.60\%$
	Additional attenuation: $\leq 0.1\text{dB}$
	No damage to outer jacket and inner elements

4.2 Crush/Compression Test

Test Standard	IEC 60794-1-2 E3
Load	2000N/10cm
Duration time	1 minute
Test number	3
Test results	After test, additional attenuation: $\leq 0.05\text{dB}$
	No damage to outer jacket and inner elements

4.3 Impact Resistance Test

Test Standard	IEC 60794-1-2 E4
Impact energy	10J
Radius	300mm
Impact points	3
Impact number	1
Test result	After test, additional attenuation: $\leq 0.05\text{dB}$
	No damage to outer jacket and inner elements

4.4 Repeated Bending Test

Test Standard	IEC 60794-1-2 E6
Bending radius	20 X diameter of cable
Cycles	30 cycles
Load	10N
Test result	No damage to outer jacket and inner elements

4.5 Torsion/Twist Test

Test Standard	IEC 60794-1-2 E7
Sample length	2m
Angles	±1 turn(360°)
cycles	5
Test result	No damage to outer jacket and inner elements

4.6 Bend Test

Test Standard	IEC 60794-1-2 E11B
Mandrel diameter	20 X diameter of cable&15 X diameter of cable
Turn number	4
Number of cycles	3
Test result	After test, additional attenuation:≤0.05dB
	No damage to outer jacket and inner elements

4.7 Temperature cycling Test

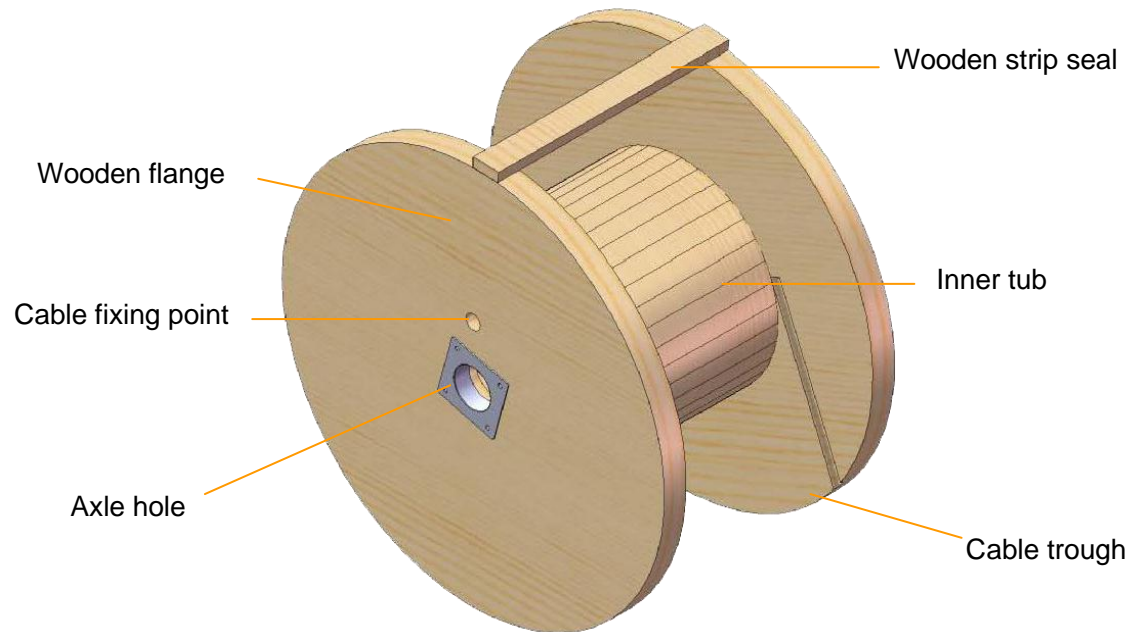
Test Standard	IEC 60794-1-2 F1
Temperature step	+20℃ →-40℃ →+70℃→-40℃ →+70℃→+20℃
Time per each step	12 hrs
Test result	Attenuation variation for reference value (the attenuation to be measured before test at +20±3℃) ≤ 0.2 dB/km

4.8 Water penetration Test

Test Standard	IEC 60794-1-2 F5
Height of water column	1m
Sample length	3m
Test time	24 hrs
Test result	No water leakage from the opposite of the sample

5. Packing and Drum

5.1 ZTT cables are packed in carton, coiled on Bakelite & wooden drum. During transportation, right tools should be used to avoid damaging the package and to handle with ease. Cables should be protected from moisture; kept away from high temperature and fire sparks; protected from over bending and crushing; protected from mechanical stress and damage.



5.2 The color of cable marking is white. (The printing shall be carried out at interval of 1 meter on the outer sheath of cable) The inner end of cable is then sealed with heat shrinkable end cap to prevent ingress of water and is made available for testing. The outer end of cable is equipped with heat shrinkable end cap. Outer sheath marking legend can be changed according to user's requests.

5.3 Outdoor cable packing

Bakelite & wooden drum

Strong wooden batten protection