

## TECHNICAL SPECIFICATIONS

### 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 GL premium designed cable with optical, mechanical and geometrical characteristics

Cable Type	Application
Non mental GYFTY G652D-MDPE	Duct directly buried/Aerial installation

#### 1.2 Cable Description

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

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

#### 1.4 Reliability

Both initial and periodic qualification testing are performed to assure the cable's performance and durability in the field environments.

1.5 The cable is designed, manufactured and tested according to international standards as follow

### B1.3(G652D) single mode fiber

<b>Optics Specifications</b>		
Attenuation(dB/km)	@1310nm	≤0.35db/km
	@1383nm (after hydrogen aging)	≤0.32db/km
	@1550nm	≤0.21db/km
	@1625nm	≤0.24db/km
Dispersion	@1285nm~1340nm	-3.0~3.0ps/(nm*km)
	@1550nm	≤18ps/(nm*km)
	@1625nm	≤22ps/(nm*km)
Zero-Dispersion wavelength		1300~1324nm
Zero-Dispersion slope		≤0.092ps/(nm <sup>2</sup> *km)
Mode field diameter @ 1310nm		9.2±0.4μm
Mode field diameter @ 1550nm		10.4±0.8μm
PMD	Max. value for fiber on the reel	0.2ps/km <sup>1/2</sup>
	Max. Designed value for link	0.08ps/km <sup>1/2</sup>
Cable cutoff wavelength,λ <sub>cc</sub>		≤1260nm
Effective group index(N <sub>eff</sub> )@1310nm		1.4675
Effective group index(N <sub>eff</sub> )@1550nm		1.4680
Macro-bend loss(Φ60mm,100 turns)@1550nm		≤0.05db
<b>Back scatter characteristic(@1310nm&amp;1550nm)</b>		
Point discontinuity		≤0.05db
Attenuation uniformity		≤0.05db/km
Attenuation coefficient difference for bi-directional measurement		≤0.05db/km
<b>Geometrical characteristics</b>		
Cladding diameter		125±1μm
Cladding non-circularity		≤1%
Core/cladding concentricity error		≤0.4μm
Fiber diameter with coating(uncolored)		245±5μm
Cladding/coating concentricity error		≤12.0μm
Curl		≥4m
<b>Mechanical characteristic</b>		
Proof test		0.69GPa

Coating strip force(typical value)	1.4N
Dynamic stress corrosion susceptibility parameter(typical value)	≥20
<b>Environmental characteristics(@1310nm&amp;1550nm)</b>	
Temperature induced attenuation(-60~+85°C)	≤0.5dB/km
Dry heat induced attenuation(85±2°C,30days)	≤0.5dB/km
Water immersion induced attenuation(23±2°C,30days)	≤0.5dB/km
Damp heat induced attenuation(85±2°C,RH85%,30days)	≤0.5dB/km

Cable structure

- Cable Type: OFC-non mental GYFTY .652D-Duct -MDPE



### Technical Characteristics

- 1) The unique extruding technology provides the fibers in the tube with good flexibility and bending endurance
- 2) 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

#### Dimension and Properties

Fiber count	12	24	48	288
Max. No of loose tube / filler No.	2/3	2/3	4/1	1+9+15
Fiber No. per tube	6	12	12	12
Loose tube diameter	1.55mm	1.55mm	1.8mm	1.8mm
Central member length diameter (FRP )	1.5mm	1.5mm	1.5mm	2.0mm
Outer sheath thickness &Material	1.5mm& MDPE			
Water blocking	Water swallable material			
Cable OD mm	7.6mm	7.6mm	8.1mm	15.6mm
Cable weight kg/km	49		53	160
Operation temperature range	-40 °C to + 70 °C			
Installation temperature range	°C to + 70 °C			
Transport and storage temperature range	-40 °C to + 70 °C			
Maximum allowable tension	800N			

Minimal bending in stallation radius	20 x OD
Minimal bending o peration radius	10 x OD

The fibres shall be marked by a coloured coating with 12 different colours according to EIA/TIA 598:

- |                        |   |
|------------------------|---|
| Fibre #1: Blue         | Fibre #7: Red                               |
| Fibre #2: Orange       | Fibre #8: Black (natural with being marked) |
| Fibre #3: Green        | Fibre #9: Yellow                            |
| Fibre #4: Brown        | Fibre #10: Violet                           |
| Fibre #5: Slate (Grey) | Fibre #11: Rose (Pink)                      |
| Fibre #6: White        | Fibre #12: Aqua (Light Blue)                |

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>

## TEST REQUIREMENTS

*Approved by various professional optical and communication product institution, GL also conduct various in-house testing in its own Laboratory and Test Center. She also conduct test with special arrangement with the Chinese Government Ministry of Quality Supervision & Inspection Center of Optical Communication Products (QSICO). GL 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

<i>Attenuation coefficient</i>	<i>IEC 60793-1-40</i>
<i>Chromatic dispersion</i>	<i>IEC 60793-1-42</i>
<i>Cable cut-off wavelength</i>	<i>IEC 60793-1-44</i>
<i>Test for outdoor cable</i>	

### 3. Tension Loading Test

Test Standard	IEC 60794-3-20
Sample length	No less than 50 meters
Load	Max. installation load
Duration time	1 hour
Test results	Additional attenuation: ≤0.05dB No damage to outer jacket and inner elements

### 4. Crush/Compression Test

Test Standard	IEC 60794-3-20
Load	Crush load
Plate size	100mm length
Duration time	1 minute
Test number	1
Test results	Additional attenuation: ≤ 0.05dB No damage to outer jacket and inner elements

### 5. Impact Resistance Test

Test Standard	IEC 60794-3-20 E4
Impact energy	6.5J
Radius	12.5mm
Impact points	3
Impact number	2
Test result	Additional attenuation: ≤0.05dB

### 6. Repeated Bending Test

Test Standard	IEC 60794-3-20 E6
Bending radius	20 X diameter of cable
Cycles	25 cycles

Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements
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#### 7. Torsion/Twist Test

Test Standard	IEC 60794-3-20 E7
Sample length	2m
Angles	$\pm 180$ degree
cycles	10
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

#### 8. Bend Test

Test Standard	IEC 60794-3-20 E11B
Mandrel diameter	20 X diameter of cable
Turn number	4
Number of cycles	3
Temperature	20°C
Test result	No damage to outer jacket and inner elements

#### 9. Temperature cycling Test

Test Standard	IEC 60794-3-20 F1
Temperature step	+20°C → -40°C → +85°C → +20°C
Time per each step	Transition from 0 °C to -40 °C :2hours; duration at -40 °C :8 hours; Transition from -40 °C to +85 °C :4hours; duration at +85 °C :8 hours; Transition from +85 °C to 0°C:2hours
Cycles	5
Test result	Attenuation variation for reference value (the attenuation to be measured before test at +20±3°C) $\leq 0.05$ dB/km

#### 10. Water penetration Test

Test Standard	IEC 60794-3-20 F5
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Height of water column	1m
Sample length	1m
Test time	1 hour
Test result	No water leakage from the opposite of the sample

#### 11. Drip Test

Test Standard	IEC 60794-3-20 E14
Sample length	0.3m
Temperature	70 °C
Duration	24 hrs
Test result	No filling compound shall drip from tubes

### PACKING AND DRUM

T 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.

