

# TECNICAL SPECIFICATION

## 1. GENERAL

### 1.1 SCOPE

Cable type	Application
GYCFN	Air blowing installation cable

### 1.2 REFERENCE

The cable provided by SUMEC need to pass the following international specifications:

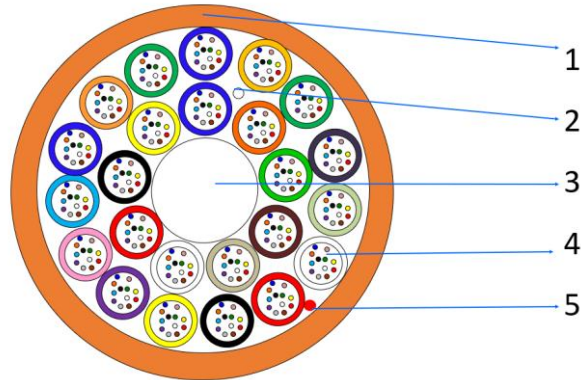
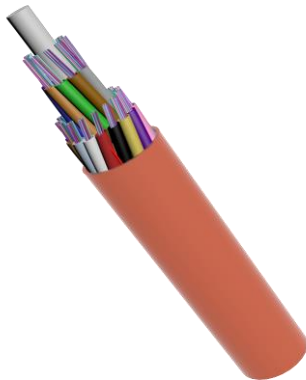
IEC 60793-1	Optical fiber Part 1: Generic specifications
IEC 60793-2	Optical fiber Part 2: Product specifications
IEC 60794-1	Optical fiber cable Part 1-2: Generic specification-basic optical cable test procedures
IEC 60794-5	Optical fiber cables- Part 5: sectional specification -Microduct cabling for installation by blowing
ITU-T G.650	Definition and test methods for the relevant parameters of single-mode fibers
ITU-T G.657	Characteristics of a bending-loss insensitive single-mode optical fiber
EIA/TIA 598	Color code of fiber optic cables

**2. OPTICAL FIBER**

G652D Fiber			
Category	Description		Specifications
Optical Specifications	Attenuation @1310 nm		≤0.40 dB/km
	Attenuation @1550 nm		≤0.30 dB/km
	Zero Dispersion Wavelength		1300~1322 nm
	Chromatic dispersion	@1310nm @1550nm @1625nm	≤3.5 ps/(nm·km) ≤18 ps/(nm·km) ≤22 ps/(nm·km)
	Zero Dispersion Slope		≤0.092 ps/nm <sup>2</sup> ·km
	PMD <sub>Q</sub>		≤0.2 ps/√km
	PMD individual value		≤0.2 ps/√km
	Cable Cutoff Wavelength (λ <sub>cc</sub> )		≤1260 nm
	Macro bending Loss (100 turns; Φ60 mm)	@1625 nm	≤ 0.10 dB
	Mode Field Diameter	@1310 nm	9.2±0.4μm
Dimensional Specifications	Cladding Diameter		125 ±1μm
	Coating diameter		245 ±5μm      200 ±5μm
	Core/clad concentricity error		≤0.6μm
	Cladding Non-Circularity		< 1.0%
Mechanical Specifications	Proof stress		≥0.69Gpa

### 3. CABLE STRUCTURE

#### 3.1 CABLE TYPE: GYCFN



Three-dimensional schematic

#### Features & Application

- Small diameter
- Semi-dry water blocking
- Perfect cable structure
- Easy for blowing
- Saving the source of duct

#### Construction:

1. Outer sheath (PA, Orange)
2. Water blocking yarns
3. Central strength member (FRP)
4. Loose tube, fiber and jelly
5. Ripcord

### Dimensions and Properties

Physical	Fiber type	250µm				200µm			
	Fiber count	72	96	144	288	72	96	144	288
	Fiber No. per tube	12	12	24	12	12	12	24	12
	Tube No./Filler No.	6/0	8/0	6/0	9/0-15/0	6/0	8/0	6/0	9/0-15/0
	Loose tube (mm)	1.4±0.05	1.4±0.05	2.3±0.05	1.4±0.05	1.2±0.05	1.2±0.05	1.75±0.05	1.2±0.05
	Strength member diameter (mm)	1.5±0.1	2.4±0.1	2.2±0.1	2.8±0.1	1.2±0.1	2.1±0.1	1.8±0.1	2.4±0.1
	Cable OD(mm)	4.9±0.3	5.8±0.3	7.3±0.3	9.2±0.3	4.0±0.3	5.1±0.3	5.9±0.3	7.3±0.3
	Cable weight(kg/km)	25	32	51	79	15	25	42	57
	Properties	Operation temperature range	-30 °C to + 65 °C						
Installation temperature range		-10 °C to + 55 °C							
Transport and storage temperature range		-30 °C to + 65 °C							
Max. tensile load(N)		700	1000			500	1000		
Crush resistance(N/10cm)		500							
Minimal installation bending radius		20*D							
Minimal operation bending radius		10*D							

D =cable diameter

**Color code scheme:**

<b>Fiber color</b>	blue	orange	green	brown	slate	white	red	black	yellow	violet	pink	aqua
<b>Tube color</b>	blue	orange	green	brown	slate	white	red	black	yellow	violet	pink	aqua

Note: Stripes will be used after more than 12 colors of loose tubes.

## 4. TEST REQUIREMENTS

### Fiber test standard

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

### Performance Testing List

#### 4.1 Tension Loading Test

<b>Test Standard</b>	<b>IEC 60794-1-21 E1</b>
<b>Sample length</b>	No less than 50 meters
<b>Load</b>	MAT
<b>Duration time</b>	1 minutes
<b>Test results</b>	Fiber strain $\leq 0.6\%$ Additional attenuation $\leq 0.05\text{dB}$
	No damage to outer jacket and inner elements

#### 4.2 Crush/Compression Test

<b>Test Standard</b>	<b>IEC 60794-1-21 E3</b>
<b>Load</b>	500N
<b>Duration time</b>	1minute
<b>Test number</b>	3
<b>Test results</b>	No change in additional attenuation after test
	No damage to outer jacket and inner elements under short term load

#### 4.3 Impact Resistance Test

<b>Test Standard</b>	<b>IEC 60794-1-21 E4</b>
<b>Impact energy</b>	3J
<b>Radius</b>	12.5mm
<b>Impact points</b>	5
<b>Impact number</b>	1
<b>Test result</b>	No change in additional attenuation after test
	No damage to outer jacket and inner elements

#### 4.4 Repeated Bending Test

<b>Test Standard</b>	<b>IEC 60794-1-21 E6</b>
<b>Bending radius</b>	20*D
<b>Cycles</b>	25 cycles
<b>Load</b>	150N
<b>Test result</b>	No change in additional attenuation after test
	No damage to cable elements

#### 4.5 Bend Test

<b>Test Standard</b>	<b>IEC 60794-1-21 E11</b>
<b>Mandrel diameter</b>	20*D
<b>Turn number</b>	3
<b>Cycles</b>	4
<b>Test result</b>	After test, no change in additional attenuation
	No damage to outer jacket and inner elements

#### 4.6 Torsion/Twist Test

<b>Test Standard</b>	<b>IEC 60794-1-21 E7</b>
<b>Sample length</b>	1m
<b>Angles</b>	±180 degree
<b>Load</b>	150N
<b>Cycles</b>	10
<b>Test result</b>	No change in additional attenuation after test
	No damage to cable elements

#### 4.7 Abrasion

<b>Test Standard</b>	<b>IEC 60794-1-21 E2B</b>
<b>Experiment method</b>	The wool felt should be thoroughly impregnated with water

<b>Frequency</b>	6-12cycles/min
<b>Load</b>	20N
<b>Cycles</b>	10
<b>Test result</b>	The marking should be legible after test

#### 4.8 Cable kink

<b>Test Standard</b>	<b>IEC 60794-1-21 E10</b>
<b>Min. Loop diameter</b>	Operating: 10*D, Installation:20*D
<b>Test result</b>	No kink occur

#### 4.9 Water penetration Test

<b>Test Standard</b>	<b>IEC 60794-1-22 F5</b>
<b>Height of water column</b>	1m
<b>Sample length</b>	1m
<b>Test time</b>	24 hour
<b>Test result</b>	No water seepage prom the opposite end of the sample

#### 4.10 Temperature cycling Test

<b>Test Standard</b>	<b>IEC 60794-1-22 F1</b>
<b>Temperature step</b>	+20℃→-30℃ →+65℃→20℃
<b>Time per each step</b>	At least 8 hours
<b>Cycles</b>	2
<b>Test result</b>	Attenuation variation for reference value (the attenuation to be measured before test at +20±3℃) ≤0.10dB/km

#### 4.11 Environmental performance

<b>Test Standard</b>	<b>RoHS</b>
<b>Test result</b>	Pass the test.

**Remark:** “No change in additional attenuation” is considered as the addition attenuation≤0.03dB,

The test wavelength is 1550 nm.