

### 1. GENERAL

#### 1) SCOPE

This specification covers the general requirements and performance of CABLE offered including optical characteristics, electrical characteristics, mechanical characteristics, geometrical characteristics.

#### 2) REFERENCES

The CABLE offered shall be designed, manufactured and tested according to international standards as follows:

<b>ISO 9001</b>	Quality Management Systems
<b>ISO 14001</b>	Environmental Management Systems
<b>IEEE Std P.1222</b>	IEEE Standard construction of composite fiber for use on electric utility power lines
<b>IEC 60793-1</b>	Optical fiber Part 1: Generic specifications
<b>IEC 60793-2</b>	Optical fiber Part 2: Product specifications
<b>IEC 60794-1-2</b>	Optical fiber cables – Part 4: Sectional specification – Aerial optical cables along electrical power lines
<b>EIA/TIA 598</b>	Color code of fiber optic cables
<b>ITU-T G.650</b>	Definition and test methods for the relevant parameters of single-mode fibers
<b>ITU-T G.652</b>	Characteristics of a single-mode optical fiber cable
<b>ITU-T G.651</b>	Characteristics of a multimode optical fiber cable
<b>ITU-T G.657</b>	Characteristics of Bending loss insensitive single mode fiber for access network

## 2. OPTICAL FIBER

### G. 652D Type

The optical fiber shall be 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:

Category	Description	Specifications
Optical Characteristics	Attenuation Coefficient: at 1310 nm Max: at 1550 nm Max:	$\leq 0.35\text{dB/km}$ $\leq 0.21\text{dB/km}$
	Chromatic Dispersion: between 1285 - 1330 nm: at 1550nm	$\leq 3.5 \text{ ps/nm}\cdot\text{km}$ $\leq 18 \text{ ps/nm}\cdot\text{km}$
	Chromatic dispersion coefficient	$\lambda_{\text{omin}}:1300\text{nm}$ $\lambda_{\text{oMax}}:1324\text{nm}$ $S_{\text{omax}}:0.092\text{ps}/(\text{nm}^2\cdot\text{km})$
	Point Discontinuity: at 1310&1550 nm	$\leq 0.1 \text{ dB}$
	Polarization Mode Dispersion (PMD) PMD Q value	$\leq 0.2 \text{ ps}/\sqrt{\text{km}}$ $\leq 0.08 \text{ ps} / \sqrt{\text{km}}$ .
	The optical fiber core and sheath shall be of the E9 / 125 type. The protective cover must be in direct contact with the surface of the optical fiber to protect it and avoid cracking of the optical fiber	E9 / 125 type
	Cable Cut off Wavelength ( $\lambda_{\text{cc}}$ )	$\leq 1260 \text{ nm}$
Geometrical Characteristics	Mode Field Diameter: at 1310 nm at 1550 nm	$9.2 \pm 0.4\mu\text{m}$ $10.4 \pm 0.5\mu\text{m}$
	The uniformity attenuation at any projected wavelength	$\leq 0.1 \text{ dB/km}$
	Cladding Diameter	$125 \pm 1.0\mu\text{m}$
	Mode field (Core/clad) concentricity error	$\leq 0.5 \mu\text{m}$
	Cladding Non-Circularity	$\leq 1\%$
	Coating Diameter	$245 \pm 7\mu\text{m}$
	Core / Cladding Concentricity error	$\leq 0.6\mu\text{m}$

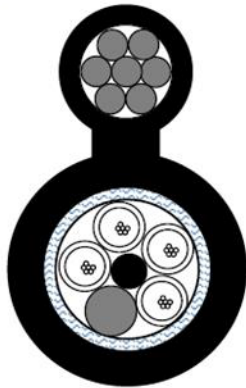
	The increase in attenuation of 100 optical fiber cores wrapped on a 50 mm diameter chuck at 1310 nm: at 1550 nm:	≤0,05 dB; ≤ 0,05 dB
	Coating-Cladding Concentricity error	≤ 12um
	Effective Group Index of Refraction: at 1550 nm	1.4675
	Coating non-circularity The test must be carried out according to IEC/EN 60793-1-21.	≤6%
	Optical fiber shall be able to withstand a strain at minimum 8N for one second. This must correspond to a maximum optical fiber elongation of 1%	minimum 8 N for one second
<b>Environmental Characteristics</b>	Temperature Cycling Induced Attenuation: at 1550nm and 1625 nm (-60°C to +85°C)	0.05dB/km
	Variation of attenuation in the temperature range -40 °C to +65 °C must not exceed: at 1310 nm: at 1550 nm:	0,05 dB/km;
		0,05 dB/km.
	Macro bending Loss: at 1550nm and 1625 nm (100 turns; Φ 60 mm)	≤ 0.1dB

### 3. DRAWING AND DATASHEET OF CABLE

## FIGURE "8" OPTICAL CABLE SPECIFICATION

Cable type: **GYTC8S - 24B1.3**

Cable structure:



Fiber: **24 x G.652D**

Structure Data			
Name		Size	
CABLE	Phosphating steel wire	Dia.	1.5 mm
	PBT	Dia.	2.0/1.4 mm
	No. of fibers	No.	24
	Filler	No.	1
	Jelly		
	Filling compound		
	Thickness of Corrugated Steel Tape		0.25 mm
	Thickness of MDPE Outer sheath		1.6 mm
Messenger	NECK	H*W	2*2 mm
	Galvanized steel wire	7	1.0 mm
	Thickness of MDPE sheath		1.0 mm

Tube/Fibers	4/6
Color of Optical fiber	Blue,Orange,Green,Brown,Grey,White
Color of buffer tube	Blue,Orange,Green,Brown

Diameter of Optical cable( D / L ):	9.7±0.5/16.7±0.5 mm
Weight:	166 kg/km

<b>Tech. Data:</b>	Standard: According to YD/T 1155-2011	
	Features: Water blocking,Moisture proof,Tensile resistant, Crushing resistant	
	Allowable Tension Strength short term	3000 N
	Voltage Resistance of Outer Sheath(measured after putting in water for 24 hours)	15KV/DC/2min
	Water ingress resistance	1meter, 24hours, 3samples
	Minimum bending radius(Dynamic)	20 D
	Minimum bending radius(Static)	10 D
	Life span of Optical cable	≥30 years
<b>TEMP.CAPABILITY</b>	-40℃ ~ +70℃	Δα≤0.05 dB/km

Note: All dimention and data are nominal value

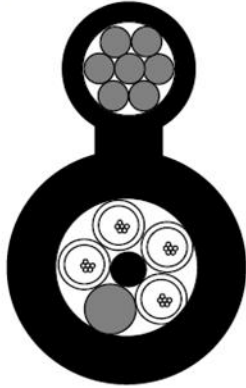
2020/4/7		BJJ
----------	--	-----

## FIGURE "8" OPTICAL CABLE SPECIFICATION

Cable type:

**GYTC8Y - 24B1.3**

Cable structure:



Fiber: **24 x G.652D**

Structure Data			
	Name		Size
CABLE	Phosphating steel wire	Dia.	1.5 mm
	PBT	Dia.	2.0/1.4 mm
	No. of fibers	No.	24
	Filler	No.	1
	Jelly		
	Filling compound		
	Thickness of MDPE Outer sheath		1.6 mm
Messenger	NECK	H*W	2*2 mm
	Galvanized steel wire	7	1.0 mm
	Thickness of MDPE sheath		1.0 mm

Tube/Fibers	4/6
Color of Optical fiber	Blue,Orange,Green,Brown,Grey,White
Color of buffer tube	Blue,Orange,Green,Brown

Diameter of Optical cable( D / L ):	8.7±0.5/15.7±0.5 mm
Weight:	133 kg/km

<b>Tech. Data:</b>	Standard: According to YD/T 1155-2011	
	Features: Water blocking,Moisture proof,Tensile resistant, Crushing resistant	
	Allowable Tension Strength short term	3000 N
	Voltage Resistance of Outer Sheath(measured after putting in water for 24 hours)	15KV/DC/2min
	Water ingress resistance	1meter, 24hours, 3samples
	Minimum bending radius(Dynamic)	20 D
	Minimum bending radius(Static)	10 D
<b>TEMP.CAPABILITY</b>	-40℃ ~ +70℃	
	Life span of Optical cable	≥30 years
		$\Delta\alpha \leq 0.05$ dB/km

**Note:** All dimention and data are nominal value

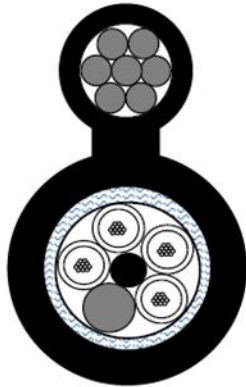
2020/2/12		BJJ
-----------	--	-----

## FIGURE "8" OPTICAL CABLE SPECIFICATION

Cable type:

**GYTC8S - 48B1.3**

Cable structure:



Fiber: **48 x G.652D**

Structure Data			
	Name		Size
CABLE	Phosphating steel wire	Dia.	1.5 mm
	PBT	Dia.	2.0/1.4 mm
	No. of fibers	No.	48
	Filler	No.	1
	Jelly		
	Filling compound		
	Thickness of Corrugated Steel Tape		0.25 mm
	Thickness of MDPE Outer sheath		1.6 mm
Messenger	NECK	H*W	2*2 mm
	Phosphating steel wire	7	1.0 mm
	Thickness of MDPE sheath		1.0 mm

Tube/Fibers	4/12
Color of Optical fiber	Blue, Orange, Green, Brown, Grey, White, Red, Black, Yellow, Violet, Pink, Aqua
Color of buffer tube	Blue, Orange, Green, Brown

Diameter of Optical cable( D / L ):	9.7±0.5/16.7±0.5 mm
Weight:	167.5 kg/km

<b>Tech. Data:</b>	Standard: According to YD/T 1155-2011	
	Features: Water blocking, Moisture proof, Tensile resistant, Crushing resistant	
	Allowable Tension Strength short term	3000 N
	Voltage Resistance of Outer Sheath(measured after putting in water for 24 hours)	15KV DC/2min
	Water ingress resistance	1meter, 24hours, 3samples
	Minimum bending radius(Dynamic)	20 D
	Minimum bending radius(Static)	10 D
Life span of Optical cable	≥30 years	
<b>TEMP.CAPABILITY</b>	-40℃ ~ +70℃ <span style="float: right;">Δα ≤ 0.05 dB/km</span>	

**Note:** All dimension and data are nominal value

2019/6/20	SWQ
-----------	-----

#### 4. COLOR IDENTIFICATION OF FIBER IN CABLE

##### 4.1 Fiber color code

Each fiber will 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.

Fiber	1	2	3	4	5	6
Color	Blue	Orange	Green	Brown	Grey	White
Code	7	8	9	10	11	12
	Red	Black	Yellow	Purple	Pink	Aqua

##### 4.2 Color Codes for Loose Tube

The loose tubes will be identifiable in accordance with the following color sequence. If there are fillers, the color is Black.

Fiber	1	2	3	4	5	6
Color	Blue	Orange	Green	Brown	Grey	White
Code	7	8	9	10	11	12
	Red	Black	Yellow	Violet	Pink	Aqua

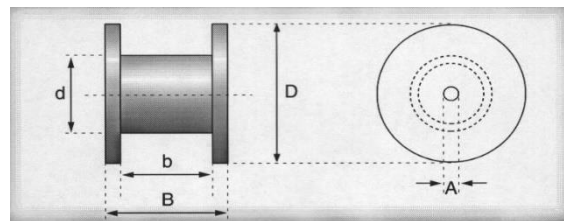
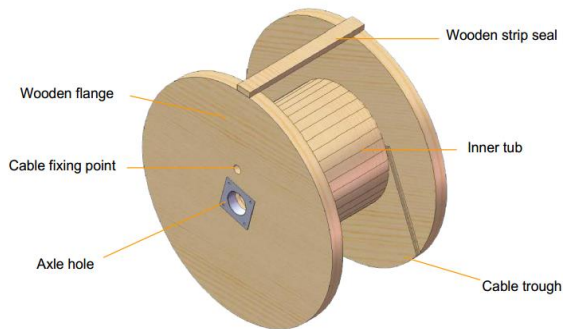
#### 5. CHARACTERISTIC OF OPTICAL CABLE

Optical fiber cable shall be accordance with applicable standard of optical fiber cable and requirement of customer. The following test items shall be carried out according to corresponding reference.

Tests of Completed Optical Fiber Cable		
1	Impact test	IEC-60794
2	Crush test	IEC-60794
3	Water penetration(0.1bar/24h)	≤1m
4	Attenuation test	ITU

## 6. PACKING AND DRUM FOR CABLE

CABLE shall be wound on a non-returnable wooden drum or metal drum. Both ends of CABLE shall be securely fastened to drum and sealed with a shrinkable cap. The required marking shall be printed with a weather-proof material on the outsides of drum according to customer's requirement.



Cable Diameter (mm)	Drum Length (km)	Drum Dimensions & Weights					
		D	b	B	d	A	weight
		m	m	m	m	m	t
9.7/16.7	4	1.5	0.61	0.7	0.6	0.08	0.158
8.7/15.7	4	1.4	0.61	0.7	0.6	0.08	0.144