

# TECHNICAL SPECIFICATION

## 1. GENERAL

### 1.1 Scope

Cable type	Application
All Dielectric Glass Yarns Armored Cable 48 G652D&G655	Duct installation cable

### 1.2 Reference

The following international specifications were used as reference documents for the cables provided by Navigator:

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 60794-3-10	Outdoor cables family specification for duct and directly buried optical telecommunication cable
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
EIA/TIA 598	Color code of fiber optic cables
ANSI/ICEA S-87-640 and Telcordia® GR-20-CORE	

### 1.3 QR Guard™

QR Guard™ is a multifunctional online platform that revolutionizes how distributors and network operators keep tabs on the status of Navigator fiber cables, ensuring efficient operations, accurate record-keeping, and valuable insights for future product development. Providing unique features including:

- Distributor exclusive management interface
- Installation record archiving
- Written guidelines and visual demonstrations

QR Guard™ plays a vital role in mitigating the costly consequences of mishandling while enabling efficient network expansion in response to evolving market demands. Scan the QR code in the bottom left corner to find out more.



## 2. OPTICAL FIBER

ITU-T G.652.D		
Category	Description	Specifications
Optical Specifications	Attenuation @1310 nm (Max.)	0.34 dB/km
	Attenuation @1550 nm (Typical/Max.)	0.20/0.22 dB/km
	Zero Dispersion Wavelength	1300~1324 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>	≤0.20 ps/√km
	PMD individual value	≤0.2ps/√km
	Cable Cutoff Wavelength ( $\lambda_{cc}$ )	≤1260 nm
	Macro bending Loss (100 turns; $\Phi$ 60 mm) @1625 nm	≤ 0.10 dB
	Mode Field Diameter @1310 nm	9.2±0.4 $\mu$ m
Dimensional Specifications	Cladding Diameter	125 ±1 $\mu$ m
	Coating diameter	245 ±10 $\mu$ m
	Core/clad concentricity error	≤0.6 $\mu$ m
	Cladding Non-Circularity	< 1.0%
Mechanical Specifications	Proof stress	≥0.69Gpa



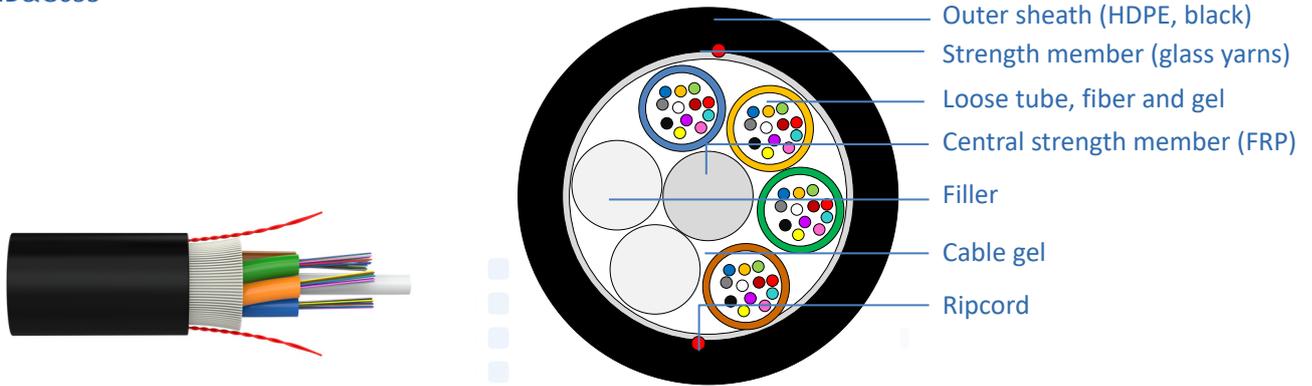
ITU-T G.655		
Category	Description	Specifications
Optical Specifications	Attenuation @1550 nm @1625nm	≤0.21 dB/km ≤0.25 dB/km
	Zero Dispersion Wavelength	1300~1324 nm
	Dispersion coefficient @1530nm~1565nm @1565nm~1620nm	2.0~6.0 ps/(nm·km) 4.5~11.2 ps/(nm·km)
	Zero Dispersion Slope	≤0.092 ps/nm <sup>2</sup> ·km
	PMD	≤0.20 ps/√km
	PMD Link value (M=20cables Q=0.01%) maximum PMDQ	≤0.06ps/√km
	Cable Cutoff Wavelength (λ <sub>cc</sub> )	≤1450 nm
	Mode Field Diameter @1550nm	(8-11)±0.7μm
Dimensional Specifications	Cladding Diameter	125 ±1μm
	Coating diameter	235-260μm
	Core/clad concentricity error	≤0.6μm
	Cladding Non-Circularity	< 2.0%
Mechanical Specifications	Proof stress	≥0.69Gpa



### 3. CABLE STRUCTURE

#### 3.1 Cable type

All Dielectric Glass Yarns Armored Cable 48  
G652D&G655



#### Features & Application

- Small diameter
- Anti animal
- Perfect cable structure
- More environmentally friendly

#### Technical Specifications

	Fiber type	ITU-T G.652.D	ITU-T G.655
Dimensional properties	Fiber count	24	24
	Tube color	Blue & Orange	Green & Brown
	No. of fibers per tube	12	
	Stranding- loose tube No./filler No.	4/2	
	Cable OD – mm(in)	10.3(0.41)	
	Cable weight – kg/km(lb/1000ft)	83(56)	
	Environmental Specifications	Operation temperature range	-40°C to + 70 °C (-40°F to 158°F)
Installation temperature range		-30 °C to + 60 °C (-22°F to 140°F)	
Transport and storage temperature range		-40 °C to + 70 °C (-40°F to 158°F)	
Mechanical Specifications	Max. tensile load (MAT) – N(lb)	Short term 2700(607) Long term 900(202)	
	Crush resistance – N/10cm(lb/in)	1000(57)	
	Minimal installation bending radius	20*D	
	Minimal operation bending radius	10*D	

\*Note: D =cable diameter;



## 4. TEST REQUIREMENTS

### Fiber test standard

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

### Performance testing list

#### 4.1 Tensile strength test

Reference standards	<b>Telcordia® GR-20-CORE 6.5.6 OR IEC 60794-1-21 E1</b>
Sample length	No less than 50 meters
Load	MAT
Duration time	Short term:60 minutes Long term: 10 minutes
Test results	Short term: fiber strain≤0.6%, After test, additional attenuation≤0.05dB Long term: fiber strain≤0.2%, Additional attenuation≤0.05dB No damage to outer jacket and inner elements

#### 4.2 Compressive strength test

Reference standards	<b>Telcordia® GR-20-CORE 6.5.5 OR IEC 60794-1-21 E3</b>
Load	Crush resistance
Duration time	10 minutes
Test number	3
Test results	Additional attenuation ≤0.05dB No damage to outer jacket and inner elements under short term load

#### 4.3 Impact resistance test

Reference standards	<b>Telcordia® GR-20-CORE 6.5.4 OR IEC 60794-1-21 E4</b>
Impact energy	4J
Radius	12.5mm
Impact points	5
Impact number	1



Test result	Additional attenuation $\leq 0.05\text{dB}$
	No damage to outer jacket and inner elements

#### 4.4 Cyclic flexing test

Reference standards	Telcordia® GR-20-CORE 6.5.8 OR IEC 60794-1-21 E6
Bending radius	20*D
Cycles	25 cycles
Load	150N
Test result	Additional attenuation $\leq 0.05\text{dB}$
	No damage to cable elements

#### 4.5 Bend test

Reference standards	Telcordia® GR-20-CORE 6.5.3 OR IEC 60794-1-21 E11
Mandrel diameter	20*D
Turn number	3
Cycles	4
Test result	Additional attenuation $\leq 0.05\text{dB}$
	No damage to outer jacket and inner elements

#### 4.6 Twist test

Reference standards	Telcordia® GR-20-CORE 6.5.7 OR IEC 60794-1-21 E7
Sample length	1m
Angles	$\pm 180$ degree
Load	150N
Cycles	10
Test result	Additional attenuation $\leq 0.05\text{dB}$
	No damage to cable elements

#### 4.7 Abrasion

Reference standards	Telcordia® GR-20-CORE 6.6.6 OR IEC 60794-1-21 E2B
Experiment method	The wool felt should be thoroughly impregnated with water
Frequency	55cycles/min
Load	20N
Cycles	10
Test result	The marking should be legible after test

#### 4.8 Water penetration Test



Reference standards	Telcordia® GR-20-CORE 6.6.7 OR IEC 60794-1-22 F5
Height of water column	1m
Sample length	3m
Test time	24 hours
Test result	No water seepage from the opposite end of the sample

**4.9 Temperature cycling Test**

Reference standards	Telcordia® GR-20-CORE 6.6.3 OR IEC 60794-1-22 F1
Temperature step	+20 °C → -40 °C → +70 °C → +20 °C
Time per each step	12 hours
Cycles	2
Test result	Attenuation variation for reference value (the attenuation to be measured before test at +20±3 °C) ≤ 0.15dB/km

**4.10 Environmental performance**

Test Standard	RoHS
Test result	Pass the test.

Remark: The test wavelength is 1550 nm.

**5. COLOR CODE SCHEME**

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

**6. SHEATH MARKING**

