

TECHNICAL SPECIFICATION

1. General

1.1 Scope

Cable type	Application
Al-Core 48F G652D Al-clad59 OD484	High voltage overhead

1.2 Reference

The cables provided by Navigator® 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
ITU-T G.652	Characteristics of a single-mode optical fiber cable
ITU-T G.655	Characteristics of a non-zero dispersion-shifted single-mode optical fiber and cable
EIA/TIA 598 B	Color code of fiber optic cables
IEC 60794-4-10	Aerial optical cables along electrical power lines – Family specification for OPGW
IEC 60794-1-2	Optical fiber cables-Part 1-2: Generic specification-Basic optical cable test procedures
IEEE1138-2009	IEEE Standard for testing and performance for optical ground wire (OPGW) for use on electric utility power lines
IEC 61232	Aluminum – clad steel wire for electrical purposes
IEC 60104	Aluminum magnesium-silicon alloy wire for overhead line conductors
IEC 61089	Round wire concentric lay overhead electrical stranded conductors

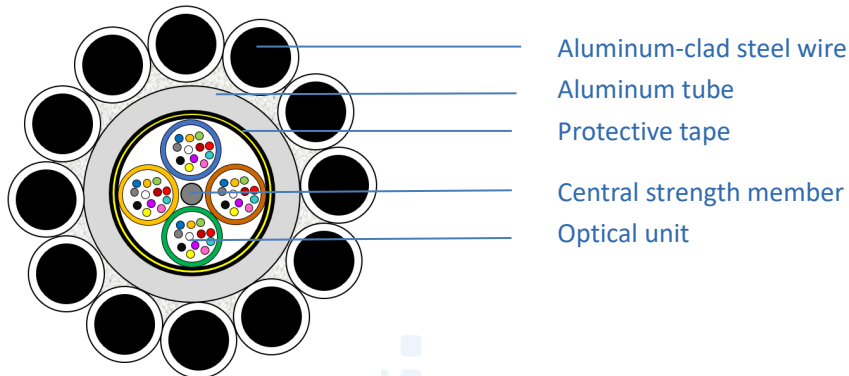
2. OPTICAL FIBER

ITU-T G.652.D		
Category	Description	Specifications
Optical Specifications	Attenuation @1310 nm	≤ 0.36 dB/km
	Attenuation @1550 nm	≤ 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 ² ·km
	PMD _Q	≤ 0.20 ps/√km
	PMD individual value	≤ 0.2 ps/√km
	Cable Cutoff Wavelength (λ_{cc})	≤ 1260 nm
	Macro bending Loss (100 turns; $\Phi 60$ mm) @1625 nm	≤ 0.10 dB
	Mode Field Diameter @1310 nm	$(8.8-9.2) \pm 0.4 \mu\text{m}$
Dimensional Specifications	Cladding Diameter	$125 \pm 0.7 \mu\text{m}$
	Coating diameter	$245 \pm 10 \mu\text{m}$
	Core/clad concentricity error	$\leq 0.6 \mu\text{m}$
	Cladding Non-Circularity	$< 1.0\%$
Mechanical Specifications	Proof stress	≥ 0.69 GPa

3. CABLE STRUCTURE

3.1 Cable type

Al-Core 48F G652D Al-clad59 OD484



Dimensions and Properties

Structure	Position	Type of component	No. of component	Component diameter
	Fiber	G652D	48	
	Center	Al tube	1	7.30mm(0.29in)
	1 st Outer Layer	20.3% Al-clad steel wire	3	2.50mm(0.10in)
		40% Al-clad steel wire	9	2.50mm(0.10in)

Technical Data	Compliant with IEC, IEEE standards				
	Inner layer greased				
	Stranding direction of outer layer is left hand(S-stranding)				
	Cable Diameter	12.30	mm	0.484	in
	Cable Weight	383	kg/km	1,359	lbs/mile
	Total supporting Cross Sectional area	76.12	mm ²	0.12	in ²
	Cross sectional area of Al-clad steel wire	58.90	mm ²	0.09	in ²
	Cross sectional area of Al tube	17.22	mm ²	0.03	in ²
	Rated Tensile Strength (RTS)	47.82	kN	10,750	lbs
	Modulus of Elasticity (E-Modulus)	107.3	kN/mm ²	24,122	kpsi
	Thermal Elongation Coefficient	15.7×10 ⁻⁶	/°C	8.72×10 ⁻⁶	/°F
	Permissible Maximum Working Stress (40% RTS)	251.2	N/mm ²	36,433	psi
	Everyday Stress (EDS) (16%~25% RTS)	100.5 ~ 157	N/mm ²	14,576~22,771	psi
	DC Resistance (25°C)	0.574	Ω/km	0.92	Ω/mile
	Short Time Current (0.5s)	10.3		kA	
	Short Time Current Capacity	53.1		kA ² S	

	(20°C~200°C)				
	Minimum Bending Radius for installation:	246	mm	9.69	in
	Minimum Bending Radius for operation:	184	mm	7.24	in
	Installation	-10°C to +50°C		+14°F to + 122°F	
	Transportation and Operation	-40°C to +85°C		-40 °F to +185 °F	

Note: All Sizes and Values are Nominal Values

Diameter Tolerance: $\pm 1\%$; Weight Tolerance: $\pm 2\%$;

4. COLOR CODE SCHEME

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

5. TEST REQUIREMENTS FOR OPGW

Items	Test Procedure
Test on fibers	
Mode field diameter	IEC 60793-1-45
Geometric parameter	IEC 60793-1-20
Attenuation (OTDR)	IEC 60793-1-40
Chromatic dispersion	IEC 60793-1-42
Cut-off wavelength (cable cut off)	IEC 60793-1-44
Test on wires before stranding	
Diameter	IEC61232/ IEC60104
Tensile strength	IEC61232/ IEC60104
Stress at 1% extension (Only ACS wire)	IEC61232
Elongation at break	IEC61232/ IEC60104
Wrapping test (Only AA wire)	IEC60104
Conductivity	IEC61232/ IEC60104
Thickness of Al-cladding (Only ACS wire)	IEC61232
Torsion test (Only ACS wire)	IEC61232
Tests on OPGW	
Quality of surface	IEC 60794-4-10
Direction of lay outer	IEC 60794-4-10

Lay length	IEC 60794-4-10
Diameter of cable	IEC 60794-4-10
Weight of Cable	IEC 60794-4-10
DC-resistance	IEC 60794-4-10
Breaking strength test	IEC 60794-4-10
Stress Strain Test	IEC 60794-4-10
Tensile performance test	IEC 60794-4-10
Sheave test	IEC 60794-4-10
Aeolian vibration simulation	IEC 60794-4-10
Galloping test	IEC 60794-4-10
Creep test	IEC 60794-4-10
Temperature cycle test	IEC 60794-4-10
Water penetration	IEC 60794-4-10
Short circuit current test	IEC 60794-4-10
Lightning test	IEC 60794-4-10