TECHNICAL SPECIFICATION

1. General

1.1 Scope

Cable type	Application
HX-Core 48F G652D Al-clad108 OD559	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

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2. OPTICAL FIBER

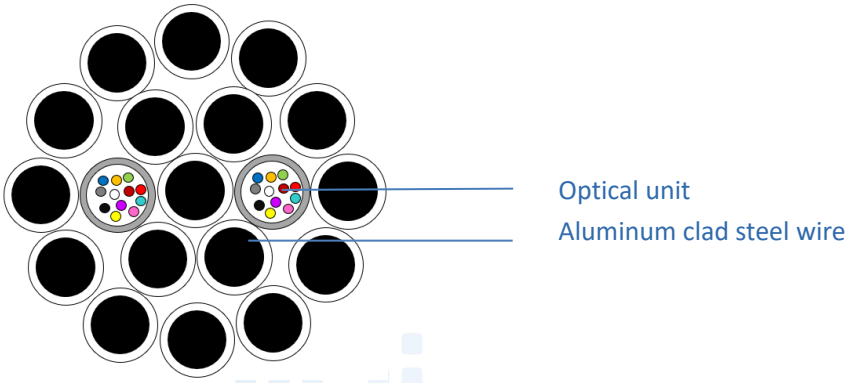
ITU-T G.652.D		
Category	Description	Specifications
Optical Specifications	Attenuation @1310 nm	≤0.36 dB/km
	Attenuation @1550 nm	≤0.22 dB/km
	Zero Dispersion Wavelength	1300~1324 nm
	Chromatic dispersion @1310nm @1550nm @1625nm	≤3.5 ps/(nm·km) ≤18 ps/(nm·km) ≤22 ps/(nm·km)
	Zero Dispersion Slope	≤0.092 ps/nm^2·km
	PMD_Q	≤0.20 ps/√km
	PMD individual value	≤0.2ps/√km
	Cable Cutoff Wavelength (λ_{cc})	≤1260 nm
	Macro bending Loss (100 turns; Φ60 mm) @1625 nm	≤ 0.10 dB
	Mode Field Diameter @1310 nm	(8.8-9.2)±0.4μm
Dimensional Specifications	Cladding Diameter	125 ±0.7μm
	Coating diameter	245 ±10μm
	Core/clad concentricity error	≤0.6μm
	Cladding Non-Circularity	＜1.0%
Mechanical Specifications	Proof stress	≥0.69Gpa

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3. CABLE STRUCTURE

3.1 Cable type

HX-Core 48F G652D Al-clad108 OD559



Dimensions and Properties

	Position	Type of component	No. of component	Component diameter
Structure	Fiber	G652D	48	
	Center	20.3% Al-clad steel wire	1	2.90mm(0.11in)
	1st Outer Layer	20.3% Al-clad steel wire	4	2.80mm(0.11in)
		Stainless steel tube	2	2.70mm(0.11in)
	2nd Outer Layer	40% Al-clad steel wire	12	2.85mm(0.11in)

Technical Data	Compliant with IEC, IEEE standards				
	Inner layer greased				
	Stranding direction of outer layer is left hand(S-stranding)				
	Cable Diameter	14.20	mm	0.559	in
	Cable Weight	599	kg/km	2,125	lbs/mile
	Total supporting Cross Sectional area	107.8	mm^2	0.17	in^2
	Cross sectional area of Al-clad steel wire	107.8	mm^2	0.17	in^2
	Rated Tensile Strength (RTS)	89.2	kN	20,053	lbs
	Modulus of Elasticity (E-Modulus)	124.4	kN/mm^2	18,043	kpsi
	Thermal Elongation Coefficient	14.6×10^{-6}	/°C	8.11×10^{-6}	/°F
	Permissible Maximum Working Stress (40% RTS)	331.1	N/mm^2	48,022	psi
	Everyday Stress（EDS) (16%~25% RTS)	132.4 ~ 206.9	N/mm^2	19,203~30,008	psi
	DC Resistance	0.483	Ω/km	0.78	Ω/mile
	Short Time Current (1s, 40°C~200°C)	9.0		kA	
	Short Time Current Capacity	81.0		kA^2S	

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	Minimum Bending Radius for installation：	284	mm	11.18	in
	Minimum Bending Radius for operation：	213	mm	8.39	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: ±1%； Weight Tolerance: ±2%；

4. COLOR CODE SCHEME

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

Note: Tracers are added to differentiate the fibers when there are 13 or more.

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

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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

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