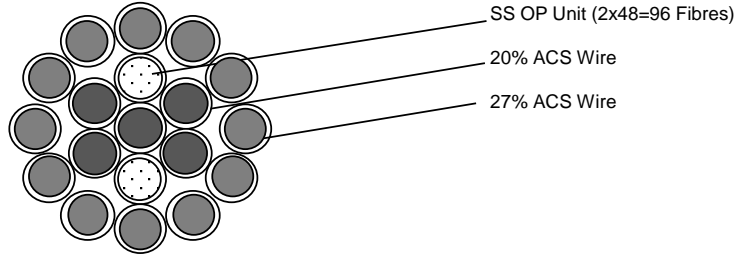
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Cable Type: **OPGW - 2S 2x48SM (AA/ACS 0/145 -109,8 )**

Cross Section:




**ITU-T G.652D (2x48=96) Fibers**

Structure:	Fiber	Material	No	Material	No.	Material Dia.
		Center	G.652D ACS wire	96		
	Layer1	ACS wire	4	AA wire	0	Diameter 3,30 mm
		SS Tube	2	Fibers(single tube)	48	Tube-Dia. 3,30 mm
	Layer2	ACS wire	12	AA wire	0	Diameter 3,30 mm

<b>Technical Data:</b>	According to IEC60794-4, IEEE-1138 standards	
	Stranding direction of outer layer is right hand (Z-stranding)	
	Stranded: Core and layer1 greased	No
	Cable Diameter	16,5 mm
	Cable Weight (Approx.)	942 kg/km
	Supporting Cross Section	145,4 mm <sup>2</sup>
	Section of ACS Wire	145,4 mm <sup>2</sup>
	Rated Tensile Strength (RTS)	150,2 kN
	Modulus of Elasticity (E-Modulus)	146,5 kN/mm <sup>2</sup>
	E.A. Value (E-Module x Load bearing cross-section)	21297 kN
	Thermal Elongation Coefficient	13,27 10 <sup>-6</sup> /°C
	Permissible Maximum Working Stress ( 42% RTS )	63,1 kN 433,8 N/mm <sup>2</sup>
	Everyday Stress ( EDS) ( 20% RTS )	30,0 kN 206,6 N/mm <sup>2</sup>
	Ultimate Exceptional Stress ( 72% RTS )	108,1 kN 743,7 N/mm <sup>2</sup>
	Max. DC Resistance at 20°C	0,472 Ω /km
	Short Time Current (0,5s, 40°C~180°C)	14,8 kA
	Short Time Current Capacity I <sup>2</sup> t ( 40°C~180°C)	109,8 kA <sup>2</sup> s
	Minimum Bending Radius Installation	330 mm
	Minimum Bending Radius Operation	247 mm
	Ratio of RTS to weight	16,2 km
<b>Temperature Range:</b>	Installation	-10°C ~ +50 °C
	Transportation and Operation	-40°C ~ +80 °C

Remarks: All Sizes and Values are Nominal Values

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### Fiber Specification:

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:

#### G.652D Fiber in cable

Category	Description	Specifications	
		Before cabling	After cabling
Optical Specifications	Attenuation @1310 nm	≤0.34 dB/km	≤0.36 dB/km
	Attenuation @1383 nm	≤0.33 dB/km	≤0.35 dB/km
	Attenuation @1550 nm	≤0.20 dB/km	≤0.23 dB/km
	Attenuation @1625 nm	≤0.23dB/km	≤0.25 dB/km
	Zero Dispersion Wavelength	1300~1324 nm	
	Zero Dispersion Slope	≤ 0.092 ps/nm <sup>2</sup> ·km	
	PMD Link value (M=20cables Q=0.01% ) maximum PMD <sub>Q</sub>	0.1 ps/√km	
	Cable Cutoff Wavelength (λ <sub>cc</sub> )	≤1260 nm	
	Macro bending Loss (100 turns; Φ50 mm) @1550 nm (100 turns; Φ50 mm) @1625 nm	≤ 0.05 dB ≤ 0.10 dB	
	Mode Field Diameter @1310 nm	9.2±0.4μm	
Dimensional Specifications	Cladding Diameter	125 ±0.7μm	
	Core/clad concentricity error	≤0.5μm	
	Cladding Non-Circularity	≤1.0%	
Mechanical Specifications	Proof stress	≥0.69Gpa	

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**Colour Coding System  
for 2x48=96 G.652D Optical Fibres acc. to IEC 60794**

**SS Tube1:**

SS Tube1: Identification of SS Tube 1 from SS Tube 2 should be done by black colored fiber.

**Fiber 1 to Fiber 12 :**

Blue, Orange, Green, Brown, Grey, White, Red  
Black, Yellow, Violet, Pink and Aqua

**Fiber 13 to Fiber 24 (\*) :**

Same base color but with one black ring mark at regular interval.

**Fiber 25 to Fiber 36 (\*) :**

Same base color but with two black ring marks at regular interval.

**Fiber 37 to Fiber 48 (\*) :**

Same base color but with three black ring marks at regular interval.

(\*) : Naturel fiber with one ring marking instead of black fiber.

**SS Tube2:**

G.652D

**Fiber 1 to Fiber 12 :**

Blue, Orange, Green, Brown, Grey, White, Red  
Natural, Yellow, Violet, Pink and Aqua

**Fiber 13 to Fiber 24 :**


Same base color but with one black ring mark at regular interval.

**Fiber 25 to Fiber 36 :**

Same base color but with two black ring marks at regular interval.

**Fiber 37 to Fiber 48 :**

Same base color but with three black ring marks at regular interval.

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## TEST REQUIREMENTS FOR OPGW

### General

There are different test series to assure the quality of OPGW:

- Routine test (in-process testing according to internal quality plan)
- Factory acceptance test (FAT, witnessed by customer)
- Type test (only in case of a basic new design, repetition in exceptional cases)

OPGW tests shall be in accordance with applicable standards or agreements between purchaser and manufacturer.

As a general rule the tests will be performed according IEC 60794-4-10. However, if necessary tests can be done according to IEEE Std1138.

### **Type test**

Type test may be waived by submitting maker's certificate of the similar product performed in an internationally acknowledged independent test organization or laboratory. If type test should be performed, it will be carried out according to an extra type test procedure reached to an agreement between purchaser and manufacturer.

### **Routine test**


The optical attenuation coefficient on all production cable lengths is measured according to IEC 60793-1-C1C (Back-scattering technique, OTDR). Standard single-mode fibers are measured at 1310nm and at 1550nm. Non-zero dispersion shifted single-mode (NZDS) fibers are measured at 1550nm.

### **Factory test**

Factory acceptance test is carried out on one sample per order in the presence of the customer or his representative. The requirements for quality characteristics are determined by relevant standards and agreed quality plans.

### **Test items**

The following table shows that the test items shall be carried out according to corresponding references.

	<b>OPGW Cable Specifications</b>			<b>Serial No:</b> HC2018-05-011
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	Routine	FAT	Type Test	Test Procedure
<b>Test on fibers</b>				
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
<b>Test on wires before stranding</b>				
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/ IEC60104
Torsion test (Only ACS wire)	●	●		IEC61232
<b>Tests on OPGW</b>				
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

**Notes: The mark "●" means different test items which belongs to different test series.**