

All-Dielectric Self-Supporting Fiber Cable

OptoWire AS-S

Fiber count	KN	FRP
4 – 144 FO	3-9 KN	1

Description

All-Dielectric Self-Supporting Fiber Cable, suitable for wall, pole and duct installation.

1.1 Scope

This listed specification covers the design requirements and performance standard for the supply of optical fiber cable in the industry. It also includes Optowire premium designed cable with optical, mechanical and geometrical characteristics

1.2 Cable name

OptoWire AS-S (4-144) FO (3-9) KN

1.3 Cable description

OptoWire cable possesses high tensile strength and flexibility in compact cable sizes. At the same time, it provides excellent optical transmission and physical performance..

1.4 Quality

Excellent quality control is achieved through intense in-house quality check and stringent audit acceptance by ISO 9001.

1.5 Reliability

Initial and periodic product qualification tests for performance and durability are performed rigorously to ensure product reliability.

1.6 Reference

The cable which OptoWire offered are designed, manufactured and tested according to international standards as follows:

IEC 60793-1	Optical fiber Part 1: Generic specifications
IEC 60793-2	Optical fiber Part 2: Product specifications
IEC 60794-4	Optical fiber cables-Part 4-20: Aerial optical cables along electrical power lines- Family specification for ADSS(All Dielectric Self Supported) optical cables
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-C	Color code of fiber optic cables

2. Optical Fiber

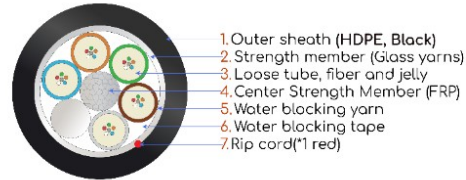
The optical fiber is made of high pure silica and germanium doped silica. UV curable acrylate material is applied over fiber cladding as optical fiber primary protective coating. The detail data of optical fiber performance are shown in the following table.

G. 652D

Category	Description	Specifications
		After cabling
Optical Specifications	Attenuation @1310nm	≤0.38 dB/km
	Attenuation @1550 nm	≤0.25 dB/km
	Dispersion @1310nm	≤3.5 ps/nm·km
	Dispersion @1550nm	≤18.0 ps/nm·km
	Zero Dispersion Wavelength	1300~1324 nm
	Zero Dispersion Slope	≤0.092 ps/nm ² ·km
	Cable Cutoff Wavelength (λ_{cc})	≤1260 nm
	Macro bending Loss (100 turns; Φ 60 mm) @1550nm (100 turns; Φ 60mm) @1625 nm	≤ 0.05 dB ≤ 0.1 dB
	Mode Field Diameter @1310 nm	9.2±0.4 μ m
Dimensional Specifications	Cladding Diameter	125±1 μ m
	Coating diameter	245±10 μ m
	Core/cladding concentricity error	≤0.6 μ m
	Cladding Non-Circularity	≤1.0 %
Mechanical Specifications	Proof stress	≥0.69Gpa

3. Cable structure

OptoWire AS-S 4-144 FO 3-4.5 KN



Dimension and Properties:

Physical	Fiber count	4	8	12	16	24	36	48	60	72	96	144	
	No of loose tube / filler	1/5	2/4	3/3	4/2	6/0	3/3	8/0	5/1	6/0	8/0.	12/0	
	Fiber No. per tube	4	4	4	4	4	12	6	12	12	12	12	
	Loose tube diameter	1.8 mm±0.1					2.2mm±0.1						
	FRP diameter	2.0mm±0.1					2.4 mm±0.1			3.3 mm±0.1			
	Outer sheath thickness	Nominal 1.6mm											
	Cable OD	9.7 mm±5%					10.9 mm±5%			12.1 mm±5%		15.2mm±5%	
	Cable weight	74kg/km±15%					93kg/km±15%			120kg/km±15%		180kg/km±15%	
	Operation temperature range	-20 deg C to + 60 deg C											
	Installation temperature range	-5 deg C to + 60 deg C											
	Transport and storage temperature range	-20 deg C to + 60 deg C											
Mechanical	RTS	5KN					7.5KN						
	MAT	3KN					4.5KN						
	MOT	1.4KN					2.2KN						
	Crush resistance	1000 N/10cm											
	Minimal installation bending radius	20D											
	Minimal operation bending radius	10D											

Color code scheme:

No.	1	2	3	4	5	6	7	8	9	10	11	12
Fiber color	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua
Tube color	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua

Notes: from 13 to 24 fiber colors are same with black tracer, instead of 20 fiber is with white tracer

Remark: (1-144) FO wind speed 25m/s, ice thickness 15mm, installed sag 1.0%, span 80m.

3. Cable structure

OptoWire AS-S 4-144 FO 4-5.5 KN



Dimension and Properties:

Physical	Fiber count	4	8	12	16	24	36	48	60	72	96	144	
	No of loose tube / filler	1/5	2/4	3/3	4/2	6/0	3/3	8/0	5/1	6/0	8/0.	12/0	
	Fiber No. per tube	4	4	4	4	4	12	6	12	12	12	12	
	Loose tube diameter	2.0 mm±0.1					2.2 mm±0.1						
	FRP diameter	2.2mm±0.1					2.4mm±0.1			3.3 mm±0.1			
	Outer sheath thickness	Nominal 1.6mm										Nominal 1.7mm	
	Cable OD	10.4 mm±5%					11.1 mm±5%			12.5 mm±5%		15.4 mm±5%	
	Cable weight	85kg/km±15%					95kg/km±15%			130kg/km±15%		190kg/km±15%	
	Operation temperature range	-20 deg C to + 60 deg C											
	Installation temperature range	-5 deg C to + 60 deg C											
	Transport and storage temperature range	-20 deg C to + 60 deg C											
Mechanical	RTS	7.5KN									10KN		
	MAT	4KN									5.5KN		
	MOT	2.5KN									3KN		
	Crush resistance	1000 N/10cm											
	Minimal installation bending radius	20D											
	Minimal operation bending radius	10D											

Color code scheme:

No.	1	2	3	4	5	6	7	8	9	10	11	12
Fiber color	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua
Tube color	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua

Notes: from 13 to 24 fiber colors are same with black tracer, instead of 20 fiber is with white tracer

Remark: (1-144) FO wind speed 25m/s, ice thickness 15mm, installed sag 1.0%, span 100m.

3. Cable structure

OptoWire AS-S 4-144 FO 8-9 KN



Dimension and Properties:

Physical	Fiber count	4	8	12	16	24	36	48	60	72	96	144			
	No of loose tube / filler	1/5	2/4	3/3	4/2	6/0	3/3	8/0	5/1	6/0	8/0.	12/0			
	Fiber No. per tube	4	4	4	4	4	12	6	12	12	12	12			
	Loose tube diameter	2.0 mm±0.1						2.2 mm±0.1							
	FRP diameter	2.2mm±0.1						2.4mm±0.1			3.3/3.8		3.3/6.7		
	Outer sheath thickness	Nominal 1.6													
	Cable OD	11.1±5%						11.5±5%				12.6±5%		15.2±5%	
	Cable weight	95 kg/km	97 kg/km	98 kg/km	100 kg/km	103 kg/km	117 kg/km	119 kg/km	120 kg/km	123 kg/km	155kg/km		220kg/km		
	Operation temperature range	-40 deg C to + 70 deg C													
	Installation temperature range	-5 deg C to + 60 deg C													
	Transport and storage temperature range	-40 deg C to + 70 deg C													
Mechanical	RTS	12KN						15KN							
	MAT	8KN						9KN							
	MOT	3.4KN						3.7KN							
	Crush resistance	1000N/100mm													
	Minimal installation bending radius	20D													
	Minimal operation bending radius	10D													

Color code scheme:

No.	1	2	3	4	5	6	7	8	9	10	11	12
Fiber color	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua
Tube color	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua

Notes: from 13 to 24 fiber colors are same with black tracer, instead of 20 fiber is with white tracer

Remark: (1-144) FO wind speed 25m/s, ice thickness 15mm, installed sag 1.0%, span 130m.

4. Test Requirements

Approved by various professional optical and communication product institution, OptoWire also conduct various in-house testing in its own Laboratory and Test Center. OptoWire also conduct test with special arrangement with the Chinese Government Ministry of Quality Supervision & Inspection Center of Optical Communication Products (QSICO). OptoWire possess the technology to keep its fiber attenuation loss within Industry Standards.

The cable is in accordance with applicable standard of cable and requirement of customer. The following test items are carried out according to corresponding reference.

Routine tests of optical fiber	
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

4.1 Tension Loading test	
Test Standard	IEC 60794-1-2 E1
Sample length	No less than 50 meters
Load	Max.Tension load
Duration time	1 minute
Test results	Additional attenuation is reversible
	No damage to outer jacket and inner elements

4.2 Crush/Compression Test	
Test Standard	IEC 60794-1-2 E3
Load	1000N/10cm
Duration time	1 minute
Test number	3
Test results	Additional attenuation:≤0.1dB
	No damage to outer jacket and inner elements

4.3 Impact Resistance Test	
Test Standard	IEC 60794-1-2 E4
Impact energy	1J
Radius	300mm
Impact points	3
Impact number	1
Test result	Additional attenuation: ≤0.1dB
	No damage to outer jacket and inner elements

4.4 Repeated Bending Test	
Test Standard	IEC 60794-1-2 E6
Bending radius	20 X diameter of cable
Cycles	25 cycles
Test result	Additional attenuation: ≤0.1dB
	No damage to outer jacket and inner elements

4.5 Torsion/Twist Test	
Test Standard	IEC 60794-1-2 E7
Sample length	2m
Angles	±180 degree
cycles	10
Test result	After test, change of attenuation: ≤0.1dB/km
	No damage to outer jacket and inner elements

4.6 Bend Test	
Test Standard	IEC 60794-1-2 E11A
Mandrel radius	20D
Turn number	4
Number of cycles	3
Test result	After test, change of attenuation: ≤0.1dB/km
	No damage to outer jacket and inner elements

4.7 Temperature cycling Test	
Test Standard	IEC 60794-1-2 F1
Temperature step	-20°C→+60°C
Time per each step	4 hrs
Cycles	2
Test result	Change of attenuation:≤0.15dB/km

4.8 Water penetration Test	
Test Standard	IEC 60794-1-2 F5
Height of water column	1m
Sample length	3m
Test time	24 hrs
Test result	No water leakage from the opposite of the sample

5. Packing and Drum

5.1 OptoWire cables are coiled on bake lite, wooden or ironwood drum. During transportation, right tools should be used to avoid damaging the package and to handle with ease. Cables should be protected from moisture; kept away from high temperature and fire sparks; protected from over bending and crushing; protected from mechanical stress and damage.

Plywood		
OptoWire Cable	D*d*B cm (weights kg) D: including seal plate thickness	
Length Type	4Km/reel	
OptoWire AS-S(4-144)FO-(3-4.5)KN	4~24F	1.15*0.71, cylinder 0.5
	36~72F	1.25*0.71, cylinder 0.58
	96F	1.25*1.1 cylinder 0.76
	144F	1.7*0.71, cylinder 0.76
OptoWire AS-S(4-144)FO-(4-5.5)KN	4~24F	1.15*0.71, cylinder 0.5
	36~72F	1.25*0.71, cylinder 0.58
	96F	1.5*0.71. cylinder 0.7
	144F	1.7*0.71, cylinder 0.76
OptoWire AS-S(4-144)FO-(8-9)KN	4~24F	1.25*0.71, cylinder 0.58
	36~72F	1.25*1.1 cylinder 0.76
	96F	1.50*0.71 cylinder 0.7
	144F	1.80*1.1 cylinder 1

5.2 The color of cable marking is black or other colors. (The printing shall be carried out at interval of 1 meter on the outer sheath of cable) The inner end of cable is then sealed with heat shrinkable end cap to prevent ingress of water and is made available for testing. The outer end of cable is equipped with heat shrinkable end cap. Outer sheath marking legend can be changed according to user's requests.

5.3 Outdoor cable packing Bakelite, wooden or ironwood drum. Strong wooden batten protection