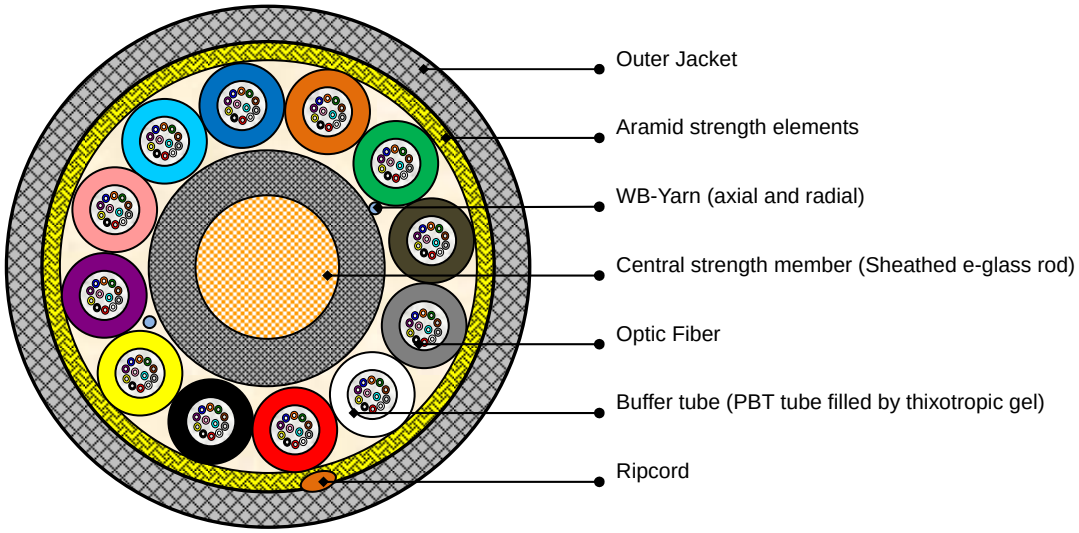
All-Dielectric Self Supporting (ADSS) Aerial Loose Tube Fiber Optic Cable

Power Guide® Short Span Dry Core Design



Version illustrated is the 144 Fibre Cable

Features

- Easily strippable sheath for quick, convenient cable preparation
- Dry Core Design – Cable core water blocked by means of dry "water swellable" technology - for quicker, cleaner cable prep for jointing
- Individual coloured tubes

Fibre Count	Tubes	Core Design	Outer Diameter [mm]	Cable Weight [kg/km]	Max Span [m]	Cable MRCL [kg]	Cable RBS [kg]	AT-Code*
144	12 (12F)	1+12 (0 Filler)	$14.8^{+/-0,2}$	175	70	448	1156	AT-[ ][ ][ ]17UT-144-CMEA

This table shows nominal diameter and weight values which may differ in shipments.
*Please refer to the OFS AT- Code. The blanks specify the fibre type.

Identification

Tube and Fibre Colour Code:

1	Blue	2	Orange	3	Green	4	Brown	5	Grey	6	White
7	Red	8	Black	9	Yellow	10	Violet	11	Rose	12	Aqua

Alternative tube and fibre colour code available on request

Sheath Marking:

OFS OPTICAL CABLE [ID] [MM/YYYY] [Handset Sign] xxxF [Meter Marking]

Alternative sheath printing available on request.
In case of order the exact sheath printing text will be clarified with the customer.

Marking color is WHITE. In the event of a reprint being required, then this will be in YELLOW.
Cable ends are sealed by thermoplastic cap.
Internal cable end is available for testing by customer.

Mechanical Properties and Environmental Behaviour

Tests according **IEC 60794**

	Parameter	Requirement	Value
Tensile Performance: IEC 60794-1-2-E1A and E1B	Long term load	– No attenuation increase* – No fibre strain	Load: 153 kg
	Short term load, during installation	– No changes in attenuation before versus after load – Max. fibre strain 0.3%	Load: 448 kg
Crush Performance: IEC 60794-1-2-E3	Long term load	– No attenuation increase*	Load (Plate/Plate): 2000 N
	Short term load	– No changes in attenuation before versus after load – No damage**	Load (Plate/Plate): 3000 N
Impact Performance: IEC 60794-1-2-E4	3 Impacts; 500 mm apart Anvil: R = 300 mm	– No changes in attenuation before versus after load – No damage**	Load: 10 J
Bending Performance: IEC 60794-1-2-E11	Handling fixed installed During installation (under Load)	– No attenuation increase* – No changes in attenuation before versus after load	Bend radius: 15 x D Bend radius: 20 x D *D is cable diameter*
Temperatures: IEC 60794-1-2-F1	Operation Installation Storage/Shipping	– No attenuation increase*	-40 to +70°C -30 to +60°C -40 to +70°C

* No changes in attenuation means that any changes in measurement value, either positive or negative within the uncertainty of measurement shall be ignored. The total uncertainty of measurement shall be less than of equal to 0.05 dB.
**Mechanical damage – when examined visually without magnification, there shall be no evidence of damage to the sheath. The imprint of plates will not be considered as damage.

Power Guide® Short Span Dry Core Cable Ordering Information

Example: AT-[ ][ ][ ]17UT-NNN[1]

	Fiber[2]		*Sheath*	*Core*	*Fiber Count*		
Part Number: AT -	***S1***	***S2***	***SF***	***S3***	***S4***	***S5***	***S6***	-	N	N	N

S1 = ***Fiber Selection***
3 =1310/1550 nm (AllWave® One ZWP Fiber)
6 =1550 nm (TrueWave® RS LWP Fiber)
R =850/1300 nm (Multimode Fiber)

S2 = ***Fiber Transmission Performance***
F =0.33/0.31/0.25/0.19/0.20 dB/km @ 1310/1385/1490/1550/1625 nm (AllWave One ZWP)
2 =0.25 dB/km @ 1550 nm (TrueWave RS LWP)
U =3.4/1.0 dB/km and 200/500 MHz-km @ 850/1300 nm (62.5 µm Multimode)
K =2.5/0.7 dB/km and 500/500 MHz-km @ 850/1300 nm (50 µm Multimode)

SF = ***Fiber Type[2]***
E = AllWave ZWP
6 = TrueWave RS LWP
9 =62.5/125 µm Multimode
2 =50/125 µm Multimode

S3 = ***Sheath Construction***
1 = Single Jacket ADSS

S4 = ***Tensile Load***
7 = PowerGuide Cable

S5 = ***Core Type***
U = 2.3 mm Gel-filled Buffer Tubes

S6 = ***Fibers per Tube***
2 = 2 fibers
4 = 4 fibers
6 = 6 fibers
8 = 8 fibers
N = 10 fibers
T = 12 fibers

NNN = ***Fiber Count***
= 002 – 288

1 Part Number shown is for standard AllWave One ZWP attenuation and standard cable print:
Maximum AllWave One ZWP attenuation: 0.33/0.31/0.25/0.19/0.20 dB/km @ 1310/1385/1490/1550/1625 nm

2 Contact OFS Order Management for information on other cable variations, including additional fi ber types, attenuation, and custom cable print.

Product Description: AT-XXX17UT-144-CMEA - Maximum Span 70 m

Loading Conditions: NESC HEAVY

Ice Thickness	12,7 mm
Wind Pressure	192 N/m^2 (63,6 km/hr)
Temperature	-17,8 C
Safety Factor	4,38 N/m

Tension @ Maximum Span for 1 % Installation Sag

Short Term	448 kg
Long Term	153 kg

Specifications:

Maximum Span	70 m
Cable Weight	0,175 kg/m
Cable Diameter	14,8 mm
Installation Temp	20 C
Cable Modulus	447,6 kg/mm^2
Linear Expansion Coefficient	0,00001519 1 / C
Estimated Break Load	1156 kg

No Loading @ Install Temperature: 20 C				**All Loading Conditions @ Temperature: -17,8 C**				
Span	Sag	Install Sag	Tension	Vertical Sag	Tension	Vertical Sag	Horizontal Sag	Angle
m	m	%	kg	% of Span	kg	m	m	Deg
10	0,1	1,00	22	1,6	121	0,2	0,1	34
30	0,3	1,00	66	2,3	250	0,7	0,5	34
50	0,5	1,00	109	2,7	354	1,4	0,9	34
70	0,7	1,00	153	3,0	448	2,1	1,4	34

AllWave® + Fibre

Zero Water Peak

The industry's first zero water peak single-mode fibre for reliable full-spectrum performance + enhanced bend performance.

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Overview

AllWave®+ Zero Water Peak (ZWP) Single-Mode Optical Fibre improves performance for optical transmission systems operating over any part of the entire wavelength range from 1260 nm to 1625 nm compared with conventional single-mode fibre. AllWave+ Fibre offers the exceptional performance of our AllWave Fibre specifications along with a 40% smaller minimum bend radius, a 50% lower bend loss and a 33% improved polarization mode dispersion (PMD) link design value. AllWave+ Fibre intermixes seamlessly with the installed base of single-mode fibres with a nominal mode field diameter of 9.2 µm.

Product Description

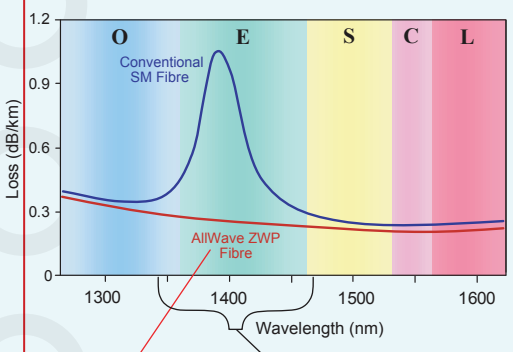
AllWave+ Fibre is a combination ITU-T G.652.D and G.657.A1 compliant fibre ideally designed for use in backhaul, metropolitan, and FTTX networks. Developed and manufactured by OFS, AllWave+ Fibre provides low and stable loss performance in the 1360 – 1460 nm E-band; plus it offers reduced bending loss to improve performance for applications operating in the bend-sensitive 1460 – 1625 nm S, C, and L bands. Its bending performance is far superior to the G.652.D Recommendation and compliant to the G.657.A1 Recommendation, supporting a minimum bend radius of 10 mm and lower bend loss than conventional single-mode fibres. This low bending loss provides improved performance and service reliability and helps to reduce the size of cables and terminals for lower cost installations. AllWave+ Fibre also has the same 9.2 micron mode field (light carrying) diameter of the installed base of single-mode fibres, such as AllWave Fibre, which enables seamless splicing, testing, and faster network turn-up.

With a composition of high purity synthetic silica throughout both the core and cladding, AllWave+ Fibre has stable and permanent low loss and mechanical reliability. OFS' patented ZWP fibre manufacturing process, which eliminates the hydrogen-aging defects, provides a 50% increase in usable spectrum compared to G.652.A and G.652.B fibre. What's more, its ultra-low PMD enables speed and distance upgrades. AllWave+ Fibre offers dramatically improved performance in almost every characteristic over conventional single-mode fibre and is fully backward compatible to any G.652 compliant single-mode fibre.

Features/Benefits:

- Low optical loss across the entire spectrum from 1260 – 1625 nm
- Lower bending loss for improved performance and service reliability, and to help reduce the size of cables and terminals
- A 9.2 micron nominal mode field diameter to facilitate splicing and testing
- Geometric control at the industry's tightest level for ultra-low splice loss and improved connector performance
- Low, stable loss performance in the 1360 – 1460 nm E-band, enabling 16-channel CWDM, DWDM, and FTTX support on a single fibre
- Comprised of high purity synthetic silica for long-term attenuation stability and mechanical reliability
- Ultra-low fibre PMD allows for speed and distance upgrades

Compatible with Conventional Single-Mode Fibre, but with More Available Spectrum



AllWave ZWP Fibre has lower & stable loss throughout by removing the water peak defect

AllWave ZWP Fibre has over 100 nm MORE spectrum

AllWave ZWP Fibre provides up to 22.5% lower attenuation and longer range compared to "enhanced" or Low Water Peak (LWP) fibres

Applications

AllWave+ Fibre provides outstanding cable performance and design freedom for fibre management systems in:

- FTTX
- Local access
- Mobile backhaul
- Metro access
- Metro edge
- Campus backbones
- Long haul

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For additional information please contact your sales representative.

You can also visit our website at: www.ofsoptics.com/ofs-fiber or call 1-888-fiberhelp (from inside the USA). For regional assistance, contact the global location closest to you.

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FURUKAWA ELECTRIC GROUP

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Product Specifications

Physical Characteristics

Clad Diameter	125.0 ± 0.7 µm
Clad Non-Circularity	≤ 0.7 %
Core/Clad Concentricity Error (Offset)	≤ 0.5 µm, < 0.2 µm typically
Coating Diameter (Natural)	235 - 245 µm
Coating-Clad Concentricity Error (Offset)	≤ 12 µm
Tensile Proof Test *(Other proof test levels available on request)*	100 kpsi (0.69 GPa)
Coating Strip Force	Range: 1.0 N ≤ CSF ≤ 9.0 N
Standard Reel Lengths	Up to 50.4 km (31.3 miles)

Optical Characteristics

Attenuation	Maximum	Typical
at 1310 nm	≤ 0.34 dB/km	≤ 0.32 dB/km
at 1385 nm	≤ 0.31 dB/km	≤ 0.28 dB/km
at 1490 nm	≤ 0.24 dB/km	≤ 0.21 dB/km
at 1550 nm	≤ 0.21 dB/km	≤ 0.19 dB/km
at 1625 nm	≤ 0.24 dB/km	≤ 0.20 dB/km

Attenuation vs. Wavelength

Range (nm)	Reference (nm) λ	α
1285 – 1330	1310	0.03
1360 – 1480	1385	0.04
1525 – 1575	1550	0.02
1460 – 1625	1550	0.04

The attenuation in a given wavelength range does not exceed the attenuation of the reference wavelength (λ) by more than the value α .

Attenuation Uniformity / Point Discontinuities at 1310 nm and 1550 nm	≤ 0.05 dB

Macrobending Attenuation:

The maximum attenuation with bending does not exceed the specified values under the following deployment conditions:

Deployment Condition	Wavelength	Induced Attenuation
1 turn on a 10 mm radius mandrel	1550 nm	≤ 0.75 dB
	1625 nm	≤ 1.50 dB
10 turns on a 15 mm radius mandrel	1550 nm	≤ 0.25 dB
	1625 nm	≤ 1.00 dB
100 turns on a 30 mm radius mandrel	1550 nm	≤ 0.03 dB
	1625 nm	≤ 0.03 dB

Chromatic Dispersion	
Zero Dispersion Wavelength (λ_0)	1300 – 1322 nm
Zero Dispersion Slope (S_0)	≤ 0.090 ps/nm^2-km
Typical Dispersion Slope	0.087 ps/nm^2-km
Group Refractive Index	
at 1310 nm	1.467
at 1550 nm	1.468
Mode Field Diameter	
at 1310 nm	9.2 ± 0.4 µm
at 1550 nm	10.4 ± 0.5 µm
Cut-off Wavelength (λ_{cc})	≤ 1260 nm
Polarization Mode Dispersion (PMD)[1]	
Fibre PMD Link Design Value (LDV)[2]	< 0.04 ps/$\sqrt{km}$
Maximum Individual Fibre	< 0.1 ps/$\sqrt{km}$
Typical Fibre LMC PMD	< 0.02 ps/$\sqrt{km}$

[1] As measured with low mode coupling (LMC) technique in fibre form, value may change when cabled. Check with your cable manufacturer for specific PMD limits in cable form.
[2] The PMD Link Design Value complies with IEC 60794-3, September 2001 (N = 20, Q = 0.01%). Details are described in IEC 61282-3 TR Ed 2, October 2006.

Environmental Characteristics (at 1310, 1550 & 1625 nm)

Temperature Cycling (-60º + 85º C)	≤ 0.05 dB/km
High Temperature Aging (85 ± 2º C)	≤ 0.05 dB/km
Temperature & Humidity Cycling (at -10º C to +85º C and 85 to ~98% RH)	≤ 0.05 dB/km
Water Immersion (23 ± 2º C)	≤ 0.05 dB/km