

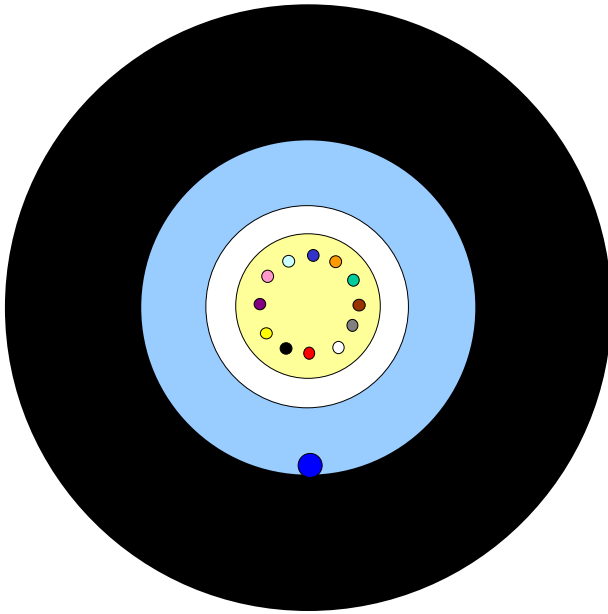
Central Loose Tube Fiber Optic Indoor/Outdoor Cable

All Dielectric Design



Standard Monotube SAFE

Issue May 2018
according to **OFS Generic Specification**



Application

Mainly used in outside plant to building transitions and inter-building installations

Design

- Optical Fibers
- Gel-filled Buffer Tube (Natural colored)
- Non-metallic Strength Elements
- Ripcord
- Flame Retardant-Jacket

Features

- Non-metallic Cable Construction
- Central Loose Tube
- Individual colored Fibers
- Individual colored Tube optional
- Single-mode and Multimode Fibers
- Low smoke/zero halogen (LS0H) rated
- Meets the requirements of IEC 60332-1-2
- Meets CPR Euro Class Eca according to EN 13501-6

Version illustrated is the 12 Fiber Cable

Fiber Count	Outer Diameter [mm]	Cable Weight [kg/km]	Standard Length [m]	Cable- Code*
Single Mode Fibers				
4	6.5	45	2000 / 4000 / 6000 / 8000	KTS1-4[]EK-[]E
6	6.5	45	2000 / 4000 / 6000 / 8000	KTS1-6[]EK-[]E
8	6.5	45	2000 / 4000 / 6000 / 8000	KTS1-8[]EK-[]E
12	6.5	45	2000 / 4000 / 6000 / 8000	KTS1-T[]EK-[]E
Multi Mode Fibers				
4	6.5	45	2000 / 4000 / 6000 / 8000	KTM1-4[]EK-[]E
6	6.5	45	2000 / 4000 / 6000 / 8000	KTM1-6[]EK-[]E
8	6.5	45	2000 / 4000 / 6000 / 8000	KTM1-8[]EK-[]E
12	6.5	45	2000 / 4000 / 6000 / 8000	KTM1-T[]EK-[]E

*Please refer to the OFS Cable- Code. The blanks specify the fiber type.

Identification

Fiber Color Code:

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

Sheath Marking

OFS OPTICAL CABLE STANDARD MONOTUBE SAFE
[ID] [MM/YYYY] [Handset-Sign]
XXXF [Meter Marking]

Alternative Sheath printing available on request

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Mechanical Properties and Environmental Behaviour

Tests according to IEC 60794

	Parameter	Requirement	Value
Tensile Performance: IEC 60794-1-21-E1A and E1B	Long term load	- No attenuation increase*	Load: 400 N
	Short term load, during installation	- No changes in attenuation before versus after load* - Max. fiber strain 0.5%	Load: 1000 N
Crush Performance: IEC 60794-1-21-E3A	Long term load	- No attenuation increase*	Load: 500 N
	Short term load	- No changes in attenuation before versus after load* - No damage**	Load: 1000 N
Bending Performance: IEC 60794-1-21-E11	Handling fixed installed	- No attenuation increase*	Bend radius: 10 x D
	During installation (under load)	- No changes in attenuation before versus after load*	Bend radius: 15 x D <i>D is the cable diameter</i>
Temperatures: IEC 60794-1-22-F1	Operation	Single-mode Fibers:	-30 to +60°C
	Installation	- No attenuation increase*	- 5 to +50°C
	Storage/Shipping		-30 to +60°C
	Operation	Multimode Fibers:	-20 to +60°C
Installation	- No attenuation increase***	- 5 to +50°C	
Storage/Shipping		-20 to +60°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 or equal to 0.05 dB for Single-mode Fibers and 0.2 dB for Multimode Fibers.

**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.

***No changes in attenuation means that any changes in measurement value, either positive or negative within the uncertainty of measurement shall be ignored. The maximal allowance for attenuation changes shall be less than or equal to +/- 0.2 dB/km for 90 % and +/- 0.3 dB/km for 100 % of the fibers.

Shipping Information

Cable Length	Small Drum Dimensions (approx.)		Shipping Weight (calc.)	
	Diameter(battened)	Width	Without lagging	With lagging
2000 m	1050 mm	790 mm	145 kg	170 kg
4000 m	1050 mm	790 mm	235 kg	260 kg
6000 m	1050 mm	790 mm	325 kg	350 kg
8000 m	1250 mm	790 mm	440 kg	470 kg

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Cable Ordering Information

Example: KTS1-T3EK-BE¹

Part Number: PREFIX – X1X2X3X4 – X5X6

PREFIX

Pos.1: **K**= Central Loose Tube FRNC
Pos.2: **T**= Standard Monotube Safe
Pos.3: **S**= Single Mode
M= Multi Mode
Pos.4: **1**= Single Jacket

X1= Fiber Count

4= 4 fibers per tube
6= 6 fibers per tube
8= 8 fibers per tube
T= 12 fibers per tube

X2= Fiber Selection

3= 1310/1550 nm (AllWave® ZWP Fiber)
1310/1550 nm (AllWave® + ZWP Fiber)
1310/1550 nm (AllWave® One ZWP Fiber)
1310/1550 nm (AllWave® Low Loss ZWP Fiber)
5= 1310/1550 nm (AllWave® FLEX ZWP Fiber)
7= 1310/1550 nm (AllWave® FLEX + ZWP Fiber)
8= 1310/1550 nm (AllWave® FLEX 200µm ZWP Fiber)
9= 1310/1550 nm (AllWave® FLEX + 200µm ZWP Fiber)
L= 850/1300 nm 50µm MMF (LaserWave® FLEX G+) (OM2+)
850/1300 nm 50µm MMF (LaserWave® FLEX 300) (OM3)
850/1300 nm 50µm MMF (LaserWave® FLEX 550) (OM4)
R= 850/1300 nm 62.5µm MMFLaser Optimized (OM1+)

X3= Fire Performance

E= EuroClass E_{ca}

X4= Sheath Color

K= Black

X5= Fiber Transmission Performance

B= 0.35/0.31/0.27/0.25/0.27 dB/km @
1310/1385/1490/1550/1625 nm
(AllWave® ZWP Fiber)
E= 0.36/0.31/0.27/0.25/0.27 dB/km @
1310/1385/1490/1550/1625 nm
(AllWave® FLEX ZWP Fiber)
(AllWave® FLEX + ZWP Fiber)
(AllWave® FLEX 200µm ZWP Fiber)
(AllWave® FLEX + 200µm ZWP Fiber)
C= 0.35/0.31/0.27/0.25/0.27 dB/km @
1310/1385/1490/1550/1625 nm (AllWave® + ZWP Fiber)
F= 0.33/0.31/0.25/0.19/0.20 dB/km @
1310/1385/1490/1550/1625 nm (AllWave® One ZWP Fiber)
A= 0.33/0.31/0.25/0.19/0.20 dB/km @
1310/1385/1490/1550/1625 nm (AllWave® Low Loss ZWP Fiber)
D= 2.4/0.7 dB/km and 700/500 MHz-km @
850/1300 nm MMF (LaserWave® FLEX G+) (OM2+)
F= 2.4/0.7 dB/km and 1500/500 MHz-km @
850/1300 nm MMF (LaserWave® FLEX 300) (OM3)
H= 2.4/0.7 dB/km and 3500/500 MHz-km @
850/1300 nm MMF (LaserWave® FLEX 550) (OM4)
A= 2.9/0.7 dB/km and 220/500 MHz-km @
850/1300 nm MMF (Laser Optimized 62,5µm) (OM1+)
X= Specific

X6= Fiber Type²

E= AllWave® ZWP Single Mode
2= 50/125 µm Multimode

1 Part Number shown is for Central Loose Monotube Safe with black FRNC sheath and 12 x 250 µm Single Mode AllWave ZWP Fibers. It meets CPR Euro Class Eca according EN 13501-6.

2 Contact OFS sales representative for information on other cable variations, including additional fiber types and attenuation.

Fire Performance

EuroClass E_{ca}

For DoP, please visit <https://www.ofs-sales.com/cpr> DoP Code :

	Singlemode	Multimode
4 fibers	KTS1-4-004	KTM1-4-004
6 fibers	KTS1-6-006	KTM1-6-006
8 fibers	KTS1-8-008	KTM1-8-008
12 fibers	KTS1-T-012	KTM1-T-012

The information is believed to be accurate at time of issue.

OFS reserves the right to improve, enhance and modify the features and specifications of OFS products without prior notification.

Please ensure you have the latest version of the data sheet.

This data sheet is property of OFS.

For additional information please contact your sales representative.

You can also visit our website at <http://www.ofsoptics.com>.

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AllWave[®] + Fibre

Zero Water Peak



ofs

A Furukawa Company

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

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

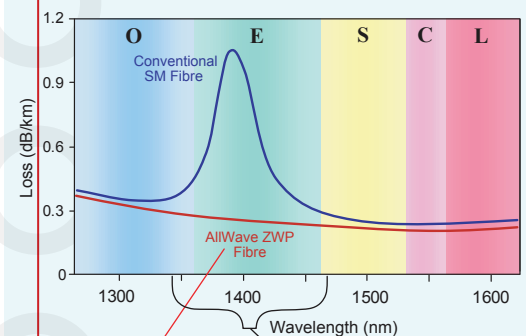
AllWave+ Fibre is a combination ITU-T G.652.D and G.657.A1 compliant fibre ideally designed for use in backhaul, metropolitan, and FTTX networks. Developed and manufactured by OFS, AllWave+ Fibre provides low and stable loss performance in the 1360 – 1460 nm E-band; plus it offers reduced bending loss 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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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 (<i>Other proof test levels available on request</i>)	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
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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
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Polarization Mode Dispersion (PMD)¹

Fibre PMD Link Design Value (LDV) ²	< 0.04 ps/√km
Maximum Individual Fibre	< 0.1 ps/√km
Typical Fibre LMC PMD	< 0.02 ps/√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 (-60° + 85° C)	≤ 0.05 dB/km
High Temperature Aging (85 ± 2° C)	≤ 0.05 dB/km
Temperature & Humidity Cycling (at -10° C to +85° C and 85 to ~98% RH)	≤ 0.05 dB/km
Water Immersion (23 ± 2° C)	≤ 0.05 dB/km