Optical Fiber Cable with AllWave® Fiber

1. INTRODUCTION

With the recent growth of information transmission implementations represented by FTTH (Fiber To The Home), optical fiber networks such as the metro and subscriber networks continue to expand. Against this background, the AllWave fiber is gaining wide attention because it has reduced the absorption loss due to OH-groups at around 1380 nm in conventional single-mode fibers.

This report introduces a slotted core optical fiber cable using AllWave fiber we have recently developed.

2. FEATURES OF ALLWAVE FIBER

2.1 Reduced OH-Group Absorption Loss for Wide Bandwidth

Conventional single-mode fibers suffer from an adverse phenomenon such that the attenuation increases at wavelengths near 1380 nm due to the absorption by OH-groups in the fiber. On the other hand, AllWave fiber features reduced attenuation at these wavelengths, resulting from the OH-group removal done during the course of fiber manufacturing. See Figure 1. Thus, the fiber can be used over a wide wavelength band of 1280 nm to 1625 nm.

2.2 Conformity to ITU-T Recommendation G.652

Regardless of its wide bandwidth as described above, AllWave fiber has general characteristics equivalent to those of conventional single-mode fibers, thus conforming to ITU-T Recommendation G.652. See Table 1. Therefore, the fiber can be used in the same way as for conventional single-mode fibers in such applications as the combined uses with existing transmission lines and transmission line facilities.

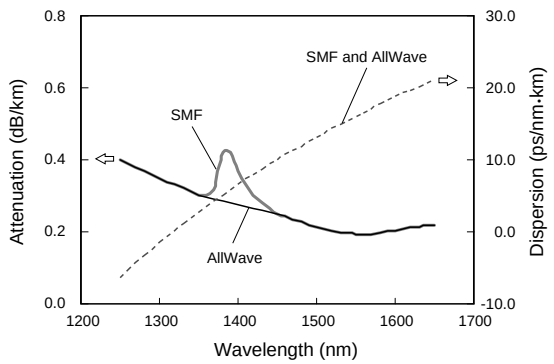

Figure 1 Comparison of AllWave fiber with conventional SMF.

† AllWave® is a registered trademark of OFS Fitel.

3. OPTICAL FIBER CABLE USING ALL-WAVE FIBER

3.1 Cable Structure

AllWave fiber with such characteristics as mentioned above has been used in a slotted core optical fiber cable, which is expected to have wide applications in the metro and subscriber networks. See Figure 2 for a typical cable structure. The polyethylene-made slotted core of the cable with a strength member at its center accommodates a number of fiber ribbons of AllWave fiber in its plural slots.

Table 1 Characteristics of AllWave fiber.

Item			Value
MFD diameter	@1310 nm	μm	8.8 ~ 9.6
Attenuation	@1310 nm @1383 nm @1550 nm @1625 nm	dB/km	≤ 0.34 ≤ 0.31 ≤ 0.21 ≤ 0.24
Zero dispersion wavelenth		nm	1302 ~ 1322
Zero dispersion slope		ps/nm^2·km	≤ 0.092

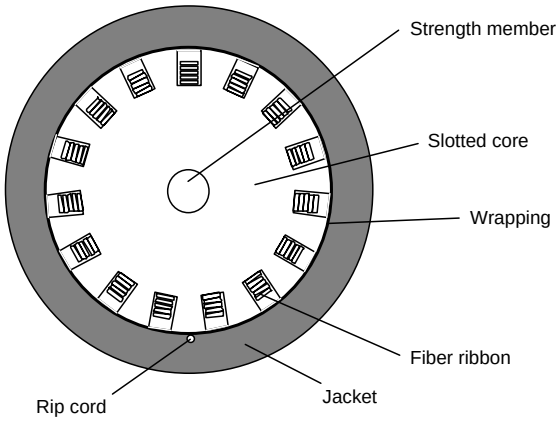

Figure 2 Cross section of slotted core optical fiber cable. (300-fiber type)

Table 2 Characteristics of slotted core optical fiber cable with AllWave fiber. (300-fiber type)

Item		Test conditions		Cable performance
Transmission characteristics	Attenuation	@1310 nm		< 0.35 dB/km
		@1380 nm		< 0.31 dB/km
		@1550 nm		< 0.21 dB/km
		@1625 nm		< 0.23 dB/km
	Polarization mode dispersion	JME method		< 0.1 ps/$\sqrt{km}$
	Temperature characteristics	-30°C~+70°C	1550 nm	< 0.05 dB/km
Mechanical characteristics	Tensile	1700 N	1550 nm	< 0.01 dB
	Squeezing	1700 N / R250 mm / 135°	1550 nm	< 0.01 dB
	Bending	R10 D×10 cycles	1550 nm	< 0.01 dB
	Lateral force	980 N	1550 nm	< 0.01 dB
	Impact	1 kg×1 m	1550 nm	< 0.01 dB
	Twist	±90°	1550 nm	< 0.01 dB

The cable has a wrapping of water absorption tape and the like over the core and is sheathed with polyethylene. A wide range of fiber count accommodated is available up to 1000 fibers maximum, permitting a suitable selection of cable adapted to applications.

3.2 Cable Characteristics

The characteristics of slotted core optical fiber cable using AllWave fiber are equivalent to or better than those of the cable with the same structure using conventional single-mode fibers. See Table 2. It is seen that the cable characteristics reflect one of the features of AllWave fiber, a low attenuation at around 1380 nm, thereby realizing a wide wavelength bandwidth.

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