

PRE-CONNECTORISED SMOOTH SHEATH ABF

AIR BLOWN FIBRE



1. **SCOPE** This specification covers the general requirements of smooth sheath ABF for installation by blowing.

2. OPTICAL FIBER

The optical, geometrical, mechanical and environmental performance of the optical fiber shall be in accordance with Table 1 below.

Table 1. Performance of the single mode fiber (ITU-T G.657A)

ITEMS	UNITS	SPECIFICATION	
		G.657.A1	G.657.A2
Attenuation	dB/km	≤ 0.40 at 1310nm ≤ 0.40 at 1383nm ≤ 0.30 at 1550nm	
Chromatic Dispersion	ps/nm.km	≤ 3.5 at 1285nm ~ 1330nm ≤ 18 at 1550nm	
Zero Dispersion Wavelength	nm	1300 ~ 1324	
Zero Dispersion Slope	ps/nm ² .km	≤ 0.092	
Cable PMD (PMDQ)	ps/ $\sqrt{\text{km}}$	≤ 0.2 (20 section link)	
Cut-off Wavelength (λ_{cc} , Cabled fiber)	nm	≤ 1260	
Attenuation vs. Bending (15mm radius x 10turns)	dB	≤ 0.25 at 1550nm ≤ 1.0 at 1625nm	≤ 0.03 at 1550nm ≤ 0.1 at 1625nm
Attenuation vs. Bending (10mm radius x 1turn)	dB	≤ 0.75 at 1550nm ≤ 1.5 at 1625nm	≤ 0.1 at 1550nm ≤ 0.2 at 1625nm
Attenuation vs. Bending (7.5mm radius x 1turn)	dB	-	≤ 0.5 at 1550nm ≤ 1.0 at 1625nm
Mode Field Diameter	μm	8.9 ± 0.4 at 1310nm	8.6 ± 0.4 at 1310nm
Core/Cladding Concentricity Error	μm	≤ 0.5	
Cladding Diameter	μm	125 ± 0.7	
Cladding Non-circularity	%	≤ 1.0	
Coating Diameter	μm	245 ± 10	
Proof Test	Gpa	≥ 0.69	

3. ABF CONSTRUCTION

The construction of the cable shall be in accordance with Table 2 below.

Table 2. Construction of the Cable

ITEMS	DESCRIPTION
Number of Fibers	1 or 2
Coating Material	UV curable Acrylate Resin
Outer Sheath	HDPE
Nom. Outer Diameter	1.2 ± 0.3
Unit Color	Yellow

*Other Unit color is also available upon request.

4. FIBER IDENTIFICATION

Color code of the individual fibers within the smooth sheath ABF shall be in accordance with Table 3 below.

Table 3. Color code of the individual fibers and tubes

No.	Color	No.	Color
1	RED	2	BLUE

5. CABLE PERFORMANCE

The mechanical and environmental performance of the cable shall be in accordance with Table 4 below. Unless otherwise specified, all attenuation measurements required in this section shall be performed at 1550nm for single mode fiber (SMF).

Table 4. The Mechanical and Environmental Performance of the Cable

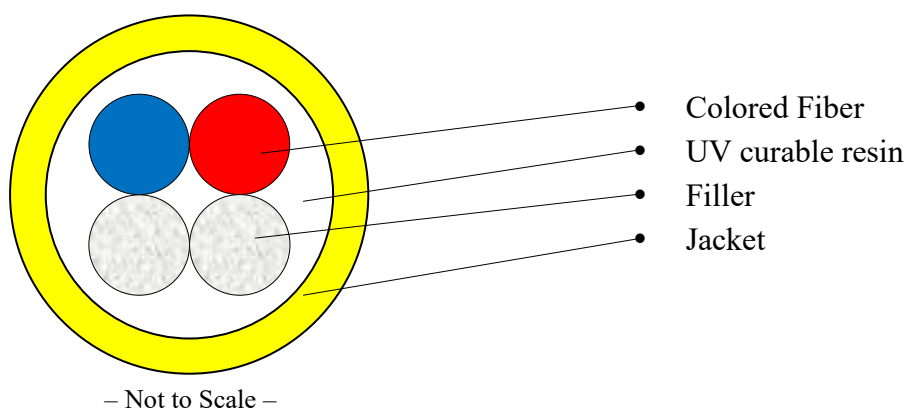
ITEMS	TEST METHOD AND ACCEPTANCE CRITERIA
Tensile Performance	▪ Test method : IEC 60794-1-21 E1 - Fixed Mandrel Diameter : ≥ 60mm - Load Mandrel Diameter : ≥ 60mm - Tensile Load : 9.81 X W (W : mass of 1km of component in kg) - Length of specimen : ≥ 10m - Rate of extension : ≥ 20mm/min - Duration Maximum Tension : 1minute - Selection of fibers to be monitors : All fibers in the unit ▪ Acceptance criteria - For Max. load : Fiber strain ≤ 0.60% at installation load - Change in Attenuation after test : ≤ 0.05dB at residual load - No significant damage to unit component

ITEMS	TEST METHOD AND ACCEPTANCE CRITERIA									
Crush	▪ Test method: IEC 60794-1-21 E3 - Maximum load : 100N/10cm - Length of specimen : $\geq 30\text{m}$ - Duration of maximum load : 60 seconds - Selection of fibers to be monitors : All fibers in the unit ▪ Acceptance criteria - Change in attenuation during the test : to be recorded - Change in attenuation after the test : $\leq 0.05\text{ dB}$ - No significant damage to unit component									
Repeated bending	▪ Test method: IEC 60794-1-21 method E6 - Bending diameter : 60mm - No. of flexing cycles: 25 cycles ▪ Acceptance criteria - No significant damage to unit component									
Torsion	▪ Test method: IEC 60794-1-21 E7 - Length of specimen : 300m - Load : adequate to assure test sample is straight at start of test ▪ Acceptance criteria - Change in attenuation after the test : $\leq 0.05\text{ dB}$ - No significant damage to unit component									
Kink	▪ Test method: IEC 60794-1-2 Method E10 - Minimum diameter : 60mm ▪ Acceptance Criteria - No significant damage to unit component									
Bend	▪ Test method : IEC 60794-1-21 Method E11A - Diameter of mandrel : 60mm - Length of specimen : $\geq 30\text{m}$ - Selection of fibers to be monitors : All fibers in the unit - No. of turns : 4 - No. of cycles : 3 ▪ Acceptance criteria - Change in attenuation after the test : $\leq 0.05\text{ dB}$ - No significant damage to unit component									
Temperature cycling	▪ Test method: IEC 60794-1-22 F1 - Length of specimen : $\geq 1\text{km}$ - Temperature condition<table><tr><td></td><td>Operation(1)</td><td>Storage(2)</td></tr><tr><td>Low (A)</td><td>T_{A1} : -40°C</td><td>T_{A2} : -40°C</td></tr><tr><td>High (B)</td><td>T_{B1} : 60°C</td><td>T_{B2} : 70°C</td></tr></table> - Temperature cycle sequence (2 cycles) .1st cycle : T_{A2} → T_{B2} .2nd cycle : T_{A1} → T_{A2} → T_{B1} → T_{B2} → 23°C - Soak time at each temperature : $\geq 24\text{ hours}$ ▪ Acceptance criteria - Attenuation variation during and after the test : $\leq 0.15\text{dB/km}$		Operation(1)	Storage(2)	Low (A)	T _{A1} : -40°C	T _{A2} : -40°C	High (B)	T _{B1} : 60°C	T _{B2} : 70°C
	Operation(1)	Storage(2)								
Low (A)	T _{A1} : -40°C	T _{A2} : -40°C								
High (B)	T _{B1} : 60°C	T _{B2} : 70°C								

ITEMS	TEST METHOD AND ACCEPTANCE CRITERIA
Water Immersion	▪ Test method : IEC 60793-1-53 - Length of specimen : $\geq 1\text{km}$ - Temperature of the water solution : $+20^{\circ}\text{C} \pm 2.0^{\circ}\text{C}$ - Water : Distilled, demineralized or de-ionized water (pH 5.0~8.0) - Dwell time : $\geq 30\text{days}$ ▪ Acceptance criteria - Attenuation variation : $\leq 0.05\text{ dB}$

6. CROSS-SECTIONAL DRAWING OF CABLE

Ex. 2F Smooth sheath ABF



Cable Type	Fiber counts	Cable dia. [mm]	Approx. cable weight [kg/km]	Minimum bending radius [mm] (Handling)
EPSU	1~2	1.2 ± 0.3	1.4 ± 0.1	40

* Actual values may deviate from the calculated values given in the table above.

7. CONNECTORIZING

7.1 Connectorizing constuction

The construction of the Connectorized cable shall be in accordance with Table 4 below.

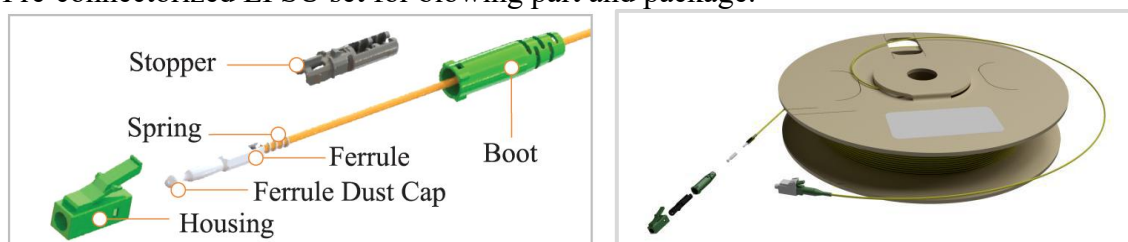
Table 5. Connectorized cable type

	Connector For Air blowing part	Connector
Type 1	1 x LC/APC	1 x LC/APC
Type 2	Open end	1 x LC/APC

7.2 Diagram

The diagram of pre-connectorized smooth sheath ABF shall be in accordance with the below image.

7.2.1 Pre-connectorized EPSU set for blowing part and package.



8. CONNECTOR PERFORMANCE

The performance of the Connector shall be in accordance with Table 6 below.

Table 6. Specification of Connector

ITEMS	Unit	Specification
Insertion Loss ¹	dB	Grade B ≤0.12 (Mean.) ≤0.25 (Max. ≥97% of the connections)
Return Loss	dB	≥60 for APC
Durability	dB	Adaptor Repeat combination No. of cycle : 500 Insertion Loss Increment : ≤0.20 Return Loss : ≥60 for APC
Retention Force	dB	1.0kgf/10s Insertion Loss Increment : ≤0.20 Return Loss : ≥60 for APC
Temperature	°C	-40 ~ 75°C Insertion Loss Increment : ≤0.5dB Return Loss : ≥35dB Return Loss : ≥60 for APC

¹ Random mating test according to IEC 61300-3-24

9. MARKING AND PACKAGE

9.1 Cable marking

The outer surface of the cable shall be marked with black characters at intervals of one meter with the following information. Other marking is also available upon request.

- 1) Cable type (ex, “ EPSU ”)
- 2) Fiber type and counts (ex, “ G.657A1 2F ”)
- 3) Name of the manufacturer
- 4) Year of manufacture
- 5) Length marking

Ex. For a single mode 2 fiber cable

0000M	EPSU	G.657A1	2F	2026	0001M...
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9.2 Package

9.2.1 The standard cable length is in 50-meter increments up to a maximum of 400 meters. Other cable lengths are also available upon customer request.

9.2.2 ABF storage Pan

When the pre-connectorized EPSU product has a cable length of 400m or less, it is wound on a disk type storage pan.