

Specification

For

MICRO AIR BLOWN CABLE
(SZ Stranded Loose Tube Type)

1. SCOPE

1.1 Application

This specification covers the general requirements of compact loose tube fiber optic telecommunication cables for outside plant applications installed in air blown method.

The cable designs described herein are capable of transmitting telephone, data and video signals in microduct installations.

1.2 Cable Description

Color coded fibers, jelly filled color coded loose tubes, PE filler (if necessary), water swellable yarn, SZ-stranded around the dielectric central strength member, ripcords and outer HDPE jacket

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. 652 D)

ITEMS	UNITS	SPECIFICATION
Attenuation	dB/km	≤ 0.36 at 1310nm ≤ 0.36 at 1383nm ¹⁾ ≤ 0.25 at 1550nm
Chromatic Dispersion	ps/nm.km	≤ 3.5 at 1285nm ~ 1330nm ≤ 18 at 1550nm
Zero Dispersion Wavelength	nm	1300 ~ 1322
Zero Dispersion Slope	ps/nm ² .km	≤ 0.092
Polarization Mode Dispersion(PMD _D)	ps/(km) ^{1/2}	≤ 0.2 (20 section link)
Cut-off Wavelength (λ_{cc} , Cabled fiber)	nm	≤ 1260
Attenuation vs. Bending (30mm radius x 100turns)	dB	≤ 0.1 at 1625nm
Mode Field Diameter	□m	9.2 ± 0.4 at 1310nm
Core-Clad Concentricity Error	□m	≤ 0.6
Cladding Diameter	□m	125 ± 1
Cladding Non-circularity	%	≤ 1
Coating Diameter	□m	250 ± 15
Proof Test Level	kPsi	≥ 100 (1%, 1 second)

Note ¹⁾ The sampled attenuation average at this wavelength shall be less than or equal to the value specified at 1310 nm after hydrogen ageing according to IEC 60793-2-50 regarding the B1.3 fiber category

3. CABLE 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		144
No. of Fibers per Tube		12
Loose Buffer Tube		PBT (Polybutylene Terephthalate)
Filling Compound in Loose Buffer Tube		Thixotropic Jelly Compound
Central Strength Member		FRP (with PE coating if necessary)
Water Blocking Material		Water Swellable Yarn around the CSM (If necessary to prevent the ingress of water)
Rip Cord		One Ripcords
Outer Jacket	Material	HDPE
	Thickness	Nom. 0.4 mm

4. FIBER AND LOOSE BUFFER TUBE IDENTIFICATION

The color code of the loose buffer tubes and the individual fibers within each loose buffer tube shall be in accordance with Table 3 below.

Table 3. The Color Code of the Individual Fibers & Loose Buffer Tubes

No. of Fiber	Color	No. of Fiber	Color
1	Blue	7	Red
2	Orange	8	Black
3	Green	9	Yellow
4	Brown	10	Violet
5	Gray	11	Rose
6	White	12	Aqua

Table 5. The Mechanical and Environmental Performance of the Cable (continued)

ITEMS	TEST METHOD AND ACCEPTANCE CRITERIA
Repeated bending Test	<p># Test method: IEC 60794-1-2, Method E6</p> <ul style="list-style-type: none"> - . Bending diameter: 40D (D = cable diameter) - . No. of flexing cycles: 25 cycles - . Flexing speed: 30 cycles/minute <p># Acceptance Criteria</p> <ul style="list-style-type: none"> - . Attenuation Increment: ≤ 0.05 dB after the completion of the test - . No jacket cracking and fiber breakage
Torsion Test	<p># Test method: IEC 60794-1-2, Method E7</p> <ul style="list-style-type: none"> - . Cable length twisted: 2m - . No. of twist cycles: 10 cycles - . Twist angle: $\pm 180^\circ$ <p># Acceptance Criteria</p> <ul style="list-style-type: none"> - . Attenuation Increment: ≤ 0.05 dB after the completion of the test - . No jacket cracking and fiber breakage
Kink	<p># Test method: IEC 60794-1-2, Method E10</p> <ul style="list-style-type: none"> - . Diameter : 40 x D <p># Acceptance Criteria</p> <ul style="list-style-type: none"> - . No jacket cracking and fiber breakage
Bend	<p># Test method: IEC 60794-1-2, Method E11A</p> <ul style="list-style-type: none"> - . Diameter : 40 x D - . Number of turns : 4 - . Number of cycles : 3 <p># Acceptance Criteria</p> <ul style="list-style-type: none"> - . Attenuation Increment: ≤ 0.05 dB after the test when measured at room temperature.
Temperature Cycling	<p># Test method: IEC 60794-1-F1</p> <ul style="list-style-type: none"> - . TB2 : 70°C - . TB1 : 60°C - . TA1 : -15°C - . TA2 : -40°C - . Temperature cycling schedule : 23°C → TA1 → TA2 → TB1 → TB2 - . Soak time at each temperature: ≥ 6 hours - . No.of cycle : 2 cycle. <p># Acceptance Criteria</p> <ul style="list-style-type: none"> - . Attenuation increment : ≤ 0.15 dB/km

Table 5. The Mechanical and Environmental Performance of the Cable (continued)

ITEMS	TEST METHOD AND ACCEPTANCE CRITERIA
Water Penetration Test	# Test method: IEC 60794-1-2, Method F5B -. Length of specimen: 3m -. Height of pressure head: 1m -. Test time: 24 hours # Acceptance Criteria -. No leakage through the open cable end
Ageing	# Test method : IEC 60794-1-2-F9 after the temperature cycling test, -. Temperature cycling schedule 85 °C for 168 hours → 23 °C (24hrs) →TA1→TA2→TB1→TB2 (2cycle) # Acceptance Criteria -. During temperature cycling test, Attenuation increment : ≤ 0.15 dB/km (maximum) ≤ 0.10 dB/km (average)

6. PACKING AND MARKING

6.1 Cable Marking

The jacket shall be marked with white characters at intervals of one meter with following information. Other marking is also available if requested by customer.

- 1) Cable type and fiber number
- 2) Name of the manufacturer
- 3) Year of manufacture
- 4) Length marking

Ex.1) For 144-fiber cable

6.2 Cable Re-marking

The re-marking shall be marked, preferably with yellow characters, on a different position of the outer cable jacket, and shall have a numbering scheme differing by a minimum of 5000 from the original number. Any cable that contains two sets of cable markings shall be marked to indicate the color of the marking to be used.

6.3 Cable Packing

6.3.1 Standard length of cable shall be 2,000 or 4,000 meters. Other cable length is also available if required by customer.

6.3.2 Each length of the cable shall be wound on a separate wooden reel.

6.3.3 Both ends of the cable shall be sealed with a suitable plastic cap to prevent the entry of moisture during shipping, handling and storage.

6.3.4 The cable ends shall be securely fastened to the reel to prevent the cable from becoming loose in transit or during placing operations.

6.3.5 The inner end of the cable is housed into a slot on the side of the reel without extra cable length for testing.

6.3.6 Wood-fiber board shall be secured with steel bands to protect the cable during normal handling and shipping.

6.4 Cable Reel

6.4.1 Details given below shall be distinctly marked with a weather proof material on the both outer sides of the reel flange. Other shipping mark is also available if requested by customer.

- 1) Purchaser's name
- 2) Length of cable in meter
- 3) Number of fibers and size
- 4) Gross weight in kilogram
- 5) Reel number
- 6) Name of the manufacturer
- 7) Year of manufacture
- 8) Arrow showing the direction the drum shall be rolled

6.4.2 The cable shall be shipped on reels designed to prevent damage to the cable during shipment and installation.

6.5 SAFETY

6.5.1 ROHS DIRECTIVE

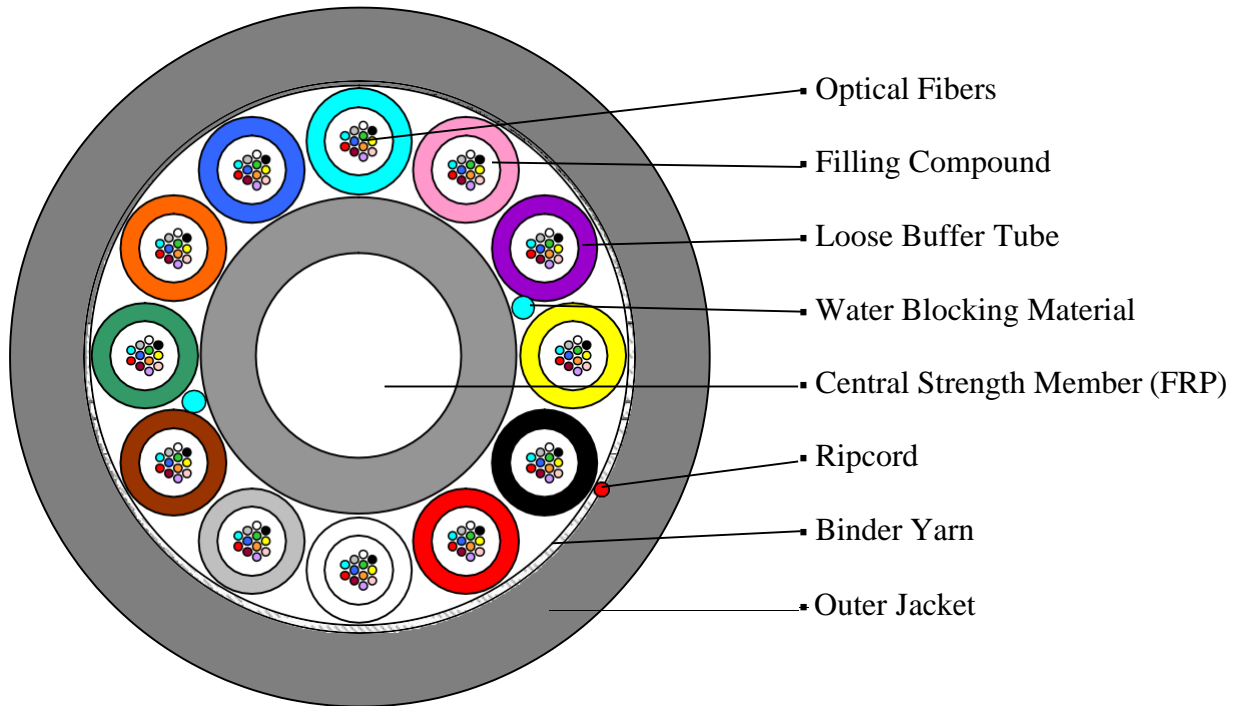
All cables and any associated packing and labeling materials shall meet RoHS (Restriction of the Use of certain Hazardous Substances) regulations as appropriate.

6.5.2 ISPM 15 DIRECTIVE

All wooden packing materials shall meet ISPM (International Standards for Phytosanitary Measures) regulations as appropriate.

Appendix 1. Cross-sectional Drawing of the Cable

144- Fiber Air Blown Cable Design(12 fiber/ tube)



“The drawing appearing on this page may be subject to change or modification without any prior notice”

Appendix 2. Diameter, Weight and Minimum Bending Radius

No. of Fibers	No. of fibers per tube	Cable Diameter (mm)	Approx. Cable Weight(kg/km)	Min. Bending Radius(mm)	
				No Load	Under Load
Up to 144	12	7.5 ±0.3	57	10D	20D

* Actual values for cable weight and diameter may deviate from the calculated values given in the table above.

== End of Specification ==