TECHNICAL SPECIFICATION

FOR

Single Mode Optical Fiber Cable

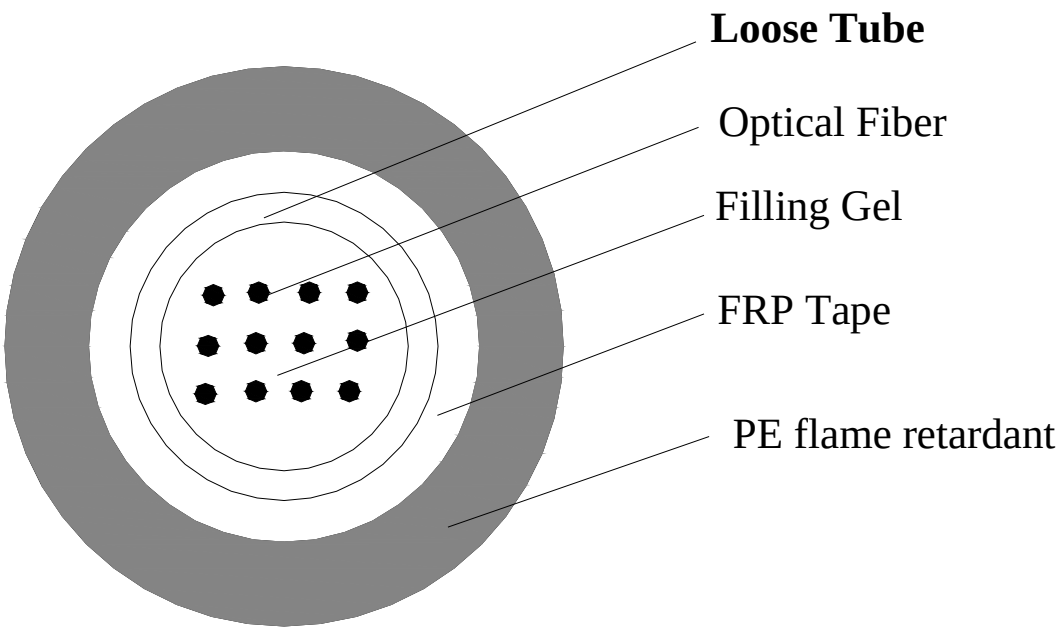
for Aerial or Duct Application

Non-Metallic Type

(SM 2-12 Fibers)

Product: Single Mode Optical Fiber Cable
Customer: Hungary
Date: Febr. 15, 2011
Write by:
Director of Technology & Quality

1、Cable Cross-section



2-12AB

2. Cable Specification

2.1 Sheath marking

UNIO	2-12AB	G652.D	2010	XXXXM

UNIO : Manufacturer's name
AB : Cable type
2-12B1 : Cable size
2011 : Manufacturing year
XXXXM : Mark of meters
**The marking is printed every 1 meter*

2.2 The color of marking is white, but if the re-printing is necessary, the yellow color marking shall be printed newly on a different position.

2.3 Each cable ends are sealed with heat shrinkable end caps to prevent water ingress.

2.4 Fiber color code

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

2.5 Loose tube (LT) & filler rod (FR) color code

Fiber number	Element no.					
	1	2	3	4	5	6
2	**LT**					
4	**LT**					
6	**LT**					
8	**LT**					
12	**LT**					

2.6 Cable structure and parameter

Fiber number	Max. fiber number per tube	Sheath thickness (nominal*)	Outer diameter (nominal**)	Weight (approx.)
		mm	mm	kg/km
2	1	1.0	6.0	41
4	1	1.0	6.0	41
6	1	1.0	6.0	41
8	1	1.0	6.0	41
12	1	1.0	6.0	41

Loose tube Diameter (nominal*)	Loose tube Thickness (nominal*)	FRP tape type Height*Width
mm	mm	mm
3.0	0.40	0.4*11.7

** The nominal sheath thickness may have a tolerance with ±0.2mm.*

- ** The nominal diameter may have a tolerance with ±0.4mm.*

3. Performance of Cabled Optical Fiber

The performance of cabled single mode optical fiber (**Corning ITU-T Rec. G.652D**)

Item	Specification
Type of fiber	Single mode
Fiber material	Doped silica
Attenuation coefficient @ 1310 nm @ 1383 nm @ 1550 nm @ 1625 nm	 ≤ 0.36 dB/km ≤ 0.36 dB/km ≤ 0.22 dB/km ≤ 0.27 Db/km

Point discontinuity	≤ 0.05 Db
Cable cut-off wavelength	≤ 1260 nm
Zero-dispersion wavelength	1300 ~ 1324 nm
Zero-dispersion slope	≤ 0.093 ps/(nm^2.km)
Chromatic dispersion @ 1288 ~ 1339 nm @ 1271 ~ 1360 nm @ 1550 nm @ 1625 nm	 ≤3.5 ps/(nm. Km) ≤5.3 ps/(nm. Km) ≤18 ps/(nm. Km) ≤22 ps/(nm. Km)
PMD_Q (Quadrature average*)	≤0.2 ps/km$^{1/2}$
Attenuation at the water peak @1383nm ± 3nm	≤ 0.7dB/km
Attenuation with temperature(-40℃ ~ +85℃)	≤ 0.05dB
Attenuation difference@1525nm ~ 1575nm	≤ 0.30dB/km
1550nm bending loss (75mm mandrel, 100 turns)	< 0.05dB
Mode field diameter @ 1310 nm	9.2±0.4 um
Mode field diameter @ 1550 nm	10.4±0.8 um
MFD concentricity error@1310nm	<0.5 um
Core / Cladding concentricity error	≤ 0.5 um
Core diameter (Nominal)	8.3um
Cladding diameter	125.0 ± 0.7 um
Cladding non-circularity	≤1.0%
Primary coating diameter	245 ± 5 um
Color coating diameter	250 ± 10 um
Radius of curvature	≥ 4m
Coating-cladding concentricity	<10um
Proof test level	100 kpsi (=0.69 Gpa), 1%

- *PMD_Q is a link of 20 cable sections (M) and a probability level of 0.01%*

4. Performance of Optical Cable

4.1 Cable bending radius: 10 x cable diameter (static)
20 x cable diameter (dynamic)

4.2 Application temperature range

Operating temperature range	:-20^{o}C to +70^{o}C
Storage / Transport temperature range	:-20^{o}C to +70^{o}C
Installation temperature range	:-20^{o}C to +50^{o}C

4.3 Main mechanical & environmental performance test

S/N	Item	Test Method	Acceptance Condition
1	Tensile Strength IEC 794-1-E1	- Load: short time:500N - Length of cable under load: 50 m	- Loss change ≤ 0.1 dB @1550 nm - No fiber break and no sheath damage.
2	Crush Test IEC 794-1-E3	- Load: 450N/100 mm - Load time: ⩾1min.	- Loss change ≤ 0.1 dB @1550 nm - No fiber break and no sheath damage.
3	Impact Resistance IEC 794-1-E4	- Points of impact: 5 -Times of per point: 5 - Impact energy:4.5 N.m - Radius of hammer head: 15mm - Impact rate: 2 sec/cycle	- Loss change ≤ 0.1 dB @1550 nm - No fiber break and no sheath damage.
4	Repeated Bending IEC 794-1-E6	- Bending radius:20 x cable diameter - Load: 150 N - Flexing rate: 3 sec/cycle - No. of cycle: 30	- Loss change ≤ 0.1 dB @1550 nm - No fiber break and no sheath damage.
5	Torsion IEC 794-1-E7	- Length: 1 m - Load: 150 N - Twist rate: 1 min/cycle - Twist angle: ±180° - No. of cycle: 10	- Loss change ≤ 0.1 dB @1550 nm - No fiber break and no sheath damage.
6	Temperature Cycling Test IEC 794-1-F1	- Temperature step: +20°C→-20°C→+70°C →+20°C - Time per each step: 12 hrs - Number of cycle: 2	- Loss change ≤ 0.05 dB/km@1550 nm - No fiber break and no sheath damage.
7	Compound Flow IEC 794-1-E14	- Sample length: 30 cm - Temp: 70℃ ± 2℃ - Time: 24 hours	- No compound flow
8	Sheath High Voltage Test	- On line test - 9t KV (t-sheath thickness)	-No sheath breakdown

5. Packing and Marking

5.1 Packing

5.1.1 Each single length of cable shall be wound on a pure wooden drum.

5.1.2 Standard drum length is 2000m ±1%, or it can be delivered according to customer requirement but not longer than 6000m with a tolerance.

5.1.3 Covered by plastic buffer sheet.

5.1.4 Sealed by strong wooden battens.

5.1.5 At least 1m of inner end of cable should be reserved for testing.

5.2 Drum marking

- Custmer’ s name & logo;
- Manufacturing year and month;
- Roll-direction arrow;
- Cable outer end position indicating arrow;
- The word “**OPTICAL FIBER CABLE**”;
- Cable type and size;
- Drum number;
- Drum length;
- Gross / net weight;
- Caution plate indicating the correct method for loading, unloading and convey the cable;
- *Other customer information such as contract no., project no., and delivery destination. (if needed)*

5.3 Cable quality certificate documents

- Quality certificate;
- Test report.

SPEC. END