

# ***TECHNICAL PROPOSAL***

**FOR**

***OPTICAL FIBER, LOOSE TUBE, SINGLE JACKET***

***ALL DIELECTRIC SELF SUPPORTING CABLE***

***(Max. Span 120m & Initial Sag 1.5% & NESC Light)***

APPROVED BY :



K.S.LEE / HEAD OF TEAM  
CABLE MANUFACTURING TEAM

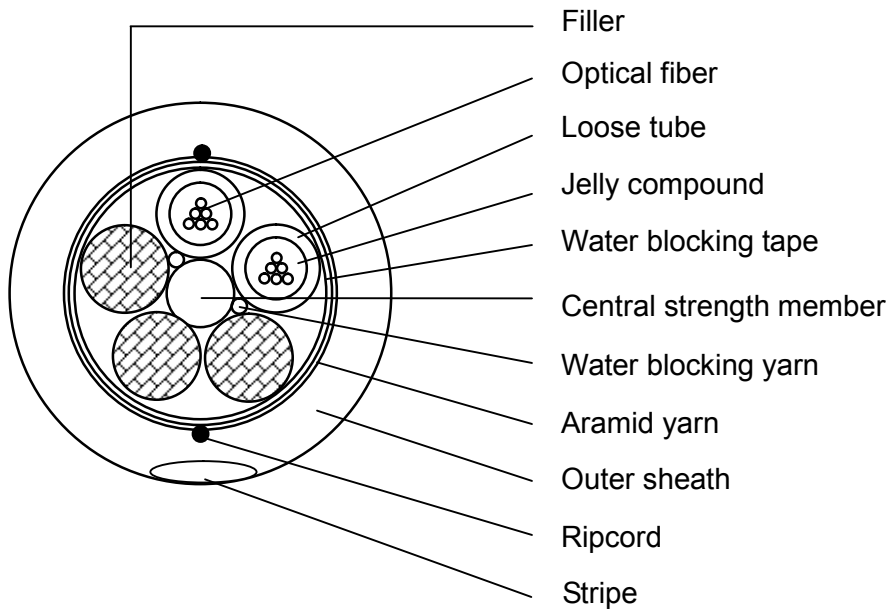
PREPARED BY :



B.S.JANG / ENGINEER  
CABLE MANUFACTURING TEAM

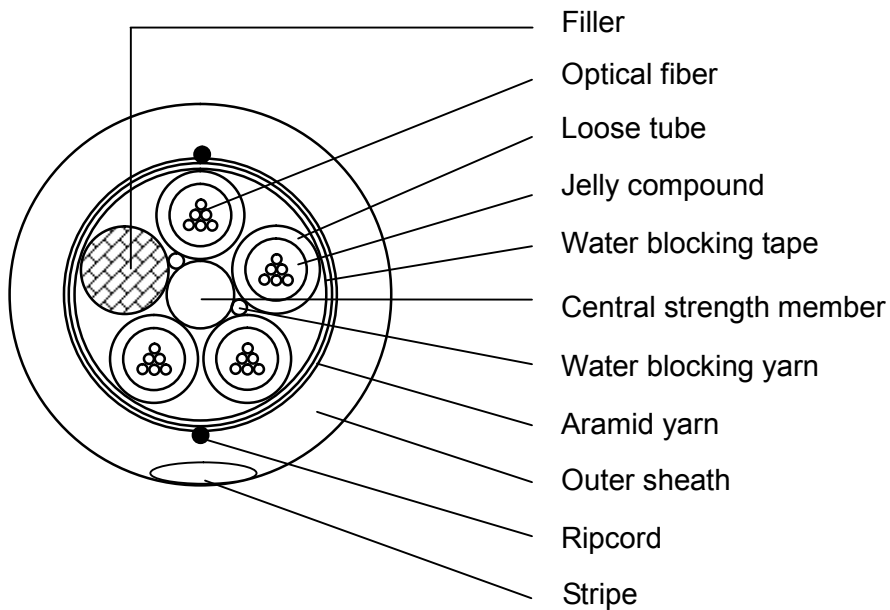
**Cross Section of Cable**

**In case of 12F Cable**



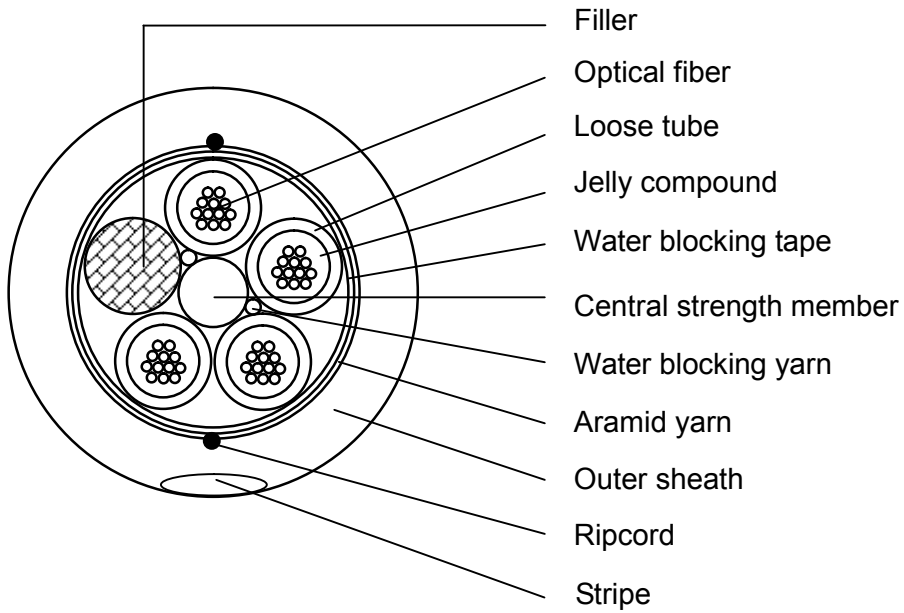
- Not to scale

**In case of 24F Cable**



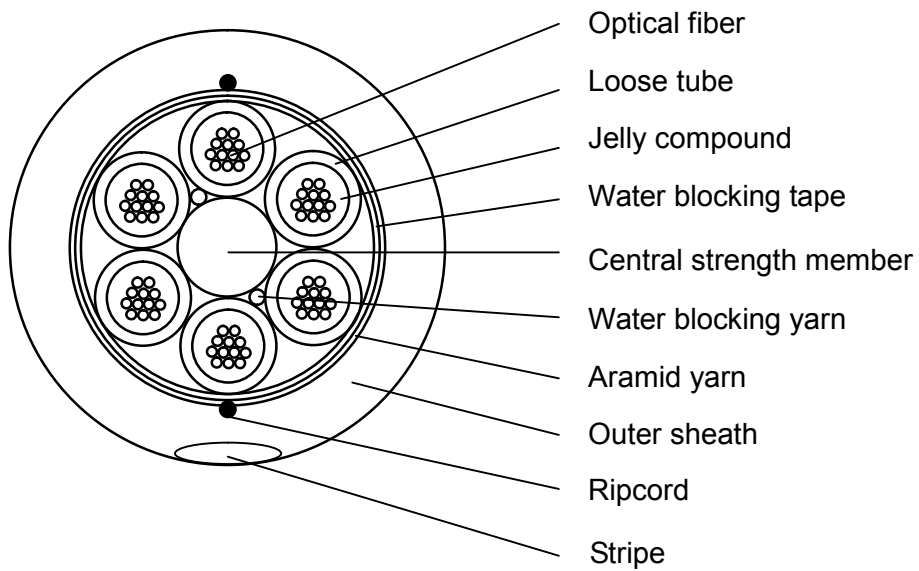
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**In case of 48F Cable**



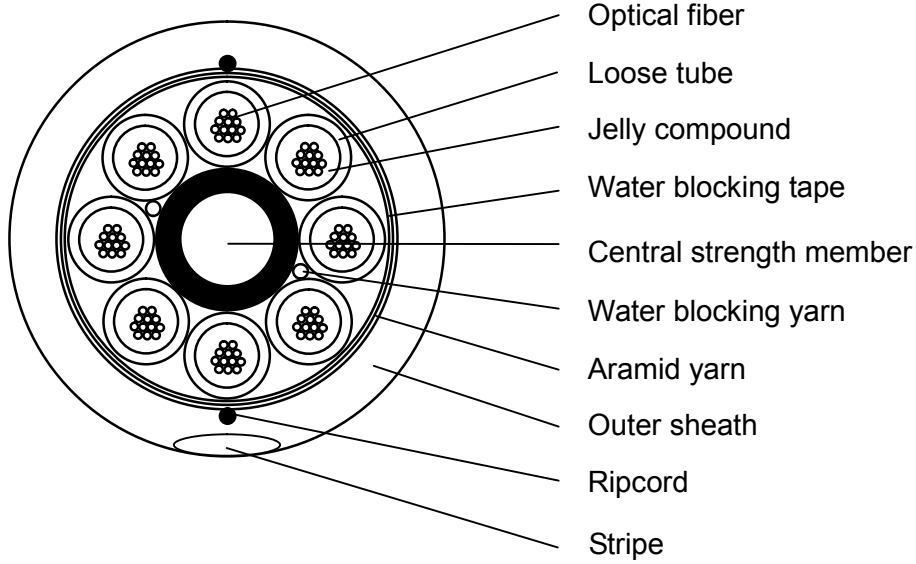
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**In case of 72F Cable**



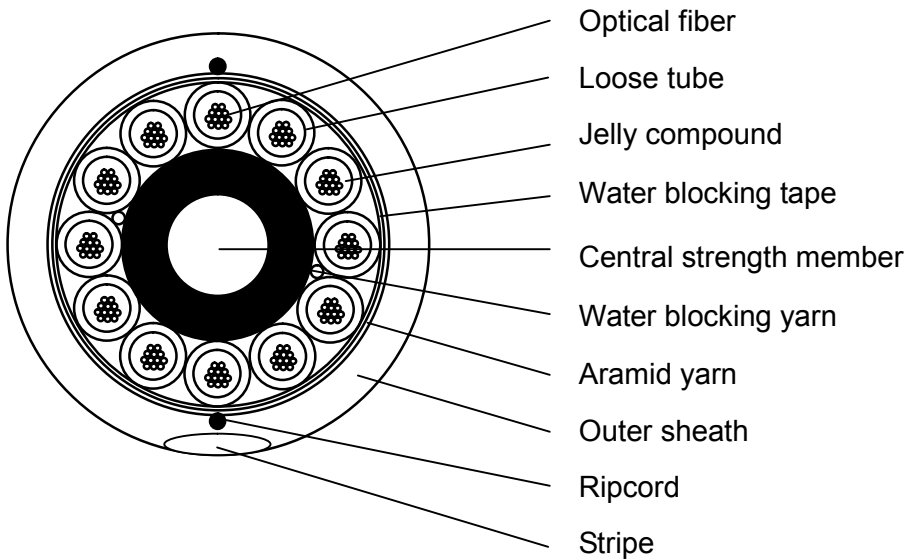
- Not to scale

**In case of 96F Cable**

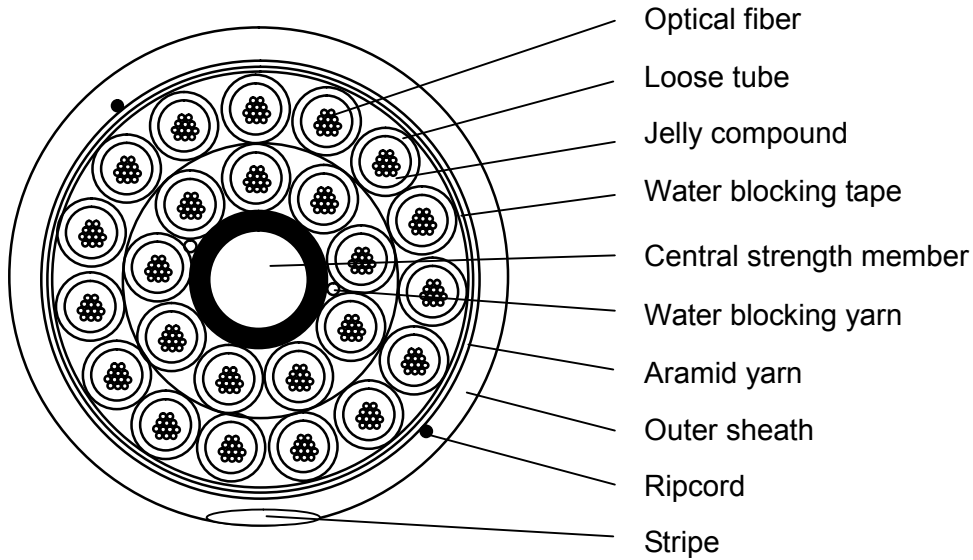


- Not to scale

**In case of 144F Cable**



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**In case of 288F Cable**


- Not to scale

**Table 1. Color Coding of Optical Fiber in Tube**

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

**Table 2. Color Coding of Loose Tube**

No. tube & color					
1	2	3	4	5	6
Blue	Orange	Green	Brown	Grey	White
7	8	9	10	11	12
Red	Black	Yellow	Violet	Pink	Aqua
13	14	15	16	17	18
Blue*	Orange*	Green*	Brown*	Grey*	White*
19	20	21	22	23	24
Red*	Black*	Yellow*	Violet*	Pink*	Aqua*

Alternative tube color code available on request

\* : Black color stripe but black tube shall be applied with white color stripe

**Table 3. Construction of Optical Fiber Cable**

Item		Description and value					
Total fiber count (F)		6~30	36~60	72	84~96	120~144	288
Number of active loose tube (ea)		1 ~ 5	3 ~ 5	6	7 ~ 8	10 ~ 12	24
Number of fiber per tube (F)		6	12	12	12	12	12
Number of filler (ea)		0 ~ 4	0 ~ 2	0	0 ~ 1	2 ~ 0	0
Loose tube	Material	PBT (Polybutylene Terephthalate)					
	Filling compound	Thixotropic jelly compound					
Filler material		Thermoplastic polymer string					
Central strength member		FRP(Fiber Reinforced Plastic) with or without PE coating					
Water blocking material		Water blocking yarn and water blocking tape					
Peripheral strength material		Aramid yarns					
Ripcord (ea)		2 (180°degree interval)					
Outer sheath	Material	Black color polyethylene with a blue color stripe					
Cable	Diameter (Nom. mm)	9.1	9.6	10.3	11.7	14.6	16.9
	Weight (Nom. kg/km)	61	68	81	105	165	215
Marking on the outer sheath	Method	Indent type					
	Color	White					
	Interval	1m interval repeat					
	Re-marking	If the marking is wrong, the yellow color marking shall be printed newly on the different position					
Min. Bending radius	Installed	10 times x O.D. of cable					
	Loaded	20 times x O.D. of cable					
Temperature range	Storage	-40 °C ~ +70 °C					
	Installation	-30 °C ~ +70 °C					
	Operation	-40 °C ~ +70 °C					

**Table 4. Sag and tension information**

Fiber count	Span	Initial		NESC Light		
		Sag	Tension	Sag		Tension(MAT)
	Meter	Vertical Meter	(kgf)	Horizontal (m)	Vertical (m)	(kgf)
6F to 30F	120	1.8(1.5%)	61	5.7	0.9	152
36F to 60F			68	5.7	0.9	159
72F			81	5.4	1.0	176
84F to 96F			105	5.3	1.1	203
120F to 144F			165	4.7	1.2	275
288F			215	4.5	1.3	329

**Table 5. Mechanical and Environmental Properties**

Test list	Method	Test value	Acceptance criteria
Tensile strength	IEC 60794-1-2 E1	Max. Allowable tension (MAT) for 1 hour.	≤ 0.1dB
Crush resistance	IEC 60794-1-2 E3	1,000N x 100mm plate x 1point for 10min	≤ 0.1dB
Impact resistance	IEC 60794-1-2 E4	5J x 5 different point impacts	≤ 0.1dB
Cable twist resistance	IEC 60794-1-2 E7	2m sample, ±180° X 10 cycles	≤ 0.1dB
Cable bend resistance	IEC 60794-1-2 E11	Radius 20 x O.D. of cable x 4turns x 10cycles	≤ 0.1dB
Temperature cycling	IEC-60794-1-2 F1	+23 °C -> -40 °C -> +70 °C for 12 hours each step X 1 cycle	≤ 0.1dB/km
Water penetration	IEC 60794-1-2 F5	3m sample x 1m height for 1hour	No leakage

The test can occur in 0.03dB error of the equipment.

The acceptance criteria of the attenuation variation are the discrepancy after and before the test.

**Table 6. Optical Fiber Characteristics**

Characteristics of fiber		Description and value
		G.652.D
Mode Field Diameter		$9.2 \pm 0.4 \mu\text{m}$ at 1310nm
Mode Field Concentricity Error		$\leq 0.6 \mu\text{m}$
Cladding Diameter		$125 \pm 1 \mu\text{m}$
Cladding Non Circularity		$\leq 1\%$
Primary Coating Diameter		$245 \pm 10 \mu\text{m}$
Attenuation	@ 1310nm	$\leq 0.36 \text{ dB/km}$
	@ 1383nm	$\leq 0.36 \text{ dB/km}$
	@ 1550nm	$\leq 0.22 \text{ dB/km}$
Dispersion	@ 1288~1339nm	$\leq 3.5 \text{ ps}/(\text{nm}\cdot\text{km})$
	@ 1550nm	$\leq 18 \text{ ps}/(\text{nm}\cdot\text{km})$
Zero Dispersion Wavelength		1300nm - 1324nm
Cable Cut off Wavelength		$\leq 1260\text{nm}$
Zero Dispersion Slope		$0.092 \text{ ps}/(\text{nm}^2\cdot\text{km})$
Fiber Proof Test Level		100kpi (0.69Gpa)
Cable PMD <sub>Q</sub> (Linked Value)		$\leq 0.2 \text{ ps}/\text{km}^{1/2}$