



G.657A1



144F / 288F



200 μm

1. GENERAL

1.1 Scope

This Specification covers the design requirements and performance standard for the supply of optical fibre cable in the industry. Mainframe Communications ensures a stable quality control system for our cable products through several programs including ISO 90001, ISO 14001 and OHS.



Cable type :
GCYFY-144/288B6a1 200 μm



Application :
Suitable for air blowing installation

1.2 Reference

The cable offered by Mainframe Communications are designed, manufactured and tested according to the standards as follows:

ITU-G657	Characteristics of a single-mode optical fiber
IEC 60794-1-1	Optical fiber cables- part1-1-Generic specification-General
IEC 60794-1-21	Optical fiber cables- part1-2-Generic specification-Basic optical cable test procedure-Mechanical test methods
IEC 60794-1-22	Optical fiber cables- part1-2-Generic specification-Basic optical cable test procedure-Environmental test methods
IEC 60794-3	Optical fiber cables- part3-Sectional specification- Outdoor cables
IEC 60794-5-10	Optical fibre cables –Part 5-10 Family specification for outdoor microduct optical and protected microducts for installation by blowing

1.3 Lifetime

Optical fibre cables supplied in compliance with this specifications is capable to withstand the typical service condition for a period of twenty-five (25) years without detriment to the operation characteristics of the cable.

1.4 Application

Item	Value
Operation temperature	-30 °C~+70 °C
Installation temperature	-10 °C~+50 °C
Storage temperature	-30 °C~+70 °C
Static bending radius	10 times the cable diameter
Dynamic bending radius	20 times the cable diameter



2. OPTICAL FIBER

Optical Fibres supplied in this specification meet the requirements of ITU-G657A1 200um.

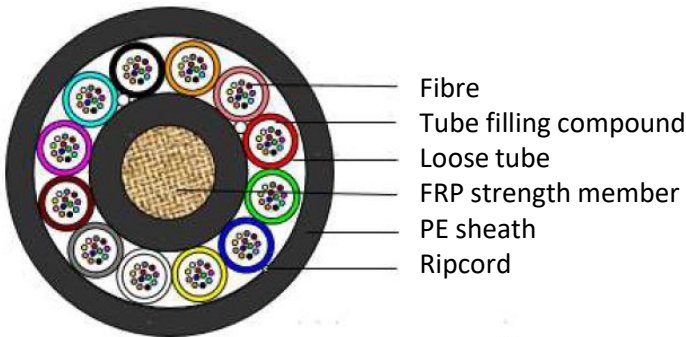
Category	Description	Specification
Geometrical Characteristics	Cladding diameter	125.0±0.7 μm
	Cladding non-circularity	≤ 0.7 %
	Core concentricity error	≤ 0.5 μm
	Coating diameter	190 ~ 210 μm (Before Colored) 195~225 μm (Colored)
	Coating/cladding concentricity error	≤ 12.0 μm
Optical Characteristics	Mode field diameter at 1310 nm	8.4 ~ 9.2 μm
	Attenuation at 1310 nm	≤ 0.36 dB/km
	Attenuation at 1550 nm	≤ 0.22 dB/km
	Point discontinuity at 1310nm and 1550nm	≤ 0.05dB
	Zero dispersion wavelength	1300 ~ 1324 nm
	Zero dispersion slope	≤0.092 ps/(nm ² ·km)
	Cable cut-off wavelength	≤ 1260 nm
	Polarization mode dispersion individual fiber	≤ 0.2 ps/√km
	Polarization mode dispersion design link value (M=20, Q=0.01%)	≤ 0.1 ps/√km
	Macro-bend loss (10 turns, 15mm radius)	1550nm: ≤ 0.25 dB; 1625nm: ≤1.0 dB;
Macro-bend loss (1 turn, 10mm radius)	1550nm: ≤ 0.75 dB; 1625nm: ≤ 1.5 dB;	
Mechanical Specification	Proof stress level	≥100kpsi (0.69 GPa)
	Coating strip force(peak value)	1.3~8.9N
	Dynamic Fatigue Parameter (nd)	≥20
	Fiber curl (Radius)	≥2 m

3. OPTICAL CABLE

3.1 Technical Characteristics

- ⊗ The unique second coating and stranding technology provide the fibres with enough space and bending endurance, which ensure good optical property of the fibres in the cable
- ⊗ Accurate process control ensures good mechanical and temperature performance
- ⊗ High quality raw material guarantees the long service life of cable

3.2 Cross section of cable



GCFY-144B6a1 200um
Structure of other fibre counts referred to 3.4
Schematic for reference only

3.3 Fiber and Loose Tube identification

The color code of fibres and loose tube will be identification in accordance with the following color sequence, other sequence also is available.

	1	2	3	4	5	6
Fiber Color Code	Blue	Orange	Green	Brown	Grey	White
	7	8	9	10	11	12
	Red	Black	Yellow	Violet	Pink	Aqua

	1	2	3	4	5	6
	Blue	Orange	Green	Brown	Grey	White
	7	8	9	10	11	12
	Red	Black	Yellow	Violet	Pink	Aqua
Tube Color Code	13	14	15	16	17	18
	Blue with black stripe	Orange with black stripe	Green with black stripe	Brown with black stripe	Grey with black stripe	White with black stripe
	19	20	21	22	23	24
	Red with black stripe	Black with white stripe	Yellow with black stripe	Violet with black stripe	Pink with black stripe	Aqua with black stripe

The color of the fillers will be natural.



3.4 Dimensions and Descriptions of Cable Constructions

Item	Contents	Value			
		24	48	144	288
Loose Tube	Number	2	4	12	24
	Outer diameter (±0.1mm)	1.2			
Filler	Number	4	2	0	0
Fiber counts per tube	G.657A1 200um	12			
Central strength member	Material	FRP			
	Diameter (mm)	1.2	1.2	2.4	2.4
	Diameter of PE layer	/	/	3.6	/
Outer sheath	Material	HDPE			
	Color	Black			
	Thickness (mm)	Approx. 0.45			
Cable diameter (±0.3mm)		4.5	4.5	6.9	8.0
Cable weight (kg/km) Approx.		18	18	43	58
For micro-duct inside (mm)		6~8	6~8	10~14	10~14
Max. tensile strength (N)		200	200	1000	1000
Crush (N/100mm)		Short term: 500 Long term: 200			

4. MECHANICAL, ELECTRICAL AND ENVIRONMENTAL TEST CHARACTERISTICS

The finished cables can be subjected to the following mechanical, electrical and environmental conditions.

Item	Test Method	Requirements
Tensile performance	IEC 60794-1-21-E1 Load: according to short term tensile described above. Cable length under tension: Not less than 50m. Duration of load sustain: 1min. Velocity of transfer device: 10mm/min	The maximum fiber strain less than 0.6% under maximum tensile short-term load. The maximum increase in attenuation less than 0.1dB. No change in attenuation after test at 1550nm. Under visual examination without magnification, no damage to the sheath or to the cable elements after test.
Crush	IEC 60794-1-21-E3 Load: 500N Duration of load: 1min	No change in attenuation after test at 1550nm. Under visual examination without magnification, no damage to the sheath or to the cable elements. The imprint of the striking surface on the sheath is not considered mechanical damage.
Impact	IEC 60794-1-21-E4 Radius: 300 mm Impact energy: 1 J Impact number: 1 Impact points: 3	The maximum increase in attenuation less than 0.1dB after test. Under visual examination without magnification, no damage to the sheath or to the cable elements.
Repeated bending	IEC 60794-1-21-E6 Bending radius: 20 times cable diameter Cycles: 25 Load: 25N Duration of cycle: Approximately 2s.	No change in attenuation at 1550nm after test. Under visual examination without magnification, no damage to the sheath or to the cable elements.
Torsion	IEC 60794-1-21-E7 Cycles:5 Length under test: 1m Turns: $\pm 180^\circ$ Load: 40N	The variation on attenuation for each fiber less than 0.05dB at 1550nm Under visual examination without magnification, no damage to the sheath or to the cable elements. No permanent change in attenuation after test
Temperature cycling	IEC 60794-1-22-F1 Sample length: at least 1000m Temperature range: $-30^\circ\text{C} \sim +70^\circ\text{C}$ Cycles: 2 Temperature cycling test dwell time: 12h	There is no change in attenuation coefficient at 1550nm after the test.
Water Penetration	IEC 60794-1-22-F5B Time : 24 hours Sample length : 3m Water height : 1m	No water leakage
Other parameters	According to IEC 60794	

Remark: "No attenuation changes" is considered as the attenuation changes ≤ 0.05 dB.



5. PACKAGING AND DRUM

5.1 Cable Sheath Marking

Unless otherwise specified, the cable sheath marking shall be as follows:

- ⊗ Color: white
- ⊗ Contents: Mainframe Communications, the year of manufacture, the type of cable, length marking
- ⊗ Interval: 1m

5.2 Reel length

Standard reel length: 4 km

5.3 Cable drum

The cables are packed in fumigated wooden drums.

5.4 Cable packing

Both ends of the cable will be sealed with suitable plastic caps to prevent the entry of moisture during shipping, handling and storage. The inner end is available for testing.