DUCT CABLE

AR-1FGPE-xxF G652D

1. GENERAL

1.1. SCOPE

This Specification covers the design requirements and performance standard for the supply of optical fibre cable in the industry. ARTIC ensures a stable quality control system for our cable products through several programs including ISO 9001, ISO 14001 and ROHS.

Cable type	Application
AR-1FGPE-xxF-G652D	Underground - duct / Aerial - winding

xx represents the fibre counts of the cable.

1.2. REFERENCE

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

ITU-T G.652	Characteristics of a single-mode optical fibre
IEC 60794-1-1	Optical fibre cables-part 1-1: Generic specification-General
IEC 60794-1-2	Optical fibre cables-part 1-2: Generic specification-Basic optical cable test procedure
IEC 60794-3	Optical fibre cables-part 3: Sectional specification-Outdoor cables
IEC 60794-3-10	Optical fibre cables-part 3-10: Outdoor cables-Family specification for duct and direct buried optical communication cables
IEC 60794-3-11	Optical fibre cables-Part 3-11: Outdoor cables-Detailed specification for duct and directly buried single-mode optical fibre telecommunication cables

1.3. LIFE TIME

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	-40 ºC～+70 ºC
Storage temperature	-40 ºC～+70 ºC
Installation temperature	-40 ºC～+70 ºC
Static bending radius	10 times the cable diameter
Dynamic bending radius	20 times the cable diameter

2. OPTICAL FIBRE

Optical Fibres supplied in this specification meet the requirements of ITU-T G.652.D

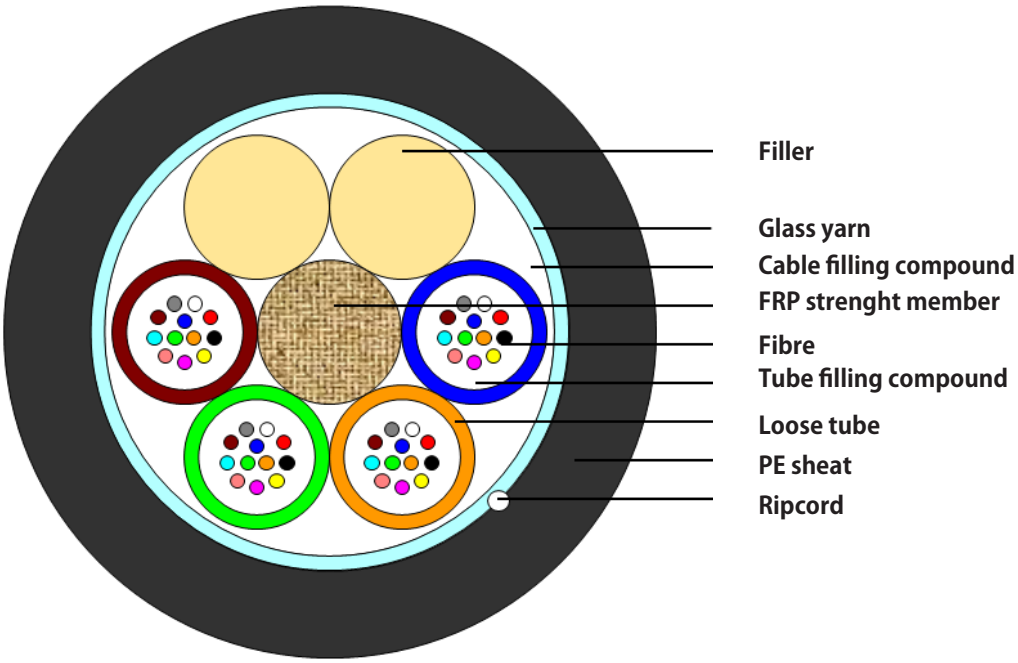
Parameter	Specification
MFD (1310nm)	9.1±0.4um
MFD (1550nm)	10.4±0.5um
Cladding diameter	125 ±1.0um
Fiber diameter	245±10um, with UV coating, and colored to : 250±15um
Core/cladding concentricity error	≤ 0.6um
Coating/cladding concentricity error	≤ 12.0um
Cladding non circularity	≤ 1.0%
Cut off wavelength	λcc ≤1260nm
Attenuation coefficient	1310nm: 0.36dB/km 1550nm: 0.22dB/km
Bending-loss performance of optical fiber @1310nm&1550nm	≤0.05dB (100 turns around a mandrel of 60mm diameter)
Polarization mode dispersion maximum individual fibre	≤0.2ps/ √km
Polarization mode dispersion link value	≤0.1ps/ √km
Zero-dispersion wavelength	1300~1324nm
Zero-dispersion slope	≤0.092ps/nm2*km

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 CABLE



3.3. FIBRE AND LOOSE TUBE IDENTIFICATION

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

Fibre color code	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	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	6+12 tube	Inner 1	Inner 2	Inner 3	Inner 4	Inner 5	Inner 6
		Blue	Orange	Green	Brown	Grey	White
		Outer 1	Outer 2	Outer 3	Outer 4	Outer 5	Outer 6
		Red	Black	Yellow	Violet	Pink	Aqua
		Outer 7	Outer 8	Outer 9	Outer 10	Outer 11	Outer 12
		Blue with black stripe	Orange with black stripe	Green with black stripe	Brown with black stripe	Grey with black stripe	White with black stripe

Tube color code	7+13 tube	Inner 1	Inner 2	Inner 3	Inner 4	Inner 5	Inner 6
		Blue	Orange	Green	Brown	Grey	White
		Inner 7	Outer 1	Outer 2	Outer 3	Outer 4	Outer 5
		Red	Black	Yellow	Violet	Pink	Aqua
		Outer 6	Outer 7	Outer 8	Outer 9	Outer 10	Outer 11
		Blue with black stripe	Orange with black stripe	Green with black stripe	Brown with black stripe	Grey with black stripe	White with black stripe
		Outer 12	Outer 13				
		Red with black stripe	Black with white stripe				

Tube color code	9+15 tube	Inner 1	Inner 2	Inner 3	Inner 4	Inner 5	Inner 6
		Blue	Orange	Green	Brown	Grey	White
		Inner 7	Inner 8	Inner 9	Outer 1	Outer 2	Outer 3
		Red	Black	Yellow	Violet	Pink	Aqua
		Outer 4	Outer 5	Outer 6	Outer 7	Outer 8	Outer 9
		Blue with black stripe	Orange with black stripe	Green with black stripe	Brown with black stripe	Grey with black stripe	White with black stripe
		Outer 10	Outer 11	Outer 12	Outer 13	Outer 14	Outer 15
		Red with black stripe	Black with white stripe	Yellow with black stripe	Violet with black stripe	Pink with black stripe	Aqua with black stripe

3.4. DIMENSIONS AND DESCRIPTIONS

The standard optical cable structure is shown in the following table, other structure and fibre count are also available according to customer requirements.

Parameter	Contents	Value						
		6/12/24	48/72	96	144	216	240	288
Structure	Type	1+6	1+6	1+8	1+12	1+6+12	1+7+13	1+9+15
Loose tube	Max Fiber counts/tube	6	12					
	Outer diameter (mm)	1.8	2.1					
	Material	PBT						
Central strenght member	Material	FRP						
	Diameter (mm)	2.0	2.25	2.6	3.5	2.25	2.8	2.6
	PE layer diameter (mm)	-	-	3.5	6.1	-	-	4.2
Water blocking	Material	Cable filling compound						
Peripheral strenght member	Material	Glass yarn						
Sheat	Material	HDPE						
	Color	Black						
	Thickness (mm)	Nominal:1.5						
Ripcord	Number	Red						
Cable diameter(mm) Approx.		9.0	9.8	11.1	13.7	14.1	14.6	16.0
Cable weight(kg/km) Approx.		70	84.6	110	176	174	198	225

3.4. MAIN MECHANICAL AND ENVIRONMENTAL PERFORMANCE

Item	Tension (N)	Crush(N/100mm)	
		Short term	Long term
6~288	1500	1000	300

4. MECHANICAL, PHYSICAL AND ENVIRONMENTAL TEST CHARACTERISTICS

The mechanical and environmental performance of the cable are in accordance with the following table. Unless otherwise specified, all attenuation measurements required in this section shall be performed at 1550nm.

Items	Test method	Requirements
Tension	**IEC 60794-1-2-E1** Load:According to 3.5 Sample length: Not less than 50m. Duration time: 1min.	Additional attenuation: ≤0.1dB after test No damage to outer jacket and inner elements
Crush	**IEC 60794-1-2-E3** Load: According to 3.5 Duration of load: 1min	Additional attenuation: ≤0.1dB after test No damage to outer jacket and inner elements
Impact	**IEC 60794-1-2-E4** Radius: 300 mm Impact energy: 10 J Impact number: 1 Impact points: 3	Additional attenuation: ≤0.1dB No damage to outer jacket and inner elements
Repeated Bending	**IEC 60794-1-2-E6** Bending radius: 20*D Cycles: 25 Load: 150 N	Additional attenuation: ≤0.1dB No damage to outer jacket and inner elements
Torsion	**IEC 60794-1-2-E7** Cycles:10 Length under test: 1m Turns: +/-180° Load: 150 N	Additional attenuation: ≤0.1dB No damage to outer jacket and inner elements
Water Penetration	**IEC 60794-1-2-F5B** Time : 24 hours Sample length : 3m Water height : 1m	No water leakage
Temperature cycling	**IEC 60794-1-2-F1** Sample length: at least 1000m Temperature range:-40 ºC~+70 ºC Cycles:2 Temperature cycling test dwell time: 12 hours	The change in attenuation coefficient shall be less than 0.05 dB/km.
Other parameters		According to **IEC 60794-1**

5. PACKAGING AND DRUM

5.1 CABLE SHEATH MARKING

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

- Color: white
- Contents: ARTIC, the year of manufacture, the type of cable, cable number, length marking
- Interval: 1 m

Outer sheath marking legend can be changed according to user's requests.

5.2 REEL LENGHT

Standard reel length: 2/4 km/reel, other length is also available.

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.