



SINGLE JACKET
FIBER GLASS
DIELECTRIC CABLE
AR-1FGTDPE-xxF-G652D

1. GENERAL

This specification covers the design requirements and performance standard for the supply of optical fibre cable in the industry. It also includes ARTIC premium designed cable with optical, mechanical and geometrical characteristics.

Cable type	Application
AR-1FGTDPE-xxF-G652D	Duct installation

xx represents the fibre counts of the cable.

1.1. CABLE DESCRIPTION

ARTIC cable has excellent optical transmission and physical performance, to meet customer requirements.

1.2. QUALITY

ARTIC ensures a stable quality control system for our cable products through several programs including ISO 9001, ISO 14001 and ROHS.

1.3. RELIABILITY

Initial and periodic qualification tests for raw material and cable product are performed to assure the cable's performance and durability in the field environment.

1.4. REFERENCE

ITU-T G.652D	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 60794-4-10	Optical fibre cables-part 3-10: Outdoor cables-Family specification for duct and direct buried optical communication cables
IEC 60794-4-11	Optical fibre cables-Part 3-11: Outdoor cables-Detailed specification for duct and directly buried single-mode optical fibre telecommunication cables

1.5. 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.

2. OPTICAL FIBRE

Optical properties of the SM fibre are achieved through a germanium doped silica based core with a pure silica cladding which meets ITU-T G652D, UV curable acrylate protective coating is applied over the glass cladding to provide the necessary maximum fibre lifetime.

Geometrical, optical, and mechanical characteristics of fibre in cable as the following table:

Parameter	Specification
MFD (1310nm)	8.7~9.5 μm
Cladding diameter	125 \pm 1.0 μm
Fiber diameter	235~255 μm , with UV coating, and colored to : 250 \pm 15 μm
Core/cladding concentricity error	\leq 0.6 μm
Coating/cladding concentricity error	\leq 12.0 μm
Cladding non circularity	\leq 1.0%
Cut off wavelength	$\lambda_{cc} \leq$ 1260nm
Attenuation coefficient	1310nm: 0.36dB/km 1550nm: 0.22dB/km
Bending-loss performance of optical fiber @1310nm&1550nm	\leq 0.05dB (100 turns around a mandrel of 50mm diameter)
Polarization mode dispersion maximum individual fibre	\leq 0.2ps/ $\sqrt{\text{km}}$
Polarization mode dispersion link value	\leq 0.1ps/ $\sqrt{\text{km}}$
Zero-dispersion wavelength	1300~1324nm
Zero-dispersion slope	\leq 0.092ps/nm ² ·km

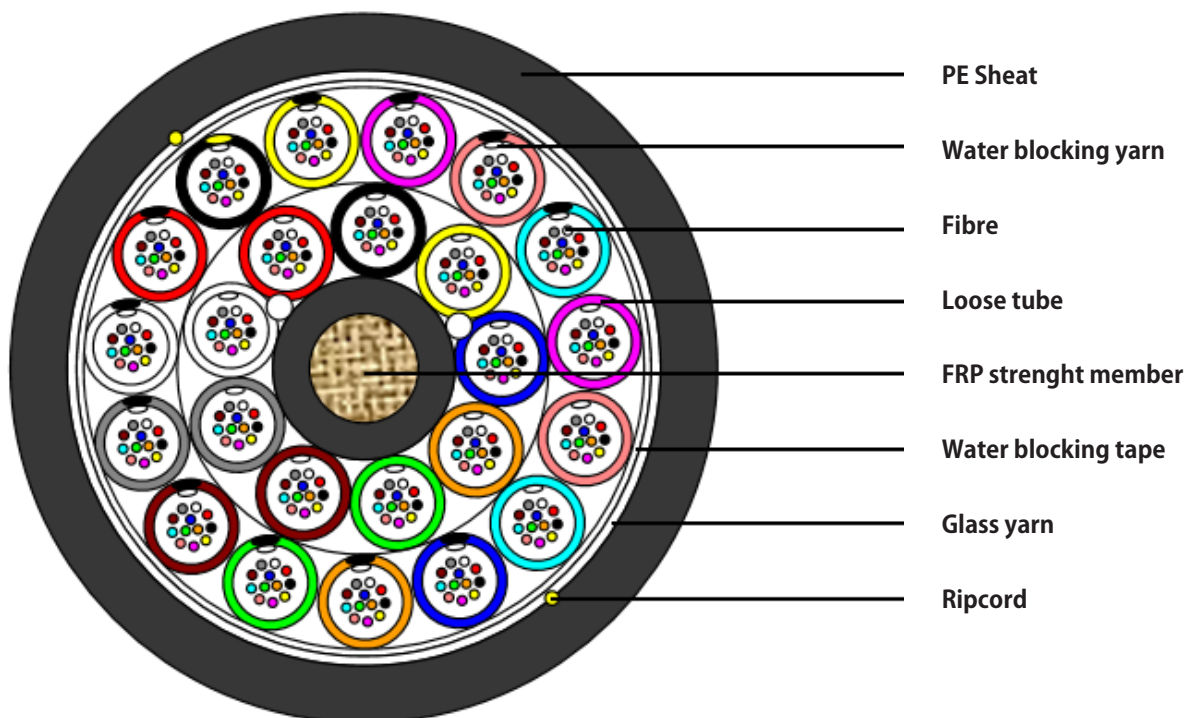
3. OPTICAL CABLE

3.1. GENERAL DESIGN

- Optical fibres are housed in loose tubes that are made of high-modulus plastic and filled without any waterproof compounds except water block yarns, and there is no any jelly in the cable core, so the cable is totally dry type and different from those semi-dry cables.
- FRP is applied as central strength member.
- PP loose tubes are SZ stranded around the central strength member.
- Dry water blocking material is used in and over the cable core to prevent it from water ingress.
- Polyethylene is applied as sheath.
- Ripcords for easy removal of jacket.

3.2. CONSTRUCTION

3.2.1 CROSS SECTION CABLE



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.
- Gel-Free water blocking design simplifies access, saves time and avoids environmental pollution, small diameter and light weight extend installation length.
- High quality raw material guarantee the long service life of cable.

3.2. MAIN MECHANICAL AND ENVIRONMENTAL PERFORMANCE OF CABLE

Fiber counts	Tensile performance(N)		Crush(N/100mm)	
	Short term	Long term	Short term	Long term
12-288	2700	900	1000	300

Operation temperature: -40°C~+70°C

3.2.2. DIMENSIONS AND DESCRIPTIONS OF CABLE CONSTRUCTIONS

The standard structure of AR-1FGTDPE-xxF-G652D cable is shown in the following table, other structure and fibre count are also available according to customer requirements.

Parameter	Contents	Value								
		12	24	36	48	72	96	120	144	288
Loose tube	Number	1	2	3	4	6	8	10	12	24
	Outer diameter (mm)	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Filler	Number	5	4	3	2	0	0	0	0	0
Max. fiber counts per tube	G.652D	12	12	12	12	12	12	12	12	12
Central Strength member	Material	FRP								
	Diameter (mm)	2.6	2.6	2.6	2.6	2.6	3.5	3.5	3.5	3.5
	PE layer diameter (mm)	-	-	-	-	-	4.2	5.6	7.2	4.8
Water Blocking Material	Material	Water Blocking Tape & Yarn								
Strength member	Material	Glass yarn								
Sheath	Material	HDPE								
	Diameter (mm)	Black								
	PE layer diameter (mm)	Nominal: 1.6								
Ripcord	Number	2								
Cable diameter(mm) Approx.		115	11.5	11.5	11.5	11.5	13.1	14.5	16.1	18.5
Cable weight(kg/km) Approx.		95					113	143	177	217













3.2.3. COLOR CODE OF THE FIBRE

























Each fibre can be identifiable throughout the length of the cable in accordance with the following color sequence.

Fiber 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

3.2.3. COLOR CODE OF THE LOOSE TUBE AND FILLER

The loose tubes will be identifiable in accordance with the following color sequence, other sequence also is available.

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	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 ring	 Black with yellow stripe	 Yellow with black stripe	 Violet with black stripe	 Pink with black stripe	 Aqua with black stripe

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 3.2.1 Sample length: Not less than 50m. Duration time: 1min.	Additional attenuation: ≤ 0.1 dB after test No damage to outer jacket and inner elements
Crush	IEC 60794-1-2-E3 Load: According to 3.2.1 Duration of load: 1min	Additional attenuation: ≤ 0.1 dB after test No damage to outer jacket and inner elements
Impact	IEC 60794-1-2-E4 Radius: 300 mm Impact energy: 4.5 J Impact number: 1 Impact points: 3	Additional attenuation: ≤ 0.1 dB No damage to outer jacket and inner elements

Repeated Bending	IEC 60794-1-2-E6 Bending radius: 20*D Cycles: 30 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: +/- 90° 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 °C~+70 °C Cycles:2 Temperature cycling test dwell time: 12 hours	The change in attenuation coefficient shall be less than 0.1 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:

- Method: Inkjet
- Color: white
- Contents: ARTIC, the year of manufacture, the type of cable, cable number, length marking
- Interval: $1 \pm 1\%$ m

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

5.2 REEL LENGTH

Standard reel length: 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 cable ends are protected against water penetration and firmly secured to the drum, so the cable cannot move and the turns cannot slide when it is moved, handled or laid. The inner end has around 2 meters of accessible length to perform reception tests.