



SINGLE JACKET METALLIC ARMOR TOTALLY DRY CABLE

AR-1FTDSPE-xxF-G652D/G657-A1
/G655

OPTICAL FIBRE CABLE TECHNICAL SPECIFICATION

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-1FTDSPE-xxF-G652D/G657-A1/G655	Duct installation

xx represents the fibre count.

1.2 Reference

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

ITU-T G.652D	Characteristics of a single-mode optical fibre ARTIC
ITU-T G.657A1	Characteristics of a single-mode optical fibre ARTIC.
ITU-T G.655	Characteristics of a non-zero dispersion-shifted single-mode optical fibre and cable
IEC 60794-1-1	Optical fibre cables-part 1-1: Generic specification-General
IEC 60794-1-21	Optical fibre cables-part 1-2: Generic specification-Basic optical cable test procedure - Mechanical test methods.
IEC 60794-1-22	Optical fibre cables-part 1-2: Generic specification-Basic optical cable test procedure - Environmental test methods.
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 °C~+70 °C
Storage temperature	-40 °C~+75 °C
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)	8.7~9.5um
Cladding diameter	125±1.0um
Fiber diameter	235~255um, 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	$\lambda_{cc} \leq 1260\text{nm}$
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 50mm 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/nm ² ·km

Optical Fibres supplied in this specification meet the requirements of ITU-T G.657A1

Parameter	Specification
MFD (1310nm)	8.4~9.2um
Cladding diameter	125±0.7um
Fiber diameter	235~255um, with UV coating, and colored to 250±15um
Core/cladding concentricity error	≤ 0.5um
Coating/cladding concentricity error	≤ 12.0um
Cladding non circularity	≤ 0.7 %
Cut off wavelength	$\lambda_{cc} \leq 1260\text{nm}$
Attenuation coefficient	1310nm: 0.36dB/km 1550nm: 0.22dB/km
Bending-loss performance of optical fiber @1550nm	≤0.25dB (10 turns around a mandrel of 30mm 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/nm ² ·km

Optical Fibres supplied in this specification meet the requirements of ITU-T G.655

Category	Description	Specification
Geometrical Characteristics	Cladding diameter	125.0 ± 1.0 μm
	Cladding non-circularity	≤ 1.0 %
	Core concentricity error	≤ 0.6 μm
	Coating diameter	245 ± 10 μm (Before Colored) 250 ± 15 μm (Colored)
Optical Characteristics	Coating/cladding concentricity error	≤ 12.0 μm
	Mode field diameter at 1550 nm	9.1~10.1 μm
	Attenuation coefficient at 1550nm	≤ 0.24 dB/km (after cable)
	Point discontinuity at 1550nm	≤ 0.05dB
	Zero-dispersion wavelength	≤1520 nm
	Dispersion slope at 1550nm	≤0.084 ps/(nm ² ·km)
	Cable cut-off wavelength (λ _{cc})	≤ 1450 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 (100 turns, 30mm radius)	1550&1625nm: ≤ 0.05 dB

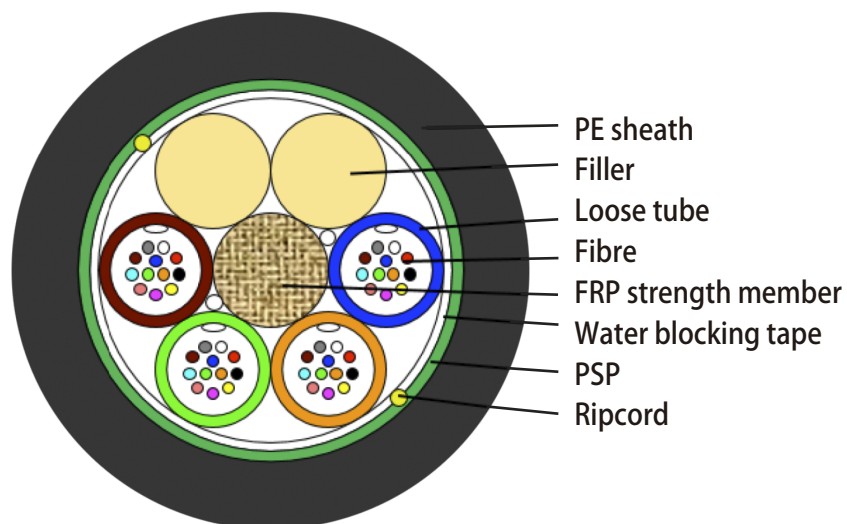
Category	Description	Specification
Mechanical Characteristics	Proof stress level	$\geq 100\text{kpsi}$ (0.69 GPa)
	Coating strip force (peak value)	1.3~8.9N
	Dynamic Fatigue Parameter (nd)	≥ 20
	Fiber curl (Radius)	$\geq 2\text{ m}$

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



3.3 Fibre and Loose Tube Identification

The color code of fibres and loose tube will be identification in accordance with the following color sequence. The color of the tube will be natural.

	1	2	3	4	5	6
Color code	 Blue	 Orange	 Green	 Brown	 Grey	 White
	 Red	 Black	 Yellow	 Violet	 Pink	 Aqua
	 Blue with black strip	 Orange with black strip	 Green with black strip	 Brown with black strip	 Grey with black strip	 White with black strip
	 Red with black strip	 Black with black strip	 Yellow with black strip	 Violet with black strip	 Pink with black strip	 Aqua with black strip

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.

Item	Contents	Value					
		12	24	48	96	144	288
Loose tube	Number	1	2	4	8	12	24
	Outer Diameter (mm)	2.4					
Filler	Number	5	4	2	0	0	0
Max. fiber counts per tube		12					
Central Strength member	Material	FRP					
	Diameter (mm)	2.6		3.5		3.5	
	PE layer diameter (mm)	-		4.2		4.8	
Water Blocking	Material	Water Blocking Tape & Yarn					
Armor	Material	Steel Tape					
Sheath	Material	MDPE					
	Color	Black					
Ripcord	Thickness (mm)	1.6					
	Number	2					
	Color	Yellow					
Cable diameter(mm) Approx.		12.5		14.3		17.2	
Cable weight(kg/km) Approx.		140		165		290	

3.5 Mail Mechanical and Environmental Performance

Main mechanical performance

Tensile performance (N)		Crush (N/100mm)	
Short term	Long term	Short term	Long term
2700	800	2200	1100

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 60794-1-21-E1 Load: According to 3.5 Sample length: Not less than 50m. Duration time: 1min	Additional attenuation: ≤ 0.15 dB after test. No damage to outer jacket and inner elements.
Crush	IEC 60794-1-21-E3 Load: According to 3.5 Duration of load: 1min	Additional attenuation: ≤ 0.1 dB after test. No damage to outer jacket and inner elements.
Impact	IEC 60794-1-21-E4 Radius: 300 mm. Impact energy: 10J Impact number: 1. Impact points: 3	Additional attenuation: ≤ 0.1 dB No damage to outer jacket and inner elements.
Bend	IEC 60794-1-21-E11A Mandrel radius: $10 \times D$ Turns: 10 Cycles: 5	Additional attenuation: ≤ 0.1 dB No damage to outer jacket and inner elements.
Repeated bending	IEC 60794-1-21-E6 Bending radius: $20 \times D$ Cycles: 30 Load: 150N	Additional attenuation: ≤ 0.1 dB No damage to outer jacket and inner elements.
Torsion	IEC 60794-1-21-E7 Cycles: 10. Length under test: 1m Turns: $\pm 90^\circ$. Load: 150N	Additional attenuation: ≤ 0.1 dB No damage to outer jacket and inner elements.
Water Penetration	IEC 60794-1-22-F5B Time : 24 hours. Sample length : 3m. Water height : 1m	No water leakage.
Temperature cycling	IEC 60794-1-22-F1 Sample length: at least 1000m. Temperature range: $-40^\circ\text{C} \sim +70^\circ\text{C}$ 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:

- Color: white.
- Content: ARTIC, the year of manufacture, the type of cable, cable number, length marking.
- Interval: 1m.
- Outer sheath marking legend can be changed according to user's requests.

5.2 Reel Length

Standard reel length: 4Km/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.