

FIBER OPTIC CABLE PRODUCT

ARSS FIBER OPTIC SINGLE JACKET CABLE.



PRODUCT DESCRIPTION

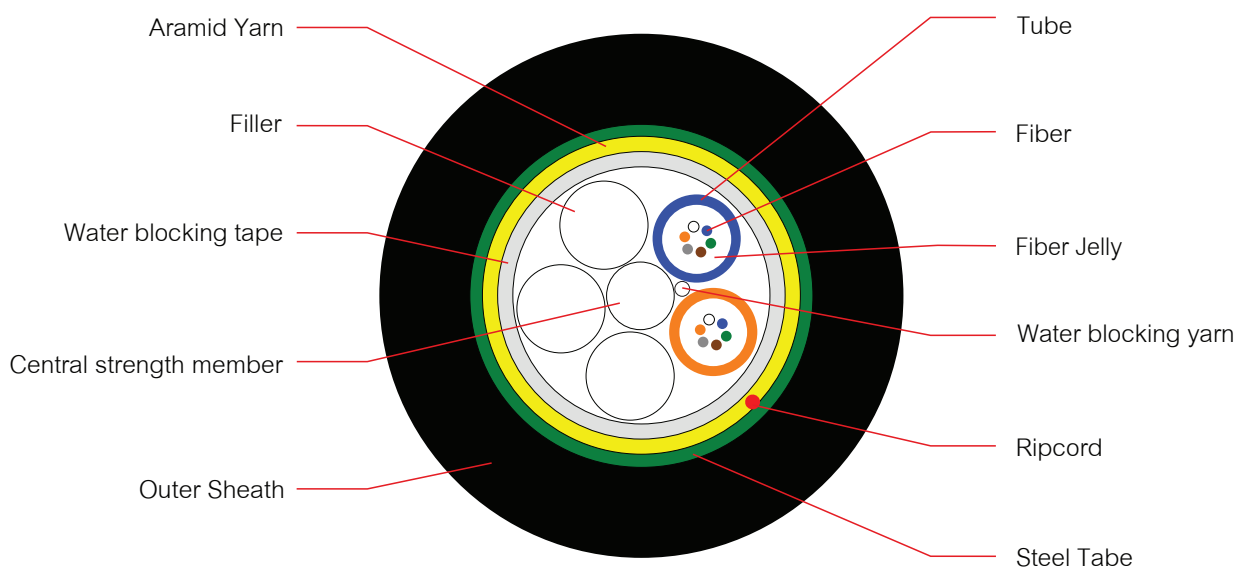
- Provide additional mechanical protection
- low friction installation
- Excellent protection from environmental hazards
- Code colour fiber and loose tube
- The cable shall be used for duct or aerial installed
- This specification covers the requirement of the ARSS (Anti Rodent Self Support) single mode optical fiber cable series

APPLICATION

Environment with high electric field strength in the Power communication system and the area where frequent thunder happens.

STANDARD

- TIA/EIA-598-A ,TIA/EIA-598-C, ANSI/TIA/EIA-568-B.3, ANSI/ TIA-568-C.3, ANSI/TIA/EIA-568-D.3, ANSI/ICEA640, EN 50173-1
- IEEE802.3 (LAN, Ethernet Fast Ethernet, Gigabit Ethernet and 10 Gigabit Ethernet) , 10 GEthernet, ATM, FDDI, FTTX,Fiber Channel,CATV, Communication
- ISO/IEC 11801:2017, ISO/IEC 11801:2011(Ed.2.2)
- Telcordia (Bellcore) GR-20CORE
- IEC 60793-2B1.3, IEC 60794-1-2, ICEA696, IEC61034-2, IEC60754-2, IEC 60793, IEC 596
- TIS 2166
- ITU-T G.652D, ITU-TG 657A2
- RoHS compliant
- Made in Thailand : MIT
- ASTM D1603 , ASTM D638 , ASTM D1693



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CONSTRUCTION

Number of fibers		6-24	36-60	72	96
Fiber Material	Core & Clading	High Grade Sillica, Compound Silica Glasses orequivalent material			
Loose Tube	Multi-Twisted Tube				
	Material	PBT (Polybutylene Terephthalate) with color coding			
	Filling Compound	Thixotropic Jelly Compound			
	Fiber per Tube	6	12	12	12
	Number	1-4	3-5	6	8
Filler Rod	Material	Plastic rod, natural color			
	Number	4-1	2-0	0	0
	Diameter	2.2 ± 0.1 mm.			
Stranding	Method	Reverse oscillating lay (ROL) technique (SZ Direction)			
Water Blocking Element	Material	shall use the dry core technology and shall be fullywater-blocked with the dry swellable materials such astape or yarn or equivalents			
Central Strength Member	Material	FRP (Fiberglass Reinforce with Plastic)			
	Color	Natural			
Water Blocking Yarn	Material	Suitable Water Swellable Materials (Dry-Core Technology)			
Binder & Wrapping	Material	Polyester yarns			
Water Blocking Tape	Thickness	0.3 ± 0.05 mm.			
Ripcord	Material	Polyester			
	Number	2			
Additional Strength Member	Material	Water blocking E-glass yarn (aramid yarn is available on request)			
Armored	Material	Corrugated chrome steel tape coated with polymer to prevent rodents (AR)			
	Thickness	Steel & Polymer coating : 0.25 mm. , polymer 0.05 mm			
Outer Sheath	Material	UV-Proof, Black HDPE (Anti Rodent Repellent/Rodent Repellent(LS2)) , The cable sheath shall be made of UV-Proof Flame Retardant Polyethylene (FRPE) and containing a suitable antioxidant to offer maximum protection in hostile environment (detail as shown in Table 3 Cable Sheath specification). *Do not reused material or mixed			
Thickness(Approx.)		Minimum thickness 1.5 mm. (6 – 144 fibers) Minimum thickness 2.0 mm (216 – 312 fibers)			
Cable Diameter (Approx.)		10.3 ± 1 mm.	10.7 ± 1 mm.	11.2 ± 1 mm.	12.4 ± 1 mm.
Cable Weight (Approx.)		90 ± 10kg./km.	100 ± 10kg./km.	110 ± 10kg./km.	135 ± 10kg./km.
Temperature Range	Operation Temperature	-40°C to +75°C			
	Installation Temperature	-40°C to +75°C			
	Storage/Shipping Temperature	-40°C to +75°C			
Numerical Aperture		0.130 ± 0.010			

OPTICAL FIBER CHARACTERISTICS

CATEGORY	DESCRIPTION	SPECIFICATIONS
Optical Specifications		ITU-T G.652D(Singlemode OS2) 9/125 μm (OS2) ITU-T G651(Multimode) 62.5/125 μm , 50/125 μm
Attenuation	@1310nm	$\leq 0.34/\leq 0.33\text{dB/km}$
	@1383nm	$\leq 0.34/\leq 0.31\text{dB/km}$
	@1490nm	$\leq 0.24\text{dB/km}$
	@1550nm	$\leq 0.21/\leq 0.19\text{dB/km}$
	@1625nm	$\leq 0.23/\leq 0.20\text{dB/km}$
at this wavelength represents post hydrogen aging performance according to IEC 60793-2-50 regarding the B1.3 fiber category.		
Attenuation discontinuity		$\leq 0.05\text{ dB}$
Attenuation coefficient for the wavelength range from	1285 -1330	@1310nm $\leq 0.03\text{ dB/km}$
	1525 -1575	@1550nm $\leq 0.02\text{ dB/km}$
Zero dispersion wavelength		1300 -1324 nm
Zero dispersion slope		$\leq 0.092\text{ ps}/(\text{nm}^2.\text{km})$
Chromatic Dispersion Coefficient	@1310 nm.	$\leq 3.5\text{ ps}/(\text{nm.km})$
	@1550 nm.	$\leq 18\text{ ps}/(\text{nm.km})$
	@1625 nm.	$\leq 22\text{ ps}/(\text{nm.km})$
Polarization mode dispersion(PMD)		$\leq 0.2\text{ ps/km}^{1/2}$
Cable cutoff wavelength (λ_{cc})		$\leq 1260\text{ nm}$ (Refer to TIA/EIA-455-170)
Effective group index of reaction	@1310nm	1.4676
	@1550nm	1.4682
Geometric Specifications		
Nominal Mode Field Diameter	@1310nm	$9.2 \pm 0.6\text{ }\mu\text{m}$
	@1550nm	$10.4 \pm 0.8\text{ }\mu\text{m}$
Cladding diameter		$125 \pm 1\text{ }\mu\text{m}$
Coating Diameter, Primary		$242 \pm 5\text{ }\mu\text{m}$
Coating Diameter, Secondary		$250 \pm 5\text{ }\mu\text{m}$
Cladding non -circularity		$\leq 1\%$
Protective Coating Material	Material	UV curable acrylate
	Diameter	$245\text{ }\mu\text{m} \pm 5\text{ }\mu\text{m}$ (uncolored), $250\text{ }\mu\text{m} \pm 15\text{ }\mu\text{m}$ (Colored) (Refer to EIA/TIA-455-173)
Coating/Cladding concentricity error		$\leq 12\text{ }\mu\text{m}$
Core/Cladding concentricity error		$\leq 0.5\text{ }\mu\text{m}$
Color Fiber Diameter		$250\text{ }\mu\text{m} \pm 15\text{ }\mu\text{m}$ (Colored)
Fiber proof-tested		0.69 GPa (1.0%, 100kpsi) in accordance with the optical fiber proof test by IEC 60793-1-30
PMD Coefficient	@ 1550 nm.	$250\text{ }\mu\text{m} \pm 15\text{ }\mu\text{m}$ (Colored)
Maximum attenuation with macrobending of fiber 100 turns 30 mm. radius	@ 1550 nm.	$\leq 0.10\text{ dB}$

OPTICAL FIBER CHARACTERISTICS

CATEGORY	DESCRIPTION	SPECIFICATIONS
Mechanical Specifications		
Proof test level		≥1.0 %
Fiber curl radius		≥4.0 m
Peak coating strip force		1.3 - 8.9N
Relative humidity		Up to 90%, no frost
Maximum Span Length	Sag 0.5%	40 m.
	Sag 1.0%	80 m.
Maximum Wind Velocity		126 km./hr.
Max. Tensile load	Installation	3,600 N. for 6-96 Cores 4,500 N. for 216-312 Cores
	Operation	2,500 N. for 6-96 Cores
Maximum Crush resistance		3,400 N./10 cm.
Minimum bending Radius	Installation	20 x Diameter of Cable
	Operation	10 x Diameter of Cable
Thermal oxidative stability (OIT-Test)		OIT at 200 °C > 40 min (IEC 60811-410)
Initial Sag		1% of span length 80 m.
Relative humidity		Up to 90%, no frost

IDENTIFICATION COLOR CODE OF FIBER AND LOOSE TUBE

The color code of the loose tubes and the individual fibers within each loose tube shall be in accordance TIA/EIA-598-C(TIA/EIA-598-A) and EIA-359-A

NO.	FIBER COLOR	LOOSE TUBE COLOR
1	Blue	Blue
2	Orange	Orange
3	Green	Green
4	Brown	Brown
5	Gray	Gray
6	White	White
7	Red	Red
8	Black	Black
9	Yellow	Yellow
10	Violet	Violet
11	Rose	Rose
12	Light Blue	Light Blue
13-16	-	Color 1-4 with a black tracer

PACKING AND DRUM

The cable is rounded on a non-returnable wooden drum. Cable Packing 4000m/reel. Both ends of cable are securely fastened to drum and sealed with a shrinkable cap to prevent ingress of moisture. The following information shall be marked on the outer sheath of the cable at an interval of about 1 meter.

- Cable type and number of optical fiber
- Cable length
- Manufacturer name
- Logo and Thai word
- Month and Year of Manufacture

The sequential number of the cable length shall be marked on the outer sheath of the cable at an interval of 1meter ± 1%

Cable Sheath Test

The procedure for testing fiber cable sheath for compliance with clause 4.3 shall be as follows or by equivalent method:

Test Parameter	Test Standard Method
1. Carbon Black	ISO 6964, ASTM D1603 Standard Test Method for Carbon Black in Olefin Plastics.
2. Tensile strength	ASTM D638
3. Elongation	ASTM D638
4. Environmental stress cracking	ASTM D1693
5. Shrinkback Slab	cut from the cable sheaths 5 cm.(2 in.) long, 13 mm.(1/2 in.) wide, and the same thickness as the cable sheath. The slab specimens shall be placed in a convection type circulating air oven operating at a temperature of $100 \pm 1^{\circ}\text{C}$ for 4 hours period for inner sheath and $115 \pm 1^{\circ}\text{C}$ for 4 hours period for outer sheath
6. Thermal Oxidation Stability	ASTM D3895

Flame Propagation

Test Standard	IEC 60332-1 Test of the fire behaviour on a single Cable (Flame retardancy)
Sample Length	600 ± 25 mm.
Overall diameter of test piece	$D \leq 25$ mm.
Time for flame application (s)	60 sec
Test result	The cable shall pass the test, if the distance between the lower edge of the top support and the onset of charring is greater than 50 mm. All soot is to be ignored. Softening or any deformation of the non-metallic is also to be ignored.

TEST REQUIREMENTS

Item	Method	Acceptance criteria
Tensile test	- Max. tensile strength: 2500 N	-Fiber strain at maximum
IEC 60794-1-2-E1A	- Sample length: 100 meters	-Load max. 0.33 %
TIA/EIA-455-33A	- Times: 1 hour	-Attenuation increase ≤ 0.1 dB
Crush or Compression test	- Load: 2200 N	-No splits or cracks in the outer jacket
IEC 60794-1-2-E3	- Time: 10 minutes	-Attenuation increase ≤ 0.10 dB
TIA/EIA-455-41A	- Length: 100 mm	
Impact test	- Height: 1 meter	- No splits or cracks in the outer jacket
IEC 60794-1-2-E4	- Impact energy :5N.m	-Attenuation increase ≤ 0.10 dB (after the test)
TIA/EIA-455-25B	- Radius of hammer head:12.5 $\pm$ 0.1mm	
	- Point of impact : 3	
	- No. of impact: 1 time each point	
Torsion or Twist test	- 1 m cable length with 150 N weight	- No splits or cracks in the outer jacket
IEC 60794-1-2-E7	- $\pm 180^\circ$,10 cycles	-Attenuation increase ≤ 0.10 dB (after the test)
TIA/EIA-455-85A		
Repeated bending	- Radius = 20 $\times$ cable outer diameter	- No splits or cracks in the outer jacket
Cable bending Test	- 1m cable length with 150 N weight, 30 cycles	-Attenuation increase ≤ 0.10 dB (after the test)
IEC 60794-1-2-E6,		
TIA/EIA-455-104A		
IEC 60794-1-2-E11B		
Temperature cycling test	- Temperature step: +20 $^\circ$ C -40 $^\circ$ C+70 $^\circ$ C-40 $^\circ$ C	-Attenuation variation for reference
IEC 60794-1-2-F1	+70 $^\circ$ C+20 $^\circ$ C	value(the attenuation to be measured before
TIA/EIA-455-3A	- Time per each step: 16 hrs.	test at +20 $\pm$ 3) ≤ 0.10 dB/km
	- Number of cycles: 2 cycles	
Water penetration test	- Water height: 1m	-No water leakage at the end of the sample
IEC 60794-1-2-F5	- Sample length:3m	
TIA/EIA-455-82B	- Duration of test: 24hrs	
Drip test	- Five 0.3m samples suspended vertically in a climate	-No filling compound shall drip from tubes after 24 hrs.
IEC 60794-1-2-E14	chamber, raised temperature to +70 $^\circ$ C	

ORDER INFORMATION

