

FIBER OPTIC CABLE

ADSS FIBER OPTIC SINGLE JACKET FRP

This specification covers design requirements and performance standards for procurement of fiber optic cables in the fiber industry. TSP brand guarantees a stable quality control system for us from the factory. Cable products pass several programs including ISO 9001, ISO 14001 and ROHS.

// PRODUCT DESCRIPTION

- Single Mode (9/125 μm)
- The cable shall be used for aerial or duct installed.
- Provide additional mechanical protection.
- low friction installation.
- Excellent protection from environmental hazards.
- Color code fiber and Loose tube in standard.

// APPLICATION

- Ethernet LAN Network, CCTV Camera , ETC
- Optical fibre cables supplied in compliance with this specifications is capable to withstand the typical service condition for a period of 30 years without detriment to the operation characteristics of the cable.
- Outdoor environment with high electric field strength in the Power communication system and the area where frequent thunder happens suitable for both aerial or duct installation.

// STANDARD

- ATM, FDDI, FTTX, Fiber Channel, CATV, Communication
- ISO/IEC 11801:2007, ISO/IEC 11801:2011 (Ed.2.2)
- ANSI/TIA/EIA-568-B.3, ANSI/TIA-568-C.3, ANSI/TIA-568.3-D, ANSI/ICEA 640
- Telcordia (Bellcore) GR-20-CORE, GR-409-CORE
- ANSI/ICEA 596, ICEA 696, IEC 61034-2, IEC 60754-2, IEC 60793, IEC 60794-1-2, EN 50173
- ITU-T G.652D, ITU-T G.657A2
- TIA/EIA-598-C (Rev. TIA/EIA-598-A), EIA-359-A.
- IEEE 802.3z, IEEE 802.3ae, IEEE 802.3 (LAN, Ethernet Fast Ethernet, Gigabit Ethernet and 10 Gigabit Ethernet 40-100 Gbps)
- RoHS Compliant
- TIS 2166-2548
- GB/T 12706-2008 Standard



// CONSTRUCTION CABLE

Cable type		ADSS
Element	-	5
Fiber Optic	Material	Silica High Grade / Compound Glass
Central strength member	Material	FRP 1.8 ± 0.2 mm
Loose tube	Material	PBT
	Outer Diameter	2.0 ± 0.2 mm
	Inner Diameter	1.5 ± 0.2 mm
	-	6 fiber per tube, Thixotropic Jelly Compound
Protective tape	Material	Water -blocking tape : 0.3mm, Water blocking yarn : 0.3mm
Strength member	Material	Aramid yarns
Rodent Protection Armor	Material	Flat FRP Non-Metallic type (FRP: Fiber Reinforced Plastics)
		Nominal thickness 1.0 ± 0.2 mm
Outer Sheath	Material	Black HDPE (non Rodent Repellent/Rodent Repellent)
	Thickness	1.8 ± 0.2 mm
Rip Cord	Material	Polyester
	No.	2
Filler Rod	Material	Polyethylene, natural Color
	Diameter	2.2 mm ± 0.2 mm
Stranding method	-	Reverse oscillating lay (ROL) technique (SZ Direction)
	-	Lay - length 75 mm ± 5 mm
Tensile Load	Short term	4000 N
	Long term	2500 N
	Pressure	≥ 3400 N / 10 cm
Overall diameter	Diameter	9.5 - 12 mm
Cable diameter	Diameter (24/48 core)	10.5 ± 1mm / 11.5 ± 1mm.
Weight	(24/48 core)	Approx. 85 / 100±10 kg/km
Span Length		40-100m
Water Blocking Element		Dry-core technology
Width		≥ 126 km/hr
Temperature Range	Operation Temperature	-40°C to +70 °C
	Installation Temperature	-40°C to +70 °C
	Storage/Shipping Temperature	-40°C to +75°C
Color Stripe		3 mm ± 0.5mm

// BUFFER TUBE STRANDING

Fiber count	Fiber number per tube	Number of tube / filler	Nom. Diameter(mm)	Nom. Weight(kg/km)
12	6	2/3	11.4 - 12	100
24	6	4/1	11.4 - 12	100
48	12	4/1	11.8 - 12.5	105
60	12	5/0	11.8 - 12.5	105

// 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	$\leq 0.35/\leq 0.33\text{dB/km}$
	@1383nm	$\leq 0.35/\leq 0.31\text{dB/km}$
	@1490nm	$\leq 0.24\text{dB/km}$
	@1550nm	$\leq 0.21/\leq 0.19\text{dB/km}$
	@1625nm	$\leq 0.23/\leq 0.20\text{dB/km}$
Attenuation discontinuity		$\leq 0.05\text{ dB}$
Attenuation vs. Wavelength	1285 -1330 @1310nm	$\leq 0.05\text{ dB/km}$
	1525 -1575@1550nm	$\leq 0.05\text{ dB/km}$
Zero dispersion wavelength		1300 -1324 nm
Zero dispersion slope		$\leq 0.092\text{ ps}/(\text{nm}^2.\text{km})$
Dispersion	@1310nm	$\leq 3.5\text{ ps}/\text{nm.km}$
	@1550nm	$\leq 18\text{ ps}/\text{nm.km}$
Polarization mode dispersion(PMD)		$\leq 0.1\text{ ps}/\text{km}^{1/2}$
Cable cutoff wavelength (λ_{cc})		$\leq 1260\text{ nm}$
Effective group index of reaction	@1310nm	1.4675
	@1550nm	1.4681
Geometric Specifications		
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		$125 \pm 1\text{ }\mu\text{m}$
Cladding non -circularity		$\leq 1.0\%$
Coating Material	Material	UV curable acrylate
	Diameter	$250 \pm 5\text{ }\mu\text{m}$
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

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Mechanical Specifications		
Proof test level		$\geq 1.0 \%$
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		80 m and wind force 126 Km/hr
Max. Tensile load	Installation	4000 N. for 6-120 Cores
	Operation	1800 N. for 6-120 Cores
Maximum Crush resistance		2200 N./10 cm.
Minimum bending Radius	Installation	20 x Diameter of Cable
	Operation	10 x Diameter of Cable

// 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 (Rev.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	Slate	Slate
6	White	White
7	Red	Red
8	Black	Black
9	Yellow	Yellow
10	Violet	Violet
11	Rose	Rose
12	Aqua	Aqua

// PACKING AND DRUM

Standard reel length: 4 km/reel, other length is also available. The cables are packed in fumigated wooden drums.

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

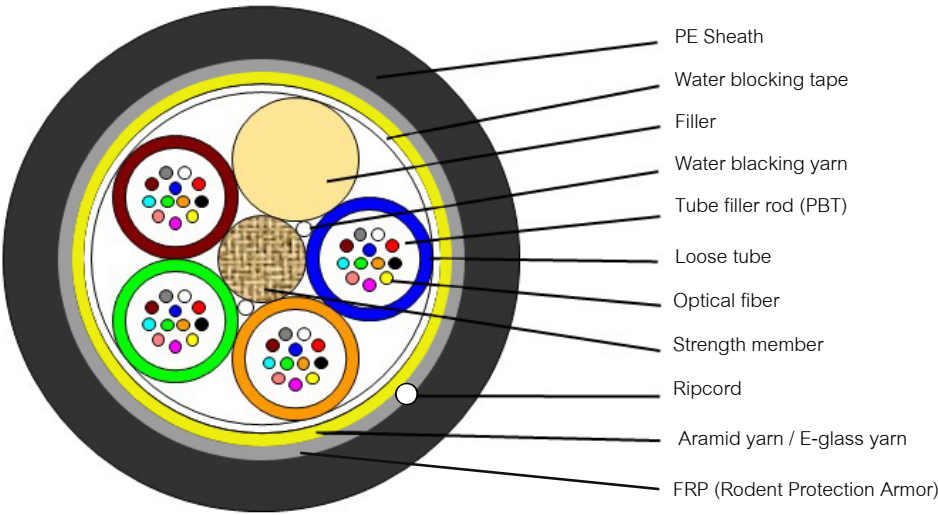
- Color: white.
- Contents: TSP, the year of manufacture, the type of cable, cable number, length marking , Name of organization in English, Thai, Chinese, etc.
- Format to choose from: screen, hot stamp, laser.
- Interval: 1 m.

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

// TEST REQUIREMENTS

Item	Method	Acceptance criteria
Tensile test	- Max. strength: 4000 N	-Fiber strain at maximum
IEC 60794-1-2	- Sample length: 100 meter	-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	- Time: 10 minute	-Attenuation increase ≤ 0.10 dB
TIA/EIA-455-41A	- Length: 100 m	
Impact test	- Impact energy: 450	- No splits or cracks in the outer jacke
IEC 60794-1-2	- Height: 1 mete	-Attenuation increase ≤ 0.10 dB (after the test)
TIA/EIA-455-25C	- Impact points: min. - Number of impacts:	
Torsion or Twist test	- 1 m cable length with 150 N weigh	- No splits or cracks in the outer jacke
IEC 60794-1-2-E7	- $\pm 180^\circ$,10 cycle	-Attenuation increase ≤ 0.10 dB (after the test)
TIA/EIA-455-85A		
Repeated bending Cable bending Test	- Radius = $20 \times$ cable outer diamete - 1m cable length with 150 N weight, 30 cycle	- No splits or cracks in the outer jacke -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	- emperature step: $+20^\circ\text{C}$ - 40°C + 70°C - 40°C + 70°C + 20°C	-Attenuation variation for reference value(the attenuation to be measured before test at $+20\pm 3$) ≤ 0.10 dB/km
IEC 60794-1-2-F1 TIA/EIA-455-3A	- ime per each step: 16 hrs. - N mber of cycles: 2 cycles	
Water penetration test	- Water height: 1	-No water leakage at the end of the sample
IEC 60794-1-2-F5	- Sample length:3	
TIA/EIA-455-82B	- Duration of test: 24hr	
Drip test	- Five 0.3m samples suspended vertically in a climat	-No filling compound shall drip from tubes after 24 hrs.
IEC 60794-1-2-E14	chamber, raised temperature to $+70^\circ\text{C}$	

STRUCTURE DESIGN



ORDER INFORMATION

NO. OF CORE	DESCRIPTION
6	Indoor/Outdoor, 6C ADSS, Single Jacket FRP, Single Mode 9/125 μm
12	Indoor/Outdoor, 12C ADSS, Single Jacket FRP, Single Mode 9/125 μm
24	Indoor/Outdoor, 24C ADSS, Single Jacket FRP, Single Mode 9/125 μm
48	Indoor/Outdoor, 48C ADSS, Single Jacket FRP, Single Mode 9/125 μm
60	Indoor/Outdoor, 60C ADSS, Single Jacket FRP, Single Mode 9/125 μm
96	Indoor/Outdoor, 96C ADSS, Single Jacket FRP, Single Mode 9/125 μm
120	Indoor/Outdoor, 120C ADSS, Single Jacket FRP, Single Mode 9/125 μm



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