

All-dielectric self-supporting cable (ADSS)

GENERAL

1.1 SCOPE

This listed specification covers the design requirements and performance standard for the supply of optical fiber cable in the industry. It should also include premium designed cable with optical, mechanical and geometrical characteristics

Cable Type	Application
ADSS	Self supporting aerial installation

1.2 Cable Description

Cable should possess high tensile strength and flexibility in compact cable sizes. At the same time, it should provide excellent optical transmission and physical performance.

1.3 Quality

Suppliers should ensure a continuing level of quality in your cable products through several quality control programs including ISO 9001.

1.4 Reliability

Both initial and periodic qualification testing should have performed to assure the cable's performance and durability in the field environments. .

1.5 The cable are designed, manufactured and tested according to international standards as follow

ITU-TG.652	Characteristics of a single mode optical fiber
ITU-TG.655	Characteristics of a non-zero dispersion -shifted single mode fibers optical
IEC 60793-1	Optical fiber Part 1: Generic specifications
IEC 60793-2	Optical fiber Part 2: Product specifications
IEC 60794-4	Optical fiber cables-Part 4: Sectional specification-Aerial optical cables along electrical power lines

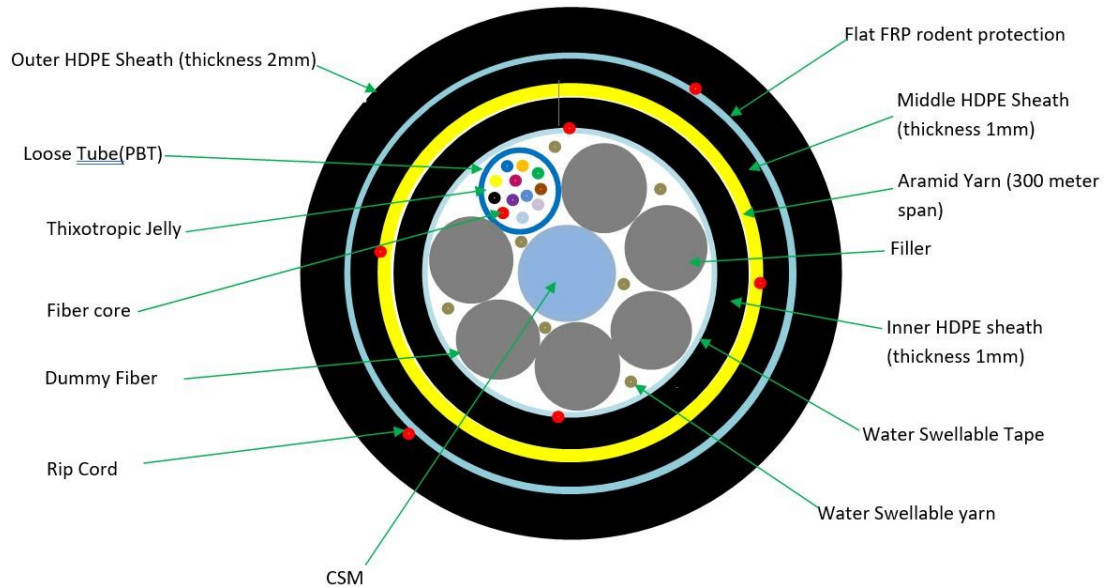
B1.3(G652D) single mode fiber

Optics Specifications		
Attenuation(dB/km)	@1310nm	≤0.35db/km
	@1383nm (after hydrogen aging)	≤0.32db/km
	@1550nm	≤0.21db/km
	@1625nm	≤0.24db/km
Dispersion	@1285nm~1340nm	-3.0~3.0ps/(nm*km)
	@1550nm	≤18ps/(nm*km)
	@1625nm	≤22ps/(nm*km)
Zero-Dispersion wavelength		1300~1324nm
Zero-Dispersion slope		≤0.092ps/(nm ² *km)
Mode field diameter @ 1310nm		9.2 ± 0.4μm
Mode field diameter @ 1550nm		10.4 ± 0.8μm
PMD	Max. value for fiber on the reel	0.2ps/km 1/2
	Max. Designed value for link	0.08ps/km 1/2
Cable cutoff wavelength,λ cc		≤1260nm
Effective group index(Neff)@1310nm		1.4675
Effective group index(Neff)@1550nm		1.4680
Macro-bend loss(Φ 60mm,100 turns)@1550nm		≤0.05db
Back scatter characteristic(@1310nm&1550nm)		
Point discontinuity		≤0.05db
Attenuation uniformity		≤0.05db/km
Attenuation coefficient difference for bi-directional measurement		≤0.05db/km
Geometrical characteristics		
Cladding diameter		125±1μm
Cladding non-circularity		≤1%
Core/cladding concentricity error		≤0.4μm
Fiber diameter with coating(uncolored)		245±5μm
Cladding/coating concentricity error		≤12.0μm
Curl		≥4m
Mechanical characteristic		
Proof test		0.69GPa
Coating strip force(typical value)		1.4N
Dynamic stress corrosion susceptibility parameter(typical value)		≥20
Environmental characteristics(@1310nm&1550nm)		
Temperature induced attenuation(-60~+85°C)		≤0.5dB/km
Dry heat induced attenuation(85 ± 2°C,30days)		≤0.5dB/km
Water immersion induced attenuation(23 ± 2°C,30days)		≤0.5dB/km
Damp heat induced attenuation(85 ± 2°C,RH85%,30days)		≤0.5dB/km

3. Cable structure

3.1 Cable Type:-ADSS

12c ADSS Fiber cable, Cross sectional view



Technical Characteristics

- 1)The unique extruding technology provides the fibers in the tube with good flexibility and bending endurance
- 2)The unique fiber excess length control method provides the cable with excellent mechanical and environmental properties Multiple water blocking material filling provides dual water blocking function
- 3)Filling Compound :Water swellable

The aerial cable shall be dry core lose tube type. There shall be proper provision to prevent the ingress or flow of moisture inside cable.In dry core design there shall be enough water swellable tape or yarn inside the cable and each loose tubes to ensure water/moisture blocking system.

Technical specifications:

Fiber Number	12
Max. No of loose tube / filler No.	1/6

Fiber No. per tube	12
Loose tube diameter	2.0mm+/-0.1mm
Loose tube material	PBT polybutylece terephthalate
Gel filled in loose tube	Yes
Central strength member diameter	2.8mm+/-0.2mm
Central strength material	FRP (Fiber Reinforced Plastic)
Outer sheath thickness/ material	2mm HDPE black
Middle sheath and inner sheath thickness	1.0mm HDPE black
Water blocking material	Water blocking tap & Water blocking yarn
Rip cord	2 red Rip cord in every layer
Cable OD	17.5mm+/-0.2mm
Cable weight	Approx.195 kg/km
Armored	FRP amour 3MM*1MM
Operation temperature range	-40 deg C to + 70 deg C
Installation temperature range	-20 °C to + 60 °C
Transport and storage temperature range	-40 °C to + 70 °C
Span	300 meter
Suitable lines	≤35kv
Maximum operation tensile	10KN
Crush resistance	2200N /10cm
Minimal installation bending radius	20 x OD
Minimal operation bending radius	10 x OD
Repeating bending	Load: 150N;number of cycles:30 No obvious addition attenuation, no fiber break and no cable damage.
Torsion	Load: 150N; number of cycles:10; twist angle:± 180° No obvious addition attenuation, no fiber break and no cable damage.
Impact	Impact energy: 450g×1m; radius of hammer head:12.5mm; number of impact: 5 No obvious addition attenuation, no fiber break and no cable damage.

COLOR IDENTIFICATION OF FIBER

The fibres shall be marked by a coloured coating with 12 different colours according to EIA/TIA 598:

Fibre #1: Blue

Fibre #2: Orange

Fibre #3: Green

Fibre #4: Brown

Fibre #5: Slate (Grey)

Fibre #6: White

Fibre #7: Red

Fibre #8: Black (natural with being marked)

Fibre #9: Yellow

Fibre #10: Violet

Fibre #11: Rose (Pink)

Fibre #12: Aqua (Light Blue)

1	2	3	4	5	6
7	8	9	10	11	12

COLOR IDENTIFICATION OF FIBER

16Fiber	1# 4fiber	2# 4fiber	3# 4fiber	4# 4fiber	5# filler	6# filler
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4.TEST REQUIREMENTS

*Approved by various professional optical and communication product institution, Cable should also conduct various in-house testing in its own Laboratory and Test Center.
The cable is in accordance with applicable standard of cable and requirement of customer.*

*The following test items are carried out according to corresponding reference.
Routine tests of optical fiber*

<i>Mode field diameter</i>	<i>IEC 60793-1-45</i>
<i>Mode field Core/clad concentricity</i>	<i>IEC 60793-1-20</i>
<i>Cladding diameter</i>	<i>IEC 60793-1-20</i>
<i>Cladding non-circularity</i>	<i>IEC 60793-1-20</i>
<i>Attenuation coefficient</i>	<i>IEC 60793-1-40</i>
<i>Chromatic dispersion</i>	<i>IEC 60793-1-42</i>
<i>Cable cut-off wavelength</i>	<i>IEC 60793-1-44</i>

Test for outdoor cable

4.1 Tension Loading Test

Test Standard	IEC 60794-1-2 E1
Sample length	No less than 50 meters
Load	Max. installation load
Duration time	1 hour
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.2 Crush/Compression Test

Test Standard	IEC 60794-1-2 E3
Load	Crush load
Plate size	100mm length
Duration time	1 minute
Test number	1
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.3 Impact Resistance Test

Test Standard	IEC 60794-1-2 E4
Impact energy	6.5J
Radius	12.5mm
Impact points	3
Impact number	2
Test result	Additional attenuation: ≤ 0.05 dB

4.4 Repeated Bending Test

Test Standard	IEC 60794-1-2 E6
Bending radius	20 X diameter of cable
Cycles	25 cycles
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.5 Torsion/Twist Test

Test Standard	IEC 60794-1-2 E7
Sample length	2m
Angles	± 180 degree
cycles	10
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.6 Bend Test

Test Standard	IEC 60794-1-2 E11B
Mandrel diameter	20 X diameter of cable
Turn number	4
Number of cycles	3
Temperature	20°C
Test result	No damage to outer jacket and inner elements

4.7 Temperature cycling Test

Test Standard	IEC 60794-1-2 F1
Temperature step	+20°C → -40°C → +85°C → +20°C
Time per each step	Transition from 0°C to -40°C:2hours; duration at -40°C:8 hours; Transition from -40°C to +85 °C:4hours; duration at +85°C:8 hours; Transition from +85°C to 0°C:2hours
Cycles	5
Test result	Attenuation variation for reference value (the attenuation to be measured before test

	at $+20 \pm 3^{\circ}\text{C}$) ≤ 0.05 dB/km
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4.8 Water penetration Test

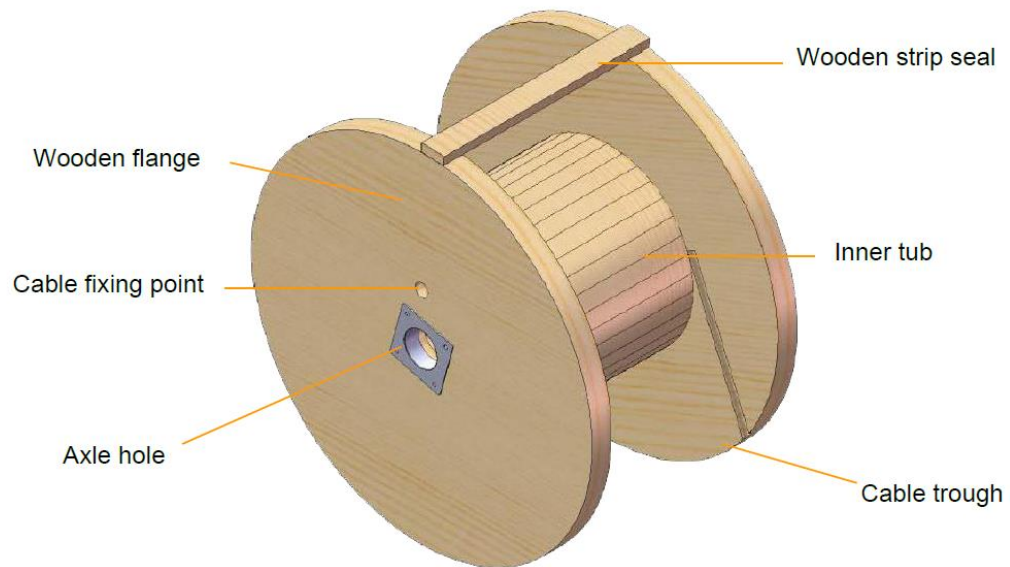
Test Standard	IEC 60794-1-2 F5
Height of water column	1m
Sample length	1m
Test time	1 hour
Test result	No water leakage from the opposite of the sample

4.9 Drip Test

Test Standard	IEC 60794-1-2 E14
Sample length	0.3m
Temperature	70 °C
Duration	24 hrs
Test result	No filling compound shall drip from tubes

5.PACKING AND DRUM

T cables are packed in carton, coiled on Bakelite & wooden drum. During transportation, right tools should be used to avoid damaging the package and to handle with ease. Cables should be protected from moisture; kept away from high temperature and fire sparks; protected from over bending and crushing; protected from mechanical stress and damage.



GENERAL

1.1 SCOPE

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with optical, mechanical and geometrical characteristics

Cable Type	Application
ADSS	Self supporting aerial installation

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1.3 Quality

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1.4 Reliability

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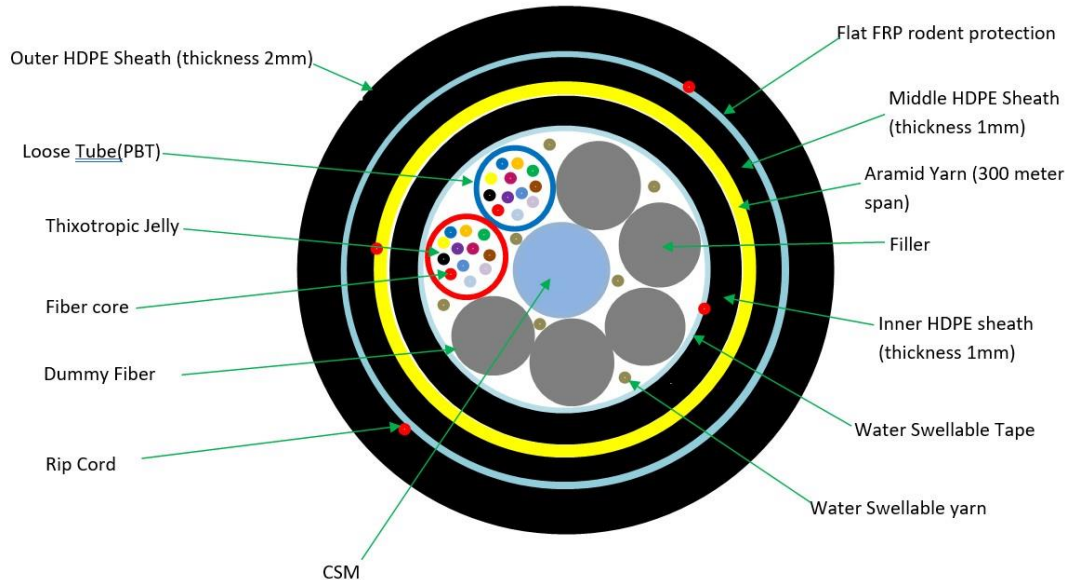
B1.3(G652D) single mode fiber

Optics Specifications		
Attenuation(dB/km)	@1310nm	≤0.35db/km
	@1383nm (after hydrogen aging)	≤0.32db/km
	@1550nm	≤0.21db/km
	@1625nm	≤0.24db/km
Dispersion	@1285nm~1340nm	-3.0~3.0ps/(nm*km)
	@1550nm	≤18ps/(nm*km)
	@1625nm	≤22ps/(nm*km)
Zero-Dispersion wavelength		1300~1324nm
Zero-Dispersion slope		≤0.092ps/(nm ² *km)
Mode field diameter @ 1310nm		9.2 ± 0.4μm
Mode field diameter @ 1550nm		10.4 ± 0.8μm
PMD	Max. value for fiber on the reel	0.2ps/km 1/2
	Max. Designed value for link	0.08ps/km 1/2
Cable cutoff wavelength,λ cc		≤1260nm
Effective group index(Neff)@1310nm		1.4675
Effective group index(Neff)@1550nm		1.4680
Macro-bend loss(Φ 60mm,100 turns)@1550nm		≤0.05db
Back scatter characteristic(@1310nm&1550nm)		
Point discontinuity		≤0.05db
Attenuation uniformity		≤0.05db/km
Attenuation coefficient difference for bi-directional measurement		≤0.05db/km
Geometrical characteristics		
Cladding diameter		125±1μm
Cladding non-circularity		≤1%
Core/cladding concentricity error		≤0.4μm
Fiber diameter with coating(uncolored)		245±5μm
Cladding/coating concentricity error		≤12.0μm
Curl		≥4m
Mechanical characteristic		
Proof test		0.69GPa
Coating strip force(typical value)		1.4N
Dynamic stress corrosion susceptibility parameter(typical value)		≥20
Environmental characteristics(@1310nm&1550nm)		
Temperature induced attenuation(-60~+85°C)		≤0.5dB/km
Dry heat induced attenuation(85 ± 2°C,30days)		≤0.5dB/km
Water immersion induced attenuation(23 ± 2°C,30days)		≤0.5dB/km
Damp heat induced attenuation(85 ± 2°C,RH85%,30days)		≤0.5dB/km

4. Cable structure

3.1 Cable Type:-ADSS

24c ADSS Fiber cable, Cross sectional view



Technical Characteristics

4)The unique extruding technology provides the fibers in the tube with good flexibility and bending endurance

5)The unique fiber excess length control method provides the cable with excellent mechanical and environmental properties Multiple water blocking material filling provides dual water blocking function

6)Filling Compound :Water swellable

The aerial cable shall be dry core lose tube type. There shall be proper provision to prevent the ingress or flow of moisture inside cable.In dry core design there shall be enough water swellable tape or yarn inside the cable and each loose tubes to ensure water/moisture blocking system.

Technical specifications:

Fiber Number	24
Max. No of loose tube / filler No.	2/5
Fiber No. per tube	12

Loose tube diameter	2.0mm+/-0.1mm
Loose tube material	PBT polybutylece terephthalate
Gel filled in loose tube	Yes
Central strength member diameter	2.8mm+/-0.2mm
Central strength material	FRP (Fiber Reinforced Plastic)
Outer sheath thickness/ material	2mm HDPE black
Middle sheath and inner sheath thickness	1.0mm HDPE black
Water blocking material	Water blocking tap & Water blocking yarn
Rip cord	2 red Rip cord in every layer
Cable OD	17.5mm+/-0.2mm
Cable weight	Approx.195 kg/km
Armored	FRP amour 3MM*1MM
Operation temperature range	-40 deg C to + 70 deg C
Installation temperature range	-20 °C to + 60 °C
Transport and storage temperature range	-40 °C to + 70 °C
Span	300 meter
Suitable lines	≤35kv
Maximum operation tensile	10KN
Crush resistance	2200N /10cm
Minimal installation bending radius	20 x OD
Minimal operation bending radius	10 x OD
Repeating bending	Load: 150N;number of cycles:30 No obvious addition attenuation, no fiber break and no cable damage.
Torsion	Load: 150N; number of cycles:10; twist angle:± 180° No obvious addition attenuation, no fiber break and no cable damage.
Impact	Impact energy: 450g×1m; radius of hammer head:12.5mm; number of impact: 5 No obvious addition attenuation, no fiber break and no cable damage.

COLOR IDENTIFICATION OF FIBER

The fibres shall be marked by a coloured coating with 12 different colours according to EIA/TIA 598:

Fibre #1: Blue

Fibre #2: Orange

Fibre #3: Green

Fibre #4: Brown

Fibre #5: Slate (Grey)

Fibre #6: White

Fibre #7: Red

Fibre #8: Black (natural with being marked)

Fibre #9: Yellow

Fibre #10: Violet

Fibre #11: Rose (Pink)

Fibre #12: Aqua (Light Blue)

1	2	3	4	5	6
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COLOR IDENTIFICATION OF FIBER

16Fiber	1# 4fiber	2# 4fiber	3# 4fiber	4# 4fiber	5# filler	6# filler
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4.TEST REQUIREMENTS

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The cable is in accordance with applicable standard of cable and requirement of customer.*

*The following test items are carried out according to corresponding reference.
Routine tests of optical fiber*

<i>Mode field diameter</i>	<i>IEC 60793-1-45</i>
<i>Mode field Core/clad concentricity</i>	<i>IEC 60793-1-20</i>
<i>Cladding diameter</i>	<i>IEC 60793-1-20</i>
<i>Cladding non-circularity</i>	<i>IEC 60793-1-20</i>
<i>Attenuation coefficient</i>	<i>IEC 60793-1-40</i>
<i>Chromatic dispersion</i>	<i>IEC 60793-1-42</i>
<i>Cable cut-off wavelength</i>	<i>IEC 60793-1-44</i>

Test for outdoor cable

4.1 Tension Loading Test

Test Standard	IEC 60794-1-2 E1
Sample length	No less than 50 meters
Load	Max. installation load
Duration time	1 hour
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.2 Crush/Compression Test

Test Standard	IEC 60794-1-2 E3
Load	Crush load
Plate size	100mm length
Duration time	1 minute
Test number	1
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.3 Impact Resistance Test

Test Standard	IEC 60794-1-2 E4
Impact energy	6.5J
Radius	12.5mm
Impact points	3
Impact number	2
Test result	Additional attenuation: ≤ 0.05 dB

4.4 Repeated Bending Test

Test Standard	IEC 60794-1-2 E6
Bending radius	20 X diameter of cable
Cycles	25 cycles
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.5 Torsion/Twist Test

Test Standard	IEC 60794-1-2 E7
Sample length	2m
Angles	± 180 degree
cycles	10
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.6 Bend Test

Test Standard	IEC 60794-1-2 E11B
Mandrel diameter	20 X diameter of cable
Turn number	4
Number of cycles	3
Temperature	20°C
Test result	No damage to outer jacket and inner elements

4.7 Temperature cycling Test

Test Standard	IEC 60794-1-2 F1
Temperature step	+20°C → -40°C → +85°C → +20°C
Time per each step	Transition from 0°C to -40°C:2hours; duration at -40°C:8 hours; Transition from -40°C to +85 °C:4hours; duration at +85°C:8 hours; Transition from +85°C to 0°C:2hours
Cycles	5
Test result	Attenuation variation for reference value (the attenuation to be measured before test

	at $+20 \pm 3^{\circ}\text{C}$) ≤ 0.05 dB/km
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4.8 Water penetration Test

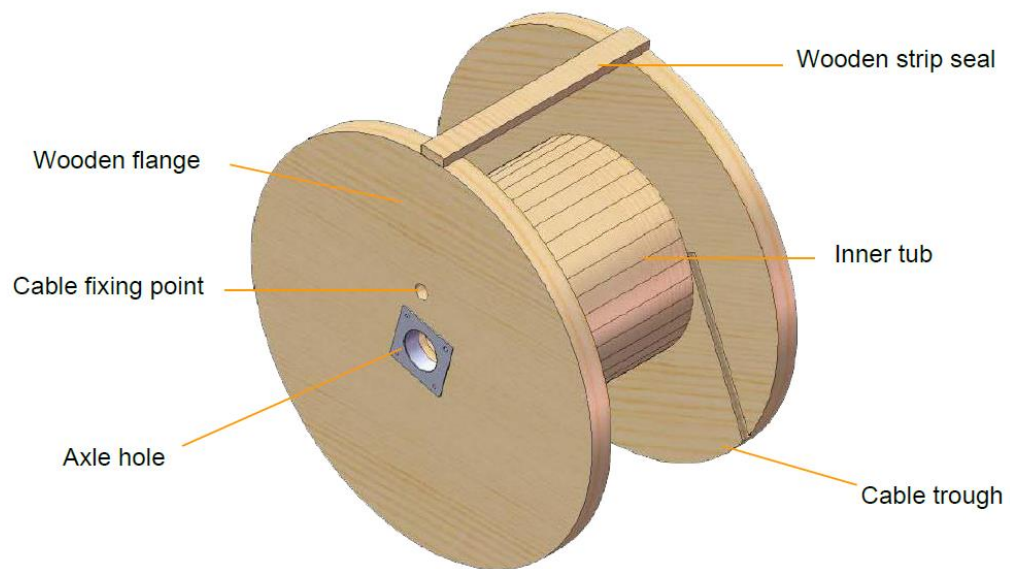
Test Standard	IEC 60794-1-2 F5
Height of water column	1m
Sample length	1m
Test time	1 hour
Test result	No water leakage from the opposite of the sample

4.9 Drip Test

Test Standard	IEC 60794-1-2 E14
Sample length	0.3m
Temperature	70 °C
Duration	24 hrs
Test result	No filling compound shall drip from tubes

6.PACKING AND DRUM

T cables are packed in carton, coiled on Bakelite & wooden drum. During transportation, right tools should be used to avoid damaging the package and to handle with ease. Cables should be protected from moisture; kept away from high temperature and fire sparks; protected from over bending and crushing; protected from mechanical stress and damage.



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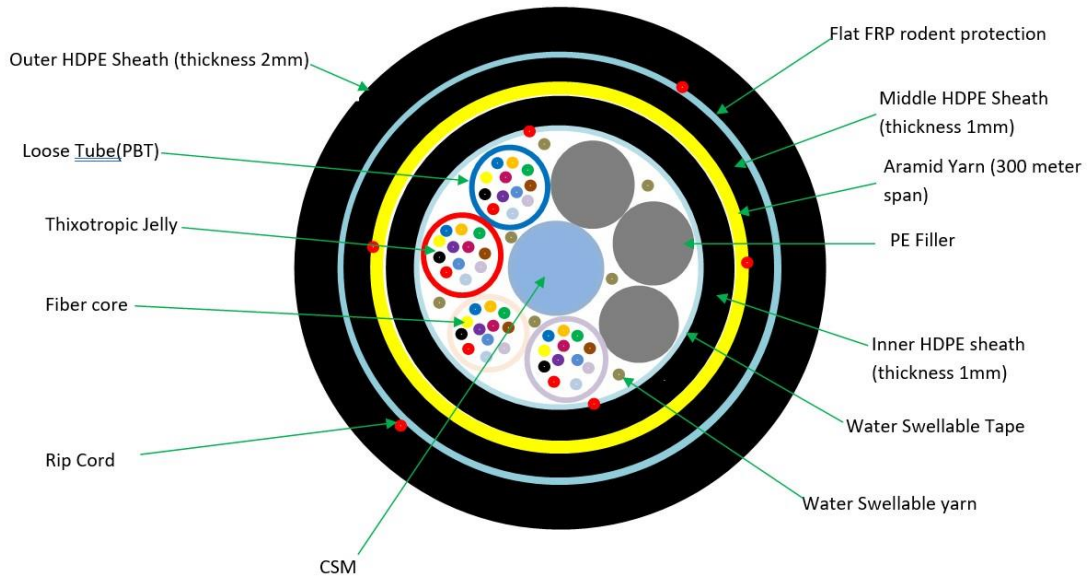
B1.3(G652D) single mode fiber

Optics Specifications		
Attenuation(dB/km)	@1310nm	≤0.35db/km
	@1383nm (after hydrogen aging)	≤0.32db/km
	@1550nm	≤0.21db/km
	@1625nm	≤0.24db/km
Dispersion	@1285nm~1340nm	-3.0~3.0ps/(nm*km)
	@1550nm	≤18ps/(nm*km)
	@1625nm	≤22ps/(nm*km)
Zero-Dispersion wavelength		1300~1324nm
Zero-Dispersion slope		≤0.092ps/(nm ² *km)
Mode field diameter @ 1310nm		9.2 ± 0.4μm
Mode field diameter @ 1550nm		10.4 ± 0.8μm
PMD	Max. value for fiber on the reel	0.2ps/km 1/2
	Max. Designed value for link	0.08ps/km 1/2
Cable cutoff wavelength,λ cc		≤1260nm
Effective group index(Neff)@1310nm		1.4675
Effective group index(Neff)@1550nm		1.4680
Macro-bend loss(Φ 60mm,100 turns)@1550nm		≤0.05db
Back scatter characteristic(@1310nm&1550nm)		
Point discontinuity		≤0.05db
Attenuation uniformity		≤0.05db/km
Attenuation coefficient difference for bi-directional measurement		≤0.05db/km
Geometrical characteristics		
Cladding diameter		125±1μm
Cladding non-circularity		≤1%
Core/cladding concentricity error		≤0.4μm
Fiber diameter with coating(uncolored)		245±5μm
Cladding/coating concentricity error		≤12.0μm
Curl		≥4m
Mechanical characteristic		
Proof test		0.69GPa
Coating strip force(typical value)		1.4N
Dynamic stress corrosion susceptibility parameter(typical value)		≥20
Environmental characteristics(@1310nm&1550nm)		
Temperature induced attenuation(-60~+85°C)		≤0.5dB/km
Dry heat induced attenuation(85 ± 2°C,30days)		≤0.5dB/km
Water immersion induced attenuation(23 ± 2°C,30days)		≤0.5dB/km
Damp heat induced attenuation(85 ± 2°C,RH85%,30days)		≤0.5dB/km

5. Cable structure

3.1 Cable Type:-ADSS

48c ADSS Fiber cable, Cross sectional view



Technical Characteristics

7)The unique extruding technology provides the fibers in the tube with good flexibility and bending endurance

8)The unique fiber excess length control method provides the cable with excellent mechanical and environmental properties Multiple water blocking material filling provides dual water blocking function

9)Filling Compound :Water swellable

The aerial cable shall be dry core lose tube type. There shall be proper provision to prevent the ingress or flow of moisture inside cable.In dry core design there shall be enough water swellable tape or yarn inside the cable and each loose tubes to ensure water/moisture blocking system.

Technical specifications:

Fiber Number	48
Max. No of loose tube / filler No.	4/3
Fiber No. per tube	12

Loose tube diameter	2.0mm+/-0.1mm
Loose tube material	PBT polybutylece terephthalate
Gel filled in loose tube	Yes
Central strength member diameter	2.8mm+/-0.2mm
Central strength material	FRP (Fiber Reinforced Plastic)
Outer sheath thickness/ material	2mm HDPE black
Middle sheath and inner sheath thickness	1.0mm HDPE black
Water blocking material	Water blocking tap & Water blocking yarn
Rip cord	2 red Rip cord in every layer
Cable OD	17.5mm+/-0.2mm
Cable weight	Approx.195 kg/km
Armored	FRP amour 3MM*1MM
Operation temperature range	-40 deg C to + 70 deg C
Installation temperature range	-20 °C to + 60 °C
Transport and storage temperature range	-40 °C to + 70 °C
Span	300 meter
Suitable lines	≤35kv
Maximum operation tensile	10KN
Crush resistance	2200N /10cm
Minimal installation bending radius	20 x OD
Minimal operation bending radius	10 x OD
Repeating bending	Load: 150N;number of cycles:30 No obvious addition attenuation, no fiber break and no cable damage.
Torsion	Load: 150N; number of cycles:10; twist angle:± 180° No obvious addition attenuation, no fiber break and no cable damage.
Impact	Impact energy: 450g×1m; radius of hammer head:12.5mm; number of impact: 5 No obvious addition attenuation, no fiber break and no cable damage.

COLOR IDENTIFICATION OF FIBER

The fibres shall be marked by a coloured coating with 12 different colours according to EIA/TIA 598:

Fibre #1: Blue

Fibre #2: Orange

Fibre #3: Green

Fibre #4: Brown

Fibre #5: Slate (Grey)

Fibre #6: White

Fibre #7: Red

Fibre #8: Black (natural with being marked)

Fibre #9: Yellow

Fibre #10: Violet

Fibre #11: Rose (Pink)

Fibre #12: Aqua (Light Blue)

1	2	3	4	5	6
7	8	9	10	11	12

COLOR IDENTIFICATION OF FIBER

16Fiber	1# 4fiber	2# 4fiber	3# 4fiber	4# 4fiber	5# filler	6# filler
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<i>Mode field Core/clad concentricity</i>	<i>IEC 60793-1-20</i>
<i>Cladding diameter</i>	<i>IEC 60793-1-20</i>
<i>Cladding non-circularity</i>	<i>IEC 60793-1-20</i>
<i>Attenuation coefficient</i>	<i>IEC 60793-1-40</i>
<i>Chromatic dispersion</i>	<i>IEC 60793-1-42</i>
<i>Cable cut-off wavelength</i>	<i>IEC 60793-1-44</i>

Test for outdoor cable

4.1 Tension Loading Test

Test Standard	IEC 60794-1-2 E1
Sample length	No less than 50 meters
Load	Max. installation load
Duration time	1 hour
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.2 Crush/Compression Test

Test Standard	IEC 60794-1-2 E3
Load	Crush load
Plate size	100mm length
Duration time	1 minute
Test number	1
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.3 Impact Resistance Test

Test Standard	IEC 60794-1-2 E4
Impact energy	6.5J
Radius	12.5mm
Impact points	3
Impact number	2
Test result	Additional attenuation: ≤ 0.05 dB

4.4 Repeated Bending Test

Test Standard	IEC 60794-1-2 E6
Bending radius	20 X diameter of cable
Cycles	25 cycles
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.5 Torsion/Twist Test

Test Standard	IEC 60794-1-2 E7
Sample length	2m
Angles	± 180 degree
cycles	10
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.6 Bend Test

Test Standard	IEC 60794-1-2 E11B
Mandrel diameter	20 X diameter of cable
Turn number	4
Number of cycles	3
Temperature	20°C
Test result	No damage to outer jacket and inner elements

4.7 Temperature cycling Test

Test Standard	IEC 60794-1-2 F1
Temperature step	+20°C → -40°C → +85°C → +20°C
Time per each step	Transition from 0°C to -40°C:2hours; duration at -40°C:8 hours; Transition from -40°C to +85 °C:4hours; duration at +85°C:8 hours; Transition from +85°C to 0°C:2hours
Cycles	5
Test result	Attenuation variation for reference value (the attenuation to be measured before test

	at $+20 \pm 3^{\circ}\text{C}$) ≤ 0.05 dB/km
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4.8 Water penetration Test

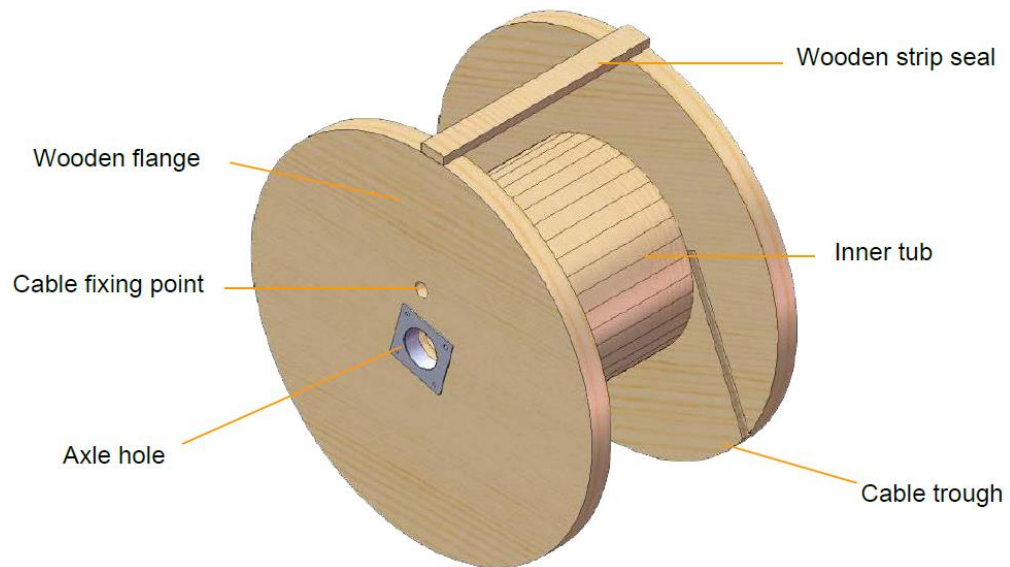
Test Standard	IEC 60794-1-2 F5
Height of water column	1m
Sample length	1m
Test time	1 hour
Test result	No water leakage from the opposite of the sample

4.9 Drip Test

Test Standard	IEC 60794-1-2 E14
Sample length	0.3m
Temperature	70 °C
Duration	24 hrs
Test result	No filling compound shall drip from tubes

7.PACKING AND DRUM

T cables are packed in carton, coiled on Bakelite & wooden drum. During transportation, right tools should be used to avoid damaging the package and to handle with ease. Cables should be protected from moisture; kept away from high temperature and fire sparks; protected from over bending and crushing; protected from mechanical stress and damage.



GENERAL

1.1 SCOPE

This listed specification covers the design requirements and performance standard for the supply of optical fiber cable in the industry. It should also include premium designed cable with optical, mechanical and geometrical characteristics

Cable Type	Application
ADSS	Self supporting aerial installation

1.2 Cable Description

Cable should possess high tensile strength and flexibility in compact cable sizes. At the same time, it should also provide excellent optical transmission and physical performance.

1.3 Quality

Suppliers should ensure a continuing level of quality in your cable products through several quality control programs including ISO 9001.

1.4 Reliability

Both initial and periodic qualification testing are performed to assure the cable's performance and durability in the field environments. .

1.5 The cable are designed, manufactured and tested according to international standards as follow

ITU-TG.652	Characteristics of a single mode optical fiber
ITU-TG.655	Characteristics of a non-zero dispersion -shifted single mode fibers optical
IEC 60793-1	Optical fiber Part 1: Generic specifications
IEC 60793-2	Optical fiber Part 2: Product specifications
IEC 60794-4	Optical fiber cables-Part 4: Sectional specification-Aerial optical cables along electrical power lines

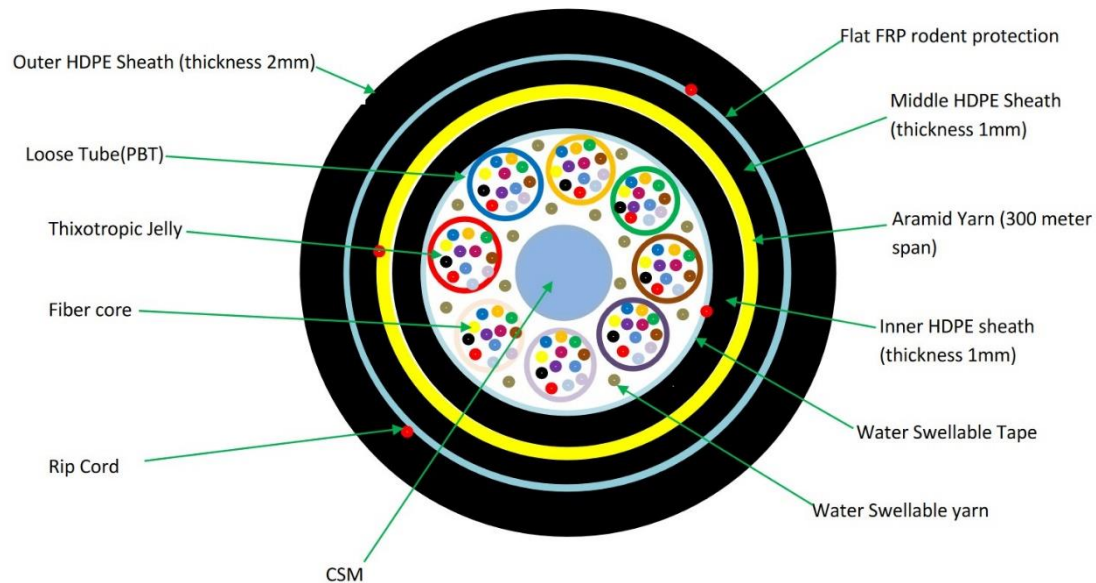
B1.3(G652D) single mode fiber

Optics Specifications		
Attenuation(dB/km)	@1310nm	≤0.35db/km
	@1383nm (after hydrogen aging)	≤0.32db/km
	@1550nm	≤0.21db/km
	@1625nm	≤0.24db/km
Dispersion	@1285nm~1340nm	-3.0~3.0ps/(nm*km)
	@1550nm	≤18ps/(nm*km)
	@1625nm	≤22ps/(nm*km)
Zero-Dispersion wavelength		1300~1324nm
Zero-Dispersion slope		≤0.092ps/(nm ² *km)
Mode field diameter @ 1310nm		9.2 ± 0.4μm
Mode field diameter @ 1550nm		10.4 ± 0.8μm
PMD	Max. value for fiber on the reel	0.2ps/km 1/2
	Max. Designed value for link	0.08ps/km 1/2
Cable cutoff wavelength,λ cc		≤1260nm
Effective group index(Neff)@1310nm		1.4675
Effective group index(Neff)@1550nm		1.4680
Macro-bend loss(Φ 60mm,100 turns)@1550nm		≤0.05db
Back scatter characteristic(@1310nm&1550nm)		
Point discontinuity		≤0.05db
Attenuation uniformity		≤0.05db/km
Attenuation coefficient difference for bi-directional measurement		≤0.05db/km
Geometrical characteristics		
Cladding diameter		125±1μm
Cladding non-circularity		≤1%
Core/cladding concentricity error		≤0.4μm
Fiber diameter with coating(uncolored)		245±5μm
Cladding/coating concentricity error		≤12.0μm
Curl		≥4m
Mechanical characteristic		
Proof test		0.69GPa
Coating strip force(typical value)		1.4N
Dynamic stress corrosion susceptibility parameter(typical value)		≥20
Environmental characteristics(@1310nm&1550nm)		
Temperature induced attenuation(-60~+85°C)		≤0.5dB/km
Dry heat induced attenuation(85 ± 2°C,30days)		≤0.5dB/km
Water immersion induced attenuation(23 ± 2°C,30days)		≤0.5dB/km
Damp heat induced attenuation(85 ± 2°C,RH85%,30days)		≤0.5dB/km

6. Cable structure

3.1 Cable Type:-ADSS

96c ADSS Fiber cable, Cross sectional view



Technical Characteristics

10)The unique extruding technology provides the fibers in the tube with good flexibility and bending endurance

11)The unique fiber excess length control method provides the cable with excellent mechanical and environmental properties Multiple water blocking material filling provides dual water blocking function

12)Filling Compound :Water swellable

The aerial cable shall be dry core lose tube type. There shall be proper provision to prevent the ingress or flow of moisture inside cable.In dry core design there shall be enough water swellable tape or yarn inside the cable and each loose tubes to ensure water/moisture blocking system.

Technical specifications:

Fiber Number	96
Max. No of loose tube / filler No.	8/0
Fiber No. per tube	12
Loose tube diameter	1.9mm+/-0.1mm
Loose tube material	PBT polybutylece terephthalate
Gel filled in loose tube	Yes
Central strength member diameter	2.8mm around PE sheath to 3.2mm
Central strength material	FRP (Fiber Reinforced Plastic)
Outer sheath thickness/ material	2mm+/-0.1mm/ HDPE black
Middle sheath and inner sheath thickness	1.0mm HDPE black
Water blocking material	Water blocking tap & Water blocking yarn
Rip cord	2 red Rip cord each in every layer
Cable OD	18.5+/-0.2mm
Cable weight	Approx.208 kg/km
Armored	FRP amour 3MM*1MM
Operation temperature range	-40 deg C to + 70 deg C
Installation temperature range	-20 °C to + 60 °C
Transport and storage temperature range	-40 °C to + 70 °C
Span	300 meter
Suitable lines	≤35kv
Maximum operation tensile	10KN
Crush resistance	2200N /10cm
Minimal installation bending radius	20 x OD
Minimal operation bending radius	10 x OD
Repeating bending	Load: 150N;number of cycles:30 No obvious addition attenuation, no fiber break and no cable damage.
Torsion	Load: 150N; number of cycles:10; twist angle:± 180° No obvious addition attenuation, no fiber break and no cable damage.

Impact	Impact energy: 450g×1m; radius of hammer head:12.5mm; number of impact: 5 No obvious addition attenuation, no fiber break and no cable damage.
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COLOR IDENTIFICATION OF FIBER

The fibres shall be marked by a coloured coating with 12 different colours according to EIA/TIA 598:

- | | |
|------------------------|---|
| Fibre #1: Blue | Fibre #7: Red |
| Fibre #2: Orange | Fibre #8: Black (natural with being marked) |
| Fibre #3: Green | Fibre #9: Yellow |
| Fibre #4: Brown | Fibre #10: Violet |
| Fibre #5: Slate (Grey) | Fibre #11: Rose (Pink) |
| Fibre #6: White | Fibre #12: Aqua (Light Blue) |

1	2	3	4	5	6
7	8	9	10	11	12

COLOR IDENTIFICATION OF FIBER

16Fiber	1# 4fiber	2# 4fiber	3# 4fiber	4# 4fiber	5# filler	6# filler
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4. TEST REQUIREMENTS

Approved by various professional optical and communication product institution. Cable should also conduct various in-house testing in its own Laboratory and Test Center. It should be in accordance with applicable standard of cable and requirement of customer.

The following test items are carried out according to corresponding reference.

Routine tests of optical fiber

Mode field diameter	IEC 60793-1-45
Mode field Core/clad concentricity	IEC 60793-1-20
Cladding diameter	IEC 60793-1-20
Cladding non-circularity	IEC 60793-1-20
Attenuation coefficient	IEC 60793-1-40
Chromatic dispersion	IEC 60793-1-42
Cable cut-off wavelength	IEC 60793-1-44

Test for outdoor cable

4.1 Tension Loading Test

Test Standard	IEC 60794-1-2 E1
Sample length	No less than 50 meters
Load	Max. installation load
Duration time	1 hour
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.2 Crush/Compression Test

Test Standard	IEC 60794-1-2 E3
Load	Crush load
Plate size	100mm length
Duration time	1 minute
Test number	1
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.3 Impact Resistance Test

Test Standard	IEC 60794-1-2 E4
Impact energy	6.5J
Radius	12.5mm
Impact points	3
Impact number	2
Test result	Additional attenuation: ≤ 0.05 dB

4.4 Repeated Bending Test

Test Standard	IEC 60794-1-2 E6
Bending radius	20 X diameter of cable
Cycles	25 cycles
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.5 Torsion/Twist Test

Test Standard	IEC 60794-1-2 E7
Sample length	2m
Angles	± 180 degree
cycles	10
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.6 Bend Test

Test Standard	IEC 60794-1-2 E11B
Mandrel diameter	20 X diameter of cable
Turn number	4
Number of cycles	3
Temperature	20°C
Test result	No damage to outer jacket and inner elements

4.7 Temperature cycling Test

Test Standard	IEC 60794-1-2 F1
Temperature step	+20°C → -40°C → +85°C → +20°C
Time per each step	Transition from 0°C to -40°C:2hours; duration at -40°C:8 hours; Transition from -40°C to +85 °C:4hours; duration at +85°C:8 hours; Transition from +85°C to 0°C:2hours
Cycles	5
Test result	Attenuation variation for reference value (the attenuation to be measured before test

	at $+20 \pm 3^{\circ}\text{C}$) ≤ 0.05 dB/km
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4.8 Water penetration Test

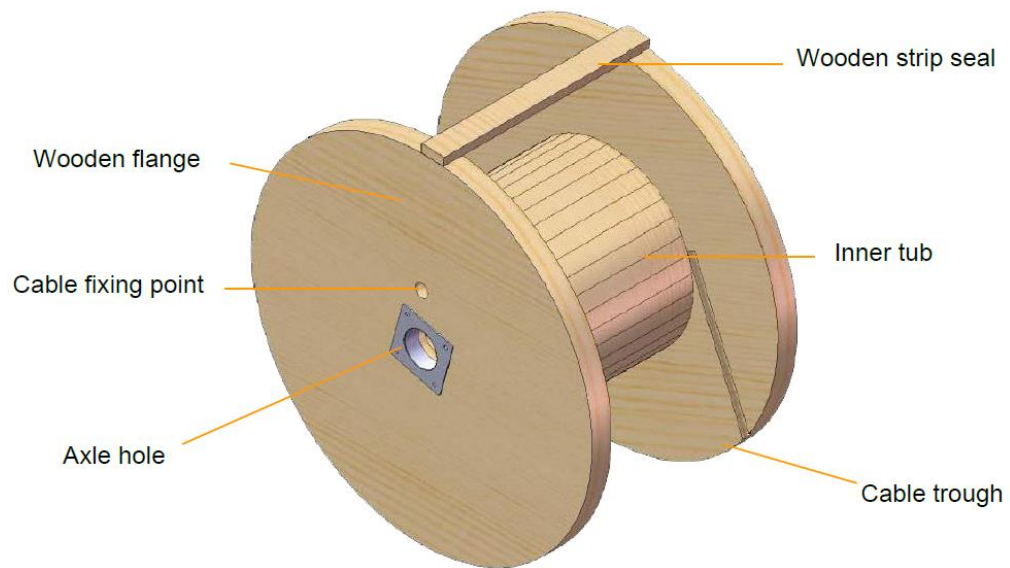
Test Standard	IEC 60794-1-2 F5
Height of water column	1m
Sample length	1m
Test time	1 hour
Test result	No water leakage from the opposite of the sample

4.9 Drip Test

Test Standard	IEC 60794-1-2 E14
Sample length	0.3m
Temperature	70 °C
Duration	24 hrs
Test result	No filling compound shall drip from tubes

8.PACKING AND DRUM

T cables are packed in carton, coiled on Bakelite & wooden drum. During transportation, right tools should be used to avoid damaging the package and to handle with ease. Cables should be protected from moisture; kept away from high temperature and fire sparks; protected from over bending and crushing; protected from mechanical stress and damage.



GENERAL

1.1 SCOPE

This listed specification covers the design requirements and performance standard for the supply of optical fiber cable in the industry. It should also include premium designed cable with optical, mechanical and geometrical characteristics

Cable Type	Application
ADSS	Self supporting aerial installation

1.2 Cable Description

Cable possesses high tensile strength and flexibility in compact cable sizes. At the same time, it provides excellent optical transmission and physical performance.

1.3 Quality

Suppliers should ensure a continuing level of quality in our cable products through several quality control programs including ISO 9001.

1.4 Reliability

Both initial and periodic qualification testing are performed to assure the cable's performance and durability in the field environments. .

1.5 The cable are designed, manufactured and tested according to international standards as follow

ITU-TG.652	Characteristics of a single mode optical fiber
ITU-TG.655	Characteristics of a non-zero dispersion -shifted single mode fibers optical
IEC 60793-1	Optical fiber Part 1: Generic specifications
IEC 60793-2	Optical fiber Part 2: Product specifications
IEC 60794-4	Optical fiber cables-Part 4: Sectional specification-Aerial optical cables along electrical power lines

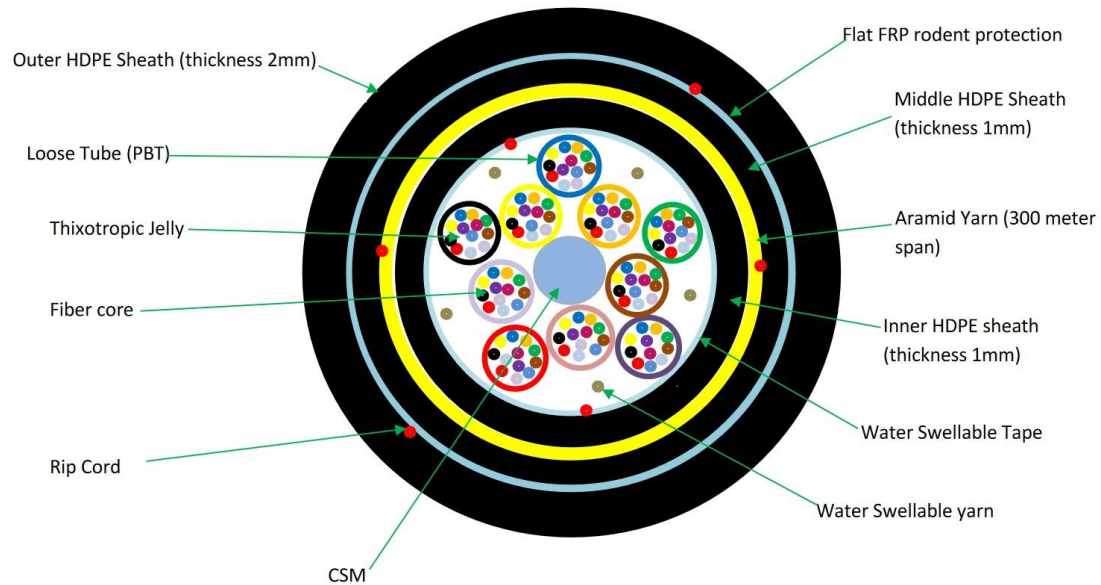
B1.3(G652D) single mode fiber

Optics Specifications		
Attenuation(dB/km)	@1310nm	≤0.35db/km
	@1383nm (after hydrogen aging)	≤0.32db/km
	@1550nm	≤0.21db/km
	@1625nm	≤0.24db/km
Dispersion	@1285nm~1340nm	-3.0~3.0ps/(nm*km)
	@1550nm	≤18ps/(nm*km)
	@1625nm	≤22ps/(nm*km)
Zero-Dispersion wavelength		1300~1324nm
Zero-Dispersion slope		≤0.092ps/(nm ² *km)
Mode field diameter @ 1310nm		9.2 ± 0.4μm
Mode field diameter @ 1550nm		10.4 ± 0.8μm
PMD	Max. value for fiber on the reel	0.2ps/km 1/2
	Max. Designed value for link	0.08ps/km 1/2
Cable cutoff wavelength,λ cc		≤1260nm
Effective group index(Neff)@1310nm		1.4675
Effective group index(Neff)@1550nm		1.4680
Macro-bend loss(Φ 60mm,100 turns)@1550nm		≤0.05db
Back scatter characteristic(@1310nm&1550nm)		
Point discontinuity		≤0.05db
Attenuation uniformity		≤0.05db/km
Attenuation coefficient difference for bi-directional measurement		≤0.05db/km
Geometrical characteristics		
Cladding diameter		125±1μm
Cladding non-circularity		≤1%
Core/cladding concentricity error		≤0.4μm
Fiber diameter with coating(uncolored)		245±5μm
Cladding/coating concentricity error		≤12.0μm
Curl		≥4m
Mechanical characteristic		
Proof test		0.69GPa
Coating strip force(typical value)		1.4N
Dynamic stress corrosion susceptibility parameter(typical value)		≥20
Environmental characteristics(@1310nm&1550nm)		
Temperature induced attenuation(-60~+85°C)		≤0.5dB/km
Dry heat induced attenuation(85 ± 2°C,30days)		≤0.5dB/km
Water immersion induced attenuation(23 ± 2°C,30days)		≤0.5dB/km
Damp heat induced attenuation(85 ± 2°C,RH85%,30days)		≤0.5dB/km

7. Cable structure

3.1 Cable Type:-ADSS

120c ADSS Fiber cable, Cross sectional view



Technical Characteristics

13)The unique extruding technology provides the fibers in the tube with good flexibility and bending endurance

14)The unique fiber excess length control method provides the cable with excellent mechanical and environmental properties Multiple water blocking material filling provides dual water blocking function

15)Filling Compound :Water swellable

The aerial cable shall be dry core lose tube type. There shall be proper provision to prevent the ingress or flow of moisture inside cable.In dry core design there shall be enough water swellable tape or yarn inside the cable and each loose tubes to ensure water/moisture blocking system.

Technical specifications:

Fiber Number	120
Max. No of loose tube / filler No.	10/0
Fiber No. per tube	12
Loose tube diameter	1.9mm+/-0.1mm
Loose tube material	PBT polybutylece terephthalate
Gel filled in loose tube	Yes
Central strength member diameter	2.8mm around PE sheath to 3.4mm
Central strength material	FRP (Fiber Reinforced Plastic)
Outer sheath thickness/ material	2mm+/-0.1mm/ HDPE
Middle sheath and inner sheath thickness	1.0mm HDPE black
Water blocking material	Water blocking tap & Water blocking yarn
Rip cord	2 red Rip cord each in every layer
Cable OD	19.8+/-0.2mm
Cable weight	Approx.232 kg/km
Armored	FRPamour 3MM*1MM
Operation temperature range	-40 deg C to + 70 deg C
Installation temperature range	-20 °C to + 60 °C
Transport and storage temperature range	-40 °C to + 70 °C
Span	300 meter
Suitable lines	≤35kv
Maximum operation tensile	10KN
Crush resistance	2200N /10cm
Minimal installation bending radius	20 x OD
Minimal operation bending radius	10 x OD
Repeating bending	Load: 150N;number of cycles:30 No obvious addition attenuation, no fiber break and no cable damage.
Torsion	Load: 150N; number of cycles:10; twist angle:± 180° No obvious addition attenuation, no fiber break and no cable damage.

Impact	Impact energy: 450g×1m; radius of hammer head:12.5mm; number of impact: 5 No obvious addition attenuation, no fiber break and no cable damage.
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COLOR IDENTIFICATION OF FIBER

The fibres shall be marked by a coloured coating with 12 different colours according to EIA/TIA 598:

- Fibre #1: Blue
- Fibre #2: Orange
- Fibre #3: Green
- Fibre #4: Brown
- Fibre #5: Slate (Grey)
- Fibre #6: White
- Fibre #7: Red
- Fibre #8: Black (natural with being marked)
- Fibre #9: Yellow
- Fibre #10: Violet
- Fibre #11: Rose (Pink)
- Fibre #12: Aqua (Light Blue)

1	2	3	4	5	6
7	8	9	10	11	12

COLOR IDENTIFICATION OF FIBER

16Fiber	1# 4fiber	2# 4fiber	3# 4fiber	4# 4fiber	5# filler	6# filler
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4.TEST REQUIREMENTS

Approved by various professional optical and communication product institution. Suppliers should also conduct various in-house testing in its own Laboratory and Test Center.

The cable should be in accordance with applicable standard of cable and requirement of customer.

The following test items are carried out according to corresponding reference.

Routine tests of optical fiber

<i>Mode field diameter</i>	<i>IEC 60793-1-45</i>
<i>Mode field Core/clad concentricity</i>	<i>IEC 60793-1-20</i>
<i>Cladding diameter</i>	<i>IEC 60793-1-20</i>
<i>Cladding non-circularity</i>	<i>IEC 60793-1-20</i>
<i>Attenuation coefficient</i>	<i>IEC 60793-1-40</i>
<i>Chromatic dispersion</i>	<i>IEC 60793-1-42</i>
<i>Cable cut-off wavelength</i>	<i>IEC 60793-1-44</i>

Test for outdoor cable

4.1 Tension Loading Test

Test Standard	IEC 60794-1-2 E1
Sample length	No less than 50 meters
Load	Max. installation load
Duration time	1 hour
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.2 Crush/Compression Test

Test Standard	IEC 60794-1-2 E3
Load	Crush load
Plate size	100mm length
Duration time	1 minute
Test number	1
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.3 Impact Resistance Test

Test Standard	IEC 60794-1-2 E4
Impact energy	6.5J
Radius	12.5mm
Impact points	3
Impact number	2
Test result	Additional attenuation: ≤ 0.05 dB

4.4 Repeated Bending Test

Test Standard	IEC 60794-1-2 E6
Bending radius	20 X diameter of cable
Cycles	25 cycles
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.5 Torsion/Twist Test

Test Standard	IEC 60794-1-2 E7
Sample length	2m
Angles	± 180 degree
cycles	10
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.6 Bend Test

Test Standard	IEC 60794-1-2 E11B
Mandrel diameter	20 X diameter of cable
Turn number	4
Number of cycles	3
Temperature	20°C
Test result	No damage to outer jacket and inner elements

4.7 Temperature cycling Test

Test Standard	IEC 60794-1-2 F1
Temperature step	+20°C → -40°C → +85°C → +20°C
Time per each step	Transition from 0°C to -40°C:2hours; duration at -40°C:8 hours; Transition from -40°C to +85 °C:4hours; duration at +85°C:8 hours; Transition from +85°C to 0°C:2hours
Cycles	5
Test result	Attenuation variation for reference value (the attenuation to be measured before test

	at $+20 \pm 3^{\circ}\text{C}$) ≤ 0.05 dB/km
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4.8 Water penetration Test

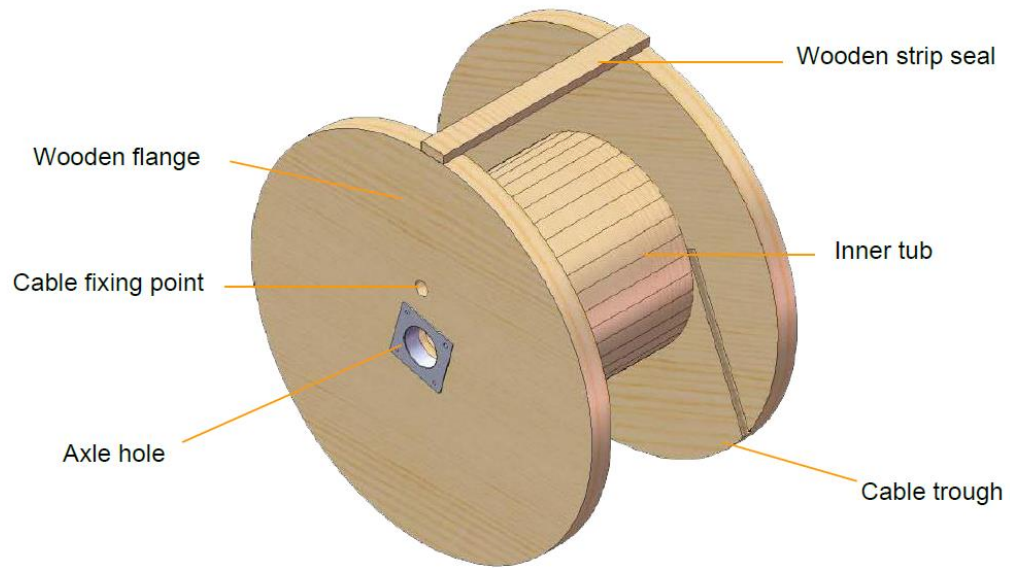
Test Standard	IEC 60794-1-2 F5
Height of water column	1m
Sample length	1m
Test time	1 hour
Test result	No water leakage from the opposite of the sample

4.9 Drip Test

Test Standard	IEC 60794-1-2 E14
Sample length	0.3m
Temperature	70 °C
Duration	24 hrs
Test result	No filling compound shall drip from tubes

9.PACKING AND DRUM

T cables are packed in carton, coiled on Bakelite & wooden drum. During transportation, right tools should be used to avoid damaging the package and to handle with ease. Cables should be protected from moisture; kept away from high temperature and fire sparks; protected from over bending and crushing; protected from mechanical stress and damage.



GENERAL

1.1 SCOPE

This listed specification covers the design requirements and performance standard for the supply of optical fiber cable in the industry. It should also include premium designed cable with optical, mechanical and geometrical characteristics

Cable Type	Application
ADSS	Self supporting aerial installation

1.2 Cable Description

Cable possesses high tensile strength and flexibility in compact cable sizes. At the same time, it provides excellent optical transmission and physical performance.

1.3 Quality

Suppliers should ensure a continuing level of quality in our cable products through several quality control programs including ISO 9001.

1.4 Reliability

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1.5 The cable are designed, manufactured and tested according to international standards as follow

ITU-TG.652	Characteristics of a single mode optical fiber
ITU-TG.655	Characteristics of a non-zero dispersion -shifted single mode fibers optical
IEC 60793-1	Optical fiber Part 1: Generic specifications
IEC 60793-2	Optical fiber Part 2: Product specifications
IEC 60794-4	Optical fiber cables-Part 4: Sectional specification-Aerial optical cables along electrical power lines

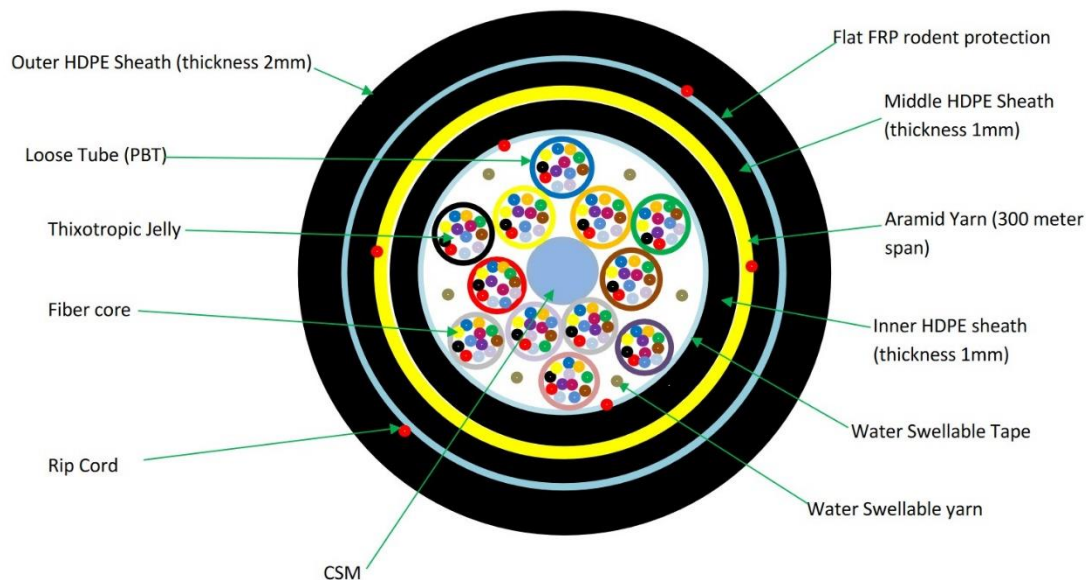
B1.3(G652D) single mode fiber

Optics Specifications		
Attenuation(dB/km)	@1310nm	≤0.35db/km
	@1383nm (after hydrogen aging)	≤0.32db/km
	@1550nm	≤0.21db/km
	@1625nm	≤0.24db/km
Dispersion	@1285nm~1340nm	-3.0~3.0ps/(nm*km)
	@1550nm	≤18ps/(nm*km)
	@1625nm	≤22ps/(nm*km)
Zero-Dispersion wavelength		1300~1324nm
Zero-Dispersion slope		≤0.092ps/(nm ² *km)
Mode field diameter @ 1310nm		9.2 ± 0.4μm
Mode field diameter @ 1550nm		10.4 ± 0.8μm
PMD	Max. value for fiber on the reel	0.2ps/km 1/2
	Max. Designed value for link	0.08ps/km 1/2
Cable cutoff wavelength,λ cc		≤1260nm
Effective group index(Neff)@1310nm		1.4675
Effective group index(Neff)@1550nm		1.4680
Macro-bend loss(Φ 60mm,100 turns)@1550nm		≤0.05db
Back scatter characteristic(@1310nm&1550nm)		
Point discontinuity		≤0.05db
Attenuation uniformity		≤0.05db/km
Attenuation coefficient difference for bi-directional measurement		≤0.05db/km
Geometrical characteristics		
Cladding diameter		125±1μm
Cladding non-circularity		≤1%
Core/cladding concentricity error		≤0.4μm
Fiber diameter with coating(uncolored)		245±5μm
Cladding/coating concentricity error		≤12.0μm
Curl		≥4m
Mechanical characteristic		
Proof test		0.69GPa
Coating strip force(typical value)		1.4N
Dynamic stress corrosion susceptibility parameter(typical value)		≥20
Environmental characteristics(@1310nm&1550nm)		
Temperature induced attenuation(-60~+85°C)		≤0.5dB/km
Dry heat induced attenuation(85 ± 2°C,30days)		≤0.5dB/km
Water immersion induced attenuation(23 ± 2°C,30days)		≤0.5dB/km
Damp heat induced attenuation(85 ± 2°C,RH85%,30days)		≤0.5dB/km

8. Cable structure

3.1 Cable Type:-ADSS

144c ADSS Fiber cable, Cross sectional view



Technical Characteristics

16) The unique extruding technology provides the fibers in the tube with good flexibility and bending endurance

17) The unique fiber excess length control method provides the cable with excellent mechanical and environmental properties. Multiple water blocking material filling provides dual water blocking function

18) Filling Compound : Water swellable

The aerial cable shall be dry core loose tube type. There shall be proper provision to prevent the ingress or flow of moisture inside cable. In dry core design there shall be enough water swellable tape or yarn inside the cable and each loose tubes to ensure water/moisture blocking system.

Technical specifications:

Fiber Number	144
Max. No of loose tube / filler No.	12/0
Fiber No. per tube	12
Loose tube diameter	1.8mm+/-0.1mm
Loose tube material	PBT polybutylece terephthalate
Gel filled in loose tube	Yes
Central strength member diameter	2.8mm around PE sheath to 3.4mm
Central strength material	FRP (Fiber Reinforced Plastic)
Outer sheath thickness/ material	2mm+/-0.1mm/ HDPE black
Middle sheath and inner sheath thickness	1.0mm+/-0.1mm/HDPE black
Water blocking material	Water blocking tap & Water blocking yarn
Rip cord	2 red Rip cord each in every layer
Cable OD	20.5+/-0.2mm
Cable weight	Approx.246 kg/km
Armored	FRP amour 3MM*1MM
Operation temperature range	-40 deg C to + 70 deg C
Installation temperature range	-20 °C to + 60 °C
Transport and storage temperature range	-40 °C to + 70 °C
Span	300 meter
Suitable lines	≤35kv
Maximum operation tensile	10KN
Crush resistance	2200N /10cm
Minimal installation bending radius	20 x OD
Minimal operation bending radius	10 x OD
Repeating bending	Load: 150N;number of cycles:30 No obvious addition attenuation, no fiber break and no cable damage.
Torsion	Load: 150N; number of cycles:10; twist angle:± 180° No obvious addition attenuation, no fiber break and no cable damage.

Impact	Impact energy: 450g×1m; radius of hammer head:12.5mm; number of impact: 5 No obvious addition attenuation, no fiber break and no cable damage.
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COLOR IDENTIFICATION OF FIBER

The fibres shall be marked by a coloured coating with 12 different colours according to EIA/TIA 598:

- Fibre #1: Blue
- Fibre #2: Orange
- Fibre #3: Green
- Fibre #4: Brown
- Fibre #5: Slate (Grey)
- Fibre #6: White
- Fibre #7: Red
- Fibre #8: Black (natural with being marked)
- Fibre #9: Yellow
- Fibre #10: Violet
- Fibre #11: Rose (Pink)
- Fibre #12: Aqua (Light Blue)

1	2	3	4	5	6
7	8	9	10	11	12

COLOR IDENTIFICATION OF FIBER

16Fiber	1# 4fiber	2# 4fiber	3# 4fiber	4# 4fiber	5# filler	6# filler
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4.TEST REQUIREMENTS

Approved by various professional optical and communication product institution. Cables should be also conducted various in-house testing in its own Laboratory and Test Center. The cable should be in accordance with applicable standard of cable and requirement of customer. The following test items are carried out according to corresponding reference. Routine tests of optical fiber

Mode field diameter	IEC 60793-1-45
Mode field Core/clad concentricity	IEC 60793-1-20
Cladding diameter	IEC 60793-1-20
Cladding non-circularity	IEC 60793-1-20
Attenuation coefficient	IEC 60793-1-40
Chromatic dispersion	IEC 60793-1-42
Cable cut-off wavelength	IEC 60793-1-44

Test for outdoor cable

4.1 Tension Loading Test

Test Standard	IEC 60794-1-2 E1
Sample length	No less than 50 meters
Load	Max. installation load
Duration time	1 hour
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.2 Crush/Compression Test

Test Standard	IEC 60794-1-2 E3
Load	Crush load
Plate size	100mm length
Duration time	1 minute
Test number	1
Test results	Additional attenuation: ≤ 0.05 dB No damage to outer jacket and inner elements

4.3 Impact Resistance Test

Test Standard	IEC 60794-1-2 E4
Impact energy	6.5J
Radius	12.5mm
Impact points	3
Impact number	2
Test result	Additional attenuation: ≤ 0.05 dB

4.4 Repeated Bending Test

Test Standard	IEC 60794-1-2 E6
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Bending radius	20 X diameter of cable
Cycles	25 cycles
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.5 Torsion/Twist Test

Test Standard	IEC 60794-1-2 E7
Sample length	2m
Angles	± 180 degree
cycles	10
Test result	Additional attenuation: $\leq 0.05\text{dB}$ No damage to outer jacket and inner elements

4.6 Bend Test

Test Standard	IEC 60794-1-2 E11B
Mandrel diameter	20 X diameter of cable
Turn number	4
Number of cycles	3
Temperature	20°C
Test result	No damage to outer jacket and inner elements

4.7 Temperature cycling Test

Test Standard	IEC 60794-1-2 F1
Temperature step	+20°C → -40°C → +85°C → +20°C
Time per each step	Transition from 0°C to -40°C:2hours; duration at -40°C:8 hours; Transition from -40°C to +85 °C:4hours; duration at +85°C:8 hours; Transition from +85°C to 0°C:2hours
Cycles	5
Test result	Attenuation variation for reference value (the attenuation to be measured before test at $+20 \pm 3^\circ\text{C}$) ≤ 0.05 dB/km

4.8 Water penetration Test

Test Standard	IEC 60794-1-2 F5
Height of water column	1m
Sample length	1m
Test time	1 hour
Test result	No water leakage from the opposite of the sample

4.9 Drip Test

Test Standard	IEC 60794-1-2 E14
Sample length	0.3m
Temperature	70 °C
Duration	24 hrs
Test result	No filling compound shall drip from tubes

10.PACKING AND DRUM

T cables are packed in carton, coiled on Bakelite & wooden drum. During transportation, right tools should be used to avoid damaging the package and to handle with ease. Cables should be protected from moisture; kept away from high temperature and fire sparks; protected from over bending and crushing; protected from mechanical stress and damage.

