

Optical Fiber Cables — Aerial



ADSS Optical Fiber Cable — 48G652D-PE, 300 m Span

All-Dielectric Self-Supporting (ADSS) Aerial Fiber Cable | 48 single-mode fibers | Designed for 300 m between supports

Standards: IEC 60794-1 / -4 (optical fiber cables), IEC 60793-2-50 (G.652 fiber, class B1.3), ITU-T G.652.D, IEEE 1222 (ADSS); ref. YD/T 979, GB/T 7424, GB/T 9771.3

Designation Breakdown

ADSS = All-Dielectric Self-Supporting | 48 = 48 optical fibers | G.652D = ITU-T G.652.D single-mode fiber (low water peak, suitable for 1310 / 1383 / 1550 / 1625 nm operation including CWDM) | PE = polyethylene outer jacket (standard, for installations where the space potential at the cable surface is ≤ 12 kV/m; for higher-induction routes, AT or PE-AT track-resistant jacket required) | 300 m = maximum design span between supports.

Cable Structure

Item	Parameter	Specification
Fiber	Fiber type	ITU-T G.652D (low water peak, IEC 60793-2-50 B1.3)
	Fiber count	48
Cable core	Core structure	Stranded loose-tube, 1 + 6 (1 central FRP + 6 elements around)
Loose buffer tube	Fibers per tube	12
	Tube count	4 (active) + 2 fillers
	Tube material	PBT (polybutylene terephthalate)
	Filling compound	Thixotropic gel (water-resistant, non-toxic)
Central strength	Material	FRP (fibreglass-reinforced plastic rod) — non-metallic, dielectric
Water blocking	Method	Water-blocking yarn (longitudinal) + water-blocking tape (radial)
Inner jacket	Material	PE (polyethylene)
	Colour	Black
Auxiliary strength	Material	Aramid yarn (Kevlar®), helically wound, two contra-helical layers
Outer jacket	Material	PE (UV-stabilised, track-resistant)
	Colour	Black
Overall	Cable outer diameter	13.8 mm (approx.)
	Cable weight	132 ± 5 kg/km
	Design span	300 m
	Rated tensile strength (RTS)	31 kN

Optical / Transmission Performance

No.	Parameter	Unit	Specification
1	Mode field diameter @ 1310 nm	µm	(8.6 – 9.5) ± 0.4
2	Mode field diameter @ 1550 nm	µm	(9.7 – 10.7) ± 0.5
3	Cladding diameter	µm	125 ± 1
4	Coating diameter	µm	245 ± 10
5	Core / cladding concentricity error	µm	≤ 0.6
6	Cladding non-circularity	%	≤ 1.0
7	Cladding / coating concentricity error	µm	≤ 12.5
8	Cable cutoff wavelength (λ _{cc})	nm	≤ 1260

No.	Parameter	Unit	Specification
9	Max. attenuation @ 1310 nm	dB/km	≤ 0.35
10	Max. attenuation @ 1383 nm (water peak)	dB/km	≤ 0.35 (G.652D — water peak controlled)
11	Max. attenuation @ 1550 nm	dB/km	≤ 0.21
12	Max. attenuation @ 1625 nm	dB/km	≤ 0.24
13	Point discontinuity @ 1310 nm / 1550 nm	dB	≤ 0.05
14	Attenuation discontinuity @ 1310 nm / 1550 nm	dB	≤ 0.1
15	Zero-dispersion wavelength (λ_0)	nm	1300 – 1324
16	Max. zero-dispersion slope (S_0)	ps/(nm ² ·km)	≤ 0.092
17	Chromatic dispersion @ 1550 nm	ps/(nm·km)	≤ 18
18	Polarisation mode dispersion (PMD, link design)	ps/ $\sqrt{\text{km}}$	≤ 0.2
19	Macrobending loss (100 turns, R = 30 mm) @ 1550 nm	dB	≤ 0.05
20	Macrobending loss (1 turn, R = 16 mm) @ 1625 nm	dB	≤ 0.1
21	Proof test	GPa	≥ 0.69 (≥ 100 kpsi, 1% strain)
22	Fiber performance standard	—	ITU-T G.652.D / IEC 60793-2-50 / GB/T 9771.3

Mechanical & Environmental Performance

Parameter	Specification
Maximum design span (between supports)	300 m
Rated tensile strength (RTS)	31 kN
Maximum allowable tension (MAT, everyday stress / EDS)	15.5 kN (50% of RTS)
Maximum installation tension	31 kN (= RTS, short-duration during stringing)
Maximum sag — typical at MAT, 300 m span	approx. 1.0 – 1.5% of span
Crush resistance (short-term)	≥ 5 000 N / 100 mm
Crush resistance (long-term)	≥ 1 000 N / 100 mm
Impact resistance	≥ 20 N·m
Repeated bending	≥ 30 cycles, radius 20 × OD
Torsion	±180° / 1 m, 10 cycles, no fiber damage
Min. bending radius (installation)	20 × cable OD (≈ 276 mm)
Min. bending radius (operation)	10 × cable OD (≈ 138 mm)
Operating temperature	-40 °C to +70 °C
Storage / transport temperature	-40 °C to +70 °C
Installation temperature	-20 °C to +60 °C
Water penetration	1 m × 3 m, 24 h, no water passage (IEC 60794-1-22 method F5)
Dielectric strength (cable)	all-dielectric — no metallic elements; suitable for installation along live HV lines
Maximum space potential (induced E-field)	≤ 12 kV/m (corona threshold for standard PE jacket — track-resistant AT jacket required above)
UV resistance	compliant with IEC 60794-1-2 method E11 (UV-stabilised PE)
Standards compliance	IEC 60794-1, IEC 60794-4, IEEE 1222, YD/T 979, GB/T 7424

Application

ADSS (All-Dielectric Self-Supporting) cables are designed to be installed on existing overhead power and telecom infrastructure as an independent, self-supporting span — no separate messenger wire and no metallic element anywhere in the cable. The fully-dielectric construction makes them safe to install on energised high-voltage transmission and distribution towers while the line is in service ('live-line stringing'), and immune to lightning strikes and induced ground-loop currents.

Typical applications:

- Backbone and access fiber routes on 110 / 220 / 330 / 500 kV overhead transmission lines, sharing the towers with the phase / ground wires
- Power utility communication — SCADA, teleprotection, substation interconnect, smart-grid data
- Carrier and ISP backbone deployment on distribution-pole networks where direct burial or duct work is uneconomic
- Railway and pipeline corridor fiber, alongside existing pole lines or catenary supports
- Long river / valley / road crossings (the self-supporting span eliminates the need for a separate messenger or a bored crossing)
- Last-mile FTTH / FTTx aerial drops in regions where overhead deployment is preferred

Span guidance for this 300 m product: suitable for distribution and sub-transmission routes with tower spacing up to 300 m. For longer spans (typically >300 m and up to ~1000 m), use the higher-strength ADSS variants with more aramid yarn layers and larger RTS values. For routes where the space potential at the cable surface exceeds 12 kV/m (close-in 220 kV / 500 kV bundles), specify the AT (Anti-Tracking) or PE-AT double-jacket version to prevent dry-band arcing damage.

Packaging and Marking

Sheath marking: clear, durable print remaining legible after wipe testing; 1-metre interval (tolerance 0 – 1%); white ink-jet printing; content as per customer requirement

Reel length: 2 – 4 km per drum (or as specified by customer)

Drum: closed-panel wooden drum with PE UV-protective wrap

Note: ITU-T G.652.D fiber meets the strictest single-mode requirements among the G.652 family — it includes a controlled water peak at 1383 nm (the OH absorption peak in older G.652.A/B fiber), enabling operation across the full E-band for CWDM channel utilisation. The 300 m span rating is at MAT (50% of RTS) under everyday-stress conditions per IEEE 1222 wind/ice loading; longer spans, heavier wind/ice zones, or higher induced electric field require an upgraded specification (larger RTS, AT/PE-AT jacket). Optical, mechanical, and environmental parameters are tested per IEC 60794-1-2x methods. The above specifications are typical maxima; specific batch values are available on the type-test report and the cable manufacturer's certificate.