

Outdoor HDPE Unarmoured Multitube Cable

Single-Mode G.652.D (OS2) | Multitube (Dry-Core) (MT) | Unarmoured | UV-Stabilised HDPE Outer Sheath | Variants: 6F + 12F + 24F + 48F + 96F

1. Product Description

Single-Mode G.652.D (OS2) fibres are housed in gel-filled, colour-coded PBT loose tubes SZ-stranded around a central FRP strength member. The all-dielectric, dry-core design (water swellable yarns and tape) enables fast mid-span access and is immune to EMI and lightning — ideal for duct installation, blowing into micro-ducts, or sub-duct application in high-voltage environments.

- Duct and sub-duct installation; air-blown micro-duct deployment
- High-voltage corridor and power utility right-of-way (all-dielectric)
- Lightning-prone areas where non-metallic construction is mandatory
- Indoor–outdoor transition cable in riser-to-campus topologies
- High fibre-count, low-weight, cost-efficient backbone deployment

2. Product Cross-Sections

All variants share the same material build; only fibre count, tube/ring arrangement and cable OD differ. Cross-sections shown below to a common scale.

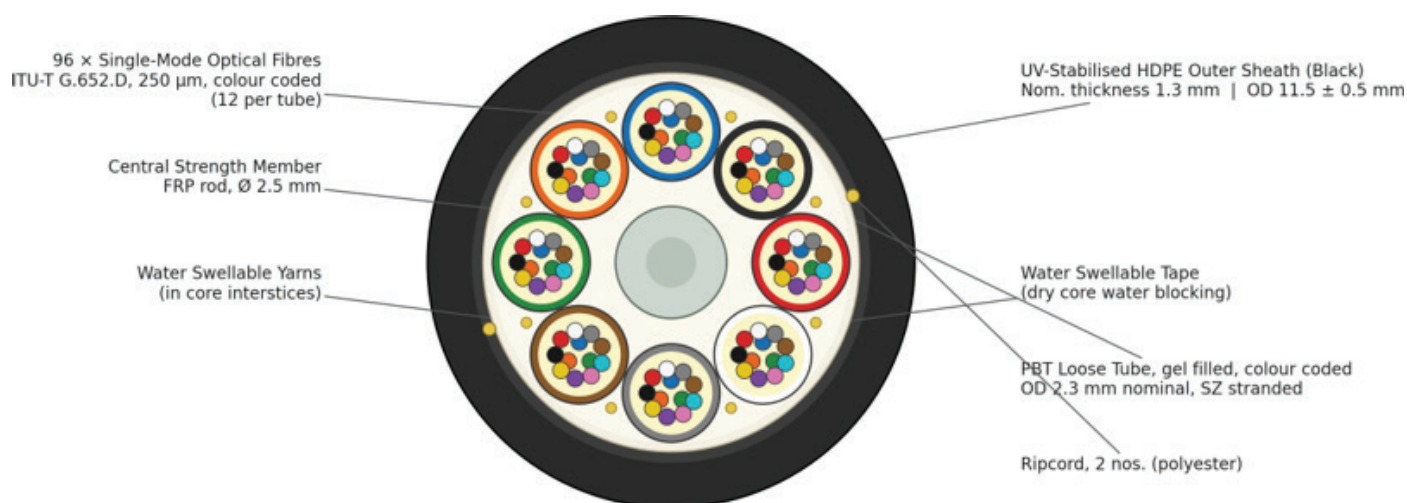


Figure — 96F Multitube Unarmoured Cross-Section (OD 11.5 $\pm$ 0.5 mm, 8 tubes $\times$ 12F + 0 filler rods)

3. Cable Construction Details

All variants share the same material specification. Construction tables below are representative of the series; variant-specific dimensions are in Section 3.2.

3.1 Common Construction — All Variants

S. No.	Element	Material / Description	Nominal Value
1	Optical fiber	Single-mode, ITU-T G.652.D / IEC 60793-2-50 B-652.D (OS2 per ISO/IEC 11801); 250 µm dual-layer UV-curable acrylate coating; colour coded per TIA-598-D; 12-colour scheme	6 fibres × 250 µm
2	Central strength member	Fibre reinforced plastic (FRP) rod	Ø 2.0 mm
3	Loose tubes	PBT, gel filled, colour coded, SZ stranded (6F per tube)	1 nos. × OD 2.0 mm
4	Filler rods	Solid polyethylene	4 nos.
5	Core water blocking	Water swellable yarns + tape (dry core)	—
6	Ripcords	Polyester	2 nos.
7	Outer sheath	UV-stabilised HDPE, black (carbon black ≥ 2.3%), sequentially marked	1.2 mm thick
8	Cable OD	Overall	8.5 ± 0.3 mm
9	Cable weight	Approximate	58 kg/km

3.2 Variant-Specific Physical Dimensions

Parameter	6F	12F	24F	48F	96F
Fibre count	6	12	24	48	96
Tubes (active)	1	2	4	4	8
Fibres per tube	6	6	6	12	12
Filler rods	4	3	1	1	0
Element count	5	5	5	5	8
Cable OD (nominal)	8.5 ± 0.3 mm	8.5 ± 0.3 mm	8.5 ± 0.3 mm	8.5 ± 0.3 mm	11.5 ± 0.5 mm
Cable weight (approx.)	58 kg/km	60 kg/km	62 kg/km	68 kg/km	105 kg/km
Tensile load S/T	1500 N	1500 N	1500 N	1500 N	2000 N
Tensile load L/T	600 N	600 N	600 N	600 N	800 N
Min. bend radius — dynamic	20 × OD (170 mm)	20 × OD (170 mm)	20 × OD (170 mm)	20 × OD (170 mm)	20 × OD (230 mm)
Min. bend radius — static	10 × OD (85 mm)	10 × OD (85 mm)	10 × OD (85 mm)	10 × OD (85 mm)	10 × OD (115 mm)

4. Optical Characteristics — ITU-T G.652.D / OS2 (Common to All Variants)

Optical performance is identical across all variants; only the construction changes.

Parameter	Condition	Specified Value
Fibre type	-	Single-mode, ITU-T G.652.D / IEC 60793-2-50 B-652.D (OS2 per ISO/IEC 11801)
Attenuation (cabled)	@ 1310 nm @ 1383 nm (water-peak) @ 1550 nm @ 1625 nm	≤ 0.36 dB/km ≤ 0.40 dB/km ≤ 0.22 dB/km ≤ 0.25 dB/km
Mode field diameter (MFD)	@ 1310 nm @ 1550 nm	9.2 ± 0.4 μm 10.4 ± 0.8 μm
Cladding diameter	-	125.0 ± 0.7 μm
Core/cladding concentricity error	-	≤ 0.5 μm
Cable cut-off wavelength (λ _{cc})	-	≤ 1260 nm
Zero dispersion wavelength (λ ₀)	-	1300 – 1324 nm
Zero dispersion slope (S ₀)	-	≤ 0.092 ps/(nm ² ·km)
Chromatic dispersion	@ 1550 nm @ 1625 nm	≤ 18 ps/(nm·km) ≤ 22 ps/(nm·km)
PMD (link design value, PMDQ)	-	≤ 0.20 ps/√km
Macrobend loss	100 turns, Ø 60 mm @ 1550 nm 100 turns, Ø 60 mm @ 1625 nm	≤ 0.10 dB ≤ 0.20 dB
Proof test level	-	≥ 0.69 GPa (≥ 1% strain)
CWDM / DWDM compatibility	-	All ITU-T G.694.1/G.694.2 channels; C+L-band DWDM

5. Mechanical Characteristics

Values vary by fibre count and cable OD — see Section 3.2 for per-variant tensile and bend radius figures. Crush and impact values are common.

Parameter	Test Method (IEC 60794-1-21)	Value
Crush resistance	Method E3	2000 N / 100 mm
Impact resistance	Method E4	3 Nm, 3 impacts

Acceptance criteria: fibre attenuation change ≤ 0.05 dB at test wavelength during and after each test; no fibre breakage; no sheath cracking.

6. Environmental Characteristics

Common to all variants.

Parameter	Test Method	Specified Value
Operating temperature	IEC 60794-1-22, F1	-40 °C to +70 °C
Installation temperature	—	-10 °C to +50 °C
Storage / transport temperature	—	-40 °C to +70 °C
Temperature cycling	IEC 60794-1-22, F1 (2 cycles)	$\Delta\alpha \leq 0.05$ dB/km @ 1310 nm and 1550 nm
Water penetration	IEC 60794-1-22, F5B	No leakage, 3 m / 1 m head / 24 h
Compound flow (tube jelly)	IEC 60794-1-21, E14	No drip @ +70 °C, 24 h
UV resistance (HDPE sheath)	Carbon black $\geq 2.3\%$, ASTM D1603	Well dispersed
Environmental stress cracking	ASTM D1693	No cracking
RoHS compliance	EU Directive 2011/65/EU	Fully compliant

7. Packing and Delivery

Standard delivery: 2,000 m / 4,000 m ($\pm 5\%$) on returnable wooden drums. Both cable ends sealed with end caps. Drum flange marked with product code, fibre type, variant (fibre count), length, gross weight, drum number, direction of rotation and traceability code. Non-standard lengths available on request.

8. ORDERING DETAILS

TVARA FIBER CONNECTOR HOUSING - LIU PANNEL ORDERING DETAILS			
AA	BBBBB	CCC	DDD
↓	↓	↓	↓
TVARA FIBER	Out Door (OD) Type Single mode	Cable Type	Fiber count
TF	S2OD	MTD - Muti tube, Die electric	006
			012
			024
			048
			096

EXAMPLE:

TF-S2OD-MTD-006	DHRUVA Connect – TVARA FIBER, Single-mode Out door, Multitube Unarmored, 6 Fiber optic cable.
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