

Blue Nylon Single-Mode Loose Tube Fibre Optic Cable

KEY FEATURES

- Complies to 9001, ISO 14001 and ROHS
- LSZH Nylon blue sheath
- High fibre count up to 576 Fibres
- Fibre glass reinforced polymer central strength member
- Water swellable yarns provide protection against water ingress (dry core construction)
- Non-metallic construction

APPLICATIONS

- Underground ducts
- Direct buried fibre links
- Inter-building links
- Campus fibre networks

1. General

1.1 Scope

This Specification covers the design requirements and performance standard for the supply of optical fibre cable in the industry. OCULA ensures a stable quality control system for our cable products through several programs including ISO 9001, ISO 14001 and OHS.

1.2 Reference

The cable offered by OCULA are designed, manufactured and tested according to the standards as follows:

ITU-T G.652	Characteristics of a single-mode optical fibre
IEC 60794-1-1	Optical fibre cables-part 1-1: Generic Specification-General
IEC 60794-1-21	Optical fibre cables- part1-2-Generic Specification-Basic optical cable test procedure-Mechanical test methods
IEC 60794-1-22	Optical fibre cables- part1-2-Generic Specification-Basic optical cable test procedure-Environmental test methods
IEC 60794-3	Optical fibre cables-part 3: Sectional Specification-Outdoor cables
IEC 60794-3-10	Optical fibre cables-part 3-10: Outdoor Cables-Family specification for duct and direct buried optical communication cables
IEC 60794-3-11	Optical fibre cables-Part 3-11: Outdoor Cables-Detailed specification for duct and directly buried single-mode optical fibre telecommunication cables

1.3 Lifetime

Optical fibre cables supplied in compliance with this specification is capable to withstand the typical service condition for a period of twenty-five (25) years without detriment to the operation characteristics of the cable.

1.4 Application

ITEM	VALUE
OPERATION TEMPERATURE	-40°C ~ +70°C
INSTALLATION TEMPERATURE	-40°C ~ +70°C
STORAGE TEMPERATURE	-40°C ~ +70°C
STATIC BENDING RADIUS	10 times the cable diameter
DYNAMIC BENDING RADIUS	20 times the cable diameter

2. Optical Fibre

Optical Fibres supplied in this specification meet the requirements of ITU-T G.652.D

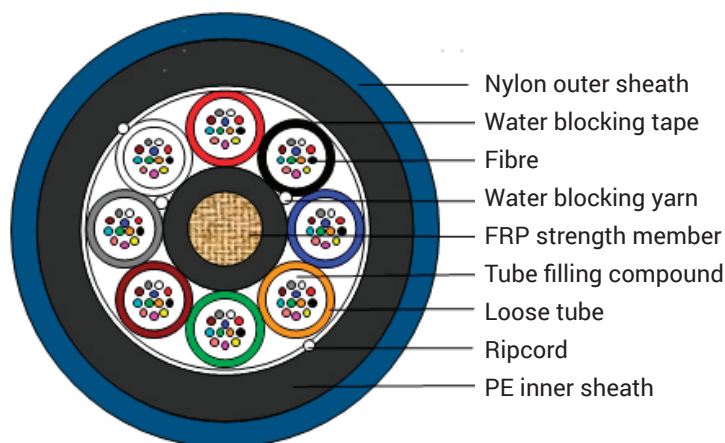
PARAMETER	SPECIFICATION
MFD (1310NM)	8.7 ~ 9.5μm
CLADDING DIAMETER	125 ± 0.7μm
FIBRE DIAMETER	235 ~ 255μm, with UV coating, and coloured to : 250±15μm
CORE/CLADDING CONCENTRICITY ERROR	≤ 0.6μm
COATING/CLADDING CONCENTRICITY ERROR	≤ 12.0μm
CLADDING NON CIRCULARITY	≤ 1.0%
CUT OFF WAVELENGTH	$\lambda_{cc} \leq 1260\text{nm}$
ATTENUATION COEFFICIENT	1310nm: 0.35dB/km max after cabling
	1550nm: 0.21dB/km max after cabling
BENDING-LOSS PERFORMANCE OF OPTICAL FIBRE @ 1310NM & 1550NM	≤0.05dB (100 turns around a mandrel of 50mm diameter)
POLARIZATION MODE DISPERSION MAXIMUM INDIVIDUAL FIBRE	≤0.2ps/√km
POLARIZATION MODE DISPERSION LINK VALUE	≤0.1ps/√km
ZERO-DISPERSION WAVELENGTH	1300~1324nm
ZERO-DISPERSION SLOPE	≤0.092ps/nm ² ·km

3. Optical Cable

3.1 Technical Characteristics

- The unique second coating and stranding technology provide the fibres with enough space and bending endurance, which ensure good optical property of the fibres in the cable
- Accurate process control ensures good mechanical and temperature performance
- High quality raw material guarantees the long service life of cable

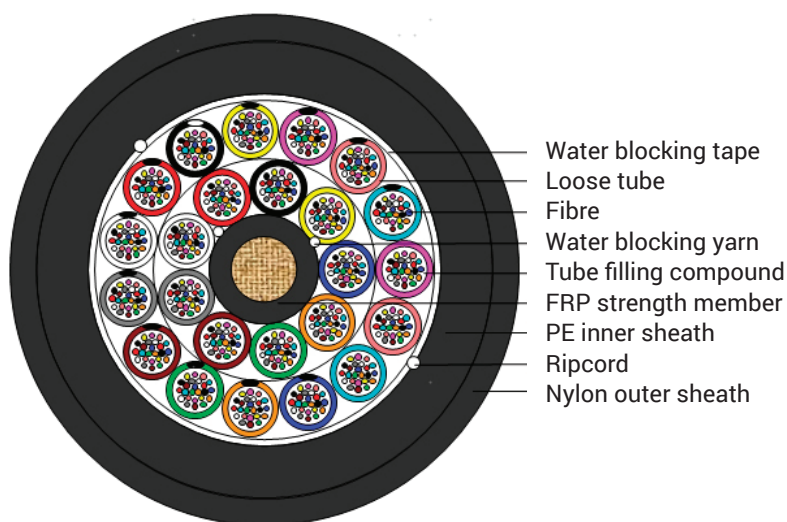
3.2 Cross Section of Cable



96 Fibre

Structure of other fibre counts referred to 3.4

Schematic for reference only



576 Fibre

Structure of other fibre counts referred to 3.4

Schematic for reference only

3.1 Fibre and Loose Tube Identification

The colour code of fibres and loose tube will be identification in accordance with the following colour sequence, other sequence also is available.

FIBRE COLOUR CODE	12F/T	1	2	3	4	5	6
		Blue	Orange	Green	Brown	Grey	White
		7	8	9	10	11	12
		Red	Black	Yellow	Purple	Pink	Aqua
		1	2	3	4	5	6
		Blue	Orange	Green	Brown	Grey	White
	24F/T	7	8	9	10	11	12
		Red	Black	Yellow	Purple	Pink	Aqua
		13	14	15	16	17	18
		Blue with black ring	Orange with black ring	Green with black ring	Brown with black ring	Grey with black ring	White with black ring
		19	20	21	22	23	24
		Red with black ring	Natural	Yellow with black ring	Purple with black ring	Pink with black ring	Aqua with black ring
TUBE COLOUR CODE	12-144 CORE	1	2	3	4	5	6
		Blue	Orange	Green	Brown	Grey	White
		7	8	9	10	11	12
		Red	Black	Yellow	Purple	Pink	Aqua
		Inner layer 1	Inner layer 2	Inner layer 3	Inner layer 4	Inner layer 5	Inner layer 6
		Blue	Orange	Green	Brown	Grey	White
	288-576 CORE	Inner layer 7	Inner layer 8	Inner layer 9	Outer layer 1	Outer layer 2	Outer layer 3
		Red	Black	Yellow	Purple	Pink	Aqua
		Outer layer 4	Outer layer 5	Outer layer 6	Outer layer 7	Outer layer 8	Outer layer 9
		Blue with black stripe	Orange with black stripe	Green with black stripe	Brown with black stripe	Grey with black stripe	White with black stripe
		Outer layer 10	Outer layer 11	Outer layer 12	Outer layer 13	Outer layer 14	Outer layer 15
		Red with black stripe	Black with white stripe	Yellow with black stripe	Purple with black stripe	Pink with black stripe	Aqua with black stripe

The colour of the fillers will be natural.

3.3 Dimensions and Descriptions

The standard optical cable structure is shown in the following table, other structure and fibre count are also available according to customer requirements.

ITEM	CONTENTS	VALUE						
		12	48	72	96	144	288	576
STRUCTURE	Type	1+6			1+8	1+12	1+9+15	
LOOSE TUBE	Fibre counts/tube	12					24	
	Outer diameter (mm)	2.1					2.7	
CENTRAL STRENGTH MEMBER	Material	FRP						
	Diameter (mm)	2.25			2.6	3.5	3.0	3.5
	PE layer diameter (mm)	/			3.5	6.1	4.2	5.4
WATER BLOCKING	Material	Water Blocking Tape & Yarn						
INNER SHEATH	Material	HDPE						
	Colour	Black						
	Thickness (mm)	Nominal: 1.0					Nominal: 1.5	
OUTER SHEATH	Material	Nylon						
	Colour	Yellow	Blue	Dark Green	Dark Blue	Red	Orange	Black
	Thickness (mm)	Nominal: 0.5						
RIPCORD	Number	2						
	Colour	White						
CABLE DIAMETER(MM) APPROX.		9.9	9.9	9.9	11.1	13.7	17.0	20.6
CABLE WEIGHT(KG/KM) APPROX.		80	75	75	95	145	205	285

3.4 Main Mechanical Performance

ITEM	TENSION (N)	CRUSH (N/100MM)
12/48/72/96	1500	2000
144/288	2000	
576	2700	

4. Mechanical, Physical and Environmental Test Characteristics

The mechanical and environmental performance of the cable are in accordance with the following table. Unless otherwise specified, all attenuation measurements required in this section shall be performed at 1550nm.

ITEMS	TEST METHOD	REQUIREMENTS
TENSION	IEC 60794-1-21-E1 Load: According to 3.5 Sample length: Not less than 50m Duration time: 1 min	Additional attenuation: ≤0.05dB after test No damage to outer jacket and inner elements
CRUSH	IEC 60794-1-21-E3A Load: According to 3.5 Duration of load: 1 min	Additional attenuation: ≤0.05dB after test No damage to outer jacket and inner elements
IMPACT	IEC 60794-1-21-E4 Radius: 300 mm Impact energy: 10 J Impact number: 1 Impact points: 3	Additional attenuation: ≤0.1dB No damage to outer jacket and inner elements
REPEATED BENDING	IEC 60794-1-21-E6 Bending radius: 20*D Cycles: 25 Load: 150N	Additional attenuation: ≤0.05dB No damage to outer jacket and inner elements
TORSION	IEC 60794-1-21-E7 Cycles:10 Length under test: 1m Turns: ±180° Load: 150N	Additional attenuation: ≤0.1dB No damage to outer jacket and inner elements
WATER PENETRATION	IEC 60794-1-22-F5B Time: 24 hours Sample length: 3m Water height: 1m	No water leakage
TEMPERATURE CYCLING	IEC 60794-1-22-F1 Sample length: at least 1000m Temperature range: -40°C ~ +70°C Cycles: 2 Temperature cycling test dwell time: 12 hours	The change in attenuation coefficient shall be less than 0.05 dB/km
OTHER PARAMETERS	According to IEC 60794-1	