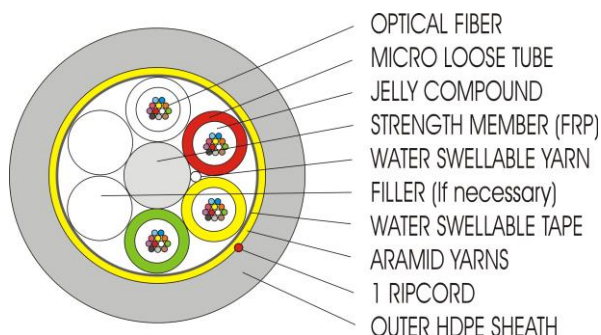
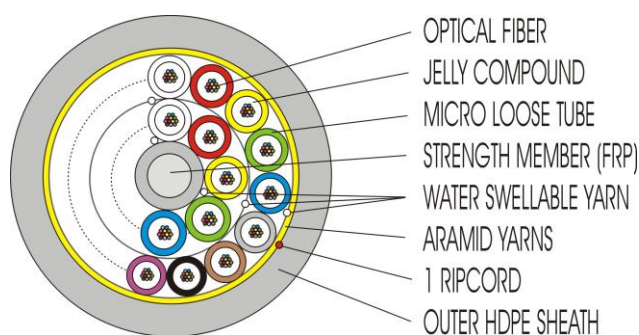


■ MINI TYPE, DUCT INSTALLATION CABLE (12C~432C)



[12~144C]



[192~432C]

- SINGLE MODE OPTICAL FIBER (ITU-T G.652D, LWPF ; Low Water Peak Fiber)
- MICRO LOOSE TUBE (JELLY FILLED)
- CENTRAL STRENGTH MEMBER (FRP)
- DRY CORE DESIGN, SZ STRANDING (1layer: 12~144C, 2layer: 192~288C, 3layer: 432C)
- MINI_APE* SHEATH FOR DUCT INSTALLATION (Metal free, Halogen free PE)

Fiber Counts		12~72C	96C	144C	192C	288C	432C
Nom. cable diameter (mm)		7.3	8.1	10.0	10.2	11.5	13.1
Fibers per tube		12	12	12	12	12	12
Nom. micro tube diameter (mm)		1.5	1.5	1.5	1.5	1.5	1.5
Nom. outer sheath thickness (mm)		1.4	1.4	1.4	1.4	1.4	1.4
Min. bend radius (mm)	No load (10xD)	75	80	100	100	115	130
	Under load (20xD)	150	160	200	200	230	260
Max. pulling tension (N)	Operation	500	750	850	850	1000	1000
	Installation	1000	1500	2000	2000	2500	2500
Cable weight (kg/km)		43	56	83	83	107	134
Recommended temperature range		-40℃ ~ +75℃ (Transportation & Storage) -10℃ ~ +50℃ (Installation) -40℃ ~ +70℃ (Operation)					

● Mechanical and Environmental Properties

Item	Test Method	Test Condition	Acceptance Criteria
Tensile strength	IEC 794-1-E1	- Load: See table (Max. pulling tension)	Note 1), 2)
Crush	IEC 794-1-E3	- Load: 2000 N/100mm	Note 1), 2)
Impact	IEC 794-1-E4	- Impact energy : 10J (10Nm) - Impact radius: 300mm, 1impact	Note 1), 2)
Repeated bending	IEC 794-1-E6	- Bending radius: 20×cable diameter - Bending cycles: 35	Note 1), 2)
Torsion	IEC 794-1-E7	- Test length: 2m - Twist angle: ±180 degrees - Twist cycles: 5	Note 1), 2)
Temperature cycling	IEC 794-1-F1	- Temperature change: -30℃ → +70℃	Note 3)
Water penetration	IEC 794-1-F5	- Cable length: 3m, Water height: 1m - Duration time: 24 hrs	No water leak

Note 1) Attenuation : ≤ 0.1dB

2) No mechanical damage

3) Attenuation : ≤ 0.2dB/km (each procedure), ≤ 0.1dB/km (after test)

Annex 1. Color Code of Optical Fiber and Loose Tube

No.	1	2	3	4	5	6	7	8	9	10	11	12	13~18
Color	White	Red	Yellow	Green	Blue	Grey	Brown	Black	Violet	Turquoise	Orange	Pink	Natural

Annex 2. Optical Fiber Cable Unit Composition

■ 12 ~ 144C (Single Layer)

Cable Core	Count of optical fiber per loose tube and unit composition (U : Unit, Tube)											
	U1	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12
12C	12	F	F	F	F	F						
24C	12	12	F	F	F	F						
36C	12	12	12	F	F	F						
48C	12	12	12	12	F	F						
60C	12	12	12	12	12	F						
72C	12	12	12	12	12	12						
96C	12	12	12	12	12	12	12	12				
144C	12	12	12	12	12	12	12	12	12	12	12	12

Note) F: Filler (Natural color)

■ 192C ~ 432C (Multi Layer)

Cable Core		Count of optical fiber per loose tube and unit composition (U : Unit, Tube)																	
		U1	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12	U13	U14	U15	U16	U17	U18
192C	1 layer	12	12	12	12	12	12												
	2 layer	12	12	12	12	12	12	12	12	12	12	F	F						
288C	1 layer	12	12	12	12	12	12	12	12	12									
	2 layer	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12			
432C	1 layer	12	12	12	12	12	12												
	2 layer	12	12	12	12	12	12	12	12	12	12	12	12						
	3 layer	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

Note) F: Filler (Natural color)

Annex 3. Optical Properties of Cable

Optical Properties of ITU-T G.652D (LWPF: Low Water Peak Fiber)

Items of Properties		Value
Geometrical Characteristics	Effective group index (step index) @1310nm	1.467
	@1550nm & 1625nm	1.468
	Mode field diameter @1310nm	$9.2 \pm 0.4 \mu\text{m}$
	Core/Clad concentricity error	$\leq 0.5 \mu\text{m}$
	Cladding diameter	$125 \pm 0.7 \mu\text{m}$
	Cladding non-circularity	$\leq 1.0 \%$
Optical Characteristics	Coating diameter (Uncolored)	$245 \pm 5 \mu\text{m}$
	Cutoff wavelength (λ_{cc})	$\leq 1260\text{nm}$
	Attenuation coefficient @1310nm Maximum (Typical) @1383nm Maximum @1550nm Maximum (Typical) @1625nm Maximum	$\leq 0.35 \text{ dB/km}$ ($\leq 0.34 \text{ dB/km}$) $\leq 0.31 \text{ dB/km}$ $\leq 0.22 \text{ dB/km}$ ($\leq 0.20 \text{ dB/km}$) $\leq 0.24 \text{ dB/km}$
	Bending loss @1625nm 30mm mandrel radius, 100 turns	$\leq 0.05 \text{ dB}$
	Attenuation uniformity	$\leq 0.05 \text{ dB}$
	Chromatic dispersion coefficient @1285~1330nm @1290~1330nm @1550nm	$\leq 3.2 \text{ ps/nm.km}$ $\leq 2.8 \text{ ps/nm.km}$ $\leq 18 \text{ ps/nm.km}$
	Zero dispersion wavelength	1300~1322nm
	Zero dispersion slope	$\leq 0.092 \text{ ps/nm}^2.\text{km}$
	PMD Link design value	$\leq 0.08 \text{ ps}/\sqrt{\text{km}}$
	PMD (maximum individual fiber)	$\leq 0.2 \text{ ps}/\sqrt{\text{km}}$
Mechanical Characteristics	Proof test level	115 kpsi (0.8Gpa).
	Coating strip (Nominal)	3.0 N/3cm
Environmental Characteristics (Uncabled fiber)	Temperature dependence (-60℃~+85℃)	$\leq 0.05\text{dB/km}$ (@1310nm/@1550nm)
	Temperature-Humidity Cycling (-10℃~+85℃/98% relative humidity)	$\leq 0.05\text{dB/km}$ (@1310nm/@1550nm)

Revision Table

Rev. No	Date	Page	Description
R0	Feb.01.2023	1~5	Initial release Spec No : MC-2023-DUCATEL-MINI_APE(12~432C)-R0 - G.652D 12, 24, 36, 48, 60, 72, 96, 144, 192, 288, 432C