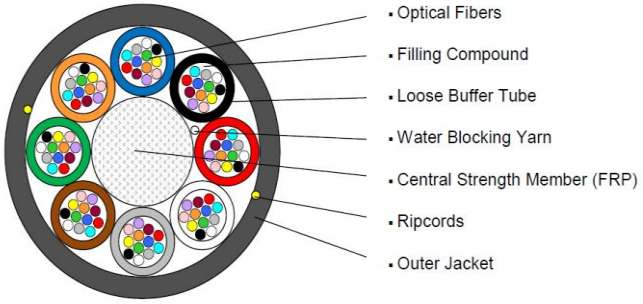
VOYGAR ABC Super Slim Design Air blown Fibre Optic Cable SM 24-144core.

This specification covers the general requirements of compact loose tube fibre optic Telecommunication cables for installation by blowing.
Colour coded fibres, gel filled colour coded loose tubes, PE filler (if necessary), and water sellable yarn, SZ-stranded around the dielectric central strength member, ripcords and outer PE jacket.
VOYGAR supplies various types of air blown cable. Its main product is central tube air blown cable and layer stranding air blow cable which has absolutely technical advantage in Korea and equivalent air blown performance as Europe products.

Cross-sectional Drawing of Cable



Features

- All dielectric Single Jacket Multi Loose Tube cables are UV-stabilized, fully water blocked for Micro duct applications.
- Loose tube design provides stable and highly reliable transmission Parameters for a variety of voice, data, video and imaging applications.
- This lightweight cable offers durability and flexibility required for many outside plant
- RoHS (Restriction of the use of Certain Hazardous Substances Directive)
- Telcordia GR-20-CORE
- IEC 60793 / IEC 60794

General Specification

Fiber Count	24 fibers	72 fibers	96 fibers	144 fibers
No. of Fibers per Tube	4	12	12	12
No. of PBT Loose Buffer Tube	6	6	8	12
Filling Compound in Loose Buffer Tube	Thixotropic Jelly Compound			
No. of PE Filler	5	5	0	0
Central Strength Member	FRP			
Water Blocking Material	Water Swellable Yarn around the CSM (If necessary to prevent the ingress of water)			
Sheath material	Black HDPE			
Rip Cord	Two Aramid Yarn			
Outer Diameter(mm)	4.5	5.9	6.5	8.0
Approx. Cable Weight (kg/km)	17	28	38	58
Weight(g/m)	19	28	48	67
Temperature Range Installation	-10℃ ~ +40℃	-10℃ ~ +40℃	-10℃ ~ +40℃	-10℃ ~ +40℃
Operation	-40℃ ~ +70℃	-40℃ ~ +70℃	-40℃ ~ +70℃	-40℃ ~ +70℃
Storage	-40℃ ~ +70℃	-40℃ ~ +70℃	-40℃ ~ +70℃	-40℃ ~ +70℃
Recommendation of Duct Size (ID/OD mm)	5.5/7 6/8 8/10	8/10	8/10 10/12	10/12 12/14
Blowing Distance	2000m	2000m	1000m/2000m	1000m/2000m
Standard Reel Length	4000m			

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Performance Specifications

Items	UNITS	SPECIFICATIONS	
		G.657.A1	G.657.A2
Attenuation	dB/km	≤ 0.36 at 1310nm ≤ 0.35 at 1383nm ≤ 0.22at 1550nm	
Chromatic Dispersion	ps/nm.km	≤ 3.5 at 1285nm ~ 1330nm ≤ 18 at 1550nm	
Zero Dispersion Wavelength	nm	1300 ~ 1324	
Zero Dispersion Slope	ps/nm2.km	≤0.092	
Cable PMD (PMDQ)	ps/√km	≤0.2 (20 section link)	
Cut-off Wavelength (lcc, Cabled fiber)	nm	≤1260	
Attenuation vs. Bending (15mm radius x 10turns)	dB	≤0.25 at 1550nm ≤1.0 at 1625nm	≤0.03 at 1550nm ≤0.1 at 1625nm
Attenuation vs. Bending (10mm radius x 1turn)	dB	≤0.75 at 1550nm ≤1.5 at 1625nm	≤0.1 at 1550nm ≤0.2 at 1625nm
Attenuation vs. Bending (7.5mm radius x 1turn)	dB	-	≤0.5 at 1550nm ≤1.0 at 1625nm
Mode Field Diameter	nm	8.9 ± 0.4 at 1310nm	8.6 ± 0.4 at 1310nm
Core/Cladding Concentricity Error	nm	≤0.5	
Cladding Diameter	nm	125 ± 0.7	
Cladding Non-circularity	%	≤1.0	
Coating Diameter	nm	245 ± 10	
Proof Test	Gpa	≥0.69	

MECHANICAL/ ENVIRONMENTAL PERFORMANCE

The mechanical and environmental performance of the cable shall be in accordance with Table below. Unless otherwise specified, all attenuation measurements required in this section shall be performed at 1550nm for Single Mode Fibres. The phrase 'No change in attenuation' is defined as 'Values in the range ±0.05dB or dB/km are considered as no change' according to IEC 60794-1- 20 (measurement uncertainty).

Items	Test Method and Acceptance Criteria
Tensile Loading And Bending Test	▪ **Test method:** IEC 60794-1-21 Method E1 - Length under tension : Min. 50m - Mandrel diameter : Typically 1m or Min. 40D (D: cable diameter) - Installation tensile load : 1 X W (W: cable weight in kg/km) - Duration maximum tension : 10 minutes ▪ **Acceptance criteria** - Fiber strain : £ 0.60% during the test - No change in attenuation after removal of load Acceptance Criteria
Crush Test	▪ **Test method**: IEC 60794-1-21 Method E3A - Load : 500N/10cm - Duration of load : 1 minute - Test number : 3 times at 3 different places (Min. 500mm apart and different from the lay length of the tubes) ▪ **Acceptance criteria** - No change in attenuation after removal of load
Impact Test	▪ **Test method:** IEC 60794-1-21 Method E4 - No. of impact : One in 3 different places (Min. 500mm apart) - Striking surface curvature radius : Flat or min. 300mm - Impact energy : 1J (e.g. 15cm X 0.7kg)

	▪ **Acceptance criteria:** - Residual increase in attenuation : ⩽0.1dB
Repeated bending	▪ **Test method:** IEC 60794-1-21 Method E6 - Bending diameter : 40D - No. of cycles : 25 - Load : Adequate to assure uniform contact with the mandrel - Flexing speed : 30 cycles/minute ▪ **Acceptance criteria:** - No damage to the sheath and to the cable elements
Torsion	▪ **Test method:** IEC 60794-1-21 Method E7 - Length under test : 2m - Load : Adequate to assure minimum sag(bend) between clamps - No. of cycles: 10 cycles - Test speed: Max. 1min/cycle - Rotating angle : ±180° ▪ **Acceptance criteria:** - No damage to the sheath and to the cable elements - No change in attenuation after test
Kink	▪ **Test method:** IEC 60794-1-21 Method E10 - Minimum diameter : 40D ▪ **Acceptance criteria:** - No damage to the sheath and to the cable elements
Bend	▪ **Test method:** IEC 60794-1-21 Method E11A - Bending diameter : 40D - Method : Single helix - No. of turns : 4 - No. of cycles : 3 ▪ **Acceptance criteria:** - No change in attenuation after test
Temperature Cycle	▪ **Test method:** IEC 60794-1-22 Method F1 - Temperature condition(Up to 144F) Operation(1) / Storage(2) Low (A): T_{A1} : -15°C / T_{A2} : -30°C High (B): T_{B1} : 60°C / T_{B2} : 70°C - Temperature cycle sequence (2 cycles) .1st cycle : TA2 à TB2 .2nd cycle : TA1 à TA2 à TB1 à TB2 à 23℃ - Soak time at each temperature : ⩾16 hours - Attenuation shall be measured at 23℃ (reference attenuation) before the sequence and at the end of the soak time at each step (TA1, TA2, TB1, TB2) in the 2nd cycle ▪ **Acceptance criteria** - No change in attenuation for TA1 and TB1 - Max. 0.15dB/km for TA2, TB2
Water Penetration Test	▪ **Test method:** IEC 60794-1-22 Method F5B - Length of specimen: 3m - Height of pressure head: 1m - Test time: 24 hours ▪ **Acceptance criteria** - No water shall be detected at the unsealed end of the sample

SAFETY

ROHS DIRECTIVE

All cables and any associated packing and labelling materials shall meet RoHS (Restriction of the Use of certain Hazardous Substances) regulations as appropriate.

Fibre and Loose Buffer Tube Identifications

The colour code of the loose buffer tubes and the individual fibres within each loose buffer tube in accordance with Tables below

The Colour Code of the Individual Fibres

No. of Fiber	Color	No. of Fiber	Color
1	Blue	7	Red
2	Orange	8	Black
3	Green	9	Yellow
4	Brown	10	Violet
5	Gray	11	Pink
6	White	12	Aqua

The Colour Code of the Loose Buffer Tubes (Up to 144F, single layer stranding)

No. of Loose Buffer Tubes	Color	No. of Loose Buffer Tubes	Color
1	Blue	7	Red
2	Orange	8	Black
3	Green	9	Yellow
4	Brown	10	Violet
5	Gray	11	Pink
6	White	12	Aqua

The Colour Code of the Loose Buffer Tubes (192, 216 and 288F, double layer stranding)

No. of Loose Buffer Tubes(1st layer)	Color	No. of Loose Buffer Tubes(2nd layer)	Color
1	Blue	1	Blue
2	Orange	2	Orange
3	Green	3	Green
4	Brown	4	Brown
5	Gray	5	Gray
6	White	6	White
7	Red	7	Red
8	Black	8	Black
9	Yellow	9	Yellow
		10	Violet
		11	Pink
		12	Aqua
		13	Natural
		14	Natural
		15	Natural

Ordering Information

PNs	Description
ACG57024	VOYGAR ABC Super Slim Design Air blown Fibre Optic Cable SM 24core
ACG57072	VOYGAR ABC Super Slim Design Air blown Fibre Optic Cable SM 72core
ACG57096	VOYGAR ABC Super Slim Design Air blown Fibre Optic Cable SM 96core
ACG57144	VOYGAR ABC Super Slim Design Air blown Fibre Optic Cable SM 144core

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