

**Specification of  
MICRO DUCT  
for ABC & ABF**

**OPTIROAD INC**

## 1. Definition

This specification describes about micro duct which is used for Air blowing cable & Air blowing fiber installation.

## 2. Applied standard

- 2.1 T49001 Packing of telecommunication cable
- 2.2 T49002 Packing of telecommunication cable (synthetic resins)
- 2.3 T43010 Inner duct for fiber optic cable
- 2.4 T43013 FTTH Duct for FTTH cable

## 3. Product structure

ITEMS	DESCRIPTION
Number of Tube	1,2,4,7,12,19,24 WAY
Type of Micro Tube(mm)	5/3.5, 7/5.5, 7/3.5, 8/6, 10/8, 12/10, 12/8, 14/10 smooth wall
Rip Cord	Nylon 3000 Dyne(red color)
Inner Sheath	Black HDPE
Outer Jacket	Orange HDPE

## 4. Product range &amp; description

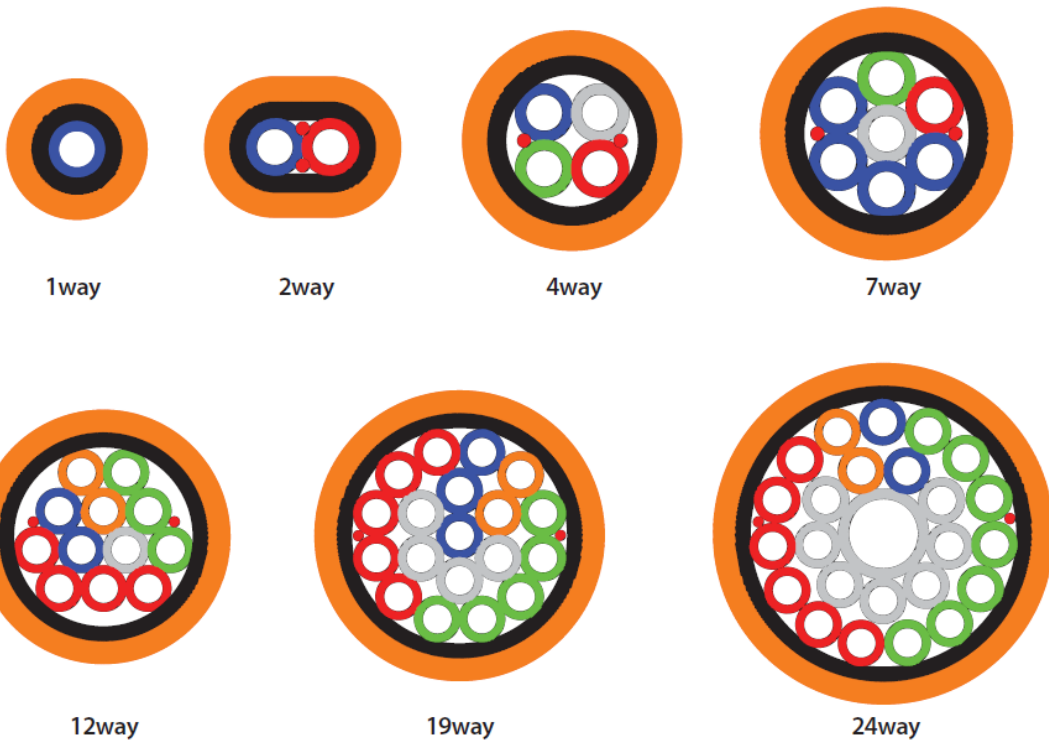
## 4.1 Direct Burial Microduct (Two jacket, Non-metallic)

Tube size O.D/I.D(mm)	Way	OD (mm)	NET WT (kg/km)	Max. Tensile(N)	Bend Radius (mm)	GROSS WT (kg/km) (including drum)
5/3.5	1	12.4±0.5	105	1000	165	250
5/3.5	2	17.4*12.4±0.6	149	1500	230*165	410
5/3.5	4	19.4±0.6	210	2100	255	550
5/3.5	7	22.4±0.75	270	2600	295	710
5/3.5	12	28.3±1.0	399	3900	375	1000
5/3.5	19	32.3±1.0	513	5000	420	1270
5/3.5	24	37.9±1.0	652	6400	500	1670
7/5.5	1	14.4±0.5	131	1300	190	360
7/5.5	2	21.4*14.4±0.75	193	1900	280*190	540

7/5.5	4	24.3±0.75	280	2700	320	750
7/5.5	7	29.8±1.0	426	4200	390	1060
7/5.5	12	37.2±1.0	590	5800	490	1530
8/6	1	15.4±0.5	149	1500	200	405
8/6	2	23.4*15.4±0.8	224	2200	310*200	620
8/6	4	28.1±0.8	390	3800	370	970
8/6	7	32.8±1.0	513	5000	430	1270
8/6	12	41.2±1.2	725	7100	540	950
10/8	1	17.4±0.6	176	1700	230	480
10/8	2	27.4*17.4±0.8	271	2700	360*230	725
10/8	4	32.9±1.0	476	4700	430	1200
10/8	7	38.8±1.0	669	6200	510	1630
12/10	1	19.4±0.6	203	2000	255	550
12/10	2	31.4*19.4±0.8	318	3100	410*255	850
12/10	4	37.8±1.0	561	5500	500	1000
12/10	7	44.8±1.2	750	7300	580	1470

\*\* Crush : 2000N

**Tube + ripcord + 1<sup>st</sup> Jacket + 2<sup>nd</sup> Jacket**



## 4.2 Direct Install Microduct (One Jacket Non-metallic)

Tube size (mm)	Way	OD (mm)	NET WT (kg/km)	Max. Tensile(N)	Bend Radius (mm)	GROSS WT (kg/km) (including drum)
5/3.5	1	8.4±0.4	43	400	110	115
5/3.5	2	13.4*8.4±0.5	68	650	180*110	180
5/3.5	4	15.5±0.5	105	1000	200	305
5/3.5	7	18.4±0.6	148	1400	240	440
5/3.5	12	23.7±0.75	220	2200	310	630
5/3.5	19	27.7±1.0	307	3000	360	820
5/3.5	24	33.3±1.0	408	4000	440	1100
7/5.5	1	10.4±0.5	57	550	140	150
7/5.5	2	17.4*10.4±0.6	9	900	230*140	270
7/5.5	4	20.3±0.75	146	1400	270	440
7/5.5	7	24.8±0.75	222	2200	330	650
7/5.5	12	32.2±1.0	332	3200	420	920
8/6	1	11.4±0.5	69	650	150	180
8/6	2	19.4*11.4±0.6	114	1100	255*150	330
8/6	4	23.1±0.75	199	1900	310	580
8/6	7	27.8±1.0	287	2800	370	780
8/6	12	36.2±1.0	436	4300	480	1180
10/8	1	13.4±0.5	84	800	180	220
10/8	2	23.4*13.4±0.75	142	1400	310*180	440
10/8	4	27.9±1.0	249	2400	370	700
10/8	7	33.8±1.0	361	3500	450	990
12/10	1	15.4±0.5	100	950	200	295
12/10	2	27.4*15.4±0.8	169	1600	360*200	510
12/10	4	32.8±1.0	298	2900	430	650
12/10	7	39.8±1.0	435	4300	520	850

\*\* Crush : 1000N

**Tube + ripcord (Except of 1way, Depends on customer decision) + 1<sup>st</sup> Jacket**



1way



2way



4way



7way



12way



19way



24way

4.3 Multi duct

Tube size O.D/I.D(mm)	Way	OD (mm)	NET WT (kg/km)	Max. Tensile(N)	Bend Radius (mm)	GROSS WT (kg/km) (including drum)
7/3.5	4	18.5±15.6	150	1400	240*200	395
7/3.5	6	20.7±19.1	214	2000	270*250	540
7/3.5	7	22.6±20.7	243	2300	300*270	610
12/8	4	30.2±25.6	306	2900	400*340	750
12/8	6	34.4±31.6	441	4300	450*420	1080
12/8	7	37.6±34.4	504	4800	490*420	1230
14/10	4	34.9±29.6	365	3500	430*390	900
14/10	6	39.8±36.6	527	5000	520*480	695
14/10	7	43.6±39.8	601	5800	570*520	790

**Tube + Sheath (Thickness is 0.8~1.0mm, Color could be adjustable according to customer request)**



4way



6way



7way

5. Identification

Item		Identification of Micro Tube											
1way	Position	1											
	Color	BL											
	Marking	#1											
2way	Position	1	2										
	Color	BL	OR										
	Marking	#1	#1										
4way	Position	1	2	3	4								
	Color	BL	OR	GN	WH								
	Marking	#1	#1	#1	#1								
7way	Position	1	2	3	4	5	6	7					
	Color	BL	BL	BL	BL	GN	RD	WH					
	Marking	#1	#2	#3	#4	#1	#1	#1					
12way	Position	1	2	3	4	5	6	7	8	9	10	11	12
	Color	BL	BL	OR	OR	GN	GN	GN	RD	RD	RD	RD	WH
	Marking	#1	#2	#1	#2	#1	#2	#3	#1	#2	#3	#4	#1
19way	Position	1	2	3	4	5	6	7	8	9	10	11	12
	Color	BL	BL	BL	BL	OR	OR	GN	GN	GN	GN	RD	RD
	Marking	#1	#2	#3	#4	#1	#2	#1	#2	#3	#4	#1	#2
	Position	13	14	15	16	17	18	19					
	Color	RD	RD	RD	WH	WH	WH	WH					
	Marking	#3	#4	#5	#1	#2	#3	#4					
24way	Position	1	2	3	4	5	6	7	8	9	10	11	12
	Color	BL	BL	OR	OR	GN	GN	GN	GN	GN	GN	GN	RD

Marking	#1	#2	#1	#2	#1	#2	#3	#4	#5	#6	#7	#1
Position	13	14	15	16	17	18	19	20	21	22	23	24
Color	RD	RD	RD	RD	RD	WH	WH	WH	WH	WH	WH	WH
Marking	#2	#3	#4	#5	#6	#1	#2	#3	#4	#5	#6	#7

## 6.. Characteristic test

6.1 Characteristic test of Micro duct is done on room temperature  $23\pm 2^{\circ}\text{C}$ .

### 6.2 Tube

Item	Requirement	Standard
<b>(Tensile)</b>	- No damage on the tube - Ball (Size is 85% of tube inner diameter) should pass through the tube.	IEC 60794-1-2 E1
<b>(Crush)</b>	- No damage on the tube - Ball (Size is 85% of tube inner diameter) should pass through the tube.	IEC 60794-1-2 E3
<b>(Bend)</b>	- No damage on the tube - Ball (Size is 85% of tube inner diameter) should pass through the tube.	IEC 60794-1-2 E11
<b>(Impact)</b>	- No damage on the tube - Ball (Size is 85% of tube inner diameter) should pass through the tube.	IEC 60794-1-2 E4
<b>(Kink)</b>	- No damage on the tube - Ball (Size is 85% of tube inner diameter) should pass through the tube.	IEC 60794-1-2 E10
<b>(Pressure withstand)</b>	- No leakage, No burst during the test	IEC 60794-1-22 F13
<b>(Friction)</b>	- Less than 0.1	GR 356
<b>(Ball Pass)</b>	- Ball should pass through whole tube length.	IEC 60794-1-21 E23

<b>Freezing pressure test</b>	<ul style="list-style-type: none"> <li>-The Tube shall be filled with water and sealed both ends. After the freezing the tube shall not be cracked or burst..</li> <li>- After removing the ice, the tube shall be remained 15minutes. And then, it shall be put into water. The tube shall not be cracked or burst during the pressurizing.</li> </ul>	-
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## 6.3 DI : Direct Install &amp; DB : Direct Burial

Item	Requirement	Standard
<b>(Tensile)</b>	<ul style="list-style-type: none"> <li>- No damage on the tube</li> <li>- Ball (Size is 85% of tube inner diameter) should pass through the tube.</li> </ul>	IEC 60794-1-2 E1
<b>(Crush)</b>	<ul style="list-style-type: none"> <li>- No damage on the tube</li> <li>- Ball (Size is 85% of tube inner diameter) should pass through the tube.</li> </ul>	IEC 60794-1-2 E3
<b>(Bend)</b>	<ul style="list-style-type: none"> <li>- No damage on the tube</li> <li>- Ball (Size is 85% of tube inner diameter) should pass through the tube.</li> </ul>	IEC 60794-1-2 E11
<b>(Impact)</b>	<ul style="list-style-type: none"> <li>- No damage on the tube</li> <li>- Ball (Size is 85% of tube inner diameter) should pass through the tube.</li> </ul>	IEC 60794-1-2 E4
<b>(Kink)</b>	<ul style="list-style-type: none"> <li>- No damage on the tube</li> <li>- Ball (Size is 85% of tube inner diameter) should pass through the tube.</li> </ul>	IEC 60794-1-2 E10
<b>(Ball Pass)</b>	<ul style="list-style-type: none"> <li>- Ball should pass through whole tube length.</li> </ul>	IEC 60794-1-21 E23
<b>(Abrasion)</b>	<ul style="list-style-type: none"> <li>- Marking shall be readable after the test.</li> </ul>	IEC 60794-1-2 E2A
<b>(Torsion)</b>	<ul style="list-style-type: none"> <li>- No damage on the tube</li> <li>- Ball (Size is 85% of tube inner diameter)</li> </ul>	IEC 60794-1-2 E7



		should pass through the tube.	
<b>Raw Material</b>	Tensile strength	More than 180kgf/cm <sup>2</sup>	KS M 3006
	Chemical Resistance	<ul style="list-style-type: none"> <li>- HCL aqueos solution : less than weight change 12g/m<sup>2</sup></li> <li>- NaOH aqueos solution : Less than weight change 12g/m<sup>2</sup></li> <li>- Polyethylene glycol aqueos solution : Less than weight change 12g/m<sup>2</sup></li> <li>- No surface change, No separation between each jacket.</li> </ul>	KS M 3407

7. Marking

According to customer requirement

8. Packing & loading qty

8.1 Direct Burial Microduct (Two jacket, Non-metallic)

Tube size 외경/내경(mm)	Way	drum size (mm)	drum length (m)	No of Drum in 40'
5/3.5	1	455*1100	2000	80
5/3.5	2	550*1330	2000	34
5/3.5	4	720*1400	2000	25
5/3.5	7	720*1600	2000	21
5/3.5	12	1100*1650	2000	14
5/3.5	19	1100*1850	2000	12
5/3.5	24	1100*2200	2000	10
7/5.5	1	550*1220	2000	37
7/5.5	2	550*1570	2000	29
7/5.5	4	720*1740	2000	20
7/5.5	7	1100*1700	2000	14
7/5.5	12	1100*2140	2000	11

8/6	1	550*1290	2000	36
8/6	2	550*1700	2000	28
8/6	4	1100*1610	2000	14
8/6	7	1100*1870	2000	12
8/6	12	1100*1790	2000	13
10/8	1	550*1450	2000	32
10/8	2	720*1680	2000	21
10/8	4	1100*1880	2000	12
10/8	7	1100*2220	2000	10
12/10	1	720*1450	2000	24
12/10	2	720*1900	2000	18
12/10	4	1100*1900	2000	12
12/10	7	1100*2170	1000	10

## 8.2 Direct Install Microduct (One Jacket Non-metallic)

Tube size 외경/내경(mm)	way	drum size (mm)	drum length (m)	No of Drum in 40'
5/3.5	1	360*900	2000	130
5/3.5	2	480*1050	2000	88
5/3.5	4	550*1250	2000	37
5/3.5	7	550*1550	2000	30
5/3.5	12	720*1700	2000	21
5/3.5	19	1100*1600	2000	14
5/3.5	24	1100*1910	2000	12
7/5.5	1	430*980	2000	96
7/5.5	2	550*1180	2000	40
7/5.5	4	720*1440	2000	24
7/5.5	7	720*1770	2000	19
7/5.5	12	1100*1840	2000	12
8/6	1	430*1050	2000	88
8/6	2	550*1290	2000	36
8/6	4	720*1650	2000	21
8/6	7	1100*1600	2000	14
8/6	12	1100*2060	2000	11

10/8	1	480*1140	2000	80
10/8	2	550*1570	2000	29
10/8	4	1100*1600	2000	14
10/8	7	1100*1920	2000	12
12/10	1	550*1250	2000	37
12/10	2	720*1560	2000	22
12/10	4	1100*1730	2000	13
12/10	7	1100*1870	1000	12

8.3 MULTI DUCT

Tube size (mm)	way	drum size (mm)	drum length (m)	No of Drum in 40'
7/3.5	4	550*1400	2000	33
7/3.5	6	720*1500	2000	22
7/3.5	7	720*1580	2000	22
12/8	4	1100*1580	2000	14
12/8	6	1100*1950	2000	12
12/8	7	1100*2080	2000	11
14/10	4	1100*1800	2000	13
14/10	6	1100*1730	1000	13
14/10	7	1100*2050	1000	12

9. COLOR CODE

구 분	Approximate Ral Color Code
Yellow(노랑)	RAL 1023
Orange(주황)	RAL 2009
Pink(분홍)	RAL 4003
Red(빨강)	RAL 3000
Blue(파랑)	RAL 5015
Green(초록)	RAL 6017
Turquoise(터키색)	RAL 6027
Brown(갈색)	RAL 8011

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<b>Purple(보라)</b>	RAL 4005
<b>Gray(회색)</b>	RAL 7031
<b>White(흰색)</b>	RAL 9016
<b>Black(검정)</b>	RAL 9017