HDPE Tube Bundle
Direct Bury (DB) 4-way 7/4mm

1. Design

A bundle of micro- or mini-tubes (strengthened wall size) is surrounded by single thin HDPE sheath. The design makes the duct assemblies suitable for installation in other existing ducts. The micro ducts are optimized for best cable blowing performance.

The inner micro duct has suitable low friction characteristics on the inside surface. The micro duct has colors according to figures 1.

(Figure 1)

1)	Inner micro duct:	7/4mm
2)	Outer Diameter:	16.4mm * 16.4mm (±0.5mm)
3)	Thickness of sheathing:	1.2mm

Remarks: Ripcord are optional.

2. Raw materials:

HDPE of a high-molecular type with the following parameters is used for production of the Tube Bundle:

● Melt flow index:	0.1 ~ 0.4 g/10 minutes (190 °C, 2.16 KG)	EN ISO 1133
● Density:	Min. 0.940 g/cm^3	ISO 1183
● Tensile strength at yield:	Min. 20MPa	ISO 527
● Elongation at the break:	Min 350%	ISO 527
● Environmental stress crack resist (F_{50})	Min. 96 hours	ISO 4599

3. Construction:

3.1 **PE sheath:** The outer sheath is manufactured from colored HDPE, halogen free. Normal outer sheath color is orange. Other color is possible upon customer request.

3.2 **Micro duct:** The micro duct is manufactured from HDPE, extruded from 100% virgin material. The color shall be red, green, blue, yellow or other customized.

4. Technical data of Tube Bundle:

Table 1: Mechanical performance of inner micro duct Φ7/4mm

Pos.	Mechanical performance	Standard	Test conditions	Performance
1	**Tensile strength at yield**	IEC 60794-1-2 Method E1	Rate of extension: 100mm/min	≥500N
2	**Crush**	IEC 60794-1-2 Method E3	Sample length: 250mm Load: 1700N Duration of Max. load: 1 minutes Recovery time: 1 hour	The outer and inner diameter shall show, under visual examination without damage and no reduction of diameter greater than 15%.
3	**Kink**	IEC 60794-1-2 Method E10	≤70mm	-
4	**Impact**	IEC 60794-1-2 Method E4	Striking surface radius: 10mm Impact Energy: 1J Number of impacts: 3 times Recovery time: 1 hour	Under visual examination, there shall be no damage to the micro duct.
5	**Bend radius**	IEC 60794-1-2 Method E11	Number of turns: 5 Mandrel diameter: 84mm Mumber of cycles: 3	The outer and inner diameter shall show, under visual examination without damage and no reduction of diameter greater than 15%.
6	**Friction**	Optowire	/	≤0.1

Table 2: Mechanical performance of Tube Bundle

Pos.	Item	Specification	
1	**Appearance**	Smooth outer wall (UV-stabilized) without visible impurities; well-proportioned color, no bubbles or cracks; with defined markings on outer wall.	
2	**Tensile strength**	Use Pull socks to tension a sample in accordance with table below: Sample length: 1m Tensile speed: 20mm/min Load: 1550N Duration of the tension: 5 min.	No visual damage or residual deformation greater than 15% of the duct assembly outer diameter.
3	**Crush Resistance**	A 250mm sample after 1 minute load time and 1 hour recovery time. Load (plate) shall be 2000N. The imprint of the plate on the sheath is not considered as mechanical damage.	No visual damage or residual deformation greater than 15% of the duct assembly outer diameter.
4	**Impact**	Striking surface radius shall be 10mm and impact energy 3J. Recovery time shall be one out. The imprint of the striking surface on the microduct is not considered as mechanical damage.	No visual damage or residual deformation greater than 15% of the duct assembly outer diameter.
5	**Bend**	Diameter of mandrel shall be 40X OD of sample, 4 turns, 3 cycles.	No visual damage or residual deformation greater than 15% of the duct assembly outer diameter.

5. Storage:

Completed packages of the HDPE Tube Bundle on drums can be stored outdoor max. 6 months upon the date of production.

Storage temperature:	-40°C	~	+70°C
Installation temperature:	-30°C	~	+50°C
Operating temperature:	-40°C	~	+70°C