



TIÚ – PLAST a.s.

areál SPOLANA a.s.
ul. Práce 657
CZ-27711 Neratovice
ISO 9001:2016



HDPE tubes (micro-ducts) for conducting and protection of optical cables

- HDPE Micro-Ducts are usually used to conduct and protect optical cables blown in by pressure air or pulled in.
- HDPE Micro-Ducts bundle is usually pushed into a larger HDPE pipe.
- HDPE Micro-Ducts comply with the EN (IEC) 60794-5, test methods according to EN (IEC) 60794-1-2: "Optical fiber cables-Part 1-2: Generic specification-Basic optical cable test procedures", chapter E1, E3, E4, E10, E11B.
- Design life of the HDPE Micro-Ducts in the ground is 50 years.

Thin walled HDPE Micro-Ducts Dimensions

Type	Outer Diameter <u>OD</u> and Tolerance [mm]	Minimal wall thickness <u>s</u> [mm]	Minimal Inner Diameter <u>ID</u> [mm]
4/3	4,00 ± 0,10	0,45	2,9
5/3,5	5,00 ± 0,10	0,65	3,4
7/5,5	7,00 ± 0,10	0,65	5,4
10/8	10,00 ± 0,10	0,90	7,9
12/10	12,00 ± 0,10	0,90	9,9
14/12	14,00 ± 0,10	0,90	11,9

Thick walled HDPE Micro-Ducts Dimensions

Type	Outer Diameter <u>OD</u> and Tolerance [mm]	Minimal wall thickness <u>s</u> [mm]	Minimal Inner Diameter <u>ID</u> [mm]
7/3,5	7,00 ± 0,10	1,65	3,4
7/4	7,00 ± 0,10	1,40	3,9
8/3,5	8,00 ± 0,10	2,15	3,4
8/4,4	8,00 ± 0,10	1,70	4,3
8/5	8,00 ± 0,10	1,40	4,9
10/5,5	10,00 ± 0,10	2,15	5,4
10/6	10,00 ± 0,10	1,90	5,9
12/8	12,00 ± 0,10	1,90	7,9



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14/10	14,00 ± 0,10	1,90	9,9
16/12	16,00 ± 0,10	1,90	11,9
16/10	16,00 ± 0,10	2,90	9,85

External and internal surface

External surface is smooth, single-colored, with no scraps cracks and grooves.

Internal surface – 3 types:

- **Smooth with permanent sliding material**, with no scraps, cracks or grooves.

Internal surface is made from permanent sliding material with, based on silicone, **the very low friction coefficient – COF = less than 0.10** (according to standard IEC/TR 62470 ed.1.0 - Test procedures A).

- **Interior straight ribs with permanent sliding material**, with no scraps, cracks or grooves.

Internal surface is made from permanent sliding material with, based on silicone, **the very low friction coefficient – COF = less than 0.10** (according to standard IEC/TR 62470 ed.1.0 - Test procedures A).

- **Smooth or with interior straight ribs** with no scraps, cracks or grooves, **without permanent sliding material.**

It's necessary to lubricate with the appropriate lubricant the microcable beginning which is applied into the tube. We recommend the quality lubricant type **PRELUBE 5000** (Polywater). **The friction coefficient - COF is around 0.13 value** by application the lubricant PRELUBE 5000.

Recommended type of cable for blowing

Thin walled HDPE Micro-Ducts

Type	Fibre-optic cable diameter [mm]
4/3	1,1 – 2,0 mm
5/3,5	1,1 – 2,5 mm
7/5,5	1,7 – 3,9 mm
10/8	2,4 – 5,6 mm
12/10	3,0 – 7,0 mm
14/12	3,6 – 8,4 mm



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Thick walled HDPE Micro-Duct

Type	Fibre-optic cable diameter [mm]
7/3,5	1,1 – 2,5 mm
7/4	1,2 – 2,8 mm
8/4,4	1,3 – 3,1 mm
8/5	1,5 – 3,5 mm
10/5,5	1,7 – 3,9 mm
10/6	1,8 – 4,2 mm
12/8	2,4 – 5,6 mm
14/10	3,0 – 7,0 mm
16/12	3,6 – 8,4 mm

Micro-ducts colours

- 15 colours are standards. Other colours are available according to customer demand referring to RAL code
- Natur or coloured with 4 stripes of various colours

RAL 9003	RAL 7004	RAL 1018	RAL 2003	RAL 3020	RAL 3015	RAL 4005	RAL 5018	RAL 5015

					NATUR
RAL 5003	RAL 6018	RAL 5021	RAL 8004	RAL 9017	not coloured

Printing

The micro-ducts are contrast printed by (INK-JET) with basic identification – length, producer name, seller name, type, dimension, date and time of production (see example). The printing is possible to change according to customer demand.

Printing example

>0121 m< TIU-PLAST SITEL 10/5,5 PE-HD SMOOTH 12/08/2013 7:42 I



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Quality

The specification of the raw material for the micro-ducts production complies with guaranty of use and installation. The HDPE microducts are described by the Company Standard "CS 64-004-99: PE-HD protection tubes". (HDPE protection tubes).

HDPE Micro-Ducts comply with the EN 60794-1-2: "Optical fiber cables-Part 1-2: Generic specification-Basic optical cable test procedures", chapter E1, E3, E4, E10, E11B.

The quality controls are periodically carried out directly during the production and also in the producer laboratory, see below Table I. The wall thickness and outer diameter measurement is continual. The minimal inner diameter monitoring is also continual. Calibration test with metal bullet of defined dimension under pressure of 6 bar is provided at each drum.

Table I Characteristics of HDPE protecting micro-ducts.

CHARACTERISTIC	UNIT	Guaranteed VALUE	Test method
<i>External and internal surface appearance</i>	-	No cracks deformations scraps grooves	-
<i>Ovality after production, before coiling, max.</i>	%	3	EN 12201
<i>The length of 1 meter, min.</i>	cm	100,0	technological specification
<i>Yield Stress, min. (thin walled) (tube length 250 mm, pulling speed 50 mm/min)</i>	N	130 (DN 4, 5) 200 (DN 7) 350 (DN 10) 450 (DN 12, DN 14)	EN ISO 527
<i>Yield Stress, min (thick walled) (tube length 250 mm, pulling speed 50 mm/min)</i>	N	400 (DN 7, DN 8) 650 (DN 10) 850 (DN 12, DN 14) 1150 (DN 16)	EN ISO 527
<i>Elongation at 50% extending (tube length 250 mm, pulling speed 50 mm/min)</i>	-	No deformation	EN ISO 527
<i>Longitudinal reversion of thermoplastic pipes (110°C, 30 min/after 2,5 hours cooling)</i>	%	3	EN ISO 2505
<i>Resistance to internal pressure at constant temperature (+23°C, 2 hours)</i>	bar	16 (thin) 20 (thick)	EN ISO 1167-1,-2
<i>Resistance to internal pressure at constant temperature (+60°C, 0,5 hour)</i>	bar	12	EN ISO 1167-1,-2
<i>Maximum blowing pressure</i>	bar	16 (thin) 20 (thick)	



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<i>Crush – pressure force (sample 200 mm, speed 15 mm/min, ID deformation by 5%)</i>	N	300 (DN 7/5,5) 600 (DN 10/8)	EN 50086-2-4
<i>Crush – pressure force (sample 200 mm, speed 15 mm/min, ID deformation by 15%)</i>	N	600 (DN 7/5,5) 1000 (DN 10/8)	EN 50086-2-4

Packaging

The micro-ducts are wound on lightweight disposable plywood drums. The top row of ducts is saved by covering with paper and stretch foil. The ends are saved by special plastic caps. The standard capacity of drum is:

- 3100 meters micro-duct diameter 5 mm
- 1750 meters micro-duct diameter 7 mm
- 1100 meters micro-duct diameter 10 mm
- 700 meters micro-duct diameter 12 mm
- 500 meters micro-duct diameter 14 mm
- 400 meters micro-duct diameter 16 mm

Standard dimension of drum: OD 700 mm; Width 400 mm; Gap 65 - 85 mm; Core 320 mm.
According to customer request it is possible to use bigger drums up to OD 1200 mm, Width 900 mm, Gap 65- 85 mm with corresponding duct capacity.

Storage

Storage conditions comply with EN ISO 8331. It is necessary to protect the HDPE microducts from the longtime daylight heating radiation, mechanical failure, effect of organic solvents, etc.

The HDPE microducts wound on the drums or in coils are stored only for necessary time before the installation, maximally 1 year from the production date.

Recommended temperature for the storage is from -40 °C to +55°C. Distance from the heating source has to be minimally 1 m.

HDPE material of microducts is classified as the "F" level flammability according to the EN 13501-1.
Recommended extinguishers fire: water, foam, powder, CO₂.

Transport

HDPE micro-ducts are transported conventionally. No special instructions are necessary.

Manipulation

Drum with micro-duct is necessary to pick-up only by the side of drum! No contacts between the outside of drums and ducts are allowed!

The recommended temperature range for the installation: -10°C to + 50°C

- The temperature of the outer microduct surface should not exceed 50°C. When the temperature of the outer microduct surface is higher than 60°C it is starting the softening of the outer microduct surface which is characteristic property (shape stability) of HDPE material.



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- The microducts are less flexible at temperature below 0 °C and during the pipe bending they could crack. Nevertheless by the careful handling it is possible to make installation up to –15 °C without damage
- During the installation it is necessary to keep the outer and inner surface clean and dry.

The recommended temperature range for the operation: -40 °C to + 55 °C

Minimal radius during the installation is recommended 10 multiple of the outer diameter of the microduct.

Average length expansion coefficient is $1.6 \cdot 10^{-4} \text{ K}^{-1}$ in the temperature range: -20°C to +70°C (see ISO 11359-2).

Environment

The waste from micro-ducts is a green product. Standard is recyclable and it is used for secondary class products. Disposal is also possible by burning in a special incineration plant or by the transport to the dumping place.

User can order a disposal at the nearest recycling company or at the producer.

Generic mark of ducts material is according to EN ISO 11469 > **PE-HD** < (see the **printing**).