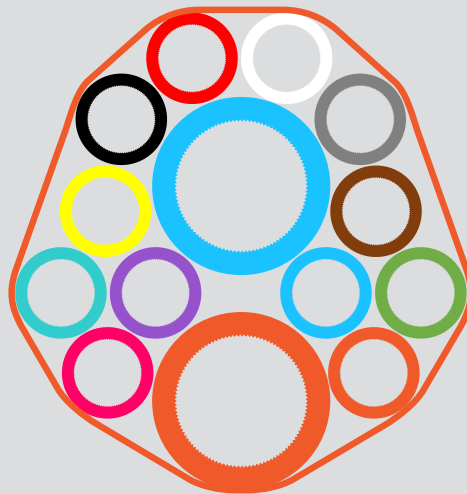


HÖHLE microduct bundles DB 12x7/3,5 + 2x14/10



Höhle microducts are designed for long term protection of fiber optical cables. Direct Bury (DB) type of microducts are thick wall products that attain their mechanical robustness and functional performance through their intrinsic thick walls and need no further protection at underground installations.

APPLICATION AREA:

The substantial wall thickness of the microduct and the type of raw material means this bundle can be used in as a **direct buried** product where the product is installed straight into the ground as well as a **direct install** product, where it is installed into an existing duct.

CONSTRUCTION OF THE PRODUCT:

Höhle microduct bundles are made of high density halogen free polyethylene – HDPE. Every microduct has a permanent, co-extruded silicone compound inner liner giving a coefficient of friction of less than 0,1. The inner surface of microduct can be manufactured with longitudinal grooves or with a smooth finish.

The bundle has a sheath suitable for installation, handling and marking.

VISUAL APPEARANCE:

The colours of microducts and the colour of the sheath as well as the placement of coloured microducts in a bundle are fully customizable. Both options – fully coloured microducts or natural colour with coloured stripes – are available.

METALLIC TRACING WIRE IS AVAILABLE AS AN OPTION:

For detecting installed bundle of microducts during its installed lifetime. The inclusion of tracing wire must be specified by the customer when ordering.

SingleHöhle microducts					
Duct type	OD mm	ID mm	inner clearance test % of ID	min bending radius mm	install tensile force N
7/3,5	7 +/- 0,1	3,5 +/- 0,1	85	70	390
14/10	14 +/- 0,1	10 +/- 0,1	85	140	1100
test method	EN 50411-6-1:2011 Annex A:A1		IEC 60794-1-21 full lenght		

MultiHöhle 12x7/3,5+2x14/10				
configuration	bundle min mm	bundle max mm	min bending radius mm	install tensile force N
12x7/3,5+2x14/10	37	39	390	6000

Min-max recommendations		
Temperature ranges	for installation	-15 ... +50°C
	transport, storage, operation	-45 ... +70°C
Fibre Optical Cable dimensions for blowing	duct 7/3,5 mm	1,1 ... 2,5 mm
	duct 14/10 mm	3,0 ... 7,0 mm
Outdoor exposure at Central Europe without protection	Multi sheath Standard	up to 24 months
	Single Standard	up to 12 months
	Single UV stabilized	up to 24 months

Mechanical characteristics			
Criteria	Test Method	Examination acc to IEC 60794-5-10 or acc to customer specification	Requirements
Pressure withstand	IEC 60794-1-22, Method F13	temp 20° C, duration 30 min; 2,5x installtion pressure	no leaks*
	IEC 60794-1-22, Method F13	temp 40° C, duration 24 h; 1,3x installtion pressure	no leaks*
	EN 50411-6-1:2011 Annex B	temp 20° C, duration 30 min; 18 bar	no leaks*
	burst pressure	temp 20°C	min 50 bars
Tensile performance	IEC 60794-1-21, Method E1	test length >1m, tensile load ≥ weight of 1 km x 9,81 in N, load 10 min	no damage**
Kinking	IEC 60794-1-21, Method E10	temp 23 +/-3° C; the length of non-kinked looped microduct and calucate $d=C/\pi$	no kinking 20x OD
Crush	IEC 60794-1-21, Method E3A	test length 250mm, F= 500N (Single), 1000N (DI bundle), 2000N (DB bundle), duration 1 min, recov 1h	no damage**
Impact	IEC 60794-1-21, Method E4	impact energy = 1J (Single), 3J (DI bundle), 15J (DB bundle), hammer 20 mm, striking surface radius 300 mm	no damage**
Bending	IEC 60794-1-21, Method E11B	mandrel diam 40x OD, 3 cycles	no damage**
Repeated bending	IEC 60794-1-21, Method E6	bending diam 40x OD, 25 cycles	no damage**
Torsion	IEC 60794-1-21, Method E7	test length 2 m, 180° clockwise/return and 180° counter-clockwise/return - 10 cycles	no damage**
Inner clearance test	IEC 60794-1-21, Annex E	to confirm inner diameter with steel ball in diameter 85%	passes full lenght
Coefficient of Friction	IEC 62470	tension around a curve 1040mm	CoF less than 0,1

(*) Under visual examination without magnification the microduct shall show no damage

(**) Under visual examination without magnification the microduct shall show no damage and the test piece shall pass inner clearance test after recovery time.

Höhle production quality control plan follows EN 50411-6-1 and IEC 60794-5 and IEC 60794-5 -10 requirements.

WE VALUE ENVIRONMENTAL AND SUSTAINABLE WAY OF ACTING:

- Our wooden drums could be re-used – please contact Trumlitagastus OÜ www.trumlitagastus.ee
- All plastic materials left would be recycled by Weerec OÜ, www.weerec.ee