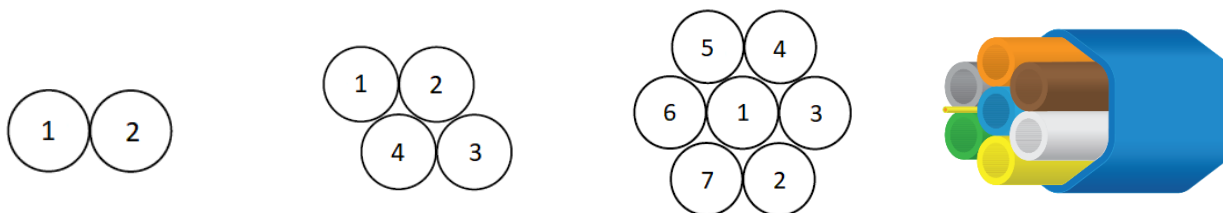


MICRODUCT NESTOR OPTIMUS DB N X 16/12 MM



Application	Microduct / duct bundle for direct buried installation or installation in existing protective pipes or cable shafts.		
Construction	Material	The individual ducts are made of HDPE.	
	Colour coding	The ducts are colour-coded according to customer specifications, FIN 2012, ANSI/TIA, IEC or other.	
	Trace wire	Duct bundles can be equipped with a tracer wire according to customer specifications.	
	Outer sheath	The duct bundles are sheathed with a common HDPE sheath. The nominal sheath thickness is $1,0 \pm 0,2$ mm. Sheath marking is printed on one-meter intervals. The sheath marking is printed according to customer specifications.	

Nominal dimensions of bare duct without outer sheath				
Duct type	Diameter [mm]		Weight [kg/km]	Tensile strength
	Outer Diameter	Wall Thickness		
16/12 mm	$16,0 \pm 0,2$	1,9...2,1	85	830 N

Nominal dimensions of ducts and duct bundles with outer sheath					
Configuration		Diameter [mm]		Weight [kg/km]	Tensile strength
Count	Grouping	Duct OD	Maximum OD		
1	1 x 16/12 mm	$16,0 \pm 0,2$	18,0	135	1310 N
2	2 x 16/12 mm	$16,0 \pm 0,2$	34,0	251	2450 N
3	3 x 16/12 mm	$16,0 \pm 0,2$	34,0	351	3420 N
4	4 x 16/12 mm	$16,0 \pm 0,2$	40,7	456	4450 N
7	7 x 16/12 mm	$16,0 \pm 0,2$	50,0	736	7200 N

Temperature ranges		
Temperature range	Installation	-15 - +40 °C
	Transport, storage and operation	-45 - +60 °C

Mechanical characteristics				
Characteristics	Test Methods	Descriptions		Requirements
Tensile strength (*)	IEC 60794-1-21, method E1	Test length	>1 m	Load = 9,81 x W [N] W = mass of 1 km [kg/km]
		Duration	10 min	
Bending (cold) (*)	IEC 60794-1-21, method E11B	Temperature	-15 °C	Mandrel diameter 30 x OD
		Cycles	10	
Repeated bending (*)	IEC 60794-1-21, method E6	Load	20 N	Bending diameter 30 x OD
		Cycles	35	
		Time per cycle	~2 s	
Impact (*)	IEC 60794-1-21, method E4	Anvil diameter	50 mm	Impact energy 15 J
		Surface radius	300 mm	
		Recovery time	1 hour	
Torsion (*)	IEC 60794-1-21, method E7	Test length	1 m	Number of turns ±1 (360° in both directions)
		Load	20 N	
		Cycles	5	
Kink (*)	IEC 60794-1-21, method E10	Temperature	20 °C	Loop diameter 20 x OD
Crush (*)	IEC 60794-1-21, method E3	Duration	15 min	Load (plate/plate) 2000 N
		Recovery time	1 hour	
Pressure withstand (**)	IEC 60794-1-22, method F13	Test length	1 m	Pressure (water) 25 bar
		Temperature	20 °C	
		Duration	30 min	
Coefficient of friction (COF)	S 201-10150	Wheel Test Without adding lubricant		≤ 0,1

Acceptance criteria:

(*) After the test, under visual examination, without magnification, there shall be no damage and the tested sample shall pass the inner clearance test (***). If a recovery time is defined, the inner clearance test is done after the recovery time.

(**) Under visual examination, without magnification, there shall be no damage to the tested microduct.

(***) Inner clearance test is done by passing a metal sphere through the tested section of microduct or microduct assembly. The minimum diameter of the sphere is 85% of the nominal microduct bore diameter (ID). The test is passed if the sphere passes through the microduct.