

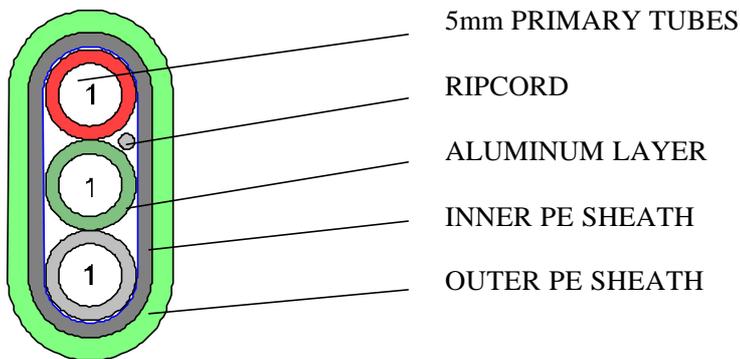


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MicroDuct Specification

DESIGNATION: MicroDuct 3/36

DATE: 21/09/03



DESCRIPTION:

Rugged construction for deployment into narrow slots cut in the roadway or footway. Assembly of three 5mm PE Microbores, each with low friction performance suitable for fibre blowing. The Microbores are arranged in-line, for stacking capability.

The MicroDuct is surrounded with an aluminum water barrier and a sheath of black MDPE. Around this is a medium duty thickness of bright green coloured HDPE making the product suitable for slot deployment.



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MicroDuct 3/36

PRODUCT DETAILS:

MicroDuct 'width':	9.2mm nominal
MicroDuct 'height':	19.2mm nom, 19.5mm max
Primary tube outer diam:	5.0 ± 0.1mm; fits std push connectors
Primary tube inner diam:	3.5 ± 0.1mm; measured by plug gauge
Size under sheath:	15 x 5mm nom
Inner PE sheath thickness:	1.1mm ± 0.2mm including aluminum
Outer PE thickness:	1.0mm nom
MicroDuct mass:	124g/m nom
Min Bend Rad:	thin direction: 140mm wide direction: 300mm
Max Installation Pull Force:	800N (80kg)
Outer sheath removal:	Sheath cutters with care
Inner sheath removal:	Use ripcord provided

COMPLIANCE:

This MicroDuct is fully compliant with the requirements of CEI/IEC 60794-3-10, International Standard for Outdoor Cables – Family specification for duct and direct buried optical telecommunication cables, (produced in-conjunction with BSI)

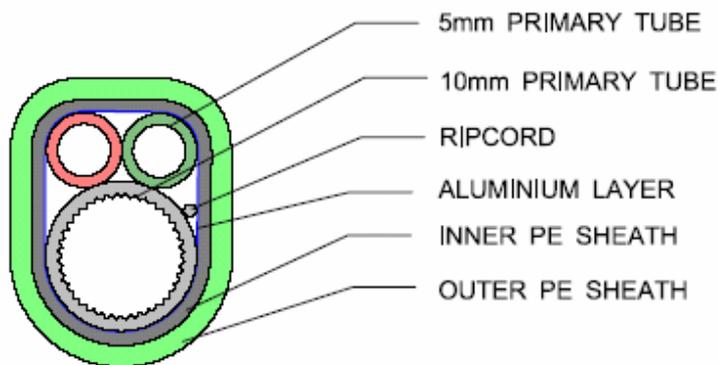


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MicroDuct Specification

DESIGNATION: MicroDuct 3/96

DATE: 21/09/03



DESCRIPTION:

Semi-rugged construction for deployment into narrow slots cut in the roadway or footway.
Assembly of three PE tubes, each with low friction performance suitable for fibre blowing:

One 10/8 tube to spec MHT 773

Two 5/3.5 tubes to spec MHT 380

The assembly is surrounded with an aluminum water barrier and a sheath of black PE. Around this is a medium duty thickness of bright green coloured HDPE making the product suitable for slot deployment.

COMMENTS:

1. Full water barrier protection
2. Shape may not be exactly as shown



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MicroDuct 3/96

PRODUCT DETAILS:

MicroDuct 'width':	15mm nominal
MicroDuct 'height':	19.2mm nom, 19.8mm max
Primary tube outer diam:	Both ± 0.1 mm; fits std push connectors
Primary tube inner diam:	Both ± 0.1 mm; measured by plug gauge
Size under sheath:	15 x 10mm nom
Inner PE sheath thickness:	1.1mm ± 0.2 mm including aluminum
Outer PE thickness:	1.2mm nom
MicroDuct mass:	173g/m nom
Min Bend Rad:	thin direction: 225mm
Max Installation Pull Force:	1.2kN (120kg)
Outer sheath removal:	Sheath cutters with care
Inner sheath removal:	Use ripcord provided

Note 1: Diameters and thicknesses are measured to nearest 0.1mm

Note 2: 'nominal' data is based on middle-spec, and is for information only, not for inspection purposes

Note 3: Dimension tolerances do not apply at the point of aluminum overlap

COMPLIANCE:

This MicroDuct is fully compliant with the requirements of CEI/IEC 60794-3-10, International Standard for Outdoor Cables – Family specification for duct and direct buried optical telecommunication cables, (produced in-conjunction with BSI)

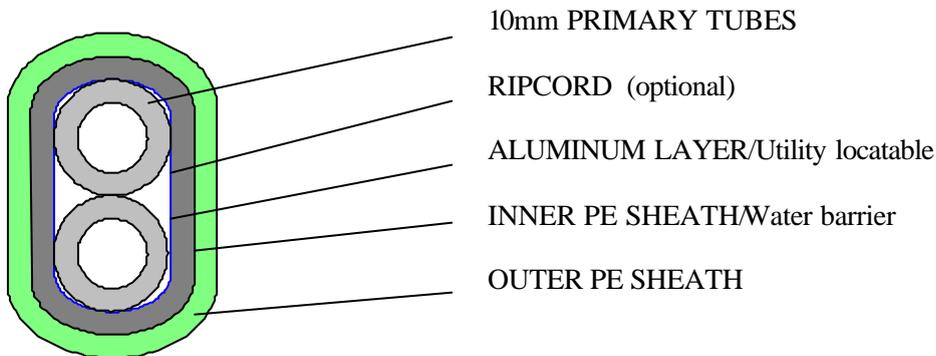


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MicroDuct Specification

DESIGNATION: MicroDuct 2/144

DATE: 21/07/06



DESCRIPTION:

Rugged construction for deployment into narrow slots cut in the roadway or footway. Assembly of two 10mm PE Microbores, each with low friction performance suitable for fibre blowing. The Microbores are arranged in-line, for stacking capability.

The MicroDuct is surrounded with an aluminum, utility locatable, water barrier and a sheath of black MDPE. Around this is a medium duty thickness of bright green coloured HDPE making the product suitable for slot deployment.

Product can be manufactured to include client's name and/or customer service number. (800)



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MicroDuct 2/144

APPROPRIATE FIBRE TYPES:

The larger 10mm PE Microbores are designed to suit lightweight fibre cables in counts ranging from 24F to 72F (LAT standard product).

PRODUCT DETAILS:

MicroDuct 'width':	18.0 ±0.1mm nominal
MicroDuct 'height':	28.5 ±0.1mm nom
Primary tube outer diam:	10.0 ± 0.1mm; fits std push connectors
Primary tube inner diam:	8.0 ± 0.1mm; measured by plug gauge
Mass of each Primary tube:	27 g/m, nom
Min Bend Rad of Primary tube:	100mm
MicroDuct mass:	285g/m nom
Min Bend Rad:	thin direction: 180mm wide direction: 260mm
Max Installation Pull Force:	2000N
Outer sheath removal:	Sheath cutters with care
Inner sheath removal:	Use ripcord provided

PE Outer Sheath

1. Sheath thickens according to diameter
2. The PE sheath shell be colored and light stabilized
3. Normal printing includes product indent, metre marks and other data by arrangement



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PE Inner Sheath:

1. Sheath thickness(all): 1.7mm nom; including aluminum
2. The PE sheath shall be colored (normally black) and light stabilized
3. There shall be a continuous foil under sheath, and bonded to it
4. The foil shall have an overlap of 4mm or greater
5. The sheath thickness measurement does not apply at the foil overlap position
6. Normal printing includes product indent, metre marks and other data by arrangement

Tube and Assembly Tests:

- | | | |
|----------------------|--------------------------------|--------------------------|
| 1. Crush test: | Test method IEC 60794-1-2-E3: | Procedure to IEC 60794-5 |
| 2. Impact test: | Test method IEC 60794-1-2-E4: | Procedure to IEC 60794-5 |
| 3. Kink test: | Test method IEC 60794-1-2-E10: | Procedure to IEC 60794-5 |
| 4. Flexibility test: | Test method IEC 60794-1-2-E11: | Procedure to IEC 60794-5 |

COMPLIANCE:

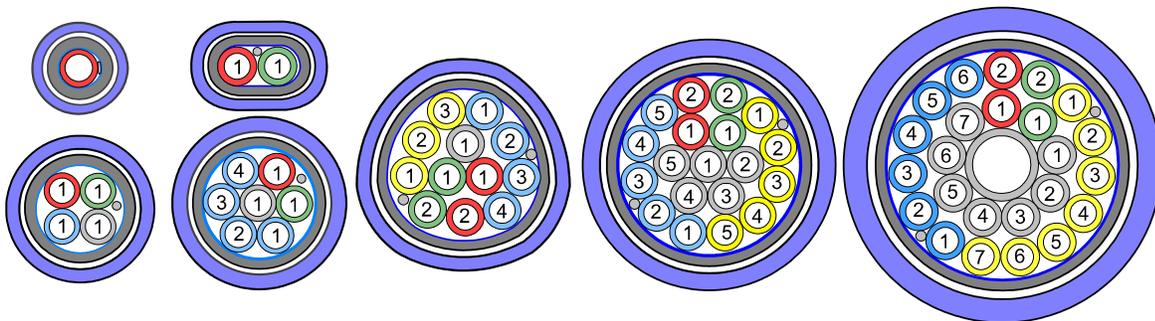
This MicroDuct is fully compliant with the requirements of CEI/IEC 60794-3-10, International Standard for Outdoor Cables – Family specification for duct and direct buried optical telecommunication cables, (produced in-conjunction with BSI). Fully locatable air and water tight.

Product is normally buried but pulling is acceptable. After applying pulling tension allow for the pulled product to relax.



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**Blown Fibre Assemblies:
Direct Bury Termite Resistant (DBT), 3mm, 5mm and 8mm**



GENERIC PRODUCT DESCRIPTION: Assemblies of 3, or 5 or 8mm microducts (m/d), each with low friction performance and suitable for fibre unit. Each assembly (bundle) is surrounded by an overlapped aluminum water barrier layer. Over this and bonded to it is a flexible sheath of black outdoor PE. Over the sheath is a layer of nylon 12 which gives mechanical and chemical protection against attack by termites and ants. Finally the assembly is protected by a heavy duty PE layer suitable for direct burial, and also preserving the smoothness of the nylon toward termite effectiveness.

APPROPRIATE FIBRE TYPES:

Any suitable sized Lite Access fibre unit: The 5mm and 8mm bundles will accommodate all FU counts: 2FU, 4FU, 8FU and 12FU. The 3mm bundles will accommodate 2FU and 4FU.



GENERIC DETAILS: MICRODUCTS (at 20°C):

Primary m/d outer diameter, nom	mm	3.0	5.0	8.0
Primary m/d inner diameter, nom	mm	2.1	3.5	6.0
primary m/d - mass, nominal	g/m	3.5	9.5	21
Min bend radius of primary m/d*	mm	30	50	80
Max pull tension, single m/d	N (kg)	20 (2)	70 (7)	140 (14)
centre m/d of 24-way inner diam, nom	mm	6	10	n/a
centre m/d of 24-way outer diam, nom	mm	4.5	8	n/a
centre m/d of 24-way – mass, nom	g/m	11.5	27	n/a
Min bend radius of single centre m/d*	mm	60	120	n/a
Max pull tension of single centre m/d	N (kg)	60 (6)	200 (20)	n/a

*This radius does not indicate a suitable radius for blowing FU.

1. All elements are compatible with designated connectors, 3mm, 5mm and 8mm
2. Max air pressure for blowing: 15bar (all sizes).
3. Storage of unprotected primary m/ds: Indoors and well shielded from daylight.

PE OUTER SHEATH:

1. Sheath thickness is according to diameter.
2. The PE sheath shall be colored (normally blue) and light stabilized.
3. Normal printing includes product ident, metre marks and other data by arrangement.
4. Sheath Removal: using sheath removal tools, consult Lite Access Technologies.

PE INNER SHEATH:

1. Sheath thickness: 1.7mm nom; including aluminum.
2. The PE sheath shall be colored (normally black) and light-stabilized.
3. There shall be a continuous aluminum foil under the sheath, and bonded to it.
4. The foil shall have an overlap of 4mm or greater.
5. The sheath thickness measurement does not apply at the foil overlap position.
6. Normal printing includes product ident, metre marks and other data by arrangement.
7. Sheath Removal: using ripcord(s) provided under the sheath

ELEMENT AND ASSEMBLY TESTS:

- | | | |
|----------------------|--------------------------------|--------------------------|
| 1. Crush test: | test method IEC 60794-1-2-E3: | Procedure to IEC 60794-5 |
| 2. Impact test: | test method IEC 60794-1-2-E4: | Procedure to IEC 60794-5 |
| 3. Kink test: | test method IEC 60794-1-2-E10: | Procedure to IEC 60794-5 |
| 3. Flexibility test: | test method IEC 60794-1-2-E11: | Procedure to IEC 60794-5 |



PRODUCT-SPECIFIC DETAILS:

	3mm				5mm				8mm			
type	OD nom mm	Mass nom g/m	Min* Bend Rad mm	Max** Pull force kg	OD nom mm	Mass nom g/m	Min* Bend Rad mm	Max** Pull force kg	OD nom mm	Mass nom g/m	Min* Bend Rad mm	Max** Pull force kg
1DBT	11.6	104	180/85	80	13.6	136	200/110	110	16.6	189	250/150	140
2DBT	11.6	117	180/85	90	13.6	164	200/110	120	16.6	238	250/150	180
4DBT	15.8	172	240/140	120	20.7	260	320/200	200	28.5	430	430/300	320
7DBT	17.6	209	270/160	160	23.6	328	350/240	260	33.2	559	560/360	440
12DBT	20.8	267	320/200	200	29.6	475	450/310	380	41.8	786	720/540	620
19DBT	23.2	322	350/240	240	33.6	599	570/360	480	48.2	1021	920/720	800
24DBT	27.2	413	410/280	280	39.2	730	670/500	500				

NOTES:

Bend Radius:

*These radius values relate only to the physical cable performance, not to recommended blowing radii. See Installation manual for blowing advice.

*The second bend radius applies after the outer 2 sheaths have been removed.

Force:

** These products are normally buried, not pulled, but pulling is acceptable. After applying pulling tensions, allow time for the pulled product to relax. See Installation manual.

Note 1: Diameters and thicknesses are measured to the nearest 0.1mm.

Note 2: 'nominal' data is based on middle-spec, and is for information only, not for inspection purposes.

Note 3: Sketches are for information purposes only, and should not be used for inspection.