

2015 BROCHURE

## Table of Contents

<b>FibreFlow™ from Emtelle</b> .....	1	<b>FibreFlow™ Accessories</b> .....	43
<b>FibreFlow™ – the optimal FttX solution</b> .....	1	Aerial .....	44
• Fibre-to-the-Curb (FttC) applications .....	2	Tube Bundle Connectivity - External .....	46
• Fibre to-the-Home (Ftth) applications .....	3	Tube Bundle Connectivity - External to Internal .....	52
• Multiple Dwelling Unit .....	4	Tube Bundle Connectivity - Internal .....	53
• Aerial applications .....	4	Fibre Connectivity .....	55
• Campus/Business Park applications .....	5	Connectors .....	66
• Telemetry .....	5	<b>FibreFlow™ Installation Equipment</b> .....	71
FttX Installation Techniques .....	6	Fibre Unit Blowing Equipment .....	72
<b>FibreFlow™ FttX Global Projects</b> .....	7	Fibre Unit Blowing Equipment Ancillaries .....	72
<b>FibreFlow™ Fibre Products</b> .....	9	Fibre Unit Blowing Equipment Spare Parts .....	75
<b>FibreFlow™ Microcable Fibre Unit (FU)</b> .....	10	Fibre Unit and Mini Cable Equipment .....	76
<b>FibreFlow™ Blown Fibre Mini Cable</b> .....	13	Mini Cable Blowing Equipment .....	78
<b>FibreFlow™ sub-duct</b> .....	15	Blowing Equipment Ancillaries .....	81
Sub-duct Accessories .....	19	<b>FibreFlow™ Tools and Consumables</b> .....	83
<b>FibreFlow™ Tube Bundle</b> .....	23	Tools .....	84
Ancillary Products .....	22	Consumables .....	91
Tube Bundle .....	24	Fibre Restraint Methods .....	93
Loose protected microduct .....	25	<b>FibreFlow™ Training</b> .....	97
Microduct Primary Tube .....	26	<b>Terms and Conditions of Sale of Goods</b> .....	101
Handling guidelines for Loose Protected Microducts .....	27	<b>Index</b> .....	104
Tight Protected Microduct .....	28		
Direct Bury metal free (DBmf) .....	29		
Direct Bury .....	32		
Direct Install (DI) .....	33		
Aerial .....	34		
Low Fire Hazard (LFH) .....	35		
Special Products .....	36		
Storage and Handling .....	42		

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## FibreFlow™ – the optimal FttX solution

### Easier, quicker, more efficient and extremely flexible

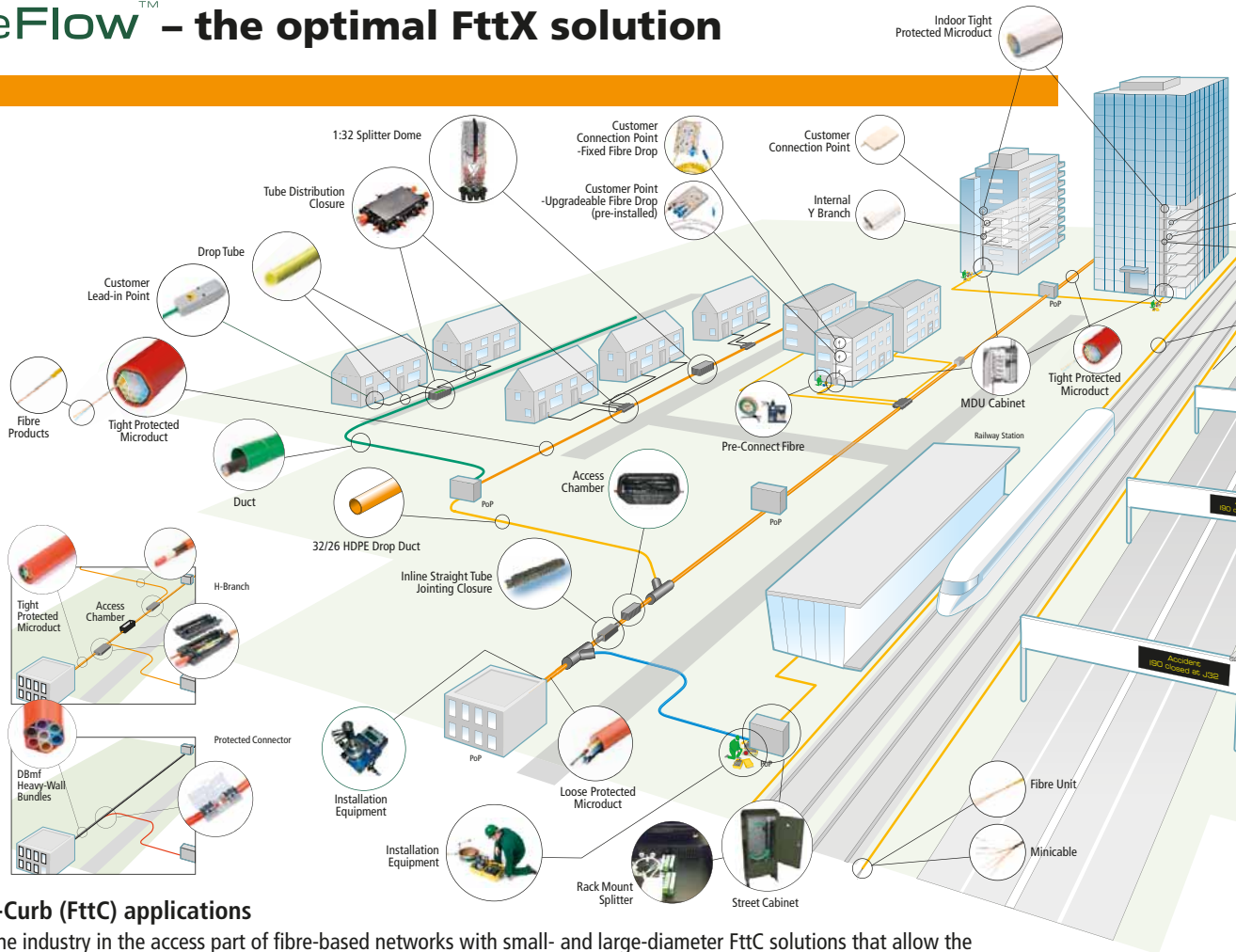
Air blown fibre (as used by Emtelle's FibreFlow™ technology) is an integral part of FttX solutions. The FibreFlow™ strain-free method of installing fibre optic cables and fibre units in microducts relies on the flow of compressed air passing over the entire length of the cable to create a fluid drag, which gently carries the cable down the microduct. In addition, a set of rollers or a caterpillar drive typically pushes the fibre optic product into the microduct.

Suitable for numerous applications and customers, air blown fibre has become the preferred installation method for those who value reliability, cost-effectiveness and flexibility. The development of air blown fibre has revolutionised the design of fibre optic products, resulting in a new generation of minicables that take up less room and need no heavy reinforcement. In addition, these developments have reduced the costs of the fibre products and the microducts into which they are installed.

Emtelle's FibreFlow™ air blown fibre system is suitable for a wide range of applications, including:

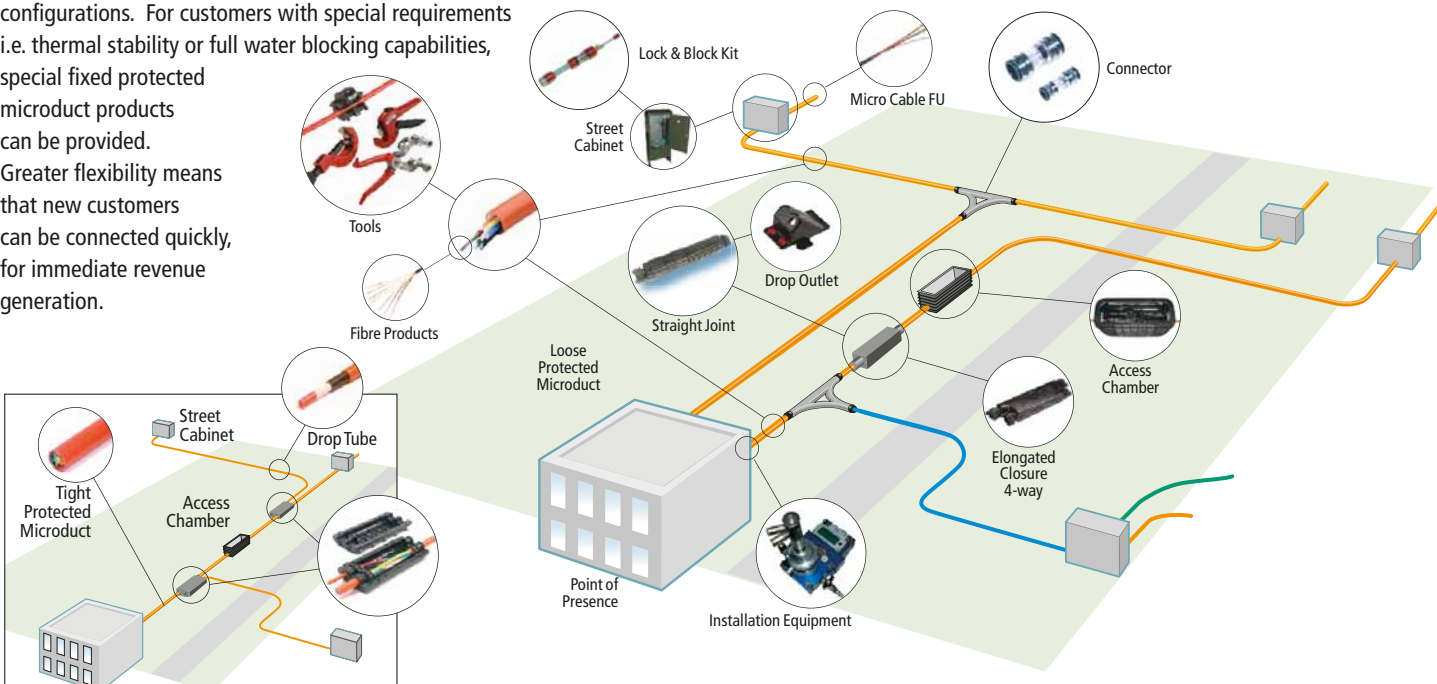
- Fibre-to-the-Home
- Multiple Dwelling Units (MDU)
- In-Building
- Fibre-to-the-Curb/Node
- Campus/Business Park
- Mobile Telephone Mast Connections
- City/Metropolitan
- Long-Distance
- Telemetry and Intelligent Transport systems

# FibreFlow™ – the optimal FttX solution

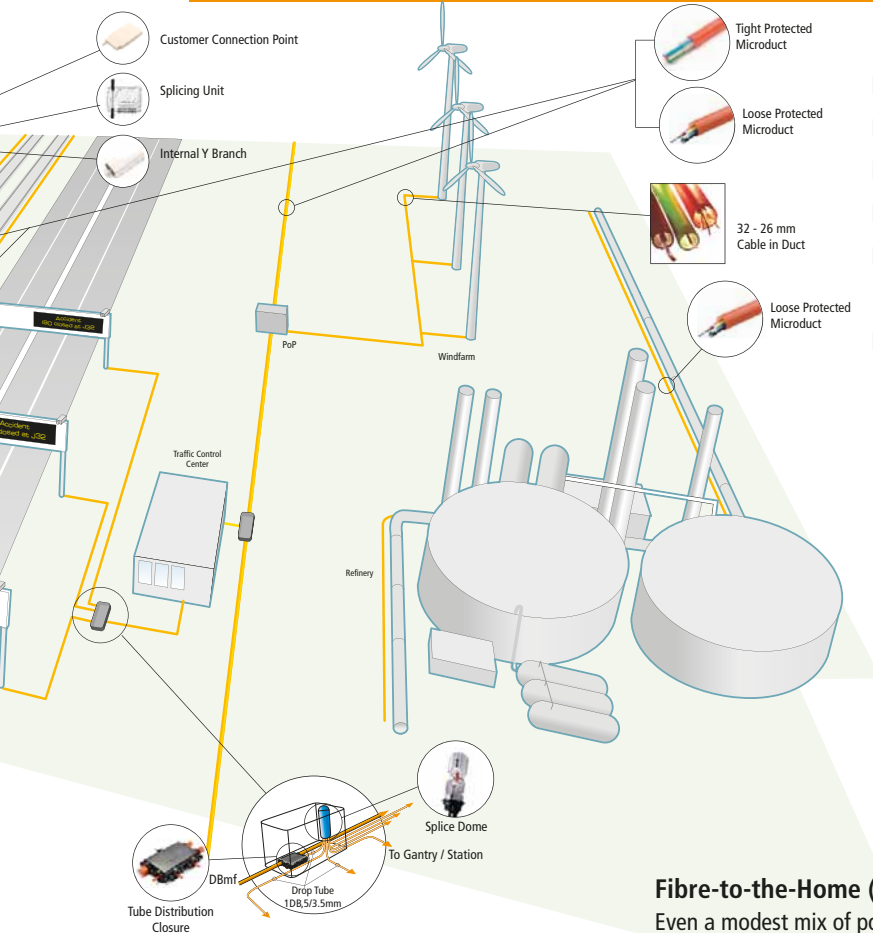


## Fibre-to-the-Curb (FttC) applications

Emtelle leads the industry in the access part of fibre-based networks with small- and large-diameter FttC solutions that allow the installation of tube bundle networks from the Point of Presence to individual homes, businesses, street cabinets, etc. Emtelle not only lead the industry in providing access network solutions, they are leaders in the delivery of high fibre count mini cables in the feeder section of the network. Our standard offering is pre-installed loose protected microduct which can be supplied in various duct sizes and microduct configurations. For customers with special requirements i.e. thermal stability or full water blocking capabilities, special fixed protected microduct products can be provided. Greater flexibility means that new customers can be connected quickly, for immediate revenue generation.



## Fibre-to-the-X (FttX)

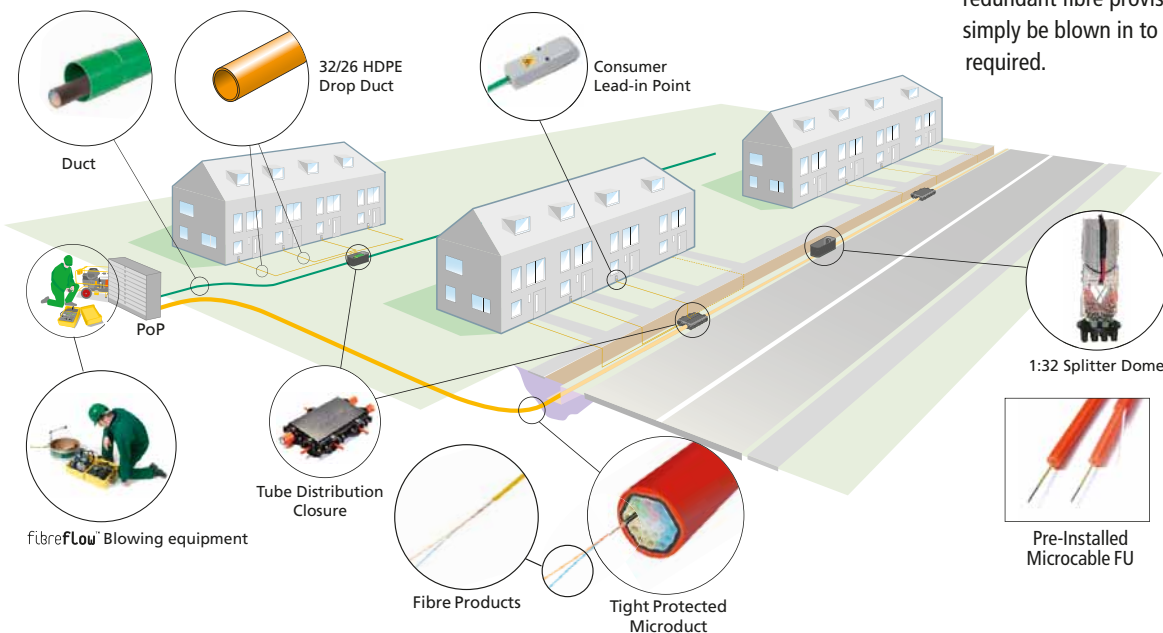


### Key benefits of Emelle's FibreFlow™ FttX solution

- Enhanced design flexibility
- Improved network scalability and reliability
- Reduced CapEx and OpEx for investor/operator
- More lucrative return-on-investment potential
- Range of innovative pre-installed and pre-fitted components
- Quicker and less intrusive network modification/maintenance

### Fibre-to-the-Home (FttH) applications

Even a modest mix of popular broadband services can involve transference speeds beyond traditional infrastructures. Optical fibre, however, is up to the task, and when deployed with FibreFlow™ can be installed easily and cost-effectively. Tubes can be laid fibre-ready along with other utility lines. This reduces build costs and the cost of redundant fibre provision. Fibre bundles can simply be blown in to supply service when it is required.



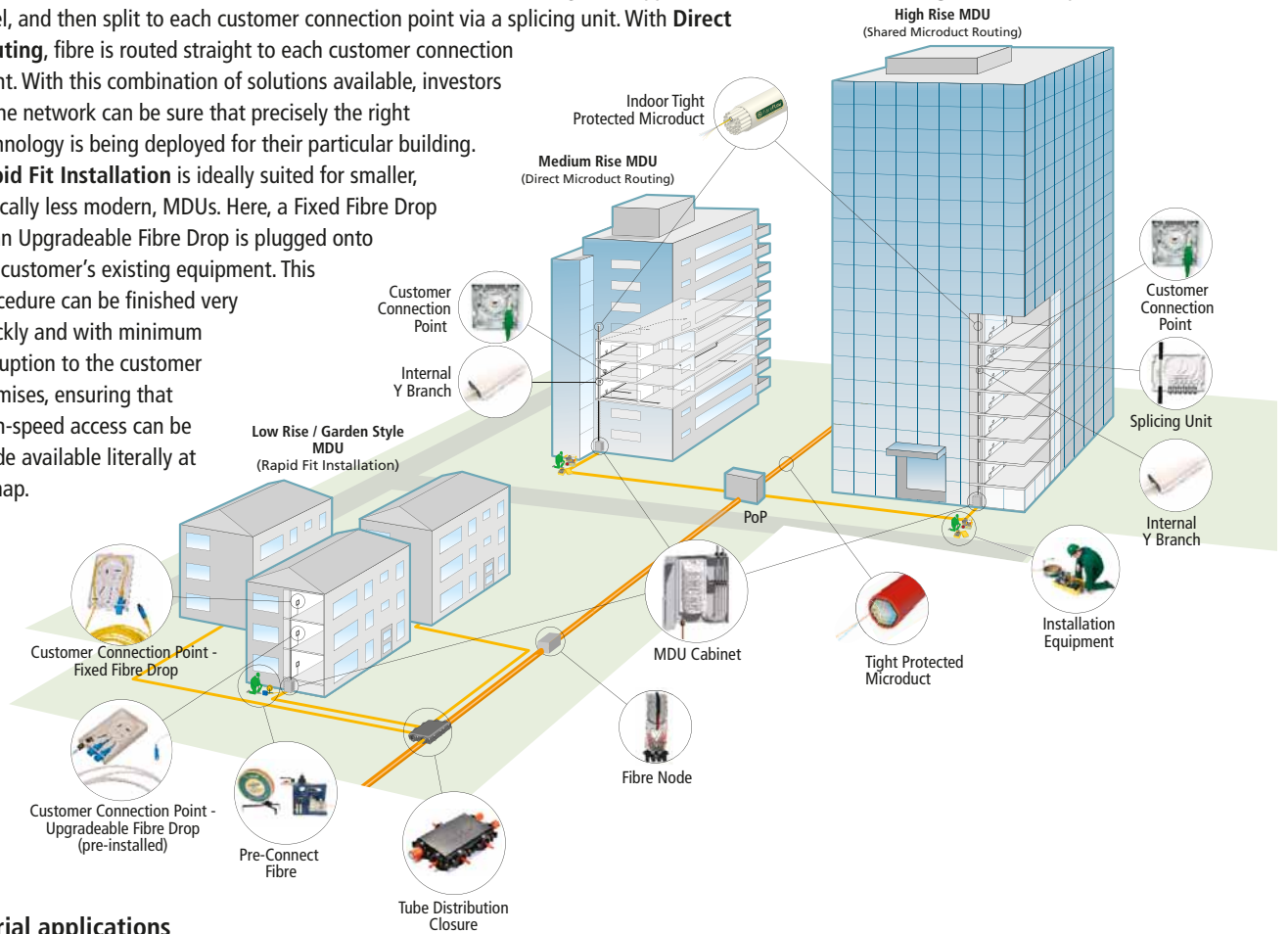
# Fibre-to-the-X (FttX)

## Multiple Dwelling Units (MDU)

To provide for a variety of MDU scenarios, Emtelle offers three solutions: Shared Microduct Routing, Direct Microduct Routing and Rapid Fit Installation. The first two solutions are ideal for use in modern high-rise applications. With **Shared Routing**, fibre is led up to each level, and then split to each customer connection point via a splicing unit. With **Direct**

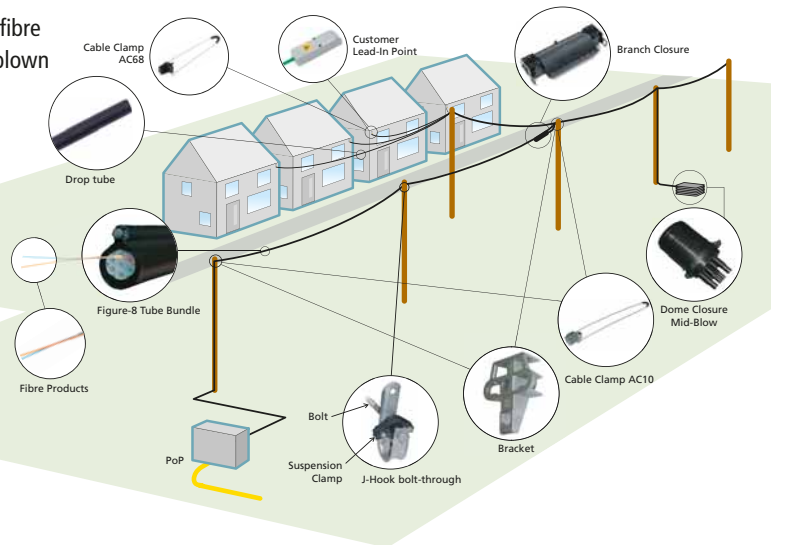
**Routing**, fibre is routed straight to each customer connection point. With this combination of solutions available, investors in the network can be sure that precisely the right technology is being deployed for their particular building.

**Rapid Fit Installation** is ideally suited for smaller, typically less modern, MDUs. Here, a Fixed Fibre Drop or an Upgradeable Fibre Drop is plugged onto the customer's existing equipment. This procedure can be finished very quickly and with minimum disruption to the customer premises, ensuring that high-speed access can be made available literally at a snap.



## Aerial applications

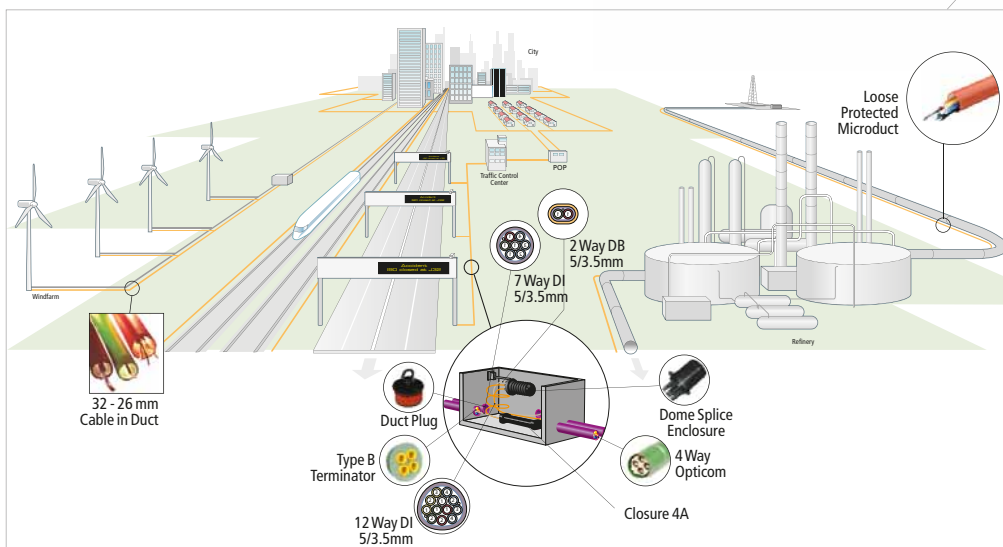
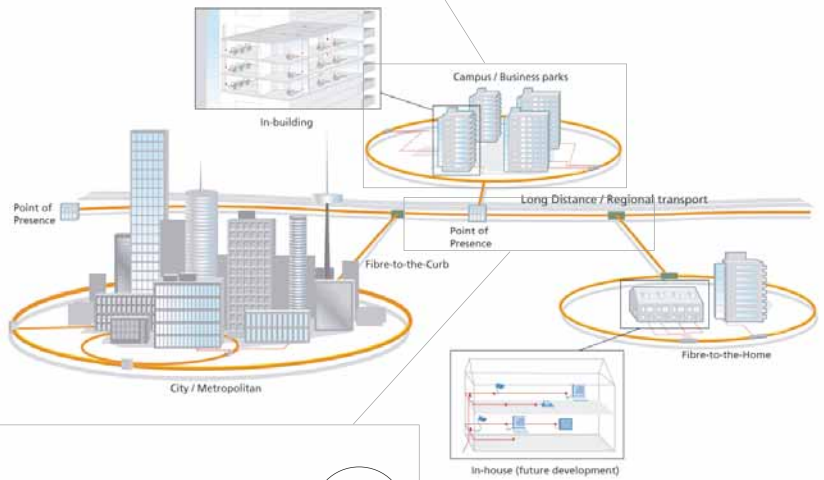
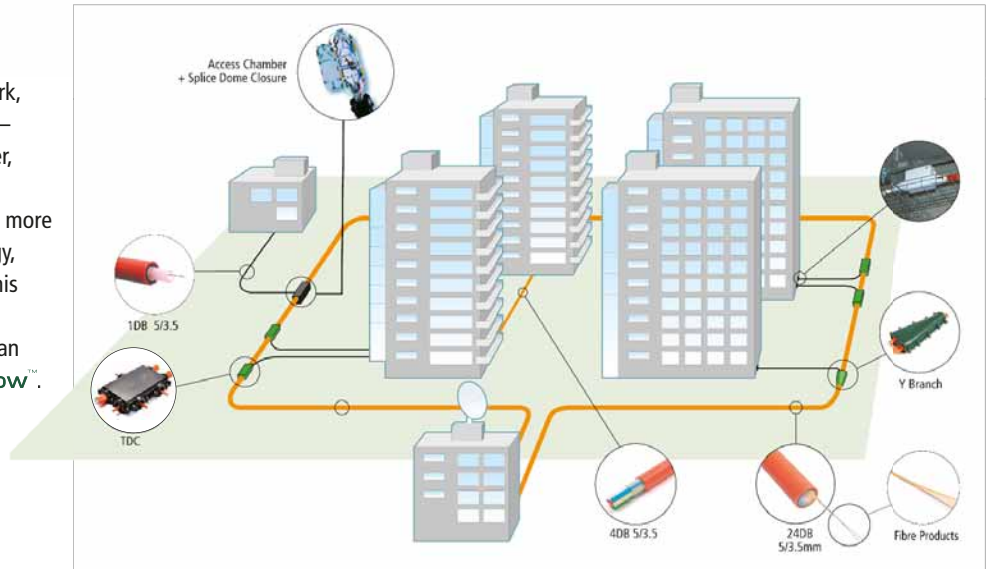
Emtelle's Aerial blown fibre solution is based on its renowned **FibreFlow™** technology and products. Modern advances in fibre product design and installation practices have revolutionized blown fibre aerial installation, producing impressive practical, technical and economic benefits without the need for digging. As a result, aerial installation is becoming recognized as a quick and cost-effective alternative, especially in cases where an existing aerial infrastructure (for example, phone lines or electrical cables) is already in place. Emtelle's Aerial blown fibre solution is ideal for a wide range of customers, including municipalities, housing developers, utility companies, network operators, cable TV operators, universities, hospitals.



# Applications

## Campus/Business Park applications

The university, the business park, the hospital, the military base – wherever people work together, they need to communicate. To maximise the potential of ever more sophisticated digital technology, high-bandwidth is essential. This requires an adaptable, robust infrastructure – the kind you can easily achieve with FibreFlow™.



## Telemetry

Emtelle's FibreFlow™ solution, can be used in a number of telemetry applications such as:

- wind farms
- oil/gas pipelines
- utilities
- intelligent transport systems
- housing projects

## FttX Installation Techniques

### A Choice of Installation Techniques

The popularity of FttX means that fibre is being installed in an increasingly wider range of applications. Different scenarios require different approaches, so Emtele offers a variety of installation techniques. We have considerable experience in all these techniques, and can work with customers both to determine the most appropriate option and to implement it successfully.

**Direct Burial**



**Directional Drilling**



**Inside Sewer**



**Mole Ploughing**



**Aerial**



**Trenching**



**Semi Aerial**



**Slot Cutting / Microtrenching**





# FibreFlow™ FttX Global Projects

Emtelle has successfully met the challenges of a wide range of FttX projects. For further information on FibreFlow™ FttX Global Projects, please refer to [www.emtelle.com](http://www.emtelle.com).

## In Building

- 2000 Commercial Buildings in Singapore
- AMP Buildings throughout Australia
- Canary Wharf, London
- ABSA Bank, Pretoria, South Africa
- International Finance Centre, Dubai, UAE
- Auckland Sky Tower, New Zealand
- Commercial Buildings, Taiwan
- Australian Federal Police
- Fiona Stanley Hospital, Perth
- High Rise, Doha, Qatar
- High Rise Commercial and residential Bangkok, Thailand

## Campus/Business Park

- Changi Airport(T3 & T1 upgrade), Singapore
- Dublin Airport, Ireland
- Johannesburg International Airport, South Africa
- Manchester University, UK
- Balsburg Building Zurich Airport, Switzerland
- Kuala Lumpur International Airport, Malaysia
- Medunsa University, South Africa
- San Antonio, Texas, USA
- Dunedin University, New Zealand
- Perwaja Steel Industrial Complex, Malaysia
- Birmingham University, UK
- Manchester Airport, UK
- Curtin University, Australia
- University of Western Australia
- Melbourne Airport, Australia
- Brisbane Airport, Australia
- Royal Children's Hospital, Melbourne, Australia
- Royal Bolton Hospital Trust, UK
- Exxon Refinery, Fawley, UK
- York University, UK
- Galway Business Park, Ireland
- Shetland Council, UK
- Industrial Estate, Thailand
- Queens University, Belfast, UK
- North Staffordshire NHS, UK
- Salford Royal NHS, UK
- Leeds Metropolitan University, UK
- Lancashire Police HQ, UK
- VA Grand Junction Hospital, CO, USA
- VA Orange County Hospital, CA, USA
- Dallas Fort Worth Airport, TX, USA
- Kansas City Airport, KS, USA
- Ohio State Prison, OH
- Ankara, Turkey
- Eastern Goldfields Prison, Australia
- Midland Health Campus, WA

## Fibre-to-the-Home / MDU

- Nueneen, Netherlands
- Binningup, Australia
- Säffle, Sweden
- Hillsboro, Oregon, USA
- Syd Energi, Denmark
- Tre-for Bredbaand, Denmark
- Energi Midt, Denmark
- Gothenburg, Sweden
- Kalgoorlie, Australia
- Södertälje, Sweden
- Eindhoven, Netherlands
- Örnsköldsvik, Sweden
- Monterrey, Mexico
- Enschede, Netherlands
- Delft, Netherlands
- Squire Creek, USA
- Leonie Hill, Singapore
- El Rio, Arizona, USA
- Lulea, Sweden
- Chunghwa Telecom, Taiwan
- Hau Hin, Thailand
- Maldives
- High Rise Apartments, Taiwan
- West Whitlawburn, UK
- Hilversum, Netherlands
- Amersfoort, Netherlands
- Dordrecht, Netherlands
- Soest, Netherlands
- Alpen aan de Rijn, Netherlands
- Skövde, Sweden
- Ystad, Sweden
- Rutland, UK
- Alston Community Broadband, UK
- Beaverton, OR, USA
- Homestead, VA, USA
- Skopje, Macedonia
- Lodz, Poland
- Neumünster, Germany
- Hamburg Eimsbüttel, Germany
- Cologne, Germany
- Sasbachwalden, Germany
- Gemeinde Heinzberg, Germany
- Montego Bay, Jamaica
- B4RN, Lancashire, UK
- Toronto, Canada
- Oldenzaal, Netherlands
- Almelo, Netherlands

## Ports

- Long Beach, CA, USA
- San Diego, CA, USA
- Port Hueneme, CA, USA
- Oakland, CA, USA
- Port Rupert, Canada

## Fibre-to-the-Curb/(City)

- Olympic Games, Athens
- Lenowisco, USA
- Christchurch City Council, New Zealand
- Electricity Ashburton, New Zealand
- North Power Whangarei, New Zealand
- Grand Junction, CO, USA
- Starrett City, NY, USA
- Sunset Communications, VA, USA
- Marshall City, LA, USA
- Pax River, VA, USA
- City of Weston, FL, USA
- Yangon City Network, Myanmar
- Micro-trenching Fibre to Mast and building, Kuala Lumpur, Malaysia

## Long Distance

- Janaf, Croatia
- Mandurah Rail, Australia
- Gateway Upgrade Project, Brisbane, Australia
- Perth - Bunbury Highway, Australia
- Reid Highway, Perth, Australia
- Southampton City Council, UK
- Makati to Nasugbu Backbone Link, Philippines
- Sea cable landing sites, Cyprus
- Tenerife
- Don Muang Toll Way, Bangkok, Thailand
- SA Power Communications, Australia
- Tollway Projects, Philippines

## Military

- Type 45 Destroyer, Royal Navy
- Army and Air Force Bases, Australia
- ADF, Enoggera, Australia
- RAAF Edinburgh, South Australia
- RAN Frigates, Australia
- RAAF Amberly, Australia
- Dover Air Force Base, USA

## Miscellaneous

- Aerial Projects, Sweden
- Skellefteå Windfarm, Sweden
- London 2012 Olympics, UK
- Manchester Metro, UK
- Trump International Golf Club, Aberdeenshire, UK
- Volvo Ocean Race, Galway, Ireland
- Electranet, Adelaide, Australia
- Energy Australia, NSW
- Gotthard Railway Tunnel, Switzerland
- Fibre backbone, Guam
- 4.5km bridge, New York State, USA
- BTS MRT Bangkok, Thailand



International Finance Centre, Dubai



Changi Airport, Singapore



Netherlands



Leonie Hill, Singapore



Janaf, Croatia



Type 45 Destroyer, Royal Navy





# FibreFlow™ FIBRE PRODUCTS

## FibreFlow™ Microcable Fibre Unit (FU)

If asked to list the most important issues to be considered when choosing a high performance fibre unit, most people would include: performance, ease-of-handling and durability. In all these criteria, Emtelle's microcable FU has been shown to exceed other currently available fibre units.

In contrast with previous generation fibre units (typically known as "EPFU"), Emtelle's fibre unit contains a state-of-the-art, specifically designed polymeric sheath that is optimised for blowing: tests (500 metres at 50 metres per minute) have shown that this sheath, in combination with the fibre unit's single layer resin, improves blowing performance by 50%.

The fibre unit, which is compatible with industry-standard blowing equipment, is also extremely easy to use and handle. For example, compared to other methods, stripping the fibre can be done simply, quickly and with greater reliability. This ensures considerable savings on the costs associated with manpower.

In terms of durability, the fibre unit again outperforms legacy designs. It is highly resistant to crushing and (thanks to the elimination of the 'sandpaper effect') minimises any problems due to abrasion. Its particle-free design also drastically reduces maintenance requirements of blowing equipment. In addition, the smoothness of the product ensures that equipment seals will last longer, further enhancing the longevity of the system.

Emtelle's fibre unit has proved itself again and again in many projects worldwide. The product has been used for varied applications in diverse environments.

- Ease of handling and durability
- Compatible with industry-standard blowing equipment
- Optimised for blowing
- Proven in many worldwide projects

	2 Fibre		4 Fibre		6 Fibre		8 Fibre		12 Fibre			
Diameter	1.1 mm		1.1 mm		1.3 mm		1.5 mm		1.6mm			
Weight (mass)	1.0 g/m		1.0 g/m		1.6 g/m		1.8 g/m		2.2 g/m			
Breakout	typically 2 mins for 3m											
Blowing distance	1400 m typical											
Fibres	2 + 2 mechanical fibres as ripcords		4		6 + 1 mechanical		8		12			
No.	1	2	3	4	5	6	7	8	9	10	11	12
Colour	Blue	Orange	Green	Red	Grey	Yellow	Brown	Violet	Black	Aqua	Pink	White
Packaging	fibre rosette into pan											
Fibre types	single mode ITU-T G.652d											
	single mode ITU-T G.657A1 G.657A2											
	single mode ITU-T G.655											
	multi mode 62.5/125 OM1											
	multi mode 50/125 OM2, OM3, OM4											



Standard sheath colour is yellow. Other colours are available on request.

Other fibre counts, e.g. 5 and 7, available on request.

OFNP RATED (USA): The 2, 4, 8 and 12\* fibre units described here are UL approved for use in plenum zones when deployed inside plenum-rated tube bundles to Emtelle specification MHT 1748.

\* Approved 12fu has a reduced mass of 2.0g/m

Refer to page 11 for product codes.



Microduct size mm	Microcable FU fibre count				
	2	4	6	8	12
3.0/2.1	✓	✓			
5.0/3.5	✓	✓	✓	✓	✓
8.0/6.0	✓	✓	✓	✓	✓

### Combo fibre unit (MHT1204)

Combinations of multi mode fibres, optionally together with single mode fibre types or filling elements specific to customer requirements. Contact your local Emtelle representative for further details.

For relevant Tools, refer to page 83  
 For Installation Equipment, refer to page 71  
 For Fibre Restraint Methods, refer to page 93

## FibreFlow™ Microcable Fibre Unit (FU)

### FibreFlow™ Microcable FU product codes

Fibre Count	single mode ITU-T			multi mode			
	G.652d	G.657A1	G.655	62.5/125 OM1	50/125 OM2	50/125 OM3	50/125 OM4
2	9032	9506	-	9021	7653	9058	9180
4	7590	9507	90159	7578	7577	6669	9181
6	90024	-	-	-	-	-	-
8	7589	9509	90160	7580	7583	6668	9182
12	7575	9510	9179	7582	7581	7714	9013
Generic Specification	<b>MHT1201</b>	<b>MHT2185</b>	<b>MHT1202</b>	<b>MHT1203</b>			

**Order Example** 2 fibre G652d = Product Code 9032 and specify standard length required

### Pan Weights and Dimensions (ext. height x diameter)



Emtelle can also offer non-standard lengths. These may be subject to longer lead-times than our standard product range. Please call your local Emtelle representative to check for availability.

Standard Length	2 fibre	4 fibre	6 fibre	8 fibre	12 fibre
12,000m	16.5 kg Large		-	-	-
6,000m	10 kg Medium		14.0 kg Large	15.0 kg Large	18 kg Large
4,000m	6.5 kg Small		10.2 kg Medium	11.0 kg Medium	13.0 kg Medium
2,000m	4.5 kg Small		5.7 kg Small	6.0 kg Small	7.0 kg Small

Small: diameter 540mm, height 200mm, Medium: diameter 540mm, height 300mm, Large: diameter 540mm, height 400mm

## FibreFlow™ Microcable Fibre Unit (FU)



### FibreFlow™ Pre-connect Fibre



FibreFlow™ Pre-Connect is a blown fibre unit supplied with factory terminated connector(s) at one end. For some applications eg. FTTH it may be an advantage to minimize splicing operations at customer premises. One method of achieving this is to use pre-connectorised fibre unit. Time and disruption at the customer premises can be reduced as a result.

Available in 30m, 50m, 70m, 100m, 150m, 200m and 250m lengths of 2 and 4 fibre unit with SC or LC

connectors on the inner end and supplied on a recyclable reel. The fibre unit can be blown using a suitable blowing head, with the reel located on a dispenser. Standard fibre supplied is single mode G.652d (MHT1201). Other fibre types are available, please contact your local sales office for further information.

Product Code	Description	
9476	Pre-Connect Scissor Stand	
9424	Pre-Connect Bracket Assembly	

#### 2fu Singlemode G.652d (1 connector)

#### 2fu Singlemode G.652d (2 connectors)

#### 4fu Singlemode G.652d (4 connectors)

Length (m)	SC/UPC	SC/APC	LC/UPC	LC/APC
30	9430	9437	9444	9451
50	9431	9438	9445	9452
70	9432	9439	9446	9453
100	9433	9440	9447	9454
150	9434	9441	9448	9455
200	9435	9442	9449	9456
250	9436	9443	9450	9457

Length (m)	SC/UPC	SC/APC	LC/UPC	LC/APC
30	9360	9367	9374	9381
50	9361	9368	9375	9382
70	9362	9369	9376	9383
100	9363	9370	9377	9384
150	9364	9371	9378	9385
200	9365	9372	9379	9386
250	9366	9373	9380	9387

Length (m)	SC/UPC	SC/APC	LC/UPC	LC/APC
30	9388	9395	9402	9409
50	9389	9396	9403	9410
70	9390	9397	9404	9411
100	9391	9398	9405	9412
150	9392	9399	9406	9413
200	9393	9400	9407	9414
250	9394	9401	9408	9415

Minimum Order quantity 500 reels\*

Minimum Order quantity 500 reels\*

Minimum Order quantity 500 reels\*

\* Can be a combination of various lengths and/or connector types.

### FibreFlow™ Pre-terminated Fibre Unit with MPO



#### Product Code 72373

Emtelle fibre unit terminated with MPO at one end, wound onto reels allowing shipping and dispensing from an un-powered spindle.

### Pre-Installed Microcable FU

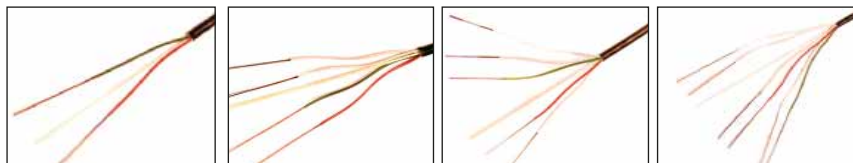
Emtelle can supply a large variety of protected microducts (refer to page 30 for details) which can be pre-installed with various types of Emtelle Microcable FU (with or without a low friction sheath). The products in the table below are an example of the products we can supply. Other products may be available, please contact your local Emtelle representative for further information.



Product Code	Description	Low friction FU sheath	Type	Colour	Standard Length	Minimum order quantity
60963	8/3.5mm + 2 PIFU MM OM3 x 1000m	yes	MM OM3	blue, orange	1000m	4000m
8476	8/3.5mm + 2 PIFU G652d x 1000m	yes	G652d	blue, green		
8497	8/3.5mm + 4 PIFU G652d x 1000m	yes	G652d	blue, green		
60982	8/3.5mm + 2 PIFU G657A1 x 2000m	no	G657A1	blue, green	2000m	

## FibreFlow™ Blown Fibre Micro and Mini Cable

Emtelle offers a range of micro and mini cable products. These products work in conjunction with Emtelle’s low-friction tube bundles for optimum blowing performance. For customer applications where a high fibre count is required, Emtelle offers a range of mini cable products that are fully water blocked and contain an FRP central strength member (12f to 216f). Emtelle also offers Microcables which are small fibre bundles (2f to 24f) that are water blocked and often, but not always, contain an additional strength member. Contact your local Emtelle representative for more information.



The figures in the table below are representative only.

	Micro Cable				Mini Cable										
	2	4	12	24	12	24	48	60	72	96	144	192	216	288	
Typical Diameter	2.0mm	2.0mm	2.3mm	2.8mm	5.8mm				6.4mm	8.5mm					10.5
Blowing Distance	1200m typical				2000m typical				1000m – 1500m typical						
Available Fibre Types	SM G.652d, G.657A1, G655, G656 (other types available on request)														
Minimum Order Quantity	4000m														

Microduct size mm	Micro Cable				Mini Cable											
	2	4	12	24	12	24	48	60	72	96	144	192	216	288		
5/3.5	✓	✓	✓													
7/5.5	✓	✓	✓	✓												
10/8					✓	✓	✓	✓	✓							
12/10					✓	✓	✓	✓	✓	✓	✓					
16/12					✓	✓	✓	✓	✓	✓	✓	✓	✓			
18/14														✓		

Design	MHT2615A	MHT2423B	MHT440	MHT441
	Product codes			
12f		90178		90175
24f		90125	90131	90134
36f		90179		90176
48f		90128	90132	90135
60f		90180		90177
72f		90129	90133	90136
84f		90181		
96f		90130	90124	
144f	90081			
Fibrecount	144	12-96	12-96	12-72
Diameter (nominal)	8.5mm	7.3mm	6.4mm	5.8mm
Central Strength Member	4.0mm	3.0mm	2.6mm	1.65mm
Sheath	HDPE	HDPE	PA	HDPE

### Fibre And Tube Identification

Colours to EIA 598 or customer requirement

No.	1	2	3	4	5	6	7	8	9	10	11	12
Colour	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua

### Sheath Marking

Marked every 1m with standard Emtelle printing or to customer requirement

Emtelle FibreFlow™ - Year - Fibre Count, G652d - Product Code - Batch ID - Metre Mark

# FibreFlow™ Blown Fibre Mini Cable

## Typical Specification

### Application

Optical mini cable for installation into microducts by blowing using air at pressures up to 15 bar using industry standard equipment.

Technical Data	
Distribution:	loose tubes containing 12 fibres (typical)
Stranding:	SZ
Central strength member:	FRP
Minimum bend radius:	During installation 20 x outside diameter
	During operation 15 x outside diameter
Temperatures (typical):	Storage/Transport: -20°C to +70°C
	Installation: -10°C to +70°C
	Operating: -20°C to +60°C
Storage Time on Drum:	12 months (recommended maximum)
Standard fibre type:	Single mode to G652d (ITU-T)

Features and Benefits	
Sheath:	Low friction for improved installation performance
Stripping:	Ripcord provided for quick and easy sheath removal
Colour coding:	Individually colour coded loose tubes for easy identification
Water Blocking:	Dry core with water swellable elements. Gel-filled loose tube.

Test	Specification
Tensile	IEC 60794-1-2-E1
Crush	IEC 60794-1-2-E3
Impact	IEC 60794-1-2-E4
Repeated Bending	IEC 60794-1-2-E6
Torsion	IEC 60794-1-2-E7
Cable Bend	IEC 60794-1-2-E11
Temperature Cycling	IEC 60794-1-2-F1
Water Penetration	IEC 60794-1-2-F5B

### Mini Cable Drum

All mini cables are supplied on 'F' drums. Dimensions below are supplied in millimetres:

Flange Diameter:	1000
Barrel Diameter:	500
Overall Width (+ flanges):	630
Drum Weight:	40kg
Drum Material:	Wood



# FibreFlow™ SUB-DUCT

## Sub-Duct

### Subduct Premium, Standard and RHDPE

Subduct Premium, Standard and RHDPE is available in various lengths and packaging types

- Premium Grade, exceptional performance and product features
- Standard Grade
- RHDPE, manufactured using recycled material to lower our environmental impact

For sub-duct accessories, refer to page 19

Subduct OD mm nominal	Coil length					
	50m	100m	200m	250m	500m	1000m
16				✓	✓	
18				✓	✓	
20				✓	✓	
25		✓	✓	✓		
32	✓	✓	✓	✓		
35	✓	✓	✓	✓		
40	✓	✓	✓			
50	✓	✓				
63	✓	✓				

1000m length are available in International markets

Drum Length	Minimum Order Quantity						
		750m	1000m	2000m	2500m	3000m	4000m
up to 6000m	12000m						
up to 6000m	12000m						
up to 5000m	10000m						
up to 4000m	8000m						
up to 3000m	6000m						
up to 2500m	4000m						
up to 2000m	4000m						
up to 1000m	4000m						
up to 750m	3000m						

TECHNICAL DATA Premium Grade (nominal unless otherwise stated)

SIZE		SDR	Mean outside Diam NOM	I.D. nom	Wall Thickness Nom	Mass nom g/m	Max Pull		Generic Specification
OD	ID						kg	kN	
16	10	5.3	16	10	3.0	119	120	1.2	MHT582
16	12	8.0	16	12	2.0	85	85	0.85	MHT582
18	14	9.0	18	14	2.0	96	90	0.90	MHT582
20	16	10.0	20	16	2.0	111	110	1.0	MHT582
25	20	10.0	25	20	2.5	168	170	1.7	MHT582
25	21	12.5	25	21	2.0	139	140	1.4	MHT582
28	24	14.0	28	24	2.0	162	160	1.6	MHT582
31	25	10.3	31	25	3.0	251	260	2.6	MHT582
32	26	10.7	32	26	3.0	260	260	2.6	MHT582
32	27	12.8	32	27	2.5	220	220	2.2	MHT582
32	28	16.0	32	28	2.0	179	180	1.8	MHT582
34	28	11.3	34	28	3.0	278	270	2.7	MHT582
35	28	10.0	35	28	3.5	329	330	3.3	MHT582
35	30	14.0	35	30	2.5	242	250	2.5	MHT582
37	32	14.8	37	32	2.5	257	250	2.5	MHT582
38	32	12.7	38	32	3.0	323	320	3.2	MHT582
40	32	10.0	40	32	4.0	425	430	4.3	MHT582
40	33	11.4	40	33	3.5	381	370	3.7	MHT582
50	41	10.9	50	40.8	4.6	612	610	6.1	MHT582
50	42	13.5	50	42.6	3.7	544	540	5.4	MHT582
63	50	9.7	63	50	6.5	1096	1100	11	MHT582

SDR' is the standard dimension ratio (OD / wall). Lower SDRs indicate heavy-duty sizes.

## Sub-Duct

TECHNICAL DATA Standard Grade (nominal unless otherwise stated)

Subduct OD mm	Subduct ID mm	Wall	SDR	Mass nom. g/m	Min Bend rad mm @ 20°C	Max pull		Generic Specification
						kg	N	
16	12	2	8.0	84	320	80	800	MHT345
20	16	2	10.0	108	400	100	1000	MHT345
25	20.4	2.3	10.9	157	500	162	1600	MHT345
32	27.6	2.2	14.5	197	640	200	2000	MHT345
32	27	2.5	12.8	221	640	210	2100	MHT345
32	26	3	10.7	261	640	240	2400	MHT345
40	35	2.5	16.0	282	800	270	2700	MHT345
40	34	3	13.3	333	800	330	3300	MHT345
40	33.2	3.4	11.8	371	800	370	3700	MHT345
40	32.6	3.7	10.8	403	800	380	3800	MHT345
50	44	3	16.7	423	1000	400	4000	MHT345
50	42	4	12.5	549	1000	520	5200	MHT345
50	41	4.5	11.1	611	1000	580	5800	MHT345

TECHNICAL DATA RHDPE Grade (nominal unless otherwise stated)

Subduct OD mm	Subduct ID mm	Wall	SDR	Mass nom. g/m	Min Bend rad mm @ 20°C	Max pull	
						kg	N
16	12	2	8.0	84	320	52	520
20	16	2	10.0	108	400	65	650
25	20.4	2.3	10.9	157	500	105	1050
32	27.6	2.2	14.5	197	640	130	1300
32	27	2.5	12.8	221	640	136	1360
32	26	3	10.7	261	640	156	1560
40	35	2.5	16.0	282	800	175	1750
40	34	3	13.3	333	800	214	2140
40	33.2	3.4	11.8	371	800	240	2400
40	32.6	3.7	10.8	403	800	247	2470
50	44	3	16.7	423	1000	260	2600
50	42	4	12.5	549	1000	338	3380
50	41	4.5	11.1	611	1000	377	3770

TECHNICAL DATA LFH (nominal unless otherwise stated)

SIZE		SDR	Mean outside Diam NOM	I.D. nom	Wall Thick- ness Nom	Mass nom g/m	Max Pull		Generic Specification
OD	ID						kg	kN	
20	16	10	20	16	2.0	172	45	450	MHT2367
25	20	10	25	20	2.5	269	70	700	MHT2367
32	26	10.7	32	26	3.0	415	100	1000	MHT2367
40	33	11.4	40	33	3.5	610	160	1600	MHT2367
50	41	11.1	50	41	4.5	977	250	2500	MHT2367
63	50	9.7	63	50	6.5	1750	450	4500	MHT2367

### Subduct Premium, Standard and RHDPE

TECHNICAL DATA Aerial (nominal unless otherwise stated)

SIZE		SDR	Profile Height	Mean outside diam. Nom	I.D. nom	Wall Thickness Nom	Mass nom g/m	Generic Specification
OD	ID							
16	12	8	28	16	12	2	242	CP1059
20	16	10	32	20	16	2	266	CP1058
25	20	10	40.8	25	20	2.5	481	CP1117
32	26	10.7	44	32	26	3	418	CP1056

### Accessories

For sub-duct accessories,  
refer to page 19



## Sub-Duct

### Dual Duct



Product Code	Description	Supply Length	Product weight kg/m	Drum		Total Weight kg
				Dimensions (OD x W)cm	Weight kg	
1997762 40B	2 x 40/3.7	2 x 1000m	0.81	220 x 120	150	1620
1997762 50B	2 x 50/4.5	2 x 600m	1.23	220 x 120	150	1542

Other configurations available on request

Duct OD mm	Duct ID mm	Wall	SDR	Mass nom. g/m	Min Bend rad mm @ 20°C	Max pull	
						kg	N
40	32.6	3.7	10.8	403	800	430	4300
50	41	4.5	11.1	615	1000	655	6550

### Triple duct



Product Code	Description	Supply Length	Product weight kg/m	Drum		Total Weight kg
				Dimensions (OD x W)cm	Weight kg	
199776240C	3 x 40/3	3 x 600	1	220 x 120	150	1800
199776250C	3 x 50/4	3 x 400	1.66	220 x 120	150	1992

Other configurations available on request

Duct OD mm	Duct ID mm	Wall	SDR	Mass nom. g/m	Min Bend rad mm @ 20°C	Max pull	
						kg	N
40	34	3	13.3	333	800	350	3500
50	42	4	12.5	553	1000	590	5900

## Sub-duct Accessories

### End stop connector

End stop connectors are used to seal an open tube.

Size	Product Code	Quantity per Pack
16	072770 016	10
20	072770 020	10
25	072770 025	10
32	072770 032	10
40	072770 040	10
50	072770 050	10
63	072770 063	10
75	072770 075	10
90	072770 090	10
110	072770 110	10



### Screw Connectors

A range of threaded connectors for connecting two pieces of HDPE duct. Both ends are threaded to within 5mm of the centre point. The two threads are asymmetrical, to aid duct grip in use. The threads at each end are opposite handed so a single turning action screws onto both ducts at one time. The threads are slightly tapered to accommodate duct diameters across the OD tolerance range. Connectors are marked with tightening directional arrow and duct OD size.

Product code	Duct Size	Body OD	Body Length	Quantity per Pack
5037	21mm	26mm	90mm	10
4448	25mm	30mm	90mm	10
4489	28mm	33mm	90mm	10
3771C	31mm	36mm	90mm	10
3650M	32mm	37mm	90mm	10
3900	34mm	39mm	90mm	10
4232	35mm	40mm	90mm	10
4067	37mm	42mm	90mm	10
4424	40mm	45mm	90mm	10
5412	44mm	49mm	90mm	10
9317	48mm	58mm	90mm	10
9318	50mm	61mm	90mm	10



## Sub-duct Accessories

### Straight Compression Connectors



Compression connectors are designed to provide a suitable joint and seal between lengths of polyethylene duct of equal diameter, for blowing purposes. (Reusable)

Product code	Duct Size	Nut OD	Fitting Length	Quantity per Pack
7891	16mm	39mm	105mm	10
4859	20mm	48mm	121mm	10
4286	25mm	54mm	125mm	10
3917P	32mm	64mm	145mm	10
4390	35mm	64mm	145mm	10
7895	40mm	82mm	177mm	10
4065	50mm	96mm	201mm	10
5361	63mm	113mm	230mm	10

### Compression Connector



A transparent screw connector used for joining cable ducts of equal diameter. (Reusable)

Product Code	Description	Quantity per Pack
073600 316	16 mm transparent screw connector	10
073600 320	20 mm transparent screw connector	10
073600 325	25 mm transparent screw connector	10
073600 332	32 mm transparent screw connector	10
073600 340	40 mm transparent screw connector	10
073600 350	50 mm transparent screw connector	10
073600 363	63 mm transparent screw connector	10

### Push Fit Connector



A straight connector used for joining cable ducts of equal diameter.

Product Code	Description	Quantity per Pack
073600 132	32 mm Hawle straight connector	10
073600 140	40 mm Hawle straight connector	10
073600 150	50 mm Hawle straight connector	10

### Reducers



Product Code	Size	Quantity per Pack
7897	16 – 20mm	10
7898	16 – 25mm	10
7899	20 – 25mm	10
7900	20 – 32mm	10
5363	25 – 32mm	10
7902	25 – 40mm	10
7904	25 – 50mm	10
7907	25 – 63mm	10
7903	32 - 40mm	10
7905	32 – 50mm	10
7908	32 – 63mm	10
7906	40 – 50mm	10
7909	40 – 63mm	10
7910	50 – 63mm	10

## Sub-duct Accessories

### Expanding Duct Plugs

The Duct plug 1.5 bar can be used to seal an open tube, and can also be used to pull a duct. To keep main duct free of water, dirt and grit between duct-laying and sub-duct/cable placement. A rope eye at the spigot end of the plug keeps ropes secure and reduces box congestion.

- All plastic construction
- Corrosion proof
- Water-tight
- Easy installation and removal
- Reusable



Product Code	Duct ID Range**	Quantity per Pack
4410A	24-30	12
4410D	29-38	12
072698 032	32	10
072698 040	40	10
072698 050	50	10
4410C	76-88	12
4410B	87-102	12
4410	100-110	8
9351	148-162	8



\*\*Addition sizes are available on request.

Additional Products are available including: Triplex Sub-duct Organiser Plugs  
Quadplex Sub-duct Organiser Plugs

### Electronic Marker

The Electronic Marker (search ball) provides a method to electronically mark and locate underground facilities.

Product code	Item name
19998 40	Search ball, orange, 101.4 kHz
70336	Search ball, red, 169.8 kHz



Other colours and frequencies are available, for further information contact your local Entelle representative.

## Ancillary Products

Marker tapes to alert following utility services of the general location of fibre ductwork and HDPE trench tiles to offer token protection from damage from trenching tools.

### Warning net: red, blue or violet



Product code	Description
199807 110	M10 with search wire 10 cm, 500 m
199807 010	M10 without search wire 10 cm, 500 m
199807 020	M10 without search wire 20 cm, 100 m
199807 030	M10 without search wire 30 cm, 100 m
199807 050	M10 without search wire 50 cm, 100 m

### Warning tape: red or orange



Item no.	Item name
199817 025	25 x 0.3 mm, 250 m per roll
199817 050	50 x 0.1 mm, 500 m per roll

### Green Marker Tapes



Green being the NJUG (UK National Joint Utilities Group) colour code for CATV and Telecomm ductworks, these come with standard print of "Caution - Fibre Optic Cables Below" or "Caution Telecoms Cable Below". These can be supplied with bespoke Colour/Printline such as company name and Emergency Free phone Number.

Product code	Description / product type	Pack Qty
4857	Marker tape:caution tel cables (365m per roll)	1
4785	Marker tape:fibre optic cable (365m per roll)	1
4785W	Marker tape:fibre optic cable (100m per roll) (contains tracer wire)	1

### Plastic tape tile: red or orange



Product code	Dimensions (W x Material thickness)	Roll length
199818 115	100 x 1.5 mm	50 m
199818 118	100 x 1.8 mm	50 m
199818 150	150 x 1.5 mm	50 m
199818 170	170 x 2.2 mm	50 m
199818 200	180 x 2.0 mm	50 m
199818 235	200 x 3.5 mm	50 m
199818 336	300 x 3.5 mm	50 m
199818 430	400 x 3.0 mm	50 m

### Trench Marker Tiles

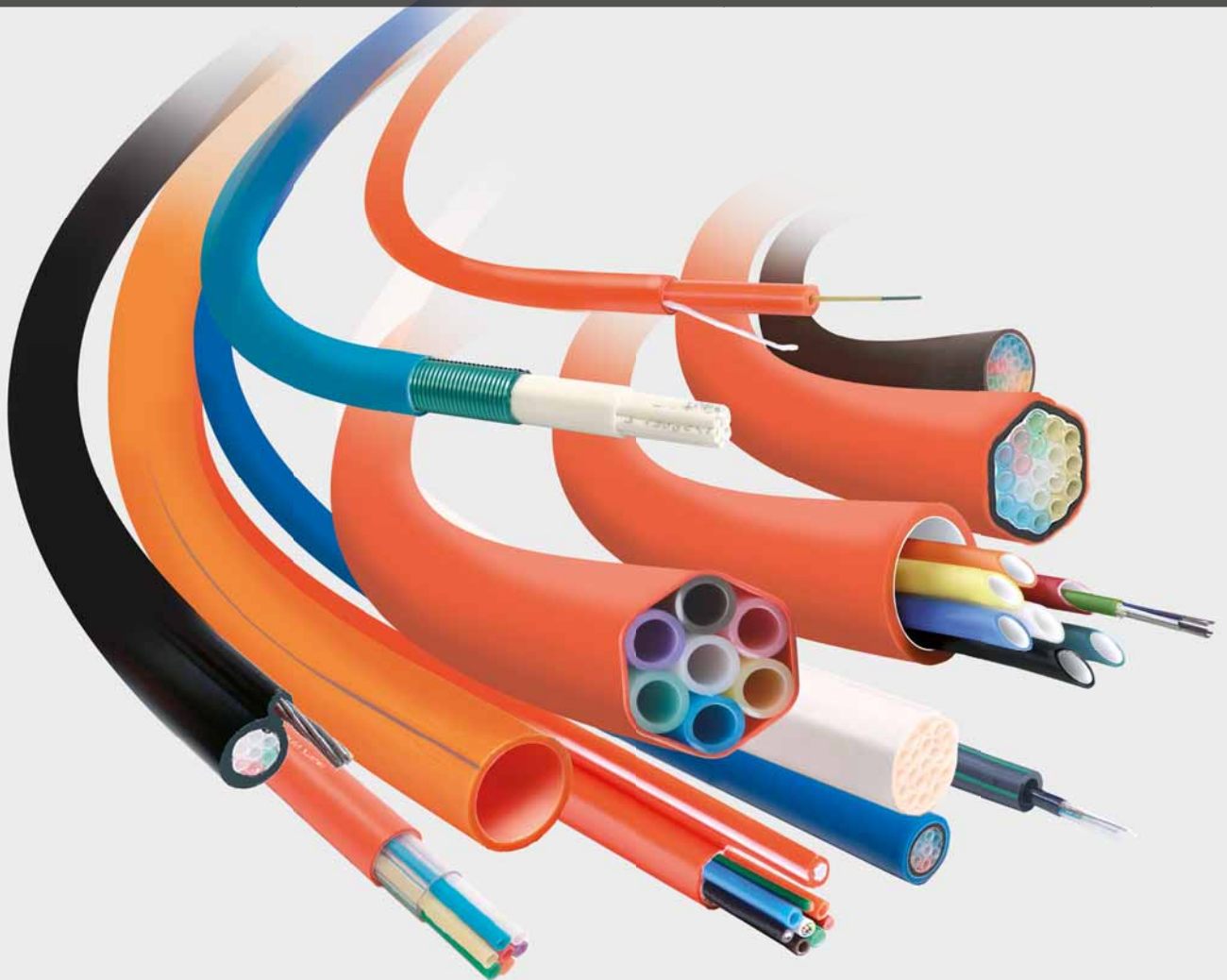


- Cable tiles are a heavy protection product manufactured from high impact recycled polyethylene sheet and are suitable to withstand damage from plant and hand tools.
- They are also suitable for fibre optic cables.
- Cable tiles are fully jointed, laid overlapped and held firm with plastic jointing pegs.
- They are a suitable direct replacement for concrete covers and steel plate.
- These are generally supplied with standard print of "Caution - Fibre Optic Cables Below" or "Caution Telecoms Cable Below".
- Bespoke Colour/Printline giving company name and their Emergency free phone number can also be supplied.

Product code	Description / product type	Pack Qty
5606	CABLE TILE 1000x150x11mm 'Caution - Fibre Optic Cable'	500



# FibreFlow™ TUBE BUNDLE



## Tube Bundle

Emtelle is experienced enough in air blown fibre installation to understand that no two projects are the same. Factors such as network size, customer requirements, geography, topography, application areas and usage projections (to name but a few) require special considerations in terms of the technology and products used. To ensure that it provides the right solution every time, Emtelle offers an extensive line of high-quality products that can cover the requirements of the vast majority of projects. For easy reference, the following pages provide details of our tube bundle products.

Type		Page
<b>Microduct / Primary tube</b>		26
<b>Direct Bury (DB)</b>	DB metal-free (DBmf)	30
	DB metal-free heavy-wall (DBmf)	31
	DB filled metal-free (DBfmf)	39
	DB Termite Resistant (DBT)	38
	DB Rodent Proof	38
	Direct Bury (DB)	33
<b>Direct Install (DI)</b>	Direct Install (DI)	34
	DI metal-free (DImf)	40
<b>Low Fire Hazard (LFH)</b>	Low Fire Hazard (LFH)	36
	Plenum Rated	37
	Riser Rated	37
<b>Aerial</b>	Drop	35
	Figure-8	35

Drum		
Type	Dimensions (OD x W )mm	Weight kg
coil	600 x 300	0
350 ply	350 x 150 x 200	5
600 ply	600 x 300	8
700 ply	700 x 350	10
E	800 x 516	38
F	1000 x 646	72
G	1200 x 718	92
HH	1000 x 475	54
MBS	1200 x 1018	98
1.2D	750 x 1018	98
1.4D	1400 x 1100	144
1.7D	1700 x 1140	237
2.0D	2000 x 1140	345
2.2D	2200 x 1165	570
2.35D	2350 x 1165	551

## Loose Protected Microduct

Loose protected microducts (see example illustrated below) are suitable for high fibre-count minicables. This tried and tested technology has been deployed over thousands of kilometres, providing excellent installation characteristics for cables from 24 to 144 fibres. The loose protected microduct solution comprises a range of microduct that are composed of standard, strong HDPE tubing as the outer duct, with a super smooth silicone coating inside. This outer duct provides complete protection of cables before, during and after installation. The smooth silicone coating remains in the duct to facilitate future repairs and/or replacements.

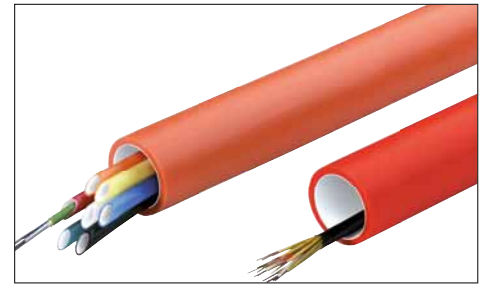
Loose protected microducts offer many advantages, including:

- Ease of installation
- Optimum impact resistance for maximum durability and performance
- Freedom of choice when choosing micro-duct configuration
- Optimal utilisation of cable networks with minimal expansion costs
- Option to upgrade networks in step with the development of new fibres
- Colour coding that facilitates the identification of different routes
- Customer-specific duct lengths
- Excellent blowing performance

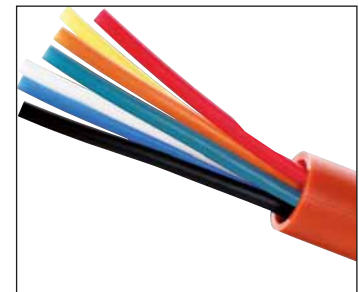
The subducts can be supplied as:

- Standard HDPE (smooth exterior and interior)
- HDPE with smooth interior silicone coating
- HDPE with ribbed interior
- HDPE with ribbed interior silicone coating

The illustration shows the difference between the two types of cable installation. The new microduct technology has been applied to the orange duct, with the microducts loosely installed in the HDPE duct. The minicables with the required number of fibres can subsequently be installed individually in the microducts. Traditional technology has been used for the red duct and only a single fibre cable has been installed; installations of this kind often fail to make full use of the duct capacity.



- Configure the loose protected microduct according to your own wishes.
- Free combination of microducts 14, 12, 10, 7 and 5mm, fibre cables and copper cables.
- other configurations can be made upon request.
- rule of thumb: Filling area above 60% generally reduces fibre blowing lengths.
- **option:** loose protected microduct can be made with a combination of microducts and fibres.



It is possible to install a number of microducts in a subduct.

The actual number depends on the number and diameters of the microducts. Some examples are listed below.

### Examples

Microduct w/silicone + ribs		
32mm	40mm	50mm
3 x 10 mm	5 x 10 mm	10 x 10 mm
4 x 10 mm	6 x 10 mm	7 x 10 mm
2 x 12 mm	4 x 12 mm	7 x 12 mm
	3 x 14 mm	6 x 12 mm
		1 x 12 mm + 9 x 10 mm
		2 x 12 mm + 8 x 10 mm
		3 x 12 mm + 6 x 10 mm
		4 x 12 mm + 5 x 10 mm
		5 x 14 mm

The availability of a 12mm Lock & Block kit means that Loose Protected Microduct can now successfully be used with Microcable FU. For further details refer to Pages 11 and 93.

Refer to page 27 for Loose Protected Microduct Handling Guidelines.



## Microduct / Primary tube

Microduct	Supply Length	Minimum Order Quantity	Product weight per metre gms	Drum Type
3/2.1mm PE	4000m	4000m	3.4	HH
5/2.1mm PE	4000m	4000m	15	HH
5/3.5mm PE	5000m	5000m	9.4	HH
6/2.7mm PE	4000m	4000m	20.9	HH
7/3.5mm PE	4000m	4000m	28	HH
7/4mm PE	4000m	4000m	25	HH
8/3.5mm PE	3000m	3000m	38	HH
8/5mm PE	3000m	3000m	29.2	HH
10/6mm PE	2000m	4000m	48	HH
10/8mm PE	2000m	4000m	27	HH
12/8mm PE	2000m	4000m	60	HH
12/10mm PE	2000m	4000m	33	HH
14/10mm PE	1000m	3000m	72.2	HH
5/3.5mm LFH	4000m	4000m	15.3	HH
5/3.5mm LFH	500m	4000m	15.3	350Ply
6/2.7mm LFH	4000m	4000m	34.3	HH
7/4mm LFH	4000m	4000m	39.4	HH
12/8mm LFH	2000m	4000m	96	HH
14/10mm LFH	1000m	4000m	115	HH

Available in 12 colours:

- Red • Orange • Yellow • Green • Blue • Violet • Black • White • Aqua • Grey • Pink • Brown

# Handling guidelines for Loose Protected Microducts

All handling of cable ducts and loose protected microducts must be in accordance with Danish Standards DS 430 "code of practice for trenching of underground flexible pipelines of plastic".

The following guidelines highlight a range of important aspects within these areas:

1. Transport
2. Reception
3. Storage
4. Laying
5. Disposal

## 1. Transport

Transport, loading and unloading are all very important factors in ensuring the quality of the ducts.

In the contexts of transport and storage, it is essential to take into account the relative softness and flexibility of the duct material to prevent the ducts from becoming deformed and/or damaged.

### 1.1 Ducts in set lengths

We recommend handling the ducts for as long as possible in the packed bundles in which they are supplied.

Ducts in set lengths should be loaded and unloaded with a forklift truck, with a crane, or manually by two people.

The ducts must never be tipped off or thrown from the vehicle. In the case of manual handling, make sure that the ducts are never dragged along asphalt or other rough surfaces.

For transport on lorries, the following conditions must be observed:

- When they are not bundled, the ducts must not overhang the rear edge of the lorry bed by more than 1 metre.
- For bundled ducts in wooden frames, the rearmost frame must lie on the lorry bed.

### 1.2 Ducts in rolls on drums

A forklift truck must always be used to move, load and unload ducts on drums. The truck operator must make sure to lift and carry the drums by their wooden frames. The drums must not be dropped from heights and must not be rolled over sharp objects.

When loaded onto a lorry bed, each drum must always be securely chocked in place, and the drums must be positioned flange against flange. Each and every drum must be secured using transport straps.

Ducts in coils are transported on pallets. The pallets may be stacked in two layers.

## 2. Delivery

On receipt of ducts, all material should be checked as the responsibility is normally transferred to the receiver upon delivery.

## 3. Storage

The ducts must be stored on a level surface without sharp edges and/or stones. During storage and transport, the ducts must be positioned flat and appropriately supported such that they are not subjected to unnecessary deformation. The surface may, for example, comprise of wooden battens spaced no more than 2 metres apart.

The ducts must be stored in such a way that they are guarded against deformation and are not subjected to damaging influences.

The ducts should not be stored in locations where they are subjected to direct sunlight for protracted periods, as this may cause the material to deteriorate. Nor should the ducts be allowed to come into contact with chemicals which may cause them to deteriorate. The maximum permitted storage period for ducts is one year.

Coils of duct must be stored lying down.

## 4. Laying

Cable ducts, pressure ducts and loose protected microducts must all be laid in accordance with Danish Standards DS 430 "Code of practice for trenching of underground flexible pipelines of plastic" and DS 475 "Code of practice for the laying of underground flexible pipelines of plastic".

**Theoretical length of expansion or contraction of micro-ducts, in metres (without friction)**

Duct length in m	Δ Degrees (Celsius)								
	L	5	10	15	20	25	30	35	40
100	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	
200	0.2	0.4	0.5	0.7	0.9	1.1	1.3	1.4	
300	0.3	0.5	0.8	1.1	1.4	1.6	1.9	2.2	
400	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	
500	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	
600	0.5	1.1	1.6	2.2	2.7	3.2	3.8	4.3	
700	0.6	1.3	1.9	2.5	3.2	3.8	4.4	5.0	
800	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	
900	0.8	1.6	2.4	3.2	4.1	4.9	5.7	6.5	
1000	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	
1100	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	
1200	1.1	2.2	3.2	4.3	5.4	6.5	7.6	8.6	
1300	1.2	2.3	3.5	4.7	5.9	7.0	8.2	9.4	
1400	1.3	2.5	3.8	5.0	6.3	7.6	8.8	10.1	
1500	1.4	2.7	4.1	5.4	6.8	8.1	9.5	10.8	
1600	1.4	2.9	4.3	5.8	7.2	8.6	10.1	11.5	
1700	1.5	3.1	4.6	6.1	7.7	9.2	10.7	12.2	
1800	1.6	3.2	4.9	6.5	8.1	9.7	11.3	13.0	
1900	1.7	3.4	5.1	6.8	8.6	10.3	12.0	13.7	
2000	1.8	3.6	5.4	7.2	9.0	10.8	12.6	14.4	

## 5. Disposal

The disposal of remainders of micro-ducts of any length (which may be polluted with soil, mud and/or other impurities) and of complete products is the responsibility of the duct manufacturer – in this case Emtelle Scandinavia. Alternatively, responsibility can be exercised via a company with the facilities for such disposal. Customers may return small volumes to Emtelle Scandinavia in Sdr. Felding, Denmark. For larger volumes (3000 metres or more), it is best to collect all used and/or unused micro-ducts in a single location close to a three-phase 380 V power supply.

NB! Temperature-related expansion and contraction of micro-ducts may occur. Emtelle Scandinavia therefore recommends laying 1 metre of extra micro-duct in each hand hole.

## Tight Protected Microducts

Tight protected microducts: suitable for the installation of fibre units containing between 1 and 12 fibres as well as minicable (24-144 fibres). In 3mm, 5mm, 7mm and 8mm microduct diameters the bundles can contain up to 24 individual microducts. They are usually deployed in the access part of the network – in FttH and Campus applications, for example.

FibreFlow™ microducts with diameters ranging from 3 to 16mm are available and can be bundled in configurations of up to 24 tubes dependent on the individual microduct diameter. Bundles are available in several types – for example, direct bury, direct install and low fire hazard – making them ideal for diverse applications such as FttH, In-Building and Campus. They can also be customized to meet specific environmental challenges.

### Etmelle Standard Microduct Numbering System

### Microduct Sequence (DI/DB)

### EIA598 Colour Sequence

LFH	DI / DB	TUBE SEQUENCE (DI/DB)	EIA598 Colour Sequence
		1 red 1 2 green 1	
		1 red 1 2 green 1 3 natural 1 4 blue 1	
		1 natural 1 2 red 1 3 green 1 4 blue 1 5 blue 2 6 blue 3 7 blue 4	
		1 red 1 2 green 1 3 natural 1 4 red 2 5 green 2 6 yellow 1 7 yellow 2 8 yellow 3 9 blue 1 10 blue 2 11 blue 3 12 blue 4	
		1 natural 1 2 red 1 3 green 1 4 natural 2 5 natural 3 6 natural 4 7 natural 5 8 red 2 9 green 2 10 yellow 1 11 yellow 2 12 yellow 3 13 yellow 4 14 yellow 5 15 blue 1 16 blue 2 17 blue 3 18 blue 4 19 blue 5	
		1 red 1 2 green 1 3 natural 1 4 natural 2 5 natural 3 6 natural 4 7 natural 5 8 natural 6 9 natural 7 10 red 2 11 green 2 12 yellow 1 13 yellow 2 14 yellow 3 15 yellow 4 16 yellow 5 17 yellow 6 18 yellow 7 19 blue 1 20 blue 2 21 blue 3 22 blue 4 23 blue 5 24 blue 6	

The Central microduct can be used to blow mini cable.

## Direct Bury metal free (DBmf)



Assemblies of PE microducts (3 or 5mm), each with low friction performance. Each assembly (tube bundle) is surrounded by blocking material that reacts to block water movement. Over the bundle is one sheath of flexible black PE, and one sheath of tough orange direct burial-grade PE. These strong products are designed for direct burial into suitably prepared ground.

### DB(mf)

Single direct buried microducts in various forms (1DBmf) are extensively used to link the network to the building. Standard 1DBs have two sheaths, so the outer sheath may be removed and the single-sheathed version can then be led into closures, chambers etc where other protection is provided.

A new style of 1DB\* is also now offered - a single heavy-wall microduct which is available sheathed or unsheathed. These heavy wall products have the ideal FTTH combination of flexibility and toughness, typically requiring no end-end connection or closure along the length. When using heavy wall microducts, ensure the correct connectors or reducers are used.

\* Refer to page 31.

Product Code	Description	Microduct Size	Supply length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Bundle OD mm	Min Bend rad mm	Max Pull N	Generic Specification
8361T	2DBmf	3/2.1mm	2000m	4000m	G	99	290	13.3 x10.3	150	550	MHT2156
8362T	4DBmf	3/2.1mm	4000m	4000m	1.4D	130	664	14.5	220	700	MHT2156
8363T	7DBmf	3/2.1mm	4000m	4000m	1.4D	157	772	16.3	240	850	MHT2156
8364T	12DBmf	3/2.1mm	4000m	4000m	2.0D	207	1173	19.5	290	1100	MHT2156
8365T	19DBmf	3/2.1mm	4000m	4000m	2.0D	256	1369	21.9	330	1400	MHT2156
8247T	24DBmf	3/2.1mm	2000m	2000m	1.7D	320	877	25.3	380	1750	MHT2156
8351T	1DBmf (heavy-wall)	5/2.1mm	500m	4000m	coil	74	37	10.0	130	400	MHT1281
8233T	1DBmf	5/3.5mm	500m	4000m	coil	62	31	10.0	150	250	MHT2156
8213T	1DBmf	5/3.5mm	500m	4000m	600ply	62	39	10.0	150	250	MHT2156
8216TS	1DBmf	5/3.5mm	2000m	4000m	F	62	196	10.0	150	250	MHT2156
8216T	1DBmf	5/3.5mm	4000m	4000m	MB5	62	346	10.0	150	250	MHT2156
8217T	2DBmf	5/3.5mm	2000m	4000m	G	145	382	12.3 x 17.3	185	750	MHT2156
8217TL	2DBmf	5/3.5mm	4000m	4000m	1.4D	145	724	12.3 x 17.3	185	750	MHT2156
8218T	4DBmf	5/3.5mm	4000m	4000m	1.7D	203	1049	19.4	300	1100	MHT2156
8219T	7DBmf	5/3.5mm	4000m	4000m	2.0D	262	1393	22.3	335	1450	MHT2156
8220T	12DBmf	5/3.5mm	4000m	4000m	2.35D	389	2107	28.1	425	2150	MHT2156
8221T	19DBmf	5/3.5mm	3000m	3000m	2.35D	500	2051	32.1	550	2750	MHT2156
8222T	24DBmf	5/3.5mm	2000m	4000m	2.2D	637	1844	37.7	645	3500	MHT2156
8239	1DBmf	10/8mm	2000m	4000m	MB5	184	466	17.7	270	1000	MHT1743
60208	2DBmf	10/8mm	2000m	4000m	1.4D	261	666	17.3 x 27.3	260	1400	MHT1805
60209	4DBmf	10/8mm	2000m	4000m	2.0D	480	1305	31.9	480	2300	MHT1805
60210	5DBmf	10/8mm	2000m	4000m	2.2D	471	1512	34.4	520	2600	MHT1805
60211	7DBmf	10/8mm	2000m	4000m	2.2D	650	1870	37.8	650	3100	MHT1805
60212	2DBmf	12/10mm	2000m	4000m	1.7D	309	855	19.1 x 31.1	290	2400	MHT1805
60213	4DBmf	12/10mm	2000m	4000m	2.2D	505	1580	36.8	630	4000	MHT1805
60548	5DBmf	12/10mm	2000m	4000m	2.35D	573	1697	39.8	680	4800	MHT1805
60144	7DBmf	12/10mm	1000m	4000m	2.0D	684	1029	43.8	750	5600	MHT1805

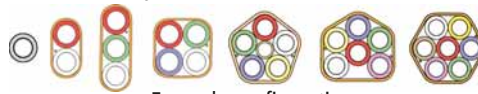
## Direct Bury metal free (DBmf)

### DBmf Heavy-Wall Microduct Bundles



All these bundles have simplicity and strength. They have exceptional toughness and crush resistance and can be directly buried without the need for additional protective closures at branch-off points, or inline connections. The individual microducts are so strong that the outer sheath does not need to be protective in design, but simply holds the bundle together. The individual tubes can be joined by Protected and Directly Buried rated connectors (page 66-68). This solution is easy to use, quick to install and will reduce the Total Cost of Ownership long term.

The 1, 2 and 3 way bundles are also suitable for slot cut installations.



Example configuration

Product Code	Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Bundle OD mm	Min Bend rad mm	Max Pull N	Generic Specification
8351T	1DBmf	5/2.1mm	500m	4000m	coil	74	37	10.0	130	400	MHT1281
60171	1DBmf	7/3.5mm	4000m	4000m	HH	28	166	7.0	100	200	MHT2309
60172	2DBmf	7/3.5mm	4000m	4000m	MB5	97	486	9.2 x 16.4	160	650	MHT2309
60173	4DBmf	7/3.5mm	4000m	4000m	1.7D	170	917	19.1	330	1200	MHT2309
60174	7DBmf	7/3.5mm	4000m	4000m	2.0D	266	1409	23.2	400	1800	MHT2309
60175	12DBmf	7/3.5mm	3000m	3000m	2.2D	429	1857	30.7	530	3000	MHT2309
60176	19DBmf	7/3.5mm	2000m	4000m	2.2D	640	1850	36.2	620	4500	MHT2309
60177	24DBmf	7/3.5mm	1000m	4000m	2.2D	860	1430	44.2	750	6000	MHT2309
60178	1DBmf	7/4mm	4000m	4000m	HH	25	154	7.0	70	180	MHT2309
60179	2DBmf	7/4mm	4000m	4000m	MB5	91	462	9.2 x 16.4	160	600	MHT2309
60180	4DBmf	7/4mm	4000m	4000m	1.7D	159	873	19.1	330	1100	MHT2309
60181	7DBmf	7/4mm	4000m	4000m	2.0D	247	1333	23.2	400	1700	MHT2309
60182	12DBmf	7/4mm	3000m	3000m	2.2D	395	1755	30.7	530	2800	MHT2309
60183	19DBmf	7/4mm	2000m	4000m	2.2D	587	1744	36.2	620	4100	MHT2309
60184	24DBmf	7/4mm	1000m	4000m	2.2D	793	1363	44.2	750	5600	MHT2309
8470	1DBmf	8/3.5mm	2000m	4000m	HH	38	130	8.0	80	250	MHT2059
8477	1DBmf	8/3.5mm + sheath	3000m	3000m	G	67	293	10.0	100	400	MHT2059
60728	1DBmf	10/6mm	2000m	4000m	HH	48	150	10.0	120	320	MHT1563
60200	2DBmf	10/6mm	2000m	4000m	MB5	150	398	12 x 22	200	800	MHT1563
60351	3DBmf	10/6mm	2000m	4000m	1.4D	218	580	12 x 32	200	1000	MHT1563
60202	4DBmf	10/6mm	2000m	4000m	1.4D	266	676	26.1	380	1200	MHT1563
60203	7DBmf	10/6mm	2000m	4000m	2.0D	430	1205	32.0	540	2400	MHT1563
60014	1DBmf	12/8mm	2000m	4000m	HH	60	174	12.0	120	400	MHT1564
60015	2DBmf	12/8mm	2000m	4000m	1.4D	184	512	14 x 26	220	900	MHT1564
60016	3DBmf	12/8mm	2000m	4000m	1.4D	267	678	14 x 38	220	1400	MHT1564
60017	4DBmf	12/8mm	2000m	4000m	2.0D	347	1039	31.0	440	1800	MHT1564
60018	5DBmf	12/8mm	2000m	4000m	2.2D	434	1438	34.4	600	2400	MHT1564
60019	6DBmf	12/8mm	2000m	4000m	2.2D	465	1500	38.0	600	2600	MHT1564
60020	7DBmf	12/8mm	2000m	4000m	2.2D	531	1632	38.0	650	2800	MHT1564
8506	1DBmf	14/10mm	1400m	4200m	HH	73	156	14.0	210	500	MHT2308
8524	2DBmf	14/10mm	1400m	4200m	MB5	215	399	30 x 16mm	240	1200	MHT2308
8499	3DBmf	14/10mm	1400m	4200m	1.4D	314	584	44 x 16mm	240	1700	MHT2308
60022	4DBmf	14/10mm	1400m	4200m	2.0D	391	892	36mm across corners	500	2000	MHT2308
60023	5DBmf	14/10mm	1400m	4200m	2.0D	507	1055	40mm across corners	700	2700	MHT2308
60352	6DBmf	14/10mm	1400m	4200m	2.2D	561	1355	44mm across corners	750	3000	MHT2308
8523	7DBmf	14/10mm	1400m	4200m	2.2D	631	1453	44mm across corners	750	3500	MHT2308
60618	1DBmf	16/12mm	1000m	4000m	F	84	156	16.0	160	850	MHT2432
60722	2DBmf	16/12mm	1000m	4000m	MB5	249	347	34 x 18	180	1600	MHT2432
60723	3DBmf	16/12mm	1000m	4000m	1.4D	363	507	50 x 18	180	2400	MHT2432
60724	4DBmf	16/12mm	1000m	4000m	2.0D	447	792	41mm across corners	570	3000	MHT2432
60725	5DBmf	16/12mm	1000m	4000m	2.0D	580	925	45.5mm across corners	770	3800	MHT2432
60726	6DBmf	16/12mm	1000m	4000m	2.2D	642	1212	50mm across corners	850	4300	MHT2432
60727	7DBmf	16/12mm	1000m	4000m	2.2D	736	1306	50mm across corners	850	4800	MHT2432



## Direct Bury metal free (DBmf)

### Direct Bury metal free combo (DBmf combo)

These products have a thin flexible sheath allowing the bundle to take many forms of shape. All are designed to fit into a 30mm wide slot (except CP1594, 32mm wide slot). Colours and print can be Emtelle standard or customer specific. All designs can have an optional 0.63mm tracer wire included.



Product Code	Description	Number of Microducts				Diameter (mm)	Sheath (mm)	Mass (g/m)	MBR* (mm)	Maximum Installation Tension (N)	Design	
		12/8	14/10	16/12	18/14							
61865	4 way LPM 12/8	4	0	0	0	40	1	357	350	2275	CP1576	
61859	4 way Combo LPM	3	1	0	0	40	1	369	400	2275	CP1601	
61853	4 way Combo LPM	3	0	1	0	40	1	381	350	2450	CP1577	
61849	4 way Combo LPM	3	0	0	1	40	1	393	350	2450	CP1584	
61862	5 way Combo LPM	3	1	1	0	40	1	453	400	2800	CP1596	
61870	5 way Combo LPM	3	1	0	1	50	1	496	400	3150	CP1627	
61856	5 way Combo LPM	3	0	2	0	50	1	495	350	3150	CP1590	
61854	5 way Combo LPM	3	0	1	1	50	1	507	400	3150	CP1582	
61850	5 way Combo LPM	3	0	0	2	50	1	519	350	3325	CP1579	
61867	5 way Combo LPM	4	0	1	0	40	1	441	400	2800	CP1578	
61866	5 way Combo LPM	4	0	0	1	50	1	483	350	3150	CP1585	
61848	5 way LPM 14/10	0	5	0	0	50	1	507	400	3150	CP1595	
61863	6 way Combo LPM	3	1	2	0	50	1	567	400	3500	CP1597	
61860	6 way Combo LPM	3	1	0	2	50	1	590	400	3850	CP1599	
61855	6 way Combo LPM	3	0	1	2	50	1	602	400	3850	CP1583	
61857	6 way Combo LPM	3	0	3	0	50	1	578	400	7350	CP1591	
61851	6 way Combo LPM	3	0	0	3	63	1.5	744	400	4550	CP1580	
61868	6 way Combo LPM	4	0	2	0	50	1	555	350	3500	CP1593	
61871	6 way Combo LPM	4	0	0	2	50	1	578	500	3500	CP1628	
61864	7 way Combo LPM	3	1	3	0	63	1.5	780	400	4900	CP1598	
61861	7 way Combo LPM	3	1	0	3	63	1.5	816	400	5250	CP1600	
61858	7 way Combo LPM	3	0	4	0	63	1.5	792	400	4900	CP1592	
61852	7 way Combo LPM	3	0	0	4	63	1.5	878	400	5600	CP1581	
61869	9 way Combo LPM	4	0	5	0	63	1.5	936	500	5950	CP1594	

\*Assumes product has flattened out to the narrowest possible

## Direct Bury (DB)

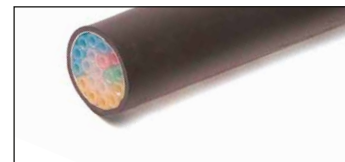


The assembly is surrounded with a 125µm aluminium layer, bonded inside a sheath of flexible black PE with a heavy duty orange coloured HDPE sheath making the product suitable for direct burial. Rip cords are pre-installed along the entire length, under the sheath, to rip through the aluminium and sheath using correct procedure.

Product Code	Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Bundle OD mm	Min Bend rad mm	Max Pull N	Generic Specification
6627	1DB	5/3.5mm	4000m	4000m	MB5	72	386	10.0	150/100	500	MHT113
6406	2DB	5/3.5mm	4000m	4000m	1.4D	159	780	12.2 x 17.2	190/120	1200	MHT113
6375	4DB	5/3.5mm	4000m	4000m	1.7D	216	1101	19.3	300/200	1600	MHT113
6314	7DB	5/3.5mm	4000m	4000m	2.0D	278	1457	22.2	350/240	2000	MHT113
6556	12DB	5/3.5mm	4000m	4000m	2.35D	411	2195	28.2	430/310	2800	MHT113
6352	19DB	5/3.5mm	3000m	3000m	2.35D	526	2129	32.2	550/360	4000	MHT113
6557	24DB	5/3.5mm	2000m	4000m	2.2D	671	1912	37.8	650/500	5000	MHT113
61035	1DB	8/6mm	4000m	4000m	1.4D	162	792	15.2	230/150	1000	MHT113
61036	2DB	8/6mm	4000m	4000m	1.7D	232	1165	15.2 x 23.2	230/150	1500	MHT113
61037	4DB	8/6mm	2000m	4000m	1.7D	368	973	27.1	400/300	2500	MHT113
8521	7DB	8/6mm	2000m	4000m	2.0D	487	1319	31.8	540/370	3500	MHT113
60153	12DB	8/6mm	2000m	4000m	2.35D	698	1947	40.4	700/550	4800	MHT113
61038	19DB	8/6mm	1400m	4200m	2.35D	987	1933	47.8	900/650	7000	MHT113
6893	1DB	10/8mm	2000m	4000m	MB5	185	468	17.2	260/180	1300	MHT167
61380	2DB	10/8mm	2000m	4000m	1.4D	285	714	17.2 x 27.2	260/180	2000	MHT167
6655	4DB	10/8mm (round)	2000m	4000m	2.0D	450	1245	31.9	540/370	3000	MHT167
6593	7DB	10/8mm	2000m	4000m	2.2D	606	1782	37.8	640/430	4000	MHT167
60152	12DB	10/8mm	1000m	4000m	2.2D	946	1516	49.5	940/660	6000	MHT167
60360	1DB	12/10mm	2000m	4000m	MB5	205	508	19.1	280/200	1500	MHT167
60361	2DB	12/10mm	2000m	4000m	1.7D	331	899	19.1 x 31.1	280/200	2400	MHT167
60736	4DB	12/10mm (round)	2000m	4000m	2.2D	542	1654	36.8	630/500	4000	MHT167
60365	7DB	12/10mm	1000m	4000m	2.0D	726	1071	43.8	750/600	5500	MHT167

## Direct Install (DI)

The assembly is surrounded with a 125µm aluminium layer, bonded inside a sheath of flexible black PE for direct-in-duct installation. A rip cord is pre-installed along the entire length, under the sheath, to rip through the aluminium and sheath using correct procedure. Also available in 8/6mm.



Product Code	Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Bundle OD mm	Min Bend rad mm	Max Pull N	Generic Specification
6285	1DI	5/3.5mm	4000m	4000m	G	49	288	8.4	120	400	MHT175
6286	2DI	5/3.5mm	4000m	4000m	MB5	77	406	8.4 x 13.4	120	600	MHT175
6287	4DI	5/3.5mm	4000m	4000m	1.4D	118	616	15.5	200	700	MHT175
6438	7DI	5/3.5mm	4000m	4000m	1.7D	162	885	18.4	240	1500	MHT175
6870	12DI	5/3.5mm	4000m	4000m	2.0D	240	1305	23.8	310	1600	MHT175
6289	19DI	5/3.5mm	3000m	3000m	2.2D	329	1557	27.8	360	2500	MHT175
6701	24DI	5/3.5mm	2000m	4000m	2.0D	437	1219	33.4	500	4000	MHT175
8357	1DI	10/8mm	2000m	4000m	G	98	288	13.4	180	700	MHT888
6797	2DI	10/8mm	2000m	4000m	MB5	162	422	13.4x23.4	180	1000	MHT888
6709L	4DI	10/8mm	2000m	4000m	1.7D	262	761	27.5	370	1700	MHT888
6886	7DI	10/8mm	2000m	4000m	2.0D	368	1081	33.4	500	2500	MHT888
60744	1DI	12/10mm	2000m	4000m	MB5	108	314	15.3	200	750	MHT888
60745	2DI	12/10mm	2000m	4000m	1.4D	178	500	15.3x27.3	200	1400	MHT888
60746	4DI	12/10mm	2000m	4000m	2.0D	302	949	32.4	500	2300	MHT888
60478	7DI	12/10mm	2000m	4000m	2.35D	413	1377	39.4	600	3200	MHT888

## Aerial

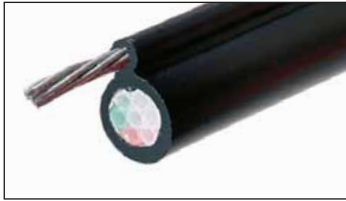


Figure-8 construction with steel strength member. All compatible fittings are available.

Emtelle recommends that the customer checks and ensures that the products are suitable to be installed on existing route. In particular, it is essential that the customer verifies that existing or proposed cable supports (towers or poles) are sufficiently robust and suitable to carry the required clamps and cable.

Product Code	Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Generic Specification
8194	Drop	5/3.5mm	1000m	4000m	700 ply	42	52	MHT1470C
60889	Drop	5/3.5mm	5000m	5000m	G	36	272	CP575
60789	Drop	6/2.7mm	4000m	4000m	E	26	142	CP963
61514	1F8	6/2.7mm + copper	2000m	4000m	E	36	110	CP1138
61515	1F8	6/2.7mm + copper + PIFU	2000m	4000m	E	37	112	CP1217
61165	1F8	10/8mm	2000m	4000m	1.7D	282	801	CP1203
60662	1F8	14/10mm	1000m	4000m	MB5	316	414	CP1019
60563	12F8	4/2.5mm + 1x12/8	2000m	4000m	2.0D	485	1315	CP968
61166	4F8	4/2.7mm	4000m	4000m	1.7D	257	1265	CP1077
60752	7F8	4/2.7mm	4000m	4000m	2.0D	317	1613	CP999
60753	12F8	4/2.7mm	3000m	3000m	2.0D	383	1494	CP1001
60894	12F8	4/2.7mm + 1x12/10	2000m	4000m	2.0D	458	1261	CP980
60754	24F8	4/2.7mm + 1x8/6	2000m	4000m	2.2D	542	1654	CP981
60890	4F8	5/3.5mm	4000m	4000m	2.0D	313	1597	CP870
8195	7F8	5/3.5mm	4000m	4000m	2.2D	367	2038	MHT1411
60891	9F8	5/3.5mm + 1x10/8mm	2000m	4000m	2.0D	449	1243	CP1032
61167	10F8	5/3.5mm + 1x12/10mm	2000m	4000m	2.0D	456	1257	CP1136
60755	12F8	5/3.5mm	2000m	4000m	2.0D	453	1251	CP1030
60892	12F8	5/3.5mm + 1x10/8mm	2000m	4000m	2.0D	450	1245	CP1070
60757	17F8	5/3.5mm + 1x10/8mm	1000m	4000m	1.7D	576	813	CP1033
60756	19F8	5/3.5mm	2000m	4000m	2.2D	549	1668	CP1031
60893	4F8	10/8mm	1000m	4000m	1.7D	486	723	CP915
61669	4F8	10/8mm	2000m	4000m	2.2D	486	1542	CP915
60758	7F8	10/8mm	1000m	4000m	2.0D	606	951	CP952
61170	4F8	12/10mm	1000m	4000m	1.7D	401	638	CP1175
60759	7F8	12/10mm	1000m	4000m	2.0D	676	1021	CP1069

### Aerial Metal Free / GRP



Specialist products with GRP are available. Please contact your local Emtelle representative for further information.

Product Code	Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Generic Specification
61834	Universal Drop Tube	7/3.7mm	1000m	4000m	HH	31	178	CP1370
61171	1F8MF	8/5mm	1000m	4000m	G	199	291	CP1099
61172	1F8MF	14/10mm	1000m	4000m	1.4D	202	346	CP1204
61173	4F8MF	5/3.5mm	2000m	4000m	1.4D	237	618	CP902
61174	7F8MF	5/3.5mm	2000m	4000m	1.7D	303	843	CP1124
61175	9F8MF	5/3.5mm + 1x10/8mm	2000m	4000m	2.0D	372	1089	CP910
61176	12F8MF	5/3.5mm + 1x10/8mm	1000m	4000m	1.7D	367	604	CP1125
61177	4F8MF	10/8mm	1000m	4000m	1.7D	423	660	CP1129
61178	2F8MF	12/10mm + 8x5/3.5mm	2000m	4000m	2.2D	451	1472	CP967

## Low Fire Hazard (LFH)

Assembly of LFH microducts, each with low friction performance and suitable for fibre blowing. Each assembly is surrounded with a sheath of LFH material suitable for indoor fire regulation use and giving excellent performance in fire scenario, meeting IEC 60332-3 and 60332-1.

Other LFH sizes may be available, please contact your local Emtele representative for further information.

- Low flammability
- Halogen free
- Low smoke



Product Code	Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Bundle OD mm	Min Bend rad mm	Max Pull N	Generic Specification
62401	1LFH	4/2.5mm	4000m	4000m	HH	40.5	216	6.2	80	130	MHT2617
62402	2LFH	4/2.5mm	4000m	4000m	F	65	332	6.2/10.2	130	200	MHT2617
62403	4LFH	4/2.5mm	4000m	4000m	1.2D	104	514	11.9	150	330	MHT2617
62404	7LFH	4/2.5mm	4000m	4000m	1.4D	151	748	14.2	190	500	MHT2617
62405	12LFH	4/2.5mm	4000m	4000m	1.7D	244	1213	18.7	250	850	MHT2617
62406	19LFH	4/2.5mm	4000m	4000m	2.0D	344	1721	22.0	350	1200	MHT2617
62407	24LFH	4/2.5mm	4000m	4000m	2.2D	461	2414	26.6	400	1600	MHT2617
6318	Primary	5/3.5mm	500m	4000m	350 ply	15.5	13	-	50	60	MHT423
6634	Primary	5/3.5mm	1000m	4000m	450 ply	15.5	21	-	50	60	MHT423
6595	Primary	5/3.5mm	4000m	4000m	HH	15.5	116	-	50	60	MHT423
6772	1LFH	5/3.5mm	1000m	4000m	700 ply	48	58	7.2	100	150	MHT423
6403S	2LFH	5/3.5mm	500m	4000m	600 ply	80	48	7.2/12.2	150	250	MHT423
6502	2LFH	5/3.5mm	1000m	4000m	700 ply	80	90	7.2/12.2	150	250	MHT423
6403	2LFH	5/3.5mm	4000m	4000m	G	80	412	7.2/12.2	150	250	MHT423
6511	4LFH	5/3.5mm	500m	4000m	E	126	101	12.2/14.3	150	400	MHT423
6643	4LFH	5/3.5mm	1000m	4000m	F	126	198	12.2/14.3	150	400	MHT423
6404	4LFH	5/3.5mm	4000m	4000m	1.4D	126	648	12.2/14.3	150	400	MHT423
6515	7LFH	5/3.5mm	500m	4000m	E	190	133	17.2	220	600	MHT423
6610	7LFH	5/3.5mm	1000m	4000m	G	190	282	17.2	220	600	MHT423
6405	7LFH	5/3.5mm	4000m	4000m	1.7D	190	997	17.2	220	600	MHT423
6533S	12LFH	5/3.5mm	500m	4000m	F	310	227	22.9	300	950	MHT423
6533	12LFH	5/3.5mm	1000m	4000m	MB5	310	408	22.9	300	950	MHT423
6533A	12LFH	5/3.5mm	4000m	4000m	2.0D	310	1585	22.9	300	950	MHT423
6611S	19LFH	5/3.5mm	500m	4000m	G	438	311	26.9	350	1300	MHT423
6611	19LFH	5/3.5mm	1000m	4000m	1.4D	438	582	26.9	350	1300	MHT423
6611A	19LFH	5/3.5mm	4000m	4000m	2.2D	438	2322	26.9	350	1300	MHT423
6513	24LFH	5/3.5mm	500m	4000m	MB5	591	394	32.5	500	1800	MHT423
6612	24LFH	5/3.5mm	1000m	4000m	1.7D	591	828	32.5	500	1800	MHT423
6612L	24LFH	5/3.5mm	2000m	2000m	2.0D	591	1527	32.5	500	1800	MHT423
61486	Primary	7/4mm	1000m	4000m	PIFU	39	82	7	70	110	CP820
61487	Primary	7/4mm	2000m	4000m	HH	39	132	7	70	110	CP820
61488	1LFH	7/4mm	2000m	4000m	F	84	240	9.2	120	240	CP821
61371	2LFH	7/4mm	2000m	4000m	G	148	388	9.2 x 16.2	120	350	CP1229
61372	4LFH	7/4mm	2000m	4000m	MB5	266	630	19.5	300	700	CP1230
61933	7LFH	7/4mm	2000m	4000m	1.7D	407	1051	21	325	1200	CP1524
61489	12LFH	7/4mm	2000m	4000m	2.0D	665	1675	30.9	475	1400	CP1411
61373	19LFH	7/4mm	1000m	4000m	1.7D	960	1197	36.5	550	2400	CP1231
61490	24LFH	7/4mm	1000m	4000m	2.0D	1371	1716	44.9	700	3000	CP1412
60008	1LFH	14/10mm	500m	4000m	HH	115	112	14.0	160	350	CP772
61156	1LFH	14/10mm	1000m	4000m	HH	115	169	14.0	160	350	CP772
61157	2LFH	14/10mm	1000m	4000m	MB5	377	475	30.5 x 16.5	250	1000	CP1112
61158	3LFH	14/10mm	1000m	4000m	1.4D	518	662	32.7	480	1500	CP897
61159	4LFH	14/10mm	1000m	4000m	1.7D	658	895	34.2	500	1750	CP1079
61160	6LFH	14/10mm	1000m	4000m	2.0D	964	1309	41.4	650	2500	CP1199
61161	7LFH	14/10mm	1000m	4000m	2.0D	1079	1424	44.7	650	3000	CP 898

## Special Products

In North America specific statutory requirements exist for the provision of optical fibre cabling, including microduct systems, within public buildings.

In the USA the National Electric Code (NEC) mandates the use of Optical Fiber Riser products in risers, in the case of microducts these are non metallic products. Emtelle riser products are therefore rated OFNR (Optical Fiber Non-metallic Riser) for use in the USA. Similarly for use in plenum space areas in the USA OFNP (Optical Fibre Non-metallic Plenum) products must be used. The tests used to prove these performance levels are UL 1666 (Riser) and NFPA 262 (Plenum). (UL File No. E254671)

In Canada a similar distinction between riser and plenum applications is recognised. However the certification of products accepted for use in Canada goes via the Canadian Standards Association (CSA). In the case of Canadian riser products the performance level is FT4 and in the case of Canadian plenum products the rating is FT6. (CSA Certificate No. 2320407)

### Plenum Rated



Plenum rated tube bundles when used with Emtelle 2, 4, 8 (standard) and 12 (plenum version) fibre unit. The microducts have an outstanding resistance to ignition and heat and are made to accommodate lightweight fibre units. Contact your local Emtelle representative for further details.

Refer to Fibre Product Section (page 10-11) for details of plenum fibre.

### Riser Rated



Riser rated tube bundles when used with Emtelle 2,4,12 fibre unit, OFNR (tested in accordance with UL 1666). A special combination of tube material and sheath material is used to achieve this rating.

Description	Microduct Size	Supply Length	Minimum Order Quantity	Product weight g/m	Generic Specification	UL Listing (USA) Product Code	CSA Listing (Canada) Product Code
1LFH Riser	5/3.5mm	4000m	4000m	45	MHT2158	60384	
2LFH Riser	5/3.5mm	4000m	4000m	80	MHT2158	60747	60798
4LFH Riser	5/3.5mm	4000m	4000m	144	MHT2158	60385	
7LFH Riser	5/3.5mm	4000m	4000m	190	MHT2158	60386	60799
12LFH Riser	5/3.5mm	4000m	4000m	310	MHT2158	60748	60800
19LFH Riser	5/3.5mm	4000m	4000m	438	MHT2158	60749	
24LFH Riser	5/3.5mm	2000m	4000m	591	MHT2158	60750	

## Special Products

Emtelle can produce many different solutions depending on the customer's specifications. Some examples of special tube bundle include:-

### Mining Applications

Description	Microduct size	Bundle Od mm	Product weight g/m	Specification	Product Code
7DBSA	5/3.5mm	22.8mm	392	MHT1781	8240
7DBSA-LF	5/3.5mm	26mm	607	CP678	61201
4F8 hybrid with copper cable	5/3.5mm	15.5mm(w) x 28.5mm(h)	358	CP1159	61202



### Direct Bury Termite Resistant (DBT)

Microducts are oversheathed with a layer of nylon12, which gives mechanical and chemical protection against attack by termites and ants (and their formic acid).



Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight g/m	Total weight kg	Generic Specification	Product Code
1DBT	5/3.5mm	4000m	4000m	1.4D	136	688	MHT1774	6629
2DBT	5/3.5mm	4000m	4000m	1.4D	164	800	MHT1774	6571
4DBT	5/3.5mm	4000m	4000m	2.0D	260	1385	MHT1774	6664
7DBT	5/3.5mm	4000m	4000m	2.0D	328	1657	MHT1774	6570
12DBT	5/3.5mm	3000m	3000m	2.2D	475	1995	MHT1774	8231
19DBT	5/3.5mm	2000m	4000m	2.2D	599	1768	MHT1774	6954
24DBT	5/3.5mm	2000m	4000m	2.2D	730	2030	MHT1774	8232

### Direct Bury Rodent Proof (corrugated steel tape)

Assembly of 7 PE microducts surrounded with a polymer filling layer, a protective layer of corrugated steel (very effective against rodents) and a heavy duty PE outer sheath.

DBR metal free rodent resistant products are available, please contact your local Emtelle representative for further information.

Description	Microduct	Bundle Od mm	Product weight g/m	Specification	Product Code
7DBSA	5/3.5mm	22.8mm	392	MHT1781	8240

### LFH Rodent Proof (corrugated steel tape)

Assembly of 7LFH microducts surrounded by a sheath of LFH, a protective layer of corrugated steel (very effective against rodents) then a secondary LFH sheath.

Description	Microduct size	Bundle Od mm	Product weight g/m	Specification	Product Code
7LFSA	5/3.5mm	23mm	470	MHT1738	8483



Other products may be available, please contact your local Emtelle representative for further information.

## Special Products

### LFH 'pinnable'

LFH microducts surrounded by a profile extrusion in LFH providing a web to allow the product to be pinned or clipped to a wall.



Description	Microduct Size	Bundle Od mm	Product weight g/m	Specification	Product Code
1LFH pinnable	3/2.1mm	6.0x10.0	56.5	CP1239	61872
4LFH pinnable	3/2.1mm	6.0x22.5	118	CP1330	61873

### PE-LF



Emtelle have developed a range of microducts which have an LFH sheath applied over conventional PE microducts (PE-LF) and which offer enhanced fire performance compared with all-PE products. For indoor installations where only moderate LFH performance is required, and where local fire regulations reflect this, then the FibreFlow™ PE-LF microduct range (MHT1757 and MHT2618) may be the solution. These bundles are designed to pass the IEC 60332-1 vertical flame spread test, similar to VW-1. Please contact your local Emtelle representative for further information.

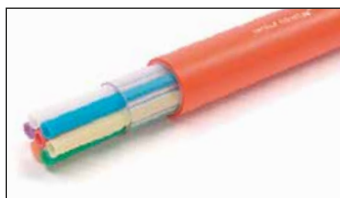
### PE-LF 'pinnable'



PE microducts surrounded by a profile extrusion in LFH providing a web to allow the product to be pinned or clipped to a wall.

Description	Microduct Size	Bundle Od mm	Product weight g/m	Specification	Product Code
4PE-LF pinnable	3/2.1mm	5.4x25.4	110	CP1485	61874
7PE-LF pinnable	3/2.1mm	8.7x14.2	190	CP1418	61875

### Direct Bury filled metal free (DBfmf)



Emtelle was the first to introduce a Metal Free range of Tube Bundles using a filling polymer between the outer sheath and the microducts providing even compression resistance and improved roundness and concentricity of the individual microducts.

Main benefits of the DB(fm) products;

- Roundness of the Tube Bundle is secured
- Protection against; Kinking and Crush,
- Better handling characteristics in the field once HDPE sheath is removed

Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Generic Specification	Product Code
3DBfmf	10/8mm	2000m	4000m	1.7D	483	1203	MHT1844	8224
4DBfmf	10/8mm	2000m	4000m	2.0D	543	1431	MHT1844	8225
5DBfmf	10/8mm	2000m	4000m	2.0D	619	1583	MHT1844	8226
7DBfmf	10/8mm	2000m	4000m	2.2D	699	1968	MHT1844	8227
3DBfmf	12/10mm	2000m	4000m	2.0D	611	1567	MHT1844	60025
4DBfmf	12/10mm	2000m	4000m	2.2D	684	1938	MHT1844	60026
5DBfmf	12/10mm	2000m	4000m	2.35D	751	2053	MHT1844	60027
7DBfmf	12/10mm	1000m	4000m	2.0D	876	1221	MHT1844	60028



## Special Products

### Mole Plough Installation

Emtelle have provided these products to many Rural and Community Broadband Projects.

DBmf	Sub-duct
4 x 12/10mm	25/17mm
7 x 12/10mm	1 x 25/20 and 2 x 14/10mm
	2 x 25/20
	32/20mm



### Horizontal Direct Drill (HDD)

Products for HDD installation are available. Please contact your local Emtelle representative for further information.

### FibreFlow™ VerTex

The Emtelle VerTex product range of FibreFlow™ Tube Bundles have been designed for installation into Microtrench and Slot Cut Installations. These products are narrow to enable the trench width to be narrow, which increases Trenching speed and therefore reduces trenching costs. Emtelle have been supplying Blown Fibre products for Microtrenching for over 10 years. Emtelle also supply accessories for Microtrenching such as narrow Marker Tapes, Direct Buried Connectors and have Tube Bundles which can accommodate Fibre Cables from 2 fibres up to 288 fibres for Microtrench applications.



Product Code	Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Bundle OD mm	Min Bend rad mm	Max Pull N	Generic Specification
62342	3DBmf combo	14/11mm	1400m	4200m	1.4D	234	472	24.9	270	1700	CP1831
62343	3DBmf	14/10mm	1400m	4200m	1.4 D	326	601	44.2 x 16.2	240	2500	CP2001
62344	3DBmf combo	16/10mm	1000m	4000m	1.4D	378	522	45.6 x 17.6	270	2700	CP1832
62228	4DBmf	14/11mm	1400m	4200m	2.0D	364	706	58.2 x 16.2	240	2700	CP1971
61843	4DBmf	14/10mm	1400m	4200m	1.7D	410	708	62.0 x 16.0	240	2700	CP1573
62215	6DBmf	12/8.5mm	2000m	4000m	2.0D	515	1226	80.0 x 14.2	200	3000	CP1967
62345	6DBmf	14/10mm	1400m	4200m	2.0D	643	1246	90.0 x 16.2	240	3000	CP1909
62227	12DBmf	6/3mm	4000m	4000m	2.2D	323	1532	38.2 x 17.0	190	2200	CP1970
62346	16DBmf	7/3.5mm	2000m	4000m	2.0D	626	1597	67.0 x 16.2	250	3000	CP2015

## Special Products

### Direct Install metal free (DImf)

It is essential that users of this product securely anchor the sheath and contents of the tube bundle to a fixed point (eg manhole side or duct mouth ) wherever the product emerges from a duct section. These duct sections should not be longer than 500m. Refer to specification MHT1772.



A simple sheathed bundle incorporating no metal, suitable for pulling into duct using moderate force. When using Emtelle Direct Install Metal Free Products adequate provision must be made to take account of all strain which may be caused by installation forces, practices and procedures, thermal changes, heat reversion or any other reasonably foreseeable force applied to the product.

Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Generic Specification	Product Code
1DImf	5/3.5mm	4000m	4000m	G	47	280	MHT1772	8321T
2DImf	5/3.5mm	4000m	4000m	MB5	71	382	MHT1772	8374T
4DImf	5/3.5mm	4000m	4000m	1.4D	109	580	MHT1772	8353T
7DImf	5/3.5mm	4000m	4000m	1.7D	151	841	MHT1772	8008LT
12DImf	5/3.5mm	4000m	4000m	2.0D	224	1241	MHT1772	8375T
19DImf	5/3.5mm	4000m	4000m	2.35D	310	1791	MHT1772	8367T
24DImf	5/3.5mm	2000m	4000m	2.0D	410	1165	MHT1772	60782

### Fibred Microducts and Ducts



Both traditional fibre optic and fibre mini-cables are available as a pre-installed product. Lengths of up to 4-10km are available dependent on the cable type and materials. Emtelle can produce various combinations of a single fibre cable in HDPE duct. This cable can be removed at a later date and upgraded as required. This configuration particularly favours fairly long-distance fibre-to-the-home (or building or MDU) deployment where neither the duct nor fibre cable are previously in place, and future installations or extensions may be called for. These product combinations are designed for direct burial in suitably prepared ground.

#### Common typical features

- Loose tube metal free constructions
- Water blocked using gel filled tubes and dry water swellable elements
- Central strength element
- Storage and operating temperature: -30°C to +65°C

#### Specifications (all types)

- Available fibre types: Singlemode ITU-T G.652d, ITU-T G.655, ITU-T G.657A1, Multimode A1 (IEC 60793-2-10)
- Fibre and tube colours: normally EIA 598 or EN187105
- Cable tested to IEC 60794

Cable Type	Cable Diameter	Micro Trenching	Mole Ploughing	Overhead	
		HDPE Duct Size (OD)/ (ID)	HDPE Duct Size (OD)	HDPE Duct Size (OD) (Plus web)	
Fibre Bundle	2 Fibre Bundle	1.1mm	8/3.5mm	16/10mm	6/2.7mm
	4 Fibre Bundle	1.1mm	8/3.5mm	16/10mm	6/2.7mm
	6 Fibre Bundle	1.3mm	8/3.5mm	16/10mm	6/2.7mm
	8 Fibre Bundle	1.5mm	8/3.5mm	16/10mm	7/3.7mm
	12 Fibre Bundle	1.6mm	8/3.5mm	16/10mm	7/3.7mm
Micro Cable	24 Fibre Micro Cable	2.8mm	10/6mm	25/17mm	8/5mm
	24 - 72 Fibre Mini Cable	6.0mm	16/10mm	25/17mm	10/8mm
Mini Cable	96 Fibre Mini Cable	7.2mm	20/16mm	25/17mm	16/12mm
	144 Fibre Mini Cable (24 Fibres / Tube)	7.9mm	20/16mm	25/17mm	16/12mm
	144 Fibre Mini Cable (12 Fibres / Tube)	9.2mm	20/16mm	25/17mm	18/14mm
	288 Fibre Mini Cable (12 Fibres / Tube)	10.5mm	20/16mm	32/20mm	20/16mm

Cable Type	Cable Diameter	Micro Trenching	Mole Ploughing	Overhead	
		HDPE Duct Size (OD)/ (ID)	HDPE Duct Size (OD)	HDPE Duct Size (OD) (Plus web)	
Conventional Fibre Cable	12 Fibre Cable	10-12mm	31/25mm	31/25mm	25/20mm
	24 Fibre Cable	10-12mm	31/25mm	31/25mm	25/20mm
	36 Fibre Cable	10-12mm	31/25mm	31/25mm	25/20mm
	48 Fibre Cable	10-12mm	31/25mm	31/25mm	25/20mm
	60 Fibre Cable	10-12mm	31/25mm	31/25mm	25/20mm
	72 Fibre Cable	10-12mm	31/25mm	31/25mm	25/20mm
	96 Fibre Cable	10-12mm	31/25mm	31/25mm	25/20mm
	128 Fibre Cable	12-14mm	31/25mm	31/25mm	25/20mm
	144 Fibre Cable	12-14mm	31/25mm	31/25mm	25/20mm
	288 Fibre Cable	14-16mm	37/31mm	37/31mm	32/26mm
	20 pair 0.9 Copper	NA	50/42mm	50/42mm	N/A
	50 pair 0.9 Copper	NA	50/42mm	50/42mm	N/A
	100 pair 0.6 Copper	NA	50/42mm	50/42mm	N/A
	100 pair 0.9 Copper	NA	63/50mm	63/50mm	N/A

Ducts can be strengthened if required. Some large ploughs require larger sub-duct sizes. Other products are available. For further information on pre-cabled duct please contact your local Emtelle representative.

## Special Products

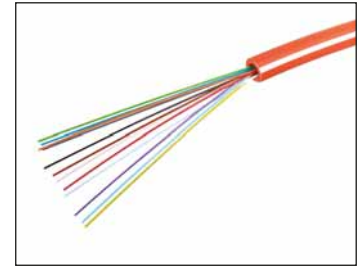
### RTRYVA

The Emtelle **RTRYVA** product range is available for installation in Direct Buried applications and for Indoor applications.

These products are small and lightweight and can be supplied with 12 or 24 fibre tubes within the duct. Each fibre tube can have 2 or 4 fibres (Various fibre types are available.)

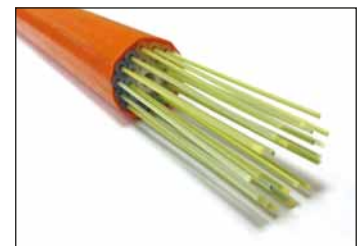
The **RTRYVA** products can be window cut at the customer drop location, a fibre tube retracted, then pushed / pulled into an Emtelle drop tube, to the customer's premises.

Please contact your Emtelle sales representative for more information.



### MULTIFU

Assembly of PE microducts each containing a fibre unit. The assembly (bundle) is surrounded by an outer sheath that is suitable for direct burial in suitably prepared ground. This product reduces the need to use specialist blowing equipment when connecting customers. **MULTIFU** products can be partially or fully populated depending on customer uptake.



Product Code	Description	Microduct Size	Supply Length	Minimum Order Quantity	Drum Type	Product weight per metre gms	Total weight kg	Bundle OD mm	Min Bend rad mm	Max Pull N	Generic Specification
61495	12DBmf mPIFU 2FU G657A1	4/2.1mm	500	4000	1.4D	151	220	18.2	350	500	CP1531
61613	12DBmf mPIFU 2FU G657A2	4/2.1mm	500	4000	1.4D	151	220	18.2	350	500	CP1531
62277	12DBmf mPIFU 4FU G657A1	4/2.1mm	800	4000	1.4D	151	265	18.2	350	500	CP1531
61496	24DBmf mPIFU 2FU G657A1	4/2.1mm	500	4000	1.4D	323	306	26.0	400	500	CP1532
61614	24DBmf mPIFU 2FU G657A2	4/2.1mm	500	4000	1.4D	323	306	26.0	400	500	CP1532
62276	24DBmf mPIFU 4FU G657A1	4/2.1mm	800	4000	1.7D	323	496	26.0	400	500	CP1532

## Storage and Handling

### 1. FibreFlow™ TUBE BUNDLES – TEMPERATURE & STORAGE

The tube bundles and packaging materials are resistant to a wide temperature range. Packaging materials are provided to protect products prior to installation. Emtelle stipulate that the packaging supplied should remain in place until the product is installed. If packaging needs to be replaced, please contact Emtelle for details of suitable materials for re-packaging.

Prolonged storage outdoors may reduce the performance of the tube bundles.

If the client requires products to be stored for periods of over 3 months prior to installation, it is a requirement that they inform Emtelle so that product and packaging specifications can be amended to suit.

### 2. TUBE ASSEMBLY STORAGE AND HANDLING / INSTALLATION

Poly Ethylene (PE) products, e.g. Direct Install (DI), Direct Bury (DB), Direct Bury Reinforced (DBR) are best stored between -40°C and +60°C (Product temperature, not air temperature), and handled between -20°C and +40°C. If stored outdoors, we recommend they are stored out of direct sunlight, and installed within 3 months of delivery. In some countries storage in direct sunlight, can cause the temperature of the products to increase to over +60°C. This will invalidate the product warranty.

Individual Microducts, both Poly Ethylene (PE) and Low Fire Hazard (LFH) should be stored indoors. These products are wrapped in black film and bubble wrap after manufacture. This protective packaging should remain in place until installation.

Individual microducts should not be exposed to direct sunlight.

LFH products can be stored between -20°C and +60°C and handled for installation between 0°C and +40°C. Handling/installation outside this temperature range can result in tube softening, distorting and possibly cracking. Please note that the maximum air pressure used when fibre bundle blowing in LFH products is 10 bar / 150psi with a maximum tube temperature of +40°C.

### 3. TEMPERATURE VARIATION:

As stated above, Emtelle tube bundles can be stored in a temperature window of -40°C and +60°C. Though the tube bundles can accommodate these temperatures, however in some countries the product temperature between day time and night time can vary by 40°C or more. In these circumstances, the outer coils of the tube bundle on the drum will experience high levels of thermal expansion and contraction. This extreme temperature cycling can cause product failure or deterioration in performance. If this type of temperature cycling cannot be avoided then Emtelle should be informed so that they can provide advice and options for safe storage of the product.

### 4. TUBE ASSEMBLIES IN OPERATION

Once the tubing assemblies are in their fixed operational location, they can be subject to the 'storage' temperatures quoted above, provided that there is no significant continuous flexing of the tube assemblies. Most installations are laid in underground ducts and so see minimal variation in position or temperature. Minimum temperatures of -40°C are permissible after installation.

Assemblies located in outdoor (e.g. overhead) routes will experience temperature cycling and expand and contract with the weather and there will be considerable continuous flexing of the tube assemblies. Consult Emtelle for advice on the correct product to use in this situation. Products intended for underground installation e.g. direct burial or direct install products which are installed above ground, (i.e., up walls) should be covered with a suitable UV protective material to eliminate the risk of UV degradation.

### 5. HANDLING PRODUCT AND OFF-LOADING

Our products are loaded into containers using Rhino horns or forklifts with extendable arms.

A normal forklift or tractor with attachments can be used if care is taken. Please carry out risk assessments and ensure you have effective lifting equipment ready for the unloading of trucks or containers. (as shown below)



Please note the following when offloading:

- Do not off-load near overhead power lines.
- Ensure a safe location for off-loading – flat, firm, level ground, free from obstacles and obstructions.
- Only authorised personnel should be in the vicinity during off-loading operations.
- It is the responsibility of the driver of the off-loading vehicle to ensure all personnel are kept at a safe distance whilst off-loading.
- Pallets, drums or loose lengths should not be dropped or thrown from the vehicle.
- Duct in coil form contains a great deal of stored energy and should be handled with care. Particular care should also be taken to avoid any damage to the restraining straps.
- In wet and frosty conditions duct and drums can become very slippery; therefore care is required when operating in these conditions.
- There must be provision made when storing products externally that they are adequately handled with the use of forklifts and drum handling equipment. All drums should be secured in position using adequate fixings. Drums should be stacked no more than 3 metres high.
- Tube bundles which are being batched down at the customer's premises should be rewound using a power pay-off. All free ends of tube bundles should be sealed using heat shrink end caps. These are available from Emtelle if required.

While every care is taken during loading, Emtelle cannot accept responsibility for the security of the load once it leaves our site. Drivers must secure their loads before leaving the factory, as under the terms of the Road Haulage Association they are responsible for the security of the load.

The drums must be stored on a level, hard surface above flood level and must be secured with chocks to prevent the drums from rolling away. Avoid contact with sharp rocks. Do not lay the drums flat, the drums must be stored as pictured below.



### 6. UNSPOOLING THE TUBE BUNDLES

The tubes and tube bundles supplied by Emtelle are supplied in coils or on drums. When uncoiling the products, the drums should be slowed to freely rotate (preferably using a drum trailer as shown below), so the products is unwound without any excess coiling. Never lay the drum or coil on its side and pull the tube bundles 'off the top', as this will induce a corkscrew twist (as shown in the photographs below), possible distortion and cause problems during installation and blowing.

Tube bundles should not be uncoiled off the top of the drum (as shown below)



The best practice is to install drums onto drum trailers as pictured:

# FibreFlow™ ACCESSORIES

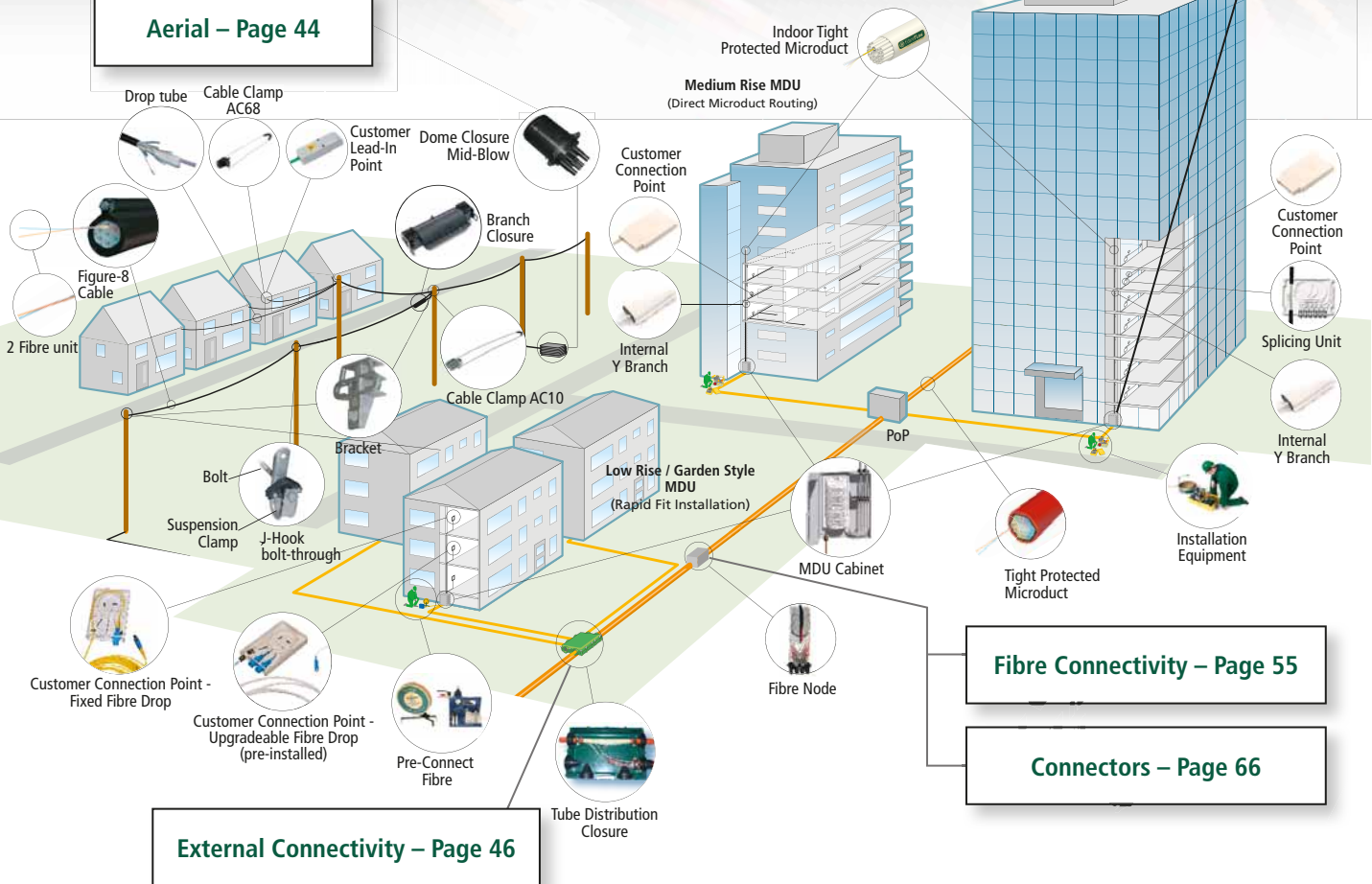
**Aerial – Page 44**

**Internal Connectivity – Page 53**

**External Connectivity – Page 46**

**Fibre Connectivity – Page 55**

**Connectors – Page 66**



Air Blown Fibre  
 FibreFlow - FttX  
 FibreFlow - Customers  
 Fibre Products  
 Sub-Duct  
 Tube Bundle  
 Accessories  
 Installation Equipment  
 Tools  
 Training  
 Terms & Conditions  
 Index

# Aerial

## Aerial Branch Closure



**Product Code 9257**

The aerial branch closure is designed for use on either lashed or self-supporting Aerial product of up to 26mm in diameter.

**Features and Benefits**

- provides a free breathing continuous Aerial Distribution Point
- for use with lashed or self-supporting aerial cable
- maximum diameter of aerial cable -26mm
- spur cable outlet - maximum diameter - 15mm
- housing - a one-piece polypropylene moulding
- all loose parts (except spur cable clamp) are captive
- main cable glands are pre-packed with mastic (additional mastic provided for final packing)
- closed cell foamed PVC seals on re-enterable cover
- drain holes provided to allow the escape of any water that may accumulate within the closure
- ample space provided to allow the use of industry standard waterproof connectors
- IP42 rated

**Dimensions**

60mm D x 351mm W x 135mm H

**Installation Instructions**

Refer to Aerial Installation Training Manual

## Aerial Manifold Closure (6-4mm)



**Product Code 70868**

A closure for connecting aerial drop microduct to DI/DB microduct bundles. Note that the aerial drop size is 6mm and the individual DI/DB microducts are 4mm OD.

## Plug Removal Tool



**Product Code 71095**

Developed to assist the removal of 6mm plugs from the Manifold Closure.

## Wrap-around Closure



A wrap around gel filled splice closure suitable for use in a FibreFlow™ Aerial application. The closure materials are UV-protected and are designed for deployment in positions open to the elements.

Product Code	Description
71132	50/20 - 250
70957	50/20 - 300
71531	50/20 - 350
71532	50/20 - 400

Air Blown Fibre, FibreFlow™ FTx, FibreFlow™ Customers, Fibre Products, Sub-Duct, Tube Bundle, Accessories, Installation Equipment, Tools, Training, Terms & Conditions, Index

## Aerial

### Pole Fittings and Tools

#### Universal Pole Bracket UPB Product Code 9246

A bracket suitable for anchoring cable clamps holding overhead fibre optic cables. Fits to poles of wood, or steel or concrete.

#### Cable Clamp AC68 140 Product Code 9249

A clamp suitable for anchoring circular drop tubes of 7mm outside diam (eg 5mm tube). Has tapered grip action using jaws that grip the insulation over the drop tube. Length of body: 55mm

#### Cable Clamp AC10 320 Product Code 9247

A clamp suitable for anchoring Fig-8 cables that have a steel strength member. Has tapered grip action using jaws that penetrate the insulation and grip the steel directly. Length of body: 80mm  
*Not for dielectric s.m.*

#### Cable Clamp AC35L 260 Product Code 9250

A clamp suitable for anchoring circular drop tube of 5mm outside diam (eg 3mm tube). Has tapered grip action using jaws that grip the insulation over the drop tube. Length of body: 108mm

#### Cable Clamp AC68L 260 Product Code 9248

A clamp suitable for anchoring short-span Fig-8 cables that have a GRP strength member. Has tapered grip action using jaws that grip the insulation over the GRP. Length of body: 110mm

#### Cable Clamp AC68L 500 Product Code 71980

A clamp suitable for anchoring Fig-8 cables that have a GRP strength member. Has tapered grip action using jaws that grip the insulation over the GRP. Length of body: 108mm

#### Cable Clamp AC810 500 Product Code 70470

A clamp suitable for anchoring long span Fig-8 cables that have a GRP strength member. Has tapered grip action using jaws that grip the insulation over the GRP. Length of body: 200mm

#### Twist Grip Product Code 71035

For 7mm drop tube

#### J-Hook for steel band: 'JR-SB' Product Code 9251

Cable support fixed to poletop using steel banding. Used to support overhead cable both during cable deployment, and through the cable lifetime

#### J-Hook, bolt-through: 'JR' Product Code 9354

Cable support fixed to poletop using through-bolt. Used to support overhead cable both during cable deployment, and through the cable lifetime

#### Suspension Clamp, 'ARC' Product Code 9252

A dielectric clamp to hold the upper portion of a Fig-8 cable in a J-Hook.  
 Order one J-hook for each ARC.

#### Bolt 16 x 300mm Product Code 9253

Bolt suitable for support brackets and J-hooks (Product Code 9251, 9354) during their lifetime.

#### Steel Banding, SB207 Product Code 9254

Steel banding suitable for supporting J-hooks and UPB (Product Code 9251, 9354, 9246) onto all pole types. Can be cut with snips. Uses buckles described below.

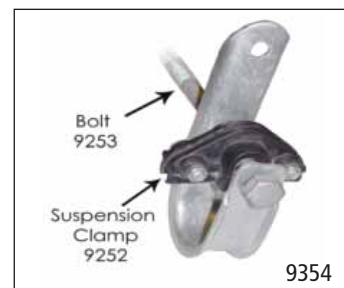
#### Buckles for banding BIB20 Product Code 9255

Buckles suitable for securing the steel banding to the pole. Can be secured with the tensioning tool described below.

#### Tensioning Tool, BTS Product Code 9256

Tool (screw-type) suitable for tensioning the steel band and securing with the appropriate buckles described above.

Metal free products are available. Contact your local Emtelle representative for further details.



## Tube Bundle Connectivity – External

CENELEC, the European Standards Organisation, recognises the requirement for both sealed and unsealed closures in blown fibre systems. In the case of sealed closures Emtelle provides these to Ingress Protection (IP) rating of IP68 as detailed in BS EN50411-2-9:2010. Unsealed closures are intended as mechanical covers for blown fibre systems which generally provide additional impact and crush protection. Unsealed closures do not contain exposed optical fibre, only microduct, and where the microduct is jointed this is performed with sealed microduct connectors. At the current time there is only a committee draft standard for unsealed blown fibre closures and the provisional IP rating of IP40 is proposed. Emtelle recognises this draft standard and rates its closures accordingly .

	Unsealed	Sealed
Degree of protection	Mechanical Cover Protection against impact and crush	Protection against impact, crush, full water immersion
Example applications	Tube joint closures	Splice closures and high specification tube joints
IEC 60529 rating	IP40	IP68

### Tube Distribution Closure (TDC)



### Tube Distribution Closure (TDC)

Emtelle’s Tube Distribution Closure (TDC) is a one-box solution that can be used in a variety of applications, including Fibre-to-the-Home, Business Parks, In-Building, Metropolitan Networks and Campus Builds. As part of the FibreFlow™ solution, the TDC can of course handle the majority of FibreFlow™ network designs.

#### Enhanced network flexibility

The TDC has been especially designed as a multi-purpose closure to cover a variety of applications such as single tube connections to buildings, up to 38mm tube bundle connections and tube break-out in H, T and Y configurations. As well as being able to branch off single microducts, the TDC can also be used with different adaptors for 19 way, 12 way and 7 way 5mm tube bundles and 24 way 3mm tube bundles. In addition, we offer a 6-way grommet that allows up to six single DB microducts to be branched from a single port. The TDC can also be deployed as a repair closure if only a few tubes have been damaged.



6 way Grommet

#### Features and benefits

- accepts FibreFlow™ tube bundles and sub-ducts up to 38mm in diameter
- one-piece grommet and seal arrangement
- manifold option allows 6 x 1DB to be dropped off from 1 port
- captivated screws in lid portion allowing inverted installation
- can be re-entered
- can be retro-fitted to existing tube bundles / sub-ducts
- straight through H, T and Y configurations possible
- lightweight: 1.2kg
- IP 40 rated

#### Dimensions

316mm L x 220mm W x 70mm H

#### Installation Instructions

Refer to document UK II 7514.

#### Tube configurations for the TDC

Standard TDC (Product Code 7514)	<ul style="list-style-type: none"> <li>■ 19 way DB 5mm adaptor (Product Code 9113) Branch out</li> <li>■ 12 way DB 5mm adaptor (Product Code 9112) Branch out or straight joint</li> </ul>
24 way DB 5mm Branch out	<ul style="list-style-type: none"> <li>■ 7 way DB 5mm adaptor (Product Code 9111) Branch out or straight joint</li> <li>■ 24 way DB 3mm adaptor (Product Code 9115) Branch out or straight joint</li> </ul>
6 way Grommet (Product Code 7717)	Up to 6 x 1DB 3mm or 5mm branching (from port 3 or 4)



## Tube Bundle Connectivity – External

### Y-Branch

#### Product Code 7954 (3mm)      Product Code 9169 (5mm)

A compact, light-weight closure that Emtelle has developed for a range of applications including Fibre-to-the-Home.

The Y-Branch has been developed for blown fibre in a Direct Bury application. FibreFlow™ microducts of either 3mm or 5mm diameter are placed into the Y-Branch where they can be branched off into single microducts.

Depending on the tube diameter used, up to six microducts can emerge from each closure. The Y-Branch can be used at several locations in the networks and therefore creates greater network flexibility. Since all microducts emerge from the branch in the same direction, the closure has the added advantage of being able to be installed in narrower-than-normal trenches.

#### Dimensions

300mm L x 160mm W x 70mm H

#### Installation Instructions

Refer to document UK II 7954 and 9169

#### Features and Benefits

- unused 1 way drops are sealed using plugs (provided)
- can be re-entered
- can be retro-fitted to existing tube bundles
- IP40 rated
- Lightweight – 1.2kg
- new design enhancements provide significant time savings for installers.



#### Product Code 7954 (3mm)

- accepts 24 way 3mm DB FibreFlow™ tube bundles
- maximum 6 x 1DB 3mm can be dropped off

#### Product Code 9169 (5mm)

- accepts 24way 5mm DB FibreFlow™ tube bundles
- maximum 4 x 1DB 5mm can be dropped off

### H-Branch Closure

#### Product Code 72279

IP-68 rated H-Branch Type Closure suitable for 50mm OD Duct.

The closure is re-openable and re-enterable and is secured with hex-bolts to achieve the IP-68 rating.

Port reducers are available to seal around smaller OD ducts.



#### Accessories

A range of accessories are available, such as port reducers, port seals etc.

Product Code	Description	Quantity per Pack	
72279	Closure	Supplied each	
72281	PLUG A	4 per set	
72282	PLUG B	10 per Bag	
72283	PLUG C	10 per Bag	

Product Code	Description	Quantity per Pack	
72284	PLUG D	10 per Bag	
72285	PLUG E 6-WAY Grommet	10 per Bag	
72286	PLUG F Blanking Plug	10 per Bag	

## Tube Bundle Connectivity – External

### CL01 - In-line Branch Closure



**Product Code 9501 (incl 6 way grommet)**

A direct buried closure for use in a fibreflow solution.

**Features and Benefits**

- 4 ports: 2 at each end
- suitable for fibre unit and minicable installations
- IP68 rated

**Specifications**

Dimensions: 405mm L x 155mm W x 125mm H. Port capacity: 40mm

**Installation Instructions**

Refer to document UK II 9500

### Elongated closure, 4-way



A closure consisting of two halves which can be easily aligned and assembled together and manually tightened. The clamping nuts are of a splittable type and shall have sufficient strength to guarantee long term performance and repeated assembly. The closure can be assembled and disassembled without the use of tools. IP 40 rated

Product code	Port Dimensions (mm)
20 0170 032	32/32/32/32
20 0170 036	40/40/2 x 16/2 x 16
20 0170 039	40/40/32/32
20 0170 040	40/40/40/40
20 0170 050	50/50/50/50

### Elongated Closure, 2-way 50mm Straight In-Line



**Product Code 9027**

A direct bury or direct installation straight through joint that has sealing capability for 50mm product. Various port adaptors are available to convert the 50mm port to a smaller size. There is also an outlet available that allows up to two microducts to be brought out from the closure. IP 40 rated

## Tube Bundle Connectivity – External

### 50mm In-Line Closure – Outlets

#### Product Code 9045

The output port of the 2 x 12mm outlet fits into the knock-out located on the top of the 50mm in line closure, product code 9027.



#### Product Code 9049

The Clamp outlet is an addition to the 50mm in-line closure (product code 9027) that allows a 40mm product to exit from the closure, when used in conjunction with a port reducer there is the possibility of having 2 x 1DB 10mm exiting from the one port (a plug is supplied with the reducer if only 1 x 1DB 10mm is being used). The clamp outlet fits into one of the knock-out sections contained within the top of the in-line closure.



### 50mm In-Line Closure - Port Reducers

The Port Reducer has the necessary sealing arrangement to protect the inner cavity against significant ingress of mud, sand and debris. The connector can be assembled and disassembled without the use of tools. There are a range of sizes available to convert the port size of the 50mm in-line closure to a smaller size.

Product Code	Description	Minimum order quantity
9046	50/40mm Port Reducer	1 bag of 10
9047	50/32mm Port Reducer	1 bag of 10



### 50mm In-Line Closure - 40/2x16mm Port Reducer

#### Product Code 9048

The Port Reducer has the necessary sealing arrangement to protect the inner cavity against significant ingress of mud, sand and debris. The connector can be assembled and disassembled without the use of tools. There are a range of sizes available to convert the port size of the 50mm in-line closure to a smaller size. Product code 9048 is used in conjunction with 40mm outlet (product code 9049).



## Tube Bundle Connectivity – External

### Split Connector



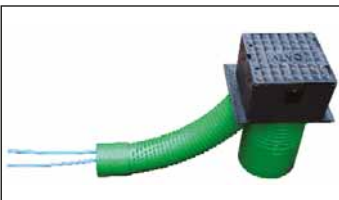
The split connector is used for repairing damaged ducts.

Product code	Item name
073800 132	32 mm split connector
073800 140	40 mm split connector
073800 150	50 mm split connector
073810 132	32 mm half ducts – 2 metres (set)
073810 140	40 mm half ducts – 2 metres (set)
073810 150	50 mm half ducts – 2 metres (set)
19998 175	110 mm lead-in bushing w/ foam rubber for micro-ducts



### Boundary Box

Product Code	Description	Minimum order Quantity (Pack)
4531	D-shaped Swivel Boundary Box	50
4604	Square SID Boundary Box 130mm x 140mm x 75mm	50
4579	Triangular Boundary Box	50
71133	Square Boundary Box 115mm x 115mm x 75mm	50



Square Boundary Box (71133) with Swept Tee (1552) to manage the bend radius of incoming tube and store excess before connection.

## Tube Bundle Connectivity – External

### Rapid Repair Kit

A repair kit comprising a central body and heat shrink sleeving designed to provide protection where FibreFlow™ Tube Bundles have to be joined.

#### Features and Benefits

- accepts FibreFlow™ Direct Burial (DB) tube bundle
- easily applied
- metal-free

#### Installation Instructions

Refer to document UK II 9076



Product code	Central body ID/OD	Number of heat shrink sleeves	Heat shrink sleeve range before/after heating	Max number of repair joints from one kit	Typical FibreFlow™ Tube Bundle
9076	25/20mm	6 pairs	32mm/8mm	6	1 way or 2 way
9077	32/26mm	6 pairs	40mm/13mm	6	2 way or 4 way
9078	40/32mm	4 pairs	50mm/16mm	4	7 way
9079	50/40mm	4 pairs	69.9mm/25.4mm	4	12 way

### 1 Way DB Repair Joint

The FibreFlow™ 1 way DB (repair) Joint has been designed to provide protection where Emtelle's FibreFlow™ Direct Buried microduct has to be joined. This would be necessary where a repair is required or where an installer has previously taken a tube out of a closure and now requires to extend the tubing to a customer's premises.

Product Code	Description
7787A	When using a 3mm x 2.1mm microduct
7787B	When using a 5mm x 2.1mm microduct
7787C	When using a 5mm x 3.5mm microduct
7787D	When using an 8mm x 6.0mm microduct
7787E	When using a 10mm x 8.0mm microduct



### 1DB Joint

#### Product Code 9604

A direct bury closure, to be used as a joint for 1DB 5mm.

#### Features and Benefits

- Accommodates DB microducts from 6mm to 12mm in diameter
- Speed of assembly
- No tools required for the assembly
- No heat source required
- IP40 rated

#### Dimensions (assembly)

165mm (approx) W x 26.5mm Dia

#### Installation Instructions

Refer to document UK II 9604



## Tube Bundle Connectivity – External to Internal

### Customer Lead In Point



#### Product Code 7500

This unit enables external cable to be passed through the building fabric from an outside wall and is typically used for fibre to the home. This unit can only accommodate a single FibreFlow™ microduct. There is space inside this unit to fit a gas sealing connector if required.

#### Features and Benefits

- can be readily fixed to walls
- manufactured from UV-resistant material
- can accommodate both 3mm and 5mm 1 way DB
- transition point between internal and external FibreFlow™
- provision of secure long-term bend protection
- easy to use and install
- IP55 rated

#### Dimensions

54mm D x 43mm W x 182mm H

#### Installation Instructions

Refer to document UK II 7500

### MDU Customer Lead In Point



#### Product Code 71486

The FibreFlow™ MDU Customer Lead In Point is designed to be fixed directly to the corridor wall to provide a method of secure connection between the corridor of MDU and the in-house network.

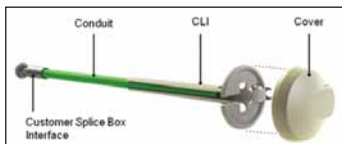
#### Features and Benefits

- Can be readily fixed to walls
- Can accommodate b-shape product, 3mm and 5mm microduct
- Transition point between the MDU corridor into the customer premises
- Provision of secure long term bend protection
- Easy to use and install

#### Dimensions

50mm x 70mm x 18mm

### External customer lead-in (Small)



#### Product Code 71502

The FibreFlow™ External customer lead-in (small) has been designed to accommodate fibre cables and may also accept 3mm tubes, the bend radius has been designed to be used with G657 fibre types. This unit consists of the external customer lead-in cover (Grey) and the customer lead-in. Additional items may be required as shown under Entelle Code 71501.

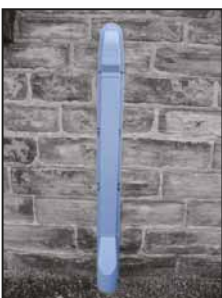
### External customer lead-in (Medium)



#### Product Code 71505

The FibreFlow™ External customer lead-in (Medium) has been designed to house a drop duct (up to 54mm diameter) exiting from the ground, to a position on a vertical wall where fibre is required to penetrate into the building. This system can be used to house both copper and fibre cables as well as Blown Fibre single tubing up to a diameter of 5mm. This unit can be cut to length to fit most entries from 30cm above ground to 75cm above ground.

### External customer lead-in (Large)



#### Product Code 71503

The FibreFlow™ External customer lead-in (Large) has been designed to house a drop duct (up to 54mm diameter) exiting from the ground, to a position on a vertical wall where fibre is required to penetrate into the building. This system can be used to house both copper and fibre cables as well as Blown Fibre single tubing up to a diameter of 5mm. This unit can be cut to length to fit most entries from 32cm above ground to 82cm above ground.

## Tube Bundle Connectivity – Internal

### Internal Customer Lead-in (Small)

#### Product Code 71501

The FibreFlow™ Internal customer lead-in (Small) can be used in conjunction with Emtelle Code 71502.

The internal customer lead-in consists of:-

- Internal CLI cover (white)
- customer lead in (from the internal side to the external, or through an internal wall, if required)
- 8mm diameter protective conduit (for protecting tube and cable when positioning them through internal or external walls)

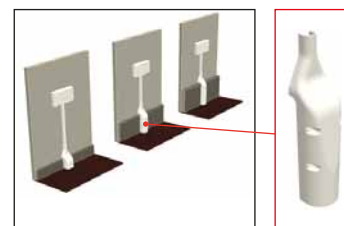
Additionally, a Customer splicing point CLI is supplied, which can fit into a 14mm diameter pre-drilled hole into a compatible surface mounted fibre termination box at the other side of a wall.



### Internal Customer Lead-in (Medium)

#### Product Code 71504

The FibreFlow™ Internal customer lead-in (Medium) is used in 'New Build' FTTH solutions where the drop duct has been brought into the meter cupboard within the home. This unit has the ability to fit around existing skirting boards within the home varying from 75mm to 225mm in height. A protecting conduit is then used to cover the fibre cable or Blown Tube all the way to the termination unit which is located in the meter cupboard. This unit is suitable for up to 6mm diameter drop tube.



### Riser Breakout Box

#### Product Code 72377

The wall/ceiling mount tube management box is designed to cater for up to 48 x 5/3.5mm microduct termination, distribution and management. The wall mount tube distribution box is suitable for applications requiring microduct termination/branching while utilising a minimum of space.

#### Dimensions

63.5mm H x 130mm W x 300mm L



## Tube Bundle Connectivity – Internal

### 3 Port FibreFlow™ ITPF



#### Dimensions

overall: 390mm L x 240mm W x 68mm H

#### Installation Instructions

Refer to document UK II 7258

#### Product Code 7258

Internal closures have been designed specifically to meet the demands of in-building applications where branch flexibility is a must. Two versions are available with the smaller unit capable of being made secure-proof to prevent tampering.

#### Features and Benefits

- ports can accept a range of Low Fire Hazard tube bundles up to 19-way
- all parts are made from flame-retardant materials
- allows individual tube breakout and re-routing
- bend radius managers prevent microducts being bent beyond the minimum radii
- retro-fitting to intercept existing part-populated tube bundle is possible
- external / internal interface interstitial gas blocking possible
- ports identifiable by means of a recessed name plate
- IP 54 rated

### 4 Port FibreFlow™ ITPF



#### Dimensions

overall:  
520mm L x 280mm W x 70mm H

#### Installation Instructions

Refer to document UK II 7217

#### Product Code 7217

Internal closures have been designed specifically to meet the demands for in-building applications where branch flexibility is a must. Two versions are available with the smaller unit capable of being made secureproof to prevent tampering.

#### Features

- ports can accept a range of Low Fire Hazard tube bundles up to 19-way
- all parts are made from flame retardant materials
- allows individual microduct breakout and re-routing
- bend radius managers prevent microducts being bent beyond the minimum radii
- retro-fitting to intercept existing part populated tube bundle is possible
- external / internal interface interstitial gas blocking possible
- ports identifiable by means of a recessed name plate
- IP 54 rated

### Y-Branch (Indoor)



#### Dimensions

300mm L x 160mm W x 70mm H

#### Installation Instructions

Refer to document UK II 9018

#### Product Code 9018

The FibreFlow™ Y-Branch Closure (Indoor) is a compact, lightweight, indoor closure developed primarily for Fibre-to-the-Home and datacoms network applications. With its simple design, the product can be installed extremely easily and rapidly. Developed in cooperation with Em-telle's customers, the Y-Branch Closure (Indoor) meets a strong market demand for closures that increase network flexibility and speed, while significantly decreasing network investment costs.

#### Features and Benefits

- compact design
- uses 7,12,19 or 24 way LFH tight protected microduct as a backbone
- up to six individual LFH microducts may be branched
- shell made from robust, low fire hazard material
- re-enterable, enabling addition or removal of individual microduct drops
- directly fixable to a riser or convenient wall
- able to accommodate gas blocking connectors if required
- IP 54 rated



## Fibre Connectivity

### Customer Connection Point (CCP)

#### Product code 9358

The Customer Connection Point is a compact, multi-functional wall-mounted closure that forms the final part of the fibre-to-the-home solution.

The CCP can accept microducts of between 3mm and 8mm in diameter. The fibre outlets are either two SC connectors or two duplex (double) LC connectors. Customers can choose to have the fibres spliced either mechanically or by fusion. For connector protection, an optional connector guard is supplied with every kit.

Each kit includes a set of endplates to suit different microduct sizes, as well as screws and fasteners for the complete installation.

#### Features and Benefits

- attractive slim design
- multi-functionality
- cost-effective solution
- ease of installation
- IP 54 rated



#### Dimensions

180mm (150mm without the connector cover) L x 100mm W x 20mm H

#### Installation instructions

Refer to document UK II 9358

### Customer Connection Point (CCP) Compact

#### Product code 70664

Used as a fibre outlet unit within a building. The unit can be fixed to a wall by using the screws and plugs supplied. Fibre is blown through a small tube into the unit and terminated using a field terminated connector or spliced onto a pigtail. Pre-terminated fibre can also be blown from the unit back to a cabinet or some other splice point.

#### Dimensions

86mm x 86mm x 31mm



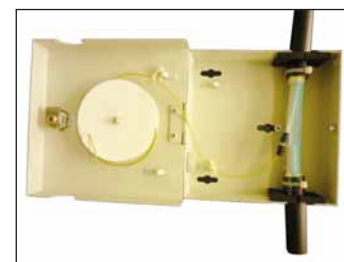
### Fibre Unit Storage Box

#### Product code 70459

Designed for storage of up to 40m of 2f or 4f blown fibre at a customer drop without the need for access to the premises. When the customer requires connecting, the final drop can be installed without the need for blowing equipment.

#### Dimensions

150x150x40mm



### FTTx Optical Fibre Distribution Box – 16 fibre

#### Product code 71063

External wall-mount optical distribution box offering flexible patch, splice and splitter solutions for FTTx networks. Designed for pole or wall mounting.



## Fibre Connectivity

### 9 Port Base Small Dome Closure

HellermannTyton

**Product Code 9040** (ANT mechanical splice protectors)

**Product Code 9040HS** (Heat shrink splice protectors)

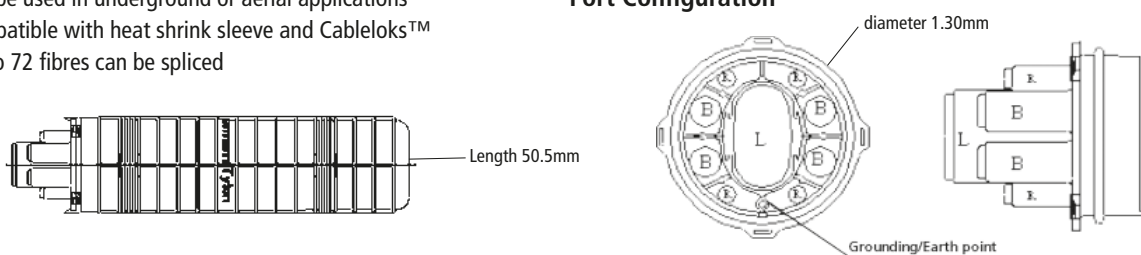
This small dome closure is a combination fibre organiser and cable closure designed to provide environmental and mechanical protection for joints for all common types of fibre optic cables. The closure system consists of a base assembly and dome together with dome sealing and cable termination kits. This kit comes with 2 x B4 Cableloks™, for minicables of diameter 4.8-9.0mm. Cablelok™ is part of the FibreFlow™ system.

#### Features

- can be used in underground or aerial applications
- compatible with heat shrink sleeve and Cableloks™
- up to 72 fibres can be spliced



#### Port Configuration



Number of ports	Port	Port Dimensions	Port Length	Heatshrink (Y/N)	Cablelok™ (Y/N)
1	L	X66, Y36	73	Y	Y
4	B	19	55	Y	Y
4	R	12	35	Y	Y

This product can be supplied as a customised pre-assembled unit. Contact your local Emtelle representative for further details.

- Aerial ■
- Tube Bundle Connectivity – External ■
- Tube Bundle Connectivity – External to Internal ■
- Tube Bundle Connectivity – Internal ■
- Fibre Connectivity ■
- Connectors ■

## Fibre Connectivity

### FDN – Fibre Distribution Node

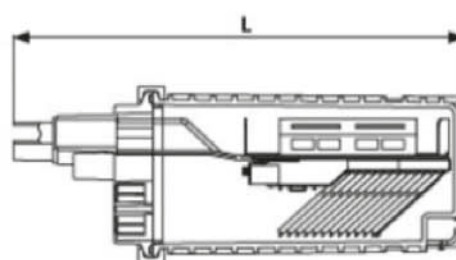
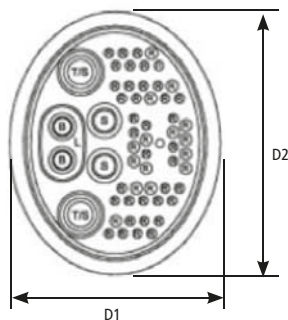
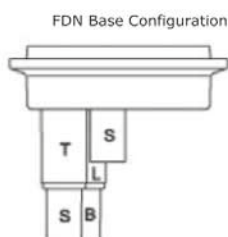


The FDN is a medium to large oval shaped cap ended closure with a high number of small cable ports.

- Up to 432 fibre splice capacity
- Ideal for FTTH Network applications, especially last mile/kilometre
- 58 round ports and 1 oval port (for loop through cable)
- Industry leading 52 drop ports accommodating up to 104 customer drop fibres
- Suitable for blown fibre/cable installations
- Accommodates up to 36 single element or 72 single circuit trays or a combination of both
- Can be configured with a fibre storage basket for loop through applications
- Available in 3 different lengths
- Cablelok™ ready
- Oval shape for use where space is limited
- Quick release cover clamp
- Accessory wall mounting bracket and stainless steel wall mounting strap kits available
- for use in underground, direct burial or aerial installations

#### FDN Port & Cable Details

Port	Number of Ports	Cable Range (mm)	
		Cablelok™	Heatshrink
L	1	2 x 5.5 – 20.0	2 x 10.0 – 24.0
T	2	15.5 – 29.0	8.0 – 35.0
S	4	8.0 – 26.0	8.0 – 26.0
B	2	4.8 – 16.5	6.0 – 19.0
R	52	1.7 – 9.5	-



AB length FDN

#### FDN Dimensions and Splice Capacity

Cover Reference	Closure Width (mm) D1 x D2	Closure Length (mm) L	Single Element (SE) Tray		Product Code
			Tray Count	Max Splice Capacity	
A	222 x 312	455	*6 (1)	72	71470
AB	222 x 312	561	12 (2)	144	71471
B	222 x 312	663	24 (4)	288	71472

\*Single tray count (tray pack/order multiple) SE -12 standard splices per tray

#### Splice Tray

Description	Product Code
Heatshrink - Pack of 6 SE Trays*	71479
ANT – Pack of 6 SE Trays*	71480

\*each tray can take 12 fibre splices

## Fibre Connectivity

### UFC – Universal Fibre Closure

HellermannTyton

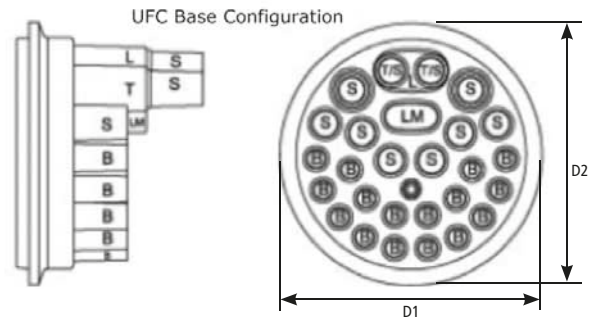


The UFC is a high fibre capacity cap ended ready access closure.

- Up to 720 fibre splice capacity
- Ideal for high fibre/splice count FTTX and trunk applications
- 28 round ports and 2 oval ports (for loop through cable)
- Accommodates up to 60 single element
- Can be configured as a double tray stack for high splice counts
- Fibre loop storage basket available with the single stack configuration
- Available in 3 different lengths
- Cablelok™ ready
- Quick release cover with clamp
- Pressure release valve
- Accessory wall mounting bracket and stainless steel wall mounting strap kits available
- For use in underground, direct burial or aerial applications

#### UFC Port & Cable Details

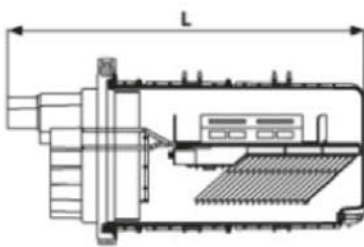
Port	Number of Ports	Cable Range (mm)	
		Cablelok™	Heatshrink
L	1	2 x 5.5 – 20.0	2 x 10.0 – 24.0
LM	1	2 x 4.0 – 15.0	2 x 8.0 – 22.0
T	2	15.5 – 29.0	8.0 – 35.0
S	10	8.0 – 26.0	8.0 – 26.0
B	16	4.8 – 16.5	6.0 – 19.0



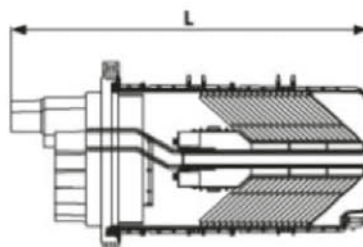
#### UFC Dimensions and Splice Capacity

Cover Reference	Closure Width (mm) D1 x D2	Closure Length (mm) L	Single Element (SE) Tray					
			Single Tray	Max Splice Capacity	Product Code	Double Tray	Max Splice Capacity	Product Code
B	275 x 310	549	*12(2)	144	71476	24 (4)	288	71481
BC	275 x 310	598	18 (3)	216	71477	36 (6)	432	71482
C	275 x 310	749	30 (5)	360	71478	60 (10)	720	71483

\*Single tray count (tray pack/order multiple) SE -12 standard splices per tray



BC length UFC Single Stack



BC length UFC Double Stack

#### Splice Tray

Description	Product Code
Heatshrink - Pack of 6 SE Trays*	71479
ANT – Pack of 6 SE Trays*	71480

\*each tray can take 12 fibre splices

## Fibre Connectivity

### Cablelok™



The Cablelok™ mechanical seal enables fast safe cable installation, providing a highly repeatable and consistent seal between the cable and the closure port with excellent non-leak performance.

#### Selecting the correct Cablelok™

Each port size on the HellermannTyton closures has a unique identifier and a dedicated series of Cableloks (i.e. R, B, S, T, LM or L). Every Cablelok™ within a series is specifically designed to accommodate a range of cable diameters. Achieving the required seal performance is simply a case of selecting the correct Cablelok™ for the port and cable combination being used.

**Step 1:** Determine the diameter of the cable being used.

**Step 2:** Choose the appropriate closure port to be used and hence port identifier.

**Step 3:** Identify the correct Cablelok™ using the port and cable ranges shown below.



Port Type	Description	Product Code
B	CABLELOK-B10 4.8 - 9.0MM X 1	70284
	CABLELOK-B20 8.0 - 14.0MM X 1	7613
	CABLELOK-B30 13.0 - 16.5MM X 1	70253
R	CABLELOK-R40 3.8 - 5.2MM X 1	70691
	CABLELOK-R50 5.2 - 8.0MM X 1	70692
	CABLELOK-R70 6.0 - 8.5MM X 1	71506
	CABLELOK-R80 8.0 - 9.5MM X 1	71507
S	CABLELOK-S10 5.0 - 8.5MM X 1	71508
	CABLELOK-S20 8.0 - 12.0MM X 1	71509
	CABLELOK-S30D 10.0 - 11.5MM X 1	71510
	CABLELOK-S40 12.0 - 16.0MM X 1	70254
T	CABLELOK-S50 16.0 - 20.0MM X 1	71511
	CABLELOK-T10 15.5 - 22.0MM X 1	71512
	CABLELOK-T20 20.5 - 23.5MM X 1	71423
	CABLELOK-T30 23.5 - 25.5MM X 1	71513
LC	CABLELOK-T40 24.5 - 29.0MM X 1	71425
	CABLELOK-L10C 5.5 - 9.5MM X 1	71514
	CABLELOK-L30C 12.0 - 15.0MM X 1	71422
LM	CABLELOK-L40C 15.0 - 18.5MM X 1	71515
	CABLELOK-LM10C 4.0 - 6.5MM X 1	71516
	CABLELOK-LM20C 5.5 - 9.0MM X 1	71517
	CABLELOK-LM30C 8.5 - 12.0MM X 1	71518
	CABLELOK-LM40C X1	71519

### Accessories



#### Port Opening Tools

Product Code	Description
70693	R Port
70260	B Port
70261	S Port
9417	T Port
71520	T/L Port

#### Wall Mount Bracket

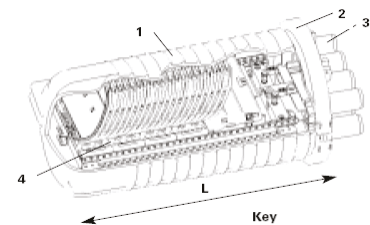
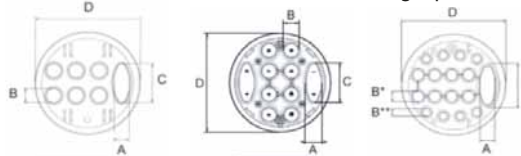
Product Code	Description
70694	FRBU/FST Wall Mounting Bracket
70703	FDN Wall Mounting Bracket
71521	FML Wall Mounting Bracket
71522	UFC Wall Mounting Bracket

## Fibre Connectivity

### FIST-GCO2 Dome Closure (for heat shrink)



The generic closure FIST-GCO2 is an environmentally sealed enclosure for the fibre management system that provides the functions of splicing and passive component integration in the external network. The product can be tailored to almost any required configuration by adding splicing and/or passive device sub-assemblies. The FIST-GCO2 has provision for all cable termination and sealing requirements. The closure is a single-ended design made of a thermoplastic material. The base and dome are sealed with a clamp and an O-ring system. One oval entry port for looped (uncut) cable and six or sixteen round ports for single cable entry/exit are provided in the base. The cable seals are manufactured from heat-shrinkable material. The UMS (Universal Mounting System) profiles provide the foundation for mounting combinations of SOSA2 (Splicing Only Sub-Assembly) and/or SASA2 (Splitter Array Sub-Assembly) modules, which consist of a modular groove plate and trays. Uncut loose buffer tube storage space is available between the two UMS profiles; for central core applications, storage baskets are available.



- Key**
- 1 Dome
  - 2 Clamp
  - 3 Base
  - 4 Wrap-around grooveplates

Length	Trays / Fibres SE	Round Base type:		
		A 6 round + 1 oval	B 8 round + 2 oval	C 16 round + 1 oval
BC - 488mm	28 / 320	7963	71523	7966
BD - 566mm	40 / 480	7964	71524	7967
BE - 700mm	56 / 672	7965	71525	7968

		GCO2-BC6-NN	GCO2-BD6-NN	GCO2-BE6-NN
Dimensions mm	L	488mm	566mm	700mm
	A	30mm	30mm	30mm
	B (B*/B**)	30 (20/13.5) mm	30 (20/13.5) mm	30 (20/13.5) mm
	C	82mm	82mm	82mm
	D	247mm	247mm	247mm
	D with clamp	285mm	285mm	285mm
	SC Tray Capacity <sup>1</sup>	28 x 2	42 x 2	58 x 2

<sup>1</sup>For blown fibre applications it is recommended to allow 26 UMS for easy microduct handling with space for water blocking devices.

All domes include base, UMS profiles (height depending on closure size), dome, clamp, O-ring, 2x FAS block pre-installed (including 2 tube holders each, cap and wedge), 2x Velcro, 2x traylids (including fibre guiding pin), silica gel, Allen key, and installation instructions. Splice trays, Splitter modules and sealing kits should be ordered separately.

### Splice Trays



Product Code	Description
70722	2 Tray Module, heat shrink type (Single Element SE, max 12 splices per tray)
7988	4 Tray Module, heat shrink type (Single Element SE, max 12 splices per tray)
9591	4 Tray Module, ANT type (Single Element SE, max 12 splices per tray)
7975	8 Tray Module, heat shrink type (Single Circuit SC, max 4 splices per tray)

### Seal Kits include

- Heat shrink sleeve with adhesive and activation spots
- Aluminium tape
- Cleaning wipes
- Sandpaper
- Strength member fixing

Product Code	Description
7973	Oval Port Seal Kit (cables 12-25mm)
7974	Round Port Seal Kit (cables 5-30mm)

Splitter options – contact your local Emtele representative

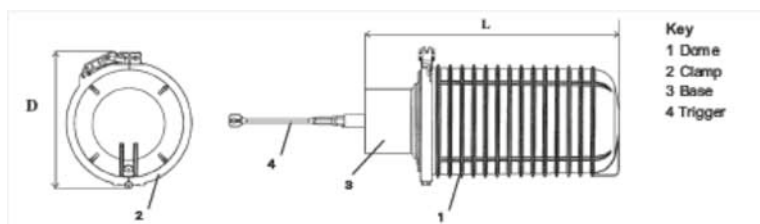
- Aerial ■
- Tube Bundle Connectivity – External ■
- Tube Bundle Connectivity – External to Internal ■
- Tube Bundle Connectivity – Internal ■
- Fibre Connectivity ■
- Connectors ■

## Fibre Connectivity

### FIST-GCOG2 Dome Closure (for gel seal)



The generic gel closure FIST-GCOG2 is the environmentally sealed, fully mechanical enclosure for the fibre management system that provides the functions of splicing and passive component integration in the external network.



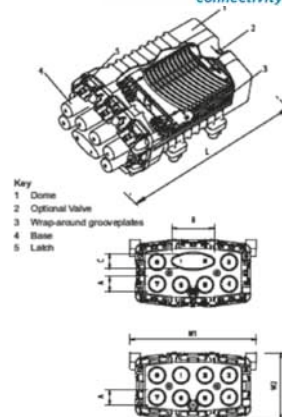
Length	Trays / Fibres SE	Round Base: D
DC - 568mm	20 / 240	70721
DD - 645mm	36 / 432	70263
DE - 753mm	52 / 624	71526

	70721 GCOG2-DC6		70263 GCOG2-DD6		71526 GCOG2-DE6	
Dimensions mm L	568		645		753	
D	247		247		247	
D with clamp	291		291		291	
	Fibres	Trays	Fibres	Trays	Fibres	Trays
Single Circuit Splicing Capacity	80	40	144	72	208	104
Single Element Splicing Capacity	240	20	432	36	624	52

### FIST – GCO2-F (for heat shrink)



The generic closure FIST-GCO2-F is the environmentally sealed enclosure for the fibre management system that provides the functions of splice and passive component integration in the external network.



Length	Trays / Fibres SE	Flat Base	
		D 6 round / 1 oval	E 8 round
FC - 384mm	8 / 96	71527	71528
FD - 432mm	12 / 144	70097	71529

	GCO2-FC		GCO2-FD	
Dimensions mm L	384		432	
W1	279		279	
W2	150		150	
A	30		30	
B	82		82	
C	30		30	
	Fibres	Trays	Fibres	Trays
Single Circuit Splicing Capacity	32	16	48	24
Single Element Splicing Capacity	96 (120)	8 (10)	144 (180)	12 (15)

## Fibre Connectivity

### FibreFlow™ Patchcords and Pigtails



**Product codes: 9518, 9519, 9520, 9520B, 9521, 9521B**

Patchcords and Pigtails using G652 compatible optical fibre, terminated with SC/PC or SC/APC connectors. Designed for multiple matings. Connectors shall meet the requirements given in the Technical Specification below.

Material/Technical Specification					
Emtelle Product Code	9518	9521 9521B		9519	9520 9520B
Description	SC SM Simplex Patchcord	SC SM Pigtail		SCA SM Simplex Patchcord	SCA SM Pigtail
Length	3.2 m	9521 9521B	0.5 m 1.5 m	3.2 m	9520 9520B
Connector/Cable Colour	Blue/Yellow	Blue/Yellow		Green/Yellow	Green/Yellow
Cable Diameter	2 mm	900µm		2 mm	900µm
Fibre Type	G.652D				
Insertion Loss, typical	0.2 dB				
Insertion Loss, max	0.3 dB				
Return Loss, typical	52 dB	52 dB		62 dB	62 dB
Return Loss, minimum	50 dB	50 dB		60 dB	60 dB
Temperature, operation	-40 ~ +75 °C				
Temperature, storage	-55 ~ +85 °C				
Impact (drop)	1.5m drop onto concrete				
Cable torsion	5N, 2.5 turns each direction (5 cycles)				
Cable pulling	Min 10N for 60s				
Vibration	10-55Hz				
Specifications	IEC 60874-14-5	IEC 60874-14-5		IEC 60874-14-10	IEC 60874-14-10
Measurements	IEC 61300-3-4/6				
Mating Cycles	500				

**Notes:**

1. Insertion Loss not exceeding 0.30 dB when tested against a concentric master cord.

**Further Information**

- Pigtail cordage 'easy strip' (buffer material can be removed in 0.25m whole segments).
- Each connector is capped (sealed) against dust and damage to the ferrule.
- The patchcords are individually packed with their test results and identification.



## Fibre Connectivity

### Cabinets

#### Outdoor Street Cabinet Product code 9799

This outdoor cabinet is made of steel with polyester coating. The termination box which houses the splice cassettes is made from plastic. Cabinet Dimensions 675x465x200mm



#### Fibre Distribution Cabinet Product Code 71159

The fibre distribution cabinet is custom made for the FibreFlow™ blown fibre solution and is designed for FTTH applications with high density optical fibre terminations and splicing. The product can be used to house splitter modules, fibre splicing and termination and also fibre management.



#### 42 RU Optical Distribution Frame (ODF) Rack Product Code 72376

Emtelle manufactures a wide range of 19' racks to suit all telecommunications networking equipment and cabling requirements.

- Standard 19", 21" or 23" mounting holes
- 2 pairs of adjustable 19" mounting channels for different equipment depth mounting
- Full range of optional accessories are available

#### Dimensions

- 800mm D x 600mm W
- 800mm D x 800mm W



## Fibre Connectivity

### ODF Solutions

Emtelle can provide ODF solutions for projects, including:

- 19" and ETSI racks
- Pre fitted shelves with splice trays and pigtails and adaptors
- Pigtails and Patchcords

If the product you require is not listed in the brochure, contact your local Emtelle representative to discuss your requirements.

### Wall Mount Tube Management Box



#### Product Code 71145

Designed for microduct termination and management of up to 24 microducts. Suitable for applications requiring microduct termination while utilising a minimum of space.

### 12 Port Wall Mount Fibre Termination Box



#### Product Code 71144

Designed for fibre termination up to 12 fibre. Suitable for applications requiring patching, splicing of single mode or multimode fibres and cross connect while utilising a minimum of space.

### 24 Port Wall Mount Fibre and Tube Termination Box



#### Product Code 71443

Designed to cater for up to 24 fibre and tube termination. The wall mount fibre termination box is suitable for applications requiring patching, splicing of single mode or multimode fibres and cross connect while utilising a minimum of space.

110mm (H) x 295mm (W) x 375mm (L)

### Wall Mount Splitter Box with modules



#### Product Code 71152

Designed to connect the incoming network and outgoing building network via optical splitters in an in-building or Fibre to the home network. The splitter box is also designed for easy install and upgrade to be compatible with range of fibre counts, pigtails, tube sizes, splitters and connector types available. In addition the splitter box provides protection for cables, splices, connectors and passive optical splitters in an in-building environment.

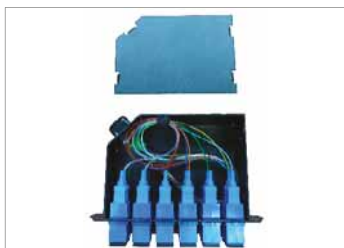
### Rack Mounted Splitter Box with modules



#### Product Code 71146

Designed to connect the incoming network and outgoing in-building network via optical splitters in an in-building or Fibre-to-the-home (FtH) network at the 19" rack in the MDF room. The splitter box is also designed for easy install and upgrade to be compatible with range of fibre counts, pigtails, tube sizes, splitters and connector types available. In addition the splitter box provides protection for cables, splices, connectors and passive optical splitters in an in-building environment.

### MPO Module Box



#### Product Code 72374

This product is custom made for the FibreFlow™ blown fibre solution to provide ease of riser breakout with the pre-terminated fibre unit with MPO solution. It also integrates with the wall mount and rack mount patch panel to provide high density plug and play solution for space constraint MDF and Data Centre applications.

#### Dimensions

130mm W x 80mm D x 37mm H

- Aerial ■
- Tube Bundle Connectivity – External ■
- Tube Bundle Connectivity – External to Internal ■
- Tube Bundle Connectivity – Internal ■
- Fibre Connectivity ■
- Connectors ■

## Fibre Connectivity

### Fibre Patch Panels

To effectively manage optical fibre terminations and splices, this product is custom made for Emtelle blown fibre solutions and provides a termination solution for both tube and fibre with lockable mechanism. The panels are designed for standard 19" and 23" with changeable side hanger. These slide out units are equipped with fibre splice trays and fibre guide accessories to limit bend radius and provide strain relief control. Fibre assemblies (pigtailed, adaptors, splice protectors) can be pre-fitted if required to suit customer requirements.

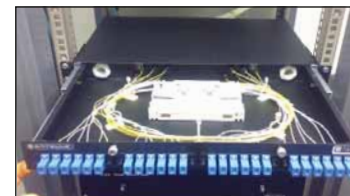
Description	Product Code
6 to 24 Ports Fibre Patch Panel	9943
1RU 24 Port Fibre Patch Panel with labelling panel	71862
2RU 48 Port Fibre Patch Panel	70443
4RU 96 Port Fibre Patch Panel	70444
5RU 144 Port Fibre Patch Panel	71158

### Adaptor Modules

Singlemode					
Module Type	SC/PC	SC/APC	LC	ST/PC	FC/PC
6x Simplex	9952	9953	-	9956	9957
8x Simplex	70453	70454	-	-	-
3x Duplex	9954	9955	-	-	-
6x Duplex	70458	70456	70452	-	-

Multimode					
Type	SC/PC	SC/APC	LC	ST/PC	FC/PC
6x Simplex	9958				
8x Simplex	70457				
3x Duplex	9959				
6x Duplex	-				

Adaptor modules not listed above may be available on request

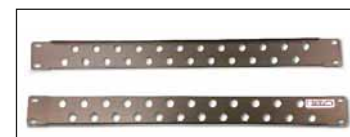


Note that adaptor modules should be ordered separately. See data sheet for a list of all included parts.

### 24 Ports Tube Patch Panel

The FibreFlow™ 24 port tube patch panel is used either in the front or the back of the 19" rack for easy management of 5 or 3mm microducts. The panel provides the capacity to accommodate up to 24 microducts.

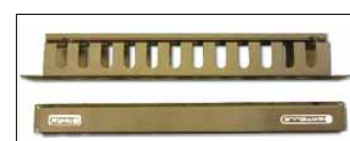
5mm Product Code 7361B  
3mm Product Code 9945



### Tube or Patch Lead Guide

#### Product Code 9946

The FibreFlow™ tube or patch lead guide is to manage the outgoing or incoming tube e.g. from Emtelle 24 port tube patch panel or patch leads from the fibre patch panel. The guide will ensure the minimum bending radius of tube and fibre are conformed with and incoming and outgoing tube/fibre are well managed.



### Fibre Termination Enclosures

Emtelle is able to provide a range of fibre management and termination products, which can be tailored to individual requirements. Please consult your local sales office to discuss your requirements.

## Fibre Connectivity

### Minicable Storage Reel with Cover



**Product code 9978**

Minicable Storage Reel is designed to provide storage of excess minicable for future maintenance and repair and includes a stainless steel cover which protects the reel and minicable in the man-hole. The storage reel set comes complete with fixing bolts to mount the storage reel and cover.

## Connectors

Emtelle provides an extensive range of standard and direct buried push-fit connectors for the FibreFlow™ system. These connectors are provided with outer shells in either acrylate (clear) or polypropylene (solid colour). The different materials provided are to suit customer's preferences or applications. All connectors supplied by Emtelle conform to our specification MHT860.

### Straight connectors



Straight connectors are used to join microducts having the same OD and ID.

Take note of both the outer and inner diameter of the microduct to be connected. eg 8/6 connectors are unsuitable for 8/3.5 microduct. Some connectors are available pre-fitted with clip-on protectors to enable direct burial for FTTH drop zones.

Microduct size (both ends)		Product codes	Minimum order quantity
outer diam - mm	inner diam - mm		
3	2.1	9916	1 bag of 10
4	2.8	9917	1 bag of 10
5	3.5	9918	1 bag of 10
7	5.5	9919	1 bag of 10
7	3.5	70193	1 bag of 10
8	6	9920	1 bag of 10
8	3.5	9772	1 bag of 10
10	8	9921	1 bag of 10
12	10	9922	1 bag of 10
14	12	9821	1 bag of 10
14	10	9923	1 bag of 10
16	12	9924	1 bag of 10

- Aerial ■
- Tube Bundle Connectivity – External ■
- Tube Bundle Connectivity – External to Internal ■
- Tube Bundle Connectivity – Internal ■
- Fibre Connectivity ■
- Connectors ■

## Connectors

### Reducers

These connectors join microducts of different size. Check the microduct OD and ID.

Microduct A		Microduct B		Product codes	Minimum order quantity
Microduct outer diam - mm	Microduct inner diam - mm	Microduct outer diam - mm	Microduct inner diam - mm		
5	3.5	3	2.1	9925	1 bag of 10
5	2.1	3	2.1	9926	1 bag of 10
7	5.5	3	2.1	70407	1 bag of 10
7	5.5	5	3.5	70031	1 bag of 10
8	3.5	3	2.1	70117	1 bag of 10
8	6	5	3.5	9927	1 bag of 10
10	8	8	6	9928	1 bag of 10
12	10	5	3.5	70034	1 bag of 10
12	10	7	5.5	9929	1 bag of 10
12	10	10	8	9930	1 bag of 10
14	10	10	8	70035	1 bag of 10
14	10	12	10	9931	1 bag of 10
16	12	12	10	70036	1 bag of 10



### End Cap

End caps are used to seal an open tube and prevent dirt or water entry.

Size	Product Code	Minimum order quantity
3mm	9932	1 bag of 10
4mm	9933	1 bag of 10
5mm	9934	1 bag of 10
6mm	9975	1 bag of 10
7mm	9935	1 bag of 10
8mm	9936	1 bag of 10
10mm	9937	1 bag of 10
12mm	9938	1 bag of 10
14mm	9939	1 bag of 10
16mm	70153	1 bag of 10



### Direct Buried Connectors

There are situations with drops to a building where a joint is required in a rugged microduct. Since such a joint would be in domestic areas rather than industrial sites, a full closure to protect the microduct joint is not always deemed necessary.

For these joints, we offer rugged connectors, and in two styles: ■ Protected Connector ■ DB (direct buriable) connector

### Protected Connectors

The protected connector is a standard microduct connector pre-fitted with a removable outer shell. The product offers enhanced protection over an uncovered connector. These covers also fit over equivalent sized end-caps.

Product code	Microduct size	Description	Minimum Order Quantity
70194	7/3.5mm	Protected connector	1 bag of 10
70169	7/5.5mm	Protected connector	1 bag of 10
70262	8/3.5mm	Protected connector	1 bag of 10
70136	8/6mm	Protected connector	1 bag of 10
70170	10/8mm	Protected connector	1 bag of 10
70171	12/10mm	Protected connector	1 bag of 10
70172	14/10mm	Protected connector	1 bag of 10



## Connectors John Guest®

### Straight connectors

 John Guest®

Microduct outer diam - mm	Connector through bore diam - mm	Product codes		Minimum order quantity
		Solid colour	clear	
3	2.1		7312	1 bag of 10
4	2.8	71070		1 bag of 10
5	3.5		7223	1 bag of 10
6	4.8	7310		1 bag of 10
6.3	5	7930		1 bag of 10
8	6		7222	1 bag of 10
10	7.6	7226		1 bag of 10
12	10	7263	9732	1 bag of 10
16	14	71424		1 bag of 10
18	16	70956		1 bag of 10

### Direct Bury Straight connectors

 John Guest®

Microduct size (both ends)		Product codes		Minimum order quantity
outer diam - mm	inner diam - mm	Solid colour	clear	
7	3.5	71108		1 bag of 10
7	4.0	71190		1 bag of 10
14	10	71105		1 bag of 10

### Reducers

 John Guest®

Microduct outer diam - mm	Connector inner diam - mm	Microduct outer diam - mm	Connector inner diam - mm	Product codes		Minimum order quantity
				Solid colour	clear	
4	2.2	3	2.2	70728		1 bag of 10
5	2.2	3	2.2		9638	1 bag of 10
6	2.2	3	2.2	70727		1 bag of 10
(1/4")6.3	3.5	5	3.0	9502		1 bag of 10
8	6	5	3.5		6085	1 bag of 10
10	6.3	8	6.3	7280		1 bag of 10
12	8	10	8	7279		1 bag of 10

### End Cap

 John Guest®

Size	Product Code		Minimum order quantity
	Solid colour	clear	
3mm	9610		1 bag of 10
4mm	70762		1 bag of 100
5mm	7221		1 bag of 10
6mm	7311		1 bag of 10
10mm	9611	7486	1 bag of 10
12mm	9612		1 bag of 10
16mm	71438		1 bag of 10

### Direct Bury End Cap

 John Guest®

Size	Product Code	Minimum order quantity
7mm	71109	1 bag of 10
14mm	71106	1 bag of 10

## Connectors

### Closedown

This connector is to protect fibre where a centre blow has taken place. The closedown covers the fibre and both ends of the break in the microduct.

Size	Product Code	Minimum order quantity
3mm	7316	1 bag of 10
5mm	7249	1 bag of 10
8mm	7331	1 bag of 10

**JG John Guest®**



### Gas Block Connectors

An active gas block (GB) connector has an internal seal that can be 'open' to permit blowing through, or 'closed' so the seal contacts the fibre and prevents the flow of gas.

Microduct size mm	Description	Product Code	Fibre cable size range Approx mm	Gas block seal colour
3mm	3GB long	70730	0.9-1.2	
3mm	3GB short	70731	0.9-1.2	
4mm	4GB	70729	0.9-1.2	
5mm	5GB	6091	FU	
6mm	6GB	71220	FU	
6-3mm reducer	6-3GB	71355	FU	
6-4mm reducer	6-4GB	70875	FU	
7mm	7GB 1.0-1.6	71110	FU	
7mm	7GB 1.8-2.4	71533		Red
7mm	7GB 2.5-3.0	71116	2.5-3.0	Blue
8mm	8GB	6086	FU	
8-5mm	8-5GB	6087	FU	
10mm	10GB 5.5-6.6	71496	5.5-6.6	Green
10mm	10GB 6.5-7.2	71497	6.5-7.2	Red
12mm	12GB 5.5-6.6	71498	5.5-6.6	Green
12mm	12GB 6.5-7.2	71499	6.5-7.2	Red
12mm	12GB 7.2 - 8.2	71534	7.2-8.2	Blue
14mm	14GB 6.5-7.2	71107	6.5-7.2	Red
14mm	14GB 7.6-8.2	71535	7.6-8.2	Blue

**JG John Guest®**



### Water-blocking Connector

These connectors are used at the end of a fibre unit (fu) length, usually inside the building, to prevent water from travelling along the tube and into the building.

The passive water blocking types have a fixed aperture size in the seal, the fibre unit being pushed through by hand after blowing is complete. For these it is best to select an item with a suitably sized seal, to give a snug fit.

We quote the size range of fibre unit or cable that each water blocking connector can accept and properly seal onto.

Tube size one end	Tube size other end	Capacity fu or fc diam	Product code
3mm	3mm	FU	7314
5mm	5mm push-on	FU	6089
6mm	3mm	FU	71441

**JG John Guest®**



### Slimline Bulkhead

A connector used mainly in rack systems to manage microducts

Size	Product Code	Minimum order quantity
5mm	7248	1 bag of 10

**JG John Guest®**



## Connectors

### Bulkhead Screw Connector



This connector act as 4mm bulkhead connector for 4mm microduct management integrating with the 1RU 24 port tube patch panel.

Size	Product code	Minimum order quantity
4mm	72375	10

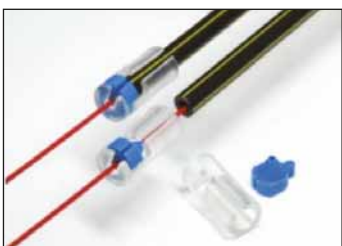
### Duct Sealing



Divisible duct sealing sets developed to provide an effective and simple solution to all gas and watertight duct sealing requirements. The modular system enables installation in new and existing situations. Set contains 2 plastic click shells, plastic cutting block, synthetic rubber plug.

Product code	Duct size O/D (mm)	Cable Diameter (mm)	Size A	Size B	Minimum Order Quantity
71161	10	2.5-3.9	32	25	25
71162	10	3.9-5.0	32	25	25
71163	10	5.0-6.5	32	25	25
71164	10	6.5-8.0	32	25	25
71165	12	2.5-3.9	32	25	25
71166	12	3.9-5.0	32	25	25
71167	12	5.0-6.5	32	25	25
71168	12	6.5-8.0	32	25	25
71169	14	5.8-8.0	34	29	25
71170	14	8.0-10.0	34	29	25
71171	16	5.8-8.0	34	29	25
71172	16	8.0-10.0	34	29	25
71173	18	9.4-12.0	36	34	25
71174	20	9.4-12.0	36	34	25

### Fibre and Micro cable seal



Easy to install gas and watertight seal for cables in mini / micro ducts.

- Gas and Water tight up to 0,25 bar
- Suitable for retro fitting
- Easy installation
- No need to slide the seal over the fibre for installation
- Slim design

Product Code	Description	Duct outside diameter (mm)	Cable Diameter (mm)	Minimum Order Quantity
71722	Miniduct seal 4mm/1.2-1.6mm	4	1.2 - 1.6	1 bag of 100
71720	Miniduct seal 5mm/1.2-1.6mm	5	1.2 - 1.6	1 bag of 100
71739	Miniduct seal 6mm/1.2-1.6mm	6	1.2 - 1.6	1 bag of 100
71175	Miniduct seal 7mm/1.2-1.6mm	7	1.2 - 1.6	1 bag of 100
71724	Miniduct seal 7mm/2.25-2.5mm	7	2.25 - 2.5	1 bag of 100
71740	Miniduct seal 8mm/1.2-1.6mm	8	1.2 - 1.6	1 bag of 100
71741	Miniduct seal 8mm/2.25-2.5mm	8	2.25 - 2.5	1 bag of 100



# FibreFlow™ INSTALLATION EQUIPMENT



## Blowing Equipment



Emtelle has selected a range of tried and tested FibreFlow™ blowing equipment to provide maximum blowing distances.

Fibre	Product codes								
	7779	9226	9471	9980	70521	70899	71869	71871	71868
2-12									
Micro and Mini cable									
Page	72	76	76	78	78	79	80	80	80
Ancillaries - Page	73-74	77	77	-	78	79	-	-	-
Spare Parts - Page	75	77	77	-	78	79	-	-	-
Blowing Equipment Ancillaries - Page	81								

For further information on mini cable installation contact your local Emtelle representative.

## Fibre Unit

### Blowing Unit 2A

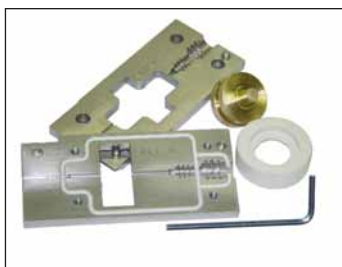


#### Product Code 7779 (55m/min)

The blowing unit has an internal buckle detector to guarantee fibre integrity at all times during the fibre installation. The blowing head comes complete with a set of standard 4 fibre plates which can be interchanged as required with FibreFlow™ 8 and 12 fibre plates from our fibre product range.

## Fibre Unit Blowing Equipment Ancillaries

### 8/12 Fibre Blowing Pack



#### 8 Fibre Blowing Pack

##### Product Code 7829

When used in conjunction with the 7779 Blowing Unit this pack contains the necessary parts to install Emtelle's 8 fibre unit.

- Contents:
- 1 set of fibre plates
  - 1 Brass Wheel
  - 1 White Tyre
  - 1 Allen Key (2.5mm)

#### 12 Fibre Blowing Pack

##### Product Code 7830

When used in conjunction with the 7779 Blowing Unit this pack contains the necessary parts to install Emtelle's 12 fibre unit.

- Contents:
- 1 set of fibre plates
  - 1 Brass Wheel
  - 1 White Tyre
  - 1 Allen Key (2.5mm)

### Tyres



A selection of tyres for use with the Blowing Unit.

Product Code	Description	Unit of Issue
7032	Smooth Green Tyres	per pair
7010	Grooved Green Tyres	per pair
7576	White Tyres	1

## Fibre Unit Blowing Equipment Ancillaries

### Fibre Plates

These plates are installed into the blowing head of the Blowing Unit 2A when installing Emtele's range of fibres. There are different plates for each fibre size (Head Seal not shown).

Product Code	Description	Unit of Issue
7584	2/4 Fibre Plates	per set
7007	8 Fibre Plates	per set
7481	12 Fibre Plates	per set



### Dispenser

#### Product Code 7855

The 2A Blowing Head is secured to the Dispenser to enable safe installation of the fibre into the FibreFlow™ microduct. The dispenser can handle up to 15 Bar air pressure.



### Flowmeter kit

#### Product Code 7778

This kit consists of an air flow meter for measuring the air flow, some connectors for connecting the compressor hose directly to the FibreFlow™ microduct, and air exhausts for stopping any foreign objects escaping from the other end of the FibreFlow™ microduct.



### Pan Guide

#### Product Code 7851

The Pan Guide is used to guide the Fibre from the pan to the blowing head.



### Pan Guide 1A

#### Product Code 7002

The Pan Guide is used to guide the Fibre from the pan to the blowing head. This pan guide can also be used along with the coiler.



### Pan Guide Support

#### Product Code 7005

The Pan Guide Support is used to raise the pan guide away from the actual pan of fibre which is necessary while coiling fibre back into the pan.



## Fibre Unit Blowing Equipment Ancillaries

### Pan Inversion Ring



**Product Code 7012**

The aluminium pan inversion ring is used in conjunction with the pan inversion clamp ring and plastic fibre pans when transferring fibre from one pan to another during centre or onward blow operations.

**Product Code 71716**

The cardboard pan inversion ring is used in conjunction with Emtelle’s fibre pans and the pan inversion clamp ring to transfer fibre from one pan to another during centre or onward blow operations.

### Pan Inversion Clamp Ring



**Product Code 7788**

The Fibre Pan Inversion Clamp Ring is a simple-to-use device for transferring fibre from one fibre pan to another.

### Power Supply for Blowing Unit



**Product Code 7655**

A re-chargeable 24v transportable power supply for use with Blowing Unit 2A. Requires a 240v supply during charging.



**Product Code 7286**

240-110v Transformer

### Head Seal



This seal is used to seal the top fibre plate to prevent air leakage during blowing.

Product Code	Unit of Issue
7033	per metre

### Glass Lens/Slips



**Product code 7219**

Spare Lens/Slips that are located in the Blowing Head.

## Fibre Unit Blowing Equipment Spare Parts

### Spares Kit

#### Product code 9002

This small pack should contain enough consumables for three years' normal use.  
 Contents: Feed Wheel tyre; Glass slips; Silicon Seal (1.5m); Allen Key 3mm AF; Fuse, anti surge 1.6A x 20; Fuse, anti surge 500mA x 5mm



### Remote Control Unit

#### Product code 9003

The remote control allows the fibre installation to be performed away from the Blowing Head. This is very useful where space is restricted at the installation site.



### Power lead 24 volt DC

#### Product code 9004

This lead connects between the 24 V dc output on the Compressor and powers the Blowing Unit 2 A. This is an alternative supply to the Blowing Unit.



### Power lead 110 volt AC

#### Product Code 9005

110 V ac power lead used to power the Blowing Unit 2A from either a 110V ac transformer or generator.



### Lead

#### Product Code 9006

This Lead connects between the Blowing Head and the Blowing Unit 2A.



## Fibre Unit and Mini Cable Equipment

### FibreFlow™ FUSION



#### Product Code 9471 (Base Unit)

The FibreFlow™ FUSION, can blow fibre counts of 1-96, something that in the past would have required two machines – one for 1-12 fibres and one for 24-96. Compatible with a wide range of mini cables, the new machine offers new levels of efficiency, flexibility and convenience, while lowering investment.

Designed to install Emtelles fibre units 2, 4, 8 & 12 and mini cable 24 to 96 fibres with dimensions ranging from 1-8mm.

Fitted with a radial force setting device, a blocking device and an electronic speed and distance counter VL10.



#### Product Code 9472 (Complete Parts Kit)

All the parts necessary to install Emtelle's complete range of fibre units and mini cable. The complete range includes Emtelle's fibre units 2, 4, 8 & 12 and mini cable 24 to 96 fibres with dimensions ranging from 1-8 mm.

### Blowing Unit EM-25



#### Product Code 9226

Capable of blowing fibre products up to 3mm outside diameter. It has a maximum inlet pressure of 16 bar. The EM-25 is run from a 24V dc supply. The EM-25 can blow into a microduct with a maximum diameter of 8mm. The EM-25 has an extensive range of microduct and cable inserts that will need to be ordered at the same time as the machine.

For ancillary equipment refer to page 77.



**Cable Insert**

9227A	Cable insert for fibre units 1-3mm	Em-25 & Fusion
9311	Cable Insert for cables 4-8mm	Fusion

**Lip/Cable Seals**

9227B	Lip Seals for fibre units 1.1-1.4mm	Em-25 & Fusion
9227C	Lip Seals for fibre units 1.4-1.8mm	Em-25 & Fusion
9227D	Lip Seals for fibre units 0.8-1.1mm	Em-25 & Fusion
9227E	Lip Seals for fibre units 1.8-2.4mm	Em-25 & Fusion
9227F	Lip Seals for fibre units 2.4-3.3mm	Em-25 & Fusion
9221A	Cable Seals for cables 3.4-4.3mm	Fusion
9221B	Cable Seals for cables 4.4-5.3mm	Fusion
9221C	Cable Seals for cables 5.4-6.3mm	Fusion
9221D	Cable Seals for cables 6.4-6.9mm	Fusion
9221E	Cable Seals for cables 7.0-7.5mm	Fusion
9221F	Cable Seals for cables 7.5-8.0mm	Fusion

**DUCT INSERTS**

9228A	Duct Insert OD 3mm, fibre units up to 1.8mm	Em-25 & Fusion
9228B	Duct Insert OD 4mm, fibre units up to 2.8mm	Em-25 & Fusion
9228C	Duct Insert OD 5mm, fibre units up to 1.8mm	Em-25 & Fusion
9228D	Duct Insert OD 5mm, fibre units up to 2.8mm	Em-25 & Fusion
9228E	Duct Insert OD 6mm, fibre units up to 3mm	Em-25 & Fusion
9228F	Duct Insert OD 7mm, fibre units up to 1.8mm	Em-25 & Fusion
9228G	Duct Insert OD 8mm, fibre units up to 2.8mm	Em-25 & Fusion
9228H	Duct Insert OD 8mm, fibre units up to 3mm	Fusion
9222A	Duct Insert OD 7mm, cables up to 4.8mm	Fusion
9222B	Duct Insert OD 8mm, cables up to 3.8mm	Fusion
9222C	Duct Insert OD 8mm, cables up to 5.6mm	Fusion
9222D	Duct Insert OD 10mm, cables up to 7.5mm	Fusion
9222E	Duct Insert OD 12mm, cables up to 8.0mm	Fusion
9222F	Duct Insert OD 14mm, cables up to 8.5mm	Fusion

**Tyres**

71851	Rubber Tyre with aluminium insert ring	Em-25 & Fusion
71852	Multi-grooved black Tyre, for 6 x 1.6mm	Em-25 & Fusion
71853	Steel Tyre, U-groove for cables 1.6mm-2.0mm	Em-25 & Fusion
71854	Steel Tyre, U-groove for cables 2.1mm-2.5mm	Em-25 & Fusion
71855	Steel Tyre, U-groove for cables 2.6mm-3.0mm	Em-25 & Fusion
9223A	Steel Tyre, U-groove for cables 3.1mm-3.5mm	Fusion
9223B	Steel Tyre, U-groove for cables 3.6-4mm	Fusion
9223C	Steel Tyre, U-groove for cables 4.1mm-4.5mm	Fusion
9223D	Steel Tyre, U-groove for cables 4.6mm-5mm	Fusion
9223E	Steel Tyre, U-groove for cables 5.1mm-5.5mm	Fusion
9223F	Steel Tyre, U-groove for cables 5.6mm-6mm	Fusion
9223G	Steel Tyre, U-groove for cables 6.1mm-6.5mm	Fusion
9223H	Steel Tyre, U-groove for cables 6.6mm-7mm	Fusion
9223J	Steel Tyre, U-groove for cables 7.1mm-7.5mm	Fusion
71856	Steel Tyre, U-groove for cables 7.6mm-8.0mm	Fusion

**Pressure Wheel**

71857	Pressure Wheel with polyurethane lining	Em-25 & Fusion
71858	Aluminium Pressure Wheel	Em-25 & Fusion

For the EM-25 order 9227A plus one item from the next 2 tables depending on fibre/microduct size

For the Fusion order 9311 plus one item from the next 3 tables depending on fibre / microduct size

**Consumables**

**Additional packs of O-Rings**

9321A	O Rings for OD 3mm
9321B	O Rings for OD 4mm
9321C	O Rings for OD 5mm
9321D	O Rings for OD 7mm
9321E	O Rings for OD 8mm
9321F	O Rings for OD 10mm
9321G	O Rings for OD 12mm

# Mini Cable Blowing Equipment

## UltimazV20



### Product Code 9980 (Base Unit)

The Ultimaz is designed for use in the FibreFlow™ system. It is suitable for installing fibre units / microcables ranging from 0.8 - 4mm diameter.

It is equipped with an adjustable torque limiter and a limiter locking device enabling high pushing forces. The Ultimaz is powered by a standard electrical / battery powered drill (not supplied). The drill must have an output torque exceeding 0.3Nm at 250 – 500 RPM.

A full range of accessories / spare parts are available. Please contact your local Emtelle representative for further details.

## MiniJet



### Product Code 70521 (Base Unit)

The MiniJet is suitable for installing microcables ranging from 4 – 16mm diameter.

Order the MiniJet and 1 item from each of the tables

### CABLE INSERT

Product Code	Description
70536	Mini-Jet P400 - Cable insert 4-5
70537	Mini-Jet P400 - Cable insert 6-8
70538	Mini-Jet P400 - Cable insert 9-12
70539	Mini-Jet P400 - Cable insert 13-16

### LIP SEALS

Product Code	Description
70540	Mini-Jet P400 - set of 6 lip seals 3.4 to 4.3mm
70541	Mini-Jet P400 - set of 6 lip seals 4.4 to 5.3mm
70542	Mini-Jet P400 - set of 6 lip seals 5.4 to 6.3mm
70543	Mini-Jet P400 - set of 6 lip seals 6.4 to 6.9mm
70544	Mini-Jet P400 - set of 6 lip seals 7.0 to 7.5mm
70545	Mini-Jet P400 - set of 6 lip seals 7.5 to 8.0mm
70546	Mini-Jet P400 - set of 6 lip seals 8.5 to 10.7mm
70547	Mini-Jet P400 - set of 6 lip seals 10.8 to 12.4mm
70548	Mini-Jet P400 - set of 6 lip seals 12.5 to 14.7mm

### DUCT INSERTS

Product Code	Description
71460	Mini-Jet P400 - Duct inserts OD - 7mm
70549	Mini-Jet P400 - Duct inserts OD - 8mm
70550	Mini-Jet P400 - Duct inserts OD - 10mm
70551	Mini-Jet P400 - Duct inserts OD - 12mm
70552	Mini-Jet P400 - Duct inserts OD - 14mm
70553	Mini-Jet P400 - Duct inserts OD - 15mm
70554	Mini-Jet P400 - Duct inserts OD - 16mm
71461	Mini-Jet P400 - Duct inserts OD - 18mm
70555	Mini-Jet P400 - Duct inserts OD - 20mm
70556	Mini-Jet P400 - Duct inserts OD - 25mm
70557	Mini-Jet P400 - Duct inserts OD - 32mm
70558	Mini-Jet P400 - Duct inserts OD - 40mm
71462	Mini-Jet P400 - Duct inserts OD - 42mm

### OPTIONAL / SPARE PARTS

Product Code	Description
71463	Mini-Jet P400 - set of 6 O-rings for duct OD - 7mm
70559	Mini-Jet P400 - set of 6 O-rings for duct OD - 8mm
70560	Mini-Jet P400 - set of 6 O-rings for duct OD - 10mm
70561	Mini-Jet P400 - set of 6 O-rings for duct OD - 12mm
70562	Mini-Jet P400 - set of 6 O-rings for duct OD - 14mm
71464	Mini-Jet P400 - set of 6 O-rings for duct OD - 15mm
70563	Mini-Jet P400 - set of 6 O-rings for duct OD - 16mm
71465	Mini-Jet P400 - set of 6 O-rings for duct OD - 18mm
71466	Mini-Jet P400 - set of 6 O-rings for duct OD - 20mm
70564	Mini-Jet P400 - set of 6 O-rings for duct OD - 25mm
70565	Mini-Jet P400 - set of 6 O-rings for duct OD - 32mm
70566	Mini-Jet P400 - set of 10 cable caps for cables - 4mm
70567	Mini-Jet P400 - set of 10 cable caps for cables - 5mm
70568	Mini-Jet P400 - set of 10 cable caps for cables - 6mm
70569	Mini-Jet P400 - set of 10 cable caps for cables - 7mm
70570	Mini-Jet P400 - set of 10 cable caps for cables - 8mm
70571	Mini-Jet P400 - Belt for MiniJet V
70572	Mini-Jet P400 - Belt for MiniJet Flat
70573	Mini-Jet P400 - Bundle Jetting kit MD 2x10mm
70574	Mini-Jet P400 - Jetting Lube - 12x95cl
70575*	Mini-Jet P400 - Microjetting Lube - 24x240ml

\*Refer to page 95



# Mini Cable Blowing Equipment

## Airstream

### Product Code 70899

The Airstream is suitable for installing micro/mini cables ranging from 2.5 – 11.0 mm. The machine features a high or low adjustable torque setting to protect the cables. This also aids in the installation of small cables.



### TUBE COLLET ASSEMBLY

Product Code	Description
70900	Outer Diameter Tube 5mm
71454	Outer Diameter Tube 7mm
71455	Outer Diameter Tube 8mm
71456	Outer Diameter Tube 10mm
71457	Outer Diameter Tube 12mm
70901	Outer Diameter Tube 14mm
70902	Outer Diameter Tube 16mm
70903	Outer Diameter Tube 18mm

### CABLE GUIDE

Product Code	Description
70904	Cable Guide 2.5 mm
70905	Cable Guide 2.6 - 3.5mm
70906	Cable Guide 3.0 - 6.4mm
70907	Cable Guide 6.0 - 11 mm

### CABLE COLLET ASSEMBLY

Product Code	Description
71337	Cable Size 2.5 - 3.0 mm
71338	Cable Size 3.0 - 3.8 mm
71339	Cable Size 3.8 - 5.0 mm
71340	Cable Size 5.0 - 6.4 mm
71341	Cable Size 6.4 - 8.0 mm
70908	Cable Size 8.0 - 9.5mm
71458	Cable Size 9.5 - 11.0mm

### OPTIONAL / SPARE PARTS

#### CABLE SEAL (PACKS OF 5)

Product Code	Description
9028A	Cable Size 2.5 - 3.0 mm
9028B	Cable Size 3.0 - 3.8 mm
9028C	Cable Size 3.8 - 5.0 mm
9028D	Cable Size 5.0 - 6.4 mm
9028E	Cable Size 6.4 - 8.0 mm
70911	Cable Size 8.0 - 9.5 mm
71459	Cable Size 9.5 - 11.0mm

#### TUBE SEAL (PACKS OF 5)

Product Code	Description
70912	Outer Diameter Tube 5mm
70913	Outer Diameter Tube 7mm
70914	Outer Diameter Tube 8mm
70466	Outer Diameter Tube 10mm
70467	Outer Diameter Tube 12mm
70468	Outer Diameter Tube 14mm
70469	Outer Diameter Tube 16mm
70915	Outer Diameter Tube 18mm

Order the Airstream and 1 item from each of the tables on the left to make a complete machine.

#### Example Order

- 1 x 70899 (Airstream)
- 1 x 70901 (Tube Collet Assembly OD 14mm)
- 1 x 70907 (Cable Guide 6.0 - 11mm)
- 1 x 9026E (Cable Collet Assembly for cable 6.4 - 8.0mm)

This setup will be for mini cable blowing into a 14mm outer diameter Microduct

#### DRIVE BELTS

Product Code	Description
70909	2.5 - 5mm Cable Diameter
70910	3 - 11 mm Cable Diameter

#### CORD SEAL

Product Code	Description
9051	Seal Cord 2mm diameter x 1 metre long

#### LUBRICANT

Product Code	Description
70848	Cable blowing lubricant 5L

## Mini Cable Blowing Equipment

### MiniFlow



**Product code 71869**

MiniFlow Rapid is a compact and efficient cable blowing machine. The machine is capable of installing fibre cable at a speeds up to 100 m/min.

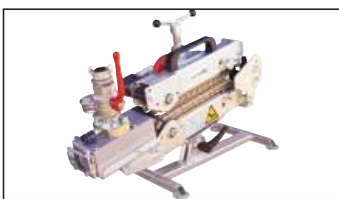
### MultiFlow



**Product code 71871**

MultiFlow is a very efficient cable blowing machine for blowing micro ducts into ducts as it is able to blow multiple micro ducts at once. The machine is able to blow many different combinations of duct and micro ducts.

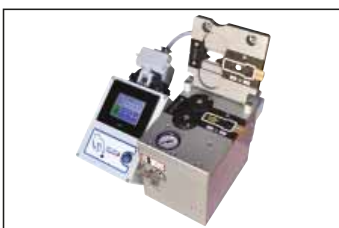
### PowerFlow



**Product code 71868**

PowerFlow is a very efficient cable blowing machine. It can blow cables with a speed up to 80 m/min.

### MicroFlow Touch



**Product code 72369**

Microflow Touch has a unique protection technology that stops the machine if the fibre cable meets an obstacle. The control unit has a user friendly touch display, which can be used to make a number of different adjustments:

- Adjustment of maximum motor torque
- Adjustment of maximum speed
- Presetting of counter with automatic stop after a certain blowing distance
- Acceleration - from start to maximum speed
- Deceleration - from maximum speed to stop
- The display shows different information during blowing, for instance: Meter count, Actual speed and Actual torque

### Control Valve



**Product code 71870**

- Control direction forward and backward
- Manometer for monitoring cable pressure
- Safety valve for pushing force
- Environmentally friendly hydraulic couplings
- for MiniFlow, PowerFlow and MultiFlow

## Mini Cable Blowing Equipment

### Multi Power pack

#### Product code 71872

The Hydraulic Multi Power Pack is the optimal power source for the Mini Flow, Multi Flow and Power Flow machines



## Blowing Equipment Ancillaries

### Compressor

The compressors have been tried and tested by Emtelle and come fitted with all the necessary air conditioning components to enable the correct air quality to be achieved for installations into the FibreFlow™ network.

The compressors can be petrol or electrically driven, delivering air up to 10 bar to the Blowing Head.



10 bar petrol driven

Product Code	Description	
7028	10 bar Petrol Compressor	With 24 Volt output
7029*	10 bar Electric Comp 110v	With 24 Volt output (UK Yellow Industrial Plug)
7757*	10 bar Electric Comp 240v	With 24 Volt output (UK Plug)
7757EU*	10 bar Electric Comp 240v	With 24 Volt output (European Plug)



10 bar electric driven

\*Please note electric compressors are for indoor use only

### Replacement Air Hose

#### Product code 7013

This replacement hose is 10m in length and is used to supply air from the compressor to the blowing unit.



### 15 bar Air Preparation Kit

#### Product code 9641

The FibreFlow™ Air Preparation Kit contains the correct filters etc to deliver good quality air for the blowing process. This allows the use of standard 'off the shelf' compressors in FibreFlow™ networks. Designed to be used in line with air coming in from the compressor and air going out to the dispenser. Maximum airflow 1000 ltr/min.



Air Blown Fibre

FibreFlow™ FTX

FibreFlow™ Customers

Fibre Products

Sub-Duct

Tube Bundle

Accessories

**Installation Equipment**

Tools

Training

Terms & Conditions

Index





# FibreFlow™ TOOLS AND CONSUMABLES



## Tools

For best possible performance, it is critical the correct tools are used. Entelle have identified and tested a range of tools that are likely to be required when installing FibreFlow™.

### Tool Kit



#### Product Code 7833

- |   |   |
|---|---|
| 1. Code 9087 Toolbox                      | 10. Code 7299 Microduct Rotational Cutter |
| 2. Code 9728 Sheath Stripper 4.5-40mm     | 11. Code 9346 42mm Heavy Duty Cutter      |
| 3. Code 7794 Metal free cutter for 1DB    | 13. Code 9345 Screwdriver Pack            |
| 4. Code 9344 Diagonal Cutters             | 13. Code 7298 Junior Hacksaw              |
| 5. Code 7301 Pliers Square nose           | 14. Code 7300 Brush Sash Tool 6A          |
| 6. Code 7069 Trimming Knife               | 15. Code 7949 Microduct Rounding Tool     |
| 7. Code 7001 Longitudinal Sheath Stripper | 16. Code 7236 Collet Locking Tool         |
| 8. Code 7071 Rotational Sheath Stripper   | 17. Code 7014 Primary Tube Cutter 12.7mm  |
| 9. Code 7039 Scissors                     |   |

### Sheath Stripper 4.5-40mm

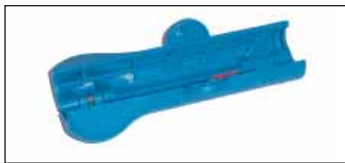


#### Product Code 9728

This is capable of making circumferential cuts on cable and FibreFlow™. The tool is plastic bodied with a spring loaded "V" anvil to attach it to the cable. The cutting blade is adjustable for depth with a capacity of 4.5-40mm.

#### Spare Blade Product Code 9728 B

### Metal Free Cutter for 1DB



#### Product Code 7794

The cutter has been specially designed to remove the outer Jacket from a 1 way DB 5mm tube assembly.

### Diagonal Cutter



#### Product Code 9344

Provides clean cutting of metal products, Direct Bury sheaths and fillers.

### Pliers Square Nose



#### Product Code 7301

Small combination pliers with cutter.

## Tools

### Trimming Knife

**Product Code 7069**

An ergonomically designed handle allows safer operation of this general-purpose knife. (Knife holder not included)



### Dismantling Knife

**Product Code 70935**

Fixed, curved stainless steel blade with guide shoe & slip guard handle. Suited to dismantling DB tube assemblies. Supplied with protective blade cap.



### Longitudinal Sheath Stripper

**Product Code 7001**

This tool can be used to strip the sheath from around the FibreFlow™ microduct without damaging it. The unwanted tube that surrounds the fibre can be stripped off with ease.

**Product Code 7001B**

Replacement blades



### Cable Cutting Tool

**Product Code 072699 100**

Cable Cutting Tool

**Product Code 072699 110**

Replacement blades



### Rotational Sheath Stripper

**Product Code 7071**

This is used for cutting round sheathed product rotationally, for gaining access to the primary tubes underneath the sheathed product.

This is suitable for entering the Direct Buried (DB) product from 12mm - 44mm.



### Duct clipper

**Product Code 072799 167**

Dimensions: 6-67mm

**Product Code 072799 016**

Dimensions: 3-16mm

This is used for cutting round sheathed product rotationally, for gaining access to the primary tubes underneath the sheathed product.



## Tools

### Heavy-Duty Scissors



**Product Code 7039**

These scissors can be used for many things when working with FibreFlow™. They are heavy-duty and can cut through foil, sheath, rope, etc.

### FibreFlow™ Microduct Rotational Cutter



**Product Code 7299**

This hand-held stripping tool is for stripping cable jackets, cable sub assemblies and microduct both longitudinally and circumferentially. There are three adjustable blades on different faces to facilitate different cutting operations and depths of 3.2mm to 5.5mm.

### Screwdriver Pack



**Product Code 9345**

A 6 piece screwdriver set used for general engineering work, maintenance, instrument and terminal assemblies etc.

Contains:

- Pozi 1 & 2
- Slotted 2.5, 4, 5.5 & 6.5

### Junior Hacksaw



**Product Code 7298**

Junior Hacksaw extremely useful when cutting sub duct and FibreFlow™ tube bundle.

### Brush Sash Tool 6A



**Product code 7300**

A useful brush for the removal of dust and dirt from inside the blowing head or the mating surfaces of a closure.

### Microduct Rounding Tool (x4)



To round microducts after cutting and before adding a connector.

**Product Code 7949 (bag of 4)**

Can be used with microducts that have internal diameters of 2.1mm, 3.5mm and 8mm



**Product Code 71437**

Can be used with microducts that have internal diameters of 10mm – 14mm

### Collet Locking Tool



**Product code 7236**

This tool ensures that the FibreFlow™ microduct is correctly locked into the connector.

Air Blown Fibre  
FibreFlow™ FTx  
FibreFlow™ Customers  
Fibre Products  
Sub-Duct  
Tube Bundle  
Accessories  
Installation Equipment  
Tools  
Training  
Terms & Conditions  
Index



## Tools

### FibreFlow™ Primary Tube Cutter

This tool gives a clean, straight cut to the FibreFlow™ microduct before inserting into a connector.

**Product Code 7014**

Maximum cutting diameter is 12.7mm.



**Product Code 72799 008**

Dimensions: 8-12mm

### Duct cutter

**Product Code 72799 012**

Dimensions: 3-14mm



### 42 mm Heavy-Duty Cutters

**Product Code 7068**

**Product Code 9346 (included in Tool kit)**

For easy cutting of all FibreFlow™ products, especially the DB type.

Cutting range is from 10 - 42mm outer diameter.



9346



7068

### Thick Wall Microduct Cutter

**Product Code 70768**

For cutting and preparing Thick Wall Microduct.

6mm-25mm Capacity.

**Product Code 70769**

Spare blade



### Plastic shears

**Product Code 072799 130**

Dimensions: 26mm



**Product Code 072799 150**

Dimensions: 50mm



**Product Code 70108**

Dimensions: 63mm

**Product Code 70108B**

Spare blade



## Tools

### Profile Stripper



**Product Code 70518**  
Dimensions: 26-52mm



**Product Code 70519**  
Dimensions: 45-75mm

### Fibre Stripper



**Product Code 9342**  
A tool to remove the outer jacket and aid the breakout of individual fibres from the Emtelle 2 or 4 fibre unit.

### Stripper Fibre 10A



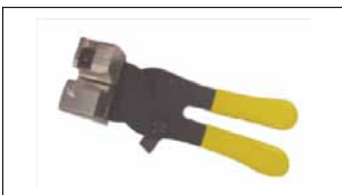
**Product Code 7335**  
A precision tool used to remove the primary coating from fibres.

### Jacket Stripping Tool



**Product Code 7562**  
Used in the removal of outer sheaths of Emtelle fibre units and used in the crimping of blowing beads (codes 7318A & 7512A)

### Web Slitting Tool



**Product Code 9418**  
Suitable for slitting the web on Figure 8 Aerial Tube Assemblies

## Tools

### Microcable FU Stripper

#### Product Codes 9719A, 9719B

Designed for removing optical fibre cable jackets up to 3mm diameter and 900um buffer.

#### Features

- Guide bushes position fibre between two opposing blades
- Range of bushes supplied to suit various diameters
- Cutting depth of blades adjustable to suit jacket
- Includes case, bushes and spare blades

Use with Emtelle Microcable FU

2f and 4f: Blue bushes

8f and 12f: White bushes



Product Code	Description
9719A	Microcable FU Stripper Includes case, bushes and spare blades
9719B	Microcable FU Bushes Set of spare guide bushes

### Longitudinal FibreFlow™ Microduct Stripper

#### Product Code 7064

This is used on products where a rip cord is not available. It will cut along 3mm thick sheaths and through glass reinforcement. There are three different spacers for cutting through different sizes of sheath.



### Hand Bevel Tool

#### Product code 072681 030



### Plastic bevel tool

#### Product Code 72681 040

Dimensions: 4-36mm



## Tools

### Aluminium Bevel Tool



**Product Code 72681 050**

Dimensions: 10-54mm

### Steel bevel tool



Product Code	Dimensions mm
72600 025	25
72600 032	32
72680 040	40
72680 050	50
72680 063	63
7925	20-63

### Wrench for 40mm and 50mm



Product Code	Dimensions mm
072799 055	40-50
7923	40-75

### Chain cutter for multi duct



**Product Code 072799 175**

Dimensions: 40-50mm

**Product Code 072799 176**

Extra Chain

Dimensions: 40-50mm

### Note

The make-up colour of some tools may differ slightly, however this will not affect the tool functionality.

## Consumables

### Splice Protectors

Product Code	Description	Quantity
7914T	Crimp splice protector	150/box
70856	Heat shrink splice protector 30mm	100/bag
9601S	Heat shrink splice protector 40mm	4/bag
7610	Heat shrink splice protector 45mm*	100/bag

\*Different sizes available on request



7914T



7610

### Swivels and Fuses

These are used for installation of FibreFlow™ Tube Bundle into pre-roped duct. They should be connected between the cable pulling sock and the draw rope. The swivel stops the rope twisting during installation and the fuse stops the cable being over-tensioned. Any cables which require an installation force of 1kN or less should be installed by hand.

Product Code	Description	Unit of Issue
7084	Connector Swivel	each
7085	Shear Pin 2kN	10
7086	Shear Pin 3kN	10
7087	Shear Pin 4.5kN	10
71122	Fused Swivel 22mm	each



### Cable Pull Sock

These are used to install any size of FibreFlow™ sheathed products by pulling. An expandable woven steel sleeve grips lightly onto cables as pulling tension is applied.

Product Code	Description
7081	6-10mm
71128	10-13mm
7082	10-20mm
71127	13-16mm
7083	20-30mm



### Blowing Beads

These beads are fixed to the end of the fibre before blowing starts. It guides the fibre through connectors and around sharp bends.

Product Code	Description	Unit of Issue
7318A	2/4 Fibre	25
7512A	6/8/12 Fibre	25



## Consumables

### Cleaning Sponge



Sponge 5/3.5mm

Used to remove foreign objects and clean microducts. Other sizes may be available on request. SIZES LISTED ARE FOR INTERNAL DIAMETERS

Product Code	Description
7063	Sponge 3.5mm
7063A	Sponge 5mm
7063B	Sponge 8mm
7063C	Sponge 10mm
7063D	Sponge 12mm
71303	Sponge 14mm
71302	Sponge 16mm
71299	Sponge 18mm

### Resin Pack



#### Resin Pack 9B – Product Code 7077

The resin pack is used to fill the interstices of the FibreFlow™ Tube Bundles to stop water and gas migration. This is normally used at entry points to buildings. The small container is added to the large container to obtain the correct mix. Assembly sealant is used to seal the cable so the resin does not pour all the way down the assembly.



#### Resin Pack 10B – Product Code 70688

Resin Pack 10B is a two component polyurea compound specifically formulated for use as a self curing closure sealant system for sealing polyethylene sheathed telecommunications cables into the bases of dome closures. This product is supplied in a two component cartridge containing both base material and hardener. Mixing is achieved using the static mixer nozzle supplied in the kit. Supplied with 3 nozzles, degreasing wipes, disposable gloves. Cartridge fits standard 425mm mastic/skeleton gun.

## Consumables

### Fibre Restraint Methods

At splice locations which are subject to thermal expansion/contraction of the microduct or vibration, it is essential that an Emtelle approved method of fibre restraint is used. Examples of such splice locations which can experience significant solar heating or vibration are (but not limited to):

- street cabinets
- access chambers
- installations next to railway tracks

The fibre restraint solutions approved by Emtelle are:-

- Lock and Block
- Fibre Grip Connector (5-3mm and 8-3mm) (pack of 10 kits)
- Fibre Grip Microduct (3.5mm bore) (pack of 100)



	Lock-and-Block		Fibre Grip Microduct	Fibre Grip Connector	
<b>Type</b>	Adhesive system based on a 2-part epoxy resin.		Tapered rubber stopper inserted into microduct	Tapered rubber stopper held in tapered connector	
<b>Product Code</b>	5mm	12mm	70207	5-3mm	7-3mm
	9313	9731		70183	71074
<b>Water Block</b>	Yes		Yes	Yes	
<b>Restraint Ability</b>	High (12N)		Medium (1N)	Medium (1N)	
<b>Compatible microduct OD/ID</b>					
3/2.1mm	Yes		No	Yes	
5/3.5mm	Yes		Yes	Yes	
8/3.5mm	Yes		Yes	Yes	
8 to 16mm OD	Yes		No	No	
Aerial	Yes		No	No	
Microcable Fibre Unit	2, 4, 8, 12		2, 4	2, 4	
Transport Tube if required 3/2.1mm Code 60001	Yes		No	Yes	

If the splice location is temperature stable then fibre unit restraint may not be necessary. Please contact your local Emtelle representative for advice.

### Fibre Grip Microduct



Device for restraining and water blocking Emtelle Fibre Units (2f and 4f) in microduct with a 3.5mm bore. The device is tapered with a central passage. Fibre unit is threaded onto the device which is then pushed into the end of a 3.5mm bore microduct.

Product Code	Description	Unit
70207	Rubber Stop 3.5/0.8mm	Bag of 100
9873	Rubber Stop 3.5/0.8mm	Bag of 500
71350	Rubber Stop 3.5/0.8mm split	Bag of 500

## Consumables

### Lock and Block

The "lock and block" provides an enhanced water-block and retention method for Emtelle microcable fibre units (all fibre counts up to and including 12 fibres) in 3mm\*, 5mm, 7mm\*, 8mm\* 10mm\*, 12mm, 14mm\* and 16mm\* Emtelle microducts. (\*Note 7, 10, 14, 16mm with reducer/enlargers)

The fibre unit is retained by bonding the fibre unit's base to the resin blocking stem (5mm or 12mm) which fits into an appropriate connector.



5mm Kit for 3mm, 5mm, 8mm Microduct OD



12mm Kit for 7mm, 10mm, 12mm, 14mm, 16mm Microduct OD

Product code	Description
9313	1 x Two part Epoxy Adhesive dispensing gun 2 x Two part Epoxy Adhesive 30 x Two part Epoxy Adhesive Mixing Nozzle 100 x Resin Blocking Stems

Product code	Description
9731	1 x Two part Epoxy Adhesive dispensing gun 2 x Two part Epoxy Adhesive 30 x Two part Epoxy Adhesive Mixing Nozzle 50 x Locking Stem (12mm)

9312	100 x Resin Blocking Stems
9241	Two part Epoxy Adhesive dispensing gun
9240	Two part Epoxy Adhesive
9242	30 x Two part Epoxy Adhesive Mixing Nozzle

9730	50 x Locking Stem
9241	Two part Epoxy Adhesive dispensing gun
9240	Two part Epoxy Adhesive
9242	30 x Two part Epoxy Adhesive Mixing Nozzle

### Fibre Grip Connector

Device for restraining and water blocking Emtelle Fibre Units (2f and 4f). The device uses a reducing connector with a small rubber insert which restrains the fibre unit when microduct is fitted. Transport tube (3mm) can then be fitted if required. Note that restraint of 2f and 4f in 3/2.1mm microduct can be achieved provided appropriate microduct is used to activate the rubber insert.



Order Code:	70183	71074
Description	4f Fibre Grip Connector 5-3	4f Fibre Grip Connector 7-3
Pack Quantity	Bag of 10x connectors with 10x 4f Fibre Grip	
Connector	9925	70407
Microduct Size	5/3.5mm to 3/2.1mm	7/5.5mm to 3/2.1mm
Connector Body	Clear	Clear
Length:	32mm	37mm
Diameter:	12mm	15mm



## Consumables

### Lubricant

#### Product Code 70575

Reduces frictional drag during the blowing of small diameter fibre optic mini cable into microduct.  
Supplied: 24 x 240ml



### Mille-Tie

A plastic fastener suitable for securing tube bundles in position.

Product code	Description	Unit
7741	9mm x 305mm	Box of 100



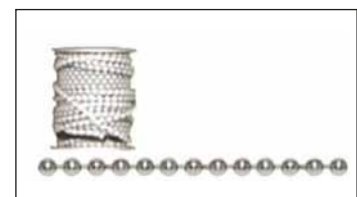
### Microduct Integrity Test (DIT) Kit

#### Product Code 71608

The Emtelle Microduct Integrity Test Continuity Catcher is a product which is used for catching the Emtelle recommended "Ball Chains" when carrying out Emtelle continuity tests on Microducts and tube bundles.



This Duct Integrity Test Kit is suitable for 8/5mm, 12/8mm, 12/10mm and 14/10mm ducts. It can be made suitable to be used in conjunction with other duct sizes by using a suitable reducer/enlarger in between the adaptor and catcher.



#### Ball Chain

The following Ball Chain sizes are recommended by Emtelle for Calibration into Microduct sizes shown in the table below.

Product Code	Tube OD (ømm)	Tube ID (ømm)	Ball chain diameter (ømm)	Diameter fill ratio - ball chain to tube ID (%)	Emtelle recommended maximum cable diameter (ømm)	Minimum bend radius for blowing fibre bundle / cable into microduct (unless tube bundle has a larger bend radius)	Length Supplied
71619	5	3.5	2.38	68%	1.6	15cm	5 x 30cm
71619	7	3.5	2.38	68%	1.6	15cm	5 x 30cm
71619	7	4	2.38	60%	1.6	15cm	5 x 30cm
71620	8	5	3.9	78%	3.0	15cm	5 x 30cm
71620	10	6	3.9	65%	3.0	30cm	5 x 30cm
71621	10	8	6.15	77%	6.0	35cm	5 x 20cm
71621	12	8	6.15	77%	6.0	35cm	5 x 20cm
71622	12	10	8.15	82%	7.3	35cm	5 x 20cm
71622	14	10	8.15	82%	7.3	35cm	5 x 20cm
71622	16	10	8.15	82%	7.3	35cm	5 x 20cm
71622	16	12	8.15	68%	9.5	35cm	5 x 20cm
71623	18	15	12.7	85%	12.0	35cm	5 x 20cm

If other sizes are required, please contact your local Emtelle representative for details.

## Consumables

### Heat Shrink End Caps



Seals and protects cable ends providing environmental protection. Cable caps are internally coated with a hot-melt adhesive.

Product Code	Product description	Suits cable/duct/bundle diameter	Cold Diameter mm	Diameter after shrinking mm
7060	12/4mm end cap	5 – 8mm	12	4
7059	16/6mm end cap	7 – 10mm	16	6
7058	20/8mm end cap	9 – 14mm	20	8
7587	26/11mm end cap	12 – 18mm	26	11
7057	36/15mm end cap	16 – 22mm	36	15
7588	40/17mm end cap	18 – 28mm	40	17
7480	57/22mm end cap	24 – 45mm	57	22

### Stretch End Cap



Re-usable stretch end cap suitable for sealing the open end of a microduct assembly or subduct.

Product Code	Diameter Range	Pack Sizes	
7723	10mm – 15mm	100 per bag	1000 / box
7725	15mm – 21mm	100 per bag	1000 / box
7727	21mm – 29mm	50 per bag	500 / box
7729	29mm – 38mm	20 per bag	200 / box
7730	38mm – 45mm	20 per bag	200 / box



# FibreFlow™ TRAINING

FibreFlow™  
air blown fibre

by Em

# Training

Emtelle compiles and develops its courses to suit our customers' needs. We have deployed air blown fibre all over the world, so you can be sure of our expertise. Training can be provided at Emtelle offices or at the customer's office\*. In addition, Emtelle works with external training partners. Experts at these companies can provide high-quality instruction for technicians wishing to gain proficiency in Emtelle's air blown fibre technology and products. Emtelle also provides two greatly respected courses, Installation & Maintenance and Design & Engineering. Completion of these courses can lead to Registered Communications Distribution Designer (RCDD) accreditation by BICSI, a global non-for-profit organisation committed to the advancement of Information Transport Systems. Emtelle's air blown fibre courses are the only ones of their kind that lead to BICSI re(qualification).

### We offer the following courses:

- FibreFlow™ Installation and Maintenance
- Design and Engineering of FibreFlow™ Networks
- Mini Cable Installation and Maintenance
- Aerial Installation Training
- Train the Trainer for Instructors
- Supervisor Training

### Features

- Learn the latest Fibre-to-the-Home (FtTH) developments and what makes FtTH so important for delivering high-speed communication to customers.
- Courses are limited to small numbers—six for all practical courses—so when we say it is a hands-on course, we mean YOUR hands on!
- You will receive a comprehensive, easy-to-follow course manual with clear diagrams and photographs, many of actual installations. If you are interested in the Design course, we will show you many examples of prestigious installations, such as the biggest FtTH deployment in the world so far in Nuenen the Netherlands, the Sky Tower in New Zealand, Perth Metro ring, Sydney Harbour Bridge, Mexico Municipality, Zurich Airport, Woodlands (intelligent neighbourhood) Estate in South Africa, Reserve Bank of South Africa in Pretoria, and the award-winning innovation project for the Ministry of Defence type 45 destroyer.
- We use up-to-date training technology. Our courses are presented using multimedia projectors and we include actual products, when needed, to enhance core concepts and understanding.
- On our Installation and Maintenance course, you will use a range of equipment and materials that you will see in the field.

\*subject to availability and minimum number.

### Installation and Maintenance - Code 7505

- Tube bundles – different types of tube bundles and identification of primary tubes
- Handling, deploying and testing of the tube bundles
- Health and safety procedures
- Tube connectors and jointing enclosures
- Fibre bundles stripping and handling techniques
- Blowing equipment and operation
- Blowing techniques including point-to-point blows, centre blowing and onward blowing
- Maintenance of the blowing equipment and changing blowing head to accommodate different fibre sizes
- Choosing maximum blowing distances for certain tube and fibre combinations
- Installation of Emtelle approved closures

### Design and Engineering - Code 7800

- Appreciate the key components and products used in an air blown fibre network
- Learn the importance of product bend radius
- Learn what effect water and ice have on the individual products and the air blown fibre system
- Appreciate how blowing distance is determined
- Learn about the various closure types and where they are used in the network
- Learn what components are needed to connect a customer
- Understand the importance of manhole selection
- Learn about the strengths of Emtelle's portfolio consisting of Tube Bundles, Fibre Products, Accessories and Blowing Equipment
- Learn about the various deployment techniques
- Learn how to extend the blowing distance and the equipment needed
- Learn how to plan for a repair
- Work through detailed planning examples of actual deployments



# Training

## Mini Cable Installation - Code 9230

- Handle, deploy and test tube bundles
- Prepare different tube bundles and identification of primary tubes
- Apply health and safety procedures
- Understand the importance of tensile and thermal tube assembly relaxation
- Use tube connectors and jointing enclosures
- Operate blowing equipment, including the fleeting machine
- Understand and apply blowing techniques including point-to-point blows, centre blowing and series blowing
- Maintain the blowing equipment and change out blowing head parts to accommodate different mini cable sizes

## \*Train the Trainer - Code 9231

- Learn how to prepare for classroom instruction and the importance of the six Ps
- Know the importance of speaking at the correct rate to get your message across
- Know how to deal with difficult questions
- Gain confidence by working through specially prepared exercises
- Appreciate the importance of using models, flip charts, OHPs and PPT presentations

## Supervisor Training

For major projects Emtelle can provide training for supervisors to ensure installations are carried out to FibreFlow™ Installation & Maintenance standards. Please contact your local Emtelle representative for further information.

\*Note: This course is only available to FibreFlow™ Registered Installers with a minimum of 6 months installation experience.

## Aerial Installation Training – Code 9527

Provide suitable aerial installation training and assessment for blown fibre installation engineers. The course will cover the following topics;

- Health and Safety as it relates to working at height and in and around access chambers
- Handling, Deploying and Installing of aerial tight protected microduct products
- Stripping of aerial tight protected microduct products
- Installation of closures both aerial and Customer Lead In Points
- Installation of Mid Blow closures
- Operation of Blowing equipment for point to point and mid blow operations



Air Blown Fibre

FibreFlow™ FTx

FibreFlow™ Customers

Fibre Products

Sub-Duct

Tube Bundle

Accessories

Installation Equipment

Tools

**Training**

Terms & Conditions

Index



**Emtelle UK Limited**

**Conditions Of Sale Of Goods**

**1. INTERPRETATION**

1.1 In these terms and conditions the following words have the following meanings:

- “Buyer” the person(s) or company whose order for the Goods is accepted by the Company;
- “Company” Emtelle UK Limited of Haughhead, Hawick, Scotland, TD9 8LF;
- “Contract” any contract between the Company and the Buyer for the sale and purchase of the Goods;
- “Goods” any goods which the Company is to supply to the Buyer (including any of them or any part of them);
- “Force Majeure” means all causes beyond the reasonable control of a party to this Agreement including, without limitation, acts of god, war, fire, industrial disputes, flood, tempest, national emergencies and the difficulty in obtaining materials except at unreasonably enhanced prices due to any of the foregoing reasons;
- “Intellectual Property Rights” means patents, trademarks, service marks, copyright, design rights and moral rights together with any or all goodwill relating or attached thereto;

1.2 The headings in these terms and conditions are for convenience only and shall not affect their interpretation.

**2. FORMATION AND INCORPORATION**

- 2.1 Subject to any variation under conditions 2.4, the Contract will be on these terms and conditions set out below to the exclusion of all other terms and conditions (including any terms or conditions which the Buyer purports to apply under any purchase order, confirmation of order or similar document.)
- 2.2 Each order for Goods by the Buyer from the Company shall be deemed to be an offer by the Buyer to purchase Goods subject to these terms and conditions.
- 2.3 No terms or conditions endorsed upon, delivered with or contained in the Buyer’s purchase order, specification or similar document will form part of this Contract simply as a result of a reference to such document being referred to in this Contract.
- 2.4 Any variation to these terms and conditions and any representations about the Goods shall have no effect unless expressly agreed in writing and signed by an authorised signatory of the Company.
- 2.5 Acceptance of delivery of the Goods shall be deemed to be conclusive evidence of the Buyer’s acceptance of these terms and conditions.
- 2.6 The Buyer must ensure that the terms of its order and any applicable specification are complete and accurate.
- 2.7 Any quotation is given on the basis that no contract will come into existence until the Company despatches an acknowledgment of

order to the Buyer. Any quotation is valid for a period of 30 days from its date provided the Company has not previously withdrawn it.

2.8 The Company accepts orders subject to the absolute right to cancel and rescind contracts in cases where the Buyer or the terms stated are not acceptable to the Company’s insurers or, where applicable, to the Export Credit Guarantee Department or to any other Governmental or other body guaranteeing overseas contracts.

**3. DESCRIPTION**

- 3.1 The description of the Goods shall be as set out in the Company’s quotation.
- 3.2 All drawings, descriptive matter, specifications and advertising issued by the Company or the manufacturer of the Goods and any descriptions or illustrations contained in the Company’s or manufacturer’s catalogues or brochures are issued or published for the sole purpose of giving an approximate idea of the Goods described in them. They will not form part of the Contract.
- 3.3 The Company may make any changes to the specification, design, materials or finishes of the Goods which are required to conform with any applicable safety or other statutory requirements.

**4. DELIVERY**

- 4.1 If the quoted price does not include carriage, delivery will take place at the Company’s place of business.
- 4.2 The Buyer will take delivery of the Goods within 7 days of the Company giving it notice that the Goods are ready for delivery.
- 4.3 If the quoted price includes carriage, delivery will be deemed to take place at the point of entry to the Buyer’s works or site specified in the Contract and the Goods shall be delivered by such means as the Company thinks fit unless the Buyer has specified in its order the details of the contract with a carrier which it reasonably requires, having regard to the nature of the Goods and the other circumstances of the case.
- 4.4 The carrier shall be deemed to be the Buyer’s agent except for the purposes of sections 44, 45 and 46 of the Sale of Goods Act 1979.
- 4.5 Delivery of the Goods shall be accepted at any time of day.
- 4.6 Any dates specified by the Company for delivery of the Goods are approximate only and may not be made of the essence by notice. If no dates are so specified, delivery will be within a reasonable time.
- 4.7 Subject to the other provisions of these terms and conditions the Company will not be liable for any loss (including loss of profit), costs, damages, charges or expenses arising directly or indirectly out of delay or failure to deliver the Goods (even if caused by the Company’s negligence).
- 4.8 The Buyer must accept delivery of the Goods and pay for them in full unless the Buyer shall have served notice on the Company requesting delivery and shall not have received the Goods within four weeks thereafter in which event the Buyer may cancel this Agreement to the extent it relates to the Goods which were subject to such

- 4.9 delivery without further liability for the Goods.
- 4.9 For orders of less than £1000 (ex VAT) the Company reserves the right to charge carriage at the rate charged by the haulier to the Company.
- 4.10 The Buyer will be responsible for loading and offloading and will, unless otherwise agreed, provide at its expense at the delivery point adequate and appropriate equipment and manual labour for off-loading or loading the Goods.
- 4.11 The Buyer will indemnify the Company against any liability and expense (whether arising under statute or common law) caused by the Buyer’s failure to provide appropriate equipment and manual labour for off-loading or loading (whether or not the off-loading or loading is supervised by or on behalf of the Buyer) for:
  - 4.11.1 any personal injury to or death of any of the Company’s employees, agents or sub-contractors or any third party; and
  - 4.11.2 any damage to or loss of any property of the Company, its employees, agents or sub-contractors or any third party.
- 4.12 The Company may deliver to the Buyer Goods up to 5% more or 5% less than the quantity ordered. The Buyer shall accept delivery of Goods within such limits without objection but invoices shall be adjusted to actual quantities.
- 4.13 Where the quoted price includes carriage the Company will not be liable for loss or damage in transit unless notice of such loss or damage is given to the carriers and to the Company:-
  - 4.13.1 in the case of extrusions at the time of delivery, by endorsement on the delivery documentation;
  - 4.13.2 in all other cases by written notification to the Company within 3 days of delivery and by endorsement on the delivery documentation.

**5. NON-DELIVERY**

- 5.1 The quantity of any consignment of Goods as recorded by the Company upon despatch from the Company’s place of business shall be conclusive evidence of the quantity received by the Buyer on delivery unless the Buyer can provide conclusive evidence proving the contrary.
- 5.2 The Company shall not be liable for any non-delivery of Goods (even if caused by the Company’s negligence) unless written notice is given to the carrier and the Company within 3 days of the date when the Goods would in the ordinary course of events have been received.
- 5.3 Any liability of the Company for the non-delivery of any one order of Goods shall be limited to replacing the Goods for that order within a reasonable time or issuing a credit note at the pro rata contract rate against any invoice raised for such Goods.

**6. PACKING**

- All pallets and returnable packaging and containers will remain the property of the Company at all times. It is the Buyer’s responsibility to return all packing and containers to the Company and should such packing and containers not be returned with
- 7.1 If the Buyer fails to take delivery of any of the Goods when they are ready for delivery or to

provide any instructions, documents, licences or authorisations required to enable the Goods to be delivered on time (except because of the Company's fault) risk in the Goods will pass to the Buyer (including, without limitation, for loss or damage caused by the Company's negligence), the Goods will be deemed to have been delivered and (without prejudice to its other rights) the Company may:

- 7.1.1 store or arrange for the storage of the Goods until actual delivery or sale and charge the Buyer for all related costs and expenses (including, without limitation, storage and insurance); and/or
- 7.1.2 following reasonable notice to the Buyer sell any of the Goods at the best price reasonably obtainable in the circumstances and charge the Buyer for any shortfall below the price under the Contract.
- 7.2 The Company is not responsible for demurrage charges or additional costs resulting from delay in unloading.

**8. RISK/OWNERSHIP**

- 8.1 Risk of damage to or loss of Goods shall pass to the Buyer upon delivery.
- 8.2 Notwithstanding delivery and the passing of risk, and solely for the purposes of securing payment of all monies due or to become due to the Company by the Buyer on any account, ownership of the Goods shall not pass to the Buyer until the Company has received in full (in cash or cleared funds) all sums due to it in respect of:
  - 8.2.1 the Goods; and
  - 8.2.2 all other sums which are or which become due to the Company from the Buyer on any account.
- 8.3 Until ownership of the Goods has passed to the Buyer, the Buyer must:
  - 8.3.1 hold the Goods on a fiduciary basis as the Company's bailee;
  - 8.3.2 store the Goods (at no cost to the Company) separately from all other goods of the Buyer or any third party in such a way that they remain readily identifiable as the Company's property;
- 8.4 The Company shall be entitled to retake possession of any Goods for which the price shall not have been paid in full when due and for that purpose the Company is authorised to enter into any premises of the Buyer or any third party where the Goods are or may be stored and repossess the Goods.
- 8.5 The Company may in respect of all unpaid debts due from the Buyer under this or any other contract have a general lien on all Goods and property of the Buyer in the Company's possession (although such Goods or some of them may have been paid for) and shall after the expiration of twenty eight days written notice to the Buyer be entitled to dispose of such Goods and property as it deems fit and apply the proceeds towards such debts, and remaining sums shall be held on trust.

**9. PRICE AND PAYMENT**

- 9.1 The price for the Goods shall be the Company's quoted price which shall be binding upon the Company only if the Buyer accepts the Company's

quotation within 30 days after which time it may be altered by the Company without notice.

- 9.2 The Company may increase the price of the Goods to reflect any increase in the cost of manufacture or distribution of the Goods which is due to any factor beyond the reasonable control of the Company; this includes (without limitation) foreign exchange fluctuation, currency regulation, alteration of duties and taxes, increase in cost of labour, materials and other manufacturing costs and transport costs, changes in rates of insurance, alterations in duties or import variations, or by reason of any cause beyond the control of the Company
- 9.3 The price for the Goods is exclusive of any value added tax or any other applicable tax which the Buyer shall pay in addition when it is due to pay for the Goods unless this is specifically shown.
- 9.4 All payments shall be made to the Company in the United Kingdom in the currency stipulated in the Company's quotation to the Buyer.
- 9.5 Unless otherwise stated, payment terms are "net monthly account", which is to be interpreted as "payment to be made before the end of the calendar month following the calendar month during which the Goods were invoiced". Time of payment shall be of the essence. No payment shall be deemed to have been received until the Company has received cleared funds.
- 9.6 If the Buyer's account is overdue for payment, the Company reserves the right to withhold or suspend deliveries under this Contract or any other Contract with the same Buyer Any such withholding or suspension shall not give rise to any claim whatsoever by the Buyer and shall be without prejudice to the Company's right to recover any amount due from the Buyer and to the exercise of any of its rights by the Company.
- 9.7 If the Buyer's account is overdue for payment, the Company reserves the right to charge interest at 4% per annum over the UK Base Rate of HSBC plc for the time being in force on the amount overdue.
- 9.8 The right of the Buyer to set off the value of any shortage, defective Goods or Goods not otherwise conforming to the Contract shall be restricted to the specific invoice for the Goods in question and shall not apply to previous or future accounts.

**10. WARRANTY**

- 10.1 In the event of any Goods supplied by the Company and not being of its own manufacture being proved to be defective or failing in service, the Buyer shall be entitled only to, and limited to, such restitution as the Company actually receives from the manufacturer and/or supplier to the Company.
- 10.2 The Company warrants that (subject to the other provisions of these terms and conditions) upon delivery the Goods are, and for a period of 12 months from the date of delivery will be, of satisfactory quality under the Sale of Goods Act 1994 and are fit for the normal purpose for which they have been designed and, where applicable conform to the relevant British Standard.

10.3 The Company shall not be liable for a breach of the warranty in condition 10.2 unless:

- 10.3.1 the Buyer gives written notice of the defect to the Company and, if the defect is as a result of damage in transit, to the carrier within 14 days of:
  - 10.3.1.1 the date of delivery (where the defect would be apparent to the Buyer upon a reasonable inspection); or
  - 10.3.1.2 the date when the Buyer knew or ought reasonably to have known of the defect (where the defect would not be apparent to the Buyer upon a reasonable inspection); and
- 10.3.2 the Company is given a reasonable opportunity after receiving the notice of examining such Goods and the Buyer (if asked to do so by the Company) returns such Goods to the Company for the examination to take place there.
- 10.4 The Company shall not be liable for a breach of the warranty in condition 10.2 if:
  - 10.4.1 the defect arises because the Buyer failed to follow the Company's oral or written instructions as to the storage, installation, commissioning, use or maintenance of the Goods or (if there are none) good trade practice. The Buyer should carry out any and all tests specified in the Emteile UK installation instructions for the Goods before and after installation as detailed in MHT2570. The latest version of these installation instructions can be found at [www.emteile.com/testprocedure](http://www.emteile.com/testprocedure) or can be requested by e-mail from [info@emteile.com](mailto:info@emteile.com); or
  - 10.4.2 the Buyer alters or repairs such Goods without the written consent of the Company; or
  - 10.4.3 the defect in such Goods arises from any design defect in any drawing, design or specification supplied or approved by the Buyer.
- 10.5 If the Buyer makes a valid claim against the Company based on a defect in the quality of the Goods, the Company shall at its option repair or supply replacement Goods (or the defective part) or refund the price of such Goods at the pro-rata contract rate.
- 10.6 If the Company complies with condition 10.5 it shall have no further liability for breach of the warranty in condition 10.2 in respect of the quality of such Goods.
- 10.7 Any defective Goods will belong to the Company and any Goods which are repaired or which are re-supplied will be warranted on these terms and conditions for the unexpired portion of the 12 month period.

**11. LIMITATION OF LIABILITY**

- 11.1 The following provisions set out the entire liability of the Company (including any liability for the acts or omissions of its employees, agents and sub-contractors) to the Buyer in respect of:
  - 11.1.1 any breach of these terms and conditions; and
  - 11.1.2 any representation, statement or tortious act or omission including negligence arising under or in connection with the Contract;
- 11.2 All warranties, conditions and other terms implied by statute or common law (save for the conditions implied by section 12 of the Sale of Goods Act 1979) are excluded from the Contract.
- 11.3 Nothing in these terms and conditions excludes

Air Blown Fibre  
FibreFlow FTx  
FibreFlow Customers  
Fibre Products  
Sub-Duct  
Tube Bundle  
Accessories  
Installation Equipment  
Tools  
Training  
Terms & Conditions  
Index



or limits the liability of the Company for death or personal injury caused by the Company's negligence or fraudulent misrepresentation.

**THE BUYER'S ATTENTION IS PARTICULARLY DRAWN TO THE PROVISIONS OF CONDITIONS 11.4 AND 11.5**

11.4 Subject to conditions 11.2 and 11.3:

11.4.1 notwithstanding the provisions of any other terms and conditions herein, the Company's total liability in contract, tort (including negligence or breach of statutory duty), misrepresentation, restitution or otherwise, arising in connection with the performance or contemplated performance of this contract shall be limited in amount to the amount of the price of the Goods; and the parties agree that this condition is reasonable and that the contract price is based on the level, exclusions and limits of liability in this condition 11.

11.4.2 the Company shall not be liable to the Buyer for:

- (I) loss of profit; or
- (II) loss of business; or
- (III) business interruption; or
- (IV) depletion of goodwill and/or similar losses; or
- (V) loss of anticipated savings;

in each case whether direct, indirect or consequential, or for any claims for consequential compensation whatsoever (howsoever caused) which arise out of or in connection with this Contract, in each of the above cases whether or not caused by the negligence of the Company, its employees, agents or sub-contractors.

11.5 The Buyer shall indemnify the Company against all liability, actions, proceedings, costs, claims, damages or demands in any way connected with this contract brought or threatened to be brought against the Company by any third party except to the extent the Company is liable to the Buyer in accordance with these terms and conditions.

11.6 The Buyer shall indemnify the Company against all damages, penalties, costs and expenses to which the Company may become liable through any work done in accordance with specifications, drawings or special requirements of the Buyer which may involve an infringement or alleged infringement of any Intellectual Property Rights of a third party or may cause any actionable damage or loss to any third party.

**12. PERFORMANCE OF CONTRACT**

12.1 The Company may deliver the Goods by installments and each installment shall be deemed to be sold under a separate contract, and no failure of or delay in delivery of any installment nor any defect in the contents thereof shall entitle the Buyer to treat the contract as repudiated with regard to any remaining installments.

12.2 If subsequent to any contract of sale which is subject to these conditions a contract of sale is made with the same Buyer without express reference to these conditions, such contract,

howsoever made, shall be deemed to be subject to these conditions.

**13. TECHNICAL ADVICE AND INFORMATION**

13.1 The Company may at the request of the Buyer, without being under any obligation to do so, furnish technical advice concerning the use of the Goods and such assistance will be given to the best of the Company's ability but this shall be on the express understanding that any such advice or assistance is given and accepted at the Buyer's risk and the Company shall not be liable for any loss, damage or claims arising therefrom.

13.2 No liability will be accepted for work carried out or material supplied to the Buyer's own drawings, design or specification.

13.3 The submission of a quotation or acceptance of an order by the Company in no way implies any responsibility on its part for any bye law, planning or other approval, which may be required by the Buyer.

**14. FORCE MAJEURE**

Deliveries may be partially or totally suspended by either party during any period in which it is prevented from manufacturing, delivering or taking delivery of the Goods through any event of Force Majeure and if such party notifies the existence of such Force Majeure to the other party in writing. If, because of such Force Majeure, the Company is unable to supply the total requirement of the Goods the Company may allocate its available supply among all of its customers, including those not under contract, as the Company thinks fit. Deliveries so suspended for three months may thereafter during such suspension be cancelled without liability but the Contract between the parties shall otherwise remain unaffected.

**15. PATENTS AND TRADEMARKS**

No representation warranty or indemnity is given by the Company that the Goods do not infringe any Intellectual Property Rights of a third party.

**16. TERMINATION**

16.1 The Contract will terminate immediately upon service of a written notice of termination by the Company on the Buyer on the happening of any one or more of the following events; the Buyer has a bankruptcy order made against him or makes an arrangement or composition with his creditors or otherwise takes the benefit of any Act for the time being in force for the relief of insolvent debtors, or (being a body corporate) convenes a meeting of creditors (whether formal or informal) or enters into liquidation (whether voluntary or compulsory), except a solvent voluntary liquidation for the purpose only of reconstruction or amalgamation, or has a receiver, manager, administrator or administrative receiver appointed of its undertaking or any part thereof, or a resolution is passed or a petition presented to any court for the winding-up of the Buyer or for the granting of an administration order in respect of the Buyer or any proceedings are commenced relating to the insolvency or possible insolvency

of the Buyer or the Buyer suffers or allows any execution whether legal or equitable to be levied on his/its property or obtained against him/it, or fails to observe or perform any of his/its obligations or duties under the Contract or any other contract between the Company and the Buyer or is unable to pay its debts within the meaning of section 123 of the Insolvency Act 1986 or the Buyer ceases to trade.

16.2 The Company's rights contained in condition 8 (but not the Buyer's rights) shall continue beyond the discharge of the Buyer's and the Company's primary obligations under the Contract consequent upon its termination.

16.3 The termination of the Contract howsoever arising shall be without prejudice to the rights and duties of either the Buyer or the Company accrued prior to termination.

**17. GENERAL**

17.1 Time for performance of all obligations of the Buyer is of the essence.

17.2 Each right or remedy of the Company under this Contract is without prejudice to any other right or remedy of the Company whether under this Contract or not.

17.3 Any provision of this Contract which is held by a competent authority to be invalid, void, voidable, unenforceable or unreasonable (in whole or in part) shall to the extent of such invalidity, voidness, voidability, unenforceability or unreasonableness be deemed severable and the other provisions of this Contract and the remainder of such provision shall not be affected.

17.4 Failure by the Company to enforce or partially enforce any provision of this contract will not be construed as a waiver of any of its rights under this Contract.

17.5 The Company may assign, license or sub-contract all or any part of its rights or obligations under this contract without the Buyer's consent.

17.6 This Contract is personal to the Buyer who may not assign, license or sub-contract all or any of its rights or obligations under this Contract without the Company's prior written consent.

17.7 The parties to this Agreement do not intend that any of its terms will be enforceable by virtue of the Contracts (Rights of Third Parties) Act 1999 by any person not a party to it.

17.8 Any notice required or permitted to be given by either party to the other under these conditions shall be in writing addressed to that other party at its registered office or principal place of business or such other address as may at the relevant time have been notified pursuant to this provision to the party giving the notice.

17.9 The formation, construction, performance, validity and all aspects of this Contract are governed by English Law and the parties submit to the exclusive jurisdiction of the English Courts.

FibreFlow™ Fibre Products

Product Code	Description	Page	Product Code	Description	Page
9032	Microcable FU 2fu SM G.652d	16	9367	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 30m	12
7590	Microcable FU 4fu SM G.652d	11	9368	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 50m	12
90024	Microcable FU 6fu SM G.652d	11	9369	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 70m	12
7589	Microcable FU 8fu SM G.652d	11	9370	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 100m	12
7575	Microcable FU 12fu SM G.652d	11	9371	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 150m	12
9506	Microcable FU 2fu SM G.657A1	11	9372	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 200m	12
9507	Microcable FU 4fu SM G.657A1	11	9373	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 250m	12
9509	Microcable FU 8fu SM G.657A1	11	9374	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 30m	12
9510	Microcable FU 12fu SM G.657A1	11	9375	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 50m	12
90159	Microcable FU 4fu SM G.655	11	9376	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 70m	12
90160	Microcable FU 8fu SM G.655	11	9377	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 100m	12
9179	Microcable FU 12fu SM G.655	11	9378	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 150m	12
9021	Microcable FU 2fu MM OM1 62.5/125	11	9379	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 200m	12
7578	Microcable FU 4fu MM OM1 62.5/125	11	9380	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 250m	12
7580	Microcable FU 8fu MM OM1 62.5/125	11	9381	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 30m	12
7582	Microcable FU 12fu MM OM1 62.5/125	11	9382	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 50m	12
7653	Microcable FU 2fu MM OM2 50/125	11	9383	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 70m	12
7577	Microcable FU 4fu MM OM2 50/125	11	9384	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 100m	12
7583	Microcable FU 8fu MM OM2 50/125	11	9385	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 150m	12
7581	Microcable FU 12fu MM OM2 50/125	11	9386	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 200m	12
9058	Microcable FU 2fu MM OM3 50/125	11	9387	Pre-Connect 2FU SM G.652d (2 connectors) LC/APC 250m	12
6669	Microcable FU 4fu MM OM3 50/125	11	9388	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 30m	12
6668	Microcable FU 8fu MM OM3 50/125	11	9389	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 50m	12
7714	Microcable FU 12fu MM OM3	11	9390	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 70m	12
9180	Microcable FU 2fu OM4 50/125	11	9391	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 100m	12
9181	Microcable FU 4fu OM4 50/125	11	9392	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 150m	12
9182	Microcable FU 8fu OM4 50/125	11	9393	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 200m	12
9013	Microcable FU 12fu OM4 50/125	11	9394	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 250m	12
9430	Pre-Connect 2FU SM G.652d (1 connector) SC/APC 30m	12	9395	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 30m	12
9431	Pre-Connect 2FU SM G.652d (1 connector) SC/APC 50m	12	9396	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 50m	12
9432	Pre-Connect 2FU SM G.652d (1 connector) SC/APC 70m	12	9397	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 70m	12
9433	Pre-Connect 2FU SM G.652d (1 connector) SC/APC 100m	12	9398	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 100m	12
9434	Pre-Connect 2FU SM G.652d (1 connector) SC/APC 150m	12	9399	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 150m	12
9435	Pre-Connect 2FU SM G.652d (1 connector) SC/APC 200m	12	9400	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 200m	12
9436	Pre-Connect 2FU SM G.652d (1 connector) SC/APC 250m	12	9401	Pre-Connect 4FU SM G.652d (4 connectors) SC/APC 250m	12
9437	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 30m	12	9402	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 30m	12
9438	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 50m	12	9403	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 50m	12
9439	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 70m	12	9404	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 70m	12
9440	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 100m	12	9405	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 100m	12
9441	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 150m	12	9406	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 150m	12
9442	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 200m	12	9407	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 200m	12
9443	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 250m	12	9408	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 250m	12
9444	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 30m	12	9409	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 30m	12
9445	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 50m	12	9410	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 50m	12
9446	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 70m	12	9411	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 70m	12
9447	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 100m	12	9412	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 100m	12
9448	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 150m	12	9413	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 150m	12
9449	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 200m	12	9414	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 200m	12
9450	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 250m	12	9415	Pre-Connect 4FU SM G.652d (4 connectors) LC/APC 250m	12
9451	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 30m	12	9476	Pre-Connect Scissor Stand	12
9452	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 50m	12	9424	Pre-Connect Bracket Assembly	12
9453	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 70m	12	72373	Pre-terminated Fibre Unit with MPO	12
9454	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 100m	12	60963	Pre-Installed FU 8/3.5mm + 2 PIFU MM OM3	12
9455	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 150m	12	8476	Pre-Installed FU 8/3.5mm + 2 PIFU G652d	12
9456	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 200m	12	8497	Pre-Installed FU 8/3.5mm + 4 PIFU G652d	12
9457	Pre-Connect 2FU SM G.652d (1 connector) LC/APC 250m	12	60982	Pre-Installed FU 8/3.5mm + 2 PIFU G657A1	12
9360	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 30m	12	90178	Mini Cable 12f MHT2423	13
9361	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 50m	12	90175	Mini Cable 12f MHT441	13
9362	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 70m	12	90125	Mini Cable 24f MHT2423	13
9363	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 100m	12	90131	Mini Cable 24f MHT440	13
9364	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 150m	12	90134	Mini Cable 24f MHT441	13
9365	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 200m	12	90179	Mini Cable 36f MHT2323	13
9366	Pre-Connect 2FU SM G.652d (2 connectors) SC/APC 250m	12	90176	Mini Cable 36f MHT441	13

**FibreFlow™ Fibre Products**

Product Code	Description	Page
90128	Mini Cable 48f MHT2323	13
90132	Mini Cable 48f MHT440	13
90135	Mini Cable 48f MHT441	13
90180	Mini Cable 60f MHT2323	13
90177	Mini Cable 60f MHT441	13
90129	Mini Cable 72f MHT2323	13

Product Code	Description	Page
90133	Mini Cable 72f MHT440	13
90136	Mini Cable 72f MHT441	13
90181	Mini Cable 84f MHT2323	13
90130	Mini Cable 96f MHT2323	13
90124	Mini Cable 96f MHT440	13
90081	Mini Cable 144f MHT2615	13

**FibreFlow™ Tube Bundle**

Product Code	Description	Page
<b>Loose Protected Microduct</b>		25
<b>Microduct / Primary tube</b>		26
62342	3DBmf combo 14/11mm	39
62343	3DBmf 14/10mm	39
62344	3DBmf combo 16/10mm	39
62228	4DBmf 14/11mm	39
61843	4DBmf 14/10mm	39
62215	6DBmf 12/8.5mm	39
62345	6DBmf 14/10mm	39
62227	12DBmf 6/3mm	39
62346	16DBmf 7/3.5mm	39
<b>Tight Protected Microduct</b>		28
<b>Aerial</b>		34
8194	Drop 5/3.5mm x 1000m	34
60889	Drop 5/3.5mm x 5000m	34
60789	Drop 6/2.7mm x 4000m	34
61514	F8 1-way 6/2.7mm + copper x 2000m	34
61515	F8 1-way 6/2.7mm + copper PIFU x 2000m	34
61165	F8 1-way 10/8mm x 2000m	34
60662	F8 1-way 14/10mm x 1000m	34
61166	F8 4-way 4/2.7mm x 4000m	34
60890	F8 4-way 5/3.5mm x 4000m	34
60893	F8 4-way 10/8mm x 1000m	34
61169	F8 4-way 10/8mm x 2000m	34
61170	F8 4-way 12/10mm x 1000m	34
60752	F8 7-way 4/2.7mm x 4000m	34
8195	F8 7-way 5/3.5mm x 4000m	34
60758	F8 7-way 10/8mm x 1000m	34
60759	F8 7-way 12/10mm x 1000m	34
60891	F8 9-way 5/3.5mm + 1x10/8mm x 2000m	34
61167	F8 10-way 5/3.5mm + 1x12/10mm x 2000m	34
60563	F8 12-way 4/2.5mm + 1x 12/8mm 2000m	34
60894	F8 12-way 4/2.7mm + 1x12/10 x 2000m	34
60753	F8 12-way 4/2.7mm x 3000m	34
60892	F8 12-way 5/3.5mm + 1x10/8mm x 2000m	34
60755	F8 12-way 5/3.5mm x 2000m	34
60757	F8 17-way 5/3.5 + 1x10/8mm 1000m	34
60756	F8 19-way 5/3.5mm x 2000m	34
60754	F8 24-way 4/2.7mm + 1x8/6mm 2000m	34
<b>Aerial Metal Free / GRP</b>		34
61834	Universal Drop Tube 7/3.7mm x 4000m	34
61171	F8MF 1-way 8/5mm x 1000m	34
61172	F8MF 1-way 14/10mm x 1000m	34
61178	F8MF 2-way 12/10mm + 8x5/3.5mm x 2000m	34
61173	F8MF 4-way 5/3.5mm x 2000m	34
61177	F8MF 4-way 10/8mm x 1000m	34
61174	F8MF 7-way 5/3.5mm x 2000m	34
61175	F8MF 9-way 5/3.5mm + 1x10/8mm x 2000m	34
61176	F8MF 12-way 5/3.5mm + 1x10/8mm x 1000m	34
<b>Ancillary Products</b>		22
199807 110	Warning Net - M10 With search wire 10cm x 500m	22
199807 010	Warning Net - M10 Without search wire 10cm x 500m	22
199807 020	Warning Net - M10 Without search wire 20cm x 100m	22

Product Code	Description	Page
199807 030	Warning Net - M10 Without search wire 30cm x 100m	22
199807 050	Warning Net - M10 Without search wire 50cm x 100m	22
199817 025	Warning Tape - 25/0.3 mm x 250m	22
199817 050	Warning Tape - 50/0.1mm x 500m	22
4857	Marker Tape: Caution Tel Cables	22
4785	Marker Tape: Fibre Optic Cable	22
4785W	Marker tape:fibre optic cable (contains tracer wire)	22
199818 115	Plastic Tape Tile 100 x 1.5	22
199818 118	Plastic Tape Tile 100 x 1.8	22
199818 150	Plastic Tape Tile 150 x 1.5	22
199818 170	Plastic Tape Tile 170 x 2.2	22
199818 200	Plastic Tape Tile 180 x 2.0	22
199818 235	Plastic Tape Tile 200 x 3.5	22
199818 336	Plastic Tape Tile 300 x 3.5	22
199818 430	Plastic Tape Tile 400 x 3.0	22
5606	Trench Marker Tile: Caution Fibre Optic Cable	22
<b>Direct Bury</b>		32
6627	DB 1-way 5/3.5mm x 4000m	32
61035	DB 1-way 8/6mm x 4000m	32
6893	DB 1-way 10/8mm x 2000m	32
60360	DB 1-way 12/10mm x 2000m	32
6406	DB 2-way 5/3.5mm x 4000m	32
61036	DB 2-way 8/6mm x 4000m	32
61380	DB 2-way 10/8mm x 2000m	32
60361	DB 2-way 12/10mm x 2000m	32
6375	DB 4-way 5/3.5mm x 4000m	32
61037	DB 4-way 8/6mm x 2000m	32
6655	DB 4-way 10/8mm (round) x 2000m	32
60736	DB 4-way 12/10mm (round) x 2000m	32
6314	DB 7-way 5/3.5mm x 4000m	32
8521	DB 7-way 8/6mm x 2000m	32
6593	DB 7-way 10/8mm x 2000m	32
60365	DB 7-way 12/10mm x 1000m	32
6556	DB 12-way 5/3.5mm x 4000m	32
60153	DB 12-way 8/6mm x 2000m	32
60152	DB 12-way 10/8mm x 1000m	32
6352	DB 19-way 5/3.5mm x 3000m	32
61038	DB 19-way 8/6mm x 1400m	32
6557	DB 24-way 5/3.5mm x 2000m	32
<b>Direct Bury metal free (DBmf)</b>		29
8213T	DBmf 1-way 5/3.5mm x 500m	29
8233T	DBmf 1-way 5/3.5mm x 500m coil	29
8216TS	DBmf 1-way 5/3.5mm x 2000m	29
8216T	DBmf 1-way 5/3.5mm x 4000m	29
8239	DBmf 1-way 10/8mm x 2000m	29
8361T	DBmf 2-way 3/2.1mm x 2000m	29
8217T	DBmf 2-way 5/3.5mm x 2000m	29
8217TL	DBmf 2-way 5/3.5mm x 4000m	29
60208	DBmf 2-way 10/8mm x 2000m	29
60212	DBmf 2-way 12/10mm x 2000m	29
8362T	DBmf 4-way 3/2.1mm x 4000m	29
8218T	DBmf 4-way 5/3.5mm x 4000m	29
60209	DBmf 4-way 10/8mm x 2000m	29

FibreFlow™ Tube Bundle

Product Code	Description	Page
60210	DBmf 5-way 10/8mm x 2000m	29
60213	DBmf 4-way 12/10mm x 2000m	29
60548	DBmf 5-way 12/10mm x 2000m	29
8363T	DBmf 7-way 3/2.1mm x 4000m	29
8219T	DBmf 7-way 5/3.5mm x 4000m	29
60211	DBmf 7-way 10/8mm x 2000m	29
60144	DBmf 7-way 12/10mm x 1000m	29
8364T	DBmf 12-way 3/2.1mm x 4000m	29
8220T	DBmf 12-way 5/3.5mm x 4000m	29
8365T	DBmf 19-way 3/2.1mm x 4000m	29
8221T	DBmf 19-way 5/3.5mm x 3000m	29
8247T	DBmf 24-way 3/2.1mm x 2000m	29
8222T	DBmf 24-way 5/3.5mm x 2000m	29
<b>Direct Bury metal free combo (DBmf combo)</b>		<b>31</b>
61859	DBmf 4-way Combo LPM (3x 12/8 , 1 x14/10)	31
61853	DBmf 4-way Combo LPM (3x 12/8 , 1 x16/12)	31
61849	DBmf 4-way Combo LPM (3x 12/8 , 1 x18/14)	31
61865	DBmf 4-way LPM 12/8mm	31
61862	DBmf 5-way Combo LPM (3x 12/8 , 1x 14/10, 1x 16/12)	31
61870	DBmf 5-way Combo LPM (3x 12/8 , 1x 14/10, 1x 18/14)	31
61854	DBmf 5-way Combo LPM (3x 12/8 , 1x 16/12, 1 x18/14)	31
61850	DBmf 5-way Combo LPM (3x 12/8 , 2 x18/14)	31
61856	DBmf 5-way Combo LPM (3x 12/8 , 2x 16/12)	31
61867	DBmf 5-way Combo LPM (4x 12/8 , 1x 16/12)	31
61866	DBmf 5-way Combo LPM (4x 12/8 , 1x 18/14)	31
61848	DBmf 5-way LPM 14/10mm	31
61863	DBmf 6-way Combo LPM (3x 12/8 , 1x 14/10, 2x 16/12)	31
61860	DBmf 6-way Combo LPM (3x 12/8 , 1x 14/10, 2x 18/14)	31
61855	DBmf 6-way Combo LPM (3x 12/8 , 1x 16/12, 2 x18/14)	31
61851	DBmf 6-way Combo LPM (3x 12/8 , 3 x18/14)	31
61857	DBmf 6-way Combo LPM (3x 12/8 , 3x 16/12)	31
61868	DBmf 6-way Combo LPM (4x 12/8 , 2x 16/12)	31
61871	DBmf 6-way Combo LPM (4x 12/8 , 2x 18/14)	31
61864	DBmf 7-way Combo LPM (3x 12/8 , 1x 14/10, 3 x16/12)	31
61861	DBmf 7-way Combo LPM (3x 12/8 , 1x 14/10, 3 x18/14)	31
61858	DBmf 7-way Combo LPM (3x 12/8 , 4 x16/12)	31
61852	DBmf 7-way Combo LPM (3x 12/8 , 4 x18/14)	31
61869	DBmf 9-way Combo LPM (4x 12/8 , 5x 16/12)	31
<b>Direct Bury metal free (DBmf) heavy wall</b>		<b>30</b>
8351T	DBmf 1-way 5/2.1mm x 500m	30
60171	DBmf 1-way 7/3.5mm x 4000m	30
60178	DBmf 1-way 7/4mm x 4000m	30
8470	DBmf 1-way 8/3.5mm x 2000m	30
8477	DBmf 1-way 8/3.5mm + sheath x 3000m	30
60728	DBmf 1-way 10/6mm x 2000m	30
60014	DBmf 1-way 12/8mm x 2000m	30
8506	DBmf 1-way 14/10mm x 1400m	30
60618	DBmf 1-way 16/12mm x 1000m	30
60172	DBmf 2-way 7/3.5mm x 4000m	30
60179	DBmf 2-way 7/4mm x 4000m	30
60200	DBmf 2-way 10/6mm x 2000m	30
60015	DBmf 2-way 12/8mm x 2000m	30
8524	DBmf 2-way 14/10mm x 1400m	30
60722	DBmf 2-way 16/12mm x 1000m	30
60351	DBmf 3-way 10/6mm x 2000m	30
60016	DBmf 3-way 12/8mm x 2000m	30
8499	DBmf 3-way 14/10mm x 1400m	30
60723	DBmf 3-way 16/12mm x 1000m	30
60173	DBmf 4-way 7/3.5mm x 4000m	30
60180	DBmf 4-way 7/4mm x 4000m	30
60202	DBmf 4-way 10/6mm x 2000m	30
60017	DBmf 4-way 12/8mm x 2000m	30
60022	DBmf 4-way 14/10mm x 1400m	30
60724	DBmf 4-way 16/12mm x 1000m	30

Product Code	Description	Page
60018	DBmf 5-way 12/8mm x 2000m	30
60023	DBmf 5-way 14/10mm x 1400m	30
60725	DBmf 5-way 16/12mm x 1000m	30
60019	DBmf 6-way 12/8mm x 2000m	30
60352	DBmf 6-way 14/10mm x 1400m	30
60726	DBmf 6-way 16/12mm x 1000m	30
60174	DBmf 7-way 7/3.5mm x 4000m	30
60181	DBmf 7-way 7/4mm x 4000m	30
60203	DBmf 7-way 10/6mm x 2000m	30
60020	DBmf 7-way 12/8mm x 2000m	30
8523	DBmf 7-way 14/10mm x 1400m	30
60727	DBmf 7-way 16/12mm x 1000m	30
60175	DBmf 12-way 7/3.5mm x 3000m	30
60182	DBmf 12-way 7/4mm x 3000m	30
60176	DBmf 19-way 7/3.5mm x 2000m	30
60183	DBmf 19-way 7/4mm x 2000m	30
60177	DBmf 24-way 7/3.5mm x 1000m	30
60184	DBmf 24-way 7/4mm x 1000m	30
<b>Direct Install</b>		<b>33</b>
6285	DI 1-way 5/3.5mm x 4000m	33
8357	DI 1-way 10/8mm x 2000m	33
60744	DI 1-way 12/10mm x 2000m	33
6286	DI 2-way 5/3.5mm x 4000m	33
6797	DI 2-way 10/8mm x 2000m	33
60745	DI 2-way 12/10mm x 2000m	33
6287	DI 4-way 5/3.5mm x 4000m	33
6709L	DI 4-way 10/8mm x 2000m	33
60746	DI 4-way 12/10mm x 2000m	33
6438	DI 7-way 5/3.5mm x 4000m	33
6886	DI 7-way 10/8mm x 2000m	33
60478	DI 7-way 12/10mm x 2000m	33
6870	DI 12-way 5/3.5mm x 4000m	33
6289	DI 19-way 5/3.5mm x 3000m	33
6701	DI 24-way 5/3.5mm x 2000m	33
<b>Low Fire Hazard</b>		<b>35</b>
6595	Primary 5/3.5mm x 4000m	35
6634	Primary 5/3.5mm x 1000m	35
6318	Primary 5/3.5mm x 500m	35
61486	Primary 7/4mm x 1000m	35
61487	Primary 7/4mm x 2000m	35
62401	LFH 1-way 4/2.5mm x 4000m	35
6772	LFH 1-way 5/3.5mm x 1000m	35
61488	LFH 1-way 7/4mm x 2000m	35
61156	LFH 1-way 14/10mm x 1000m	35
60008	LFH 1-way 14/10mm x 500m	35
62402	LFH 2-way 4/2.5mm x 4000m	35
6403	LFH 2-way 5/3.5mm x 4000m	35
6502	LFH 2-way 5/3.5mm x 1000m	35
6403S	LFH 2-way 5/3.5mm x 500m	35
61371	LFH 2-way 7/4mm x 2000m	35
61157	LFH 2-way 14/10mm x 1000m	35
61158	LFH 3-way 14/10mm x 1000m	35
62403	LFH 4-way 4/2.5mm x 4000m	35
6404	LFH 4-way 5/3.5mm x 4000m	35
6643	LFH 4-way 5/3.5mm x 1000m	35
6511	LFH 4-way 5/3.5mm x 500m	35
61372	LFH 4-way 7/4mm x 2000m	35
61159	LFH 4-way 14/10mm x 1000m	35
61160	LFH 6-way 14/10mm x 1000m	35
62404	LFH 7-way 4/2.5mm x 4000m	35
6405	LFH 7-way 5/3.5mm x 4000m	35
6610	LFH 7-way 5/3.5mm x 1000m	35
6515	LFH 7-way 5/3.5mm x 500m	35
61933	LFH 7-way 7/4mm x 2000m	35

**FibreFlow™ Tube Bundle**

Product Code	Description	Page
61161	LFH 7-way 14/10mm x 1000m	35
62405	LFH 12-way 4/2.5mm x 4000m	35
6533A	LFH 12-way 5/3.5mm x 4000m	35
6533	LFH 12-way 5/3.5mm x 1000m	35
6533S	LFH 12-way 5/3.5mm x 500m	35
61489	LFH 12-way 7/4mm x 2000m	35
62406	LFH 19-way 4/2.5mm x 4000m	35
6611A	LFH 19-way 5/3.5mm x 4000m	35
6611	LFH 19-way 5/3.5mm x 1000m	35
6611S	LFH 19-way 5/3.5mm x 500m	35
61373	LFH 19-way 7/4mm x 1000m	35
62407	LFH 24-way 4/2.5mm x 4000m	35
6612L	LFH 24-way 5/3.5mm x 2000m	35
6612	LFH 24-way 5/3.5mm x 1000m	35
6513	LFH 24-way 5/3.5mm x 500m	35
61490	LFH 24-way 7/4mm x 1000m	35
<b>Special Products</b>		
<b>Direct Bury filled metal free</b>		
8224	DBfmf 3-way 10/8mm x 2000m	39
60025	DBfmf 3-way 12/10mm x 2000m	39
8225	DBfmf 4-way 10/8mm x 2000m	39
60026	DBfmf 4-way 12/10mm x 2000m	39
8226	DBfmf 5-way 10/8mm x 2000m	39
60027	DBfmf 5-way 12/10mm x 2000m	39
8227	DBfmf 7-way 10/8mm x 2000m	39
60028	DBfmf 7-way 12/10mm x 1000m	39
<b>Direct Bury Rodent Proof (corrugated steel tape)</b>		
8240	DBSA 7-way 5/3.5mm	38
<b>Direct Bury Termite Resistant</b>		
6629	DBT 1-way 5/3.5mm x 4000m	38
6571	DBT 2-way 5/3.5mm x 4000m	38
6664	DBT 4-way 5/3.5mm x 4000m	38
6570	DBT 7-way 5/3.5mm x 4000m	38
8231	DBT 12-way 5/3.5mm x 3000m	38
6954	DBT 19-way 5/3.5mm x 3000m	38
8232	DBT 24-way 5/3.5mm x 2000m	38
<b>Direct Install metal free</b>		
8321T	Dlmf 1-way 5/3.5mm x 4000m	40
8374T	Dlmf 2-way 5/3.5mm x 4000m	40
8353T	Dlmf 4-way 5/3.5mm x 4000m	40

Product Code	Description	Page
8008LT	Dlmf 7-way 5/3.5mm x 4000m	40
8375T	Dlmf 12-way 5/3.5mm x 4000m	40
8367T	Dlmf 19-way 5/3.5mm x 4000m	40
60782	Dlmf 24-way 5/3.5mm x 2000m	40
<b>Horizontal Direct Drill (HDD)</b>		
<b>LFH 'pinnable'</b>		
61872	LFH 1-way pinnable 3/2.1mm	38
61873	LFH 4-way pinnable 3/2.1mm	38
<b>LFH Rodent Proof (corrugated steel tape)</b>		
8483	LFSA 7-way 5/3.5mm	37
<b>Mining Applications</b>		
8240	DBSA 7-way 5/3.5mm	37
61201	DBSA-LF 7-way 5/3.5mm	37
61202	F8 4-way hybrid with copper cable 5/3.5mm	37
<b>Mole Plough Installation</b>		
<b>PE-LF</b>		
<b>PE-LF 'pinnable'</b>		
61874	PE-LF 4-way pinnable 3/2.1mm	38
61875	PE-LF 7-way pinnable 3/2.1mm	38
<b>Plenum Rated</b>		
<b>Fibred Microducts and Ducts</b>		
<b>RTRYVA</b>		
<b>MULTIFU</b>		
<b>Riser Rated</b>		
60384	LFH Riser 1-way 5/3.5mm x 4000m UL Listing	36
60747	LFH Riser 2-way 5/3.5mm x 4000m UL Listing	36
60385	LFH Riser 4-way 5/3.5mm x 4000m UL Listing	36
60386	LFH Riser 7-way 5/3.5mm x 4000m UL Listing	36
60748	LFH Riser 12-way 5/3.5mm x 4000m UL Listing	36
60749	LFH Riser 19-way 5/3.5mm x 4000m UL Listing	36
60750	LFH Riser 24-way 5/3.5mm x 2000m UL Listing	36
60798	LFH Riser 2-way 5/3.5mm x 4000m CSA Listing	36
60799	LFH Riser 7-way 5/3.5mm x 4000m CSA Listing	36
60800	LFH Riser 12-way 5/3.5mm x 4000m CSA Listing	36
<b>Vertex</b>		
<b>Sub Duct</b>		
1997762 40B	Dual Duct 2x40/3.7 - 2x1000m	15
1997762 50B	Dual Duct 2x50/4.5 - 2x600m	15
1997762 40C	Triple Duct 3x40/3 - 3x600m	15
1997762 50C	Triple Duct 3x50/4 - 3x400m	15

**Accessories**

Product Code	Description	Page
<b>Boundary Box</b>		
4531	Boundary Box D Shaped Swivel	50
71133	Boundary Box Square 115x115x75	50
4604	Boundary Box Square SID 130x140x75	50
4579	Boundary Box Triangular	50
9978	Minicable Storage Reel with cover	66
<b>Aerial</b>		
9257	Aerial Branch Closure	44
70868	Aerial Manifold Closure (6-4mm)	44
71095	Plug Removal Tool	44
71132	Wrap-around Closure 50/20 - 250	44
70957	Wrap-around Closure 50/20 - 300	44
71531	Wrap-around Closure 50/20 - 350	44
71532	Wrap-around Closure 50/20 - 400	44
<b>Aerial Pole Fittings and Tools</b>		
9253	Bolt 16 x 300mm	45
9255	Buckles for banding BIB20	45
9247	Cable Clamp AC10 320	45
9250	Cable Clamp AC35L 260	45
9249	Cable Clamp AC68 140	45

Product Code	Description	Page
9248	Cable Clamp AC68L 260	45
71980	Cable Clamp AC68L 500	45
70470	Cable Clamp AC810 500	45
9251	J-Hook for steel band: 'JR-SB'	45
9354	J-Hook, bolt-through: 'JR'	45
9254	Steel Banding, SB207	45
9252	Suspension Clamp, 'ARC'	45
9256	Tensioning Tool, BTS	45
71035	Twist Grip	45
9246	Universal Pole Bracket UPB	45
<b>Connectors</b>		
7248	Bulkhead Connector	69
72375	Bulkhead Screw Connector	70
7316	Closedown Connector 3mm (John Guest)	69
7249	Closedown Connector 5mm (John Guest)	69
7331	Closedown Connector 8mm (John Guest)	69
71161	Duct Seal 10mm/3.9-2.5mm	70
71162	Duct Seal 10mm/5.0-3.9mm	70
71163	Duct Seal 10mm/6.5-5.0mm	70
71164	Duct Seal 10mm/8.0-6.5mm	70

Accessories

Product Code	Description	Page
71165	Duct Seal 12mm/3.9-2.5mm	70
71166	Duct Seal 12mm/5.0-3.9mm	70
71167	Duct Seal 12mm/6.5-5.0mm	70
71168	Duct Seal 12mm/8.0-6.5mm	70
71169	Duct Seal 14mm/8.0-5.8mm	70
71170	Duct Seal 14mm/10.0-8.0mm	70
71171	Duct Seal 16mm/8.0-5.8mm	70
71172	Duct Seal 16mm/10.0-8.0mm	70
71173	Duct Seal 18mm/12.0-9.4mm	70
71174	Duct Seal 20mm/12.0-9.4mm	70
9932	End Cap 3mm	67
9610	End Cap 3mm Solid (John Guest)	68
9933	End Cap 4mm	67
70762	End Cap 4mm Solid (John Guest)	68
9934	End Cap 5mm	67
7221	End Cap 5mm Solid (John Guest)	68
9975	End Cap 6mm	67
7311	End Cap 6mm Solid (John Guest)	68
9935	End Cap 7mm	67
9936	End Cap 8mm	67
9937	End Cap 10mm	67
7486	End Cap 10mm Clear (John Guest)	68
9611	End Cap 10mm Solid (John Guest)	68
9938	End Cap 12mm	67
9612	End Cap 12mm Solid (John Guest)	68
9939	End Cap 14mm	67
70153	End Cap 16mm	67
71438	End Cap 16mm Solid (John Guest)	68
71109	End Cap DB 7mm (John Guest)	68
71106	End Cap DB 14mm (John Guest)	68
70730	Gas Block Connector 3GB long 3mm (John Guest)	69
70731	Gas Block Connector 3GB short 3mm (John Guest)	69
70729	Gas Block Connector 4GB 4mm (John Guest)	69
6091	Gas Block Connector 5GB 5mm (John Guest)	69
71220	Gas Block Connector 6GB 6mm (John Guest)	69
71355	Gas Block Connector 6-3GB 6-3mm reducer (John Guest)	69
70875	Gas Block Connector 6-4GB 6-4mm reducer (John Guest)	69
71110	Gas Block Connector 7GB 1.0-1.6 7mm (John Guest)	69
71533	Gas Block Connector 7GB 1.8-2.4 7mm (John Guest)	69
71116	Gas Block Connector 7GB 2.5-3.0 7mm (John Guest)	69
6086	Gas Block Connector 8GB 8mm (John Guest)	69
6087	Gas Block Connector 8-5GB 8-5mm (John Guest)	69
71496	Gas Block Connector 10GB 5.5-6.6 10mm (John Guest)	69
71497	Gas Block Connector 10GB 6.5-7.2 10mm (John Guest)	69
71498	Gas Block Connector 12GB 5.5-6.6 12mm (John Guest)	69
71499	Gas Block Connector 12GB 6.5-7.2 12mm (John Guest)	69
71534	Gas Block Connector 12GB 7.2-8.2 12mm (John Guest)	69
71107	Gas Block Connector 14GB 6.5-7.2 14mm (John Guest)	69
71535	Gas Block Connector 14GB 7.6-8.2 14mm (John Guest)	69
71722	Miniduct seal 4mm	70
71720	Miniduct seal 5mm	70
71739	Miniduct seal 6mm	70
71175	Miniduct seal 7mm	70
71724	Miniduct seal 7mm	70
71740	Miniduct seal 8mm	70
71741	Miniduct seal 8mm	70
70194	Protected connector 7/3.5mm	67
70169	Protected connector 7/5.5mm	67
70262	Protected connector 8/3.5mm	67
70136	Protected connector 8/6mm	67
70170	Protected connector 10/8mm	67
70171	Protected connector 12/10mm	67
70172	Protected connector 14/10mm	67
70728	Reducer 4 - 3mm Solid (John Guest)	68

Product Code	Description	Page
9926	Reducer 5/2.1 - 3/2.1mm	67
9925	Reducer 5/3.5 - 3/2.1mm	67
9638	Reducer 5 - 3mm Clear (John Guest)	68
70727	Reducer 6 - 3mm Solid (John Guest)	68
9502	Reducer 6.3 - 5mm Solid (John Guest)	68
70407	Reducer 7/5.5 - 3/2.1mm	67
70031	Reducer 7/5.5 - 5/3.5mm	67
70117	Reducer 8/3.5 - 3/2.1mm	67
6085	Reducer 8 - 5mm Clear (John Guest)	68
9927	Reducer 8/6 - 5/3.5mm	67
7280	Reducer 10 - 8mm Solid (John Guest)	68
9928	Reducer 10/8 - 8/6mm	67
7279	Reducer 12 - 10mm Solid (John Guest)	68
9930	Reducer 12/10 - 10/8mm	67
70034	Reducer 12/10 - 5/3.5mm	67
9929	Reducer 12/10 - 7/5.5mm	67
70035	Reducer 14/10 - 10/8mm	67
9931	Reducer 14/10 - 12/10mm	67
70036	Reducer 16/12 - 12/10mm	67
9916	Straight Connector 3/2.1mm	66
7312	Straight Connector 3/2.1mm Clear (John Guest)	68
9917	Straight Connector 4mm	66
71070	Straight Connector 4mm Solid (John Guest)	68
9918	Straight Connector 5/3.5mm	66
7223	Straight Connector 5/3.5mm Clear (John Guest)	68
7310	Straight Connector 6mm Solid (John Guest)	68
7930	Straight Connector 6.3mm Solid (John Guest)	68
70193	Straight Connector 7/3.5mm	66
9919	Straight Connector 7/5.5mm	66
9772	Straight Connector 8/3.5mm	66
9920	Straight Connector 8/6mm	66
7222	Straight Connector 8/6mm Clear (John Guest)	68
9921	Straight Connector 10/8mm	66
7226	Straight Connector 10mm Solid (John Guest)	68
9922	Straight Connector 12/10mm	66
9732	Straight Connector 12/10mm Clear (John Guest)	68
7263	Straight Connector 12/10mm Solid (John Guest)	68
9923	Straight Connector 14/10mm	66
9821	Straight Connector 14/12mm	66
9924	Straight Connector 16/12mm	66
71424	Straight Connector 16/14mm Solid (John Guest)	68
70956	Straight Connector 18/16mm Solid (John Guest)	68
71108	Straight Connector DB 7/3.5mm Solid (John Guest)	68
71190	Straight Connector DB 7/4mm (Solid) (John Guest)	68
71105	Straight Connector DB 14/10mm Solid (John Guest)	68
7314	Water Blocking Connector 3mm (John Guest)	69
6089	Water Blocking Connector 5mm push-on (John Guest)	69
71441	Water Blocking Connector 6mm	69
<b>Fibre Connectivity</b>		
9959	Adaptor Module 3 Multimode SC/PC duplex	65
9955	Adaptor Module 3 Singlemode SC/APC duplex	65
9954	Adaptor module 3 Singlemode SC/PC duplex	65
9958	Adaptor Module 6 Multimode SC/PC simplex	65
9957	Adaptor Module 6 Singlemode FC/PC simplex	65
70452	Adaptor Module 6 Singlemode LC duplex	65
70456	Adaptor Module 6 Singlemode SC/APC duplex	65
9953	Adaptor Module 6 Singlemode SC/APC simplex	65
70458	Adaptor module 6 Singlemode SC/PC duplex	65
9952	Adaptor Module 6 Singlemode SC/PC simplex	65
9956	Adaptor Module 6 Singlemode ST/PC simplex	65
70457	Adaptor Module 8 Multimode SC/PC simplex	65
70454	Adaptor Module 8 Singlemode SC/APC simplex	65
70453	Adaptor Module 8 Singlemode SC/PC simplex	65
71159	Cabinet, Fibre Distribution	63

Accessories

Product Code	Description	Page	Product Code	Description	Page
9799	Cabinet, Outdoor Street	63	7905	Reducer 32-50mm	20
9358	Customer Connection Point (CCP)	55	7908	Reducer 32-63mm	20
70664	Customer Connection Point (CCP) Compact	55	7906	Reducer 40-50mm	20
	Dome Closures and Accessories - HellermannTyton	56-59	7909	Reducer 40-63mm	20
	Dome Closures and Accessories - Tyco	60-61	7910	Reducer 50-63mm	20
71063	Fibre Distribution Box - 16 Fibre	55	5037	Screw Connector 21mm	19
71862	Fibre Patch Panel 1RU 24 Port, with labelling panel	65	4448	Screw Connector 25mm	19
70443	Fibre Patch Panel 2RU 48 Port	65	4489	Screw Connector 28mm	19
70444	Fibre Patch Panel 4RU 96 Port	65	3771C	Screw Connector 31mm	19
71158	Fibre Patch Panel 5RU 144 Port	65	3650M	Screw Connector 32mm	19
9943	Fibre Patch Panel 6 to 24 Ports	65	3900	Screw Connector 34mm	19
71144	Fibre Termination Box 12 Port, Wall Mount	64	4232	Screw Connector 35mm	19
71443	Fibre and Tube Termination Box, 24 Port, Wall Mount	64	4067	Screw Connector 37mm	19
70459	Fibre Unit Storage Box	55	4424	Screw Connector 40mm	19
72374	MPO Module Box	64	5412	Screw Connector 44mm	19
9945	Patch Panel 24 Ports Tube 3mm	65	9317	Screw Connector 48mm	19
7361B	Patch Panel 24 Ports Tube 5mm	65	9318	Screw Connector 50mm	19
9518	Patchcord SC SM Simplex	62	19998 40	Search Ball Electronic Marker orange, 101.4 kHz	21
9519	Patchcord SCA SM Simplex	62	70336	Search Ball Electronic Marker red, 169.8 kHz	21
9521	Pigtail SC SM	62	7891	Straight Compression Connector 16mm	20
9521B	Pigtail SC SM (1.5m length)	62	4859	Straight Compression Connector 20mm	20
9520	Pigtail SCA SM	62	4286	Straight Compression Connector 25mm	20
9520B	Pigtail SCA SM (1.5m length)	62	3917P	Straight Compression Connector 32mm	20
72376	Rack, Optical Distribution Frame	63	4390	Straight Compression Connector 35mm	20
71146	Splitter Box with modules, Rack Mounted	64	7895	Straight Compression Connector 40mm	20
71152	Splitter Box with modules, Wall Mount	64	4065	Straight Compression Connector 50mm	20
71145	Tube Management Box, Wall Mount	64	5361	Straight Compression Connector 63mm	20
9946	Tube or Patch Lead Guide	65	073600 132	Straight Connector 32mm Hawle	20
	<b>Sub Duct Accessories</b>		073600 140	Straight Connector 40mm Hawle	20
073600 316	Compression Screw Connector 16mm Transparent	20	073600 150	Straight Connector 50mm Hawle	20
073600 320	Compression Screw Connector 20mm Transparent	20		<b>Tube Bundle Connectivity - External</b>	
073600 325	Compression Screw Connector 25mm Transparent	20	9604	1DB Joint	51
073600 332	Compression Screw Connector 32mm Transparent	20	7787A	1way DB Repair Joint: 3mm x 2.1mm microduct	51
073600 340	Compression Screw Connector 40mm Transparent	20	7787B	1way DB Repair Joint: 5mm x 2.1mm microduct	51
073600 350	Compression Screw Connector 50mm Transparent	20	7787C	1way DB Repair Joint: 5mm x 3.5mm microduct	51
073600 363	Compression Screw Connector 63mm Transparent	20	7787D	1way DB Repair Joint: 8mm x 6.0mm microduct	51
072770 016	End Stop Connector size 16	19	7787E	1way DB Repair Joint: 10mm x 8.0mm microduct	51
072770 020	End Stop Connector size 20	19	9027	Elongated Closure 2-way 50mm Straight In-Line	48
072770 025	End Stop Connector size 25	19	200170032	Elongated Closure 4-way 32/32/32/32	48
072770 032	End Stop Connector size 32	19	200170036	Elongated Closure 4-way 40/40/2x16/2x16	48
072770 040	End Stop Connector size 40	19	200170039	Elongated Closure 4-way 40/40/32/32	48
072770 050	End Stop Connector size 50	19	200170040	Elongated Closure 4-way 40/40/40/40	48
072770 063	End Stop Connector size 63	19	200170050	Elongated Closure 4-way 50/50/50/50	48
072770 075	End Stop Connector size 75	19	72279	H-Branch Closure, Plug A, Plug B, Plug C, Plug D, Plug E, Plug F	47
072770 090	End Stop Connector size 90	19	9501	In-Line Branch Closure (incl 6 way grommet) CLO1	48
072770 110	End Stop Connector size 110	19	9049	In-Line Clamp Outlet 50mm	49
4410A	Expanding Duct Plugs 24-30	21	9045	In-Line Closure 50mm - Outlets 2x12mm	49
4410D	Expanding Duct Plugs 29-38	21	9048	In-Line Closure 50mm 40/2x16mm Port Reducer	49
072698 032	Expanding Duct Plugs 32	21	9047	In-Line Closure 50mm 50/32mm Port Reducer	49
072698 040	Expanding Duct Plugs 40	21	9046	In-Line Closure 50mm 50/40mm Port Reducer	49
072698 050	Expanding Duct Plugs 50	21	19998175	Lead-in bushing 110mm w/foam rubber	50
4410C	Expanding Duct Plugs 76-88	21	9076	Rapid Repair Kit 25/20mm	51
4410B	Expanding Duct Plugs 87-102	21	9077	Rapid Repair Kit 32/26mm	51
4410	Expanding Duct Plugs 100-110	21	9078	Rapid Repair Kit 40/32mm	51
9351	Expanding Duct Plugs 148-162	21	9079	Rapid Repair Kit 50/40mm	51
7897	Reducer 16-20mm	20	073800132	Split connector 32mm	50
7898	Reducer 16-25mm	20	073800140	Split connector 40mm	50
7899	Reducer 20-25mm	20	073800150	Split connector 50mm	50
7900	Reducer 20-32mm	20	073810132	Split connector : Half ducts 32mm - 2 metres (set)	50
5363	Reducer 25-32mm	20	073810140	Split connector : Half ducts 40mm - 2 metres(set)	50
7902	Reducer 25-40mm	20	073810150	Split connector : Half ducts 50mm - 2 metres (set)	50
7904	Reducer 25-50mm	20	9112	Tube Distribution Closure: 12way DB 5mm Adaptor Branch Out or Straight joint	46
7907	Reducer 25-63mm	20	9113	Tube Distribution Closure: 19way DB 5mm Adaptor Branch Out	46
7903	Reducer 32-40mm	20	9115	Tube Distribution Closure: 24way DB 3mm Adaptor Branch Out or Straight joint	46

## Accessories

Product Code	Description	Page
7717	Tube Distribution Closure: 6way Grommet up to 6 x 1DB 3mm or 5mm Branching	46
9111	Tube Distribution Closure: 7way DB 5mm Adaptor Branch Out or Straight joint	46
7514	Tube Distribution Closure: Standard	46
7954	Y- Branch 3mm	47
9169	Y- Branch 5mm	47
<b>Tube Bundle Connectivity - External to Internal</b>		
7500	Customer Lead In Point	52
71486	Customer Lead In Point, MDU	52
71502	Customer Lead In (Small), External	52

Product Code	Description	Page
71505	Customer Lead In (Medium), External	52
71503	Customer Lead In (Large), External	52
<b>Tube Bundle Connectivity - Internal</b>		
71501	Customer Lead In (Small), Internal	53
71504	Customer Lead In (Medium), Internal	53
72377	Riser Breakout Box	53
7258	ITFP 3 port	54
7217	ITFP 4 port	54
9018	Y-Branch Closure (indoor)	54

## Installation Equipment

Product Code	Description	Page
<b>Fibre Unit</b>		
7779	Blowing Unit	72
7655	Blowing Unit, Power Supply	74
7286	Blowing Unit, Power Supply 240-110v	74
7829	Blowing Pack 8 Fibre	72
7830	Blowing Pack 12 Fibre	72
7855	Dispenser	73
7584	Fibre Plates 2/4	73
7007	Fibre Plates 8	73
7481	Fibre Plates 12	73
7778	Flowmeter Kit	73
7219	Glass Lens/Slips	74
7033	Head Seal	74
9006	Lead	75
7851	Pan Guide	73
7002	Pan Guide 1A	73
7005	Pan Guide Support	73
7788	Pan Inversion Clamp Ring	74
7012	Pan Inversion Ring	74
71716	Pan Inversion Ring	74
9004	Power Lead 24 volt DC	75
9005	Power Lead 110 volt AC	75
9003	Remote Control Unit	75
9002	Spares Kit	75
7010	Tyres - Grooved Green	72
7032	Tyres - Smooth Green	72
7576	Tyres - White	72
<b>Fibre Unit and Mini Cable</b>		
9226	Blowing Unit EM-25	76
9471	Fusion Base Unit	76
9472	Fusion Complete Parts Kit	76
9227A	Cable insert: for fibre units 1-3mm	77
9311	Cable Insert: for cables 4-8mm	77
9221A	Cable Seals for cables 3.4-4.3mm	77
9221B	Cable Seals for cables 4.4-5.3mm	77
9221C	Cable Seals for cables 5.4-6.3mm	77
9221D	Cable seals for cables 6.4mm 6.9mm	77
9221E	Cable Seals for cables 7.0-7.5mm	77
9221F	Cable Seals for cables 7.5-8.0mm	77
9228A	Duct Insert OD 3mm fibre units up to 1.8mm	77
9228B	Duct Insert OD 4mm fibre units up to 2.8mm	77
9228C	Duct Insert OD 5mm fibre units up to 1.8mm	77
9228D	Duct insert OD 5mm fibre units up to 2.8mm	77
9228E	Duct insert OD 6mm fibre units up to 3mm	77
9228F	Duct insert OD 7mm fibre units up to 1.8mm	77
9228G	Duct insert OD 8mm fibre units up to 2.8mm	77
9228H	Duct insert OD 8mm fibre units up to 3mm	77
9222A	Duct insert OD 7mm cables up to 4.8mm	77
9222B	Duct insert OD 8mm cables up to 3.8mm	77
9222C	Duct insert OD 8mm cables up to 5.6mm	77
9222D	Duct insert OD 10mm cables up to 7.5mm	77

Product Code	Description	Page
9222E	Duct insert OD 12mm cables up to 8.0mm	77
9222F	Duct insert OD 14mm cables up to 8.5mm	77
9227D	Lip Seals: for fibre units 0.8-1.1mm	77
9227B	Lip Seals: for fibre units 1.1-1.4mm	77
9227C	Lip Seals: for fibre units 1.4-1.8mm	77
9227E	Lip Seals: for fibre units 1.8-2.4mm	77
9227F	Lip Seals: for fibre units 2.4-3.3mm	77
9321A	O Rings for OD 3mm	77
9321B	O Rings for OD 4mm	77
9321C	O Rings for OD 5mm	77
9321D	O Rings for OD 7mm	77
9321E	O Rings for OD 8mm	77
9321F	O Rings for OD 10mm	77
9321G	O Rings for OD 12mm	77
71857	Pressure Wheel with polyurethane lining	77
71858	Pressure Wheel, Aluminium	77
71852	Tyre, Multi-grooved black, for 6 x 1.6mm	77
71851	Tyre Rubber, with aluminium insert ring	77
71853	Tyre Steel, U-groove for cables 1.6mm-2.0mm	77
71854	Tyre Steel, U-groove for cables 2.1mm-2.5mm	77
71855	Tyre Steel, U-groove for cables 2.6mm-3.0mm	77
9223A	Tyre Steel, U-groove for cables 3.1mm-3.5mm	77
9223B	Tyre Steel, U-groove for cables 3.6-4mm	77
9223C	Tyre Steel, U-groove for cables 4.1mm-4.5mm	77
9223D	Tyre Steel, U-groove for cables 4.6mm-5mm	77
9223E	Tyre Steel, U-groove for cables 5.1mm-5.5mm	77
9223F	Tyre Steel, U-groove for cables 5.6mm-6mm	77
9223G	Tyre Steel, U-groove for cables 6.1-6.5mm	77
9223H	Tyre Steel, U-groove for cables 6.6mm-7mm	77
9223J	Tyre Steel, U-groove for cables 7.1mm-7.5mm	77
71856	Tyre Steel, U-groove for cables 7.6mm-8.0mm	77
<b>Minicable</b>		
70899	Airstream Cable Blowing Machine	79
9051	Airstream 1 metre sealing cord	79
71337	Airstream Cable Collet Assembly - cable size 2.5 - 3.0mm	79
71338	Airstream Cable Collet Assembly - cable size 3.0 - 3.8mm	79
71339	Airstream Cable Collet Assembly - cable size 3.8 - 5.0mm	79
71340	Airstream Cable Collet Assembly - cable size 5.0 - 6.4mm	79
71341	Airstream Cable Collet Assembly - cable size 6.4 - 8.0mm	79
70908	Airstream Cable Collet Assembly - cable size 8.0 - 9.5mm	79
71458	Airstream Cable Collet Assembly - cable size 9.5 - 11.0mm	79
70904	Airstream Cable Guide 2.5mm	79
70905	Airstream Cable Guide 2.6-3.5mm	79
70906	Airstream Cable Guide 3.0-6.4mm	79
70907	Airstream Cable Guide 6.0-11.0mm	79
70909	Airstream Drive Belts 2.5-5mm Cable Diameter	79
70910	Airstream Drive Belts 3-11mm Cable Diameter	79
9028A	Airstream Cable Seals - for cables 2.5 - 3.0mm	79
9028B	Airstream Cable Seals - for cables 3.0 - 3.8mm	79
9028C	Airstream Cable Seals - for cables 3.8 - 5.0mm	79
9028D	Airstream Cable Seals - for cables 5.0 - 6.4mm	79



**Installation Equipment**

Product Code	Description	Page
9028E	Airstream Cable Seals - for cables 6.4 - 8.0mm	79
70911	Airstream Cable Seals - for cables 8.0 - 9.5mm	79
71459	Airstream Cable Seals - for cables 9.5 - 11.0mm	79
70900	Airstream Tube Collet Assembly - tube OD 5mm	79
71454	Airstream Tube Collet Assembly - tube OD 7mm	79
71455	Airstream Tube Collet Assembly - tube OD 8mm	79
71456	Airstream Tube Collet Assembly - tube OD 10mm	79
71457	Airstream Tube Collet Assembly - tube OD 12mm	79
70901	Airstream Tube Collet Assembly - tube OD 14mm	79
70902	Airstream Tube Collet Assembly - tube OD 16mm	79
70903	Airstream Tube Collet Assembly - tube OD 18mm	79
70912	Airstream Tube Seal - Tube OD 5mm	79
70913	Airstream Tube Seal - Tube OD 7mm	79
70914	Airstream Tube Seal - Tube OD 8mm	79
70466	Airstream Tube Seal - Tube OD 10mm	79
70467	Airstream Tube Seal - Tube OD 12mm	79
70468	Airstream Tube Seal - Tube OD 14mm	79
70469	Airstream Tube Seal - Tube OD 16mm	79
70915	Airstream Tube Seal - Tube OD 18mm	79
71870	Control Valve, for MiniFlow, PowerFlow and MultiFlow	80
70848	Lubricant - Cable blowing lubricant	79
72369	MicroFlow Touch	80
71869	MiniFlow	80
70521	MiniJet	78
70572	Mini-jet - Belt for MiniJet Flat	78
70571	Mini-jet - Belt for MiniJet V	78
70573	Mini-jet - Bundle Jetting Kit MD 2x10mm	78
70566	Mini-jet Cable Caps for cables - 4mm	78
70567	Mini-jet Cable Caps for cables - 5mm	78
70568	Mini-jet Cable Caps for cables - 6mm	78
70569	Mini-jet Cable Caps for cables - 7mm	78
70570	Mini-jet Cable Caps for cables - 8mm	78
70536	Mini-jet Cable Insert 4-5mm	78
70537	Mini-jet Cable Insert 6-8mm	78
70538	Mini-jet Cable Insert 9-12mm	78
70539	Mini-jet Cable Insert 13-16mm	78
71460	Mini-jet Duct Inserts OD 7mm	78
70549	Mini-jet Duct Inserts OD 8mm	78
70550	Mini-jet Duct Inserts OD 10mm	78
70551	Mini-jet Duct Inserts OD 12mm	78
70552	Mini-jet Duct Inserts OD 14mm	78

Product Code	Description	Page
70553	Mini-jet Duct Inserts OD 15mm	78
70554	Mini-jet Duct Inserts OD 16mm	78
71461	Mini-jet Duct Inserts OD 18mm	78
70555	Mini-jet Duct Inserts OD 20mm	78
70556	Mini-jet Duct Inserts OD 25mm	78
70557	Mini-jet Duct Inserts OD 32mm	78
70558	Mini-jet Duct Inserts OD 40mm	78
71462	Mini-jet Duct Inserts OD 42mm	78
70574	Mini-jet Jetting Lube	78
70540	Mini-jet Lip Seals 3.4 to 4.3mm	78
70541	Mini-jet Lip Seals 4.4 to 5.3mm	78
70542	Mini-jet Lip Seals 5.4 to 6.3mm	78
70543	Mini-jet Lip Seals 6.4 to 6.9mm	78
70544	Mini-jet Lip Seals 7.0 to 7.5mm	78
70545	Mini-jet Lip Seals 7.5 to 8.0mm	78
70546	Mini-jet Lip Seals 8.5 to 10.7mm	78
70547	Mini-jet Lip Seals 10.8 to 12.4mm	78
70548	Mini-jet Lip Seals 12.5 to 14.7mm	78
70575	Mini-jet Microjetting Lube	78
71463	Mini-jet O-rings for duct OD 7mm	78
70559	Mini-jet O-rings for duct OD 8mm	78
70560	Mini-jet O-rings for duct OD 10mm	78
70561	Mini-jet O-rings for duct OD 12mm	78
70562	Mini-jet O-rings for duct OD 14mm	78
71464	Mini-jet O-rings for duct OD 15mm	78
70563	Mini-jet O-rings for duct OD 16mm	78
71465	Mini-jet O-rings for duct OD 18mm	78
71466	Mini-jet O-rings for duct OD 20mm	78
70564	Mini-jet O-rings for duct OD 25mm	78
70565	Mini-jet O-rings for duct OD 32mm	78
71871	MultiFlow	80
71872	Multi Power pack, for MiniFlow, PowerFlow and MultiFlow	81
71868	PowerFlow	80
9980	UltimazV20 Base Unit	78
<b>Blowing Equipment Ancillaries</b>		
7029	10 bar Electric Compressor 110v - 24volt output (UK yellow industrial plug)	81
7757EU	10 bar Electric Compressor 240v - 24 volt output (European plug)	81
7757	10 bar Electric Compressor 240v - 24 volt output (UK plug)	81
7028	10 bar Petrol Compressor - 24 volt output	81
9641	15 bar Air Preparation Kit	81
7013	Replacement Air Hose	81

**Tools**

Product Code	Description	Page
7833	Tool Kit	84
9087	Tool Box	84
7300	Brush Sash Tool 6A	86
072699100	Cable Cutting Tool	85
072699110	Cable Cutting Tool: Replacement Blades	85
72799175	Chain Cutter Multi Duct 40-55mm	90
72799176	Chain Cutter Multi Duct 40-50mm Extra Chain	90
7236	Collet Locking Tool	86
72799012	Cutter, Duct 3-14mm	87
9346	Cutter, Heavy Duty 10-42mm	87
7068	Cutter, Heavy Duty 42mm	87
7299	Cutter, Microduct Rotational	86
7014	Cutter, Primary Tube	87
72799008	Cutter, Primary Tube 8-12mm	87
70768	Cutter, Thick Wall Microduct	87
70769	Cutter, Thick Wall Microduct: spare blade	87
9344	Diagonal Cutters	84
70935	Dismantling Knife	85
072799016	Duct Clipper 3-16mm	85

Product Code	Description	Page
072799167	Duct Clipper 6-67mm	85
7562	Jacket Stripping Tool	88
7298	Junior Hacksaw	86
7064	Longitudinal Microduct Stripper	89
7001	Longitudinal Sheath Stripper	85
7001B	Longitudinal Sheath Stripper: Replacement Blades	85
7794	Metal Free Cutter for 1DB	84
9719B	Microcable FU Bushes	89
9719A	Microcable FU Stripper	89
7949	Microduct Rounding Tool	86
71437	Microduct Rounding Tool	86
7301	Pliers Square Nose	84
7071	Rotational Sheath Stripper	85
7039	Scissors: Heavy Duty	86
9345	Screwdriver Pack	86
072799130	Shears, Plastic 26mm	87
072799150	Shears, Plastic 50mm	87
70108	Shears, Plastic 63mm	87
70108B	Shears, Plastic 63mm, spare blade	87

## Tools

Product Code	Description	Page	Product Code	Description	Page
9728	Sheath Stripper 4.5-40mm	84	7059	End Caps, Heat Shrink 16/6mm	96
9728B	Sheath Stripper 4.5-40mm , spare blade	84	7058	End Caps, Heat Shrink 20/8mm	96
9342	Stripper, Fibre	88	7587	End Caps, Heat Shrink 26/11mm	96
7335	Stripper, Fibre 10a	88	7057	End Caps, Heat Shrink 36/15mm	96
70518	Stripper, Profile 26-52mm	88	7588	End Caps, Heat Shrink 40/17mm	96
70519	Stripper, Profile 45-75mm	88	7480	End Caps, Heat Shrink 57/22mm	96
72681050	Tool, Aluminium Bevel	90	7723	End Cap, Stretch 10-15mm	96
072681030	Tool, Hand Bevel	89	7725	End Cap, Stretch 15-21mm	96
072681040	Tool, Plastic Bevel	89	7727	End Cap, Stretch 21-29mm	96
72600025	Tool, Steel Bevel 25mm	90	7729	End Cap, Stretch 29-38mm	96
72600032	Tool, Steel Bevel 32mm	90	7730	End Cap, Stretch 38-45mm	96
72680040	Tool, Steel Bevel 40mm	90	70183	Fibre Grip Connector 5-3	94
72680050	Tool, Steel Bevel 50mm	90	71074	Fibre Grip Connector 7-3	94
72680063	Tool, Steel Bevel 63mm	90	70207	Fibre Grip Microduct Rubber Stop 3.5/0.8mm x 100	93
7925	Tool, Steel Bevel 20-63mm	90	9873	Fibre Grip Microduct Rubber Stop 3.5/0.8mm x 500	93
7069	Trimming Knife	85	71350	Fibre Grip Microduct Rubber Stop 3.5/0.8mm split x 500	93
9418	Web Slitting Tool	88	9242	Lock & Block 30 x Two part Epoxy Adhesive Mixing Nozzle	94
72799055	Wrench for 40-50mm	90	9731	Lock & Block 12mm Kit	94
7923	Wrench for 40-75mm	90	9313	Lock & Block 5mm Kit	94
<b>Consumables</b>			9730	Lock & Block Locking Stem x 50	94
7318A	Blowing Beads 2/4 Fibre	91	9312	Lock & Block Resin Blocking Stems x 100	94
7512A	Blowing Beads 6/8/12 Fibre	91	9240	Lock & Block Two Part Epoxy Adhesive	94
7081	Cable Pull Sock 6-10mm	91	9241	Lock & Block Two Part Epoxy Adhesive Dispensing Gun	94
71128	Cable Pull Sock 10-13mm	91	70575	Lubricant	95
7082	Cable Pull Sock 10-20mm	91	71608	Microduct Integrity Test Kit	95
72217	Cable Pull Sock 13-16mm	91	7741	Mille-Tie	95
7083	Cable Pull Sock 20-30mm	91	70688	Resin Pack 10B	92
7063	Cleaning Sponge 3.5mm	92	7077	Resin Pack 9B	92
7063A	Cleaning Sponge 5mm	92	7085	Shear Pin 2kN	91
7063B	Cleaning Sponge 8mm	92	7086	Shear Pin 3kN	91
7063C	Cleaning Sponge 10mm	92	7087	Shear Pin 4.5kN	91
7063D	Cleaning Sponge 12mm	92	7914T	Splice protector, Crimp	91
71303	Cleaning Sponge 14mm	92	70856	Splice protector, Heat shrink 30mm	91
71302	Cleaning Sponge 16mm	92	9601S	Splice protector, Heat shrink 45mm	91
71299	Cleaning Sponge 18mm	92	7610	Splice protector, Heat shrink 45mm	91
7084	Connector Swivel	91	71122	Swivel 22mm, Fused	91
7060	End Caps, Heat Shrink 12/4mm	96			

## Training

Product Code	Description	Page	Product Code	Description	Page
9527	Aerial Installation Training	99	9230	Mini Cable Installation	99
7800	Design and Engineering	98	9231	Train the Trainer	99
7505	Installation and Maintenance	98			





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