



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
Fibre colours	Blue, orange	Blue, orange, green, red	Blue, orange, green, red, grey, yellow	Blue, orange, green, red, grey, yellow, brown, violet	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				
	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 16 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 93
 For Installation Equipment, refer to page 79
 For Fibre Restraint Methods, refer to page 102

Singlemode Optical Parameters

Fibre type	ITU-T G.652d and ITU-T G.657A1	
Attenuation	1310 nm	≤ 0.4 dB/km
	1550 nm	≤ 0.3 dB/km
Waterpeak	1383± 3 nm	≤ 0.34 dB/km
PMD		≤ 0.2ps / (km) ^{0.5}

¹Primary coated fibre bend radius in accordance with ITU-T G.657A1

Multimode Optical Parameters

Attenuation		
Fibre Class	Maximum Attenuation at 20°C (dB/km)	
	850nm	1300nm
62.5/125 Fibres: OM1	3.5	1.0
50/125 Fibres: OM2, OM3 and OM4	2.6	0.8

Standards

Emtelle Class	Fibre Core/Cladding (microns)	ISO/IEC 11801	IEC 60793-2-10	TIA/EIA
OM1	62.5/125	type OM1	type A1b	492AAAA-A
OM2	50/125	type OM2	type A1a.1	492AAAB
OM3 and OM4	50/125	type OM3	type A1a.2	492AAAC-A

Bandwidth and Transmission Capacity

Fibre Class	Bandwidth (MHz.km)				*1000Base-SX Gigabit Ethernet Reach (m) at 850nm	**10GBase-SR 10 Gigabit Ethernet Reach (m) at 850nm
	Legacy LED Based OFLa		Laser Based			
	OFL ^a		RML ^b	EMB ^c		
	850nm	1300nm	850nm	850nm		
OM1	200	500	220	–	300	–
OM2	500	500	–	510	600	–
OM3	1500	500	–	2000	1000	300
OM4	3500	500	–	4700	1100d	550

Notes:

- a. OFL; measured by over filled launch as per IEC 60793-1-41, for legacy and LED-based systems.
- b. RML; measured by restricted modal launch as per IEC 60793-1-41. for intermediate performance laser based systems.
- c. EMB; Effective modal bandwidth by minEMBc in accordance with IEC 60793-1-49.
- d. Extended reach requires maximum cabled attenuation 3.0dB/km and total connector loss of 1.0dB at 850nm.
- * Gigabit Ethernet: Characterised system reach is based on IEEE 802.3z Standard Reference Model in accordance with ISO/IEC 11801. System reach can be calculated using EMB.
- ** 10 Gigabit Ethernet: Characterised system reach is based on IEEE 802.3ae Standard Reference Model in accordance with ISO/IEC 11801. System reach can be calculated using EMB.



Environmental Performance*

Test	Test Method	Test Parameters
Temperature Cycle	IEC 60794-1-2-F1 (3 cycles)	+20°C, -40°C, +60°C ≤0.1dB change during and after test
Water Soak	IEC 60794-5	18°C / 22°C ≤0.1dB change during and after test
Damp Heat Cycle	IEC 60068-2-38 (10 cycles)	25°C, 65°C, 25°C, 65°C, 25°C, -10°C, 25°C ≤0.1dB change during and after test

Mechanical Performance*

Test	Test Method	Test Parameters
Tensile Performance	(EN 187000 A1/ 501 IEC60 794-12-E1) Change @ 1550nm	Load is 1x w (in kg) (eg 12fu is 2.2kg) 10 min 0.05dB change after test
Flexing	IEC 60794-1-2-E11A Change @ 1550nm	Diam 40mm x 3 turns 5 cycles at 20°C ≤0.05dB change after test
Crush I	IEC 60794-1-2-E3 Change @ 1550nm	100 mm plate, 100N, 1 min, 2 tests at different places ≤0.05dB change after test
Crush II	IEC 60794-1-2-E3 Change @ 1550nm	100 mm plate, 500N, 1 min, 2 tests at different places ≤0.05dB change after test

*Singlemode fibre. For multimode fibre, see datasheet MHT1203

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	MHT1201	MHT2185	MHT1202	MHT1203			

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™ 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)

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

Minimum Order quantity 500 reels*

2fu Singlemode G.652d (2 connectors)

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

Minimum Order quantity 500 reels*

4fu Singlemode G.652d (4 connectors)

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*

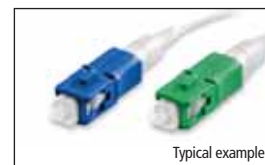
* Can be a combination of various lengths and/or connector types.

Field Fit Connectors

Optical fibre interconnection is carried out using these basic technologies:

1. Standard format optical connectors (FC/PC, SC, ST, E2000 all in PC and APC versions). Factory fitted or Field-fit versions available.
2. Small format optical connectors (LC type)
3. Multifibre connectors (MT-RJ, MPO, MTP and MT)
4. Mechanical splices
5. Fusion splicing

Emtelle can provide a number of fibre connection options. The optimum solution depends upon technical considerations such as optical, mechanical, temperature and re-connection performance. Please contact your local Emtelle representative for details of the various options.



Pre-Installed Microcable FU

Emtelle can supply a large variety of protected microducts (refer to page 32 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	

