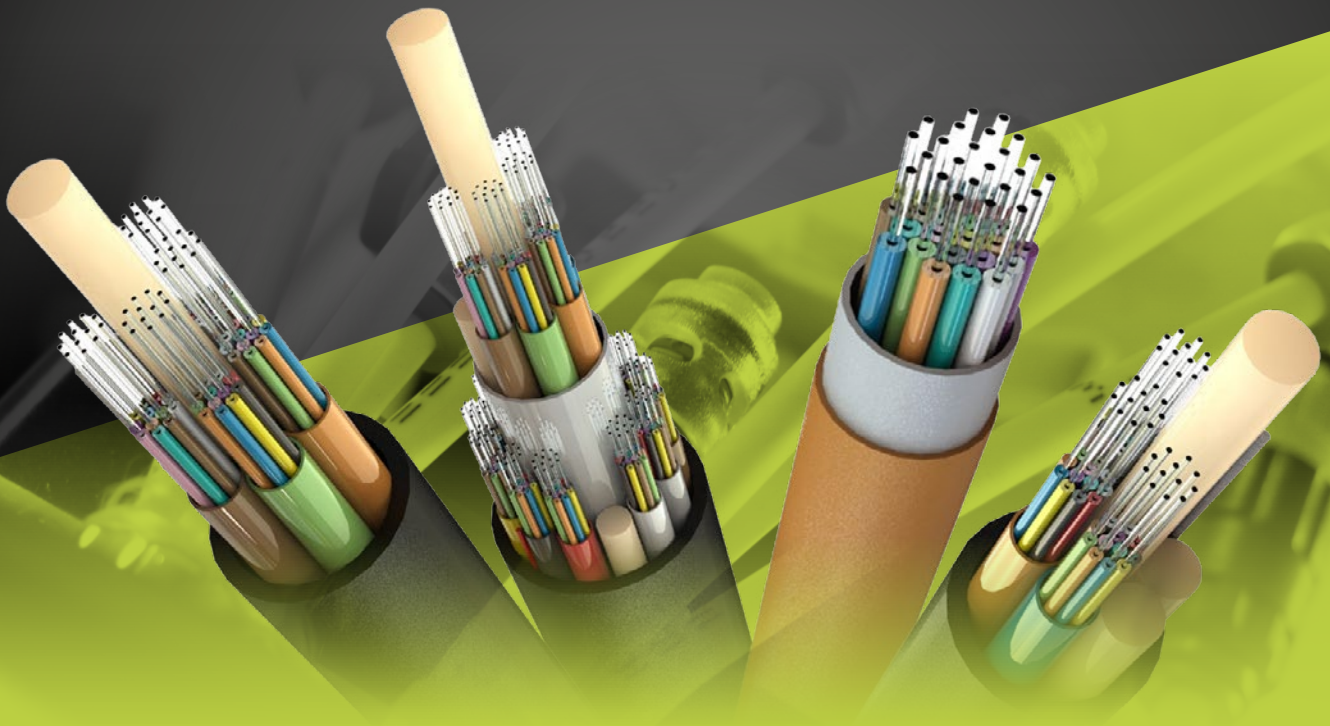


Excel Enbeam Blown Fibre Solutions

www.excel-networking.com/fibre/blown-fibre

Section 12



Blown Fibre Overview

Originally designed for the carrier network, the system is now breaking into the enterprise market and is particularly useful in campus installations, including both industrial and office environments. Recently, with the growth in data centres, the benefits of quick repair, expansion and upgrades are being realised.

Real Benefits

At its simplest, blown fibre uses a series of fitted ducts issued to install fibre between locations. The foundation is the installation of a duct network (the ducts are available in various tube counts and construction meaning internal, direct burial and direct install grades between required locations). The aim is to install the duct cable so that every location is linked, either point to point or, more efficiently, in a loop. Provision should be included for redundant ducting to allow for future expansion. The duct can easily be re-configured if the design evolves or changes.

The key to a good installation in the enterprise market is to work from the destinations back to the source(s), rather than the traditional method of starting with a large multi-core and breaking it down. This will assure that the minimum number and category of fibre is accounted for with sufficient future tube capacities. Blown fibre is very easy to install and modify, and there are huge time savings.

The major benefits to blown fibre are very easy to pinpoint and the comparison to more conventional installation methods is vast.

Investment

One of the key benefits is by initially investing in a well designed future proofed duct network; the fibre core costs and termination can be deferred until actually needed. Then, when a network requires expanding, the new fibre units are blown in quickly and without physical disruption to the fabric of the building or campus. Money is not tied up in having the fibre cores installed, and terminated, for a number of years when they are not being used (and may never be used) and redundant fibre units can be very quickly removed using the same blowing equipment, making the ducts available for the future. As and when new grades of fibre are developed this can be quickly and easily deployed as necessary.

This approach to staged deployment assists both initial budgeting and future investments. Network Managers can invest on day one in a duct network which is populated with fibres as required. As business needs change, either in terms of capacity or performance required, more fibre, or a different class of fibre, can be installed quickly and easily, often when the rest of the network continues to operate.

Repair and Upgrade

Whether there is a need to replace a damaged cable or upgrade a larger section of the infrastructure, blown fibre makes it very simple. Blown fibre can be described as a 'plug and play' solution as that is exactly how the duct cable is joined with push fit connectors. The ducts are installed and the fibre is blown in, it only then needs to be spliced and then the job is complete and ready for use. If damage occurs to the duct cable and fibre the 'Mean Time to Repair' is very fast. Simply locate the damage, open up the outer sheath of the duct cable using standard cable tools, locate the damaged duct(s), cut the duct, blow the fibre unit out, join the duct with push fit connectors (the section of duct cable can be cut out and replaced if needs be), blow in the replacement fibre unit, terminate & test and then the fibre is ready for reconnection. What used to take days, now can be reduced to hours to repair. And if some of the ducts have intact fibre units they do not need to be disconnected or compromised. This is hugely advantageous for data centres where time is critical and may be subject to costly Service Level Agreements (SLA).

How long does it actually take? It can take just a few minutes to remove old fibre and new fibre is blown in at 30 metres per minute, meaning that the whole process, including termination and testing, can be completed within the hour.

Building the System

In an industry where Moves, Adds and Changes (MACs) are inevitable, contingency planning becomes vital and finding a solution that can allow easy modifications is a much preferable choice.

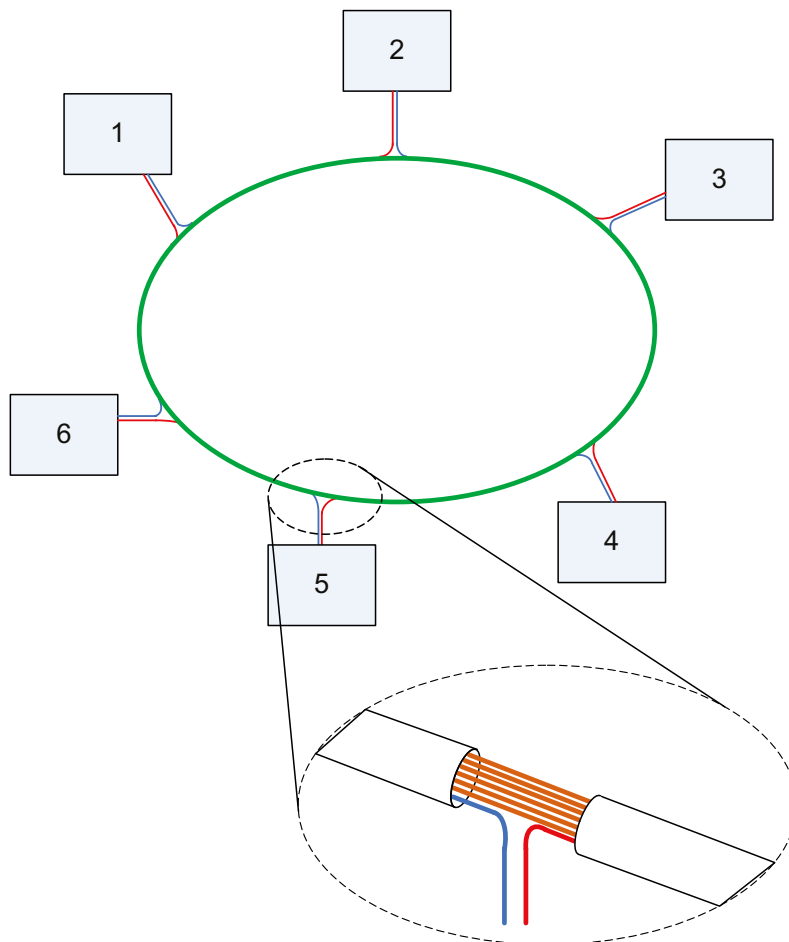
The need for maintenance in itself is greatly reduced by using blown fibre. Blowing fibre is a smooth process as the cable travels effortlessly down a tube, with no interference. In comparison, using the more traditional pulling method can cause damage to the cable which may shorten its life and may not be evident on day one. The stress it faces means that the need for maintenance becomes far more likely and its warranty becomes vulnerable. Stress is eliminated when the blown technique is used, as air transports the cable through its tube, supporting the fibre core along its entire length, greatly increasing its longevity. The tube cable is installed, with the usual pulling forces applied to any cable, without the fibre unit in place.

Diversity

A robust network should have more than one path for cable, ensuring that if one path goes down a second can pick up the feed. This can be achieved with any installation method, but blown fibre provides far greater advantages.

Consider the requirement to link satellite cabinets back to the main communications room. These may not even be in the same building, for example in a campus environment. Traditionally, multiple fibres would be installed between the cabinets or buildings. Almost every combination of connectivity would need to be considered. If the position of the 'main' communications room is swapped, or connectivity between two locations was not considered, this can be a time consuming and a costly exercise.

With blown fibre each individual tube can carry a fibre unit consisting of 12 cores. Let us assume that the initial requirement is for no more than 12 cores to each location. The practice for the blown fibre installation is to install tube cable(s) with a total number of tubes in excess of the number of locations linked to them all in a ring. Ideally twice the number of tubes, to allow for a future expansion or upgrade. So, with this ring, a fibre unit can be installed clockwise and anti-clockwise between two locations offering diversity and only tying up one tube. Tubes that are not required at a location are not cut. The spares are there for upgrades or expansion. If an 8 core is installed and this becomes insufficient then a spare tube could be used to install say a 12 core. When the service is cut over, the 8 core should be recovered. That way the spare capacity of the system is maintained.





Duct	Multiple blown fibre ducts contained within a single sheath. Ducts are available in Internal, Direct Install and Direct Bury grades with different duct counts. The ducts do not include the fibre unit (fibre optic cores).
Fibre Unit	Multiple cores of fibre bonded together into a single unit for blowing into the tube cable. The fibre is bonded together with an easy to remove substrate. Fibre units are available in different categories of fibre optic including OM3, OM4 & OS2 and a combination thereof if required. Fibre units can be made with any fibre optic core.
Dark Fibre	Fibre optic cable that is installed surplus to the immediate requirement. Usually the fibre optic is not terminated and it is referred to as 'Dark Fibre' as no light is shone down it. If terminated and used, the fibre optic is no longer 'Dark' fibre.

Blown fibre truly is a more cost effective, easier and more flexible approach. Fundamentally, as only the tubes are put in on day one, it means that the whole cable can be manipulated as needed, offering numerous advantages. Using conventional methods, the cable is fixed in place so the flexibility is non-existent and, should a MAC be required, the time and cost implications could be huge.

Future proofed

The ease of modification alone means blown fibre provides a future proofed solution, but further to that Excel is also able to turn any optical fibre they make or source into a fibre unit. A system installed a few years ago, before OS2 even existed, can still utilise OS2 today, and the unknown ahead of us will still be able to fit into systems that are being installed today.

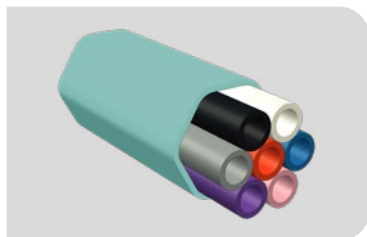
Blown Fibre Systems provide a simple solution to manage evolving network demands without the need for high initial capital expenditure or extensive network planning. The system enables optical networks to adapt to changing business requirements and allows optical fibres to be deployed on demand from one point of a network to another (internal or external) using compressed air to blow optical fibre into pre-installed tubes.

The flexibility offered by blown fibre solutions can substantially minimise today's network build costs. With the many uncertainties in the market, such as future trends in technology, demand from customers, people movement and financial confidence, can provide a flexible, low total life cost and 'peace of mind' solution.

Some of the key benefits include:

- It uses new, innovative technology and state of the art equipment
- It uses multiple fibres
- Fibres that are blown out can be reused
- The blows can be cascaded
- It is a total cable solution
- It offers integrity and extra length
- The tube can be tested before the fibre is blown in

Blown Fibre Systems are made up of the following key elements:

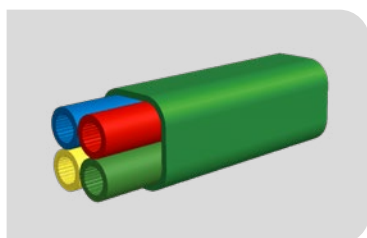


Internal Blowing Tube Duct

- Internal application
- LSOH Sheath
- Available up to 24 x 5mm bundles
- Crush and Impact Resistant
- RoHS compliant
- 25 Year system warranty

Enbeam Internal blowing tubes have been designed to allow blown fibre to be distributed internally. The internal grade tubes are over-sheathed with Polyethylene and Halogen free (HF) flame retardant material foil. The tubes have a low friction inner coating to reduce drag & maximise blowing distances. The compact tubes can accommodate Excel fibre units containing from 2 to 12 fibres and are colour-coded for identification.

The tubes are easy to terminate and branch-off using suitable Excel connection closures and push-fit connectors. The tubes are supplied on disposable wooden drums and capped at both ends to prevent ingress of moisture or contamination.



External Blowing Tube Duct

- Duct-installable
- HDPE Sheath
- Multiple sizes available
- Multiple bundle configurations
- Crush and impact resistant
- RoHS Compliant

Enbeam duct installable blowing tubes have been designed for direct installation into existing ducts to allow blown fibre to be distributed externally. All tube bundles are over-sheathed with High Density Polyethylene (HDPE) to withstand the friction when installing the micro ducts. All internal tubes are colour coded for easy identification and have a low friction inner coating to reduce drag & maximise blowing distances.

Tubes are easily broken out of the main sheath and can be branched-off using the Enbeam push-fit blown tube connectors. The tubes are supplied on disposable wooden drums and capped at both ends to prevent ingress of moisture or contamination.



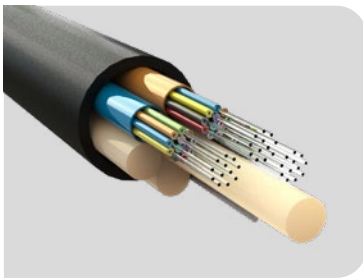
Internal Fibre Unit

- Available in OM3/OM4/OS2
- Bend Insensitive Fibres
- TIA-598-C Colour coded
- 25 Year system warranty
- Available in 4, 8 & 12-fibre bundles
- Easy strip

Enbeam Enhanced Performance Fibre Units (EPFU) are designed specifically for blown-fibre applications and are optimised for installation within our range of blown-fibre tubes. The fibres are contained within a soft acrylate layer which cushions the fibres. This layer is coated with a hard layer for strength and finally a low-friction coating to ensure low drag and maximise blowing distances within the tubes.

The acrylate coatings are easy to remove to expose the 250-micron primary-coated fibres for quick splicing. The fibres are colour-coded according to TIA-598-C.

The fibre units are available in OM3, OM4 and OS2 (G.657.A1 bend insensitive).



Blown Micro Blown Fibre (External)

- Small diameter
- High core count - from 48-432
- High Density Polyethylene (HDPE) outer jacket
- G657-A1 Bend Insensitive
- Recommended internal duct size - from 10-14mm
- Euroclass Fca

The Enbeam Micro Blown fibre has been designed for blowing into the Enbeam Micro-duct system. The cable is constructed from multiple gel filled loose tubes around a central strength member, overlaid with water blocking yarn and covered with a High-Density Polyethylene (HDPE) outer jacket.

The small diameter 5mm to 12.2mm allows high core count fibres to be blown into the access network down micro-duct with an inner diameter as small as 10 to 14 mm.

Please note this cable is used for blown systems only and should not be manually pulled into ducts.



Connectivity

The Enbeam internal tube distribution unit has been designed for use with the Enbeam blown fibre system. It allows micro tubes to be broken out into different directions allowing the blown fibres to distributed around the internal building structure. IP rated external grade tube distribution units are also available.

- Full range of 19" Patch Panels
- Choice of internal and external Customer Splice Boxes
- Compact Termination Boxes
- Tube Distribution Closures
- Blown Fibre Gas Seal Units



Connectors

A full range of connectors for use in the installation of the system including:

- Tube Connectors
- Tube End Connectors
- Water Blocking Connectors
- Gas Seal Connectors
- Tube Sealing Caps
- Reducer Connectors
- Bulkhead Connectors



Installation Equipment

- Blowing Head - used in conjunction with the compressor to blow in the EPFU
- Compressor - available as an electric or petrol version
- Installation kits are available to buy or hire

Source: www.factair.co.uk/blown-fibre/

For further details please visit www.excel-networking.com.

Blowing Tube Duct / Fibre Unit Compatibility Table

Blowing Tube Duct		Fibre Units
5/3.5mm External		
208-750	Single - Green	208-790, 2 fibre unit
208-751	2 Way - Green	208-791, 4 fibre unit
208-752	4 Way - Green	208-792, 6 fibre unit
208-753	7 Way - Green	208-793, 8 fibre unit
208-754	12 Way - Green	208-794, 12 fibre unit
208-755	24 Way - Green	208-795, 24 fibre unit
208-800	2 Way - Black	
208-801	4 Way - Black	
208-802	7 Way - Black	
208-803	12 Way - Black	
208-828	19 Way - Black	
208-804	24 Way - Black	
7/5.5mm External		
208-756	Single - Green	
208-757	2 Way - Green	
208-758	4 Way - Green	
208-759	7 Way - Green	
208-760	12 Way - Green	

14/10mm External			
208-766	Single - Green	325-048, 48 core micro blown G657-A1	326-048, 48 core micro blown G652D
208-767	2 Way - Green	325-072, 72 core micro blown G657-A1	326-072, 72 core micro blown G652D
208-768	4 Way - Green	325-096, 96 core micro blown G657-A1	326-096, 96 core micro blown G652D
208-769	7 Way - Green		

16/12mm External					
208-777	Single - Green	325-144, 144 core micro blown G657-A1	328-144, 144 core micro blown 200µm G657-A1	327-144, 144 core micro blown 200µm G652D	326-144, 144 core micro blown G652D
208-778	2 Way - Green	325-192, 192 core micro blown G657-A1	328-192, 192 core micro blown 200µm G657-A1	327-192, 192 core micro blown 200µm G652D	326-192, 192 core micro blown G652D
208-779	4 Way - Green	325-288, 288 core micro blown G657-A1	328-288, 288 core micro blown 200µm G657-A1	327-288, 288 core micro blown 200µm G652D	326-288, 288 core micro blown G652D

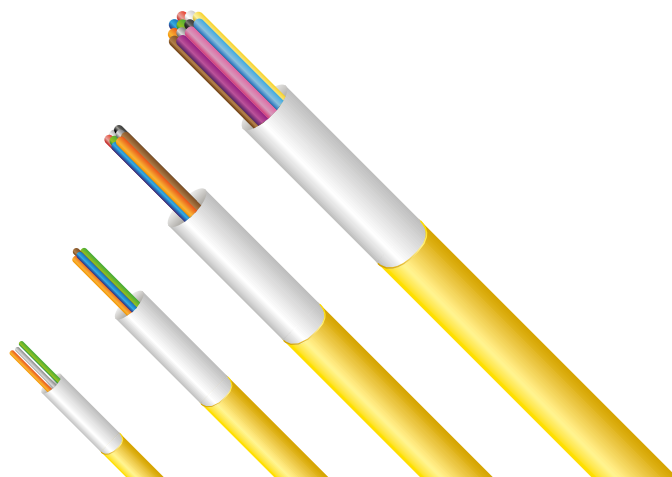
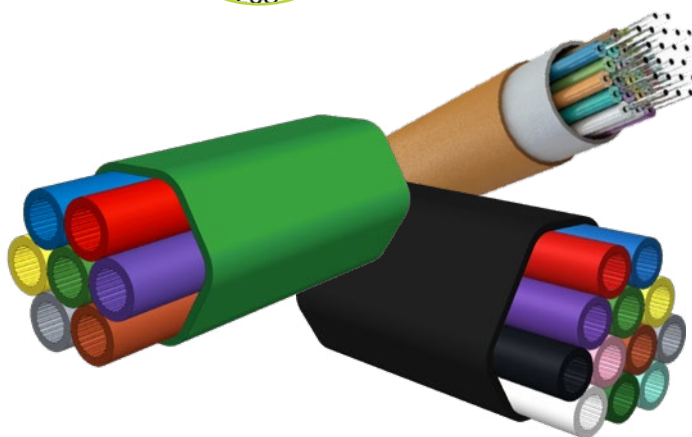
18/14mm External					
208-786	Single - Green	325-432, 432 core micro blown G657-A1	328-432, 432 core micro blown 200µm G657-A1	327-432, 432 core micro blown 200µm G652D	326-432, 432 core micro blown G652D
208-787	2 Way - Green				
208-788	4 Way - Green				

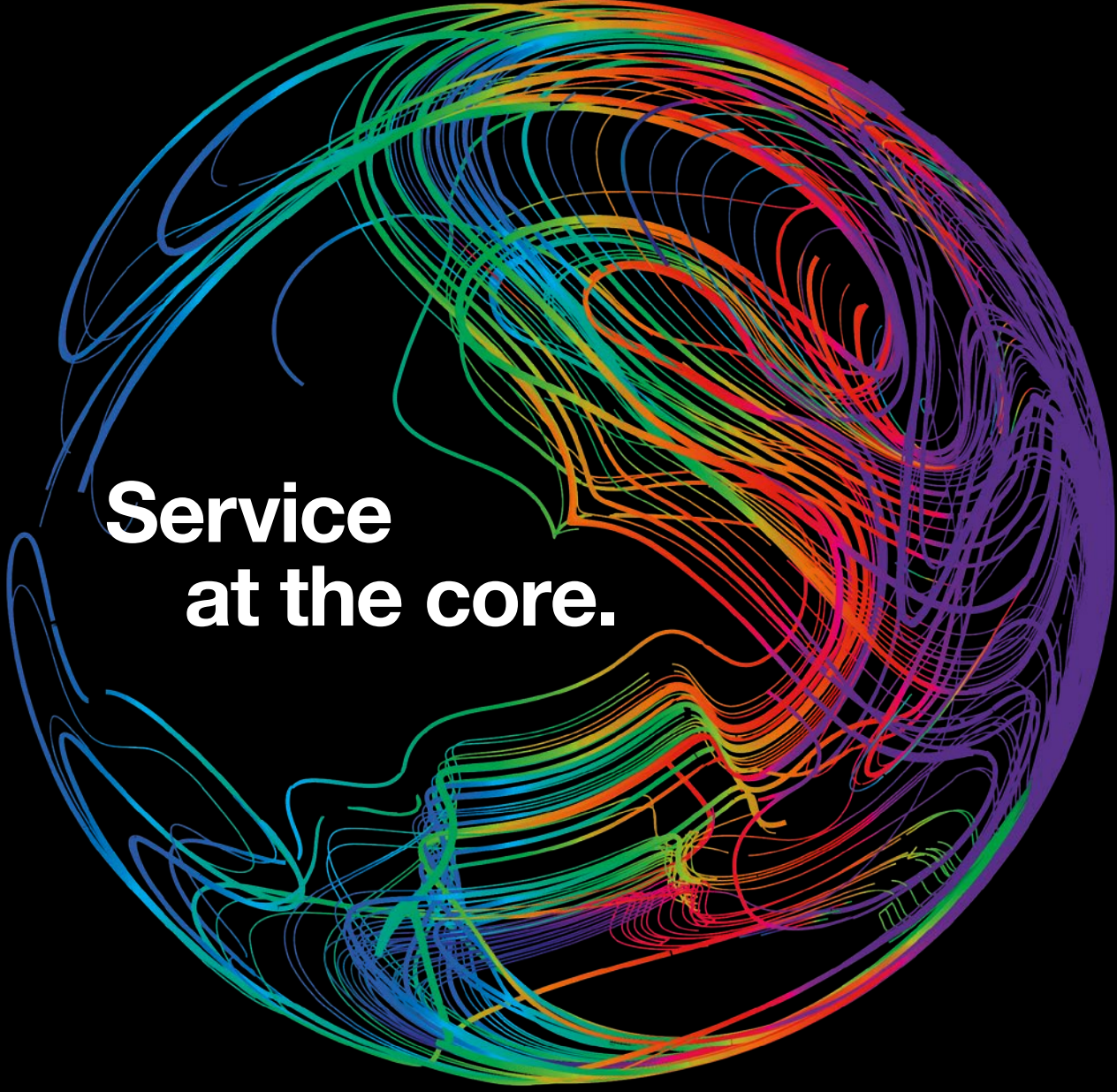
5/3.5mm Internal		Internal EPFU
208-770	Single - White	208-811 2 fibre OS2
208-805	2 Way - Ice Blue	208-812 4 fibre OS2
208-806	4 Way - Ice Blue	208-813 8 fibre OS2
208-807	7 Way - Ice Blue	208-814 12 fibre OS2
208-808	12 Way - Ice Blue	208-816 4 fibre OM3
208-809	19 Way - Ice Blue	208-817 8 fibre OM3
208-810	24 Way - Ice Blue	208-818 12 fibre OM3
		208-822 4 fibre OM4
		208-823 8 fibre OM4
		208-819 12 fibre OM



The first number indicates the Outer Diameter (5mm)

The second number indicates the Internal Diameter is 3.5mm





**Service
at the core.**

S12

ENBEAM

Flexible, scalable, ultra high performance fibre optic systems from Excel

Enbeam from Excel introduces unrivalled levels of technical and service support when selecting and purchasing fibre optic systems for LAN and DC environments. From online ordering, next day delivery, in house termination facilities, through to free technical support, white papers and national demonstration centres, you can be assured of peace of mind by choosing Enbeam.

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without compromise.