Prysmian Group

FlexTube®

Flexibility and durability – whatever the infrastructure challenge

FlexTube® FROM PRYSMIAN GROUP

PRYSMIAN

Draka

Prysmian
Group

Linking the future

As the worldwide leader in the cable industry, Prysmian Group believes in the effective, efficient and sustainable supply of energy and information as a primary driver in the development of communities.

With this in mind, we provide major global organisations in many industries with best-in-class cable solutions, based on state-of-the-art technology. Through two renowned commercial brands – Prysmian and Draka – based in around

50 countries, we're constantly close to our customers, enabling them to further develop the world's energy and telecoms infrastructures, and achieve sustainable, profitable growth.

Drawing on over 130 years' experience and continuously investing in R&D, we apply excellence, understanding and integrity to everything we do, meeting and exceeding the precise needs of our customers across all continents, at the same time shaping the evolution of our industry.

Introducing
FLEXTUBE®

FLEXTUBE® is an optical micromodule which can be built into many different designs of internal or external cables for extensive and widespread application.

The *FLEXTUBE*® micromodule is made of a soft, flexible material which makes it easy to use, especially when it is being prepared for end termination or mid-span breakout.
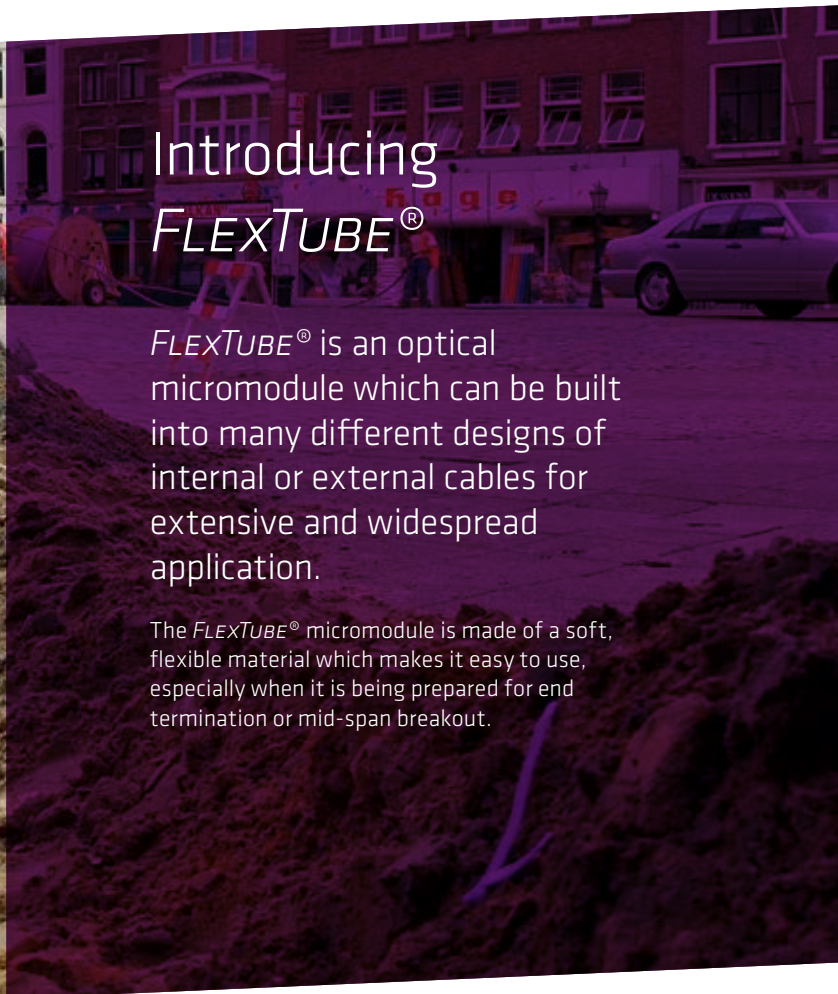
Linking communications to communities

Prysmian Group is the world's largest producer of telecoms cables, supporting the infrastructures of many of the world's leading telecoms operators. The Prysmian Group delivers optical fibre and copper cabling solutions that help link communications to communities around the globe.

Easy installation and reduced costs

More dense and quicker to prepare and install, the Prysmian range of *FLEXTUBE*® cables offers many advantages compared with using standard loose tube optical cables. The key benefits of denser design and easier handling mean you make major savings in terms of time and cost – and the larger the project, the greater the savings.

What does it deliver to you?

– Reduced installation time
  – Easier handling, particularly in fibre distribution and termination units
  – Fast access to fibres; easy to remove the module material with no tools required
  – Small quantity of grease, minimising clean-up time
– Avoid the risk of tube kinking (potentially causing attenuation increments or fibre breakage)
– Simple mid-span breakout enabling single module extraction to aid distribution

– Available with Low-Smoke Halogen-Free Fire-Retardant (HFFR) sheath compound for indoor applications
– Most *FLEXTUBE*® cables contain Prysmian Group's *BENDBRIGHT*^{XS} bend insensitive G.657.A2 fibres. In regular 250μm format or even denser 200μm versions, this enables the Flextubes to be wound around tight radii without signal loss. This supports the reduction in size of connectivity units, saving space and providing improved aesthetics.
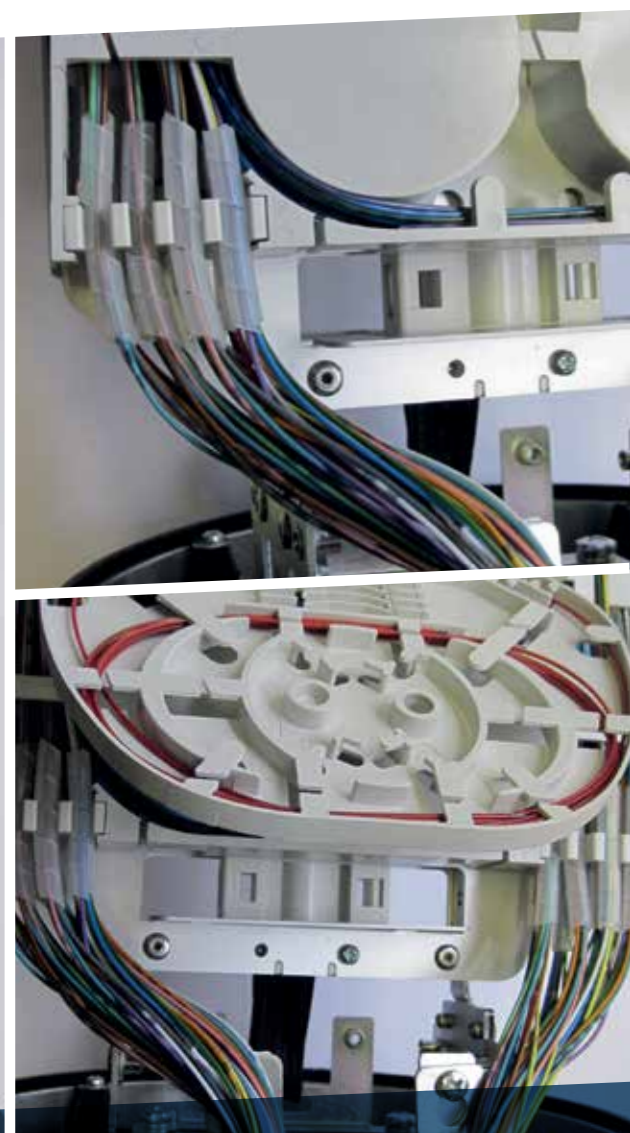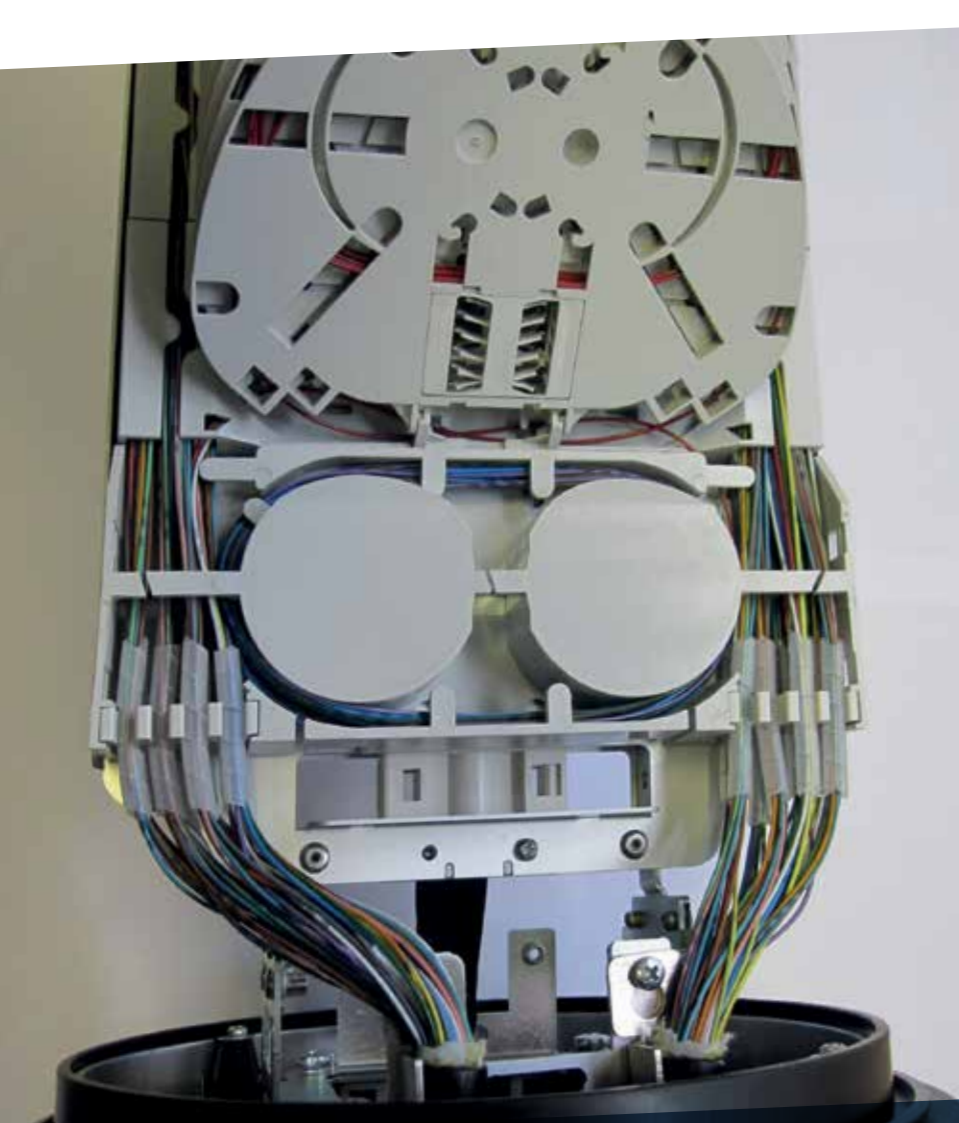
The *FlexTube®* family of optical cables from Prysmian

The *FlexTube®* family of optical micromodule designs was introduced by the Prysmian Group in order to provide even better performance than standard loose tube cables.

While loose tube products are still used extensively around the world and remain the most prevalent technology for cable designs (and produced globally in very high volumes by Prysmian Group) the *FlexTube®* solution is able to create real benefits for operators, installers and other users through the key advantages of easy fibre access and breakout, avoiding attenuation risks through tube kinking, and providing much better thermal stability especially when tightly wound in joints. These benefits are achieved across the entire range of *FlexTube®* designs.

One of the attractions of the *FlexTube®* solution is its ability to address the full range of application areas with options that reflect customers' wants and needs.

– The optical micromodule itself is available with a single fibre within each unit up to 24-fibre packages (1, 2, 4, 6, 8, 12 and 24).

– Standard duct cables are available up to 864-fibre: there are two building-block options to cover the bulk of normal fibrecounts, one for up to 288-fibre and another for those above (to 864-fibre). Higher fibrecounts are available as customised solutions.

– Modified and improved designs that address customer demand for high density solutions.
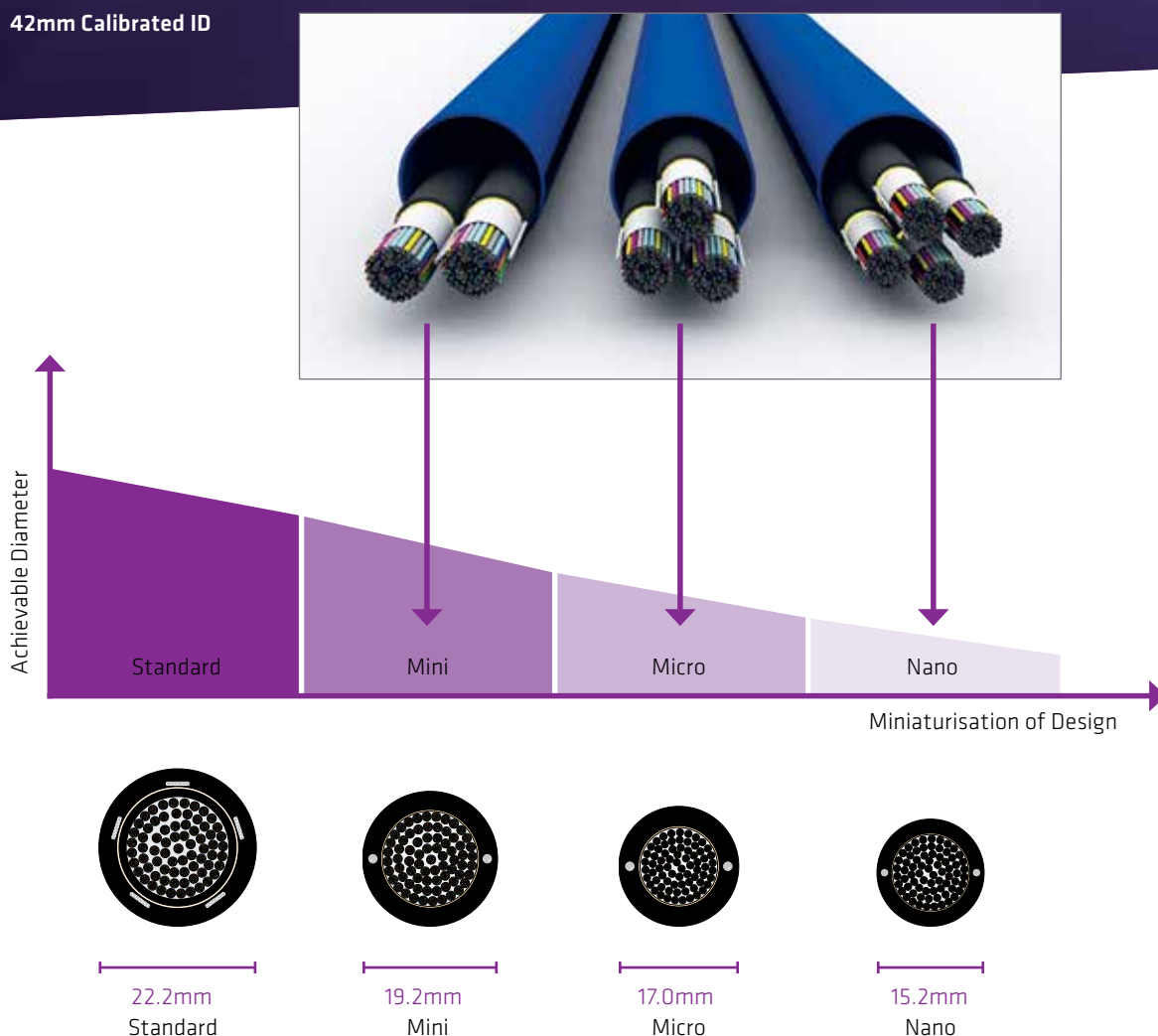
– Cable designs for all application areas.

The range has expanded from the standard portfolio of *FLEXTUBE*® cables

The *FLEXTUBE*® family of optical micromodule designs has evolved over the years as our customers want to put more and more fibres into the duct space that they have available.

– **Mini *FLEXTUBE*® cables:** designed for µduct installation, the material layers around the *FLEXTUBE*® microbundles are improved in these design options.

– **Micro *FLEXTUBE*® cables:** these cables are further enhanced by optimising the *FLEXTUBE*® module itself including new materials together with optimisation of cable designs.

– **Nano *FLEXTUBE*® cables:** the ultimate density solution, where the coating diameter of the fibre is reduced from 250µm to 200µm.

The effect of these improvements can be seen below, with the example of an 864–fibre *FLEXTUBE*® cable showing how the technology has assisted in reducing cable diameters.

42mm Calibrated ID

Achievable Diameter

| Standard | Mini | Micro | Nano |

Miniaturisation of Design

| 22.2mm | 19.2mm | 17.0mm | 15.2mm |
| Standard | Mini | Micro | Nano |

When size matters, the extensive *FlexTube®* family has the answers

If you want to optimise the fibre density of your network, you can move within the *FlexTube®* duct/µduct family of optical micromodule designs from left to right in the earlier diagram and table below. Here, the external dimensions of the cable will reduce, as well as the net weight.

Depending upon the customer's (operator's) priorities, network design philosophy and topology, these issues may be highly beneficial or of little consequence; e.g. using blown installation practices will demand a significantly lower tensile strength requirement from the cable design.

Utilising the nano technology option in the *FlexTube®* family, which incorporates 200µm *BendBright*[XS] G.657.A2 fibres, means that 72 fibres can be provided inside a 6mm cable and 864 fibres inside a 15.2mm cable with knock-on effects on microduct dimensions too. **This represents a record 4.8 fibres per mm².**

BendBright[XS] **at core**

	Standard	Mini	Micro	Nano
Diameter (mm)	22.2	19.2	17.0	15.2
Design example (864f)				
Cable cross- section (mm²)	387 (reference)	290 (-25%)	227 (-41%)	181 (-53%)
Fibre density in cable (fibres/mm²)	2.2	3.0	3.8	4.8 **RECORD**
Fibre coating diameter (µm)	250	250	250	200
Duct capacity (42mm calibrated ID)	Reference			
Duct capacity vs. occupied space	**864f**/387mm² (reference)	**1728f**/579mm² (x2/+50%)	**2592f**/681mm² (x3/+76%)	**3456f**/726mm² (x4/+88%)

The *FlexTube®* families are available in fibre counts up to 864. Higher fibre counts are available as customised solutions. The effects of the state-of-the art density of *FlexTube®* families are significant, as can be seen from the table above where the downward trend in overall cable dimensions means that 4x864-fibre nano *FlexTube®* cables can now be installed in a calibrated 42mm ID duct (a total of 3456 fibres), doubling the capacity compared to two years ago and quadrupling compared to historical reference.

Where to use *FLEXTUBE*® optical cables from Prysmian

FLEXTUBE® optical micromodule designs are available for the most extensive range of applications, throughout internal and external networks, whether traditional duct, micro-duct or direct buried networks or the most innovative solutions using new forms of rights-of-way.

Almost every application benefits from *FLEXTUBE*®, including high value-add solutions deployed in crowded ducts and microducts, premises distribution, risers, sewer rights-of-way and aerial.

Other applications include:
- Direct buried
- Rodent resistant
- Gunshot resistant
- Façade

- Indoor and outdoor
- Hybrid
- Underwater
- Tunnel

FLEXTUBE®

How *FlexTube*® goes beyond Loose Tube

FlexTube® offers significant improvements over regular loose tube technology, delivering higher performance and operational savings for critical aspects of cable deployments. Three tests demonstrate these advantages clearly.

Kink

The *FlexTube*® construction is immune to kinking, which is a key operational advantage over loose tube, which suffers from kinking at small bend diameters.
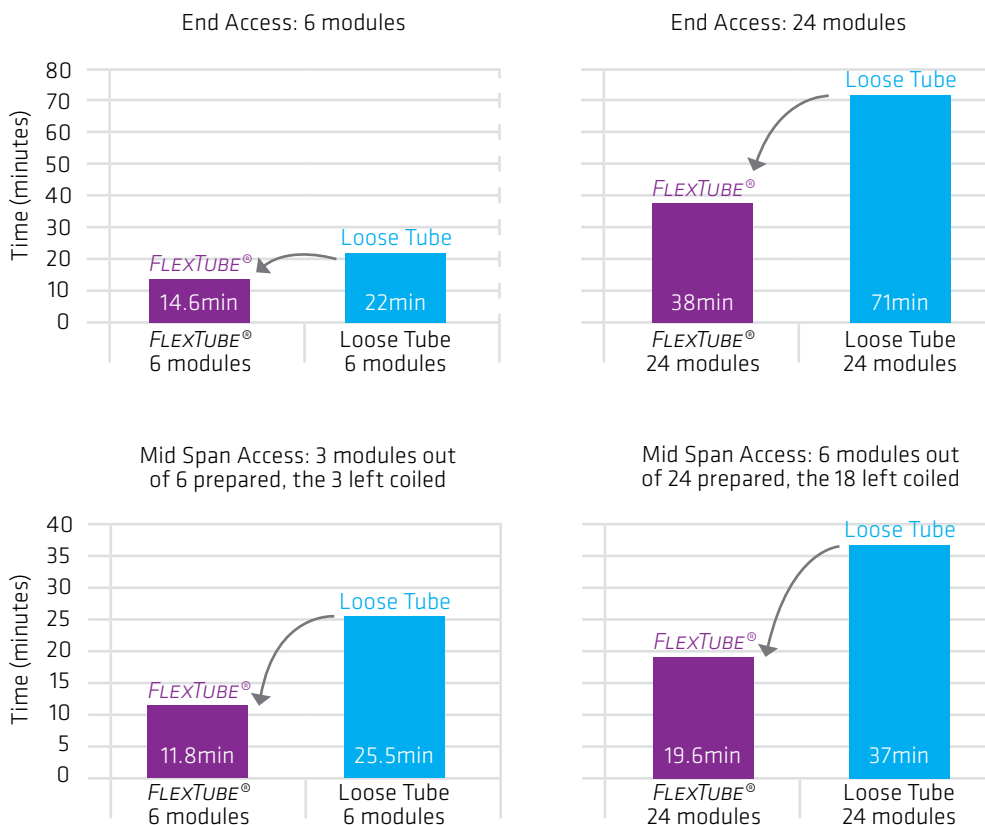
Loose Tube
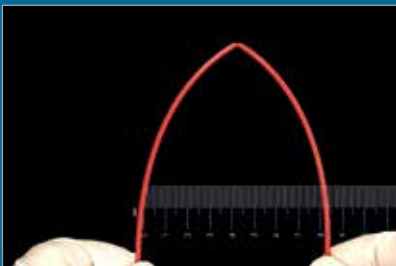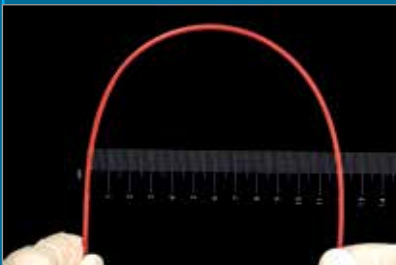
FlexTube®

Access to the fibres
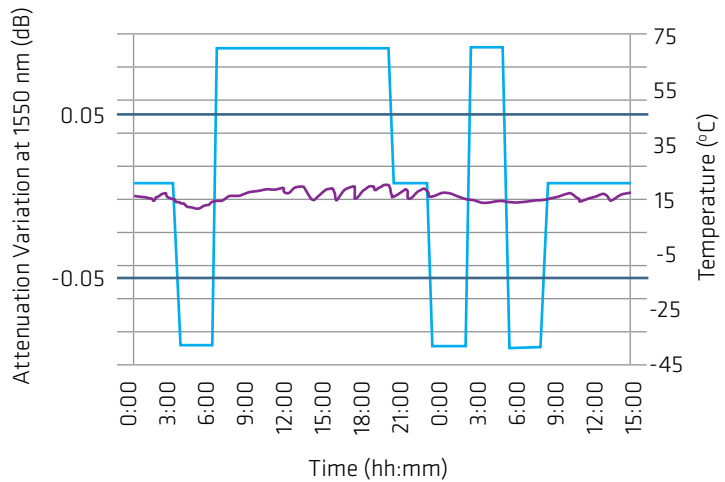
Reduced preparation time for end access (approximately 40%) and reduced fibre access and coiling time for mid-span access (approximately 50%).

End Access: 6 modules

Time (minutes)

FLEXTUBE®
14.6min

Loose Tube
22min

FLEXTUBE®
6 modules

Loose Tube
6 modules

End Access: 24 modules

Loose Tube

FLEXTUBE®

FLEXTUBE®
38min

Loose Tube
71min

FLEXTUBE®
24 modules

Loose Tube
24 modules

Mid Span Access: 3 modules out of 6 prepared, the 3 left coiled

Time (minutes)

FLEXTUBE®
11.8min

Loose Tube
25.5min

FLEXTUBE®
6 modules

Loose Tube
6 modules

Mid Span Access: 6 modules out of 24 prepared, the 18 left coiled

Loose Tube

FLEXTUBE®

FLEXTUBE®
19.6min

Loose Tube
37min

FLEXTUBE®
24 modules

Loose Tube
24 modules

FLEXTUBE®

Extreme express module performance

When coiling inside a joint closure a *FLEXTUBE*® is extremely stable in temperature versus time (~0.2% variation), allowing operators to future-proof and secure their network against environmental conditions and maintenance tasks for decades.

This high level of attenuation stability can be considered state-of-the-art cable technology.

Attenuation Variation at 1550 nm (dB)

Temperature (°C)

0.05

-0.05

75
55
35
15
-5
-25
-45

0:00 3:00 6:00 9:00 12:00 15:00 18:00 21:00 0:00 3:00 6:00 9:00 12:00 15:00

Time (hh:mm)

— *FLEXTUBE*® 7 times better @1625nm than conventional design

— Temperature (°C)

A global solution

Around 40 countries have already benefited from the capabilities of *FlexTube®* technology.

That includes broad adoption across Europe, significant deployments in Africa and the commencement of significant new builds in Latin America and Oceania.

Micromodule's versatility makes it the technology of choice throughout the network, spanning in-building solutions (risers, *VertiCasaˣˢ*), scalable FTTx and access (retracting systems), up to full end-to-end infrastructures in significant deployment cases.

The advantages of our solution can be leveraged in a wide variety of environments, taking in France, Germany, Spain, Portugal, UK, Benelux and several Eastern European countries among others.

FlexTube®

Linking communications to communities

Prysmian Group
Viale Sarca 222
20126 Milan
Italy

Email: telecom@prysmiangroup.com
Tel: +39 02 6449 3500

www.prysmiangroup.com

Prysmian Group

FlexTube®

Follow us

Prysmian Group

PRYSMIAN

Draka