

# New construction with ESM micromodules



Flexible. Pliable. But quick to install  
and failure-free.

# FIBRAIN

## Microduct cables



new

MK-FM ESM

## TELECOM cables



MDC-FM ESM

## TELECOM aerial cables



new

AERO-FM ESM

## FTTH cables



VC-D20 ESM



VC-D30 ESM



VC-D40 ESM



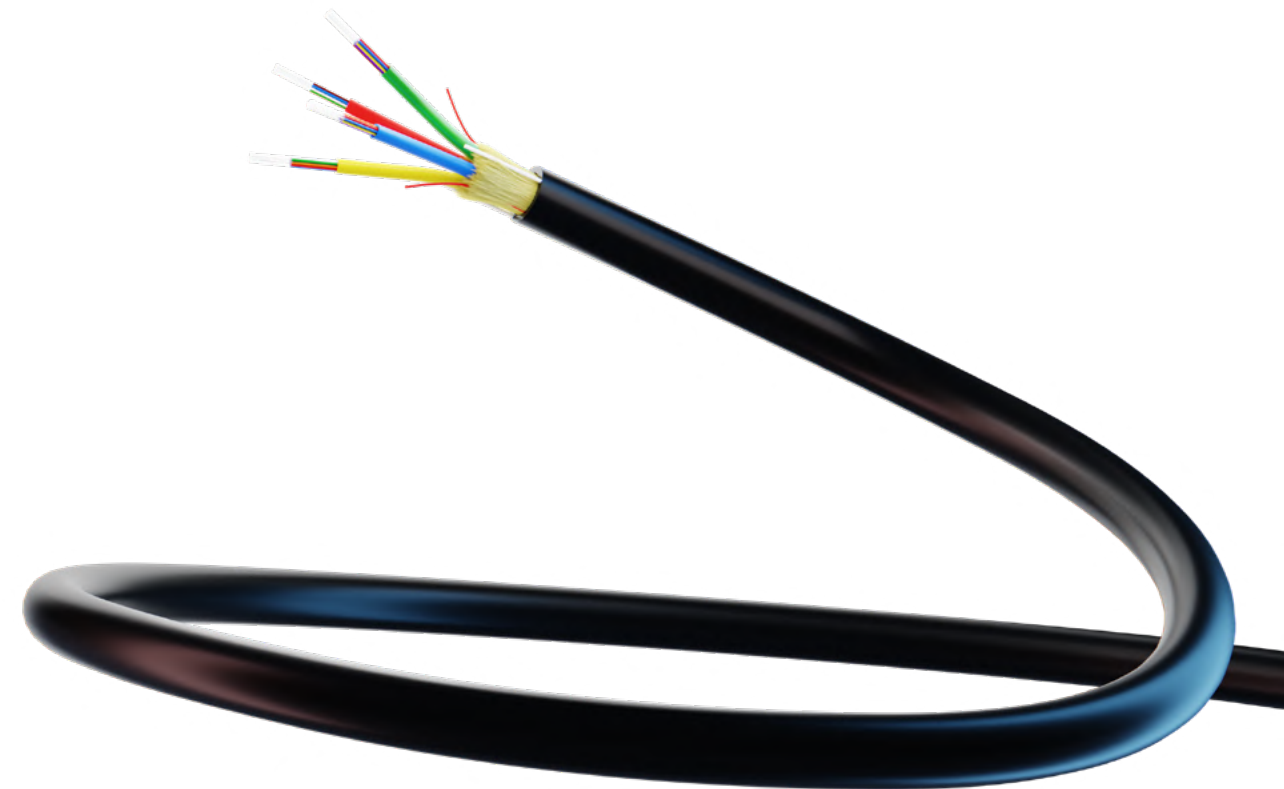
EAC-Ram ESM

# New construction with ESM micromodules

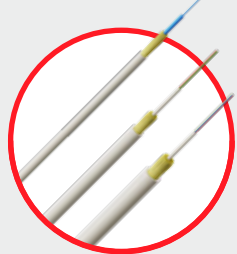
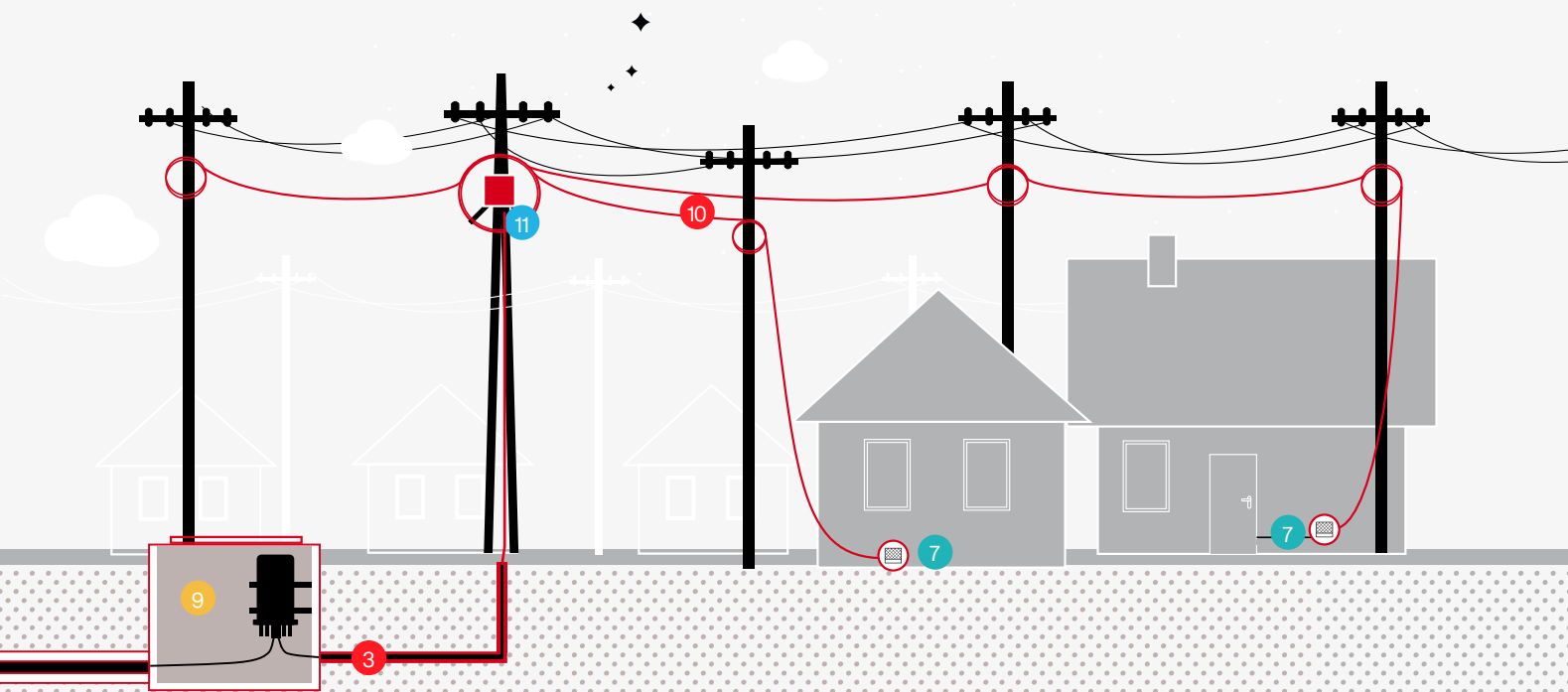
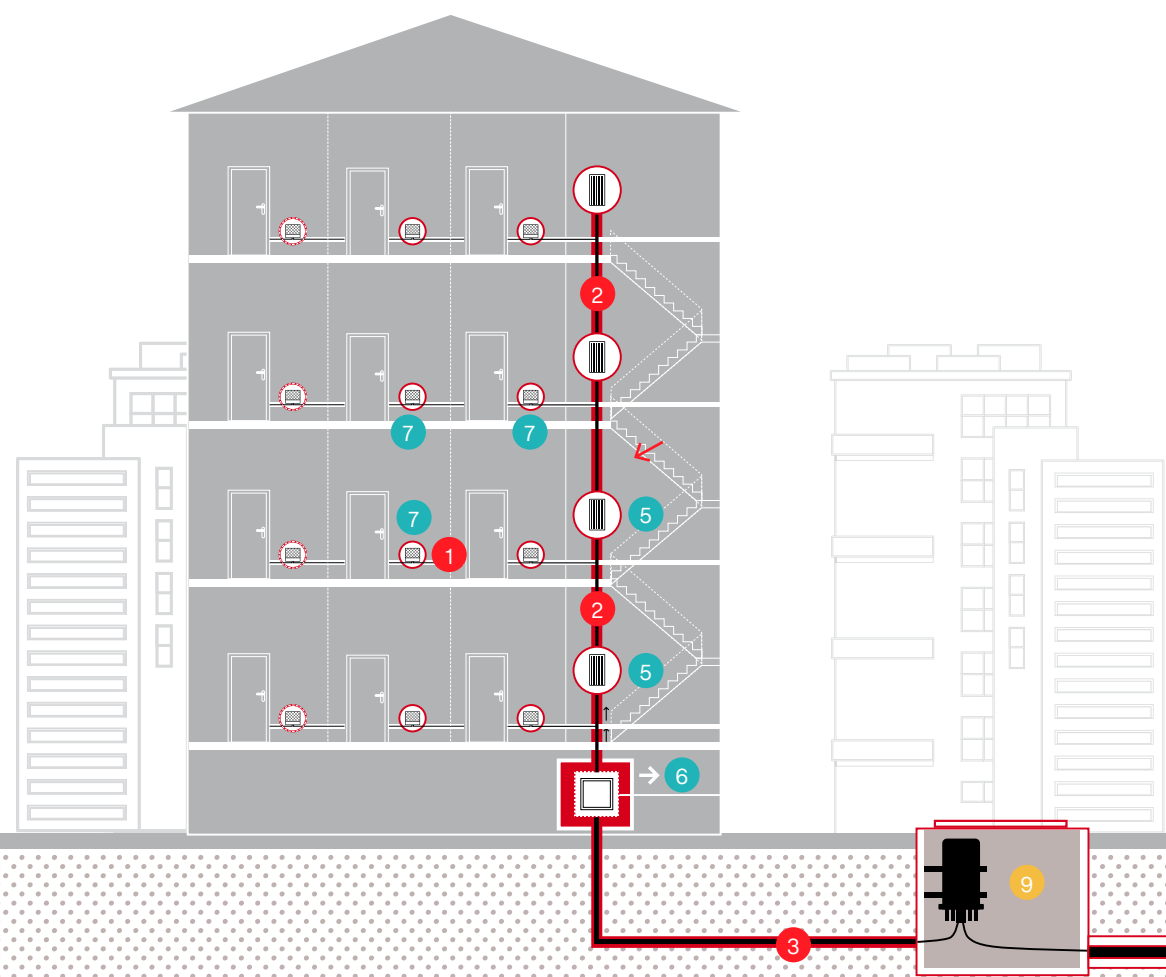
Cables with ESM micromodule cables serves as a replacement for traditional loose tubes offering flexible and pliable material with a low stiffness ratio. They facilitate working with cable significantly by accelerating the stripping and installing cable in connection or distribution points.

Day and night Installers are looking for new solutions that facilitate installing fiber optic cables. Quicker installation means faster project implementation and savings. To face these expectations, FIBRAIN is launching a new family with ESM micromodules.

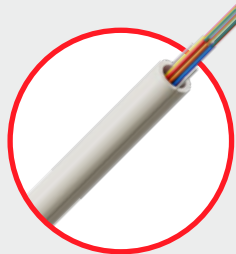
Cables with flexible ESM micromodules facilitate installation at the final part of cables, but also when it is necessary to pull out single fibers. A wide range of benefits make this new construction an attractive alternative towards traditional construction based on loose tubes.



# ESM – application example



1  
VC-D20E ESM  
VC-D30E ESM  
VC-D40E ESM  
Drop cables ESM



2  
EAC Ram ESM



3  
MDC-FM ESM



4  
MK-FM ESM



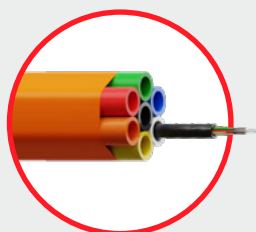
9  
FOBP



10  
AERO-FM ESM



11  
OBP S8



8  
MetroJet



5  
BU-XN



6  
IFDT



7  
VFTO  
customer outlet

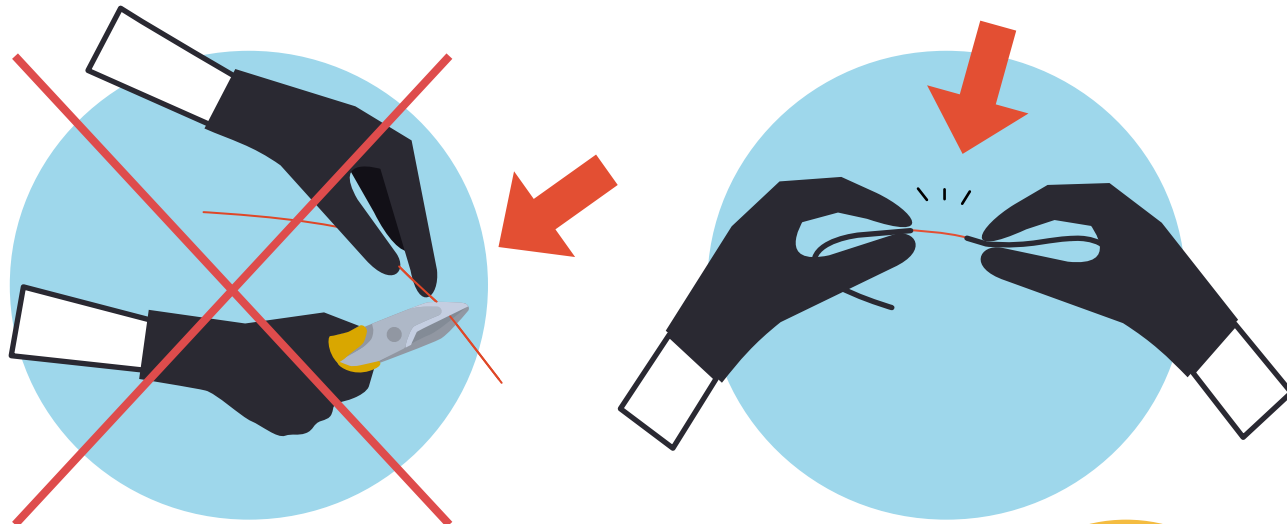
# Why cables with ESM?



## 1. Toolless access to fibers

Removing the micromodule coating doesn't require tools that are commonly used with a loose tube. The covering of a micromodule can be easily cut without any tools. Access to the fibers is extremely simple and

quick compared to standard solutions. Consequently, it reduces the cable installation time and ensures the simplicity of the whole activity.



**Faster  
access to fibers  
–  
toolless**

# Why cables with ESM?

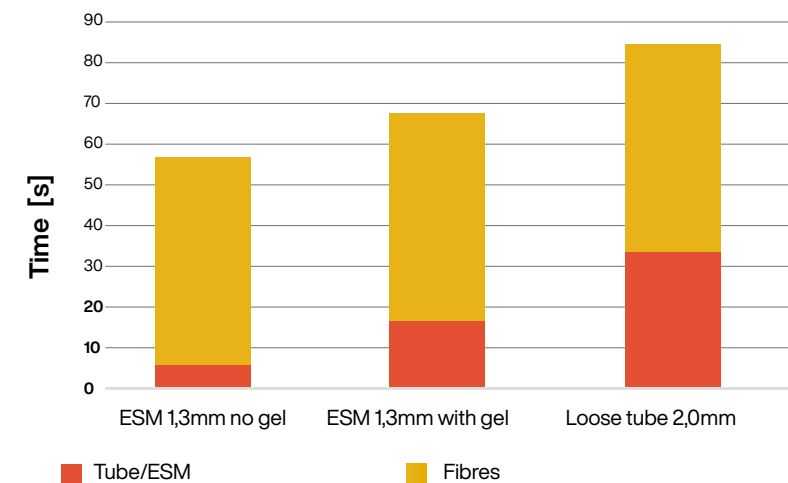


Fig. 1. Stripping time

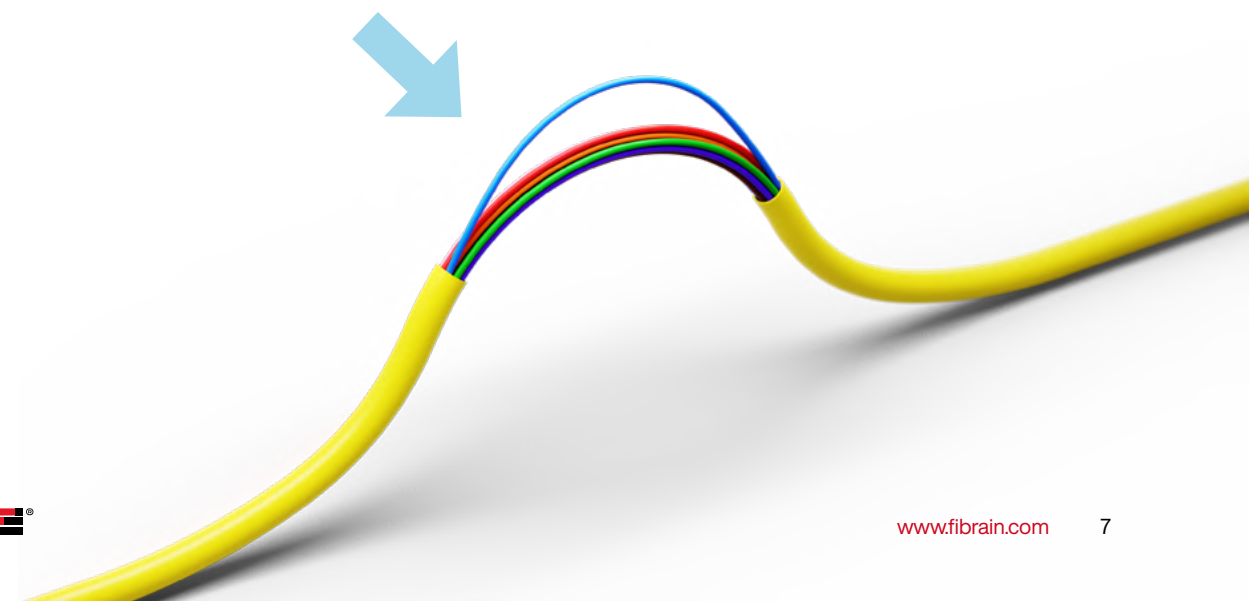
**Quicker  
stripping**



## 2. Easy access to single fibers 'mid span access'

Installers often need easy access to single fibers without cutting other fibers and generating unnecessary costs of splicing. Undoubtedly, micromodules fulfill these needs and requirements.

Similarly, as in case of standard cables, the access to fibers is manual – without extra tools.



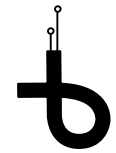
# Why cables with ESM?



## 3. Clean installation

Micromodules are filled with less amount of gel comparing to loose tubes. Moreover, you can find in our product portfolio dry constructions, which don't

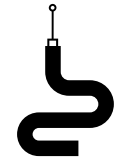
have gel inside a module. It is also very comfortable for Installers as clean installation is fast and easy.



## 4. Flexibility of the micromodule material

No memory effect of the module, unique flexibility and small diameter guarantee easy installation,

for example inside distribution points (fiber optic closures).

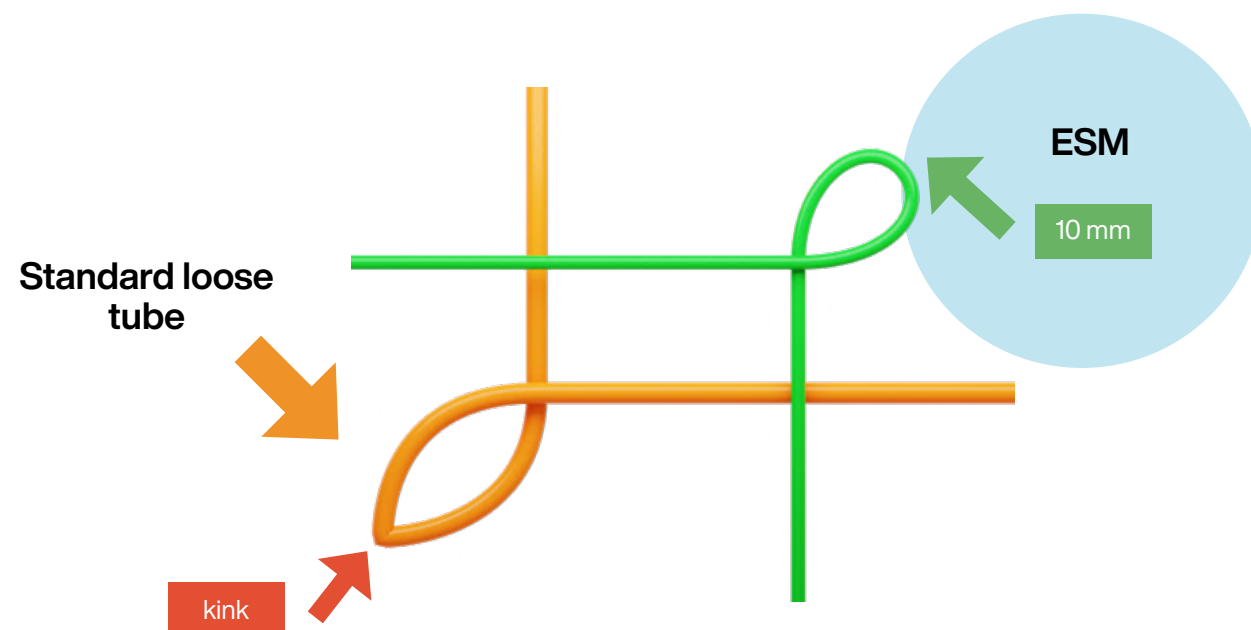


## 5. Anti-Kink

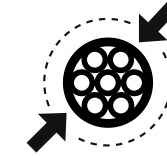
Minimum risk of damage to a micromodule during installation compared to a standard loose tube.

Breaking or folding a loose tube when during installation can often cause damage or higher attenuation of an optical fiber. Flexible material of Easy

Section Modules provides much smaller diameter of a micromodule loop minimising the possibility of damaging fibers.



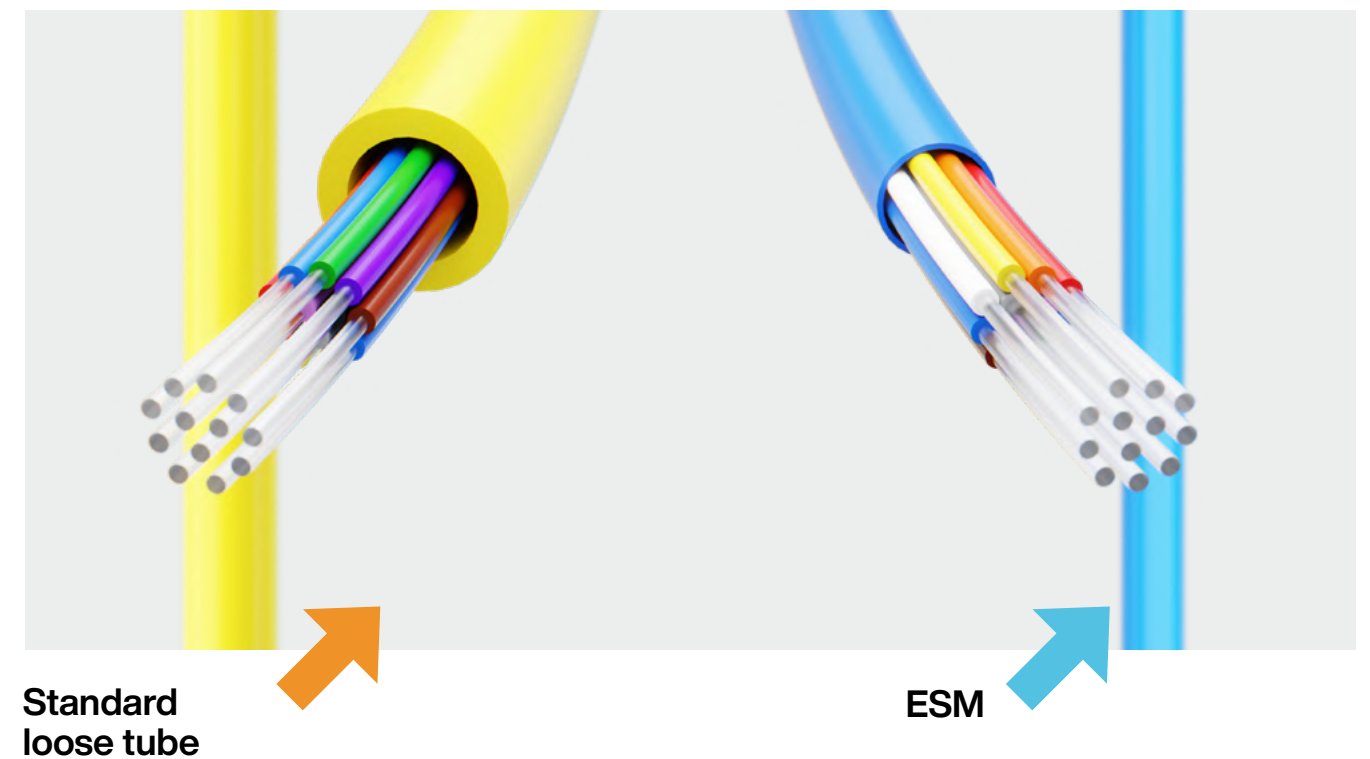
# Why cables with ESM?



## 6. Smaller dimensions of fiber optic cables

We will analyze this feature on the example. Micromodules with 12 fibers and 1.3 mm diameter means that the cross-section area was reduced by 60% comparing to standard loose tube 2.0 mm.

Moreover, there is a possibility to use compatible fibers with smaller 200  $\mu\text{m}$  diameter. It translates into higher fibers density in the cross-section, and thus, smaller diameter and weight.

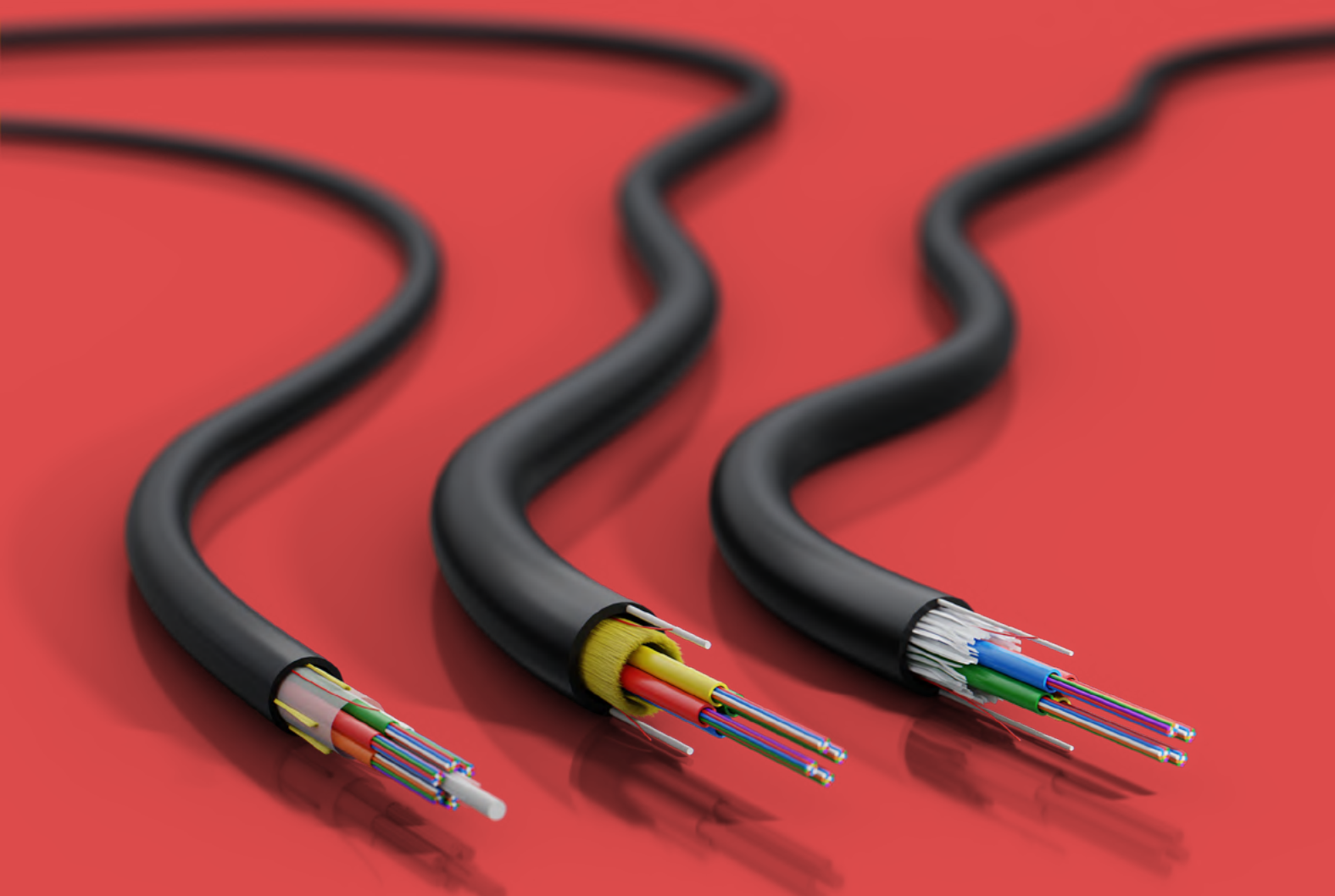




# New constructions in FIBRAIN product portfolio

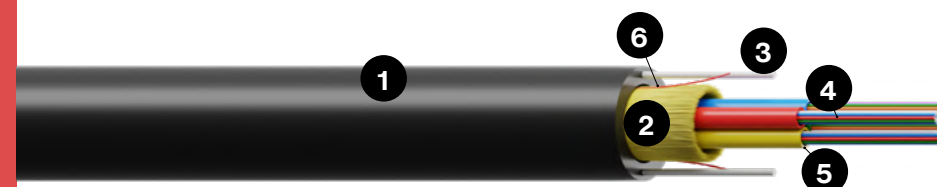
FIBRAIN constantly extend its ESM cable product portfolio. Our customers can find a wide range of drop cables with ESM, and therefore EAS easy access cable and MDC-FM cable installed in microduct

systems. In addition, there are new constructions available now, including AERO-FM and MK-FM microduct cable.



# New constructions in FIBRAIN product portfolio

## AERO-FM ESM



### Construction:

1. HDPE outer jacket (black)
2. Water blocking and tensile strength elements
3. FRP rods incorporated in outer jacket
4. Optical fibres
5. Easy Section Module
6. Polyester ripcords

AERO-FM is the upgraded type of MDC-FM cable in which aramid yarns were used as strength elements to achieve higher resistance to stretching for aerial applications. Small dimensions of micromodules and FRP rods incorporated in the outer jacket translated into higher fibers density in the cross-section,

and thus, smaller diameter and weight. Moreover, micromodules are also available without gel inside a module in our product portfolio, which guarantees clean and fast installation.

## MK-FM ESM



### Construction:

1. Outer sheath: HDPE
2. Easy Section Module with 12 optical fibres
3. Central strength member (FRP)
4. Water swellable yarns on FRP
5. Water swellable tape and aramid yarns
6. Ripcord

MK-FM it is another cable in ESM family for especially designed microduct applications such as Fibrain MetroJet system. It is a combination of easy installation with a possibility for cable blowing in microduct systems. The use of micromodules provides the same advantages as in other cables

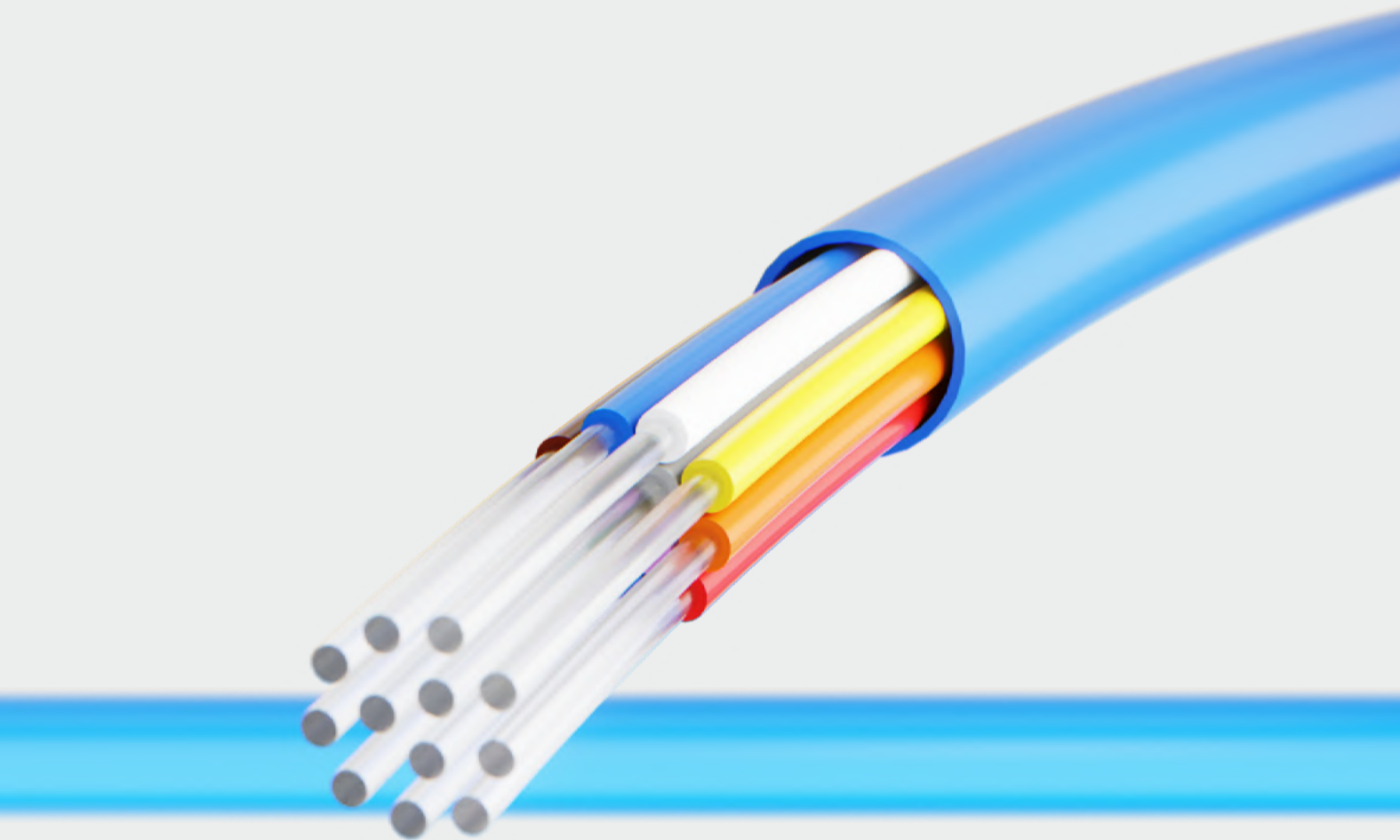
with Easy Section Module which are fast installation and toolless access to fibers. Other standard characteristics of microcables are maintained, including compact dimensions and stiffness of the structure that facilitates cable blowing.

# Summary

**For network operators, the choice of ESM means faster installation, lower investment costs, and reduced risk of network failure.**

However, micromodules in fiber optic cables doesn't exclude any further dominance of the loose tube on the multi-fiber cable market. Both solutions can complement each other. Loose tubes appear to be a proven solution that has been successfully used well-

known for years. However, wherever users appreciate the ease of installation, increased capacity and search for new solutions tailored to their profile, new constructions with the Easy Section Modules seem to be an obvious alternative.



# FIBRAIN products



**FOBP fiber optic closure**



**FDH outdoor cabinet**



**VFTO customer outlet**



**BU-XN**



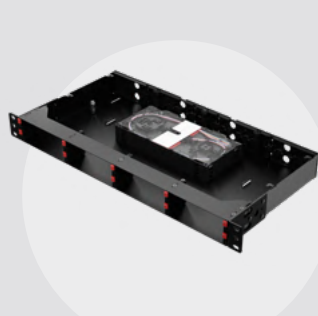
**IFDT distribution cabinet**



**OBP S8**



**MetroJet**



**Optical distribution frame**

Product center FIBRAIN → [fibrain.com](http://fibrain.com)

# AERO-FM

Single HDPE jacket outdoor distribution aerial and duct cable with Easy Section Modules (up to 90 m) modulo 6 / modulo 12

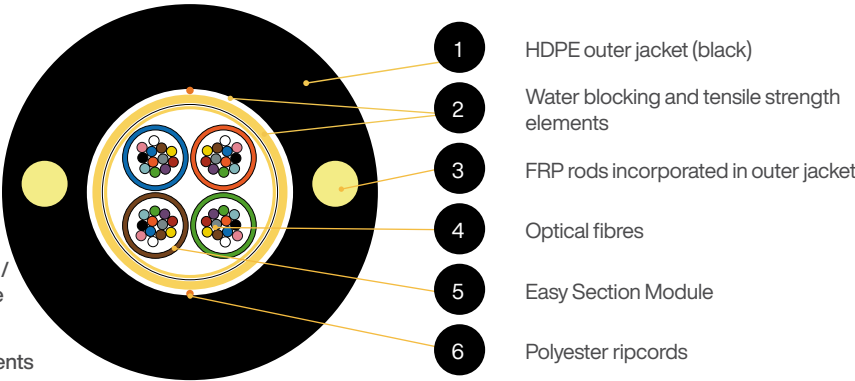


Application:

- Duct cable
- Aerial cable
- FTTH networks
- Fully dielectric

Design:

- 1,0mm ESM™ modules with 6 fibres in each module / 1,3mm ESM™ modules with 12 fibres in each module
- Dry design, no filling compound inside ESM
- Water swellable and tensile strength (aramid) elements
- FRP rods as strength and anti-buckling elements (incorporated in outer jacket)
- UV resistant black HDPE sheath
- Polyester ripcord



Configuration:

| VARIANT              | QUANTITY [PCS] |                    | Ø NOMINAL (TYP. ±0,3) UP TO 0,5 | NOMINAL WEIGHT (±10%) | MAX ALLOWED TENSION | MAX OPERATING TENSION |
|----------------------|----------------|--------------------|---------------------------------|-----------------------|---------------------|-----------------------|
|                      | FIBRES         | FIBRES PER MOD-ULE |                                 |                       |                     |                       |
| 1M x 6F / 1M x 12F   | 6 / 12         | 6 / 12             | 5,9                             | 29                    | 550 / 800           | 300 / 500             |
| 2M x 6F / 1M x 12F   | 12 / 24        | 6 / 12             | 7,2                             | 38                    | 800 / 750           | 450                   |
| 3M x 12F             | 36             | 12                 | 8,0                             | 45                    | 900                 | 550                   |
| 4M x 6F / 4M x 12F   | 24 / 48        | 6 / 12             | 8,0                             | 45                    | 900                 | 600 / 700             |
| 6M x 6F / 6M x 12F   | 36 / 72        | 6 / 12             | 8,5 / 10,2                      | 48 / 70               | 900 / 1300          | 600 / 700             |
| 8M x 6F / 12M x 12F  | 48 / 96        | 6 / 12             | 10,2 / 11,5                     | 70 / 90               | 1300 / 2000         | 700 / 1000            |
| 12M x 6F / 12M x 12F | 72 / 144       | 6 / 12             | 11,5                            | 95                    | 1600 / 2000         | 950 / 1000            |
| 16M x 6F             | 96             | 6                  | 11,5                            | 108                   | 1800                | 1100                  |
| 24M x 6F             | 144            | 6                  | 13,5                            | 127                   | 2000                | 1300                  |

Other variants, designs, mechanical and environmental properties available on demand

Mechanical and environmental characteristics:

|                      |                 |
|----------------------|-----------------|
| Bending performance: | 10 x D          |
| Temperature range:   |                 |
| Installation         | -5... +40 [°C]  |
| Operation            | -30... +60 [°C] |
| Transport & Storage  | -40... +70 [°C] |
| Crush resistance:    | Load: 1500 N    |

# MDC-FM

Single LSOH jacket duct cable with Easy Section

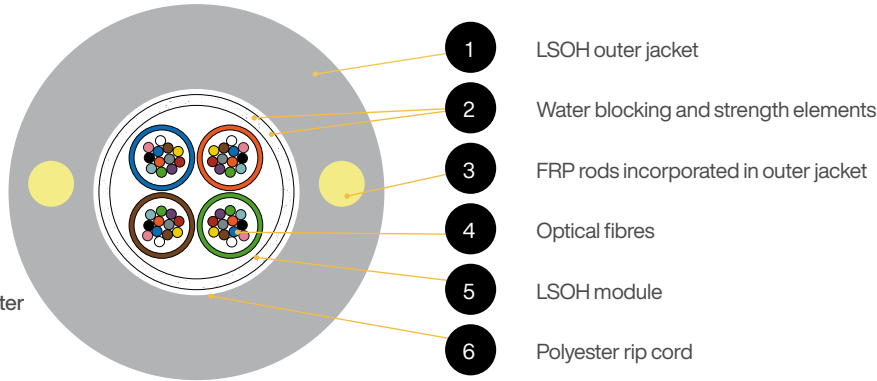


Application:

- Duct cable
- FTTH access networks
- Fully dielectric cable

Design:

- LSOH modules with 12 pcs of optical fibres each
- Water swellable and tensile strength elements
- FRP rods as strength elements (incorporated in outer jacket)
- LSOH sheath
- Polyester rip cord



Configuration:

| VARIANT   | QUANTITY [PCS] |                    | Ø NOMINAL (TYP. ±0,3) UP TO 0,5 | NOMINAL WEIGHT (±10%) | MAX ALLOWED TENSION | MAX OPERATING TENSION |
|-----------|----------------|--------------------|---------------------------------|-----------------------|---------------------|-----------------------|
|           | FIBRES         | FIBRES PER MOD-ULE |                                 |                       |                     |                       |
| 1M x 12F  | 12             | 12                 | 5,9 (max 6,4)                   | 35                    | 800                 | 400                   |
| 2M x 12F  | 24             | 12                 | 7,0 (max 7,5)                   | 45                    | 800                 | 400                   |
| 3M x 12F  | 36             | 12                 | 7,2 (max 7,7)                   | 50                    | 800                 | 400                   |
| 4M x 12F  | 48             | 12                 | 7,9 (max 8,4)                   | 55                    | 1000                | 500                   |
| 6M x 12F  | 72             | 12                 | 9,0 (max 9,5)                   | 65                    | 1600                | 800                   |
| 8M x 12F  | 96             | 12                 | 10,2 (max 10,7)                 | 93                    | 1800                | 900                   |
| 12M x 12F | 144            | 12                 | 11,2 (max 11,7)                 | 110                   | 2200                | 1100                  |

Other variants, designs, mechanical and environmental properties available on demand

Mechanical and environmental characteristics:

|                      |                 |
|----------------------|-----------------|
| Bending performance: | 15 x D          |
| Temperature range:   |                 |
| Installation         | -5... +40 [°C]  |
| Operation            | -30... +60 [°C] |
| Transport & Storage  | -40... +70 [°C] |
| Crush resistance:    | Load: 2000 N    |



# MDC-FM

Single HDPE jacket duct cable with Easy Section Modules  
modulo 6 / modulo 12

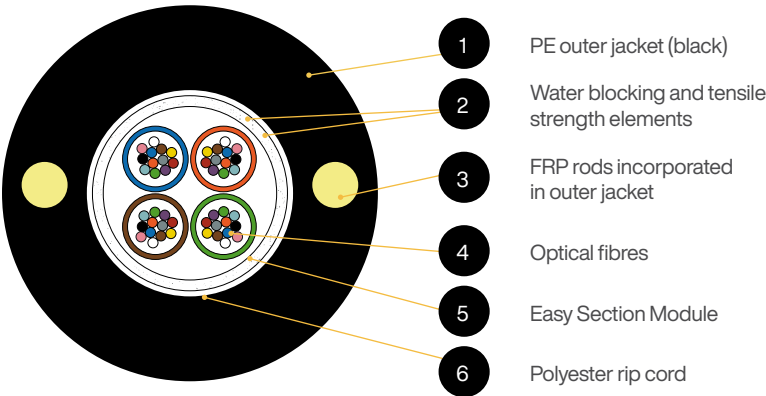


Application:

- Duct cable
- FTTH access networks

Design:

- 1,1 mm ESM® modules with 6 fibres in each module / 1,3 mm ESM® modules with 12 fibres in each module
- Dry design, no filling compound inside ESM®
- Water swellable and tensile strength elements
- FRP rods as strength and anti-buckling elements (incorporated in outer jacket)
- UV resistant black HDPE sheath
- Polyester rip cord



Configuration:

| VARIANT              | QUANTITY [PCS] |                   | Ø NOMINAL (TYP. ±0,3) | NOMINAL WEIGHT (±10%) | MAX ALLOWED TENSION | MAX OPERATING TENSION |
|----------------------|----------------|-------------------|-----------------------|-----------------------|---------------------|-----------------------|
|                      | FIBRES         | FIBRES PER MODULE |                       |                       |                     |                       |
|                      |                |                   | [MM]                  | [KG/KM]               | [N]                 | [N]                   |
| 1M x 6F / 1M x 12F   | 6 / 12         | 6 / 12            | 7,0 / 7,0             | 36 / 30               | 800                 | 400                   |
| 2M x 6F / 2M x 12F   | 12 / 24        | 6 / 12            | 7,0                   | 37 / 40               | 800                 | 400                   |
| 3M x 12F             | 36             | 12                | 7,2                   | 42                    | 800                 | 400                   |
| 4M x 6F / 4M x 12F   | 24 / 48        | 6 / 12            | 7,0 / 7,9             | 40 / 49               | 800 / 1000          | 400 / 500             |
| 6M x 6F / 6M x 12F   | 36 / 72        | 6 / 12            | 7,9 / 9,0             | 49 / 55               | 1000 / 1600         | 500 / 800             |
| 8M x 6F / 8M x 12F   | 48 / 96        | 6 / 12            | 9,0 / 10,2            | 55 / 85               | 1000 / 1800         | 500 / 900             |
| 12M x 6F / 12M x 12F | 72 / 44        | 6 / 12            | 10,2 / 11,2           | 70 / 110              | 1600 / 2200         | 800 / 1100            |
| 16M x 6F / 16M x 12F | 96 / 192       | 6 / 12            | 10,2 / 13,0           | 77 / 140              | 1600 / 2300         | 800 / 1100            |
| 18M x 12F            | 216            | 12                | 14,0                  | 155                   | 2500                | 1200                  |
| 24M x 6F / 24M x 12F | 144 / 288      | 6 / 12            | 11,5 / 14,5           | 94 / 147              | 1800 / 2700         | 900 / 1300            |

Other variants, designs, mechanical and environmental properties available on demand

Mechanical and environmental characteristics:

|                      |                 |
|----------------------|-----------------|
| Bending performance: | 15 x D          |
| Temperature range:   |                 |
| Installation         | -5... +40 [°C]  |
| Operation            | -30... +60 [°C] |
| Transport & Storage  | -40... +70 [°C] |
| Crush resistance:    | Load: 2000 N    |

# EAC-RAm

Easy Access, single LSOH jacket cable with retractable Easy Section Modules

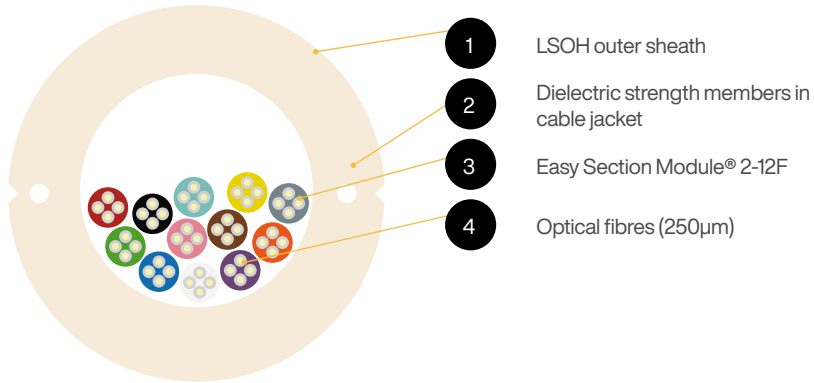


Application:

- Distribution cable
- For laying in risers
- FTTH feeder
- Easy access and installation

Design:

- FRP strength members inside cable jacket
- Optical fibres in bundles
- 1-12 elements in cable
- LSOH outer jacket (white by default, various colour possible)



Configuration:

| VARIANT                  | QUANTITY [PCS] |                   | Ø NOMINAL (TYP. ±0,3) | NOMINAL WEIGHT (±10%) | TENSILE STRENGTH [N]         |
|--------------------------|----------------|-------------------|-----------------------|-----------------------|------------------------------|
|                          | FIBRES         | FIBRES PER MODULE |                       |                       |                              |
|                          |                |                   | [MM]                  | [KG/KM]               | ε=0,6% Δα≤0,1 dB, REVERSIBLE |
| 2F Easy Section Modules  | 2-24           | 1-12              | 8,7                   | 69                    | 400                          |
|                          | 26-30          | 13-15             | 10,5                  | 83                    | 400                          |
|                          | 32-48          | 16-24             | 12,0                  | 106                   | 600                          |
| 4F Easy Section Modules  | 2-48           | 1-12              | 8,7                   | 70                    | 400                          |
|                          | 52-60          | 13-15             | 10,5                  | 85                    | 400                          |
|                          | 64-96          | 16-24             | 12,0                  | 110                   | 600                          |
| 6F Easy Section Modules  | 6-48           | 1-8               | 8,7                   | 75                    | 400                          |
|                          | 54-72          | 9-12              | 10,5                  | 112                   | 400                          |
|                          | 78-96          | 13-16             | 12,0                  | 130                   | 600                          |
| 8F Easy Section Modules  | 8-32           | 1-4               | 8,7                   | 67                    | 400                          |
|                          | 40-96          | 5-12              | 10,5                  | 90                    | 400                          |
| 12F Easy Section Modules | 12-48          | 1-4               | 8,7                   | 70                    | 400                          |
|                          | 60-96          | 5-8               | 10,5                  | 90                    | 400                          |
|                          | 108-144        | 9-12              | 12,0                  | 115                   | 600                          |

Mechanical and environmental characteristics:

|                      |                 |
|----------------------|-----------------|
| Bending performance: | 15 x D          |
| Temperature range:   |                 |
| Installation         | -5... +60 [°C]  |
| Operation            | -10... +60 [°C] |
| Transport & Storage  | -40... +70 [°C] |
| Crush resistance:    | Load: 1000 N    |



# MK-FM 6,7,8 PE

Single HDPE jacket ESM module microcable with aramid yarns and FRP rod reinforcement

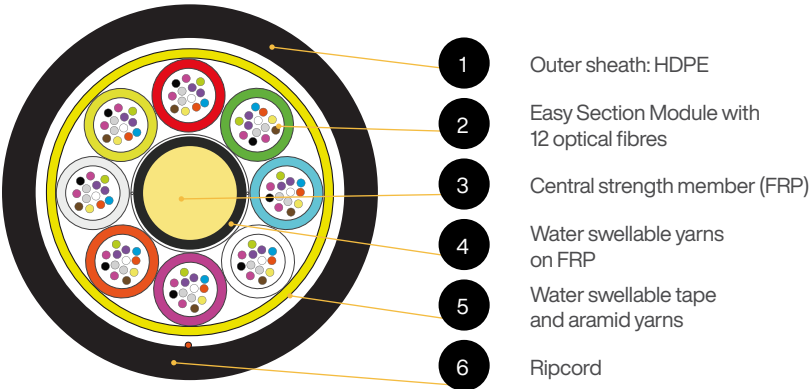


Application:

- Microduct cabling air-blowing system application
- Metro networks
- Flexible network design
- Distribution network

Design:

- HDPE, UV stabilized external jacket with low coefficient of friction
- Smallest outer diameter for blowing into microducts
- ESM modules with 12 fibres in each module
- UV resistant black HDPE sheath
- Polyester rip cord



Configuration:

| VARIANT    | QUANTITY [PCS] |                 |                |              | NOMINAL WEIGHT<br>(±5%) | NOMINAL WEIGHT<br>(±10%) |
|------------|----------------|-----------------|----------------|--------------|-------------------------|--------------------------|
|            | FIBRES         | FIBRES PER TUBE | TOTAL ELEMENTS | ACTIVE TUBES | [MM]                    | [KG/KM]                  |
| 1-6T x 12F | 12-72          | 12              | 6              | 1-6          | 6,0                     | 30                       |
| 8T x 12F   | 96             | 12              | 8              | 8            | 6,3                     | 40                       |
| 12T x 12F  | 144            | 12              | 12             | 12           | 7,9                     | 61                       |

Other variants, designs, mechanical and environmental properties available on demand

Mechanical and environmental characteristics:

|                      |                   |
|----------------------|-------------------|
| Bending performance: | R=15 x D          |
| Temperature range:   |                   |
| Installation         | - 15 to + 60 [°C] |
| Operation            | - 30 to + 70 [°C] |
| Transport & Storage  | - 40 to + 70 [°C] |
| Crush resistance:    | Load: 400 N       |

# VC-D20 ESM

FTTH Single LSOH Jacket Cable – 2-4F in 900µm module – Drop Cable with Aramid Strength Members

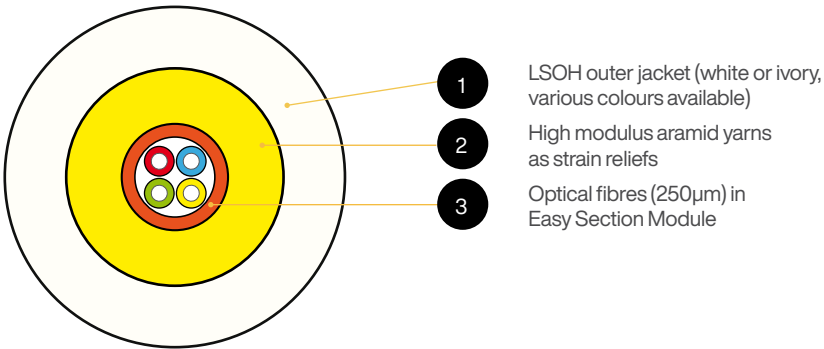


Application:

- Optical cable with aramid yarns reinforcement
- For customer connection
- Fully dielectric cable
- Last mile connection
- LAN and FTTX networks
- Distribution network
- ODF connections
- Inside house OLT connection

Design:

- Optical fibres (up to 4 pcs) inside 900µm Easy Section Module
- Aramid strength element
- LSOH outer jacket



Configuration:

| VARIANT | QUANTITY [PCS] |                   | Ø NOMINAL<br>(TYP. ±0,1) | NOMINAL WEIGHT<br>(±10%) | MAX ALLOWED TENSION | MAX OPERATING TENSION |
|---------|----------------|-------------------|--------------------------|--------------------------|---------------------|-----------------------|
|         | FIBRES         | FIBRES PER MODULE | [MM]                     | [KG/KM]                  | [N]                 | [N]                   |
| 2F      | 2              | 2                 | 2,1                      | 5                        | 200                 | 75                    |
| 4F      | 4              | 4                 | 2,1                      | 5                        | 200                 | 75                    |

Mechanical and environmental characteristics:

|                      |                 |
|----------------------|-----------------|
| Bending performance: | R=15 mm         |
| Temperature range:   |                 |
| Installation         | -5... +55 [°C]  |
| Operation            | -20... +70 [°C] |
| Transport & Storage  | -40... +70 [°C] |
| Crush resistance:    | Load: 300 N     |

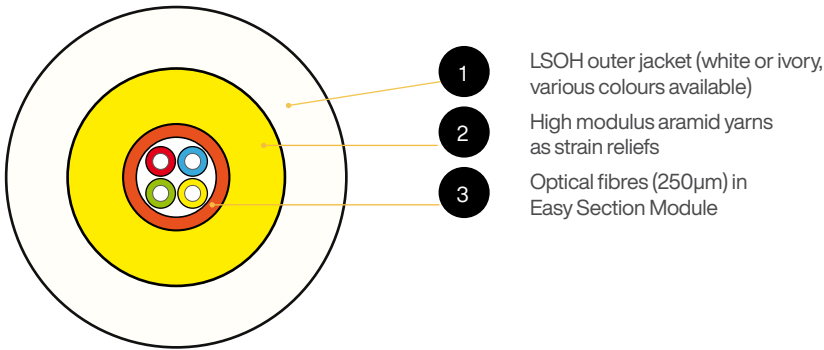
# VC-D30 ESM

FTTH Single LSOH Jacket Cable – 2-4F in 900µm module – Drop Cable with Aramid Strength Members



Application:

- Optical cable with aramid yarns reinforcement
- For customer connection
- Fully dielectric cable
- Last mile connection
- LAN and FTTX networks
- Distribution network
- ODF connections
- Inside house OLT connection



Design:

- Optical fibres (up to 4 pcs) inside 900µm Easy Section Module
- Aramid strength element
- LSOH outer jacket

Configuration:

| VARIANT | QUANTITY [PCS] |                   | Ø NOMINAL (TYP. ±0,1) | NOMINAL WEIGHT (±10%) | MAX ALLOWED TENSION | MAX OPERATING TENSION |
|---------|----------------|-------------------|-----------------------|-----------------------|---------------------|-----------------------|
|         | FIBRES         | FIBRES PER MODULE |                       |                       |                     |                       |
| 2F      | 2              | 2                 | 3,0                   | 9                     | 170                 | 60                    |
| 4F      | 4              | 4                 | 3,0                   | 9                     | 170                 | 60                    |

Mechanical and environmental characteristics:

|                      |                 |
|----------------------|-----------------|
| Bending performance: | R=15 mm         |
| Temperature range:   |                 |
| Installation         | -5... +55 [°C]  |
| Operation            | -20... +70 [°C] |
| Transport & Storage  | -40... +70 [°C] |
| Crush resistance:    | Load: 300 N     |

EasyReel packing option:



|                      |                      |
|----------------------|----------------------|
| Product coding       | ER-500-1-VC-D30E-XXX |
| Cable length         | 500 m                |
| Packaging dimensions | 270mm x 270mm x 270m |

500m sections are wound in the EasyReel system and placed in a cardboard box. The reel is wound without an internal drum

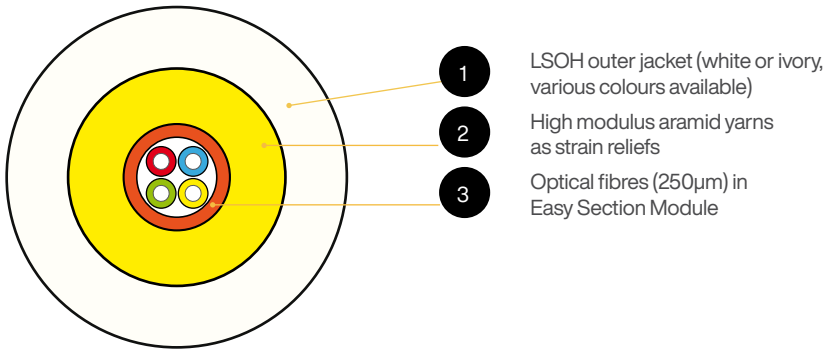
# VC-D40 ESM

FTTH Single LSOH Jacket Cable – 1-4F in 900µm module – Drop Cable with Aramid Strength Members



Application:

- Optical cable with aramid yarns reinforcement
- For customer connection
- Fully dielectric cable
- Last mile connection
- LAN and FTTX networks
- Distribution network
- ODF connections
- Inside house OLT connection



Design:

- Optical fibres (up to 4 pcs) inside 900µm Easy Section Module
- Aramid strength element
- LSOH outer jacket

Configuration:

| VARIANT | QUANTITY [PCS] |                   | Ø NOMINAL (TYP. ±0,1) | NOMINAL WEIGHT (±10%) | MAX ALLOWED TENSION | MAX OPERATING TENSION |
|---------|----------------|-------------------|-----------------------|-----------------------|---------------------|-----------------------|
|         | FIBRES         | FIBRES PER MODULE |                       |                       |                     |                       |
| 2F      | 2              | 2                 | 4,1                   | 15                    | 420                 | 150                   |
| 4F      | 4              | 4                 | 4,1                   | 15                    | 420                 | 150                   |

Mechanical and environmental characteristics:

|                      |                 |
|----------------------|-----------------|
| Bending performance: | R=15 mm         |
| Temperature range:   |                 |
| Installation         | -5... +55 [°C]  |
| Operation            | -20... +70 [°C] |
| Transport & Storage  | -40... +70 [°C] |
| Crush resistance:    | Load: 300 N     |

EasyReel packing option:

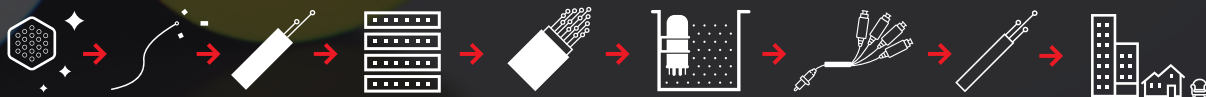


|                      |                      |
|----------------------|----------------------|
| Product coding       | ER-500-2-VC-D40E-XXX |
| Cable length         | 500 m                |
| Packaging dimensions | 350mm x 350mm x 270m |

Odcinki o długości 500m nawijane są w systemie EasyReel i umieszczane w kartonowym pudełku. Szpule nawijane są bez wewnętrznego bębna.

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