

Туре:	MAR-FM	REV: 0
Issued:	19/08/2021	KP
Modified:		
Project:	008-21	
	000 21	

# Single HDPE jacket outdoor distribution aerial and duct cable with Easy Section Modules™ MAR-FM (modulo 12)



Water blocking and tensile strength elements

FRP rods incorporated in outer jacket

Optical fibres

DESIGN

Easy Section Module™ (ESM)

Polyester ripcords (two pieces on opposite sides)

\*schematic drawing of 48F configuration, not to scale

## **APPLICATION**

Mixed use duct/aerial FTTH networks Fully dielectric For installation along power lines with an operation voltage below 150 kV and producing space potential below 4 kV.

ESM<sup>™</sup> - Easy Section Module with 12 fibres each, 1,3mm.

Water blocking aramid yarns as a strain relief Water swellable elements FRP rods as strength and anti-buckling elements UV resistant black HDPE sheath Polyester ripcord, two pieces on opposite sides

## VARIANTS

	Quantity [pcs]					Nominal	Max	Max	Max
Variant	Fibres	Fibres per module	Total elements	Active modules	Ø nominal (±0,5)	weight (±10%)	allowed tension MAT / T <sub>M</sub>	operating tension MOT / T <sub>L</sub>	installation tension MIT
					[mm]	[kg/km]	[N]	[N]	[N]
1M x 12F	12	12	1	1	5,9	29	600	170	145
2M x 12F	24	12	2	2	7,2	38	800	220	190
3M x 12F	36	12	3	3	8,0	45	950	270	220
4M x 12F	48	12	4	4	8,5	48	1000	300	240
6M x 12F	72	12	6	6	10,2	70	1500	400	350
8M x 12F	96	12	8	8	11,5	90	1900	550	500
12M x 12F	144	12	12	12	11,5	95	2000	600	530
16M x 12F	192	12	16	16	13,5	125	2650	800	740
18M x 12F	216	12	18	18	13,5	127	2650	800	740
24M x 12F	288	12	24	24	14,5	143	3000	1000	980

## **MECHANICAL AND ENVIRONMENTAL CHARACTERISTICS**

Test	Specification	Method	Requirements
Tensile strength	IEC60794-1-21 Method E1	Mandrel diameter: $\geq 30 \times OD$ Load T <sub>M</sub> : as provided in the table above	Fibre strain: $e \le 0.3\%$ , during test, reversible Cable stain: $e \le 0.5\%$ , during test, reversible $\Delta \alpha \le 0.5$ dB/km, during test, reversible
		Mandrel diameter: $\geq$ 30 x OD Sustained Load T <sub>L</sub> : as provided in the table above	Fibre strain: e ≤ 0.1%, no attenuation change
Crush resistance	IEC60794-1-21 Method E3	Load: 2000 N / 10 cm / 15 minutes Plate size: 100 mm x 100mm Number of pts: at 5 different points 200mm apart	Δα ≤ 0.1dB @ 1550nm, during test, reversible No jacket cracking and fibre breakage
	12000/34-1-21 Miethod E3	Load: 3000 N / 10 cm / 15 minutes Plate size: 100 mm x 100mm Number of pts: at 5 different points 200mm apart	$\Delta \alpha$ reversible, No jacket cracking and fibre breakage



Type:	MAR-FM	REV: 0
Issued:	19/08/2021	KP
Modified:		
Project:	008-21	

Impact resistance	IEC60794-1-21 Method E4	Impact energy: 5J Striking survace radius: 10 mm No. of impacts: at 3 different points 200mm apart	Δα reversible, No jacket cracking and fibre breakage		
Torsion	IEC60794-1-21 Method E7	Cable length to be twisted: 1m No. of cycles: 20 Twist angle: ± 180°	∆α≤0.1dB @ 1550nm, during test, reversible No jacket cracking and fibre breakage		
Cable kink	IEC60794-1-21 Method E10	Loop diameter: 10 x OD	No cable kink		
Repeated bending	EC60794-1-21 Method E6	Mandrel radius: 20x OD No. of cycles: 20	No jacket cracking and fibre breakage		
Bending	IEC60794-1-21 Method E11	Mandrel radius: 15 x OD / 5 turns (wrapped and unwrapped) No. of cycles: 10	∆α≤0.1dB @ 1550nm, during test No jacket cracking and fibre breakage		
Water penetration	IEC 60794-1-22 Method F5B	Water head: 1m Sample length: 3m Number of samples: 10 pcs Time: 168 hrs	No water leakage for 9 out of 10 samples		
Temperature range	IEC 60794-1-22 Method F1	Operation: Storage: Transport:-40 +70 [°C]	∆α≤0,1 dB/km @1550nm, during test, reversible		

(\*) values for single-mode fibres, all optical measurements performed at 1550nm

## SUGGESTED MAXIMUM SPAN VALUES CALCULATED FOR THE SPECIFIED CABLE STRAIN AND MIT LIMIT

Suggested max span [m]	Fibre count / modulo 12									
Loading conditions (Sag 2,0%)	12F	24F	36F	48F	72F	96F	144F	192F	216F	288F
NESC heavy	29	31	36	36	44	55	55	65	65	65
NESC medium	59	61	65	65	80	80	80	80	80	80
NESC light	75	80	80	80	80	80	80	80	80	80

#### **OPTICAL FIBRE AND MODULES COLOUR IDENTIFICATION**

For optical fibres and modules identification information please see DSH\_Colors\_CODE\_XXXX document.

## **FIBRE PARAMETERS**

For selected post-production optical fibres parameters please see DSH\_OFP document.

#### MARKING

The following print (hot stamped, laser or other suitable printing method) is applied at 1-meter intervals:

- Supplier: FIBRAIN
- Standard code (product type, fibre type, fibre count)
- Year of manufacture: xxxx
- Length marking in meters
- Cable ID / Drum No

Example: FIBRAIN MAR-FM2 48F SM G657A2 4M12F "YEAR OF MANUFACTURE" "LASER SYMBOL" "LENGTH MARKING" "BATCH NUMBER"

The accuracy of marking is ±0,5%. Remarking is in accordance with Bellcore GR 20 and supersedes earlier markings. Occasional loss of marking is possible. Cables can be supplied with a range of single mode or multimode fibres and customized print.

#### PACKING

Cables will be shipped on disposable wooden or treated wooden drums. Both ends of the cable will be capped and accessible for testing. Identification information will be placed on the drum.

#### **DELIVERY LENGTH**

2000 - 8000 meters  $\pm 5\%$ , with possibility of supplying up to 5% of total contract quantity as short length cables which should be above 1000 meters long. Tolerance of 5% of order quantity shall be allowed.

This document and the statements contained in it are not intended for customers within the meaning of the Civil Code. The information submitted in this document is to our knowledge and belief true at the time of issue, however, we do not assume any liability whatsoever for its accuracy, and completeness. This document is for informational purposes on an "as is" basis only and Fibrain reserves the right to change its contents at any time without prior notice. The specification cannot, in any case, be considered an offer within the meaning of the Civil Code and is not contractually valid unless specifically authorized by Fibrain. Before using this product, its buyer and/or user has to make sure that it is suitable for the intended use. All liability issues related to this product are subjected to the seller's separate Terms of Sale or the terms and conditions agreed with the Fibrain representative or distributor.