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	<b>CAVO OTTICO DIELETTRICO AUTOPORTANTE (ADSS) LIGHT PER POSA SU PALIFICATA BT E MT</b>	<b>GSCF015</b> Rev. 1 26/03/2018

## CAVO OTTICO DIELETTRICO AUTOPORTANTE (ADSS) LIGHT PER POSA SU PALIFICATA BT E MT

Revisione	Natura della modifica
0	Prima emissione
1	Inserimento nuovi cavi GSCF015/8 e GSCF015/9

	Elaborated by	Verified by	Approved by
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## 1 Scopo

Le presenti prescrizioni hanno lo scopo di indicare le principali caratteristiche costruttive del cavo ottico autoportante (ADSS) light per linee elettriche aeree.

## 2 Campo di applicazione

Le presenti prescrizioni si applicano al cavo ottico autoportante posato su infrastruttura elettrica aerea<sup>1</sup> nell'ambito del territorio Italia.

## 3 Caratteristiche tecnico-costruttive

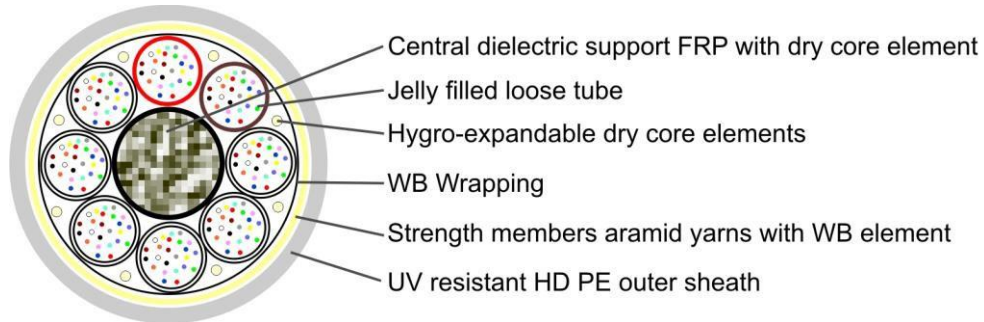
Tipo	Configurazione	Livello di tensione dell'infrastruttura elettrica
GSCF015/1	8 tubetti da 24 fibre: 192 fibre	BT
GSCF015/2	8 tubetti da 24 fibre: 192 fibre	MT; BT
GSCF015/3	8 tubetti da 36 fibre: 288 fibre	BT
GSCF015/4	12 tubetti da 24 fibre: 288 fibre	BT
GSCF015/5	8 tubetti da 36 fibre: 288 fibre	MT; BT
GSCF015/6	11 tubetti da 36 fibre: 396 fibre	BT
GSCF015/7	11 tubetti da 36 fibre: 396 fibre	MT; BT
GSCF015/8	2 o 4 tubetti da 12 o 24 fibre: 24 o 48 fibre	MT; BT
GSCF015/9	4 o 6 tubetti da 24 fibre: 96 o 144 fibre	MT; BT

NOTA: le tipologia sopra elencate sono ammesse anche per la posa in facciata

<sup>1</sup> E' ammessa anche la posa in facciata.

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### TIPO GSCF015/1



## 1. COLOUR CODE

### 1.1 LOOSE TUBE COLOUR

	COLOUR
Pilot	Red
Directional	Brown
OTHERS	White
FILLER	-

### 1.2 FIBERS COLOUR

N° FIBER	COLOUR	N° FIBER	COLOUR	N° FIBER	COLOUR
1	Red	5	Blue	9	Grey
2	Green	6	Violet	10	Black
3	Yellow	7	Pink	11	Aqua
4	Brown	8	Orange	12	White

**Fiber 13-24:** as above + black ring, exception for the black colour substituted by natural + black ring

### 1.3 OUTER SHEATH COLOUR

Grey RAL 7001

## 2. GENERAL CHARACTERISTICS

	UM	VALUE
N° fibers	-	<b>192 FO</b>
Type code		<b>GSCF015/1</b>
Loose tubes in the cable	-	8 tubes 24 fo
Aramid yarns	dTex	≥75.000
Nominal outer sheath thickness	mm	1,5
Nominal outer diameter	mm	13,5
Nominal weight	kg/km	160

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### 3. CABLE PERFORMANCES

TEST	NORMS OF REFERENCE	UM	VALUE	
Minimum Bending Radius	<b>IEC 60794-1-2 E11</b>	mm	Under Maximum Tension	20 x Cable - Ø
			Without Tension	15 x Cable - Ø
Max. tensile load	<b>IEC 60794-1-2 E1</b>	N	Temporary	6.000
			Permanent	3.000
Crush	<b>IEC 60794-1-2 E3</b>	dB	1.500 N/10 cm	Max. att. increase <0.05 (reversible)
Max. Impact	<b>IEC 60794-1-2 E4</b>	J	Energy: 5 J N° impact: 3	Max. att. increase <0.1 (reversible)
Temperature range	<b>IEC 60794-1-2 F1</b>	°C	operating	-30°C +60°C
			transport & storage	-40°C +70°C
			installation	-20°C +60°C
Water Penetration	<b>IEC 60794-1-2 F5</b>	-	3 m cable/1mt water column X 24 h	No leakage

LAYING CONDITION		
Elastic modulus	GPa	45,5
Linear expansion thermal coefficient	1/°Cx10 <sup>-6</sup>	2,63

### 4. NORMS OF REFERENCE

- IEC 60794
- ITU-T G657/A1 200 µm
- ENEL GSCF005 "CAVO ADSS LIGHT PER POSA SU PALIFICATA BT E SU FACCIATA"  
Rev. 0 2016(as applicable)

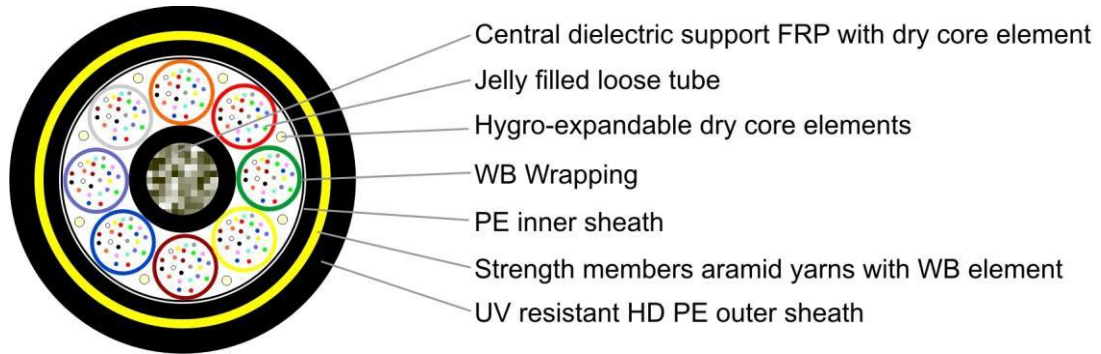
### 5. OUTER SHEATH MARKING

The outer sheath is marked each meter as follows:

SUPPLIER + CAVO OTTICO + CABLE TYPE + year/lot + metric marking

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**TIPO GSCF015/2 E GSCF015/5**



**1. COLOUR CODE**

**1.1 LOOSE TUBE COLOUR**

N° FIBER	COLOUR	N° FIBER	COLOUR
1	Red	5	Blue
2	Green	6	Violet
3	Yellow	7	Grey
4	Brown	8	Orange

**1.2 FIBERS COLOUR**

N° FIBER	COLOUR	N° FIBER	COLOUR	N° FIBER	COLOUR
1	Red	5	Blue	9	Pink
2	Green	6	Violet	10	White
3	Yellow	7	Grey	11	Black
4	Brown	8	Orange	12	Turquoise

**Fiber 13-24:** as above + black ring, exception for the black colour substituted by natural + black ring

**Fiber 25-36:** as above + 2 black rings, exception for the black colour substituted by natural + 2 black rings

**1.3 OUTER SHEATH COLOUR**

Black RAL 9005

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## 2. GENERAL CHARACTERISTICS

	UM	VALUE	
N° fibers	-	<b>192 FO</b>	<b>288 FO</b>
Type code		<b>GSCF015/2</b>	<b>GSCF015/5</b>
Loose tubes in the cable	-	8 tubes 24 fo	8 tubes 36 fo
Aramid yarns	dTex	≥80.000	
Nominal outer sheath thickness	mm	1,5	
Nominal outer diameter	mm	14,0	
Nominal weight	kg/km	190	195

## 3. CABLE PERFORMANCES

TEST	NORMS OF REFERENCE	UM	VALUE	
Minimum Bending Radius	<b>IEC 60794-1-2 E11</b>	mm	Under Maximum Tension	20 x Cable - Ø
			Without Tension	15 x Cable - Ø
Max. tensile load	<b>IEC 60794-1-2 E1</b>	daN	Temporary	2.300
			Permanent	1.200
Breaking load	-	daN	≥5.000	
Max. Impact	<b>IEC 60794-1-2 E4</b>	J	Energy: 5 J ; N° impact: 3	
Temperature range	<b>IEC 60794-1-2 F1</b>	°C	operating	-30°C +60°C
			transport & storage	-40°C +70°C
			installation	-20°C +60°C
Water Penetration	<b>IEC 60794-1-2 F5</b>	-	3 m cable/1mt water column X 24 h	No leakage

LAYING CONDITION			
Linear expansion thermal coefficient		1/°Cx10 <sup>-6</sup>	1,44
Elastic modulus		GPa	26,31
Max. pole span		m	350

## 4. NORMS OF REFERENCE

- IEC 60794
- ITU-T G657/A1 200 um
- ENEL GSCF001 CAVO OTTICO DIELETTRICO AUTOPORTANTE (ADSS) CON PROTEZIONE ALLA PENETRAZIONE DA PALLINI DA CACCIA PER LINEE ELETTRICHE AEREE Rev.1 2018 (as applicable)

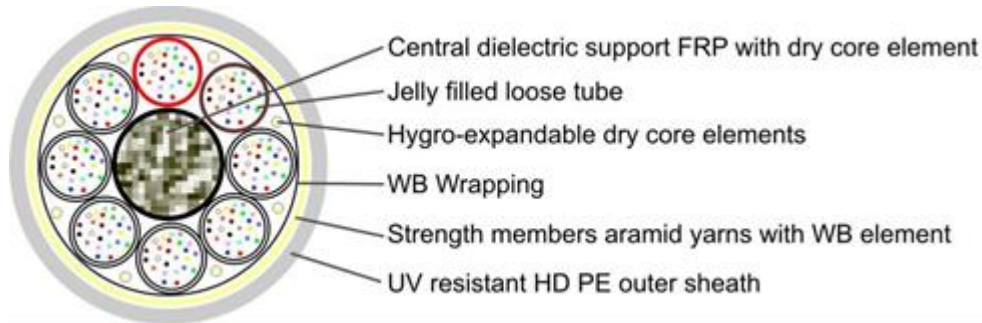
## 5. OUTER SHEATH MARKING

The outer sheath is marked each meter as follows:

SUPPLIER + CAVO OTTICO + N°FO + ENEL +month/year + lot + metric marking

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### TIPO GSCF015/3 E GSCF015/4



## 1. COLOUR CODE

### 1.1 LOOSE TUBE COLOUR

	COLOUR
Pilot	Red
Directional	Brown
OTHERS	White
FILLER	-

### 1.2 FIBERS COLOUR

N° FIBER	COLOUR	N° FIBER	COLOUR	N° FIBER	COLOUR
1	Red	5	Blue	9	Grey
2	Green	6	Violet	10	Black
3	Yellow	7	Rose	11	Tourquoise
4	Brown	8	Orange	12	White

**FIBERS 13-24:** as above + one black ring, exception black colour substituted by natural + one black ring

**FIBERS 25-36:** as above + two black ring, exception black colour substituted by natural + two black rings

### 1.3 OUTER SHEATH COLOUR

Grey RAL 7001

## 2. GENERAL CHARACTERISTICS

	UM	VALUE	
N° fibers	-	<b>288 FO</b>	<b>288 FO</b>
Type code		<b>GSCF015/3</b>	<b>GSCF015/4</b>
Cable core	-	8 tubes 36 fo	12 tubes 24 fo
Aramid yarns	dTex	≥75.000	
Nominal outer sheath thickness	mm	1,60	
Nominal diameter	mm	14,2	15,7
Nominal weight	kg/km	175	210



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### 3. CABLE PERFORMANCES

TEST	NORMS OF REFERENCE	UM	VALUE	
Minimum Bending Radius	<b>IEC 60794-1-2 E11</b>	mm	Permanent	20 x Cable - Ø
Max. tensile load	<b>IEC 60794-1-2 E1</b>	N	Installation (temporary)	6.000
			Operative (permanent)	3.000
Crush	<b>IEC 60794-1-2 E3</b>	dB	1.500 N/10 cm	Max. att. increase <0.05 (reversible)
Impact	<b>IEC 60794-1-2 E4</b>	J	Energy: 5 J N° impact: 3	Max. att. increase <0.1 (reversible)
Temperature range	<b>IEC 60794-1-2 F1</b>	°C	-30°C +60°C	
Water Penetration	<b>IEC 60794-1-2 F5</b>	-	3 m cable/1mt water column X 24 h	No leakage

LAYING CONDITION		<b>8X36 FO</b>	<b>12X24 FO</b>
Elastic modulus	GPa	47,5	58,4
Linear expansion thermal coefficient	1/°Cx10 <sup>-6</sup>	2,16	4,20

### 4. NORMS OF REFERENCE

- IEC 60794
- ITU-T G6567/A1 200 um
- ENEL GSCF005 "CAVO ADSS LIGHT PER POSA SU PALIFICATA BT E SU FACCIATA"  
Rev. 0 2016 (as applicable)

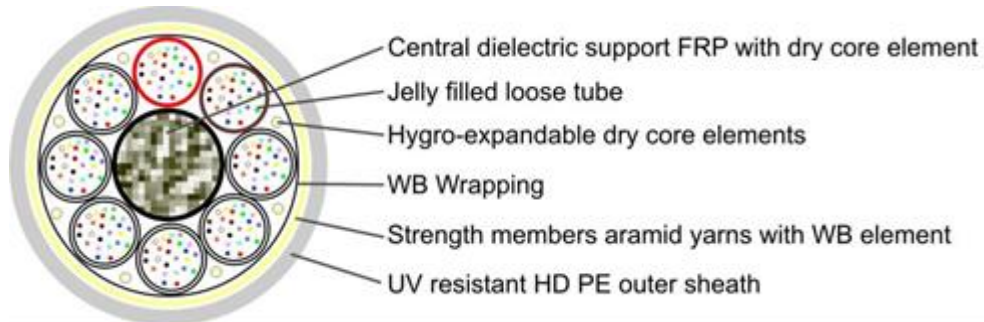
### 5. OUTER SHEATH MARKING

The outer sheath is marked each meter as follows:

SUPPLIER + CAVO OTTICO + 288 FO + ENEL + month/year + FIBER TYPE + metric marking

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### TIPO GSCF015/6



## 1. COLOUR CODE

### 1.1 LOOSE TUBE COLOUR

	COLOUR
Pilot	Red
Directional	Brown
OTHERS	White
FILLER	-

### 1.2 FIBERS COLOUR

N° FIBER	COLOUR	N° FIBER	COLOUR	N° FIBER	COLOUR
1	Red	5	Blue	9	Grey
2	Green	6	Violet	10	Black
3	Yellow	7	Rose	11	Tourquoise
4	Brown	8	Orange	12	White

**FIBERS 13-24:** as above + one black ring, exception black colour substituted by natural + one black ring

**FIBERS 25-36:** as above + two black ring, exception black colour substituted by natural + two black rings

### 1.3 OUTER SHEATH COLOUR

Grey RAL 7001

## 2. GENERAL CHARACTERISTICS

	UM	VALUE
N° fibers	-	<b>396 FO</b>
Type code		<b>GSCF015/6</b>
Cable core	-	11 tubes 36 fo
Aramid yarns	dTex	≥75.000
Nominal outer sheath thickness	mm	1,50

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Nominal diameter	mm	15,5
Nominal weight	kg/km	220

### 3. CABLE PERFORMANCES

TEST	NORMS OF REFERENCE	UM	VALUE	
Minimum Bending Radius	<b>IEC 60794-1-2 E11</b>	mm	Permanent	20 x Cable - Ø
Max. tensile load	<b>IEC 60794-1-2 E1</b>	N	Installation (temporary)	6.000
			Operative (permanent)	3.000
Crush	<b>IEC 60794-1-2 E3</b>	dB	1.500 N/10 cm	Max. att. increase <0.05 (reversible)
Impact	<b>IEC 60794-1-2 E4</b>	J	Energy: 5 J N° impact: 3	Max. att. increase <0.1 (reversible)
Temperature range	<b>IEC 60794-1-2 F1</b>	°C	-30°C +60°C	
Water Penetration	<b>IEC 60794-1-2 F5</b>	-	3 m cable/1mt water column X 24 h	No leakage

LAYING CONDITION		
Elastic modulus	GPa	43,14
Linear expansion thermal coefficient	1/°Cx10 <sup>-6</sup>	2,95

### 4. NORMS OF REFERENCE

- IEC 60794
- ITU-T G6567/A1 200 um
- ENEL GSCF005 "CAVO ADSS LIGHT PER POSA SU PALIFICATA BT E SU FACCIATA"  
Rev. 0 2016(as applicable)

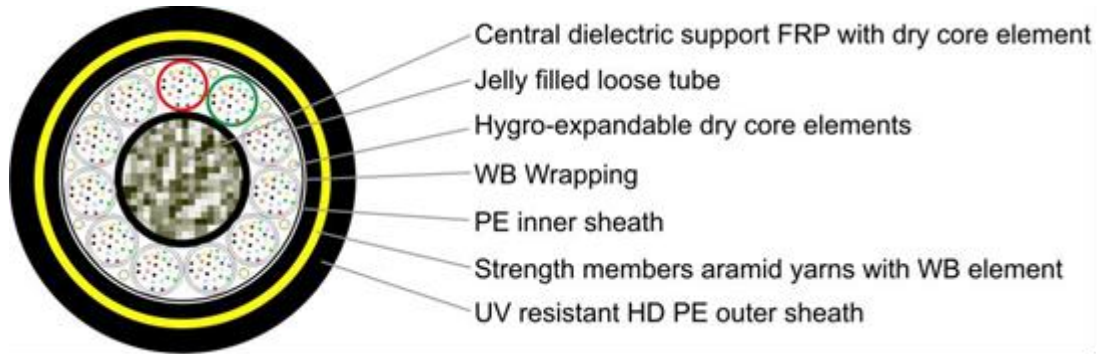
### 5. OUTER SHEATH MARKING

The outer sheath is marked each meter as follows:

SUPPLIER + CAVO OTTICO + 396 FO + ENEL + month/year + FIBER TYPE + metric marking

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### TIPO GSCF015/7



## 1. COLOUR CODE

### 1.1 LOOSE TUBE COLOUR

	COLOUR
Pilot	Red
Directional	Green
OTHERS	White
FILLER	-

### 1.2 FIBERS COLOUR

N° FIBER	COLOUR	N° FIBER	COLOUR	N° FIBER	COLOUR
1	Red	5	Blue	9	Grey
2	Green	6	Violet	10	Black
3	Yellow	7	Pink	11	Aqua
4	Brown	8	Orange	12	White

**Fiber 13-24:** as above + black ring, exception for the black colour substituted by natural + black ring

**Fiber 25-36:** as above + 2 black rings, exception for the black colour substituted by natural + 2 black rings

### 1.3 OUTER SHEATH COLOUR

Black RAL 9005

## 2. GENERAL CHARACTERISTICS

	UM	VALUE
N° fibers	-	<b>396 FO</b>
Type code		<b>GSCF015/7</b>
Loose tubes in the cable	-	11 tubes 36 fo
Aramid yarns	dTex	≥80.000
Nominal outer sheath thickness	mm	1,5
Nominal outer diameter	mm	17,7
Nominal weight	kg/km	285

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### 3. CABLE PERFORMANCES

TEST	NORMS OF REFERENCE	UM	VALUE	
Minimum Bending Radius	<b>IEC 60794-1-2 E11</b>	mm	Under Maximum Tension	20 x Cable - Ø
			Without Tension	15 x Cable - Ø
Max. tensile load	<b>IEC 60794-1-2 E1</b>	daN	Temporary	2.300
			Permanent	1.200
Breaking load	-	daN	≥5.000	
Max. Impact	<b>IEC 60794-1-2 E4</b>	J	Energy: 5 J ; N° impact: 3	
Temperature range	<b>IEC 60794-1-2 F1</b>	°C	operating	-30°C +60°C
			transport & storage	-40°C +70°C
			installation	-20°C +60°C
Water Penetration	<b>IEC 60794-1-2 F5</b>	-	3 m cable/1mt water column X 24 h	No leakage

LAYING CONDITION			
Linear expansion thermal coefficient		1/°Cx10 <sup>-6</sup>	5
Elastic modulus		GPa	37,4
Max. pole span		m	350

### 4. NORMS OF REFERENCE

- IEC 60794
- ITU-T G657/A1 200 µm
- ENEL GSCF001 "CAVO OTTICO DIELETTRICO AUTOPORTANTE (ADSS) CON PROTEZIONE ALLA PENETRAZIONE DA PALLINI DA CACCIA PER LINEE ELETTRICHE AEREE" Rev. 1 2018 (as applicabe)

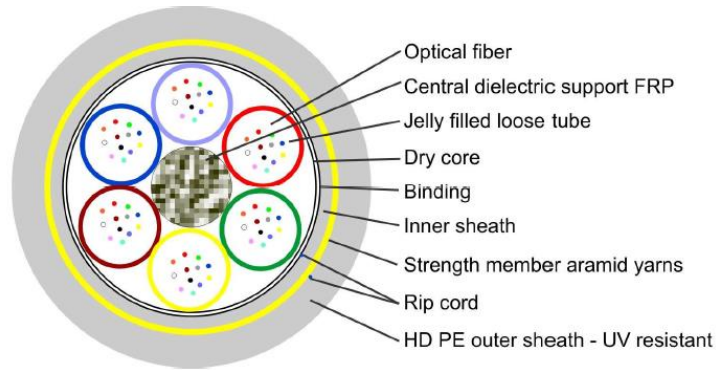
### 5. OUTER SHEATH MARKING

The outer sheath is marked each meter as follows:

SUPPLIER + CAVO OTTICO + CABLE TYPE + year/lot + metric marking

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**TIPO GSCF015/8 E GSCF015/9**



**1. COLOUR CODE**

**1.1 LOOSE TUBE COLOUR**

N° TUBE	COLOUR	N° TUBE	COLOUR
1	Red	4	Brown
2	Green	5	Blue
3	Yellow	6	Violet
FILLER		Black	

**1.2 FIBERS COLOUR**

N° FIBER	COLOUR	N° FIBER	COLOUR	N° FIBER	COLOUR
1	Red	5	Blue	9	Pink
2	Green	6	Violet	10	White
3	Yellow	7	Grey	11	Black
4	Brown	8	Orange	12	Turquoise

Fiber 13-24: as above + black ring, exception for the black colour substituted by natural + black ring

**1.3 OUTER SHEATH COLOUR**

Grey RAL 7001

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## 2. GENERAL CHARACTERISTICS

	UM	VALUE			
N° fibers	-	24 FO	48 FO	96 FO	144 FO
Type code		<b>GSCC015/8</b>		<b>GSCC015/9</b>	
Nominal FRP diameter	mm	≥ 2.3		≥ 3	
Loose tubes & module	-	2 tubes 12 of 4 fillers	4 tubes 12 of 2 fillers	4 tubes 24 of 2 fillers	6 tubes 24 of -
Nominal inner sheath thickness	mm	0,8			
Aramid yarns	dTex	≥280.000			
Nominal outer sheath thickness	mm	1,5			
Nominal outer diameter	mm	13,5±0,5			
Nominal weight	kg/km	180			

## 3. CABLE PERFORMANCES

TEST	NORMS OF REFERENCE	UM	VALUE	
Minimum Bending Radius	IEC 60794-1-2 E11	mm	Installation	200
			Permanent	270
Max. tensile load	IEC 60794-1-2 E1	daN	Installation (temporary)	500
			Operative (permanent)	400
Breaking load	-	daN	1.000	
Max. Impact	IEC 60794-1-2 E4	J	Energy: 5 J ; N° impact: 3	Max. att. increase <0.05 (reversible)
Temperature range	IEC 60794-1-2 F1	°C	-30°C +60°C	
Water Penetration	IEC 60794-1-2 F5	-	3 m cable/1mt water column X 24 h	No leakage

LAYING CONDITION			
Linear expansion thermal coefficient	1/°Cx10 <sup>-1</sup>		2,50
Elastic modulus	daN		18000
Max. pole span	m		350

## 4. NORMS OF REFERENCE

IEC 60794  
ITU-T G657/A1  
OPEN FIBER ST 1704 – CAVO OTTICO AUTOPORTANTE (ADSS) PER LINEE ELETTRICHE  
AEREE  
UV RESISTANCE: ISO 4892-2 2013

## 5. OUTER SHEATH MARKING

SUPPLIER + CAVO OTTICO + CABLE TYPE + year/lot + metric marking