



## CFOA-SM-ASY-S XX FIBRAS COMPACTO

### Description

**CFOA-SM-ASY-S XXFIBRAS COMPACTO**, rated cable that consists of loose tubes stranded around the non-metal central strength member (FRP). The cable core wrapped with water blocking tape or water blocking yarns for water blocking, and then Kevlar yarns are applied over the cable core. Polyethylene (PE) is extruded as outer sheath. The loose tube sheathing is made of high modulus plastics (PBT). The individual fibers are secondary coated into the loose tube with suitable excess.

### Characteristics

- All dielectric structure, light weight, easy installation, good electromagnetic resistance, suitable for operating in the electrical system on towers and poles of high voltage power line to meet the demands of the power sector.
- The cable is ideal for installation in distribution as well as transmission environments; including live-line installations.
- Kevlar, as the main tensile strength member, has the advantages of high Young's modulus, light, minor long-term extension. Its minor negative heat-expansion coefficient improves cable temperature property.
- The amount of Kevlar applied to the cable can be adjusted to obtain the mechanical properties required by the environment (span, sag, ice load, wind speed, etc.).
- No support or messenger wire is required. Installation is achieved in a single pass.
- Precision design and optimum control of excess length of the fibers in the tube to ensure suited strain on the fibers, individually or collectively.
- Strict craft and raw material control enable lifespan over 30 years.

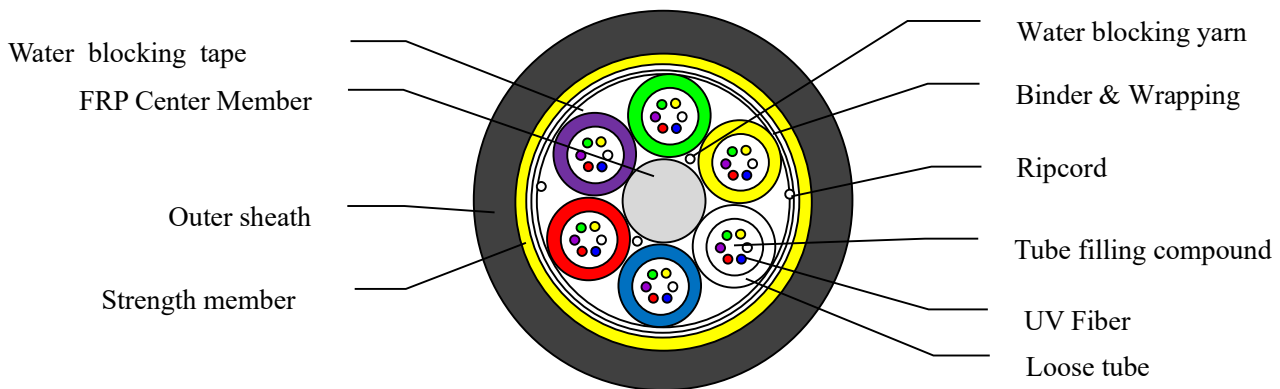


Figure. Cable Cross-Section (A-end)

| Item                  | Material                    | Description  |
|-----------------------|-----------------------------|--|
| Outer sheath          | PE                          | PE   |
| Strength member       | Aramid yarn                 | Additional strength member   |
| Binder & Wrapping     | Polyester Yarn              | Cable core binding   |
| Water blocking tape   | Water blocking tape         | Water blocking & moisture proof  |
| Loose tube            | PBTP                        | Colors of tubes: green, yellow, white, blue, red, violet, brown, pink, black, grey, orange, aqua       |
| Filler                | PP                          | Diameter same as tube , color grey   |
| Tube filling compound | Tube filling compound       | Water blocking & moisture proof  |
| Fiber                 | Silicon-based fiber(G.652D) | UV colored fiber with: green, yellow, white, blue, red, violet, brown, pink, black, grey, orange, aqua |
| Water blocking yarn   | Water blocking yarn         | Water blocking & moisture proof  |
| Center Member         | FRP/FRP+PE                  | FRP/FRP+PE   |

Y=80m (span) ,XX= 6-144 (cable cores)

| <b>Cable Cores</b>   | <b>Unit</b> | <b>6</b>  | <b>12</b> | <b>18</b> | <b>24</b>                              | <b>36</b> |
|--|-------------|-----------|-----------|-----------|--|-----------|
| No. of Tubes   |             | 3         | 6         | 3         | 4                                      | 6         |
| No. of Fillers   |             | 3         | 0         | 3         | 2                                      | 0         |
| Fiber Counts in Tube                                       |             | 2         | 2         | 6         | 6                                      | 6         |
| Cable Diameter   | Mm          | 6.8±0.5   |           |           | 8.0±0.5                                |           |
| Cable Weight   | Kg/km       | 36±10     |           |           | 47±10                                  |           |
| <b>Cable Cores</b>   | <b>Unit</b> | <b>48</b> | <b>60</b> | <b>72</b> | <b>144</b>                             |           |
| No. of Tubes   |             | 4         | 5         | 6         | 12                                     |           |
| No. of Fillers   |             | 2         | 1         | 0         | 0                                      |           |
| Fiber Counts in Tube                                       |             | 12        | 12        | 12        | 12                                     |           |
| Cable Diameter   | Mm          | 8.6±0.5   |           |           | 12.7±0.5                               |           |
| Cable Weight   | Kg/km       | 56±10     |           |           | 125±10                                 |           |
| Allowable tensile strength (N)                             |             |           |           |           | Y=80, 1.5×P                            |           |
| Allowable crush resistance (N)                             |             |           |           |           | 1×P, minimum 1000N                     |           |
| Operation temperature                                      |             |           |           |           | -20 ° C +65 ° C                        |           |
| Min bending radius during installation/ after installation |             |           |           |           | 20D/ 10D<br>D is the diameter of cable |           |

Y=120m (span) ,XX= 6-144 (cable cores)

| <b>Cable Cores</b>   | <b>Unit</b> | <b>6</b>  | <b>12</b> | <b>18</b> | <b>24</b>                              | <b>36</b> |
|--|-------------|-----------|-----------|-----------|--|-----------|
| No. of Tubes   |             | 3         | 6         | 3         | 4                                      | 6         |
| No. of Fillers   |             | 3         | 0         | 3         | 2                                      | 0         |
| Fiber Counts in Tube                                       |             | 2         | 2         | 6         | 6                                      | 6         |
| Cable Diameter   | Mm          | 7.2±0.5   |           | 8.1±0.5   |  |           |
| Cable Weight   | Kg/km       | 41±10     |           | 50±10     |  |           |
| <b>Cable Cores</b>   | <b>Unit</b> | <b>48</b> | <b>60</b> | <b>72</b> | <b>144</b>                             |           |
| No. of Tubes   |             | 4         | 5         | 6         | 12                                     |           |
| No. of Fillers   |             | 2         | 1         | 0         | 0                                      |           |
| Fiber Counts in Tube                                       |             | 12        | 12        | 12        | 12                                     |           |
| Cable Diameter   | Mm          | 8.8±0.5   |           |           | 13.0±0.5                               |           |
| Cable Weight   | Kg/km       | 60±10     |           |           | 130±10                                 |           |
| Allowable tensile strength (N)                             |             |           |           |           | Y=120, 2×P                             |           |
| Allowable crush resistance (N)                             |             |           |           |           | 1×P, minimum 1000N                     |           |
| Operation temperature                                      |             |           |           |           | -20 ° C +65 ° C                        |           |
| Min bending radius during installation/ after installation |             |           |           |           | 20D/ 10D<br>D is the diameter of cable |           |

Y=200m (span) ,XX= 6-144 (cable cores)

| <b>Cable Cores</b>   | <b>Unit</b> | <b>6</b>  | <b>12</b> | <b>18</b> | <b>24</b>                              | <b>36</b> |
|--|-------------|-----------|-----------|-----------|--|-----------|
| No. of Tubes   |             | 3         | 6         | 3         | 4                                      | 6         |
| No. of Fillers   |             | 3         | 0         | 3         | 2                                      | 0         |
| Fiber Counts in Tube                                       |             | 2         | 2         | 6         | 6                                      | 6         |
| Cable Diameter   | Mm          | 7.5±0.5   |           |           | 8.4±0.5                                |           |
| Cable Weight   | Kg/km       | 45±10     |           |           | 55±10                                  |           |
| <b>Cable Cores</b>   | <b>Unit</b> | <b>48</b> | <b>60</b> | <b>72</b> | <b>144</b>                             |           |
| No. of Tubes   |             | 4         | 5         | 6         | 12                                     |           |
| No. of Fillers   |             | 2         | 1         | 0         | 0                                      |           |
| Fiber Counts in Tube                                       |             | 12        | 12        | 12        | 12                                     |           |
| Cable Diameter   | Mm          | 9.1±0.5   |           |           | 13.5±0.5                               |           |
| Cable Weight   | Kg/km       | 65±10     |           |           | 143±10                                 |           |
| Allowable tensile strength (N)                             |             |           |           |           | Y=200, 3×P                             |           |
| Allowable crush resistance (N)                             |             |           |           |           | 1×P, minimum 1000N                     |           |
| Operation temperature                                      |             |           |           |           | -20 ° C +65 ° C                        |           |
| Min bending radius during installation/ after installation |             |           |           |           | 20D/ 10D<br>D is the diameter of cable |           |

## 1. General

- 1.1 This specification covers the requirements for the supply of dry core, single-mode optical fiber cables.
- 1.2 This single mode optical fiber cable shall comply with the requirements of this specification and ITU-T G.652D.

## 2. Fiber characteristics

The optical, geometrical, mechanical and environmental performance of the optical fiber shall be in accordance with tables 2.1.

The manufacture is FiberHome.

**Table 2.1 G.652D fiber characteristics**

| G.652D fiber characteristics        |                              |                                 |
|-------------------------------------|------------------------------|---------------------------------|
| Optics specifications               |                              |                                 |
| Attenuation                         | @1310nm                      | Max value < 0.36dB/km           |
|                                     | @1550nm                      | Max value < 0.22dB/km           |
| Dispersion                          | @1285nm~1330nm               | -3.0ps/(nm·km)~3.0ps/(nm·km)    |
|                                     | @1550nm                      | ≤ 18ps/(nm·km)                  |
|                                     | @1625nm                      | ≤ 22ps/(nm·km)                  |
| Zero-Dispersion wavelength          |                              | 1300nm~1324nm                   |
| Zero-Dispersion slope               |                              | ≤ 0.092ps/(nm <sup>2</sup> ·km) |
| Mode field diameter (MFD) at 1310nm |                              | 9.3±0.5μm                       |
| Mode field diameter (MFD) at 1550nm |                              | 10.4±0.8μm                      |
| PMD                                 | Max. for fiber on the reel   | 0.20ps/km <sup>1/2</sup>        |
|                                     | Max. for link designed value | 0.10ps/km <sup>1/2</sup>        |

|   |                                      |                                       |
|---|--------------------------------------|---------------------------------------|
| Cable cutoff wavelength $\lambda_{cc}$ (nm)                       |                                      | $\leq 1270\text{nm}$                  |
| Effective group index ( $N_{\text{eff}}$ ) @1310nm                |                                      | 1.4675                                |
| Effective group index ( $N_{\text{eff}}$ ) @1550nm                |                                      | 1.4680                                |
| <b>Back scatter characteristics(at 1310nm&amp;1550nm)</b>         |                                      |                                       |
| Point discontinuity   |                                      | $\leq 0.05\text{dB}$                  |
| Attenuation uniformity  |                                      | $< 0.08\text{dB/km}$                  |
| Attenuation coefficient difference for bi-directional measurement |                                      | $\leq 0.05\text{dB/km}$               |
| <b>Geometrical characteristics</b>                                |                                      |                                       |
| Cladding diameter   |                                      | $125\pm 1.0\mu\text{m}$               |
| Cladding non-circularity  |                                      | $\leq 1\%$                            |
| Core/cladding concentricity error                                 |                                      | $\leq 0.6\mu\text{m}$                 |
| Fiber diameter with coating (uncolored)                           |                                      | $245\pm 10\mu\text{m}$                |
| Cladding/coating concentricity error                              |                                      | $\leq 12.0\mu\text{m}$                |
| Curl  |                                      | $\geq 4\text{m}$                      |
| <b>Mechanical characteristics</b>                                 |                                      |                                       |
| Proof stress  |                                      | $\geq 0.69\text{GPa}(100\text{kpsi})$ |
| Coating strip force(typical value)                                |                                      | 1.4N                                  |
| Dynamic stress corrosion susceptibility parameter(typical value)  |                                      | $\geq 20$                             |
| Macrobend loss<br>at 1550nm                                       | $\Phi 60\text{mm}, 100\text{ turns}$ | $\leq 0.05\text{dB}$                  |
|   | $\Phi 32\text{mm}, 1\text{ turn}$    | $\leq 0.1\text{dB}$                   |
| <b>Environmental characteristics (at 1310nm &amp; 1550nm)</b>     |                                      |                                       |
| Temperature induced attenuation(-60~+85°C)                        |                                      | $\leq 0.05\text{dB/km}$               |
| Dry heat induced attenuation (85°C $\pm$ 2°C,30 days)             |                                      | $\leq 0.05\text{dB/km}$               |
| Water immersion induced attenuation(23°C $\pm$ 2°C, 30 days)      |                                      | $\leq 0.05\text{dB/km}$               |
| Damp heat induced attenuation(85°C $\pm$ 2°C,RH85%,30 days)       |                                      | $\leq 0.05\text{dB/km}$               |

### 3. PHYSICAL, MECHANICAL, ENVIRONMENTAL, PERFORMANCE AND TESTS

#### 3.1 Mechanical and Environmental Performance of the Cable

The mechanical and environmental performance of the cable shall be in accordance with Table 3.1 below. Unless otherwise specified, all attenuation measurements required in this section shall be performed at 1550nm for single mode fiber.

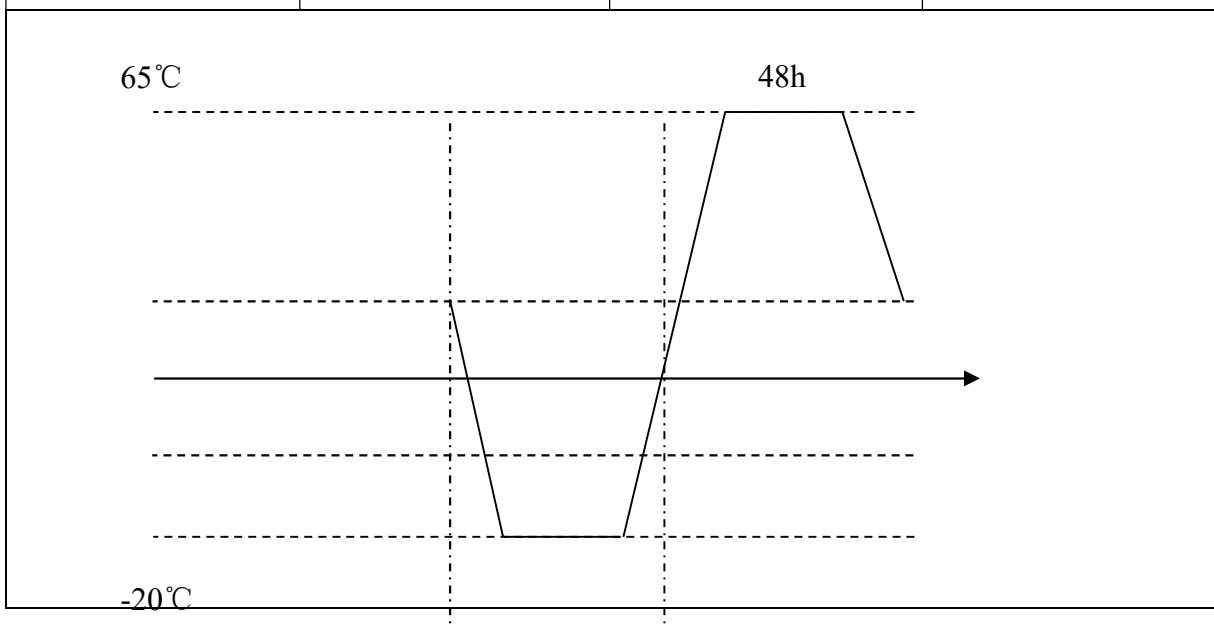
**Table3.1: The Mechanical and Environmental Performance of the Cable**

| Item             | Test Method | Test Conditions                                   | Acceptance Criteria   |
|------------------|-------------|---|---|
| Tensile Strength | NBR13512    | L ≥ 50 m<br>Load: depend on cable weight and span | Additional attenuation ≤ 0.1 dB<br>No visible damage to the surface of outer sheath |
| Crush Resistance | NBR 13507   | Load: depend on cable weight<br>Length: 100 mm    | Additional attenuation ≤ 0.1 dB<br>No visible damage to the surface of outer sheath |



| Item              | Test Method | Test Conditions  | Acceptance Criteria  |
|-------------------|-------------|--|--|
| Impact Resistance | NBR 13509   | The impact of weight:<br>depend on cable diameter<br>Height: 150mm<br>3 point , 25 times per point | No crack to fiber<br>No visible damage to the surface of outer sheath                    |
| Repeated bending  | NBR 13507   | Radius:6D<br>Tests = 30 cycles   | Additional attenuation $\leq 0.1$ dB<br>No visible damage to the surface of outer sheath |
| Torsion           | NBR 13513   | The test length =0.2m,<br>$\pm 90$ degree,<br>10 cycles,   | Additional attenuation $\leq 0.1$ dB<br>No visible damage to the surface of outer sheath |

| Item                | Test Method | Test Conditions   | Acceptance Criteria                      |
|---------------------|-------------|---|--|
| Temperature cycling | NBR 13510   | Operating Temperature:<br>-20 ° C to +65 ° C<br>Cycle time:48h<br>Cycle:4 | Additional attenuation $\leq 0.05$ dB/km |



48h

## **4 Packing and Marking**

### **4.1 Cable Packing**

Standard length of cable shall be 4,000m per reel with a tolerance of  $\pm 1\%$ . Other cable lengths are also available if requested by customer.

Each length of the cable shall be wound on a separate wooden reel.

Both ends of the cable shall be sealed with suitable plastic caps to prevent the entry of moisture during shipping, handling and storage.

The cable ends shall be securely fastened to the reel to prevent the cable from becoming loose in transit or during placing operations.

The inner end of the cable is housed into a slot on the side of the reel without extra cable length for testing.

Wood-fiber board shall be secured with steel bands to protect the cable during normal handling and shipping.

### **4.2 Cable Reel**

4.4.1 Details given below shall be distinctly marked with a weather-proof material on both outer sides of the reel flange:

- 1).Purchaser's name
- 2).Reel number
- 3).Name of the manufacturer
- 4).Year of manufacture
- 5).Arrow showing the direction the drum shall be rolled
- 6).An identification label according to drawing AMI03- 428

4.2.2 Other shipping mark is also available if requested by customer.

4.2.3 The cable shall be shipped on reels designed to prevent damage to the cable during shipment and installation.

4.2.4 The arbor holes provided in the reels shall be approximately 85 mm with a wood or steel hub in the arbor hole (in lieu of fiberboard).