



# LadonX™ 144F OPGW Cable

Optical Fiber Composite Overhead Ground Wires G.652D fiber

## Flame Resistant

No Request

## Design Reference

IEC 60793-1&2

IEC 60794-4

IEC 60104

IEC 61232

IEC 61395

IEC 61396

ITU-T G.652

IEEE 1138

## Application

Overhead power lines

## Working Conditions

Storage Temperature

-40°C ~ +85°C

Installation Temperature:

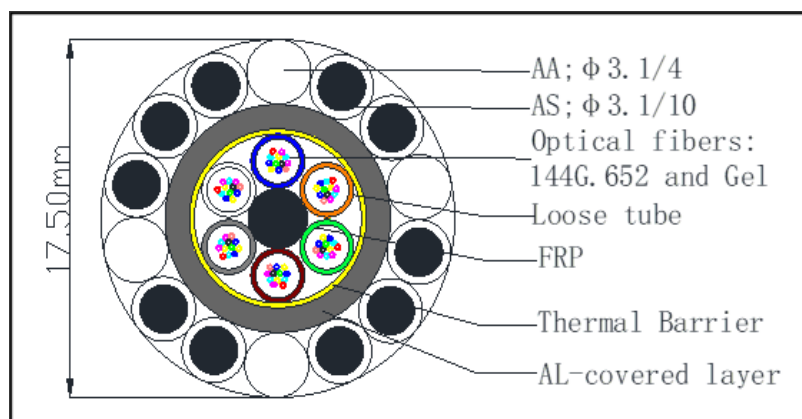
-10°C ~ +50°C

Operation Temperature

-40°C ~ +85°C

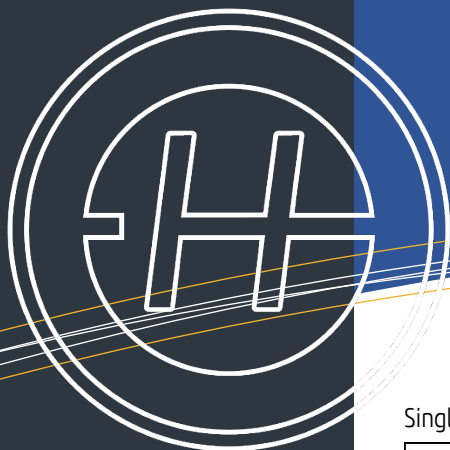
## Min bending radius(dynamic)

350mm

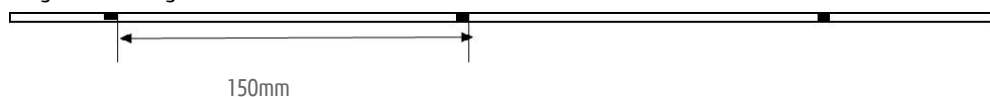


## Technical data

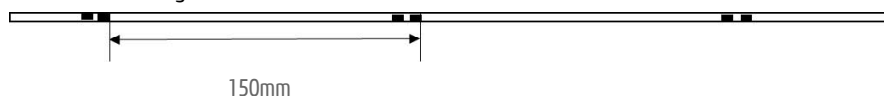
|                             |                 |                |
|-----------------------------|-----------------|----------------|
| Number of Fibers            |                 | 144            |
| Fiber Type                  |                 | G.652D         |
| Center Layer                |                 | AL-Clad PBT    |
| AL-Clad PBT OD              | mm              | 11.3           |
| Conductivity of AL-Clad PBT |                 | 53%            |
| AS Amount                   |                 | 10 in 1 layer  |
| AS OD                       | mm              | 3.1            |
| Conductivity of AS          |                 | 20.3%          |
| AA Amount                   |                 | 4 in 1 layer   |
| AA OD                       | mm              | 3.1            |
| Conductivity of AA          |                 | 52.5%          |
| Cable Diameter(Nom.)        | mm              | 17.5           |
| Cable Weight (Approx.)      | kg/km           | 748            |
| Carrying Area               | mm <sup>2</sup> | 135.07         |
| AL/AS/AA area               | mm <sup>2</sup> | 29.4/75.5/30.2 |
| Outer Layer Direction       |                 | Right Hand     |



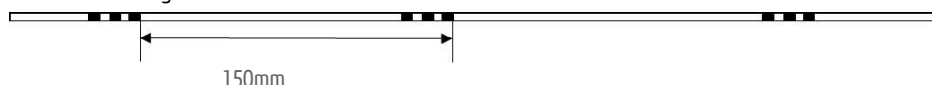
Single black ring



Double black ring



Three black ring



## Mechanical Property

| No. | Technical Parameter                        | Unit                 | Designed Value |
|-----|--------------------------------------------|----------------------|----------------|
| 1   | Rate Tensile Strength (RTS)                | kN                   | 103            |
| 2   | Elasticity coefficient                     | KN/mm <sup>2</sup>   | 119            |
| 3   | Thermal Expansion Coefficient              | 10 <sup>-6</sup> /°C | 15.4           |
| 4   | EDT(20%RTS) Everyday Tension               | KN                   | 20.6           |
| 5   | MAT (40% RTS) Maximum Allowable Tension    | KN                   | 41.2           |
| 6   | 20°C DC Resistance                         | Ω/Km                 | 0.3568         |
| 7   | Short-circuit current capacity(40°C~200°C) | kA <sup>2</sup> .s   | 144            |

## Test Requirements for OPGW

There are different test series to assure the quality of OPGW:

- Routine test (in-process testing according to internal quality plan).
- Factory acceptance test (FAT, witnessed by customer).
- Type test (only in case of a basic new design, repetition in exceptional cases)

OPGW tests shall be accordance with applicable standards implied in the bidding documents.

### Type Test

Type test may be waived by submitting maker's certificate of the similar product performed in an internationally acknowledged independent test organization or laboratory. If type test should be performed, it will be carried out according to an extra type test procedure reached to an agreement between purchaser and manufacturer.

### Routine test

The optical attenuation coefficient on all production cable lengths is measured according to IEC 60793-1-C1C (Back-scattering technique, OTDR). Standard single-mode fibers are measured at 1310nm and at 1550nm. Non-zero dispersion shifted single-mode (NZDS) fibers are measured at 1550nm.

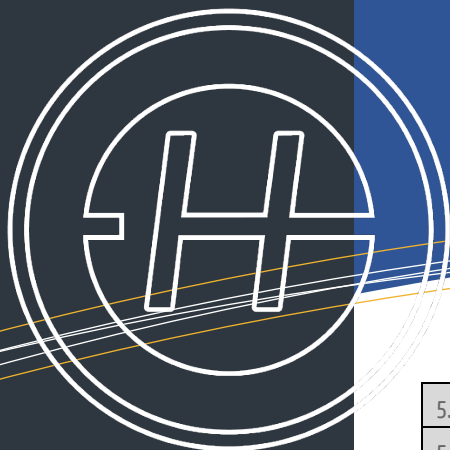


### Factory test

Factory acceptance test is carried out on two samples per order in the presence of the customer or his representative. The requirements for quality characteristics are determined by relevant standards and agreed quality plans.

## Test Items

| NO. | ITEMS                                 | TEST METHOD       | TEST TYPE        |             |
|-----|---------------------------------------|-------------------|------------------|-------------|
|     |                                       |                   | TEST Type        | REFERENCE   |
| 1   | <b>OPGW Mechanical Performance</b>    |                   |                  |             |
| 1.1 | Crush Test                            | IEC 60794-4-9.4.4 | Type Test        | IEC 60794-4 |
| 1.2 | Stress-strain Test                    | IEC 60794-4-9.3   | Type Test        |             |
| 1.3 | Sheave Test                           | IEC 60794-4-9.4.1 | Type Test        |             |
| 1.4 | Aeolian Vibration Test                | IEC 60794-4-9.10  | Type Test        |             |
| 1.5 | Galloping Test                        | IEC 60794-4-10    | Type Test        |             |
| 1.6 | Creep Test                            | IEC 60794-4-9.11  | Type Test        |             |
| 1.7 | Breaking strength Test                | IEC 60794-4-9.3   | FAT&Type Test    |             |
| 2   | <b>OPGW Electronic Performance</b>    |                   |                  |             |
| 2.1 | Short Circuit Test                    | IEC 60794-4-9.6   | Type Test        |             |
| 2.2 | Lightening Arc Test                   | IEC 60794-4-9.7   | Type Test        |             |
| 2.3 | DC-resistance                         | IEC 60974-4-10    | FAT Test         |             |
| 3   | <b>OPGW Environmental Performance</b> |                   |                  |             |
| 3.1 | Temperature Cycling Test              | IEC 60794-4-9.5   | Type Test        |             |
| 3.2 | Seepage of Flooding Compound Test     | IEC 60794-4-9.14  | Type Test        |             |
| 3.3 | Water Penetration Test                | IEC 60794-4-9.13  | Type Test        |             |
| 4   | <b>OPGW Structure</b>                 |                   |                  |             |
| 4.1 | Quality of surface                    | IEC 60794-4       | Routine&FAT Test |             |
| 4.2 | Identification of Fiber Color Coding  | IEC 60794-4       | Routine&FAT Test |             |
| 4.3 | Overall Diameter                      | IEC 60794-4       | Routine&FAT Test |             |
| 4.4 | Direction of lay outer                | IEC 60794-4       | Routine&FAT Test |             |
| 4.5 | Lay length                            | IEC 60794-4       | Routine&FAT Test |             |
| 4.6 | Weight of cable                       | IEC 60794-4       | Routine&FAT Test |             |
| 5   | <b>Test on fibers</b>                 |                   |                  |             |
| 5.1 | Mode Field Diameter                   | IEC 60793-1-45    | Routine Test     |             |
| 5.2 | Cut-off Wavelength                    | IEC 60793-1-44    | Routine Test     |             |



|     |                                         |                |                  |           |
|-----|-----------------------------------------|----------------|------------------|-----------|
| 5.3 | Attenuation Co-efficient                | IEC 60793-1-40 | Routine&FAT Test |           |
| 5.4 | Chromatic Dispersion                    | IEC 60793-1-42 | Routine Test     |           |
| 5.5 | Cladding Diameter                       | IEC 60793-1-21 | Routine Test     |           |
| 5.6 | Core cladding concentricity error       | IEC 60793-1-21 | Routine Test     |           |
| 5.7 | Clad non-circularity                    | IEC 60793-1-21 | Routine Test     |           |
| 6   | <b>Test on wires before stranding</b>   |                |                  |           |
| 6.1 | Diameter                                | IEC 61232      | Routine&FAT Test | IEC 61232 |
| 6.2 | Tensile strength                        | IEC 61232      | Routine&FAT Test |           |
| 6.3 | Stress at 1% extension(Only ACS wire)   | IEC 61232      | Routine&FAT Test |           |
| 6.4 | Elongation at break                     | IEC 61232      | Routine&FAT Test |           |
| 6.5 | Wrapping test(Only AA wire)             | EN 50183       | Routine&FAT Test |           |
| 6.6 | Conductivity                            | IEC 61232      | Routine&FAT Test |           |
| 6.7 | Thickness of Al-cladding(Only ACS wire) | IEC 61232      | Routine&FAT Test |           |
| 6.8 | Torsion test(Only ACS wire)             | IEC 61232      | Routine&FAT Test |           |

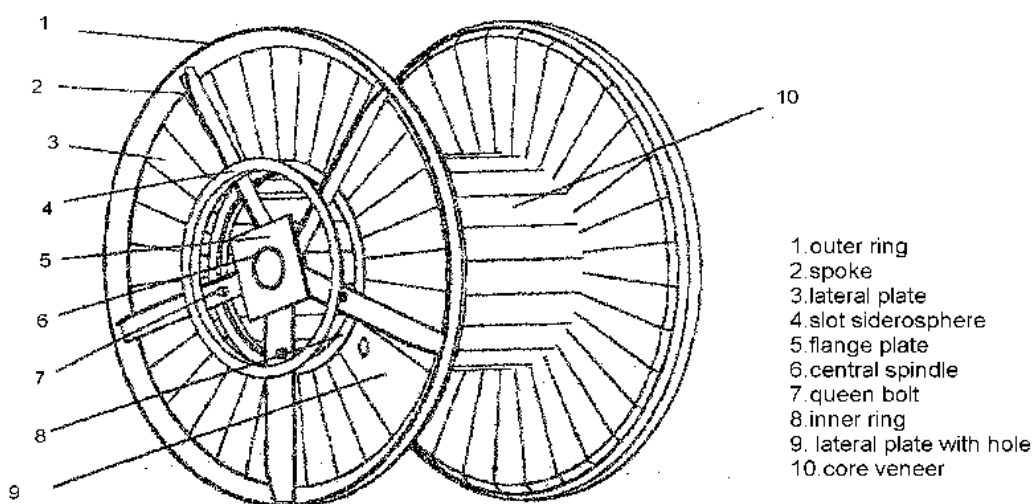
## Optic Fiber

Optic Fibers supplied in this specification meet the requirements of ITU-T G.652D

| Parameter                                             | Specification                                                                                                                                            |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| MFD (1550nm)                                          | 9.2±0.4μm                                                                                                                                                |
| Cladding diameter                                     | 125 ±0.7μm                                                                                                                                               |
| Core/clad mode field concentricity error(MFCE)        | ≤0.5μm                                                                                                                                                   |
| Splicing loss                                         | ≤0.05dB/Joint                                                                                                                                            |
| Cladding non- circularity                             | ≤ 0.8%                                                                                                                                                   |
| Cut- off wavelength                                   | $\lambda_{cc} \leq 1260\text{nm}$                                                                                                                        |
| Optical Fiber Attenuation                             | 1310nm: 0.35dB/km max after cabling<br>1383nm: 0.31dB/km max after cabling<br>1550nm: 0.21dB/km max after cabling<br>1625nm: 0.24dB/km max after cabling |
| Bending- loss performance of optical fiber @ 1550nm   | ≤0.05dB ( 100 turns around a mandrel of 60mm diameter)                                                                                                   |
| Polarization mode dispersion maximum individual fibre | 0.2ps/√km                                                                                                                                                |
| Polarization mode dispersion design link value        | 0. 1ps/√km                                                                                                                                               |
| Zero Dispersion Wavelength                            | 1300 ~ 1324nm                                                                                                                                            |



## Drum Size



## Dimension of steel-and-wood drum

| Reel No. | Drum Details (nominal) |                 |                 |            |                   |
|----------|------------------------|-----------------|-----------------|------------|-------------------|
|          | Flange Dia(mm)         | Barrel Dia.(mm) | Inner Width(mm) | Weight(kg) | Spindle hole Dia. |
| 1        | 1000                   | 520             | 650             | 75         | 80                |
| 2        | 1200                   | 520             | 650             | 115        | 80                |
| 3        | 1400                   | 740             | 656             | 145        | 80                |
| 4        | 1600A                  | 900             | 765             | 195        | 80                |
| 5        | 1600B                  | 900             | 900             | 220        | 80                |
| 6        | 1800                   | 900             | 842             | 295        | 80                |
| 7        | 2000                   | 1000            | 842             | 315        | 80                |
| 8        | 2300                   | 1250            | 900             | 445        | 80                |

Info@hermesys.com  
Phone +65 66921168  
42 Emerald Hill Road, Singapore



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