METRIC INDUSTRIAL

# FibreCore UWIC Dobbelarmert sjøkabel

**FibreCore UWIC** er en sjøkabel med to lag med galvanisert ståltrådarmering og med ytre kappe av slitesterk polyetylen. Kabelen leveres med 12 til 288 G.652D fibre som er merket i henhold til Telenor farge kode. Kabelen egner seg for forlegning i grunne innsjøer, vassdrag eller i grunne farvann langs kysten.

## 1. GENERAL

1.1 Scope

The listed specifications covers the design requirements and performance standard for the supply of optical fiber cable in the industry. It also includes this premium designed cable with optical, mechanical and geometrical characteristics.

| Cable marking | Application |
|---|---|
| FibreCore-xxx G.652D-FSwUW-S1 | Under water installation cable |

xxx: Fiber count

1.2 Cable Description

The cable possesses high tensile strength and flexibility in a compact cable size. At the same time, it provides excellent optical transmission and physical performance.

1.3 Quality

Excellent quality control is achieved through intense in-house quality check and stringent audit acceptance by ISO 9001.

1.4 Reliability

Initial and periodic product qualification tests for performance and durability are performed rigorously to ensure product reliability.

1.5 Reference

The cable offered are designed, manufactured and tested according international standards as follows:

| | |
|---|---|
| IEC 60793-1 | Optical fiber Part 1: Generic specifications |
| IEC 60793-2 | Optical fiber part2: Product specifications |
| IEC 60794-3-30 | Optical fiber cables: Part 3-30, outdoor cables- family specification for lake and river crossings |
| ITU-T G.650 | Definition and test methods for the relevant parameters of single-mode fibers |
| ITU-T G.652 | Characteristics of a single-mode optical fiber and cable |

## 2. OPTICAL FIBER

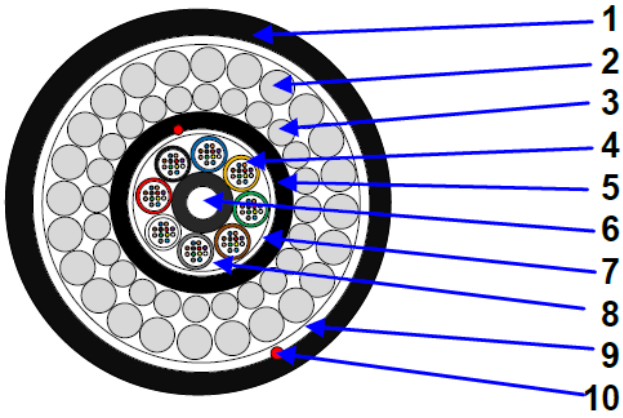
The optical fiber is made of high pure silica and germanium doped silica. UV curable acrylate material is applied over fiber cladding as optical fiber fiber primary protective coating. The detail data of optical fiber performance are shown in the following table. ITU-T G652 fiber uses special spun device to successfully control the value of PMD to ensure stability during cabling.

## G.652D Fiber

| Category | Description | Specifications | |
|---|---|---|---|
| | | Before cabling | After cabling |
| Optical Specifications | Attenuation @ 1310 nm | ≤0,34 dB/km | ≤0,36 dB/km |
| | Attenuation @ 1550 nm | ≤0,20 dB/km | ≤0,22 dB/km |
| | Zero Dispersion Wavelength | 1300~1324 nm | |
| | Zero Dispersion Slope | ≤0,092ps/nm$^2$-km | |
| | PMD Max. Value | ≤0,2 ps/√km | |
| | Cable Cutoff Wavelenght (λ | ≤1260 nm | |
| | Macro bending loss | | |
| | (100 turns ø50 mm) @ 1550 nm | ≤0,05 dB | |
| | (100 turns ø50 mm) @ 1625 nm | ≤0,10 dB | |
| | MDF (Mode Field Diameter) @ 1310 nm | 9,2 ± 1µm | |
| Dimensional Specifications | Cladding Diameter | 125 ± 1µm | |
| | Core/clad concentricity error | ≤0,6µm | |
| | Cladding non-circularity | ≤1,0% | |
| Mechanical Specifications | Proof stress | ≥0,69Gpa | |

### 3. CABLE STRUCTURE

3.1 Cable type




**Construction:**

1. Outer sheath (HDPE)
2. and 3. Galvanized steel wire armor
4. Loose tube, fiber and jelly
5. Inner sheath (HDPE)
6. Central strength member (Coated FRP)
7. Water blocking tape
8. Thixotropic jelly
9. Wrap tape
10. Ripcord x2

**Technical Characteristics:**

- The unique extruding technology provides the fibers in the tube with good flexibility and bending endurance
- The unique fiber excess length control method provides the cable with excellent mechanical and environmental properties
- Multiple water blocking material fillings provides dual water blocking function

## Dimension and Properties

| Fiber count | 12 | 24 | 48 | 96 | 144 | 192 | 240 | 288 |
|---|---|---|---|---|---|---|---|---|
| No. of loose tube/filler layer 1 | 1/5 | 2/4 | 4/2 | 8/0 | 12/0 | 6/0 | 9/0 | 9/0 |
| No. of loose tube/filler layer 2 | - | - | - | - | - | 10/2 | 11/4 | 15/0 |
| Fiber no. per tube | 12 | | | | | | | |
| Cable OD, nominell (mm) | 20,3 | 20,3 | 20,3 | 21,5 | 24,9 | 26,0 | 27,2 | 27,2 |
| Cable weight, nominell (kg/km) | 1100 | 1105 | 1110 | 1250 | 1487 | 1675 | 1730 | 1735 |
| Operation temp. range (˚C) | -40 ~+70 | | | | | | | |
| Installation temp. range (˚C) | -20 ~+70 | | | | | | | |
| Transport/storage temp. range (˚C) | -40 ~+70 | | | | | | | |
| Max.tensile load (N) | Installation: 20000, Operation 12000 | | | | | | | |
| Crush resistance (N/10cm) | Short term: 5000, Long term 2000 | | | | | | | |
| Minimum installation bending radius | 30 x OD | | | | | | | |
| Minimum operational bending radius | 15 x OD | | | | | | | |

### COLOR CODE SCHEME

**Color code fiber**

| 1 Hvit | 2 Rød | 3 Gul | 4 Grønn | 5 Blå | 6 Grå | 7 Brun | 8 Sort | 9 Violett | 10 Aqua | 11 Orange | 12 Rosa |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

**Color code tube layer 1 (inner layer)**

| 1 Hvit | 2 Rød | 3 Gul | 4 Grønn | 5 Blå | 6 Grå | 7 Brun | 8 Sort | 9 Violett | 10 Aqua | 11 Orange | 12 Rosa |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

**Color code tube layer 2 (outer layer)**

| 1 Hvit | 2 Rød | 3 Gul | 4 Grønn | 5 Blå | 6 Grå | 7 Brun | 8 Sort | 9 Violett | 10 Aqua | 11 Orange | 12 Rosa |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

| 13 Aqua | 14 Orange | 15 Rosa |
|---|---|---|
| | | |

Other color code scheme are available on request.

### 4. TEST REQUIREMENT

The cable is in accordance with applicable standard of cable and requirement of customer. The following test items are carried out according to corresponding reference.

| | |
|---|---|
| Mode field diameter | IEC 60793-1-45 |
| Core/clad concentricity | IEC 60793-1-20 |
| Cladding diameter | IEC 60793-1-20 |
| Cladding non-circularity | IEC 60793-1-20 |
| Attenuation coefficient | IEC 60793-1-40 |
| Chromatic dispersion | IEC 60793-1-42 |
| Cable cut-off wavelength | IEC 60793-1-44 |

**TEST LIST**

4.1 Tension Loading Test

| | |
|---|---|
| Test Standard | IEC 60794-1-2 E1 |
| Sample length | No less than 50 mtr. |
| Load | Max. Tension load |
| Duration time | 10 min. |
| Test result | Fiber strain ≤0,33% |
| | Additional attenuation≤0,1dB |
| | No damage to outer jacket nor inner elements |

4.2 Crush/Compression Test

| | |
|---|---|
| Test Standard | IEC 60794-1-2 E3 |
| Load | Crush load |
| Duration time | 5 min. |
| Test number | 3 |
| Test result | Additional attenuation≤0,1dB |
| | No damage to outer jacket nor inner elements |

4.3 Impact Resistance Test

| | |
|---|---|
| Test Standard | IEC 60794-1-2 E4 |
| Impact energy | 10J |
| Radius | 300mm |
| Impact points | 3 |
| Impact numbers | 1 |
| Test result | Additional attenuation≤0,1dB |
| | No damage to outer jacket nor inner elements |

4.4 Temperature Cycling Test

| | |
|---|---|
| Test Standard | IEC 60794-1-2 F1 |
| Impact energy | +20°C ->-40°C ->+70°C ->-40°C ->+70°C ->+20°C |
| Radius | 12 hrs |
| Impact points | 2 |
| Test result | After test, attenuation variation for reference value (the attenuation to be measured before test at +20±3°C) ≤ 0,10dB/km at 1550 nm |

4.5 Water Penetration Test

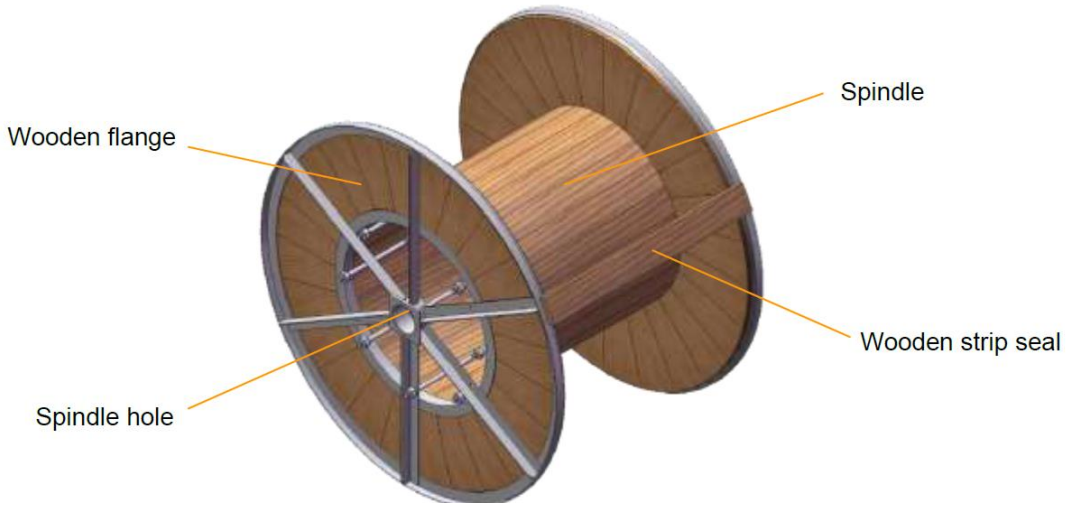
| | |
|---|---|
| Test Standard | IEC 60794-1-2 F5B |
| Height of water column | 1 mtr. |
| Sample length | 3 mtr. |
| Test time | 24 hrs |
| Test result | No water leakage from the opposite of the cable core |

4.6 Drip Test

| | |
|---|---|
| Test Standard | IEC 60794-1-2 E14 |
| Sample length | 0,3 mtr. |
| Temperature | 70°C |
| Duration | 24 hrs |
| Test result | No filling compound shall drip from the tubes |

## 5. PACKAGING AND DRUM

5.1 The cables are coiled on Iron-wooden drum. During transportation, the correct tools should be used to avoid damaging the package and to handle with ease. Cables should be protected from moisture, kept away from high temperature and fire sparks. It should be protected from over bending and crushing as well as from mechanical stress and damage.




5.2 The color of cable marking is white (The printing shall be carried out at interval of 1 meter on the outer sheath of the cable) The inner end of the cable is then sealed with heat shrinkable end cap to prevent ingress of water and is made available for testing. The outer end of the cable is equipped with heat shrinkable end cap. Outer sheath marking legend can be changed upon user's request

5.3 Outdoor cable packing. Iron wooden drum. Strong wooden batten protection.

## ORDERING INFORMATION

| Elnr | MI art. Nr. | Beskrivelse |
|---|---|---|
| 10 009 68 | G12-9/125 B1.D UWIC 2S | G12 FibreCore UWIC dobbelarmert sjøkabel, G.652D |
| 10 009 69 | G24-9/125 B1.D UWIC 2S | G24 FibreCore UWIC dobbelarmert sjøkabel, G.652D |
| 10 009 70 | G48-9/125 B1.D UWIC 2S | G48 FibreCore UWIC dobbelarmert sjøkabel, G.652D |
| 10 009 71 | G96-9/125 B1.D UWIC 2S | G96 FibreCore UWIC dobbelarmert sjøkabel, G.652D |
| 10 009 72 | G144-9/125 B1.D UWIC 2S | G144 FibreCore UWIC dobbelarmert sjøkabel, G.652D |
| 10 009 73 | G192-9/125 B1.D UWIC 2S | G192 FibreCore UWIC dobbelarmert sjøkabel, G.652D |
| 10 009 74 | G240-9/125 B1.D UWIC 2S | G240 FibreCore UWIC dobbelarmert sjøkabel, G.652D |
| 10 009 75 | G288-9/125 B1.D UWIC 2S | G288 FibreCore UWIC dobbelarmert sjøkabel, G.652D |