# Duct Cable OFC-xx G.652D-DiC -S1 Modulo 12

## Application / Construction

| Application | Micro module cable for duct installation | |
|---|---|---|
| | 12-288 fibers | 432 fibers |
| Cross Section (not to scale) |  |  |
| Configuration | - Micro module with 12 optical fibres and jelly inside<br>- Easy to strip the micro module<br>**12-288fo:**<br>- Glass yarns and water blocking yarns<br>- Ripcord *1 (red)<br>- Outer sheath: HDPE, with 2 FRP embedded in the sheath symmetrically<br>**432fo:**<br>- Water blocking tape and water blocking yarns<br>- Each 12 modules grouped with a binder yarn<br>- Outer sheath: HDPE, with 2 FRP embedded in the sheath symmetrically | |
| Temperature Range | Storage and transport -40 to +70°C | Installation -5 to +40°C — Operation -40 to +70°C |
| Standards | IEC 60793-1, IEC 60793-2, IEC 60794-3-10, XP C93-850-3-25-2019 | |

## Dimensions

| Fiber counts | | 12 | 24 | 36 | 48 | 72 | 96 | 144 | 288 | 432 |
|---|---|---|---|---|---|---|---|---|---|---|
| Modularity | | 12 | | | | | | | | |
| Module Φ | mm | 1.4 | | | | | | | | |
| Outer diameter | mm | 6.7±0.5 | 7.8±0.5 | 8.3±0.5 | 8.6±0.5 | 10.0±5% | 11.2±5% | 11.7±5% | 14.4±5% | 16.5±5% |
| Weight/km | kg | 30 | 38 | 49 | 50 | 72 | 86 | 90 | 144 | 194 |

Sizes and values without tolerances are nominal values

## Mechanical Properties

| Fiber counts | 12 | 24 | 36 | 48 | 72 | 96 | 144 | 288 | 432 |
|---|---|---|---|---|---|---|---|---|---|
| Tensile strength (Tm) | 800 | 1000 | 1000N | 1000N | 1600N | 2200N | 2200N | 2700N | 2700N |
| Impact | 5Nm | | | | | | | | |
| Min. Bending radius | Without tension 10D | | | | | | | | |

See Point 6: Test Methods

## Marking

| Fiber Color | 1 blue | 2 orange | 3 green | 4 brown | 5 grey | 6 white | 7 red | 8 black | 9 yellow | 10 violet | 11 pink | 12 aqua |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Module Color | 1 blue | 2 orange | 3 green | 4 brown | 5 grey | 6 white | 7 red | 8 black | 9 yellow | 10 violet | 11 pink | 12 aqua |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Module Color | 13 blue | 14 orange | 15 green | 16 brown | 17 grey | 18 white | 19 red | 20 black | 21 yellow | 22 violet | 23 pink | 24 aqua |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Module Color | 25 blue | 26 orange | 27 green | 28 brown | 29 grey | 30 white | 31 red | 32 black | 33 yellow | 34 violet | 35 pink | 36 aqua |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Binder Color (432fo) | 1 blue | 2 orange | 3 green |
|---|---|---|---|

Outer Sheath: black, Ink print, marking in 1 meter intervals as follows (for example) :

| |
|---|
| MFOU10200 / H 12 FO G.652D M 12 <year > <week> <BatchNumber> <meter> |
| MFOU10203 / H 36 FO G.652D M 12 <year > <week> <BatchNumber> <meter> |
| MFOU10206 / H 72 FO G.652D M 12 <year > <week> <BatchNumber> <meter> |
| MFOU10208  / H 96 FO G.652D M 12 <year > <week> <BatchNumber> <meter> |
| MFOU10211 / H 144 FO G.652D M 12 <year > <week> <BatchNumber> <meter> |
| MFOU10213 / H 288 FO G.652D M 12 <year > <week> <BatchNumber> <meter> |
| MFOU10215 / H 432 FO G.652D M 12 <year > <week> <BatchNumber> <meter> |

## Optical Fiber

| | | | |
|---|---|---|---|
| **Standard** | ITU-T G.652D | | |
| **Optical** | Fibre attenuation (dB/km) | **Before cable**<br>≤0.34 @1310nm<br>≤0.20 @1550nm | **After Cable**<br>≤0.36 @1310nm<br>≤0.23 @1550nm |
| | Zero Dispersion Wavelength | 1300~1324 nm | |
| | Zero Dispersion Slope | ≤0.092 ps/nm$^2$·km | |
| | Cable Cutoff Wavelength (λcc) | *≤1260 nm | |
| | PMD Max. Value | ≤0.12 ps/√km | |
| | PMD Average | ≤0.1 ps/√km | |
| | PMD Link design value<br>(M=20 cables,Q=0.01%) | ≤0.06ps/√km | |
| | Macro bending Loss<br>(100 turns; Φ50 mm)        @1550 nm<br>(100 turns; Φ50 mm)        @1625 nm | ≤ 0.05 dB<br>≤ 0.10 dB | |
| | Mode Field Diameter | 9.2±0.4 µm @1310 nm<br>10.2±0.4 µm @1550 nm | |
| **Geometric** | Cladding Diameter | 125±1.0 µm | |
| | Cladding non circularity | ≤ 1.0% | |
| | Core/clad concentricity error | ≤ 0.6µm | |
| **Mechanical** | Proof stress | ≥ 0.69GPa | |

*Remark: Cable cut-off wavelength according to IEC 60793-1-44-2011 Annex A method A

## Test Methods

| Test | Conditions | Acceptance criteria |
|---|---|---|
| **Tension Loading**<br>**IEC 60794-1-2 E1** | Tensile strength: See point 3<br>Sample length: ≥100 m, 1 min | - Δα reversible. |
| **Crush**<br>**IEC 60794-1-2 E3** | Crush: 2000N/10cm<br>Test: 1 min, number of tests: 5 | - Δα≤ 0.1dB |
| **Impact**<br>**IEC 60794-1-2 E4** | 5Nm, R = 300 mm,<br>number of places/tests: 3 | - Δα reversible |
| **Torsion**<br>**IEC 60794-1-2 E7** | Sample length: 1 m, ± 180°, 5 cycles | - Δα≤ 0.1dB |
| **Bend**<br>**IEC 60794-1-2 E11** | R=10D, 4 bends, 3 cycles | - Δα reversible. |
| **Temperature cycling**<br>**IEC 60794-1-2 F1** | -30℃→+60℃<br>12h each step, 2 cycles | - △α≤0.10dB/km |
| **Water penetration**<br>**IEC 60794-1-2 F5** | Sample: 3 m, water column height: 1m<br>Test duration: 24 h | - No water leakage |

All optical measurements at 1550 nm

# Fiber Test List

| Test Item | Test Standard | Acceptance Criteria | |
|---|---|---|---|
| Attenuation coefficient | IEC 60793-1-40 Measurement methods and test procedures-Attenuation | Before cable ≤0.34 dB/km @1310nm ≤0.20 dB/km @1550nm | After cable ≤0.36 dB/km @1310nm ≤0.23 dB/km @1550nm |
| Chromatic Dispersion | IEC 60793-1-42 Measurement Methods And Test Procedures - Chromatic Dispersion | Zero Dispersion Wavelength：1300~1324 nm Zero Dispersion Slope： ≤0.092 ps/nm$^2$·km | |
| Cable Cutoff Wavelength | IEC 60793-1-44 Measurement methods and test procedures - Cut-off wavelength  Annex A method A | ≤1260 nm | |
| PMD | IEC 60793-1-48 Measurement methods and test procedures - Polarization mode dispersion | Max PMD≤0.12 ps/√km PMD average≤0.1 ps/√km | |
| PMD link design value | IEC 60794-3 Outdoor cables-Sectional specification | PMDQ≤0.06 ps/√km M=20Cables,Q=0.01% | |
| Macro bending Loss | IEC 60793-1-47 Measurement methods and test procedures - Macro bending Loss | (100 turns; Φ50 mm) @1550 nm≤ 0.05 dB (100 turns; Φ50 mm) @1625 nm≤ 0.10 dB | |
| Mode field diameter | IEC 60793-1-45 Measurement methods and test procedures - Mode field diameter | 9.2±0.4μm@1310 nm 10.2±0.4μm@1550 nm | |
| Geometric parameters | IEC 60793-1-20 Measurement methods and test procedures - Fibre geometry | Cladding Diameter: 125±1μm Cladding non circularity: ≤1.0% Core/clad concentricity error: ≤0.6μm | |
| Proof test | IEC 60793-1-30 Measurement methods and test procedures - Fibre proof test | ≥0.69GPa | |

# Logistics

| Cable type | Length Tolerance | 4000m | |
|---|---|---|---|
| OFC-12G.652D-DiC-S1 (M12) | | 100*60*75 179kg | |
| OFC-24G.652D-DiC-S1 (M12) | | 110*60*75 220kg | |
| OFC-36G.652D-DiC-S1 (M12) | | Wood 105*60*105 272 kg | |
| OFC-48G.652D-DiC-S1 (M12) | | 115*60*75 273 kg | |
| OFC-60G.652D-DiC-S1 (M12) | Drum Type Dimensions Weight | Wood 110*60*105 314 kg | |
| OFC-72G.652D-DiC-S1 (M12) | | Wood 125*60*75 364 kg | |
| OFC-96G.652D-DiC-S1 (M12) | | Wood 135*60*75 440 kg | |
| OFC-144G.652D-DiC-S1 (M12) | | Wood 145*70*75 469 kg | |
| OFC-288G.652D-DiC-S1 (M12) | | Wood 175*80*75 735 kg | |
| OFC-432G.652D-DiC-S1 (M12) | | Wood 175*100*105 969 kg | |
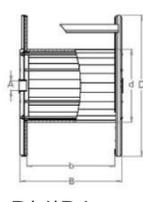


D*d*B in cm