Various fiber arrangement and branching structures depending on specific applications

- High flexibility for short length optical connection
- Good mechanical properties to distortion and bending
- Low curling tendency and good wiring workability
- Available with glass fiber, plastic optical fiber, etc.
- Number of optical fiber optional with customer specification

### Test Condition Result

<table>
<thead>
<tr>
<th>Test Condition</th>
<th>Result Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental twist by 180°</td>
<td>JIS C 6838 22 times</td>
</tr>
<tr>
<td>Flexibility Test</td>
<td>180° 30mm radius No physical damage</td>
</tr>
<tr>
<td></td>
<td>Optical loss change &lt; 0.1°/m</td>
</tr>
<tr>
<td>Removability of coating</td>
<td>100 times good</td>
</tr>
<tr>
<td>Temperature-Humidity Aging Test</td>
<td>85°C/85%RH 2000hr No physical damage</td>
</tr>
<tr>
<td></td>
<td>Optical loss change &lt; 0.001°/m</td>
</tr>
<tr>
<td>Temperature-Humidity Cycling Test</td>
<td>-40 to 70°C up to 80%RH 200 cycles</td>
</tr>
<tr>
<td></td>
<td>No physical damage</td>
</tr>
<tr>
<td></td>
<td>Optical loss change &lt; 0.003°/m</td>
</tr>
</tbody>
</table>

Data in this table are measured values in our measurement system, and not guaranteed values.
**Compact and high density optical fiber routing**

**High flexibility and good wiring workability**

**Free design in size, shape, and routing pattern**

<table>
<thead>
<tr>
<th>Features</th>
<th>Structure</th>
<th>Test Condition Result</th>
</tr>
</thead>
</table>
|                   | Silicone rubber | Flexibility Test 180° Bend: 30 mm radius | No physical damage.  
|                   | Optical fiber | Optical loss change < 0.1 dB.               |
|                   | Substrate   | Twist Test 90°: No physical damage.         |
|                   |             | No optical loss change.                     |
|                   |             | Compression 0.784 N/mm² on the surface: No physical damage.  
|                   |             | Optical loss change < 0.01 dB.              |
|                   |             | Temperature-Humidity Aging Test: Telcordia GR-1221  
|                   |             | 85°C, 85%RH, 2000hr: No physical damage.  
|                   |             | Optical loss change < 0.1 dB.               |
|                   |             | Temperature-Humidity Cycling Test: Telcordia GR-1221  
|                   |             | -40 to 70°C, up to 80%RH, 200 cycles (8 weeks): No physical damage.  
|                   |             | Optical loss change < 0.1 dB.               |

**Performance Specifications**

- Thickness: 0.5 mm to 2.5 mm (depending on routing pattern and number of fiber layers at intersection)
- Length of leg: < 500 mm (treatment method required to ask us)
- Optical fiber: SM, MM, etc.
- Connector: SC, FC, MT, etc. (other types required to ask us)

Data in this table are measured values in our measurement system, and not guaranteed values.

**Applications**

- Intra/Inter-rack fiber management
- Optical shuffles
- Optical fan-outs
- Optical harness
- Optical back planes

**Patent registration**
Optical Fiber Coil

Features
- Possible to release optical fiber
- Small installation space
- Strong coil structure to external force

Structure
Optical fiber
Coil core
Optical fibers are bundled and adhered to a coil core.
FitWell is a refractive index matching film used for polishing-less PC (Physical Contact) optical connection. It is made of pressure sensitive adhesive and strongly adheres to optical fibers.

- No flowing out and no pollution
- Easy in supplying prescribed volume to optical fiber edge
- Excellent in handling
- Strong adhering to optical fibers
- Possible to hold optical connection stable

<table>
<thead>
<tr>
<th>Item</th>
<th>Insertion Loss &lt; 0.36 dB</th>
<th>Return Loss &gt; 40 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Cycling Test Loss Change</td>
<td>&lt; 0.07 dB</td>
<td></td>
</tr>
<tr>
<td>Heat Aging Test Loss Change</td>
<td>&lt; 0.03 dB</td>
<td></td>
</tr>
<tr>
<td>Humidity Aging Test Loss Change</td>
<td>&lt; 0.1 dB 40°C, 93% RH, 96 hours</td>
<td></td>
</tr>
</tbody>
</table>

Following measuring conditions:
- Distance between fiber fixing parts < 350 µm,
- Distance between optical fibers < 10 µm,
- Distance between fiber fixing parts < 350 µm,
- Distance between optical fibers < 15 µm

Temperature Dependence:
- -50°C to 70°C,
- 50 cycles

Refractive index matching oil

Single mode optical fiber used. Film thickness 25 µm.

Data in this table are measured values in our measurement system, and not guaranteed values. They depend on optical fiber type and the shape of optical fiber edge.

The content in this table may be changed without notice as a result of product improvement.
**Double Groove Optical Fiber Connector**

**Features**

- Size: 37 ~ 5 ~ 5 mm (4-fiber)
- Number of fibers: 4-fiber (optional with customer specification)
- Insertion Loss: < 0.8 dB
- Return Loss: 40 dB to 50 dB

**Performance**

- This is measured value, and not guaranteed value. It depends on optical fiber type and the shape of optical fiber edge.

- Compact size and small space
- Upward plug installation to adaptor
- Combined assembly with optical parts
- Optical fiber wiring with no surplus length on substrate

**Application Example**

- Product Name: Plug1, Plug2, Adaptor
- Structure: Connecting Process
- 4-Fiber tape
- Bended fiber
- Straightened fiber

**Patent Application**

* This is measured value, and not guaranteed value. It depends on optical fiber type and the shape of optical fiber edge.
Fibers of 4-fiber tape are re-arranged in fiber shuffle region for wiring in accordance with input/output ports.

Optical circuit is re-configured at connecting or branching positions and dark fibers are effectively used.

4-Fiber tape covered with silicone rubber has low curling tendency and good wiring workability owing to good mechanical properties.

<table>
<thead>
<tr>
<th>Fiber Shuffle Region</th>
<th>Type A</th>
<th>Type B</th>
<th>Type C</th>
<th>Type D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Length</td>
<td>Outside Diameter</td>
<td>Specification</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>about 40 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>about 5 mm (same as protection sleeve)</td>
<td></td>
</tr>
</tbody>
</table>

Fiber Shuffle Module

Traditional distribution tray

Shuffle module used distribution tray

Sales by Kitanihon Electric Cable Co., Ltd.

Patent application