Fiberguide has been supporting the Original Equipment Manufacturer (OEM) in taking their concepts and ideas to market since 1977. Our staff of engineers, technical sales professionals and experienced production team unites in developing that product specific to your individual application. We design and engineer assemblies using not only our own pure silica core/silica clad, silica core/plastic clad fibers, but borosilicate glass fiber, ESKA™ plastic optical fiber, fluoride fiber, chalcogenide fiber, erbium-doped fiber and polarization maintaining fiber as well. Available with numerical apertures (N.A.’s) from 0.12 (full acceptance angle 14°) to 0.66 (full acceptance angle 82°), with the widest range of custom and standard endfittings/connectors and outer jackets to tailor a product to your technical and economic requisites.

The definition of a fiber optic assembly is “A length of fiber optic cable that has been terminated with a connector, pigtail or other component.” This could be a single fiber cable terminated with industry standard connectors on both ends and jacketed in flexible sheathing, to a multi-fiber design consisting of multiple input and/or output, each with different cross-section areas and geometries, each requiring a custom machined endfitting and a heavy duty outer jacket to protect the assembly from being crushed.
**Technical Data**

**REFERENCE SUMMARY**

**Product Category:** Assembly

**Trade Name:** Fiber Optic Assemblies

**End Terminations**

- **905 SMA**
- **905 SMA (ceramic nose)**
- **905 SMA (high power)**
- **905 SMA (w/heat sink)**
- **FC**
- **FC (ceramic)**
- **ST**
- **ST (ceramic)**
- **Biconic**
- **Rectangular Slit**
- **Round Slit**
- **V-Groove Slit**
- **Round Ferrule**
- **Round Step**
- **Custom**

**DESIGN FEATURES**

- Temperatures from -269°C to +750°C. (Using gold coated fibers.)
- Vacuum compatible tested to 10-9 Torr.
- Chemical resistant: acids, bases, and organic solvents.
- Radiation resistant: gamma, e-beam, fast neutrons, and x-ray resistant.
- Operating wavelengths from 180nm to 2400nm.
- Overall lengths up to 100 meters.
- Active area geometries include circular, arc, segmented, rectangle, concentric, square, linear, hexagonal, or whatever the application calls for.
- Bifurcated, trifurcated to complex multiple leg assemblies.
- Cross-section, or aperture, of each end may be of a different geometry, i.e. line-to-spot, spot-to-spot, concentric-to-(2) spots, or whatever the application calls for.
- Different size and/or different fibers (e.g. silica/silica and borosilicate) may be combined into the same assembly.
- Fiber arrangement may be random, uniformly distributed, scrambled, coherently aligned, mapped for specific input/output distribution, precision spaced.
- Wide assortment of end terminations and furcation joints.
**Technical Data**

**REFERENCE SUMMARY**

**Product Category:** Assembly

**Trade Name:** Fiber Optic Assemblies

---

**Furcation Joints**

- **Bifurcator**
- **Bifurcator (YC Type)**
- **Trifurcator**

---

**SHEATHING/JACKET MATERIALS**

<table>
<thead>
<tr>
<th>To Achieve</th>
<th>Tight Bend Radius</th>
<th>Non Conductive</th>
<th>Chemical Resistance</th>
<th>Non Magnetic</th>
<th>Vacuum Compatible</th>
<th>Liquid Tight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakout Tubing</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td>Silverflex (Fiberglass)</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td>Polyimide Tubing</td>
<td>C</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>PVC (polyvinyl chloride) Monocoil</td>
<td>B</td>
<td>*</td>
<td>A</td>
<td>F</td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td>PVC Tubing</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Stainless Steel Monocoil</td>
<td>C</td>
<td>F</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td>Stainless Steel Braided Hose</td>
<td>C</td>
<td>F</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Tygon Tubing</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>F</td>
<td>A</td>
</tr>
</tbody>
</table>

- **A** = Best
- **F** = Worst
- * = Inside coil is conductive, outside PVC jacket is not.

---

<table>
<thead>
<tr>
<th>To Protect Against</th>
<th>Bending</th>
<th>Crushing</th>
<th>Cutting</th>
<th>Kinking</th>
<th>Pulling</th>
<th>High Heat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakout Tubing</td>
<td>B</td>
<td>C</td>
<td>C</td>
<td>B</td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>Silverflex (Fiberglass)</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>B</td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td>Polyimide Tubing</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>D</td>
<td>A</td>
</tr>
<tr>
<td>PVC (polyvinyl chloride) Monocoil</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>PVC Tubing</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Stainless Steel Monocoil</td>
<td>A</td>
<td>A</td>
<td>C</td>
<td>A</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Stainless Steel Braided Hose</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Tygon Tubing</td>
<td>F</td>
<td>D</td>
<td>F</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>

- **A** = Best
- **F** = Worst

These are rough “guidelines” only. Subject to change without notice. Consult engineering for specific needs or questions.
### SHEATHING/JACKET MATERIALS

<table>
<thead>
<tr>
<th>Material</th>
<th>Temperature Rating</th>
<th>Used For</th>
<th>NOT Used For</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC jacket, inner polypropylene tube with kevlar strands.</td>
<td>-20°C through 80°C</td>
<td>Non-conductive, chemical resistant, non-magnetic, liquid tight and low cost.</td>
<td>Environments that consist of crushing, cutting, vacuum requirements and high heat requirements.</td>
</tr>
<tr>
<td>Fiberglass, (Dyed or natural, saturated or unsaturated).</td>
<td>Temperature Rating: up to 625°C. Used For: Tight bend radius, non-conductive, chemical resistant, non-magnetic, vacuum compatible, high temperature, low cost.</td>
<td>Environments that consist of crushing, cutting, liquid tight requirements, aerospace environment and pulling.</td>
<td></td>
</tr>
<tr>
<td>Polyimide.</td>
<td>Temperature Rating: -250°C through 480°C. Used For: Non-conductive, chemical resistant, non-magnetic, liquid tight and low cost.</td>
<td>Environments that consist of bending, crushing, cutting, kinking and pulling.</td>
<td></td>
</tr>
</tbody>
</table>

### PVC Tubing

<table>
<thead>
<tr>
<th>Material</th>
<th>Temperature Rating</th>
<th>Used For</th>
<th>NOT Used For</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC tubing, steel coils.</td>
<td>-30°C through 100°C.</td>
<td>Moderate bend radius, chemical resistant, liquid tight, resistant to kinking, cutting and crushing with moderate cost.</td>
<td>Environments that consist of vacuum, non-magnetic, high temperature requirements.</td>
</tr>
<tr>
<td>PVC tubing, brass or stainless steel interlocked coils.</td>
<td>-30°C through 100°C.</td>
<td>Moderate bend radius, chemical resistant, liquid tight, resistant to kinking, cutting and crushing with moderate cost.</td>
<td>Environments that consist of vacuum non-magnetic, high temperature requirements.</td>
</tr>
<tr>
<td>PVC tubing.</td>
<td>Temperature Rating: -20°C through 100°C.</td>
<td>Tight bend radius, non-conductive, chemical resistant, non-magnetic, liquid tight, low cost.</td>
<td>Environments that consist of bending, crushing, cutting, vacuum, high temperature requirements.</td>
</tr>
</tbody>
</table>
**Technical Data**

**REFERENCE SUMMARY**

**Product Category:** Assembly

**Trade Name:** Fiber Optic Assemblies

### SHEATHING/JACKET MATERIALS

**Stainless Steel Monocoil**

Material: Stainless steel.
Temperature Rating: -160°C through 800°C.
Used For: Chemical resistant, non-magnetic, vacuum compatible, resistant to tight bending, crushing, cutting, kinking, high temperature.
**NOT Used For:** Environments that consist of tight bending, liquid tight, non-conductive requirements.

**Stainless Steel Braided Hose**

Material: Stainless steel.
Temperature Rating: up to 525°C.
Used For: Chemical resistant, liquid tight, vacuum compatible, resistant to tight bending, crushing, cutting, kinking, high temperature.
**NOT Used For:** Environments that consist of tight bending, liquid tight, non-conductive requirements.

**Tygon Tubing**

Material: Tygon.
Temperature Rating: -45°C through 70°C.
Used For: Tight bend radius, non-conductive, chemical resistant, non-magnetic, liquid tight and low cost.
**NOT Used For:** Environments that consist of crushing, cutting, vacuum and high temperature.

### TYPICAL APPLICATIONS

**Scientific**
- Remote spectroscopy
- Photoinitiated chemistry
- Particle detection
- Fluorescence excitation
- Microscope illumination
- Chemical analysis
- Colorimetry
- Raman scattering, thompson scattering, optical pyrometry, and streak cameras

**Industrial**
- Remote illumination
- Reflective sensors
- Quality control
- Inspection systems
- Smoke detection
- Scanning, counting, monitoring, inspecting
- High power laser delivery
- Laser welding, soldering

**Medical**
- Laser delivery
- Medical diagnostics
- Photodynamic therapy
- Endoscopy
- Flow Cytometry
- Genomics
- Proteomics
Technical Data

REFERENCE SUMMARY

Product Category:  
Assembly

Trade Name:  
Fiber Optic Assemblies

SPECTRAL ATTENUATION
(Typical)

Bundle Transmission UV-VIS

Note: Percent transmission is expressed as a function of wavelength, overall length and packing fraction (maximum number of fibers which can fit into a given area). Total loss shown includes input/output Fresnel loss, packing fraction loss and intrinsic attenuation.
Technical Data

REFERENCE SUMMARY

Product Category: Assembly
Trade Name: Fiber Optic Assemblies

SPECTRAL ATTENUATION
(Typical)

.55 NA Borosilicate Glass Fiber Attenuation

.50 NA ESKA™ Premier Plastic Optical Fiber Attenuation
FLUORIDE FIBER
An optical fiber operating in the mid-infrared wavelength range is fabricated using ZrF₄-based fluoride glass.

CHALCOGENIDE FIBER
These multimode step index fibers have a chalcogenide core and chalcogenide cladding of lower refractive index, transmitting light from 1µm - 6µm. Are flexible and do not suffer from serious degradation by moisture ingress as with certain other types of fiber designed for similar wavelengths. Chalcogenide fibers do not have the tensile strength of silica fibers, however, they are quite easy to handle if given a suitable jacket for protection.

ERBIUM-DOPED FIBER
Erbium is a metallic rare earth element that is used to amplify light signals sent along fiber optic cable. If this chemical element is doped in a glass fiber and light is pumped through it, the result is an Erbium-Doped Fiber Amplifier (EDFA). These amplifiers provide a large gain, which occurs when the fiber is “pumped” by additional light input at a wavelength shorter than 1.55 µm, e.g. a wavelength of 980nm. Also, large output power is obtained, and near quantum-limited noise performance in the 1.55 µm spectrum. EDFAs enable the user transmitting an optical signals over very long distances without the need for electronic signal regeneration.

POLARIZATION MAINTAINING (PM) FIBER
An optical fiber in which the polarization planes of light waves launched into the fiber are maintained during propagation with little or no cross-coupling of optical power between the polarization modes. PMF is used for pigtails, integrated optics and Gyros/sensors.

TYPICAL FIBER SPECIFICATIONS

<table>
<thead>
<tr>
<th>Fiber Type</th>
<th>N.A.</th>
<th>Acceptance Angle</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic Clad Silica Standard OH</td>
<td>0.37</td>
<td>46° full angle</td>
<td>-30°C to +150°C*</td>
</tr>
<tr>
<td>Plastic Clad Silica Low OH</td>
<td>0.37</td>
<td>46° full angle</td>
<td>-30°C to +150°C*</td>
</tr>
<tr>
<td>Plastic Clad Silica/Silica Standard OH</td>
<td>0.22</td>
<td>25° full angle</td>
<td>-40°C to +150°C*</td>
</tr>
<tr>
<td>Plastic Clad Silica/Silica Low OH</td>
<td>0.22</td>
<td>25° full angle</td>
<td>-40°C to +150°C*</td>
</tr>
<tr>
<td>Polymer Coated Silica/Silica Standard OH</td>
<td>0.22</td>
<td>25° full angle</td>
<td>-40°C to +100°C - +350°C*</td>
</tr>
<tr>
<td>Polymer Coated Silica/Silica Low OH</td>
<td>0.22</td>
<td>25° full angle</td>
<td>-40°C to +100°C - +350°C*</td>
</tr>
<tr>
<td>Polymer Coated Silica/Silica Standard OH</td>
<td>0.12</td>
<td>14° full angle</td>
<td>-40°C to +100°C - +350°C*</td>
</tr>
<tr>
<td>Polymer Coated Silica/Silica Low OH</td>
<td>0.12</td>
<td>14° full angle</td>
<td>-40°C to +100°C - +350°C*</td>
</tr>
<tr>
<td>Polymer Coated Silica/Silica Standard OH</td>
<td>0.26</td>
<td>30° full angle</td>
<td>-40°C to +100°C - +350°C*</td>
</tr>
<tr>
<td>Polymer Coated Silica/Silica Low OH</td>
<td>0.26</td>
<td>30° full angle</td>
<td>-40°C to +100°C - +350°C*</td>
</tr>
<tr>
<td>Borosilicate Glass/Glass</td>
<td>0.55</td>
<td>66° full angle</td>
<td>-45°C to +500°C</td>
</tr>
<tr>
<td>ESKA™ Plastic Optical Fiber (PMMA)</td>
<td>0.50</td>
<td>62° full angle</td>
<td>-55°C to +70°C</td>
</tr>
<tr>
<td>Fluoride Mid IR Fiber</td>
<td>0.10+</td>
<td>12°+ full angle</td>
<td>-20°C to +150°C</td>
</tr>
<tr>
<td>Chalcogenide Fiber</td>
<td>0.10+</td>
<td>12°+ full angle</td>
<td>-200°C to +100°C</td>
</tr>
<tr>
<td>Erbium-Doped Fiber</td>
<td>0.23</td>
<td>27° full angle</td>
<td>-40°C to +150°C</td>
</tr>
<tr>
<td>Polarization Maintaining Fiber</td>
<td>0.13</td>
<td>15° full angle</td>
<td>-40°C to +150°C</td>
</tr>
</tbody>
</table>

*Note: Please see detailed fiber data sheet for complete specifications.
## Technical Data

**REFERENCE SUMMARY**

**Product Category:** Assembly  
**Trade Name:** Fiber Optic Assemblies

### Spot to Spot Bundle

<table>
<thead>
<tr>
<th>PVC/Monocoil (PVC) - Flexible Stainless Steel (SS)</th>
<th>Legs (millimeters)</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TYPICAL SPOT-TO-SPOT BUNDLES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC/Monocoil (PVC) - Flexible Stainless Steel (SS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TYPICAL BI-FURCATED SPOT-TO-SPOT BUNDLES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC/Monocoil (PVC) - Flexible Stainless Steel (SS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Spot to Line Bundle

<table>
<thead>
<tr>
<th>PVC/Monocoil (PVC) - Flexible Stainless Steel (SS)</th>
<th>Legs (millimeters)</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TYPICAL SPOT-TO-SPOT BUNDLES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC/Monocoil (PVC) - Flexible Stainless Steel (SS)</td>
<td></td>
<td></td>
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</tbody>
</table>

### Spot to Line Bundle

<table>
<thead>
<tr>
<th>PVC/Monocoil (PVC) - Flexible Stainless Steel (SS)</th>
<th>Legs (millimeters)</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TYPICAL SPOT-TO-LINE BUNDLES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC/Monocoil (PVC) - Flexible Stainless Steel (SS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*0.5 meter length tolerance ±5%  
Note: A and J dimensions are slightly larger for FS fiber

For Standard Plastic Clad Silica (PCS) and All Fused Silica (FS) Bundles

<table>
<thead>
<tr>
<th>Fiber Type</th>
<th>Construction</th>
<th>Part Number</th>
<th>Protective Sheathing</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-Superguide UV-VIS</td>
<td>PC-Plastic Clad (PCS)</td>
<td>See Tables</td>
<td>P-PVC/Monocoil</td>
<td>X Meters</td>
</tr>
<tr>
<td>A-Anhydroguide VIS-IR</td>
<td>FS-Fused Silica (FS)</td>
<td>Above</td>
<td>S-Stainless Steel Monocoil</td>
<td></td>
</tr>
</tbody>
</table>

Example: Product Code SPFOMS15PX2 -  
Superguide PCS, Spot to Spot Bundle, 1.5mm Active Area, PVC/Monocoil Protective Sheathing, 2 meters long  

*Express 0.5 meter length as 05

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**Fiberguide Industries Customization Program**  
Fiberguide Industries is a full service custom fiber and value-added assembly provider. If you have unique requirements, please contact us to discuss tailoring a product or design to optimize optical performance for your specific application.

Fiberguide Industries, Inc., 1 Bay Street, Stirling, NJ 07980  
Phone: 908-647-6601  Fax: 908-647-8464  info@fiberguide.com  www.fiberguide.com

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**FUSED END FIBER BUNDLES**

A high end solution for UV and IR spectroscopy and a direct replacement for liquid light guides, the fused end fiber bundle offers immeasurable options for applications involving high power or high temperatures. Through a patented process the interstitial voids commonly found in multiple fiber bundles (gaps formed when bundling round fibers together, typically filled with epoxy, creating a transmission loss factor called “absorption loss”), are eliminated resulting in increased bundle transmission. The common, input, or light source end is free of epoxies enhancing applications in the UV range and can withstand up to 1000° C.

**APPLICATIONS**

- UV Curing
- Semiconductor
- Spectroscopy
- Analytical instruments
- Pyrometry
- Sensors

**NOTES**

1. Part Number FG3737-1 = 3mm active bundle diameter at common (input) end.
2. Part Number FG3737-2 = 5mm active bundle diameter at common (input) end.
3. Operating wavelength: 250nm to 850nm.
4. Fibers in output connector are not fused.
5. Fibers from common (input) end to output end are randomized.