

# Plastic Coated Silica/Silica (Low OH)

Fiberguide Industries

Anhydroguide™ AFS

## Technical Data

### REFERENCE SUMMARY

**Product Category:**  
Fiber

**Mode:**  
Step Index, Multimode

**Type:**  
Plastic Coated Silica/Silica  
(Low OH)

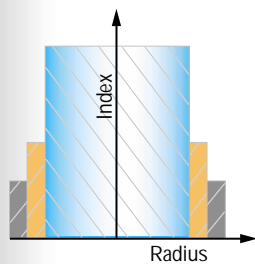
**Trade Name:**  
Anhydroguide™ AFS  
VIS-IR

### DESCRIPTION

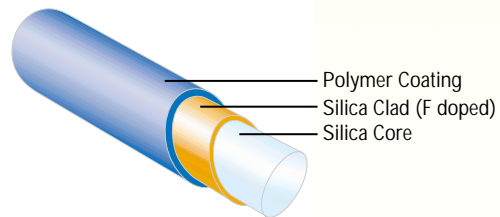
When looking for a high quality fiber with superior transmission and a numerical aperture (N.A.) of 0.22 for efficient light coupling, the Anhydroguide™ AFS is the fiber of choice. The Anhydroguide™ fiber is drawn from preforms manufactured by the Plasma Outside Deposition (POD) process. Rods of extremely pure synthetic fused silica are coated with fluorine doped silica layers to obtain preforms with step-like refractive index profiles. Plasma torches prepare the reaction compounds from  $\text{SiCl}_4$ ,  $\text{O}_2$ , and a fluorine containing gas. Strong thermal gradients combined with the temperature plasma lead to chemical deposition conditions, which allow very high fluorine concentrations to be incorporated in the fused silica network. Refractive index differences of 0.27 corresponding to numerical apertures in excess of 0.28 have been realized with undoped core rods.



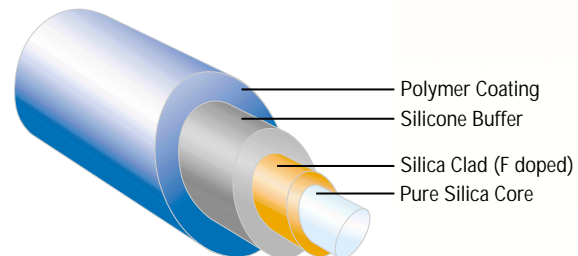
### FIBER CROSS SECTION



#### Polyimide and Acrylate Coated



#### Nylon and Tefzel Coated



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### FEATURES & BENEFITS

Features	Benefits
<ul style="list-style-type: none"><li>• All buffers/coatings certified by NAMS under USP Class VI for Biocompatibility.</li><li>• Lowest loss for Visible (VIS) through Infrared (IR) applications.</li><li>• Specialty coatings available (see Gold and Aluminum Data Sheets).</li><li>• Maximum laser damage resistance for Pulsed Dye (595nm), Excimer (193nm), HeNe (633) laser delivery.</li><li>• Large core-to-clad ratios available.</li><li>• Core diameters available up to 1500<math>\mu</math> (Nylon and Tefzel® buffers).</li><li>• May be sterilized by ETO, steam, e-beam and gamma radiation. Polyimide buffer may be autoclaved (heat resistant).</li><li>• Radiation resistant.</li><li>• All dielectric, non-magnetic construction.</li><li>• Polyimide buffer resists most organics, solvents, and acid.</li><li>• Thin wall polyimide buffer (12<math>\mu</math> to 15<math>\mu</math>).</li></ul>	<ul style="list-style-type: none"><li>• Faster approvals for 510K's.</li><li>• More efficient systems.</li><li>• Idea for extreme temperatures, high vacuum and harsh chemical environments.</li><li>• Improved performance.</li><li>• Peak efficiency in bundled assemblies (see Fiber Optic Assembly Data Sheet).</li><li>• The right fiber for your special application.</li><li>• Ideal for any reusable medical device.</li><li>• Just the right medium for your "hot" environment.</li><li>• Metal free.</li><li>• Use in the most hostile of environments.</li><li>• Allows for the manufacture of high packing efficiency arrays and bundles (see Fiber Optic Assembly Data Sheet).</li></ul>

**Note:** If the buffer/jacket material has a lower refractive index than the cladding, as is the case for silicone coated silica/silica fibers, then optical energy can be guided within the cladding. The high refractive index of Polyimide and Acrylate effectively strips out these "cladding modes".



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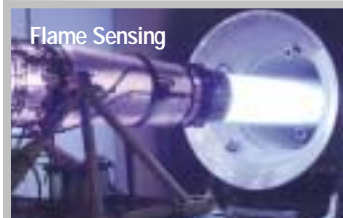
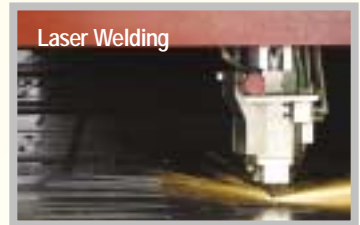
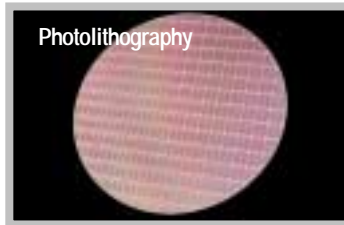
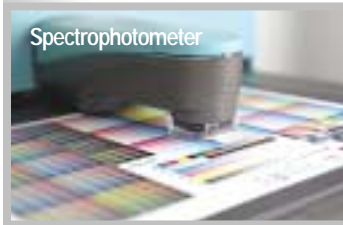
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### APPLICATIONS

- Laser surgery
- Medical diagnostics
- Laser marking, welding, soldering, cutting
- Remote spectroscopy for pollution analysis and chemical processing
- UV photolithography
- Nuclear plasma diagnostics
- Photoinitiated chemistry
- Medical diagnostics and photo therapy
- Pharmaceutical dissolution testing
- Vacuum environments and feedthroughs
- Semiconductor manufacturing systems
- Plasma diagnostics
- Flame sensing
- Remote sensing
- Reflection/Backscattering probes, industrial and medical laser delivery systems
- Aerospace

### TYPICAL EXAMPLES



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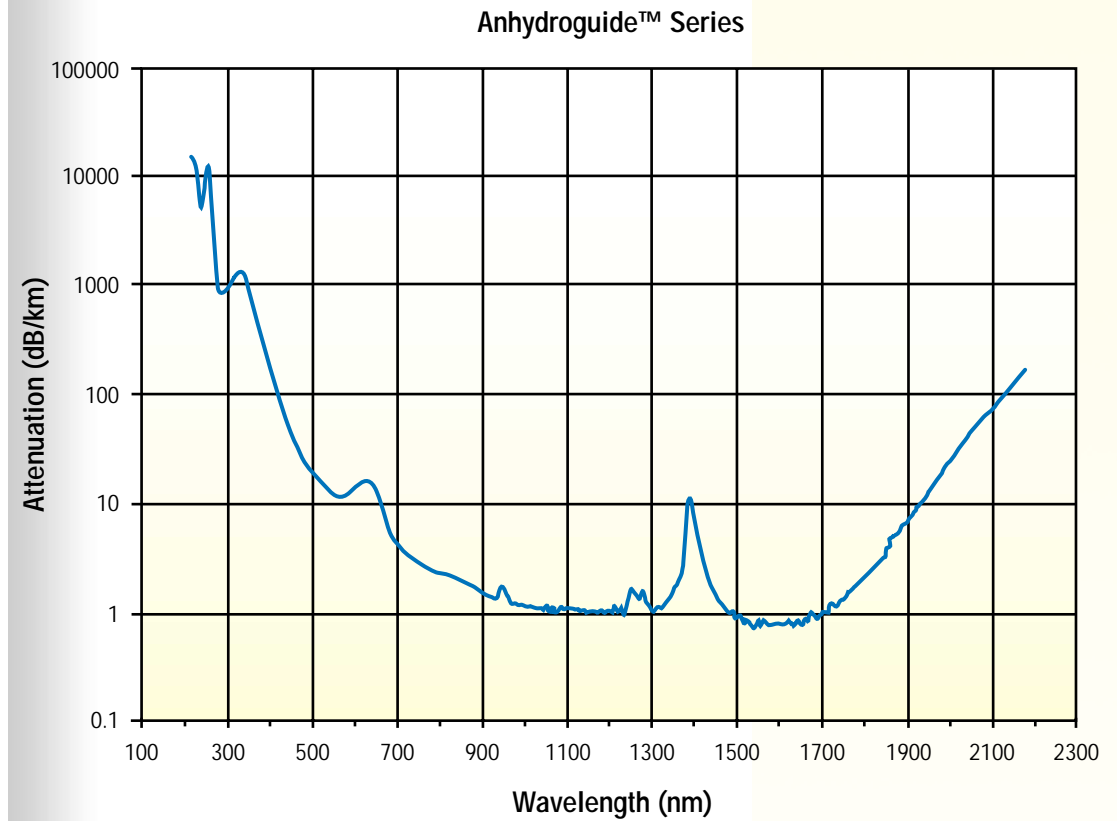
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### SPECTRAL ATTENUATION (Typical)



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### FIBER SPECIFICATIONS

- Standard Secondary Buffer/Jacket: Nylon (suffix "N"), Tefzel® (suffix "Z")
  - Standard Primary Buffer/Jacket: Acrylate (suffix "Y"), Thermocoat/Polyimide (suffix "T")
  - Standard Numerical Aperture: (N.A.): 0.22 ± 0.02 (Full Acceptance Angle 25°)
  - Available Numerical Apertures: 0.12 (Full Acceptance Angle 14°) Utilize Prefix Designation "AFM"
- Note: Low OH fibers are limited for long wavelength use. Cladding must be at least 10x the longest wavelength of operation. I.E.: A 100µ core / 110µ clad fiber has a clad thickness of 5µ and is not recommended much past 500nm to 600nm. A 50µ core / 125µ clad fiber is produced from a 1.4 ratio preform having a clad thickness of 10 and is not recommended much past 1µ.
- 0.26 (Full Acceptance Angle 30°) Utilize Prefix Designation "AFH"
  - Standard Core/Clad Ratio: 1.1
  - Available Core/Clad Ratios: 1.2, 1.4 and 2.5
  - Typical Attenuation Values: 15dB/km @ 633nm  
2dB/km @ 850nm  
1.5dB/km @ 1064nm  
10dB/km @ 1385nm  
70dB/km @ 2100nm
  - Temperature Operating Range: Nylon Buffer/Coating: -40°C to +100°C  
Tefzel® Buffer/Coating: -40°C to +200°C  
Acrylate Buffer/Coating: -40°C to +85°C  
Polyimide Buffer/Coating: -190°C to +350°C

- Recommended Bend Radius: Short Term: 120 x Clad Diameter  
Long Term: 240 x Clad Diameter
- Proof Test Using Bend Method
- Non-standard Sizes Available As Custom Run (Call For Details).

**Note:** The fibers in the following table carry a designation "AFS" standing for "Anhydroguide Fiber Series", followed by the large core diameter and small core diameter (in microns) and concluding with the suffix "N" that designates natural Nylon secondary buffer, suffix "Z" that designates a clear Tefzel® secondary buffer, suffix "Y" that designates clear Acrylate primary buffer and suffix "T" that designates Polyimide buffer.

### FIBER SPECIFICATIONS - NYLON COATING

Product Code	AFS50/125N	AFS100/110N	AFS100/140N	AFS200/220N
Core Diameter	50µ ± 2%	100µ ± 2%	100µ ± 2%	200µ ± 2%
Clad Diameter	125µ +1µ/-3µ	110µ ± 2%	140µ +1µ/-3µ	220µ ± 2%
Silicone Buffer	225µ ± 3%	210µ ± 3%	240µ ± 3%	320µ ± 3%
Nylon Coating (O.D.)	295µ ± 5%	280µ ± 5%	310µ ± 2%	390µ ± 5%

Product Code	AFS300/330N	AFS400/440N	AFS600/660N
Core Diameter	300µ ± 2%	400µ ± 2%	600µ ± 2%
Clad Diameter	330µ ± 2%	440µ ± 2%	660µ ± 2%
Silicone Buffer	430µ ± 3%	540µ ± 3%	760µ ± 3%
Nylon Coating (O.D.)	530µ ± 5%	640µ ± 5%	860µ ± 5%

Product Code	AFS800/880N	AFS1000/1100N	AFS1500/1650N
Core Diameter	800µ ± 2%	1000µ ± 2%	1500µ ± 2%
Clad Diameter	880µ ± 2%	1100µ ± 2%	1650µ ± 2%
Silicone Buffer	980µ ± 3%	1200µ ± 3%	1800µ ± 3%
Nylon Coating (O.D.)	1080µ ± 5%	1300µ ± 5%	1950µ ± 5%



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### FIBER SPECIFICATIONS - TEFZEL® COATING

Product Code	AFS100/110Z	AFS100/140Z	AFS200/220Z
Core Diameter	100μ ± 2%	100μ ± 2%	200μ ± 2%
Clad Diameter	110μ ± 2%	140μ +1μ/-3μ	220μ ± 2%
Silicone Buffer	240μ ± 3%	240μ ± 3%	320μ ± 3%
Tefzel® Coating (O.D.)	310μ ± 5%	370μ ± 5%	480μ ± 2%

Product Code	AFS300/330Z	AFS400/440Z	AFS600/660Z
Core Diameter	300μ ± 2%	400μ ± 2%	600μ ± 2%
Clad Diameter	330μ ± 2%	440μ ± 2%	660μ ± 2%
Silicone Buffer	480μ ± 3%	590μ ± 2%	810μ ± 2%
Tefzel® Coating (O.D.)	720μ ± 5%	880μ ± 5%	1200μ ± 5%

Product Code	AFS800/880Z	AFS1000/1100Z	AFS1500/1650Z
Core Diameter	800μ ± 2%	1000μ ± 2%	1500μ ± 2%
Clad Diameter	880μ ± 2%	1100μ ± 2%	1800μ ± 2%
Silicone Buffer	1030μ ± 3%	1250μ ± 3%	1950μ ± 3%
Tefzel® Coating (O.D.)	1550μ ± 5%	1850μ ± 5%	2900μ ± 5%

### FIBER SPECIFICATIONS - ACRYLATE COATING

Product Code	AFS50/125Y	AFS100/140Y	AFS105/125Y	AFS200/220Y
Core Diameter	50μ ± 2%	100μ ± 2%	105μ ± 2%	200μ ± 2%
Clad Diameter	125μ +1μ/-3μ	140μ +1μ/-3μ	125μ +1μ/-3μ	220μ ± 2%
Acrylate Diameter	250μ ± 5%	250μ ± 5%	250μ ± 5%	320μ ± 5%



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### FIBER SPECIFICATIONS - THERMOCOAT/POLYIMIDE COATING

Product Code	AFS50/125T	AFS100/110T	AFS100/120T
Core Diameter	50μ ± 2%	100μ ± 2%	100μ ± 2%
Clad Diameter	125μ +1μ/-3μ	110μ ± 2%	120μ ± 2%
Polyimide Diameter	145μ ± 5μ	130μ ± 5μ	140μ ± 5μ

Product Code	AFS100/140T	AFS105/125T	AFS200/220T
Core Diameter	100μ ± 2%	105μ ± 2%	200μ ± 2%
Clad Diameter	140μ +1μ/-3μ	125μ +1μ/-3μ	220μ ± 2%
Polyimide Diameter	165μ ± 5μ	145μ ± 5μ	245μ ± 5μ

Product Code	AFS300/330T	AFS400/440T	AFS600/660T
Core Diameter	300μ ± 2%	400μ ± 2%	600μ ± 2%
Clad Diameter	330μ ± 2%	440μ ± 2%	660μ ± 2%
Polyimide Diameter	370μ ± 10μ	480μ ± 10μ	710μ ± 15μ

### 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.

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