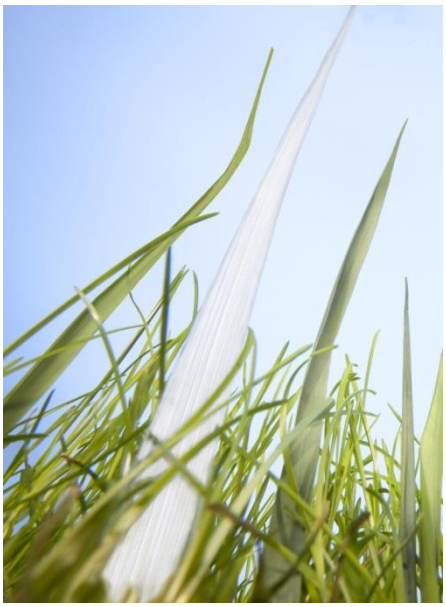
PURAVIS® *GOF85*

Eco-friendly High Performance Glass Optical Fiber



SCHOTT is setting new standards for illumination fiber optics with PURAVIS® premium quality glass optical fibers. For the high purity optical glasses SCHOTT utilizes its unique manufacturing capabilities.

PURAVIS® fibers feature premium transmission and excellent color rendering with low discoloration even for longer length to meet today's demanding requirements of sophisticated illumination applications.

For superior performance in applications which utilize a larger numerical aperture the PURAVIS® GOF85 offers aperture angles up to 85°, depending on fiber diameter, length and wavelength. With its improved chemical stability and low solarization properties it enables long term use, in particular for medical applications.

High numerical aperture combined with low attenuation and significantly improved color rendering the PURAVIS® GOF85 is the best choice for demanding high end illumination applications.

Technical Data PURAVIS® GOF85				
Fiber Type		Step-index Multimode Fiber		
Material Core / Cladding		High Purity Optical Glass without lead,arsenic, antimony Fully RoHS compliant		
Biocompatibility According to DIN ISO 10993-5		Yes		
Numerical Aperture Theoretical Value at 587 nm		**0.64**		
Typical Aperture Angles 2α Fiber Diameter 70 µm at Wavelength V(λ)		1 m length: **~ 85°** 10 m length: **~ 79°**		
Optical Attenuation Measured according to DIN 58141 Part 1 Fiber Diameter 70 µm (Single Fiber)		at 450 nm < **500** dB/km at 553 nm < **280** dB/km		
Typical Values of average Production		1 m	3 m	5 m
Correlated Color Temperature (CCT) determined with CIE Standard Illuminant	A (2856 K)	*2785 K*	*2786 K*	*2788 K*
	D65 (6500 K)	*6232 K*	*5917 K*	*5675 K*
Chromaticity Coordinates determined with CIE Standard Illuminant	A (x = 0.4476) (y = 0.4074)	*x = 0.4527* *y = 0.4088*	*x = 0.4556* *y = 0.4142*	*x = 0.4581* *y = 0.4193*
	D65 (x = 0.3127) (y = 0.3290)	*x = 0.3168* *y = 0.3366*	*x = 0.3244* *y = 0.3473*	*x = 0.3280* *y = 0.3577*
Temperature Stability • Static Applications *(fibers only, may be limited by lubricants, epoxy resins or sheathing materials)* • End Surface with high Temp. Epoxy • End Surface Hot-fused		- 20°C to 200°C / - 4 F to 392 F Up to 200°C / 392 F Up to 400°C / 752 F		
Single Fiber Diameter		**30 µm, 50 µm, 70 µm ± 4 µm**		

Applications

- White Light Endoscopy
- Fluorescence Endoscopy
- Photo Dynamic Diagnostics PDD
- Medical/Industrial Spectroscopy
- White Light Microscopy
- Fluorescence Microscopy
- Medical Sensor Applications
- Surgical Microscopy
- Industrial Sensor Applications
- Machine Vision Illumination

Chemical Resistance Classes	
Acid Resistance Class SR (acc. to ISO 8424: 1996 [2])	**1.0**
Alkaline Resistance Class AR (acc. to ISO 10629: 1996[3])	**1.0**
Climatic Resistance Class CR (acc. to proposed standard ISO/CD13384 [1])	**1.0**
Stain Resistance Class: FR	**0**

For further details on chemical resistance classes refer to the SCHOTT publication TIE-30 "Chemical properties of optical glass".

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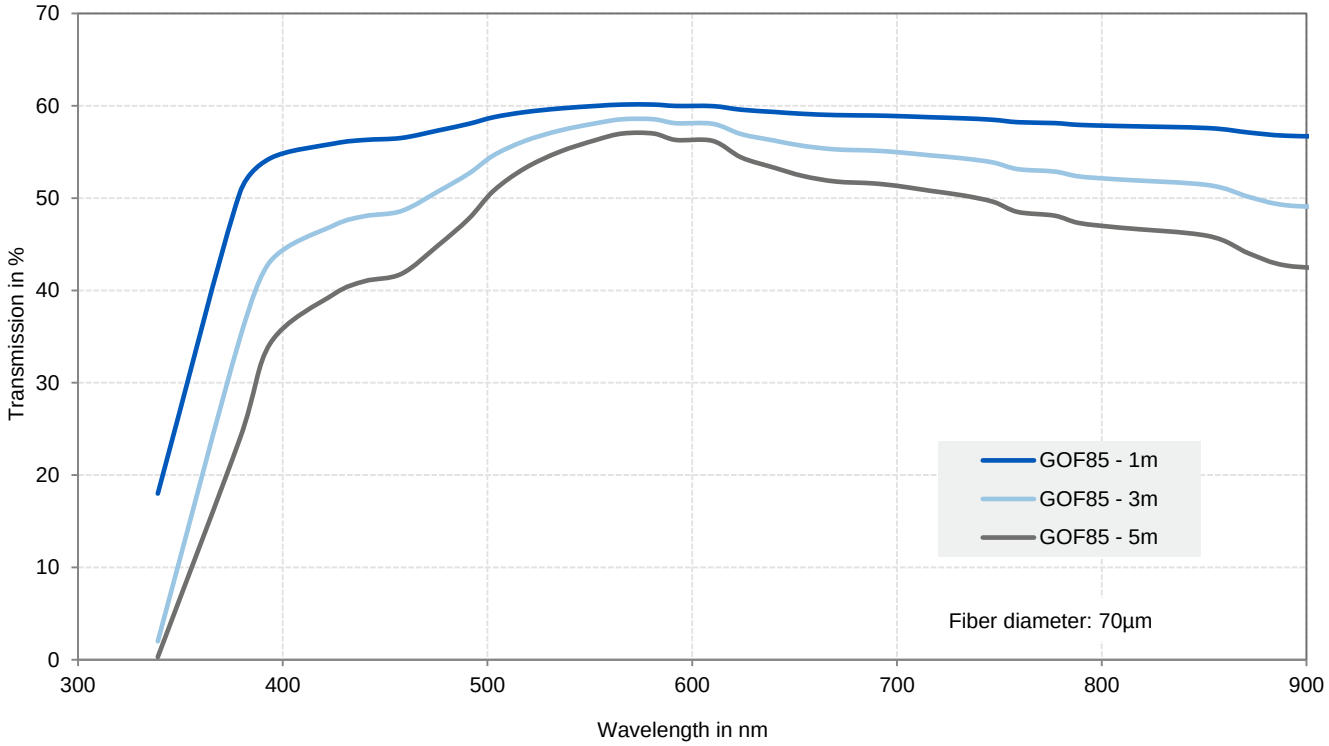
Optical Properties of PURAVIS® GOF85

Spectral Transmission

(Measured according to DIN 58 141 Part 2)

Transmission of a fiber bundle depends on the attenuation of core glass, packing fraction of fibers, core/cladding surface ratio, quality of end polish and length of the fiber bundle. The displayed transmission curves represent SCHOTT's typical average manufacturing quality level for an epoxied fiber bundle with GOF85 fibers.

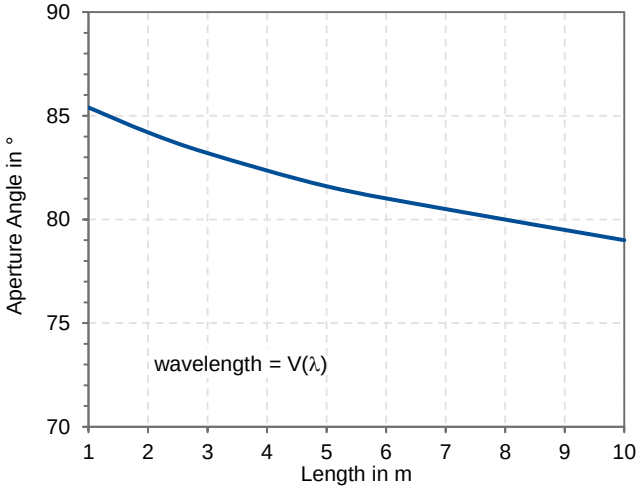


Numerical Aperture

(Measured according to DIN 58 141 Part 3)

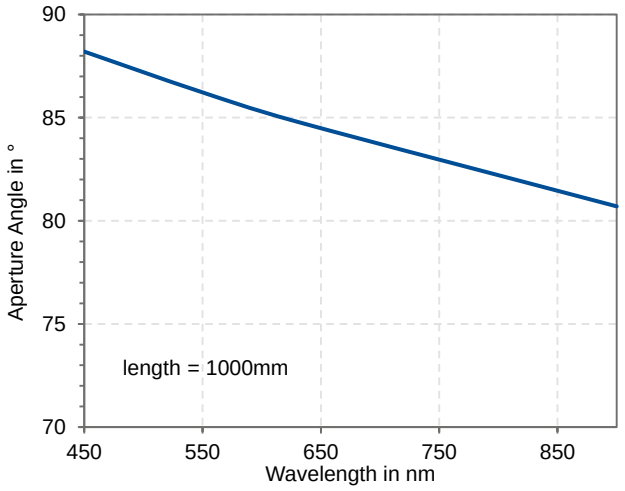
Dependence of the aperture angle over length:

The effective aperture angle of the GOF85 fiber naturally decreases over longer length.



Dispersion of aperture angle:

Small decrease over wavelength results in an improved color homogeneity of the illumination in the far field.



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Long Term Stability of PURAVIS® GOF85 – Solarization Stability

Visible Light:

Solarization stability was tested with different light sources over a time period of 450 hours.

The PURAVIS® GOF85 shows low solarization effects with losses in transmission of only a few percent with the tested light sources.

Blue Light (405 nm):

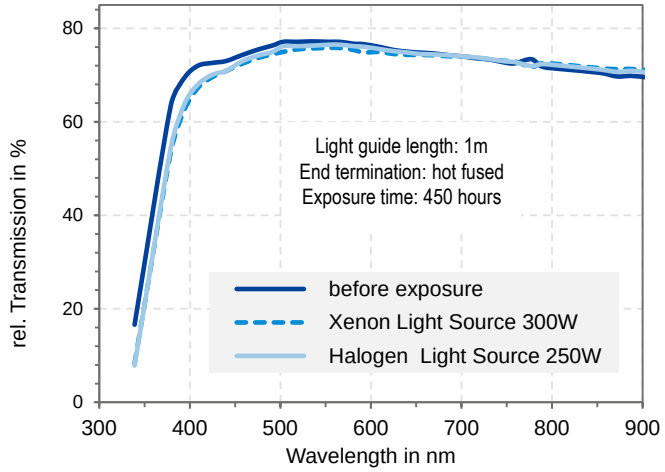
Solarization stability was tested with a 405 nm Laser LED with three different energy levels. The higher the irradiation intensity the faster the effect stabilizes at a lower transmission level.

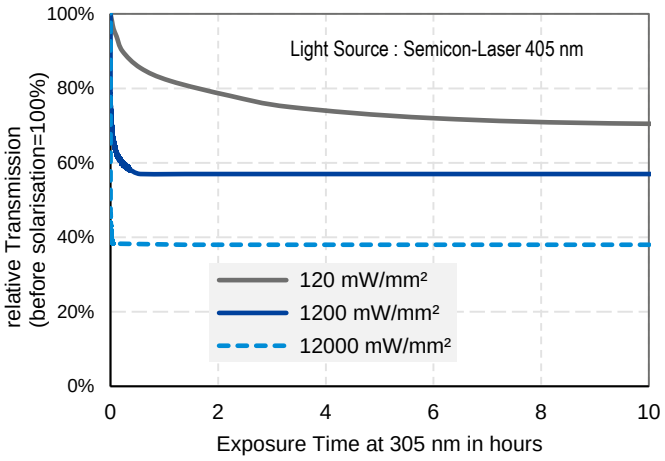
In general solarization effects are depending on several factors:

- Intensity level, respectively power density, coherency of light source
- Individual spectra, respectively wavelengths (shorter wavelength may cause higher effects)
- Length of the light guide, since some effects are length depending.

Depending on the specific application further solarization tests are recommended with the intended set-up.

Please contact your SCHOTT representative to discuss your individual requirements.





Long Term Stability of PURAVIS® GOF85 – Mechanical Stability

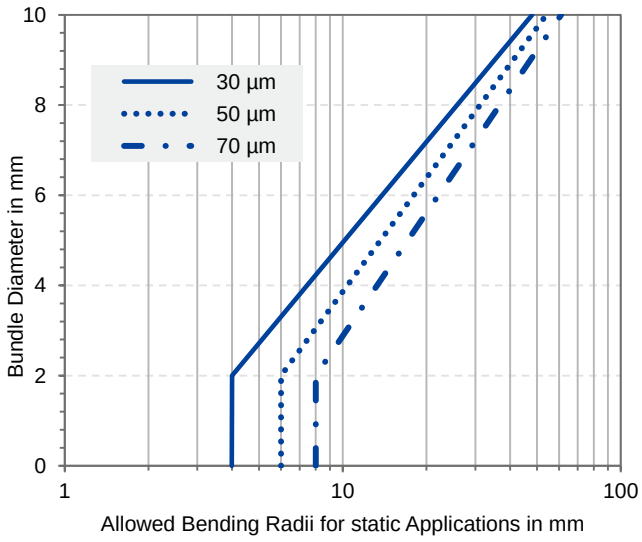
PURAVIS® Glass Optical Fibers feature high mechanical stability enabling high flexibility and very small bending radii.

Proof tests of single fibers - representing stress in axial direction – verify that the PURAVIS® fibers feature significantly reduced breakage by factor 4 in comparison to the conventional SCHOTT fibers.

Loop bending tests of single fibers according to DIN 58 141- 6 show an average diameter of 1.0 mm before breakage for short term bends. For long-term (permanent) bends in static applications the graph to the right shows the recommended bending angles depending on bundle diameter for 30 µm, 50 µm and 70 µm fiber diameter.

Applications, which combine small bending radii in combination with frequent movements (torsion or drag chain movements) require special designs.

Please contact your sales representative for further information.



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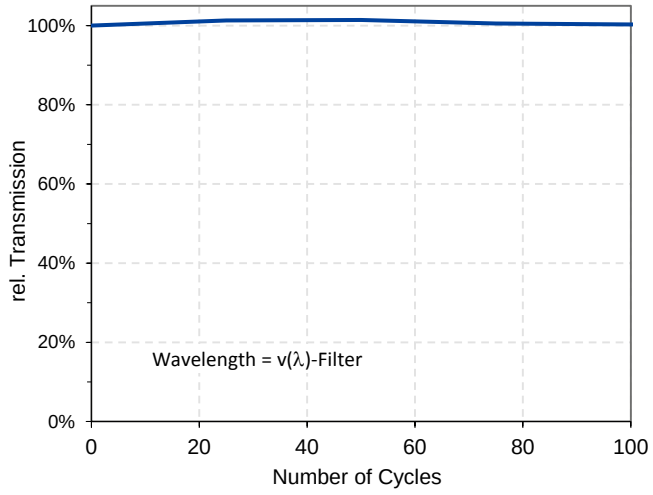
Long Term Stability of PURAVIS® GOF85 – Chemical Stability

PURAVIS® GOF85 Glass Optical Fibers feature significantly improved chemical stability than SCHOTTs conventional fibers. Core and cladding glasses have high chemical resistance, which ensure long-term stability over lifetime under repeated reprocessing cycles.

- Samples: Fiber bundle Ø2,4 mm , length 100 mm, bonded into stain-less steel tube
- Prior to each measurement: Cleaning of end surface with ethanol
- Rel. transmission measured according to DIN 58 141 Part 2; Aperture of light beam: NA 0.1
  Measurement wavelength: λ = 535 nm

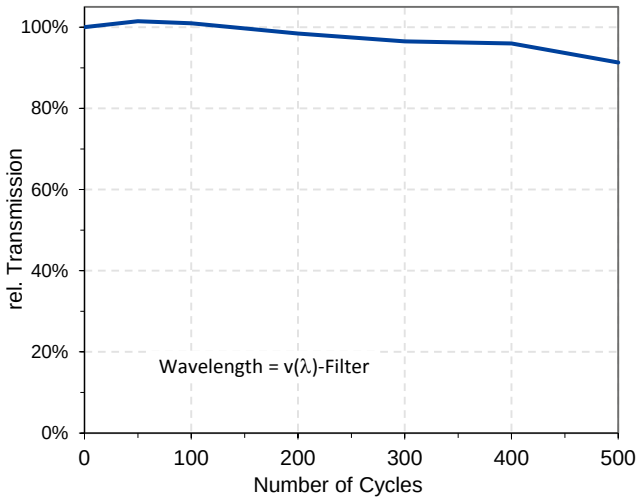
Thermal Disinfection Stability

Device	Miele Disinfektor PG8536
Program	Recommendation AKI (www.a-k-i.org)
Detergent	Neodisher FA 0,5 % V/V (5 ml/l) pH11
Neutralizer	Neodisher Z 0,1 % V/V (1ml/l)
Cycles	5 x 20



Autoclaving Stability

Autoclave	Lautenschläger Protocert 839
Program	134 °C (3 bar) Sterilization time: 10 min Cycle time: 40 min



Inquiries

SCHOTT's capabilities in light guide design and manufacturing comprise a variety of options depending on the specific application.

Capabilities comprise specific design of ferrules, biocompatible sheathings, temperature stable end terminations (hot-fused) and more.

Please contact your SCHOTT representative for a quotation of your specific light guide design containing SCHOTT PURAVIS® glass optical fibers.

For more information please contact:

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