

# PURAVIS® GOF120

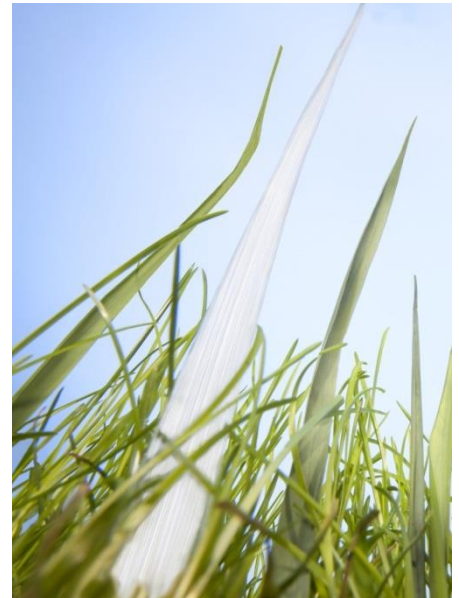
## Eco-friendly Wide Angle Glass Optical Fiber

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 with low solarization and excellent color rendering for all kind of illumination applications.

For large area illumination applications which utilize the highest numerical aperture the PURAVIS® GOF120 now offers aperture angles larger than 118°, depending on fiber diameter, length and wavelength. More and whiter light with significantly improved color rendering enables reliable illumination conditions.

In addition, its improved chemical stability enables long-term use for medical endoscopy applications. The better chemical resistance classes allow repeated cleaning and autoclaving cycles with minimum losses in transmission.

Highest numerical aperture combined with low attenuation and significantly improved color rendering the PURAVIS® GOF120 is the best choice for illumination of large areas with small fiber bundles.



Technical Data PURAVIS® GOF120			
<b>Fiber Type</b>	Step-index Multimode Fiber for Illumination Applications with visible Light		
<b>Numerical Aperture</b> Theoretical Value at 587 nm	0.86		
<b>Eff. Aperture Angle 2α</b> Measured for a 50 μm Fiber at V(λ) Length 1 meter	> 118°		
<b>Optical Attenuation</b> Measured according to DIN 58141 Part 1 for a 70 μm single Fiber	at 550 nm < 500 dB/km at 640 nm < 500 dB/km		
<b>Material Core / Cladding</b>	High Purity Optical Glass without lead, arsenic, antimony Fully RoHS compliant		
<b>Biocompatibility</b> According to DIN ISO 10993-5	Yes Test Certificate available		
<b>Temperature Stability</b> • Operational (epoxied End) • Operational (hot-fused End Surface)	- 20°C to 200°C / - 4 F to 392 F - 20°C to 400°C / - 4 F to 752 F		
<b>Single Fiber Diameter</b>	30 μm ± 4 μm 50 μm ± 4 μm		
<b>Chemical Resistance Classes</b>	<b>GOF120</b>	<b>W-Fiber</b>	<b>D1-Fiber</b>
Acid Resistance Class SR (acc. to ISO 8424: 1996 [2] )	1.2	3.2	2.0
Alkaline Resistance Class AR (acc. to ISO 10629: 1996[3] )	1.0	2.3	2.3
Climatic Resistance Class CR (acc. to proposed Standard ISO/CD13384 [1])	1.0	2.0	1.0
Stain Resistance Class: FR	0	1.0	0

### 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.



Data on this data sheet is compared to the conventional leaded SCHOTT glass fibers D1 and W.

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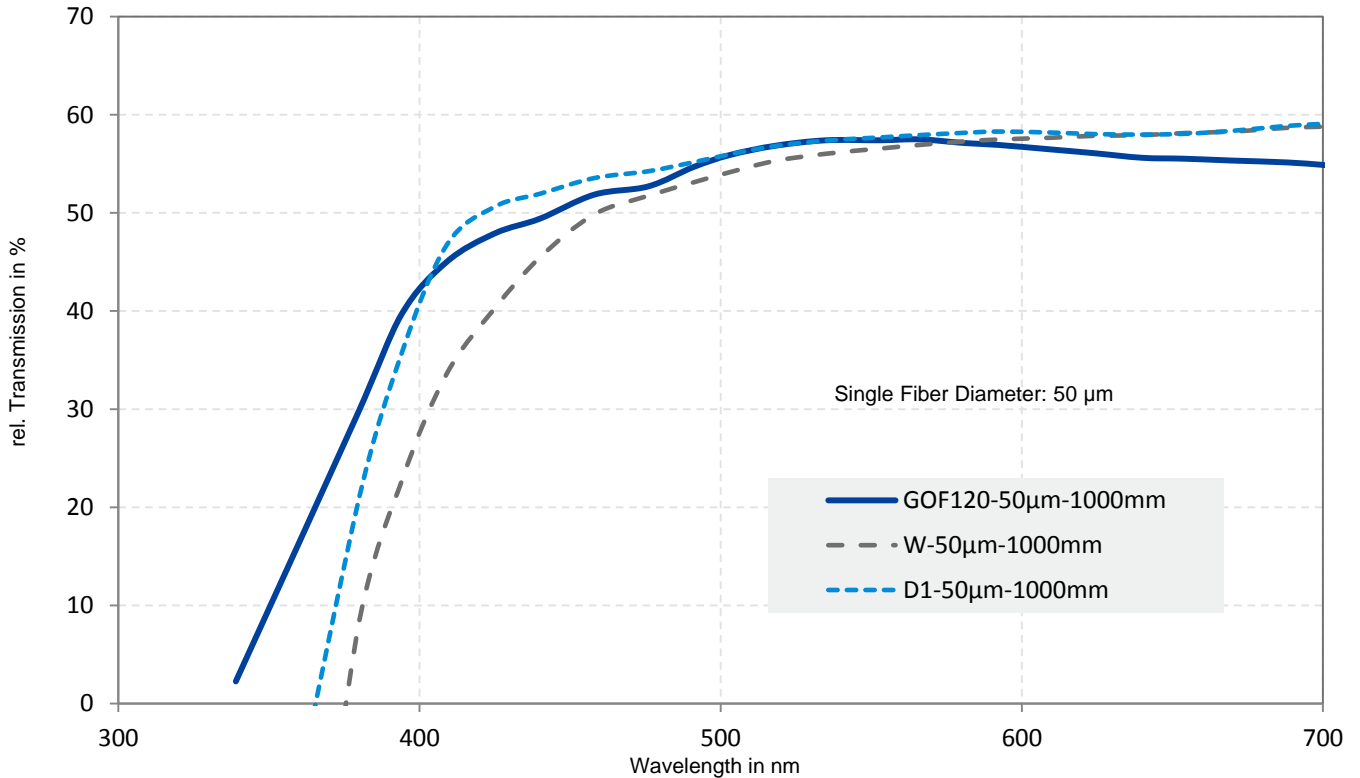


## Optical Properties of PURAVIS® GOF120

### 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 surface polish and length of the fiber bundle. The displayed transmission curves represent SCHOTT's typical manufacturing level for a fiber bundle with GOF120 fiber in comparison to W- and D1-fibers.



### Transmission of white Light

Today's demanding illumination applications require true white transmission for optimum color rendering. PURAVIS® GOF120 features improved low discoloration even with longer length, which provides a more realistic appearance of the illuminated objects.

The table below shows typical data of the correlated color temperatures (CCT) as well as chromaticity coordinates of the fibers, illuminated with the standard illuminant "D65" for xenon.

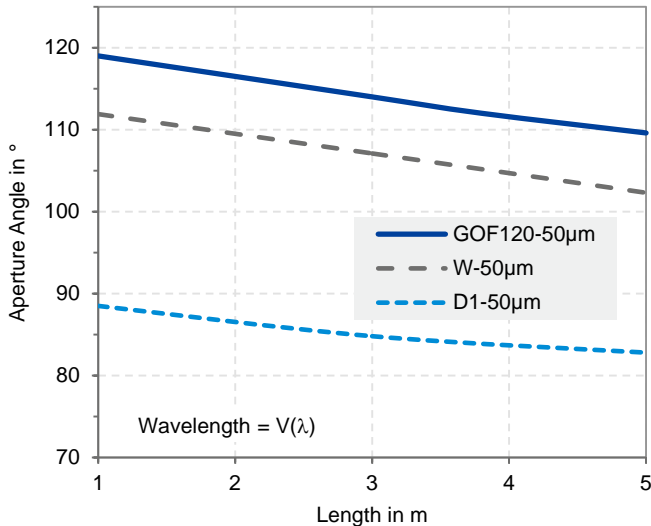
Length	Standard Illuminant „D65“ (6500 K)			Chromaticity Coordinates Standard Illuminant „D65“		
	GOF120	W-Fiber	D1-Fiber	GOF120	W-Fiber	D1-Fiber
1 m	<b>6063K</b>	5554 K	6000 K	<b>x = 0.3197</b> <b>y = 0.3436</b>	x = 0.3303 y = 0,3550	x = 0.3207 y = 0.3394
3 m	<b>5543K</b>	4738 K	4970 K	<b>x = 0.3309</b> <b>y = 0.3678</b>		x = 0.3475 y = 0.3695
5 m	<b>5238K</b>	4230 K	4210 K	<b>x = 0.3409</b> <b>y = 0.3897</b>	x = 0.3749 y = 0.4067	x = 0.3789 y = 0.3998

## Numerical Aperture

(Measured according to DIN 58 141 Part 3)

### Dependence of the aperture angle over bundle length:

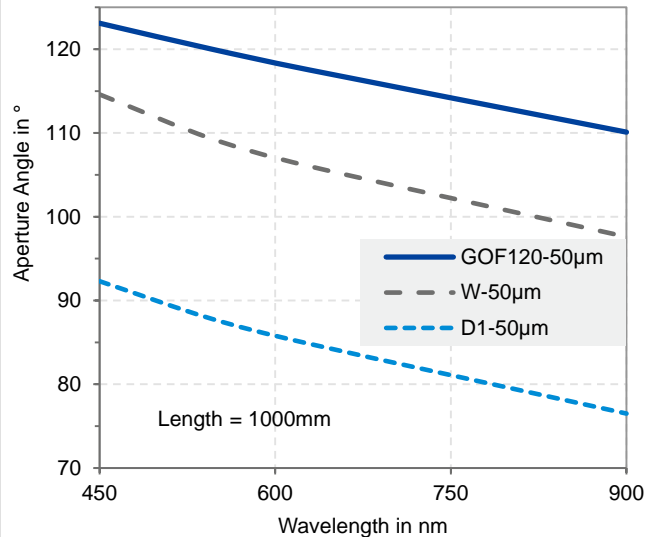
The effective aperture angle of the GOF120 fiber decreases with longer length. The decrease is less than for the W or D1 fibers.



### Dispersion of aperture angle:

The PURAVIS® GOF120 shows a lower dispersion than the W fibers and – in particular for shorter wavelengths – a significant lower dispersion than the D1-fiber.

This results in an improved color homogeneity of the illumination in the far field.



## Long Term Stability of Optical Parameter – Solarization Stability

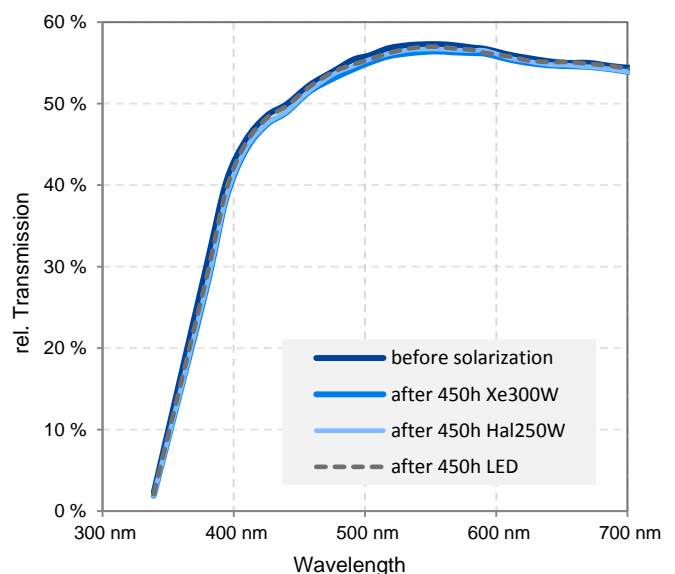
### Visible Light:

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

- Xe300W + Coupling light guide GOF85 (length 2.3m)
- Hal250W (SCHOTT KL2500)
- LED (SCHOTT LEDgine 2 LS)

The PURAVIS® GOF120 shows low solarization with losses in the range of a few % in transmission with the tested light sources.

Depending on intensity levels and respective spectra other light sources must be tested individually. Please contact your SCHOTT sales representative for further details.



## Long Term Stability of PURAVIS® GOF120 – Chemical Stability

PURAVIS® GOF120 Glass Optical Fibers feature significantly improved chemical stability. Core and cladding glasses have high chemical resistance, which ensure long-term stability over lifetime under repeated reprocessing cycles. For further details on chemical resistance classes refer to SCHOTT publication TIE-30 “Chemical properties of optical glass”

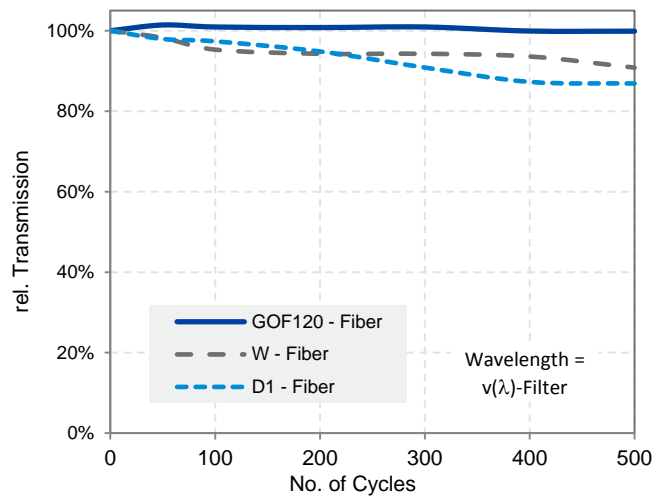
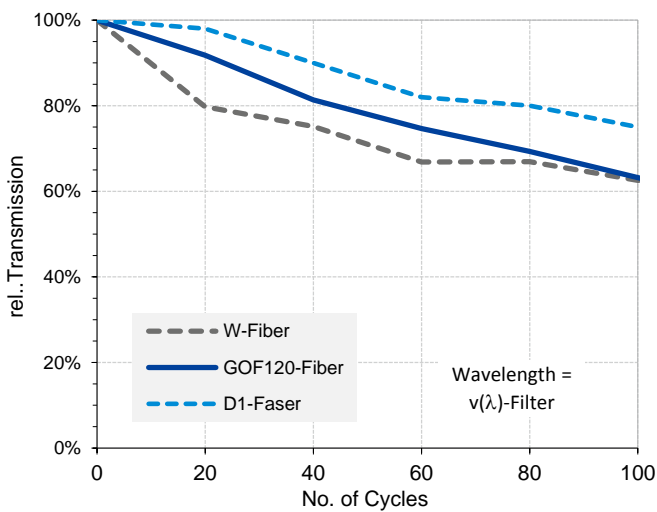
- Fiber bundle Ø2,4 mm, length 100 mm bonded into stain-less steel tube
- Prior to each measurement: Cleaning of end surface with ethanol
- Rel. transmission measured according to DIN 58 141 Part 2; Aperture of light beam: NA 0.1 Measurement wavelength:  $\lambda = 535 \text{ nm}$

### 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



## Long Term Stability of PURAVIS® GOF120 – Mechanical Stability

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

Proof tests of single fibers - simulating stress in axial direction - show 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 and 50 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.

