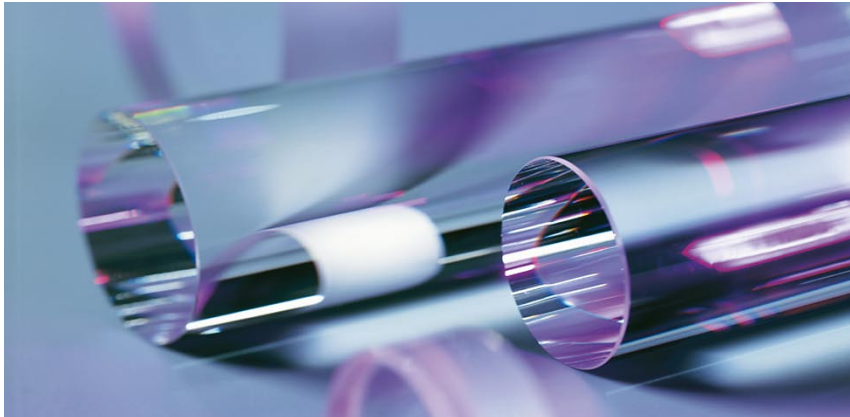


# LITHOSIL® Synthetic Fused Silica Standard-Grade-Opto

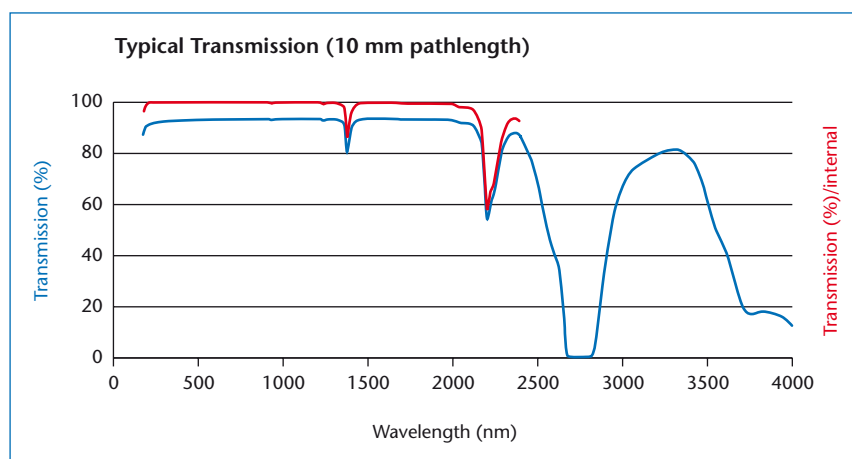


## Product Information

Amorphous synthetic fused silica SiO<sub>2</sub> of high purity completes the application range of optical materials from DUV to IR with an excellent transmission ranging from 250 nm to 2.5 μm.

## Application

**Standard-Grade-Opto** of LITHOSIL® is a standardized, cost efficient product for optical applications. It offers a high transmission @ wavelengths > 250 nm. It is available in standard geometries from stock.



## Optical Properties

### ■ Transmission:

internal transmission of LITHOSIL®  
**Standard-Grade-Opto** is >99.9%  
(per 10 mm sample thickness/  
wavelength > 300 nm)

OH-content: 800 ... 1400 ppm

Other contaminants: ≤ 0.6 ppm

### ■ Homogeneity:

Refractive index homogeneity  
@ 633 nm

≤ 20 ppm (PV)

### ■ Bubbles and inclusions:

According to ISO 10110-3	Max. diameter [mm]
1/1 x 0.063	< 0.07

1/1 x 0.063 < 0.07

### ■ Stress birefringence:

Standard [nm/cm]

≤ 10

### ■ Striae<sup>1)</sup> and striations:

Extremely free of striae

(in functional direction)

## Available Standard Geometries:

### ■ Rod material:

Diameter [mm]	Thickness <sup>2)</sup> [mm]
90 ... 200	90 ... 1000

### ■ Block material:

Length, width (square)	Thickness <sup>2)</sup> [mm]
5"/6"/110 mm	90 ... 400

### ■ Drilled or cut rods:

Diameter/ Square [in]	Thickness <sup>2)</sup> [mm]
0.5/1/1.5/2	40 ± 10

<sup>1)</sup> polarizer is used for striae and striation detection

<sup>2)</sup> referring to the available sizes

# Properties of LITHOSIL®

Refractive Indices $n(N_2)$ (at 20°C, nitrogen atmosphere, 1013 hPa)		Variation over temperature	
	$\lambda_{vac}$ [nm]	n	$\Delta n/\Delta T (N_2)$ [1E-6/K]
$n_{2325}$	2325.59	1.43290	–
$n_{1970}$	1970.56	1.43849	–
$n_{1530}$	1530	1.44424	–
$n_{1060}$	1060	1.44965	–
$n_t$	1014.25	1.45021	9.6
$n_s$	852.35	1.45243	9.7
$n_r$	706.71	1.45511	9.8
$n_c$	656.45	1.45633	9.9
$n_{c'}$	644.03	1.45667	9.9
$n_{He-Ne}$	632.98	1.45698	9.9
$n_D$	589.46	1.45837	10.0
$n_d$	587.73	1.45843	10.0
$n_e$	546.23	1.46004	10.1
$n_F$	486.27	1.46309	10.3
$n_{F'}$	480.13	1.46347	10.3
$n_g$	435.96	1.46666	10.5
$n_h$	404.77	1.46958	10.8
$n_i$	365.12	1.47450	11.2
$n_{334}$	334.24	1.47973	11.6
$n_{312}$	312.66	1.48446	12.1
$n_{296}$	296.82	1.48870	12.5
$n_{280}$	280.43	1.49401	13.0
$n_{248}$	248.35	1.50837	14.5
$n_{194}$	194.23	1.55887	20.1
$n_{193}$	193.37	1.56022	20.3
$n_{184}$	184.95	1.57497	21.9

All refractive indices are interpolated from values measured under dry nitrogen;  $\lambda_{vac}$  = vacuum wavelength.  
Tolerances of refractive indice:  $\pm 2.0 \cdot 10^{-5}$

$n_d = 1.45843$	$v_d = 67.83$	$n_F - n_C = 0.00676$
$n_e = 1.46004$	$v_e = 67.68$	$n_{F'} - n_{C'} = 0.00680$

Relative Partial Dispersion		Deviation of Relative Partial Dispersions from "Normal Line"	
$P_{s,t}$	0.3287	$\Delta P_{C,t}$	0.0390
$P_{C,s}$	0.5770	$\Delta P_{C,s}$	0.0159
$P_{d,c}$	0.3102	$\Delta P_{F,e}$	-0.0017
$P_{e,d}$	0.2388	$\Delta P_{g,F}$	-0.0020
$P_{g,F}$	0.5277	$\Delta P_{i,g}$	0.0054
$P_{i,h}$	0.7283		

Sellmeier Dispersion Formula for Refractive Indices (according to SCHOTT Technical Information TIE29 Literature link: 9)			
$n^2 - 1 = B_1 \lambda^2 / (\lambda^2 - C_1) + B_2 \lambda^2 / (\lambda^2 - C_2) + B_3 \lambda^2 / (\lambda^2 - C_3)$ with $\lambda$ in $\mu m$			
Constants of Sellmeier Dispersion Formula for $\lambda_{vac}$ and $n(N_2)$			
$B_1$	$6.694226 \cdot 10^{-1}$	$C_1$	$4.480112 \cdot 10^{-3}$
$B_2$	$4.345839 \cdot 10^{-1}$	$C_2$	$1.328470 \cdot 10^{-2}$
$B_3$	$8.716947 \cdot 10^{-1}$	$C_3$	$9.534148 \cdot 10^{-1}$

valid for  $184 \text{ nm} < \lambda < 2326 \text{ nm}$  (20°C; 1013 hPa);  $n = n(N_2)$ ;  $\lambda = \lambda_{vac}$

Refractive Index Variation over Temperature Change
$\Delta n/\Delta T (18 - 28 \text{ °C}) = t_0 + t_1 \cdot \lambda^{-2} + t_2 \cdot \lambda^{-4} + t_3 \cdot \lambda^{-6}$

Constants of formula for $\Delta n/\Delta T$ in Nitrogen		Constants of formula for $dn_{abs}/dT$ in Vacuum	
$t_0$	$9.4 \cdot 10^{-6}$	$D_0$	$2.06 \cdot 10^{-5}$
$t_1$	$1.7 \cdot 10^{-1}$	$D_1$	$2.51 \cdot 10^{-8}$
$t_2$	$8.7 \cdot 10^{-2}$	$D_2$	$-2.47 \cdot 10^{-11}$
$t_3$	$3.1 \cdot 10^{-4}$	$E_0$	$3.12 \cdot 10^{-7}$
–	–	$E_1$	$4.22 \cdot 10^{-10}$
–	–	$\lambda_{TK} [\mu m]$	0.16

valid for  $184 \text{ nm} < \lambda < 1014 \text{ nm}$  and for  $+18 \text{ °C} \leq T \leq +28 \text{ °C}$

valid for  $365 \text{ nm} < \lambda < 1060 \text{ nm}$  and for  $-100 \text{ °C} \leq T \leq +140 \text{ °C}$

Differential Temperature Coefficients of the Refractive Index (according to SCHOTT Technical Information TIE19 Literature link: 11)						
$\lambda_{vac}$ [nm]	$\Delta n_{rel}/\Delta T [10^{-6}/K]^*$			$\Delta n_{abs}/\Delta T [10^{-6}/K]**$		
	1060.0	546.23	365.12	1060.0	546.23	365.12
-40/-20 [°C]	8.9	9.4	10.2	6.9	7.3	8.1
+20/+40 [°C]	9.4	9.9	10.9	8.1	8.6	9.6
+60/+80 [°C]	9.8	10.4	11.5	8.8	9.4	10.4

valid for  $365 \text{ nm} < \lambda < 1060 \text{ nm}$  and for  $-100 \text{ °C} \leq T \leq +140 \text{ °C}$

\*) relative to nitrogen    \*\*) relative to vacuum

For more information please contact:

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