



## DATA SHEET

## UV FUSED SILICA – SPECTROSIL

Spectrosil® is a synthetic fused silica manufactured using a patented, environmentally friendly process that results in a virtually Chlorine-free material of exceptional purity which is bubble-free and fluorescence-free.

Due to this ultra-high purity, the Spectrosil® 2000 series has excellent optical transmission in the deep UV with a useful range from 180 nm in the deep UV through to 2000 nm in the infrared and is available in a variety of grades for use in a wide range of optical and fibre optic applications.

### Optical Properties

Spectrosil® Grade	1000	1000R	2000	2000	2100	2200
<b>Bubbles</b>						
Bubble class (DIN 58927)	0	0	0	0	0	0
Sum of CSA (mm <sup>2</sup> / 100 cm <sup>3</sup> )	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Maximum number of inclusions	0	0	0	0	0	0
Striae (MIL-G-174A)	N/A	N/A	1 Direction Free	1 Direction Free	3 Direction Free	3 Direction Free
Granularity	None	None	None	None	None	None
<b>Refractive index homogeneity*</b>						
Up to 100 mm	N/A	N/A	-	N/A	< 5 x 10 <sup>-6</sup>	< 5 x 10 <sup>-6</sup>
Up to 200 mm	N/A	N/A	< 25 x 10 <sup>-6</sup>	N/A	< 10 x 10 <sup>-6</sup>	< 10 x 10 <sup>-6</sup>
Over 200 mm	N/A	N/A	not specified	N/A	N/A	N/A
Residual strain (nm/cm)	N/A	N/A	< 10 (except edge)	N/A	< 5	< 5
Fluorescence (254 nm excitation)	None	None	None	None	None	None
Standard diameters *	300 mm	50 mm	300 mm	50 mm	200 mm	200 mm

### TYPICAL CHEMICAL ANALYSIS

	Spectrosil® 1000	Spectrosil® 2000 Series
<b>Typical trace elements in ppb †</b>		
<b>Al</b>	< 20	< 10
<b>Ca</b>	<10	<10
<b>Co</b>	<10	<10
<b>Cr</b>	<10	<10
<b>Cu</b>	<10	<10
<b>Fe</b>	<10	<10
<b>K</b>	<10	<10
<b>Li</b>	<10	<10
<b>Mg</b>	<10	<10
<b>Mn</b>	<10	<10
<b>Na</b>	<10	<10
<b>Ti</b>	<10	<10
<b>V</b>	<10	<10
<b>Zn</b>	<10	<10
<b>Zr</b>	<10	<10
<b>ppm</b>		
<b>Cl</b>	<1	<1
<b>OH</b>	1000	1000

† Detection limit is 10 ppb

Refractive index values For all grades at 20°C	
WAVELENGTH (nm)	REFRACTIVE INDEX
200	1.551
220	1.528
240	1.513
248	1.509
254	1.504
260	1.502
280	1.494
300	1.488
320	1.483
340	1.479
360	1.475
400	1.470
500	1.462
589	1.458
633	1.457
700	1.455
800	1.453
900	1.452
1000	1.450

### Internal Transmission - Spectrosil® 2200

At 193.4 nm > 99.5 %  
 At 248 nm > 99.9 %  
 (10 mm pathlength)

## Thermal Data

Strain Point \*\* 990°C  
Annealing Point \*\* 1100°C  
Softening Point \*\* 1710°C

## Thermal Expansion

Coefficient (Average)  $0.54 \times 10^{-6}$  per degree C.

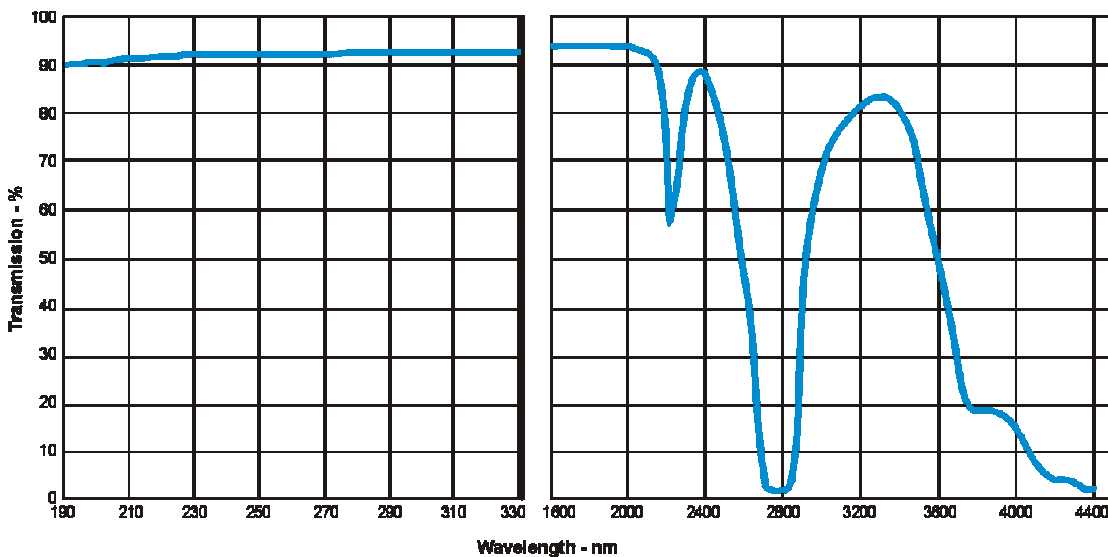
\*\* Note that these values may vary, depending on thermal history of the glass

## Mechanical Data

Density  $2.2 \times 10^3 \text{ kg/m}^3$   
Young's Modulus  $73 \times 10^9 \text{ N/m}^2$   
Rigidity modulus  $31 \times 10^9 \text{ N/m}^2$   
Compressive strength  $2.0 \times 10^9 \text{ N/m}^2$   
Tensile strength  $55 \times 10^6 \text{ N/m}^2$   
Shear strength  $55 \times 10^6 \text{ N/m}^2$

## Transmission

Typical transmission of Spectrosil® 2000 series fused silica  
(including Fresnel reflection losses for 10 mm pathlength)



- Spectrosil® 1000 grade for non-transmissive mirrors and substrates, and other high purity components which do not require specified optical transmission
- Spectrosil® 2000 deep UV, fluorescence free grade
- Spectrosil® 2100 with improved refractive index homogeneity
- Spectrosil® 2200 Excimer laser grade specially developed for maximum transmission and prolonged life in microlithography and other critical deep UV applications using KrF (248 nm) and ArF (193 nm) excimer lasers

WHILE EVERY ATTEMPT HAS BEEN MADE TO VERIFY THE SOURCE OF THE INFORMATION, NO RESPONSIBILITY IS ACCEPTED FOR ACCURACY OF DATA.

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