

# Specification

## Physical and chemical properties (PCP)

### D 263<sup>®</sup> bio



Non-toleranced numerical values are reference values of a typical production quality.

D 263<sup>®</sup> bio is a colorless borosilicate glass with a homogeneous, low intrinsic auto fluorescence across the spectrum. Tight, controlled refractive index tolerances ensure consistent, high optical transmission properties and diagnostic results. It offers great chemical stability and resistance to reagents as used in microarray and diagnostic protocols.

D 263<sup>®</sup> bio is produced in a SCHOTT-specific down-draw method, which results in non-porous, ultra-flat fire-polished surface quality on both sides at target thicknesses without polishing. The glass is available in round wafer dimensions or custom-cut rectangular substrates, cleaned inspected and packaged to meet demanding standards of the Biotechnology and Semiconductor industries.

Chemically toughenable and easy to structure, this glass can be used in numerous applications in demand of high optical and chemical qualities such as substrate glass for optical diagnostics, microfluidic components or other consumer and industrial applications.

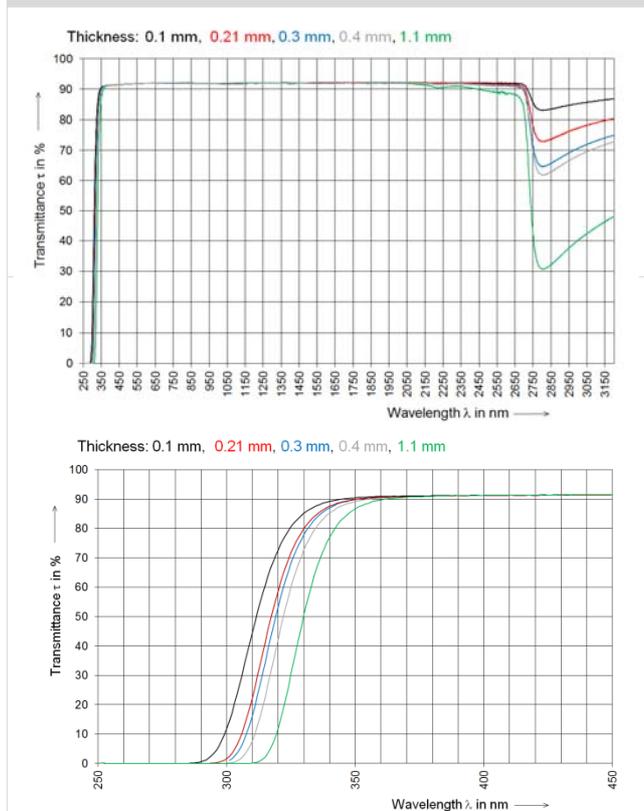
D 263<sup>®</sup> bio has certified biocompatibility (Cytotoxicity as per DIN EN ISO 10993-5:2009 and Haemocompatibility as per DIN EN ISO 10993-4:2009)

Optical properties		
Refractive indices	$n_g$	1.5354
Pretreatment of samples Condition as supplied ["as drawn"]	$n_F$	1.5305
	$n_F$	1.5300
	$n_e$	$1.5255 \pm 0.0015$
	$n_d$	1.5231
	$n_D$	1.5230
	$n_C$	1.5209
	$n_C$	1.5204
Abbe value	$v_e$	55

Thermal properties		
CTE (Coefficient of thermal expansion) $\alpha$	in $10^{-6} \cdot K^{-1}$ (20 °C; 300 °C)	7.2
Mean specific heat capacity $c_p$	in J/(g·K) (20 °C to 100 °C)	0.8
Transformation temperature $T_g$	in °C	557
Viscosities	Viscosity lg $\eta$ in dPas	Temperature in °C
Strain point	14.5	529
Annealing point	13.0	557
Softening point	7.6	736

Mechanical properties		
Density $\rho$ (annealed at 40 °C/h)	in g/cm <sup>3</sup>	2.51
Stress optical coefficient C	in $1.02 \cdot 10^{-12} \text{ m}^2/\text{N}$	3.4
Chemical toughening ( $d = 0.3 \text{ mm}$ )	temperature $\vartheta$ in °C	410
	time $t$ in h	4
	Compressive Stress (CS) in MPa	317
	Depth of Layer (DoL) in $\mu\text{m}$	18
Young's modulus E	in kN/mm <sup>2</sup>	72.9
Poisson's ratio $\mu$		0.21
Torsion modulus G	in kN/mm <sup>2</sup>	30
Knoop hardness	HK 0.1/20	470
Vickers hardness	HV 0.2/25	510

Spectral transmittance ( $\lambda = 250 \text{ nm}$  to  $3200 \text{ nm}$  and  $\lambda = 250 \text{ nm}$  to  $450 \text{ nm}$ )



Transmittance values

Thickness	Wavelength	$\tau(\lambda)$ in %
0.3 mm	at 254 nm	< 0.1
	at 380 nm	91.2
	at 632.8 nm	92
	at 1064 nm	92
Edge wavelength $\lambda_c$ ( $\tau = 0.46$ )	Thickness in mm	Wavelength in nm
	0.10	308
	0.21	315
	0.30	318
	1.10	329
Luminous transmittance	Thickness in mm	$\tau_{vD65}$ in %
	0.3	$91.7 \pm 0.3$

# Specification

## Physical and chemical properties (PCP)

### D 263<sup>®</sup> bio

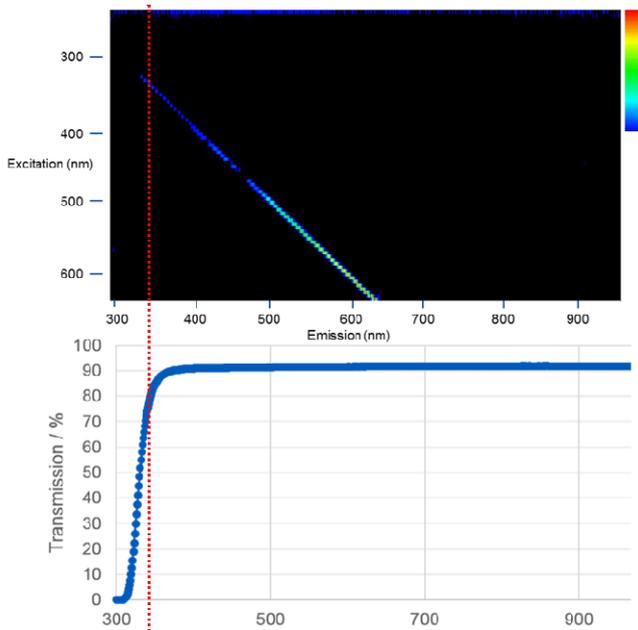


Non-toleranced numerical values are reference values of a typical production quality.

Electrical properties		
Dielectric constant $\epsilon_r$ (at $\vartheta = 25\text{ °C}$ )	at 1 MHz	6.7
	at 1 GHz	6.4
	at 5 GHz	6.3
Dissipation factor $\tan \delta$ (at $\vartheta = 25\text{ °C}$ )	at 1 MHz	$61 \cdot 10^{-4}$
	at 1 GHz	$74 \cdot 10^{-4}$
	at 5 GHz	$101 \cdot 10^{-4}$
Electric volume resistivity $\rho_D$	in $\Omega \cdot \text{cm}$	$1.6 \cdot 10^8$
	alternate current 50 Hz ( $\vartheta = 250\text{ °C}$ )	$3.5 \cdot 10^6$
		( $\vartheta = 350\text{ °C}$ )

Chemical properties		
Hydrolytic resistance (acc. to DIN ISO 719)	Class	HGB 1
	Equivalent of alkali per gram glass grains in $\mu\text{g/g}$	20
Acid resistance (acc. to DIN 12116)	class	S 2
	Half surface weight loss after 6 hours in $\text{mg}/\text{dm}^2$	1.4
Alkali resistance (acc. to DIN ISO 695)	class	A 2
	Surface weight loss after 3 hours in $\text{mg}/\text{dm}^2$	88

#### Auto fluorescence in >80% transmission spectrum



The left graph shows a homogeneously low level of fluorescence emission spectra when excited at wavelengths above the 80% transmission threshold (red dotted line) of the glass. The colored diagonal line represents the excitation wavelength itself, with no emittance of fluorescence above and below.