



SCHOTT
glass made of ideas



Optical Filter Glass

Data Sheets

Introduction

This is a datasheet collection for our portfolio glasses in 2019. The date of the current data status is indicated on each data sheet.

Refractive index

The refractive indices of the glass types are stated as reference values. Due to different annealing conditions, there are deviations from batch to batch. Any refractive indices within the defined wavelength range can be calculated from the Sellmeier dispersion formula.

Note that the wavelength must be entered into the Sellmeier dispersion formula in units of μm in order to calculate the correct refractive index from the given coefficients.

$$n^2 - 1 = \frac{B_1\lambda^2}{\lambda^2 - C_1} + \frac{B_2\lambda^2}{\lambda^2 - C_2} + \frac{B_3\lambda^2}{\lambda^2 - C_3}$$

Transmission

The internal transmittance τ_i is given for the respective reference thickness d .

$$\tau_{i,d_1} = (\tau_{i,d})^{\left(\frac{d_1}{d}\right)}$$

The formula can be used to calculate the internal transmittance for any other thickness d_1 .



Nomenclature

AR	Alkali resistance class in accordance with ISO 10629
d	Reference thickness
B_1, B_2, B_3	Coefficients of the Sellmeier dispersion formula
C_1, C_2, C_3	Coefficients of the Sellmeier dispersion formula
FR	stain resistance class in accordance with catalog "SCHOTT Optical Filter Glass"
HK[0,1/20]	Knoop hardness in accordance with ISO 9385
n_d	Refractive index at the d-line
P_e	Excitation purity
SR	Acid resistance class in accordance with ISO 8424
Tg	transformation temperature in accordance with ISO 7884-8
Tk	Temperature coefficient longpass filter
x, y	Chromaticity coordinates
Y	Tristimulus value of brightness
$\alpha_{-30^\circ\text{C}/+70^\circ\text{C}}$	Linear coefficient of thermal expansion in $10^{-6}/\text{K}$ in the temperature range $[-30^\circ\text{C}$ to $+70^\circ\text{C}]$
$\alpha_{20^\circ\text{C}/200^\circ\text{C}}$	Linear coefficient of thermal expansion in $10^{-6}/\text{K}$ in the temperature range $[+20^\circ\text{C}$ to $+200^\circ\text{C}]$
$\alpha_{20^\circ\text{C}/300^\circ\text{C}}$	Linear coefficient of thermal expansion in $10^{-6}/\text{K}$ in the temperature range $[+20^\circ\text{C}$ to $+300^\circ\text{C}]$. Some glasses have such a low Tg, that the measurement for those glass types is not feasible.
λ	Wavelength
λ_d	Dominant wavelength
τ_i	internal transmittance
ρ	Density
P_d	Reflection Factor at the d-line

For further explanations, see the catalog "SCHOTT Optical Filter Glass".

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Filter type	Glass type	Filter type	Glass type
Bandpass filter	BG3	Longpass filter	OG570
	BG7		OG590
	BG18		RG610
	BG25		RG630
	BG38		RG645
	BG39		RG665
	BG40		RG695
	BG42		RG715
	S8612		RG9
	BG50		RG780
	BG55		RG830
	BG57		RG850
	BG60		RG1000
	BG60HT	Multi bandpass filter	
	BG61		BG36
	BG62	Neutral density filter	
	BG62HT		NG1
	BG63		NG3
	BG64		NG4
	BG66		NG5
	BG66HS		NG9
	BG67		NG11
	BG67HT	Shortpass filter	
	VG9		KG1
	VG20		KG2
	S8022		KG3
	S8023		KG5
Longpass filter		UV Bandpassfilter	
	N-WG280		UG1
	N-WG295		UG2A
	N-WG305		UG5
	N-WG320		UG11
	GG395		
	GG400		
	GG420		
	GG435		
	GG455		
	GG475		
	GG495		
	OG515		
	OG530		
	OG550		

BG3

Optical properties	
Reflection factor	
P_d	= 0,921
Spectral values guaranteed	
τ_i (365 nm)	≥ 0,94
τ_i (633 nm)	≤ 0,00005
Refractive indices	
n_F (486 nm)	= 1,52
n_e (546 nm)	= 1,51
n_d (587,6 nm)	= 1,51
Sellmeier coefficients	
valid from 300 nm to 1600 nm	
B_1	0,8735
B_2	0,3716
B_3	1,1076
C_1	9,390E-03 μm^2
C_2	1,0998E-02 μm^2
C_3	145,898 μm^2
Internal quality	
Bubble class	1

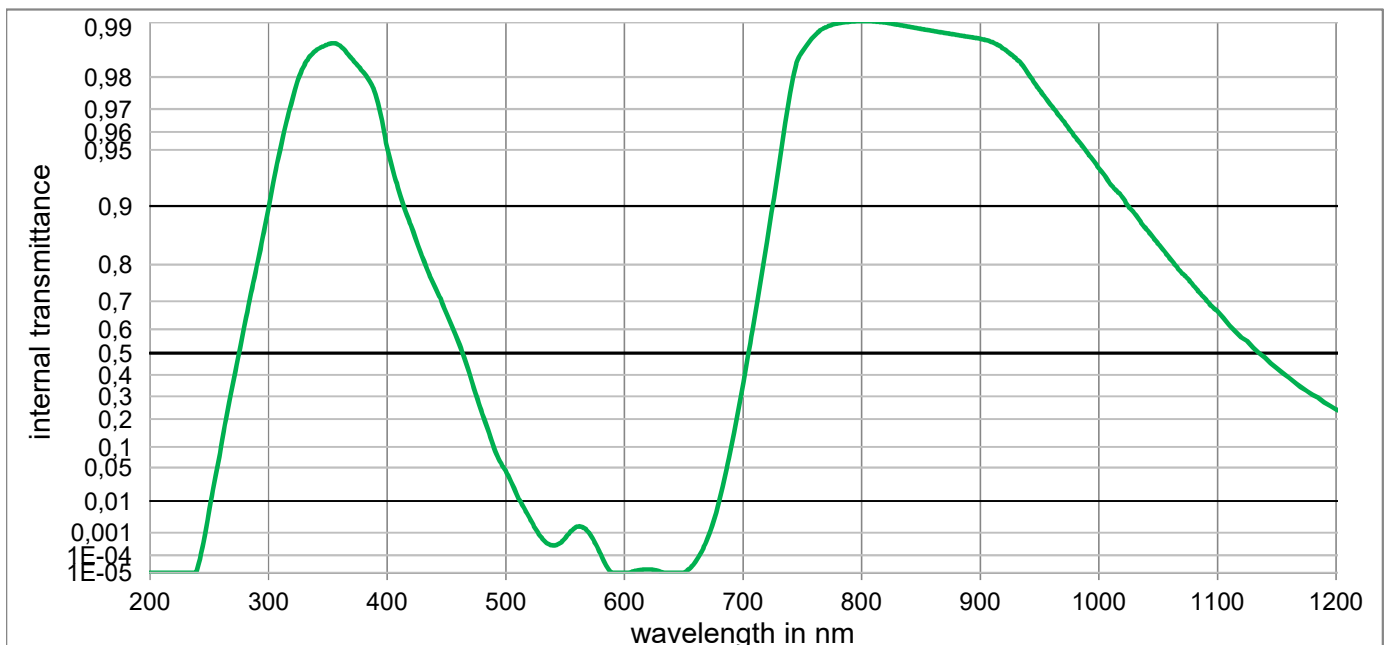
Mechanical properties	
Reference thickness	
d	= 1,00 mm
Density	
ρ	= 2,55 g/cm ³
Knoop hardness	
HK[0.1/20]	= 438

Thermal properties	
Transformation temperature	
T_g	= 478 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 8,8
α (20°C/300°C)	= 10,1

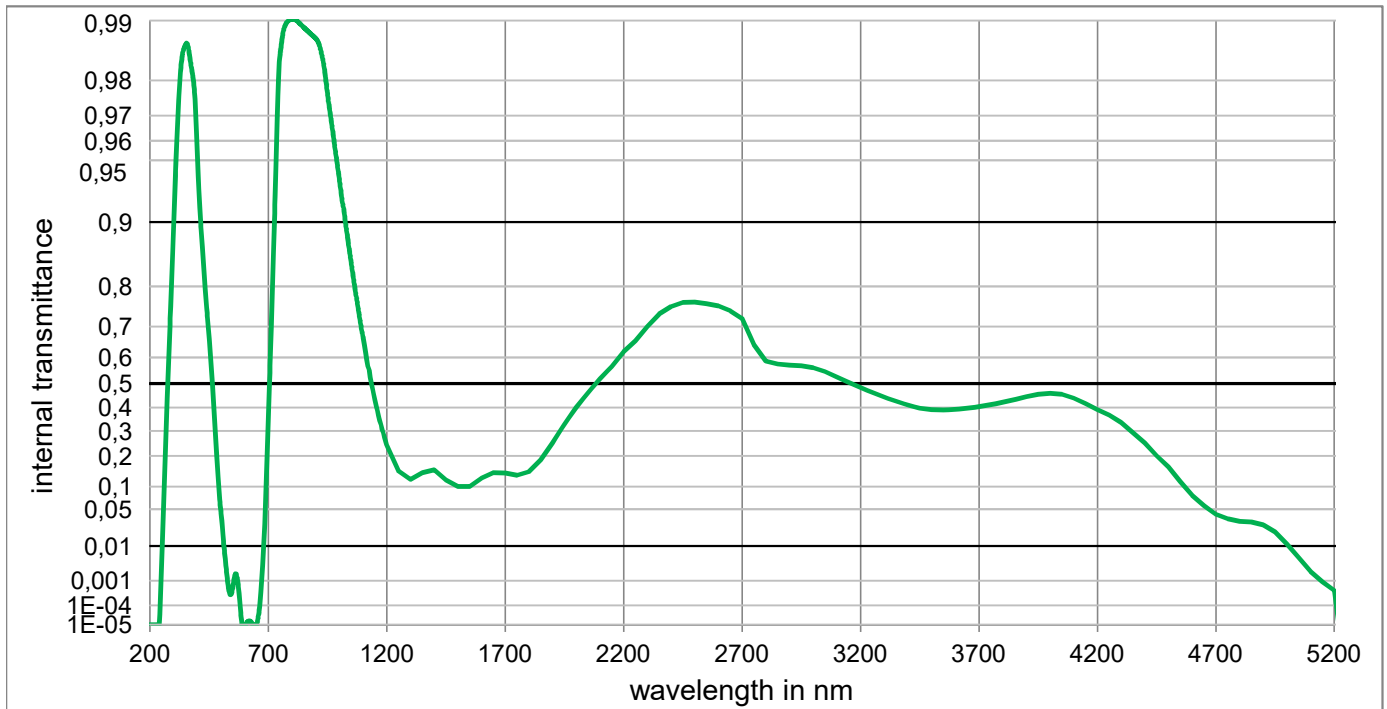
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,154	0,160	0,163
	y	0,029	0,018	0,014
	Y	2,0	0,8	0,5
	λ_d	455 nm	448 nm	444 nm
	P_e	0,979	0,993	0,996
Illuminant A	x	0,160	0,166	0,170
	y	0,042	0,024	0,020
	Y	0,9	0,3	0,2
	λ_d	458 nm	447 nm	440 nm
	P_e	0,958	0,977	0,978

Notes	
UV	
Transmission changes are possible under the action of intense ultraviolet radiation.	
Ionically colored glass	
Bandpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG3



Internal transmittance τ_i at reference thickness											
The internal transmittance values, tabulated and graphically represented, are reference values only											
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	4,300E-02	800	9,902E-01	1100	6,665E-01	2200	6,200E-01	3700	4,038E-01
210	< 1,0E-05	510	1,276E-02	810	9,901E-01	1110	6,152E-01	2250	6,566E-01	3750	4,132E-01
220	< 1,0E-05	520	3,214E-03	820	9,900E-01	1120	5,680E-01	2300	7,009E-01	3800	4,226E-01
230	< 1,0E-05	530	6,442E-04	830	9,897E-01	1130	5,247E-01	2350	7,349E-01	3850	4,330E-01
240	1,9E-05	540	2,973E-04	840	9,895E-01	1140	4,800E-01	2400	7,538E-01	3900	4,462E-01
250	6,1E-03	550	6,182E-04	850	9,892E-01	1150	4,319E-01	2450	7,642E-01	3950	4,557E-01
260	1,0E-01	560	1,673E-03	860	9,889E-01	1160	3,884E-01	2500	7,651E-01	4000	4,600E-01
270	3,6E-01	570	1,000E-03	870	9,886E-01	1170	3,432E-01	2550	7,613E-01	4050	4,557E-01
280	6,3E-01	580	1,108E-04	880	9,883E-01	1180	3,081E-01	2600	7,557E-01	4100	4,400E-01
290	8,0E-01	590	< 1,000E-05	890	9,880E-01	1190	2,727E-01	2650	7,434E-01	4150	4,170E-01
300	9,0E-01	600	< 1,000E-05	900	9,877E-01	1200	2,412E-01	2700	7,236E-01	4200	3,915E-01
310	9,5E-01	610	1,340E-05	910	9,872E-01	1250	1,462E-01	2750	6,443E-01	4250	3,670E-01
320	9,734E-01	620	1,611E-05	920	9,860E-01	1300	1,200E-01	2800	5,868E-01	4300	3,368E-01
330	9,828E-01	630	1,167E-05	930	9,842E-01	1350	1,406E-01	2850	5,764E-01	4350	2,925E-01
340	9,858E-01	640	< 1,000E-05	940	9,810E-01	1400	1,500E-01	2900	5,717E-01	4400	2,500E-01
350	9,868E-01	650	< 1,000E-05	950	9,764E-01	1450	1,179E-01	2950	5,698E-01	4450	2,000E-01
360	9,866E-01	660	4,721E-05	960	9,712E-01	1500	1,000E-01	3000	5,623E-01	4500	1,600E-01
370	9,842E-01	670	5,929E-04	970	9,651E-01	1550	1,000E-01	3050	5,481E-01	4550	1,132E-01
380	9,812E-01	680	1,040E-02	980	9,574E-01	1600	1,236E-01	3100	5,264E-01	4600	7,780E-02
390	9,752E-01	690	1,004E-01	990	9,484E-01	1650	1,406E-01	3150	5,066E-01	4650	5,610E-02
400	9,510E-01	700	3,590E-01	1000	9,369E-01	1700	1,400E-01	3200	4,840E-01	4700	4,159E-02
410	9,160E-01	710	6,550E-01	1010	9,230E-01	1750	1,330E-01	3250	4,632E-01	4750	3,483E-02
420	8,740E-01	720	8,460E-01	1020	9,099E-01	1800	1,443E-01	3300	4,443E-01	4800	3,170E-02
430	8,150E-01	730	9,380E-01	1030	8,909E-01	1850	1,849E-01	3350	4,274E-01	4850	3,076E-02
440	7,450E-01	740	9,760E-01	1040	8,680E-01	1900	2,500E-01	3400	4,100E-01	4900	2,729E-02
450	6,580E-01	750	9,856E-01	1050	8,428E-01	1950	3,283E-01	3450	3,981E-01	4950	2,004E-02
460	5,500E-01	760	9,881E-01	1060	8,133E-01	2000	4,000E-01	3500	3,915E-01	5000	1,099E-02
470	3,930E-01	770	9,894E-01	1070	7,800E-01	2050	4,623E-01	3550	3,896E-01	5050	5,082E-03
480	2,220E-01	780	9,899E-01	1080	7,463E-01	2100	5,200E-01	3600	3,915E-01	5100	2,032E-03
490	9,700E-02	790	9,901E-01	1090	7,060E-01	2150	5,670E-01	3650	3,981E-01	5150	9,099E-04

BG7

Optical properties	
Reflection factor	
$P_d = 0,918$	
Spectral values guaranteed	
τ_i (365 nm)	$\geq 0,25$
τ_i (488 nm)	$\geq 0,78$
τ_i (633 nm)	$\leq 0,08$
Refractive indices	
n_d (587,6 nm) = 1,52	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	1

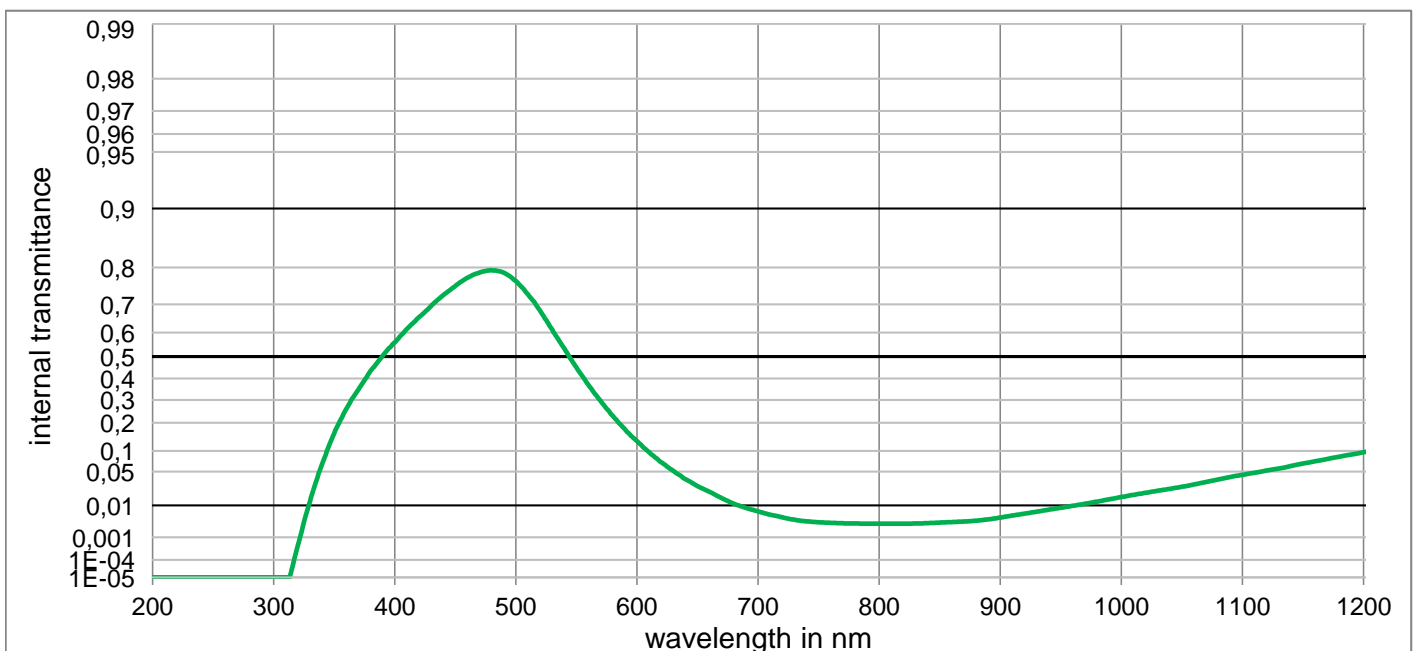
Mechanical properties	
Reference thickness	
d = 1,00 mm	
Density	
$\rho = 2,60 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 441	

Thermal properties	
Transformation temperature	
$T_g = 447 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 8,7
α (20°C/300°C)	= 10,0

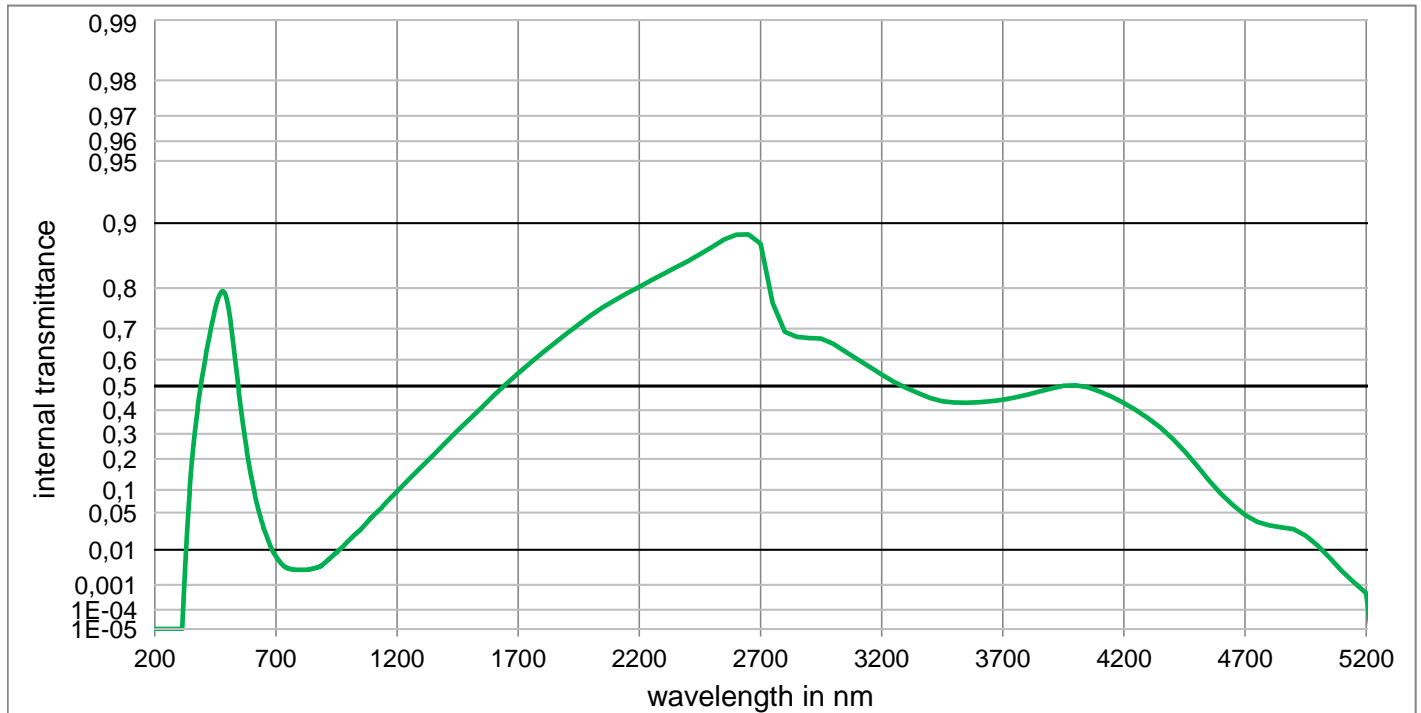
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colorimetric properties				
	1 mm	2 mm	3 mm	
Illuminant D65	x	0,191	0,152	0,138
	y	0,272	0,229	0,200
	Y	37,9	20,6	12,7
	λ_d	486 nm	484 nm	482 nm
	P_e	0,493	0,675	0,758
Illuminant A	x	0,262	0,179	0,145
	y	0,406	0,360	0,317
	Y	30,1	14,5	8,2
	λ_d	495 nm	492 nm	490 nm
	P_e	0,438	0,654	0,755

Notes	
Ionically colored glass	
Bandpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG7



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	7,670E-01	800	2,994E-03	1100	4,400E-02	2200	8,025E-01	3700	4,437E-01
210	< 1,0E-05	510	7,300E-01	810	2,991E-03	1110	4,807E-02	2250	8,157E-01	3750	4,531E-01
220	< 1,0E-05	520	6,790E-01	820	3,000E-03	1120	5,220E-02	2300	8,274E-01	3800	4,648E-01
230	< 1,0E-05	530	6,110E-01	830	3,035E-03	1130	5,630E-02	2350	8,386E-01	3850	4,779E-01
240	< 1,0E-05	540	5,350E-01	840	3,117E-03	1140	6,164E-02	2400	8,493E-01	3900	4,903E-01
250	< 1,0E-05	550	4,500E-01	850	3,240E-03	1150	6,717E-02	2450	8,600E-01	3950	5,013E-01
260	< 1,0E-05	560	3,690E-01	860	3,370E-03	1160	7,262E-02	2500	8,704E-01	4000	5,034E-01
270	< 1,0E-05	570	2,950E-01	870	3,515E-03	1170	7,810E-02	2550	8,805E-01	4050	4,947E-01
280	< 1,0E-05	580	2,290E-01	880	3,723E-03	1180	8,353E-02	2600	8,866E-01	4100	4,778E-01
290	< 1,0E-05	590	1,740E-01	890	4,074E-03	1190	8,971E-02	2650	8,869E-01	4150	4,560E-01
300	< 1,0E-05	600	1,310E-01	900	4,627E-03	1200	9,577E-02	2700	8,749E-01	4200	4,300E-01
310	< 1,0E-05	610	9,600E-02	910	5,299E-03	1250	1,317E-01	2750	7,671E-01	4250	3,997E-01
320	4,675E-04	620	7,000E-02	920	5,997E-03	1300	1,713E-01	2800	6,908E-01	4300	3,656E-01
330	1,289E-02	630	5,100E-02	930	6,812E-03	1350	2,151E-01	2850	6,751E-01	4350	3,263E-01
340	6,592E-02	640	3,700E-02	940	7,737E-03	1400	2,635E-01	2900	6,716E-01	4400	2,809E-01
350	1,600E-01	650	2,700E-02	950	8,668E-03	1450	3,140E-01	2950	6,698E-01	4450	2,297E-01
360	2,600E-01	660	2,070E-02	960	9,771E-03	1500	3,629E-01	3000	6,536E-01	4500	1,774E-01
370	3,490E-01	670	1,500E-02	970	1,100E-02	1550	4,125E-01	3050	6,281E-01	4550	1,280E-01
380	4,350E-01	680	1,103E-02	980	1,244E-02	1600	4,621E-01	3100	6,016E-01	4600	9,050E-02
390	5,040E-01	690	8,610E-03	990	1,407E-02	1650	5,077E-01	3150	5,741E-01	4650	6,410E-02
400	5,610E-01	700	6,910E-03	1000	1,593E-02	1700	5,497E-01	3200	5,456E-01	4700	4,610E-02
410	6,140E-01	710	5,620E-03	1010	1,784E-02	1750	5,885E-01	3250	5,170E-01	4750	3,580E-02
420	6,570E-01	720	4,710E-03	1020	1,981E-02	1800	6,238E-01	3300	4,930E-01	4800	3,122E-02
430	6,950E-01	730	3,974E-03	1030	2,181E-02	1850	6,562E-01	3350	4,715E-01	4850	2,870E-02
440	7,280E-01	740	3,550E-03	1040	2,396E-02	1900	6,854E-01	3400	4,512E-01	4900	2,660E-02
450	7,540E-01	750	3,317E-03	1050	2,634E-02	1950	7,124E-01	3450	4,376E-01	4950	2,000E-02
460	7,755E-01	760	3,182E-03	1060	2,928E-02	2000	7,365E-01	3500	4,328E-01	5000	1,250E-02
470	7,881E-01	770	3,080E-03	1070	3,273E-02	2050	7,569E-01	3550	4,316E-01	5050	6,300E-03
480	7,936E-01	780	3,032E-03	1080	3,649E-02	2100	7,736E-01	3600	4,338E-01	5100	2,760E-03
490	7,880E-01	790	3,009E-03	1090	4,051E-02	2150	7,893E-01	3650	4,378E-01	5150	1,210E-03

BG18

Optical properties	
Reflection factor	
$P_d = 0,914$	
Spectral values guaranteed	
τ_i (350 nm)	$\geq 0,3$
τ_i (405 nm)	$\geq 0,65$
τ_i (514 nm)	$\geq 0,88$
τ_i (633 nm)	$\leq 0,25$
τ_i (694 nm)	$\leq 0,03$
τ_i (1060 nm)	$\leq 0,0005$
Refractive indices	
n_d (587,6 nm) = 1,54	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	2

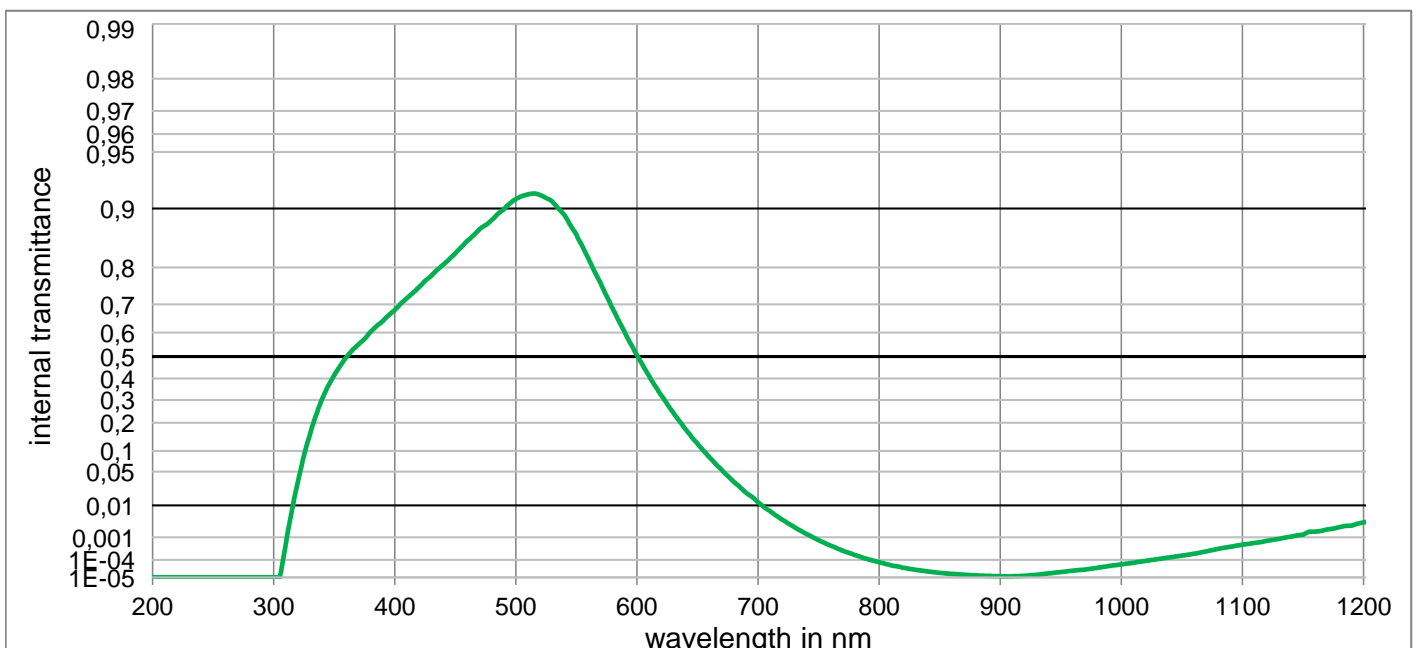
Mechanical properties	
Reference thickness	
$d = 1,00$ mm	
Density	
$\rho = 2,68$ g/cm ³	
Knoop hardness	
HK[0.1/20] = 462	

Thermal properties	
Transformation temperature	
$T_g = 457$ °C	
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 7,4
α (20°C/300°C)	= 8,9

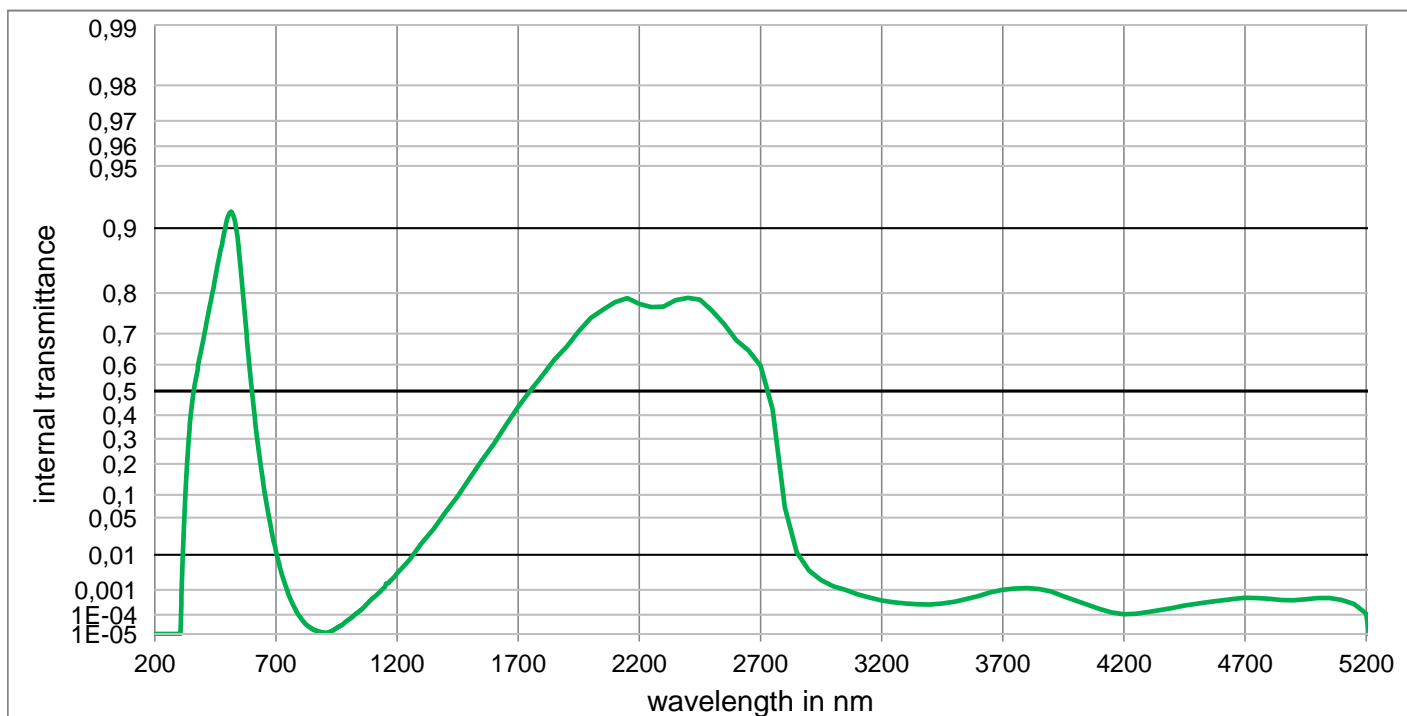
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 2
AR class	= 2

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,255	0,225	0,206
	y	0,335	0,340	0,346
	Y	67,6	54,2	45,1
	λ_d	493 nm	493 nm	493 nm
	P_e	0,205	0,312	0,376
Illuminant A	x	0,361	0,309	0,275
	y	0,441	0,459	0,472
	Y	60,8	46,0	36,7
	λ_d	502 nm	501 nm	501 nm
	P_e	0,197	0,315	0,392

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG18



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,109E-01	800	7,603E-05	1100	5,023E-04	2200	7,765E-01	3700	1,000E-03
210	< 1,0E-05	510	9,159E-01	810	5,164E-05	1110	5,957E-04	2250	7,690E-01	3750	1,117E-03
220	< 1,0E-05	520	9,150E-01	820	3,784E-05	1120	7,145E-04	2300	7,700E-01	3800	1,156E-03
230	< 1,0E-05	530	9,081E-01	830	2,904E-05	1130	8,591E-04	2350	7,849E-01	3850	1,072E-03
240	< 1,0E-05	540	8,920E-01	840	2,323E-05	1140	1,056E-03	2400	7,900E-01	3900	8,650E-04
250	< 1,0E-05	550	8,630E-01	850	1,907E-05	1150	1,260E-03	2450	7,858E-01	3950	5,821E-04
260	< 1,0E-05	560	8,190E-01	860	1,661E-05	1160	1,624E-03	2500	7,600E-01	4000	4,000E-04
270	< 1,0E-05	570	7,610E-01	870	1,474E-05	1170	1,940E-03	2550	7,263E-01	4050	2,735E-04
280	< 1,0E-05	580	6,860E-01	880	1,331E-05	1180	2,299E-03	2600	6,800E-01	4100	1,803E-04
290	< 1,0E-05	590	6,000E-01	890	1,245E-05	1190	2,572E-03	2650	6,484E-01	4150	1,256E-04
300	< 1,0E-05	600	5,060E-01	900	1,188E-05	1200	3,303E-03	2700	5,956E-01	4200	1,064E-04
310	5,6E-04	610	4,110E-01	910	1,184E-05	1250	7,500E-03	2750	4,255E-01	4250	1,102E-04
320	3,300E-02	620	3,220E-01	920	1,265E-05	1300	1,760E-02	2800	7,000E-02	4300	1,327E-04
330	1,560E-01	630	2,420E-01	930	1,465E-05	1350	3,270E-02	2850	1,117E-02	4350	1,614E-04
340	3,050E-01	640	1,750E-01	940	1,771E-05	1400	6,000E-02	2900	4,000E-03	4400	2,000E-04
350	4,160E-01	650	1,220E-01	950	2,149E-05	1450	9,630E-02	2950	2,113E-03	4450	2,553E-04
360	4,970E-01	660	8,200E-02	960	2,560E-05	1500	1,500E-01	3000	1,318E-03	4500	2,972E-04
370	5,520E-01	670	5,300E-02	970	3,000E-05	1550	2,136E-01	3050	1,000E-03	4550	3,508E-04
380	6,030E-01	680	3,300E-02	980	3,747E-05	1600	2,800E-01	3100	7,000E-04	4600	4,000E-04
390	6,430E-01	690	1,992E-02	990	4,756E-05	1650	3,594E-01	3150	5,248E-04	4650	4,667E-04
400	6,820E-01	700	1,200E-02	1000	5,807E-05	1700	4,356E-01	3200	4,000E-04	4700	5,140E-04
410	7,190E-01	710	6,990E-03	1010	7,070E-05	1750	5,018E-01	3250	3,412E-04	4750	5,000E-04
420	7,510E-01	720	4,000E-03	1020	8,810E-05	1800	5,600E-01	3300	3,097E-04	4800	4,699E-04
430	7,800E-01	730	2,294E-03	1030	1,098E-04	1850	6,191E-01	3350	2,871E-04	4850	4,266E-04
440	8,060E-01	740	1,333E-03	1040	1,337E-04	1900	6,600E-01	3400	2,793E-04	4900	4,169E-04
450	8,300E-01	750	7,750E-04	1050	1,622E-04	1950	7,070E-01	3450	3,034E-04	4950	4,477E-04
460	8,530E-01	760	4,570E-04	1060	2,000E-04	2000	7,430E-01	3500	3,606E-04	5000	5,000E-04
470	8,720E-01	770	2,754E-04	1070	2,573E-04	2050	7,631E-01	3550	4,634E-04	5050	5,000E-04
480	8,850E-01	780	1,734E-04	1080	3,317E-04	2100	7,807E-01	3600	6,000E-04	5100	4,198E-04
490	8,991E-01	790	1,109E-04	1090	4,133E-04	2150	7,891E-01	3650	8,185E-04	5150	2,931E-04

BG25

Optical properties	
Reflection factor	
P_d	= 0,920
Spectral values guaranteed	
τ_i (334 nm)	≤ 0,8
τ_i (405 nm)	≥ 0,93
τ_i (488 nm)	≤ 0,39
τ_i (725 nm)	≤ 0,36
Refractive indices	
n_F (486 nm)	= 1,52
n_e (546 nm)	= 1,51
n_d (587,6 nm)	= 1,51
Sellmeier coefficients	
valid from 400 nm to 1550 nm	
B_1	0,8738
B_2	0,3772
B_3	1,1188
C_1	9,601E-03 μm^2
C_2	1,1147E-02 μm^2
C_3	145,493 μm^2
Internal quality	
Bubble class	1

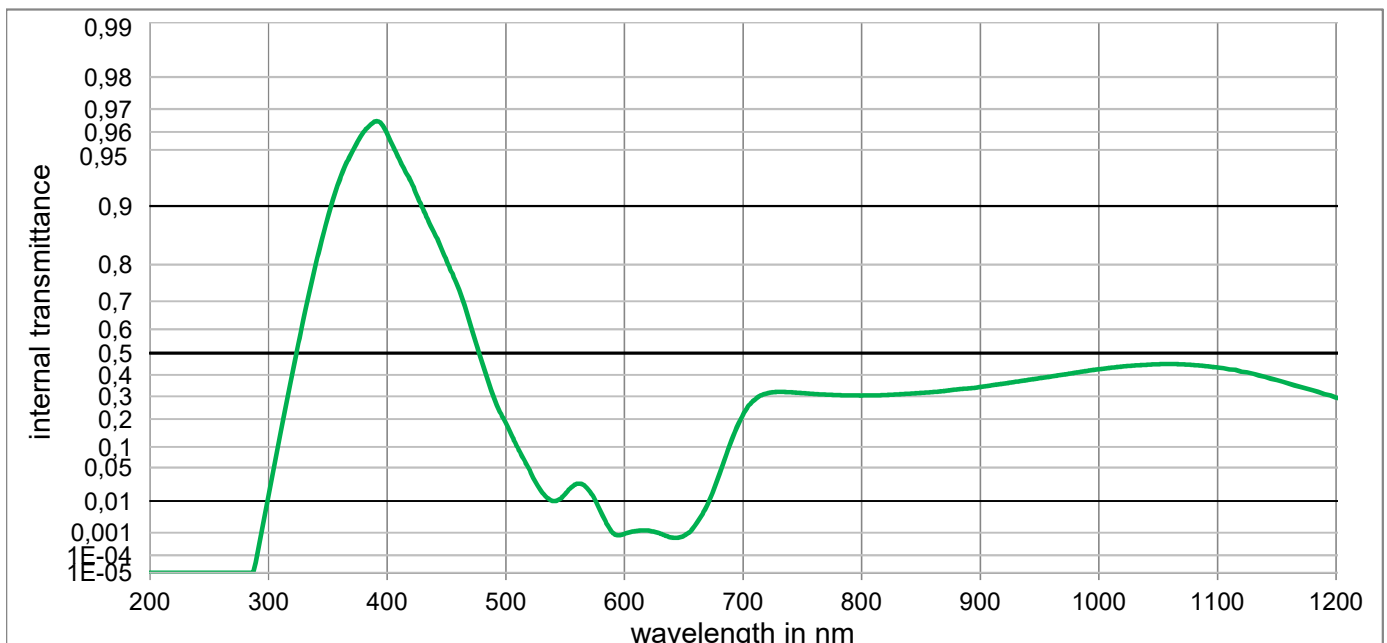
Mechanical properties	
Reference thickness	
d	= 1,00 mm
Density	
ρ	= 2,56 g/cm ³
Knoop hardness	
HK[0.1/20]	= 434

Thermal properties	
Transformation temperature	
T_g	= 459 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 8,9
α (20°C/300°C)	= 10,2

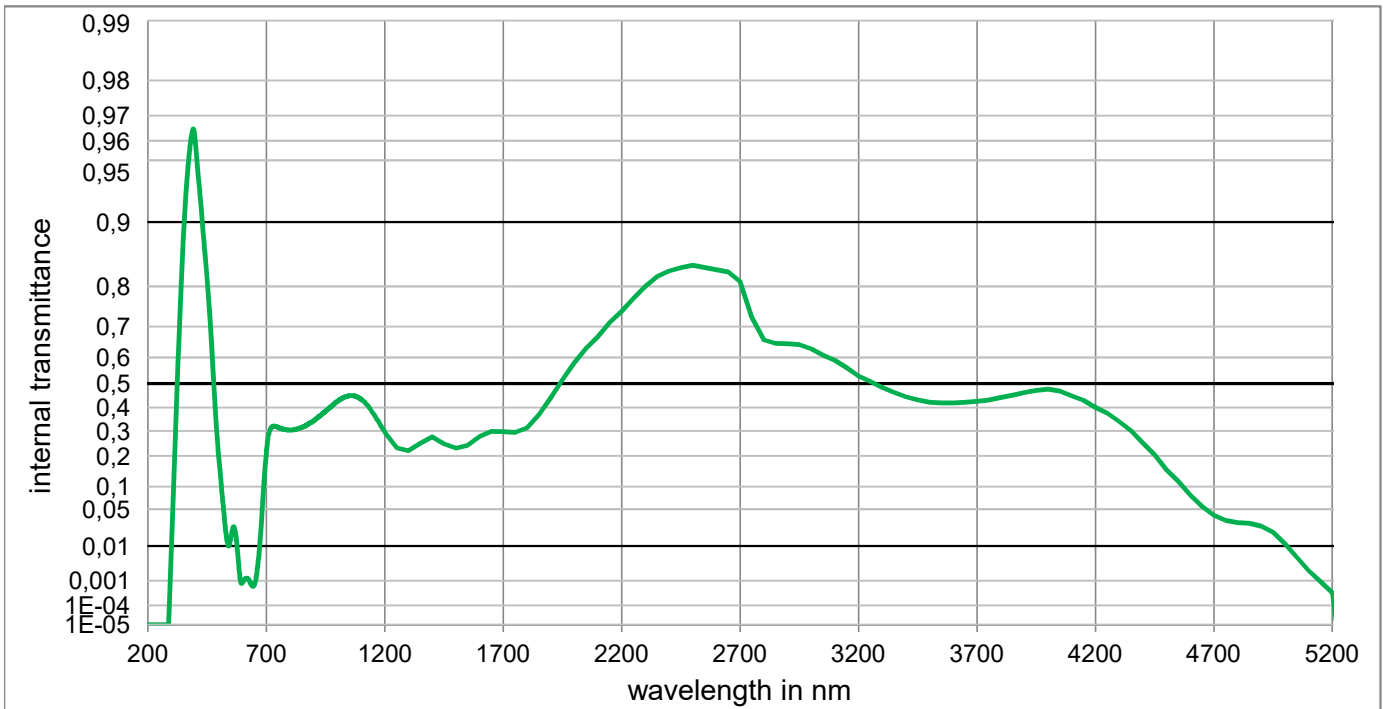
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,150	0,153	0,157
	y	0,055	0,027	0,021
	Y	5,0	1,8	1,1
	λ_d	463 nm	455 nm	451 nm
	P_e	0,934	0,985	0,993
Illuminant A	x	0,155	0,151	0,155
	y	0,093	0,035	0,024
	Y	2,6	0,7	0,4
	λ_d	470 nm	459 nm	454 nm
	P_e	0,903	0,981	0,992

Notes	
UV	
Transmission changes are possible under the action of intense ultraviolet radiation.	
Ionically colored glass	
Bandpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG25



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	1,830E-01	800	3,037E-01	1100	4,350E-01	2200	7,421E-01	3700	4,262E-01
210	< 1,0E-05	510	9,700E-02	810	3,043E-01	1110	4,263E-01	2250	7,743E-01	3750	4,322E-01
220	< 1,0E-05	520	4,500E-02	820	3,060E-01	1120	4,160E-01	2300	8,000E-01	3800	4,424E-01
230	< 1,0E-05	530	1,700E-02	830	3,089E-01	1130	4,069E-01	2350	8,200E-01	3850	4,517E-01
240	< 1,0E-05	540	1,000E-02	840	3,122E-01	1140	3,915E-01	2400	8,300E-01	3900	4,636E-01
250	< 1,0E-05	550	1,500E-02	850	3,157E-01	1150	3,759E-01	2450	8,363E-01	3950	4,721E-01
260	< 1,0E-05	560	2,499E-02	860	3,200E-01	1160	3,598E-01	2500	8,400E-01	4000	4,772E-01
270	< 1,0E-05	570	1,800E-02	870	3,250E-01	1170	3,452E-01	2550	8,363E-01	4050	4,700E-01
280	< 1,0E-05	580	5,153E-03	880	3,320E-01	1180	3,280E-01	2600	8,321E-01	4100	4,500E-01
290	8,5E-05	590	1,014E-03	890	3,368E-01	1190	3,108E-01	2650	8,278E-01	4150	4,305E-01
300	1,4E-02	600	9,099E-04	900	3,438E-01	1200	2,943E-01	2700	8,100E-01	4200	4,000E-01
310	1,4E-01	610	1,170E-03	910	3,517E-01	1250	2,318E-01	2750	7,251E-01	4250	3,761E-01
320	4,080E-01	620	1,212E-03	920	3,598E-01	1300	2,200E-01	2800	6,600E-01	4300	3,400E-01
330	6,550E-01	630	9,256E-04	930	3,683E-01	1350	2,496E-01	2850	6,478E-01	4350	3,006E-01
340	8,050E-01	640	6,433E-04	940	3,764E-01	1400	2,751E-01	2900	6,470E-01	4400	2,500E-01
350	8,870E-01	650	7,603E-04	950	3,850E-01	1450	2,462E-01	2950	6,436E-01	4450	2,046E-01
360	9,280E-01	660	1,998E-03	960	3,932E-01	1500	2,300E-01	3000	6,300E-01	4500	1,500E-01
370	9,480E-01	670	7,995E-03	970	4,017E-01	1550	2,420E-01	3050	6,079E-01	4550	1,146E-01
380	9,600E-01	680	3,800E-02	980	4,106E-01	1600	2,768E-01	3100	5,900E-01	4600	7,834E-02
390	9,650E-01	690	1,180E-01	990	4,192E-01	1650	2,980E-01	3150	5,621E-01	4650	5,508E-02
400	9,590E-01	700	2,190E-01	1000	4,270E-01	1700	2,963E-01	3200	5,300E-01	4700	4,000E-02
410	9,440E-01	710	2,860E-01	1010	4,338E-01	1750	2,946E-01	3250	5,086E-01	4750	3,296E-02
420	9,260E-01	720	3,140E-01	1020	4,398E-01	1800	3,133E-01	3300	4,840E-01	4800	3,000E-02
430	8,970E-01	730	3,205E-01	1030	4,442E-01	1850	3,693E-01	3350	4,636E-01	4850	2,924E-02
440	8,610E-01	740	3,190E-01	1040	4,475E-01	1900	4,400E-01	3400	4,449E-01	4900	2,576E-02
450	8,090E-01	750	3,150E-01	1050	4,501E-01	1950	5,145E-01	3450	4,330E-01	4950	1,968E-02
460	7,400E-01	760	3,109E-01	1060	4,513E-01	2000	5,800E-01	3500	4,228E-01	5000	1,132E-02
470	6,200E-01	770	3,079E-01	1070	4,498E-01	2050	6,325E-01	3550	4,200E-01	5050	5,236E-03
480	4,570E-01	780	3,057E-01	1080	4,465E-01	2100	6,700E-01	3600	4,200E-01	5100	2,178E-03
490	2,910E-01	790	3,043E-01	1090	4,416E-01	2150	7,124E-01	3650	4,228E-01	5150	9,397E-04

BG38

Optical properties	
Reflection factor	
$P_d = 0,916$	
Spectral values guaranteed	
τ_i (350 nm)	$\geq 0,8$
τ_i (405 nm)	$\geq 0,93$
τ_i (514 nm)	$\geq 0,95$
τ_i (633 nm)	$\leq 0,67$
τ_i (694 nm)	$\leq 0,32$
τ_i (1060 nm)	$\leq 0,06$
Refractive indices	
n_d (587,6 nm) = 1,53	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	2

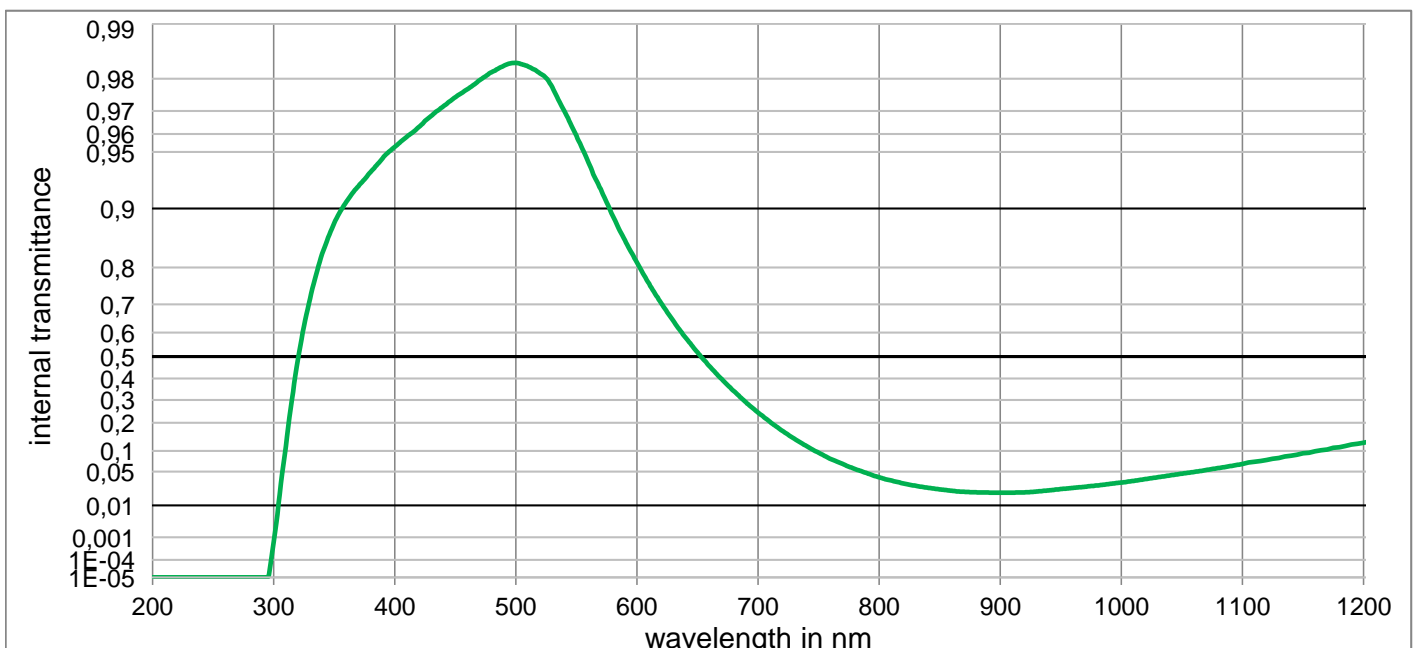
Mechanical properties	
Reference thickness	
$d = 1,00$ mm	
Density	
$\rho = 2,66$ g/cm ³	
Knoop hardness	
HK[0.1/20] = 472	

Thermal properties	
Transformation temperature	
$T_g = 482$ °C	
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 7,5
α (20°C/300°C)	= 8,9

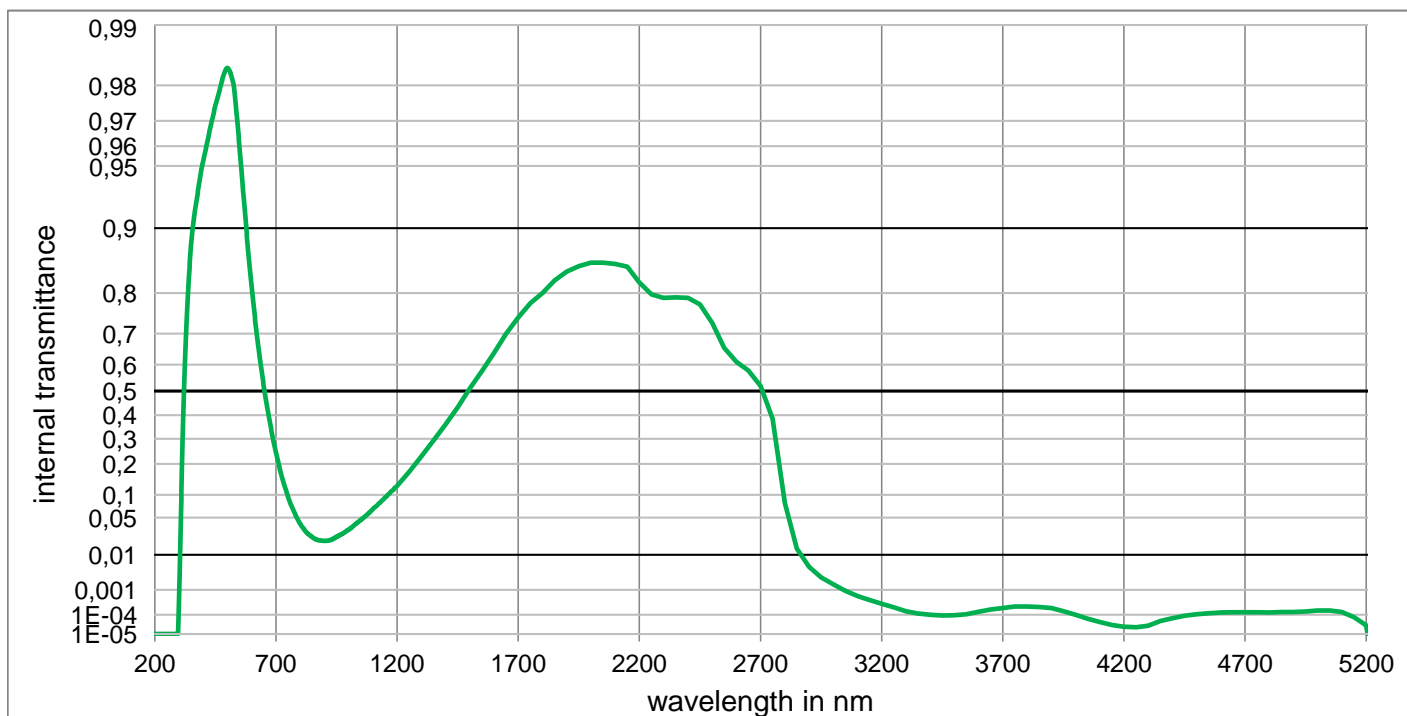
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 2
AR class	= 2

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,288	0,268	0,253
	y	0,328	0,326	0,323
	Y	83,2	76,4	70,8
	λ_d	491 nm	491 nm	490 nm
	P_e	0,092	0,164	0,223
Illuminant A	x	0,413	0,384	0,360
	y	0,419	0,427	0,433
	Y	79,7	70,7	63,7
	λ_d	501 nm	500 nm	500 nm
	P_e	0,078	0,144	0,200

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG38



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only



λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,836E-01	800	4,002E-02	1100	6,593E-02	2200	8,208E-01	3700	2,000E-04
210	< 1,0E-05	510	9,829E-01	810	3,491E-02	1110	7,111E-02	2250	7,973E-01	3750	2,296E-04
220	< 1,0E-05	520	9,813E-01	820	3,080E-02	1120	7,524E-02	2300	7,897E-01	3800	2,317E-04
230	< 1,0E-05	530	9,777E-01	830	2,761E-02	1130	8,054E-02	2350	7,907E-01	3850	2,193E-04
240	< 1,0E-05	540	9,700E-01	840	2,539E-02	1140	8,631E-02	2400	7,897E-01	3900	2,000E-04
250	< 1,0E-05	550	9,590E-01	850	2,341E-02	1150	9,319E-02	2450	7,756E-01	3950	1,449E-04
260	< 1,0E-05	560	9,430E-01	860	2,183E-02	1160	9,869E-02	2500	7,300E-01	4000	1,000E-04
270	< 1,0E-05	570	9,210E-01	870	2,077E-02	1170	1,044E-01	2550	6,569E-01	4050	6,471E-05
280	< 1,0E-05	580	8,910E-01	880	2,026E-02	1180	1,113E-01	2600	6,100E-01	4100	4,436E-05
290	< 1,0E-05	590	8,540E-01	890	2,000E-02	1190	1,198E-01	2650	5,786E-01	4150	3,090E-05
300	6,5E-04	600	8,110E-01	900	1,991E-02	1200	1,258E-01	2700	5,200E-01	4200	2,500E-05
310	1,1E-01	610	7,600E-01	910	1,996E-02	1250	1,715E-01	2750	3,854E-01	4250	2,410E-05
320	4,870E-01	620	7,040E-01	920	2,020E-02	1300	2,281E-01	2800	8,000E-02	4300	2,818E-05
330	7,180E-01	630	6,440E-01	930	2,103E-02	1350	2,931E-01	2850	1,384E-02	4350	5,047E-05
340	8,290E-01	640	5,810E-01	940	2,227E-02	1400	3,600E-01	2900	5,000E-03	4400	6,776E-05
350	8,813E-01	650	5,180E-01	950	2,371E-02	1450	4,335E-01	2950	2,547E-03	4450	9,036E-05
360	9,077E-01	660	4,560E-01	960	2,505E-02	1500	5,100E-01	3000	1,531E-03	4500	1,047E-04
370	9,239E-01	670	3,970E-01	970	2,650E-02	1550	5,768E-01	3050	9,290E-04	4550	1,169E-04
380	9,359E-01	680	3,410E-01	980	2,805E-02	1600	6,400E-01	3100	6,000E-04	4600	1,247E-04
390	9,460E-01	690	2,890E-01	990	3,000E-02	1650	7,000E-01	3150	4,236E-04	4650	1,294E-04
400	9,530E-01	700	2,430E-01	1000	3,196E-02	1700	7,436E-01	3200	3,000E-04	4700	1,294E-04
410	9,587E-01	710	2,030E-01	1010	3,434E-02	1750	7,784E-01	3250	2,133E-04	4750	1,282E-04
420	9,634E-01	720	1,680E-01	1020	3,707E-02	1800	8,000E-01	3300	1,422E-04	4800	1,259E-04
430	9,680E-01	730	1,390E-01	1030	4,006E-02	1850	8,246E-01	3350	1,138E-04	4850	1,330E-04
440	9,717E-01	740	1,150E-01	1040	4,300E-02	1900	8,400E-01	3400	1,000E-04	4900	1,330E-04
450	9,748E-01	750	9,500E-02	1050	4,610E-02	1950	8,491E-01	3450	9,120E-05	4950	1,409E-04
460	9,772E-01	760	7,800E-02	1060	4,929E-02	2000	8,548E-01	3500	9,550E-05	5000	1,560E-04
470	9,796E-01	770	6,600E-02	1070	5,297E-02	2050	8,548E-01	3550	1,057E-04	5050	1,531E-04
480	9,816E-01	780	5,500E-02	1080	5,700E-02	2100	8,529E-01	3600	1,358E-04	5100	1,318E-04
490	9,830E-01	790	4,700E-02	1090	6,123E-02	2150	8,482E-01	3650	1,694E-04	5150	7,516E-05

BG39

Optical properties	
Reflection factor	
$P_d = 0,914$	
Spectral values guaranteed	
τ_i (350 nm)	$\geq 0,6$
τ_i (405 nm)	$\geq 0,85$
τ_i (514 nm)	$\geq 0,93$
τ_i (633 nm)	$\leq 0,3$
τ_i (694 nm)	$\leq 0,03$
τ_i (1060 nm)	$\leq 0,001$
Refractive indices	
n_d (587,6 nm) = 1,54	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	2

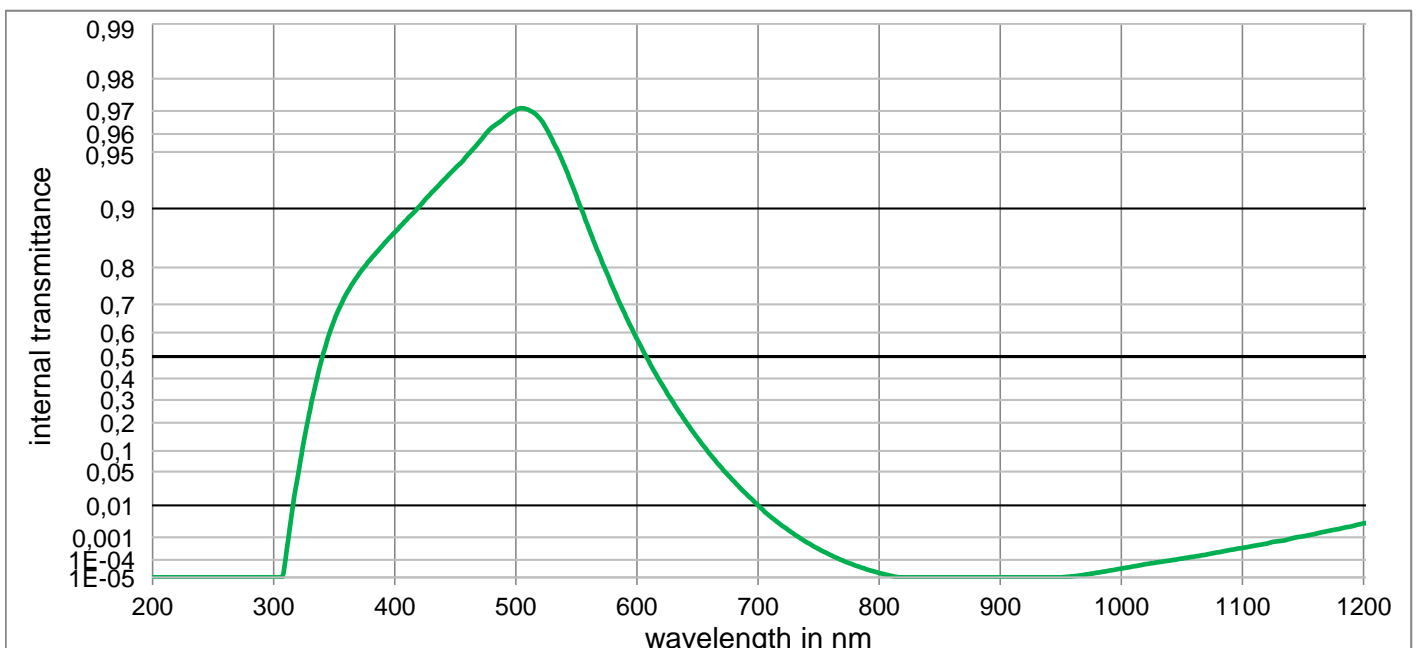
Mechanical properties	
Reference thickness	
$d = 1,00$ mm	
Density	
$\rho = 2,74$ g/cm ³	
Knoop hardness	
HK[0.1/20] = 386	

Thermal properties	
Transformation temperature	
$T_g = 322$ °C	
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 11,6
α (20°C/200°C)	= 13,1

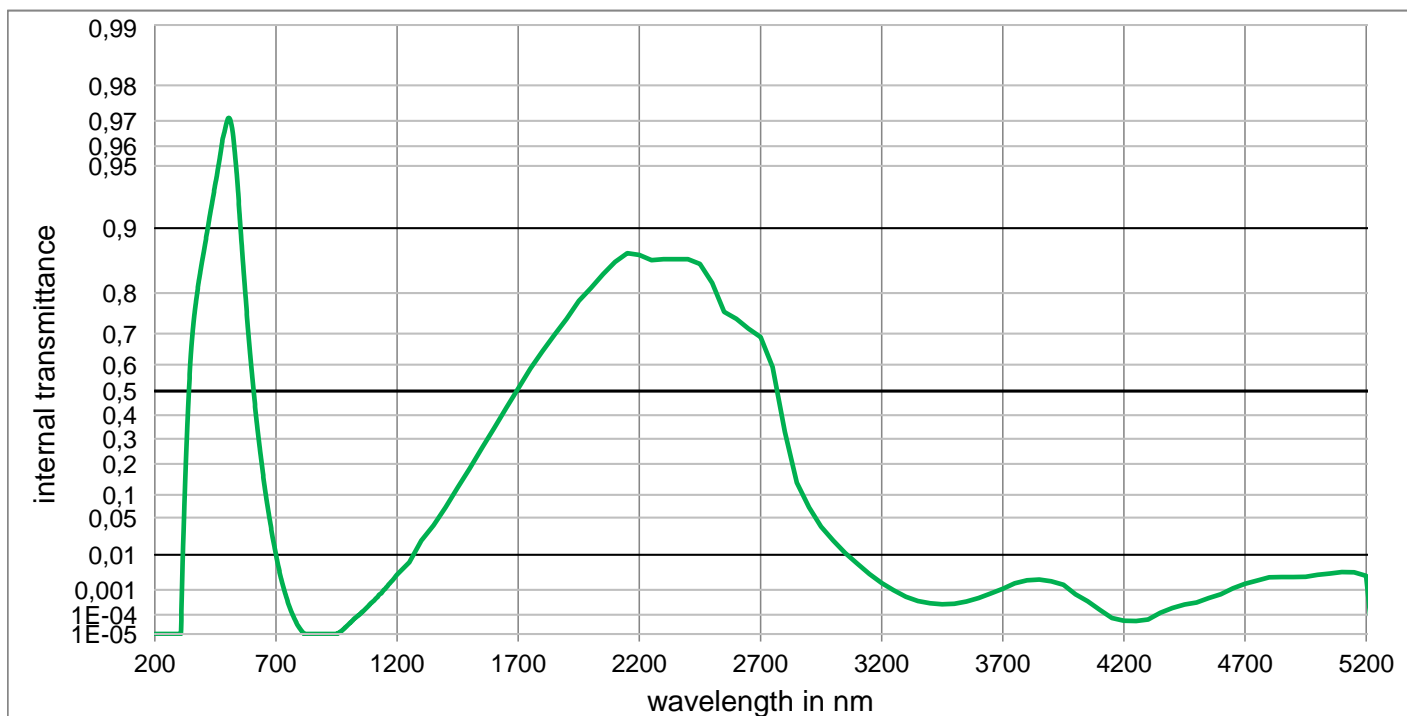
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 5.1
AR class	= 3
 	
Long-term changes in the polished surface are possible.	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,257	0,226	0,207
	y	0,326	0,322	0,318
	Y	72,8	62,3	55,1
	λ_d	491 nm	490 nm	490 nm
	P_e	0,207	0,321	0,395
Illuminant A	x	0,365	0,314	0,279
	y	0,434	0,445	0,450
	Y	65,9	53,3	45,2
	λ_d	500 nm	500 nm	499 nm
	P_e	0,188	0,305	0,385

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG39



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only


λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,704E-01	800	1,914E-05	1100	3,654E-04	2200	8,661E-01	3700	1,086E-03
210	< 1,0E-05	510	9,705E-01	810	1,254E-05	1110	4,625E-04	2250	8,585E-01	3750	1,648E-03
220	< 1,0E-05	520	9,670E-01	820	< 1,000E-05	1120	5,538E-04	2300	8,600E-01	3800	2,075E-03
230	< 1,0E-05	530	9,571E-01	830	< 1,000E-05	1130	7,037E-04	2350	8,600E-01	3850	2,173E-03
240	< 1,0E-05	540	9,410E-01	840	< 1,000E-05	1140	8,786E-04	2400	8,600E-01	3900	1,910E-03
250	< 1,0E-05	550	9,140E-01	850	< 1,000E-05	1150	1,070E-03	2450	8,529E-01	3950	1,476E-03
260	< 1,0E-05	560	8,740E-01	860	< 1,000E-05	1160	1,330E-03	2500	8,200E-01	4000	7,000E-04
270	< 1,0E-05	570	8,200E-01	870	< 1,000E-05	1170	1,667E-03	2550	7,577E-01	4050	3,784E-04
280	< 1,0E-05	580	7,510E-01	880	< 1,000E-05	1180	2,012E-03	2600	7,400E-01	4100	1,663E-04
290	< 1,0E-05	590	6,680E-01	890	< 1,000E-05	1190	2,445E-03	2650	7,143E-01	4150	6,966E-05
300	< 1,0E-05	600	5,750E-01	900	< 1,000E-05	1200	3,055E-03	2700	6,900E-01	4200	5,188E-05
310	1,5E-04	610	4,760E-01	910	< 1,000E-05	1250	6,600E-03	2750	5,918E-01	4250	4,955E-05
320	4,200E-02	620	3,780E-01	920	< 1,000E-05	1300	2,000E-02	2800	3,300E-01	4300	6,000E-05
330	2,560E-01	630	2,870E-01	930	< 1,000E-05	1350	3,770E-02	2850	1,355E-01	4350	1,236E-04
340	4,940E-01	640	2,070E-01	940	< 1,000E-05	1400	7,000E-02	2900	7,000E-02	4400	2,000E-04
350	6,470E-01	650	1,420E-01	950	1,008E-05	1450	1,206E-01	2950	3,614E-02	4450	2,767E-04
360	7,320E-01	660	9,200E-02	960	1,175E-05	1500	1,838E-01	3000	2,000E-02	4500	3,388E-04
370	7,830E-01	670	5,700E-02	970	1,482E-05	1550	2,620E-01	3050	1,096E-02	4550	5,000E-04
380	8,180E-01	680	3,371E-02	980	1,948E-05	1600	3,440E-01	3100	6,000E-03	4600	7,000E-04
390	8,450E-01	690	1,900E-02	990	2,563E-05	1650	4,307E-01	3150	3,148E-03	4650	1,138E-03
400	8,670E-01	700	1,000E-02	1000	3,406E-05	1700	5,100E-01	3200	1,694E-03	4700	1,589E-03
410	8,860E-01	710	5,032E-03	1010	4,488E-05	1750	5,862E-01	3250	9,638E-04	4750	2,037E-03
420	9,020E-01	720	2,553E-03	1020	5,930E-05	1800	6,455E-01	3300	5,585E-04	4800	2,523E-03
430	9,170E-01	730	1,289E-03	1030	7,490E-05	1850	6,974E-01	3350	3,855E-04	4850	2,570E-03
440	9,290E-01	740	6,470E-04	1040	9,240E-05	1900	7,400E-01	3400	3,148E-04	4900	2,594E-03
450	9,390E-01	750	3,320E-04	1050	1,167E-04	1950	7,831E-01	3450	2,871E-04	4950	2,642E-03
460	9,480E-01	760	1,712E-04	1060	1,452E-04	2000	8,100E-01	3500	3,000E-04	5000	3,000E-03
470	9,560E-01	770	9,260E-05	1070	1,828E-04	2050	8,359E-01	3550	3,648E-04	5050	3,296E-03
480	9,630E-01	780	5,137E-05	1080	2,333E-04	2100	8,557E-01	3600	5,093E-04	5100	3,614E-03
490	9,670E-01	790	3,007E-05	1090	2,972E-04	2150	8,689E-01	3650	7,430E-04	5150	3,548E-03

BG40

Optical properties	
Reflection factor	
$P_d = 0,916$	
Spectral values guaranteed	
τ_i (350 nm)	$\geq 0,8$
τ_i (405 nm)	$\geq 0,93$
τ_i (514 nm)	$\geq 0,97$
τ_i (633 nm)	$\leq 0,57$
τ_i (694 nm)	$\leq 0,16$
τ_i (1060 nm)	$\leq 0,02$
Refractive indices	
n_F (486 nm)	$= 1,54$
n_e (546 nm)	$= 1,53$
n_d (587,6 nm)	$= 1,53$
Sellmeier coefficients	
valid from 435 nm to 1550 nm	
B_1	0,9300
B_2	0,3779
B_3	1,0478
C_1	$8,617E-03 \mu m^2$
C_2	$1,0398E-02 \mu m^2$
C_3	$149,651 \mu m^2$
Internal quality	
Bubble class	2

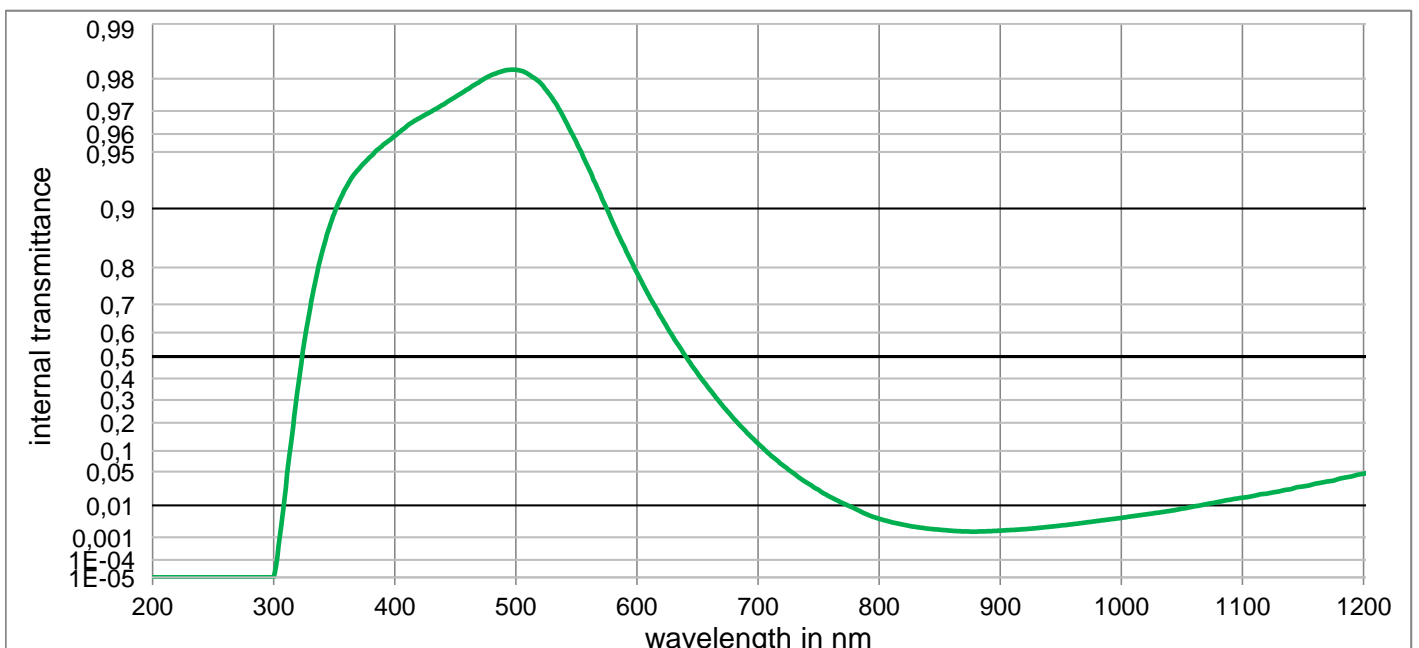
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,74 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 383	

Thermal properties	
Transformation temperature	
$T_g = 313 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	$= 11,9$
α (20°C/200°C)	$= 13,7$

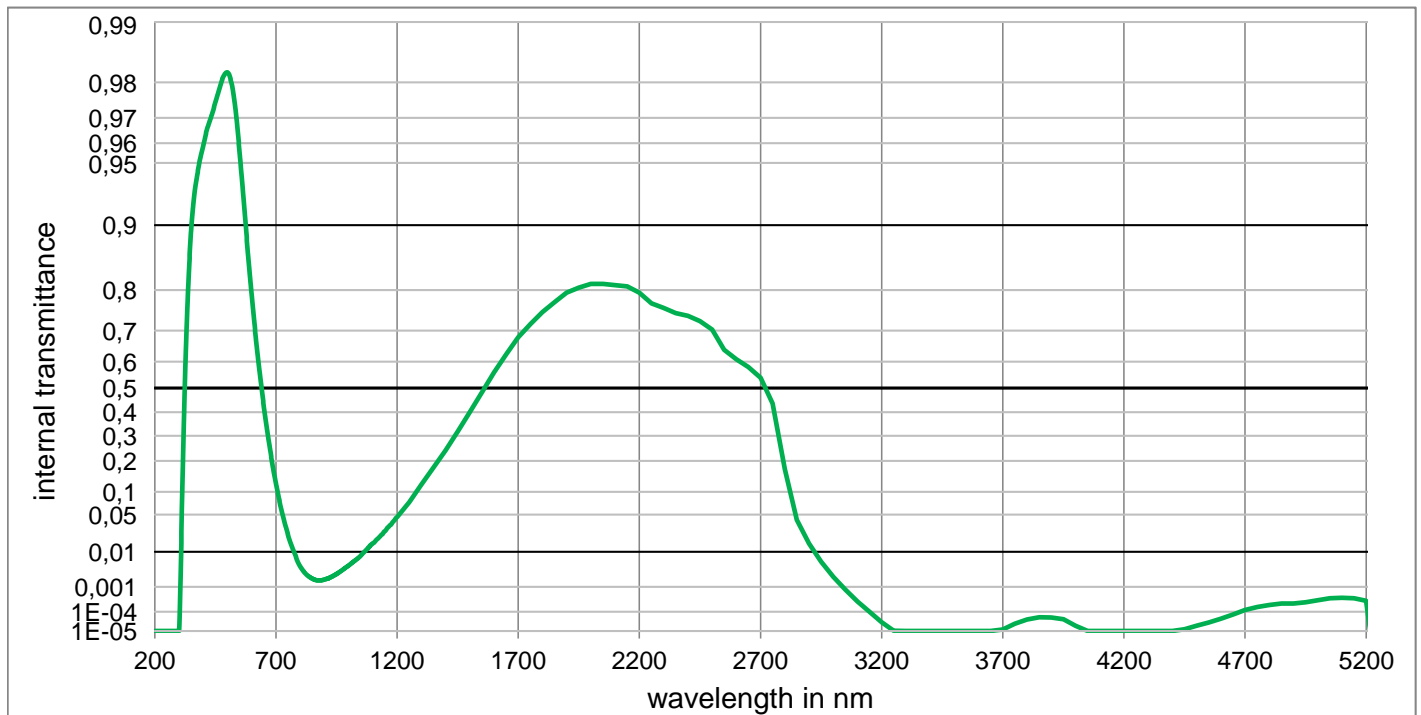
Chemical properties	
Chemical resistance	
FR class	$= 0$
SR class	$= 5.1$
AR class	$= 3$
 <p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,283	0,262	0,246
	y	0,327	0,324	0,321
	Y	82,1	74,8	69,0
	λ_d	491 nm	490 nm	490 nm
	P_e	0,108	0,188	0,250
Illuminant A	x	0,406	0,374	0,348
	y	0,421	0,430	0,436
	Y	78,0	68,4	61,3
	λ_d	501 nm	500 nm	500 nm
	P_e	0,094	0,168	0,227

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG40



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,821E-01	800	4,252E-03	1100	1,533E-02	2200	7,945E-01	3700	1,213E-05
210	< 1,0E-05	510	9,812E-01	810	3,366E-03	1110	1,712E-02	2250	7,709E-01	3750	2,518E-05
220	< 1,0E-05	520	9,790E-01	820	2,780E-03	1120	1,901E-02	2300	7,600E-01	3800	4,169E-05
230	< 1,0E-05	530	9,745E-01	830	2,340E-03	1130	2,123E-02	2350	7,473E-01	3850	5,395E-05
240	< 1,0E-05	540	9,670E-01	840	2,062E-03	1140	2,354E-02	2400	7,400E-01	3900	5,333E-05
250	< 1,0E-05	550	9,556E-01	850	1,880E-03	1150	2,665E-02	2450	7,266E-01	3950	4,335E-05
260	< 1,0E-05	560	9,390E-01	860	1,734E-03	1160	3,051E-02	2500	7,030E-01	4000	2,000E-05
270	< 1,0E-05	570	9,150E-01	870	1,644E-03	1170	3,350E-02	2550	6,408E-01	4050	< 1,000E-05
280	< 1,0E-05	580	8,820E-01	880	1,622E-03	1180	3,747E-02	2600	6,079E-01	4100	< 1,000E-05
290	< 1,0E-05	590	8,400E-01	890	1,670E-03	1190	4,112E-02	2650	5,805E-01	4150	< 1,000E-05
300	< 1,0E-05	600	7,880E-01	900	1,752E-03	1200	4,588E-02	2700	5,400E-01	4200	< 1,000E-05
310	2,6E-02	610	7,260E-01	910	1,850E-03	1250	7,450E-02	2750	4,363E-01	4250	< 1,000E-05
320	3,560E-01	620	6,570E-01	920	1,964E-03	1300	1,200E-01	2800	1,700E-01	4300	< 1,000E-05
330	6,860E-01	630	5,810E-01	930	2,136E-03	1350	1,762E-01	2850	4,150E-02	4350	< 1,000E-05
340	8,320E-01	640	5,030E-01	940	2,360E-03	1400	2,400E-01	2900	1,510E-02	4400	< 1,000E-05
350	8,940E-01	650	4,240E-01	950	2,607E-03	1450	3,185E-01	2950	5,754E-03	4450	1,256E-05
360	9,230E-01	660	3,490E-01	960	2,880E-03	1500	4,000E-01	3000	2,153E-03	4500	2,000E-05
370	9,380E-01	670	2,790E-01	970	3,228E-03	1550	4,825E-01	3050	8,072E-04	4550	2,958E-05
380	9,470E-01	680	2,170E-01	980	3,631E-03	1600	5,600E-01	3100	2,818E-04	4600	4,645E-05
390	9,540E-01	690	1,650E-01	990	4,064E-03	1650	6,258E-01	3150	9,840E-05	4650	7,362E-05
400	9,590E-01	700	1,230E-01	1000	4,527E-03	1700	6,800E-01	3200	3,000E-05	4700	1,197E-04
410	9,638E-01	710	8,900E-02	1010	5,091E-03	1750	7,181E-01	3250	1,033E-05	4750	1,618E-04
420	9,671E-01	720	6,400E-02	1020	5,708E-03	1800	7,500E-01	3300	< 1,000E-05	4800	2,000E-04
430	9,698E-01	730	4,570E-02	1030	6,370E-03	1850	7,737E-01	3350	< 1,000E-05	4850	2,286E-04
440	9,723E-01	740	3,200E-02	1040	7,145E-03	1900	7,945E-01	3400	< 1,000E-05	4900	2,286E-04
450	9,748E-01	750	2,267E-02	1050	8,180E-03	1950	8,048E-01	3450	< 1,000E-05	4950	2,600E-04
460	9,771E-01	760	1,580E-02	1060	9,350E-03	2000	8,124E-01	3500	< 1,000E-05	5000	3,126E-04
470	9,792E-01	770	1,138E-02	1070	1,068E-02	2050	8,124E-01	3550	< 1,000E-05	5050	3,802E-04
480	9,809E-01	780	8,250E-03	1080	1,221E-02	2100	8,100E-01	3600	< 1,000E-05	5100	3,981E-04
490	9,819E-01	790	5,710E-03	1090	1,384E-02	2150	8,076E-01	3650	< 1,000E-05	5150	3,758E-04

BG42

Optical properties	
Reflection factor	
$P_d = 0,914$	
Spectral values guaranteed	
τ_i (350 nm)	$\geq 0,4$
τ_i (405 nm)	$\geq 0,65$
τ_i (514 nm)	$\geq 0,88$
τ_i (633 nm)	$\leq 0,27$
τ_i (694 nm)	$\leq 0,03$
τ_i (1060 nm)	$\leq 0,002$
Refractive indices	
n_d (587,6 nm) = 1,54	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	2

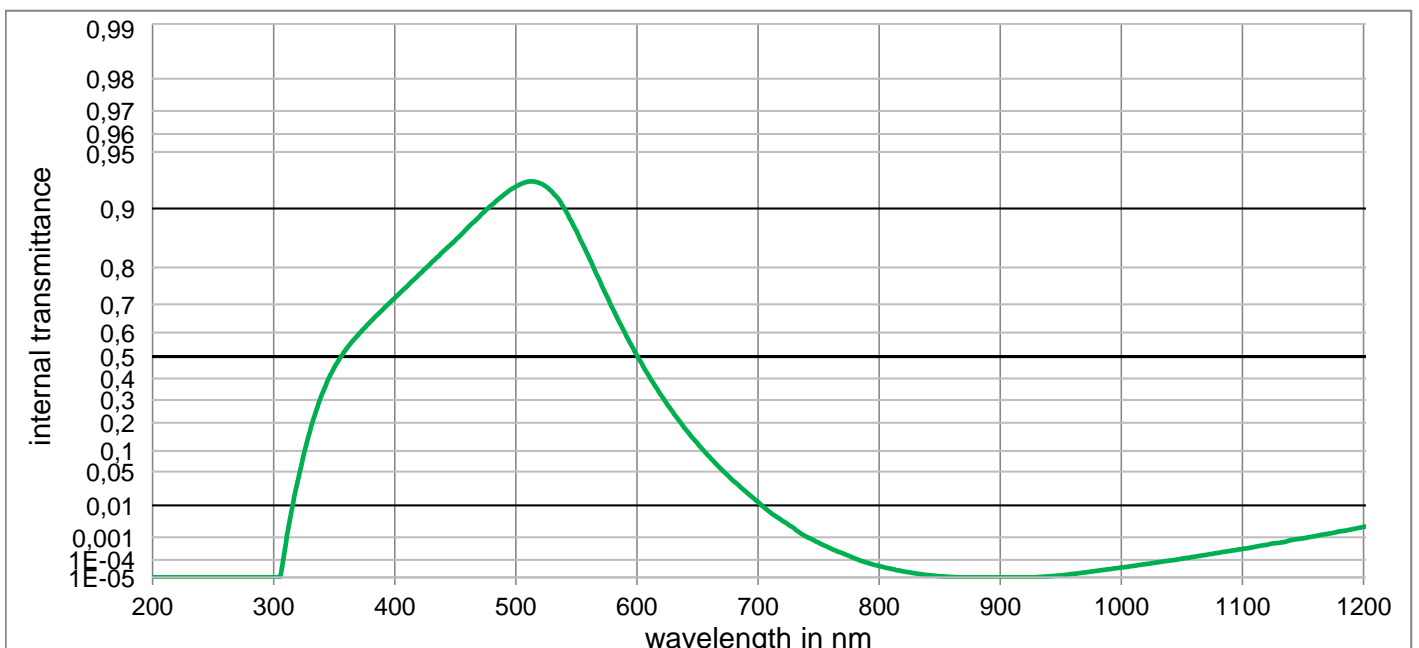
Mechanical properties	
Reference thickness	
$d = 1,00$ mm	
Density	
$\rho = 2,69$ g/cm ³	
Knoop hardness	
HK[0.1/20] = 467	

Thermal properties	
Transformation temperature	
$T_g = 475$ °C	
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 7,3
α (20°C/300°C)	= 8,7

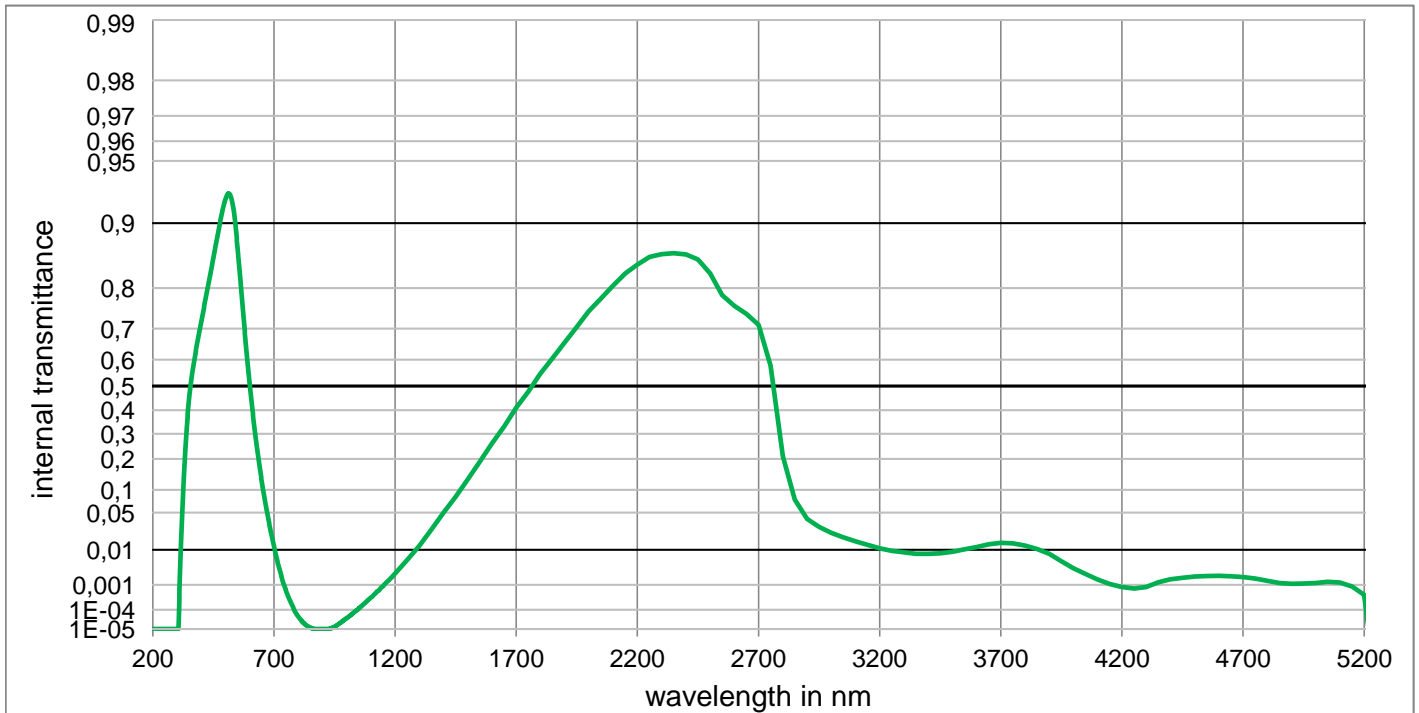
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 2
AR class	= 2

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,254	0,222	0,203
	y	0,332	0,334	0,337
	Y	68,1	55,2	46,4
	λ_d	492 nm	492 nm	492 nm
	P_e	0,214	0,325	0,393
Illuminant A	x	0,359	0,305	0,270
	y	0,439	0,456	0,466
	Y	61,1	46,6	37,6
	λ_d	501 nm	501 nm	501 nm
	P_e	0,201	0,323	0,403

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG42



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only



λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,234E-01	800	4,721E-05	1100	3,325E-04	2200	8,435E-01	3700	1,435E-02
210	< 1,0E-05	510	9,278E-01	810	3,258E-05	1110	4,084E-04	2250	8,557E-01	3750	1,396E-02
220	< 1,0E-05	520	9,265E-01	820	2,344E-05	1120	4,973E-04	2300	8,600E-01	3800	1,239E-02
230	< 1,0E-05	530	9,180E-01	830	1,770E-05	1130	6,020E-04	2350	8,614E-01	3850	1,035E-02
240	< 1,0E-05	540	9,000E-01	840	1,400E-05	1140	7,651E-04	2400	8,595E-01	3900	8,000E-03
250	< 1,0E-05	550	8,690E-01	850	1,183E-05	1150	8,992E-04	2450	8,519E-01	3950	5,212E-03
260	< 1,0E-05	560	8,240E-01	860	1,066E-05	1160	1,112E-03	2500	8,284E-01	4000	3,319E-03
270	< 1,0E-05	570	7,620E-01	870	< 1,000E-05	1170	1,339E-03	2550	7,850E-01	4050	2,234E-03
280	< 1,0E-05	580	6,860E-01	880	< 1,000E-05	1180	1,636E-03	2600	7,600E-01	4100	1,507E-03
290	< 1,0E-05	590	5,990E-01	890	< 1,000E-05	1190	1,926E-03	2650	7,400E-01	4150	1,064E-03
300	< 1,0E-05	600	5,050E-01	900	< 1,000E-05	1200	2,342E-03	2700	7,106E-01	4200	8,356E-04
310	5,7E-04	610	4,100E-01	910	< 1,000E-05	1250	5,700E-03	2750	5,777E-01	4250	7,413E-04
320	3,500E-02	620	3,210E-01	920	< 1,000E-05	1300	1,230E-02	2800	2,100E-01	4300	8,414E-04
330	1,680E-01	630	2,420E-01	930	1,035E-05	1350	2,640E-02	2850	7,586E-02	4350	1,230E-03
340	3,280E-01	640	1,750E-01	940	1,164E-05	1400	5,000E-02	2900	4,000E-02	4400	1,549E-03
350	4,510E-01	650	1,230E-01	950	1,341E-05	1450	8,290E-02	2950	2,931E-02	4450	1,718E-03
360	5,330E-01	660	8,300E-02	960	1,644E-05	1500	1,300E-01	3000	2,280E-02	4500	1,879E-03
370	5,930E-01	670	5,370E-02	970	2,037E-05	1550	1,904E-01	3050	1,854E-02	4550	1,959E-03
380	6,420E-01	680	3,400E-02	980	2,541E-05	1600	2,600E-01	3100	1,538E-02	4600	2,000E-03
390	6,830E-01	690	2,079E-02	990	3,155E-05	1650	3,308E-01	3150	1,291E-02	4650	1,932E-03
400	7,200E-01	700	1,216E-02	1000	3,890E-05	1700	4,100E-01	3200	1,086E-02	4700	1,828E-03
410	7,530E-01	710	6,530E-03	1010	4,820E-05	1750	4,778E-01	3250	9,462E-03	4750	1,637E-03
420	7,830E-01	720	3,740E-03	1020	5,998E-05	1800	5,485E-01	3300	8,710E-03	4800	1,377E-03
430	8,100E-01	730	2,027E-03	1030	7,447E-05	1850	6,060E-01	3350	8,072E-03	4850	1,156E-03
440	8,337E-01	740	1,047E-03	1040	9,247E-05	1900	6,578E-01	3400	8,000E-03	4900	1,079E-03
450	8,540E-01	750	6,120E-04	1050	1,153E-04	1950	7,049E-01	3450	8,299E-03	4950	1,102E-03
460	8,736E-01	760	3,490E-04	1060	1,422E-04	2000	7,473E-01	3500	9,000E-03	5000	1,164E-03
470	8,900E-01	770	2,050E-04	1070	1,770E-04	2050	7,775E-01	3550	1,021E-02	5050	1,274E-03
480	9,041E-01	780	1,191E-04	1080	2,193E-04	2100	8,048E-01	3600	1,156E-02	5100	1,197E-03
490	9,153E-01	790	7,178E-05	1090	2,716E-04	2150	8,284E-01	3650	1,318E-02	5150	8,650E-04

S8612

Optical properties	
Reflection factor	
$P_d = 0,913$	
Spectral values guaranteed	
τ_i (500 nm)	$\geq 0,96$
τ_i (600 nm)	$\geq 0,48$
τ_i (700 nm)	$< 0,02$
Refractive indices	
n_F (486 nm)	= 1,55
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 400 nm to 1550 nm	
B_1	0,9589
B_2	0,3811
B_3	1,1938
C_1	8,342E-03 μm^2
C_2	1,0187E-02 μm^2
C_3	134,146 μm^2
Internal quality	
Bubble class	1

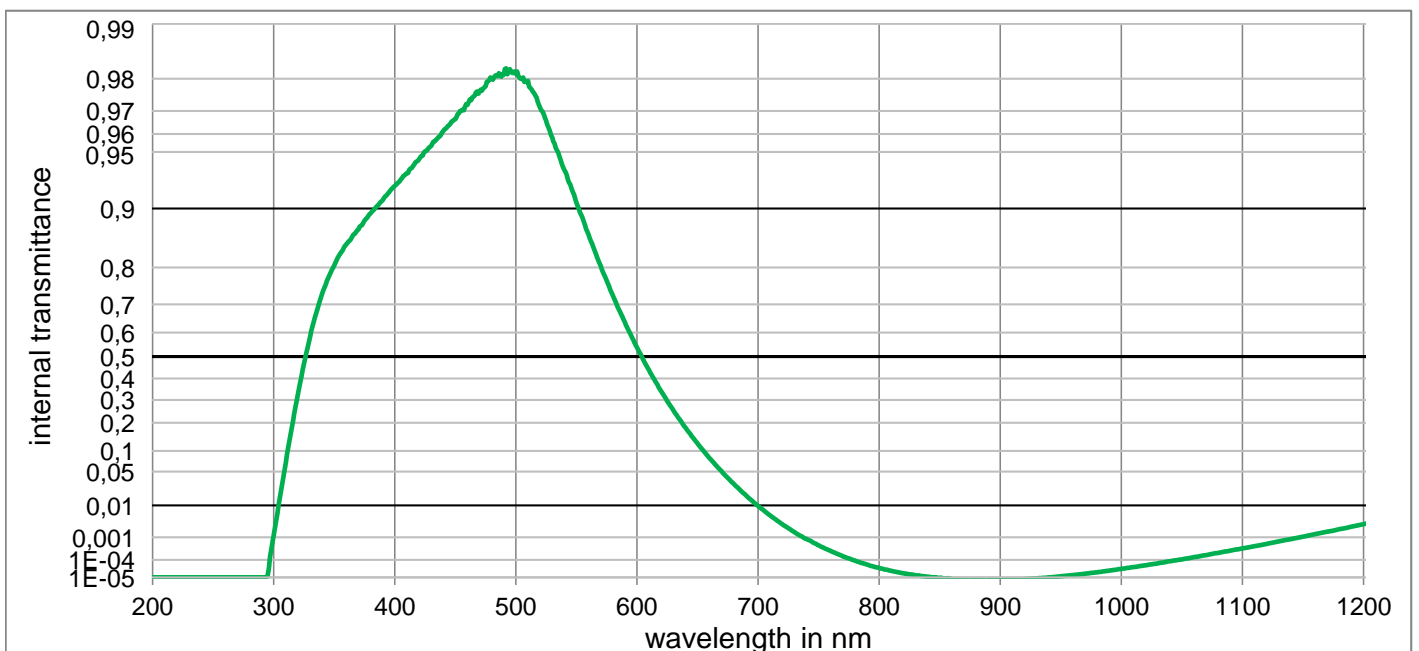
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,66 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 470	

Thermal properties	
Transformation temperature	
$T_g = 391 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 9,5$	

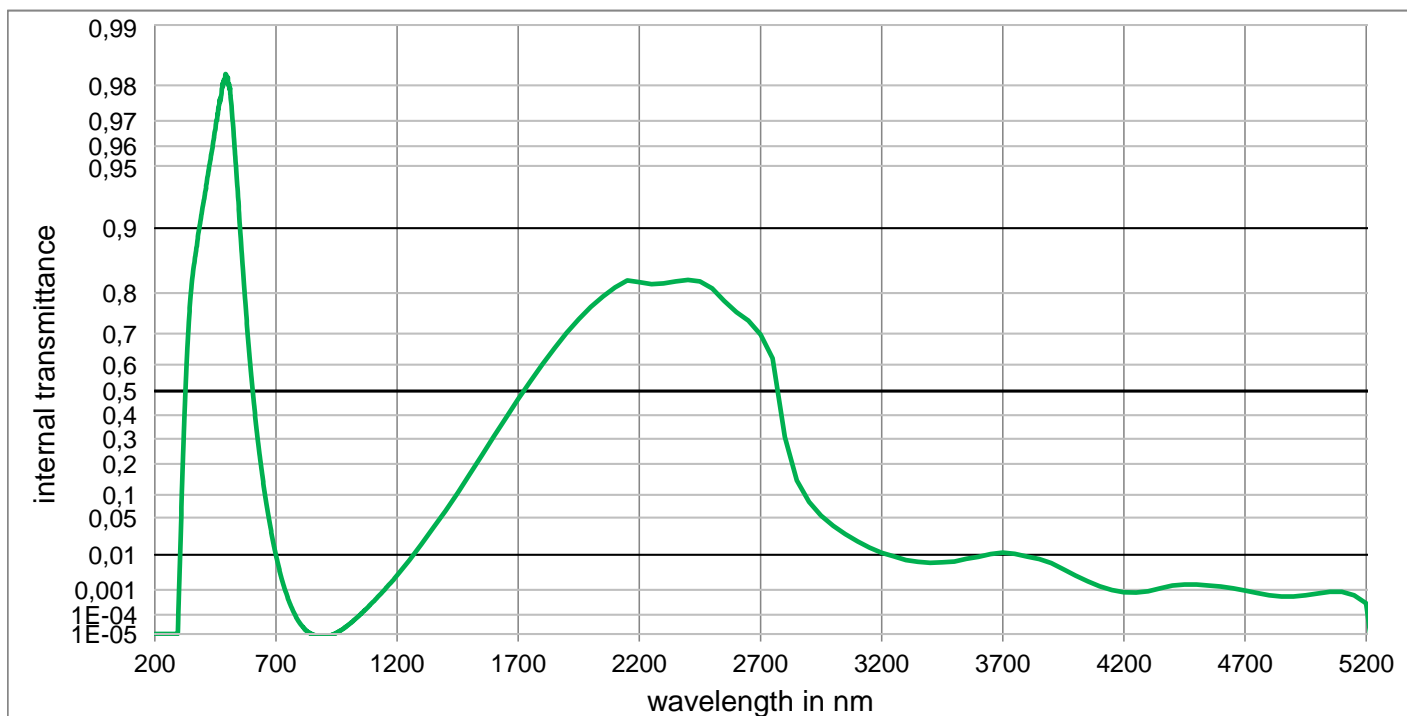
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 3
AR class	= 3
 	
Long-term changes in the polished surface are possible.	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,251	0,218	0,198
	y	0,321	0,311	0,302
	Y	72,1	61,5	54,4
	λ_d	490 nm	489 nm	489 nm
	P_e	0,232	0,358	0,438
Illuminant A	x	0,356	0,301	0,265
	y	0,433	0,440	0,440
	Y	64,6	51,8	43,9
	λ_d	500 nm	499 nm	498 nm
	P_e	0,208	0,335	0,421

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



S8612



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,812E-01	800	3,721E-05	1100	3,490E-04	2200	8,214E-01	3700	1,127E-02
210	< 1,0E-05	510	9,794E-01	810	2,547E-05	1110	4,398E-04	2250	8,176E-01	3750	1,048E-02
220	< 1,0E-05	520	9,712E-01	820	1,846E-05	1120	5,462E-04	2300	8,190E-01	3800	9,124E-03
230	< 1,0E-05	530	9,581E-01	830	1,353E-05	1130	6,882E-04	2350	8,230E-01	3850	7,921E-03
240	< 1,0E-05	540	9,376E-01	840	1,144E-05	1140	8,525E-04	2400	8,257E-01	3900	6,253E-03
250	< 1,0E-05	550	9,064E-01	850	< 1,000E-05	1150	1,056E-03	2450	8,228E-01	3950	4,323E-03
260	< 1,0E-05	560	8,634E-01	860	< 1,000E-05	1160	1,303E-03	2500	8,093E-01	4000	2,878E-03
270	< 1,0E-05	570	8,031E-01	870	< 1,000E-05	1170	1,600E-03	2550	7,833E-01	4050	1,922E-03
280	< 1,0E-05	580	7,281E-01	880	< 1,000E-05	1180	1,949E-03	2600	7,570E-01	4100	1,324E-03
290	< 1,0E-05	590	6,380E-01	890	< 1,000E-05	1190	2,376E-03	2650	7,355E-01	4150	9,941E-04
300	1,2E-03	600	5,394E-01	900	< 1,000E-05	1200	2,905E-03	2700	6,974E-01	4200	8,230E-04
310	7,0E-02	610	4,375E-01	910	< 1,000E-05	1250	7,369E-03	2750	6,221E-01	4250	8,062E-04
320	3,262E-01	620	3,402E-01	920	< 1,000E-05	1300	1,688E-02	2800	3,075E-01	4300	8,948E-04
330	5,836E-01	630	2,532E-01	930	< 1,000E-05	1350	3,500E-02	2850	1,427E-01	4350	1,139E-03
340	7,324E-01	640	1,806E-01	940	< 1,000E-05	1400	6,250E-02	2900	8,200E-02	4400	1,405E-03
350	8,052E-01	650	1,227E-01	950	1,169E-05	1450	1,056E-01	2950	5,346E-02	4450	1,517E-03
360	8,471E-01	660	8,015E-02	960	1,407E-05	1500	1,633E-01	3000	3,712E-02	4500	1,498E-03
370	8,719E-01	670	5,011E-02	970	1,696E-05	1550	2,331E-01	3050	2,668E-02	4550	1,412E-03
380	8,942E-01	680	3,002E-02	980	2,080E-05	1600	3,106E-01	3100	1,947E-02	4600	1,288E-03
390	9,098E-01	690	1,724E-02	990	2,577E-05	1650	3,906E-01	3150	1,445E-02	4650	1,134E-03
400	9,241E-01	700	9,713E-03	1000	3,264E-05	1700	4,675E-01	3200	1,116E-02	4700	9,531E-04
410	9,351E-01	710	5,318E-03	1010	4,113E-05	1750	5,384E-01	3250	9,156E-03	4750	7,737E-04
420	9,452E-01	720	2,878E-03	1020	5,209E-05	1800	6,014E-01	3300	7,488E-03	4800	6,368E-04
430	9,536E-01	730	1,550E-03	1030	6,608E-05	1850	6,560E-01	3350	6,807E-03	4850	5,693E-04
440	9,614E-01	740	8,691E-04	1040	8,476E-05	1900	7,019E-01	3400	6,426E-03	4900	5,713E-04
450	9,668E-01	750	4,709E-04	1050	1,072E-04	1950	7,397E-01	3450	6,601E-03	4950	6,405E-04
460	9,722E-01	760	2,680E-04	1060	1,355E-04	2000	7,696E-01	3500	6,905E-03	5000	7,477E-04
470	9,764E-01	770	1,513E-04	1070	1,735E-04	2050	7,930E-01	3550	7,981E-03	5050	8,493E-04
480	9,801E-01	780	9,133E-05	1080	2,205E-04	2100	8,115E-01	3600	8,930E-03	5100	8,478E-04
490	9,810E-01	790	5,627E-05	1090	2,782E-04	2150	8,248E-01	3650	1,037E-02	5150	6,335E-04

BG50

Optical properties	
Reflection factor	
P_d	= 0,916
Spectral values guaranteed	
τ_i (500 nm)	≥ 0,96
τ_i (600 nm)	≥ 0,68
τ_i (700 nm)	≤ 0,13
Refractive indices	
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,53
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	1

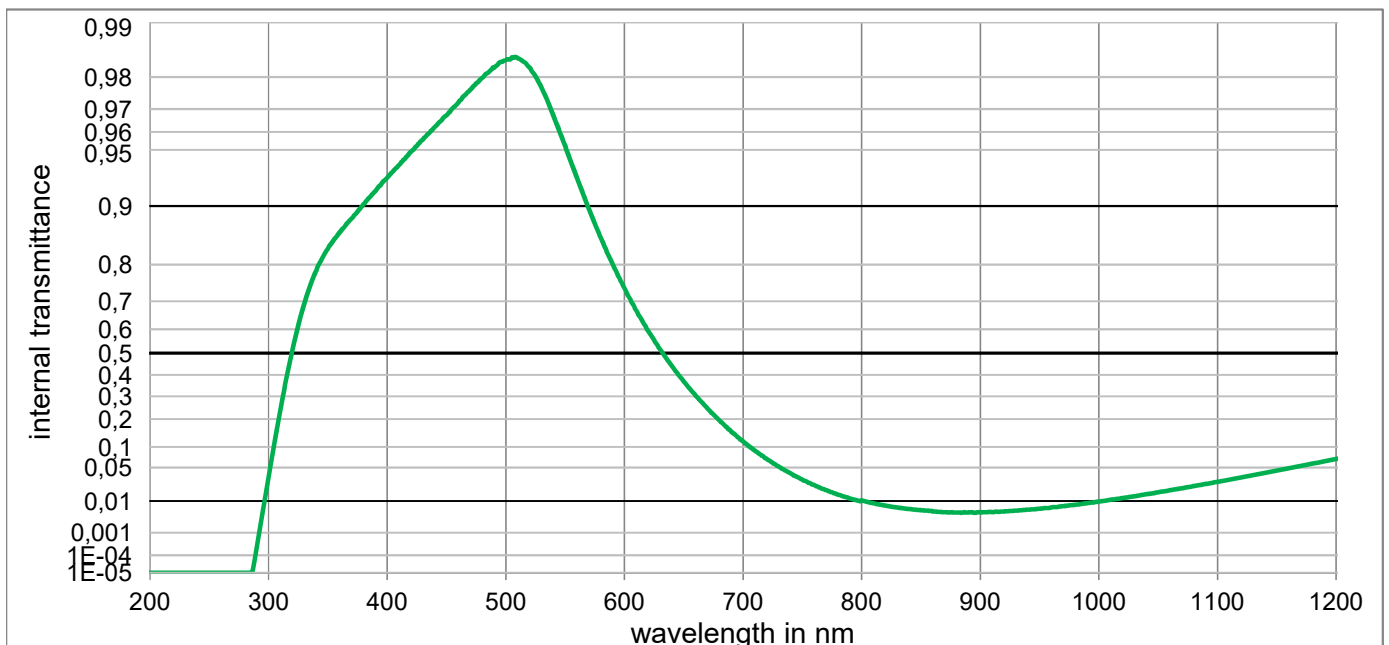
Mechanical properties	
Reference thickness	
d	= 1,00 mm
Density	
ρ	= 2,61 g/cm ³
Knoop hardness	
HK[0.1/20]	= 500

Thermal properties	
Transformation temperature	
T_g	= 452 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 7,3
α (20°C/300°C)	= 9,0

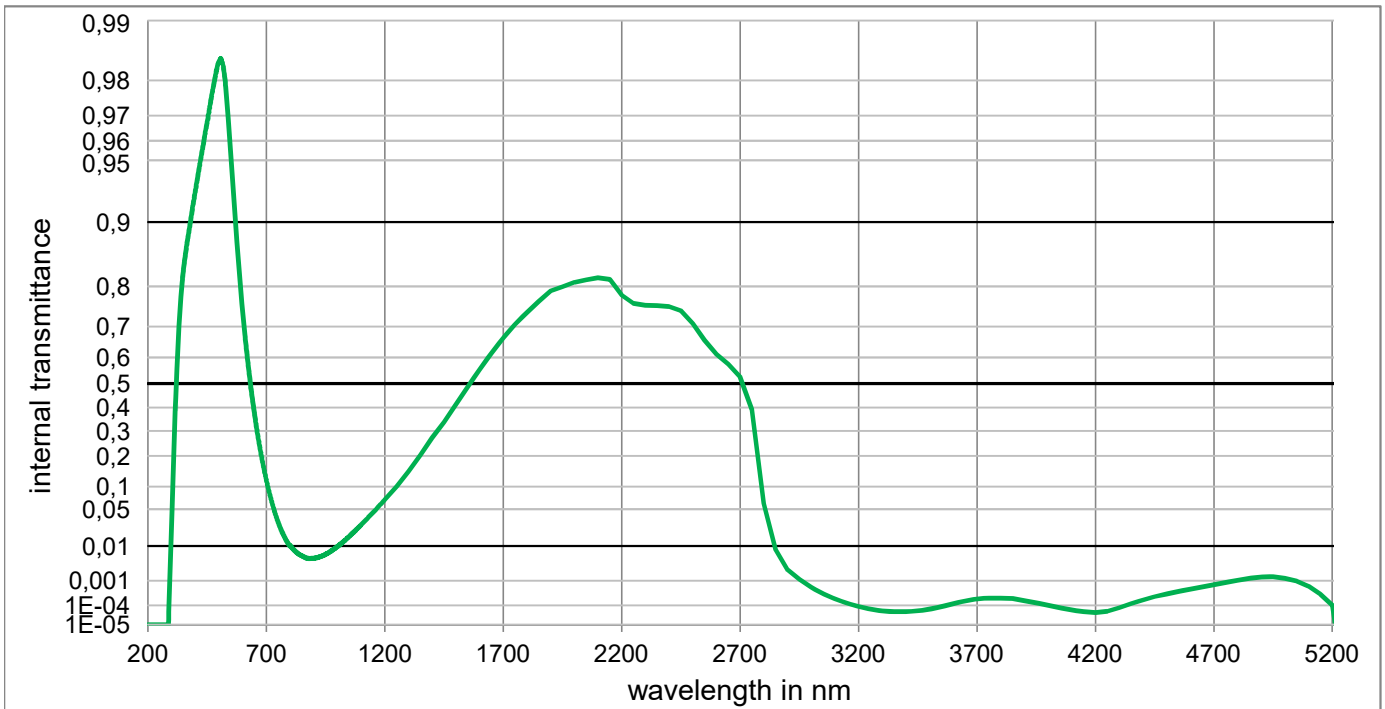
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 2
AR class	= 2
<p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,278	0,254	0,236
	y	0,328	0,325	0,323
	Y	80,1	72,1	66,1
	λ_d	491 nm	491 nm	491 nm
	P_e	0,128	0,218	0,286
Illuminant A	x	0,398	0,360	0,331
	y	0,424	0,435	0,441
	Y	75,3	64,9	57,5
	λ_d	501 nm	500 nm	500 nm
	P_e	0,112	0,198	0,267

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG50



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only


λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,839E-01	800	1,037E-02	1100	2,742E-02	2200	7,812E-01	3700	1,973E-04
210	< 1,0E-05	510	9,842E-01	810	8,778E-03	1110	3,025E-02	2250	7,616E-01	3750	2,116E-04
220	< 1,0E-05	520	9,822E-01	820	7,608E-03	1120	3,332E-02	2300	7,572E-01	3800	2,120E-04
230	< 1,0E-05	530	9,772E-01	830	6,752E-03	1130	3,694E-02	2350	7,563E-01	3850	2,052E-04
240	< 1,0E-05	540	9,674E-01	840	6,125E-03	1140	4,032E-02	2400	7,542E-01	3900	1,659E-04
250	< 1,0E-05	550	9,522E-01	850	5,688E-03	1150	4,421E-02	2450	7,434E-01	3950	1,296E-04
260	< 1,0E-05	560	9,289E-01	860	5,197E-03	1160	4,843E-02	2500	7,084E-01	4000	1,011E-04
270	< 1,0E-05	570	8,966E-01	870	4,946E-03	1170	5,312E-02	2550	6,584E-01	4050	7,680E-05
280	< 1,0E-05	580	8,539E-01	880	4,823E-03	1180	5,828E-02	2600	6,109E-01	4100	6,008E-05
290	2,6E-04	590	8,011E-01	890	4,901E-03	1190	6,325E-02	2650	5,749E-01	4150	4,951E-05
300	3,5E-02	600	7,390E-01	900	4,915E-03	1200	6,887E-02	2700	5,269E-01	4200	4,519E-05
310	2,4E-01	610	6,688E-01	910	4,987E-03	1250	1,003E-01	2750	3,913E-01	4250	5,260E-05
320	5,136E-01	620	5,939E-01	920	5,229E-03	1300	1,453E-01	2800	6,071E-02	4300	7,854E-05
330	6,928E-01	630	5,169E-01	930	5,480E-03	1350	2,027E-01	2850	8,223E-03	4350	1,220E-04
340	7,857E-01	640	4,412E-01	940	5,861E-03	1400	2,710E-01	2900	2,336E-03	4400	1,756E-04
350	8,340E-01	650	3,695E-01	950	6,242E-03	1450	3,377E-01	2950	1,128E-03	4450	2,437E-04
360	8,633E-01	660	3,035E-01	960	6,813E-03	1500	4,130E-01	3000	5,772E-04	4500	3,176E-04
370	8,842E-01	670	2,449E-01	970	7,328E-03	1550	4,865E-01	3050	3,274E-04	4550	3,950E-04
380	9,022E-01	680	1,942E-01	980	7,995E-03	1600	5,544E-01	3100	2,007E-04	4600	4,885E-04
390	9,167E-01	690	1,517E-01	990	8,860E-03	1650	6,147E-01	3150	1,291E-04	4650	5,950E-04
400	9,293E-01	700	1,170E-01	1000	9,751E-03	1700	6,652E-01	3200	8,906E-05	4700	7,243E-04
410	9,397E-01	710	8,944E-02	1010	1,078E-02	1750	7,067E-01	3250	6,669E-05	4750	8,725E-04
420	9,487E-01	720	6,797E-02	1020	1,200E-02	1800	7,389E-01	3300	5,495E-05	4800	1,049E-03
430	9,559E-01	730	5,156E-02	1030	1,325E-02	1850	7,665E-01	3350	5,023E-05	4850	1,222E-03
440	9,624E-01	740	3,924E-02	1040	1,476E-02	1900	7,902E-01	3400	5,039E-05	4900	1,350E-03
450	9,676E-01	750	3,004E-02	1050	1,637E-02	1950	7,990E-01	3450	5,582E-05	4950	1,362E-03
460	9,724E-01	760	2,323E-02	1060	1,823E-02	2000	8,086E-01	3500	6,718E-05	5000	1,229E-03
470	9,765E-01	770	1,820E-02	1070	2,014E-02	2050	8,135E-01	3550	8,770E-05	5050	9,773E-04
480	9,798E-01	780	1,449E-02	1080	2,240E-02	2100	8,176E-01	3600	1,188E-04	5100	6,281E-04
490	9,822E-01	790	1,176E-02	1090	2,484E-02	2150	8,145E-01	3650	1,588E-04	5150	3,065E-04

BG55

Optical properties	
Reflection factor	
$P_d = 0,914$	
Spectral values guaranteed	
τ_i (405 nm)	$\geq 0,76$
τ_i (514 nm)	$\geq 0,93$
τ_i (633 nm)	$\geq 0,18$
τ_i (694 nm)	$\leq 0,016$
τ_i (1060 nm)	$\leq 0,0005$
Refractive indices	
n_F (486 nm)	= 1,55
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 400 nm to 1550 nm	
B_1	1,3373
B_2	0,0002
B_3	0,8117
C_1	9,095E-03 μm^2
C_2	1,4952E-02 μm^2
C_3	100,000 μm^2
Internal quality	
Bubble class	2

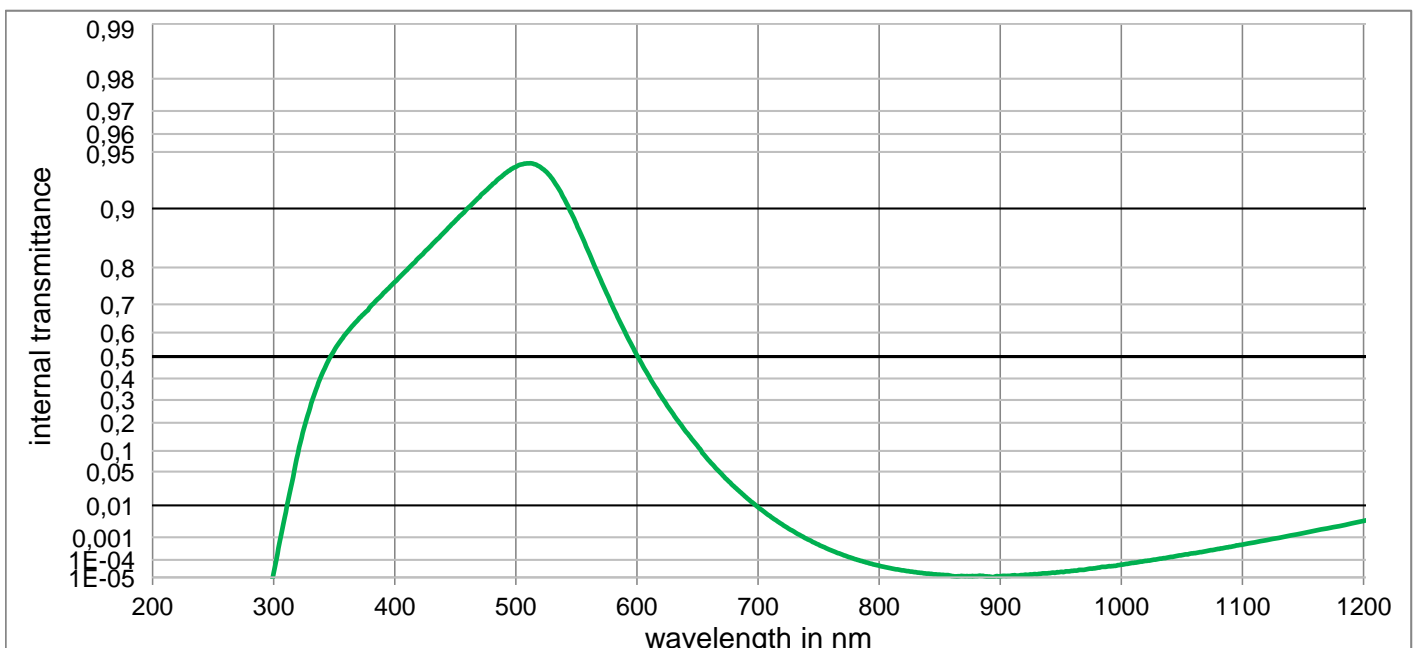
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,65 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 504	

Thermal properties	
Transformation temperature	
$T_g = 453 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30 $^\circ\text{C}/+70^\circ\text{C}$)	= 7,2
α (20 $^\circ\text{C}/300^\circ\text{C}$)	= 9,1

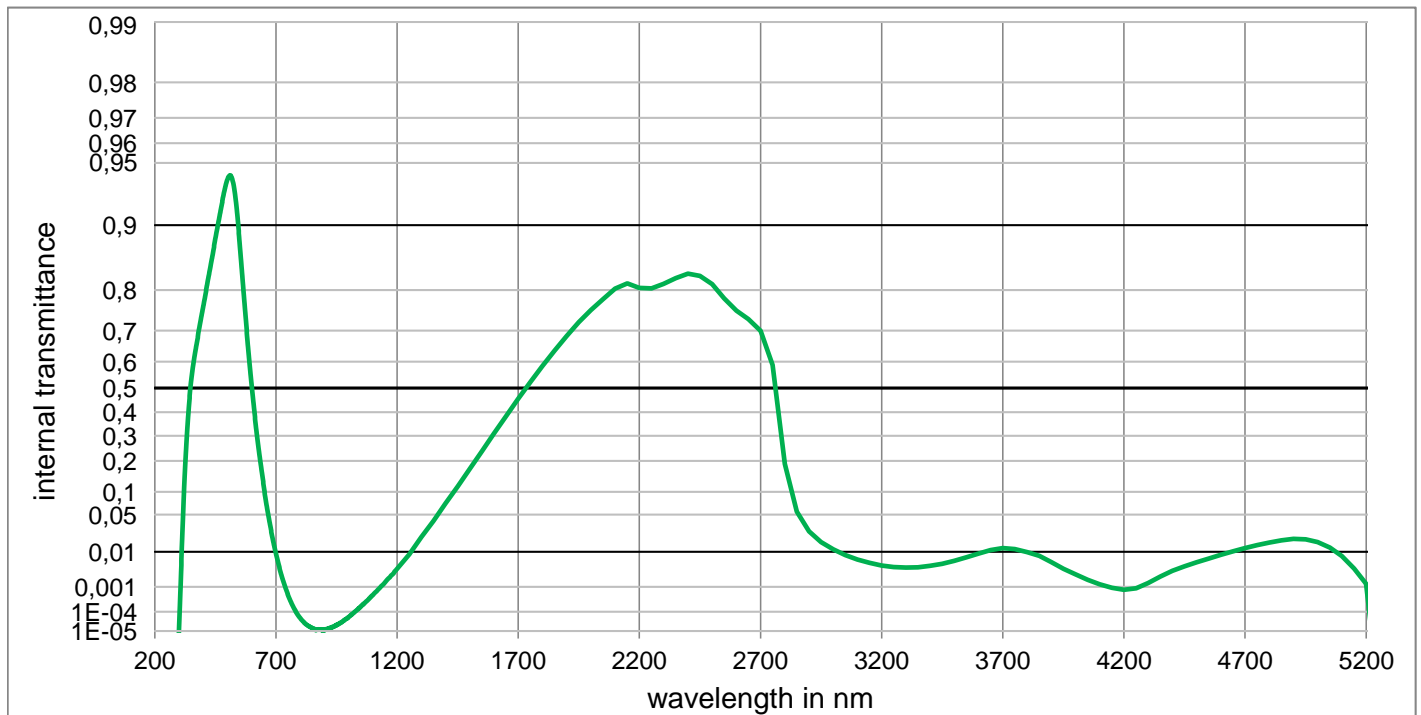
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 2
AR class	= 2
 <p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,252	0,220	0,201
	y	0,329	0,328	0,328
	Y	68,9	56,6	48,2
	λ_d	492 nm	491 nm	491 nm
	P_e	0,223	0,339	0,409
Illuminant A	x	0,356	0,302	0,267
	y	0,438	0,452	0,460
	Y	61,7	47,6	39,0
	λ_d	501 nm	500 nm	500 nm
	P_e	0,208	0,331	0,413

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG55



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only



λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,399E-01	800	4,932E-05	1100	5,070E-04	2200	8,044E-01	3700	1,209E-02
210	< 1,0E-05	510	9,424E-01	810	3,514E-05	1110	6,338E-04	2250	8,032E-01	3750	1,149E-02
220	< 1,0E-05	520	9,400E-01	820	2,670E-05	1120	7,650E-04	2300	8,123E-01	3800	9,901E-03
230	< 1,0E-05	530	9,303E-01	830	2,088E-05	1130	9,376E-04	2350	8,232E-01	3850	8,076E-03
240	< 1,0E-05	540	9,110E-01	840	1,720E-05	1140	1,165E-03	2400	8,313E-01	3900	5,598E-03
250	< 1,0E-05	550	8,792E-01	850	1,489E-05	1150	1,429E-03	2450	8,272E-01	3950	3,651E-03
260	< 1,0E-05	560	8,329E-01	860	1,194E-05	1160	1,739E-03	2500	8,119E-01	4000	2,558E-03
270	< 1,0E-05	570	7,701E-01	870	1,204E-05	1170	2,078E-03	2550	7,821E-01	4050	1,710E-03
280	< 1,0E-05	580	6,928E-01	880	1,213E-05	1180	2,505E-03	2600	7,532E-01	4100	1,227E-03
290	< 1,0E-05	590	6,029E-01	890	1,174E-05	1190	3,047E-03	2650	7,316E-01	4150	9,269E-04
300	1,9E-05	600	5,057E-01	900	1,213E-05	1200	3,660E-03	2700	6,993E-01	4200	7,882E-04
310	6,7E-03	610	4,085E-01	910	1,337E-05	1250	8,670E-03	2750	5,881E-01	4250	8,827E-04
320	9,213E-02	620	3,166E-01	920	1,442E-05	1300	2,062E-02	2800	1,888E-01	4300	1,344E-03
330	2,650E-01	630	2,354E-01	930	1,549E-05	1350	4,003E-02	2850	5,554E-02	4350	2,158E-03
340	4,212E-01	640	1,677E-01	940	1,815E-05	1400	7,197E-02	2900	2,645E-02	4400	3,245E-03
350	5,277E-01	650	1,149E-01	950	2,216E-05	1450	1,148E-01	2950	1,629E-02	4450	4,293E-03
360	5,980E-01	660	7,208E-02	960	2,501E-05	1500	1,710E-01	3000	1,137E-02	4500	5,522E-03
370	6,500E-01	670	4,508E-02	970	2,982E-05	1550	2,371E-01	3050	8,398E-03	4550	6,840E-03
380	6,932E-01	680	2,711E-02	980	3,763E-05	1600	3,093E-01	3100	6,519E-03	4600	8,465E-03
390	7,313E-01	690	1,583E-02	990	4,603E-05	1650	3,844E-01	3150	5,315E-03	4650	1,031E-02
400	7,648E-01	700	9,032E-03	1000	5,649E-05	1700	4,561E-01	3200	4,538E-03	4700	1,220E-02
410	7,945E-01	710	5,056E-03	1010	6,997E-05	1750	5,236E-01	3250	4,113E-03	4750	1,406E-02
420	8,214E-01	720	2,809E-03	1020	8,815E-05	1800	5,841E-01	3300	3,971E-03	4800	1,587E-02
430	8,447E-01	730	1,576E-03	1030	1,083E-04	1850	6,379E-01	3350	4,064E-03	4850	1,775E-02
440	8,657E-01	740	8,774E-04	1040	1,382E-04	1900	6,841E-01	3400	4,457E-03	4900	1,892E-02
450	8,842E-01	750	5,024E-04	1050	1,697E-04	1950	7,241E-01	3450	5,018E-03	4950	1,854E-02
460	8,999E-01	760	2,940E-04	1060	2,108E-04	2000	7,545E-01	3500	6,034E-03	5000	1,629E-02
470	9,131E-01	770	1,762E-04	1070	2,661E-04	2050	7,807E-01	3550	7,359E-03	5050	1,249E-02
480	9,246E-01	780	1,098E-04	1080	3,291E-04	2100	8,029E-01	3600	9,128E-03	5100	7,925E-03
490	9,338E-01	790	7,172E-05	1090	4,099E-04	2150	8,131E-01	3650	1,095E-02	5150	3,751E-03

BG57

Optical properties	
Reflection factor	
$P_d = 0,911$	
Spectral values guaranteed	
τ_i (405 nm)	$\geq 0,35$
τ_i (430 nm)	$\geq 0,37$
τ_i (514 nm)	$\geq 0,71$
τ_i (565 nm)	$\geq 0,42$
τ_i (633 nm)	$\leq 0,02$
τ_i (1500 nm)	$\leq 0,02$
Refractive indices	
n_F (486 nm)	= 1,56
n_e (546 nm)	= 1,55
n_d (587,6 nm)	= 1,55
Sellmeier coefficients	
valid from 440 nm to 1550 nm	
B_1	1,2553
B_2	0,1147
B_3	30,4267
C_1	4,447E-03 μm^2
C_2	5,4025E-02 μm^2
C_3	4843,287 μm^2
Internal quality	
Bubble class	0

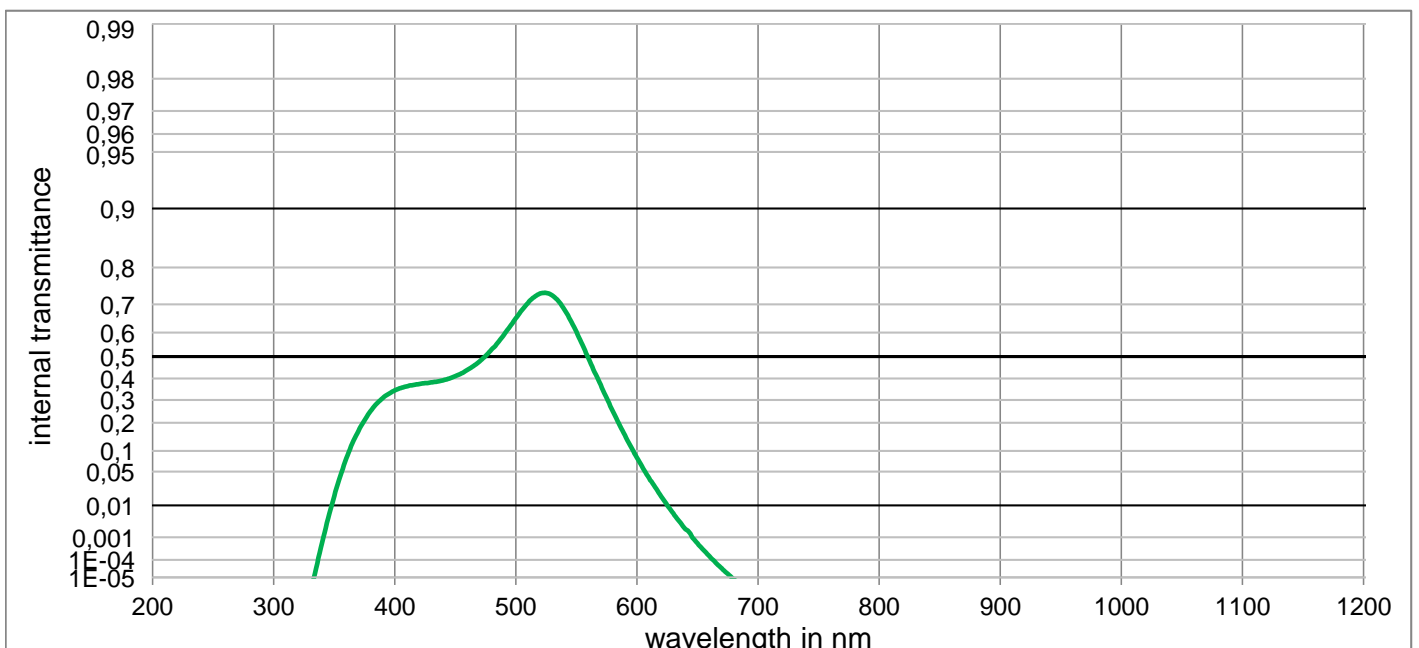
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,81 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 418	

Thermal properties	
Transformation temperature	
$T_g = 411 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30 $^\circ\text{C}/+70^\circ\text{C}$)	= 9,7
α (20 $^\circ\text{C}/300^\circ\text{C}$)	= 11,5

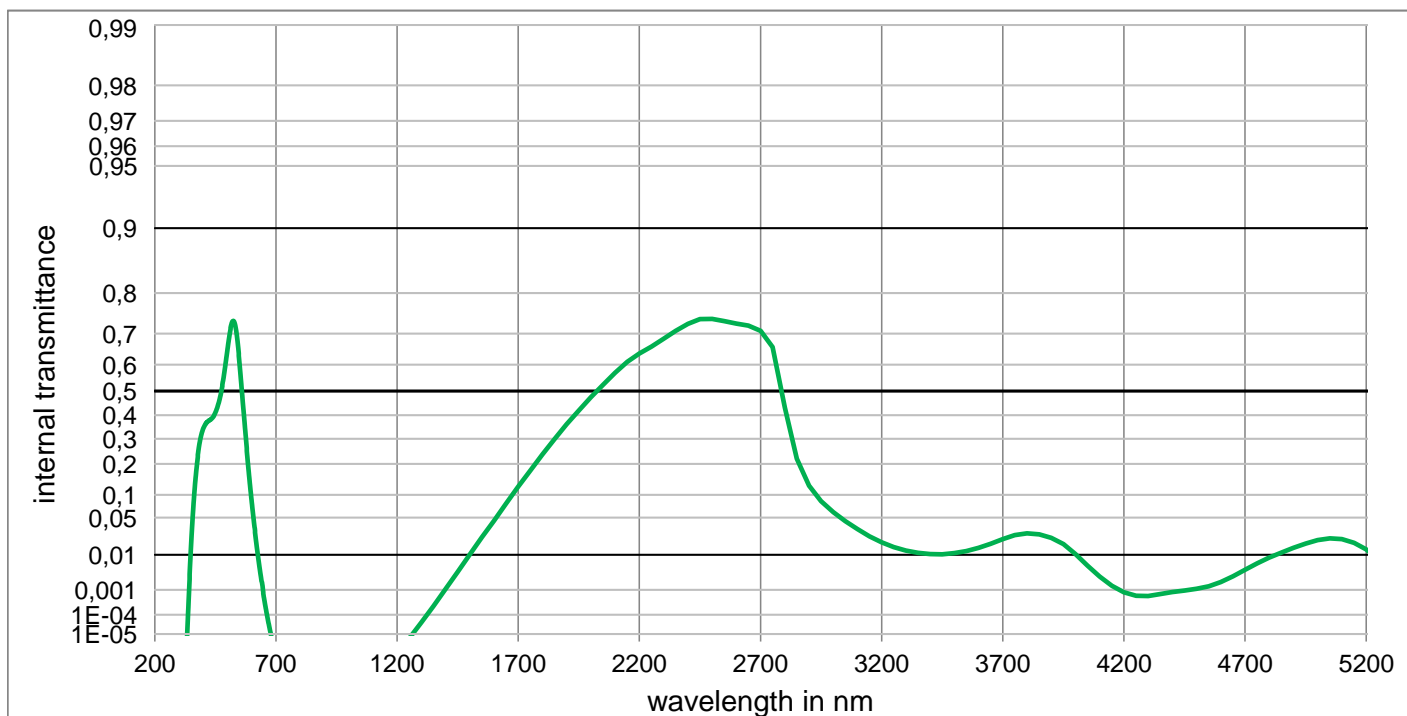
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 5.2
AR class	= 3
 	
Long-term changes in the polished surface are possible.	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,204	0,178	0,164
	y	0,379	0,442	0,507
	Y	40,3	23,8	15,1
	λ_d	497 nm	502 nm	507 nm
	P_e	0,367	0,438	0,484
Illuminant A	x	0,265	0,215	0,191
	y	0,501	0,557	0,604
	Y	32,5	18,1	11,2
	λ_d	504 nm	507 nm	510 nm
	P_e	0,412	0,526	0,589

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.11\text{mm}) @ 634 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG57



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only


λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	6,534E-01	800	< 1,000E-05	1100	< 1,000E-05	2200	6,377E-01	3700	2,143E-02
210	< 1,0E-05	510	7,048E-01	810	< 1,000E-05	1110	< 1,000E-05	2250	6,608E-01	3750	2,541E-02
220	< 1,0E-05	520	7,329E-01	820	< 1,000E-05	1120	< 1,000E-05	2300	6,849E-01	3800	2,739E-02
230	< 1,0E-05	530	7,276E-01	830	< 1,000E-05	1130	< 1,000E-05	2350	7,078E-01	3850	2,629E-02
240	< 1,0E-05	540	6,838E-01	840	< 1,000E-05	1140	< 1,000E-05	2400	7,273E-01	3900	2,273E-02
250	< 1,0E-05	550	6,025E-01	850	< 1,000E-05	1150	< 1,000E-05	2450	7,395E-01	3950	1,712E-02
260	< 1,0E-05	560	4,918E-01	860	< 1,000E-05	1160	< 1,000E-05	2500	7,402E-01	4000	1,035E-02
270	< 1,0E-05	570	3,699E-01	870	< 1,000E-05	1170	< 1,000E-05	2550	7,343E-01	4050	5,365E-03
280	< 1,0E-05	580	2,501E-01	880	< 1,000E-05	1180	< 1,000E-05	2600	7,278E-01	4100	2,666E-03
290	< 1,0E-05	590	1,514E-01	890	< 1,000E-05	1190	< 1,000E-05	2650	7,223E-01	4150	1,375E-03
300	< 1,0E-05	600	8,109E-02	900	< 1,000E-05	1200	< 1,000E-05	2700	7,081E-01	4200	8,151E-04
310	< 1,0E-05	610	3,824E-02	910	< 1,000E-05	1250	< 1,000E-05	2750	6,591E-01	4250	6,075E-04
320	< 1,000E-05	620	1,649E-02	920	< 1,000E-05	1300	4,250E-05	2800	4,327E-01	4300	6,014E-04
330	< 1,000E-05	630	6,063E-03	930	< 1,000E-05	1350	2,424E-04	2850	2,198E-01	4350	7,125E-04
340	6,058E-04	640	1,958E-03	940	< 1,000E-05	1400	1,062E-03	2900	1,259E-01	4400	8,454E-04
350	1,687E-02	650	5,678E-04	950	< 1,000E-05	1450	3,664E-03	2950	8,382E-02	4450	9,521E-04
360	7,972E-02	660	1,473E-04	960	< 1,000E-05	1500	1,014E-02	3000	5,999E-02	4500	1,083E-03
370	1,685E-01	670	3,477E-05	970	< 1,000E-05	1550	2,340E-02	3050	4,408E-02	4550	1,327E-03
380	2,498E-01	680	< 1,000E-05	980	< 1,000E-05	1600	4,450E-02	3100	3,254E-02	4600	1,813E-03
390	3,088E-01	690	< 1,000E-05	990	< 1,000E-05	1650	7,875E-02	3150	2,429E-02	4650	2,713E-03
400	3,445E-01	700	< 1,000E-05	1000	< 1,000E-05	1700	1,230E-01	3200	1,859E-02	4700	4,191E-03
410	3,632E-01	710	< 1,000E-05	1010	< 1,000E-05	1750	1,764E-01	3250	1,484E-02	4750	6,236E-03
420	3,744E-01	720	< 1,000E-05	1020	< 1,000E-05	1800	2,367E-01	3300	1,246E-02	4800	8,626E-03
430	3,818E-01	730	< 1,000E-05	1030	< 1,000E-05	1850	2,994E-01	3350	1,104E-02	4850	1,127E-02
440	3,919E-01	740	< 1,000E-05	1040	< 1,000E-05	1900	3,617E-01	3400	1,035E-02	4900	1,428E-02
450	4,108E-01	750	< 1,000E-05	1050	< 1,000E-05	1950	4,199E-01	3450	1,030E-02	4950	1,756E-02
460	4,399E-01	760	< 1,000E-05	1060	< 1,000E-05	2000	4,746E-01	3500	1,088E-02	5000	2,055E-02
470	4,790E-01	770	< 1,000E-05	1070	< 1,000E-05	2050	5,244E-01	3550	1,217E-02	5050	2,217E-02
480	5,307E-01	780	< 1,000E-05	1080	< 1,000E-05	2100	5,704E-01	3600	1,425E-02	5100	2,143E-02
490	5,905E-01	790	< 1,000E-05	1090	< 1,000E-05	2150	6,100E-01	3650	1,735E-02	5150	1,821E-02

BG60

Optical properties	
Reflection factor	
$P_d = 0,914$	
Spectral values guaranteed	
τ_i (405 nm)	$\geq 0,8$
τ_i (514 nm)	$\geq 0,91$
τ_i (633 nm)	$\geq 0,1$
τ_i (694 nm)	$\leq 0,008$
τ_i (1060 nm)	$\leq 0,0015$
Refractive indices	
n_F (486 nm)	$= 1,54$
n_e (546 nm)	$= 1,54$
n_d (587,6 nm)	$= 1,54$
Sellmeier coefficients	
valid from 340 nm to 1550 nm	
B_1	1,3298
B_2	0,0004
B_3	2,5598
C_1	9,241E-03 μm^2
C_2	1,0918E-01 μm^2
C_3	450,591 μm^2
Internal quality	
Bubble class	2

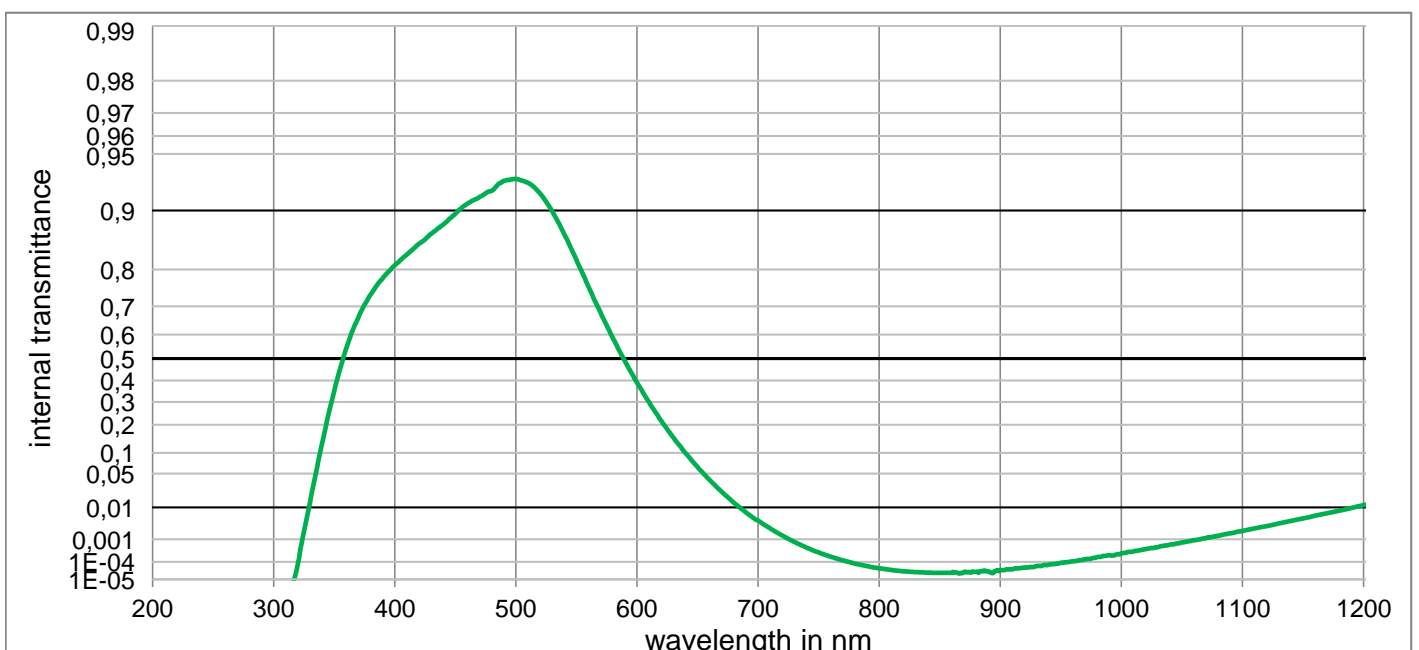
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,83 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 362	

Thermal properties	
Transformation temperature	
$T_g = 411 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30 $^\circ\text{C}/+70^\circ\text{C}$)	$= 12,0$
α (20 $^\circ\text{C}/300^\circ\text{C}$)	$= 13,9$

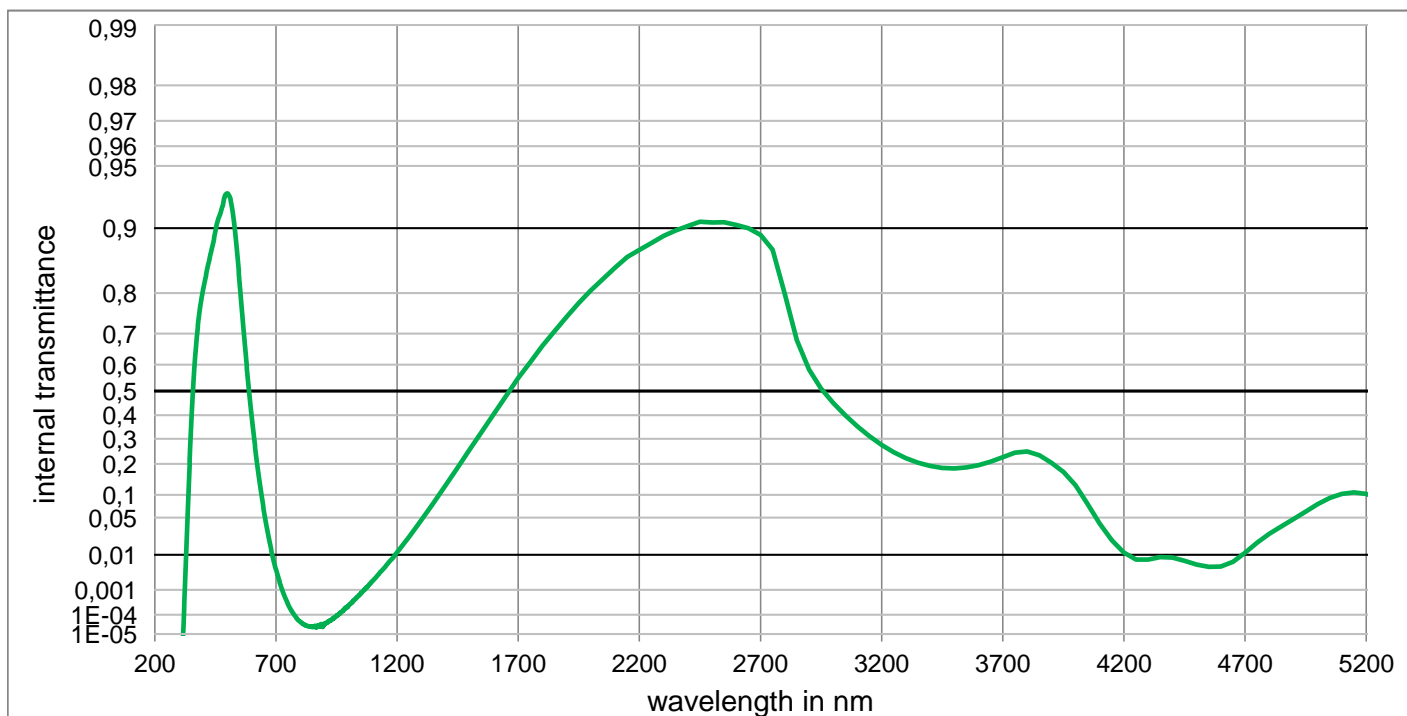
Chemical properties	
Chemical resistance	
FR class	$= 1$
SR class	$= 52.3$
AR class	$= 3.3$
 <p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,236	0,201	0,181
	y	0,318	0,306	0,297
	Y	63,8	49,9	41,0
	λ_d	490 nm	489 nm	489 nm
	P_e	0,286	0,425	0,506
Illuminant A	x	0,334	0,271	0,232
	y	0,436	0,441	0,437
	Y	55,7	40,5	31,7
	λ_d	499 nm	498 nm	497 nm
	P_e	0,259	0,406	0,498

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.3\text{mm}) = 633 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG60



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,319E-01	800	4,553E-05	1100	1,992E-03	2200	8,733E-01	3700	2,259E-01
210	< 1,0E-05	510	9,286E-01	810	3,683E-05	1110	2,416E-03	2250	8,825E-01	3750	2,432E-01
220	< 1,0E-05	520	9,187E-01	820	3,115E-05	1120	2,902E-03	2300	8,910E-01	3800	2,484E-01
230	< 1,0E-05	530	8,991E-01	830	2,752E-05	1130	3,528E-03	2350	8,974E-01	3850	2,331E-01
240	< 1,0E-05	540	8,673E-01	840	2,593E-05	1140	4,192E-03	2400	9,023E-01	3900	2,041E-01
250	< 1,0E-05	550	8,208E-01	850	2,497E-05	1150	4,976E-03	2450	9,069E-01	3950	1,707E-01
260	< 1,0E-05	560	7,573E-01	860	2,632E-05	1160	5,967E-03	2500	9,061E-01	4000	1,275E-01
270	< 1,0E-05	570	6,790E-01	870	2,877E-05	1170	7,049E-03	2550	9,064E-01	4050	7,682E-02
280	< 1,0E-05	580	5,874E-01	880	2,856E-05	1180	8,166E-03	2600	9,035E-01	4100	4,036E-02
290	< 1,0E-05	590	4,892E-01	890	3,182E-05	1190	9,653E-03	2650	9,000E-01	4150	2,037E-02
300	< 1,0E-05	600	3,905E-01	900	3,559E-05	1200	1,142E-02	2700	8,923E-01	4200	1,121E-02
310	< 1,0E-05	610	2,979E-01	910	3,967E-05	1250	2,400E-02	2750	8,737E-01	4250	7,748E-03
320	7,831E-05	620	2,168E-01	920	4,945E-05	1300	4,588E-02	2800	7,977E-01	4300	7,701E-03
330	1,360E-02	630	1,505E-01	930	5,977E-05	1350	7,977E-02	2850	6,805E-01	4350	8,815E-03
340	1,301E-01	640	1,000E-01	940	7,197E-05	1400	1,268E-01	2900	5,825E-01	4400	8,635E-03
350	3,524E-01	650	6,356E-02	950	8,963E-05	1450	1,867E-01	2950	5,097E-01	4450	7,195E-03
360	5,453E-01	660	3,882E-02	960	1,064E-04	1500	2,557E-01	3000	4,513E-01	4500	5,756E-03
370	6,642E-01	670	2,294E-02	970	1,346E-04	1550	3,305E-01	3050	3,996E-01	4550	4,996E-03
380	7,356E-01	680	1,314E-02	980	1,709E-04	1600	4,056E-01	3100	3,524E-01	4600	5,132E-03
390	7,795E-01	690	7,409E-03	990	2,146E-04	1650	4,814E-01	3150	3,104E-01	4650	6,813E-03
400	8,093E-01	700	4,338E-03	1000	2,576E-04	1700	5,511E-01	3200	2,744E-01	4700	1,106E-02
410	8,314E-01	710	2,421E-03	1010	3,170E-04	1750	6,093E-01	3250	2,449E-01	4750	1,826E-02
420	8,515E-01	720	1,378E-03	1020	3,967E-04	1800	6,632E-01	3300	2,218E-01	4800	2,702E-02
430	8,678E-01	730	7,905E-04	1030	4,818E-04	1850	7,071E-01	3350	2,043E-01	4850	3,642E-02
440	8,817E-01	740	4,644E-04	1040	6,148E-04	1900	7,456E-01	3400	1,921E-01	4900	4,731E-02
450	8,959E-01	750	2,818E-04	1050	7,502E-04	1950	7,786E-01	3450	1,852E-01	4950	6,127E-02
460	9,080E-01	760	1,794E-04	1060	9,159E-04	2000	8,056E-01	3500	1,834E-01	5000	7,711E-02
470	9,150E-01	770	1,187E-04	1070	1,118E-03	2050	8,274E-01	3550	1,867E-01	5050	9,209E-02
480	9,214E-01	780	8,223E-05	1080	1,357E-03	2100	8,467E-01	3600	1,950E-01	5100	1,029E-01
490	9,303E-01	790	6,013E-05	1090	1,655E-03	2150	8,632E-01	3650	2,082E-01	5150	1,065E-01

BG60HT

Optical properties	
Reflection factor	
P_d	= 0,914
Spectral values guaranteed	
τ_i (405 nm)	≥ 0,85
τ_i (514 nm)	≥ 0,93
τ_i (633 nm)	≥ 0,1
τ_i (694 nm)	≤ 0,008
τ_i (1060 nm)	≤ 0,0015
Refractive indices	
n_F (486 nm)	= 1,54
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 340 nm to 1550 nm	
B_1	1,3298
B_2	0,0004
B_3	2,5598
C_1	9,241E-03 μm^2
C_2	1,0918E-01 μm^2
C_3	450,591 μm^2
Internal quality	
Bubble class	2

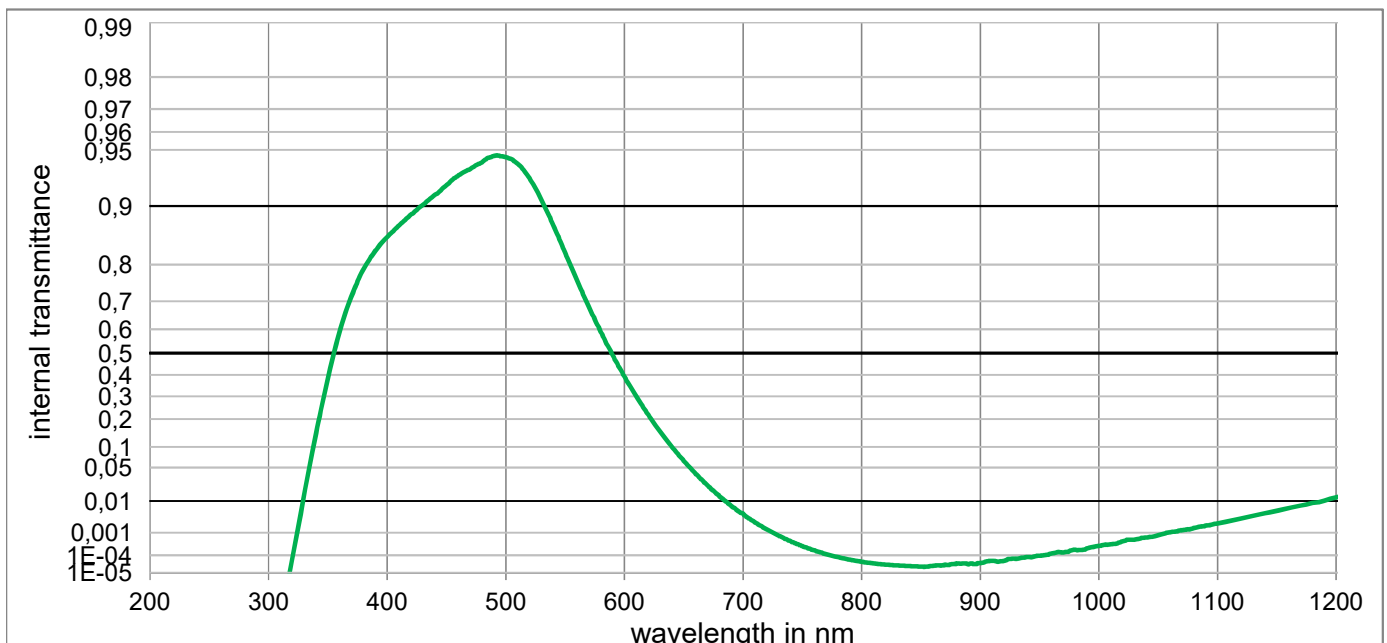
Mechanical properties	
Reference thickness	
d	= 1,00 mm
Density	
ρ	= 2,83 g/cm ³
Knoop hardness	
HK[0.1/20]	= 362

Thermal properties	
Transformation temperature	
T_g	= 411 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 12,0
α (20°C/300°C)	= 13,9

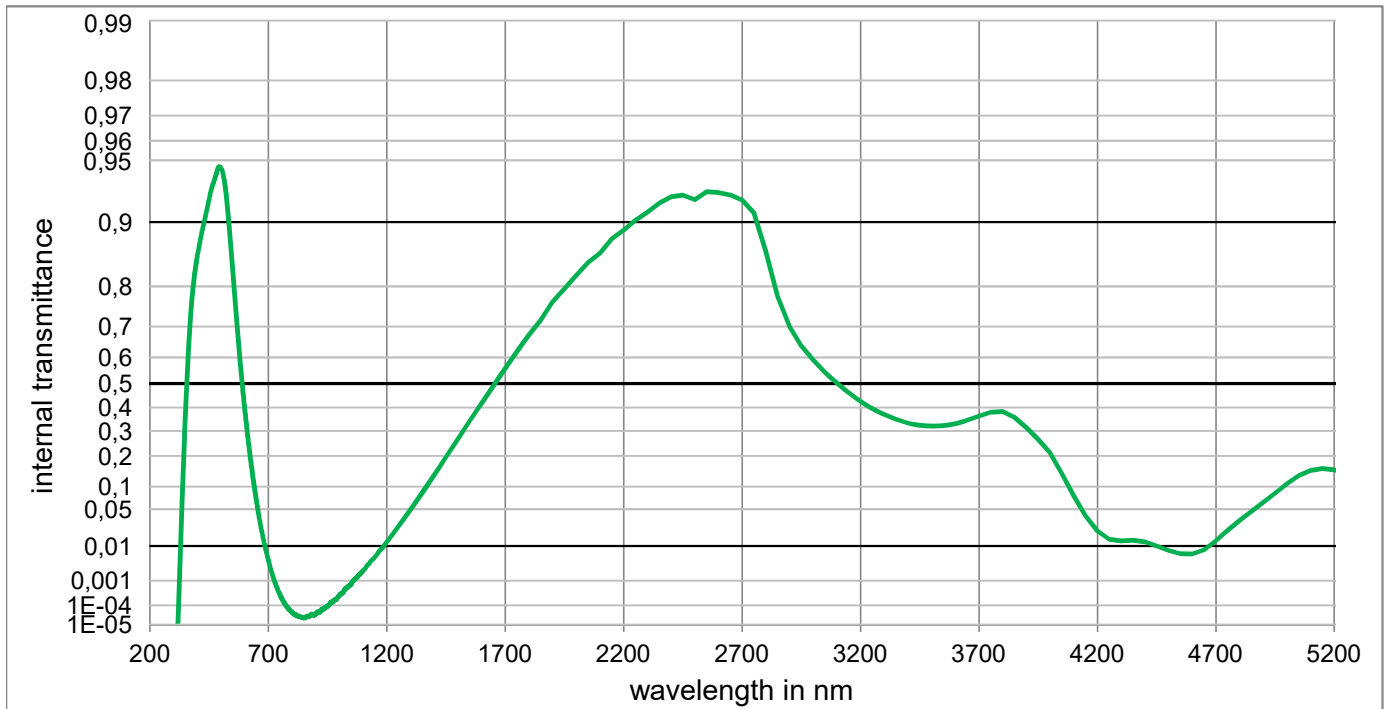
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.2
AR class	= 3.2
Long-term changes in the polished surface are possible under some circumstances.	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,233	0,198	0,178
	y	0,315	0,300	0,287
	Y	64,1	50,6	42,0
	λ_d	489 nm	488 nm	488 nm
	P_e	0,300	0,442	0,525
Illuminant A	x	0,330	0,266	0,227
	y	0,435	0,436	0,429
	Y	55,7	40,8	32,2
	λ_d	499 nm	498 nm	496 nm
	P_e	0,270	0,421	0,514

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.3\text{mm}) = 633 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG60HT



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only


λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,452E-01	800	4,502E-05	1100	2,177E-03	2200	8,909E-01	3700	3,635E-01
210	< 1,0E-05	510	9,404E-01	810	3,656E-05	1110	2,626E-03	2250	9,019E-01	3750	3,805E-01
220	< 1,0E-05	520	9,288E-01	820	3,119E-05	1120	3,188E-03	2300	9,103E-01	3800	3,826E-01
230	< 1,0E-05	530	9,073E-01	830	2,793E-05	1130	3,874E-03	2350	9,188E-01	3850	3,583E-01
240	< 1,0E-05	540	8,739E-01	840	2,564E-05	1140	4,603E-03	2400	9,246E-01	3900	3,143E-01
250	< 1,0E-05	550	8,260E-01	850	2,372E-05	1150	5,383E-03	2450	9,257E-01	3950	2,645E-01
260	< 1,0E-05	560	7,618E-01	860	2,639E-05	1160	6,519E-03	2500	9,222E-01	4000	2,114E-01
270	< 1,0E-05	570	6,817E-01	870	2,872E-05	1170	7,711E-03	2550	9,288E-01	4050	1,384E-01
280	< 1,0E-05	580	5,900E-01	880	3,410E-05	1180	8,976E-03	2600	9,279E-01	4100	7,617E-02
290	< 1,0E-05	590	4,908E-01	890	3,233E-05	1190	1,032E-02	2650	9,261E-01	4150	3,905E-02
300	< 1,0E-05	600	3,920E-01	900	3,719E-05	1200	1,224E-02	2700	9,218E-01	4200	2,110E-02
310	< 1,0E-05	610	2,994E-01	910	5,030E-05	1250	2,586E-02	2750	9,096E-01	4250	1,416E-02
320	7,415E-05	620	2,184E-01	920	4,952E-05	1300	4,890E-02	2800	8,624E-01	4300	1,306E-02
330	1,574E-02	630	1,509E-01	930	6,534E-05	1350	8,439E-02	2850	7,781E-01	4350	1,346E-02
340	1,447E-01	640	1,002E-01	940	8,100E-05	1400	1,324E-01	2900	7,003E-01	4400	1,236E-02
350	3,866E-01	650	6,391E-02	950	9,477E-05	1450	1,953E-01	2950	6,400E-01	4450	9,979E-03
360	5,939E-01	660	3,912E-02	960	1,248E-04	1500	2,655E-01	3000	5,905E-01	4500	7,775E-03
370	7,185E-01	670	2,310E-02	970	1,384E-04	1550	3,426E-01	3050	5,454E-01	4550	6,476E-03
380	7,901E-01	680	1,336E-02	980	1,873E-04	1600	4,175E-01	3100	5,027E-01	4600	6,340E-03
390	8,295E-01	690	7,552E-03	990	2,146E-04	1650	4,899E-01	3150	4,626E-01	4650	8,118E-03
400	8,554E-01	700	4,483E-03	1000	2,823E-04	1700	5,594E-01	3200	4,268E-01	4700	1,303E-02
410	8,740E-01	710	2,369E-03	1010	3,353E-04	1750	6,200E-01	3250	3,957E-01	4750	2,161E-02
420	8,890E-01	720	1,335E-03	1020	4,468E-04	1800	6,742E-01	3300	3,700E-01	4800	3,292E-02
430	9,016E-01	730	7,666E-04	1030	5,325E-04	1850	7,188E-01	3350	3,495E-01	4850	4,615E-02
440	9,125E-01	740	4,521E-04	1040	6,468E-04	1900	7,658E-01	3400	3,339E-01	4900	6,232E-02
450	9,226E-01	750	2,747E-04	1050	8,132E-04	1950	7,954E-01	3450	3,245E-01	4950	8,366E-02
460	9,312E-01	760	1,741E-04	1060	1,044E-03	2000	8,219E-01	3500	3,205E-01	5000	1,085E-01
470	9,365E-01	770	1,155E-04	1070	1,248E-03	2050	8,448E-01	3550	3,231E-01	5050	1,318E-01
480	9,417E-01	780	8,046E-05	1080	1,509E-03	2100	8,596E-01	3600	3,311E-01	5100	1,485E-01
490	9,460E-01	790	5,856E-05	1090	1,833E-03	2150	8,797E-01	3650	3,451E-01	5150	1,548E-01

BG61

Optical properties	
Reflection factor	
$P_d = 0,915$	
Spectral values guaranteed	
τ_i (405 nm)	$\geq 0,84$
τ_i (514 nm)	$\geq 0,93$
τ_i (633 nm)	$\geq 0,18$
τ_i (694 nm)	$\leq 0,03$
τ_i (1060 nm)	$\leq 0,008$
Refractive indices	
n_F (486 nm)	= 1,54
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,53
Sellmeier coefficients	
valid from 340 nm to 1550 nm	
B_1	1,3212
B_2	0,0004
B_3	0,0589
C_1	9,180E-03 μm^2
C_2	1,1649E-01 μm^2
C_3	12,101 μm^2
Internal quality	
Bubble class	2

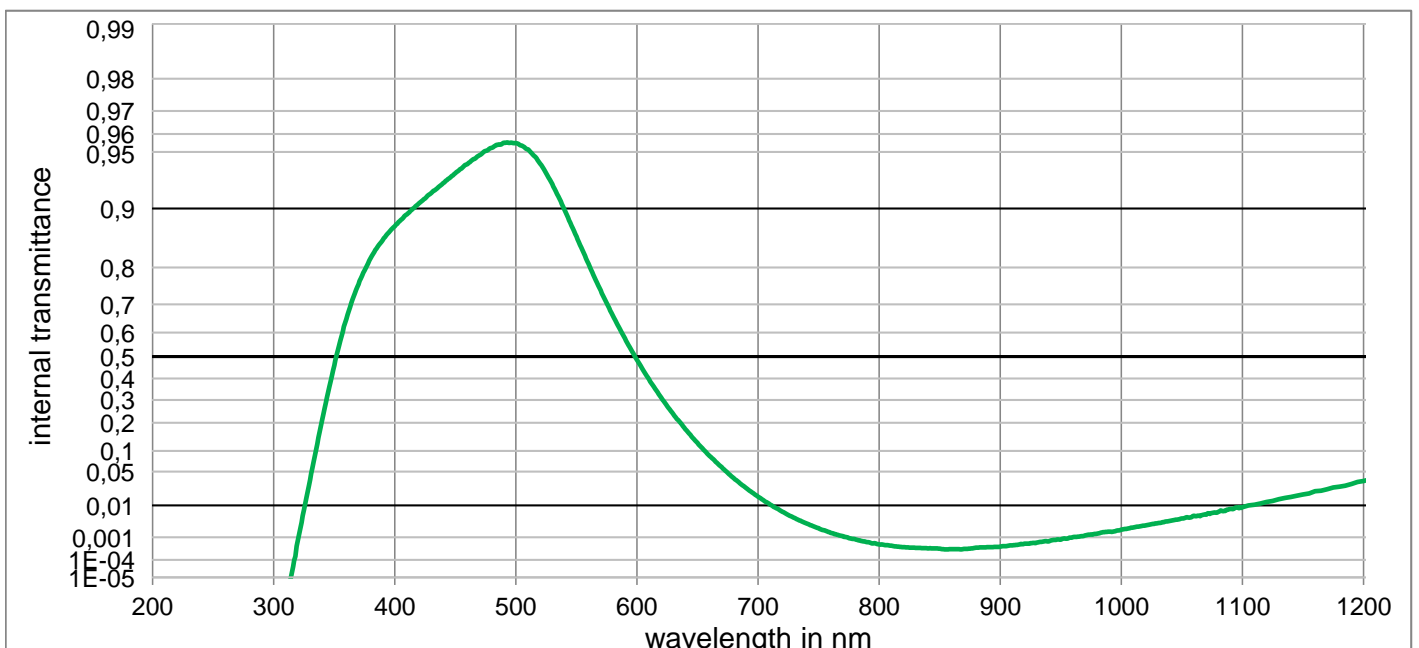
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,81 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 363	

Thermal properties	
Transformation temperature	
$T_g = 402 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30 $^\circ\text{C}/+70^\circ\text{C}$)	= 11,9
α (20 $^\circ\text{C}/300^\circ\text{C}$)	= 13,9

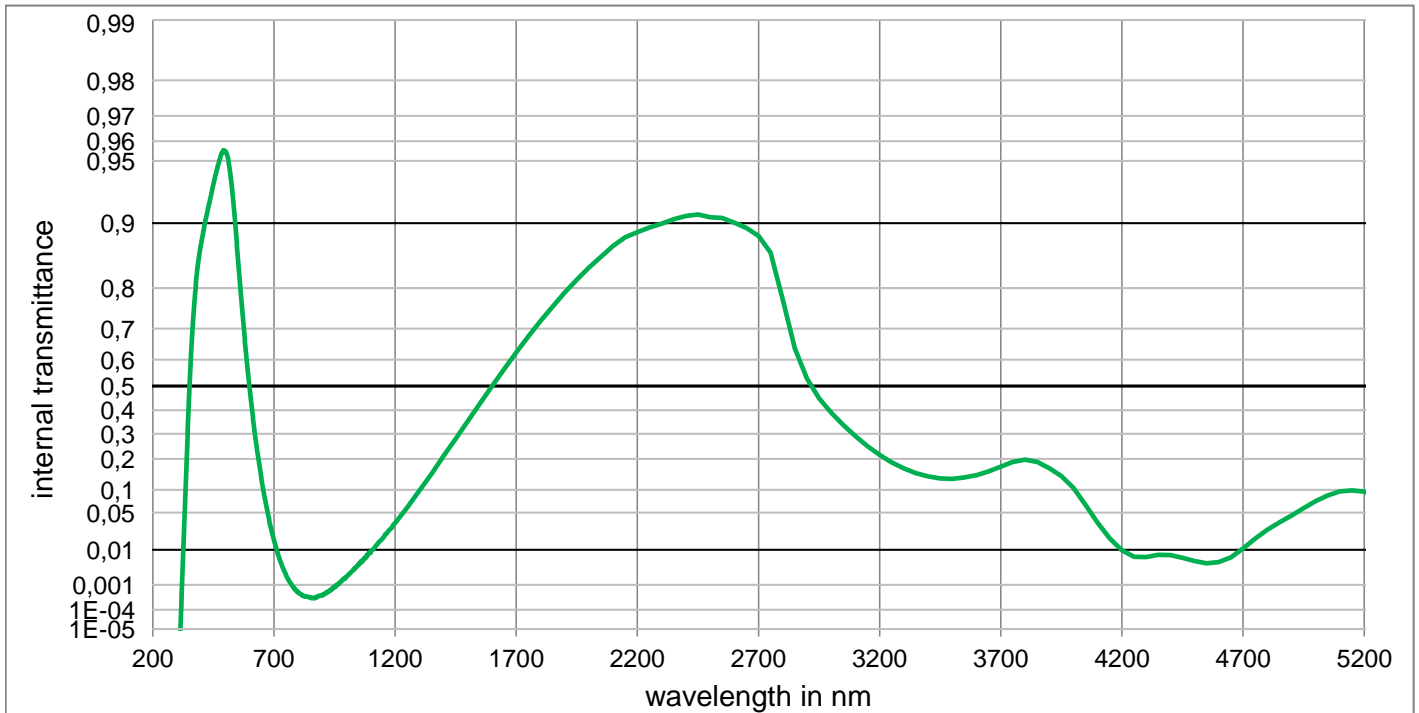
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.3
AR class	= 3.3
 <p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,245	0,210	0,189
	y	0,319	0,307	0,296
	Y	68,0	55,2	46,7
	λ_d	490 nm	489 nm	488 nm
	P_e	0,254	0,391	0,476
Illuminant A	x	0,349	0,289	0,250
	y	0,432	0,438	0,435
	Y	60,4	45,7	36,9
	λ_d	499 nm	498 nm	497 nm
	P_e	0,225	0,365	0,458

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.3\text{mm}) = 648 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG61



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only


λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,551E-01	800	5,193E-04	1100	9,044E-03	2200	8,897E-01	3700	1,718E-01
210	< 1,0E-05	510	9,515E-01	810	4,547E-04	1110	1,045E-02	2250	8,951E-01	3750	1,889E-01
220	< 1,0E-05	520	9,422E-01	820	3,958E-04	1120	1,210E-02	2300	8,995E-01	3800	1,973E-01
230	< 1,0E-05	530	9,256E-01	830	3,721E-04	1130	1,412E-02	2350	9,042E-01	3850	1,886E-01
240	< 1,0E-05	540	8,989E-01	840	3,530E-04	1140	1,599E-02	2400	9,076E-01	3900	1,668E-01
250	< 1,0E-05	550	8,601E-01	850	3,372E-04	1150	1,819E-02	2450	9,091E-01	3950	1,399E-01
260	< 1,0E-05	560	8,082E-01	860	3,277E-04	1160	2,144E-02	2500	9,064E-01	4000	1,051E-01
270	< 1,0E-05	570	7,417E-01	870	3,291E-04	1170	2,359E-02	2550	9,055E-01	4050	6,433E-02
280	< 1,0E-05	580	6,631E-01	880	3,728E-04	1180	2,664E-02	2600	9,005E-01	4100	3,430E-02
290	< 1,0E-05	590	5,767E-01	890	3,944E-04	1190	3,013E-02	2650	8,947E-01	4150	1,749E-02
300	< 1,0E-05	600	4,848E-01	900	4,116E-04	1200	3,407E-02	2700	8,849E-01	4200	9,654E-03
310	< 1,0E-05	610	3,949E-01	910	4,741E-04	1250	5,972E-02	2750	8,623E-01	4250	6,791E-03
320	7,696E-04	620	3,106E-01	920	5,553E-04	1300	9,768E-02	2800	7,744E-01	4300	6,709E-03
330	3,610E-02	630	2,359E-01	930	6,122E-04	1350	1,471E-01	2850	6,386E-01	4350	7,569E-03
340	2,111E-01	640	1,744E-01	940	6,917E-04	1400	2,110E-01	2900	5,289E-01	4400	7,518E-03
350	4,610E-01	650	1,247E-01	950	8,146E-04	1450	2,800E-01	2950	4,504E-01	4450	6,408E-03
360	6,502E-01	660	8,605E-02	960	9,997E-04	1500	3,528E-01	3000	3,893E-01	4500	5,234E-03
370	7,591E-01	670	5,862E-02	970	1,164E-03	1550	4,286E-01	3050	3,366E-01	4550	4,591E-03
380	8,200E-01	680	3,831E-02	980	1,375E-03	1600	4,994E-01	3100	2,896E-01	4600	4,923E-03
390	8,543E-01	690	2,506E-02	990	1,621E-03	1650	5,662E-01	3150	2,488E-01	4650	6,605E-03
400	8,763E-01	700	1,619E-02	1000	1,899E-03	1700	6,247E-01	3200	2,145E-01	4700	1,066E-02
410	8,929E-01	710	1,049E-02	1010	2,246E-03	1750	6,771E-01	3250	1,871E-01	4750	1,748E-02
420	9,060E-01	720	6,864E-03	1020	2,621E-03	1800	7,210E-01	3300	1,658E-01	4800	2,590E-02
430	9,171E-01	730	4,501E-03	1030	3,084E-03	1850	7,586E-01	3350	1,500E-01	4850	3,480E-02
440	9,267E-01	740	3,032E-03	1040	3,652E-03	1900	7,902E-01	3400	1,394E-01	4900	4,502E-02
450	9,350E-01	750	2,113E-03	1050	4,329E-03	1950	8,168E-01	3450	1,330E-01	4950	5,802E-02
460	9,418E-01	760	1,465E-03	1060	5,237E-03	2000	8,384E-01	3500	1,313E-01	5000	7,262E-02
470	9,480E-01	770	1,094E-03	1070	5,656E-03	2050	8,562E-01	3550	1,359E-01	5050	8,615E-02
480	9,525E-01	780	8,376E-04	1080	6,708E-03	2100	8,717E-01	3600	1,432E-01	5100	9,571E-02
490	9,555E-01	790	6,491E-04	1090	8,091E-03	2150	8,834E-01	3650	1,554E-01	5150	9,889E-02

BG62

Optical properties	
Reflection factor	
$P_d = 0,914$	
Spectral values guaranteed	
τ_i (405 nm)	$\geq 0,73$
τ_i (514 nm)	$\geq 0,89$
τ_i (633 nm)	$\geq 0,08$
τ_i (694 nm)	$\leq 0,005$
τ_i (1060 nm)	$\leq 0,0005$
Refractive indices	
n_F (486 nm)	= 1,55
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 340 nm to 1550 nm	
B_1	1,2129
B_2	0,1238
B_3	0,0621
C_1	6,667E-03 μm^2
C_2	3,0034E-02 μm^2
C_3	12,219 μm^2
Internal quality	
Bubble class	2

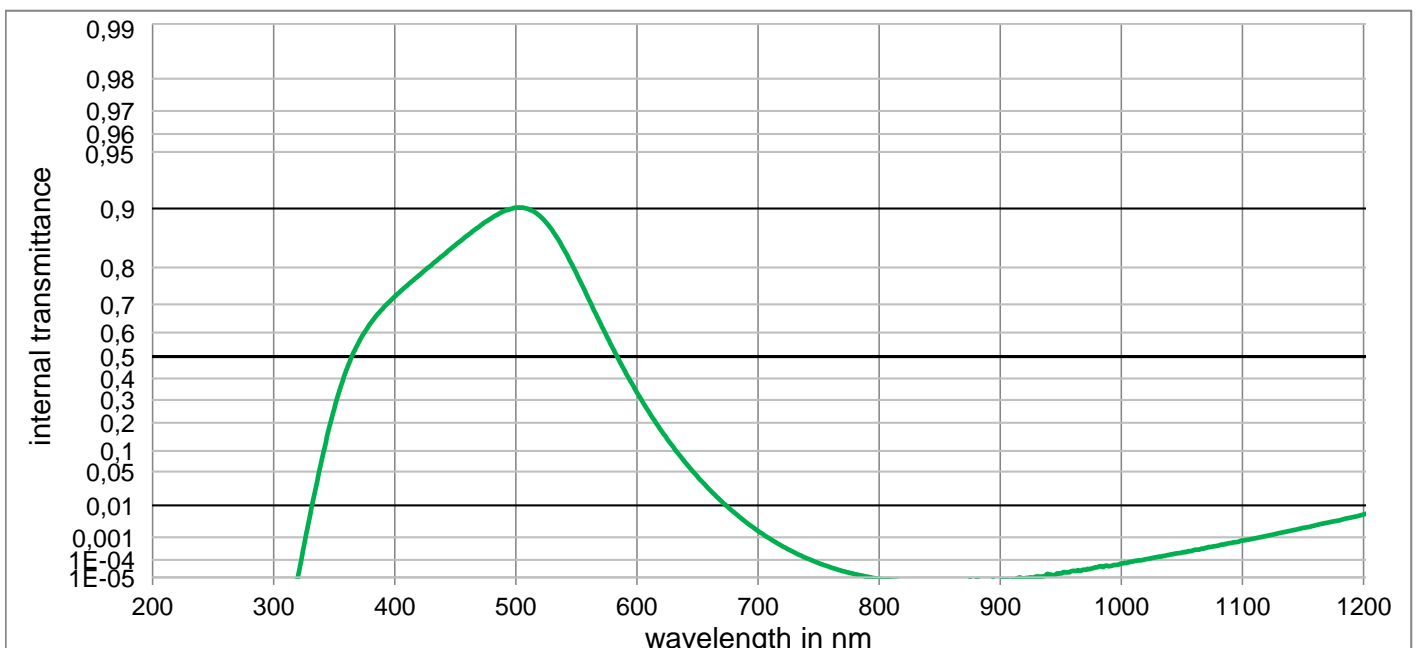
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,85 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 368	

Thermal properties	
Transformation temperature	
$T_g = 410 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 11,9
α (20°C/300°C)	= 13,6

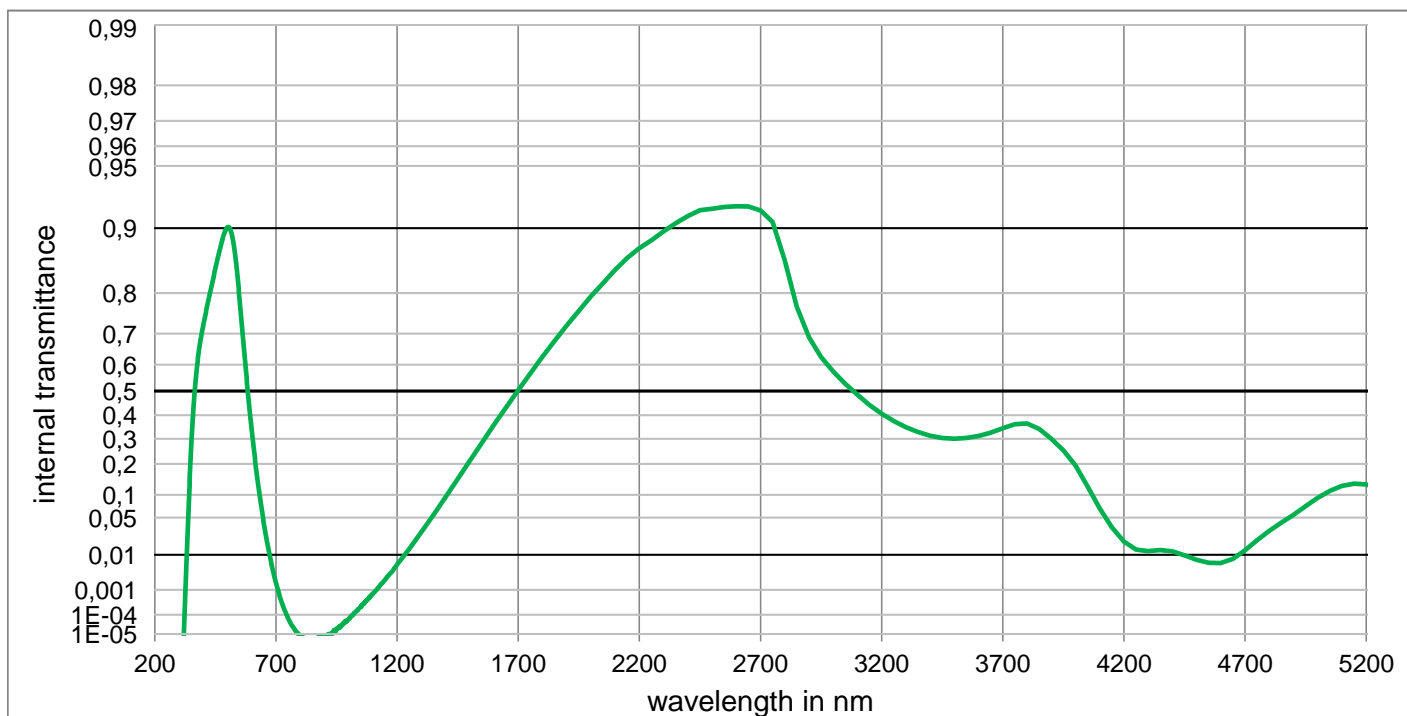
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.3
AR class	= 3.3
 <p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,229	0,194	0,175
	y	0,320	0,311	0,305
	Y	60,0	45,1	35,8
	λ_d	490 nm	490 nm	489 nm
	P_e	0,312	0,446	0,520
Illuminant A	x	0,321	0,257	0,220
	y	0,441	0,447	0,445
	Y	51,6	36,0	27,2
	λ_d	499 nm	498 nm	498 nm
	P_e	0,290	0,438	0,524

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.21\text{mm}) = 644 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG62



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,010E-01	800	< 1,000E-05	1100	7,390E-04	2200	8,757E-01	3700	3,448E-01
210	< 1,0E-05	510	8,996E-01	810	< 1,000E-05	1110	9,134E-04	2250	8,858E-01	3750	3,621E-01
220	< 1,0E-05	520	8,902E-01	820	< 1,000E-05	1120	1,135E-03	2300	8,963E-01	3800	3,647E-01
230	< 1,0E-05	530	8,704E-01	830	< 1,000E-05	1130	1,415E-03	2350	9,053E-01	3850	3,416E-01
240	< 1,0E-05	540	8,363E-01	840	< 1,000E-05	1140	1,732E-03	2400	9,126E-01	3900	2,998E-01
250	< 1,0E-05	550	7,859E-01	850	< 1,000E-05	1150	2,149E-03	2450	9,180E-01	3950	2,524E-01
260	< 1,0E-05	560	7,179E-01	860	< 1,000E-05	1160	2,620E-03	2500	9,193E-01	4000	1,940E-01
270	< 1,0E-05	570	6,330E-01	870	< 1,000E-05	1170	3,235E-03	2550	9,208E-01	4050	1,235E-01
280	< 1,0E-05	580	5,365E-01	880	< 1,000E-05	1180	3,803E-03	2600	9,215E-01	4100	6,781E-02
290	< 1,0E-05	590	4,347E-01	890	< 1,000E-05	1190	4,695E-03	2650	9,213E-01	4150	3,506E-02
300	< 1,0E-05	600	3,347E-01	900	< 1,000E-05	1200	5,724E-03	2700	9,177E-01	4200	1,926E-02
310	< 1,0E-05	610	2,446E-01	910	< 1,000E-05	1250	1,361E-02	2750	9,065E-01	4250	1,309E-02
320	1,091E-05	620	1,691E-01	920	< 1,000E-05	1300	2,886E-02	2800	8,575E-01	4300	1,218E-02
330	5,414E-03	630	1,115E-01	930	1,165E-05	1350	5,506E-02	2850	7,696E-01	4350	1,280E-02
340	7,963E-02	640	6,907E-02	940	1,541E-05	1400	9,391E-02	2900	6,891E-01	4400	1,197E-02
350	2,609E-01	650	4,086E-02	950	1,755E-05	1450	1,474E-01	2950	6,267E-01	4450	9,752E-03
360	4,385E-01	660	2,302E-02	960	2,479E-05	1500	2,108E-01	3000	5,754E-01	4500	7,643E-03
370	5,592E-01	670	1,251E-02	970	2,870E-05	1550	2,833E-01	3050	5,287E-01	4550	6,426E-03
380	6,359E-01	680	6,564E-03	980	4,020E-05	1600	3,593E-01	3100	4,846E-01	4600	6,306E-03
390	6,861E-01	690	3,364E-03	990	4,506E-05	1650	4,329E-01	3150	4,432E-01	4650	8,001E-03
400	7,241E-01	700	1,703E-03	1000	6,306E-05	1700	5,028E-01	3200	4,065E-01	4700	1,261E-02
410	7,548E-01	710	8,557E-04	1010	8,451E-05	1750	5,686E-01	3250	3,749E-01	4750	2,046E-02
420	7,817E-01	720	4,359E-04	1020	1,094E-04	1800	6,275E-01	3300	3,489E-01	4800	3,035E-02
430	8,047E-01	730	2,284E-04	1030	1,406E-04	1850	6,784E-01	3350	3,284E-01	4850	4,167E-02
440	8,263E-01	740	1,222E-04	1040	1,816E-04	1900	7,221E-01	3400	3,129E-01	4900	5,510E-02
450	8,455E-01	750	6,774E-05	1050	2,297E-04	1950	7,604E-01	3450	3,039E-01	4950	7,229E-02
460	8,620E-01	760	3,935E-05	1060	2,932E-04	2000	7,928E-01	3500	3,002E-01	5000	9,193E-02
470	8,761E-01	770	2,448E-05	1070	3,653E-04	2050	8,197E-01	3550	3,034E-01	5050	1,109E-01
480	8,878E-01	780	1,610E-05	1080	4,627E-04	2100	8,428E-01	3600	3,118E-01	5100	1,255E-01
490	8,965E-01	790	1,109E-05	1090	5,805E-04	2150	8,618E-01	3650	3,260E-01	5150	1,323E-01

BG62HT

Optical properties	
Reflection factor	
P_d	= 0,914
Spectral values guaranteed	
τ_i (405 nm)	≥ 0,8
τ_i (514 nm)	≥ 0,9
τ_i (633 nm)	≥ 0,08
τ_i (694 nm)	≤ 0,004
τ_i (1060 nm)	≤ 0,0005
Refractive indices	
n_F (486 nm)	= 1,55
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 340 nm to 1550 nm	
B_1	1,2129
B_2	0,1238
B_3	0,0621
C_1	6,667E-03 μm^2
C_2	3,0034E-02 μm^2
C_3	12,219 μm^2
Internal quality	
Bubble class	2

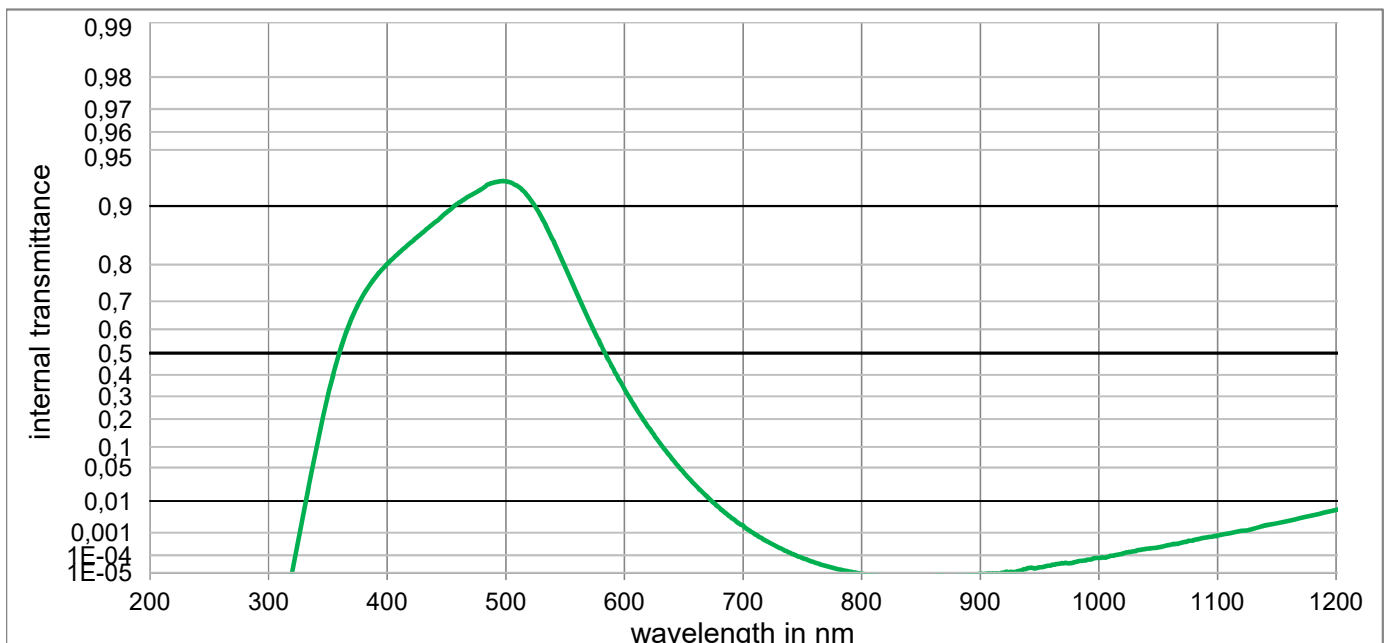
Mechanical properties	
Reference thickness	
d	= 1,00 mm
Density	
ρ	= 2,85 g/cm ³
Knoop hardness	
HK[0.1/20]	= 368

Thermal properties	
Transformation temperature	
T_g	= 410 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 11,8
α (20°C/300°C)	= 13,7

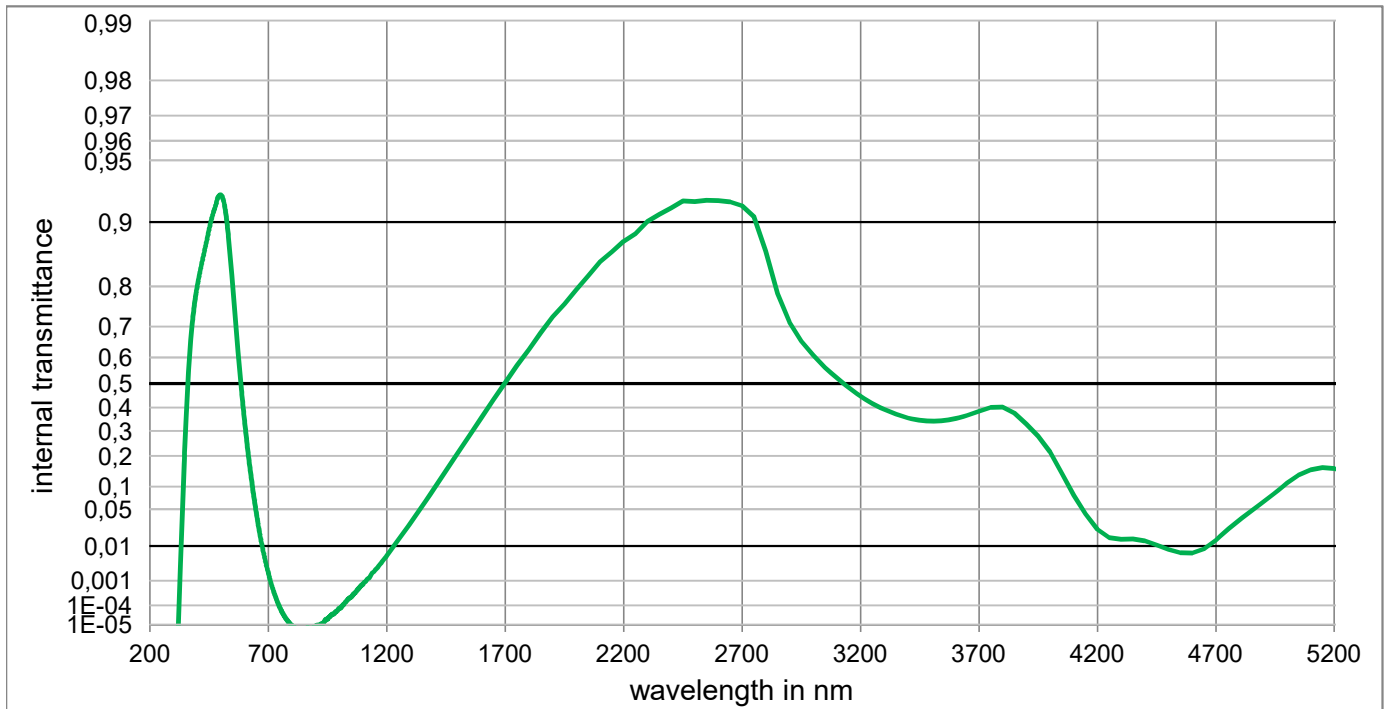
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.3
AR class	= 3.3
Long-term changes in the polished surface are possible under some circumstances.	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,226	0,191	0,172
	y	0,314	0,299	0,288
	Y	60,8	46,6	37,7
	λ_d	489 nm	489 nm	488 nm
	P_e	0,326	0,468	0,546
Illuminant A	x	0,317	0,252	0,215
	y	0,438	0,438	0,430
	Y	52,0	36,9	28,4
	λ_d	499 nm	497 nm	496 nm
	P_e	0,299	0,452	0,542

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.21\text{mm}) = 644 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG62HT



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only


λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,261E-01	800	< 1,000E-05	1100	7,708E-04	2200	8,764E-01	3700	3,841E-01
210	< 1,0E-05	510	9,214E-01	810	< 1,000E-05	1110	9,495E-04	2250	8,864E-01	3750	4,004E-01
220	< 1,0E-05	520	9,089E-01	820	< 1,000E-05	1120	1,194E-03	2300	9,006E-01	3800	4,015E-01
230	< 1,0E-05	530	8,856E-01	830	< 1,000E-05	1130	1,417E-03	2350	9,081E-01	3850	3,755E-01
240	< 1,0E-05	540	8,483E-01	840	< 1,000E-05	1140	1,889E-03	2400	9,143E-01	3900	3,297E-01
250	< 1,0E-05	550	7,945E-01	850	< 1,000E-05	1150	2,190E-03	2450	9,208E-01	3950	2,780E-01
260	< 1,0E-05	560	7,232E-01	860	< 1,000E-05	1160	2,656E-03	2500	9,204E-01	4000	2,153E-01
270	< 1,0E-05	570	6,361E-01	870	< 1,000E-05	1170	3,280E-03	2550	9,214E-01	4050	1,386E-01
280	< 1,0E-05	580	5,373E-01	880	< 1,000E-05	1180	3,977E-03	2600	9,213E-01	4100	7,754E-02
290	< 1,0E-05	590	4,338E-01	890	< 1,000E-05	1190	4,816E-03	2650	9,202E-01	4150	4,183E-02
300	< 1,0E-05	600	3,335E-01	900	< 1,000E-05	1200	5,792E-03	2700	9,166E-01	4200	2,268E-02
310	< 1,0E-05	610	2,433E-01	910	< 1,000E-05	1250	1,420E-02	2750	9,057E-01	4250	1,526E-02
320	1,339E-05	620	1,683E-01	920	1,017E-05	1300	2,938E-02	2800	8,625E-01	4300	1,405E-02
330	5,930E-03	630	1,110E-01	930	1,146E-05	1350	5,598E-02	2850	7,851E-01	4350	1,440E-02
340	9,512E-02	640	6,912E-02	940	1,861E-05	1400	9,470E-02	2900	7,123E-01	4400	1,317E-02
350	3,042E-01	650	4,089E-02	950	2,151E-05	1450	1,470E-01	2950	6,549E-01	4450	1,057E-02
360	5,087E-01	660	2,308E-02	960	2,868E-05	1500	2,097E-01	3000	6,073E-01	4500	8,216E-03
370	6,420E-01	670	1,259E-02	970	3,657E-05	1550	2,813E-01	3050	5,638E-01	4550	6,843E-03
380	7,214E-01	680	6,615E-03	980	4,364E-05	1600	3,563E-01	3100	5,224E-01	4600	6,690E-03
390	7,694E-01	690	3,406E-03	990	5,597E-05	1650	4,329E-01	3150	4,834E-01	4650	8,518E-03
400	8,016E-01	700	1,849E-03	1000	7,191E-05	1700	5,036E-01	3200	4,482E-01	4700	1,353E-02
410	8,257E-01	710	8,801E-04	1010	9,398E-05	1750	5,702E-01	3250	4,175E-01	4750	2,221E-02
420	8,456E-01	720	4,531E-04	1020	1,185E-04	1800	6,281E-01	3300	3,919E-01	4800	3,359E-02
430	8,627E-01	730	2,360E-04	1030	1,571E-04	1850	6,812E-01	3350	3,714E-01	4850	4,702E-02
440	8,779E-01	740	1,276E-04	1040	2,103E-04	1900	7,279E-01	3400	3,556E-01	4900	6,337E-02
450	8,919E-01	750	7,146E-05	1050	2,391E-04	1950	7,606E-01	3450	3,461E-01	4950	8,489E-02
460	9,036E-01	760	4,179E-05	1060	3,161E-04	2000	7,936E-01	3500	3,419E-01	5000	1,098E-01
470	9,121E-01	770	2,577E-05	1070	4,016E-04	2050	8,208E-01	3550	3,445E-01	5050	1,335E-01
480	9,190E-01	780	1,695E-05	1080	5,109E-04	2100	8,458E-01	3600	3,524E-01	5100	1,508E-01
490	9,251E-01	790	1,170E-05	1090	6,481E-04	2150	8,616E-01	3650	3,662E-01	5150	1,578E-01

BG63

Optical properties	
Reflection factor	
$P_d = 0,915$	
Spectral values guaranteed	
τ_i (405 nm)	$\geq 0,95$
τ_i (514 nm)	$\geq 0,96$
τ_i (633 nm)	$\geq 0,5$
τ_i (694 nm)	$\leq 0,25$
τ_i (1060 nm)	$\leq 0,16$
Refractive indices	
n_F (486 nm)	= 1,54
n_e (546 nm)	= 1,53
n_d (587,6 nm)	= 1,53
Sellmeier coefficients	
valid from 365 nm to 2325 nm	
B_1	1,3115
B_2	0,0046
B_3	0,3087
C_1	8,469E-03 μm^2
C_2	5,7634E-02 μm^2
C_3	46,721 μm^2
Internal quality	
Bubble class	2

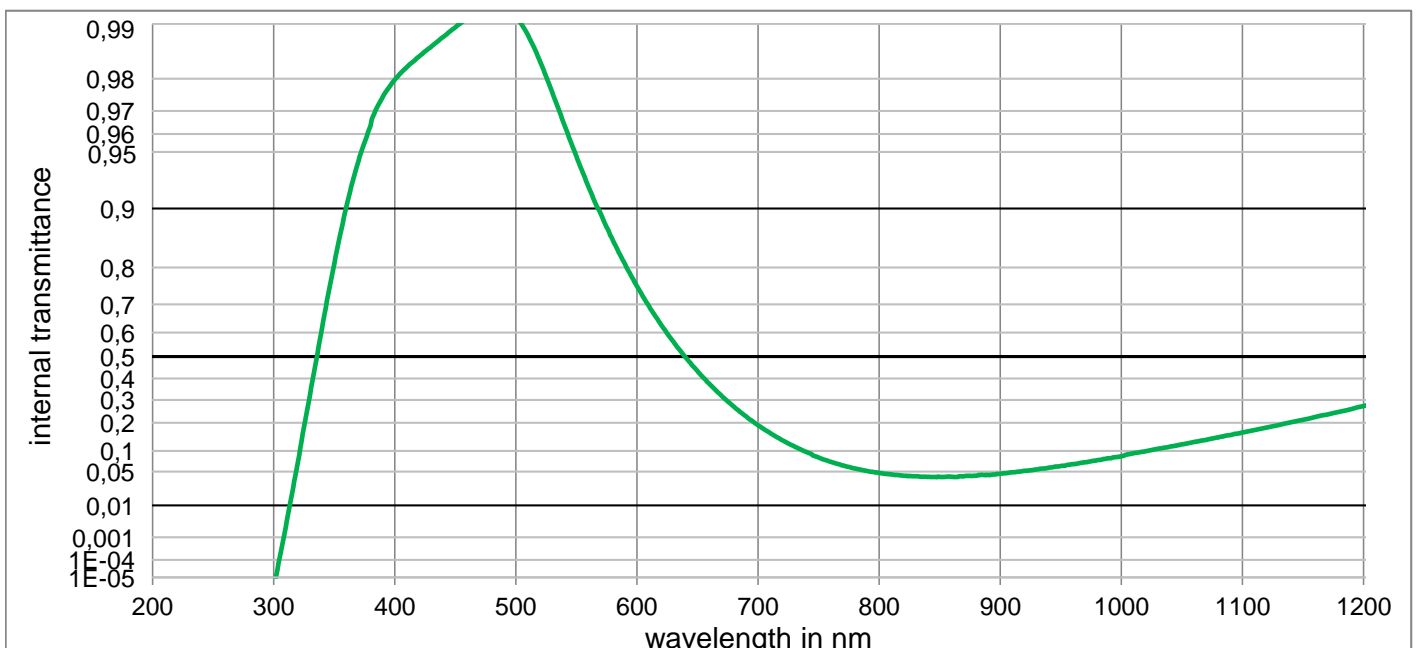
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,79 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 362	

Thermal properties	
Transformation temperature	
$T_g = 416 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 11,9
α (20°C/300°C)	= 13,9

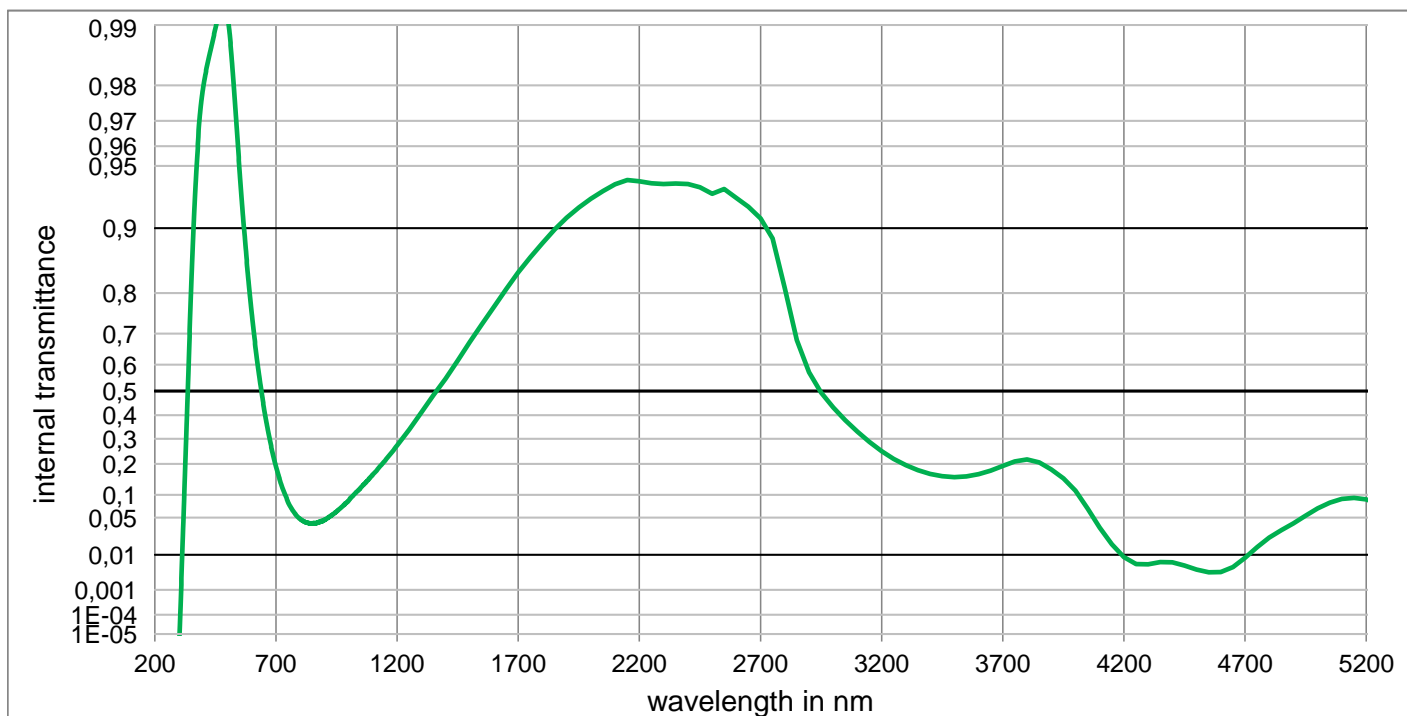
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.3
AR class	= 3.3
 Long-term changes in the polished surface are possible under some circumstances.	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,280	0,255	0,237
	y	0,325	0,319	0,313
	Y	80,9	73,0	67,0
	λ_d	490 nm	489 nm	489 nm
	P_e	0,123	0,216	0,289
Illuminant A	x	0,403	0,366	0,336
	y	0,420	0,428	0,432
	Y	76,5	66,2	58,6
	λ_d	500 nm	499 nm	499 nm
	P_e	0,102	0,186	0,256

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50}(d=1.5\text{mm}) = 614 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG63



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only


λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,909E-01	800	4,771E-02	1100	1,621E-01	2200	9,406E-01	3700	1,921E-01
210	< 1,0E-05	510	9,885E-01	810	4,471E-02	1110	1,714E-01	2250	9,393E-01	3750	2,095E-01
220	< 1,0E-05	520	9,839E-01	820	4,271E-02	1120	1,806E-01	2300	9,388E-01	3800	2,171E-01
230	< 1,0E-05	530	9,763E-01	830	4,174E-02	1130	1,912E-01	2350	9,391E-01	3850	2,055E-01
240	< 1,0E-05	540	9,644E-01	840	4,061E-02	1140	2,015E-01	2400	9,387E-01	3900	1,796E-01
250	< 1,0E-05	550	9,471E-01	850	4,057E-02	1150	2,122E-01	2450	9,364E-01	3950	1,492E-01
260	< 1,0E-05	560	9,232E-01	860	4,065E-02	1160	2,240E-01	2500	9,317E-01	4000	1,114E-01
270	< 1,0E-05	570	8,935E-01	870	4,149E-02	1170	2,349E-01	2550	9,352E-01	4050	6,722E-02
280	< 1,0E-05	580	8,543E-01	880	4,238E-02	1180	2,467E-01	2600	9,284E-01	4100	3,475E-02
290	< 1,0E-05	590	8,076E-01	890	4,391E-02	1190	2,591E-01	2650	9,210E-01	4150	1,686E-02
300	< 1,0E-05	600	7,536E-01	900	4,619E-02	1200	2,726E-01	2700	9,101E-01	4200	8,809E-03
310	2,4E-03	610	6,937E-01	910	4,868E-02	1250	3,398E-01	2750	8,881E-01	4250	5,895E-03
320	7,008E-02	620	6,295E-01	920	5,153E-02	1300	4,115E-01	2800	8,095E-01	4300	5,826E-03
330	3,265E-01	630	5,632E-01	930	5,418E-02	1350	4,843E-01	2850	6,807E-01	4350	6,643E-03
340	6,188E-01	640	4,980E-01	940	5,756E-02	1400	5,477E-01	2900	5,725E-01	4400	6,550E-03
350	8,085E-01	650	4,343E-01	950	6,141E-02	1450	6,145E-01	2950	4,941E-01	4450	5,416E-03
360	9,020E-01	660	3,734E-01	960	6,548E-02	1500	6,746E-01	3000	4,325E-01	4500	4,256E-03
370	9,441E-01	670	3,185E-01	970	6,997E-02	1550	7,266E-01	3050	3,786E-01	4550	3,563E-03
380	9,639E-01	680	2,695E-01	980	7,511E-02	1600	7,697E-01	3100	3,298E-01	4600	3,622E-03
390	9,748E-01	690	2,267E-01	990	7,958E-02	1650	8,079E-01	3150	2,863E-01	4650	4,923E-03
400	9,797E-01	700	1,900E-01	1000	8,513E-02	1700	8,387E-01	3200	2,493E-01	4700	8,493E-03
410	9,827E-01	710	1,594E-01	1010	9,301E-02	1750	8,629E-01	3250	2,191E-01	4750	1,485E-02
420	9,849E-01	720	1,340E-01	1020	9,917E-02	1800	8,822E-01	3300	1,952E-01	4800	2,293E-02
430	9,867E-01	730	1,133E-01	1030	1,063E-01	1850	8,987E-01	3350	1,771E-01	4850	3,124E-02
440	9,882E-01	740	9,696E-02	1040	1,124E-01	1900	9,108E-01	3400	1,640E-01	4900	4,079E-02
450	9,896E-01	750	8,151E-02	1050	1,202E-01	1950	9,204E-01	3450	1,564E-01	4950	5,353E-02
460	9,907E-01	760	7,097E-02	1060	1,282E-01	2000	9,277E-01	3500	1,535E-01	5000	6,786E-02
470	9,915E-01	770	6,270E-02	1070	1,348E-01	2050	9,336E-01	3550	1,559E-01	5050	8,079E-02
480	9,919E-01	780	5,639E-02	1080	1,437E-01	2100	9,385E-01	3600	1,629E-01	5100	8,941E-02
490	9,919E-01	790	5,125E-02	1090	1,522E-01	2150	9,414E-01	3650	1,752E-01	5150	9,218E-02

BG64

Optical properties	
Reflection factor	
$P_d = 0,916$	
Spectral values guaranteed	
τ_i (405 nm)	$\geq 0,99$
τ_i (514 nm)	$\geq 0,99$
τ_i (633 nm)	$\geq 0,72$
τ_i (694 nm)	$\leq 0,55$
τ_i (1060 nm)	$\leq 0,45$
Refractive indices	
n_F (486 nm)	= 1,54
n_e (546 nm)	= 1,53
n_d (587,6 nm)	= 1,53
Sellmeier coefficients	
valid from 365 nm to 2325 nm	
B_1	1,3031
B_2	0,0067
B_3	0,4940
C_1	8,159E-03 μm^2
C_2	5,5599E-02 μm^2
C_3	69,869 μm^2
Internal quality	
Bubble class	2

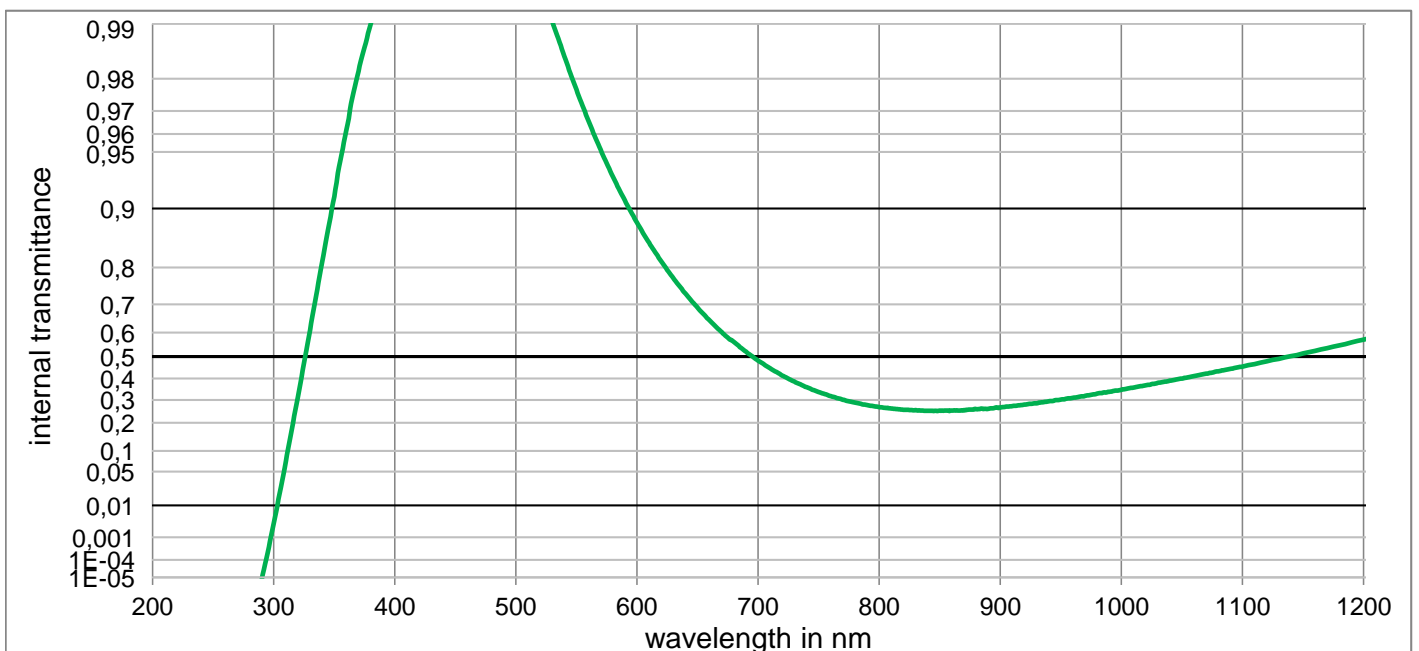
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,78 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 371	

Thermal properties	
Transformation temperature	
$T_g = 417 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30 $^\circ\text{C}/+70^\circ\text{C}$)	= 12,0
α (20 $^\circ\text{C}/300^\circ\text{C}$)	= 13,8

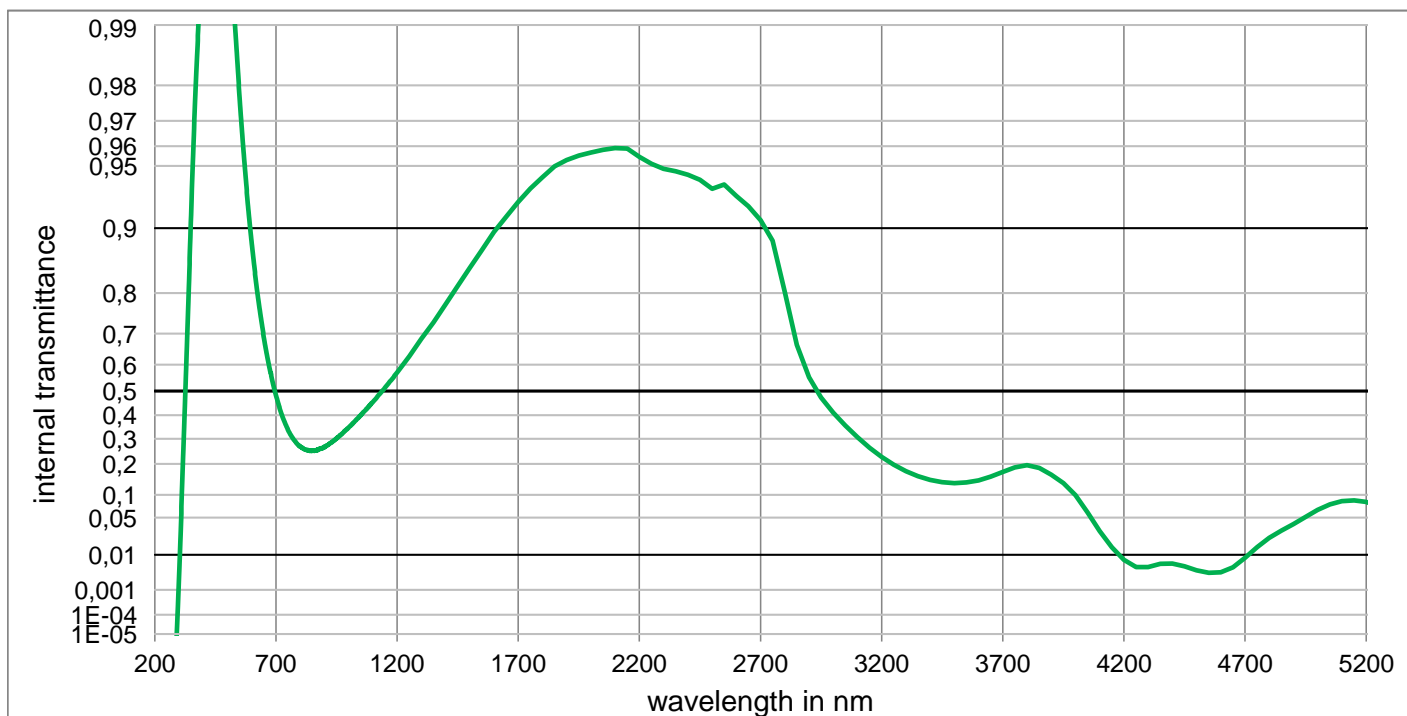
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.3
AR class	= 3.3
 <p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,297	0,284	0,272
	y	0,327	0,325	0,323
	Y	86,6	82,4	78,6
	λ_d	490 nm	490 nm	490 nm
	P_e	0,058	0,109	0,154
Illuminant A	x	0,427	0,408	0,391
	y	0,414	0,419	0,423
	Y	84,4	78,4	73,3
	λ_d	500 nm	500 nm	500 nm
	P_e	0,047	0,089	0,129

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=3\text{mm}) = 619 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG64



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only


λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,971E-01	800	2,682E-01	1100	4,553E-01	2200	9,549E-01	3700	1,706E-01
210	< 1,0E-05	510	9,959E-01	810	2,611E-01	1110	4,666E-01	2250	9,512E-01	3750	1,874E-01
220	< 1,0E-05	520	9,938E-01	820	2,558E-01	1120	4,786E-01	2300	9,484E-01	3800	1,951E-01
230	< 1,0E-05	530	9,903E-01	830	2,539E-01	1130	4,896E-01	2350	9,469E-01	3850	1,849E-01
240	< 1,0E-05	540	9,850E-01	840	2,511E-01	1140	5,017E-01	2400	9,447E-01	3900	1,614E-01
250	< 1,0E-05	550	9,770E-01	850	2,523E-01	1150	5,137E-01	2450	9,416E-01	3950	1,338E-01
260	< 1,0E-05	560	9,660E-01	860	2,522E-01	1160	5,248E-01	2500	9,354E-01	4000	9,910E-02
270	< 1,0E-05	570	9,513E-01	870	2,539E-01	1170	5,370E-01	2550	9,383E-01	4050	5,906E-02
280	< 1,0E-05	580	9,324E-01	880	2,592E-01	1180	5,479E-01	2600	9,299E-01	4100	3,025E-02
290	< 1,0E-05	590	9,093E-01	890	2,601E-01	1190	5,602E-01	2650	9,214E-01	4150	1,459E-02
300	3,0E-03	600	8,816E-01	900	2,661E-01	1200	5,719E-01	2700	9,084E-01	4200	7,556E-03
310	7,2E-02	610	8,496E-01	910	2,722E-01	1250	6,292E-01	2750	8,853E-01	4250	4,980E-03
320	3,138E-01	620	8,137E-01	920	2,787E-01	1300	6,842E-01	2800	8,020E-01	4300	4,985E-03
330	6,101E-01	630	7,745E-01	930	2,850E-01	1350	7,313E-01	2850	6,664E-01	4350	6,061E-03
340	8,116E-01	640	7,328E-01	940	2,938E-01	1400	7,753E-01	2900	5,540E-01	4400	6,099E-03
350	9,134E-01	650	6,894E-01	950	3,014E-01	1450	8,142E-01	2950	4,734E-01	4450	5,149E-03
360	9,618E-01	660	6,452E-01	960	3,100E-01	1500	8,461E-01	3000	4,106E-01	4500	4,072E-03
370	9,818E-01	670	6,013E-01	970	3,187E-01	1550	8,733E-01	3050	3,560E-01	4550	3,468E-03
380	9,899E-01	680	5,625E-01	980	3,291E-01	1600	8,959E-01	3100	3,067E-01	4600	3,580E-03
390	9,935E-01	690	5,212E-01	990	3,379E-01	1650	9,119E-01	3150	2,634E-01	4650	4,884E-03
400	9,950E-01	700	4,821E-01	1000	3,475E-01	1700	9,252E-01	3200	2,268E-01	4700	8,466E-03
410	9,959E-01	710	4,471E-01	1010	3,575E-01	1750	9,356E-01	3250	1,972E-01	4750	1,487E-02
420	9,962E-01	720	4,140E-01	1020	3,681E-01	1800	9,432E-01	3300	1,740E-01	4800	2,278E-02
430	9,966E-01	730	3,852E-01	1030	3,793E-01	1850	9,497E-01	3350	1,565E-01	4850	3,076E-02
440	9,970E-01	740	3,593E-01	1040	3,898E-01	1900	9,532E-01	3400	1,440E-01	4900	3,956E-02
450	9,973E-01	750	3,369E-01	1050	3,999E-01	1950	9,556E-01	3450	1,367E-01	4950	5,139E-02
460	9,976E-01	760	3,175E-01	1060	4,107E-01	2000	9,570E-01	3500	1,339E-01	5000	6,452E-02
470	9,977E-01	770	3,011E-01	1070	4,223E-01	2050	9,583E-01	3550	1,362E-01	5050	7,625E-02
480	9,977E-01	780	2,879E-01	1080	4,326E-01	2100	9,591E-01	3600	1,428E-01	5100	8,386E-02
490	9,977E-01	790	2,763E-01	1090	4,452E-01	2150	9,589E-01	3650	1,544E-01	5150	8,586E-02

BG66

Optical properties	
Reflection factor	
$P_d = 0,914$	
Spectral values guaranteed	
τ_i (430 nm)	$\geq 0,815$
τ_i (514 nm)	$\geq 0,89$
τ_i (565 nm)	$\geq 0,615$
τ_i (694 nm)	$\leq 0,0015$
τ_i (1060 nm)	$\leq 0,0002$
Refractive indices	
n_F (486 nm)	= 1,54
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 440 nm to 1550 nm	
B_1	1,3353
B_2	0,0004
B_3	0,6203
C_1	8,684E-03 μm^2
C_2	2,0582E-02 μm^2
C_3	100,000 μm^2
Internal quality	
Bubble class	0

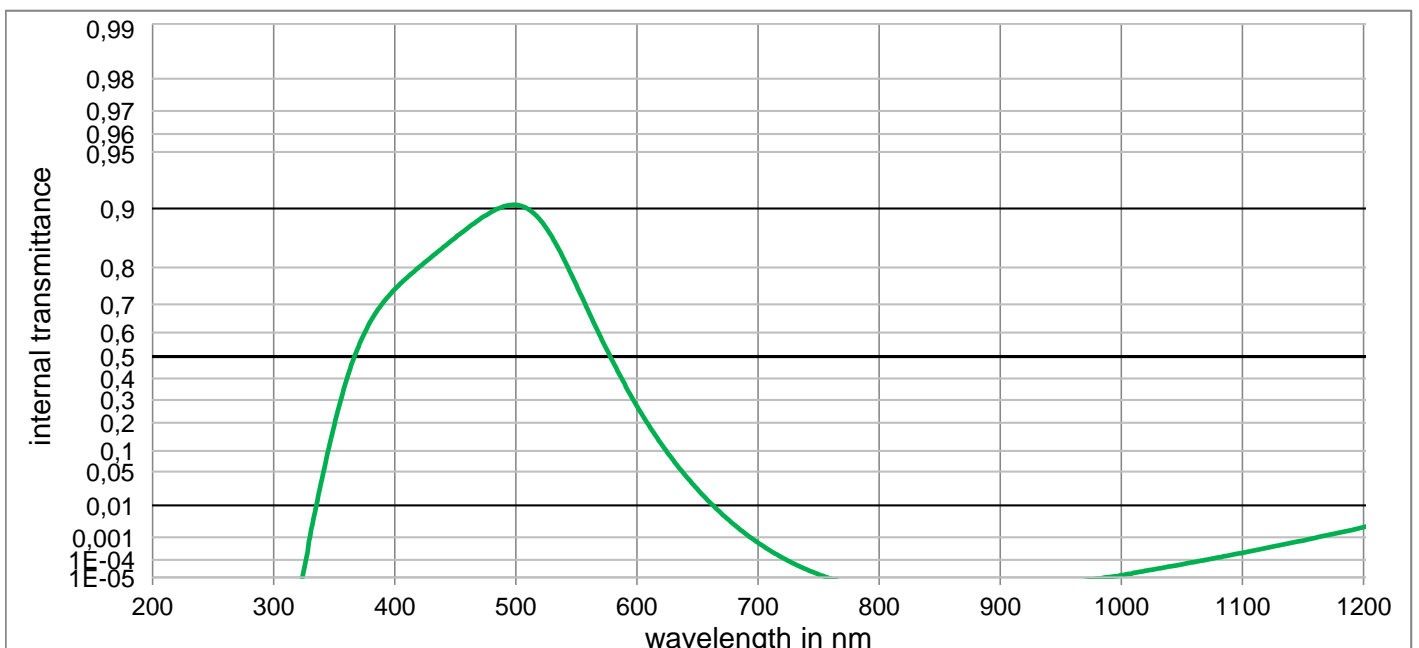
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,85 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 373	

Thermal properties	
Transformation temperature	
$T_g = 411 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30 $^\circ\text{C}/+70^\circ\text{C}$)	= 11,8
α (20 $^\circ\text{C}/300^\circ\text{C}$)	= 13,7

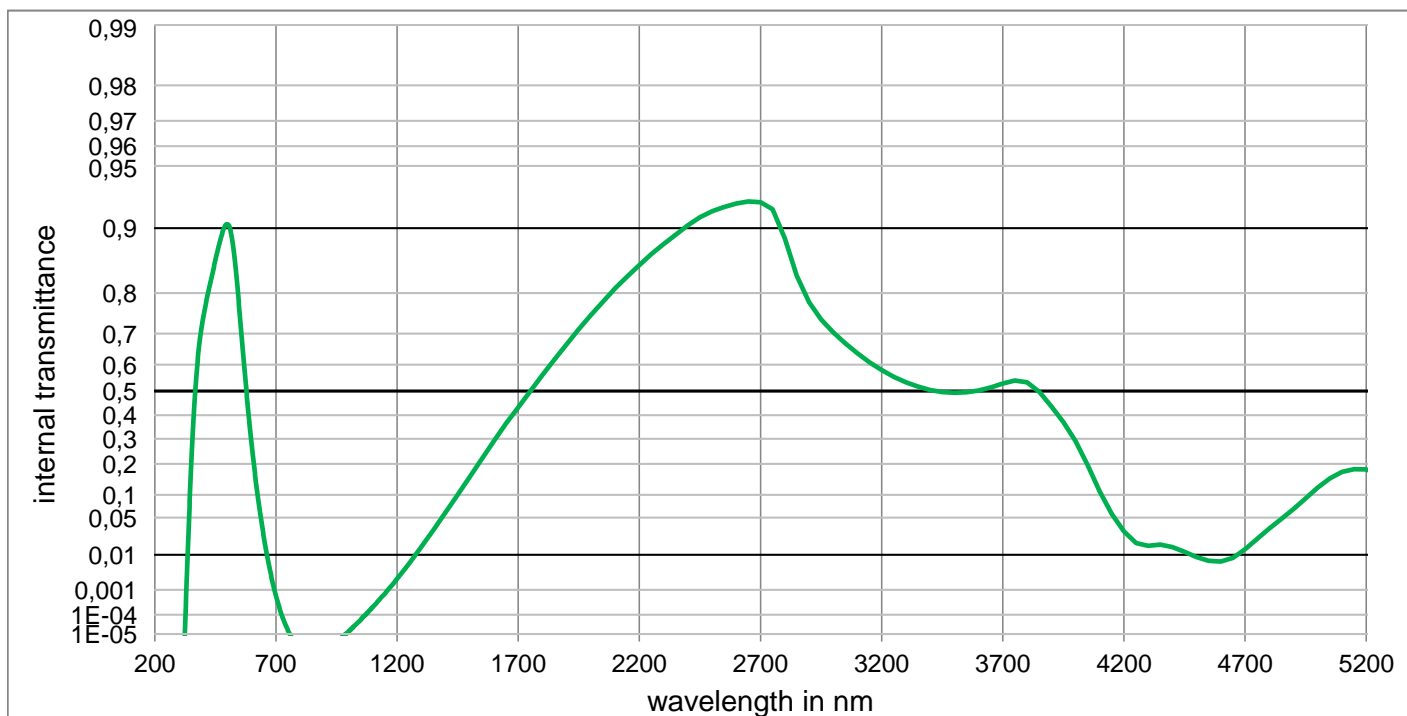
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 52.3
AR class	= 3.3
 <p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,218	0,183	0,165
	y	0,313	0,297	0,286
	Y	57,0	42,1	33,1
	λ_d	489 nm	489 nm	488 nm
	P_e	0,356	0,497	0,571
Illuminant A	x	0,303	0,237	0,202
	y	0,440	0,438	0,429
	Y	48,0	32,8	24,5
	λ_d	499 nm	497 nm	496 nm
	P_e	0,332	0,487	0,574

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50}(d=0.21\text{mm}) @ 635 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG66



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,043E-01	800	< 1,000E-05	1100	2,196E-04	2200	8,507E-01	3700	5,296E-01
210	< 1,0E-05	510	8,995E-01	810	< 1,000E-05	1110	2,858E-04	2250	8,676E-01	3750	5,413E-01
220	< 1,0E-05	520	8,856E-01	820	< 1,000E-05	1120	3,654E-04	2300	8,810E-01	3800	5,348E-01
230	< 1,0E-05	530	8,590E-01	830	< 1,000E-05	1130	4,675E-04	2350	8,927E-01	3850	4,976E-01
240	< 1,0E-05	540	8,165E-01	840	< 1,000E-05	1140	5,998E-04	2400	9,031E-01	3900	4,373E-01
250	< 1,0E-05	550	7,560E-01	850	< 1,000E-05	1150	7,406E-04	2450	9,113E-01	3950	3,702E-01
260	< 1,0E-05	560	6,770E-01	860	< 1,000E-05	1160	9,407E-04	2500	9,170E-01	4000	2,907E-01
270	< 1,0E-05	570	5,822E-01	870	< 1,000E-05	1170	1,191E-03	2550	9,209E-01	4050	1,956E-01
280	< 1,0E-05	580	4,782E-01	880	< 1,000E-05	1180	1,473E-03	2600	9,239E-01	4100	1,091E-01
290	< 1,0E-05	590	3,726E-01	890	< 1,000E-05	1190	1,816E-03	2650	9,256E-01	4150	5,625E-02
300	< 1,0E-05	600	2,720E-01	900	< 1,000E-05	1200	2,301E-03	2700	9,250E-01	4200	2,989E-02
310	< 1,0E-05	610	1,883E-01	910	< 1,000E-05	1250	6,219E-03	2750	9,187E-01	4250	1,788E-02
320	< 1,000E-05	620	1,222E-01	920	< 1,000E-05	1300	1,501E-02	2800	8,882E-01	4300	1,572E-02
330	1,069E-03	630	7,459E-02	930	< 1,000E-05	1350	3,166E-02	2850	8,326E-01	4350	1,676E-02
340	3,817E-02	640	4,295E-02	940	< 1,000E-05	1400	5,986E-02	2900	7,804E-01	4400	1,484E-02
350	1,903E-01	650	2,347E-02	950	< 1,000E-05	1450	1,006E-01	2950	7,387E-01	4450	1,165E-02
360	3,905E-01	660	1,207E-02	960	< 1,000E-05	1500	1,543E-01	3000	7,035E-01	4500	8,858E-03
370	5,434E-01	670	5,939E-03	970	< 1,000E-05	1550	2,192E-01	3050	6,707E-01	4550	7,190E-03
380	6,426E-01	680	2,832E-03	980	< 1,000E-05	1600	2,908E-01	3100	6,389E-01	4600	6,838E-03
390	7,040E-01	690	1,320E-03	990	1,054E-05	1650	3,659E-01	3150	6,083E-01	4650	8,472E-03
400	7,451E-01	700	6,092E-04	1000	1,418E-05	1700	4,320E-01	3200	5,802E-01	4700	1,325E-02
410	7,757E-01	710	2,779E-04	1010	1,905E-05	1750	4,998E-01	3250	5,554E-01	4750	2,175E-02
420	8,004E-01	720	1,290E-04	1020	2,566E-05	1800	5,622E-01	3300	5,344E-01	4800	3,342E-02
430	8,220E-01	730	6,140E-05	1030	3,340E-05	1850	6,185E-01	3350	5,175E-01	4850	4,796E-02
440	8,414E-01	740	3,033E-05	1040	4,450E-05	1900	6,680E-01	3400	5,044E-01	4900	6,617E-02
450	8,584E-01	750	1,534E-05	1050	5,799E-05	1950	7,125E-01	3450	4,961E-01	4950	9,066E-02
460	8,735E-01	760	< 1,000E-05	1060	7,729E-05	2000	7,496E-01	3500	4,929E-01	5000	1,200E-01
470	8,861E-01	770	< 1,000E-05	1070	1,000E-04	2050	7,815E-01	3550	4,948E-01	5050	1,486E-01
480	8,961E-01	780	< 1,000E-05	1080	1,319E-04	2100	8,096E-01	3600	5,022E-01	5100	1,706E-01
490	9,027E-01	790	< 1,000E-05	1090	1,712E-04	2150	8,319E-01	3650	5,144E-01	5150	1,811E-01

BG66HS

Optical properties	
Reflection factor	
P_d	= 0,913
Spectral values guaranteed	
τ_i (405 nm)	≥ 0,71
τ_i (514 nm)	≥ 0,85
τ_i (633 nm)	≥ 0,04
τ_i (694 nm)	≤ 0,0025
τ_i (1060 nm)	≤ 0,0004
Refractive indices	
n_F (486 nm)	= 1,55
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 365 nm to 1550 nm	
B_1	0,8063
B_2	0,5354
B_3	0,7669
C_1	3,349E-03 μm^2
C_2	1,7804E-02 μm^2
C_3	131,310 μm^2
Internal quality	
Bubble class	2

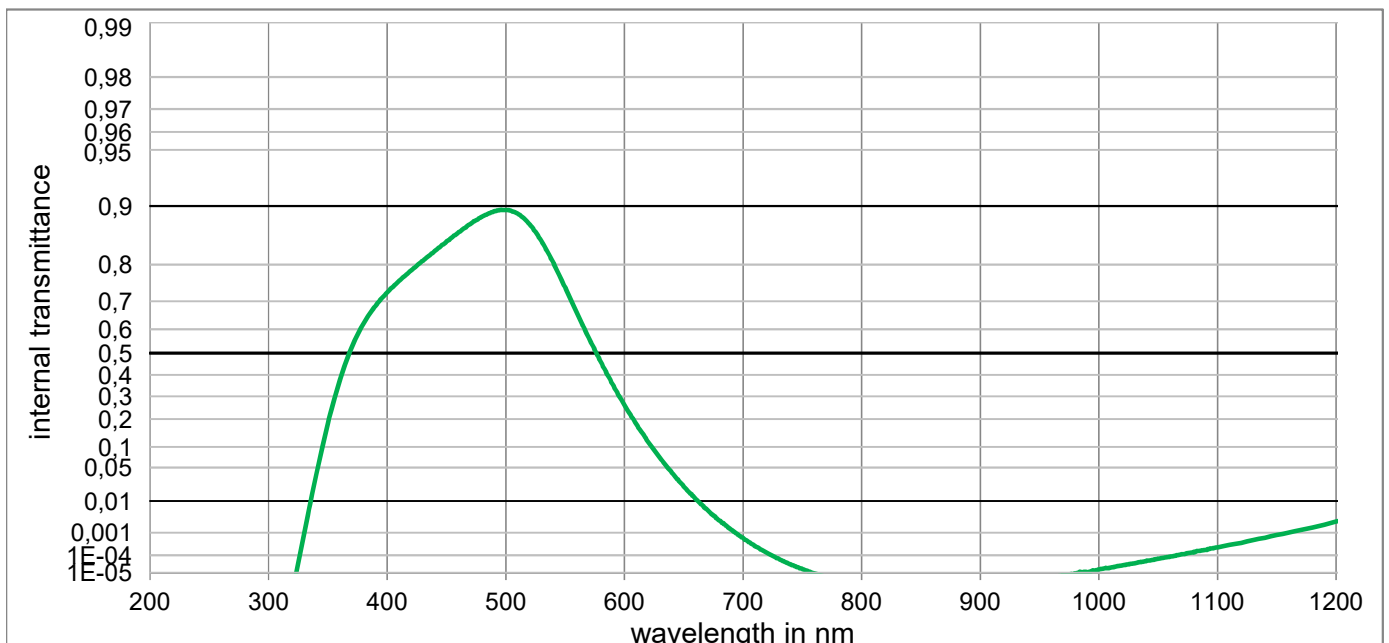
Mechanical properties	
Reference thickness	
d	= 1,00 mm
Density	
ρ	= 2,87 g/cm ³
Knoop hardness	
HK[0.1/20]	= 385

Thermal properties	
Transformation temperature	
T_g	= 425 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 11,5
α (20°C/300°C)	= 13,3

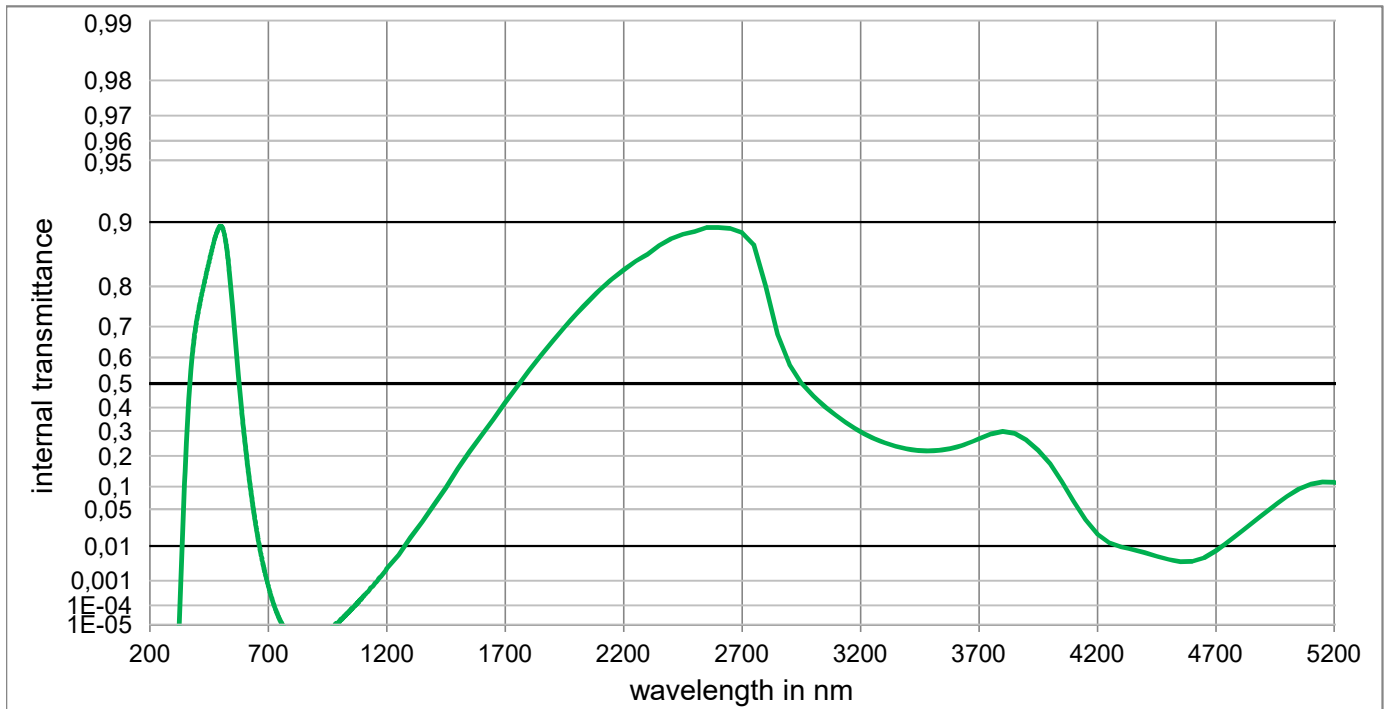
Chemical properties	
Chemical resistance	
FR class	
SR class	= 52,3
AR class	
Long-term changes in the polished surface are possible under some circumstances.	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,217	0,182	0,164
	y	0,313	0,298	0,288
	Y	56,0	40,9	31,9
	λ_d	489 nm	489 nm	488 nm
	P_e	0,362	0,502	0,576
Illuminant A	x	0,300	0,234	0,198
	y	0,440	0,438	0,430
	Y	47,0	31,7	23,5
	λ_d	499 nm	497 nm	496 nm
	P_e	0,338	0,495	0,581

Notes	
Ionically colored glass	
Bandpass filter / Shortpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.21\text{mm}) = 634 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG66HS




Internal transmittance τ_i at reference thickness													
The internal transmittance values, tabulated and graphically represented, are reference values only													
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	8,950E-01	800	< 1,000E-05	1100	2,451E-04	2200	8,318E-01	3700	2,668E-01		
210	< 1,0E-05	510	8,901E-01	810	< 1,000E-05	1110	3,149E-04	2250	8,467E-01	3750	2,868E-01		
220	< 1,0E-05	520	8,752E-01	820	< 1,000E-05	1120	3,900E-04	2300	8,577E-01	3800	2,981E-01		
230	< 1,0E-05	530	8,479E-01	830	< 1,000E-05	1130	5,114E-04	2350	8,709E-01	3850	2,898E-01		
240	< 1,0E-05	540	8,039E-01	840	< 1,000E-05	1140	6,304E-04	2400	8,798E-01	3900	2,617E-01		
250	< 1,0E-05	550	7,414E-01	850	< 1,000E-05	1150	8,148E-04	2450	8,858E-01	3950	2,215E-01		
260	< 1,0E-05	560	6,603E-01	860	< 1,000E-05	1160	1,017E-03	2500	8,891E-01	4000	1,714E-01		
270	< 1,0E-05	570	5,644E-01	870	< 1,000E-05	1170	1,283E-03	2550	8,938E-01	4050	1,138E-01		
280	< 1,0E-05	580	4,600E-01	880	< 1,000E-05	1180	1,561E-03	2600	8,939E-01	4100	6,435E-02		
290	< 1,0E-05	590	3,557E-01	890	< 1,000E-05	1190	1,978E-03	2650	8,927E-01	4150	3,347E-02		
300	< 1,0E-05	600	2,598E-01	900	< 1,000E-05	1200	2,514E-03	2700	8,877E-01	4200	1,817E-02		
310	< 1,0E-05	610	1,786E-01	910	< 1,000E-05	1250	6,007E-03	2750	8,715E-01	4250	1,184E-02		
320	< 1,000E-05	620	1,154E-01	920	< 1,000E-05	1300	1,525E-02	2800	8,004E-01	4300	9,431E-03		
330	9,746E-04	630	7,064E-02	930	< 1,000E-05	1350	3,121E-02	2850	6,770E-01	4350	8,061E-03		
340	3,686E-02	640	4,057E-02	940	< 1,000E-05	1400	5,831E-02	2900	5,736E-01	4400	6,827E-03		
350	1,848E-01	650	2,192E-02	950	< 1,000E-05	1450	9,706E-02	2950	5,020E-01	4450	5,629E-03		
360	3,750E-01	660	1,135E-02	960	< 1,000E-05	1500	1,543E-01	3000	4,490E-01	4500	4,562E-03		
370	5,257E-01	670	5,713E-03	970	< 1,000E-05	1550	2,162E-01	3050	4,039E-01	4550	3,951E-03		
380	6,234E-01	680	2,706E-03	980	< 1,000E-05	1600	2,816E-01	3100	3,635E-01	4600	4,022E-03		
390	6,849E-01	690	1,310E-03	990	1,098E-05	1650	3,501E-01	3150	3,275E-01	4650	5,088E-03		
400	7,276E-01	700	6,095E-04	1000	1,558E-05	1700	4,212E-01	3200	2,968E-01	4700	7,678E-03		
410	7,600E-01	710	2,798E-04	1010	2,078E-05	1750	4,883E-01	3250	2,714E-01	4750	1,229E-02		
420	7,860E-01	720	1,318E-04	1020	2,785E-05	1800	5,511E-01	3300	2,513E-01	4800	1,932E-02		
430	8,087E-01	730	6,345E-05	1030	3,659E-05	1850	6,065E-01	3350	2,363E-01	4850	2,904E-02		
440	8,292E-01	740	3,181E-05	1040	4,852E-05	1900	6,553E-01	3400	2,259E-01	4900	4,150E-02		
450	8,471E-01	750	1,671E-05	1050	6,733E-05	1950	6,989E-01	3450	2,202E-01	4950	5,726E-02		
460	8,626E-01	760	< 1,000E-05	1060	8,545E-05	2000	7,349E-01	3500	2,192E-01	5000	7,547E-02		
470	8,758E-01	770	< 1,000E-05	1070	1,127E-04	2050	7,661E-01	3550	2,233E-01	5050	9,314E-02		
480	8,864E-01	780	< 1,000E-05	1080	1,454E-04	2100	7,934E-01	3600	2,327E-01	5100	1,062E-01		
490	8,933E-01	790	< 1,000E-05	1090	1,854E-04	2150	8,150E-01	3650	2,474E-01	5150	1,124E-01		

BG67

Optical properties	
Reflection factor	
$P_d = 0,913$	
Spectral values guaranteed	
τ_i (450 nm)	$\geq 0,7$
τ_i (500 nm)	$\geq 0,8$
τ_i (550 nm)	$\geq 0,65$
τ_i (600 nm)	$\leq 0,19$
Refractive indices	
n_F (486 nm)	= 1,55
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 400 nm to 1550 nm	
B_1	0,7165
B_2	0,6218
B_3	0,6042
C_1	1,764E-09 μm^2
C_2	1,9422E-02 μm^2
C_3	100,000 μm^2
Internal quality	
Bubble class	2

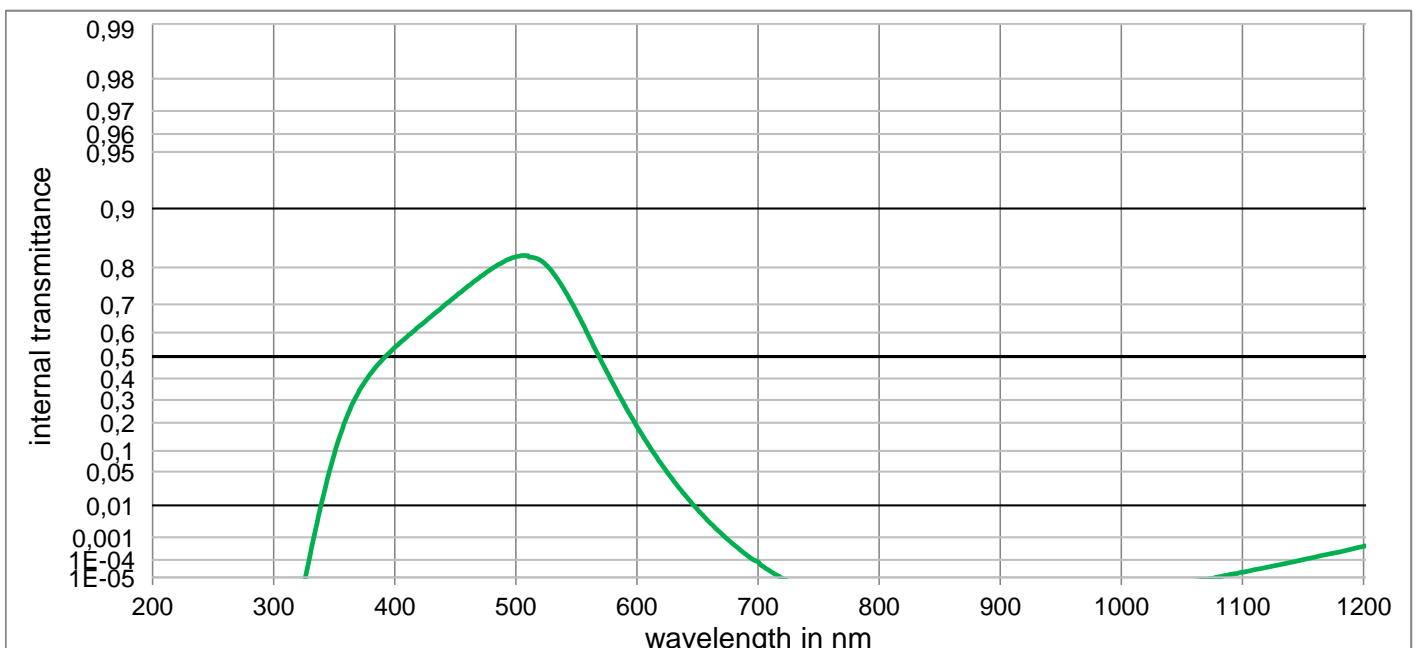
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,85 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 364	

Thermal properties	
Transformation temperature	
$T_g = 390 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 11,8
α (20°C/300°C)	= 13,7

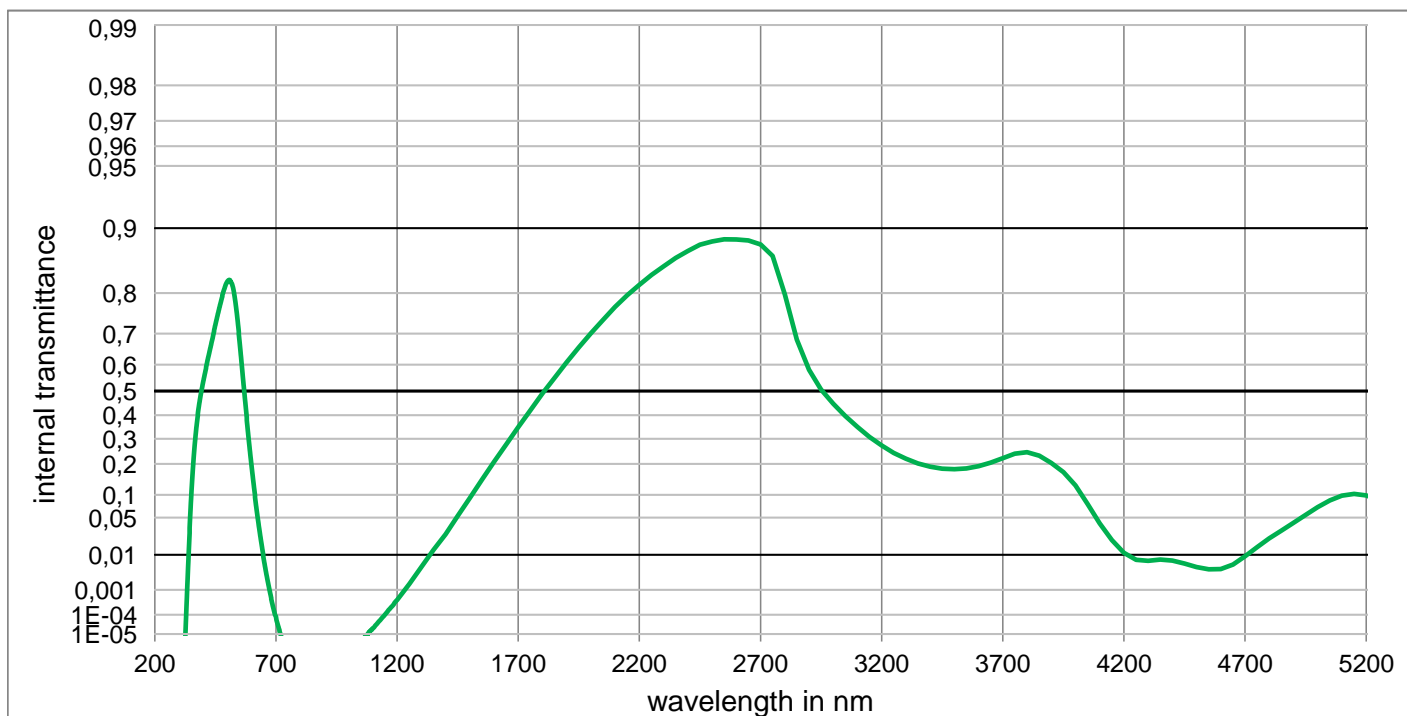
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.3
AR class	= 3.3
 <p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,209	0,176	0,159
	y	0,321	0,317	0,318
	Y	49,7	33,4	24,0
	λ_d	491 nm	490 nm	491 nm
	P_e	0,383	0,508	0,569
Illuminant A	x	0,285	0,222	0,189
	y	0,450	0,456	0,457
	Y	40,9	25,4	17,5
	λ_d	499 nm	498 nm	498 nm
	P_e	0,372	0,519	0,595

Notes	
Ionically colored glass	
Bandpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.145\text{mm}) @ 641 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG67



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	8,231E-01	800	< 1,000E-05	1100	2,071E-05	2200	8,164E-01	3700	2,218E-01
210	< 1,0E-05	510	8,251E-01	810	< 1,000E-05	1110	2,923E-05	2250	8,345E-01	3750	2,392E-01
220	< 1,0E-05	520	8,162E-01	820	< 1,000E-05	1120	3,952E-05	2300	8,488E-01	3800	2,455E-01
230	< 1,0E-05	530	7,899E-01	830	< 1,000E-05	1130	5,505E-05	2350	8,619E-01	3850	2,318E-01
240	< 1,0E-05	540	7,437E-01	840	< 1,000E-05	1140	7,511E-05	2400	8,717E-01	3900	2,036E-01
250	< 1,0E-05	550	6,764E-01	850	< 1,000E-05	1150	1,020E-04	2450	8,803E-01	3950	1,699E-01
260	< 1,0E-05	560	5,876E-01	860	< 1,000E-05	1160	1,362E-04	2500	8,844E-01	4000	1,268E-01
270	< 1,0E-05	570	4,859E-01	870	< 1,000E-05	1170	1,856E-04	2550	8,871E-01	4050	7,709E-02
280	< 1,0E-05	580	3,787E-01	880	< 1,000E-05	1180	2,399E-04	2600	8,867E-01	4100	4,066E-02
290	< 1,0E-05	590	2,747E-01	890	< 1,000E-05	1190	3,271E-04	2650	8,855E-01	4150	2,051E-02
300	< 1,0E-05	600	1,851E-01	900	< 1,000E-05	1200	4,258E-04	2700	8,805E-01	4200	1,109E-02
310	< 1,0E-05	610	1,152E-01	910	< 1,000E-05	1250	1,575E-03	2750	8,647E-01	4250	7,611E-03
320	< 1,000E-05	620	6,630E-02	920	< 1,000E-05	1300	4,935E-03	2800	7,974E-01	4300	7,207E-03
330	1,702E-04	630	3,513E-02	930	< 1,000E-05	1350	1,287E-02	2850	6,825E-01	4350	7,703E-03
340	1,300E-02	640	1,721E-02	940	< 1,000E-05	1400	2,625E-02	2900	5,817E-01	4400	7,300E-03
350	9,108E-02	650	7,798E-03	950	< 1,000E-05	1450	5,320E-02	2950	5,066E-01	4450	6,119E-03
360	2,195E-01	660	3,302E-03	960	< 1,000E-05	1500	9,161E-02	3000	4,476E-01	4500	4,921E-03
370	3,360E-01	670	1,321E-03	970	< 1,000E-05	1550	1,447E-01	3050	3,964E-01	4550	4,292E-03
380	4,226E-01	680	5,023E-04	980	< 1,000E-05	1600	2,069E-01	3100	3,497E-01	4600	4,391E-03
390	4,878E-01	690	1,842E-04	990	< 1,000E-05	1650	2,769E-01	3150	3,079E-01	4650	5,777E-03
400	5,392E-01	700	8,097E-05	1000	< 1,000E-05	1700	3,488E-01	3200	2,721E-01	4700	9,208E-03
410	5,833E-01	710	2,428E-05	1010	< 1,000E-05	1750	4,211E-01	3250	2,426E-01	4750	1,479E-02
420	6,234E-01	720	< 1,000E-05	1020	< 1,000E-05	1800	4,898E-01	3300	2,195E-01	4800	2,212E-02
430	6,594E-01	730	< 1,000E-05	1030	< 1,000E-05	1850	5,517E-01	3350	2,018E-01	4850	3,079E-02
440	6,935E-01	740	< 1,000E-05	1040	< 1,000E-05	1900	6,083E-01	3400	1,895E-01	4900	4,149E-02
450	7,239E-01	750	< 1,000E-05	1050	< 1,000E-05	1950	6,584E-01	3450	1,825E-01	4950	5,501E-02
460	7,523E-01	760	< 1,000E-05	1060	< 1,000E-05	2000	7,010E-01	3500	1,804E-01	5000	7,058E-02
470	7,760E-01	770	< 1,000E-05	1070	< 1,000E-05	2050	7,377E-01	3550	1,834E-01	5050	8,601E-02
480	7,970E-01	780	< 1,000E-05	1080	1,035E-05	2100	7,696E-01	3600	1,913E-01	5100	9,768E-02
490	8,128E-01	790	< 1,000E-05	1090	1,536E-05	2150	7,959E-01	3650	2,044E-01	5150	1,023E-01

BG67HT

Optical properties	
Reflection factor	
P_d	= 0,913
Spectral values guaranteed	
τ_i (450 nm)	≥ 0,75
τ_i (500 nm)	≥ 0,83
τ_i (550 nm)	≥ 0,65
τ_i (600 nm)	≤ 0,19
Refractive indices	
n_F (486 nm)	= 1,55
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 400 nm to 1550 nm	
B_1	0,7165
B_2	0,6218
B_3	0,6042
C_1	1,764E-09 μm^2
C_2	1,9422E-02 μm^2
C_3	100,000 μm^2
Internal quality	
Bubble class	2

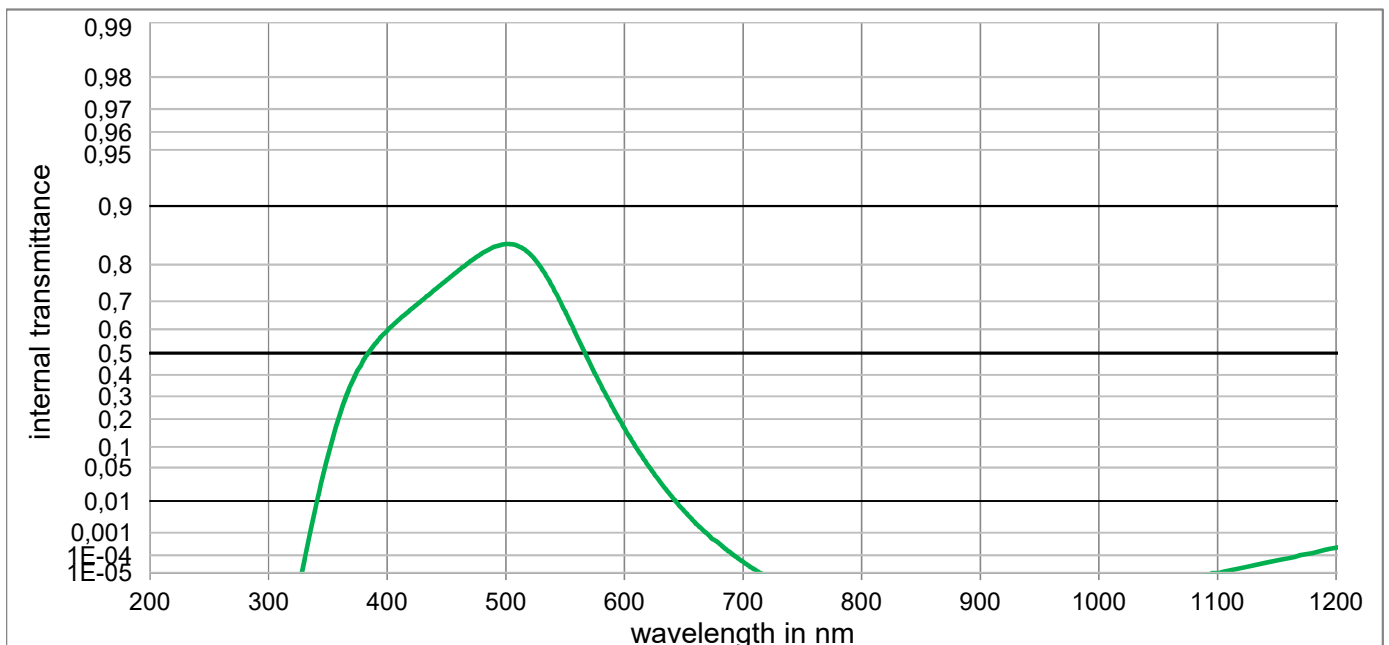
Mechanical properties	
Reference thickness	
d	= 1,00 mm
Density	
ρ	= 2,85 g/cm ³
Knoop hardness	
HK[0.1/20]	= 364

Thermal properties	
Transformation temperature	
T_g	= 390 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 11,8
α (20°C/300°C)	= 13,7

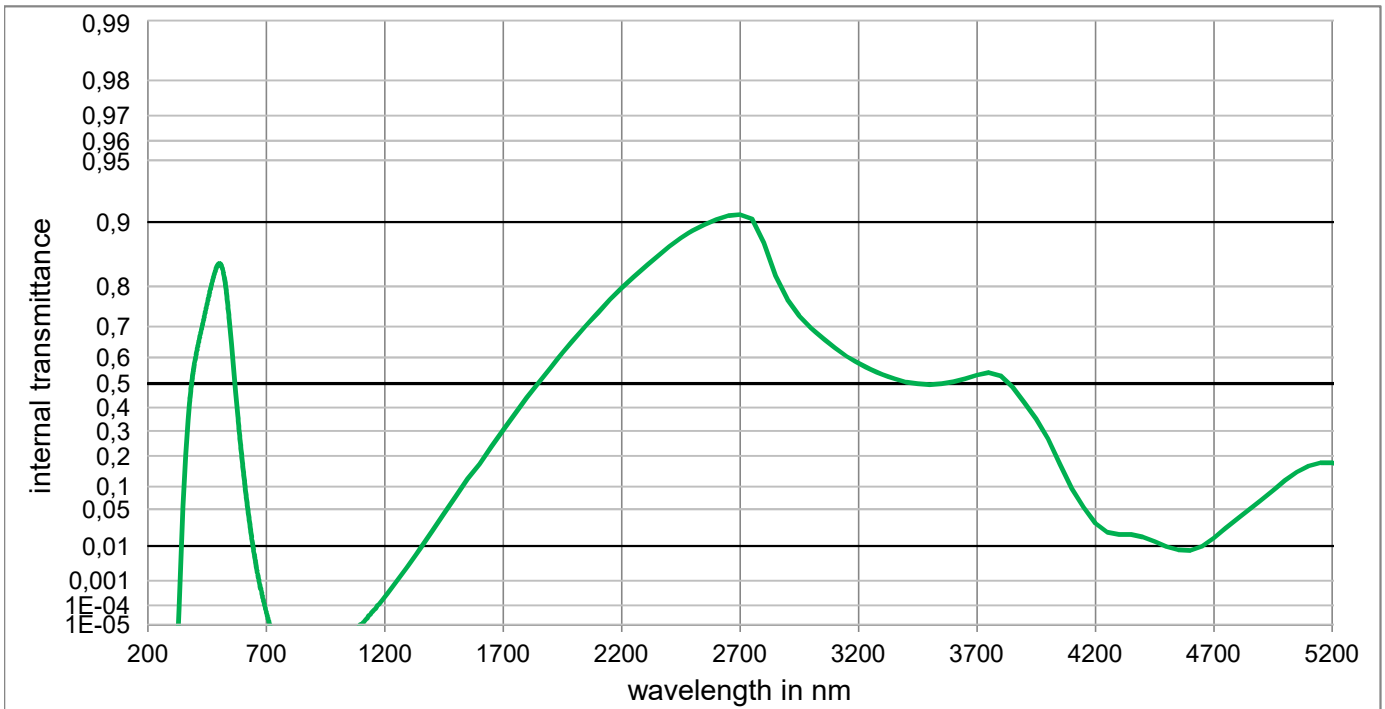
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.3
AR class	= 3.3
Long-term changes in the polished surface are possible under some circumstances.	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,203	0,170	0,154
	y	0,312	0,300	0,294
	Y	49,0	33,2	24,1
	λ_d	490 nm	489 nm	489 nm
	P_e	0,413	0,543	0,607
Illuminant A	x	0,274	0,211	0,179
	y	0,445	0,441	0,434
	Y	39,9	24,9	17,2
	λ_d	499 nm	497 nm	496 nm
	P_e	0,398	0,549	0,625

Notes	
Ionically colored glass	
Bandpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.11\text{mm}) @ 634 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG67HT



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	8,425E-01	800	< 1,000E-05	1100	< 1,000E-05	2200	7,964E-01	3700	5,342E-01
210	< 1,0E-05	510	8,389E-01	810	< 1,000E-05	1110	1,392E-05	2250	8,185E-01	3750	5,437E-01
220	< 1,0E-05	520	8,236E-01	820	< 1,000E-05	1120	1,999E-05	2300	8,379E-01	3800	5,316E-01
230	< 1,0E-05	530	7,914E-01	830	< 1,000E-05	1130	2,837E-05	2350	8,541E-01	3850	4,866E-01
240	< 1,0E-05	540	7,393E-01	840	< 1,000E-05	1140	3,755E-05	2400	8,694E-01	3900	4,207E-01
250	< 1,0E-05	550	6,655E-01	850	< 1,000E-05	1150	5,176E-05	2450	8,808E-01	3950	3,509E-01
260	< 1,0E-05	560	5,721E-01	860	< 1,000E-05	1160	7,067E-05	2500	8,905E-01	4000	2,676E-01
270	< 1,0E-05	570	4,641E-01	870	< 1,000E-05	1170	1,026E-04	2550	8,973E-01	4050	1,689E-01
280	< 1,0E-05	580	3,534E-01	880	< 1,000E-05	1180	1,293E-04	2600	9,027E-01	4100	9,411E-02
290	< 1,0E-05	590	2,493E-01	890	< 1,000E-05	1190	1,808E-04	2650	9,067E-01	4150	5,303E-02
300	< 1,0E-05	600	1,627E-01	900	< 1,000E-05	1200	2,372E-04	2700	9,079E-01	4200	2,924E-02
310	< 1,0E-05	610	9,760E-02	910	< 1,000E-05	1250	9,582E-04	2750	9,034E-01	4250	1,970E-02
320	< 1,000E-05	620	5,393E-02	920	< 1,000E-05	1300	3,153E-03	2800	8,741E-01	4300	1,772E-02
330	4,871E-05	630	2,735E-02	930	< 1,000E-05	1350	8,739E-03	2850	8,210E-01	4350	1,772E-02
340	7,922E-03	640	1,274E-02	940	< 1,000E-05	1400	2,078E-02	2900	7,707E-01	4400	1,571E-02
350	7,618E-02	650	5,556E-03	950	< 1,000E-05	1450	4,231E-02	2950	7,303E-01	4450	1,258E-02
360	2,203E-01	660	2,205E-03	960	< 1,000E-05	1500	7,563E-02	3000	6,961E-01	4500	9,730E-03
370	3,634E-01	670	8,986E-04	970	< 1,000E-05	1550	1,217E-01	3050	6,643E-01	4550	8,055E-03
380	4,698E-01	680	3,566E-04	980	< 1,000E-05	1600	1,704E-01	3100	6,331E-01	4600	7,823E-03
390	5,425E-01	690	1,258E-04	990	< 1,000E-05	1650	2,347E-01	3150	6,032E-01	4650	9,759E-03
400	5,941E-01	700	4,383E-05	1000	< 1,000E-05	1700	3,036E-01	3200	5,784E-01	4700	1,497E-02
410	6,380E-01	710	1,529E-05	1010	< 1,000E-05	1750	3,737E-01	3250	5,564E-01	4750	2,385E-02
420	6,736E-01	720	< 1,000E-05	1020	< 1,000E-05	1800	4,423E-01	3300	5,361E-01	4800	3,556E-02
430	7,056E-01	730	< 1,000E-05	1030	< 1,000E-05	1850	5,043E-01	3350	5,195E-01	4850	4,991E-02
440	7,350E-01	740	< 1,000E-05	1040	< 1,000E-05	1900	5,627E-01	3400	5,065E-01	4900	6,777E-02
450	7,620E-01	750	< 1,000E-05	1050	< 1,000E-05	1950	6,167E-01	3450	4,991E-01	4950	9,057E-02
460	7,861E-01	760	< 1,000E-05	1060	< 1,000E-05	2000	6,627E-01	3500	4,961E-01	5000	1,170E-01
470	8,074E-01	770	< 1,000E-05	1070	< 1,000E-05	2050	7,040E-01	3550	4,998E-01	5050	1,430E-01
480	8,244E-01	780	< 1,000E-05	1080	< 1,000E-05	2100	7,389E-01	3600	5,074E-01	5100	1,638E-01
490	8,370E-01	790	< 1,000E-05	1090	< 1,000E-05	2150	7,711E-01	3650	5,196E-01	5150	1,750E-01

VG9

Optical properties	
Reflection factor	
$P_d = 0,911$	
Spectral values guaranteed	
τ_i (450 nm)	$\leq 0,21$
τ_i (514 nm)	$\geq 0,67$
τ_i (633 nm)	$\leq 0,15$
τ_i (725 nm)	$\leq 0,07$
τ_i (1060 nm)	$\leq 0,18$
Refractive indices	
n_d (587,6 nm) = 1,55	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	1

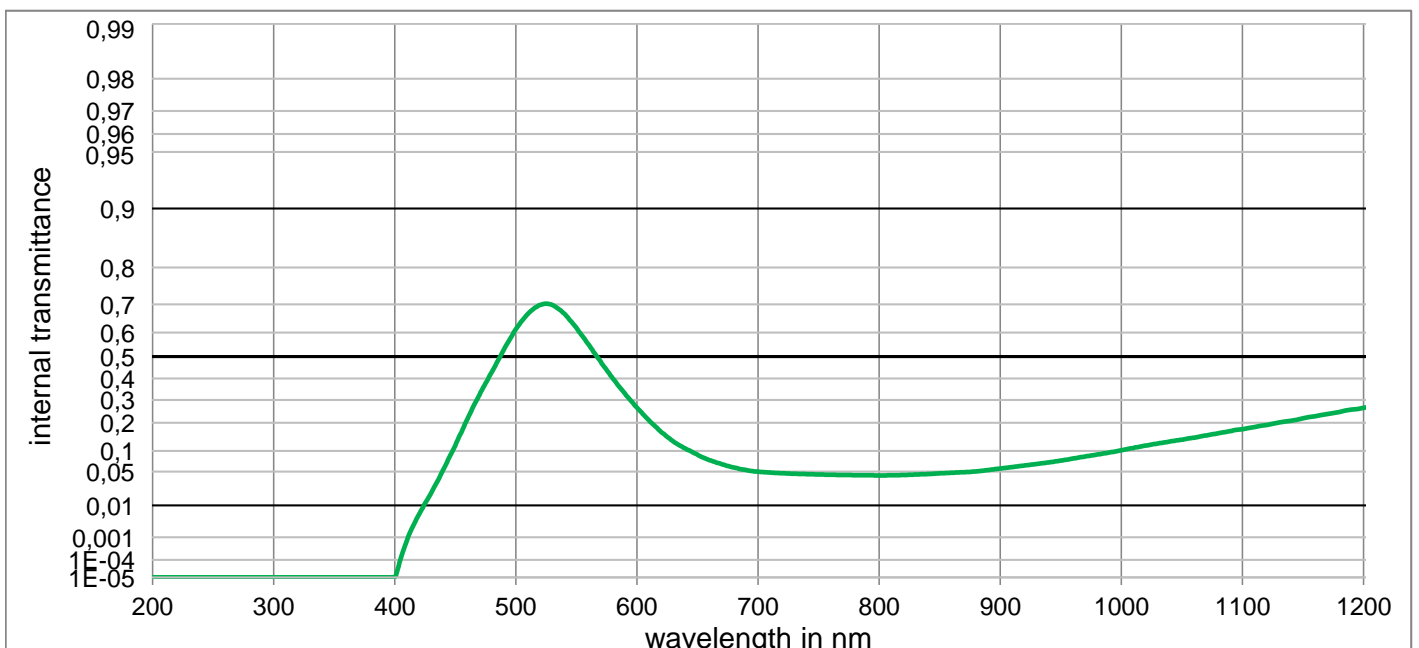
Mechanical properties	
Reference thickness	
d = 1,00 mm	
Density	
$\rho = 2,87 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 449	

Thermal properties	
Transformation temperature	
$T_g = 451 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 9,2
α (20°C/300°C)	= 10,6

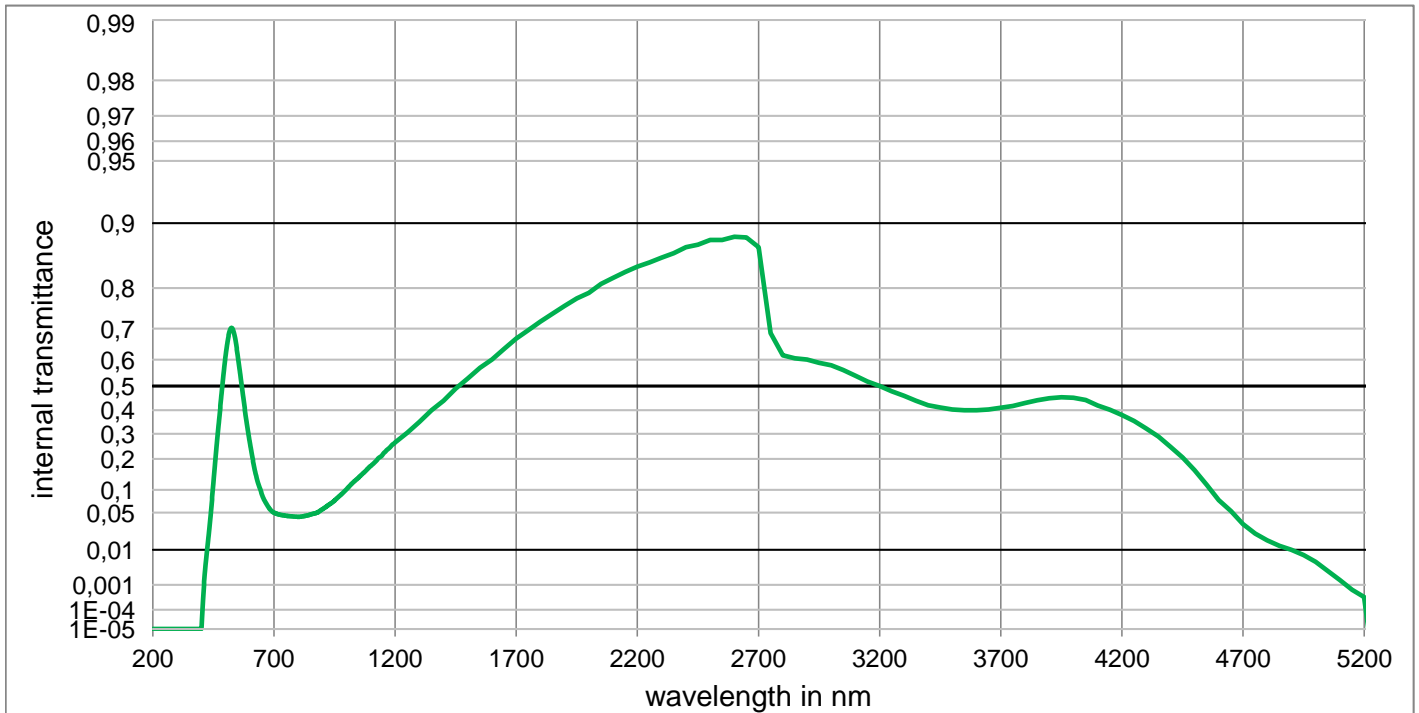
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,284	0,246	0,220
	y	0,493	0,582	0,637
	Y	44,8	25,2	15,2
	λ_d	541 nm	535 nm	532 nm
	P_e	0,392	0,561	0,660
Illuminant A	x	0,370	0,306	0,265
	y	0,522	0,596	0,645
	Y	39,7	20,9	12,1
	λ_d	535 nm	529 nm	527 nm
	P_e	0,307	0,468	0,576

Notes	
Ionically colored glass	
Bandpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



VG9



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only


λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	6,130E-01	800	4,315E-02	1100	1,745E-01	2200	8,400E-01	3700	4,100E-01
210	< 1,0E-05	510	6,690E-01	810	4,327E-02	1110	1,824E-01	2250	8,472E-01	3750	4,175E-01
220	< 1,0E-05	520	6,980E-01	820	4,381E-02	1120	1,907E-01	2300	8,548E-01	3800	4,300E-01
230	< 1,0E-05	530	6,980E-01	830	4,462E-02	1130	2,013E-01	2350	8,614E-01	3850	4,420E-01
240	< 1,0E-05	540	6,690E-01	840	4,547E-02	1140	2,079E-01	2400	8,700E-01	3900	4,500E-01
250	< 1,0E-05	550	6,180E-01	850	4,674E-02	1150	2,184E-01	2450	8,736E-01	3950	4,542E-01
260	< 1,0E-05	560	5,520E-01	860	4,781E-02	1160	2,273E-01	2500	8,800E-01	4000	4,524E-01
270	< 1,0E-05	570	4,770E-01	870	4,890E-02	1170	2,372E-01	2550	8,800E-01	4050	4,429E-01
280	< 1,0E-05	580	4,010E-01	880	5,036E-02	1180	2,460E-01	2600	8,840E-01	4100	4,200E-01
290	< 1,0E-05	590	3,300E-01	890	5,300E-02	1190	2,562E-01	2650	8,830E-01	4150	4,015E-01
300	< 1,0E-05	600	2,650E-01	900	5,608E-02	1200	2,644E-01	2700	8,700E-01	4200	3,800E-01
310	< 1,0E-05	610	2,090E-01	910	5,926E-02	1250	3,044E-01	2750	6,870E-01	4250	3,543E-01
320	< 1,000E-05	620	1,640E-01	920	6,255E-02	1300	3,500E-01	2800	6,154E-01	4300	3,223E-01
330	< 1,000E-05	630	1,300E-01	930	6,600E-02	1350	4,000E-01	2850	6,050E-01	4350	2,884E-01
340	< 1,000E-05	640	1,070E-01	940	6,967E-02	1400	4,400E-01	2900	6,000E-01	4400	2,469E-01
350	< 1,000E-05	650	8,900E-02	950	7,392E-02	1450	4,901E-01	2950	5,890E-01	4450	2,054E-01
360	< 1,000E-05	660	7,500E-02	960	7,900E-02	1500	5,300E-01	3000	5,800E-01	4500	1,600E-01
370	< 1,000E-05	670	6,558E-02	970	8,434E-02	1550	5,702E-01	3050	5,626E-01	4550	1,140E-01
380	< 1,000E-05	680	5,811E-02	980	8,972E-02	1600	6,000E-01	3100	5,400E-01	4600	7,450E-02
390	< 1,000E-05	690	5,297E-02	990	9,538E-02	1650	6,371E-01	3150	5,183E-01	4650	5,248E-02
400	< 1,000E-05	700	4,985E-02	1000	1,020E-01	1700	6,700E-01	3200	5,000E-01	4700	3,251E-02
410	7,621E-04	710	4,816E-02	1010	1,091E-01	1750	6,955E-01	3250	4,787E-01	4750	2,203E-02
420	5,715E-03	720	4,695E-02	1020	1,162E-01	1800	7,200E-01	3300	4,600E-01	4800	1,614E-02
430	1,963E-02	730	4,597E-02	1030	1,230E-01	1850	7,407E-01	3350	4,392E-01	4850	1,230E-02
440	5,343E-02	740	4,533E-02	1040	1,295E-01	1900	7,600E-01	3400	4,213E-01	4900	1,000E-02
450	1,170E-01	750	4,479E-02	1050	1,360E-01	1950	7,775E-01	3450	4,118E-01	4950	7,534E-03
460	2,160E-01	760	4,422E-02	1060	1,430E-01	2000	7,900E-01	3500	4,034E-01	5000	5,000E-03
470	3,250E-01	770	4,387E-02	1070	1,510E-01	2050	8,086E-01	3550	4,000E-01	5050	2,773E-03
480	4,290E-01	780	4,354E-02	1080	1,590E-01	2100	8,200E-01	3600	4,000E-01	5100	1,455E-03
490	5,300E-01	790	4,328E-02	1090	1,670E-01	2150	8,312E-01	3650	4,024E-01	5150	6,637E-04

VG20

Optical properties	
Reflection factor	
$P_d = 0,913$	
Spectral values guaranteed	
τ_i (450 nm)	$\geq 0,75$
τ_i (500 nm)	$\geq 0,83$
τ_i (550 nm)	$\geq 0,65$
τ_i (600 nm)	$\leq 0,19$
Refractive indices	
n_F (486 nm)	= 1,55
n_e (546 nm)	= 1,54
n_d (587,6 nm)	= 1,54
Sellmeier coefficients	
valid from 400 nm to 1550 nm	
B_1	0,7165
B_2	0,6218
B_3	0,6042
C_1	1,764E-09 μm^2
C_2	1,9422E-02 μm^2
C_3	100,000 μm^2
Internal quality	
Bubble class	2

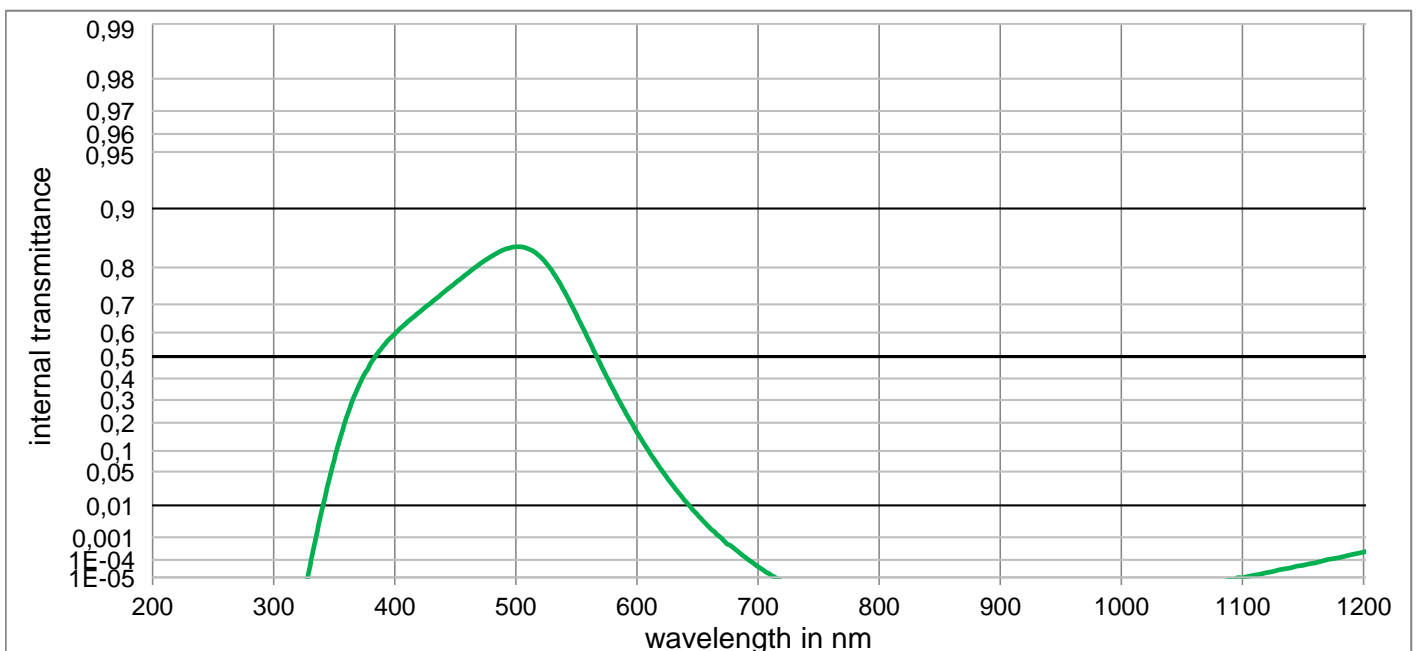
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,85 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 364	

Thermal properties	
Transformation temperature	
$T_g = 390 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 11,8
α (20°C/300°C)	= 13,7

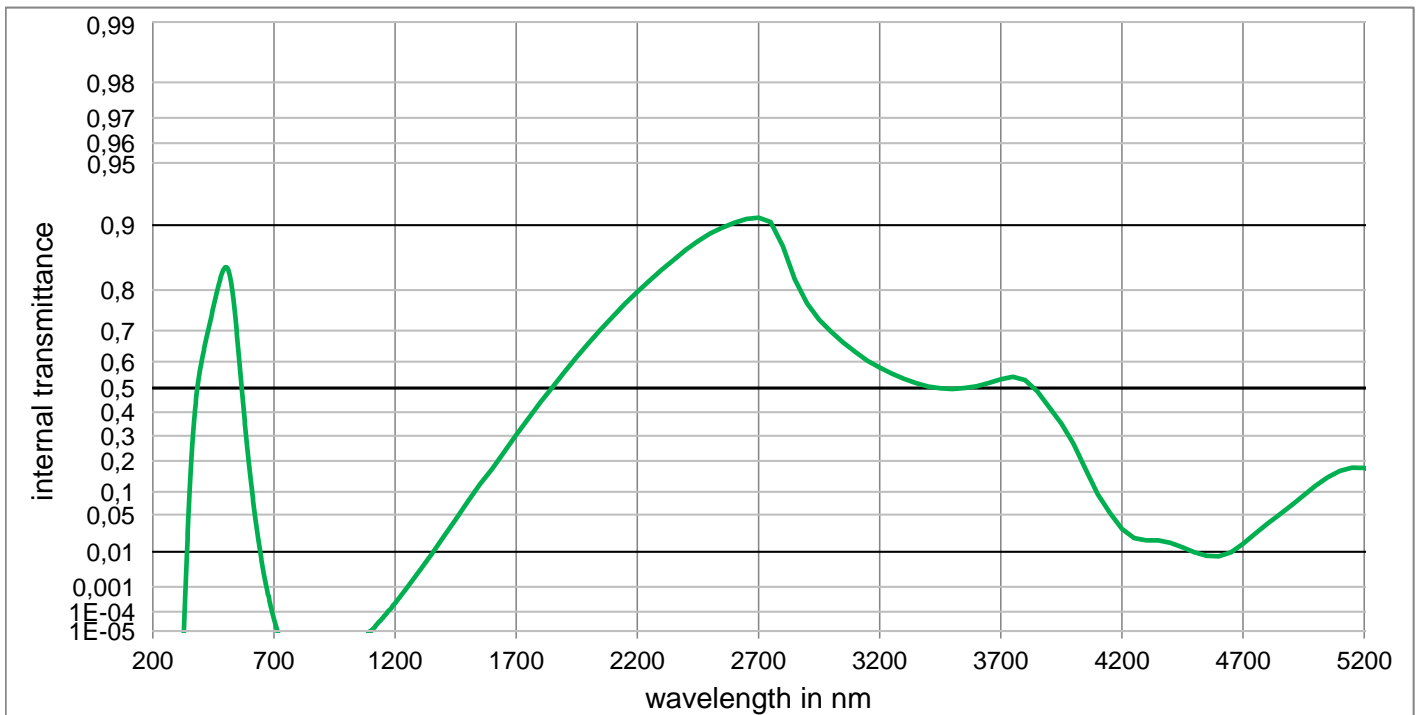
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.3
AR class	= 3.3
 <p>Long-term changes in the polished surface are possible under some circumstances.</p>	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,203	0,170	0,154
	y	0,312	0,300	0,294
	Y	49,0	33,2	24,1
	λ_d	490 nm	489 nm	489 nm
	P_e	0,413	0,543	0,607
Illuminant A	x	0,274	0,211	0,179
	y	0,445	0,441	0,434
	Y	39,9	24,9	17,2
	λ_d	499 nm	497 nm	496 nm
	P_e	0,398	0,549	0,625

Notes	
Ionically colored glass	
Bandpass filter	
NIR cutoff filter	
$\lambda_{50\%}(d=0.3\text{mm}) @ 604 \text{ nm}$	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



VG20



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

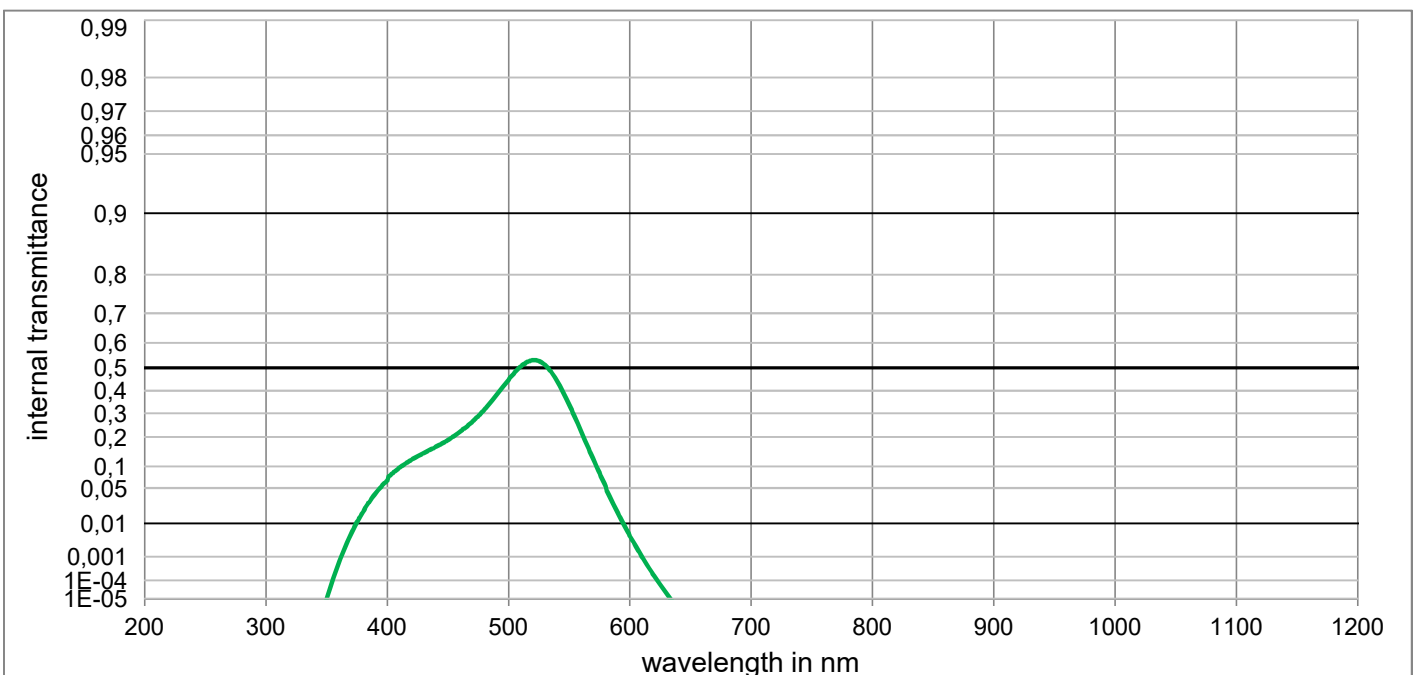
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	8,425E-01	800	< 1,000E-05	1100	< 1,000E-05	2200	7,964E-01	3700	5,342E-01
210	< 1,0E-05	510	8,389E-01	810	< 1,000E-05	1110	1,392E-05	2250	8,185E-01	3750	5,437E-01
220	< 1,0E-05	520	8,236E-01	820	< 1,000E-05	1120	1,999E-05	2300	8,379E-01	3800	5,316E-01
230	< 1,0E-05	530	7,914E-01	830	< 1,000E-05	1130	2,837E-05	2350	8,541E-01	3850	4,866E-01
240	< 1,0E-05	540	7,393E-01	840	< 1,000E-05	1140	3,755E-05	2400	8,694E-01	3900	4,207E-01
250	< 1,0E-05	550	6,655E-01	850	< 1,000E-05	1150	5,176E-05	2450	8,808E-01	3950	3,509E-01
260	< 1,0E-05	560	5,721E-01	860	< 1,000E-05	1160	7,067E-05	2500	8,905E-01	4000	2,676E-01
270	< 1,0E-05	570	4,641E-01	870	< 1,000E-05	1170	1,026E-04	2550	8,973E-01	4050	1,689E-01
280	< 1,0E-05	580	3,534E-01	880	< 1,000E-05	1180	1,293E-04	2600	9,027E-01	4100	9,411E-02
290	< 1,0E-05	590	2,493E-01	890	< 1,000E-05	1190	1,808E-04	2650	9,067E-01	4150	5,303E-02
300	< 1,0E-05	600	1,627E-01	900	< 1,000E-05	1200	2,372E-04	2700	9,079E-01	4200	2,924E-02
310	< 1,0E-05	610	9,760E-02	910	< 1,000E-05	1250	9,582E-04	2750	9,034E-01	4250	1,970E-02
320	< 1,000E-05	620	5,393E-02	920	< 1,000E-05	1300	3,153E-03	2800	8,741E-01	4300	1,772E-02
330	4,871E-05	630	2,735E-02	930	< 1,000E-05	1350	8,739E-03	2850	8,210E-01	4350	1,772E-02
340	7,922E-03	640	1,274E-02	940	< 1,000E-05	1400	2,078E-02	2900	7,707E-01	4400	1,571E-02
350	7,618E-02	650	5,556E-03	950	< 1,000E-05	1450	4,231E-02	2950	7,303E-01	4450	1,258E-02
360	2,203E-01	660	2,205E-03	960	< 1,000E-05	1500	7,563E-02	3000	6,961E-01	4500	9,730E-03
370	3,634E-01	670	8,986E-04	970	< 1,000E-05	1550	1,217E-01	3050	6,643E-01	4550	8,055E-03
380	4,698E-01	680	3,566E-04	980	< 1,000E-05	1600	1,704E-01	3100	6,331E-01	4600	7,823E-03
390	5,425E-01	690	1,258E-04	990	< 1,000E-05	1650	2,347E-01	3150	6,032E-01	4650	9,759E-03
400	5,941E-01	700	4,383E-05	1000	< 1,000E-05	1700	3,036E-01	3200	5,784E-01	4700	1,497E-02
410	6,380E-01	710	1,529E-05	1010	< 1,000E-05	1750	3,737E-01	3250	5,564E-01	4750	2,385E-02
420	6,736E-01	720	< 1,000E-05	1020	< 1,000E-05	1800	4,423E-01	3300	5,361E-01	4800	3,556E-02
430	7,056E-01	730	< 1,000E-05	1030	< 1,000E-05	1850	5,043E-01	3350	5,195E-01	4850	4,991E-02
440	7,350E-01	740	< 1,000E-05	1040	< 1,000E-05	1900	5,627E-01	3400	5,065E-01	4900	6,777E-02
450	7,620E-01	750	< 1,000E-05	1050	< 1,000E-05	1950	6,167E-01	3450	4,991E-01	4950	9,057E-02
460	7,861E-01	760	< 1,000E-05	1060	< 1,000E-05	2000	6,627E-01	3500	4,961E-01	5000	1,170E-01
470	8,074E-01	770	< 1,000E-05	1070	< 1,000E-05	2050	7,040E-01	3550	4,998E-01	5050	1,430E-01
480	8,244E-01	780	< 1,000E-05	1080	< 1,000E-05	2100	7,389E-01	3600	5,074E-01	5100	1,638E-01
490	8,370E-01	790	< 1,000E-05	1090	< 1,000E-05	2150	7,711E-01	3650	5,196E-01	5150	1,750E-01

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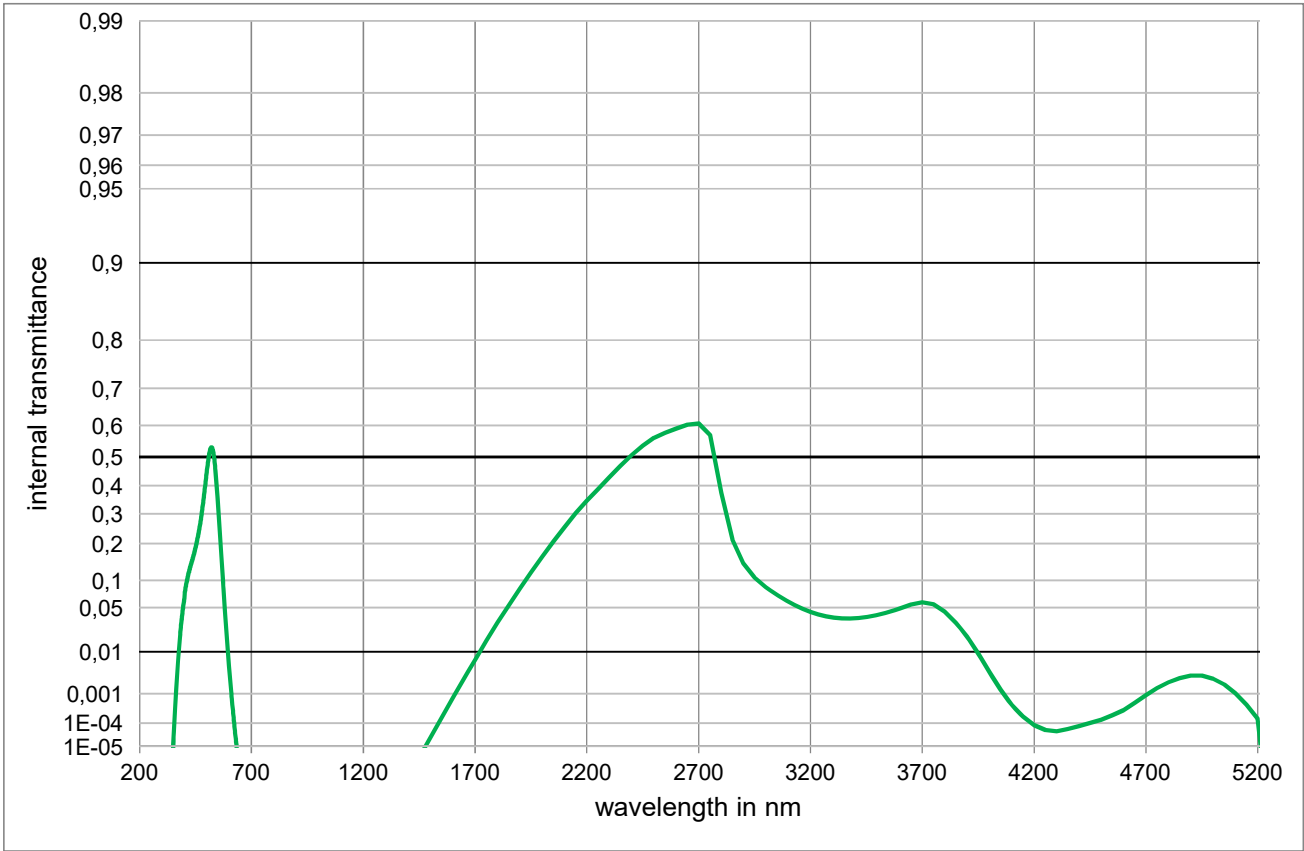
Optical properties	
Reflection factor	
$P_d = 0,910$	
Values guaranteed	
The color of glass is within a circle of the CIE Yu'v'UCS(1976) defined by $(u' - 0,088)^2 + (v' - 0,543)^2 = (0,037)^2$ for any black body radiator 1500K to 3200K	
Black body radiator	Photopic Transmittance [%]
2100 K	13,5 ± 1.5
1500 K	9 ± 1.5
Refractive indices	
$n_d (587,6 \text{ nm}) = 1,555 \pm 0,005$	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	1

Mechanical properties	
Reference thickness	
$d = 2 \text{ mm}$	
Density	
$\rho = 2,77 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20]	
Thermal properties	
Transformation temperature	
$T_g = 453 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 7,8$	
$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 8,9$	
$\alpha_{(20^\circ\text{C}/200^\circ\text{C})}$	
Chemical properties	
Chemical resistance	
FR class = 0	
SR class = 4	
AR class = 3	
Long-term changes in the polished surface are possible.	

Colorimetric properties				
	1 mm	2 mm	3 mm	
Illuminant D65	x	0,196	0,169	0,154
	y	0,374	0,432	0,492
	Y	37,3	20,7	12,4
	λ_d	496,0	500,0	505,0
	P_e	0,400	0,470	0,510
Illuminant A	x	0,253	0,203	0,178
	y	0,498	0,549	0,593
	Y	29,6	15,5	9,0
	λ_d	503,0	505,0	508,0
	P_e	0,440	0,550	0,610
Notes				
Ionically colored glass				
Bandpass filter				
NIR cutoff filter				
NVIS-Green A - 2 mm bandpass filter according to MIL-STD-3009				
Disclaimer				
All data without tolerances are to be understood to be reference values				



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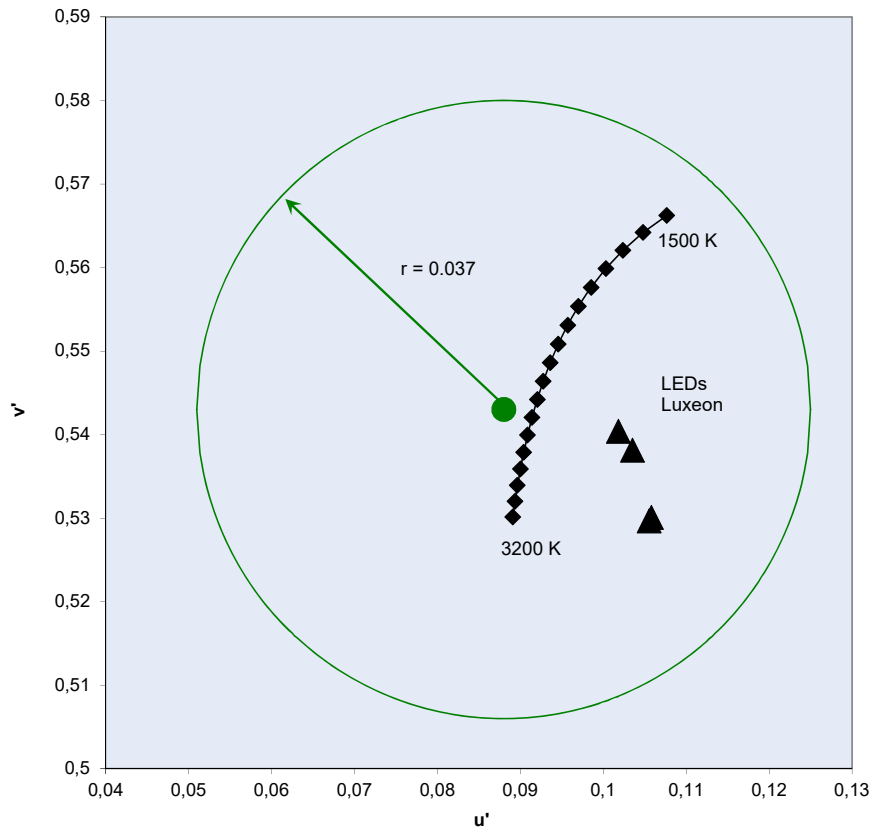


Internal transmittance t_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	4,483E-01	800	< 1,000E-05	1100	< 1,000E-05	2200	3,453E-01	3700	5,800E-02
210	< 1,0E-05	510	5,049E-01	810	< 1,000E-05	1110	< 1,000E-05	2250	3,871E-01	3750	5,505E-02
220	< 1,0E-05	520	5,313E-01	820	< 1,000E-05	1120	< 1,000E-05	2300	4,287E-01	3800	4,448E-02
230	< 1,0E-05	530	5,123E-01	830	< 1,000E-05	1130	< 1,000E-05	2350	4,691E-01	3850	3,093E-02
240	< 1,0E-05	540	4,431E-01	840	< 1,000E-05	1140	< 1,000E-05	2400	5,060E-01	3900	1,879E-02
250	< 1,0E-05	550	3,370E-01	850	< 1,000E-05	1150	< 1,000E-05	2450	5,380E-01	3950	9,286E-03
260	< 1,0E-05	560	2,201E-01	860	< 1,000E-05	1160	< 1,000E-05	2500	5,617E-01	4000	3,658E-03
270	< 1,0E-05	570	1,199E-01	870	< 1,000E-05	1170	< 1,000E-05	2550	5,775E-01	4050	1,282E-03
280	< 1,0E-05	580	5,327E-02	880	< 1,000E-05	1180	< 1,000E-05	2600	5,903E-01	4100	4,598E-04
290	< 1,0E-05	590	1,731E-02	890	< 1,000E-05	1190	< 1,000E-05	2650	6,017E-01	4150	1,798E-04
300	< 1,0E-05	600	4,677E-03	900	< 1,000E-05	1200	< 1,000E-05	2700	6,055E-01	4200	8,400E-05
310	< 1,0E-05	610	9,895E-04	910	< 1,000E-05	1250	< 1,000E-05	2750	5,709E-01	4250	5,361E-05
320	< 1,000E-05	620	1,628E-04	920	< 1,000E-05	1300	< 1,000E-05	2800	3,741E-01	4300	4,785E-05
330	< 1,000E-05	630	2,102E-05	930	< 1,000E-05	1350	< 1,000E-05	2850	2,130E-01	4350	5,774E-05
340	< 1,000E-05	640	< 1,000E-05	940	< 1,000E-05	1400	< 1,000E-05	2900	1,425E-01	4400	7,778E-05
350	< 1,000E-05	650	< 1,000E-05	950	< 1,000E-05	1450	< 1,000E-05	2950	1,074E-01	4450	1,016E-04
360	5,717E-04	660	< 1,000E-05	960	< 1,000E-05	1500	2,437E-05	3000	8,629E-02	4500	1,365E-04
370	5,212E-03	670	< 1,000E-05	970	< 1,000E-05	1550	1,610E-04	3050	7,123E-02	4550	1,958E-04
380	1,815E-02	680	< 1,000E-05	980	< 1,000E-05	1600	7,352E-04	3100	5,950E-02	4600	3,023E-04
390	3,992E-02	690	< 1,000E-05	990	< 1,000E-05	1650	2,520E-03	3150	5,038E-02	4650	5,195E-04
400	6,468E-02	700	< 1,000E-05	1000	< 1,000E-05	1700	6,915E-03	3200	4,380E-02	4700	9,015E-04
410	9,600E-02	710	< 1,000E-05	1010	< 1,000E-05	1750	1,600E-02	3250	3,942E-02	4750	1,433E-03
420	1,198E-01	720	< 1,000E-05	1020	< 1,000E-05	1800	3,121E-02	3300	3,689E-02	4800	2,044E-03
430	1,414E-01	730	< 1,000E-05	1030	< 1,000E-05	1850	5,323E-02	3350	3,594E-02	4850	2,635E-03
440	1,629E-01	740	< 1,000E-05	1040	< 1,000E-05	1900	8,298E-02	3400	3,609E-02	4900	3,028E-03
450	1,883E-01	750	< 1,000E-05	1050	< 1,000E-05	1950	1,197E-01	3450	3,746E-02	4950	3,019E-03
460	2,211E-01	760	< 1,000E-05	1060	< 1,000E-05	2000	1,616E-01	3500	4,005E-02	5000	2,545E-03
470	2,620E-01	770	< 1,000E-05	1070	< 1,000E-05	2050	2,074E-01	3550	4,379E-02	5050	1,799E-03
480	3,155E-01	780	< 1,000E-05	1080	< 1,000E-05	2100	2,550E-01	3600	4,878E-02	5100	1,030E-03
490	3,799E-01	790	< 1,000E-05	1090	< 1,000E-05	2150	3,025E-01	3650	5,436E-02	5150	4,597E-04

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Chromaticity dependence on Incandescent Color Temperature



Chromaticity and NVIS Radiance at reference thickness 2 mm						
Planck [K]	u'	v'	x	y	Y	NR _A
1500	0,108	0,566	0,270	0,631	9,5	6,1E-11
1600	0,105	0,564	0,262	0,627	10,4	5,8E-11
1700	0,102	0,562	0,254	0,621	11,2	5,6E-11
1800	0,100	0,560	0,248	0,615	11,9	5,4E-11
1900	0,099	0,558	0,242	0,608	12,6	5,2E-11
2000	0,097	0,555	0,236	0,601	13,3	5,1E-11
2100	0,096	0,553	0,231	0,594	13,9	5,0E-11
2200	0,095	0,551	0,227	0,587	14,5	4,9E-11
2300	0,094	0,549	0,223	0,580	15,0	4,8E-11
2400	0,093	0,546	0,219	0,573	15,5	4,7E-11
2500	0,092	0,544	0,215	0,566	15,9	4,7E-11
2600	0,091	0,542	0,212	0,559	16,3	4,6E-11
2700	0,091	0,540	0,209	0,553	16,7	4,6E-11
2800	0,090	0,538	0,207	0,547	17,1	4,5E-11
2900	0,090	0,536	0,204	0,540	17,4	4,5E-11
3000	0,090	0,534	0,202	0,535	17,8	4,4E-11
3100	0,089	0,532	0,200	0,529	18,1	4,4E-11
3200	0,089	0,530	0,198	0,523	18,4	4,4E-11
LED	u'	v'	x	y	Y	NR _A
LUXEON rebel A2-RM-G	0,102	0,540	0,231	0,545	21,1	4,2E-11
LUXEON rebel T2-SO-L	0,106	0,530	0,229	0,511	20,9	4,2E-11
LUXEON rebel B5-R0-G	0,106	0,530	0,228	0,510	20,7	4,3E-11
LUXEON rebel Q1-RM-K	0,104	0,538	0,232	0,537	20,7	4,3E-11
other sources of illumination	A service for calculating chromaticity or NVIS radiance can be provided					

NVIS Green A

NVIS Green A Chromaticity coordinates
(as defined by MIL-STD-3009)

u' = 0.088

v' = 0.543

with radius of tolerance r = 0.037

S8023

Optical properties	
Reflection factor	
$P_d = 0,913$	
Values guaranteed	
The color of glass is within a circle of the CIE Yu'VUCS(1976) defined by $(u' - 0,088)^2 + (v' - 0,543)^2 = (0,037)^2$ for any black body radiator 1500K to 3200K	
Black body radiator	Photopic Transmittance [%]
2100 K	15 ±1.5
1500 K	10,5 ±1.5
Refractive indices	
$n_d (587,6 \text{ nm}) = 1,541 \pm 0,005$	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	1

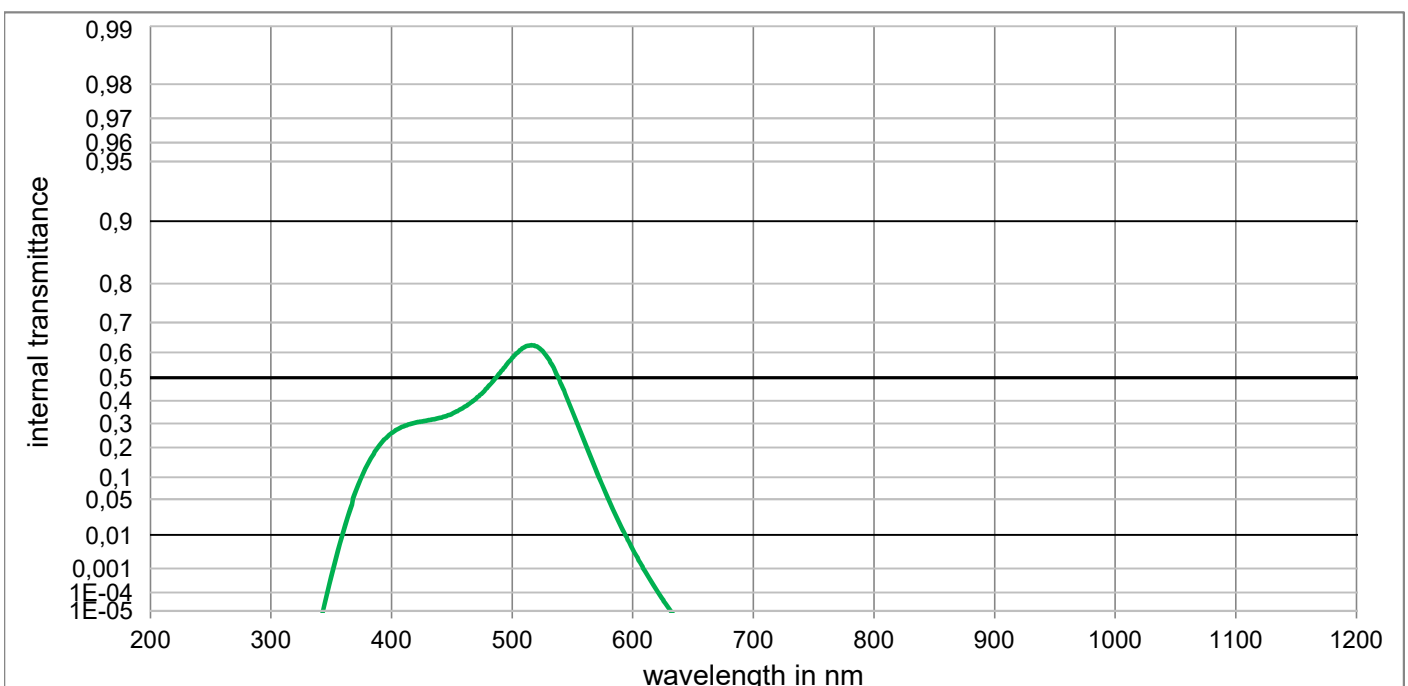
Mechanical properties	
Reference thickness	
$d = 3$	mm
Density	
$\rho = 2,75$	g/cm ³
Knoop hardness	
HK[0.1/20]	

Thermal properties	
Transformation temperature	
$T_g = 444$	°C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	
α (20°C/300°C)	
α (20°C/200°C) = 9,7	

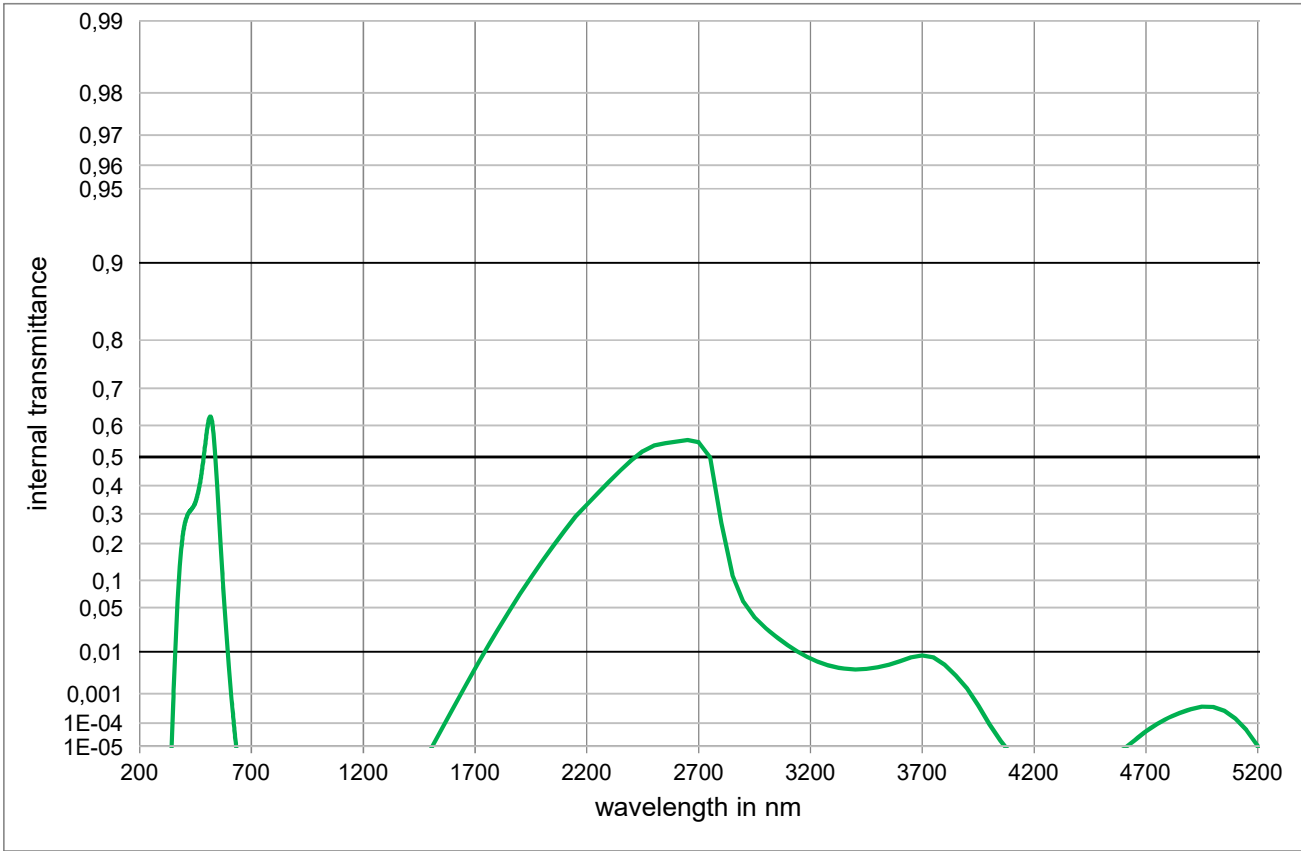
Chemical properties	
Chemical resistance	
FR class = 0	
SR class = 4	
AR class = 3	
Long-term changes in the polished surface are possible.	

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,206	0,176	0,160
	y	0,328	0,334	0,346
	Y	50,5	35,3	26,4
	λ_d	491,5	492,0	492,9
Illuminant A	P_e	0,388	0,496	0,544
	x	0,277	0,218	0,189
	y	0,459	0,474	0,486
	Y	41,3	26,9	19,3
	λ_d	500,1	499,8	500,1
	P_e	0,388	0,522	0,588

Notes	
Ionically colored glass	
Bandpass filter	
NIR cutoff filter	
NVIS-Green A - 3 mm bandpass filter according to MIL-STD-3009	
Disclaimer	
All data without tolerances are to be understood to be reference values	



S8023

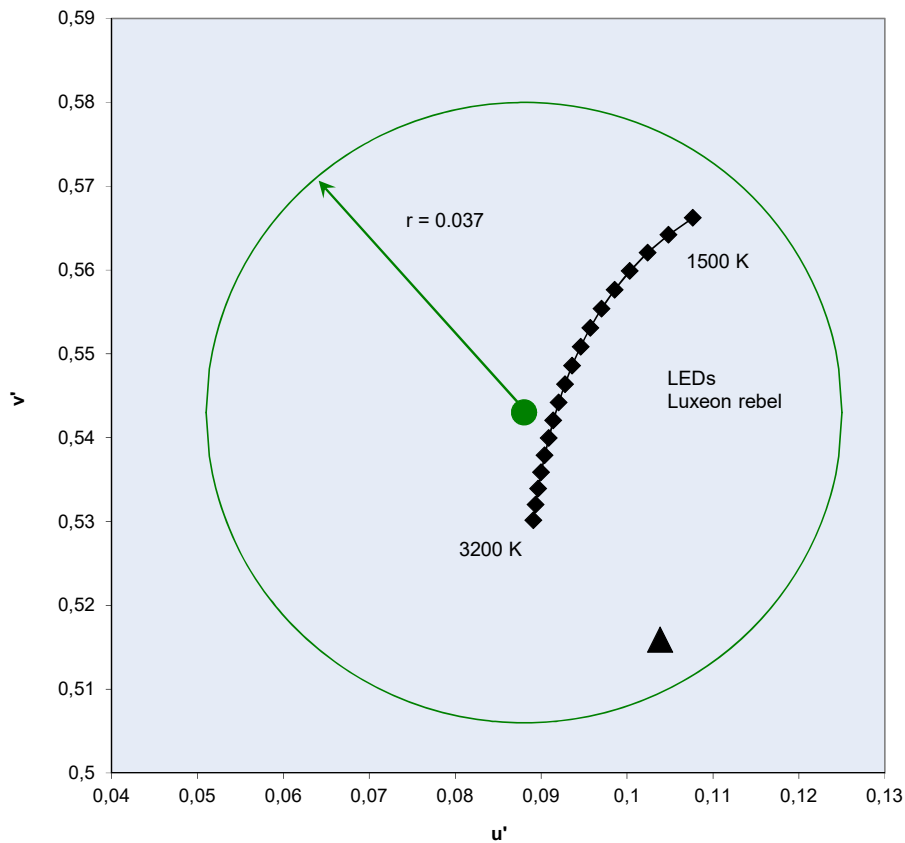


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	5,796E-01	800	< 1,000E-05	1100	< 1,000E-05	2200	3,323E-01	3700	8,548E-03
210	< 1,0E-05	510	6,186E-01	810	< 1,000E-05	1110	< 1,000E-05	2250	3,728E-01	3750	7,773E-03
220	< 1,0E-05	520	6,216E-01	820	< 1,000E-05	1120	< 1,000E-05	2300	4,136E-01	3800	5,431E-03
230	< 1,0E-05	530	5,754E-01	830	< 1,000E-05	1130	< 1,000E-05	2350	4,531E-01	3850	3,027E-03
240	< 1,0E-05	540	4,804E-01	840	< 1,000E-05	1140	< 1,000E-05	2400	4,891E-01	3900	1,397E-03
250	< 1,0E-05	550	3,530E-01	850	< 1,000E-05	1150	< 1,000E-05	2450	5,187E-01	3950	4,345E-04
260	< 1,0E-05	560	2,225E-01	860	< 1,000E-05	1160	< 1,000E-05	2500	5,374E-01	4000	9,178E-05
270	< 1,0E-05	570	1,162E-01	870	< 1,000E-05	1170	< 1,000E-05	2550	5,451E-01	4050	1,790E-05
280	< 1,0E-05	580	4,910E-02	880	< 1,000E-05	1180	< 1,000E-05	2600	5,502E-01	4100	< 1,000E-05
290	< 1,0E-05	590	1,618E-02	890	< 1,000E-05	1190	< 1,000E-05	2650	5,547E-01	4150	< 1,000E-05
300	< 1,0E-05	600	4,118E-03	900	< 1,000E-05	1200	< 1,000E-05	2700	5,481E-01	4200	< 1,000E-05
310	< 1,0E-05	610	8,105E-04	910	< 1,000E-05	1250	< 1,000E-05	2750	4,994E-01	4250	< 1,000E-05
320	< 1,000E-05	620	1,208E-04	920	< 1,000E-05	1300	< 1,000E-05	2800	2,689E-01	4300	< 1,000E-05
330	< 1,000E-05	630	1,360E-05	930	< 1,000E-05	1350	< 1,000E-05	2850	1,121E-01	4350	< 1,000E-05
340	< 1,000E-05	640	< 1,000E-05	940	< 1,000E-05	1400	< 1,000E-05	2900	5,898E-02	4400	< 1,000E-05
350	5,305E-04	650	< 1,000E-05	950	< 1,000E-05	1450	< 1,000E-05	2950	3,724E-02	4450	< 1,000E-05
360	1,243E-02	660	< 1,000E-05	960	< 1,000E-05	1500	< 1,000E-05	3000	2,578E-02	4500	< 1,000E-05
370	6,439E-02	670	< 1,000E-05	970	< 1,000E-05	1550	5,810E-05	3050	1,840E-02	4550	< 1,000E-05
380	1,397E-01	680	< 1,000E-05	980	< 1,000E-05	1600	3,349E-04	3100	1,314E-02	4600	< 1,000E-05
390	2,098E-01	690	< 1,000E-05	990	< 1,000E-05	1650	1,381E-03	3150	9,636E-03	4650	1,919E-05
400	2,590E-01	700	< 1,000E-05	1000	< 1,000E-05	1700	4,363E-03	3200	7,306E-03	4700	4,704E-05
410	2,881E-01	710	< 1,000E-05	1010	< 1,000E-05	1750	1,129E-02	3250	5,847E-03	4750	9,473E-05
420	3,042E-01	720	< 1,000E-05	1020	< 1,000E-05	1800	2,387E-02	3300	4,945E-03	4800	1,584E-04
430	3,144E-01	730	< 1,000E-05	1030	< 1,000E-05	1850	4,389E-02	3350	4,463E-03	4850	2,376E-04
440	3,249E-01	740	< 1,000E-05	1040	< 1,000E-05	1900	7,212E-02	3400	4,260E-03	4900	3,262E-04
450	3,430E-01	750	< 1,000E-05	1050	< 1,000E-05	1950	1,074E-01	3450	4,380E-03	4950	3,896E-04
460	3,719E-01	760	< 1,000E-05	1060	< 1,000E-05	2000	1,488E-01	3500	4,740E-03	5000	3,832E-04
470	4,097E-01	770	< 1,000E-05	1070	< 1,000E-05	2050	1,947E-01	3550	5,450E-03	5050	2,843E-04
480	4,614E-01	780	< 1,000E-05	1080	< 1,000E-05	2100	2,428E-01	3600	6,450E-03	5100	1,509E-04
490	5,213E-01	790	< 1,000E-05	1090	< 1,000E-05	2150	2,908E-01	3650	7,713E-03	5150	5,275E-05

S8023

Chromaticity dependence on Incandescent Color Temperature



Chromaticity and NVIS Radiance at reference thickness 3 mm						
Planck [K]	u'	v'	x	y	Y	NR _A
1500	0,103	0,561	0,254	0,616	10,2	5,5E-11
1600	0,100	0,558	0,245	0,607	11,2	5,3E-11
1700	0,098	0,555	0,237	0,598	12,2	5,1E-11
1800	0,096	0,551	0,231	0,587	13,0	4,9E-11
1900	0,095	0,548	0,224	0,577	13,8	4,8E-11
2000	0,094	0,545	0,219	0,566	14,6	4,7E-11
2100	0,093	0,541	0,214	0,556	15,3	4,6E-11
2200	0,092	0,538	0,209	0,546	15,9	4,6E-11
2300	0,091	0,535	0,205	0,536	16,6	4,5E-11
2400	0,091	0,531	0,202	0,526	17,1	4,4E-11
2500	0,090	0,528	0,198	0,516	17,7	4,4E-11
2600	0,090	0,525	0,196	0,507	18,2	4,3E-11
2700	0,090	0,522	0,193	0,499	18,6	4,3E-11
2800	0,090	0,519	0,190	0,490	19,1	4,3E-11
2900	0,089	0,516	0,188	0,482	19,5	4,2E-11
3000	0,089	0,513	0,186	0,475	19,9	4,2E-11
3100	0,089	0,510	0,184	0,467	20,2	4,2E-11
3200	0,089	0,508	0,182	0,460	20,6	4,2E-11
LED	u'	v'	x	y	Y	NR _A
LUXEON rebel A2-RM-G	0,104	0,516	0,214	0,472	23,0	4,0E-11
other sources of illumination	A service for calculating chromaticity or NVIS radiance can be provided					

NVIS Green A

NVIS Green A Chromaticity coordinates
(as defined by MIL-STD-3009)

u' = 0.088
v' = 0.543

with radius of tolerance r = 0.037

N-WG280

Optical properties	
Reflection factor	
$P_d = 0,918$	
Spectral values guaranteed (d = 2 mm)	
$\lambda_c (\tau_i = 0,5)$	= 280 nm ± 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 230 nm
$\lambda_p (\tau_{i,L} = 0,99)$	= 380 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,52
$n_t (1014 \text{ nm})$	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	1

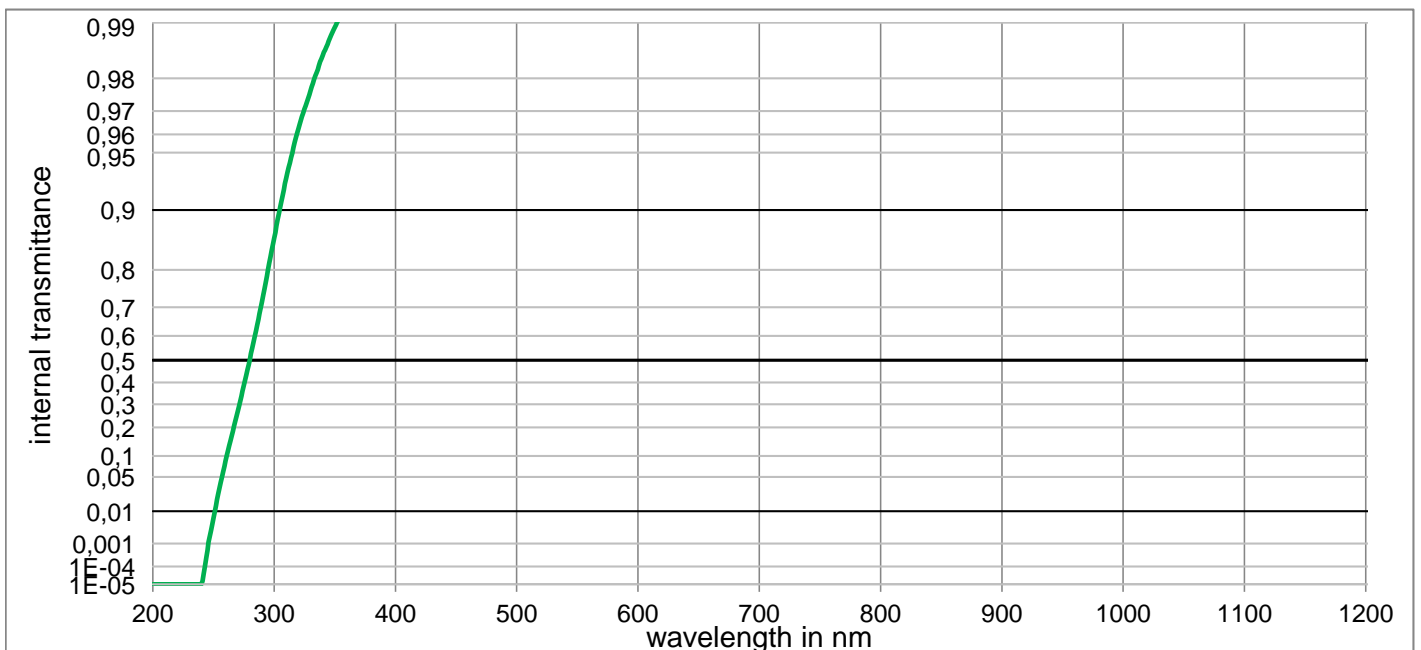
Mechanical properties	
Reference thickness	
d = 2,00 mm	
Density	
$\rho = 2,51 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 610$	

Thermal properties	
Transformation temperature	
Tg = 558 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha (-30^\circ C/+70^\circ C)$	= 7,1
$\alpha (20^\circ C/300^\circ C)$	= 8,4
Temperature coefficient	
Tk = 0,06 nm/K	

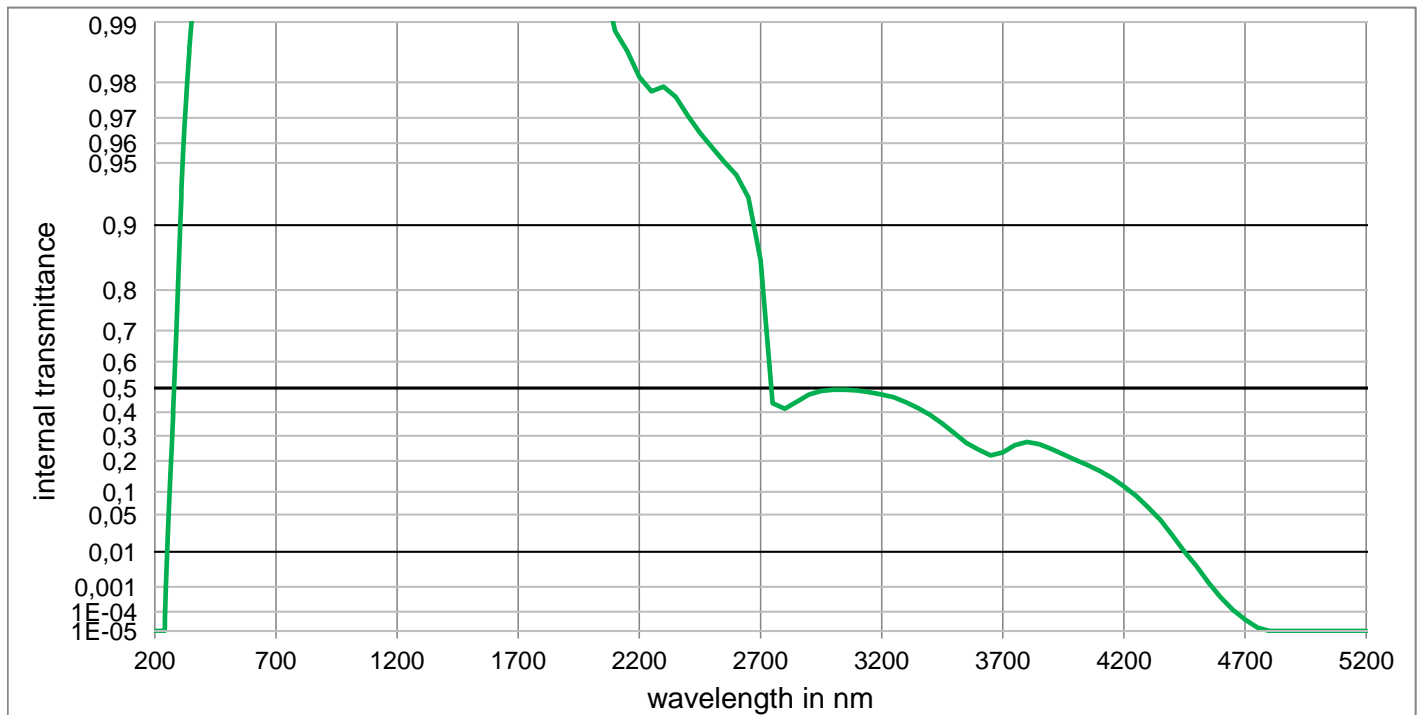
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 2

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
base glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



N-WG280



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,974E-01	800	9,999E-01	1100	9,999E-01	2200	9,812E-01	3700	2,325E-01
210	< 1,0E-05	510	9,976E-01	810	9,999E-01	1110	9,999E-01	2250	9,778E-01	3750	2,613E-01
220	< 1,0E-05	520	9,978E-01	820	9,999E-01	1120	9,999E-01	2300	9,790E-01	3800	2,746E-01
230	< 1,0E-05	530	9,980E-01	830	9,999E-01	1130	9,999E-01	2350	9,764E-01	3850	2,651E-01
240	< 1,0E-05	540	9,982E-01	840	9,999E-01	1140	9,999E-01	2400	9,708E-01	3900	2,462E-01
250	6,6E-03	550	9,983E-01	850	9,999E-01	1150	9,999E-01	2450	9,645E-01	3950	2,245E-01
260	8,6E-02	560	9,985E-01	860	9,999E-01	1160	9,999E-01	2500	9,579E-01	4000	2,037E-01
270	2,7E-01	570	9,986E-01	870	9,999E-01	1170	9,999E-01	2550	9,507E-01	4050	1,843E-01
280	5,1E-01	580	9,988E-01	880	9,999E-01	1180	9,999E-01	2600	9,427E-01	4100	1,645E-01
290	7,2E-01	590	9,989E-01	890	9,999E-01	1190	9,999E-01	2650	9,264E-01	4150	1,408E-01
300	8,6E-01	600	9,991E-01	900	9,999E-01	1200	9,999E-01	2700	8,540E-01	4200	1,155E-01
310	9,3E-01	610	9,992E-01	910	9,999E-01	1250	9,999E-01	2750	4,381E-01	4250	8,980E-02
320	9,626E-01	620	9,993E-01	920	9,999E-01	1300	9,999E-01	2800	4,145E-01	4300	6,370E-02
330	9,766E-01	630	9,995E-01	930	9,999E-01	1350	9,999E-01	2850	4,442E-01	4350	4,140E-02
340	9,849E-01	640	9,996E-01	940	9,999E-01	1400	9,993E-01	2900	4,740E-01	4400	2,230E-02
350	9,894E-01	650	9,997E-01	950	9,999E-01	1450	9,999E-01	2950	4,882E-01	4450	1,000E-02
360	9,916E-01	660	9,998E-01	960	9,999E-01	1500	9,999E-01	3000	4,934E-01	4500	4,310E-03
370	9,928E-01	670	9,998E-01	970	9,999E-01	1550	9,999E-01	3050	4,934E-01	4550	1,352E-03
380	9,936E-01	680	9,999E-01	980	9,999E-01	1600	9,999E-01	3100	4,900E-01	4600	4,070E-04
390	9,942E-01	690	9,999E-01	990	9,999E-01	1650	9,999E-01	3150	4,835E-01	4650	1,191E-04
400	9,946E-01	700	9,999E-01	1000	9,999E-01	1700	9,999E-01	3200	4,740E-01	4700	4,227E-05
410	9,950E-01	710	9,999E-01	1010	9,999E-01	1750	9,999E-01	3250	4,622E-01	4750	1,585E-05
420	9,954E-01	720	9,999E-01	1020	9,999E-01	1800	9,999E-01	3300	4,423E-01	4800	< 1,000E-05
430	9,957E-01	730	9,999E-01	1030	9,999E-01	1850	9,995E-01	3350	4,173E-01	4850	< 1,000E-05
440	9,960E-01	740	9,999E-01	1040	9,999E-01	1900	9,984E-01	3400	3,885E-01	4900	< 1,000E-05
450	9,962E-01	750	9,999E-01	1050	9,999E-01	1950	9,974E-01	3450	3,516E-01	4950	< 1,000E-05
460	9,965E-01	760	9,999E-01	1060	9,999E-01	2000	9,961E-01	3500	3,114E-01	5000	< 1,000E-05
470	9,967E-01	770	9,999E-01	1070	9,999E-01	2050	9,941E-01	3550	2,708E-01	5050	< 1,000E-05
480	9,970E-01	780	9,999E-01	1080	9,999E-01	2100	9,889E-01	3600	2,429E-01	5100	< 1,000E-05
490	9,972E-01	790	9,999E-01	1090	9,999E-01	2150	9,860E-01	3650	2,207E-01	5150	< 1,000E-05

N-WG295

Optical properties	
Reflection factor	
$P_d = 0,918$	
Spectral values guaranteed (d = 2 mm)	
$\lambda_c (\tau_i = 0,5)$	= 295 nm \pm 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 250 nm
$\lambda_p (\tau_{i,L} = 0,99)$	= 400 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,52
$n_t (1014 \text{ nm})$	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	1

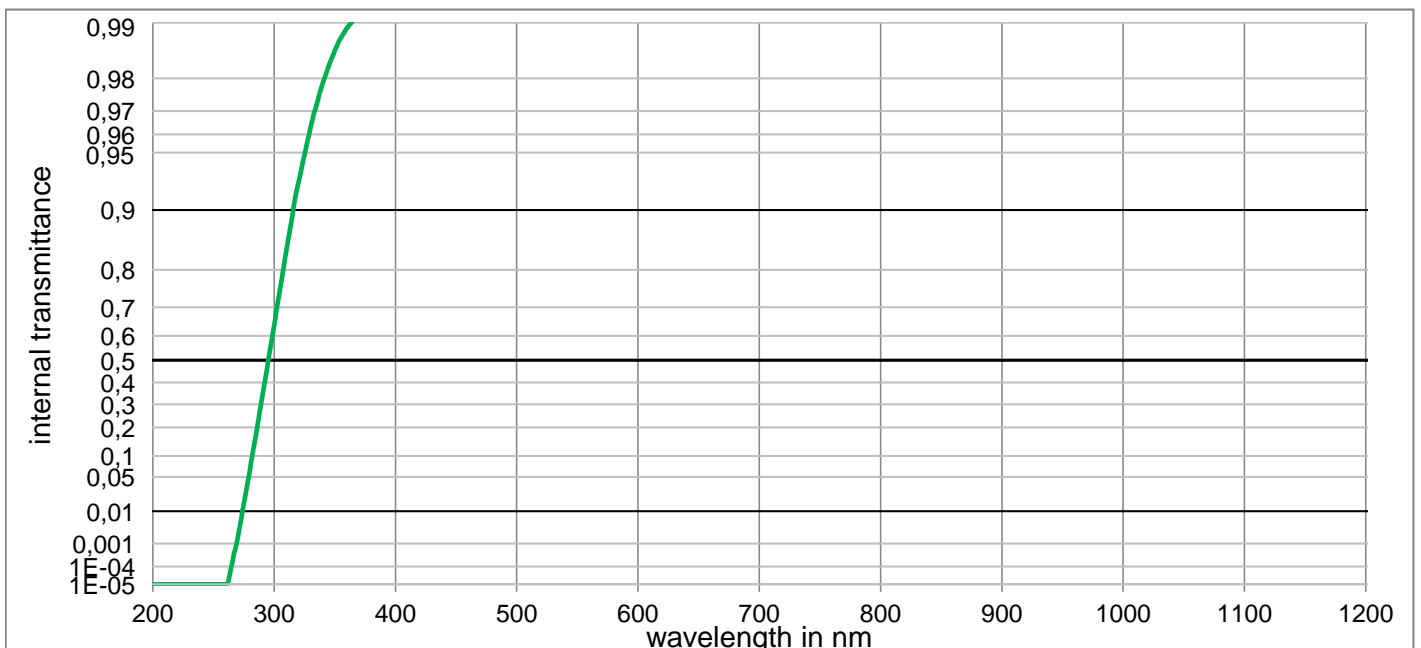
Mechanical properties	
Reference thickness	
d = 2,00 mm	
Density	
$\rho = 2,51 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 610$	

Thermal properties	
Transformation temperature	
Tg = 565 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha (-30^\circ C/+70^\circ C)$	= 7,2
$\alpha (20^\circ C/300^\circ C)$	= 8,4
Temperature coefficient	
Tk = 0,06 nm/K	

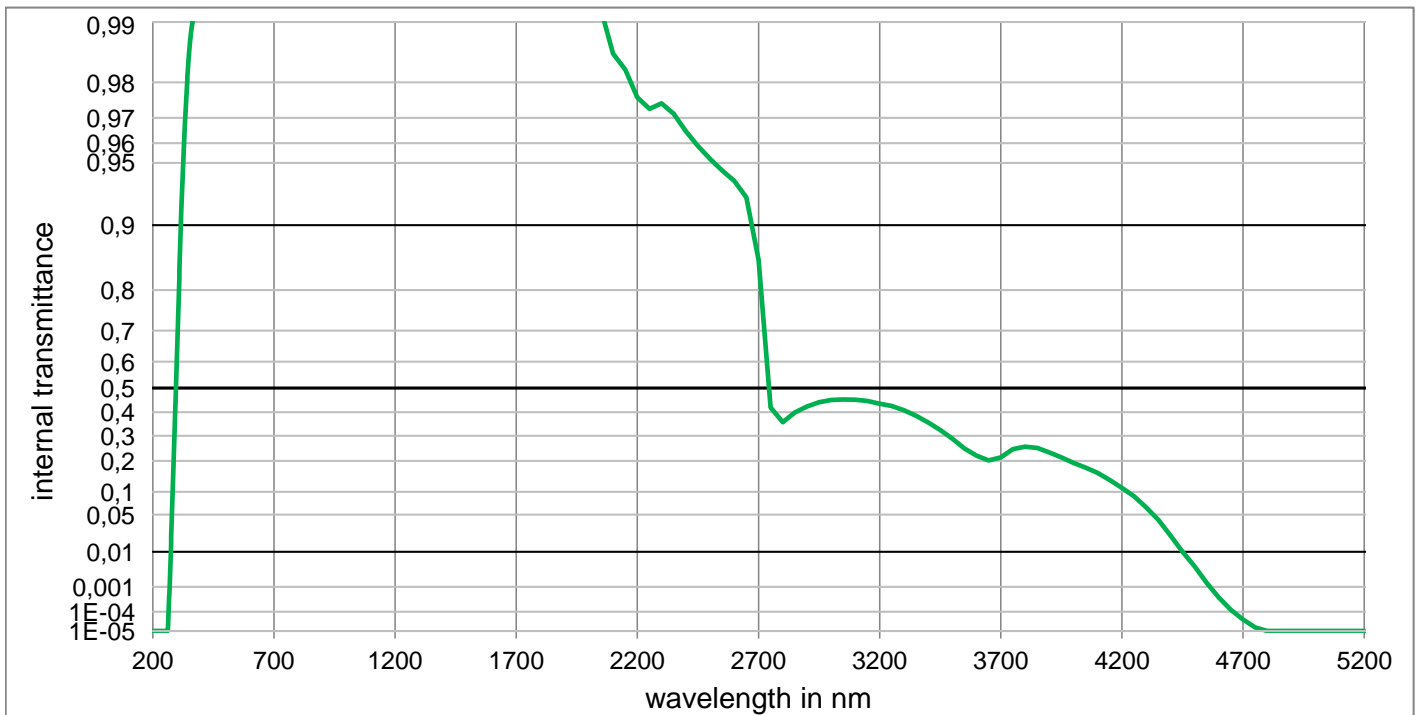
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 2

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
base glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



N-WG295



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,966E-01	800	9,999E-01	1100	9,999E-01	2200	9,762E-01	3700	2,127E-01
210	< 1,0E-05	510	9,968E-01	810	9,999E-01	1110	9,999E-01	2250	9,730E-01	3750	2,453E-01
220	< 1,0E-05	520	9,971E-01	820	9,999E-01	1120	9,999E-01	2300	9,746E-01	3800	2,557E-01
230	< 1,0E-05	530	9,973E-01	830	9,999E-01	1130	9,999E-01	2350	9,713E-01	3850	2,500E-01
240	< 1,0E-05	540	9,975E-01	840	9,999E-01	1140	9,999E-01	2400	9,651E-01	3900	2,320E-01
250	< 1,0E-05	550	9,977E-01	850	9,999E-01	1150	9,999E-01	2450	9,587E-01	3950	2,127E-01
260	< 1,0E-05	560	9,978E-01	860	9,999E-01	1160	9,999E-01	2500	9,521E-01	4000	1,921E-01
270	1,6E-03	570	9,980E-01	870	9,999E-01	1170	9,999E-01	2550	9,455E-01	4050	1,753E-01
280	6,4E-02	580	9,981E-01	880	9,999E-01	1180	9,999E-01	2600	9,387E-01	4100	1,574E-01
290	3,3E-01	590	9,982E-01	890	9,999E-01	1190	9,999E-01	2650	9,264E-01	4150	1,342E-01
300	6,4E-01	600	9,984E-01	900	9,999E-01	1200	9,999E-01	2700	8,540E-01	4200	1,111E-01
310	8,4E-01	610	9,985E-01	910	9,999E-01	1250	9,999E-01	2750	4,197E-01	4250	8,840E-02
320	9,279E-01	620	9,986E-01	920	9,999E-01	1300	9,999E-01	2800	3,578E-01	4300	6,370E-02
330	9,630E-01	630	9,987E-01	930	9,999E-01	1350	9,999E-01	2850	3,992E-01	4350	4,140E-02
340	9,787E-01	640	9,988E-01	940	9,999E-01	1400	9,985E-01	2900	4,244E-01	4400	2,230E-02
350	9,859E-01	650	9,989E-01	950	9,999E-01	1450	9,999E-01	2950	4,419E-01	4450	1,000E-02
360	9,893E-01	660	9,991E-01	960	9,999E-01	1500	9,999E-01	3000	4,509E-01	4500	4,310E-03
370	9,909E-01	670	9,992E-01	970	9,999E-01	1550	9,999E-01	3050	4,537E-01	4550	1,352E-03
380	9,919E-01	680	9,993E-01	980	9,999E-01	1600	9,999E-01	3100	4,518E-01	4600	4,070E-04
390	9,928E-01	690	9,994E-01	990	9,999E-01	1650	9,999E-01	3150	4,466E-01	4650	1,191E-04
400	9,934E-01	700	9,995E-01	1000	9,999E-01	1700	9,999E-01	3200	4,357E-01	4700	4,227E-05
410	9,939E-01	710	9,996E-01	1010	9,999E-01	1750	9,997E-01	3250	4,258E-01	4750	1,585E-05
420	9,942E-01	720	9,997E-01	1020	9,999E-01	1800	9,988E-01	3300	4,088E-01	4800	< 1,000E-05
430	9,946E-01	730	9,997E-01	1030	9,999E-01	1850	9,978E-01	3350	3,852E-01	4850	< 1,000E-05
440	9,949E-01	740	9,998E-01	1040	9,999E-01	1900	9,965E-01	3400	3,568E-01	4900	< 1,000E-05
450	9,951E-01	750	9,998E-01	1050	9,999E-01	1950	9,949E-01	3450	3,242E-01	4950	< 1,000E-05
460	9,955E-01	760	9,999E-01	1060	9,999E-01	2000	9,932E-01	3500	2,878E-01	5000	< 1,000E-05
470	9,957E-01	770	9,999E-01	1070	9,999E-01	2050	9,913E-01	3550	2,486E-01	5050	< 1,000E-05
480	9,960E-01	780	9,999E-01	1080	9,999E-01	2100	9,856E-01	3600	2,200E-01	5100	< 1,000E-05
490	9,963E-01	790	9,999E-01	1090	9,999E-01	2150	9,827E-01	3650	2,018E-01	5150	< 1,000E-05

N-WG305

Optical properties	
Reflection factor	
$P_d = 0,918$	
Spectral values guaranteed (d = 2 mm)	
$\lambda_c (\tau_i = 0,5)$	= 305 nm ± 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 260 nm
$\lambda_p (\tau_{i,L} = 0,99)$	= 420 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,52
$n_t (1014 \text{ nm})$	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	1

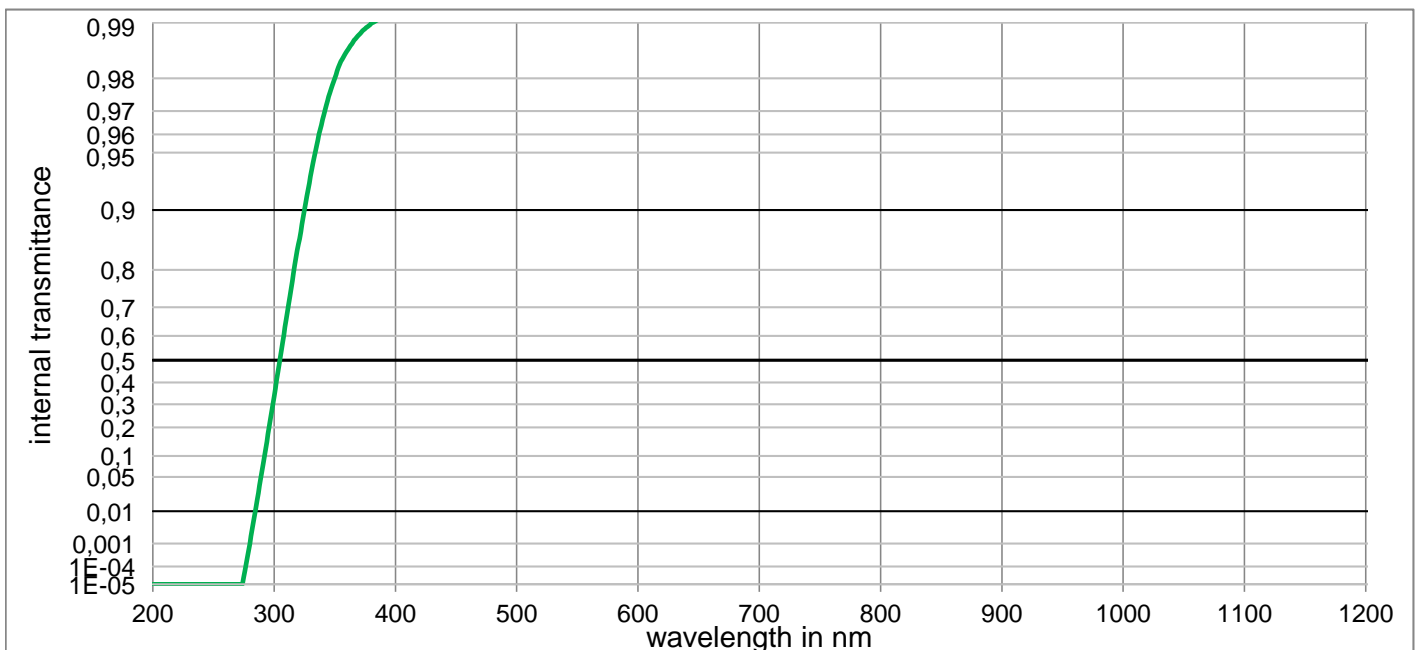
Mechanical properties	
Reference thickness	
d = 2,00 mm	
Density	
$\rho = 2,51 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 610$	

Thermal properties	
Transformation temperature	
Tg = 562 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha (-30^\circ C/+70^\circ C)$	= 7,1
$\alpha (20^\circ C/300^\circ C)$	= 8,4
Temperature coefficient	
Tk = 0,06 nm/K	

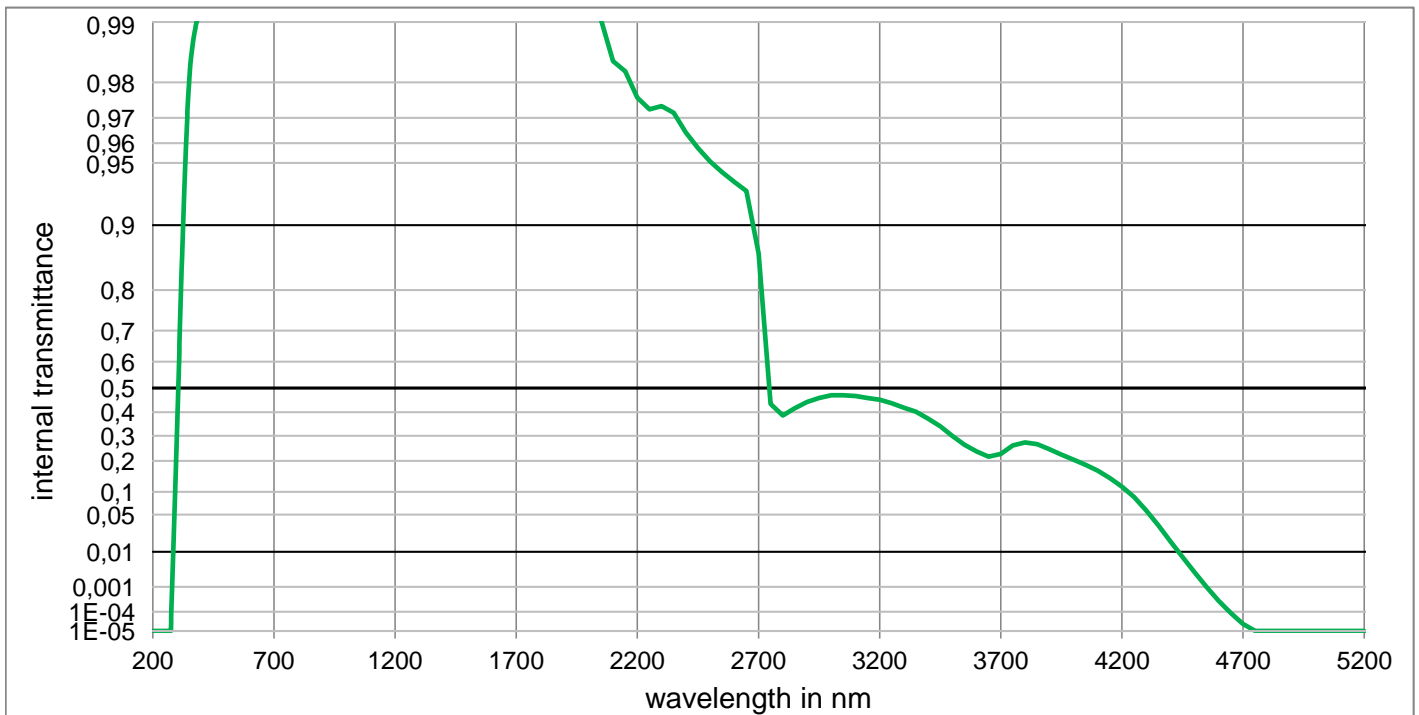
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 2

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
base glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



N-WG305



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,949E-01	800	9,987E-01	1100	9,999E-01	2200	9,762E-01	3700	2,268E-01
210	< 1,0E-05	510	9,952E-01	810	9,987E-01	1110	9,999E-01	2250	9,728E-01	3750	2,600E-01
220	< 1,0E-05	520	9,954E-01	820	9,988E-01	1120	9,999E-01	2300	9,738E-01	3800	2,730E-01
230	< 1,0E-05	530	9,957E-01	830	9,988E-01	1130	9,999E-01	2350	9,717E-01	3850	2,656E-01
240	< 1,0E-05	540	9,959E-01	840	9,989E-01	1140	9,999E-01	2400	9,647E-01	3900	2,457E-01
250	< 1,0E-05	550	9,961E-01	850	9,990E-01	1150	9,999E-01	2450	9,577E-01	3950	2,240E-01
260	< 1,0E-05	560	9,962E-01	860	9,990E-01	1160	9,999E-01	2500	9,508E-01	4000	2,042E-01
270	< 1,0E-05	570	9,964E-01	870	9,991E-01	1170	9,999E-01	2550	9,445E-01	4050	1,853E-01
280	1,0E-03	580	9,965E-01	880	9,991E-01	1180	9,999E-01	2600	9,380E-01	4100	1,650E-01
290	6,2E-02	590	9,967E-01	890	9,992E-01	1190	9,999E-01	2650	9,315E-01	4150	1,400E-01
300	3,4E-01	600	9,968E-01	900	9,993E-01	1200	9,999E-01	2700	8,640E-01	4200	1,144E-01
310	6,6E-01	610	9,970E-01	910	9,993E-01	1250	9,999E-01	2750	4,342E-01	4250	8,660E-02
320	8,507E-01	620	9,971E-01	920	9,994E-01	1300	9,999E-01	2800	3,856E-01	4300	5,780E-02
330	9,332E-01	630	9,972E-01	930	9,994E-01	1350	9,999E-01	2850	4,168E-01	4350	3,380E-02
340	9,668E-01	640	9,973E-01	940	9,995E-01	1400	9,970E-01	2900	4,433E-01	4400	1,700E-02
350	9,800E-01	650	9,975E-01	950	9,995E-01	1450	9,994E-01	2950	4,594E-01	4450	7,444E-03
360	9,857E-01	660	9,976E-01	960	9,996E-01	1500	9,999E-01	3000	4,707E-01	4500	2,938E-03
370	9,884E-01	670	9,977E-01	970	9,996E-01	1550	9,999E-01	3050	4,707E-01	4550	9,640E-04
380	9,899E-01	680	9,977E-01	980	9,997E-01	1600	9,999E-01	3100	4,679E-01	4600	2,931E-04
390	9,907E-01	690	9,978E-01	990	9,997E-01	1650	9,995E-01	3150	4,600E-01	4650	8,511E-05
400	9,914E-01	700	9,979E-01	1000	9,998E-01	1700	9,988E-01	3200	4,518E-01	4700	2,483E-05
410	9,920E-01	710	9,980E-01	1010	9,998E-01	1750	9,979E-01	3250	4,376E-01	4750	< 1,000E-05
420	9,924E-01	720	9,981E-01	1020	9,999E-01	1800	9,969E-01	3300	4,188E-01	4800	< 1,000E-05
430	9,928E-01	730	9,982E-01	1030	9,999E-01	1850	9,958E-01	3350	4,017E-01	4850	< 1,000E-05
440	9,931E-01	740	9,983E-01	1040	9,999E-01	1900	9,943E-01	3400	3,724E-01	4900	< 1,000E-05
450	9,935E-01	750	9,983E-01	1050	9,999E-01	1950	9,927E-01	3450	3,401E-01	4950	< 1,000E-05
460	9,937E-01	760	9,984E-01	1060	9,999E-01	2000	9,916E-01	3500	2,997E-01	5000	< 1,000E-05
470	9,940E-01	770	9,985E-01	1070	9,999E-01	2050	9,902E-01	3550	2,637E-01	5050	< 1,000E-05
480	9,943E-01	780	9,985E-01	1080	9,999E-01	2100	9,843E-01	3600	2,360E-01	5100	< 1,000E-05
490	9,946E-01	790	9,986E-01	1090	9,999E-01	2150	9,824E-01	3650	2,164E-01	5150	< 1,000E-05

N-WG320

Optical properties	
Reflection factor	
$P_d = 0,918$	
Spectral values guaranteed (d = 2 mm)	
$\lambda_c (\tau_i = 0,5)$	= 320 nm ± 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 280 nm
$\lambda_p (\tau_{i,L} = 0,99)$	= 470 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,52
$n_t (1014 \text{ nm})$	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	1

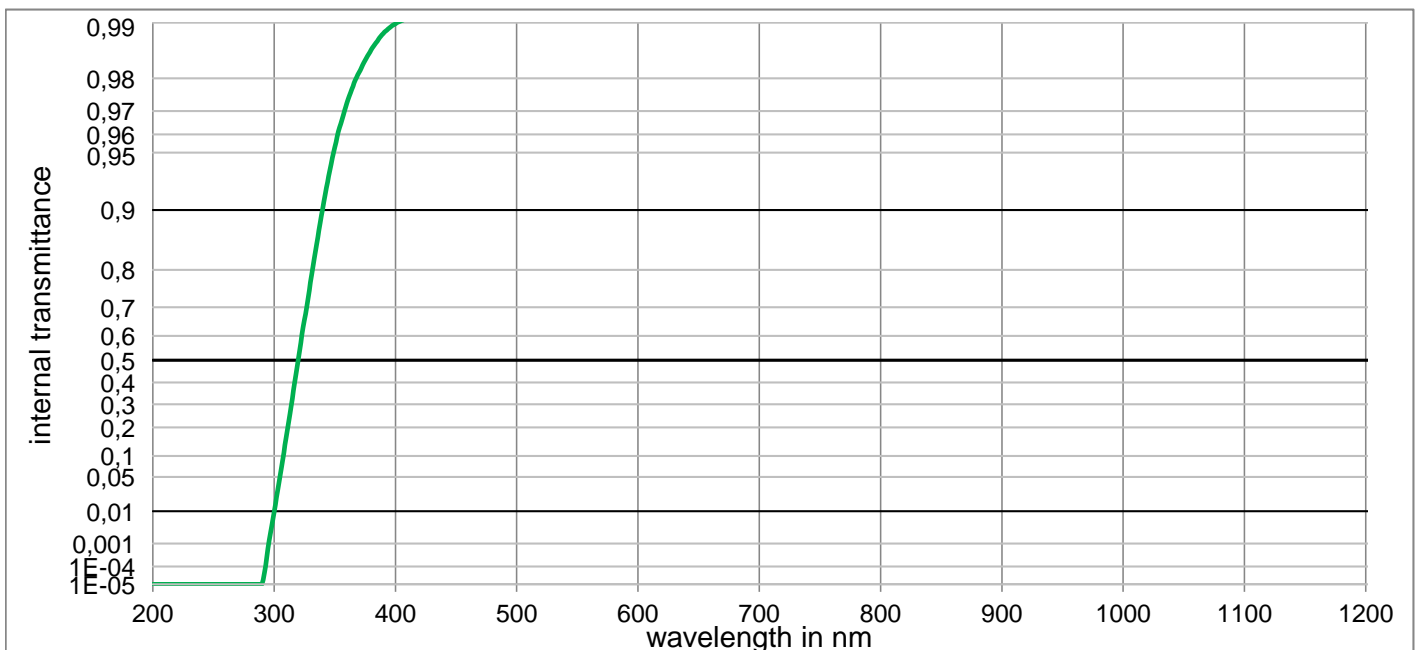
Mechanical properties	
Reference thickness	
d = 2,00 mm	
Density	
$\rho = 2,51 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 610$	

Thermal properties	
Transformation temperature	
Tg = 563 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha (-30^\circ C/+70^\circ C)$	= 7,1
$\alpha (20^\circ C/300^\circ C)$	= 8,4
Temperature coefficient	
Tk = 0,06 nm/K	

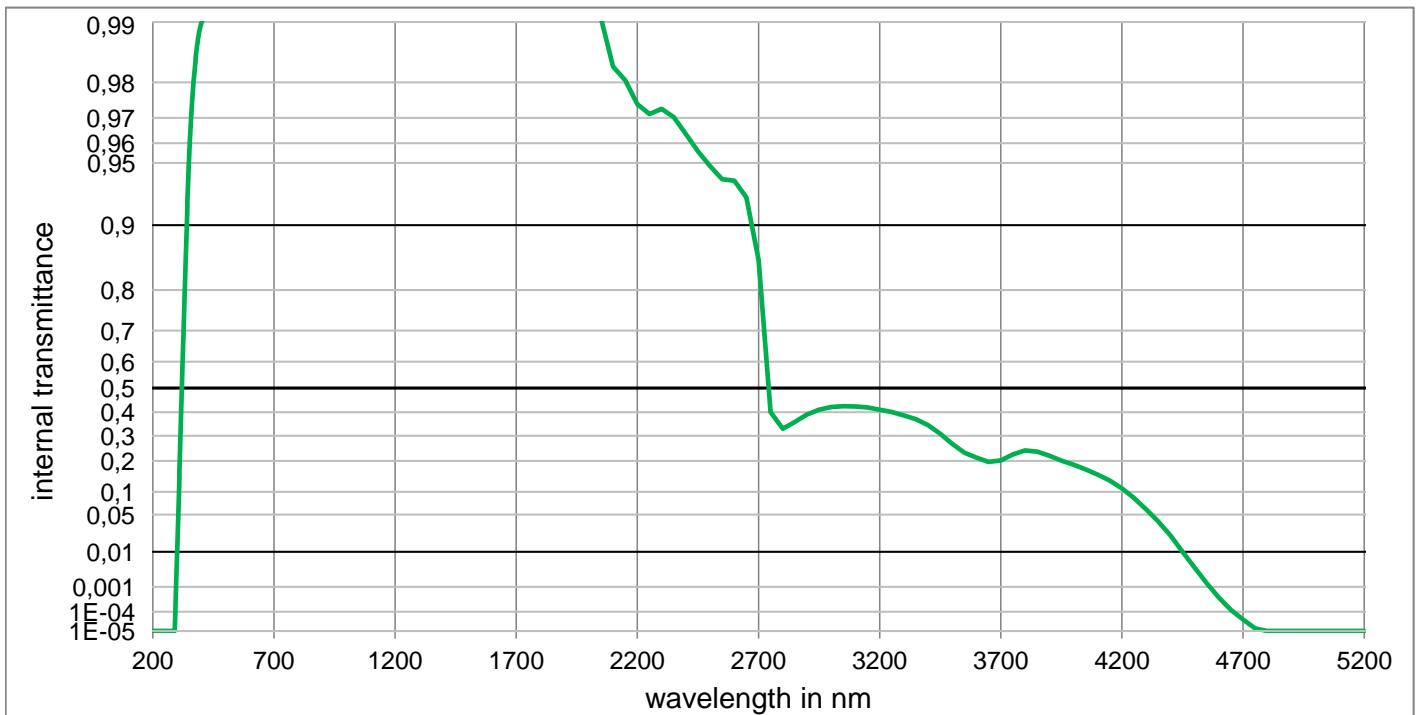
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 2

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
P _e				
Illuminant A	x			
	y			
	Y			
	λ_d			
	P _e			

Notes	
base glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



N-WG320



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,940E-01	800	9,983E-01	1100	9,997E-01	2200	9,743E-01	3700	2,020E-01
210	< 1,0E-05	510	9,942E-01	810	9,984E-01	1110	9,998E-01	2250	9,713E-01	3750	2,246E-01
220	< 1,0E-05	520	9,945E-01	820	9,985E-01	1120	9,998E-01	2300	9,729E-01	3800	2,400E-01
230	< 1,0E-05	530	9,948E-01	830	9,985E-01	1130	9,998E-01	2350	9,702E-01	3850	2,356E-01
240	< 1,0E-05	540	9,950E-01	840	9,986E-01	1140	9,999E-01	2400	9,641E-01	3900	2,195E-01
250	< 1,0E-05	550	9,953E-01	850	9,987E-01	1150	9,999E-01	2450	9,562E-01	3950	2,012E-01
260	< 1,0E-05	560	9,955E-01	860	9,987E-01	1160	9,999E-01	2500	9,480E-01	4000	1,864E-01
270	< 1,0E-05	570	9,957E-01	870	9,988E-01	1170	9,999E-01	2550	9,400E-01	4050	1,692E-01
280	< 1,0E-05	580	9,959E-01	880	9,988E-01	1180	9,999E-01	2600	9,389E-01	4100	1,516E-01
290	< 1,0E-05	590	9,960E-01	890	9,989E-01	1190	9,999E-01	2650	9,264E-01	4150	1,323E-01
300	9,6E-03	600	9,962E-01	900	9,989E-01	1200	9,999E-01	2700	8,540E-01	4200	1,092E-01
310	1,6E-01	610	9,964E-01	910	9,990E-01	1250	9,999E-01	2750	4,000E-01	4250	8,440E-02
320	5,066E-01	620	9,965E-01	920	9,990E-01	1300	9,999E-01	2800	3,300E-01	4300	5,970E-02
330	7,700E-01	630	9,967E-01	930	9,990E-01	1350	9,999E-01	2850	3,585E-01	4350	3,896E-02
340	9,013E-01	640	9,968E-01	940	9,991E-01	1400	9,975E-01	2900	3,900E-01	4400	2,230E-02
350	9,533E-01	650	9,969E-01	950	9,991E-01	1450	9,999E-01	2950	4,109E-01	4450	1,000E-02
360	9,728E-01	660	9,970E-01	960	9,992E-01	1500	9,999E-01	3000	4,219E-01	4500	4,000E-03
370	9,814E-01	670	9,971E-01	970	9,992E-01	1550	9,999E-01	3050	4,249E-01	4550	1,318E-03
380	9,859E-01	680	9,972E-01	980	9,993E-01	1600	9,999E-01	3100	4,236E-01	4600	4,070E-04
390	9,885E-01	690	9,973E-01	990	9,993E-01	1650	9,999E-01	3150	4,194E-01	4650	1,191E-04
400	9,899E-01	700	9,974E-01	1000	9,993E-01	1700	9,998E-01	3200	4,100E-01	4700	4,227E-05
410	9,906E-01	710	9,975E-01	1010	9,994E-01	1750	9,990E-01	3250	4,011E-01	4750	1,390E-05
420	9,911E-01	720	9,976E-01	1020	9,994E-01	1800	9,980E-01	3300	3,864E-01	4800	< 1,000E-05
430	9,916E-01	730	9,977E-01	1030	9,995E-01	1850	9,969E-01	3350	3,700E-01	4850	< 1,000E-05
440	9,920E-01	740	9,978E-01	1040	9,995E-01	1900	9,957E-01	3400	3,450E-01	4900	< 1,000E-05
450	9,924E-01	750	9,979E-01	1050	9,995E-01	1950	9,943E-01	3450	3,093E-01	4950	< 1,000E-05
460	9,928E-01	760	9,980E-01	1060	9,996E-01	2000	9,930E-01	3500	2,669E-01	5000	< 1,000E-05
470	9,931E-01	770	9,981E-01	1070	9,996E-01	2050	9,904E-01	3550	2,314E-01	5050	< 1,000E-05
480	9,934E-01	780	9,982E-01	1080	9,996E-01	2100	9,833E-01	3600	2,120E-01	5100	< 1,000E-05
490	9,937E-01	790	9,983E-01	1090	9,997E-01	2150	9,805E-01	3650	1,961E-01	5150	< 1,000E-05

GG395

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 395 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 340 nm
λ_p ($\tau_{i,L} = 0,92$)	= 480 nm
Refractive indices	
n_d (587,6 nm)	= 1,52
n_s (852 nm)	= 1,52
n_t (1014 nm)	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

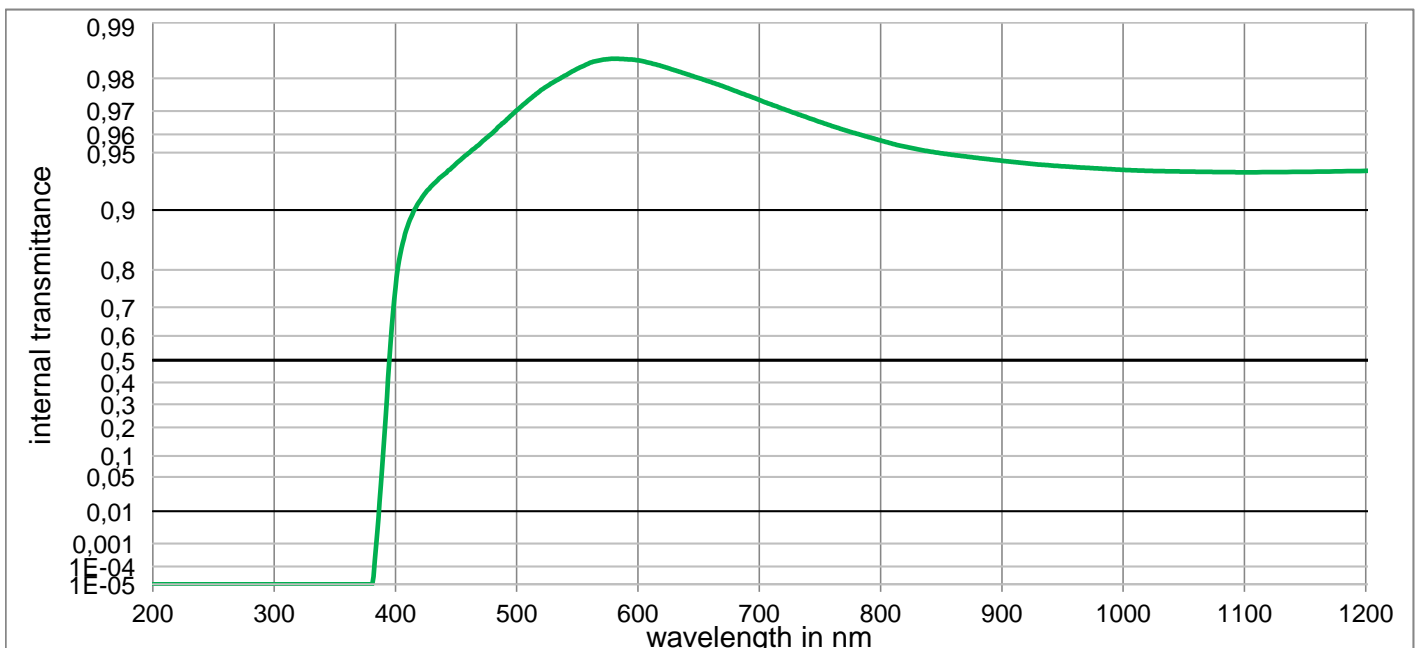
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,55 g/cm ³
Knoop hardness	
HK _[0.1/20]	= 409

Thermal properties	
Transformation temperature	
Tg	= 538 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 7,8
α (20°C/300°C)	= 9,0
Temperature coefficient	
Tk	= 0,07 nm/K

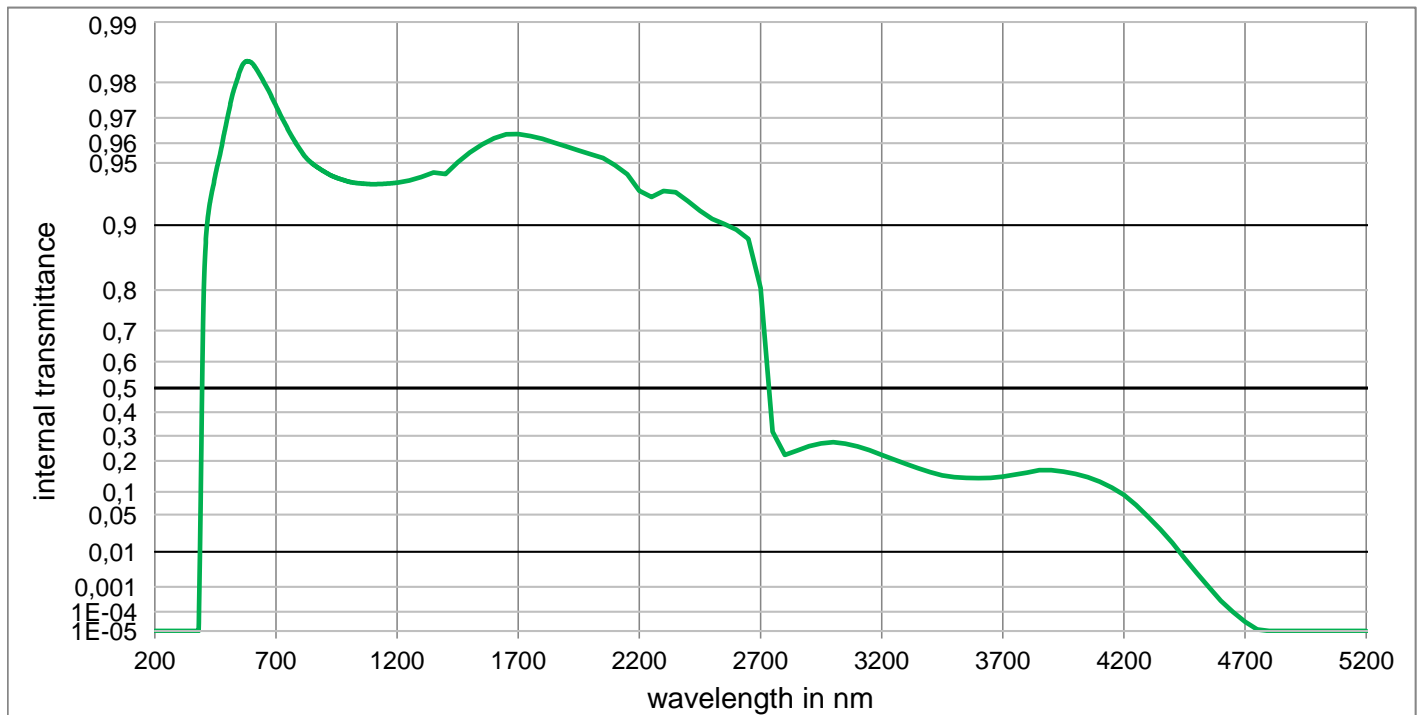
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,314	0,315	0,316
	y	0,331	0,332	0,334
	Y	91,1	90,5	89,8
	λ_d	570 nm	570 nm	571 nm
	P _e	0,008	0,016	0,023
Illuminant A	x	0,448	0,449	0,450
	y	0,408	0,409	0,410
	Y	91,1	90,6	90,0
	λ_d	581 nm	581 nm	581 nm
	P _e	0,010	0,020	0,030

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



GG395



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,703E-01	800	9,569E-01	1100	9,365E-01	2200	9,318E-01	3700	1,448E-01
210	< 1,0E-05	510	9,738E-01	810	9,551E-01	1110	9,365E-01	2250	9,268E-01	3750	1,512E-01
220	< 1,0E-05	520	9,768E-01	820	9,535E-01	1120	9,366E-01	2300	9,315E-01	3800	1,583E-01
230	< 1,0E-05	530	9,789E-01	830	9,521E-01	1130	9,366E-01	2350	9,306E-01	3850	1,667E-01
240	< 1,0E-05	540	9,807E-01	840	9,507E-01	1140	9,367E-01	2400	9,235E-01	3900	1,668E-01
250	< 1,0E-05	550	9,823E-01	850	9,496E-01	1150	9,368E-01	2450	9,147E-01	3950	1,618E-01
260	< 1,0E-05	560	9,835E-01	860	9,486E-01	1160	9,369E-01	2500	9,067E-01	4000	1,544E-01
270	< 1,0E-05	570	9,841E-01	870	9,476E-01	1170	9,371E-01	2550	9,014E-01	4050	1,433E-01
280	< 1,0E-05	580	9,843E-01	880	9,467E-01	1180	9,372E-01	2600	8,950E-01	4100	1,295E-01
290	< 1,0E-05	590	9,842E-01	890	9,457E-01	1190	9,374E-01	2650	8,838E-01	4150	1,116E-01
300	< 1,0E-05	600	9,840E-01	900	9,448E-01	1200	9,376E-01	2700	8,040E-01	4200	9,191E-02
310	< 1,0E-05	610	9,835E-01	910	9,439E-01	1250	9,391E-01	2750	3,176E-01	4250	6,847E-02
320	< 1,000E-05	620	9,828E-01	920	9,431E-01	1300	9,414E-01	2800	2,228E-01	4300	4,612E-02
330	< 1,000E-05	630	9,819E-01	930	9,422E-01	1350	9,443E-01	2850	2,391E-01	4350	2,855E-02
340	< 1,000E-05	640	9,810E-01	940	9,416E-01	1400	9,433E-01	2900	2,571E-01	4400	1,568E-02
350	< 1,000E-05	650	9,801E-01	950	9,409E-01	1450	9,504E-01	2950	2,688E-01	4450	6,940E-03
360	< 1,000E-05	660	9,791E-01	960	9,404E-01	1500	9,555E-01	3000	2,738E-01	4500	2,800E-03
370	< 1,000E-05	670	9,779E-01	970	9,398E-01	1550	9,594E-01	3050	2,675E-01	4550	9,940E-04
380	< 1,000E-05	680	9,766E-01	980	9,393E-01	1600	9,622E-01	3100	2,561E-01	4600	3,013E-04
390	1,131E-01	690	9,753E-01	990	9,388E-01	1650	9,638E-01	3150	2,409E-01	4650	9,863E-05
400	7,568E-01	700	9,739E-01	1000	9,383E-01	1700	9,640E-01	3200	2,224E-01	4700	3,281E-05
410	8,785E-01	710	9,723E-01	1010	9,379E-01	1750	9,632E-01	3250	2,055E-01	4750	1,227E-05
420	9,102E-01	720	9,708E-01	1020	9,376E-01	1800	9,619E-01	3300	1,892E-01	4800	< 1,000E-05
430	9,252E-01	730	9,691E-01	1030	9,374E-01	1850	9,602E-01	3350	1,733E-01	4850	< 1,000E-05
440	9,348E-01	740	9,675E-01	1040	9,372E-01	1900	9,585E-01	3400	1,601E-01	4900	< 1,000E-05
450	9,427E-01	750	9,657E-01	1050	9,370E-01	1950	9,566E-01	3450	1,494E-01	4950	< 1,000E-05
460	9,495E-01	760	9,639E-01	1060	9,369E-01	2000	9,546E-01	3500	1,437E-01	5000	< 1,000E-05
470	9,553E-01	770	9,621E-01	1070	9,368E-01	2050	9,526E-01	3550	1,407E-01	5050	< 1,000E-05
480	9,606E-01	780	9,604E-01	1080	9,366E-01	2100	9,487E-01	3600	1,403E-01	5100	< 1,000E-05
490	9,658E-01	790	9,587E-01	1090	9,365E-01	2150	9,432E-01	3650	1,412E-01	5150	< 1,000E-05

GG400

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 400 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 340 nm
λ_p ($\tau_{i,L} = 0,93$)	= 480 nm
Refractive indices	
n_d (587,6 nm)	= 1,52
n_s (852 nm)	= 1,52
n_t (1014 nm)	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

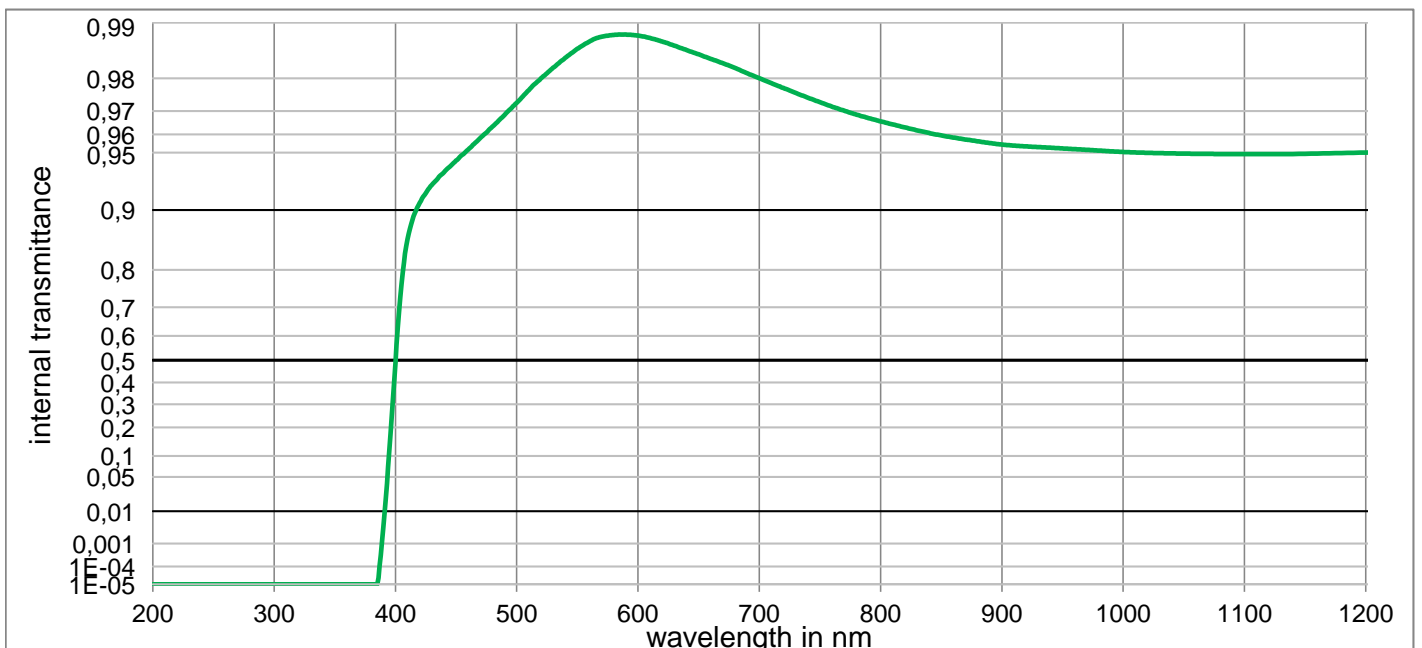
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,55 g/cm ³
Knoop hardness	
HK _[0.1/20]	= 463

Thermal properties	
Transformation temperature	
Tg	= 537 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 7,9
α (20°C/300°C)	= 9,1
Temperature coefficient	
Tk	= 0,07 nm/K

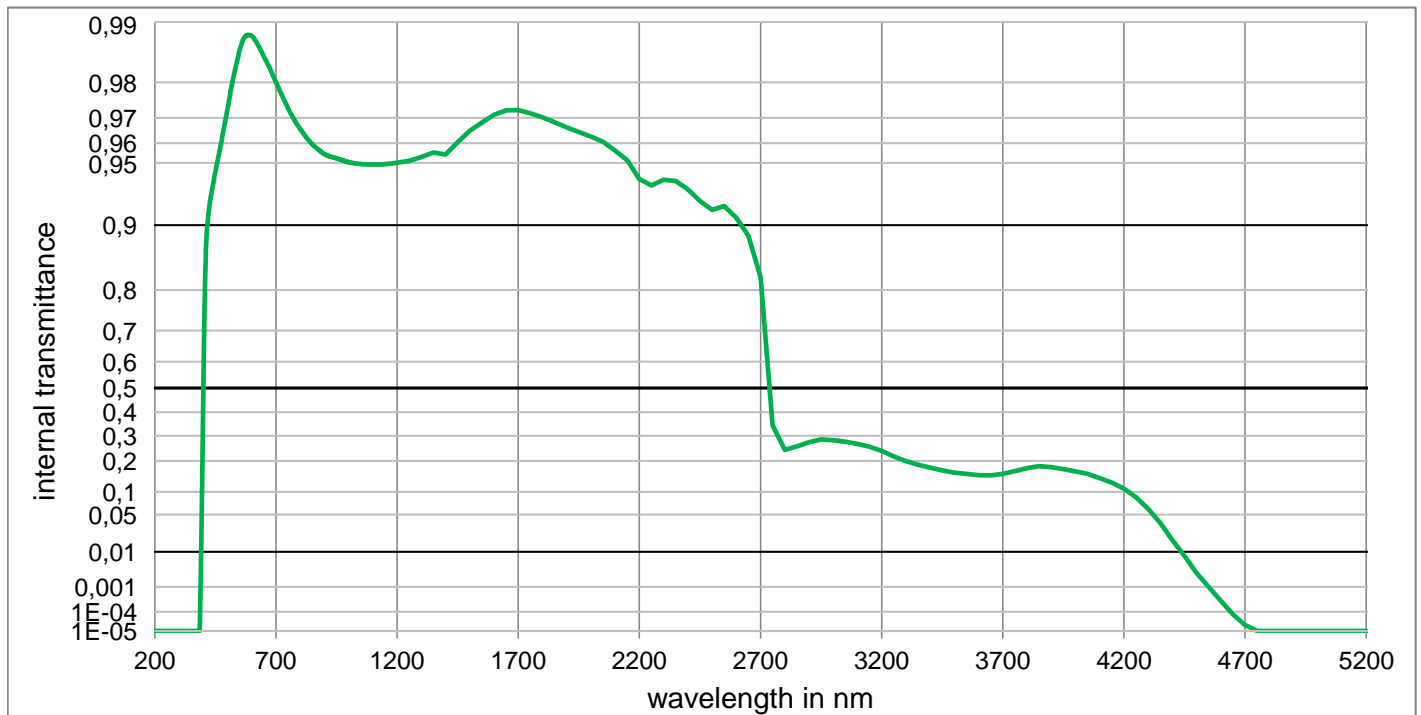
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,314	0,315	0,316
	y	0,331	0,333	0,335
	Y	91,2	90,7	90,2
	λ_d	570 nm	571 nm	571 nm
	P _e	0,009	0,017	0,025
Illuminant A	x	0,448	0,449	0,450
	y	0,408	0,409	0,410
	Y	91,2	90,8	90,4
	λ_d	581 nm	581 nm	581 nm
	P _e	0,011	0,022	0,032

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



GG400



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,729E-01	800	9,660E-01	1100	9,491E-01	2200	9,401E-01	3700	1,537E-01
210	< 1,0E-05	510	9,769E-01	810	9,646E-01	1110	9,491E-01	2250	9,355E-01	3750	1,636E-01
220	< 1,0E-05	520	9,800E-01	820	9,633E-01	1120	9,491E-01	2300	9,397E-01	3800	1,740E-01
230	< 1,0E-05	530	9,825E-01	830	9,620E-01	1130	9,491E-01	2350	9,388E-01	3850	1,810E-01
240	< 1,0E-05	540	9,845E-01	840	9,607E-01	1140	9,492E-01	2400	9,329E-01	3900	1,771E-01
250	< 1,0E-05	550	9,861E-01	850	9,595E-01	1150	9,493E-01	2450	9,234E-01	3950	1,704E-01
260	< 1,0E-05	560	9,873E-01	860	9,584E-01	1160	9,494E-01	2500	9,154E-01	4000	1,625E-01
270	< 1,0E-05	570	9,881E-01	870	9,574E-01	1170	9,496E-01	2550	9,190E-01	4050	1,540E-01
280	< 1,0E-05	580	9,883E-01	880	9,565E-01	1180	9,497E-01	2600	9,076E-01	4100	1,405E-01
290	< 1,0E-05	590	9,884E-01	890	9,555E-01	1190	9,499E-01	2650	8,878E-01	4150	1,266E-01
300	< 1,0E-05	600	9,883E-01	900	9,547E-01	1200	9,501E-01	2700	8,248E-01	4200	1,089E-01
310	< 1,0E-05	610	9,879E-01	910	9,541E-01	1250	9,512E-01	2750	3,440E-01	4250	8,600E-02
320	< 1,000E-05	620	9,874E-01	920	9,537E-01	1300	9,533E-01	2800	2,420E-01	4300	6,050E-02
330	< 1,000E-05	630	9,867E-01	930	9,533E-01	1350	9,555E-01	2850	2,560E-01	4350	3,670E-02
340	< 1,000E-05	640	9,859E-01	940	9,529E-01	1400	9,545E-01	2900	2,740E-01	4400	1,800E-02
350	< 1,000E-05	650	9,852E-01	950	9,525E-01	1450	9,605E-01	2950	2,848E-01	4450	7,910E-03
360	< 1,000E-05	660	9,843E-01	960	9,521E-01	1500	9,652E-01	3000	2,819E-01	4500	2,760E-03
370	< 1,000E-05	670	9,834E-01	970	9,517E-01	1550	9,683E-01	3050	2,755E-01	4550	9,780E-04
380	< 1,000E-05	680	9,824E-01	980	9,512E-01	1600	9,710E-01	3100	2,667E-01	4600	3,000E-04
390	3,430E-03	690	9,812E-01	990	9,508E-01	1650	9,725E-01	3150	2,557E-01	4650	7,345E-05
400	4,907E-01	700	9,800E-01	1000	9,504E-01	1700	9,725E-01	3200	2,381E-01	4700	2,171E-05
410	8,588E-01	710	9,788E-01	1010	9,501E-01	1750	9,715E-01	3250	2,170E-01	4750	< 1,000E-05
420	9,082E-01	720	9,774E-01	1020	9,499E-01	1800	9,702E-01	3300	1,987E-01	4800	< 1,000E-05
430	9,259E-01	730	9,760E-01	1030	9,497E-01	1850	9,684E-01	3350	1,864E-01	4850	< 1,000E-05
440	9,365E-01	740	9,746E-01	1040	9,495E-01	1900	9,666E-01	3400	1,757E-01	4900	< 1,000E-05
450	9,448E-01	750	9,731E-01	1050	9,494E-01	1950	9,648E-01	3450	1,659E-01	4950	< 1,000E-05
460	9,518E-01	760	9,716E-01	1060	9,493E-01	2000	9,629E-01	3500	1,586E-01	5000	< 1,000E-05
470	9,583E-01	770	9,702E-01	1070	9,492E-01	2050	9,606E-01	3550	1,536E-01	5050	< 1,000E-05
480	9,636E-01	780	9,687E-01	1080	9,491E-01	2100	9,565E-01	3600	1,499E-01	5100	< 1,000E-05
490	9,686E-01	790	9,673E-01	1090	9,491E-01	2150	9,515E-01	3650	1,493E-01	5150	< 1,000E-05

GG420

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 420 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 360 nm
λ_p ($\tau_{i,L} = 0,93$)	= 530 nm
Refractive indices	
n_d (587,6 nm)	= 1,52
n_s (852 nm)	= 1,52
n_t (1014 nm)	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

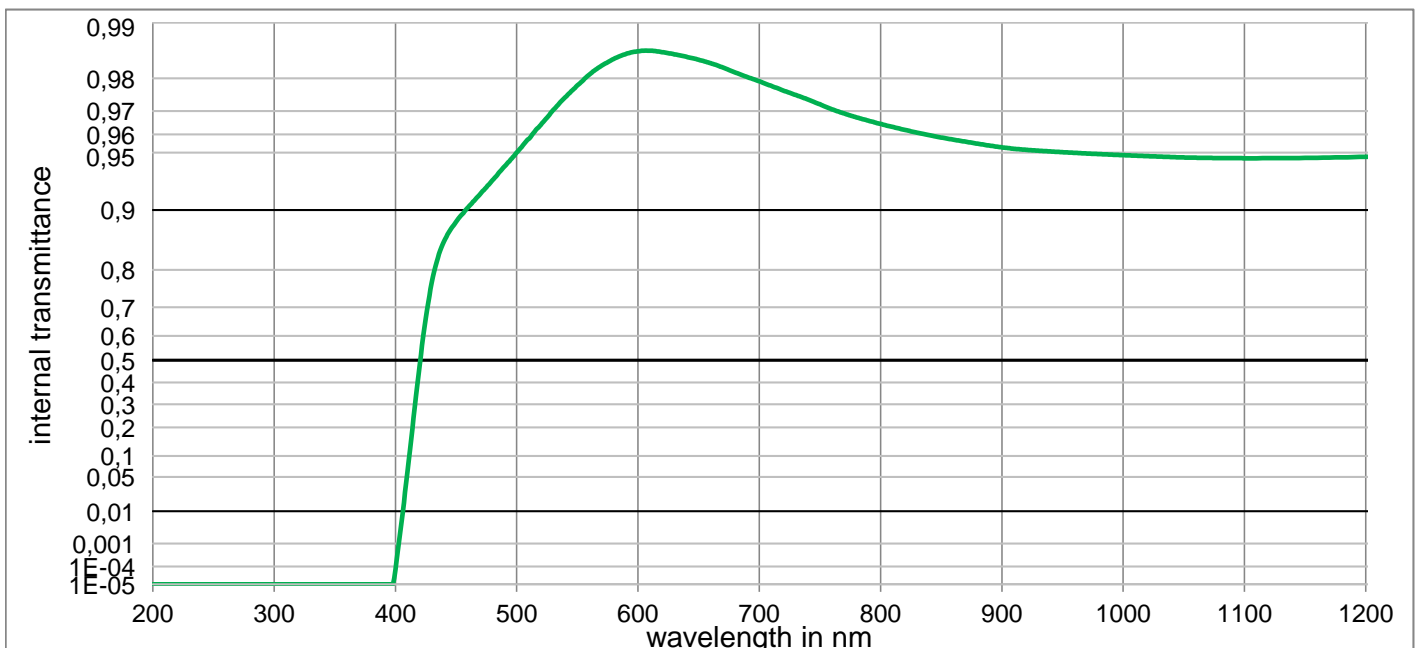
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,55 g/cm ³
Knoop hardness	
HK _[0.1/20]	= 503

Thermal properties	
Transformation temperature	
Tg	= 535 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 7,8
α (20°C/300°C)	= 9,0
Temperature coefficient	
Tk	= 0,07 nm/K

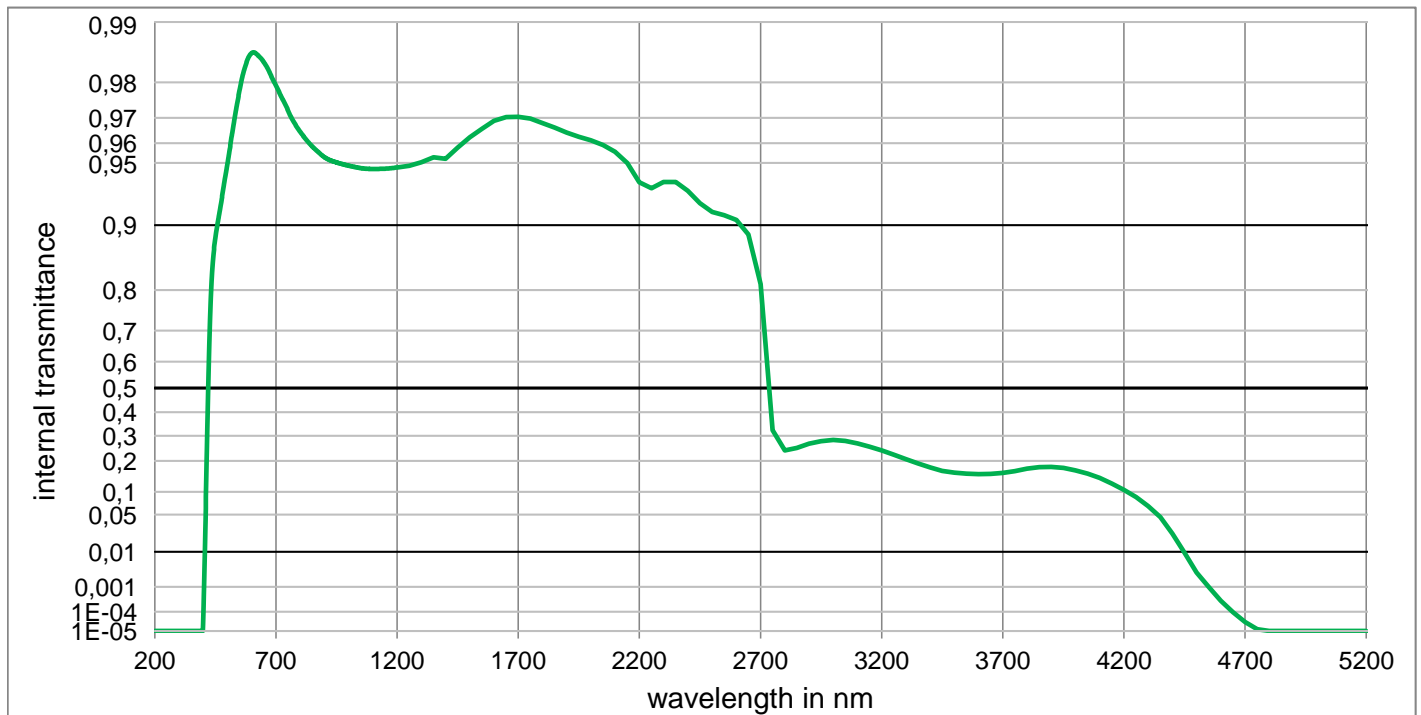
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,317	0,320	0,324
	y	0,337	0,342	0,348
	Y	90,9	90,1	89,2
	λ_d	569 nm	570 nm	570 nm
	P _e	0,033	0,059	0,082
Illuminant A	x	0,450	0,453	0,455
	y	0,410	0,412	0,414
	Y	91,0	90,4	89,7
	λ_d	581 nm	581 nm	581 nm
	P _e	0,038	0,068	0,096

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



GG420



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,500E-01	800	9,649E-01	1100	9,465E-01	2200	9,379E-01	3700	1,571E-01
210	< 1,0E-05	510	9,578E-01	810	9,635E-01	1110	9,465E-01	2250	9,336E-01	3750	1,636E-01
220	< 1,0E-05	520	9,645E-01	820	9,622E-01	1120	9,465E-01	2300	9,381E-01	3800	1,720E-01
230	< 1,0E-05	530	9,703E-01	830	9,609E-01	1130	9,465E-01	2350	9,380E-01	3850	1,772E-01
240	< 1,0E-05	540	9,747E-01	840	9,596E-01	1140	9,466E-01	2400	9,317E-01	3900	1,785E-01
250	< 1,0E-05	550	9,781E-01	850	9,585E-01	1150	9,467E-01	2450	9,215E-01	3950	1,744E-01
260	< 1,0E-05	560	9,809E-01	860	9,574E-01	1160	9,468E-01	2500	9,136E-01	4000	1,660E-01
270	< 1,0E-05	570	9,829E-01	870	9,563E-01	1170	9,469E-01	2550	9,104E-01	4050	1,550E-01
280	< 1,0E-05	580	9,843E-01	880	9,552E-01	1180	9,470E-01	2600	9,056E-01	4100	1,410E-01
290	< 1,0E-05	590	9,852E-01	890	9,541E-01	1190	9,472E-01	2650	8,892E-01	4150	1,232E-01
300	< 1,0E-05	600	9,857E-01	900	9,531E-01	1200	9,474E-01	2700	8,120E-01	4200	1,053E-01
310	< 1,0E-05	610	9,858E-01	910	9,523E-01	1250	9,484E-01	2750	3,239E-01	4250	8,629E-02
320	< 1,000E-05	620	9,856E-01	920	9,517E-01	1300	9,504E-01	2800	2,398E-01	4300	6,632E-02
330	< 1,000E-05	630	9,852E-01	930	9,512E-01	1350	9,531E-01	2850	2,500E-01	4350	4,599E-02
340	< 1,000E-05	640	9,847E-01	940	9,507E-01	1400	9,522E-01	2900	2,672E-01	4400	2,394E-02
350	< 1,000E-05	650	9,841E-01	950	9,503E-01	1450	9,580E-01	2950	2,777E-01	4450	9,460E-03
360	< 1,000E-05	660	9,834E-01	960	9,499E-01	1500	9,626E-01	3000	2,832E-01	4500	2,866E-03
370	< 1,000E-05	670	9,825E-01	970	9,495E-01	1550	9,660E-01	3050	2,786E-01	4550	9,830E-04
380	< 1,000E-05	680	9,814E-01	980	9,491E-01	1600	9,690E-01	3100	2,687E-01	4600	3,006E-04
390	< 1,000E-05	690	9,803E-01	990	9,488E-01	1650	9,703E-01	3150	2,553E-01	4650	9,550E-05
400	7,048E-05	700	9,792E-01	1000	9,484E-01	1700	9,704E-01	3200	2,405E-01	4700	3,112E-05
410	6,112E-02	710	9,780E-01	1010	9,481E-01	1750	9,697E-01	3250	2,235E-01	4750	1,250E-05
420	4,792E-01	720	9,767E-01	1020	9,478E-01	1800	9,682E-01	3300	2,064E-01	4800	< 1,000E-05
430	7,703E-01	730	9,754E-01	1030	9,475E-01	1850	9,665E-01	3350	1,911E-01	4850	< 1,000E-05
440	8,551E-01	740	9,740E-01	1040	9,472E-01	1900	9,646E-01	3400	1,760E-01	4900	< 1,000E-05
450	8,849E-01	750	9,724E-01	1050	9,470E-01	1950	9,628E-01	3450	1,639E-01	4950	< 1,000E-05
460	9,032E-01	760	9,706E-01	1060	9,468E-01	2000	9,612E-01	3500	1,578E-01	5000	< 1,000E-05
470	9,176E-01	770	9,691E-01	1070	9,467E-01	2050	9,591E-01	3550	1,551E-01	5050	< 1,000E-05
480	9,300E-01	780	9,676E-01	1080	9,466E-01	2100	9,559E-01	3600	1,535E-01	5100	< 1,000E-05
490	9,409E-01	790	9,662E-01	1090	9,465E-01	2150	9,500E-01	3650	1,540E-01	5150	< 1,000E-05

GG435

Optical properties	
Reflection factor	
$P_d = 0,918$	
Spectral values guaranteed (d = 3 mm)	
$\lambda_c (\tau_i = 0,5)$	= 435 nm \pm 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 370 nm
$\lambda_p (\tau_{i,L} = 0,92)$	= 520 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,52
$n_s (852 \text{ nm})$	= 1,52
$n_t (1014 \text{ nm})$	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

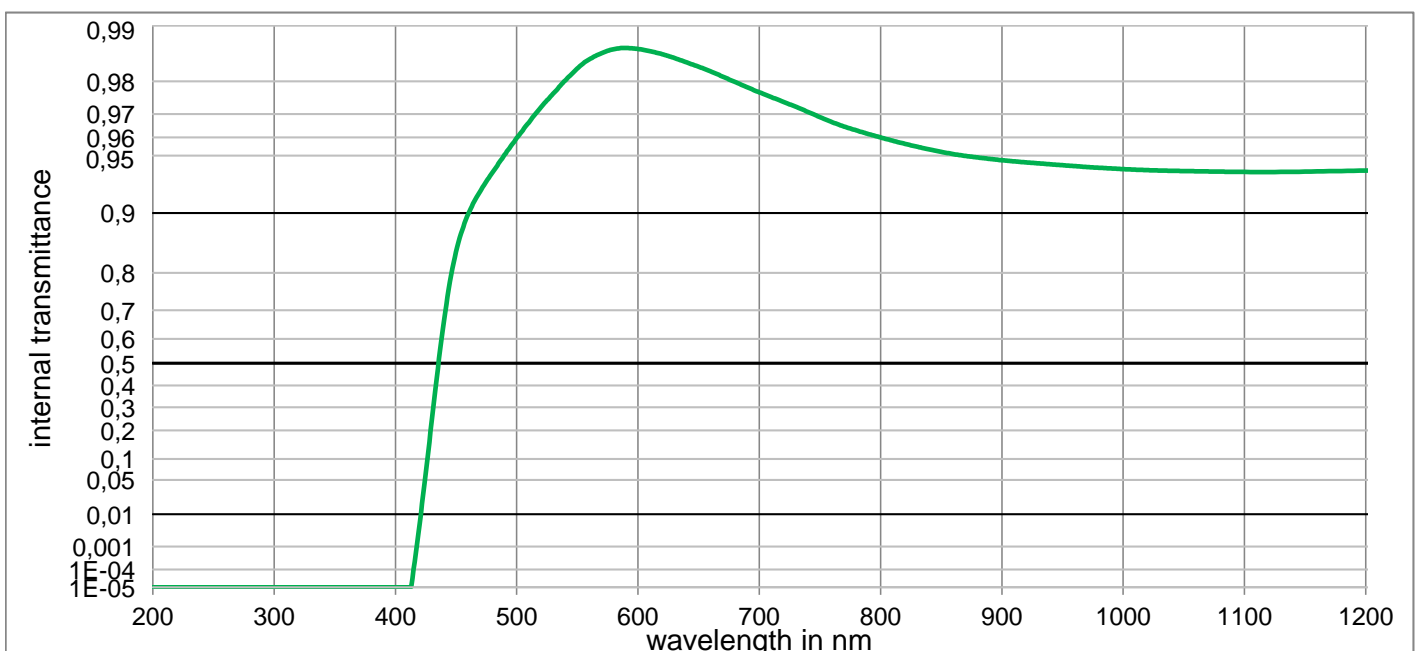
Mechanical properties	
Reference thickness	
d = 3,00 mm	
Density	
$\rho = 2,55 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 449$	

Thermal properties	
Transformation temperature	
Tg = 537 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha_{(-30^\circ C/+70^\circ C)}$	= 7,8
$\alpha_{(20^\circ C/300^\circ C)}$	= 9,1
Temperature coefficient	
Tk = 0,08 nm/K	

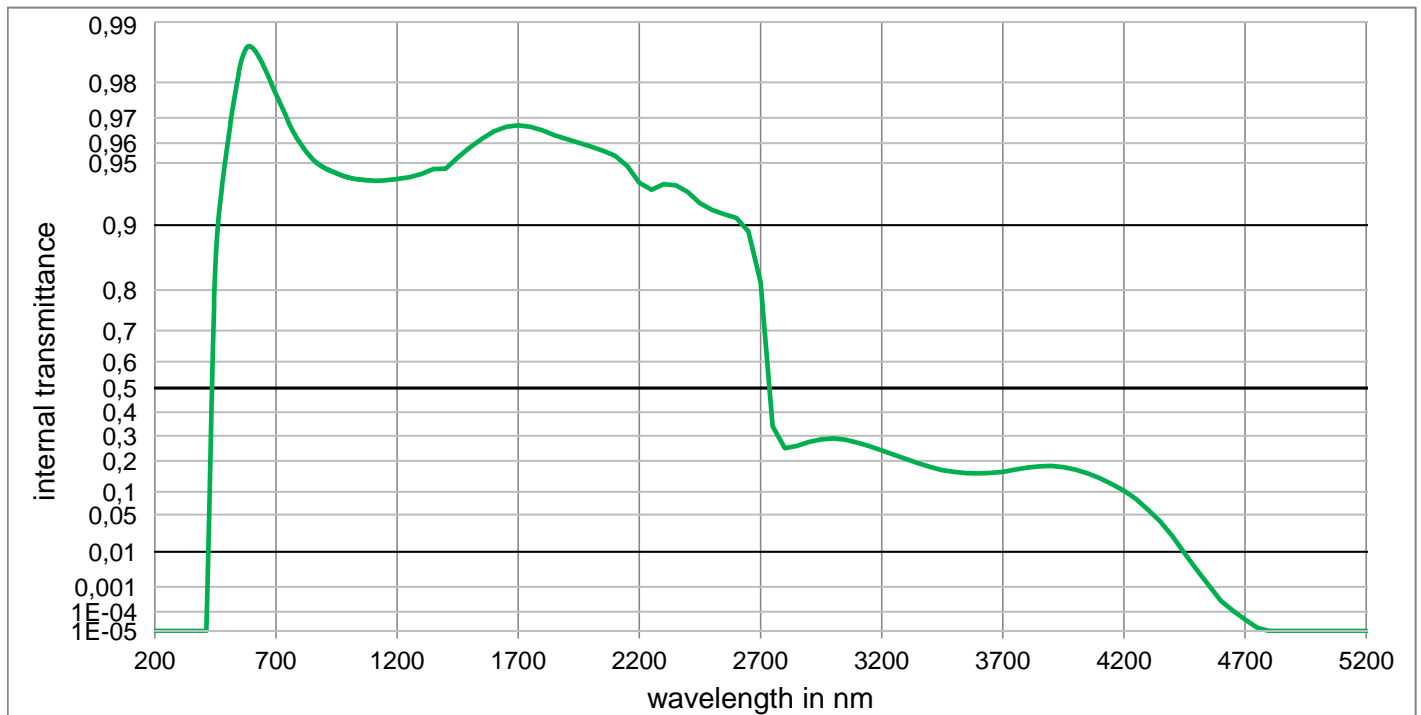
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,323	0,328	0,333
	y	0,350	0,361	0,369
	Y	90,9	90,2	89,5
	λ_d	568 nm	568 nm	568 nm
	P_e	0,086	0,132	0,166
Illuminant A	x	0,453	0,457	0,459
	y	0,415	0,419	0,422
	Y	91,1	90,5	90,0
	λ_d	580 nm	580 nm	580 nm
	P_e	0,092	0,143	0,182

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



GG435



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,596E-01	800	9,600E-01	1100	9,390E-01	2200	9,376E-01	3700	1,608E-01
210	< 1,0E-05	510	9,667E-01	810	9,583E-01	1110	9,390E-01	2250	9,324E-01	3750	1,688E-01
220	< 1,0E-05	520	9,724E-01	820	9,568E-01	1120	9,389E-01	2300	9,365E-01	3800	1,759E-01
230	< 1,0E-05	530	9,767E-01	830	9,552E-01	1130	9,390E-01	2350	9,358E-01	3850	1,802E-01
240	< 1,0E-05	540	9,802E-01	840	9,537E-01	1140	9,391E-01	2400	9,307E-01	3900	1,817E-01
250	< 1,0E-05	550	9,829E-01	850	9,523E-01	1150	9,392E-01	2450	9,214E-01	3950	1,770E-01
260	< 1,0E-05	560	9,848E-01	860	9,510E-01	1160	9,394E-01	2500	9,154E-01	4000	1,683E-01
270	< 1,0E-05	570	9,859E-01	870	9,498E-01	1170	9,395E-01	2550	9,115E-01	4050	1,561E-01
280	< 1,0E-05	580	9,866E-01	880	9,489E-01	1180	9,397E-01	2600	9,076E-01	4100	1,404E-01
290	< 1,0E-05	590	9,868E-01	890	9,480E-01	1190	9,399E-01	2650	8,930E-01	4150	1,219E-01
300	< 1,0E-05	600	9,866E-01	900	9,471E-01	1200	9,401E-01	2700	8,152E-01	4200	1,034E-01
310	< 1,0E-05	610	9,862E-01	910	9,464E-01	1250	9,413E-01	2750	3,405E-01	4250	8,162E-02
320	< 1,000E-05	620	9,857E-01	920	9,457E-01	1300	9,434E-01	2800	2,494E-01	4300	5,873E-02
330	< 1,000E-05	630	9,850E-01	930	9,451E-01	1350	9,464E-01	2850	2,584E-01	4350	3,903E-02
340	< 1,000E-05	640	9,842E-01	940	9,444E-01	1400	9,466E-01	2900	2,745E-01	4400	2,142E-02
350	< 1,000E-05	650	9,833E-01	950	9,438E-01	1450	9,530E-01	2950	2,847E-01	4450	9,220E-03
360	< 1,000E-05	660	9,823E-01	960	9,432E-01	1500	9,579E-01	3000	2,890E-01	4500	3,490E-03
370	< 1,000E-05	670	9,811E-01	970	9,426E-01	1550	9,619E-01	3050	2,838E-01	4550	1,129E-03
380	< 1,000E-05	680	9,799E-01	980	9,420E-01	1600	9,651E-01	3100	2,715E-01	4600	3,010E-04
390	< 1,000E-05	690	9,785E-01	990	9,415E-01	1650	9,668E-01	3150	2,572E-01	4650	1,117E-04
400	< 1,000E-05	700	9,771E-01	1000	9,411E-01	1700	9,673E-01	3200	2,407E-01	4700	4,207E-05
410	< 1,000E-05	710	9,757E-01	1010	9,407E-01	1750	9,668E-01	3250	2,237E-01	4750	1,556E-05
420	5,714E-03	720	9,742E-01	1020	9,403E-01	1800	9,654E-01	3300	2,073E-01	4800	< 1,000E-05
430	2,404E-01	730	9,726E-01	1030	9,401E-01	1850	9,634E-01	3350	1,920E-01	4850	< 1,000E-05
440	6,640E-01	740	9,708E-01	1040	9,398E-01	1900	9,618E-01	3400	1,782E-01	4900	< 1,000E-05
450	8,424E-01	750	9,689E-01	1050	9,397E-01	1950	9,602E-01	3450	1,665E-01	4950	< 1,000E-05
460	8,986E-01	760	9,669E-01	1060	9,395E-01	2000	9,584E-01	3500	1,606E-01	5000	< 1,000E-05
470	9,230E-01	770	9,650E-01	1070	9,394E-01	2050	9,564E-01	3550	1,567E-01	5050	< 1,000E-05
480	9,386E-01	780	9,633E-01	1080	9,392E-01	2100	9,539E-01	3600	1,559E-01	5100	< 1,000E-05
490	9,506E-01	790	9,616E-01	1090	9,391E-01	2150	9,482E-01	3650	1,573E-01	5150	< 1,000E-05

GG455

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 455 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 390 nm
λ_p ($\tau_{i,L} = 0,92$)	= 530 nm
Refractive indices	
n_d (587,6 nm)	= 1,52
n_s (852 nm)	= 1,52
n_t (1014 nm)	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

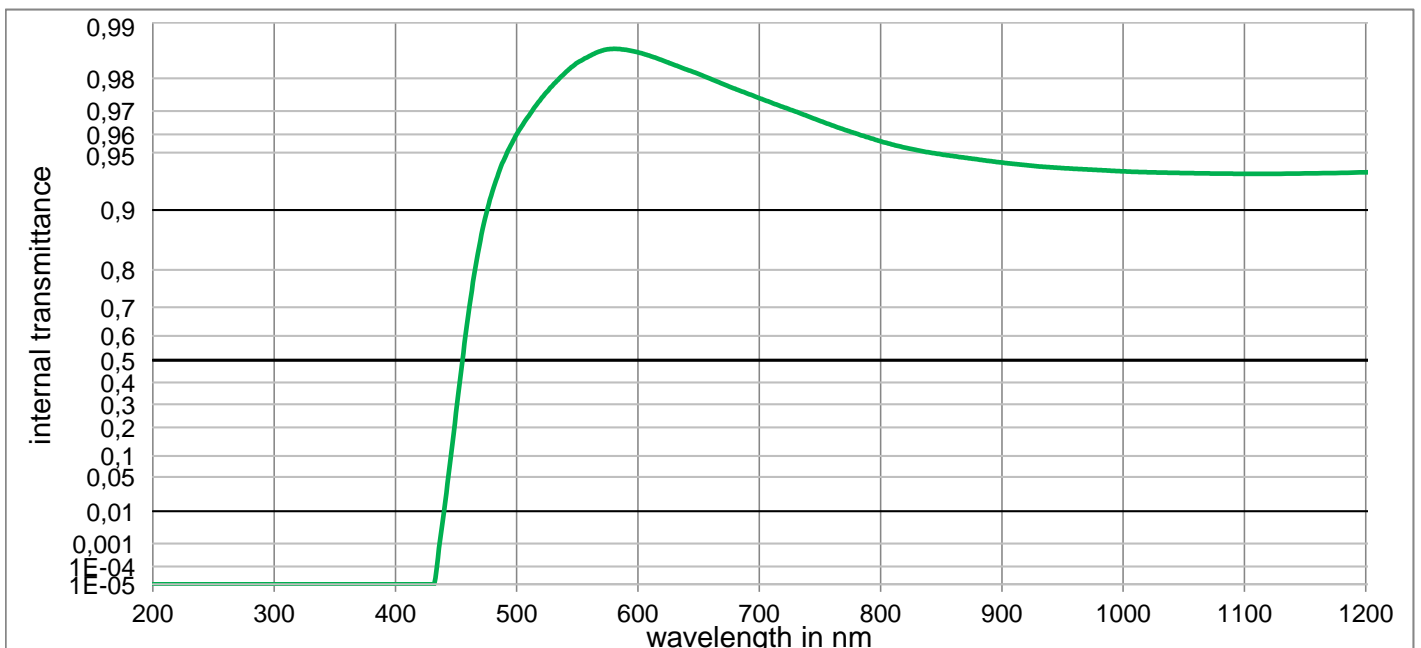
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,56 g/cm ³
Knoop hardness	
HK _[0.1/20]	= 445

Thermal properties	
Transformation temperature	
Tg	= 529 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 8,2
α (20°C/300°C)	= 9,5
Temperature coefficient	
Tk	= 0,09 nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,344	0,354	0,361
	y	0,394	0,414	0,426
	Y	90,5	89,7	88,9
	λ_d	568 nm	568 nm	568 nm
	P _e	0,270	0,355	0,408
Illuminant A	x	0,465	0,470	0,473
	y	0,431	0,437	0,441
	Y	91,0	90,4	89,8
	λ_d	579 nm	580 nm	580 nm
	P _e	0,282	0,364	0,415

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



GG455



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,600E-01	800	9,565E-01	1100	9,353E-01	2200	9,323E-01	3700	1,353E-01
210	< 1,0E-05	510	9,681E-01	810	9,547E-01	1110	9,353E-01	2250	9,263E-01	3750	1,428E-01
220	< 1,0E-05	520	9,741E-01	820	9,530E-01	1120	9,353E-01	2300	9,301E-01	3800	1,502E-01
230	< 1,0E-05	530	9,783E-01	830	9,515E-01	1130	9,354E-01	2350	9,287E-01	3850	1,579E-01
240	< 1,0E-05	540	9,813E-01	840	9,501E-01	1140	9,355E-01	2400	9,228E-01	3900	1,614E-01
250	< 1,0E-05	550	9,835E-01	850	9,489E-01	1150	9,356E-01	2450	9,141E-01	3950	1,566E-01
260	< 1,0E-05	560	9,848E-01	860	9,478E-01	1160	9,357E-01	2500	9,062E-01	4000	1,474E-01
270	< 1,0E-05	570	9,858E-01	870	9,467E-01	1170	9,358E-01	2550	9,066E-01	4050	1,372E-01
280	< 1,0E-05	580	9,861E-01	880	9,457E-01	1180	9,360E-01	2600	8,992E-01	4100	1,244E-01
290	< 1,0E-05	590	9,860E-01	890	9,446E-01	1190	9,363E-01	2650	8,855E-01	4150	1,092E-01
300	< 1,0E-05	600	9,855E-01	900	9,436E-01	1200	9,365E-01	2700	8,129E-01	4200	9,100E-02
310	< 1,0E-05	610	9,849E-01	910	9,426E-01	1250	9,381E-01	2750	3,480E-01	4250	7,064E-02
320	< 1,000E-05	620	9,840E-01	920	9,417E-01	1300	9,402E-01	2800	2,470E-01	4300	5,106E-02
330	< 1,000E-05	630	9,831E-01	930	9,409E-01	1350	9,434E-01	2850	2,521E-01	4350	3,463E-02
340	< 1,000E-05	640	9,821E-01	940	9,402E-01	1400	9,440E-01	2900	2,632E-01	4400	2,040E-02
350	< 1,000E-05	650	9,811E-01	950	9,396E-01	1450	9,502E-01	2950	2,713E-01	4450	9,120E-03
360	< 1,000E-05	660	9,798E-01	960	9,391E-01	1500	9,556E-01	3000	2,723E-01	4500	3,420E-03
370	< 1,000E-05	670	9,786E-01	970	9,386E-01	1550	9,595E-01	3050	2,640E-01	4550	1,100E-03
380	< 1,000E-05	680	9,772E-01	980	9,382E-01	1600	9,627E-01	3100	2,507E-01	4600	3,097E-04
390	< 1,000E-05	690	9,759E-01	990	9,377E-01	1650	9,646E-01	3150	2,344E-01	4650	9,484E-05
400	< 1,000E-05	700	9,745E-01	1000	9,372E-01	1700	9,650E-01	3200	2,168E-01	4700	3,236E-05
410	< 1,000E-05	710	9,730E-01	1010	9,368E-01	1750	9,640E-01	3250	1,998E-01	4750	1,500E-05
420	< 1,000E-05	720	9,714E-01	1020	9,365E-01	1800	9,625E-01	3300	1,836E-01	4800	< 1,000E-05
430	< 1,000E-05	730	9,698E-01	1030	9,363E-01	1850	9,605E-01	3350	1,681E-01	4850	< 1,000E-05
440	9,602E-03	740	9,680E-01	1040	9,361E-01	1900	9,583E-01	3400	1,540E-01	4900	< 1,000E-05
450	2,603E-01	750	9,662E-01	1050	9,359E-01	1950	9,563E-01	3450	1,421E-01	4950	< 1,000E-05
460	6,726E-01	760	9,643E-01	1060	9,357E-01	2000	9,543E-01	3500	1,357E-01	5000	< 1,000E-05
470	8,568E-01	770	9,623E-01	1070	9,356E-01	2050	9,519E-01	3550	1,359E-01	5050	< 1,000E-05
480	9,199E-01	780	9,604E-01	1080	9,355E-01	2100	9,484E-01	3600	1,378E-01	5100	< 1,000E-05
490	9,464E-01	790	9,585E-01	1090	9,354E-01	2150	9,434E-01	3650	1,333E-01	5150	< 1,000E-05

GG475

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 475 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 410 nm
λ_p ($\tau_{i,L} = 0,92$)	= 550 nm
Refractive indices	
n_d (587,6 nm)	= 1,52
n_s (852 nm)	= 1,52
n_t (1014 nm)	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

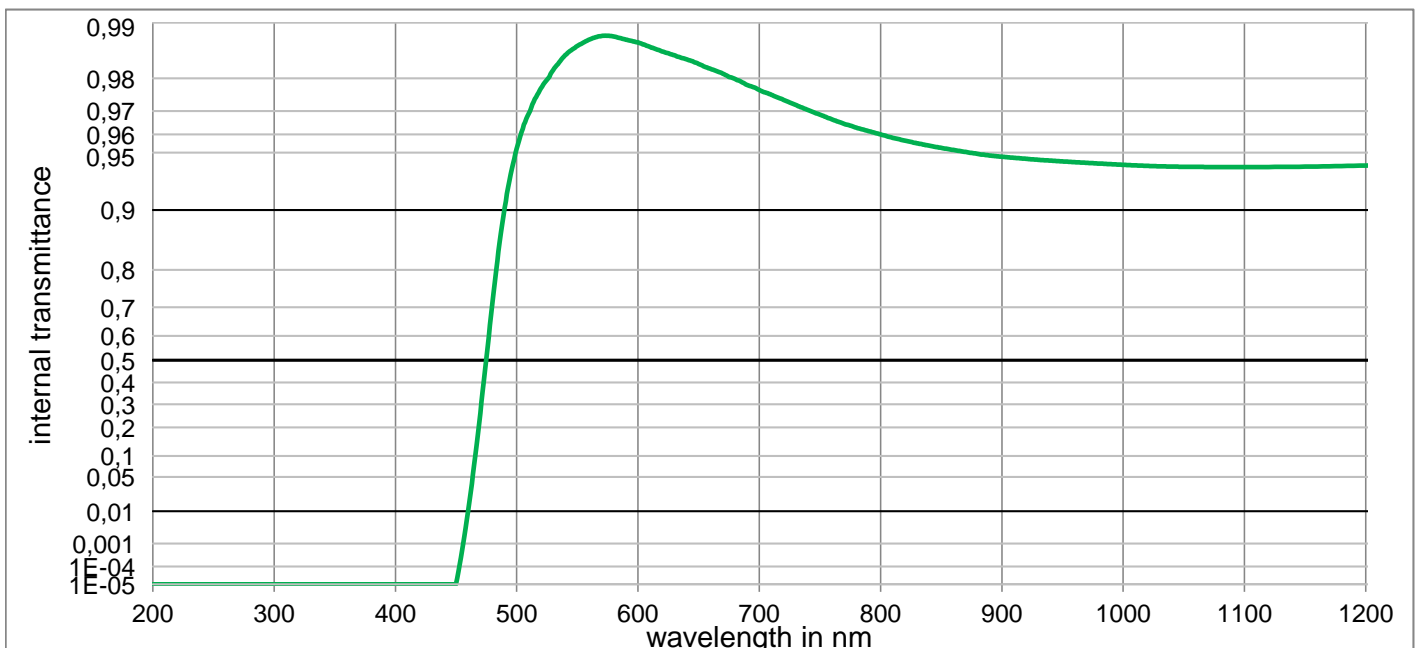
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,56 g/cm ³
Knoop hardness	
HK _[0.1/20]	= 451

Thermal properties	
Transformation temperature	
Tg	= 531 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 8,2
α (20°C/300°C)	= 9,4
Temperature coefficient	
Tk	= 0,09 nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,381	0,394	0,401
	y	0,463	0,485	0,494
	Y	89,5	88,5	87,7
	λ_d	568 nm	569 nm	569 nm
	P _e	0,567	0,664	0,709
Illuminant A	x	0,483	0,489	0,492
	y	0,453	0,460	0,463
	Y	90,7	90,0	89,4
	λ_d	580 nm	580 nm	580 nm
	P _e	0,560	0,648	0,689

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



GG475



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,523E-01	800	9,600E-01	1100	9,404E-01	2200	9,336E-01	3700	1,458E-01
210	< 1,0E-05	510	9,691E-01	810	9,583E-01	1110	9,404E-01	2250	9,290E-01	3750	1,530E-01
220	< 1,0E-05	520	9,773E-01	820	9,568E-01	1120	9,404E-01	2300	9,335E-01	3800	1,617E-01
230	< 1,0E-05	530	9,819E-01	830	9,554E-01	1130	9,405E-01	2350	9,320E-01	3850	1,674E-01
240	< 1,0E-05	540	9,850E-01	840	9,541E-01	1140	9,406E-01	2400	9,259E-01	3900	1,685E-01
250	< 1,0E-05	550	9,866E-01	850	9,529E-01	1150	9,407E-01	2450	9,164E-01	3950	1,656E-01
260	< 1,0E-05	560	9,877E-01	860	9,516E-01	1160	9,408E-01	2500	9,109E-01	4000	1,582E-01
270	< 1,0E-05	570	9,882E-01	870	9,504E-01	1170	9,409E-01	2550	9,120E-01	4050	1,473E-01
280	< 1,0E-05	580	9,881E-01	880	9,492E-01	1180	9,411E-01	2600	9,054E-01	4100	1,326E-01
290	< 1,0E-05	590	9,876E-01	890	9,482E-01	1190	9,413E-01	2650	8,939E-01	4150	1,147E-01
300	< 1,0E-05	600	9,872E-01	900	9,474E-01	1200	9,415E-01	2700	8,190E-01	4200	9,520E-02
310	< 1,0E-05	610	9,864E-01	910	9,468E-01	1250	9,430E-01	2750	3,672E-01	4250	7,140E-02
320	< 1,000E-05	620	9,857E-01	920	9,461E-01	1300	9,453E-01	2800	2,487E-01	4300	5,080E-02
330	< 1,000E-05	630	9,850E-01	930	9,454E-01	1350	9,481E-01	2850	2,550E-01	4350	3,277E-02
340	< 1,000E-05	640	9,842E-01	940	9,449E-01	1400	9,481E-01	2900	2,658E-01	4400	1,894E-02
350	< 1,000E-05	650	9,833E-01	950	9,443E-01	1450	9,546E-01	2950	2,713E-01	4450	8,760E-03
360	< 1,000E-05	660	9,822E-01	960	9,438E-01	1500	9,596E-01	3000	2,719E-01	4500	3,295E-03
370	< 1,000E-05	670	9,811E-01	970	9,434E-01	1550	9,633E-01	3050	2,657E-01	4550	1,200E-03
380	< 1,000E-05	680	9,799E-01	980	9,429E-01	1600	9,660E-01	3100	2,506E-01	4600	3,357E-04
390	< 1,000E-05	690	9,783E-01	990	9,424E-01	1650	9,679E-01	3150	2,333E-01	4650	1,035E-04
400	< 1,000E-05	700	9,769E-01	1000	9,420E-01	1700	9,683E-01	3200	2,158E-01	4700	3,656E-05
410	< 1,000E-05	710	9,754E-01	1010	9,416E-01	1750	9,671E-01	3250	1,989E-01	4750	1,393E-05
420	< 1,000E-05	720	9,739E-01	1020	9,412E-01	1800	9,655E-01	3300	1,827E-01	4800	< 1,000E-05
430	< 1,000E-05	730	9,722E-01	1030	9,409E-01	1850	9,638E-01	3350	1,680E-01	4850	< 1,000E-05
440	< 1,000E-05	740	9,704E-01	1040	9,407E-01	1900	9,618E-01	3400	1,558E-01	4900	< 1,000E-05
450	< 1,000E-05	750	9,686E-01	1050	9,406E-01	1950	9,598E-01	3450	1,467E-01	4950	< 1,000E-05
460	1,043E-02	760	9,667E-01	1060	9,405E-01	2000	9,575E-01	3500	1,419E-01	5000	< 1,000E-05
470	2,606E-01	770	9,649E-01	1070	9,404E-01	2050	9,551E-01	3550	1,402E-01	5050	< 1,000E-05
480	7,129E-01	780	9,632E-01	1080	9,404E-01	2100	9,516E-01	3600	1,403E-01	5100	< 1,000E-05
490	9,022E-01	790	9,616E-01	1090	9,404E-01	2150	9,462E-01	3650	1,418E-01	5150	< 1,000E-05

GG495

Optical properties	
Reflection factor	
P_d	= 0,917
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 495 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 430 nm
λ_p ($\tau_{i,L} = 0,92$)	= 560 nm
Refractive indices	
n_d (587,6 nm)	= 1,52
n_s (852 nm)	= 1,52
n_t (1014 nm)	= 1,51
Sellmeier coefficients	
valid from 400 nm to 2400 nm	
B_1	= 1,2863
B_2	= 0,0012
B_3	= 0,8815
C_1	= 9,397E-03 μm^2
C_2	= 1,5104E-01 μm^2
C_3	= 106,389 μm^2
Internal quality	
Bubble class	3

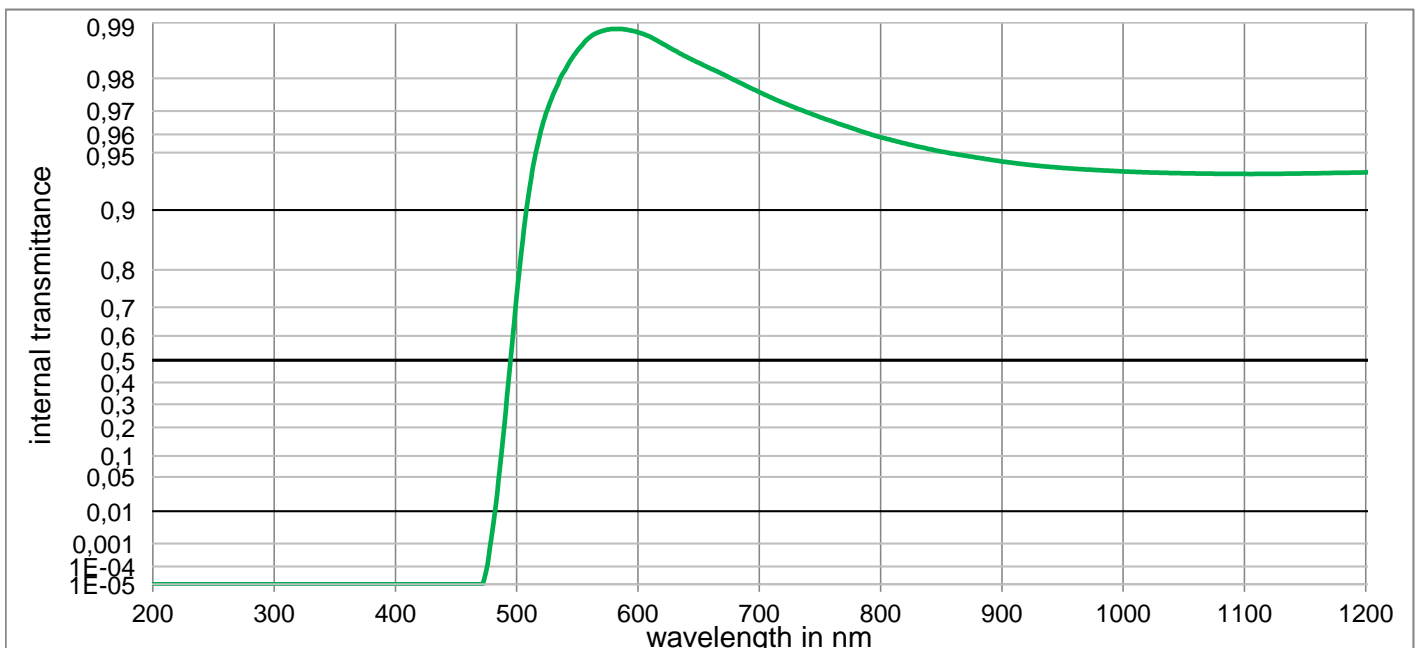
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,56 g/cm ³
Knoop hardness	
$HK_{[0.1/20]}$	= 501

Thermal properties	
Transformation temperature	
T_g	= 535 °C
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 8,1
α (20°C/300°C)	= 9,4
Temperature coefficient	
Tk	= 0,1 nm/K

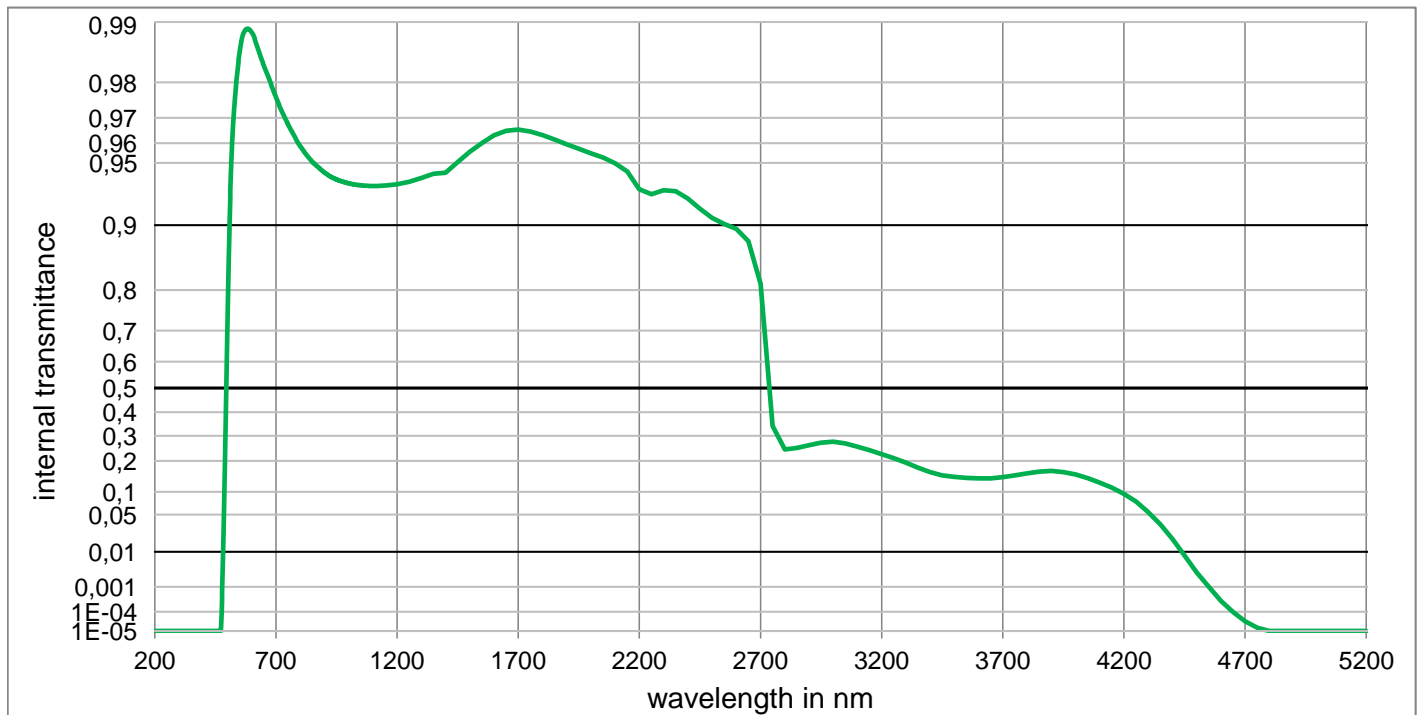
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,422	0,433	0,438
	y	0,514	0,525	0,527
	Y	86,7	85,1	84,0
	λ_d	570 nm	571 nm	571 nm
Illuminant A	P_e	0,824	0,887	0,904
	x	0,502	0,507	0,509
	y	0,469	0,472	0,472
	Y	89,5	88,5	87,7
Illuminant A	λ_d	580 nm	581 nm	581 nm
	P_e	0,807	0,862	0,880

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



GG495



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	7,321E-01	800	9,586E-01	1100	9,352E-01	2200	9,329E-01	3700	1,435E-01
210	< 1,0E-05	510	9,185E-01	810	9,569E-01	1110	9,352E-01	2250	9,289E-01	3750	1,488E-01
220	< 1,0E-05	520	9,617E-01	820	9,553E-01	1120	9,352E-01	2300	9,320E-01	3800	1,553E-01
230	< 1,0E-05	530	9,755E-01	830	9,537E-01	1130	9,353E-01	2350	9,313E-01	3850	1,619E-01
240	< 1,0E-05	540	9,821E-01	840	9,522E-01	1140	9,355E-01	2400	9,256E-01	3900	1,643E-01
250	< 1,0E-05	550	9,858E-01	850	9,507E-01	1150	9,356E-01	2450	9,166E-01	3950	1,600E-01
260	< 1,0E-05	560	9,880E-01	860	9,493E-01	1160	9,357E-01	2500	9,077E-01	4000	1,521E-01
270	< 1,0E-05	570	9,889E-01	870	9,481E-01	1170	9,359E-01	2550	9,014E-01	4050	1,405E-01
280	< 1,0E-05	580	9,892E-01	880	9,468E-01	1180	9,360E-01	2600	8,958E-01	4100	1,265E-01
290	< 1,0E-05	590	9,891E-01	890	9,456E-01	1190	9,362E-01	2650	8,808E-01	4150	1,113E-01
300	< 1,0E-05	600	9,887E-01	900	9,443E-01	1200	9,364E-01	2700	8,125E-01	4200	9,490E-02
310	< 1,0E-05	610	9,881E-01	910	9,432E-01	1250	9,382E-01	2750	3,410E-01	4250	7,570E-02
320	< 1,000E-05	620	9,870E-01	920	9,422E-01	1300	9,407E-01	2800	2,445E-01	4300	5,470E-02
330	< 1,000E-05	630	9,859E-01	930	9,413E-01	1350	9,435E-01	2850	2,499E-01	4350	3,490E-02
340	< 1,000E-05	640	9,847E-01	940	9,405E-01	1400	9,441E-01	2900	2,611E-01	4400	1,910E-02
350	< 1,000E-05	650	9,835E-01	950	9,398E-01	1450	9,506E-01	2950	2,714E-01	4450	8,150E-03
360	< 1,000E-05	660	9,823E-01	960	9,391E-01	1500	9,560E-01	3000	2,751E-01	4500	2,939E-03
370	< 1,000E-05	670	9,810E-01	970	9,386E-01	1550	9,601E-01	3050	2,686E-01	4550	1,008E-03
380	< 1,000E-05	680	9,795E-01	980	9,381E-01	1600	9,634E-01	3100	2,558E-01	4600	3,020E-04
390	< 1,000E-05	690	9,779E-01	990	9,376E-01	1650	9,653E-01	3150	2,409E-01	4650	9,616E-05
400	< 1,000E-05	700	9,763E-01	1000	9,371E-01	1700	9,657E-01	3200	2,257E-01	4700	3,420E-05
410	< 1,000E-05	710	9,746E-01	1010	9,367E-01	1750	9,650E-01	3250	2,105E-01	4750	1,528E-05
420	< 1,000E-05	720	9,729E-01	1020	9,364E-01	1800	9,636E-01	3300	1,931E-01	4800	< 1,000E-05
430	< 1,000E-05	730	9,712E-01	1030	9,361E-01	1850	9,616E-01	3350	1,754E-01	4850	< 1,000E-05
440	< 1,000E-05	740	9,695E-01	1040	9,359E-01	1900	9,595E-01	3400	1,601E-01	4900	< 1,000E-05
450	< 1,000E-05	750	9,677E-01	1050	9,357E-01	1950	9,574E-01	3450	1,487E-01	4950	< 1,000E-05
460	< 1,000E-05	760	9,659E-01	1060	9,356E-01	2000	9,552E-01	3500	1,438E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,641E-01	1070	9,354E-01	2050	9,530E-01	3550	1,410E-01	5050	< 1,000E-05
480	2,765E-03	780	9,623E-01	1080	9,353E-01	2100	9,498E-01	3600	1,393E-01	5100	< 1,000E-05
490	2,183E-01	790	9,604E-01	1090	9,352E-01	2150	9,449E-01	3650	1,396E-01	5150	< 1,000E-05

OG515

Optical properties	
Reflection factor	
P_d	= 0,921
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 515 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 440 nm
λ_p ($\tau_{i,L} = 0,93$)	= 580 nm
Refractive indices	
n_d (587,6 nm)	= 1,51
n_s (852 nm)	= 1,51
n_t (1014 nm)	= 1,50
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

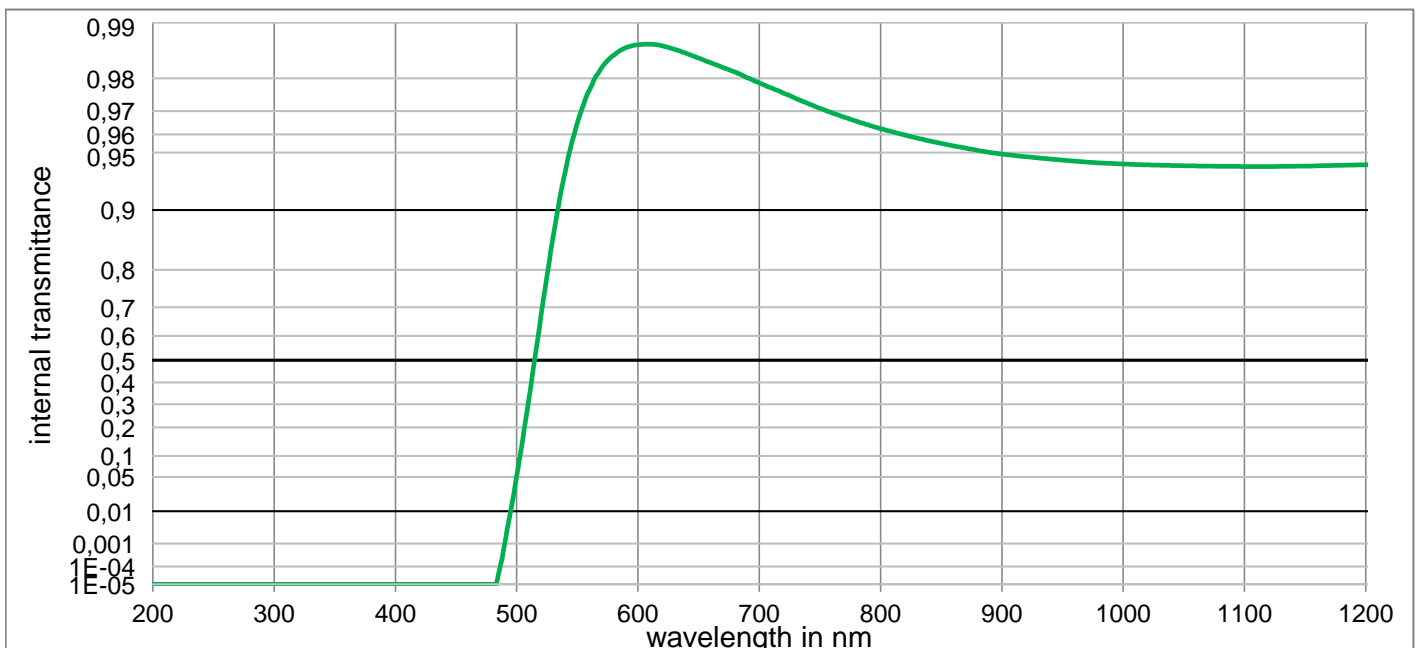
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,56 g/cm ³
Knoop hardness	
HK _[0.1/20]	= 455

Thermal properties	
Transformation temperature	
Tg	= 509 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 7,9
α (20°C/300°C)	= 9,0
Temperature coefficient	
Tk	= 0,11 nm/K

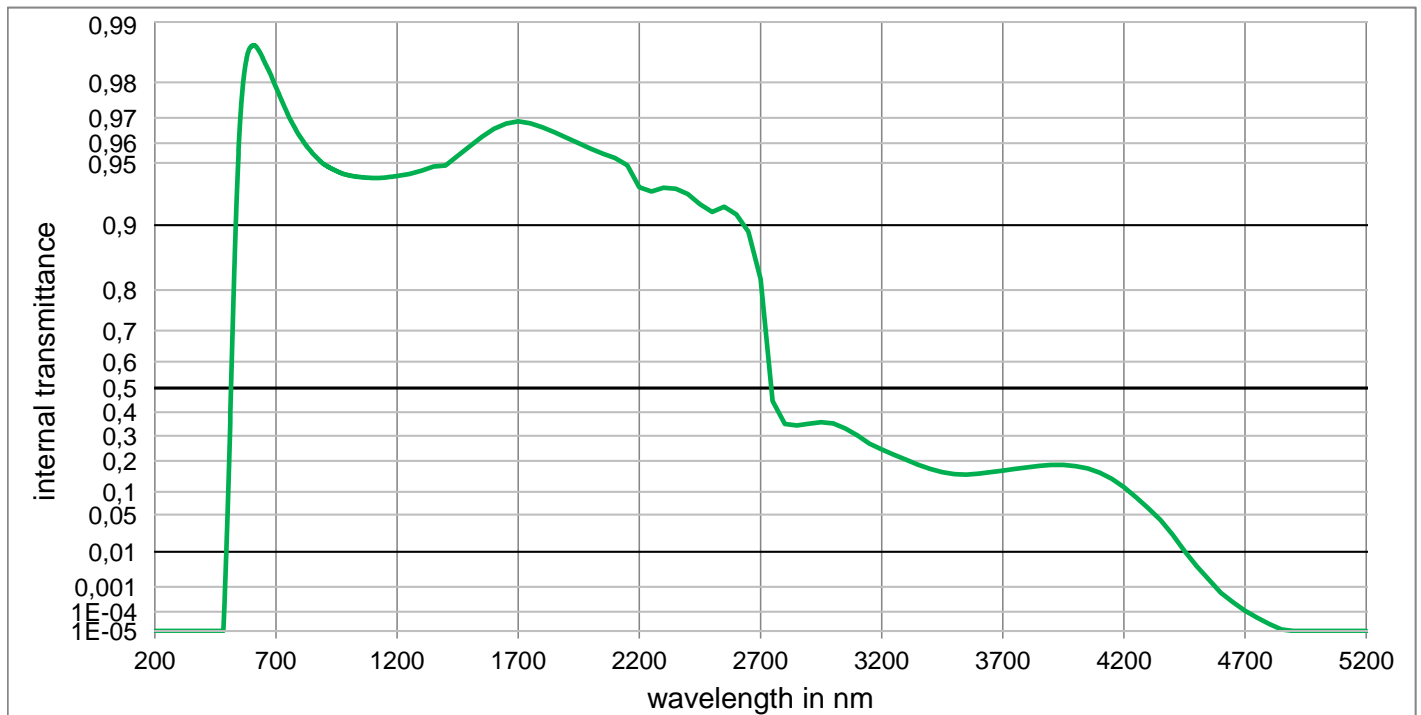
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,448	0,465	0,473
	y	0,516	0,519	0,515
	Y	81,5	77,9	75,4
	λ_d	573 nm	574 nm	575 nm
	P _e	0,902	0,958	0,969
Illuminant A	x	0,516	0,525	0,530
	y	0,468	0,466	0,463
	Y	86,5	84,1	82,3
	λ_d	582 nm	583 nm	583 nm
	P _e	0,896	0,945	0,957

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



OG515



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	5,093E-02	800	9,627E-01	1100	9,408E-01	2200	9,342E-01	3700	1,653E-01
210	< 1,0E-05	510	3,219E-01	810	9,612E-01	1110	9,408E-01	2250	9,311E-01	3750	1,708E-01
220	< 1,0E-05	520	6,692E-01	820	9,597E-01	1120	9,408E-01	2300	9,339E-01	3800	1,767E-01
230	< 1,0E-05	530	8,627E-01	830	9,582E-01	1130	9,408E-01	2350	9,332E-01	3850	1,817E-01
240	< 1,0E-05	540	9,370E-01	840	9,568E-01	1140	9,409E-01	2400	9,292E-01	3900	1,850E-01
250	< 1,0E-05	550	9,652E-01	850	9,553E-01	1150	9,411E-01	2450	9,207E-01	3950	1,850E-01
260	< 1,0E-05	560	9,769E-01	860	9,540E-01	1160	9,413E-01	2500	9,136E-01	4000	1,811E-01
270	< 1,0E-05	570	9,824E-01	870	9,527E-01	1170	9,414E-01	2550	9,185E-01	4050	1,729E-01
280	< 1,0E-05	580	9,850E-01	880	9,514E-01	1180	9,416E-01	2600	9,111E-01	4100	1,582E-01
290	< 1,0E-05	590	9,864E-01	890	9,501E-01	1190	9,418E-01	2650	8,926E-01	4150	1,380E-01
300	< 1,0E-05	600	9,868E-01	900	9,491E-01	1200	9,421E-01	2700	8,215E-01	4200	1,127E-01
310	< 1,0E-05	610	9,869E-01	910	9,482E-01	1250	9,434E-01	2750	4,471E-01	4250	8,609E-02
320	< 1,000E-05	620	9,867E-01	920	9,474E-01	1300	9,454E-01	2800	3,500E-01	4300	6,209E-02
330	< 1,000E-05	630	9,861E-01	930	9,467E-01	1350	9,479E-01	2850	3,433E-01	4350	4,140E-02
340	< 1,000E-05	640	9,853E-01	940	9,459E-01	1400	9,486E-01	2900	3,513E-01	4400	2,314E-02
350	< 1,000E-05	650	9,844E-01	950	9,452E-01	1450	9,538E-01	2950	3,569E-01	4450	1,039E-02
360	< 1,000E-05	660	9,835E-01	960	9,445E-01	1500	9,586E-01	3000	3,519E-01	4500	4,394E-03
370	< 1,000E-05	670	9,825E-01	970	9,439E-01	1550	9,628E-01	3050	3,310E-01	4550	1,743E-03
380	< 1,000E-05	680	9,815E-01	980	9,433E-01	1600	9,660E-01	3100	3,011E-01	4600	6,152E-04
390	< 1,000E-05	690	9,802E-01	990	9,429E-01	1650	9,680E-01	3150	2,673E-01	4650	2,588E-04
400	< 1,000E-05	700	9,789E-01	1000	9,426E-01	1700	9,688E-01	3200	2,440E-01	4700	1,117E-04
410	< 1,000E-05	710	9,774E-01	1010	9,422E-01	1750	9,681E-01	3250	2,238E-01	4750	5,117E-05
420	< 1,000E-05	720	9,760E-01	1020	9,419E-01	1800	9,666E-01	3300	2,048E-01	4800	2,449E-05
430	< 1,000E-05	730	9,744E-01	1030	9,417E-01	1850	9,647E-01	3350	1,862E-01	4850	1,211E-05
440	< 1,000E-05	740	9,727E-01	1040	9,415E-01	1900	9,624E-01	3400	1,707E-01	4900	< 1,000E-05
450	< 1,000E-05	750	9,710E-01	1050	9,413E-01	1950	9,599E-01	3450	1,598E-01	4950	< 1,000E-05
460	< 1,000E-05	760	9,693E-01	1060	9,412E-01	2000	9,574E-01	3500	1,533E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,676E-01	1070	9,410E-01	2050	9,549E-01	3550	1,517E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,660E-01	1080	9,409E-01	2100	9,526E-01	3600	1,549E-01	5100	< 1,000E-05
490	9,674E-04	790	9,644E-01	1090	9,408E-01	2150	9,486E-01	3650	1,601E-01	5150	< 1,000E-05

OG530

Optical properties	
Reflection factor	
$P_d = 0,921$	
Spectral values guaranteed (d = 3 mm)	
$\lambda_c (\tau_i = 0,5)$	= 530 nm \pm 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 460 nm
$\lambda_p (\tau_{i,L} = 0,93)$	= 600 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,51
$n_s (852 \text{ nm})$	= 1,51
$n_t (1014 \text{ nm})$	= 1,50
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

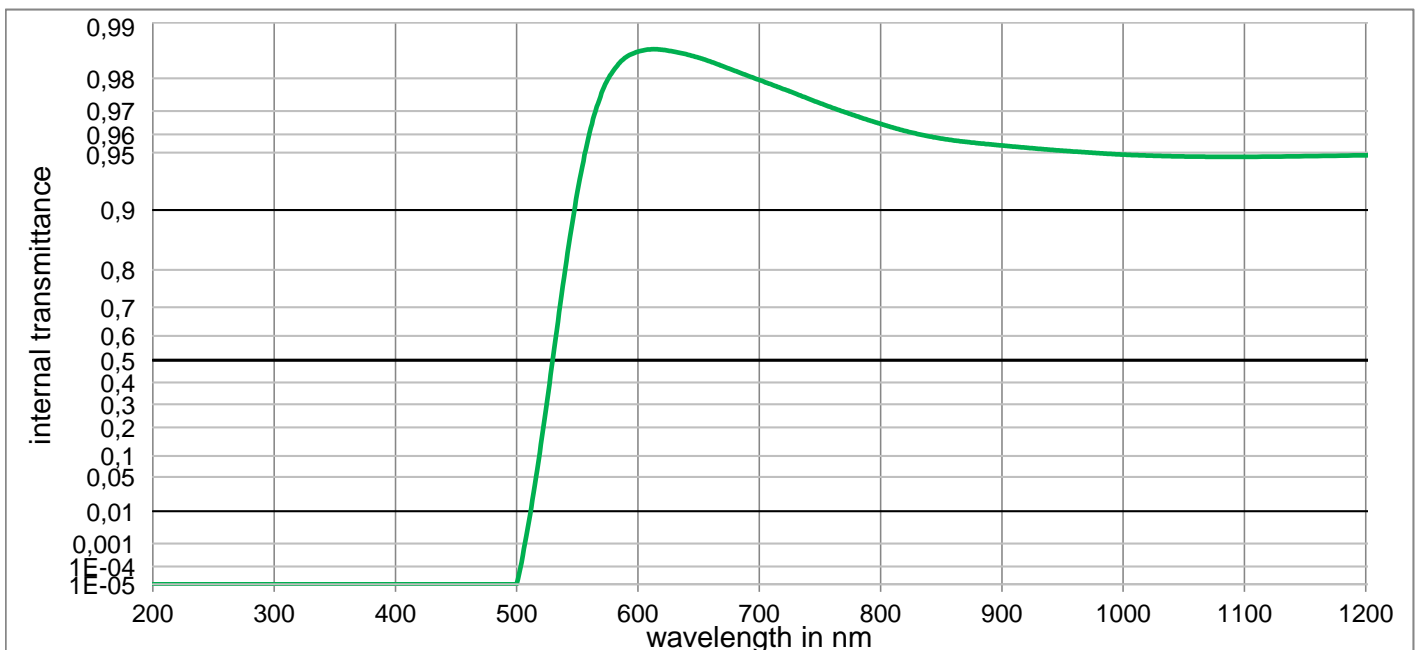
Mechanical properties	
Reference thickness	
d = 3,00 mm	
Density	
$\rho = 2,56 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 450$	

Thermal properties	
Transformation temperature	
Tg = 506 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha_{(-30^\circ C/+70^\circ C)}$	= 7,9
$\alpha_{(20^\circ C/300^\circ C)}$	= 9,0
Temperature coefficient	
Tk = 0,11 nm/K	

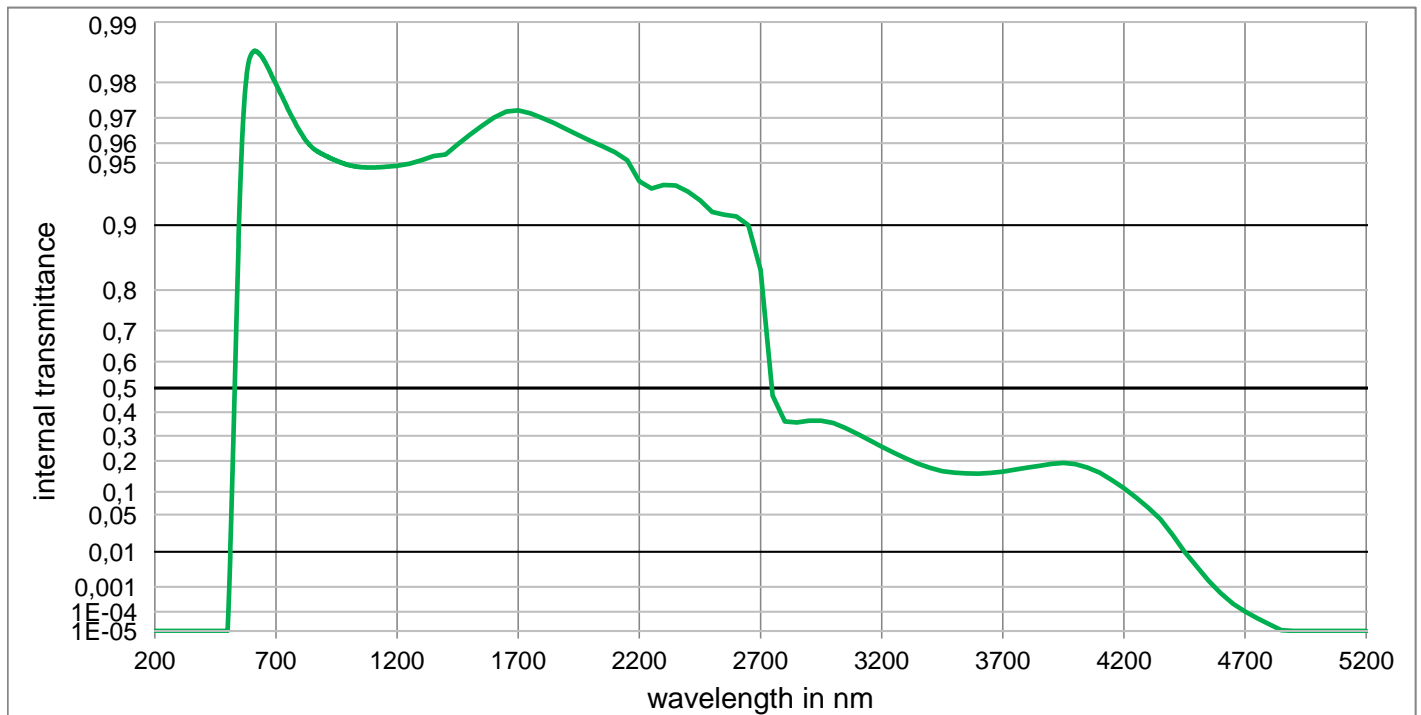
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,476	0,496	0,505
	y	0,501	0,498	0,490
	Y	73,6	68,7	65,6
	λ_d	576 nm	578 nm	579 nm
	P_e	0,938	0,985	0,990
Illuminant A	x	0,534	0,545	0,550
	y	0,457	0,452	0,447
	Y	81,4	77,8	75,4
	λ_d	584 nm	585 nm	586 nm
	P_e	0,943	0,979	0,984

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



OG530



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,649E-01	1100	9,474E-01	2200	9,385E-01	3700	1,617E-01
210	< 1,0E-05	510	5,189E-03	810	9,633E-01	1110	9,474E-01	2250	9,335E-01	3750	1,681E-01
220	< 1,0E-05	520	1,364E-01	820	9,617E-01	1120	9,475E-01	2300	9,360E-01	3800	1,751E-01
230	< 1,0E-05	530	5,140E-01	830	9,603E-01	1130	9,476E-01	2350	9,356E-01	3850	1,819E-01
240	< 1,0E-05	540	8,018E-01	840	9,591E-01	1140	9,477E-01	2400	9,311E-01	3900	1,888E-01
250	< 1,0E-05	550	9,191E-01	850	9,579E-01	1150	9,478E-01	2450	9,242E-01	3950	1,925E-01
260	< 1,0E-05	560	9,608E-01	860	9,570E-01	1160	9,479E-01	2500	9,136E-01	4000	1,884E-01
270	< 1,0E-05	570	9,760E-01	870	9,562E-01	1170	9,480E-01	2550	9,108E-01	4050	1,758E-01
280	< 1,0E-05	580	9,819E-01	880	9,555E-01	1180	9,481E-01	2600	9,091E-01	4100	1,579E-01
290	< 1,0E-05	590	9,846E-01	890	9,548E-01	1190	9,482E-01	2650	8,999E-01	4150	1,342E-01
300	< 1,0E-05	600	9,856E-01	900	9,542E-01	1200	9,484E-01	2700	8,375E-01	4200	1,099E-01
310	< 1,0E-05	610	9,861E-01	910	9,536E-01	1250	9,496E-01	2750	4,700E-01	4250	8,523E-02
320	< 1,000E-05	620	9,860E-01	920	9,529E-01	1300	9,515E-01	2800	3,608E-01	4300	6,292E-02
330	< 1,000E-05	630	9,856E-01	930	9,523E-01	1350	9,537E-01	2850	3,563E-01	4350	4,250E-02
340	< 1,000E-05	640	9,852E-01	940	9,517E-01	1400	9,545E-01	2900	3,638E-01	4400	2,287E-02
350	< 1,000E-05	650	9,845E-01	950	9,512E-01	1450	9,595E-01	2950	3,642E-01	4450	1,006E-02
360	< 1,000E-05	660	9,837E-01	960	9,506E-01	1500	9,637E-01	3000	3,540E-01	4500	4,333E-03
370	< 1,000E-05	670	9,828E-01	970	9,501E-01	1550	9,672E-01	3050	3,325E-01	4550	1,581E-03
380	< 1,000E-05	680	9,818E-01	980	9,497E-01	1600	9,701E-01	3100	3,076E-01	4600	5,943E-04
390	< 1,000E-05	690	9,807E-01	990	9,492E-01	1650	9,721E-01	3150	2,820E-01	4650	2,254E-04
400	< 1,000E-05	700	9,796E-01	1000	9,488E-01	1700	9,725E-01	3200	2,556E-01	4700	1,028E-04
410	< 1,000E-05	710	9,784E-01	1010	9,484E-01	1750	9,716E-01	3250	2,313E-01	4750	4,932E-05
420	< 1,000E-05	720	9,771E-01	1020	9,482E-01	1800	9,700E-01	3300	2,090E-01	4800	2,377E-05
430	< 1,000E-05	730	9,758E-01	1030	9,479E-01	1850	9,681E-01	3350	1,900E-01	4850	1,109E-05
440	< 1,000E-05	740	9,743E-01	1040	9,477E-01	1900	9,658E-01	3400	1,744E-01	4900	< 1,000E-05
450	< 1,000E-05	750	9,728E-01	1050	9,476E-01	1950	9,634E-01	3450	1,637E-01	4950	< 1,000E-05
460	< 1,000E-05	760	9,713E-01	1060	9,475E-01	2000	9,610E-01	3500	1,583E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,697E-01	1070	9,474E-01	2050	9,584E-01	3550	1,556E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,681E-01	1080	9,474E-01	2100	9,556E-01	3600	1,548E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,665E-01	1090	9,474E-01	2150	9,515E-01	3650	1,570E-01	5150	< 1,000E-05

OG550

Optical properties	
Reflection factor	
P_d	= 0,917
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 550 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 480 nm
λ_p ($\tau_{i,L} = 0,93$)	= 620 nm
Refractive indices	
n_d (587,6 nm)	= 1,52
n_s (852 nm)	= 1,52
n_t (1014 nm)	= 1,51
Sellmeier coefficients	
valid from 580 nm to 2330 nm	
B_1	= 1,2525
B_2	= 0,0009
B_3	= 0,8269
C_1	= 9,542E-03 μm^2
C_2	= 1,8891E-01 μm^2
C_3	= 101,937 μm^2
Internal quality	
Bubble class	3

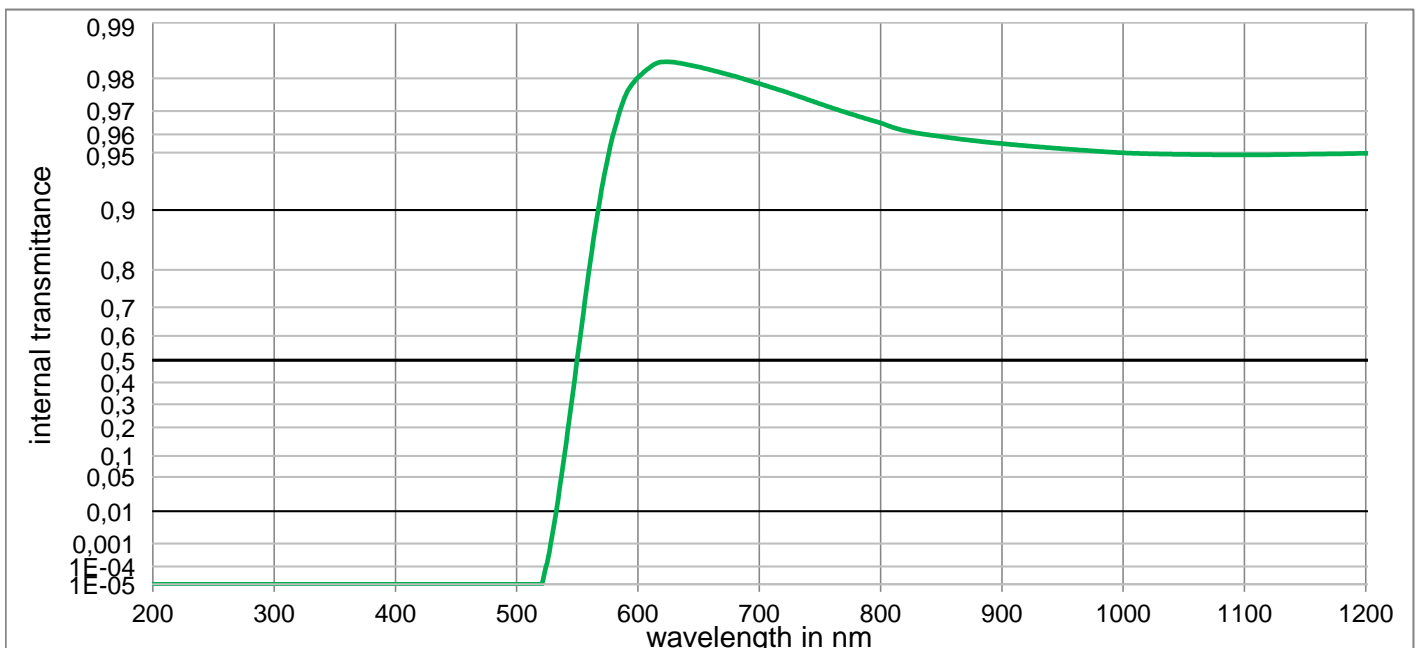
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,56 g/cm ³
Knoop hardness	
HK _[0.1/20]	= 462

Thermal properties	
Transformation temperature	
Tg	= 507 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 7,9
α (20°C/300°C)	= 9,0
Temperature coefficient	
Tk	= 0,12 nm/K

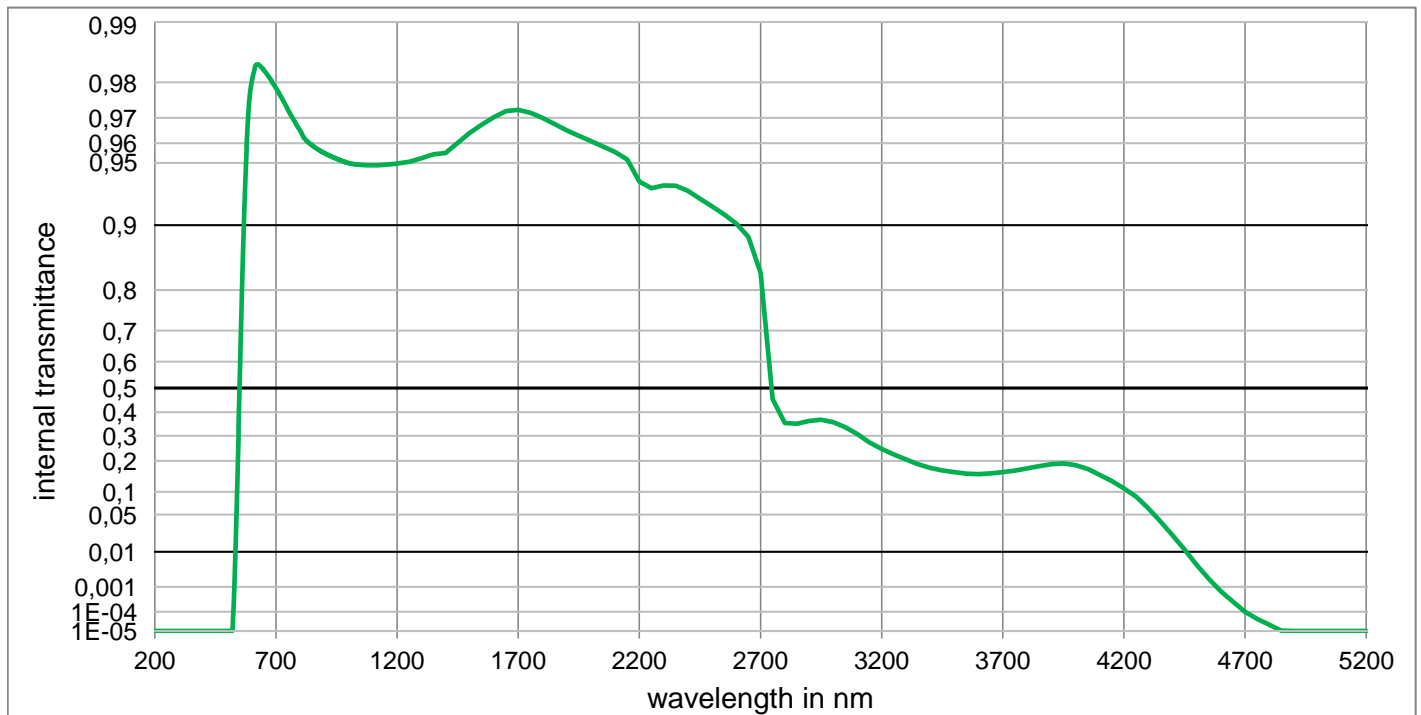
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,521	0,547	0,557
	y	0,459	0,451	0,441
	Y	58,3	52,3	48,9
	λ_d	583 nm	586 nm	587 nm
	P _e	0,948	0,996	0,998
Illuminant A	x	0,565	0,580	0,587
	y	0,429	0,419	0,412
	Y	69,8	64,8	61,7
	λ_d	589 nm	591 nm	592 nm
	P _e	0,963	0,995	0,997

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



OG550



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,652E-01	1100	9,486E-01	2200	9,385E-01	3700	1,601E-01
210	< 1,0E-05	510	< 1,000E-05	810	9,633E-01	1110	9,486E-01	2250	9,335E-01	3750	1,653E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,618E-01	1120	9,487E-01	2300	9,356E-01	3800	1,725E-01
230	< 1,0E-05	530	2,837E-03	830	9,607E-01	1130	9,488E-01	2350	9,353E-01	3850	1,806E-01
240	< 1,0E-05	540	1,194E-01	840	9,597E-01	1140	9,489E-01	2400	9,316E-01	3900	1,878E-01
250	< 1,0E-05	550	5,076E-01	850	9,589E-01	1150	9,490E-01	2450	9,254E-01	3950	1,905E-01
260	< 1,0E-05	560	8,065E-01	860	9,581E-01	1160	9,491E-01	2500	9,186E-01	4000	1,842E-01
270	< 1,0E-05	570	9,217E-01	870	9,573E-01	1170	9,492E-01	2550	9,112E-01	4050	1,706E-01
280	< 1,0E-05	580	9,608E-01	880	9,566E-01	1180	9,493E-01	2600	9,015E-01	4100	1,507E-01
290	< 1,0E-05	590	9,755E-01	890	9,559E-01	1190	9,495E-01	2650	8,864E-01	4150	1,305E-01
300	< 1,0E-05	600	9,802E-01	900	9,552E-01	1200	9,496E-01	2700	8,330E-01	4200	1,098E-01
310	< 1,0E-05	610	9,826E-01	910	9,546E-01	1250	9,507E-01	2750	4,559E-01	4250	8,790E-02
320	< 1,000E-05	620	9,837E-01	920	9,540E-01	1300	9,525E-01	2800	3,545E-01	4300	6,225E-02
330	< 1,000E-05	630	9,836E-01	930	9,534E-01	1350	9,547E-01	2850	3,508E-01	4350	3,942E-02
340	< 1,000E-05	640	9,832E-01	940	9,529E-01	1400	9,553E-01	2900	3,630E-01	4400	2,259E-02
350	< 1,000E-05	650	9,826E-01	950	9,523E-01	1450	9,602E-01	2950	3,684E-01	4450	1,125E-02
360	< 1,000E-05	660	9,820E-01	960	9,518E-01	1500	9,644E-01	3000	3,570E-01	4500	4,721E-03
370	< 1,000E-05	670	9,813E-01	970	9,513E-01	1550	9,676E-01	3050	3,358E-01	4550	1,845E-03
380	< 1,000E-05	680	9,805E-01	980	9,508E-01	1600	9,703E-01	3100	3,065E-01	4600	7,031E-04
390	< 1,000E-05	690	9,796E-01	990	9,503E-01	1650	9,722E-01	3150	2,725E-01	4650	2,704E-04
400	< 1,000E-05	700	9,786E-01	1000	9,499E-01	1700	9,727E-01	3200	2,459E-01	4700	9,979E-05
410	< 1,000E-05	710	9,776E-01	1010	9,496E-01	1750	9,717E-01	3250	2,244E-01	4750	4,519E-05
420	< 1,000E-05	720	9,765E-01	1020	9,493E-01	1800	9,700E-01	3300	2,055E-01	4800	2,259E-05
430	< 1,000E-05	730	9,753E-01	1030	9,492E-01	1850	9,678E-01	3350	1,881E-01	4850	1,052E-05
440	< 1,000E-05	740	9,740E-01	1040	9,490E-01	1900	9,655E-01	3400	1,749E-01	4900	< 1,000E-05
450	< 1,000E-05	750	9,726E-01	1050	9,489E-01	1950	9,632E-01	3450	1,660E-01	4950	< 1,000E-05
460	< 1,000E-05	760	9,711E-01	1060	9,488E-01	2000	9,609E-01	3500	1,599E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,697E-01	1070	9,487E-01	2050	9,585E-01	3550	1,546E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,682E-01	1080	9,487E-01	2100	9,558E-01	3600	1,533E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,668E-01	1090	9,486E-01	2150	9,519E-01	3650	1,558E-01	5150	< 1,000E-05

OG570

Optical properties	
Reflection factor	
$P_d = 0,921$	
Spectral values guaranteed (d = 3 mm)	
$\lambda_c (\tau_i = 0,5)$	= 570 nm \pm 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 500 nm
$\lambda_p (\tau_{i,L} = 0,93)$	= 640 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,51
$n_s (852 \text{ nm})$	= 1,51
$n_t (1014 \text{ nm})$	= 1,50
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

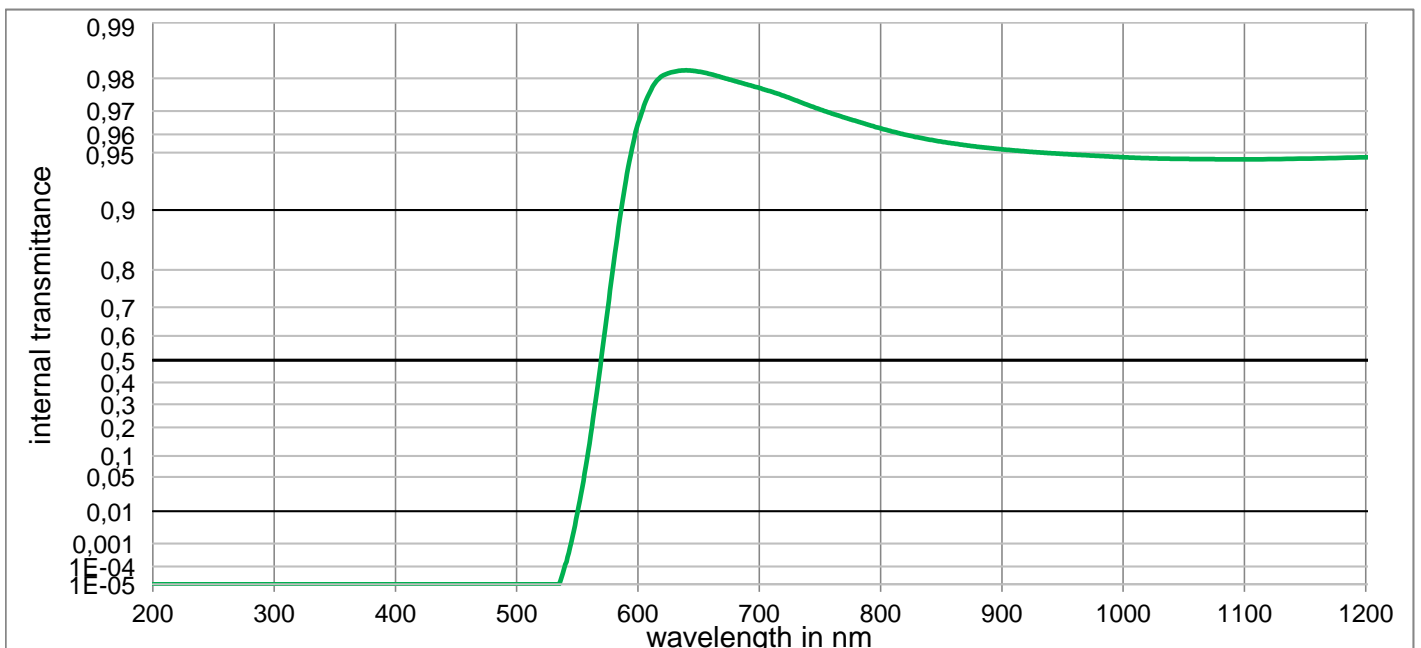
Mechanical properties	
Reference thickness	
d = 3,00 mm	
Density	
$\rho = 2,74 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 455$	

Thermal properties	
Transformation temperature	
Tg = 510 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha_{(-30^\circ C/+70^\circ C)}$	= 7,9
$\alpha_{(20^\circ C/300^\circ C)}$	= 9,0
Temperature coefficient	
Tk = 0,12 nm/K	

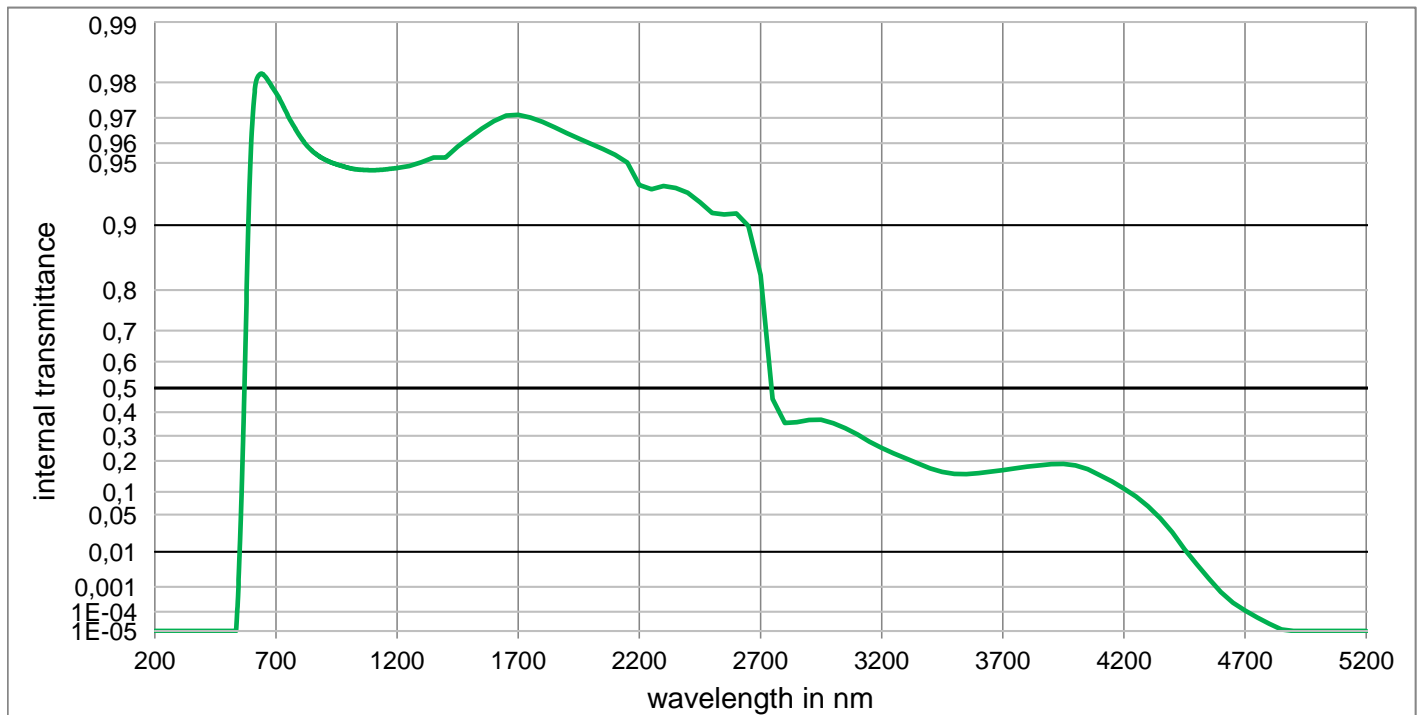
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,566	0,600	0,611
	y	0,412	0,399	0,389
	Y	42,7	36,1	32,9
	λ_d	591 nm	595 nm	597 nm
	P_e	0,941	0,998	1,000
Illuminant A	x	0,600	0,619	0,627
	y	0,394	0,380	0,372
	Y	55,7	49,4	46,0
	λ_d	596 nm	598 nm	600 nm
	P_e	0,964	0,999	1,000

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



OG570



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,629E-01	1100	9,457E-01	2200	9,360E-01	3700	1,671E-01
210	< 1,0E-05	510	< 1,000E-05	810	9,613E-01	1110	9,458E-01	2250	9,328E-01	3750	1,730E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,599E-01	1120	9,458E-01	2300	9,352E-01	3800	1,787E-01
230	< 1,0E-05	530	< 1,000E-05	830	9,586E-01	1130	9,459E-01	2350	9,337E-01	3850	1,839E-01
240	< 1,0E-05	540	1,275E-04	840	9,574E-01	1140	9,461E-01	2400	9,302E-01	3900	1,879E-01
250	< 1,0E-05	550	8,832E-03	850	9,563E-01	1150	9,462E-01	2450	9,224E-01	3950	1,893E-01
260	< 1,0E-05	560	1,386E-01	860	9,553E-01	1160	9,464E-01	2500	9,125E-01	4000	1,838E-01
270	< 1,0E-05	570	5,166E-01	870	9,544E-01	1170	9,465E-01	2550	9,111E-01	4050	1,700E-01
280	< 1,0E-05	580	8,155E-01	880	9,535E-01	1180	9,467E-01	2600	9,121E-01	4100	1,503E-01
290	< 1,0E-05	590	9,299E-01	890	9,527E-01	1190	9,469E-01	2650	8,991E-01	4150	1,297E-01
300	< 1,0E-05	600	9,649E-01	900	9,520E-01	1200	9,470E-01	2700	8,288E-01	4200	1,090E-01
310	< 1,0E-05	610	9,764E-01	910	9,513E-01	1250	9,483E-01	2750	4,551E-01	4250	8,758E-02
320	< 1,000E-05	620	9,806E-01	920	9,507E-01	1300	9,503E-01	2800	3,544E-01	4300	6,582E-02
330	< 1,000E-05	630	9,816E-01	930	9,502E-01	1350	9,529E-01	2850	3,574E-01	4350	4,375E-02
340	< 1,000E-05	640	9,819E-01	940	9,497E-01	1400	9,529E-01	2900	3,675E-01	4400	2,518E-02
350	< 1,000E-05	650	9,816E-01	950	9,492E-01	1450	9,584E-01	2950	3,676E-01	4450	1,145E-02
360	< 1,000E-05	660	9,810E-01	960	9,488E-01	1500	9,625E-01	3000	3,531E-01	4500	4,940E-03
370	< 1,000E-05	670	9,802E-01	970	9,483E-01	1550	9,661E-01	3050	3,320E-01	4550	1,875E-03
380	< 1,000E-05	680	9,793E-01	980	9,479E-01	1600	9,689E-01	3100	3,052E-01	4600	6,610E-04
390	< 1,000E-05	690	9,784E-01	990	9,475E-01	1650	9,708E-01	3150	2,759E-01	4650	2,500E-04
400	< 1,000E-05	700	9,775E-01	1000	9,471E-01	1700	9,711E-01	3200	2,507E-01	4700	1,134E-04
410	< 1,000E-05	710	9,764E-01	1010	9,468E-01	1750	9,701E-01	3250	2,286E-01	4750	5,284E-05
420	< 1,000E-05	720	9,752E-01	1020	9,465E-01	1800	9,686E-01	3300	2,093E-01	4800	2,512E-05
430	< 1,000E-05	730	9,737E-01	1030	9,463E-01	1850	9,666E-01	3350	1,906E-01	4850	1,226E-05
440	< 1,000E-05	740	9,722E-01	1040	9,461E-01	1900	9,643E-01	3400	1,730E-01	4900	< 1,000E-05
450	< 1,000E-05	750	9,706E-01	1050	9,460E-01	1950	9,620E-01	3450	1,604E-01	4950	< 1,000E-05
460	< 1,000E-05	760	9,691E-01	1060	9,459E-01	2000	9,597E-01	3500	1,540E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,676E-01	1070	9,458E-01	2050	9,572E-01	3550	1,536E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,661E-01	1080	9,458E-01	2100	9,544E-01	3600	1,568E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,644E-01	1090	9,457E-01	2150	9,502E-01	3650	1,618E-01	5150	< 1,000E-05

OG590

Optical properties	
Reflection factor	
$P_d = 0,921$	
Spectral values guaranteed (d = 3 mm)	
$\lambda_c (\tau_i = 0,5)$	= 590 nm \pm 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 510 nm
$\lambda_p (\tau_{i,L} = 0,93)$	= 660 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,51
$n_s (852 \text{ nm})$	= 1,51
$n_t (1014 \text{ nm})$	= 1,50
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

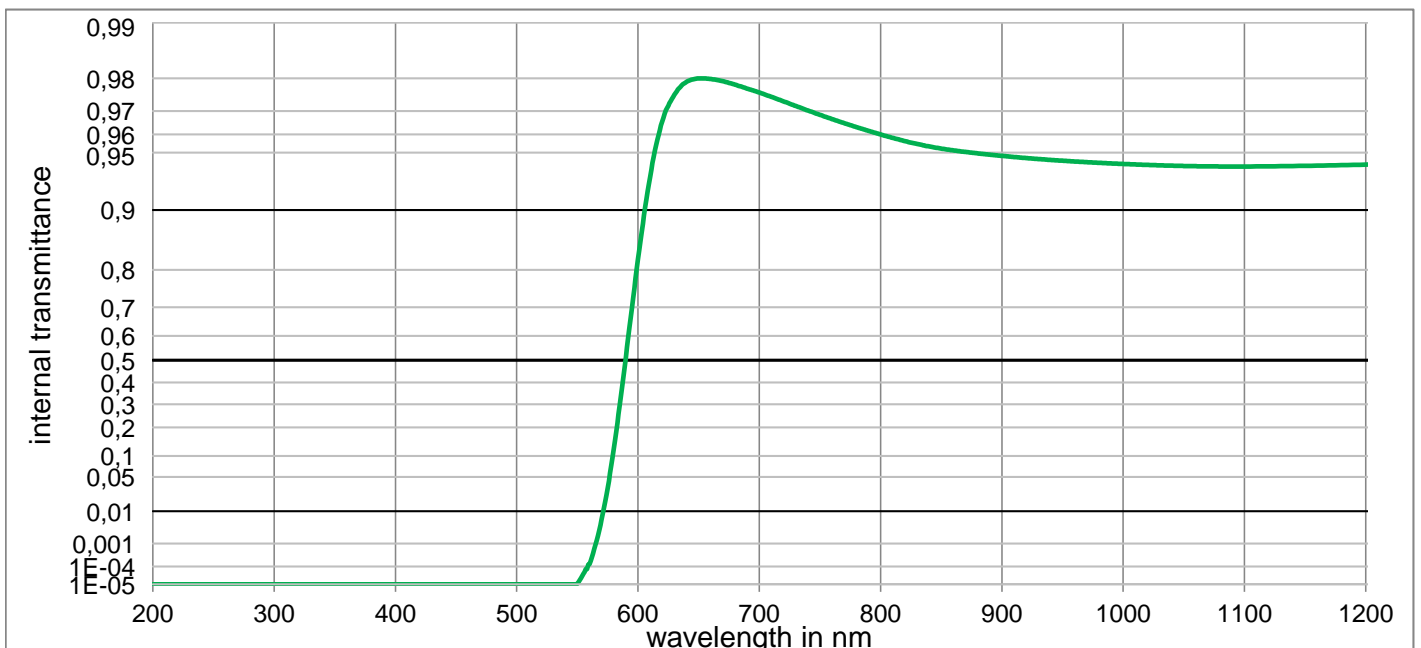
Mechanical properties	
Reference thickness	
d = 3,00 mm	
Density	
$\rho = 2,56 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 448$	

Thermal properties	
Transformation temperature	
Tg = 506 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha_{(-30^\circ C/+70^\circ C)}$	= 7,9
$\alpha_{(20^\circ C/300^\circ C)}$	= 9,0
Temperature coefficient	
Tk = 0,13 nm/K	

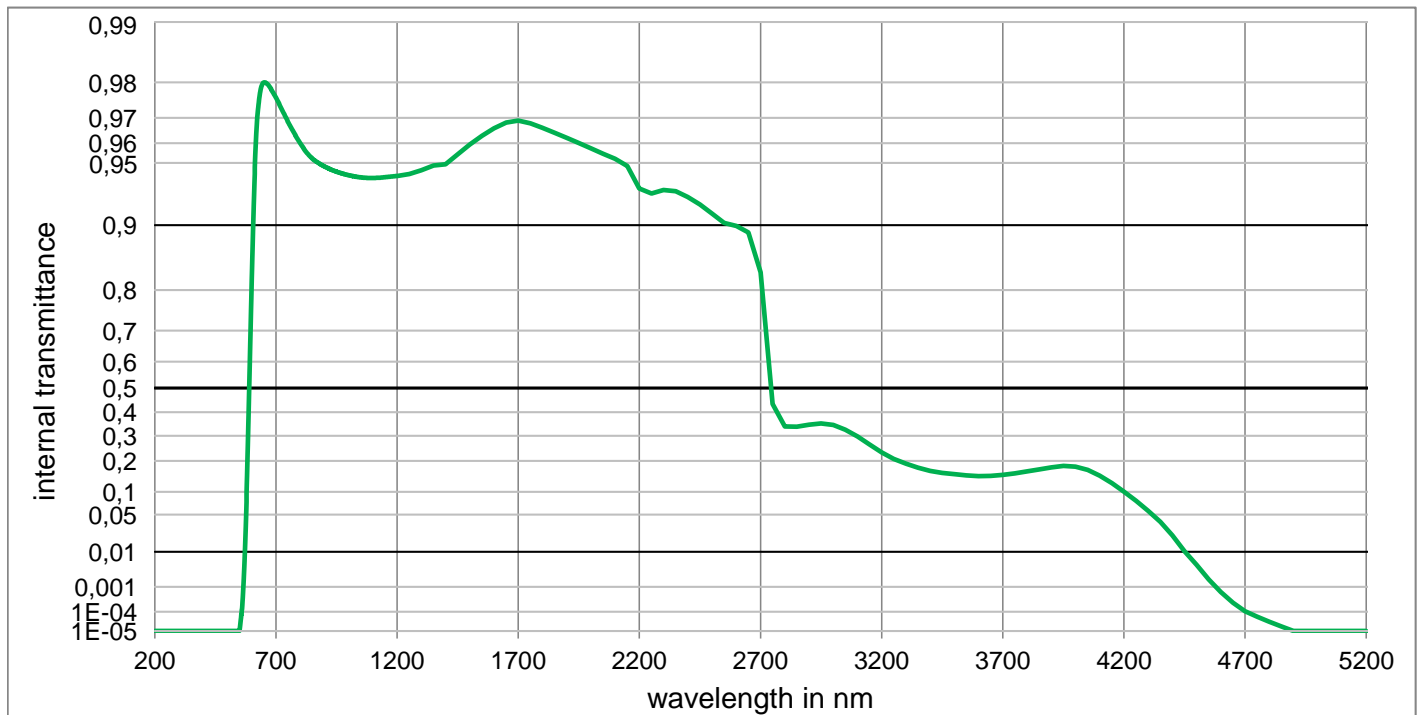
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,610	0,652	0,661
	y	0,361	0,347	0,338
	Y	27,3	21,5	19,2
	λ_d	602 nm	606 nm	609 nm
P _e		0,920	0,998	1,000
Illuminant A	x	0,639	0,662	0,669
	y	0,354	0,338	0,331
	Y	39,2	32,7	29,8
	λ_d	605 nm	609 nm	611 nm
P _e		0,956	0,998	0,999

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



OG590



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,600E-01	1100	9,408E-01	2200	9,334E-01	3700	1,509E-01
210	< 1,0E-05	510	< 1,000E-05	810	9,583E-01	1110	9,408E-01	2250	9,295E-01	3750	1,558E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,566E-01	1120	9,409E-01	2300	9,323E-01	3800	1,624E-01
230	< 1,0E-05	530	< 1,000E-05	830	9,551E-01	1130	9,410E-01	2350	9,313E-01	3850	1,697E-01
240	< 1,0E-05	540	< 1,000E-05	840	9,537E-01	1140	9,411E-01	2400	9,267E-01	3900	1,765E-01
250	< 1,0E-05	550	1,060E-05	850	9,524E-01	1150	9,413E-01	2450	9,205E-01	3950	1,813E-01
260	< 1,0E-05	560	1,311E-04	860	9,514E-01	1160	9,414E-01	2500	9,117E-01	4000	1,794E-01
270	< 1,0E-05	570	5,941E-03	870	9,504E-01	1170	9,416E-01	2550	9,024E-01	4050	1,678E-01
280	< 1,0E-05	580	1,208E-01	880	9,495E-01	1180	9,418E-01	2600	8,992E-01	4100	1,480E-01
290	< 1,0E-05	590	5,150E-01	890	9,488E-01	1190	9,420E-01	2650	8,917E-01	4150	1,246E-01
300	< 1,0E-05	600	8,226E-01	900	9,480E-01	1200	9,421E-01	2700	8,337E-01	4200	1,006E-01
310	< 1,0E-05	610	9,329E-01	910	9,473E-01	1250	9,434E-01	2750	4,344E-01	4250	7,750E-02
320	< 1,000E-05	620	9,658E-01	920	9,466E-01	1300	9,457E-01	2800	3,392E-01	4300	5,680E-02
330	< 1,000E-05	630	9,755E-01	930	9,459E-01	1350	9,485E-01	2850	3,381E-01	4350	3,854E-02
340	< 1,000E-05	640	9,791E-01	940	9,454E-01	1400	9,493E-01	2900	3,473E-01	4400	2,229E-02
350	< 1,000E-05	650	9,800E-01	950	9,448E-01	1450	9,547E-01	2950	3,524E-01	4450	1,033E-02
360	< 1,000E-05	660	9,798E-01	960	9,443E-01	1500	9,594E-01	3000	3,453E-01	4500	4,710E-03
370	< 1,000E-05	670	9,793E-01	970	9,438E-01	1550	9,632E-01	3050	3,252E-01	4550	1,742E-03
380	< 1,000E-05	680	9,784E-01	980	9,434E-01	1600	9,662E-01	3100	2,969E-01	4600	6,577E-04
390	< 1,000E-05	690	9,773E-01	990	9,430E-01	1650	9,684E-01	3150	2,648E-01	4650	2,483E-04
400	< 1,000E-05	700	9,762E-01	1000	9,426E-01	1700	9,690E-01	3200	2,322E-01	4700	1,059E-04
410	< 1,000E-05	710	9,748E-01	1010	9,422E-01	1750	9,681E-01	3250	2,078E-01	4750	5,728E-05
420	< 1,000E-05	720	9,734E-01	1020	9,419E-01	1800	9,664E-01	3300	1,899E-01	4800	3,214E-05
430	< 1,000E-05	730	9,718E-01	1030	9,416E-01	1850	9,645E-01	3350	1,755E-01	4850	1,832E-05
440	< 1,000E-05	740	9,702E-01	1040	9,414E-01	1900	9,623E-01	3400	1,643E-01	4900	< 1,000E-05
450	< 1,000E-05	750	9,686E-01	1050	9,412E-01	1950	9,600E-01	3450	1,571E-01	4950	< 1,000E-05
460	< 1,000E-05	760	9,669E-01	1060	9,410E-01	2000	9,576E-01	3500	1,528E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,652E-01	1070	9,409E-01	2050	9,550E-01	3550	1,494E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,635E-01	1080	9,408E-01	2100	9,523E-01	3600	1,469E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,617E-01	1090	9,408E-01	2150	9,482E-01	3650	1,478E-01	5150	< 1,000E-05

RG610

Optical properties	
Reflection factor	
P_d	0,920
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 610 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 530 nm
λ_p ($\tau_{i,L} = 0,94$)	= 690 nm
Refractive indices	
n_d (587,6 nm)	= 1,51
n_s (852 nm)	= 1,5
n_t (1014 nm)	= 1,50
Sellmeier coefficients	
valid from 580 nm to 2330 nm	
B_1	= 1,2549
B_2	= 0,0002
B_3	= 0,7981
C_1	= 9,761E-03 μm^2
C_2	= 2,8886E-01 μm^2
C_3	= 98,991 μm^2
Internal quality	
Bubble class	3

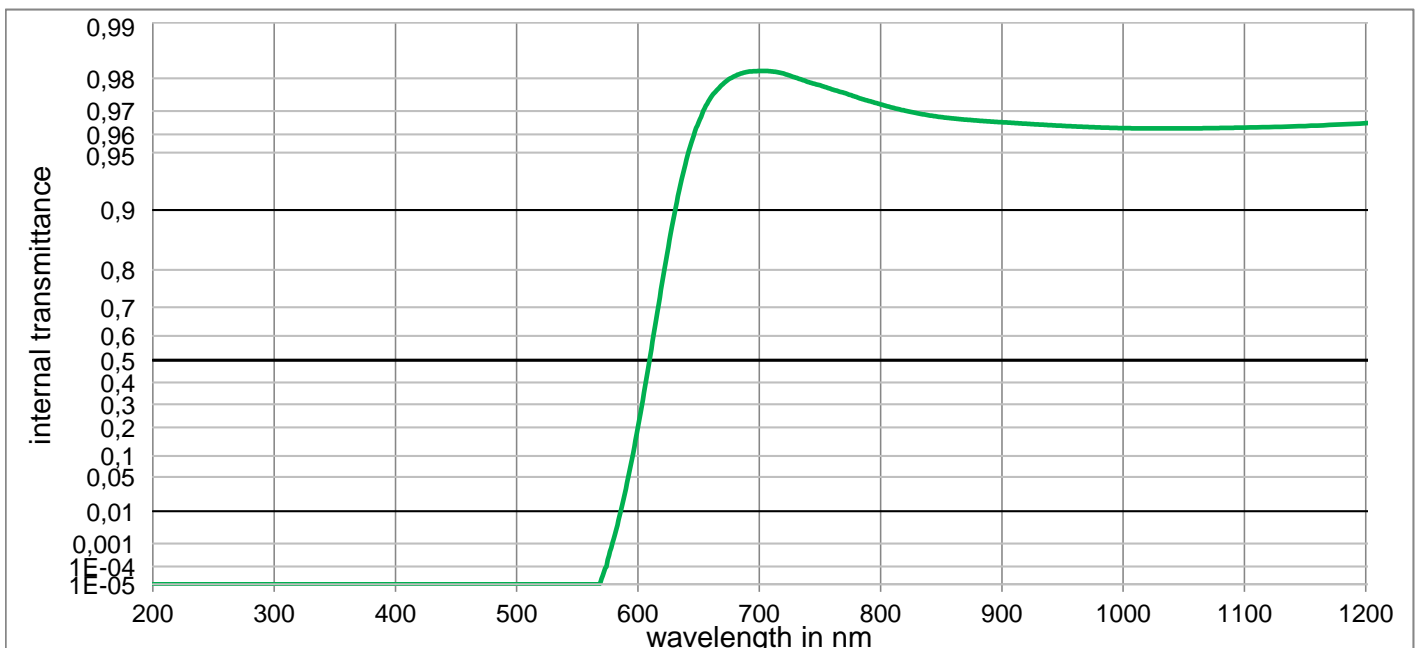
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,65 g/cm ³
Knoop hardness	
$HK_{[0.1/20]}$	= 448

Thermal properties	
Transformation temperature	
T_g	= 520 °C
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 8,0
α (20°C/300°C)	= 9,2
Temperature coefficient	
Tk	= 0,14 nm/K

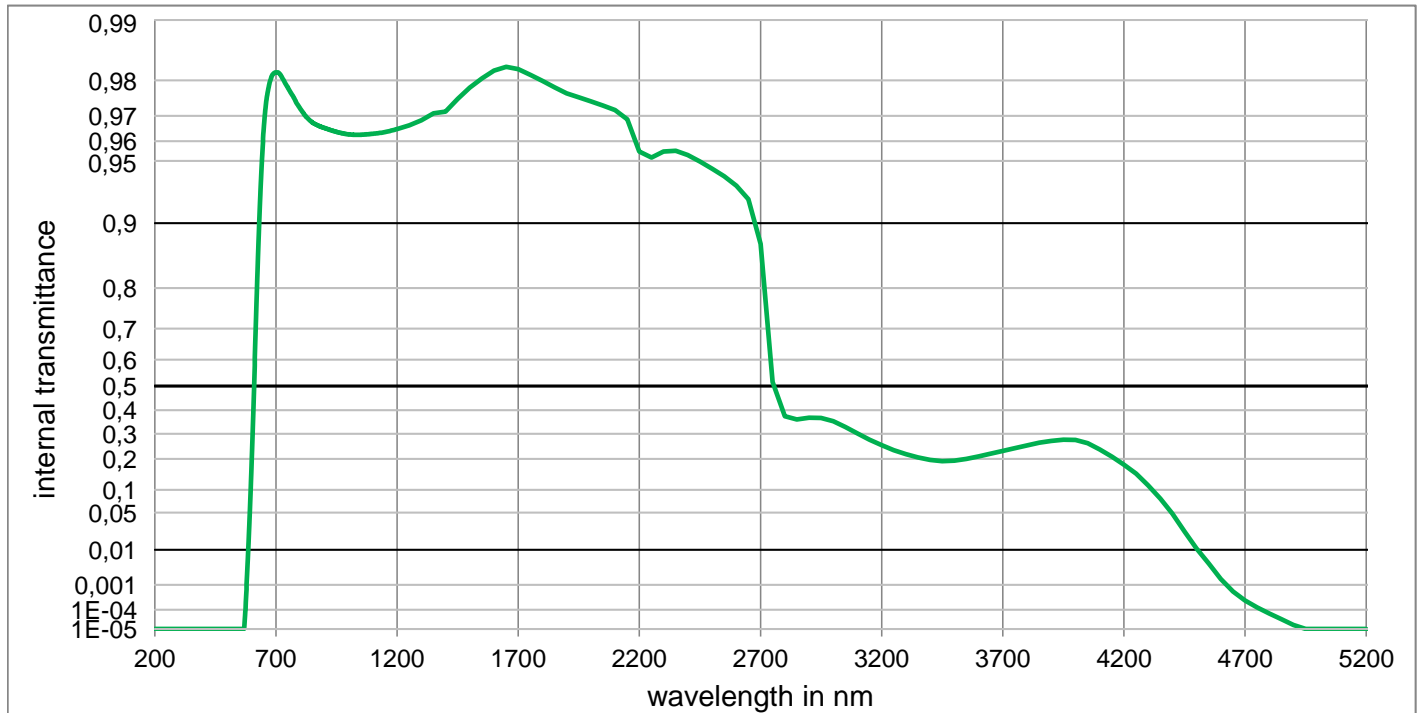
Chemical properties	
Chemical resistance	
FR class	
SR class	= 1
AR class	= 1

Colorimetric properties				
	1 mm	2 mm	3 mm	
Illuminant D65	x	0,629	0,684	0,693
	y	0,330	0,315	0,307
	Y	17,4	11,9	9,9
	λ_d	611 nm	617 nm	621 nm
	P_e	0,886	0,996	1,000
Illuminant A	x	0,663	0,690	0,697
	y	0,328	0,310	0,303
	Y	26,5	19,7	16,8
	λ_d	614 nm	619 nm	623 nm
	P_e	0,939	0,998	0,999

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



RG610



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,724E-01	1100	9,632E-01	2200	9,550E-01	3700	2,302E-01
210	< 1,0E-05	510	< 1,000E-05	810	9,713E-01	1110	9,633E-01	2250	9,519E-01	3750	2,411E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,702E-01	1120	9,635E-01	2300	9,550E-01	3800	2,527E-01
230	< 1,0E-05	530	< 1,000E-05	830	9,692E-01	1130	9,636E-01	2350	9,554E-01	3850	2,631E-01
240	< 1,0E-05	540	< 1,000E-05	840	9,684E-01	1140	9,637E-01	2400	9,532E-01	3900	2,708E-01
250	< 1,0E-05	550	< 1,000E-05	850	9,677E-01	1150	9,639E-01	2450	9,496E-01	3950	2,756E-01
260	< 1,0E-05	560	< 1,000E-05	860	9,671E-01	1160	9,641E-01	2500	9,454E-01	4000	2,742E-01
270	< 1,0E-05	570	2,118E-05	870	9,667E-01	1170	9,644E-01	2550	9,405E-01	4050	2,614E-01
280	< 1,0E-05	580	1,470E-03	880	9,663E-01	1180	9,646E-01	2600	9,339E-01	4100	2,362E-01
290	< 1,0E-05	590	3,112E-02	890	9,659E-01	1190	9,649E-01	2650	9,232E-01	4150	2,080E-01
300	< 1,0E-05	600	2,019E-01	900	9,656E-01	1200	9,652E-01	2700	8,746E-01	4200	1,793E-01
310	< 1,0E-05	610	5,164E-01	910	9,653E-01	1250	9,666E-01	2750	5,165E-01	4250	1,482E-01
320	< 1,000E-05	620	7,703E-01	920	9,649E-01	1300	9,685E-01	2800	3,748E-01	4300	1,123E-01
330	< 1,000E-05	630	8,948E-01	930	9,646E-01	1350	9,708E-01	2850	3,606E-01	4350	7,840E-02
340	< 1,000E-05	640	9,454E-01	940	9,643E-01	1400	9,715E-01	2900	3,684E-01	4400	4,815E-02
350	< 1,000E-05	650	9,655E-01	950	9,640E-01	1450	9,753E-01	2950	3,671E-01	4450	2,387E-02
360	< 1,000E-05	660	9,746E-01	960	9,638E-01	1500	9,783E-01	3000	3,529E-01	4500	1,073E-02
370	< 1,000E-05	670	9,785E-01	970	9,635E-01	1550	9,804E-01	3050	3,291E-01	4550	4,530E-03
380	< 1,000E-05	680	9,806E-01	980	9,633E-01	1600	9,821E-01	3100	3,018E-01	4600	1,580E-03
390	< 1,000E-05	690	9,815E-01	990	9,631E-01	1650	9,829E-01	3150	2,753E-01	4650	5,741E-04
400	< 1,000E-05	700	9,817E-01	1000	9,630E-01	1700	9,824E-01	3200	2,529E-01	4700	2,512E-04
410	< 1,000E-05	710	9,817E-01	1010	9,629E-01	1750	9,812E-01	3250	2,334E-01	4750	1,279E-04
420	< 1,000E-05	720	9,812E-01	1020	9,628E-01	1800	9,799E-01	3300	2,183E-01	4800	6,668E-05
430	< 1,000E-05	730	9,802E-01	1030	9,628E-01	1850	9,783E-01	3350	2,060E-01	4850	3,420E-05
440	< 1,000E-05	740	9,791E-01	1040	9,628E-01	1900	9,768E-01	3400	1,965E-01	4900	1,687E-05
450	< 1,000E-05	750	9,782E-01	1050	9,628E-01	1950	9,757E-01	3450	1,917E-01	4950	< 1,000E-05
460	< 1,000E-05	760	9,771E-01	1060	9,629E-01	2000	9,746E-01	3500	1,933E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,761E-01	1070	9,630E-01	2050	9,733E-01	3550	1,999E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,748E-01	1080	9,630E-01	2100	9,719E-01	3600	2,098E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,736E-01	1090	9,631E-01	2150	9,688E-01	3650	2,201E-01	5150	< 1,000E-05

RG630

Optical properties	
Reflection factor	
$P_d = 0,918$	
Spectral values guaranteed (d = 3 mm)	
$\lambda_c (\tau_i = 0,5)$	= 630 nm \pm 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 540 nm
$\lambda_p (\tau_{i,L} = 0,94)$	= 710 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,52
$n_s (852 \text{ nm})$	= 1,52
$n_t (1014 \text{ nm})$	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

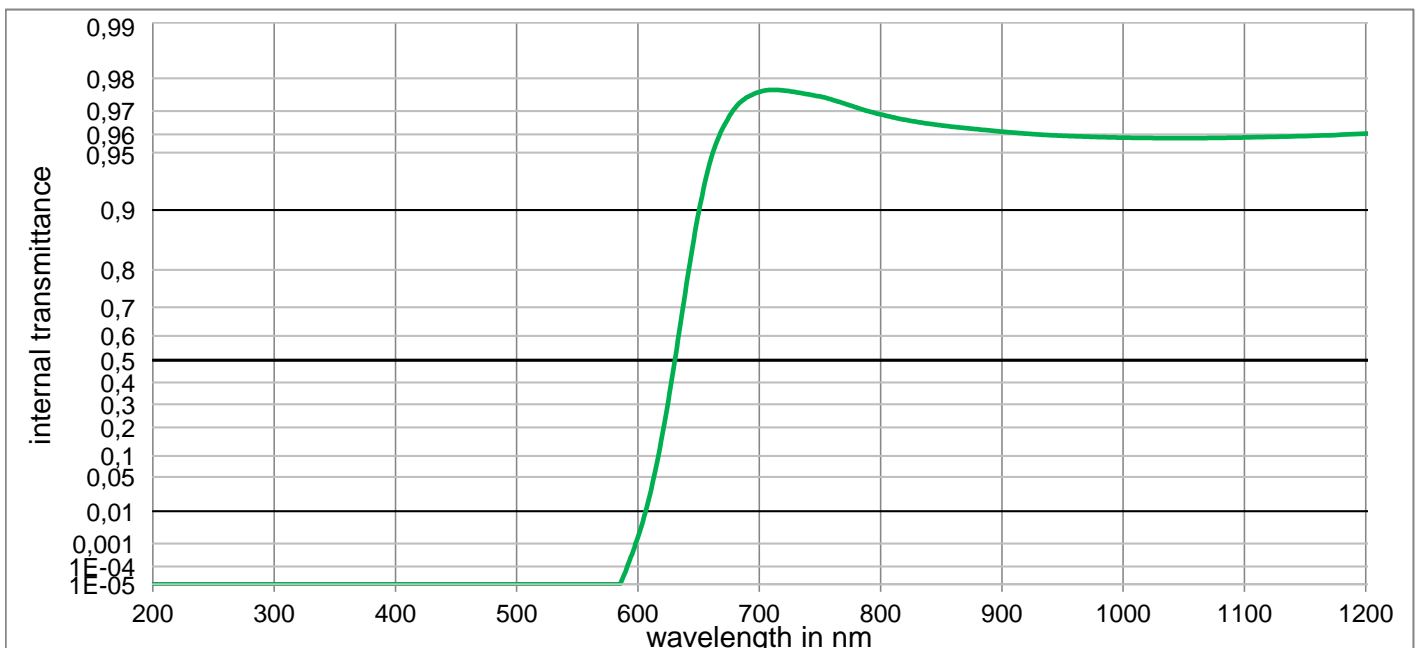
Mechanical properties	
Reference thickness	
d = 3,00 mm	
Density	
$\rho = 2,65 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 456$	

Thermal properties	
Transformation temperature	
$T_g = 527 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})}$	= 8,0
$\alpha_{(20^\circ\text{C}/300^\circ\text{C})}$	= 9,2
Temperature coefficient	
$Tk = 0,14 \text{ nm/K}$	

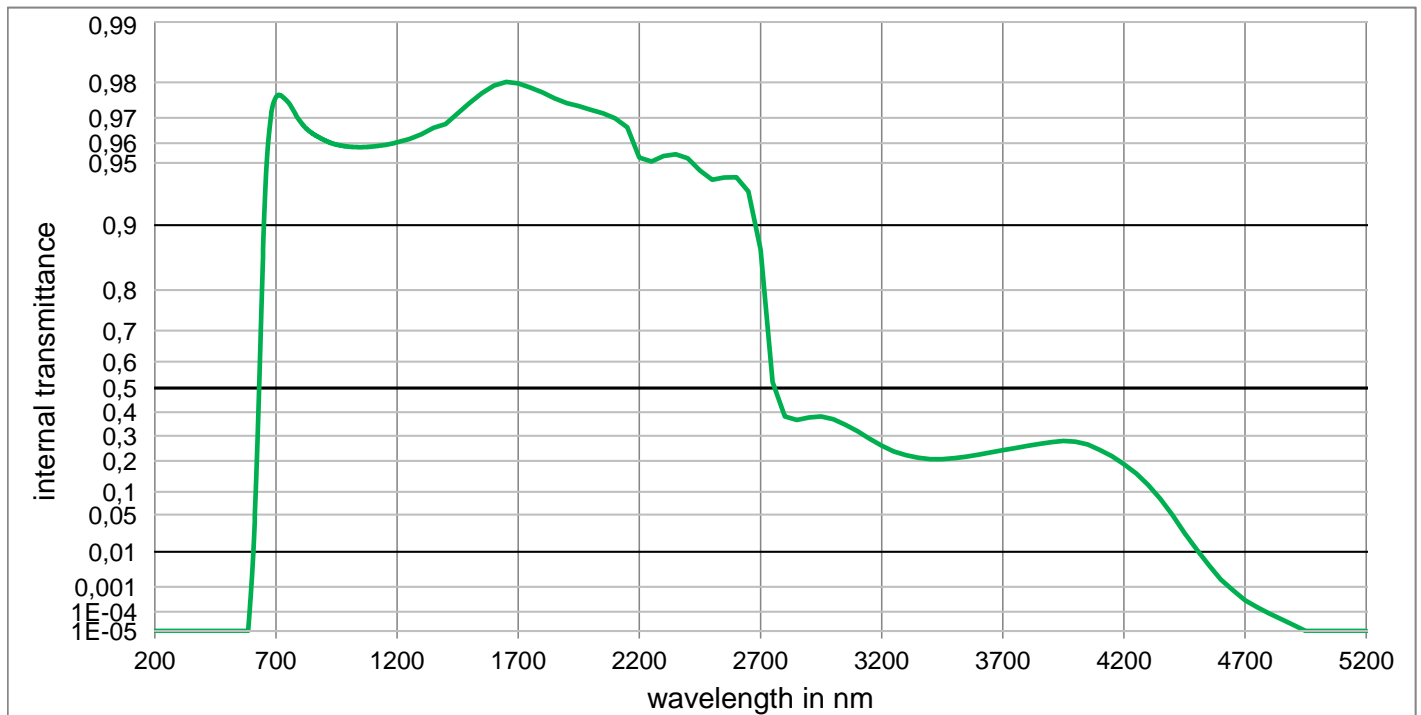
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,624	0,708	0,716
	y	0,305	0,289	0,284
	Y	9,3	5,1	4,0
	λ_d	625 nm	633 nm	637 nm
Illuminant A	P_e	0,802	0,992	1,000
	x	0,678	0,712	0,718
	y	0,307	0,287	0,282
	Y	14,8	9,4	7,6
Illuminant A	λ_d	627 nm	634 nm	639 nm
	P_e	0,899	0,996	0,999

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



RG630



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,688E-01	1100	9,585E-01	2200	9,530E-01	3700	2,410E-01
210	< 1,0E-05	510	< 1,000E-05	810	9,676E-01	1110	9,586E-01	2250	9,509E-01	3750	2,495E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,666E-01	1120	9,587E-01	2300	9,537E-01	3800	2,579E-01
230	< 1,0E-05	530	< 1,000E-05	830	9,657E-01	1130	9,589E-01	2350	9,546E-01	3850	2,660E-01
240	< 1,0E-05	540	< 1,000E-05	840	9,649E-01	1140	9,590E-01	2400	9,525E-01	3900	2,735E-01
250	< 1,0E-05	550	< 1,000E-05	850	9,642E-01	1150	9,592E-01	2450	9,456E-01	3950	2,783E-01
260	< 1,0E-05	560	< 1,000E-05	860	9,636E-01	1160	9,594E-01	2500	9,395E-01	4000	2,755E-01
270	< 1,0E-05	570	< 1,000E-05	870	9,630E-01	1170	9,596E-01	2550	9,412E-01	4050	2,645E-01
280	< 1,0E-05	580	< 1,000E-05	880	9,625E-01	1180	9,598E-01	2600	9,412E-01	4100	2,425E-01
290	< 1,0E-05	590	6,236E-05	890	9,619E-01	1190	9,601E-01	2650	9,312E-01	4150	2,177E-01
300	< 1,0E-05	600	1,716E-03	900	9,614E-01	1200	9,604E-01	2700	8,695E-01	4200	1,884E-01
310	< 1,0E-05	610	2,467E-02	910	9,608E-01	1250	9,619E-01	2750	5,243E-01	4250	1,559E-01
320	< 1,000E-05	620	1,692E-01	920	9,604E-01	1300	9,638E-01	2800	3,813E-01	4300	1,198E-01
330	< 1,000E-05	630	4,871E-01	930	9,600E-01	1350	9,664E-01	2850	3,670E-01	4350	8,250E-02
340	< 1,000E-05	640	7,652E-01	940	9,596E-01	1400	9,678E-01	2900	3,776E-01	4400	4,948E-02
350	< 1,000E-05	650	8,970E-01	950	9,593E-01	1450	9,715E-01	2950	3,817E-01	4450	2,448E-02
360	< 1,000E-05	660	9,457E-01	960	9,591E-01	1500	9,748E-01	3000	3,698E-01	4500	1,133E-02
370	< 1,000E-05	670	9,631E-01	970	9,589E-01	1550	9,774E-01	3050	3,471E-01	4550	4,684E-03
380	< 1,000E-05	680	9,711E-01	980	9,587E-01	1600	9,792E-01	3100	3,189E-01	4600	1,739E-03
390	< 1,000E-05	690	9,747E-01	990	9,585E-01	1650	9,801E-01	3150	2,884E-01	4650	7,540E-04
400	< 1,000E-05	700	9,763E-01	1000	9,584E-01	1700	9,798E-01	3200	2,589E-01	4700	3,162E-04
410	< 1,000E-05	710	9,769E-01	1010	9,583E-01	1750	9,788E-01	3250	2,366E-01	4750	1,596E-04
420	< 1,000E-05	720	9,768E-01	1020	9,582E-01	1800	9,776E-01	3300	2,219E-01	4800	8,375E-05
430	< 1,000E-05	730	9,763E-01	1030	9,582E-01	1850	9,760E-01	3350	2,117E-01	4850	4,355E-05
440	< 1,000E-05	740	9,756E-01	1040	9,582E-01	1900	9,747E-01	3400	2,061E-01	4900	2,203E-05
450	< 1,000E-05	750	9,749E-01	1050	9,581E-01	1950	9,737E-01	3450	2,064E-01	4950	< 1,000E-05
460	< 1,000E-05	760	9,740E-01	1060	9,582E-01	2000	9,727E-01	3500	2,103E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,727E-01	1070	9,582E-01	2050	9,715E-01	3550	2,160E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,713E-01	1080	9,583E-01	2100	9,698E-01	3600	2,240E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,700E-01	1090	9,584E-01	2150	9,666E-01	3650	2,323E-01	5150	< 1,000E-05

RG645

Optical properties	
Reflection factor	
P_d	0,918
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 645 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 560 nm
λ_p ($\tau_{i,L} = 0,94$)	= 720 nm
Refractive indices	
n_d (587,6 nm)	= 1,52
n_s (852 nm)	= 1,52
n_t (1014 nm)	= 1,51
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

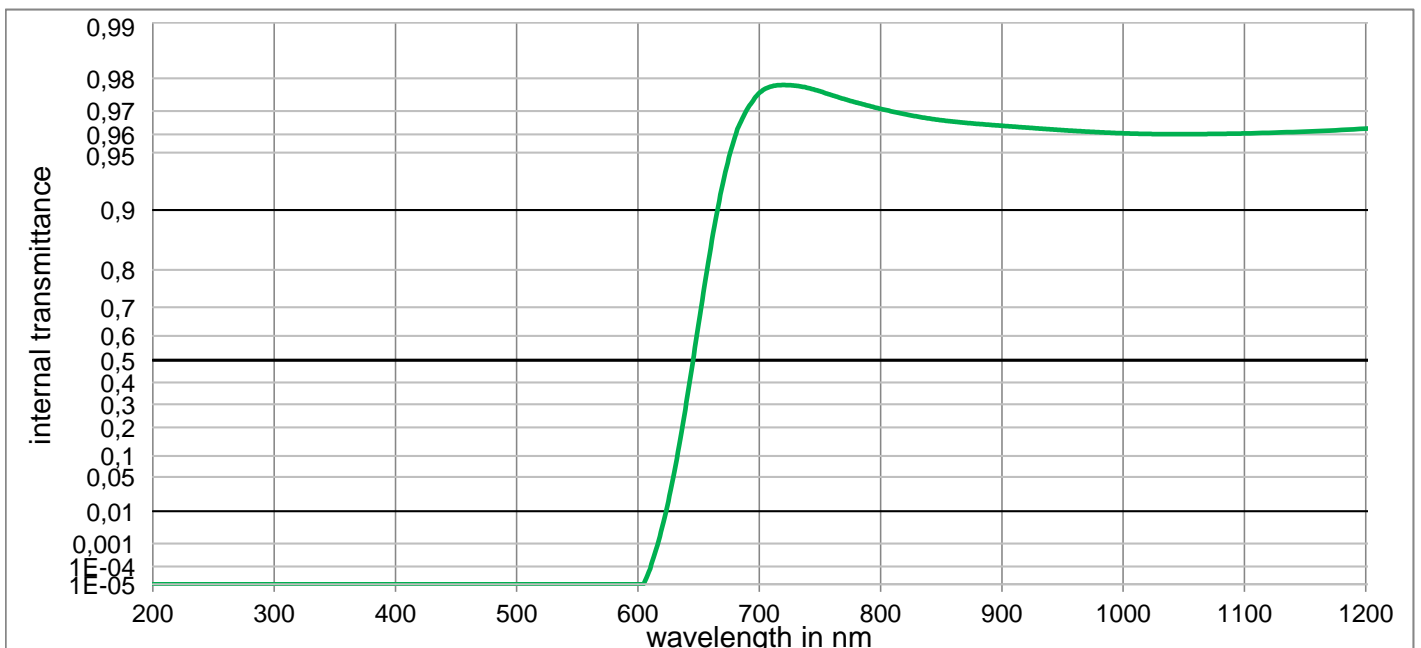
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,65 g/cm ³
Knoop hardness	
HK _[0.1/20]	= 456

Thermal properties	
Transformation temperature	
Tg	= 519 °C
Thermal expansion in 10⁻⁶/K	
α (-30°C/+70°C)	= 8,0
α (20°C/300°C)	= 9,2
Temperature coefficient	
Tk	= 0,16 nm/K

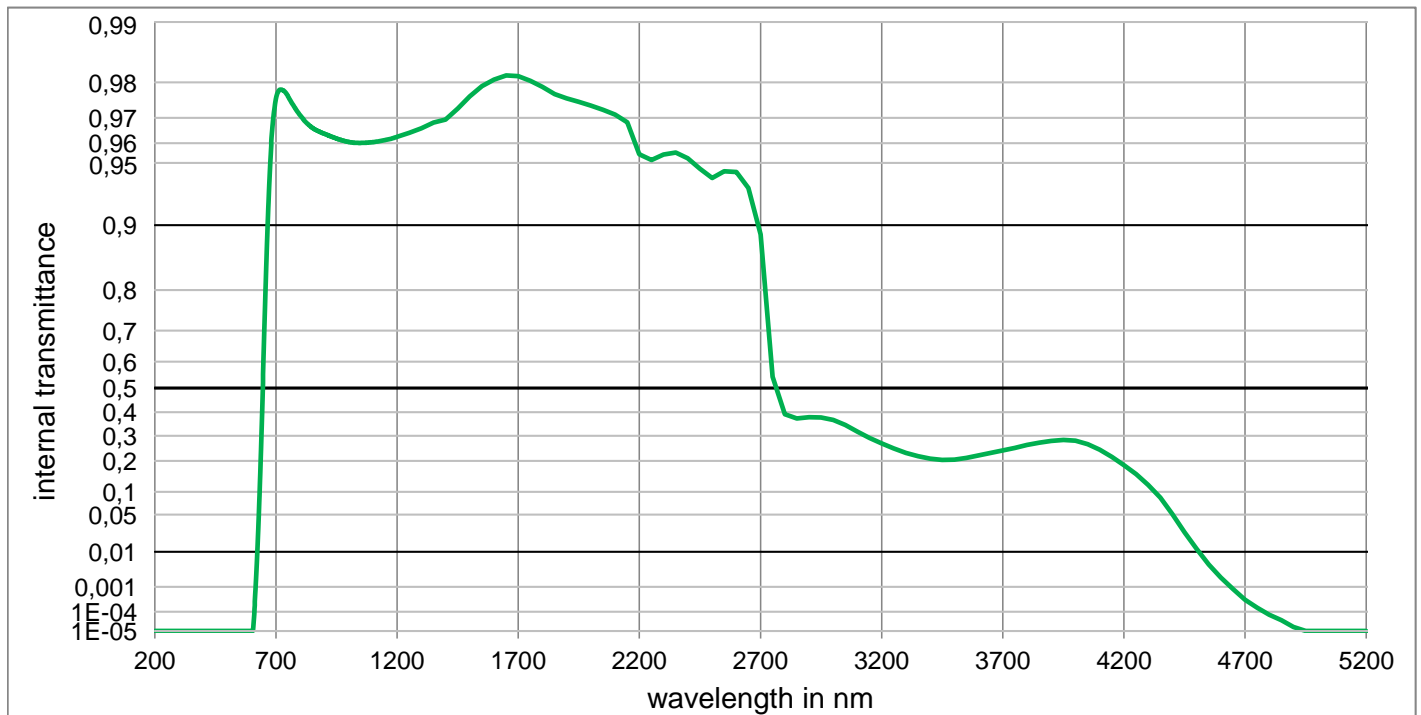
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,584	0,717	0,726
	y	0,298	0,278	0,274
	Y	5,4	2,4	1,8
	λ_d	638 nm	645 nm	650 nm
Illuminant A	P _e	0,670	0,984	0,999
	x	0,672	0,722	0,726
	y	0,303	0,277	0,274
	Y	8,6	4,7	3,6
	λ_d	640 nm	647 nm	651 nm
	P _e	0,828	0,993	0,999

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



RG645



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,708E-01	1100	9,605E-01	2200	9,547E-01	3700	2,399E-01
210	< 1,0E-05	510	< 1,000E-05	810	9,698E-01	1110	9,606E-01	2250	9,516E-01	3750	2,503E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,688E-01	1120	9,608E-01	2300	9,545E-01	3800	2,623E-01
230	< 1,0E-05	530	< 1,000E-05	830	9,679E-01	1130	9,610E-01	2350	9,555E-01	3850	2,714E-01
240	< 1,0E-05	540	< 1,000E-05	840	9,671E-01	1140	9,611E-01	2400	9,525E-01	3900	2,787E-01
250	< 1,0E-05	550	< 1,000E-05	850	9,664E-01	1150	9,613E-01	2450	9,466E-01	3950	2,827E-01
260	< 1,0E-05	560	< 1,000E-05	860	9,658E-01	1160	9,616E-01	2500	9,408E-01	4000	2,792E-01
270	< 1,0E-05	570	< 1,000E-05	870	9,653E-01	1170	9,618E-01	2550	9,451E-01	4050	2,656E-01
280	< 1,0E-05	580	< 1,000E-05	880	9,649E-01	1180	9,621E-01	2600	9,447E-01	4100	2,436E-01
290	< 1,0E-05	590	< 1,000E-05	890	9,644E-01	1190	9,624E-01	2650	9,337E-01	4150	2,152E-01
300	< 1,0E-05	600	< 1,000E-05	900	9,641E-01	1200	9,628E-01	2700	8,894E-01	4200	1,844E-01
310	< 1,0E-05	610	7,607E-05	910	9,636E-01	1250	9,644E-01	2750	5,439E-01	4250	1,529E-01
320	< 1,000E-05	620	3,586E-03	920	9,632E-01	1300	9,662E-01	2800	3,916E-01	4300	1,199E-01
330	< 1,000E-05	630	6,056E-02	930	9,628E-01	1350	9,684E-01	2850	3,738E-01	4350	8,517E-02
340	< 1,000E-05	640	3,112E-01	940	9,624E-01	1400	9,694E-01	2900	3,791E-01	4400	5,083E-02
350	< 1,000E-05	650	6,454E-01	950	9,621E-01	1450	9,730E-01	2950	3,779E-01	4450	2,517E-02
360	< 1,000E-05	660	8,449E-01	960	9,617E-01	1500	9,765E-01	3000	3,671E-01	4500	1,162E-02
370	< 1,000E-05	670	9,271E-01	970	9,614E-01	1550	9,791E-01	3050	3,455E-01	4550	4,841E-03
380	< 1,000E-05	680	9,589E-01	980	9,611E-01	1600	9,806E-01	3100	3,177E-01	4600	2,037E-03
390	< 1,000E-05	690	9,706E-01	990	9,608E-01	1650	9,815E-01	3150	2,911E-01	4650	8,337E-04
400	< 1,000E-05	700	9,760E-01	1000	9,605E-01	1700	9,814E-01	3200	2,687E-01	4700	3,327E-04
410	< 1,000E-05	710	9,779E-01	1010	9,604E-01	1750	9,804E-01	3250	2,482E-01	4750	1,524E-04
420	< 1,000E-05	720	9,783E-01	1020	9,602E-01	1800	9,789E-01	3300	2,309E-01	4800	7,289E-05
430	< 1,000E-05	730	9,781E-01	1030	9,602E-01	1850	9,772E-01	3350	2,176E-01	4850	3,837E-05
440	< 1,000E-05	740	9,775E-01	1040	9,601E-01	1900	9,760E-01	3400	2,081E-01	4900	1,694E-05
450	< 1,000E-05	750	9,765E-01	1050	9,601E-01	1950	9,750E-01	3450	2,036E-01	4950	< 1,000E-05
460	< 1,000E-05	760	9,754E-01	1060	9,602E-01	2000	9,739E-01	3500	2,049E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,742E-01	1070	9,602E-01	2050	9,726E-01	3550	2,113E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,730E-01	1080	9,603E-01	2100	9,711E-01	3600	2,208E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,719E-01	1090	9,604E-01	2150	9,684E-01	3650	2,302E-01	5150	< 1,000E-05

RG665

Optical properties	
Reflection factor	
P_d	0,918
Spectral values guaranteed (d = 3 mm)	
λ_c ($\tau_i = 0,5$)	= 665 nm \pm 6 nm
λ_s ($\tau_{i,U} = 1E-05$)	= 580 nm
λ_p ($\tau_{i,L} = 0,96$)	= 750 nm
Refractive indices	
n_d (587,6 nm)	= 1,52
n_s (852 nm)	= 1,51
n_t (1014 nm)	= 1,51
Sellmeier coefficients	
valid from 350 nm to 2400 nm	
B_1	= 0,7958
B_2	= 0,4847
B_3	= 0,8880
C_1	= 5,130E-03 μm^2
C_2	= 1,8116E-02 μm^2
C_3	= 117,823 μm^2
Internal quality	
Bubble class	3

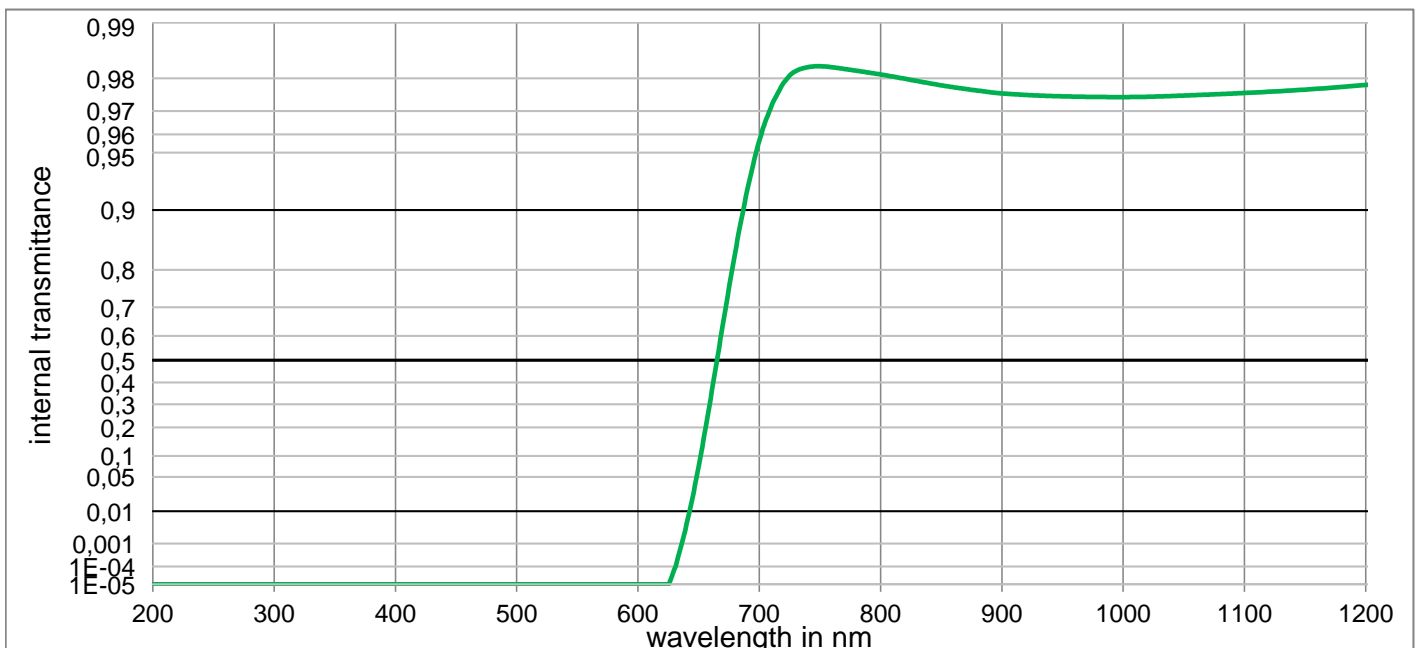
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,77 g/cm ³
Knoop hardness	
$HK_{[0.1/20]}$	= 453

Thermal properties	
Transformation temperature	
T_g	= 527 °C
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 8,1
α (20°C/300°C)	= 9,4
Temperature coefficient	
Tk	= 0,17 nm/K

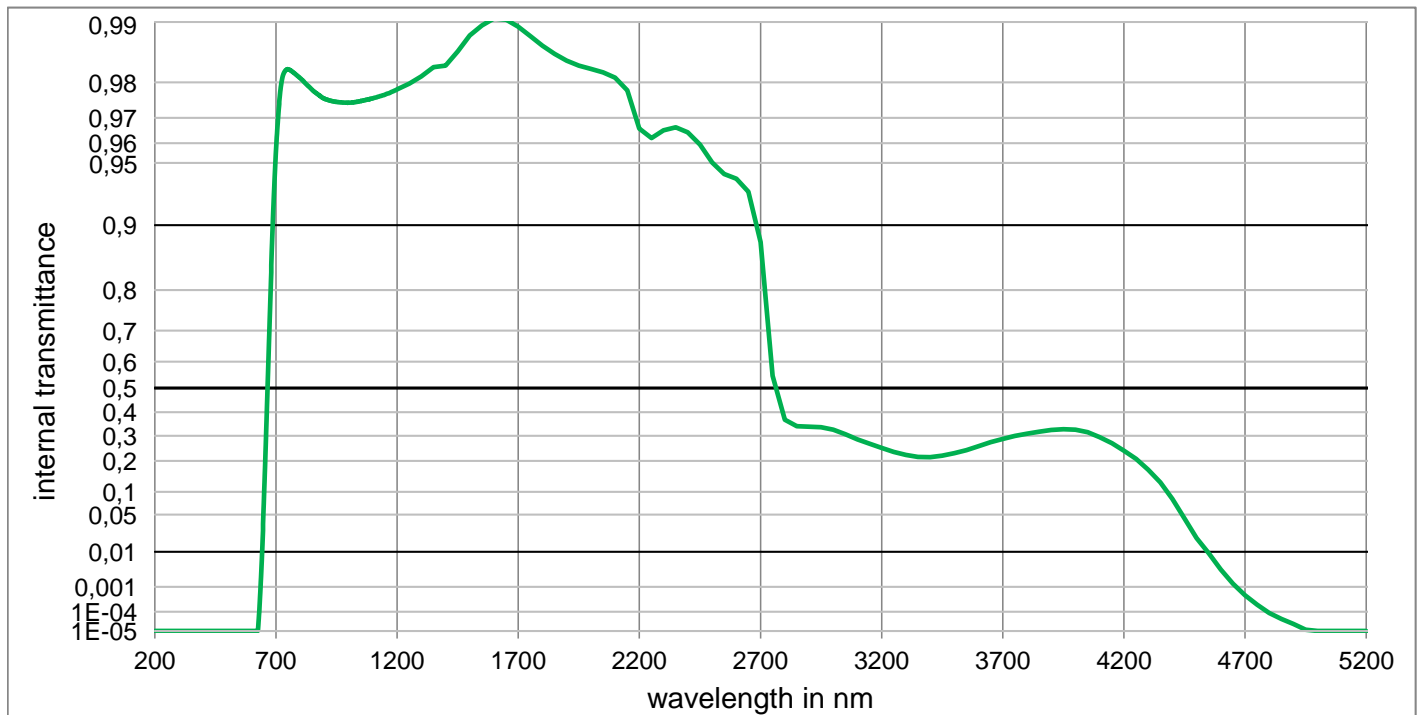
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,487	0,711	0,731
	y	0,305	0,272	0,268
	Y	3,2	0,8	0,5
	λ_d	654 nm	662 nm	668 nm
Illuminant A	P_e	0,420	0,954	0,998
	x	0,631	0,726	0,732
	y	0,318	0,272	0,268
	Y	4,5	1,6	1,2
	λ_d	656 nm	664 nm	671 nm
	P_e	0,654	0,982	0,999

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



RG665



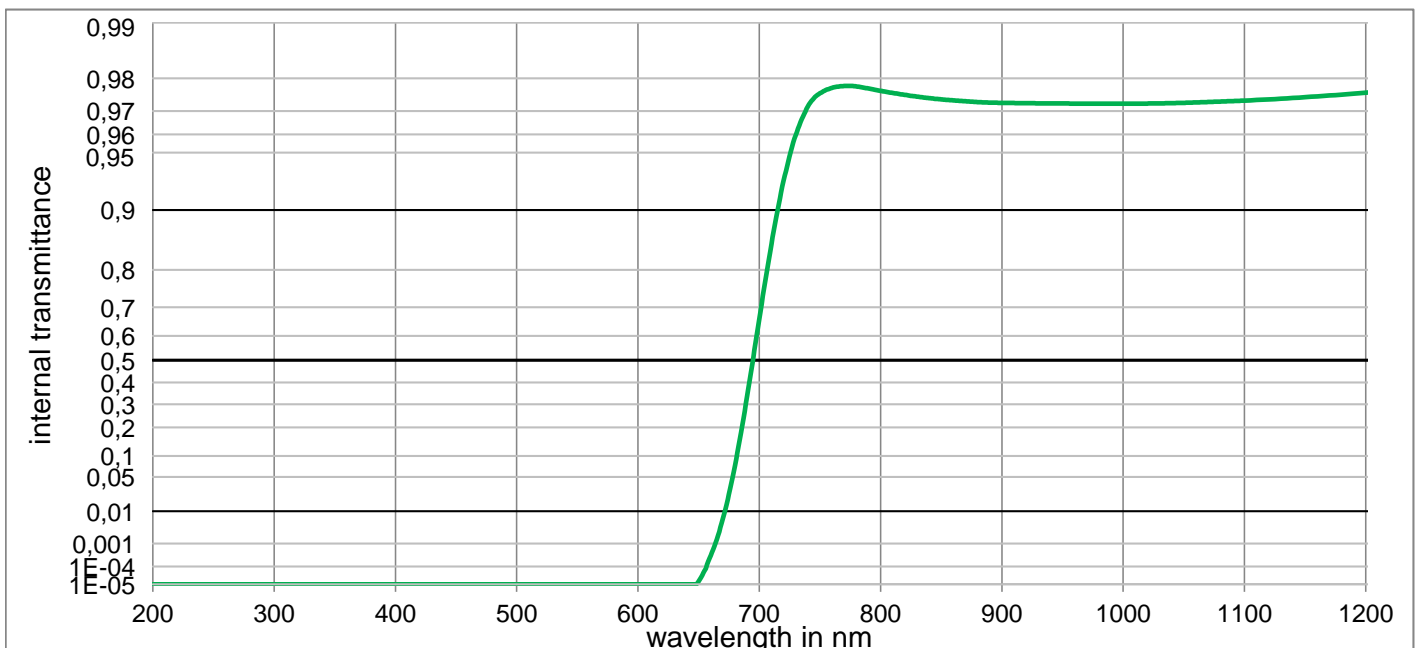
Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

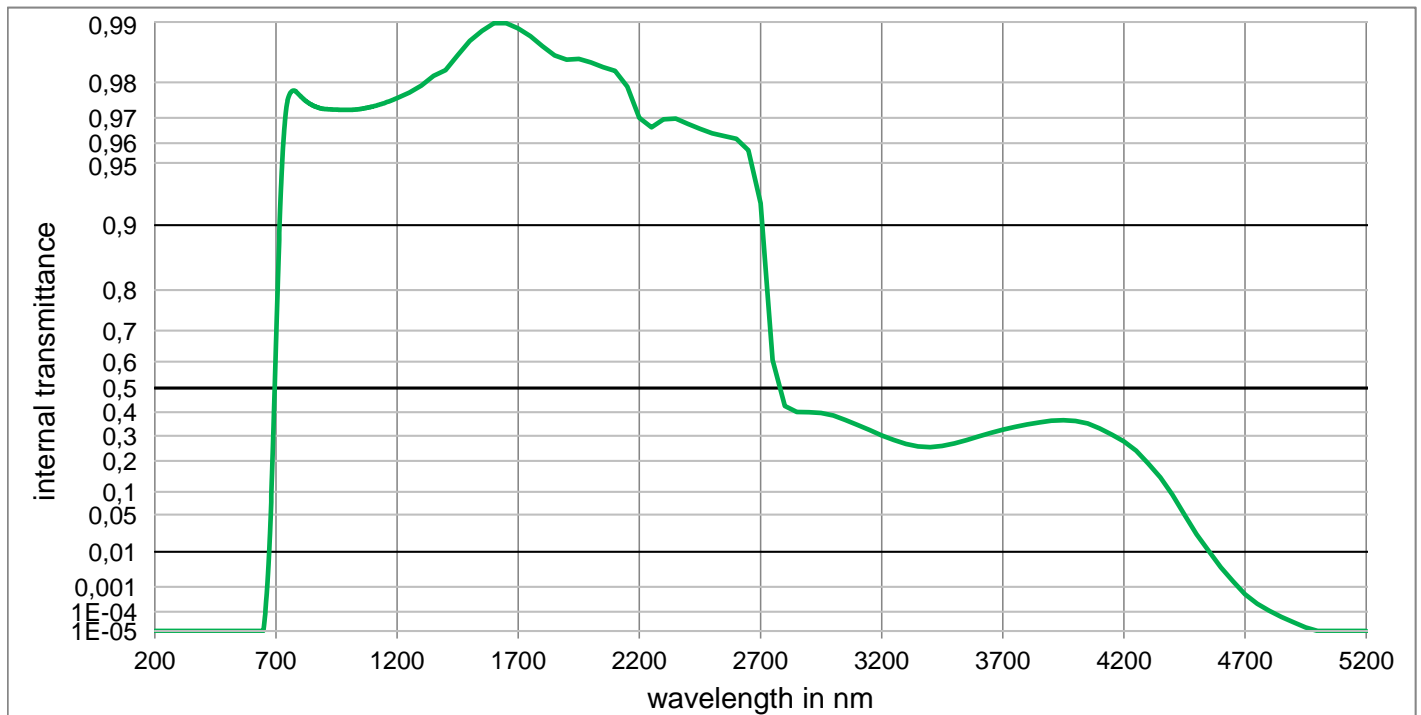
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,809E-01	1100	9,760E-01	2200	9,661E-01	3700	2,872E-01
210	< 1,0E-05	510	< 1,000E-05	810	9,804E-01	1110	9,762E-01	2250	9,623E-01	3750	2,991E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,799E-01	1120	9,764E-01	2300	9,655E-01	3800	3,090E-01
230	< 1,0E-05	530	< 1,000E-05	830	9,793E-01	1130	9,766E-01	2350	9,666E-01	3850	3,173E-01
240	< 1,0E-05	540	< 1,000E-05	840	9,788E-01	1140	9,768E-01	2400	9,646E-01	3900	3,241E-01
250	< 1,0E-05	550	< 1,000E-05	850	9,782E-01	1150	9,770E-01	2450	9,594E-01	3950	3,273E-01
260	< 1,0E-05	560	< 1,000E-05	860	9,777E-01	1160	9,772E-01	2500	9,503E-01	4000	3,259E-01
270	< 1,0E-05	570	< 1,000E-05	870	9,772E-01	1170	9,775E-01	2550	9,434E-01	4050	3,147E-01
280	< 1,0E-05	580	< 1,000E-05	880	9,767E-01	1180	9,777E-01	2600	9,403E-01	4100	2,940E-01
290	< 1,0E-05	590	< 1,000E-05	890	9,763E-01	1190	9,780E-01	2650	9,310E-01	4150	2,697E-01
300	< 1,0E-05	600	< 1,000E-05	900	9,759E-01	1200	9,783E-01	2700	8,797E-01	4200	2,395E-01
310	< 1,0E-05	610	< 1,000E-05	910	9,756E-01	1250	9,797E-01	2750	5,478E-01	4250	2,072E-01
320	< 1,000E-05	620	< 1,000E-05	920	9,754E-01	1300	9,814E-01	2800	3,680E-01	4300	1,688E-01
330	< 1,000E-05	630	7,438E-05	930	9,752E-01	1350	9,832E-01	2850	3,399E-01	4350	1,267E-01
340	< 1,000E-05	640	4,275E-03	940	9,751E-01	1400	9,835E-01	2900	3,380E-01	4400	8,260E-02
350	< 1,000E-05	650	7,177E-02	950	9,750E-01	1450	9,860E-01	2950	3,359E-01	4450	4,350E-02
360	< 1,000E-05	660	3,297E-01	960	9,749E-01	1500	9,883E-01	3000	3,259E-01	4500	1,970E-02
370	< 1,000E-05	670	6,426E-01	970	9,748E-01	1550	9,896E-01	3050	3,067E-01	4550	9,240E-03
380	< 1,000E-05	680	8,339E-01	980	9,748E-01	1600	9,904E-01	3100	2,847E-01	4600	3,528E-03
390	< 1,000E-05	690	9,205E-01	990	9,748E-01	1650	9,903E-01	3150	2,670E-01	4650	1,277E-03
400	< 1,000E-05	700	9,567E-01	1000	9,748E-01	1700	9,895E-01	3200	2,501E-01	4700	4,966E-04
410	< 1,000E-05	710	9,719E-01	1010	9,748E-01	1750	9,882E-01	3250	2,347E-01	4750	2,028E-04
420	< 1,000E-05	720	9,788E-01	1020	9,749E-01	1800	9,869E-01	3300	2,224E-01	4800	8,730E-05
430	< 1,000E-05	730	9,817E-01	1030	9,750E-01	1850	9,856E-01	3350	2,148E-01	4850	4,477E-05
440	< 1,000E-05	740	9,826E-01	1040	9,751E-01	1900	9,844E-01	3400	2,144E-01	4900	2,472E-05
450	< 1,000E-05	750	9,828E-01	1050	9,752E-01	1950	9,835E-01	3450	2,198E-01	4950	1,183E-05
460	< 1,000E-05	760	9,826E-01	1060	9,754E-01	2000	9,828E-01	3500	2,290E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,822E-01	1070	9,755E-01	2050	9,822E-01	3550	2,412E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,818E-01	1080	9,757E-01	2100	9,811E-01	3600	2,577E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,814E-01	1090	9,758E-01	2150	9,781E-01	3650	2,734E-01	5150	< 1,000E-05

RG695

Optical properties	Mechanical properties	Colormetric properties	
Reflection factor	Reference thickness	1 mm 2 mm 3 mm	
$P_d = 0,915$	$d = 3,00 \text{ mm}$	Illuminant D65 x y Y λ_d P_e	
Spectral values guaranteed (d = 3 mm)	Density		Illuminant A x y Y λ_d P_e
$\lambda_c (\tau_i = 0,5) = 695 \text{ nm} \pm 6 \text{ nm}$	$\rho = 2,76 \text{ g/cm}^3$		
$\lambda_s (\tau_{i,U} = 1E-05) = 610 \text{ nm}$	Knoop hardness		
$\lambda_p (\tau_{i,L} = 0,96) = 780 \text{ nm}$	$HK_{[0.1/20]} = 459$		
	Thermal properties		
	Transformation temperature		
	$T_g = 532 \text{ }^\circ\text{C}$		
	Thermal expansion in $10^{-6}/\text{K}$		
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 8,1$		
	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 9,4$		
	Temperature coefficient		
	$Tk = 0,18 \text{ nm/K}$		
Refractive indices	Chemical properties	Notes	
$n_d (587,6 \text{ nm}) = 1,53$	Chemical resistance		
$n_s (852 \text{ nm}) = 1,53$	FR class = 0	Stricking glass	
$n_t (1014 \text{ nm}) = 1,52$	SR class = 1	Longpass filter	
	AR class = 1		
Sellmeier coefficients		DIN 58131	
valid from 440 nm to 1550 nm			
$B_1 = 0,6009$			
$B_2 = 0,7114$			
$B_3 = 25,2603$			
$C_1 = 1,682E-02 \text{ } \mu\text{m}^2$			
$C_2 = 4,0132E-03 \text{ } \mu\text{m}^2$			
$C_3 = 4853,501 \text{ } \mu\text{m}^2$			
Internal quality		Disclaimer	
Bubble class 3		All data without tolerances are to be understood to be reference values	



RG695



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,766E-01	1100	9,736E-01	2200	9,700E-01	3700	3,257E-01
210	< 1,0E-05	510	< 1,000E-05	810	9,760E-01	1110	9,738E-01	2250	9,666E-01	3750	3,377E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,754E-01	1120	9,740E-01	2300	9,695E-01	3800	3,478E-01
230	< 1,0E-05	530	< 1,000E-05	830	9,749E-01	1130	9,743E-01	2350	9,698E-01	3850	3,564E-01
240	< 1,0E-05	540	< 1,000E-05	840	9,744E-01	1140	9,745E-01	2400	9,679E-01	3900	3,633E-01
250	< 1,0E-05	550	< 1,000E-05	850	9,740E-01	1150	9,747E-01	2450	9,660E-01	3950	3,659E-01
260	< 1,0E-05	560	< 1,000E-05	860	9,737E-01	1160	9,750E-01	2500	9,642E-01	4000	3,632E-01
270	< 1,0E-05	570	< 1,000E-05	870	9,734E-01	1170	9,752E-01	2550	9,631E-01	4050	3,523E-01
280	< 1,0E-05	580	< 1,000E-05	880	9,732E-01	1180	9,755E-01	2600	9,619E-01	4100	3,308E-01
290	< 1,0E-05	590	< 1,000E-05	890	9,730E-01	1190	9,758E-01	2650	9,567E-01	4150	3,050E-01
300	< 1,0E-05	600	< 1,000E-05	900	9,729E-01	1200	9,761E-01	2700	9,214E-01	4200	2,770E-01
310	< 1,0E-05	610	< 1,000E-05	910	9,728E-01	1250	9,775E-01	2750	6,057E-01	4250	2,394E-01
320	< 1,000E-05	620	< 1,000E-05	920	9,728E-01	1300	9,793E-01	2800	4,261E-01	4300	1,911E-01
330	< 1,000E-05	630	< 1,000E-05	930	9,727E-01	1350	9,814E-01	2850	4,014E-01	4350	1,424E-01
340	< 1,000E-05	640	< 1,000E-05	940	9,727E-01	1400	9,826E-01	2900	4,002E-01	4400	9,250E-02
350	< 1,000E-05	650	1,534E-05	950	9,727E-01	1450	9,854E-01	2950	3,970E-01	4450	4,970E-02
360	< 1,000E-05	660	3,350E-04	960	9,727E-01	1500	9,876E-01	3000	3,859E-01	4500	2,317E-02
370	< 1,000E-05	670	6,330E-03	970	9,726E-01	1550	9,889E-01	3050	3,665E-01	4550	1,037E-02
380	< 1,000E-05	680	7,498E-02	980	9,726E-01	1600	9,899E-01	3100	3,462E-01	4600	4,025E-03
390	< 1,000E-05	690	3,367E-01	990	9,726E-01	1650	9,899E-01	3150	3,243E-01	4650	1,530E-03
400	< 1,000E-05	700	6,612E-01	1000	9,726E-01	1700	9,892E-01	3200	3,018E-01	4700	5,346E-04
410	< 1,000E-05	710	8,508E-01	1010	9,726E-01	1750	9,882E-01	3250	2,824E-01	4750	2,234E-04
420	< 1,000E-05	720	9,295E-01	1020	9,727E-01	1800	9,868E-01	3300	2,667E-01	4800	1,104E-04
430	< 1,000E-05	730	9,596E-01	1030	9,727E-01	1850	9,853E-01	3350	2,563E-01	4850	5,636E-05
440	< 1,000E-05	740	9,716E-01	1040	9,728E-01	1900	9,846E-01	3400	2,535E-01	4900	3,062E-05
450	< 1,000E-05	750	9,759E-01	1050	9,729E-01	1950	9,847E-01	3450	2,581E-01	4950	1,570E-05
460	< 1,000E-05	760	9,775E-01	1060	9,730E-01	2000	9,841E-01	3500	2,681E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,780E-01	1070	9,732E-01	2050	9,832E-01	3550	2,819E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,779E-01	1080	9,733E-01	2100	9,825E-01	3600	2,973E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,773E-01	1090	9,735E-01	2150	9,790E-01	3650	3,121E-01	5150	< 1,000E-05

RG715

Optical properties	
Reflection factor	
$P_d = 0,914$	
Spectral values guaranteed (d = 3 mm)	
$\lambda_c (\tau_i = 0,5)$	= 715 nm \pm 9 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 620 nm
$\lambda_p (\tau_{i,L} = 0,96)$	= 810 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,54
$n_s (852 \text{ nm})$	= 1,53
$n_t (1014 \text{ nm})$	= 1,53
Sellmeier coefficients	
valid from 440 nm to 1550 nm	
B_1	= 0,8330
B_2	= 0,4883
B_3	= 6,5998
C_1	= 1,082E-02 μm^2
C_2	= 1,1301E-02 μm^2
C_3	= 855,262 μm^2
Internal quality	
Bubble class	3

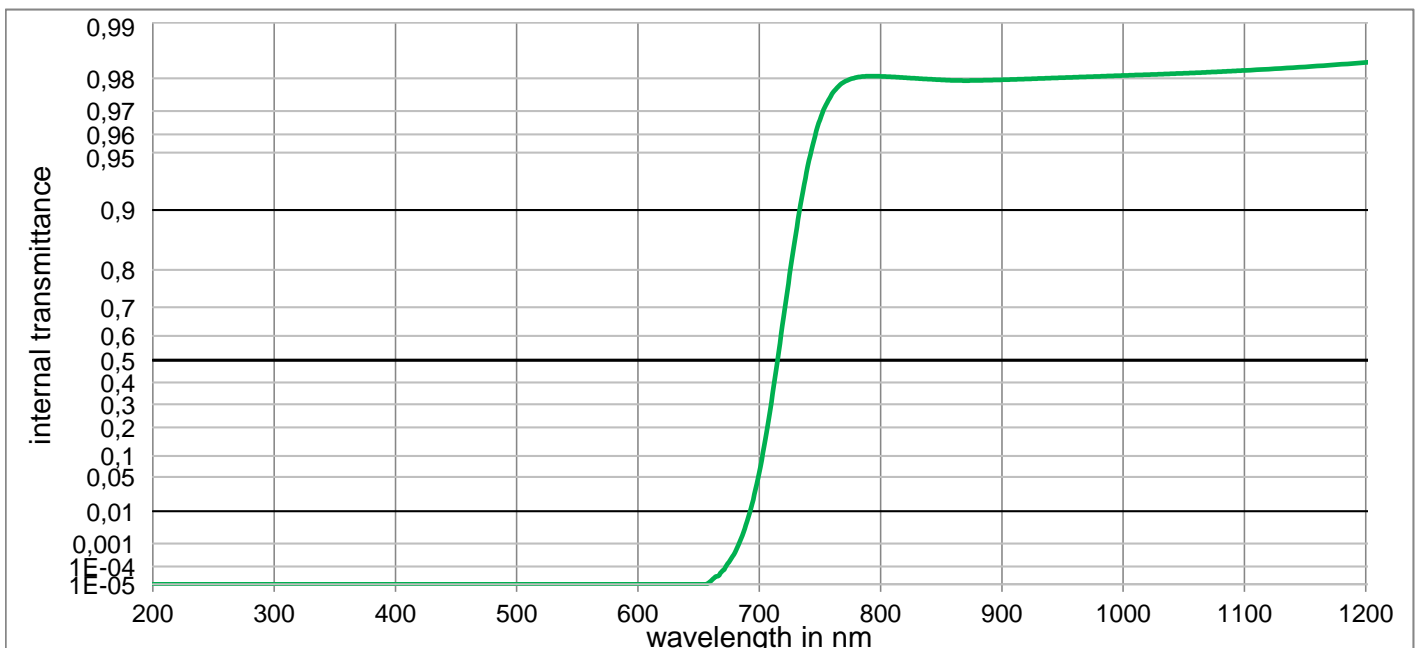
Mechanical properties	
Reference thickness	
d = 3,00 mm	
Density	
$\rho = 2,76 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 545$	

Thermal properties	
Transformation temperature	
Tg = 532 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})}$	= 8,1
$\alpha_{(20^\circ\text{C}/300^\circ\text{C})}$	= 9,4
Temperature coefficient	
Tk = 0,18 nm/K	

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
Stricking glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



RG715



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,805E-01	1100	9,819E-01	2200	9,680E-01	3700	2,827E-01
210	< 1,0E-05	510	< 1,000E-05	810	9,804E-01	1110	9,820E-01	2250	9,641E-01	3750	2,995E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,802E-01	1120	9,822E-01	2300	9,678E-01	3800	3,127E-01
230	< 1,0E-05	530	< 1,000E-05	830	9,800E-01	1130	9,823E-01	2350	9,684E-01	3850	3,232E-01
240	< 1,0E-05	540	< 1,000E-05	840	9,798E-01	1140	9,825E-01	2400	9,658E-01	3900	3,305E-01
250	< 1,0E-05	550	< 1,000E-05	850	9,796E-01	1150	9,827E-01	2450	9,598E-01	3950	3,302E-01
260	< 1,0E-05	560	< 1,000E-05	860	9,795E-01	1160	9,828E-01	2500	9,545E-01	4000	3,252E-01
270	< 1,0E-05	570	< 1,000E-05	870	9,794E-01	1170	9,830E-01	2550	9,592E-01	4050	3,154E-01
280	< 1,0E-05	580	< 1,000E-05	880	9,795E-01	1180	9,832E-01	2600	9,597E-01	4100	2,993E-01
290	< 1,0E-05	590	< 1,000E-05	890	9,795E-01	1190	9,834E-01	2650	9,495E-01	4150	2,758E-01
300	< 1,0E-05	600	< 1,000E-05	900	9,796E-01	1200	9,836E-01	2700	9,017E-01	4200	2,464E-01
310	< 1,0E-05	610	< 1,000E-05	910	9,797E-01	1250	9,846E-01	2750	5,597E-01	4250	2,120E-01
320	< 1,000E-05	620	< 1,000E-05	920	9,798E-01	1300	9,860E-01	2800	3,653E-01	4300	1,666E-01
330	< 1,000E-05	630	< 1,000E-05	930	9,799E-01	1350	9,877E-01	2850	3,378E-01	4350	1,238E-01
340	< 1,000E-05	640	< 1,000E-05	940	9,801E-01	1400	9,879E-01	2900	3,356E-01	4400	7,960E-02
350	< 1,000E-05	650	< 1,000E-05	950	9,802E-01	1450	9,897E-01	2950	3,336E-01	4450	4,376E-02
360	< 1,000E-05	660	1,589E-05	960	9,803E-01	1500	9,917E-01	3000	3,236E-01	4500	1,980E-02
370	< 1,000E-05	670	6,257E-05	970	9,804E-01	1550	9,927E-01	3050	3,067E-01	4550	8,430E-03
380	< 1,000E-05	680	4,487E-04	980	9,805E-01	1600	9,932E-01	3100	2,864E-01	4600	3,292E-03
390	< 1,000E-05	690	5,351E-03	990	9,806E-01	1650	9,929E-01	3150	2,660E-01	4650	1,132E-03
400	< 1,000E-05	700	5,900E-02	1000	9,807E-01	1700	9,919E-01	3200	2,477E-01	4700	4,375E-04
410	< 1,000E-05	710	3,110E-01	1010	9,808E-01	1750	9,905E-01	3250	2,325E-01	4750	1,791E-04
420	< 1,000E-05	720	6,665E-01	1020	9,809E-01	1800	9,891E-01	3300	2,202E-01	4800	8,337E-05
430	< 1,000E-05	730	8,663E-01	1030	9,810E-01	1850	9,878E-01	3350	2,120E-01	4850	4,236E-05
440	< 1,000E-05	740	9,410E-01	1040	9,811E-01	1900	9,869E-01	3400	2,072E-01	4900	2,218E-05
450	< 1,000E-05	750	9,666E-01	1050	9,812E-01	1950	9,869E-01	3450	2,093E-01	4950	1,076E-05
460	< 1,000E-05	760	9,757E-01	1060	9,813E-01	2000	9,862E-01	3500	2,171E-01	5000	< 1,000E-05
470	< 1,000E-05	770	9,791E-01	1070	9,815E-01	2050	9,853E-01	3550	2,313E-01	5050	< 1,000E-05
480	< 1,000E-05	780	9,802E-01	1080	9,816E-01	2100	9,841E-01	3600	2,476E-01	5100	< 1,000E-05
490	< 1,000E-05	790	9,805E-01	1090	9,817E-01	2150	9,803E-01	3650	2,649E-01	5150	< 1,000E-05

RG9

Optical properties	
Reflection factor	
$P_d = 0,918$	
Spectral values guaranteed	
τ_i (720 nm)	$\leq 0,45$
τ_i (800 nm)	$\geq 0,92$
τ_i (1060 nm)	$\leq 0,4$
Refractive indices	
n_d (587,6 nm) = 1,52	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

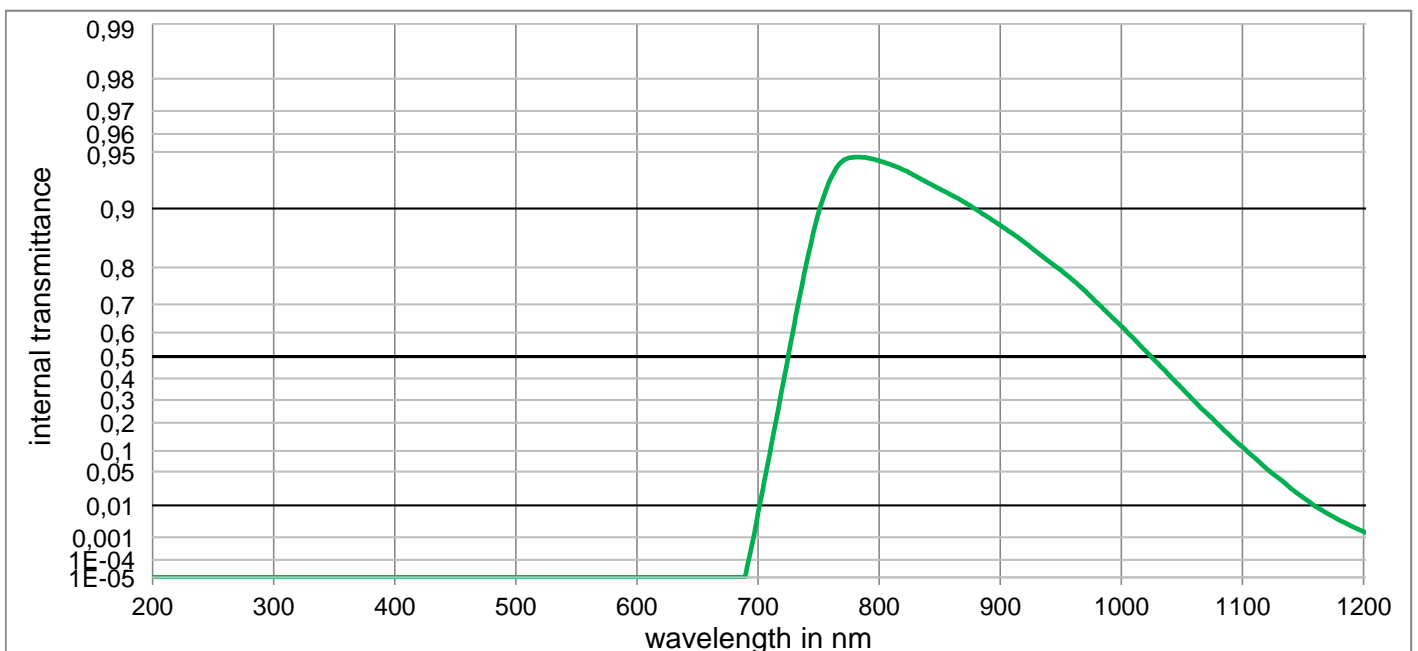
Mechanical properties	
Reference thickness	
$d = 3,00$ mm	
Density	
$\rho = 2,58$ g/cm ³	
Knoop hardness	
HK[0.1/20] = 459	

Thermal properties	
Transformation temperature	
$T_g = 519$ °C	
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 7,9
α (20°C/300°C)	= 9,0
Temperature coefficient	
Tk = 0,06 nm/K	

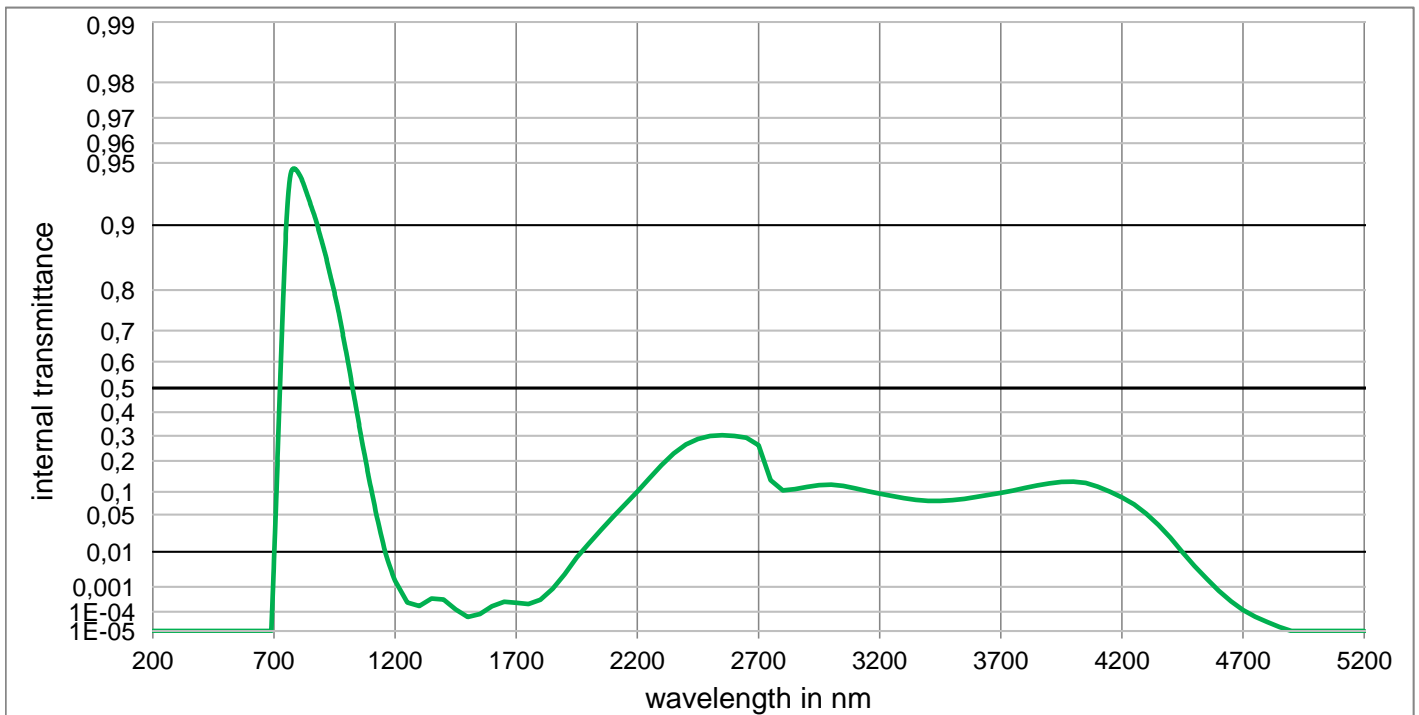
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
Bandpass filter / Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



RG9



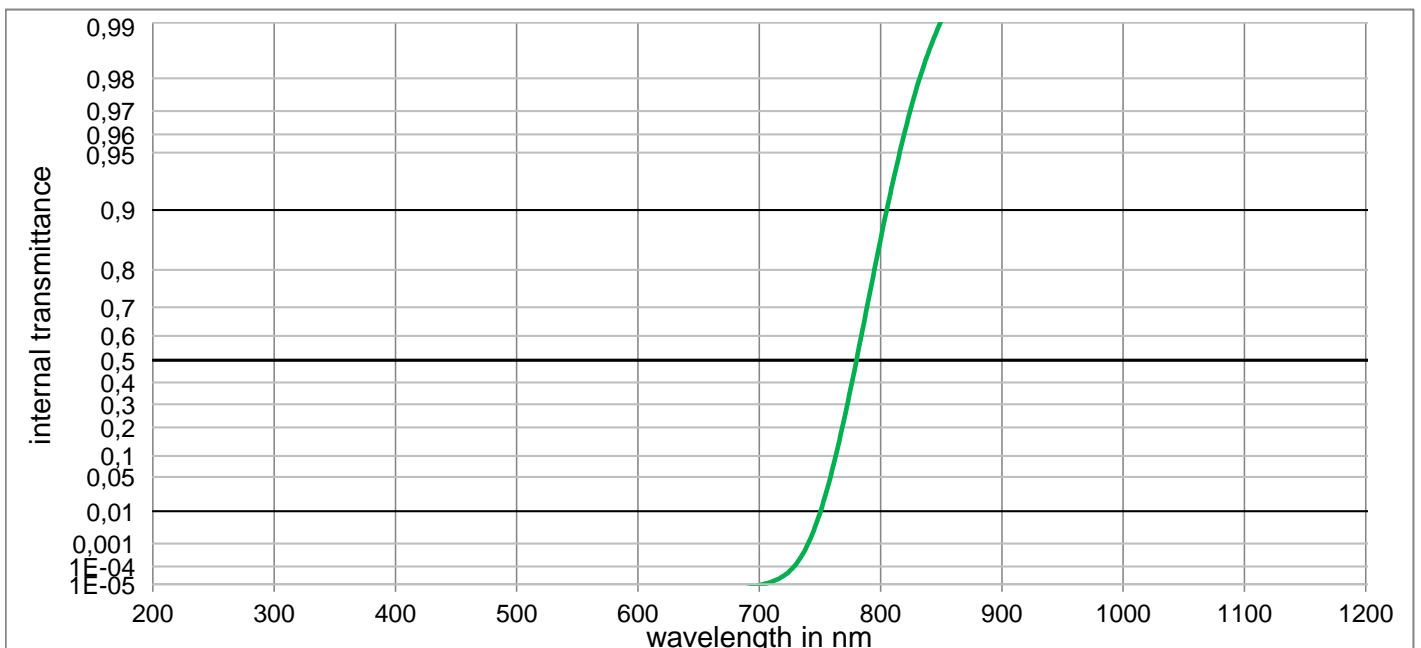
Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

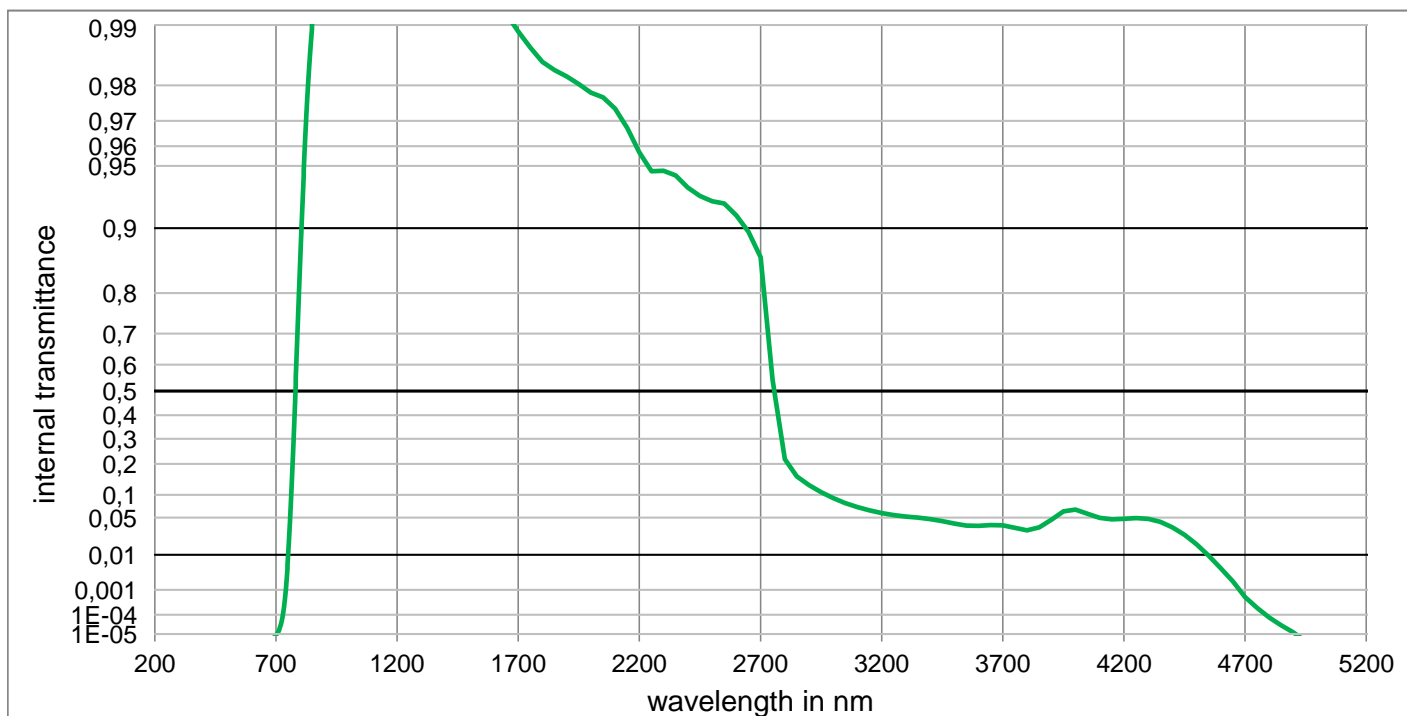
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	9,442E-01	1100	1,124E-01	2200	1,008E-01	3700	9,734E-02
210	< 1,0E-05	510	< 1,000E-05	810	9,414E-01	1110	8,093E-02	2250	1,400E-01	3750	1,032E-01
220	< 1,0E-05	520	< 1,000E-05	820	9,377E-01	1120	5,559E-02	2300	1,844E-01	3800	1,105E-01
230	< 1,0E-05	530	< 1,000E-05	830	9,327E-01	1130	3,853E-02	2350	2,288E-01	3850	1,182E-01
240	< 1,0E-05	540	< 1,000E-05	840	9,271E-01	1140	2,454E-02	2400	2,643E-01	3900	1,239E-01
250	< 1,0E-05	550	< 1,000E-05	850	9,212E-01	1150	1,553E-02	2450	2,870E-01	3950	1,281E-01
260	< 1,0E-05	560	< 1,000E-05	860	9,148E-01	1160	9,600E-03	2500	2,997E-01	4000	1,292E-01
270	< 1,0E-05	570	< 1,000E-05	870	9,076E-01	1170	6,124E-03	2550	3,020E-01	4050	1,255E-01
280	< 1,0E-05	580	< 1,000E-05	880	8,989E-01	1180	3,890E-03	2600	2,991E-01	4100	1,144E-01
290	< 1,0E-05	590	< 1,000E-05	890	8,889E-01	1190	2,500E-03	2650	2,922E-01	4150	1,006E-01
300	< 1,0E-05	600	< 1,000E-05	900	8,776E-01	1200	1,611E-03	2700	2,612E-01	4200	8,570E-02
310	< 1,0E-05	610	< 1,000E-05	910	8,651E-01	1250	2,518E-04	2750	1,342E-01	4250	6,981E-02
320	< 1,000E-05	620	< 1,000E-05	920	8,505E-01	1300	1,782E-04	2800	1,042E-01	4300	5,190E-02
330	< 1,000E-05	630	< 1,000E-05	930	8,328E-01	1350	3,698E-04	2850	1,074E-01	4350	3,430E-02
340	< 1,000E-05	640	< 1,000E-05	940	8,137E-01	1400	3,388E-04	2900	1,136E-01	4400	2,019E-02
350	< 1,000E-05	650	< 1,000E-05	950	7,936E-01	1450	1,272E-04	2950	1,185E-01	4450	9,760E-03
360	< 1,000E-05	660	< 1,000E-05	960	7,697E-01	1500	5,674E-05	3000	1,203E-01	4500	4,410E-03
370	< 1,000E-05	670	< 1,000E-05	970	7,403E-01	1550	7,805E-05	3050	1,164E-01	4550	1,840E-03
380	< 1,000E-05	680	< 1,000E-05	980	7,052E-01	1600	1,738E-04	3100	1,094E-01	4600	7,240E-04
390	< 1,000E-05	690	1,925E-05	990	6,662E-01	1650	2,710E-04	3150	1,016E-01	4650	2,825E-04
400	< 1,000E-05	700	6,397E-03	1000	6,249E-01	1700	2,449E-04	3200	9,522E-02	4700	1,191E-04
410	< 1,000E-05	710	9,896E-02	1010	5,770E-01	1750	2,216E-04	3250	8,942E-02	4750	5,808E-05
420	< 1,000E-05	720	3,571E-01	1020	5,244E-01	1800	3,322E-04	3300	8,429E-02	4800	3,162E-05
430	< 1,000E-05	730	6,334E-01	1030	4,702E-01	1850	8,561E-04	3350	7,998E-02	4850	1,690E-05
440	< 1,000E-05	740	8,095E-01	1040	4,126E-01	1900	2,534E-03	3400	7,746E-02	4900	< 1,000E-05
450	< 1,000E-05	750	8,952E-01	1050	3,537E-01	1950	7,370E-03	3450	7,752E-02	4950	< 1,000E-05
460	< 1,000E-05	760	9,306E-01	1060	2,968E-01	2000	1,525E-02	3500	7,945E-02	5000	< 1,000E-05
470	< 1,000E-05	770	9,442E-01	1070	2,425E-01	2050	2,800E-02	3550	8,240E-02	5050	< 1,000E-05
480	< 1,000E-05	780	9,467E-01	1080	1,938E-01	2100	4,638E-02	3600	8,704E-02	5100	< 1,000E-05
490	< 1,000E-05	790	9,462E-01	1090	1,483E-01	2150	7,040E-02	3650	9,214E-02	5150	< 1,000E-05

RG780

Optical properties	Mechanical properties	Colormetric properties	
Reflection factor	Reference thickness	1 mm 2 mm 3 mm	
$P_d = 0,908$	$d = 3,00 \text{ mm}$	Illuminant D65 x y Y λ_d P_e	
Spectral values guaranteed (d = 3 mm)	Density		Illuminant A x y Y λ_d P_e
$\lambda_c (\tau_i = 0,5) = 780 \text{ nm} \pm 9 \text{ nm}$	$\rho = 2,94 \text{ g/cm}^3$		
$\lambda_s (\tau_{i,U} = 1E-05) = 610 \text{ nm}$	Knoop hardness		
$\lambda_p (\tau_{i,L} = 0,97) = 900 \text{ nm}$	$HK_{[0.1/20]}$		
	Thermal properties		
	Transformation temperature		
	$T_g = 552 \text{ }^\circ\text{C}$		
	Thermal expansion in $10^{-6}/\text{K}$		
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 9,5$		
	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 10,5$		
Refractive indices	Temperature coefficient		
$n_d (587,6 \text{ nm}) = 1,56$	$Tk = 0,22 \text{ nm/K}$		
$n_s (852 \text{ nm}) = 1,55$			
$n_t (1014 \text{ nm}) = 1,55$			
Sellmeier coefficients	Chemical properties	Notes	
valid from 440 nm to 1550 nm	Chemical resistance		
$B_1 = 0,4066$	FR class = 5	Stricking glass	
$B_2 = 0,9852$	SR class = 53.4	Longpass filter	
$B_3 = 0,3548$	AR class = 1.3		
$C_1 = 1,139E-02 \text{ } \mu\text{m}^2$			
$C_2 = 1,2050E-02 \text{ } \mu\text{m}^2$		DIN 58131	
$C_3 = 55,081 \text{ } \mu\text{m}^2$			
Internal quality		Disclaimer	
Bubble class 3		All data without tolerances are to be understood to be reference values	



RG780



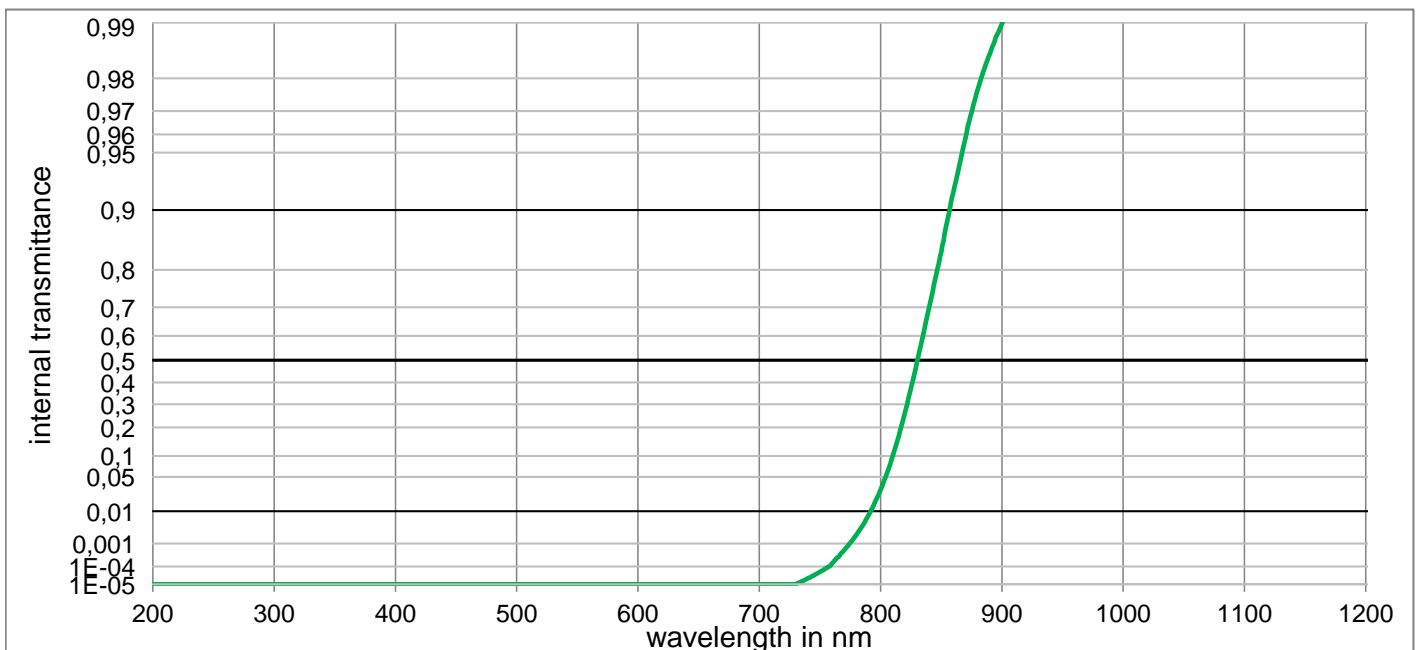
Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

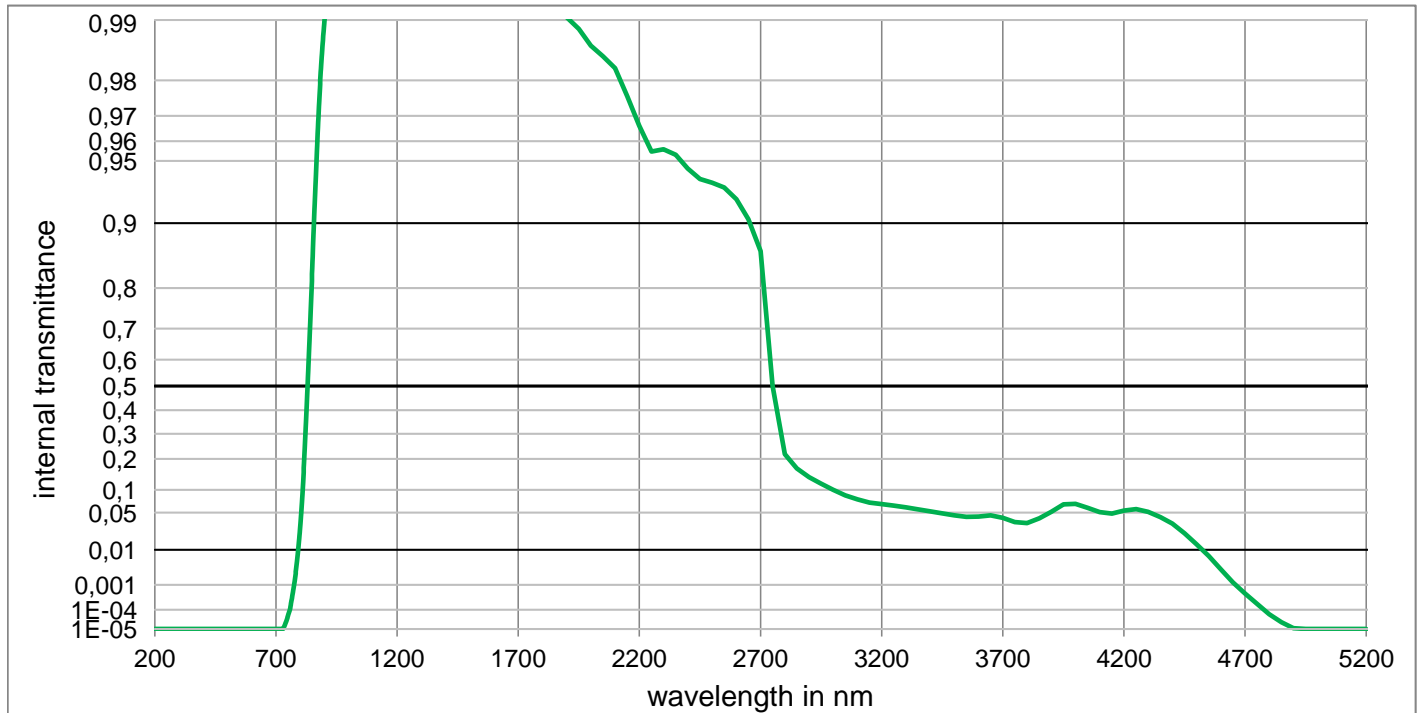
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	8,585E-01	1100	9,944E-01	2200	9,571E-01	3700	3,777E-02
210	< 1,0E-05	510	< 1,000E-05	810	9,277E-01	1110	9,944E-01	2250	9,468E-01	3750	3,428E-02
220	< 1,0E-05	520	< 1,000E-05	820	9,614E-01	1120	9,944E-01	2300	9,472E-01	3800	3,105E-02
230	< 1,0E-05	530	< 1,000E-05	830	9,778E-01	1130	9,945E-01	2350	9,443E-01	3850	3,484E-02
240	< 1,0E-05	540	< 1,000E-05	840	9,858E-01	1140	9,945E-01	2400	9,363E-01	3900	4,632E-02
250	< 1,0E-05	550	< 1,000E-05	850	9,902E-01	1150	9,945E-01	2450	9,300E-01	3950	6,186E-02
260	< 1,0E-05	560	< 1,000E-05	860	9,910E-01	1160	9,945E-01	2500	9,257E-01	4000	6,493E-02
270	< 1,0E-05	570	< 1,000E-05	870	9,919E-01	1170	9,945E-01	2550	9,238E-01	4050	5,684E-02
280	< 1,0E-05	580	< 1,000E-05	880	9,924E-01	1180	9,946E-01	2600	9,131E-01	4100	4,949E-02
290	< 1,0E-05	590	< 1,000E-05	890	9,927E-01	1190	9,946E-01	2650	8,962E-01	4150	4,707E-02
300	< 1,0E-05	600	< 1,000E-05	900	9,929E-01	1200	9,947E-01	2700	8,629E-01	4200	4,802E-02
310	< 1,0E-05	610	< 1,000E-05	910	9,930E-01	1250	9,948E-01	2750	5,436E-01	4250	4,921E-02
320	< 1,000E-05	620	< 1,000E-05	920	9,931E-01	1300	9,950E-01	2800	2,180E-01	4300	4,794E-02
330	< 1,000E-05	630	< 1,000E-05	930	9,931E-01	1350	9,951E-01	2850	1,559E-01	4350	4,304E-02
340	< 1,000E-05	640	< 1,000E-05	940	9,931E-01	1400	9,930E-01	2900	1,279E-01	4400	3,517E-02
350	< 1,000E-05	650	< 1,000E-05	950	9,930E-01	1450	9,933E-01	2950	1,071E-01	4450	2,583E-02
360	< 1,000E-05	660	< 1,000E-05	960	9,930E-01	1500	9,942E-01	3000	9,129E-02	4500	1,685E-02
370	< 1,000E-05	670	< 1,000E-05	970	9,933E-01	1550	9,938E-01	3050	7,961E-02	4550	9,430E-03
380	< 1,000E-05	680	< 1,000E-05	980	9,937E-01	1600	9,927E-01	3100	7,064E-02	4600	4,586E-03
390	< 1,000E-05	690	< 1,000E-05	990	9,939E-01	1650	9,912E-01	3150	6,354E-02	4650	1,887E-03
400	< 1,000E-05	700	< 1,000E-05	1000	9,940E-01	1700	9,892E-01	3200	5,827E-02	4700	5,470E-04
410	< 1,000E-05	710	1,422E-05	1010	9,941E-01	1750	9,870E-01	3250	5,439E-02	4750	1,991E-04
420	< 1,000E-05	720	3,155E-05	1020	9,942E-01	1800	9,847E-01	3300	5,195E-02	4800	7,430E-05
430	< 1,000E-05	730	1,255E-04	1030	9,942E-01	1850	9,832E-01	3350	5,008E-02	4850	2,958E-05
440	< 1,000E-05	740	9,334E-04	1040	9,942E-01	1900	9,820E-01	3400	4,755E-02	4900	1,222E-05
450	< 1,000E-05	750	8,941E-03	1050	9,943E-01	1950	9,803E-01	3450	4,414E-02	4950	< 1,000E-05
460	< 1,000E-05	760	6,268E-02	1060	9,943E-01	2000	9,783E-01	3500	4,020E-02	5000	< 1,000E-05
470	< 1,000E-05	770	2,345E-01	1070	9,943E-01	2050	9,771E-01	3550	3,737E-02	5050	< 1,000E-05
480	< 1,000E-05	780	4,959E-01	1080	9,943E-01	2100	9,739E-01	3600	3,722E-02	5100	< 1,000E-05
490	< 1,000E-05	790	7,222E-01	1090	9,944E-01	2150	9,675E-01	3650	3,809E-02	5150	< 1,000E-05

RG830

Optical properties	Mechanical properties	Colormetric properties
Reflection factor	Reference thickness	1 mm 2 mm 3 mm
$P_d = 0,909$	$d = 3,00 \text{ mm}$	Illuminant D65
Spectral values guaranteed (d = 3 mm)	Density	x
$\lambda_c (\tau_i = 0,5) = 830 \text{ nm} \pm 9 \text{ nm}$	$\rho = 2,94 \text{ g/cm}^3$	y
$\lambda_s (\tau_{i,U} = 1E-05) = 670 \text{ nm}$	Knoop hardness	Y
$\lambda_p (\tau_{i,L} = 0,97) = 950 \text{ nm}$	$HK_{[0.1/20]} = 436$	λ_d
		P_e
		Illuminant A
		x
		y
		Y
		λ_d
		P_e
Refractive indices	Thermal properties	Notes
$n_d (587,6 \text{ nm}) = 1,56$	Transformation temperature	
$n_s (852 \text{ nm}) = 1,55$	$T_g = 554 \text{ }^\circ\text{C}$	Stricking glass
$n_t (1014 \text{ nm}) = 1,55$	Thermal expansion in $10^{-6}/\text{K}$	Longpass filter
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 9,5$	
	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 10,5$	
		DIN 58131
Sellmeier coefficients	Temperature coefficient	
on request	$Tk = 0,23 \text{ nm/K}$	Disclaimer
	Chemical properties	All data without tolerances are to be understood to be reference values
	Chemical resistance	
	FR class = 5	
	SR class = 53.4	
	AR class = 1.3	
Internal quality		
Bubble class 3		



RG830

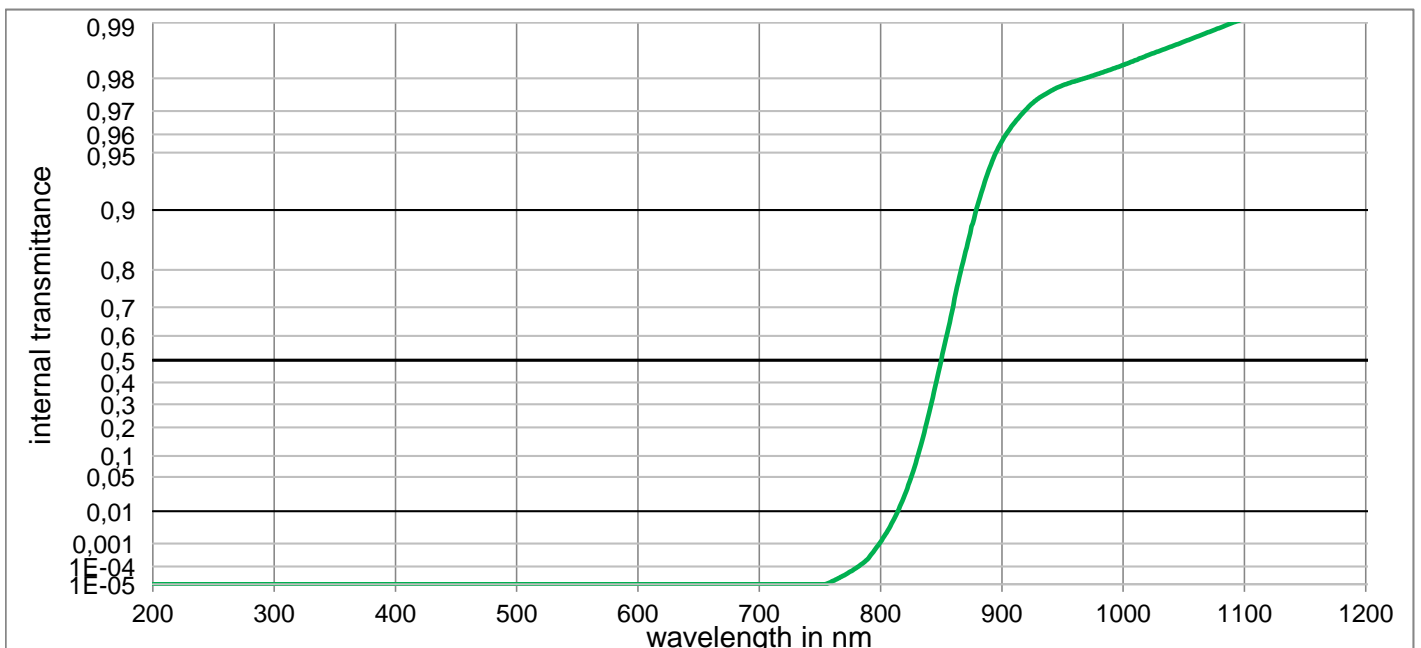


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

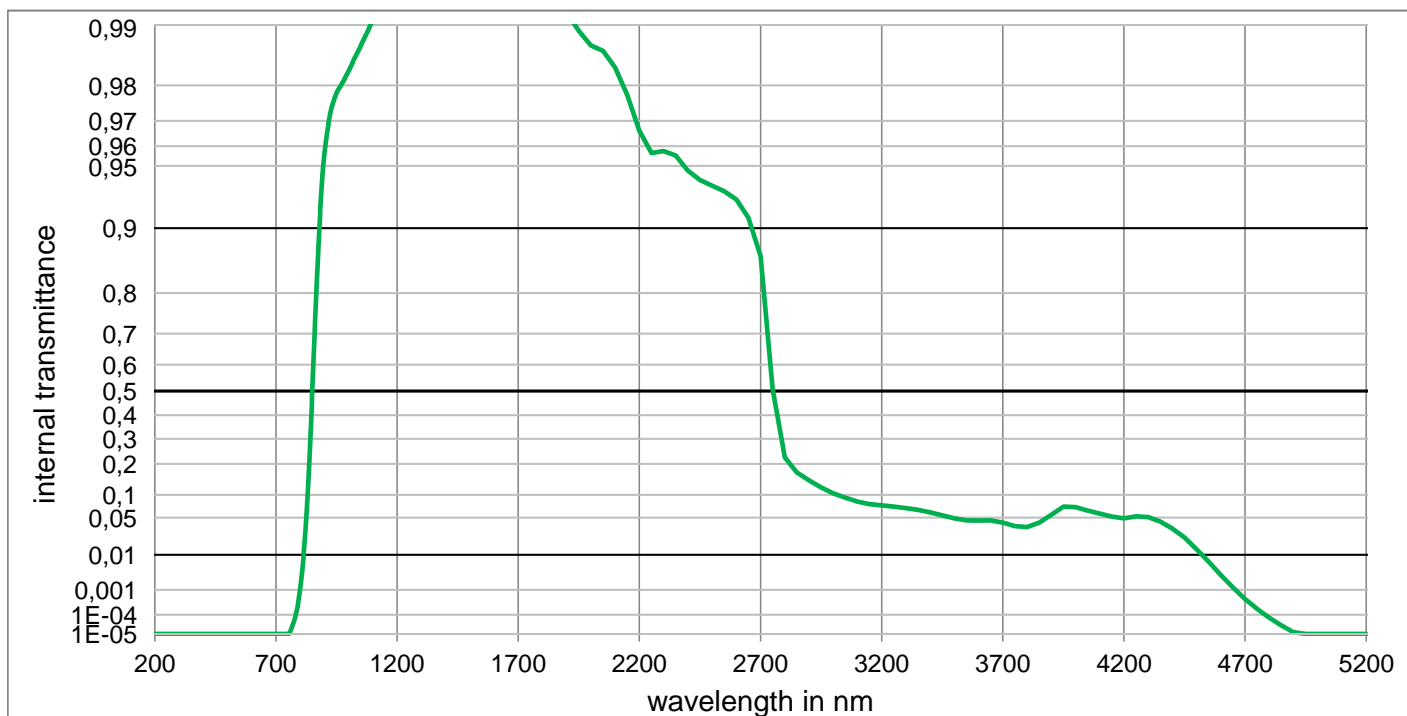
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	2,968E-02	1100	9,971E-01	2200	9,664E-01	3700	4,138E-02
210	< 1,0E-05	510	< 1,000E-05	810	9,936E-02	1110	9,971E-01	2250	9,550E-01	3750	3,550E-02
220	< 1,0E-05	520	< 1,000E-05	820	2,604E-01	1120	9,972E-01	2300	9,562E-01	3800	3,400E-02
230	< 1,0E-05	530	< 1,000E-05	830	4,901E-01	1130	9,973E-01	2350	9,533E-01	3850	4,058E-02
240	< 1,0E-05	540	< 1,000E-05	840	6,987E-01	1140	9,973E-01	2400	9,455E-01	3900	5,135E-02
250	< 1,0E-05	550	< 1,000E-05	850	8,366E-01	1150	9,974E-01	2450	9,387E-01	3950	6,590E-02
260	< 1,0E-05	560	< 1,000E-05	860	9,189E-01	1160	9,975E-01	2500	9,361E-01	4000	6,660E-02
270	< 1,0E-05	570	< 1,000E-05	870	9,582E-01	1170	9,976E-01	2550	9,326E-01	4050	5,851E-02
280	< 1,0E-05	580	< 1,000E-05	880	9,768E-01	1180	9,976E-01	2600	9,232E-01	4100	5,083E-02
290	< 1,0E-05	590	< 1,000E-05	890	9,852E-01	1190	9,977E-01	2650	9,041E-01	4150	4,831E-02
300	< 1,0E-05	600	< 1,000E-05	900	9,899E-01	1200	9,978E-01	2700	8,646E-01	4200	5,371E-02
310	< 1,0E-05	610	< 1,000E-05	910	9,927E-01	1250	9,983E-01	2750	5,000E-01	4250	5,637E-02
320	< 1,000E-05	620	< 1,000E-05	920	9,943E-01	1300	9,989E-01	2800	2,183E-01	4300	5,122E-02
330	< 1,000E-05	630	< 1,000E-05	930	9,951E-01	1350	9,997E-01	2850	1,663E-01	4350	4,271E-02
340	< 1,000E-05	640	< 1,000E-05	940	9,954E-01	1400	9,985E-01	2900	1,371E-01	4400	3,328E-02
350	< 1,000E-05	650	< 1,000E-05	950	9,956E-01	1450	9,987E-01	2950	1,170E-01	4450	2,234E-02
360	< 1,000E-05	660	< 1,000E-05	960	9,958E-01	1500	9,998E-01	3000	1,002E-01	4500	1,333E-02
370	< 1,000E-05	670	< 1,000E-05	970	9,959E-01	1550	9,999E-01	3050	8,620E-02	4550	7,120E-03
380	< 1,000E-05	680	< 1,000E-05	980	9,960E-01	1600	9,997E-01	3100	7,650E-02	4600	3,120E-03
390	< 1,000E-05	690	< 1,000E-05	990	9,961E-01	1650	9,984E-01	3150	6,962E-02	4650	1,208E-03
400	< 1,000E-05	700	< 1,000E-05	1000	9,962E-01	1700	9,965E-01	3200	6,599E-02	4700	4,875E-04
410	< 1,000E-05	710	< 1,000E-05	1010	9,963E-01	1750	9,942E-01	3250	6,294E-02	4750	1,828E-04
420	< 1,000E-05	720	< 1,000E-05	1020	9,964E-01	1800	9,924E-01	3300	5,949E-02	4800	6,152E-05
430	< 1,000E-05	730	1,025E-05	1030	9,965E-01	1850	9,911E-01	3350	5,595E-02	4850	2,366E-05
440	< 1,000E-05	740	2,262E-05	1040	9,966E-01	1900	9,903E-01	3400	5,237E-02	4900	1,099E-05
450	< 1,000E-05	750	5,207E-05	1050	9,967E-01	1950	9,889E-01	3450	4,889E-02	4950	< 1,000E-05
460	< 1,000E-05	760	1,421E-04	1060	9,967E-01	2000	9,866E-01	3500	4,561E-02	5000	< 1,000E-05
470	< 1,000E-05	770	5,562E-04	1070	9,968E-01	2050	9,848E-01	3550	4,294E-02	5050	< 1,000E-05
480	< 1,000E-05	780	2,044E-03	1080	9,969E-01	2100	9,826E-01	3600	4,356E-02	5100	< 1,000E-05
490	< 1,000E-05	790	7,784E-03	1090	9,970E-01	2150	9,760E-01	3650	4,528E-02	5150	< 1,000E-05

RG850

Optical properties	Mechanical properties	Colorimetric properties	
Reflection factor	Reference thickness	1 mm 2 mm 3 mm	
$P_d = 0,909$	$d = 3,00 \text{ mm}$	Illuminant D65 x y Y λ_d P_e	
Spectral values guaranteed (d = 3 mm)	Density		Illuminant A x y Y λ_d P_e
$\lambda_c (\tau_i = 0,5) = 850 \text{ nm} \pm 9 \text{ nm}$	$\rho = 2,93 \text{ g/cm}^3$		
$\lambda_s (\tau_{i,U} = 1E-05) = 700 \text{ nm}$	Knoop hardness		
$\lambda_p (\tau_{i,L} = 0,90) = 950 \text{ nm}$	$HK_{[0.1/20]} = 441$		
$\lambda_p (\tau_{i,L} = 0,97) = 1200 \text{ nm}$	Thermal properties		
	Transformation temperature		
	$T_g = 554 \text{ }^\circ\text{C}$		
	Thermal expansion in $10^{-6}/\text{K}$		
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 9,5$		
	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 10,5$		
	Temperature coefficient		
	$Tk = 0,24 \text{ nm/K}$		
Refractive indices	Chemical properties	Notes	
$n_d (587,6 \text{ nm}) = 1,56$	Chemical resistance		
$n_s (852 \text{ nm}) = 1,55$	FR class = 5	Stricking glass	
$n_t (1014 \text{ nm}) = 1,55$	SR class = 53.4	Longpass filter	
	AR class = 1.3		
Sellmeier coefficients		DIN 58131	
on request			
		Disclaimer	
		All data without tolerances are to be understood to be reference values	
Internal quality			
Bubble class 3			



RG850



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	1,156E-03	1100	9,905E-01	2200	9,665E-01	3700	4,170E-02
210	< 1,0E-05	510	< 1,000E-05	810	5,250E-03	1110	9,909E-01	2250	9,567E-01	3750	3,687E-02
220	< 1,0E-05	520	< 1,000E-05	820	2,363E-02	1120	9,914E-01	2300	9,577E-01	3800	3,540E-02
230	< 1,0E-05	530	< 1,000E-05	830	9,140E-02	1130	9,918E-01	2350	9,555E-01	3850	4,188E-02
240	< 1,0E-05	540	< 1,000E-05	840	2,610E-01	1140	9,923E-01	2400	9,474E-01	3900	5,486E-02
250	< 1,0E-05	550	< 1,000E-05	850	5,003E-01	1150	9,927E-01	2450	9,414E-01	3950	7,151E-02
260	< 1,0E-05	560	< 1,000E-05	860	7,037E-01	1160	9,931E-01	2500	9,375E-01	4000	7,070E-02
270	< 1,0E-05	570	< 1,000E-05	870	8,376E-01	1170	9,935E-01	2550	9,336E-01	4050	6,328E-02
280	< 1,0E-05	580	< 1,000E-05	880	9,053E-01	1180	9,939E-01	2600	9,272E-01	4100	5,719E-02
290	< 1,0E-05	590	< 1,000E-05	890	9,399E-01	1190	9,943E-01	2650	9,108E-01	4150	5,179E-02
300	< 1,0E-05	600	< 1,000E-05	900	9,565E-01	1200	9,946E-01	2700	8,646E-01	4200	4,878E-02
310	< 1,0E-05	610	< 1,000E-05	910	9,651E-01	1250	9,960E-01	2750	5,095E-01	4250	5,219E-02
320	< 1,000E-05	620	< 1,000E-05	920	9,706E-01	1300	9,973E-01	2800	2,243E-01	4300	5,097E-02
330	< 1,000E-05	630	< 1,000E-05	930	9,743E-01	1350	9,984E-01	2850	1,689E-01	4350	4,352E-02
340	< 1,000E-05	640	< 1,000E-05	940	9,765E-01	1400	9,974E-01	2900	1,425E-01	4400	3,343E-02
350	< 1,000E-05	650	< 1,000E-05	950	9,782E-01	1450	9,984E-01	2950	1,212E-01	4450	2,305E-02
360	< 1,000E-05	660	< 1,000E-05	960	9,792E-01	1500	9,997E-01	3000	1,043E-01	4500	1,334E-02
370	< 1,000E-05	670	< 1,000E-05	970	9,802E-01	1550	9,999E-01	3050	9,268E-02	4550	6,780E-03
380	< 1,000E-05	680	< 1,000E-05	980	9,811E-01	1600	9,998E-01	3100	8,310E-02	4600	2,980E-03
390	< 1,000E-05	690	< 1,000E-05	990	9,821E-01	1650	9,986E-01	3150	7,685E-02	4650	1,211E-03
400	< 1,000E-05	700	< 1,000E-05	1000	9,830E-01	1700	9,968E-01	3200	7,425E-02	4700	4,656E-04
410	< 1,000E-05	710	< 1,000E-05	1010	9,840E-01	1750	9,950E-01	3250	7,161E-02	4750	1,803E-04
420	< 1,000E-05	720	< 1,000E-05	1020	9,850E-01	1800	9,933E-01	3300	6,837E-02	4800	7,194E-05
430	< 1,000E-05	730	< 1,000E-05	1030	9,858E-01	1850	9,922E-01	3350	6,445E-02	4850	2,958E-05
440	< 1,000E-05	740	< 1,000E-05	1040	9,865E-01	1900	9,914E-01	3400	5,946E-02	4900	1,282E-05
450	< 1,000E-05	750	< 1,000E-05	1050	9,873E-01	1950	9,893E-01	3450	5,405E-02	4950	< 1,000E-05
460	< 1,000E-05	760	1,507E-05	1060	9,880E-01	2000	9,874E-01	3500	4,881E-02	5000	< 1,000E-05
470	< 1,000E-05	770	3,444E-05	1070	9,887E-01	2050	9,865E-01	3550	4,544E-02	5050	< 1,000E-05
480	< 1,000E-05	780	8,542E-05	1080	9,894E-01	2100	9,837E-01	3600	4,510E-02	5100	< 1,000E-05
490	< 1,000E-05	790	2,412E-04	1090	9,900E-01	2150	9,776E-01	3650	4,534E-02	5150	< 1,000E-05

RG1000

Optical properties	
Reflection factor	
$P_d = 0,913$	
Spectral values guaranteed (d = 3 mm)	
$\lambda_c (\tau_i = 0,5)$	= 1000 nm \pm 6 nm
$\lambda_s (\tau_{i,U} = 1E-05)$	= 730 nm
$\lambda_p (\tau_{i,L} = 0,90)$	= 1300 nm
Refractive indices	
$n_d (587,6 \text{ nm})$	= 1,54
$n_s (852 \text{ nm})$	= 1,53
$n_t (1014 \text{ nm})$	= 1,53
Sellmeier coefficients	
valid from 440 nm to 1550 nm	
B_1	= 0,8970
B_2	= 0,4353
B_3	= 1,1960
C_1	= 1,087E-02 μm^2
C_2	= 1,1835E-02 μm^2
C_3	= 142,345 μm^2
Internal quality	
Bubble class	3

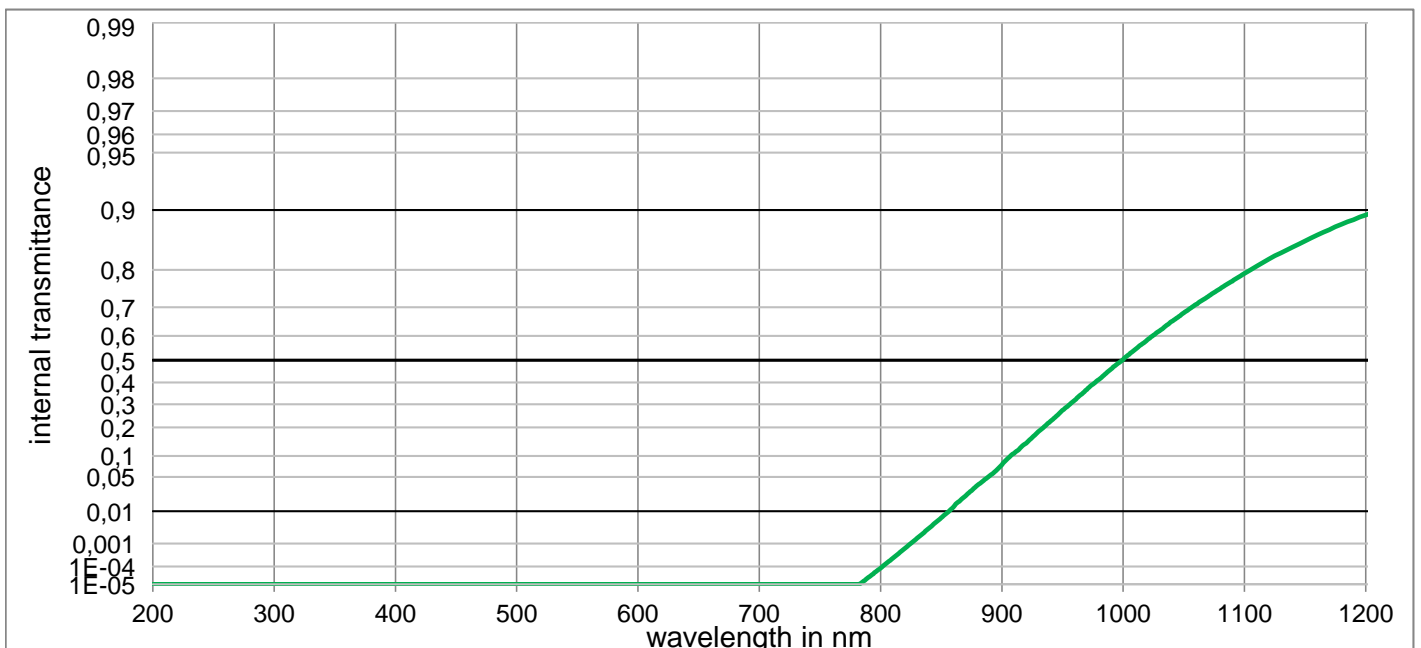
Mechanical properties	
Reference thickness	
d = 3,00 mm	
Density	
$\rho = 2,73 \text{ g/cm}^3$	
Knoop hardness	
$HK_{[0.1/20]} = 460$	

Thermal properties	
Transformation temperature	
Tg = 476 °C	
Thermal expansion in $10^{-6}/K$	
$\alpha (-30^\circ\text{C}/+70^\circ\text{C})$	= 9,0
$\alpha (20^\circ\text{C}/300^\circ\text{C})$	= 10,3
Temperature coefficient	
Tk = 0,41 nm/K	

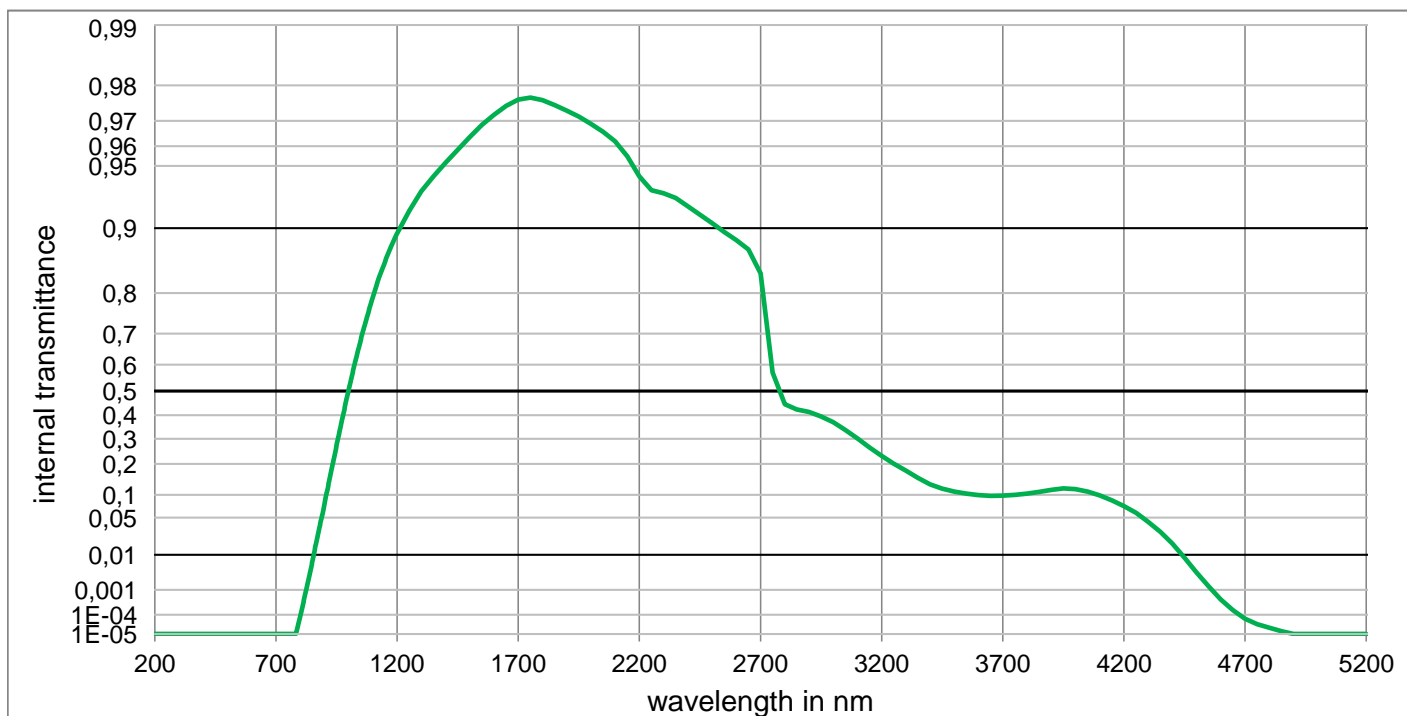
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
Ionically colored glass	
Longpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



RG1000



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	8,394E-05	1100	7,917E-01	2200	9,439E-01	3700	9,800E-02
210	< 1,0E-05	510	< 1,000E-05	810	2,455E-04	1110	8,080E-01	2250	9,342E-01	3750	1,002E-01
220	< 1,0E-05	520	< 1,000E-05	820	6,502E-04	1120	8,226E-01	2300	9,320E-01	3800	1,036E-01
230	< 1,0E-05	530	< 1,000E-05	830	1,551E-03	1130	8,350E-01	2350	9,284E-01	3850	1,080E-01
240	< 1,0E-05	540	< 1,000E-05	840	3,371E-03	1140	8,459E-01	2400	9,216E-01	3900	1,136E-01
250	< 1,0E-05	550	< 1,000E-05	850	6,757E-03	1150	8,561E-01	2450	9,138E-01	3950	1,179E-01
260	< 1,0E-05	560	< 1,000E-05	860	1,254E-02	1160	8,656E-01	2500	9,054E-01	4000	1,161E-01
270	< 1,0E-05	570	< 1,000E-05	870	2,229E-02	1170	8,739E-01	2550	8,959E-01	4050	1,089E-01
280	< 1,0E-05	580	< 1,000E-05	880	3,617E-02	1180	8,816E-01	2600	8,861E-01	4100	9,840E-02
290	< 1,0E-05	590	< 1,000E-05	890	5,218E-02	1190	8,879E-01	2650	8,740E-01	4150	8,574E-02
300	< 1,0E-05	600	< 1,000E-05	900	7,670E-02	1200	8,940E-01	2700	8,370E-01	4200	7,245E-02
310	< 1,0E-05	610	< 1,000E-05	910	1,073E-01	1250	9,176E-01	2750	5,716E-01	4250	5,855E-02
320	< 1,000E-05	620	< 1,000E-05	920	1,407E-01	1300	9,335E-01	2800	4,462E-01	4300	4,286E-02
330	< 1,000E-05	630	< 1,000E-05	930	1,822E-01	1350	9,438E-01	2850	4,240E-01	4350	2,926E-02
340	< 1,000E-05	640	< 1,000E-05	940	2,248E-01	1400	9,518E-01	2900	4,138E-01	4400	1,762E-02
350	< 1,000E-05	650	< 1,000E-05	950	2,726E-01	1450	9,583E-01	2950	3,942E-01	4450	8,530E-03
360	< 1,000E-05	660	< 1,000E-05	960	3,177E-01	1500	9,640E-01	3000	3,704E-01	4500	3,477E-03
370	< 1,000E-05	670	< 1,000E-05	970	3,676E-01	1550	9,687E-01	3050	3,373E-01	4550	1,300E-03
380	< 1,000E-05	680	< 1,000E-05	980	4,135E-01	1600	9,720E-01	3100	3,015E-01	4600	4,406E-04
390	< 1,000E-05	690	< 1,000E-05	990	4,614E-01	1650	9,747E-01	3150	2,644E-01	4650	1,603E-04
400	< 1,000E-05	700	< 1,000E-05	1000	5,029E-01	1700	9,764E-01	3200	2,303E-01	4700	6,397E-05
410	< 1,000E-05	710	< 1,000E-05	1010	5,464E-01	1750	9,770E-01	3250	2,013E-01	4750	3,404E-05
420	< 1,000E-05	720	< 1,000E-05	1020	5,848E-01	1800	9,763E-01	3300	1,753E-01	4800	2,249E-05
430	< 1,000E-05	730	< 1,000E-05	1030	6,192E-01	1850	9,750E-01	3350	1,507E-01	4850	1,445E-05
440	< 1,000E-05	740	< 1,000E-05	1040	6,527E-01	1900	9,733E-01	3400	1,302E-01	4900	< 1,000E-05
450	< 1,000E-05	750	< 1,000E-05	1050	6,821E-01	1950	9,715E-01	3450	1,174E-01	4950	< 1,000E-05
460	< 1,000E-05	760	< 1,000E-05	1060	7,085E-01	2000	9,690E-01	3500	1,088E-01	5000	< 1,000E-05
470	< 1,000E-05	770	< 1,000E-05	1070	7,320E-01	2050	9,660E-01	3550	1,030E-01	5050	< 1,000E-05
480	< 1,000E-05	780	< 1,000E-05	1080	7,538E-01	2100	9,622E-01	3600	9,915E-02	5100	< 1,000E-05
490	< 1,000E-05	790	2,575E-05	1090	7,734E-01	2150	9,551E-01	3650	9,763E-02	5150	< 1,000E-05

BG36

Optical properties	
Reflection factor	
$P_d = 0,877$	
Spectral values guaranteed	
τ_i (405 nm)	$\geq 0,9$
τ_i (450 nm)	$\leq 0,42$
τ_i (650 nm)	$\geq 0,9$
τ_i (800 nm)	$\leq 0,01$
Refractive indices	
n_d (587,6 nm) = 1,69	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

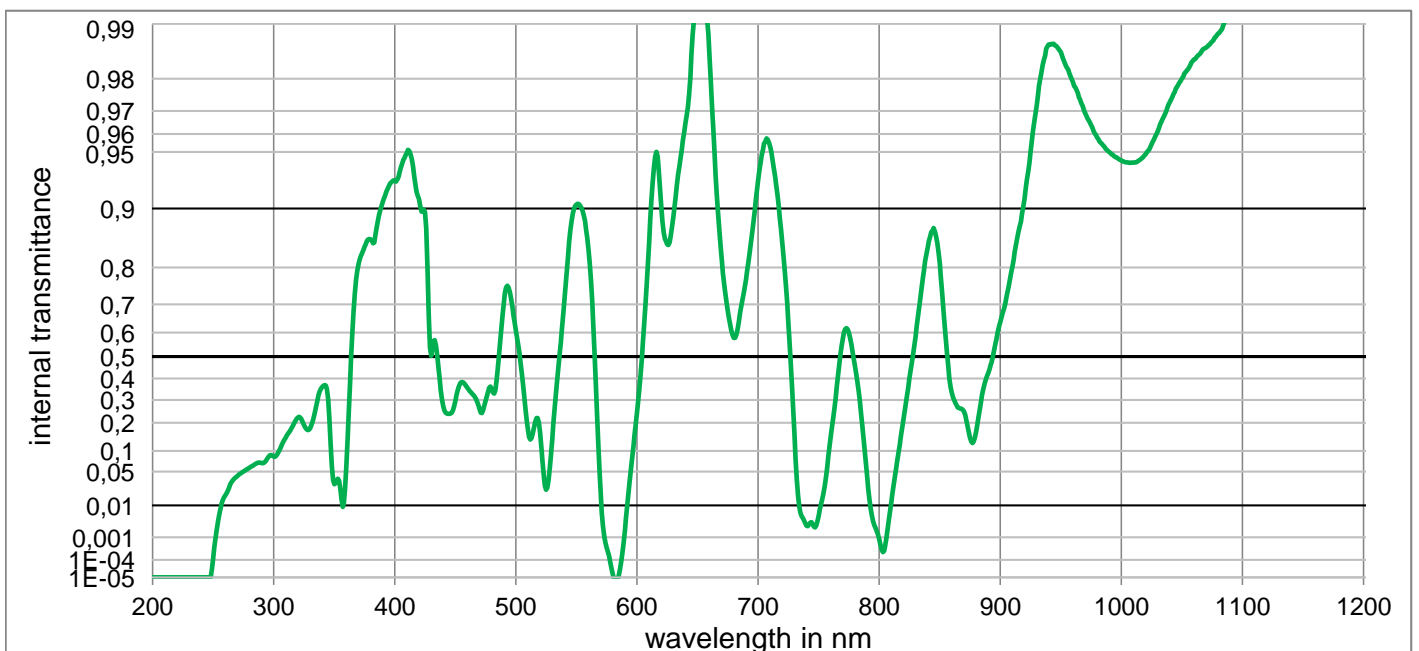
Mechanical properties	
Reference thickness	
d = 1,00 mm	
Density	
$\rho = 3,59 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 701	

Thermal properties	
Transformation temperature	
$T_g = 657 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 6,1
α (20°C/300°C)	= 7,2

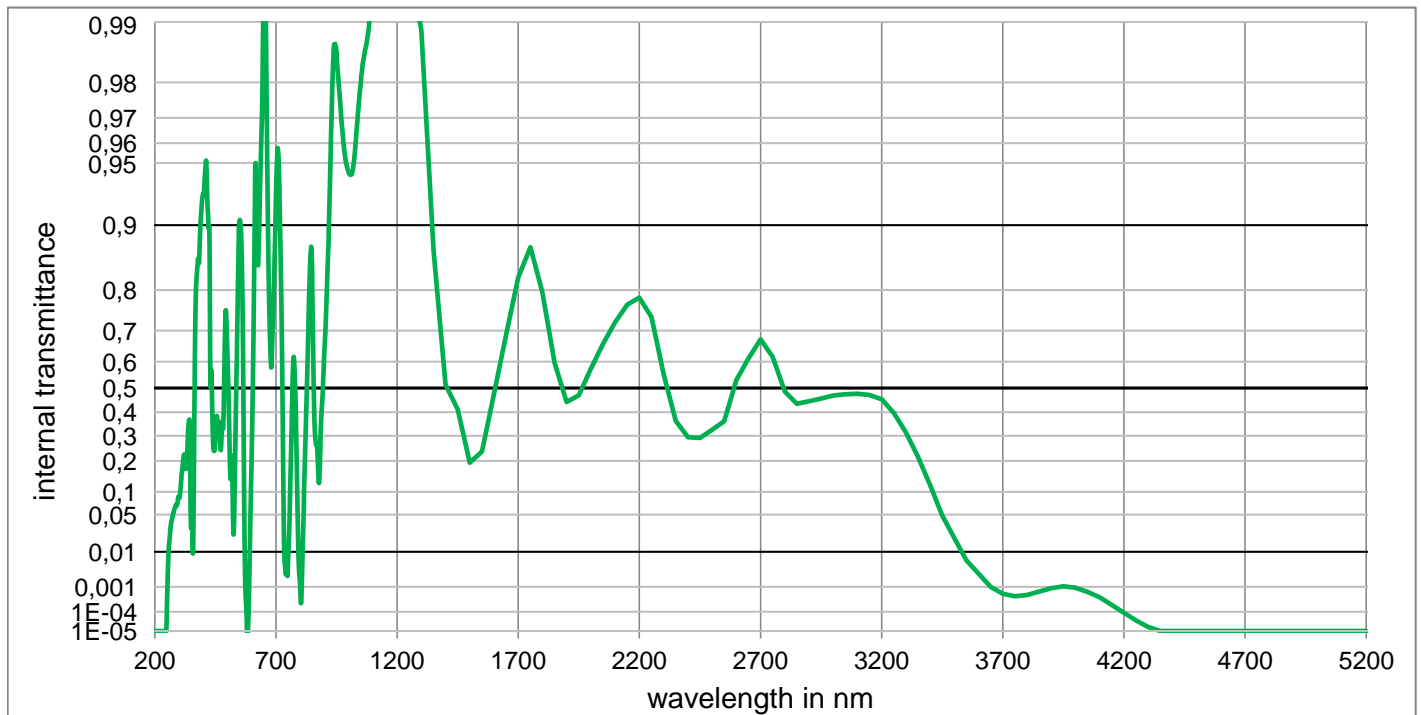
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 52.2
AR class	= 1.2

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,344	0,395	0,429
	y	0,327	0,356	0,370
	Y	39,5	29,0	23,5
	λ_d	622 nm	591 nm	590 nm
	P_e	0,082	0,305	0,437
Illuminant A	x	0,495	0,534	0,557
	y	0,387	0,390	0,389
	Y	41,4	32,2	26,9
	λ_d	628 nm	600 nm	599 nm
	P_e	0,185	0,478	0,628

Notes	
Ionically colored glass	
Multi bandpass filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



BG36



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	6,084E-01	800	8,615E-04	1100	9,947E-01	2200	7,840E-01	3700	5,636E-04
210	< 1,0E-05	510	1,685E-01	810	1,212E-02	1110	9,956E-01	2250	7,370E-01	3750	4,498E-04
220	< 1,0E-05	520	1,625E-01	820	2,111E-01	1120	9,965E-01	2300	5,570E-01	3800	5,035E-04
230	< 1,0E-05	530	1,386E-01	830	5,842E-01	1130	9,973E-01	2350	3,641E-01	3850	6,764E-04
240	< 1,0E-05	540	7,084E-01	840	8,398E-01	1140	9,979E-01	2400	2,940E-01	3900	8,872E-04
250	1,3E-04	550	9,047E-01	850	8,090E-01	1150	9,981E-01	2450	2,914E-01	3950	1,054E-03
260	1,7E-02	560	8,367E-01	860	3,330E-01	1160	9,979E-01	2500	3,250E-01	4000	9,311E-04
270	4,2E-02	570	1,873E-02	870	2,481E-01	1170	9,974E-01	2550	3,616E-01	4050	6,485E-04
280	5,8E-02	580	1,610E-05	880	1,625E-01	1180	9,966E-01	2600	5,320E-01	4100	4,112E-04
290	6,8E-02	590	1,816E-03	890	4,256E-01	1190	9,956E-01	2650	6,110E-01	4150	2,000E-04
300	8,4E-02	600	2,413E-01	900	6,394E-01	1200	9,946E-01	2700	6,740E-01	4200	8,913E-05
310	1,4E-01	610	8,512E-01	910	8,023E-01	1250	9,950E-01	2750	6,170E-01	4250	3,746E-05
320	2,223E-01	620	9,037E-01	920	9,102E-01	1300	9,890E-01	2800	4,856E-01	4300	1,710E-05
330	1,781E-01	630	8,899E-01	930	9,718E-01	1350	8,689E-01	2850	4,360E-01	4350	< 1,000E-05
340	3,601E-01	640	9,649E-01	940	9,870E-01	1400	5,130E-01	2900	4,455E-01	4400	< 1,000E-05
350	2,978E-02	650	9,962E-01	950	9,857E-01	1450	4,112E-01	2950	4,570E-01	4450	< 1,000E-05
360	6,104E-02	660	9,844E-01	960	9,792E-01	1500	1,930E-01	3000	4,695E-01	4500	< 1,000E-05
370	8,080E-01	670	8,158E-01	970	9,692E-01	1550	2,365E-01	3050	4,748E-01	4550	< 1,000E-05
380	8,558E-01	680	5,792E-01	980	9,582E-01	1600	4,754E-01	3100	4,767E-01	4600	< 1,000E-05
390	9,077E-01	690	7,712E-01	990	9,499E-01	1650	6,889E-01	3150	4,720E-01	4650	< 1,000E-05
400	9,286E-01	700	9,289E-01	1000	9,445E-01	1700	8,240E-01	3200	4,547E-01	4700	< 1,000E-05
410	9,496E-01	710	9,529E-01	1010	9,429E-01	1750	8,730E-01	3250	3,980E-01	4750	< 1,000E-05
420	9,107E-01	720	8,502E-01	1020	9,484E-01	1800	7,951E-01	3300	3,137E-01	4800	< 1,000E-05
430	5,033E-01	730	1,533E-01	1030	9,614E-01	1850	5,949E-01	3350	2,154E-01	4850	< 1,000E-05
440	2,722E-01	740	2,600E-03	1040	9,731E-01	1900	4,433E-01	3400	1,186E-01	4900	< 1,000E-05
450	2,957E-01	750	5,260E-03	1050	9,801E-01	1950	4,709E-01	3450	4,861E-02	4950	< 1,000E-05
460	3,560E-01	760	1,460E-01	1060	9,843E-01	2000	5,741E-01	3500	1,952E-02	5000	< 1,000E-05
470	2,574E-01	770	5,782E-01	1070	9,865E-01	2050	6,600E-01	3550	6,251E-03	5050	< 1,000E-05
480	3,513E-01	780	4,586E-01	1080	9,887E-01	2100	7,230E-01	3600	2,675E-03	5100	< 1,000E-05
490	7,056E-01	790	4,187E-02	1090	9,918E-01	2150	7,680E-01	3650	1,009E-03	5150	< 1,000E-05

NG1

Optical properties	
Reflection factor	
$P_d = 0,918$	
Spectral values guaranteed	
τ_i (546 nm)	< 0,0001
Refractive indices	
n_F (486 nm)	= 1,53
n_e (546 nm)	= 1,53
n_d (587,6 nm)	= 1,52
Sellmeier coefficients	
valid from 440 nm to 1550 nm	
B_1	0,8361
B_2	0,4344
B_3	0,8624
C_1	1,081E-02 μm^2
C_2	1,1185E-02 μm^2
C_3	100,000 μm^2
Internal quality	
Bubble class	2

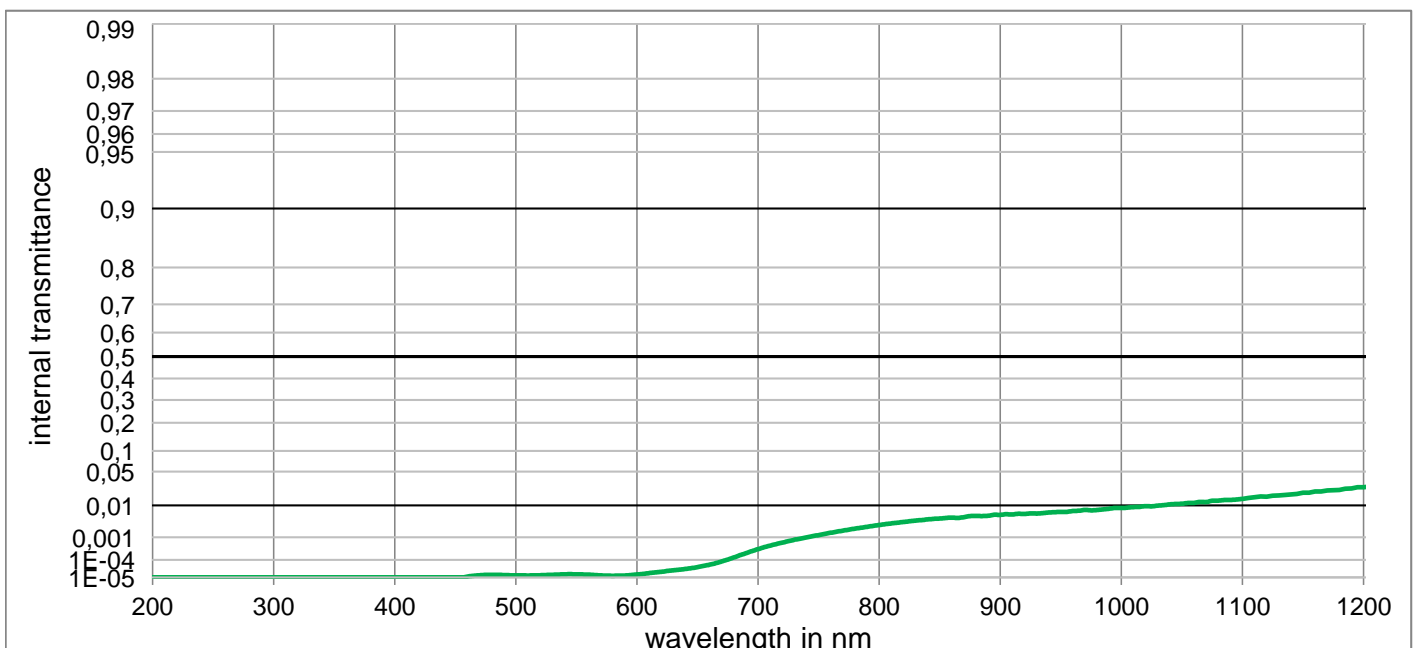
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,48 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 418	

Thermal properties	
Transformation temperature	
$T_g = 461 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 6,5
α (20°C/300°C)	= 7,0

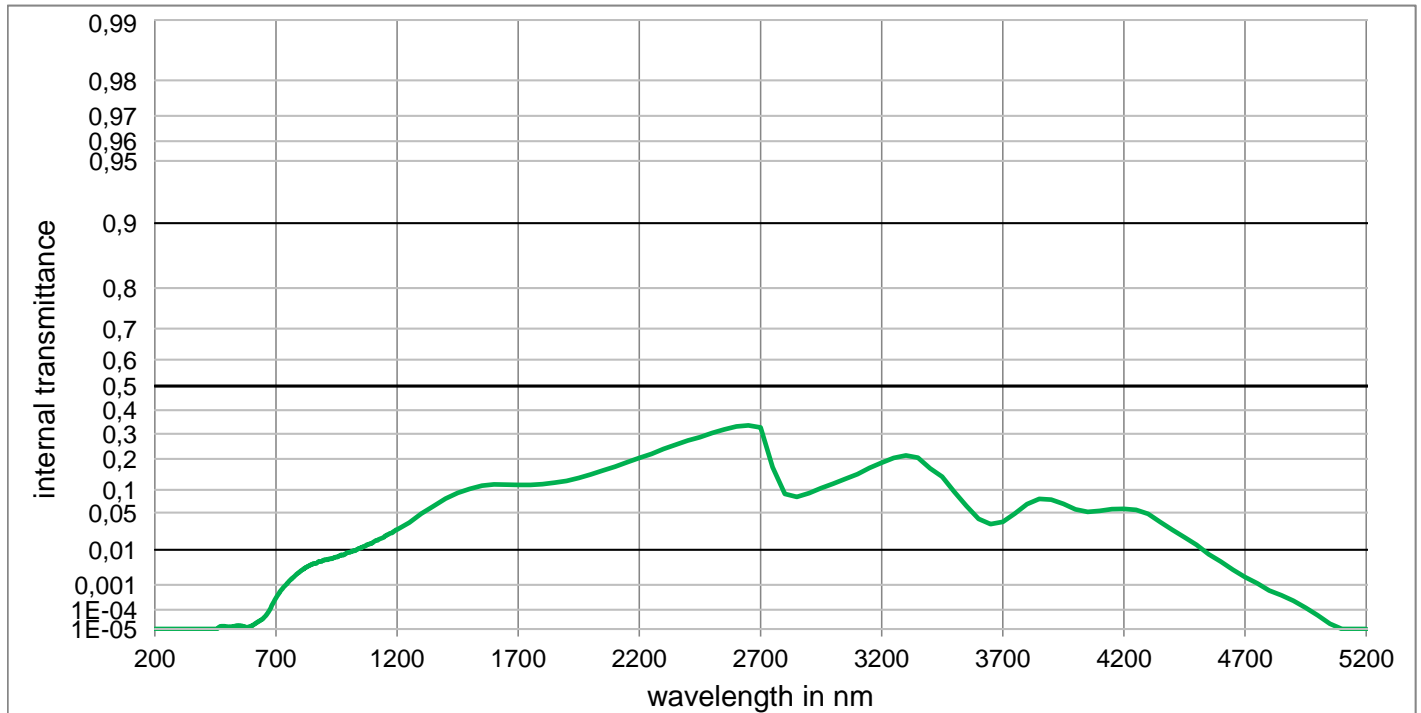
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 2,2
AR class	= 1

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
Ionically colored glass	
Neutral density filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



NG1



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	1,340E-05	800	2,710E-03	1100	1,444E-02	2200	2,037E-01	3700	3,550E-02
210	< 1,0E-05	510	1,317E-05	810	3,039E-03	1110	1,580E-02	2250	2,186E-01	3750	4,830E-02
220	< 1,0E-05	520	1,365E-05	820	3,391E-03	1120	1,615E-02	2300	2,378E-01	3800	6,600E-02
230	< 1,0E-05	530	1,459E-05	830	3,730E-03	1130	1,720E-02	2350	2,555E-01	3850	7,740E-02
240	< 1,0E-05	540	1,559E-05	840	4,067E-03	1140	1,811E-02	2400	2,719E-01	3900	7,590E-02
250	< 1,0E-05	550	1,559E-05	850	4,328E-03	1150	1,976E-02	2450	2,853E-01	3950	6,660E-02
260	< 1,0E-05	560	1,482E-05	860	4,614E-03	1160	2,103E-02	2500	3,031E-01	4000	5,590E-02
270	< 1,0E-05	570	1,338E-05	870	4,761E-03	1170	2,212E-02	2550	3,186E-01	4050	5,129E-02
280	< 1,0E-05	580	1,272E-05	880	5,150E-03	1180	2,265E-02	2600	3,308E-01	4100	5,300E-02
290	< 1,0E-05	590	1,315E-05	890	5,234E-03	1190	2,446E-02	2650	3,354E-01	4150	5,610E-02
300	< 1,0E-05	600	1,533E-05	900	5,543E-03	1200	2,600E-02	2700	3,265E-01	4200	5,670E-02
310	< 1,0E-05	610	1,841E-05	910	5,665E-03	1250	3,480E-02	2750	1,700E-01	4250	5,495E-02
320	< 1,000E-05	620	2,208E-05	920	5,865E-03	1300	4,830E-02	2800	8,940E-02	4300	4,786E-02
330	< 1,000E-05	630	2,692E-05	930	6,039E-03	1350	6,230E-02	2850	8,230E-02	4350	3,548E-02
340	< 1,000E-05	640	3,251E-05	940	6,463E-03	1400	7,810E-02	2900	9,160E-02	4400	2,570E-02
350	< 1,000E-05	650	4,074E-05	950	6,682E-03	1450	9,190E-02	2950	1,043E-01	4450	1,862E-02
360	< 1,000E-05	660	5,559E-05	960	7,102E-03	1500	1,029E-01	3000	1,171E-01	4500	1,288E-02
370	< 1,000E-05	670	8,318E-05	970	7,607E-03	1550	1,114E-01	3050	1,313E-01	4550	7,762E-03
380	< 1,000E-05	680	1,321E-04	980	7,578E-03	1600	1,150E-01	3100	1,469E-01	4600	5,129E-03
390	< 1,000E-05	690	2,104E-04	990	8,216E-03	1650	1,143E-01	3150	1,675E-01	4650	3,020E-03
400	< 1,000E-05	700	3,243E-04	1000	8,560E-03	1700	1,136E-01	3200	1,860E-01	4700	1,820E-03
410	< 1,000E-05	710	4,624E-04	1010	9,052E-03	1750	1,136E-01	3250	2,040E-01	4750	1,122E-03
420	< 1,000E-05	720	6,152E-04	1020	9,580E-03	1800	1,157E-01	3300	2,129E-01	4800	6,310E-04
430	< 1,000E-05	730	7,998E-04	1030	9,838E-03	1850	1,200E-01	3350	2,044E-01	4850	4,169E-04
440	< 1,000E-05	740	9,863E-04	1040	1,064E-02	1900	1,256E-01	3400	1,661E-01	4900	2,455E-04
450	< 1,000E-05	750	1,208E-03	1050	1,101E-02	1950	1,349E-01	3450	1,384E-01	4950	1,230E-04
460	1,119E-05	760	1,469E-03	1060	1,158E-02	2000	1,455E-01	3500	9,440E-02	5000	5,495E-05
470	1,365E-05	770	1,738E-03	1070	1,212E-02	2050	1,590E-01	3550	6,250E-02	5050	1,995E-05
480	1,434E-05	780	2,046E-03	1080	1,309E-02	2100	1,718E-01	3600	4,000E-02	5100	< 1,000E-05
490	1,409E-05	790	2,360E-03	1090	1,361E-02	2150	1,876E-01	3650	3,270E-02	5150	< 1,000E-05

NG3

Optical properties	
Reflection factor	
$P_d = 0,921$	
Spectral values guaranteed	
τ_i (405 nm)	= 0,06 ± 0,02
τ_i (546 nm)	= 0,1 ± 0,02
τ_i (694 nm)	= 0,17 ± 0,03
Refractive indices	
n_d (587,6 nm) = 1,51	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	2

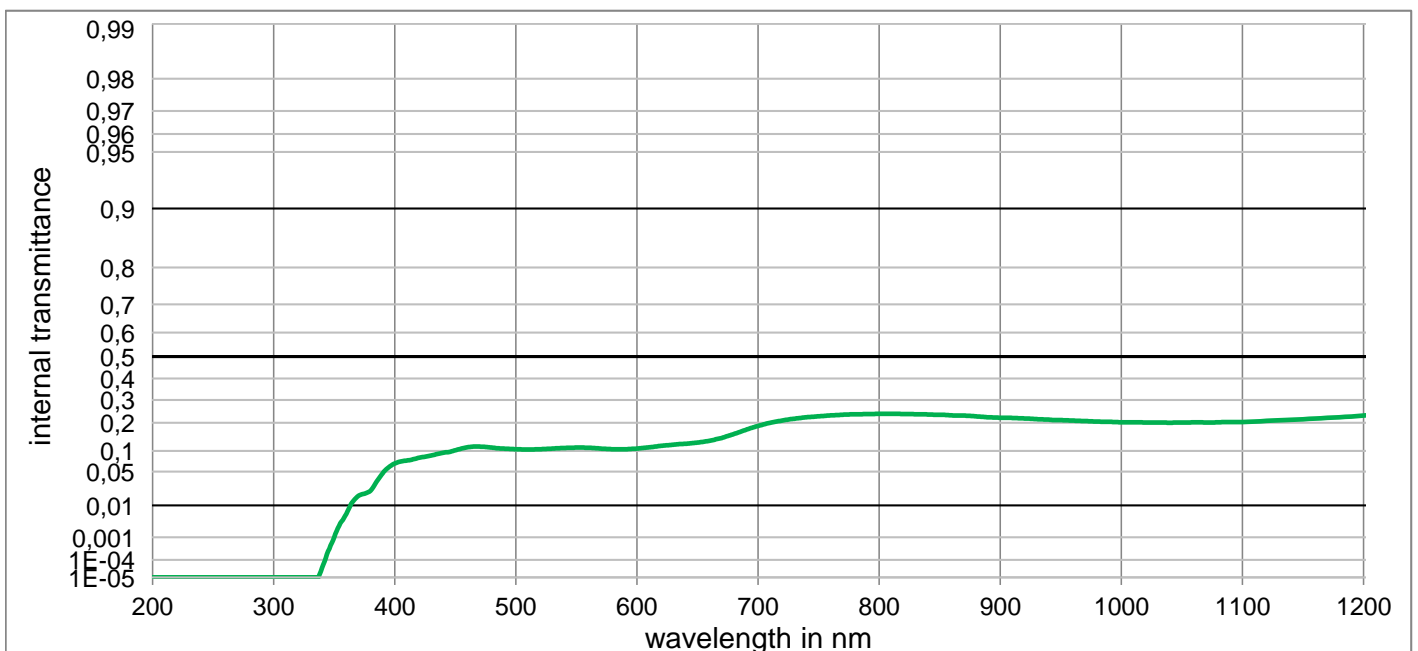
Mechanical properties	
Reference thickness	
d = 1,00 mm	
Density	
$\rho = 2,44 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 443	

Thermal properties	
Transformation temperature	
$T_g = 462 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 6,5
α (20°C/300°C)	= 7,3

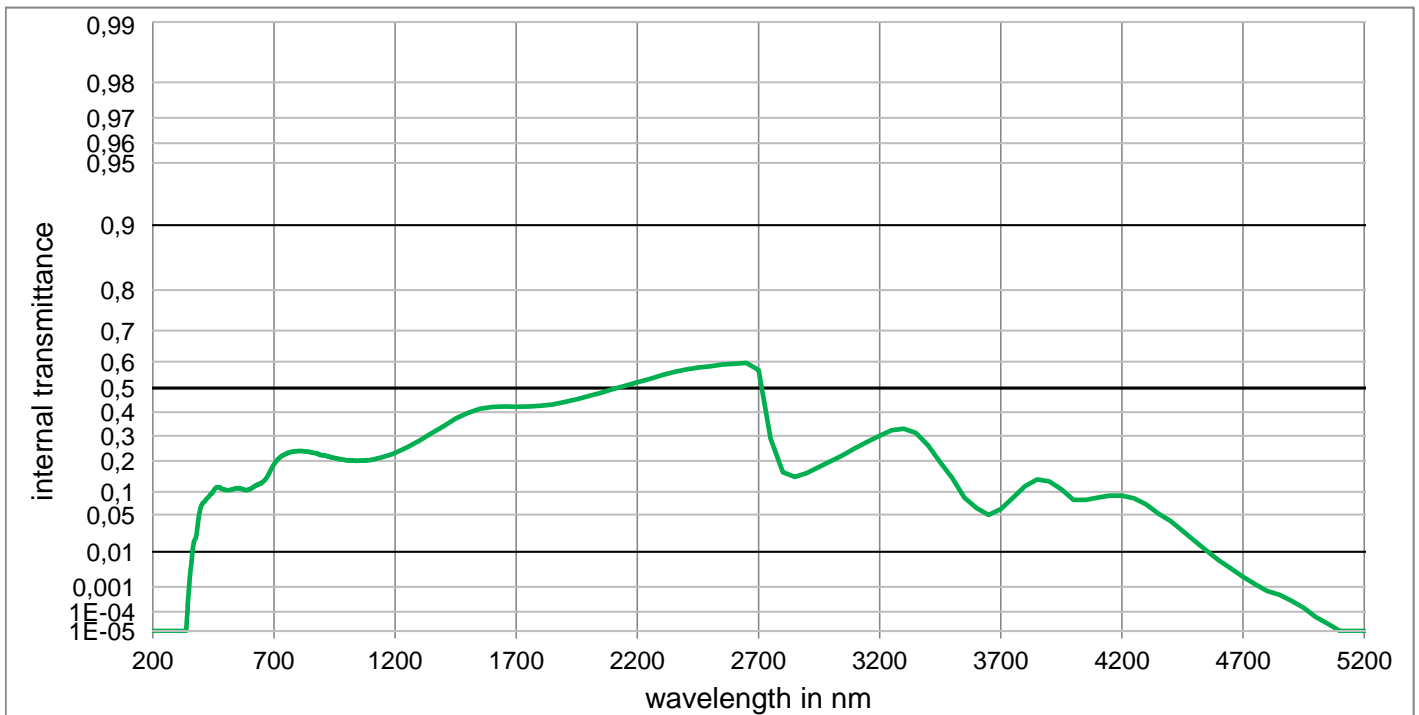
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 2.2
AR class	= 1

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
Ionically colored glass	
Neutral density filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



NG3



Internal transmittance τ_i at reference thickness

The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	1,050E-01	800	2,380E-01	1100	2,034E-01	2200	5,225E-01	3700	6,000E-02
210	< 1,0E-05	510	1,043E-01	810	2,375E-01	1110	2,054E-01	2250	5,360E-01	3750	8,480E-02
220	< 1,0E-05	520	1,050E-01	820	2,370E-01	1120	2,077E-01	2300	5,500E-01	3800	1,156E-01
230	< 1,0E-05	530	1,070E-01	830	2,360E-01	1130	2,100E-01	2350	5,617E-01	3850	1,363E-01
240	< 1,0E-05	540	1,090E-01	840	2,350E-01	1140	2,124E-01	2400	5,711E-01	3900	1,300E-01
250	< 1,0E-05	550	1,100E-01	850	2,340E-01	1150	2,149E-01	2450	5,786E-01	3950	1,068E-01
260	< 1,0E-05	560	1,095E-01	860	2,310E-01	1160	2,175E-01	2500	5,837E-01	4000	8,000E-02
270	< 1,0E-05	570	1,071E-01	870	2,300E-01	1170	2,202E-01	2550	5,900E-01	4050	8,000E-02
280	< 1,0E-05	580	1,050E-01	880	2,270E-01	1180	2,232E-01	2600	5,925E-01	4100	8,511E-02
290	< 1,0E-05	590	1,049E-01	890	2,230E-01	1190	2,263E-01	2650	5,956E-01	4150	9,016E-02
300	< 1,0E-05	600	1,070E-01	900	2,210E-01	1200	2,300E-01	2700	5,700E-01	4200	9,000E-02
310	< 1,0E-05	610	1,110E-01	910	2,200E-01	1250	2,532E-01	2750	2,880E-01	4250	8,318E-02
320	< 1,000E-05	620	1,157E-01	920	2,180E-01	1300	2,800E-01	2800	1,600E-01	4300	7,000E-02
330	< 1,000E-05	630	1,192E-01	930	2,150E-01	1350	3,110E-01	2850	1,439E-01	4350	5,176E-02
340	3,855E-05	640	1,222E-01	940	2,130E-01	1400	3,400E-01	2900	1,574E-01	4400	4,000E-02
350	1,040E-03	650	1,260E-01	950	2,110E-01	1450	3,732E-01	2950	1,784E-01	4450	2,679E-02
360	5,900E-03	660	1,319E-01	960	2,090E-01	1500	3,970E-01	3000	2,000E-01	4500	1,726E-02
370	1,704E-02	670	1,420E-01	970	2,070E-01	1550	4,147E-01	3050	2,224E-01	4550	1,050E-02
380	2,199E-02	680	1,560E-01	980	2,050E-01	1600	4,216E-01	3100	2,500E-01	4600	6,237E-03
390	4,696E-02	690	1,720E-01	990	2,040E-01	1650	4,241E-01	3150	2,752E-01	4650	3,750E-03
400	6,691E-02	700	1,871E-01	1000	2,020E-01	1700	4,230E-01	3200	3,000E-01	4700	2,128E-03
410	7,402E-02	710	2,000E-01	1010	2,022E-01	1750	4,241E-01	3250	3,236E-01	4750	1,222E-03
420	8,105E-02	720	2,094E-01	1020	2,010E-01	1800	4,273E-01	3300	3,300E-01	4800	7,096E-04
430	8,703E-02	730	2,170E-01	1030	2,012E-01	1850	4,325E-01	3350	3,116E-01	4850	5,200E-04
440	9,500E-02	740	2,230E-01	1040	2,000E-01	1900	4,425E-01	3400	2,600E-01	4900	2,985E-04
450	1,019E-01	750	2,270E-01	1050	2,010E-01	1950	4,546E-01	3450	1,948E-01	4950	1,528E-04
460	1,110E-01	760	2,310E-01	1060	2,020E-01	2000	4,674E-01	3500	1,400E-01	5000	5,649E-05
470	1,130E-01	770	2,340E-01	1070	2,010E-01	2050	4,813E-01	3550	8,540E-02	5050	2,518E-05
480	1,100E-01	780	2,360E-01	1080	2,020E-01	2100	4,957E-01	3600	6,220E-02	5100	< 1,000E-05
490	1,070E-01	790	2,370E-01	1090	2,029E-01	2150	5,090E-01	3650	4,960E-02	5150	< 1,000E-05

NG4

Optical properties	
Reflection factor	
$P_d = 0,921$	
Spectral values guaranteed	
τ_i (405 nm)	= 0,27 ± 0,03
τ_i (546 nm)	= 0,31 ± 0,03
τ_i (694 nm)	= 0,39 ± 0,04
Refractive indices	
n_d (587,6 nm) = 1,51	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	2

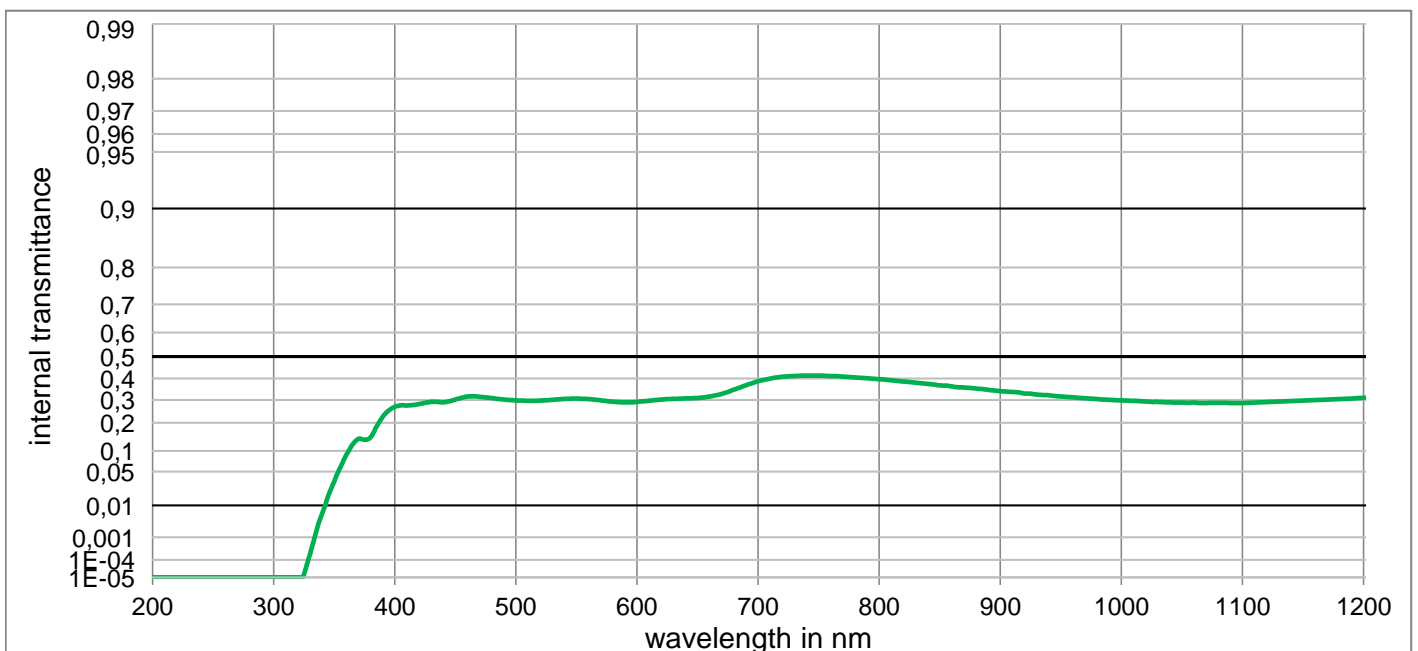
Mechanical properties	
Reference thickness	
$d = 1,00$ mm	
Density	
$\rho = 2,42$ g/cm ³	
Knoop hardness	
HK[0.1/20] = 423	

Thermal properties	
Transformation temperature	
$T_g = 470$ °C	
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 6,5
α (20°C/300°C)	= 7,1

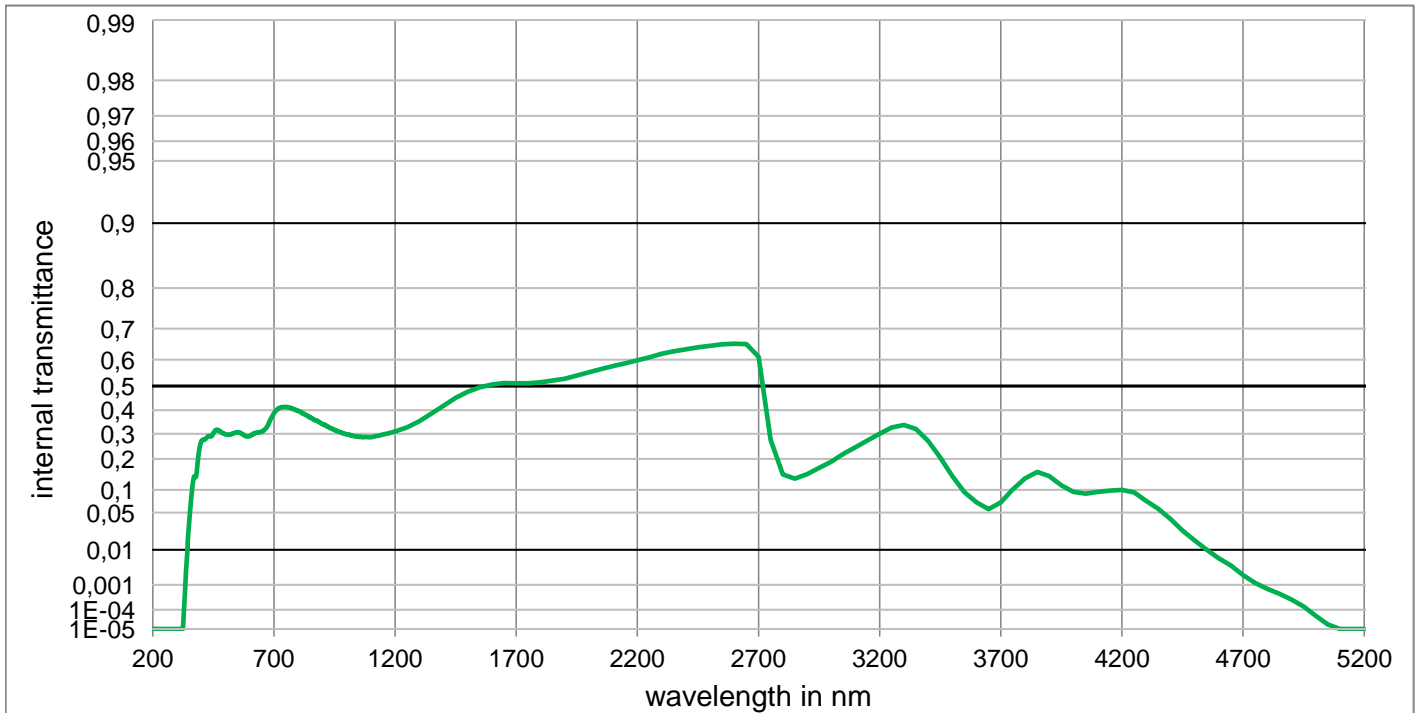
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 2.2
AR class	= 1

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
Ionically colored glass	
Neutral density filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



NG4



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	2,980E-01	800	3,970E-01	1100	2,860E-01	2200	5,974E-01	3700	7,000E-02
210	< 1,0E-05	510	2,962E-01	810	3,920E-01	1110	2,882E-01	2250	6,084E-01	3750	1,012E-01
220	< 1,0E-05	520	2,971E-01	820	3,860E-01	1120	2,902E-01	2300	6,200E-01	3800	1,327E-01
230	< 1,0E-05	530	3,007E-01	830	3,807E-01	1130	2,924E-01	2350	6,289E-01	3850	1,539E-01
240	< 1,0E-05	540	3,046E-01	840	3,750E-01	1140	2,945E-01	2400	6,355E-01	3900	1,400E-01
250	< 1,0E-05	550	3,060E-01	850	3,680E-01	1150	2,968E-01	2450	6,421E-01	3950	1,121E-01
260	< 1,0E-05	560	3,040E-01	860	3,630E-01	1160	2,991E-01	2500	6,472E-01	4000	9,441E-02
270	< 1,0E-05	570	2,983E-01	870	3,580E-01	1170	3,016E-01	2550	6,516E-01	4050	9,000E-02
280	< 1,0E-05	580	2,920E-01	880	3,530E-01	1180	3,042E-01	2600	6,538E-01	4100	9,441E-02
290	< 1,0E-05	590	2,890E-01	890	3,470E-01	1190	3,069E-01	2650	6,531E-01	4150	9,772E-02
300	< 1,0E-05	600	2,910E-01	900	3,410E-01	1200	3,100E-01	2700	6,100E-01	4200	1,000E-01
310	< 1,0E-05	610	2,966E-01	910	3,370E-01	1250	3,276E-01	2750	2,750E-01	4250	9,333E-02
320	< 1,000E-05	620	3,018E-01	920	3,300E-01	1300	3,533E-01	2800	1,459E-01	4300	7,330E-02
330	1,991E-04	630	3,050E-01	930	3,250E-01	1350	3,855E-01	2850	1,319E-01	4350	5,675E-02
340	6,039E-03	640	3,070E-01	940	3,220E-01	1400	4,185E-01	2900	1,466E-01	4400	4,000E-02
350	3,390E-02	650	3,090E-01	950	3,160E-01	1450	4,523E-01	2950	1,679E-01	4450	2,500E-02
360	8,880E-02	660	3,159E-01	960	3,120E-01	1500	4,764E-01	3000	1,900E-01	4500	1,611E-02
370	1,391E-01	670	3,279E-01	970	3,080E-01	1550	4,948E-01	3050	2,184E-01	4550	1,000E-02
380	1,439E-01	680	3,480E-01	980	3,040E-01	1600	5,065E-01	3100	2,448E-01	4600	6,166E-03
390	2,250E-01	690	3,685E-01	990	3,010E-01	1650	5,116E-01	3150	2,727E-01	4650	4,000E-03
400	2,689E-01	700	3,870E-01	1000	2,980E-01	1700	5,109E-01	3200	3,000E-01	4700	2,104E-03
410	2,750E-01	710	4,000E-01	1010	2,960E-01	1750	5,109E-01	3250	3,262E-01	4750	1,153E-03
420	2,809E-01	720	4,080E-01	1020	2,930E-01	1800	5,153E-01	3300	3,372E-01	4800	7,261E-04
430	2,910E-01	730	4,117E-01	1030	2,910E-01	1850	5,219E-01	3350	3,200E-01	4850	4,688E-04
440	2,890E-01	740	4,134E-01	1040	2,890E-01	1900	5,292E-01	3400	2,700E-01	4900	2,786E-04
450	3,020E-01	750	4,135E-01	1050	2,880E-01	1950	5,417E-01	3450	2,052E-01	4950	1,393E-04
460	3,160E-01	760	4,115E-01	1060	2,880E-01	2000	5,534E-01	3500	1,400E-01	5000	5,212E-05
470	3,150E-01	770	4,090E-01	1070	2,860E-01	2050	5,659E-01	3550	9,380E-02	5050	1,820E-05
480	3,089E-01	780	4,050E-01	1080	2,870E-01	2100	5,769E-01	3600	7,000E-02	5100	< 1,000E-05
490	3,020E-01	790	4,010E-01	1090	2,860E-01	2150	5,871E-01	3650	5,640E-02	5150	< 1,000E-05

NG5

Optical properties	
Reflection factor	
$P_d = 0,923$	
Spectral values guaranteed	
τ_i (405 nm)	$= 0,56 \pm 0,03$
τ_i (546 nm)	$= 0,57 \pm 0,03$
τ_i (694 nm)	$= 0,62 \pm 0,03$
Refractive indices	
n_d (587,6 nm) = 1,5	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	2

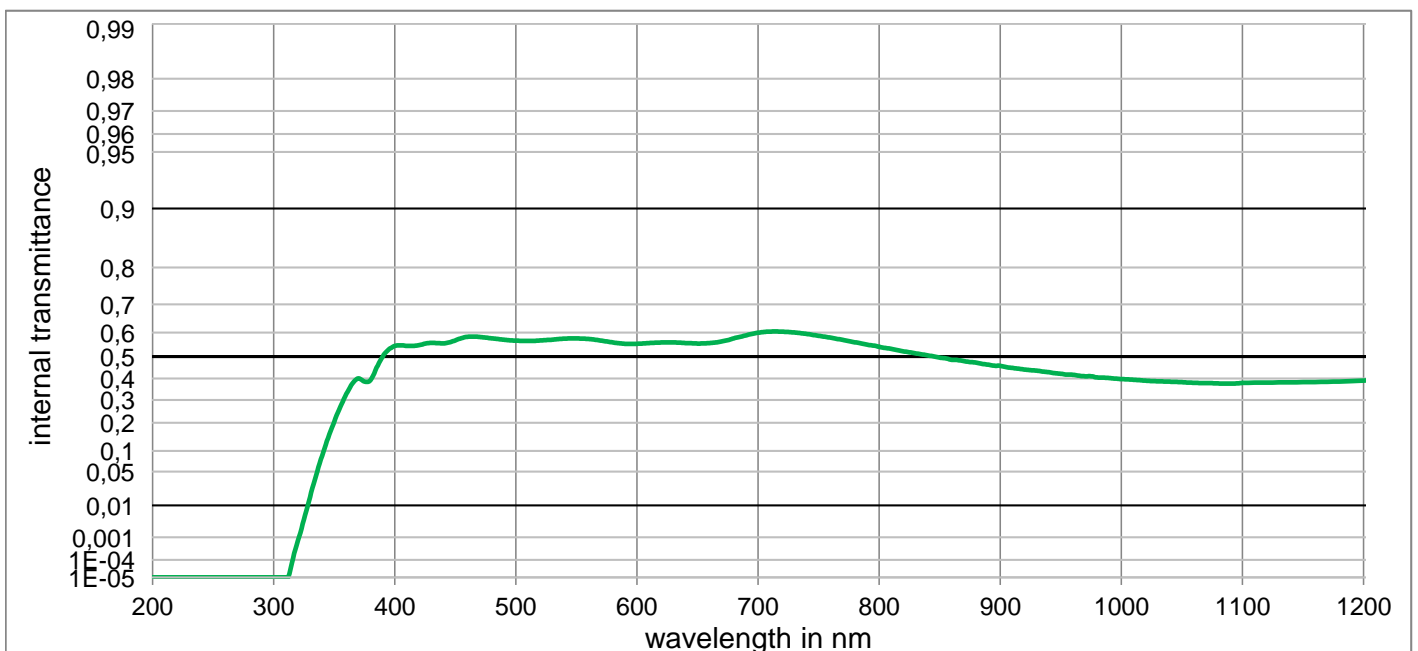
Mechanical properties	
Reference thickness	
$d = 1,00$ mm	
Density	
$\rho = 2,42$ g/cm ³	
Knoop hardness	
HK[0.1/20] = 435	

Thermal properties	
Transformation temperature	
$T_g = 474$ °C	
Thermal expansion in $10^{-6}/K$	
α (-30°C/+70°C)	= 6,6
α (20°C/300°C)	= 7,1

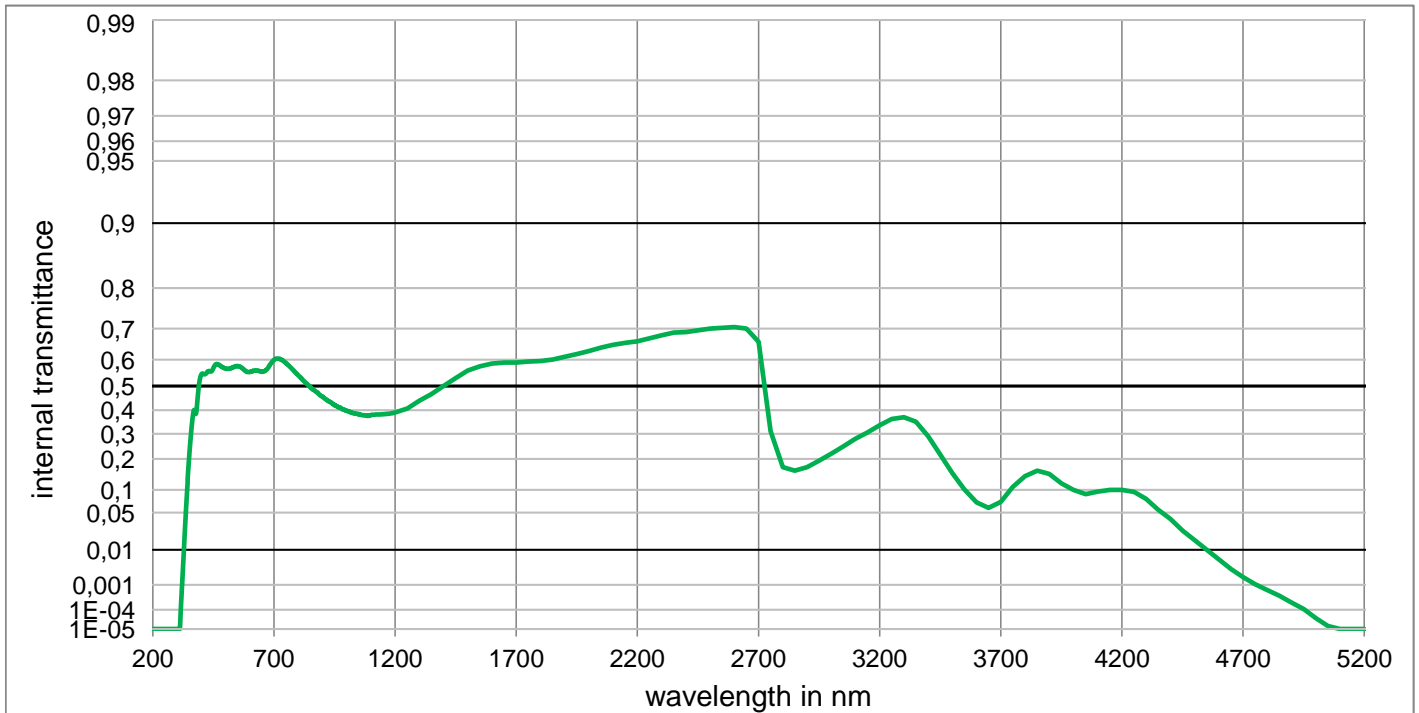
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 3.2
AR class	= 2

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
Ionically colored glass	
Neutral density filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



NG5



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	5,677E-01	800	5,424E-01	1100	3,794E-01	2200	6,619E-01	3700	7,110E-02
210	< 1,0E-05	510	5,667E-01	810	5,337E-01	1110	3,808E-01	2250	6,707E-01	3750	1,077E-01
220	< 1,0E-05	520	5,684E-01	820	5,230E-01	1120	3,812E-01	2300	6,800E-01	3800	1,400E-01
230	< 1,0E-05	530	5,717E-01	830	5,142E-01	1130	3,816E-01	2350	6,883E-01	3850	1,583E-01
240	< 1,0E-05	540	5,757E-01	840	5,055E-01	1140	3,821E-01	2400	6,900E-01	3900	1,473E-01
250	< 1,0E-05	550	5,767E-01	850	4,955E-01	1150	3,827E-01	2450	6,949E-01	3950	1,180E-01
260	< 1,0E-05	560	5,747E-01	860	4,857E-01	1160	3,835E-01	2500	7,000E-01	4000	1,000E-01
270	< 1,0E-05	570	5,682E-01	870	4,796E-01	1170	3,845E-01	2550	7,022E-01	4050	8,913E-02
280	< 1,0E-05	580	5,605E-01	880	4,735E-01	1180	3,858E-01	2600	7,044E-01	4100	9,550E-02
290	< 1,0E-05	590	5,549E-01	890	4,636E-01	1190	3,875E-01	2650	7,000E-01	4150	1,000E-01
300	< 1,0E-05	600	5,548E-01	900	4,585E-01	1200	3,900E-01	2700	6,600E-01	4200	1,000E-01
310	< 1,0E-05	610	5,579E-01	910	4,487E-01	1250	4,075E-01	2750	3,108E-01	4250	9,441E-02
320	7,413E-04	620	5,602E-01	920	4,416E-01	1300	4,400E-01	2800	1,700E-01	4300	7,762E-02
330	1,600E-02	630	5,604E-01	930	4,364E-01	1350	4,676E-01	2850	1,583E-01	4350	5,495E-02
340	8,600E-02	640	5,578E-01	940	4,293E-01	1400	5,000E-01	2900	1,700E-01	4400	4,000E-02
350	2,050E-01	650	5,558E-01	950	4,220E-01	1450	5,321E-01	2950	1,935E-01	4450	2,512E-02
360	3,280E-01	660	5,576E-01	960	4,175E-01	1500	5,600E-01	3000	2,200E-01	4500	1,622E-02
370	4,012E-01	670	5,643E-01	970	4,104E-01	1550	5,761E-01	3050	2,485E-01	4550	1,000E-02
380	3,930E-01	680	5,773E-01	980	4,050E-01	1600	5,857E-01	3100	2,800E-01	4600	5,821E-03
390	5,000E-01	690	5,891E-01	990	4,022E-01	1650	5,900E-01	3150	3,057E-01	4650	3,192E-03
400	5,456E-01	700	5,993E-01	1000	3,974E-01	1700	5,900E-01	3200	3,364E-01	4700	1,820E-03
410	5,460E-01	710	6,038E-01	1010	3,941E-01	1750	5,930E-01	3250	3,628E-01	4750	1,038E-03
420	5,487E-01	720	6,035E-01	1020	3,900E-01	1800	5,952E-01	3300	3,700E-01	4800	6,561E-04
430	5,587E-01	730	6,003E-01	1030	3,870E-01	1850	6,000E-01	3350	3,511E-01	4850	3,981E-04
440	5,564E-01	740	5,948E-01	1040	3,850E-01	1900	6,100E-01	3400	2,900E-01	4900	2,104E-04
450	5,690E-01	750	5,873E-01	1050	3,830E-01	1950	6,194E-01	3450	2,170E-01	4950	1,079E-04
460	5,833E-01	760	5,797E-01	1060	3,800E-01	2000	6,300E-01	3500	1,500E-01	5000	3,917E-05
470	5,828E-01	770	5,707E-01	1070	3,790E-01	2050	6,414E-01	3550	1,012E-01	5050	1,503E-05
480	5,770E-01	780	5,610E-01	1080	3,770E-01	2100	6,500E-01	3600	7,000E-02	5100	< 1,000E-05
490	5,715E-01	790	5,511E-01	1090	3,760E-01	2150	6,568E-01	3650	5,860E-02	5150	< 1,000E-05

NG9

Optical properties	
Reflection factor	
$P_d = 0,921$	
Spectral values guaranteed	
τ_i (405 nm)	= 0,03 ± 0,01
τ_i (546 nm)	= 0,04 ± 0,02
τ_i (694 nm)	= 0,08 ± 0,02
Refractive indices	
n_d (587,6 nm) = 1,51	
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	2

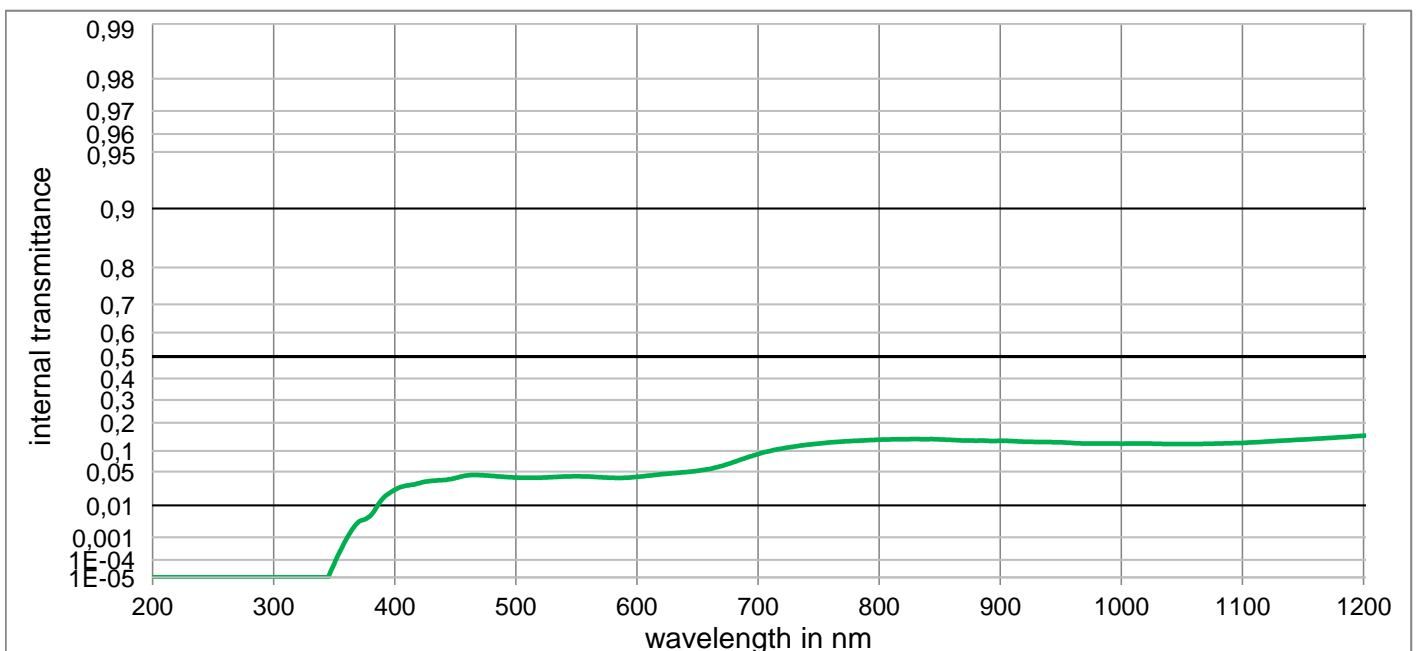
Mechanical properties	
Reference thickness	
d = 1,00 mm	
Density	
$\rho = 2,44 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 420	

Thermal properties	
Transformation temperature	
$T_g = 469 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 6,5
α (20°C/300°C)	= 7,0

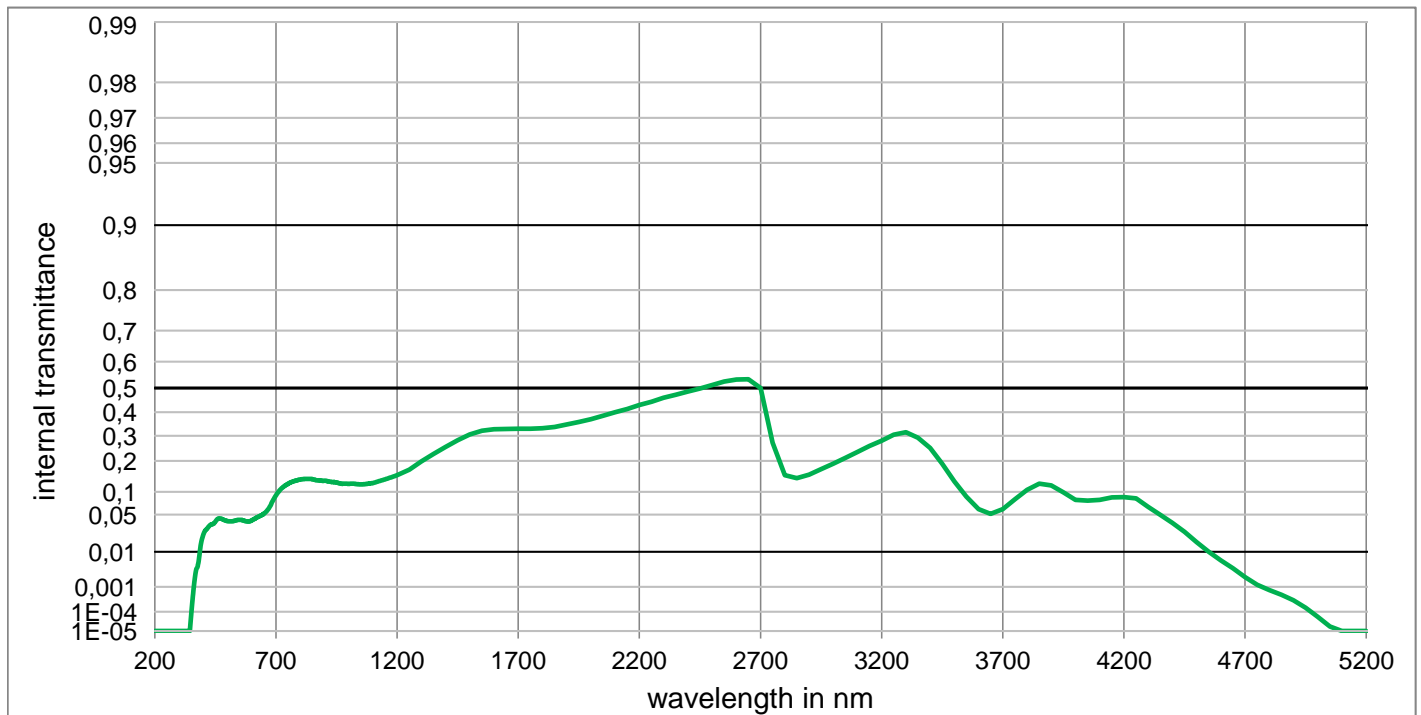
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 3,2
AR class	= 2

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
Ionically colored glass	
Neutral density filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



NG9



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	3,959E-02	800	1,359E-01	1100	1,250E-01	2200	4,300E-01	3700	6,000E-02
210	< 1,0E-05	510	3,908E-02	810	1,369E-01	1110	1,273E-01	2250	4,442E-01	3750	8,100E-02
220	< 1,0E-05	520	3,933E-02	820	1,376E-01	1120	1,295E-01	2300	4,600E-01	3800	1,055E-01
230	< 1,0E-05	530	4,021E-02	830	1,381E-01	1130	1,318E-01	2350	4,731E-01	3850	1,231E-01
240	< 1,0E-05	540	4,120E-02	840	1,377E-01	1140	1,340E-01	2400	4,857E-01	3900	1,181E-01
250	< 1,0E-05	550	4,158E-02	850	1,368E-01	1150	1,364E-01	2450	4,982E-01	3950	9,860E-02
260	< 1,0E-05	560	4,120E-02	860	1,350E-01	1160	1,389E-01	2500	5,120E-01	4000	8,000E-02
270	< 1,0E-05	570	3,995E-02	870	1,330E-01	1170	1,414E-01	2550	5,259E-01	4050	7,810E-02
280	< 1,0E-05	580	3,908E-02	880	1,325E-01	1180	1,440E-01	2600	5,340E-01	4100	8,000E-02
290	< 1,0E-05	590	3,908E-02	890	1,319E-01	1190	1,469E-01	2650	5,347E-01	4150	8,590E-02
300	< 1,0E-05	600	4,067E-02	900	1,320E-01	1200	1,501E-01	2700	5,000E-01	4200	8,650E-02
310	< 1,0E-05	610	4,276E-02	910	1,310E-01	1250	1,686E-01	2750	2,710E-01	4250	8,356E-02
320	< 1,000E-05	620	4,500E-02	920	1,290E-01	1300	1,980E-01	2800	1,500E-01	4300	6,457E-02
330	< 1,000E-05	630	4,700E-02	930	1,280E-01	1350	2,268E-01	2850	1,404E-01	4350	4,966E-02
340	< 1,000E-05	640	4,900E-02	940	1,280E-01	1400	2,538E-01	2900	1,514E-01	4400	3,698E-02
350	6,412E-05	650	5,159E-02	950	1,270E-01	1450	2,814E-01	2950	1,700E-01	4450	2,590E-02
360	8,472E-04	660	5,537E-02	960	1,246E-01	1500	3,060E-01	3000	1,900E-01	4500	1,637E-02
370	3,404E-03	670	6,155E-02	970	1,229E-01	1550	3,217E-01	3050	2,112E-01	4550	1,000E-02
380	5,284E-03	680	7,039E-02	980	1,231E-01	1600	3,273E-01	3100	2,347E-01	4600	6,223E-03
390	1,464E-02	690	8,100E-02	990	1,231E-01	1650	3,292E-01	3150	2,582E-01	4650	3,784E-03
400	2,301E-02	700	9,104E-02	1000	1,226E-01	1700	3,300E-01	3200	2,800E-01	4700	2,089E-03
410	2,795E-02	710	1,000E-01	1010	1,231E-01	1750	3,300E-01	3250	3,040E-01	4750	1,186E-03
420	3,108E-02	720	1,074E-01	1020	1,232E-01	1800	3,317E-01	3300	3,149E-01	4800	7,727E-04
430	3,435E-02	730	1,134E-01	1030	1,221E-01	1850	3,368E-01	3350	2,923E-01	4850	5,176E-04
440	3,555E-02	740	1,186E-01	1040	1,214E-01	1900	3,474E-01	3400	2,500E-01	4900	3,148E-04
450	3,872E-02	750	1,228E-01	1050	1,211E-01	1950	3,581E-01	3450	1,900E-01	4950	1,493E-04
460	4,308E-02	760	1,268E-01	1060	1,213E-01	2000	3,700E-01	3500	1,300E-01	5000	5,754E-05
470	4,356E-02	770	1,297E-01	1070	1,220E-01	2050	3,845E-01	3550	8,770E-02	5050	1,820E-05
480	4,231E-02	780	1,320E-01	1080	1,229E-01	2100	4,000E-01	3600	6,000E-02	5100	< 1,000E-05
490	4,069E-02	790	1,340E-01	1090	1,240E-01	2150	4,140E-01	3650	5,110E-02	5150	< 1,000E-05

NG11

Optical properties	
Reflection factor	
$P_d = 0,923$	
Spectral values guaranteed	
τ_i (405 nm)	= 0,76 ± 0,02
τ_i (546 nm)	= 0,77 ± 0,02
τ_i (694 nm)	= 0,79 ± 0,02
Refractive indices	
n_F (486 nm)	= 1,5
n_e (546 nm)	= 1,5
n_d (587,6 nm)	= 1,5
Sellmeier coefficients	
valid from 365 nm to 1530 nm	
B_1	1,1839
B_2	0,0336
B_3	1,1111
C_1	7,634E-03 μm^2
C_2	4,3272E-02 μm^2
C_3	116,448 μm^2
Internal quality	
Bubble class	2

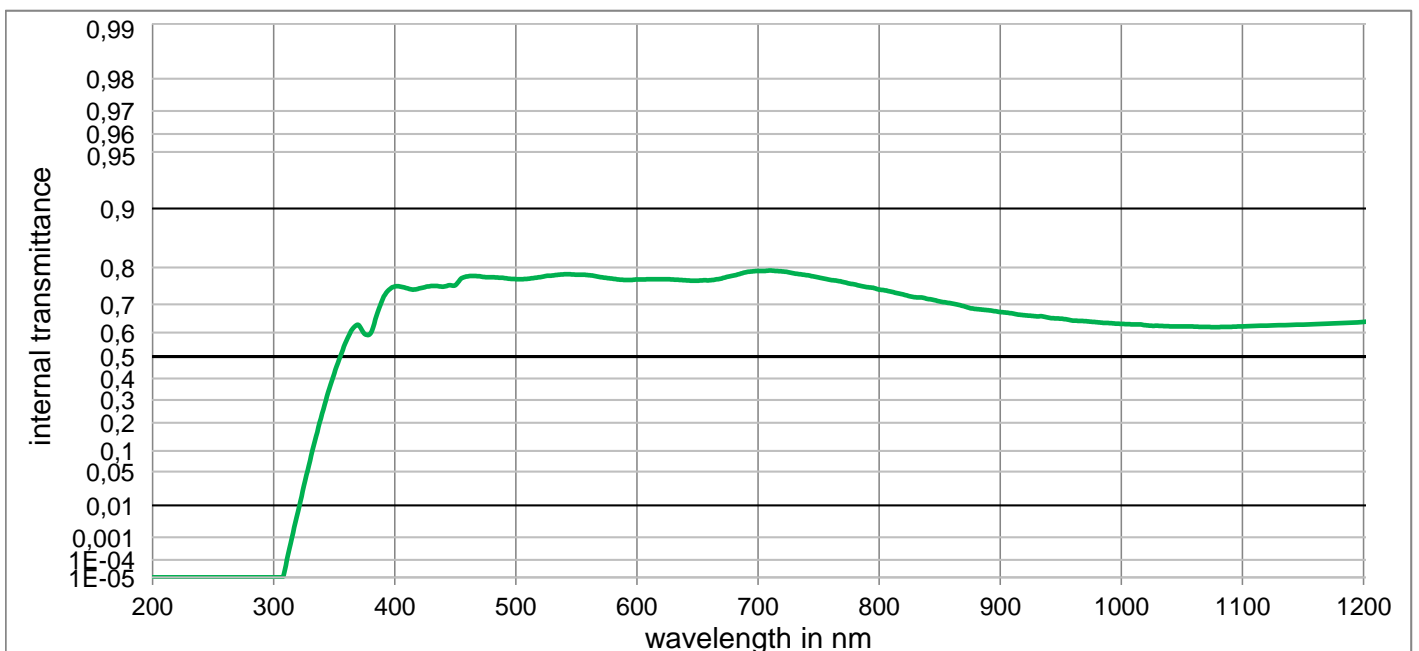
Mechanical properties	
Reference thickness	
$d = 1,00 \text{ mm}$	
Density	
$\rho = 2,41 \text{ g/cm}^3$	
Knoop hardness	
HK[0.1/20] = 460	

Thermal properties	
Transformation temperature	
$T_g = 481 \text{ }^\circ\text{C}$	
Thermal expansion in $10^{-6}/\text{K}$	
α (-30°C/+70°C)	= 6,7
α (20°C/300°C)	= 7,2
α (20°C/200°C)	= 7

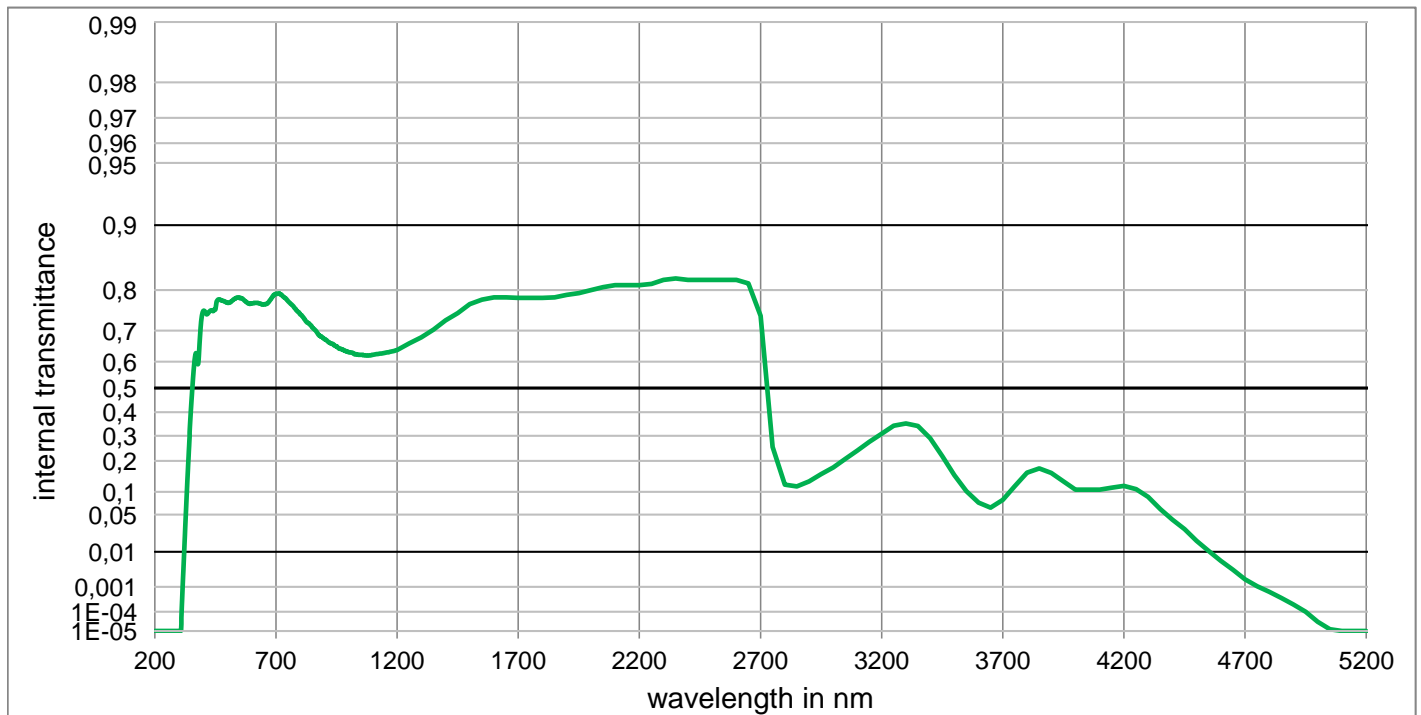
Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 3.4
AR class	= 2

Colorimetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes	
Ionically colored glass	
Neutral density filter	
DIN 58131	
Disclaimer	
All data without tolerances are to be understood to be reference values	



NG11

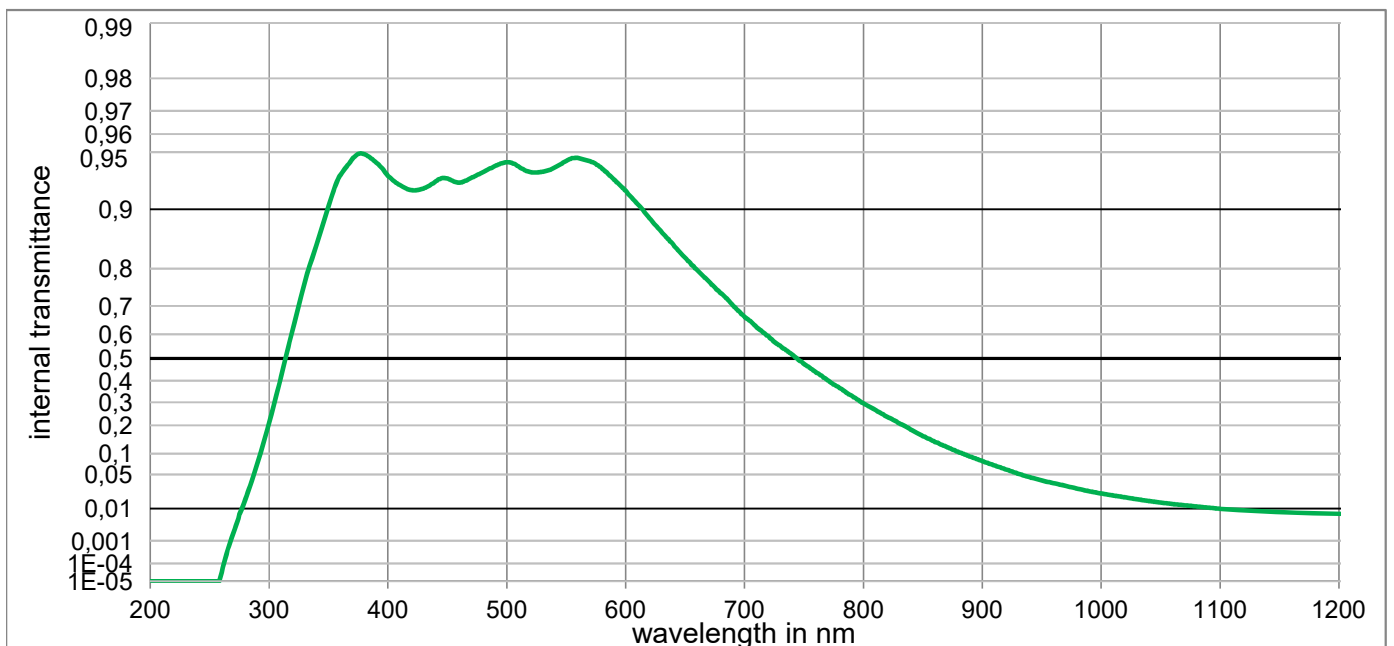


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

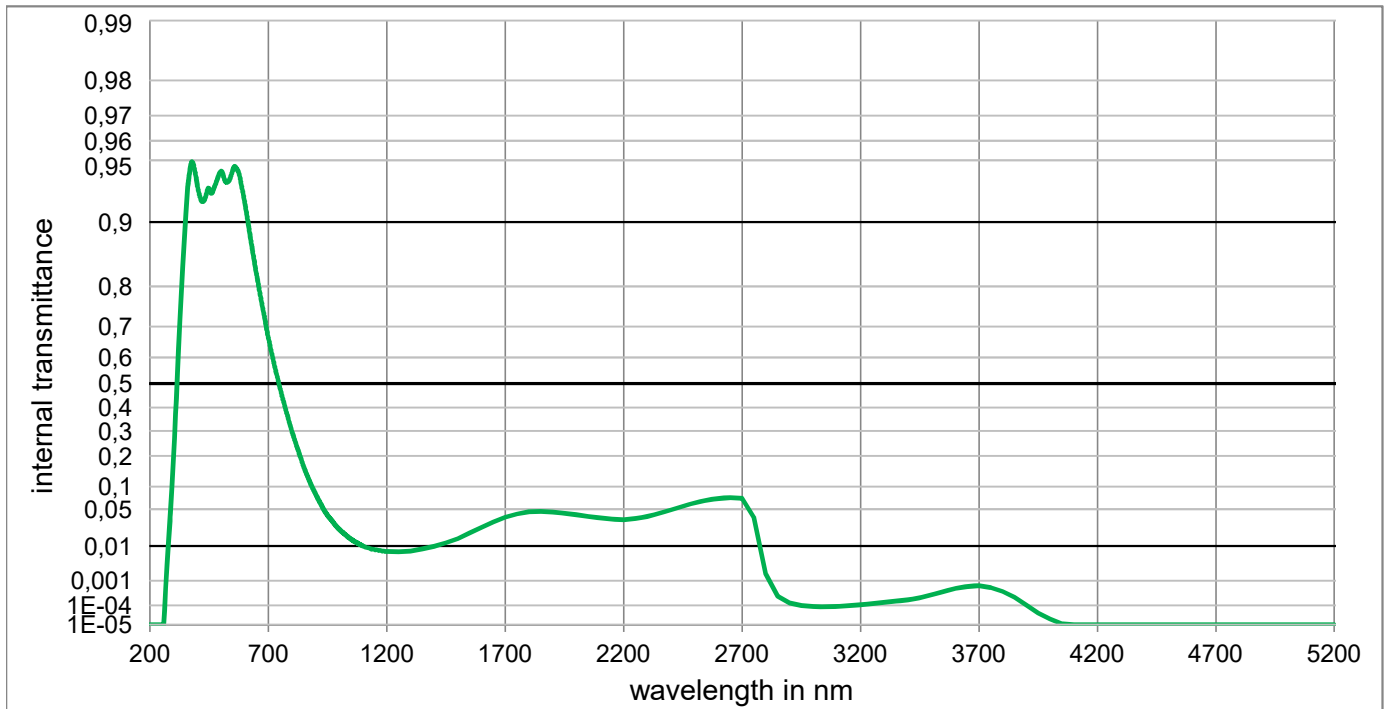
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	7,720E-01	800	7,440E-01	1100	6,240E-01	2200	8,100E-01	3700	8,000E-02
210	< 1,0E-05	510	7,730E-01	810	7,380E-01	1110	6,254E-01	2250	8,124E-01	3750	1,159E-01
220	< 1,0E-05	520	7,770E-01	820	7,300E-01	1120	6,266E-01	2300	8,200E-01	3800	1,583E-01
230	< 1,0E-05	530	7,810E-01	830	7,220E-01	1130	6,278E-01	2350	8,227E-01	3850	1,725E-01
240	< 1,0E-05	540	7,840E-01	840	7,170E-01	1140	6,290E-01	2400	8,200E-01	3900	1,574E-01
250	< 1,0E-05	550	7,830E-01	850	7,090E-01	1150	6,304E-01	2450	8,200E-01	3950	1,300E-01
260	< 1,0E-05	560	7,820E-01	860	7,030E-01	1160	6,318E-01	2500	8,200E-01	4000	1,060E-01
270	< 1,0E-05	570	7,770E-01	870	6,940E-01	1170	6,335E-01	2550	8,200E-01	4050	1,060E-01
280	< 1,0E-05	580	7,730E-01	880	6,850E-01	1180	6,353E-01	2600	8,200E-01	4100	1,058E-01
290	< 1,0E-05	590	7,700E-01	890	6,810E-01	1190	6,375E-01	2650	8,133E-01	4150	1,117E-01
300	< 1,0E-05	600	7,710E-01	900	6,750E-01	1200	6,400E-01	2700	7,400E-01	4200	1,162E-01
310	5,1E-05	610	7,720E-01	910	6,700E-01	1250	6,616E-01	2750	2,545E-01	4250	1,072E-01
320	6,622E-03	620	7,720E-01	920	6,640E-01	1300	6,800E-01	2800	1,200E-01	4300	8,710E-02
330	7,396E-02	630	7,710E-01	930	6,600E-01	1350	7,030E-01	2850	1,150E-01	4350	6,012E-02
340	2,387E-01	640	7,690E-01	940	6,550E-01	1400	7,285E-01	2900	1,300E-01	4400	4,169E-02
350	4,241E-01	650	7,680E-01	950	6,520E-01	1450	7,473E-01	2950	1,527E-01	4450	2,904E-02
360	5,667E-01	660	7,690E-01	960	6,450E-01	1500	7,690E-01	3000	1,762E-01	4500	1,720E-02
370	6,290E-01	670	7,740E-01	970	6,430E-01	1550	7,794E-01	3050	2,073E-01	4550	1,038E-02
380	5,968E-01	680	7,810E-01	980	6,390E-01	1600	7,841E-01	3100	2,400E-01	4600	6,000E-03
390	7,166E-01	690	7,890E-01	990	6,360E-01	1650	7,841E-01	3150	2,752E-01	4650	3,459E-03
400	7,530E-01	700	7,920E-01	1000	6,330E-01	1700	7,831E-01	3200	3,091E-01	4700	1,778E-03
410	7,480E-01	710	7,930E-01	1010	6,310E-01	1750	7,831E-01	3250	3,421E-01	4750	1,052E-03
420	7,470E-01	720	7,910E-01	1020	6,280E-01	1800	7,831E-01	3300	3,525E-01	4800	6,607E-04
430	7,540E-01	730	7,860E-01	1030	6,260E-01	1850	7,841E-01	3350	3,412E-01	4850	3,846E-04
440	7,520E-01	740	7,820E-01	1040	6,240E-01	1900	7,900E-01	3400	2,900E-01	4900	2,089E-04
450	7,559E-01	750	7,760E-01	1050	6,240E-01	1950	7,935E-01	3450	2,186E-01	4950	1,007E-04
460	7,790E-01	760	7,700E-01	1060	6,230E-01	2000	8,000E-01	3500	1,500E-01	5000	3,236E-05
470	7,790E-01	770	7,650E-01	1070	6,220E-01	2050	8,058E-01	3550	1,018E-01	5050	1,271E-05
480	7,770E-01	780	7,580E-01	1080	6,210E-01	2100	8,100E-01	3600	7,350E-02	5100	< 1,000E-05
490	7,750E-01	790	7,510E-01	1090	6,220E-01	2150	8,100E-01	3650	6,310E-02	5150	< 1,000E-05

KG1

Optical properties	Mechanical properties	Colorimetric properties
Reflection factor	Reference thickness	1 mm 2 mm 3 mm
$P_d = 0,918$	$d = 2,00 \text{ mm}$	Illuminant D65 x 0,311 0,309 0,307 y 0,330 0,331 0,332 Y 88,7 85,6 82,6 λ_d 497 nm 497 nm 498 nm P_e 0,006 0,013 0,018
Spectral values guaranteed (d = 2 mm)	Density	
$\lambda_c (\tau_i = 0,5) = \text{nm nm}$	$\rho = 2,52 \text{ g/cm}^3$	
$\lambda_s (\tau_{i,U} =) = \text{nm}$	Knoop hardness	
$\lambda_p (\tau_{i,L} =) = \text{nm}$	$HK_{[0,1/20]} = 456$	
$t_i (800 \text{ nm} \leq 0,33)$	Thermal properties	Illuminant A x 0,444 0,441 0,438 y 0,409 0,411 0,413 Y 88,4 84,9 81,6 λ_d 505 nm 505 nm 505 nm P_e 0,007 0,014 0,021
$\tau_i (900 \text{ nm} \leq 0,1)$	Transformation temperature	
	$T_g = 599 \text{ }^\circ\text{C}$	
	Thermal expansion in $10^{-6}/\text{K}$	
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 5,3$	
Refractive indices	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 6,1$	Notes
$n_d (587,6 \text{ nm}) = 1,52$		UV
		Transmission changes are possible under the action of intense ultraviolet radiation.
		Ionically colored glass
Sellmeier coefficients	Chemical properties	
on request	Chemical resistance	
	FR class = 0	
	SR class = 2	
	AR class = 3	
		DIN 58131
	Long-term changes in the polished surface are possible under some circumstances.	
Internal quality		Disclaimer
Bubble class 3		All data without tolerances are to be understood to be reference values



KG1

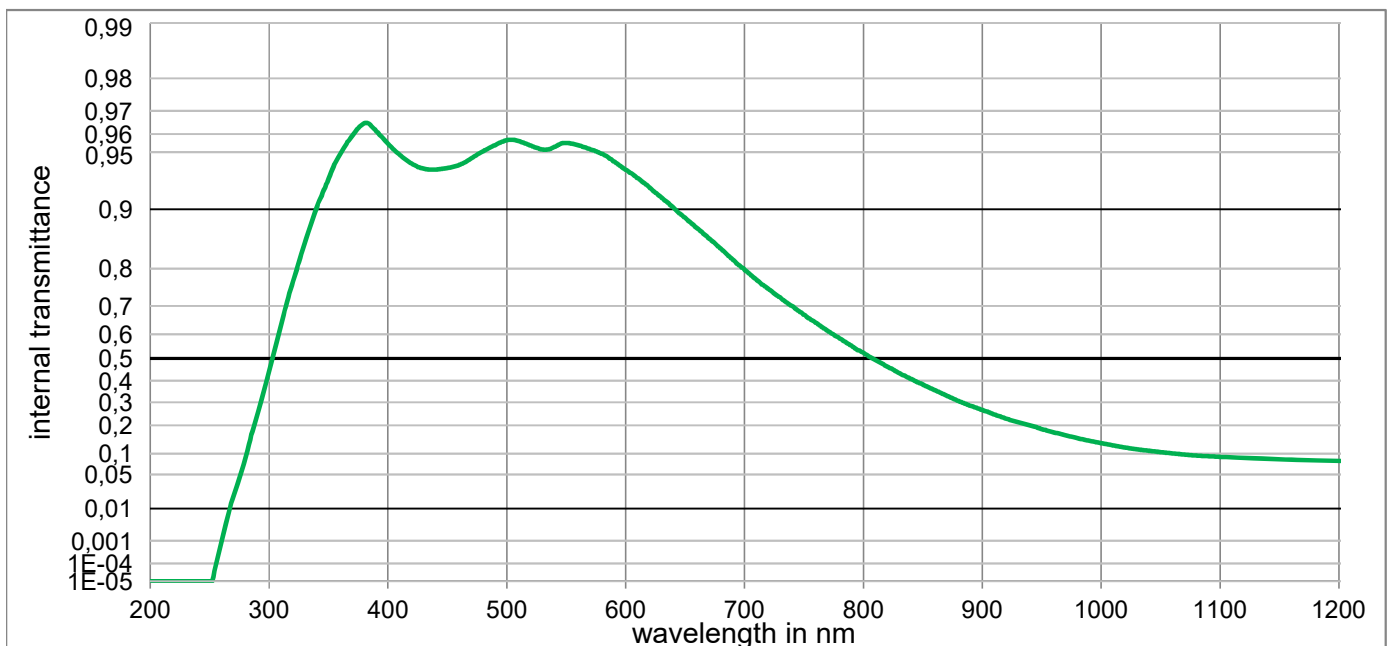


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

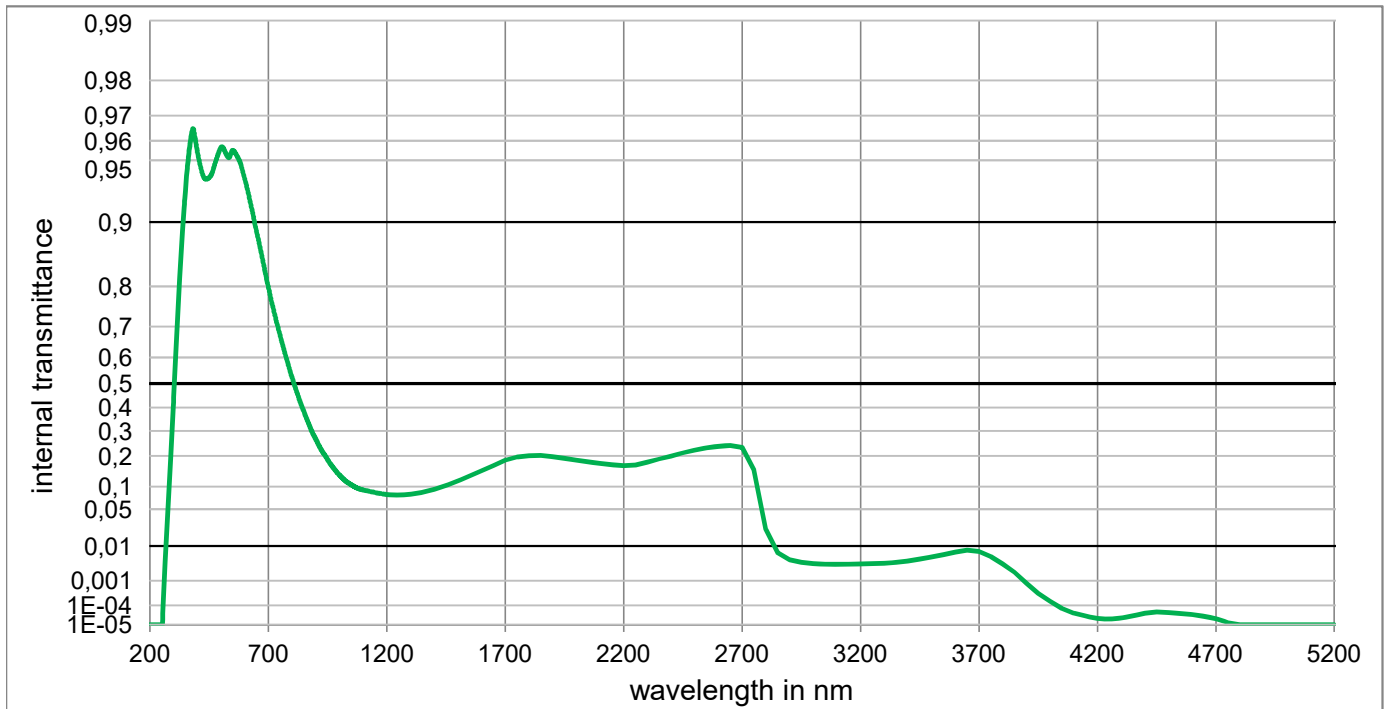
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,434E-01	800	2,936E-01	1100	9,948E-03	2200	3,377E-02	3700	6,632E-04
210	< 1,0E-05	510	9,402E-01	810	2,650E-01	1110	9,410E-03	2250	3,523E-02	3750	5,698E-04
220	< 1,0E-05	520	9,362E-01	820	2,349E-01	1120	8,986E-03	2300	3,829E-02	3800	3,991E-04
230	< 1,0E-05	530	9,364E-01	830	2,082E-01	1130	8,642E-03	2350	4,292E-02	3850	2,350E-04
240	< 1,0E-05	540	9,395E-01	840	1,824E-01	1140	8,360E-03	2400	4,886E-02	3900	1,033E-04
250	< 1,0E-05	550	9,444E-01	850	1,581E-01	1150	8,157E-03	2450	5,536E-02	3950	4,236E-05
260	3,5E-05	560	9,463E-01	860	1,377E-01	1160	7,950E-03	2500	6,181E-02	4000	2,104E-05
270	2,0E-03	570	9,440E-01	870	1,206E-01	1170	7,750E-03	2550	6,692E-02	4050	1,117E-05
280	1,7E-02	580	9,389E-01	880	1,047E-01	1180	7,580E-03	2600	7,069E-02	4100	< 1,000E-05
290	7,3E-02	590	9,302E-01	890	9,150E-02	1190	7,453E-03	2650	7,279E-02	4150	< 1,000E-05
300	2,1E-01	600	9,199E-01	900	7,971E-02	1200	7,350E-03	2700	7,150E-02	4200	< 1,000E-05
310	4,2E-01	610	9,060E-01	910	6,939E-02	1250	7,200E-03	2750	3,692E-02	4250	< 1,000E-05
320	6,222E-01	620	8,887E-01	920	6,017E-02	1300	7,570E-03	2800	1,650E-03	4300	< 1,000E-05
330	7,690E-01	630	8,693E-01	930	5,187E-02	1350	8,490E-03	2850	2,541E-04	4350	< 1,000E-05
340	8,500E-01	640	8,481E-01	940	4,499E-02	1400	9,840E-03	2900	1,282E-04	4400	< 1,000E-05
350	9,040E-01	650	8,230E-01	950	3,971E-02	1450	1,182E-02	2950	9,931E-05	4450	< 1,000E-05
360	9,340E-01	660	7,970E-01	960	3,543E-02	1500	1,472E-02	3000	8,892E-05	4500	< 1,000E-05
370	9,456E-01	670	7,690E-01	970	3,157E-02	1550	1,909E-02	3050	8,612E-05	4550	< 1,000E-05
380	9,487E-01	680	7,380E-01	980	2,790E-02	1600	2,463E-02	3100	9,044E-05	4600	< 1,000E-05
390	9,433E-01	690	7,020E-01	990	2,477E-02	1650	3,097E-02	3150	9,750E-05	4650	< 1,000E-05
400	9,330E-01	700	6,640E-01	1000	2,230E-02	1700	3,707E-02	3200	1,074E-04	4700	< 1,000E-05
410	9,251E-01	710	6,280E-01	1010	2,029E-02	1750	4,196E-02	3250	1,208E-04	4750	< 1,000E-05
420	9,205E-01	720	5,921E-01	1020	1,846E-02	1800	4,558E-02	3300	1,397E-04	4800	< 1,000E-05
430	9,222E-01	730	5,530E-01	1030	1,677E-02	1850	4,635E-02	3350	1,594E-04	4850	< 1,000E-05
440	9,284E-01	740	5,170E-01	1040	1,525E-02	1900	4,488E-02	3400	1,805E-04	4900	< 1,000E-05
450	9,309E-01	750	4,770E-01	1050	1,404E-02	1950	4,284E-02	3450	2,178E-04	4950	< 1,000E-05
460	9,274E-01	760	4,393E-01	1060	1,300E-02	2000	4,076E-02	3500	2,881E-04	5000	< 1,000E-05
470	9,315E-01	770	4,012E-01	1070	1,212E-02	2050	3,830E-02	3550	3,919E-04	5050	< 1,000E-05
480	9,362E-01	780	3,658E-01	1080	1,133E-02	2100	3,616E-02	3600	5,113E-04	5100	< 1,000E-05
490	9,408E-01	790	3,290E-01	1090	1,062E-02	2150	3,447E-02	3650	6,113E-04	5150	< 1,000E-05

KG2

Optical properties	Mechanical properties	Colorimetric properties
Reflection factor	Reference thickness	1 mm 2 mm 3 mm
$P_d = 0,921$	$d = 2,00 \text{ mm}$	Illuminant D65 x 0,312 0,311 0,310 y 0,330 0,331 0,331 Y 89,5 87,1 84,7 λ_d 501 nm 501 nm 501 nm P_e 0,003 0,007 0,010
Spectral values guaranteed (d = 2 mm)	Density	
$\lambda_c (\tau_i = 0,5) = \text{nm nm}$	$\rho = 2,52 \text{ g/cm}^3$	
$\lambda_s (\tau_{i,U} =) = \text{nm}$	Knoop hardness	
$\lambda_p (\tau_{i,L} =) = \text{nm}$	$HK_{[0,1/20]} = 444$	
$t_i (800 \text{ nm} \leq 0,55)$	Thermal properties	Illuminant A x 0,446 0,444 0,442 y 0,409 0,410 0,411 Y 89,3 86,7 84,2 λ_d 506 nm 507 nm 507 nm P_e 0,004 0,008 0,012
$\tau_i (900 \text{ nm} \leq 0,28)$	Transformation temperature	
	$T_g = 605 \text{ }^\circ\text{C}$	
Refractive indices	Thermal expansion in $10^{-6}/\text{K}$	
$n_d (587,6 \text{ nm}) = 1,51$	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 5,4$	
	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 6,3$	Notes
Sellmeier coefficients	Chemical properties	UV
on request	Chemical resistance	Transmission changes are possible under the action of intense ultraviolet radiation.
	FR class = 0	Ionically colored glass
	SR class = 2	
	AR class = 3	
		DIN 58131
Internal quality	Long-term changes in the polished surface are possible under some circumstances.	Disclaimer
Bubble class 3		All data without tolerances are to be understood to be reference values



KG2

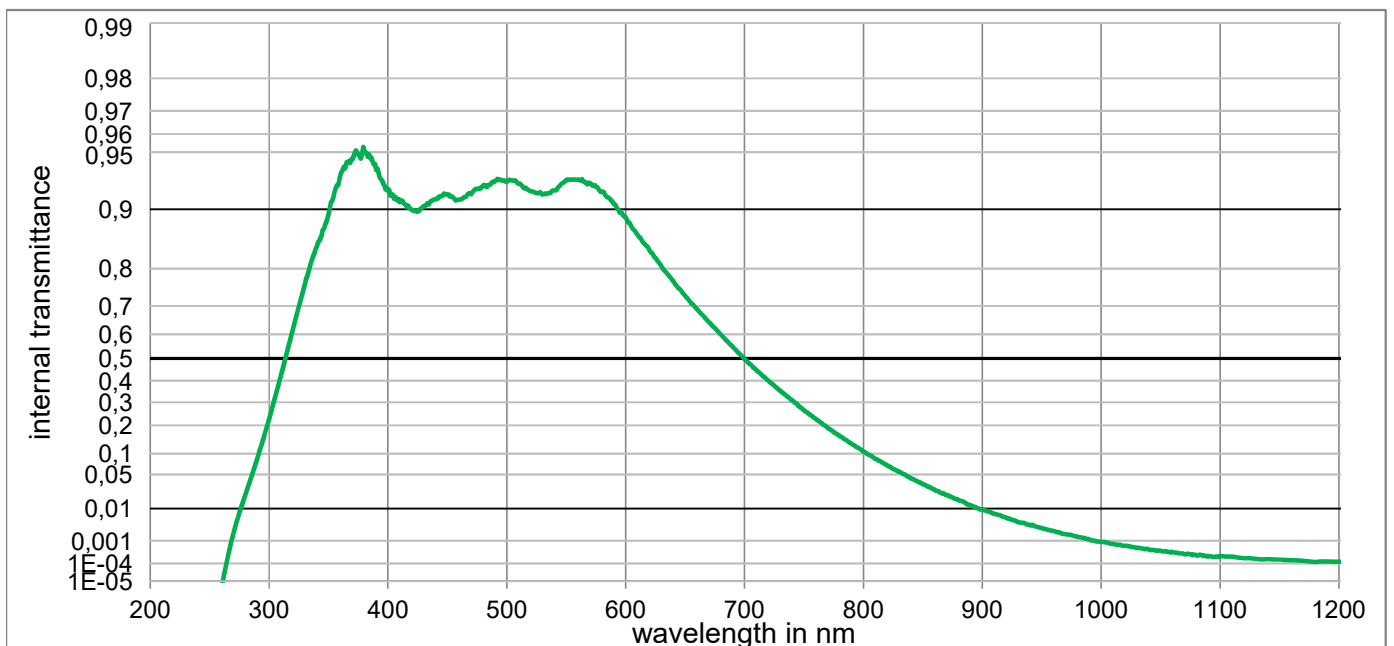


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

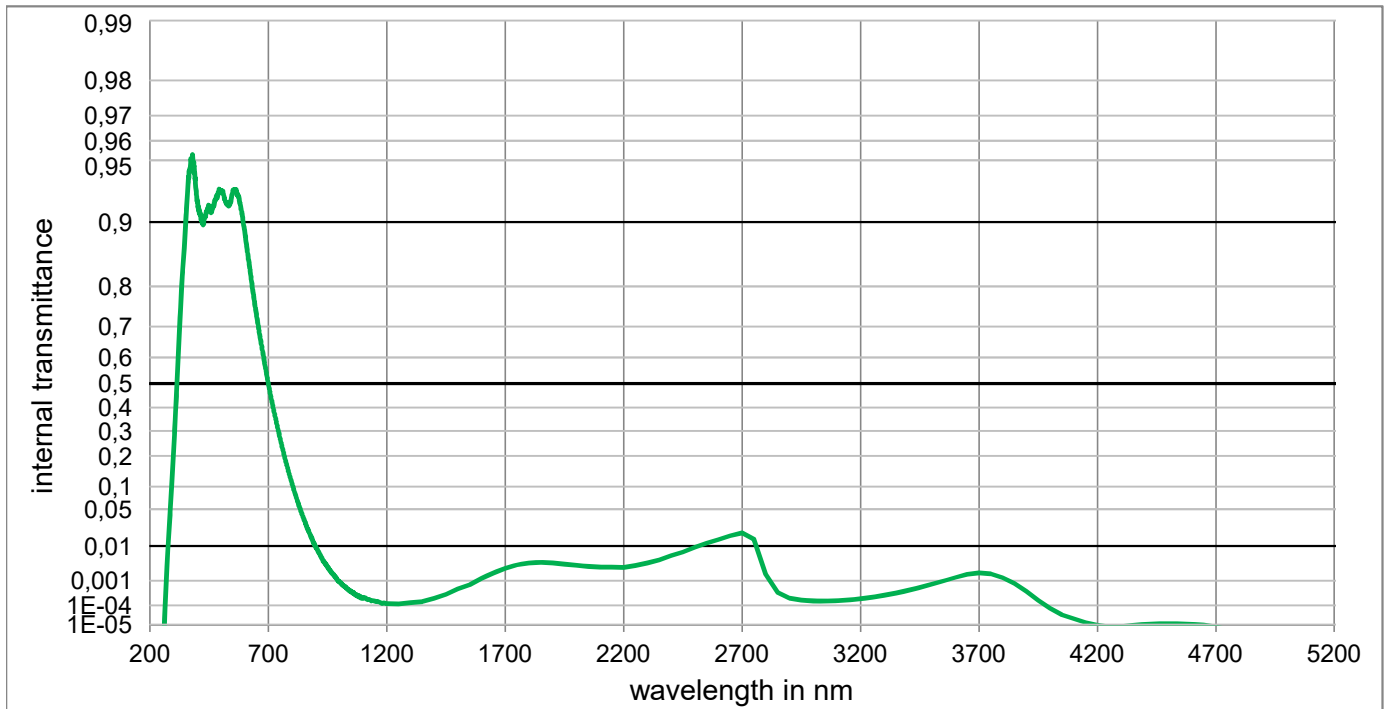
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,569E-01	800	5,237E-01	1100	9,099E-02	2200	1,647E-01	3700	7,376E-03
210	< 1,0E-05	510	9,564E-01	810	4,940E-01	1110	8,975E-02	2250	1,671E-01	3750	5,454E-03
220	< 1,0E-05	520	9,538E-01	820	4,640E-01	1120	8,844E-02	2300	1,764E-01	3800	3,463E-03
230	< 1,0E-05	530	9,516E-01	830	4,342E-01	1130	8,715E-02	2350	1,885E-01	3850	1,917E-03
240	< 1,0E-05	540	9,531E-01	840	4,080E-01	1140	8,600E-02	2400	1,997E-01	3900	8,350E-04
250	< 1,0E-05	550	9,554E-01	850	3,822E-01	1150	8,470E-02	2450	2,114E-01	3950	3,360E-04
260	1,0E-03	560	9,541E-01	860	3,557E-01	1160	8,350E-02	2500	2,227E-01	4000	1,525E-04
270	2,0E-02	570	9,518E-01	870	3,300E-01	1170	8,252E-02	2550	2,311E-01	4050	7,328E-05
280	8,8E-02	580	9,489E-01	880	3,054E-01	1180	8,150E-02	2600	2,370E-01	4100	4,198E-05
290	2,5E-01	590	9,440E-01	890	2,840E-01	1190	8,070E-02	2650	2,404E-01	4150	2,924E-05
300	4,4E-01	600	9,380E-01	900	2,652E-01	1200	8,005E-02	2700	2,327E-01	4200	2,239E-05
310	6,4E-01	610	9,314E-01	910	2,457E-01	1250	7,868E-02	2750	1,493E-01	4250	2,065E-05
320	7,690E-01	620	9,230E-01	920	2,280E-01	1300	8,103E-02	2800	2,260E-02	4300	2,344E-05
330	8,522E-01	630	9,132E-01	930	2,130E-01	1350	8,550E-02	2850	6,823E-03	4350	3,020E-05
340	9,020E-01	640	9,020E-01	940	2,001E-01	1400	9,250E-02	2900	4,519E-03	4400	4,162E-05
350	9,310E-01	650	8,891E-01	950	1,850E-01	1450	1,028E-01	2950	3,811E-03	4450	4,823E-05
360	9,492E-01	660	8,750E-01	960	1,726E-01	1500	1,157E-01	3000	3,483E-03	4500	4,508E-05
370	9,593E-01	670	8,590E-01	970	1,611E-01	1550	1,305E-01	3050	3,357E-03	4550	4,009E-05
380	9,651E-01	680	8,407E-01	980	1,510E-01	1600	1,471E-01	3100	3,334E-03	4600	3,556E-05
390	9,615E-01	690	8,199E-01	990	1,415E-01	1650	1,651E-01	3150	3,357E-03	4650	2,884E-05
400	9,549E-01	700	7,980E-01	1000	1,333E-01	1700	1,835E-01	3200	3,420E-03	4700	2,143E-05
410	9,482E-01	710	7,740E-01	1010	1,259E-01	1750	1,951E-01	3250	3,491E-03	4750	1,346E-05
420	9,423E-01	720	7,499E-01	1020	1,189E-01	1800	2,007E-01	3300	3,614E-03	4800	< 1,000E-05
430	9,388E-01	730	7,250E-01	1030	1,133E-01	1850	2,011E-01	3350	3,793E-03	4850	< 1,000E-05
440	9,382E-01	740	6,990E-01	1040	1,089E-01	1900	1,971E-01	3400	4,130E-03	4900	< 1,000E-05
450	9,393E-01	750	6,710E-01	1050	1,047E-01	1950	1,905E-01	3450	4,645E-03	4950	< 1,000E-05
460	9,416E-01	760	6,428E-01	1060	1,009E-01	2000	1,834E-01	3500	5,333E-03	5000	< 1,000E-05
470	9,461E-01	770	6,130E-01	1070	9,748E-02	2050	1,776E-01	3550	6,109E-03	5050	< 1,000E-05
480	9,506E-01	780	5,840E-01	1080	9,478E-02	2100	1,724E-01	3600	7,119E-03	5100	< 1,000E-05
490	9,542E-01	790	5,530E-01	1090	9,283E-02	2150	1,676E-01	3650	7,893E-03	5150	< 1,000E-05

KG3

Optical properties		Mechanical properties		Colorimetric properties		
Reflection factor		Reference thickness		1 mm 2 mm 3 mm		
$P_d = 0,919$		$d = 2,00 \text{ mm}$		Illuminant D65	x	0,309 0,306 0,303
Spectral values guaranteed (d = 2 mm)		Density			y	0,330 0,332 0,333
$\lambda_c (\tau_i = 0,5) = \text{nm nm}$		$\rho = 2,52 \text{ g/cm}^3$			Y	87,1 82,4 78,1
$\lambda_s (\tau_{i,U} =) = \text{nm}$		Knoop hardness			λ_d	496 nm 496 nm 496 nm
$\lambda_p (\tau_{i,L} =) = \text{nm}$		$HK_{[0,1/20]} = 442$			P_e	0,012 0,023 0,033
		Thermal properties		Illuminant A	x	0,442 0,437 0,432
$t_i \quad (800 \text{ nm} \leq 0,14)$		Transformation temperature			y	0,410 0,413 0,416
$\tau_i \quad (900 \text{ nm} \leq 0,03)$		$T_g = 581 \text{ }^\circ\text{C}$			Y	86,4 81,3 76,6
		Thermal expansion in $10^{-6}/\text{K}$			λ_d	504 nm 505 nm 505 nm
		$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 5,3$			P_e	0,012 0,024 0,035
		$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 6,1$		Notes		
Refractive indices		Chemical properties		UV		
$n_d (587,6 \text{ nm}) = 1,52$		Chemical resistance		Transmission changes are possible under the action of intense ultraviolet radiation.		
$n_s (852 \text{ nm}) = 1,51$		FR class = 0		Ionically colored glass		
$n_t (1014 \text{ nm}) = 1,51$		SR class = 2				
		AR class = 4		DIN 58131		
Sellmeier coefficients				Disclaimer		
valid from 400 nm to 1600 nm				All data without tolerances are to be understood to be reference values		
$B_1 = 1,1717$						
$B_2 = 0,0980$						
$B_3 = 0,0713$						
$C_1 = 6,324\text{E-}03 \text{ } \mu\text{m}^2$						
$C_2 = 3,1092\text{E-}02 \text{ } \mu\text{m}^2$						
$C_3 = 10,066 \text{ } \mu\text{m}^2$						
Internal quality						
Bubble class	3					



KG3

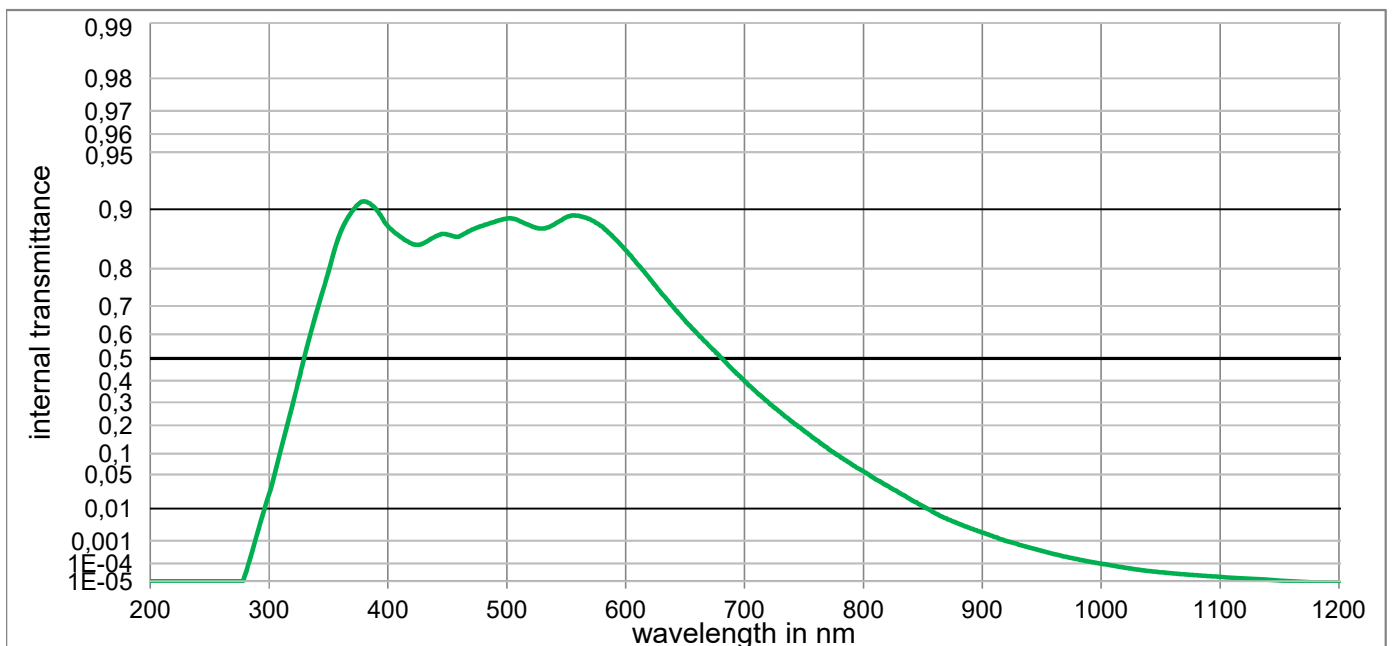


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

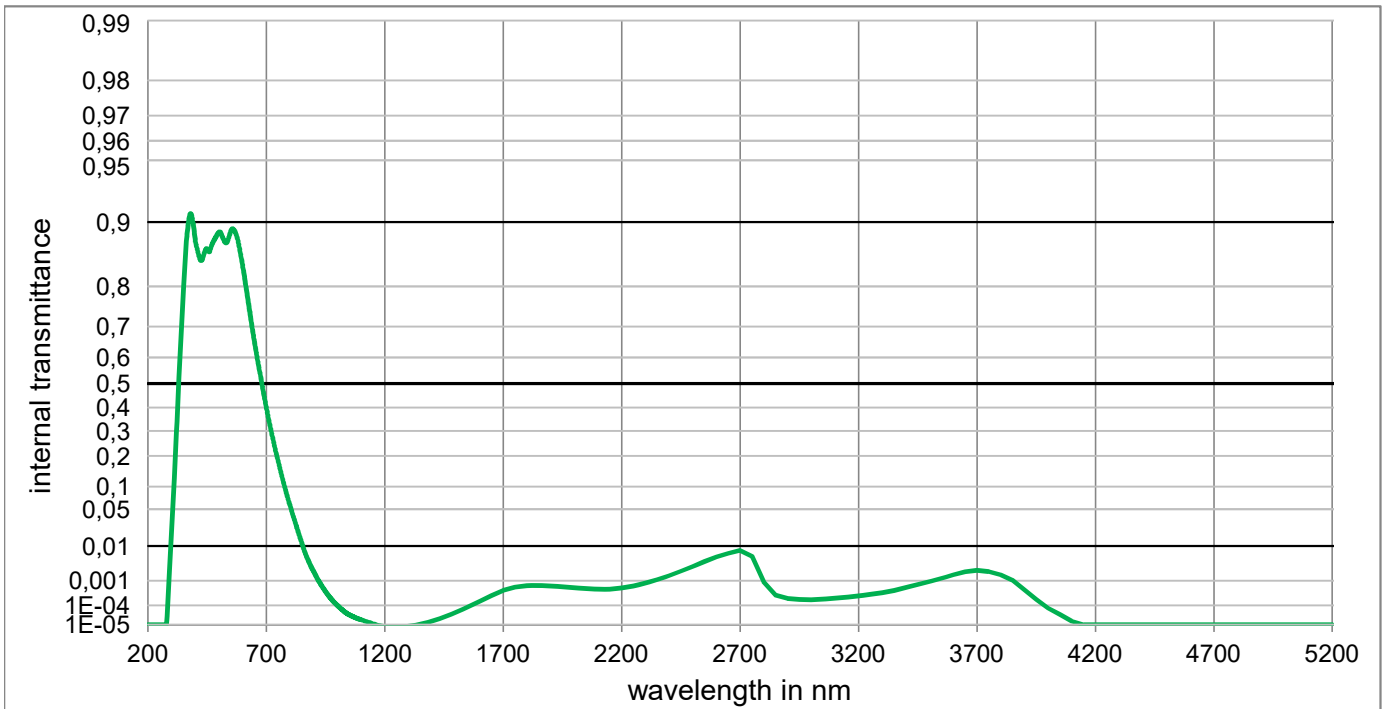
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,282E-01	800	1,066E-01	1100	2,334E-04	2200	2,727E-03	3700	1,822E-03
210	< 1,0E-05	510	9,265E-01	810	8,548E-02	1110	2,163E-04	2250	3,103E-03	3750	1,693E-03
220	< 1,0E-05	520	9,194E-01	820	6,913E-02	1120	1,828E-04	2300	3,642E-03	3800	1,292E-03
230	< 1,0E-05	530	9,162E-01	830	5,533E-02	1130	1,729E-04	2350	4,394E-03	3850	8,111E-04
240	< 1,0E-05	540	9,202E-01	840	4,313E-02	1140	1,649E-04	2400	5,839E-03	3900	4,055E-04
250	< 1,0E-05	550	9,298E-01	850	3,387E-02	1150	1,586E-04	2450	7,150E-03	3950	1,710E-04
260	< 1,0E-05	560	9,303E-01	860	2,668E-02	1160	1,510E-04	2500	9,398E-03	4000	7,230E-05
270	1,9E-03	570	9,267E-01	870	2,066E-02	1170	1,379E-04	2550	1,160E-02	4050	3,512E-05
280	2,1E-02	580	9,189E-01	880	1,585E-02	1180	1,201E-04	2600	1,403E-02	4100	2,115E-05
290	8,7E-02	590	9,059E-01	890	1,195E-02	1190	1,309E-04	2650	1,687E-02	4150	1,291E-05
300	2,3E-01	600	8,899E-01	900	9,471E-03	1200	1,227E-04	2700	1,917E-02	4200	< 1,000E-05
310	4,3E-01	610	8,645E-01	910	7,401E-03	1250	1,188E-04	2750	1,420E-02	4250	< 1,000E-05
320	6,184E-01	620	8,381E-01	920	5,677E-03	1300	1,322E-04	2800	1,641E-03	4300	< 1,000E-05
330	7,634E-01	630	8,054E-01	930	4,323E-03	1350	1,495E-04	2850	3,690E-04	4350	< 1,000E-05
340	8,445E-01	640	7,704E-01	940	3,458E-03	1400	2,072E-04	2900	2,146E-04	4400	1,042E-05
350	8,948E-01	650	7,303E-01	950	2,746E-03	1450	3,025E-04	2950	1,725E-04	4450	1,106E-05
360	9,343E-01	660	6,891E-01	960	2,212E-03	1500	4,975E-04	3000	1,586E-04	4500	1,106E-05
370	9,455E-01	670	6,451E-01	970	1,740E-03	1550	7,248E-04	3050	1,571E-04	4550	1,106E-05
380	9,509E-01	680	5,988E-01	980	1,401E-03	1600	1,222E-03	3100	1,649E-04	4600	1,042E-05
390	9,379E-01	690	5,497E-01	990	1,092E-03	1650	1,812E-03	3150	1,794E-04	4650	< 1,000E-05
400	9,217E-01	700	4,982E-01	1000	9,072E-04	1700	2,542E-03	3200	2,000E-04	4700	< 1,000E-05
410	9,079E-01	710	4,482E-01	1010	7,715E-04	1750	3,228E-03	3250	2,324E-04	4750	< 1,000E-05
420	8,992E-01	720	3,989E-01	1020	6,422E-04	1800	3,652E-03	3300	2,755E-04	4800	< 1,000E-05
430	9,037E-01	730	3,535E-01	1030	5,357E-04	1850	3,770E-03	3350	3,430E-04	4850	< 1,000E-05
440	9,112E-01	740	3,084E-01	1040	4,512E-04	1900	3,681E-03	3400	4,356E-04	4900	< 1,000E-05
450	9,159E-01	750	2,645E-01	1050	3,972E-04	1950	3,366E-03	3450	5,699E-04	4950	< 1,000E-05
460	9,109E-01	760	2,263E-01	1060	3,472E-04	2000	3,121E-03	3500	7,511E-04	5000	< 1,000E-05
470	9,167E-01	770	1,901E-01	1070	2,827E-04	2050	2,861E-03	3550	9,992E-04	5050	< 1,000E-05
480	9,250E-01	780	1,584E-01	1080	2,515E-04	2100	2,785E-03	3600	1,302E-03	5100	< 1,000E-05
490	9,288E-01	790	1,302E-01	1090	2,367E-04	2150	2,752E-03	3650	1,630E-03	5150	< 1,000E-05

KG5

Optical properties	Mechanical properties	Colorimetric properties
Reflection factor	Reference thickness	1 mm 2 mm 3 mm
$P_d = 0,921$	$d = 2,00 \text{ mm}$	Illuminant D65 x 0,308 0,304 0,300 y 0,331 0,332 0,334 Y 85,4 79,3 73,7 λ_d 496 nm 496 nm 496 nm P _e 0,015 0,029 0,042
Spectral values guaranteed (d = 2 mm)	Density	
$\lambda_c (\tau_i = 0,5) = \text{nm nm}$	$\rho = 2,53 \text{ g/cm}^3$	
$\lambda_s (\tau_{i,U} =) = \text{nm}$	Knoop hardness	
$\lambda_p (\tau_{i,L} =) = \text{nm}$	$HK_{[0,1/20]} = 435$	
$t_i (800 \text{ nm} \leq 0,09)$	Thermal properties	Illuminant A x 0,440 0,434 0,427 y 0,411 0,415 0,418 Y 84,6 77,9 71,9 λ_d 504 nm 505 nm 505 nm P _e 0,016 0,031 0,045
$\tau_i (900 \text{ nm} \leq 0,01)$	Transformation temperature	
	$T_g = 565 \text{ }^\circ\text{C}$	
	Thermal expansion in $10^{-6}/\text{K}$	
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 5,4$	
Refractive indices	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 6,2$	Notes
$n_d (587,6 \text{ nm}) = 1,51$		UV
		Transmission changes are possible under the action of intense ultraviolet radiation.
Sellmeier coefficients	Chemical properties	Ionically colored glass
on request	Chemical resistance	
	FR class = 0	
	SR class = 3	
	AR class = 4	DIN 58131
	Long-term changes in the polished surface are possible under some circumstances.	Disclaimer
Internal quality		All data without tolerances are to be understood to be reference values
Bubble class 3		



KG5

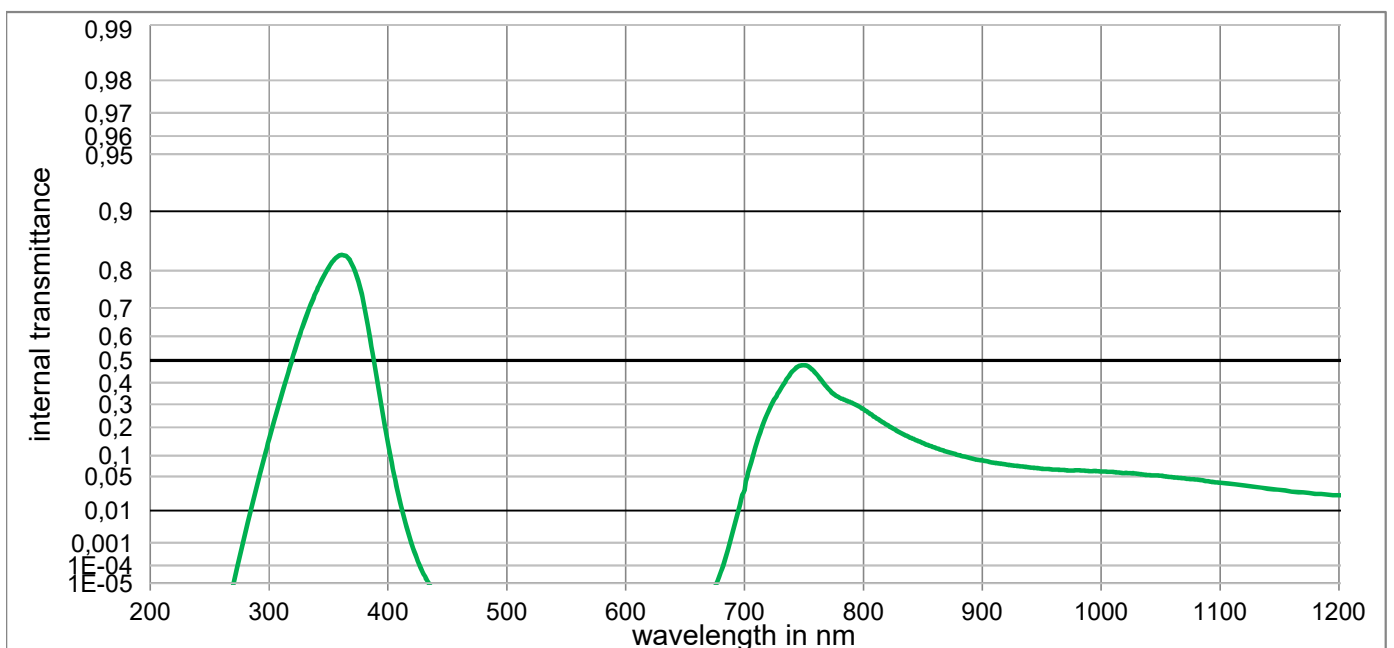


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

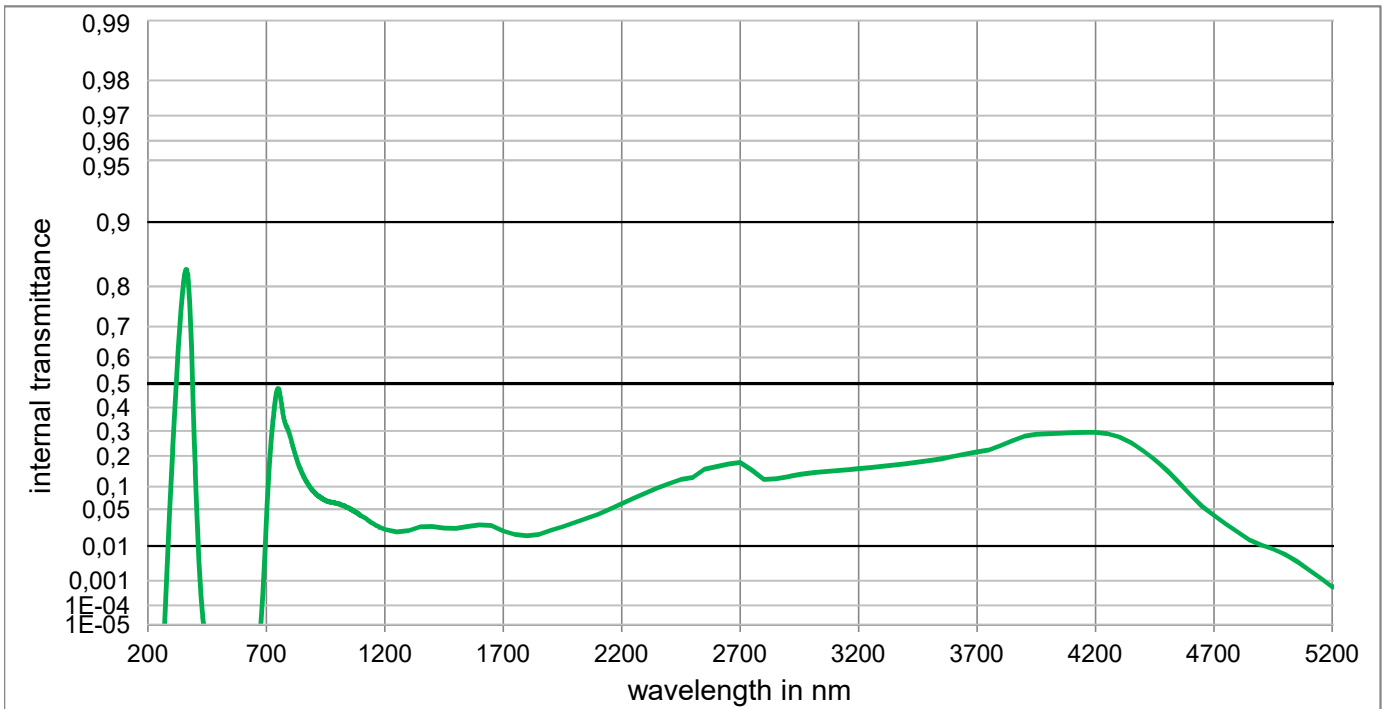
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	8,883E-01	800	5,600E-02	1100	1,875E-05	2200	5,413E-04	3700	2,208E-03
210	< 1,0E-05	510	8,854E-01	810	4,211E-02	1110	1,667E-05	2250	6,482E-04	3750	2,015E-03
220	< 1,0E-05	520	8,781E-01	820	3,171E-02	1120	1,500E-05	2300	8,290E-04	3800	1,577E-03
230	< 1,0E-05	530	8,743E-01	830	2,311E-02	1130	1,370E-05	2350	1,095E-03	3850	1,039E-03
240	< 1,0E-05	540	8,806E-01	840	1,632E-02	1140	1,239E-05	2400	1,479E-03	3900	4,560E-04
250	< 1,0E-05	550	8,900E-01	850	1,135E-02	1150	1,109E-05	2450	2,058E-03	3950	1,861E-04
260	< 1,0E-05	560	8,919E-01	860	7,720E-03	1160	1,007E-05	2500	2,914E-03	4000	7,390E-05
270	< 1,0E-05	570	8,870E-01	870	5,300E-03	1170	< 1,000E-05	2550	4,090E-03	4050	3,650E-05
280	2,8E-05	580	8,770E-01	880	3,839E-03	1180	< 1,000E-05	2600	5,337E-03	4100	1,570E-05
290	1,9E-03	590	8,600E-01	890	2,716E-03	1190	< 1,000E-05	2650	6,620E-03	4150	< 1,000E-05
300	2,2E-02	600	8,380E-01	900	1,990E-03	1200	< 1,000E-05	2700	7,858E-03	4200	< 1,000E-05
310	1,1E-01	610	8,100E-01	910	1,410E-03	1250	< 1,000E-05	2750	5,622E-03	4250	< 1,000E-05
320	2,950E-01	620	7,770E-01	920	1,000E-03	1300	< 1,000E-05	2800	8,872E-04	4300	< 1,000E-05
330	5,160E-01	630	7,380E-01	930	7,311E-04	1350	1,050E-05	2850	2,754E-04	4350	< 1,000E-05
340	6,840E-01	640	6,960E-01	940	5,320E-04	1400	1,549E-05	2900	2,037E-04	4400	< 1,000E-05
350	7,950E-01	650	6,500E-01	950	3,917E-04	1450	2,588E-05	2950	1,856E-04	4450	< 1,000E-05
360	8,690E-01	660	6,040E-01	960	2,877E-04	1500	4,550E-05	3000	1,817E-04	4500	< 1,000E-05
370	8,980E-01	670	5,550E-01	970	2,153E-04	1550	8,507E-05	3050	1,894E-04	4550	< 1,000E-05
380	9,090E-01	680	5,050E-01	980	1,633E-04	1600	1,545E-04	3100	2,083E-04	4600	< 1,000E-05
390	8,998E-01	690	4,500E-01	990	1,256E-04	1650	2,683E-04	3150	2,330E-04	4650	< 1,000E-05
400	8,774E-01	700	3,980E-01	1000	9,931E-05	1700	4,375E-04	3200	2,670E-04	4700	< 1,000E-05
410	8,619E-01	710	3,470E-01	1010	7,816E-05	1750	5,757E-04	3250	3,098E-04	4750	< 1,000E-05
420	8,497E-01	720	2,990E-01	1020	6,166E-05	1800	6,608E-04	3300	3,557E-04	4800	< 1,000E-05
430	8,505E-01	730	2,550E-01	1030	4,932E-05	1850	6,868E-04	3350	4,320E-04	4850	< 1,000E-05
440	8,619E-01	740	2,140E-01	1040	4,055E-05	1900	6,537E-04	3400	5,640E-04	4900	< 1,000E-05
450	8,651E-01	750	1,780E-01	1050	3,467E-05	1950	6,034E-04	3450	7,280E-04	4950	< 1,000E-05
460	8,620E-01	760	1,450E-01	1060	3,006E-05	2000	5,593E-04	3500	9,320E-04	5000	< 1,000E-05
470	8,720E-01	770	1,160E-01	1070	2,630E-05	2050	5,136E-04	3550	1,222E-03	5050	< 1,000E-05
480	8,787E-01	780	9,200E-02	1080	2,323E-05	2100	4,851E-04	3600	1,604E-03	5100	< 1,000E-05
490	8,841E-01	790	7,200E-02	1090	2,075E-05	2150	4,927E-04	3650	1,950E-03	5150	< 1,000E-05

UG1

Optical properties	Mechanical properties	Colorimetric properties
Reflection factor	Reference thickness	1 mm 2 mm 3 mm
$P_d = 0,913$	$d = 1,00 \text{ mm}$	Illuminant D65 x y Y λ_d P_e
Spectral values guaranteed (d = 1 mm)	Density	
$\lambda_c (\tau_i = 0,5) = \text{nm nm}$	$\rho = 2,77 \text{ g/cm}^3$	
$\lambda_s (\tau_{i,U} =) = \text{nm}$	Knoop hardness	
$\lambda_p (\tau_{i,L} =) = \text{nm}$	$HK_{[0.1/20]} = 482$	
	Thermal properties	Illuminant A x y Y λ_d P_e
	Transformation temperature	
	$T_g = 603 \text{ }^\circ\text{C}$	
	Thermal expansion in $10^{-6}/\text{K}$	
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 7,9$	
	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 8,9$	
Refractive indices	Chemical properties	Notes
$n_d (587,6 \text{ nm}) = 1,54$	Chemical resistance	UV
$n_s (852 \text{ nm}) = 1,53$	FR class = 0	Transmission changes are possible under the action of intense ultraviolet radiation.
$n_t (1014 \text{ nm}) = 1,53$	SR class = 1	Ionically colored glass
	AR class = 1	Bandpass filter
Sellmeier coefficients		DIN 58131
valid from 400 nm to 1550 nm		
$B_1 = 0,9475$		
$B_2 = 0,3895$		
$B_3 = 1,1076$		
$C_1 = 9,783\text{E-}03 \text{ } \mu\text{m}^2$		
$C_2 = 1,1182\text{E-}02 \text{ } \mu\text{m}^2$		
$C_3 = 147,627 \text{ } \mu\text{m}^2$		
		Disclaimer
Internal quality		All data without tolerances are to be understood to be reference values
Bubble class 1		



UG1

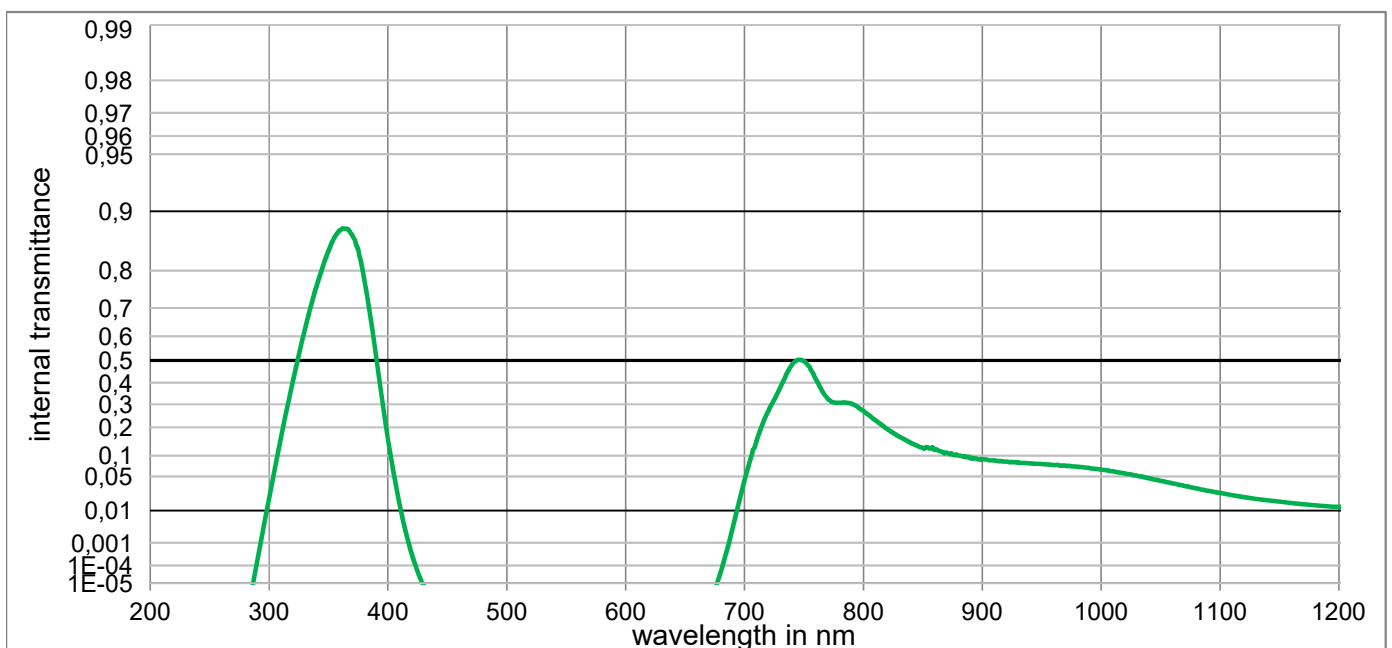


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

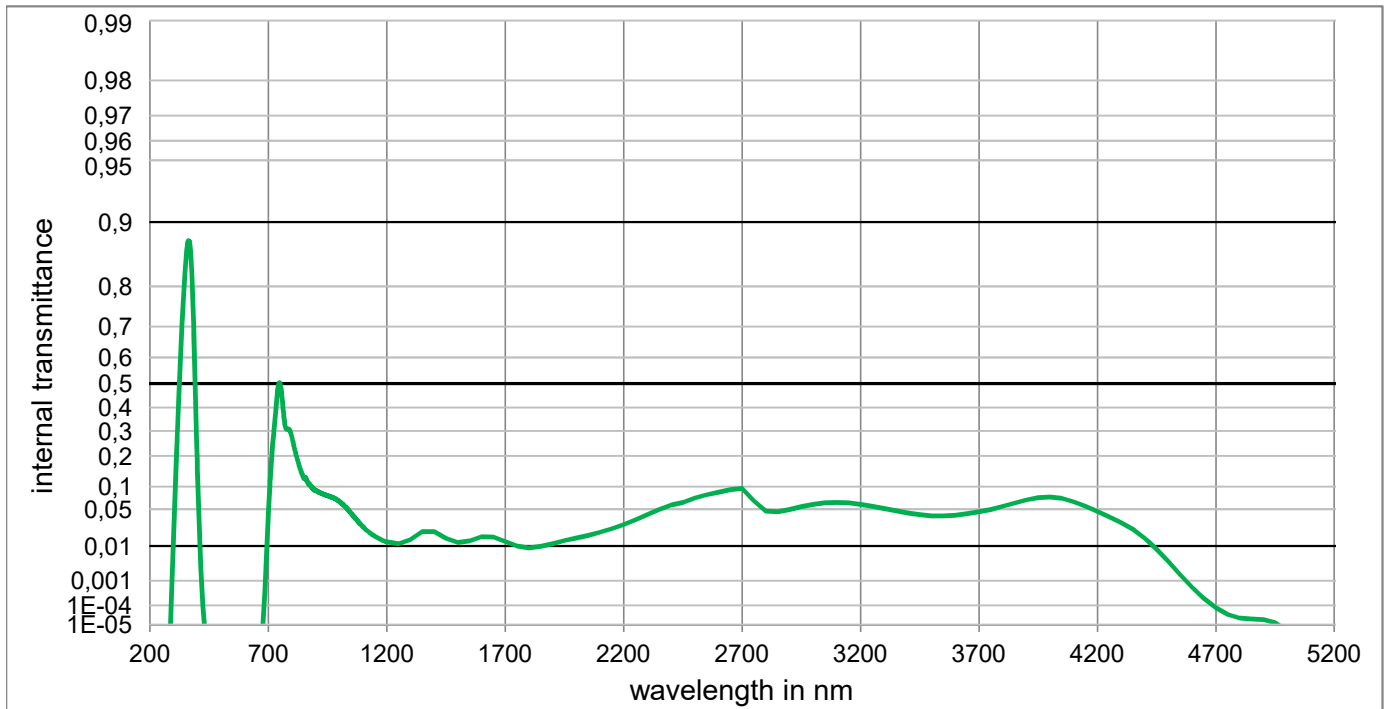
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	2,769E-01	1100	3,919E-02	2200	5,979E-02	3700	2,146E-01
210	< 1,0E-05	510	< 1,000E-05	810	2,416E-01	1110	3,721E-02	2250	7,156E-02	3750	2,230E-01
220	< 1,0E-05	520	< 1,000E-05	820	2,091E-01	1120	3,533E-02	2300	8,324E-02	3800	2,400E-01
230	< 1,0E-05	530	< 1,000E-05	830	1,812E-01	1130	3,286E-02	2350	9,590E-02	3850	2,592E-01
240	< 1,0E-05	540	< 1,000E-05	840	1,584E-01	1140	3,046E-02	2400	1,083E-01	3900	2,774E-01
250	< 1,0E-05	550	< 1,000E-05	850	1,402E-01	1150	2,892E-02	2450	1,199E-01	3950	2,859E-01
260	< 1,0E-05	560	< 1,000E-05	860	1,250E-01	1160	2,682E-02	2500	1,262E-01	4000	2,887E-01
270	< 1,0E-05	570	< 1,000E-05	870	1,123E-01	1170	2,601E-02	2550	1,524E-01	4050	2,906E-01
280	2,4E-03	580	< 1,000E-05	880	1,019E-01	1180	2,411E-02	2600	1,615E-01	4100	2,925E-01
290	3,7E-02	590	< 1,000E-05	890	9,311E-02	1190	2,337E-02	2650	1,700E-01	4150	2,934E-01
300	1,6E-01	600	< 1,000E-05	900	8,686E-02	1200	2,243E-02	2700	1,762E-01	4200	2,934E-01
310	3,4E-01	610	< 1,000E-05	910	8,073E-02	1250	2,020E-02	2750	1,498E-01	4250	2,893E-01
320	5,189E-01	620	< 1,000E-05	920	7,633E-02	1300	2,134E-02	2800	1,200E-01	4300	2,755E-01
330	6,591E-01	630	< 1,000E-05	930	7,269E-02	1350	2,534E-02	2850	1,219E-01	4350	2,523E-01
340	7,508E-01	640	< 1,000E-05	940	6,916E-02	1400	2,552E-02	2900	1,279E-01	4400	2,200E-01
350	8,072E-01	650	< 1,000E-05	950	6,633E-02	1450	2,378E-02	2950	1,354E-01	4450	1,860E-01
360	8,327E-01	660	< 1,000E-05	960	6,451E-02	1500	2,337E-02	3000	1,400E-01	4500	1,500E-01
370	8,124E-01	670	< 1,000E-05	970	6,314E-02	1550	2,540E-02	3050	1,439E-01	4550	1,131E-01
380	7,060E-01	680	4,430E-05	980	6,293E-02	1600	2,746E-02	3100	1,476E-01	4600	8,000E-02
390	4,380E-01	690	2,460E-03	990	6,107E-02	1650	2,657E-02	3150	1,508E-01	4650	5,508E-02
400	1,376E-01	700	2,820E-02	1000	6,046E-02	1700	2,106E-02	3200	1,546E-01	4700	4,000E-02
410	1,650E-02	710	1,395E-01	1010	5,929E-02	1750	1,786E-02	3250	1,580E-01	4750	2,838E-02
420	8,618E-04	720	2,686E-01	1020	5,705E-02	1800	1,677E-02	3300	1,621E-01	4800	2,000E-02
430	3,463E-05	730	3,682E-01	1030	5,553E-02	1850	1,793E-02	3350	1,668E-01	4850	1,380E-02
440	< 1,000E-05	740	4,499E-01	1040	5,300E-02	1900	2,145E-02	3400	1,718E-01	4900	1,057E-02
450	< 1,000E-05	750	4,798E-01	1050	5,141E-02	1950	2,515E-02	3450	1,769E-01	4950	8,356E-03
460	< 1,000E-05	760	4,419E-01	1060	4,881E-02	2000	3,012E-02	3500	1,825E-01	5000	6,281E-03
470	< 1,000E-05	770	3,736E-01	1070	4,668E-02	2050	3,544E-02	3550	1,891E-01	5050	4,055E-03
480	< 1,000E-05	780	3,298E-01	1080	4,456E-02	2100	4,160E-02	3600	1,995E-01	5100	2,328E-03
490	< 1,000E-05	790	3,068E-01	1090	4,168E-02	2150	5,012E-02	3650	2,070E-01	5150	1,230E-03

UG2A

Optical properties	Mechanical properties	Colormetric properties
Reflection factor	Reference thickness	1 mm 2 mm 3 mm
$P_d = 0,918$	$d = 3,00 \text{ mm}$	Illuminant D65 x y Y λ_d P_e
Spectral values guaranteed (d = 3 mm)	Density	
$\lambda_c (\tau_i = 0,5) = \text{nm nm}$	$\rho = 2,60 \text{ g/cm}^3$	
$\lambda_s (\tau_{i,U} =) = \text{nm}$	Knoop hardness	
$\lambda_p (\tau_{i,L} =) = \text{nm}$	HK _[0.1/20]	
$t_i (750 \text{ nm} \leq 0,52)$	Thermal properties	Illuminant A x y Y λ_d P_e
	Transformation temperature	
	$T_g = 484 \text{ }^\circ\text{C}$	
	Thermal expansion in $10^{-6}/\text{K}$	
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 8,7$	
Refractive indices	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 9,9$	Notes
$n_d (587,6 \text{ nm}) = 1,52$	Chemical properties	UV
$n_s (852 \text{ nm}) = 1,52$	Chemical resistance	Transmission changes are possible under the action of intense ultraviolet radiation.
$n_t (1014 \text{ nm}) = 1,51$	FR class	Ionically colored glass
Sellmeier coefficients	SR class = 1.0	Bandpass filter
valid from 295 nm to 1600 nm	AR class = 1.3	
$B_1 = 0,8819$		DIN 58131
$B_2 = 0,4027$		
$B_3 = 1,2925$		Disclaimer
$C_1 = 4,435\text{E-}03 \text{ } \mu\text{m}^2$		All data without tolerances are to be understood to be reference values
$C_2 = 2,0863\text{E-}02 \text{ } \mu\text{m}^2$		
$C_3 = 169,418 \text{ } \mu\text{m}^2$		
Internal quality		
Bubble class 2		



UG2A

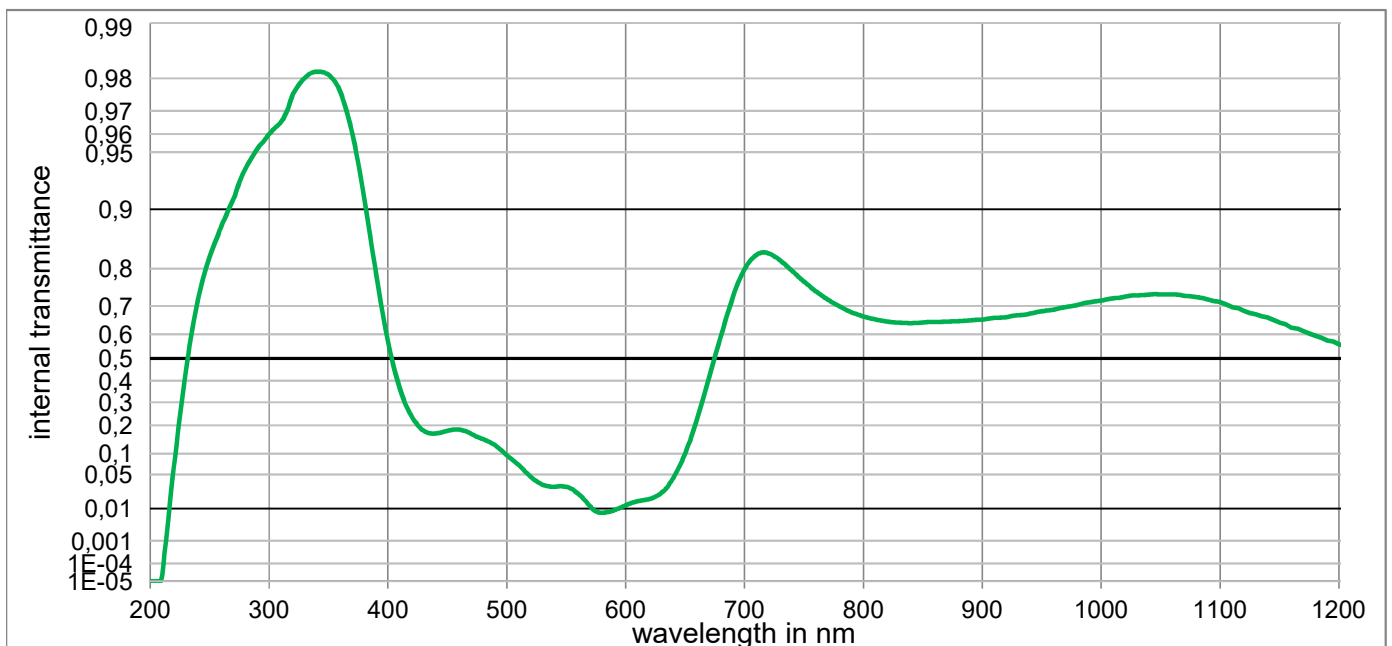


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

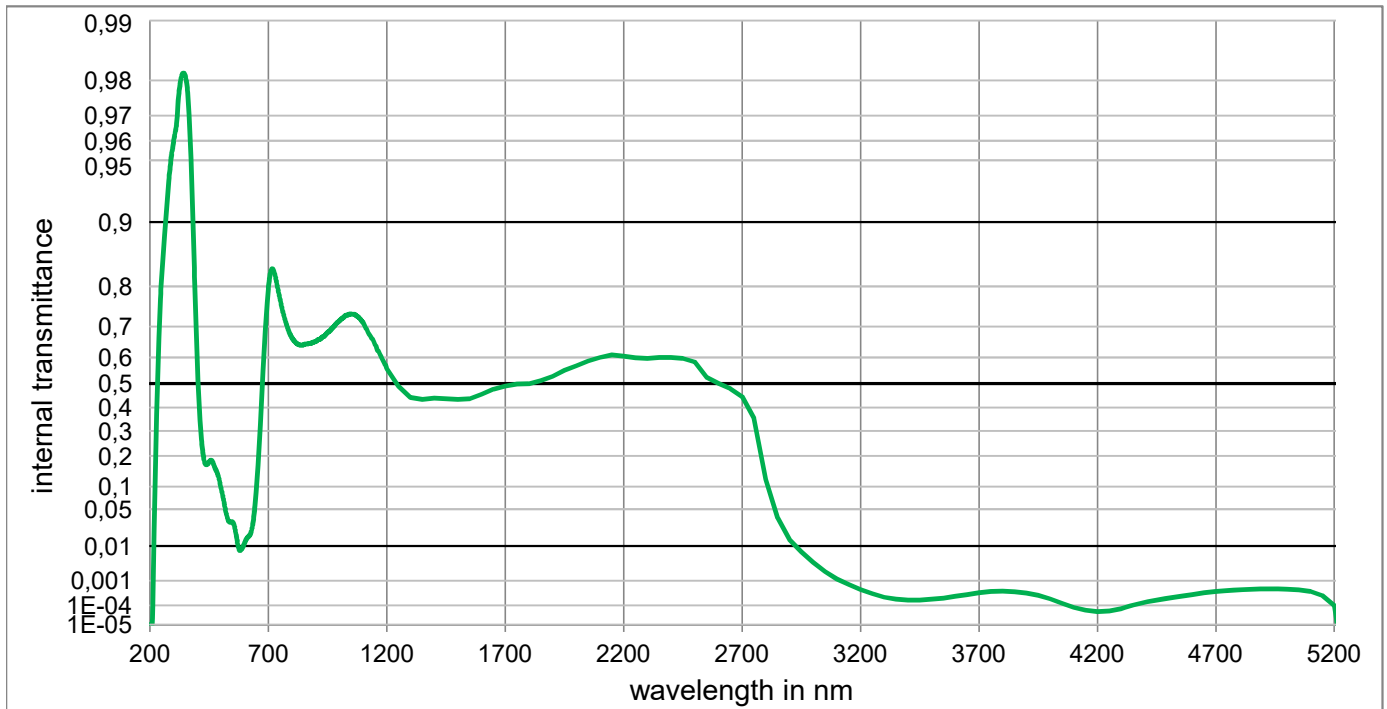
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	2,694E-01	1100	2,523E-02	2200	2,753E-02	3700	4,550E-02
210	< 1,0E-05	510	< 1,000E-05	810	2,291E-01	1110	2,269E-02	2250	3,365E-02	3750	4,960E-02
220	< 1,0E-05	520	< 1,000E-05	820	1,934E-01	1120	2,075E-02	2300	4,119E-02	3800	5,487E-02
230	< 1,0E-05	530	< 1,000E-05	830	1,638E-01	1130	1,906E-02	2350	4,948E-02	3850	6,125E-02
240	< 1,0E-05	540	< 1,000E-05	840	1,408E-01	1140	1,742E-02	2400	5,747E-02	3900	6,769E-02
250	< 1,0E-05	550	< 1,000E-05	850	1,232E-01	1150	1,630E-02	2450	6,255E-02	3950	7,273E-02
260	< 1,0E-05	560	< 1,000E-05	860	1,173E-01	1160	1,523E-02	2500	7,233E-02	4000	7,429E-02
270	< 1,0E-05	570	< 1,000E-05	870	1,091E-01	1170	1,438E-02	2550	7,920E-02	4050	7,123E-02
280	< 1,0E-05	580	< 1,000E-05	880	1,008E-01	1180	1,343E-02	2600	8,580E-02	4100	6,414E-02
290	1,8E-04	590	< 1,000E-05	890	9,226E-02	1190	1,285E-02	2650	9,190E-02	4150	5,492E-02
300	2,0E-02	600	< 1,000E-05	900	8,992E-02	1200	1,239E-02	2700	9,526E-02	4200	4,586E-02
310	1,6E-01	610	< 1,000E-05	910	8,713E-02	1250	1,130E-02	2750	6,593E-02	4250	3,757E-02
320	4,089E-01	620	< 1,000E-05	920	8,362E-02	1300	1,398E-02	2800	4,651E-02	4300	3,000E-02
330	6,267E-01	630	< 1,000E-05	930	8,186E-02	1350	2,031E-02	2850	4,580E-02	4350	2,243E-02
340	7,641E-01	640	< 1,000E-05	940	7,948E-02	1400	2,052E-02	2900	4,947E-02	4400	1,481E-02
350	8,415E-01	650	< 1,000E-05	950	7,743E-02	1450	1,494E-02	2950	5,439E-02	4450	8,338E-03
360	8,747E-01	660	< 1,000E-05	960	7,516E-02	1500	1,214E-02	3000	5,885E-02	4500	3,947E-03
370	8,670E-01	670	< 1,000E-05	970	7,294E-02	1550	1,314E-02	3050	6,181E-02	4550	1,607E-03
380	7,794E-01	680	4,743E-05	980	7,087E-02	1600	1,595E-02	3100	6,279E-02	4600	5,872E-04
390	5,154E-01	690	3,525E-03	990	6,786E-02	1650	1,574E-02	3150	6,159E-02	4650	2,055E-04
400	1,524E-01	700	4,381E-02	1000	6,441E-02	1700	1,264E-02	3200	5,873E-02	4700	7,701E-05
410	1,277E-02	710	1,482E-01	1010	6,074E-02	1750	1,000E-02	3250	5,510E-02	4750	3,602E-05
420	3,343E-04	720	2,701E-01	1020	5,634E-02	1800	9,086E-03	3300	5,112E-02	4800	2,360E-05
430	< 1,000E-05	730	3,772E-01	1030	5,164E-02	1850	9,759E-03	3350	4,711E-02	4850	2,090E-05
440	< 1,000E-05	740	4,822E-01	1040	4,693E-02	1900	1,129E-02	3400	4,352E-02	4900	1,931E-05
450	< 1,000E-05	750	4,969E-01	1050	4,254E-02	1950	1,318E-02	3450	4,076E-02	4950	1,251E-05
460	< 1,000E-05	760	4,160E-01	1060	3,842E-02	2000	1,507E-02	3500	3,919E-02	5000	< 1,000E-05
470	< 1,000E-05	770	3,251E-01	1070	3,455E-02	2050	1,693E-02	3550	3,909E-02	5050	< 1,000E-05
480	< 1,000E-05	780	3,076E-01	1080	3,079E-02	2100	1,983E-02	3600	4,021E-02	5100	< 1,000E-05
490	< 1,000E-05	790	3,020E-01	1090	2,776E-02	2150	2,320E-02	3650	4,237E-02	5150	< 1,000E-05

UG5

Optical properties	Mechanical properties	Colorimetric properties
Reflection factor	Reference thickness	1 mm 2 mm 3 mm
$P_d = 0,914$	$d = 1,00 \text{ mm}$	Illuminant D65 x y Y λ_d P_e
Spectral values guaranteed (d = 1 mm)	Density	
$\lambda_c(\tau_i = 0,5) = \text{nm nm}$	$\rho = 2,85 \text{ g/cm}^3$	
$\lambda_s(\tau_{i,U} =) = \text{nm}$	Knoop hardness	
$\lambda_p(\tau_{i,L} =) = \text{nm}$	$HK_{[0.1/20]} = 407$	
$t_i (633 \text{ nm} \leq 0,05)$	Thermal properties	Illuminant A x y Y λ_d P_e
$\tau_i (725 \text{ nm} \leq 0,85)$	Transformation temperature	
	$T_g = 462 \text{ }^\circ\text{C}$	
	Thermal expansion in $10^{-6}/\text{K}$	
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 8,1$	
Refractive indices	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 9,4$	Notes
$n_d (587,6 \text{ nm}) = 1,54$	Chemical properties	UV
	Chemical resistance	Transmission changes are possible under the action of intense ultraviolet radiation.
$n_t (1014 \text{ nm}) = 1,53$	FR class = 0	Ionically colored glass
	SR class = 3	Bandpass filter
Sellmeier coefficients	AR class = 2	
valid from 270 nm to 600 nm		DIN 58131
$B_1 = 1,3960$	Long-term changes in the polished surface are possible.	
$B_2 = 0,0097$		Disclaimer
$B_3 = 0,5658$		All data without tolerances are to be understood to be reference values
$C_1 = 9,230\text{E-}03 \text{ } \mu\text{m}^2$		
$C_2 = 4,4000\text{E-}02 \text{ } \mu\text{m}^2$		
$C_3 = 96,000 \text{ } \mu\text{m}^2$		
Internal quality		
Bubble class 2		



UG5

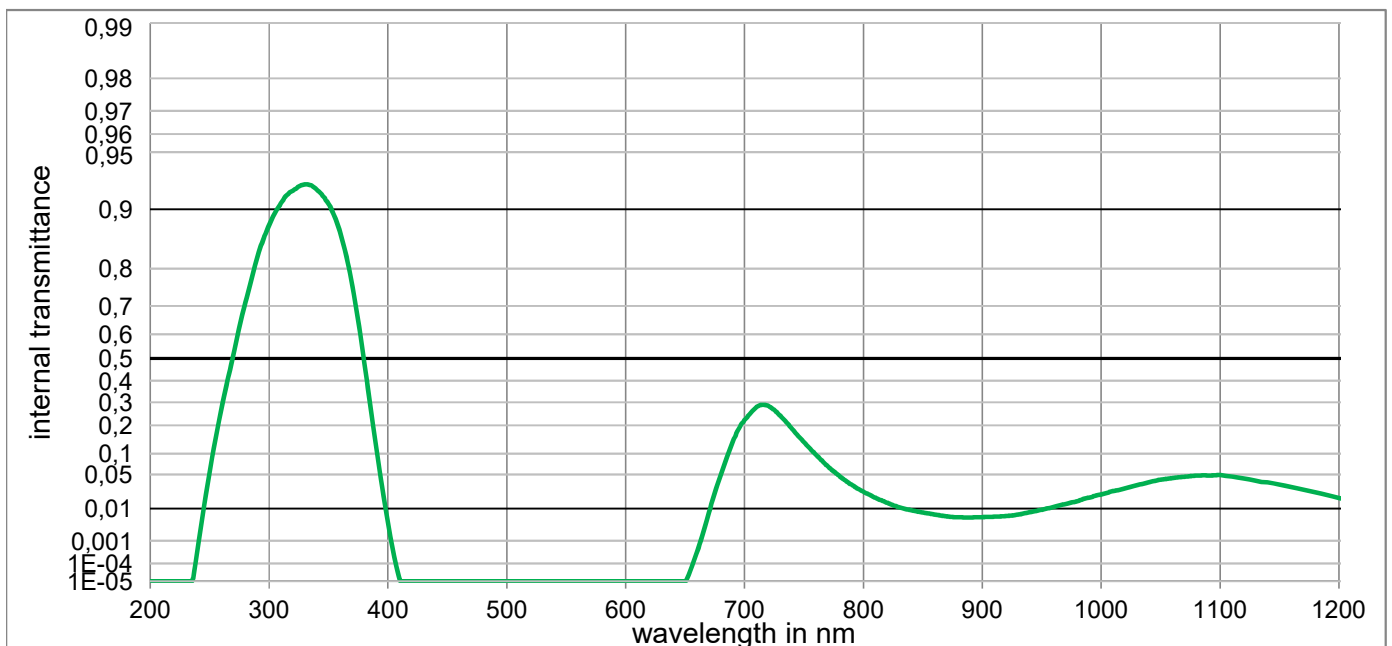


Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

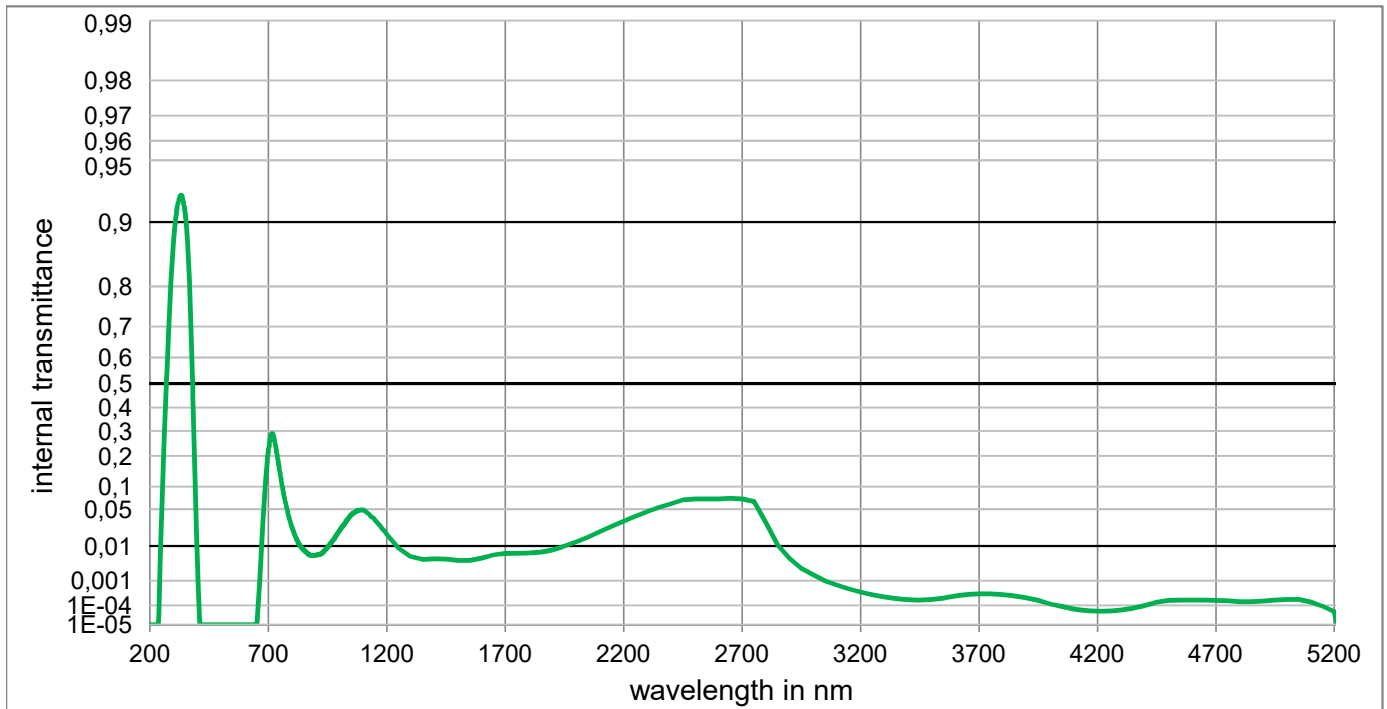
λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	9,500E-02	800	6,650E-01	1100	7,118E-01	2200	6,039E-01	3700	3,581E-04
210	2,2E-05	510	7,000E-02	810	6,550E-01	1110	6,962E-01	2250	5,992E-01	3750	4,036E-04
220	6,9E-02	520	4,600E-02	820	6,476E-01	1120	6,834E-01	2300	5,961E-01	3800	4,130E-04
230	4,5E-01	530	3,300E-02	830	6,436E-01	1130	6,725E-01	2350	6,000E-01	3850	3,873E-04
240	7,2E-01	540	3,041E-02	840	6,420E-01	1140	6,615E-01	2400	6,000E-01	3900	3,451E-04
250	8,3E-01	550	3,015E-02	850	6,443E-01	1150	6,444E-01	2450	5,969E-01	3950	2,780E-04
260	8,8E-01	560	2,200E-02	860	6,463E-01	1160	6,248E-01	2500	5,835E-01	4000	2,000E-04
270	9,1E-01	570	1,136E-02	870	6,476E-01	1170	6,122E-01	2550	5,246E-01	4050	1,271E-04
280	9,4E-01	580	7,810E-03	880	6,487E-01	1180	5,947E-01	2600	5,010E-01	4100	8,166E-05
290	9,5E-01	590	9,020E-03	890	6,518E-01	1190	5,762E-01	2650	4,806E-01	4150	5,902E-05
300	9,6E-01	600	1,203E-02	900	6,543E-01	1200	5,600E-01	2700	4,461E-01	4200	5,093E-05
310	9,7E-01	610	1,514E-02	910	6,606E-01	1250	4,893E-01	2750	3,534E-01	4250	5,433E-05
320	9,757E-01	620	1,703E-02	920	6,628E-01	1300	4,429E-01	2800	1,200E-01	4300	7,000E-05
330	9,802E-01	630	2,304E-02	930	6,694E-01	1350	4,351E-01	2850	3,622E-02	4350	1,009E-04
340	9,816E-01	640	4,400E-02	940	6,745E-01	1400	4,400E-01	2900	1,396E-02	4400	1,371E-04
350	9,809E-01	650	1,010E-01	950	6,826E-01	1450	4,374E-01	2950	7,228E-03	4450	1,726E-04
360	9,761E-01	660	2,270E-01	960	6,876E-01	1500	4,343E-01	3000	3,784E-03	4500	2,113E-04
370	9,600E-01	670	4,140E-01	970	6,962E-01	1550	4,374E-01	3050	2,037E-03	4550	2,570E-04
380	9,120E-01	680	5,950E-01	980	7,030E-01	1600	4,555E-01	3100	1,169E-03	4600	3,000E-04
390	7,870E-01	690	7,270E-01	990	7,112E-01	1650	4,767E-01	3150	7,430E-04	4650	3,516E-04
400	5,700E-01	700	7,990E-01	1000	7,164E-01	1700	4,900E-01	3200	4,775E-04	4700	4,000E-04
410	3,600E-01	710	8,290E-01	1010	7,232E-01	1750	4,979E-01	3250	3,236E-04	4750	4,315E-04
420	2,360E-01	720	8,320E-01	1020	7,278E-01	1800	5,000E-01	3300	2,296E-04	4800	4,688E-04
430	1,780E-01	730	8,180E-01	1030	7,317E-01	1850	5,128E-01	3350	1,910E-04	4850	4,909E-04
440	1,680E-01	740	7,950E-01	1040	7,338E-01	1900	5,293E-01	3400	1,758E-04	4900	5,000E-04
450	1,780E-01	750	7,690E-01	1050	7,344E-01	1950	5,529E-01	3450	1,758E-04	4950	5,000E-04
460	1,830E-01	760	7,430E-01	1060	7,347E-01	2000	5,700E-01	3500	1,910E-04	5000	4,955E-04
470	1,660E-01	770	7,190E-01	1070	7,305E-01	2050	5,874E-01	3550	2,133E-04	5050	4,645E-04
480	1,470E-01	780	6,980E-01	1080	7,267E-01	2100	6,000E-01	3600	2,547E-04	5100	4,000E-04
490	1,260E-01	790	6,789E-01	1090	7,194E-01	2150	6,094E-01	3650	3,000E-04	5150	2,742E-04

UG11

Optical properties	Mechanical properties	Colorimetric properties
Reflection factor	Reference thickness	1 mm 2 mm 3 mm
$P_d = 0,908$	$d = 1,00 \text{ mm}$	Illuminant D65 x y Y λ_d P_e
Spectral values guaranteed (d = 1 mm)	Density	
$\lambda_c (\tau_i = 0,5) = \text{nm nm}$	$\rho = 2,92 \text{ g/cm}^3$	
$\lambda_s (\tau_{i,U} =) = \text{nm}$	Knoop hardness	
$\lambda_p (\tau_{i,L} =) = \text{nm}$	$HK_{[0.1/20]} = 440$	
$t_i \quad (725 \text{ nm} \leq 0,32)$	Thermal properties	Illuminant A x y Y λ_d P_e
	Transformation temperature	
	$T_g = 545 \text{ }^\circ\text{C}$	
	Thermal expansion in $10^{-6}/\text{K}$	
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 7,8$	
Refractive indices	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 9,0$	Notes
$n_d (587,6 \text{ nm}) = 1,56$	Chemical properties	UV
$n_s (852 \text{ nm}) = 1,56$	Chemical resistance	Transmission changes are possible under the action of intense ultraviolet radiation.
	FR class = 0	Ionically colored glass
Sellmeier coefficients	SR class = 3	Bandpass filter
valid from 270 nm to 600 nm	AR class = 2.2	
$B_1 = 1,3960$		DIN 58131
$B_2 = 0,0097$	Long-term changes in the polished surface are possible.	
$B_3 = 0,5658$		Disclaimer
$C_1 = 9,230\text{E-}03 \text{ } \mu\text{m}^2$		All data without tolerances are to be understood to be reference values
$C_2 = 4,4000\text{E-}02 \text{ } \mu\text{m}^2$		
$C_3 = 96,000 \text{ } \mu\text{m}^2$		
Internal quality		
Bubble class 2		



UG11



Internal transmittance τ_i at reference thickness
 The internal transmittance values, tabulated and graphically represented, are reference values only

λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i	λ /nm	τ_i
200	< 1,0E-05	500	< 1,000E-05	800	2,400E-02	1100	4,897E-02	2200	3,160E-02	3700	3,206E-04
210	< 1,0E-05	510	< 1,000E-05	810	1,800E-02	1110	4,608E-02	2250	3,845E-02	3750	3,177E-04
220	< 1,0E-05	520	< 1,000E-05	820	1,382E-02	1120	4,300E-02	2300	4,600E-02	3800	3,000E-04
230	< 1,0E-05	530	< 1,000E-05	830	1,088E-02	1130	3,948E-02	2350	5,309E-02	3850	2,594E-04
240	6,1E-04	540	< 1,000E-05	840	9,121E-03	1140	3,666E-02	2400	6,000E-02	3900	2,213E-04
250	5,6E-02	550	< 1,000E-05	850	7,965E-03	1150	3,325E-02	2450	6,776E-02	3950	1,710E-04
260	2,8E-01	560	< 1,000E-05	860	7,014E-03	1160	2,970E-02	2500	7,000E-02	4000	1,180E-04
270	5,2E-01	570	< 1,000E-05	870	6,255E-03	1170	2,691E-02	2550	7,000E-02	4050	8,954E-05
280	7,1E-01	580	< 1,000E-05	880	5,892E-03	1180	2,354E-02	2600	7,000E-02	4100	6,653E-05
290	8,3E-01	590	< 1,000E-05	890	5,834E-03	1190	2,064E-02	2650	7,161E-02	4150	5,741E-05
300	8,8E-01	600	< 1,000E-05	900	5,948E-03	1200	1,775E-02	2700	7,000E-02	4200	5,236E-05
310	9,1E-01	610	< 1,000E-05	910	6,114E-03	1250	8,800E-03	2750	6,427E-02	4250	5,383E-05
320	9,200E-01	620	< 1,000E-05	920	6,368E-03	1300	5,470E-03	2800	3,000E-02	4300	6,067E-05
330	9,260E-01	630	< 1,000E-05	930	7,000E-03	1350	4,590E-03	2850	1,057E-02	4350	7,621E-05
340	9,210E-01	640	< 1,000E-05	940	8,090E-03	1400	4,770E-03	2900	4,819E-03	4400	1,000E-04
350	9,060E-01	650	< 1,000E-05	950	9,390E-03	1450	4,650E-03	2950	2,547E-03	4450	1,384E-04
360	8,660E-01	660	3,631E-04	960	1,100E-02	1500	4,270E-03	3000	1,589E-03	4500	1,663E-04
370	7,560E-01	670	8,128E-03	970	1,300E-02	1550	4,340E-03	3050	1,000E-03	4550	1,742E-04
380	4,820E-01	680	5,000E-02	980	1,520E-02	1600	5,000E-03	3100	6,966E-04	4600	1,766E-04
390	1,200E-01	690	1,380E-01	990	1,825E-02	1650	5,970E-03	3150	5,000E-04	4650	1,750E-04
400	3,999E-03	700	2,220E-01	1000	2,132E-02	1700	6,600E-03	3200	3,750E-04	4700	1,710E-04
410	1,047E-05	710	2,780E-01	1010	2,498E-02	1750	6,660E-03	3250	2,897E-04	4750	1,633E-04
420	< 1,000E-05	720	2,830E-01	1020	2,809E-02	1800	6,790E-03	3300	2,360E-04	4800	1,503E-04
430	< 1,000E-05	730	2,400E-01	1030	3,263E-02	1850	7,160E-03	3350	2,075E-04	4850	1,496E-04
440	< 1,000E-05	740	1,850E-01	1040	3,673E-02	1900	8,040E-03	3400	1,824E-04	4900	1,560E-04
450	< 1,000E-05	750	1,360E-01	1050	4,100E-02	1950	1,000E-02	3450	1,758E-04	4950	1,726E-04
460	< 1,000E-05	760	9,700E-02	1060	4,375E-02	2000	1,238E-02	3500	1,875E-04	5000	1,866E-04
470	< 1,000E-05	770	6,700E-02	1070	4,599E-02	2050	1,577E-02	3550	2,133E-04	5050	1,875E-04
480	< 1,000E-05	780	4,700E-02	1080	4,800E-02	2100	2,029E-02	3600	2,594E-04	5100	1,435E-04
490	< 1,000E-05	790	3,300E-02	1090	4,828E-02	2150	2,582E-02	3650	3,000E-04	5150	9,376E-05

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