SCHOTT
glass made of ideas

Optical Filter Glass

Data Sheets

Introduction

This is a data sheet collection for our portfolio glasses in 2022. We have revised the layout of our data sheets in 2020: you can find data about the Knoop hardness for all filter glasses, which is given in the section “Mechanical properties” of each data sheet. Furthermore, the resistance against humidity has been updated according to an updated method; see chapter 5.5 in the “Optical Filter Glass 2020” catalog, or the section “Resistance against humidity” below.

The date of the current data status is indicated on each data sheet.

Resistance against humidity

Group “resistant glasses”
No substantial surface change occurs in the filter glass types. A change in the surface is only possible under extreme conditions such as 85 °C and 85 % relative humidity over hundreds of hours.

Group “robust glasses”
These glass types withstand the warm humidity testing at 60 °C and 90 % relative humidity for more than 48 hours.

Group “sensitive glasses”
These glass types should be used and stored in a moderate climate or in closed work and store rooms (constant temperature below 35 °C, relative humidity less than 60 %). A desiccant is to be used when wetness is a possibility. For use and storage in open air and tropical climates, it is advisable to apply protective coatings be which SCHOTT can provide on request.

Group “delicate glasses”
For these types of optical filter glass, changes in the glass surface are possible after several months of normal storage. These glasses are to be handled with care: Any contact with water or warm humidity should be avoided. A desiccant is to be used for long-term storage of unprotected glass. For this reason, protective coatings are recommended which SCHOTT can provide upon request.

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
$\alpha_{-30\,°C/+70\,°C}$	Linear coefficient of thermal expansion in 10^{-6}/K in the temperature range [– 30 °C to + 70 °C]
$\alpha_{20\,°C/200\,°C}$	Linear coefficient of thermal expansion in 10^{-6}/K in the temperature range [+ 20 °C to + 200 °C]
$\alpha_{20\,°C/300\,°C}$	Linear coefficient of thermal expansion in 10^{-6}/K in the temperature range [+ 20 °C to + 300 °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”.

Table of contents

Data Sheet

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)		=	1,516
n_e (546 nm)		=	1,512
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 µm²		
C_2	1,0998E-02 µm²		
C_3	145,898 µm²		
Internal quality			
Bubble class	1		

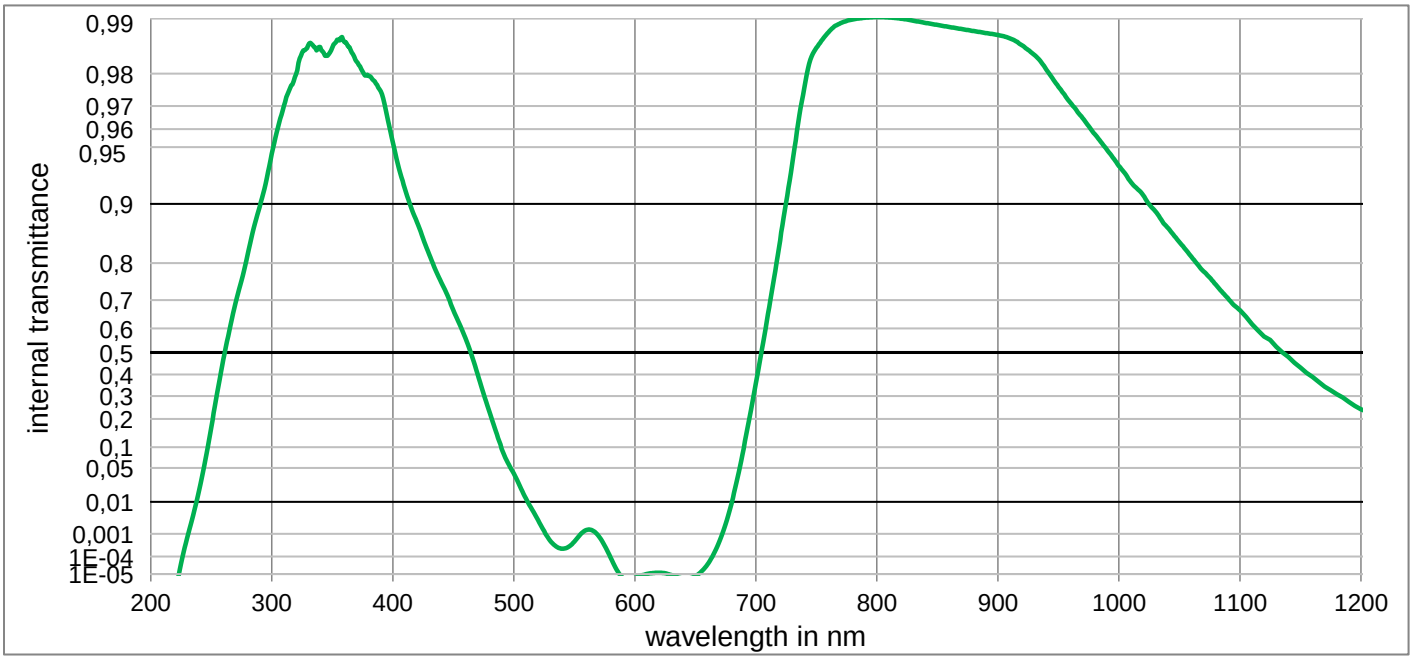
Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,55 g/cm³
Knoop hardness			
	HK[0.1/20]	=	438

Thermal properties			
Transformation temperature			
	Tg	=	478 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	8,8
	$\alpha_{(20°C/300°C)}$	=	10,1

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	1
	AR class	=	1
Resistance against humidity			
Sensitive glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

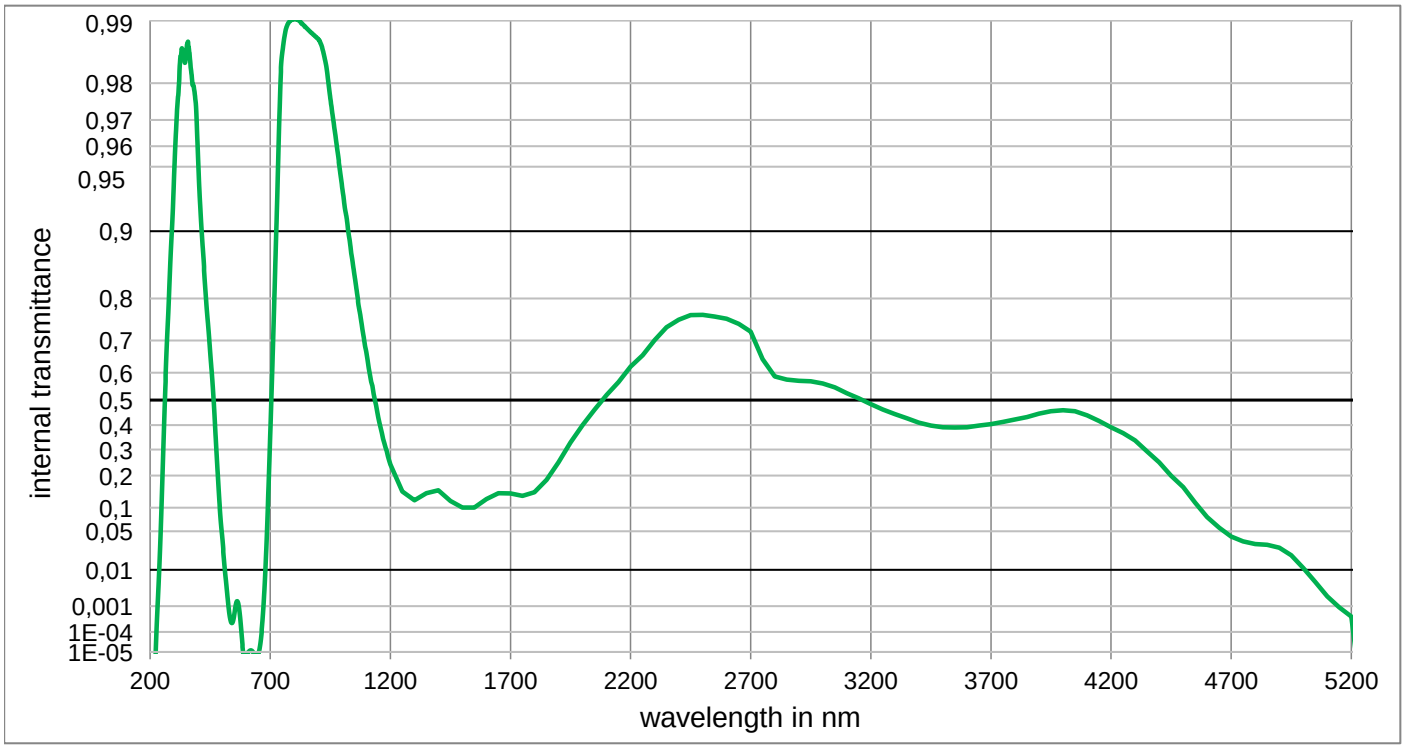
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,154	0,160	0,163
	y	0,029	0,018	0,014
	Y	2,0	0,8	0,5
	λ_d	455 nm	448 nm	444 nm
	P_e	0,979	0,993	0,996
Illuminant A	x	0,160	0,166	0,170
	y	0,042	0,024	0,020
	Y	0,9	0,3	0,2
	λ_d	458 nm	447 nm	440 nm
	P_e	0,958	0,977	0,978

Notes
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Bandpass filter / Shortpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG3



Internal transmittance ti 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	< 1,000E-05	500	4,007E-02	800	9,902E-01	1100	6,665E-01	2200	6,200E-01	3700	4,038E-01
210	< 1,000E-05	510	1,201E-02	810	9,901E-01	1110	6,152E-01	2250	6,566E-01	3750	4,132E-01
220	< 1,000E-05	520	2,977E-03	820	9,900E-01	1120	5,680E-01	2300	7,009E-01	3800	4,226E-01
230	6,761E-04	530	5,426E-04	830	9,897E-01	1130	5,247E-01	2350	7,349E-01	3850	4,330E-01
240	1,924E-02	540	2,394E-04	840	9,895E-01	1140	4,800E-01	2400	7,538E-01	3900	4,462E-01
250	1,690E-01	550	4,902E-04	850	9,892E-01	1150	4,319E-01	2450	7,642E-01	3950	4,557E-01
260	4,698E-01	560	1,401E-03	860	9,889E-01	1160	3,884E-01	2500	7,651E-01	4000	4,600E-01
270	6,903E-01	570	8,404E-04	870	9,886E-01	1170	3,432E-01	2550	7,613E-01	4050	4,557E-01
280	8,188E-01	580	8,776E-05	880	9,883E-01	1180	3,081E-01	2600	7,557E-01	4100	4,400E-01
290	8,972E-01	590	< 1,000E-05	890	9,880E-01	1190	2,727E-01	2650	7,434E-01	4150	4,170E-01
300	9,457E-01	600	< 1,000E-05	900	9,877E-01	1200	2,412E-01	2700	7,236E-01	4200	3,915E-01
310	9,700E-01	610	1,013E-05	910	9,872E-01	1250	1,462E-01	2750	6,443E-01	4250	3,670E-01
320	9,798E-01	620	1,227E-05	920	9,860E-01	1300	1,200E-01	2800	5,868E-01	4300	3,368E-01
330	9,859E-01	630	< 1,000E-05	930	9,842E-01	1350	1,406E-01	2850	5,764E-01	4350	2,925E-01
340	9,857E-01	640	< 1,000E-05	940	9,810E-01	1400	1,500E-01	2900	5,717E-01	4400	2,500E-01
350	9,856E-01	650	< 1,000E-05	950	9,764E-01	1450	1,179E-01	2950	5,698E-01	4450	2,000E-01
360	9,865E-01	660	3,783E-05	960	9,712E-01	1500	1,000E-01	3000	5,623E-01	4500	1,600E-01
370	9,829E-01	670	5,207E-04	970	9,651E-01	1550	1,000E-01	3050	5,481E-01	4550	1,132E-01
380	9,794E-01	680	9,561E-03	980	9,574E-01	1600	1,236E-01	3100	5,264E-01	4600	7,780E-02
390	9,750E-01	690	9,566E-02	990	9,484E-01	1650	1,406E-01	3150	5,066E-01	4650	5,610E-02
400	9,527E-01	700	3,590E-01	1000	9,369E-01	1700	1,400E-01	3200	4,840E-01	4700	4,159E-02
410	9,169E-01	710	6,550E-01	1010	9,230E-01	1750	1,330E-01	3250	4,632E-01	4750	3,483E-02
420	8,758E-01	720	8,460E-01	1020	9,099E-01	1800	1,443E-01	3300	4,443E-01	4800	3,170E-02
430	8,192E-01	730	9,380E-01	1030	8,909E-01	1850	1,849E-01	3350	4,274E-01	4850	3,076E-02
440	7,520E-01	740	9,760E-01	1040	8,680E-01	1900	2,500E-01	3400	4,100E-01	4900	2,729E-02
450	6,672E-01	750	9,856E-01	1050	8,428E-01	1950	3,283E-01	3450	3,981E-01	4950	2,004E-02
460	5,617E-01	760	9,881E-01	1060	8,133E-01	2000	4,000E-01	3500	3,915E-01	5000	1,099E-02
470	4,022E-01	770	9,894E-01	1070	7,800E-01	2050	4,623E-01	3550	3,896E-01	5050	5,082E-03
480	2,258E-01	780	9,899E-01	1080	7,463E-01	2100	5,200E-01	3600	3,915E-01	5100	2,032E-03
490	9,487E-02	790	9,901E-01	1090	7,060E-01	2150	5,670E-01	3650	3,981E-01	5150	9,099E-04

Data Sheet

BG7

Optical properties			
Reflection factor			
	P_d	=	0,919
Spectral values guaranteed			
τ_i (365 nm)		≥	0,25
τ_i (488 nm)		≥	0,78
τ_i (633 nm)		≤	0,08
Refractive indices			
n_F (486 nm)		=	1,526
n_e (546 nm)		=	1,521
n_d (587,6 nm)		=	1,519
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1			0,5574
B_2			0,7122
B_3			37,3513
C_2			1,8447E-02 µm²
C_3			5502,533 µm²
Internal quality			
Bubble class			1

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,60 g/cm³
Knoop hardness			
	HK[0.1/20]	=	441

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

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	1
	AR class	=	1
Resistance against humidity			
Robust glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric 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 / Shortpass filter
ISO 23364:2021
Disclaimer
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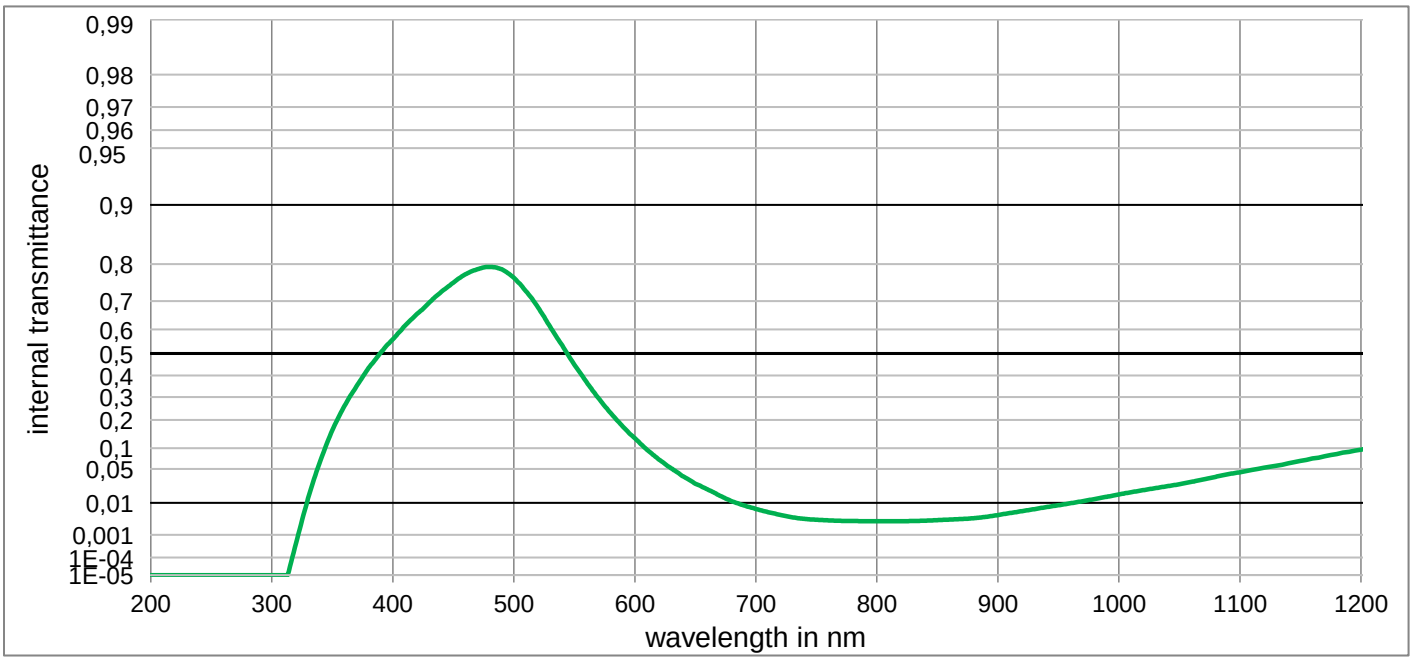
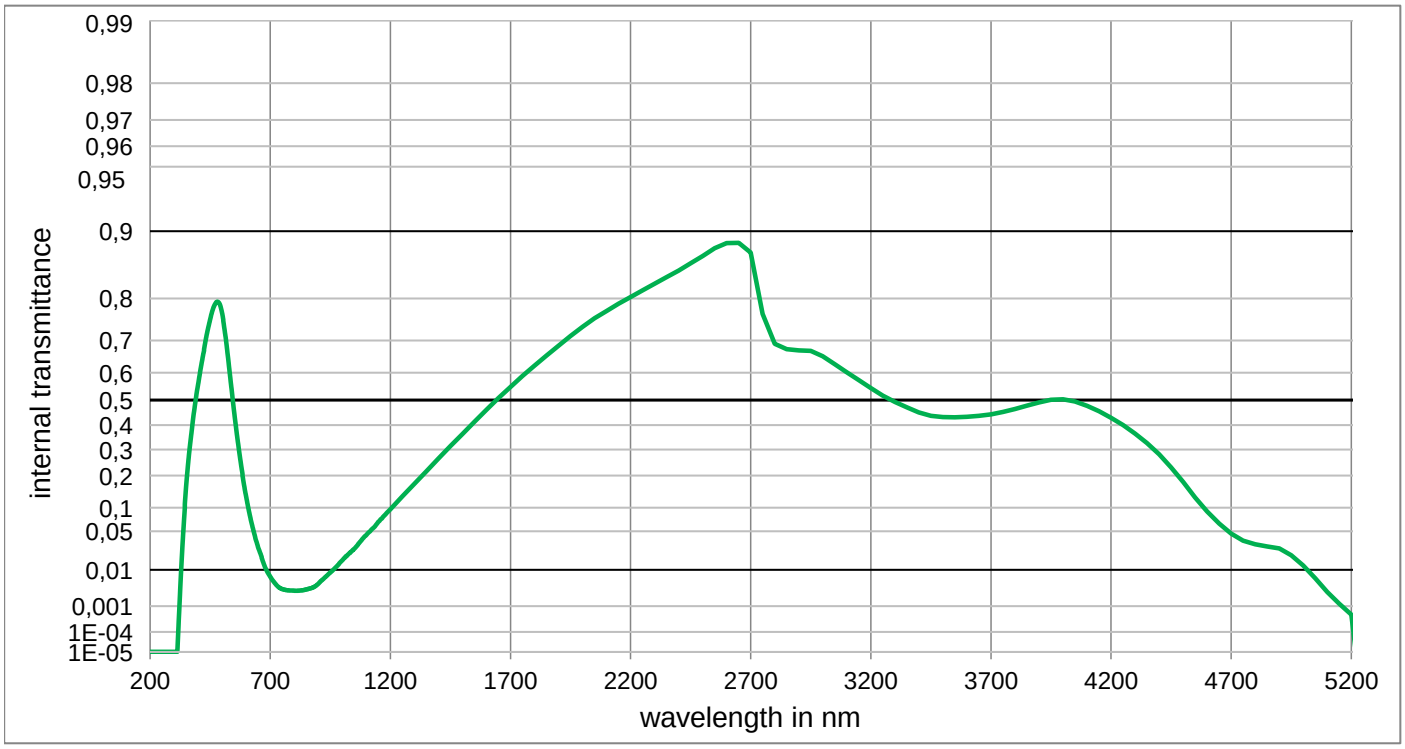


Data Sheet

BG7



Internal transmittance ti 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	< 1,000E-05	500	7,670E-01	800	2,994E-03	1100	4,400E-02	2200	8,025E-01	3700	4,437E-01
210	< 1,000E-05	510	7,300E-01	810	2,991E-03	1110	4,807E-02	2250	8,157E-01	3750	4,531E-01
220	< 1,000E-05	520	6,790E-01	820	3,000E-03	1120	5,220E-02	2300	8,274E-01	3800	4,648E-01
230	< 1,000E-05	530	6,110E-01	830	3,035E-03	1130	5,630E-02	2350	8,386E-01	3850	4,779E-01
240	< 1,000E-05	540	5,350E-01	840	3,117E-03	1140	6,164E-02	2400	8,493E-01	3900	4,903E-01
250	< 1,000E-05	550	4,500E-01	850	3,240E-03	1150	6,717E-02	2450	8,600E-01	3950	5,013E-01
260	< 1,000E-05	560	3,690E-01	860	3,370E-03	1160	7,262E-02	2500	8,704E-01	4000	5,034E-01
270	< 1,000E-05	570	2,950E-01	870	3,515E-03	1170	7,810E-02	2550	8,805E-01	4050	4,947E-01
280	< 1,000E-05	580	2,290E-01	880	3,723E-03	1180	8,353E-02	2600	8,866E-01	4100	4,778E-01
290	< 1,000E-05	590	1,740E-01	890	4,074E-03	1190	8,971E-02	2650	8,869E-01	4150	4,560E-01
300	< 1,000E-05	600	1,310E-01	900	4,627E-03	1200	9,577E-02	2700	8,749E-01	4200	4,300E-01
310	< 1,000E-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

Data Sheet

BG18

Optical properties			
Reflection factor			
P_d	=	0,915	
Spectral values guaranteed			
τ_i (350 nm)	≥	0,3	
τ_i (405 nm)	≥	0,65	
τ_i (514 nm)	≥	0,88	
τ_i (633 nm)	≤	0,25	
τ_i (694 nm)	≤	0,03	
τ_i (1060 nm)	≤	0,0005	
Refractive indices			
n_F (486 nm)	=	1,539	
n_e (546 nm)	=	1,536	
n_d (587,6 nm)	=	1,534	
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1		1,2546	
B_2		0,0793	
B_3		90,1178	
C_1		1,531E-03	µm²
C_2		7,2019E-02	µm²
C_3		8112,428	µm²
Internal quality			
Bubble class		2	

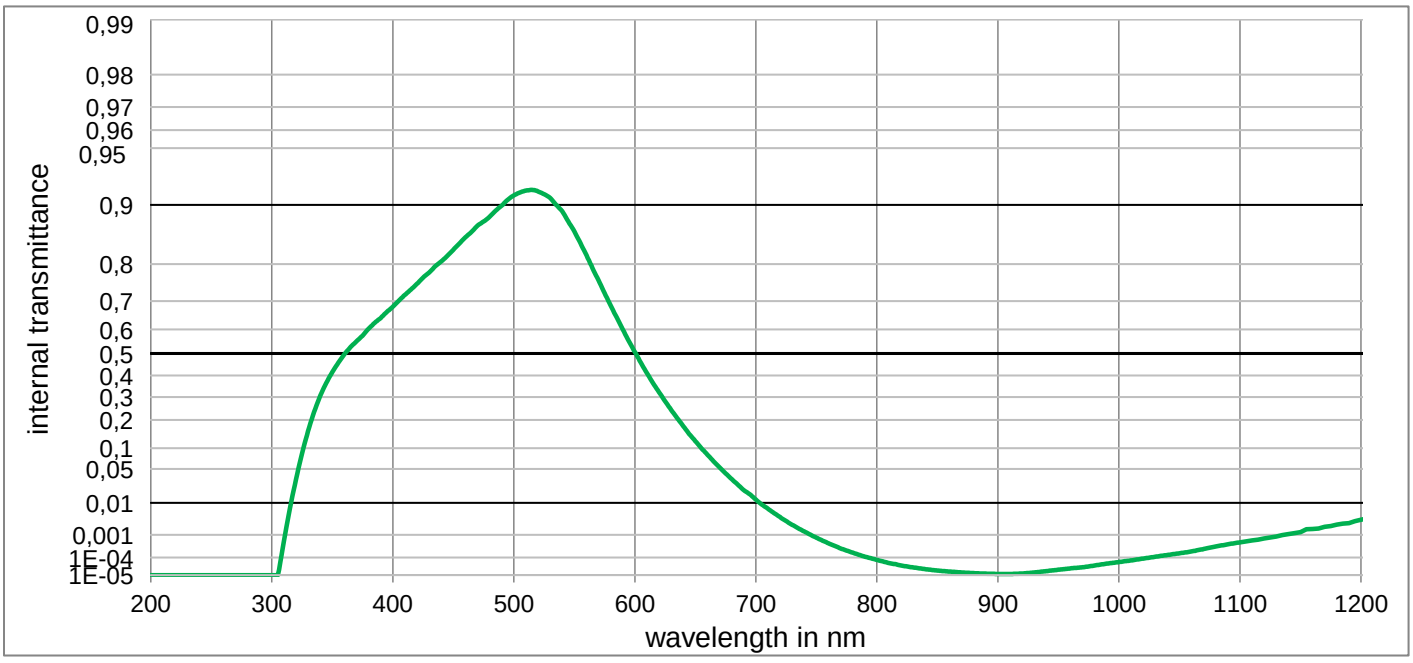
Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,68 g/cm³
Knoop hardness		
HK[0.1/20]	=	462

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

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	2
AR class	=	2
Resistance against humidity		
Sensitive glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

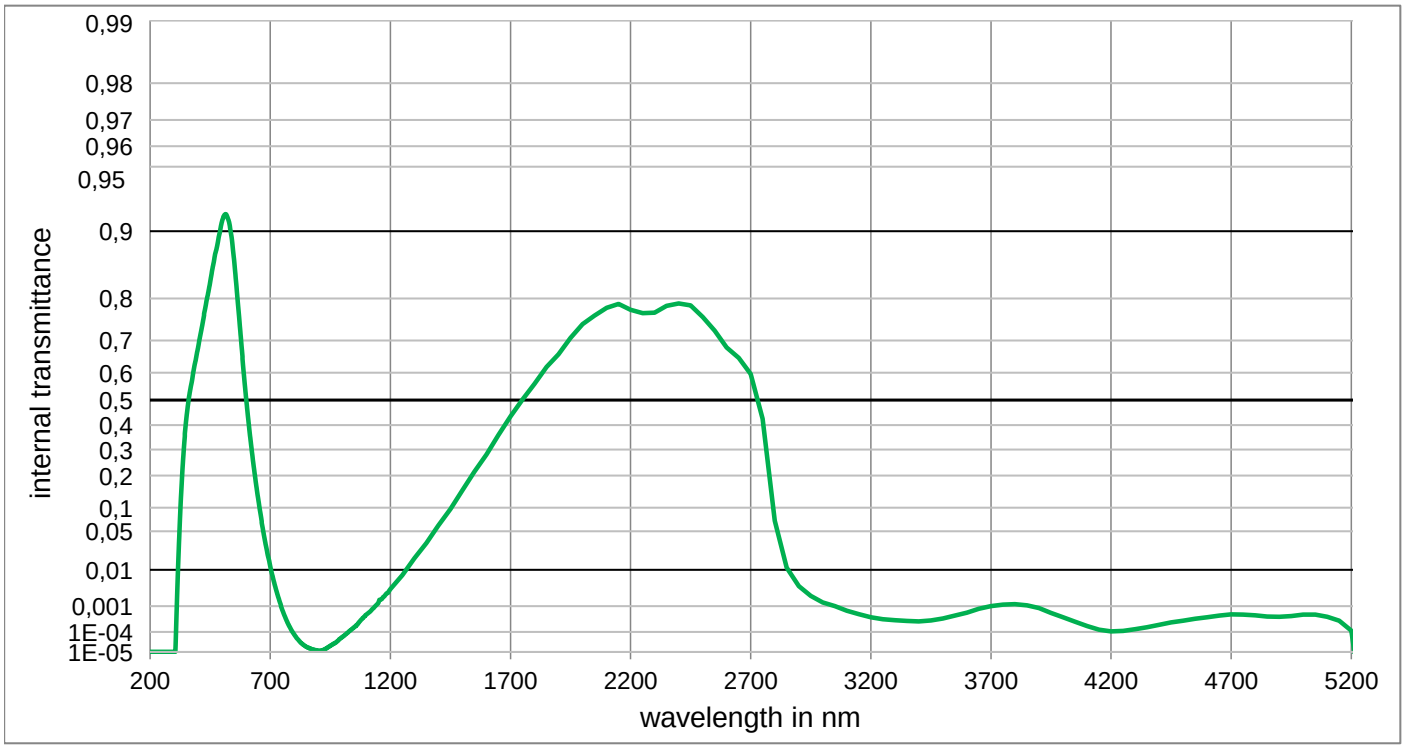
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,255	0,225	0,206
	y	0,335	0,340	0,346
	Y	67,6	54,2	45,1
	λ_d	493 nm	493 nm	493 nm
	P_e	0,205	0,312	0,376
Illuminant A	x	0,361	0,309	0,275
	y	0,441	0,459	0,472
	Y	60,8	46,0	36,7
	λ_d	502 nm	501 nm	501 nm
	P_e	0,197	0,315	0,392

Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG18



Internal transmittance ti 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	< 1,000E-05	500	9,109E-01	800	7,603E-05	1100	5,023E-04	2200	7,765E-01	3700	1,000E-03
210	< 1,000E-05	510	9,159E-01	810	5,164E-05	1110	5,957E-04	2250	7,690E-01	3750	1,117E-03
220	< 1,000E-05	520	9,150E-01	820	3,784E-05	1120	7,145E-04	2300	7,700E-01	3800	1,156E-03
230	< 1,000E-05	530	9,081E-01	830	2,904E-05	1130	8,591E-04	2350	7,849E-01	3850	1,072E-03
240	< 1,000E-05	540	8,920E-01	840	2,323E-05	1140	1,056E-03	2400	7,900E-01	3900	8,650E-04
250	< 1,000E-05	550	8,630E-01	850	1,907E-05	1150	1,260E-03	2450	7,858E-01	3950	5,821E-04
260	< 1,000E-05	560	8,190E-01	860	1,661E-05	1160	1,624E-03	2500	7,600E-01	4000	4,000E-04
270	< 1,000E-05	570	7,610E-01	870	1,474E-05	1170	1,940E-03	2550	7,263E-01	4050	2,735E-04
280	< 1,000E-05	580	6,860E-01	880	1,331E-05	1180	2,299E-03	2600	6,800E-01	4100	1,803E-04
290	< 1,000E-05	590	6,000E-01	890	1,245E-05	1190	2,572E-03	2650	6,484E-01	4150	1,256E-04
300	< 1,000E-05	600	5,060E-01	900	1,188E-05	1200	3,303E-03	2700	5,956E-01	4200	1,064E-04
310	5,636E-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

Data Sheet

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)		=	1,518
n_e (546 nm)		=	1,514
n_d (587,6 nm)		=	1,512
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 µm²		
C_2	1,1147E-02 µm²		
C_3	145,493 µm²		
Internal quality			
Bubble class	1		

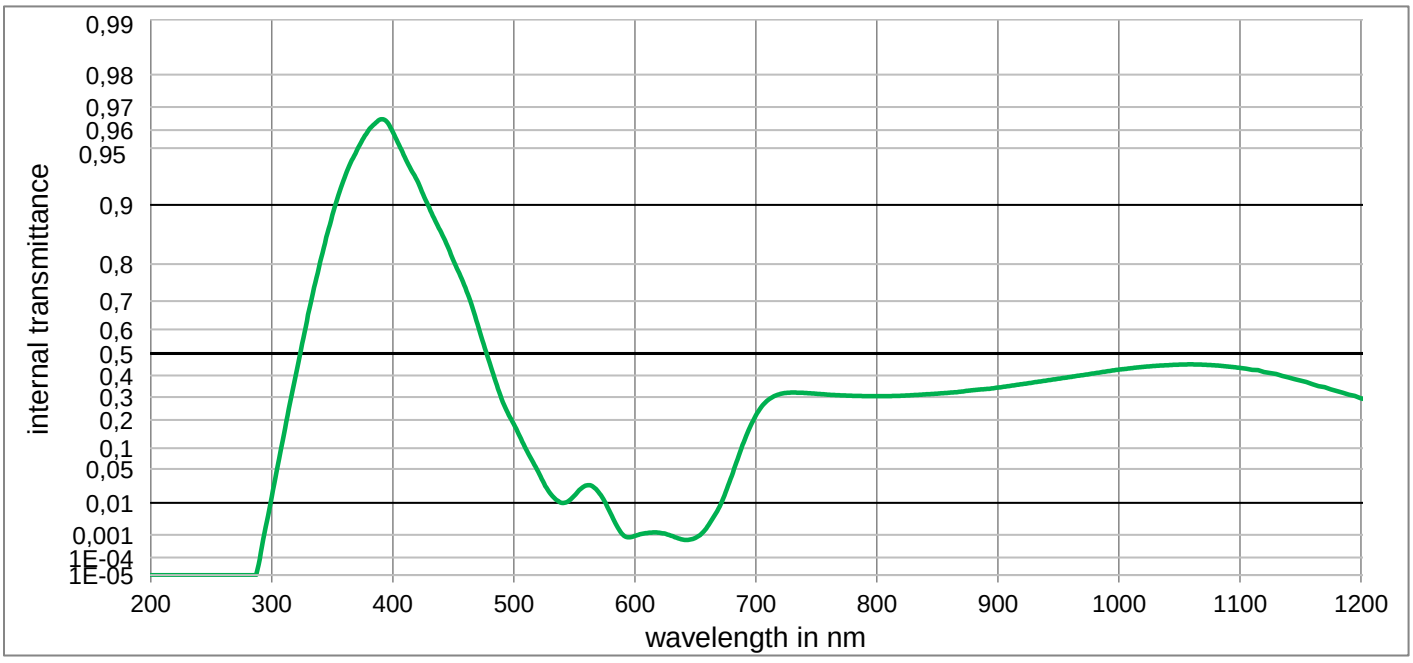
Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,56 g/cm³
Knoop hardness			
	HK[0.1/20]	=	434

Thermal properties			
Transformation temperature			
	Tg	=	459 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	8,9
	$\alpha_{(20°C/300°C)}$	=	10,2

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	1
	AR class	=	1
Resistance against humidity			
Robust glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

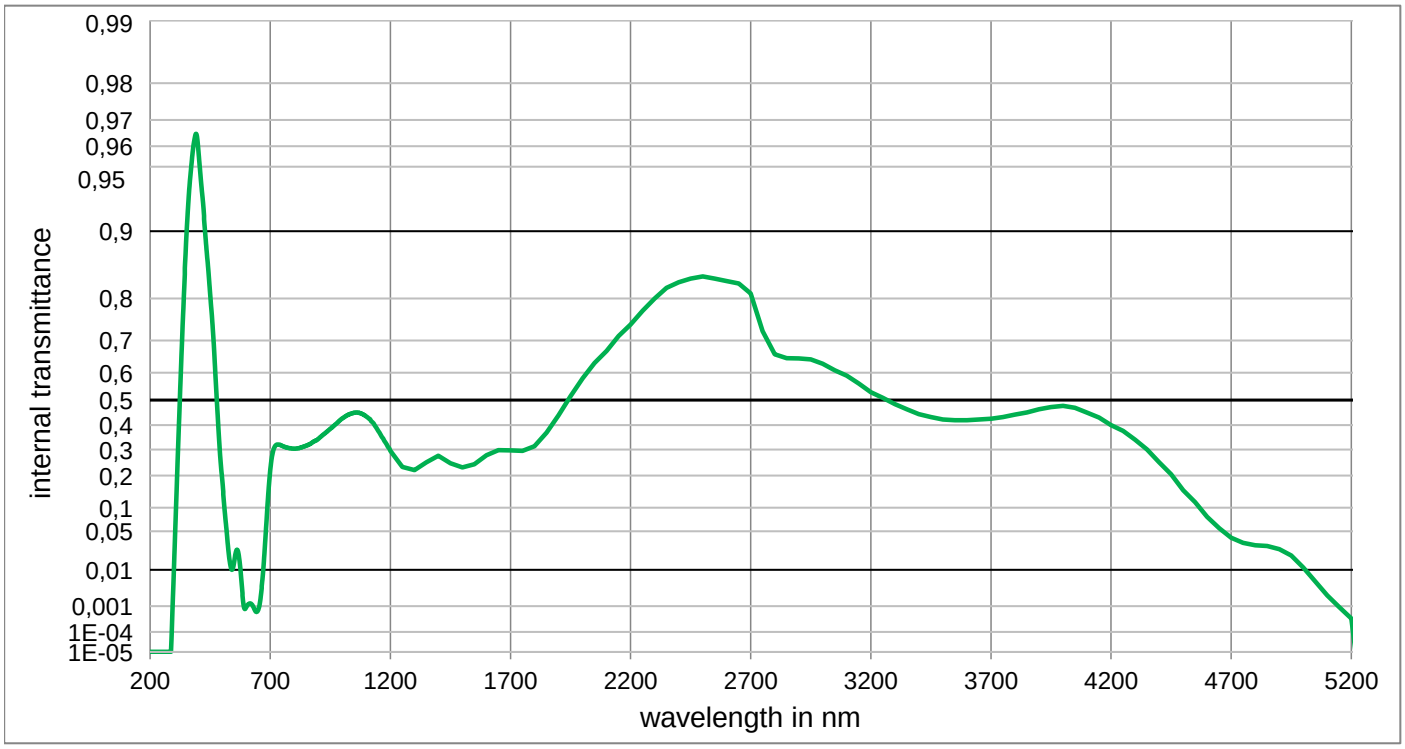
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,150	0,153	0,157
	y	0,055	0,027	0,021
	Y	5,0	1,8	1,1
	λ_d	463 nm	455 nm	451 nm
	P_e	0,934	0,985	0,993
Illuminant A	x	0,155	0,151	0,155
	y	0,093	0,035	0,024
	Y	2,6	0,7	0,4
	λ_d	470 nm	459 nm	454 nm
	P_e	0,903	0,981	0,992

Notes
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Bandpass filter / Shortpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG25



Internal transmittance ti 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	< 1,000E-05	500	1,830E-01	800	3,037E-01	1100	4,350E-01	2200	7,421E-01	3700	4,262E-01
210	< 1,000E-05	510	9,700E-02	810	3,043E-01	1110	4,263E-01	2250	7,743E-01	3750	4,322E-01
220	< 1,000E-05	520	4,500E-02	820	3,060E-01	1120	4,160E-01	2300	8,000E-01	3800	4,424E-01
230	< 1,000E-05	530	1,700E-02	830	3,089E-01	1130	4,069E-01	2350	8,200E-01	3850	4,517E-01
240	< 1,000E-05	540	1,000E-02	840	3,122E-01	1140	3,915E-01	2400	8,300E-01	3900	4,636E-01
250	< 1,000E-05	550	1,500E-02	850	3,157E-01	1150	3,759E-01	2450	8,363E-01	3950	4,721E-01
260	< 1,000E-05	560	2,499E-02	860	3,200E-01	1160	3,598E-01	2500	8,400E-01	4000	4,772E-01
270	< 1,000E-05	570	1,800E-02	870	3,250E-01	1170	3,452E-01	2550	8,363E-01	4050	4,700E-01
280	< 1,000E-05	580	5,153E-03	880	3,320E-01	1180	3,280E-01	2600	8,321E-01	4100	4,500E-01
290	8,492E-05	590	1,014E-03	890	3,368E-01	1190	3,108E-01	2650	8,278E-01	4150	4,305E-01
300	1,400E-02	600	9,099E-04	900	3,438E-01	1200	2,943E-01	2700	8,100E-01	4200	4,000E-01
310	1,439E-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

Data Sheet

BG38

Optical properties			
Reflection factor			
	P_d	=	0,916
Spectral values guaranteed			
τ_i (350 nm)		≥	0,8
τ_i (405 nm)		≥	0,93
τ_i (514 nm)		≥	0,95
τ_i (633 nm)		≤	0,67
τ_i (694 nm)		≤	0,32
τ_i (1060 nm)		≤	0,06
Refractive indices			
n_F (486 nm)		=	1,533
n_e (546 nm)		=	1,529
n_d (587,6 nm)		=	1,527
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1			0,3382
B_2			0,9643
B_3			1,7959
C_1			3,475E-03 µm²
C_2			1,0319E-02 µm²
C_3			190,755 µm²
Internal quality			
Bubble class			2

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,66 g/cm³
Knoop hardness			
	HK[0.1/20]	=	472

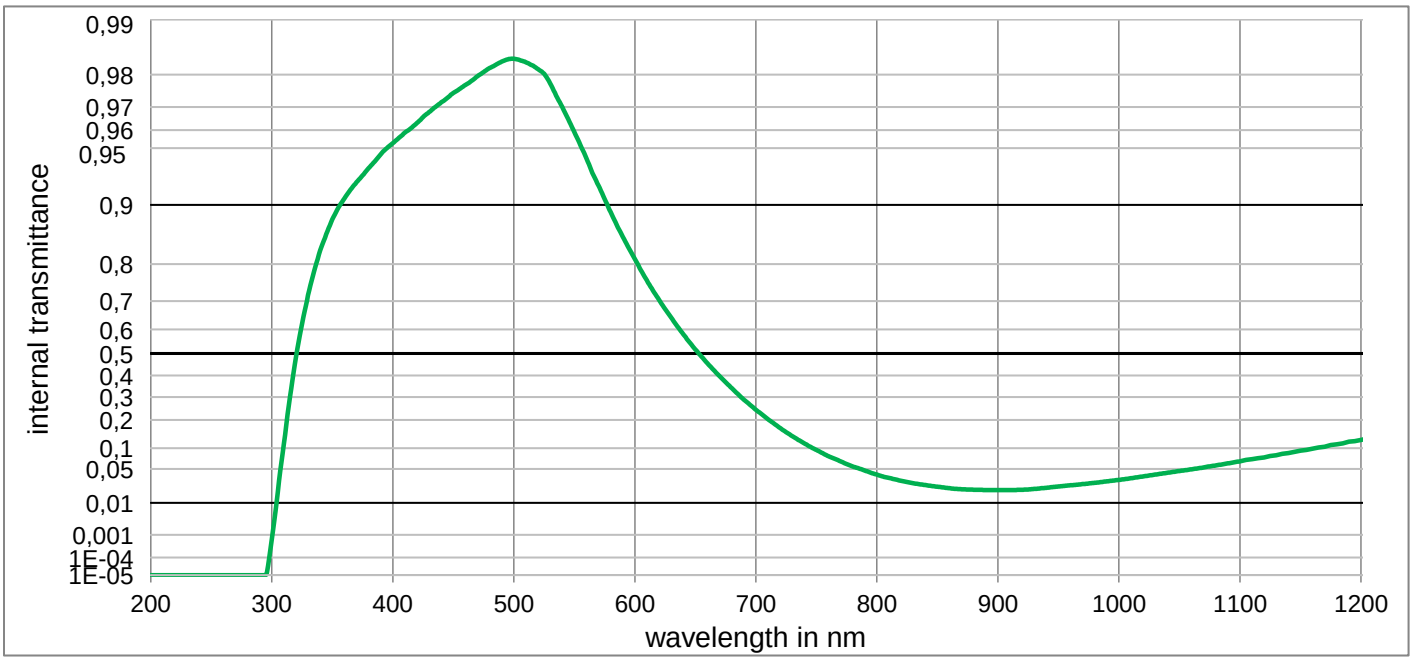
Thermal properties			
Transformation temperature			
	Tg	=	482 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	7,5
	$\alpha_{(20°C/300°C)}$	=	8,9

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	2
	AR class	=	2
Resistance against humidity			
Sensitive glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric 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

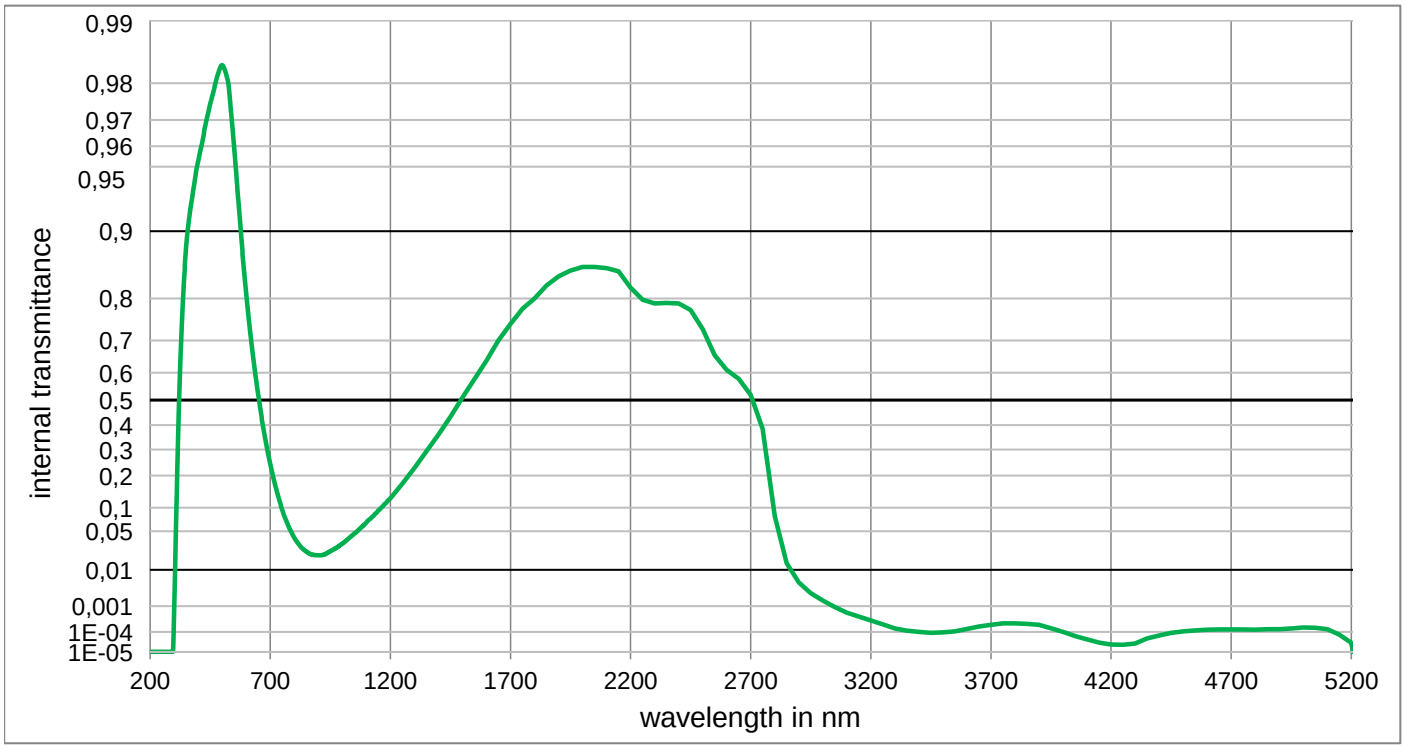
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG38



Internal transmittance ti 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	< 1,000E-05	500	9,836E-01	800	4,002E-02	1100	6,593E-02	2200	8,208E-01	3700	2,000E-04
210	< 1,000E-05	510	9,829E-01	810	3,491E-02	1110	7,111E-02	2250	7,973E-01	3750	2,296E-04
220	< 1,000E-05	520	9,813E-01	820	3,080E-02	1120	7,524E-02	2300	7,897E-01	3800	2,317E-04
230	< 1,000E-05	530	9,777E-01	830	2,761E-02	1130	8,054E-02	2350	7,907E-01	3850	2,193E-04
240	< 1,000E-05	540	9,700E-01	840	2,539E-02	1140	8,631E-02	2400	7,897E-01	3900	2,000E-04
250	< 1,000E-05	550	9,590E-01	850	2,341E-02	1150	9,319E-02	2450	7,756E-01	3950	1,449E-04
260	< 1,000E-05	560	9,430E-01	860	2,183E-02	1160	9,869E-02	2500	7,300E-01	4000	1,000E-04
270	< 1,000E-05	570	9,210E-01	870	2,077E-02	1170	1,044E-01	2550	6,569E-01	4050	6,471E-05
280	< 1,000E-05	580	8,910E-01	880	2,026E-02	1180	1,113E-01	2600	6,100E-01	4100	4,436E-05
290	< 1,000E-05	590	8,540E-01	890	2,000E-02	1190	1,198E-01	2650	5,786E-01	4150	3,090E-05
300	6,457E-04	600	8,110E-01	900	1,991E-02	1200	1,258E-01	2700	5,200E-01	4200	2,500E-05
310	1,140E-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

Data Sheet

BG39

Optical properties			
Reflection factor			
P_d	=	0,914	
Spectral values guaranteed			
τ_i (350 nm)	≥	0,6	
τ_i (405 nm)	≥	0,85	
τ_i (514 nm)	≥	0,93	
τ_i (633 nm)	≤	0,3	
τ_i (694 nm)	≤	0,03	
τ_i (1060 nm)	≤	0,001	
Refractive indices			
n_F (486 nm)	=	1,542	
n_e (546 nm)	=	1,538	
n_d (587,6 nm)	=	1,536	
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1		0,4382	
B_2		0,8900	
B_3		7,4825	
C_1		2,508E-02	µm²
C_2		1,2201E-04	µm²
C_3		973,996	µm²
Internal quality			
Bubble class		2	

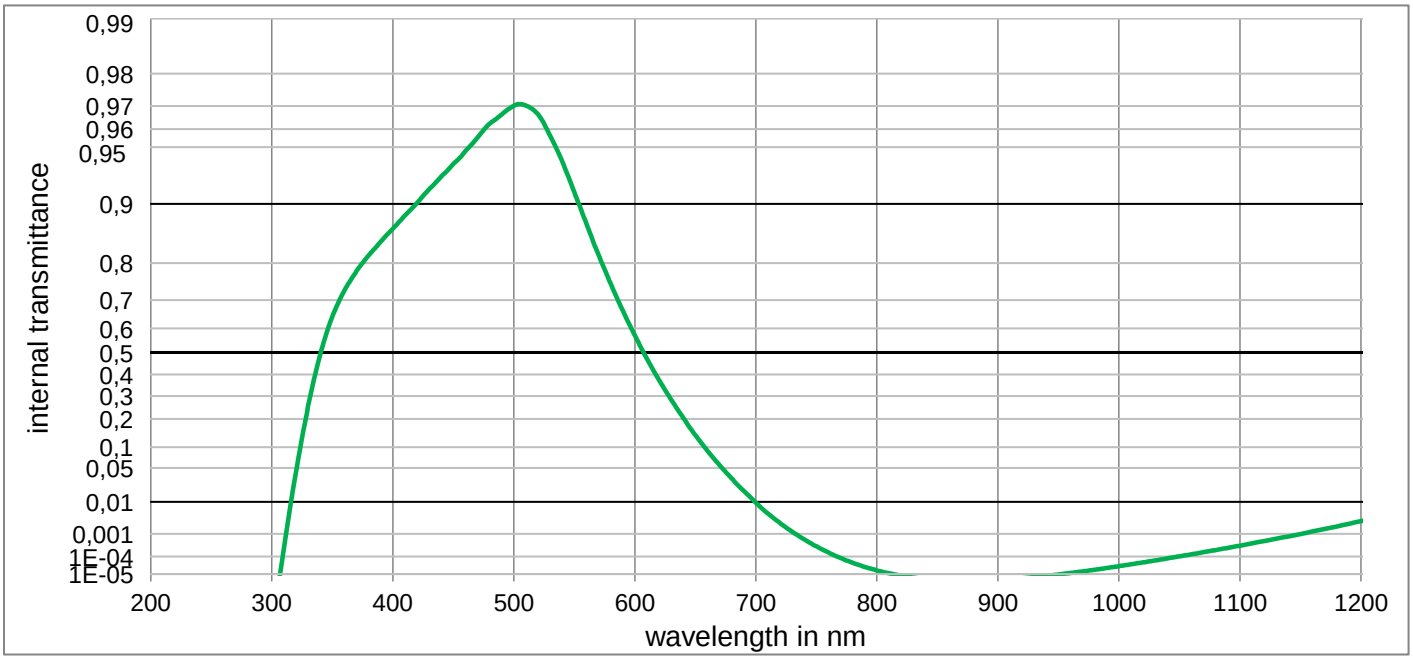
Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,74 g/cm³
Knoop hardness		
HK[0.1/20]	=	386

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

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	5.1
AR class	=	3
Resistance against humidity		
Delicate glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

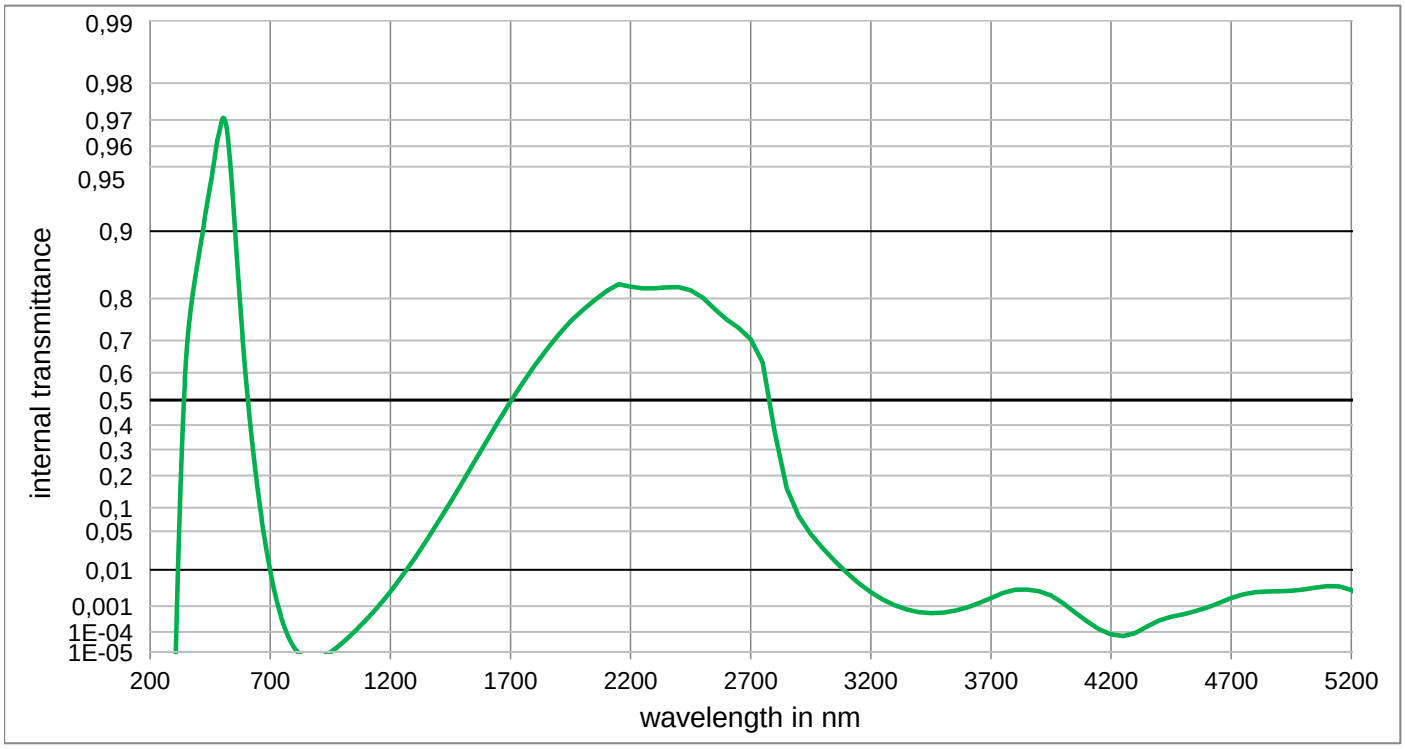
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,257	0,226	0,207
	y	0,326	0,322	0,318
	Y	72,8	62,3	55,1
	λ_d	491 nm	490 nm	490 nm
	P_e	0,207	0,321	0,395
Illuminant A	x	0,365	0,314	0,279
	y	0,434	0,445	0,450
	Y	65,9	53,3	45,2
	λ_d	500 nm	500 nm	499 nm
	P_e	0,188	0,305	0,385

Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG39



Internal transmittance ti 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	< 1,000E-05	500	9,701E-01	800	1,679E-05	1100	3,264E-04	2200	8,223E-01	3700	1,829E-03
210	< 1,000E-05	510	9,702E-01	810	1,129E-05	1110	4,120E-04	2250	8,194E-01	3750	2,580E-03
220	< 1,000E-05	520	9,667E-01	820	< 1,000E-05	1120	5,116E-04	2300	8,195E-01	3800	3,154E-03
230	< 1,000E-05	530	9,566E-01	830	< 1,000E-05	1130	6,423E-04	2350	8,210E-01	3850	3,205E-03
240	< 1,000E-05	540	9,404E-01	840	< 1,000E-05	1140	7,952E-04	2400	8,214E-01	3900	2,858E-03
250	< 1,000E-05	550	9,132E-01	850	< 1,000E-05	1150	9,899E-04	2450	8,158E-01	3950	2,168E-03
260	< 1,000E-05	560	8,728E-01	860	< 1,000E-05	1160	1,222E-03	2500	8,015E-01	4000	1,246E-03
270	< 1,000E-05	570	8,184E-01	870	< 1,000E-05	1170	1,508E-03	2550	7,779E-01	4050	6,041E-04
280	< 1,000E-05	580	7,488E-01	880	< 1,000E-05	1180	1,853E-03	2600	7,542E-01	4100	2,775E-04
290	< 1,000E-05	590	6,653E-01	890	< 1,000E-05	1190	2,274E-03	2650	7,335E-01	4150	1,304E-04
300	< 1,000E-05	600	5,718E-01	900	< 1,000E-05	1200	2,781E-03	2700	7,036E-01	4200	7,747E-05
310	2,473E-04	610	4,724E-01	910	< 1,000E-05	1250	7,276E-03	2750	6,343E-01	4250	6,541E-05
320	4,316E-02	620	3,743E-01	920	< 1,000E-05	1300	1,708E-02	2800	3,706E-01	4300	8,895E-05
330	2,547E-01	630	2,834E-01	930	< 1,000E-05	1350	3,605E-02	2850	1,569E-01	4350	1,733E-04
340	4,905E-01	640	2,037E-01	940	< 1,000E-05	1400	6,784E-02	2900	7,906E-02	4400	3,052E-04
350	6,442E-01	650	1,392E-01	950	< 1,000E-05	1450	1,147E-01	2950	4,535E-02	4450	4,169E-04
360	7,297E-01	660	8,981E-02	960	1,176E-05	1500	1,765E-01	3000	2,671E-02	4500	5,160E-04
370	7,811E-01	670	5,537E-02	970	1,474E-05	1550	2,513E-01	3050	1,536E-02	4550	6,651E-04
380	8,163E-01	680	3,258E-02	980	1,859E-05	1600	3,332E-01	3100	8,588E-03	4600	9,006E-04
390	8,436E-01	690	1,825E-02	990	2,366E-05	1650	4,155E-01	3150	4,772E-03	4650	1,277E-03
400	8,658E-01	700	9,545E-03	1000	3,013E-05	1700	4,949E-01	3200	2,711E-03	4700	1,805E-03
410	8,849E-01	710	4,770E-03	1010	3,852E-05	1750	5,633E-01	3250	1,632E-03	4750	2,353E-03
420	9,011E-01	720	2,404E-03	1020	4,902E-05	1800	6,229E-01	3300	1,062E-03	4800	2,719E-03
430	9,162E-01	730	1,205E-03	1030	6,271E-05	1850	6,739E-01	3350	7,617E-04	4850	2,853E-03
440	9,283E-01	740	6,007E-04	1040	7,974E-05	1900	7,158E-01	3400	6,129E-04	4900	2,887E-03
450	9,384E-01	750	3,062E-04	1050	1,018E-04	1950	7,492E-01	3450	5,650E-04	4950	2,973E-03
460	9,475E-01	760	1,568E-04	1060	1,287E-04	2000	7,754E-01	3500	5,886E-04	5000	3,218E-03
470	9,556E-01	770	8,431E-05	1070	1,640E-04	2050	7,963E-01	3550	6,906E-04	5050	3,616E-03
480	9,626E-01	780	4,649E-05	1080	2,067E-04	2100	8,145E-01	3600	8,896E-04	5100	3,971E-03
490	9,666E-01	790	2,707E-05	1090	2,611E-04	2150	8,268E-01	3650	1,246E-03	5150	3,909E-03

Data Sheet

BG40

Optical properties			
Reflection factor			
	P_d	=	0,916
Spectral values guaranteed			
τ_i (350 nm)		≥	0,8
τ_i (405 nm)		≥	0,93
τ_i (514 nm)		≥	0,97
τ_i (633 nm)		≤	0,57
τ_i (694 nm)		≤	0,16
τ_i (1060 nm)		≤	0,02
Refractive indices			
n_F (486 nm)		=	1,536
n_e (546 nm)		=	1,532
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 µm²		
C_2	1,0398E-02 µm²		
C_3	149,651 µm²		
Internal quality			
Bubble class	1		

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,74 g/cm³
Knoop hardness			
	HK[0.1/20]	=	383

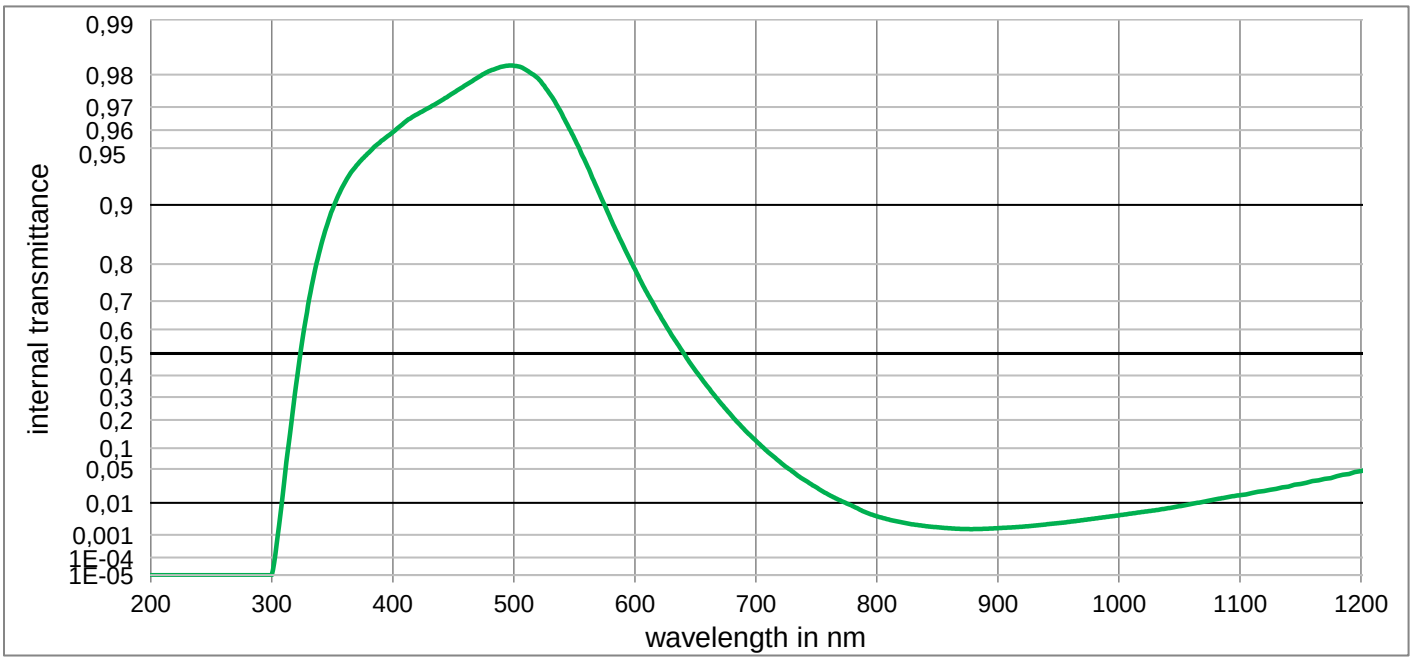
Thermal properties			
Transformation temperature			
	Tg	=	313 °C
Thermal expansion in			10^{-6}/K
$\alpha_{(-30°C/+70°C)}$		=	11,9
$\alpha_{(20°C/200°C)}$		=	13,7

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	5.1
	AR class	=	3
Resistance against humidity			
Sensitive glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric 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

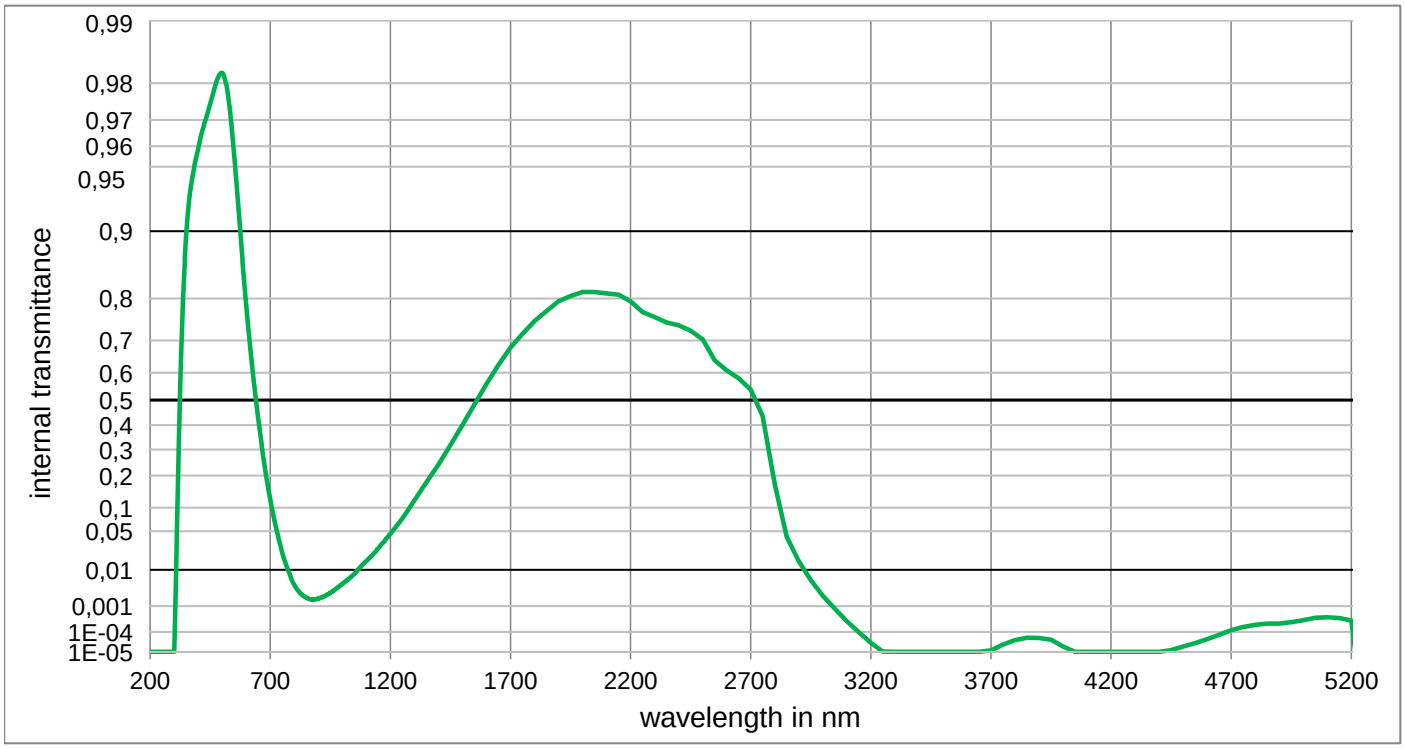
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG40



Internal transmittance ti 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	< 1,000E-05	500	9,821E-01	800	4,252E-03	1100	1,533E-02	2200	7,945E-01	3700	1,213E-05
210	< 1,000E-05	510	9,812E-01	810	3,366E-03	1110	1,712E-02	2250	7,709E-01	3750	2,518E-05
220	< 1,000E-05	520	9,790E-01	820	2,780E-03	1120	1,901E-02	2300	7,600E-01	3800	4,169E-05
230	< 1,000E-05	530	9,745E-01	830	2,340E-03	1130	2,123E-02	2350	7,473E-01	3850	5,395E-05
240	< 1,000E-05	540	9,670E-01	840	2,062E-03	1140	2,354E-02	2400	7,400E-01	3900	5,333E-05
250	< 1,000E-05	550	9,556E-01	850	1,880E-03	1150	2,665E-02	2450	7,266E-01	3950	4,335E-05
260	< 1,000E-05	560	9,390E-01	860	1,734E-03	1160	3,051E-02	2500	7,030E-01	4000	2,000E-05
270	< 1,000E-05	570	9,150E-01	870	1,644E-03	1170	3,350E-02	2550	6,408E-01	4050	< 1,000E-05
280	< 1,000E-05	580	8,820E-01	880	1,622E-03	1180	3,747E-02	2600	6,079E-01	4100	< 1,000E-05
290	< 1,000E-05	590	8,400E-01	890	1,670E-03	1190	4,112E-02	2650	5,805E-01	4150	< 1,000E-05
300	< 1,000E-05	600	7,880E-01	900	1,752E-03	1200	4,588E-02	2700	5,400E-01	4200	< 1,000E-05
310	2,600E-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

Data Sheet

BG42

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

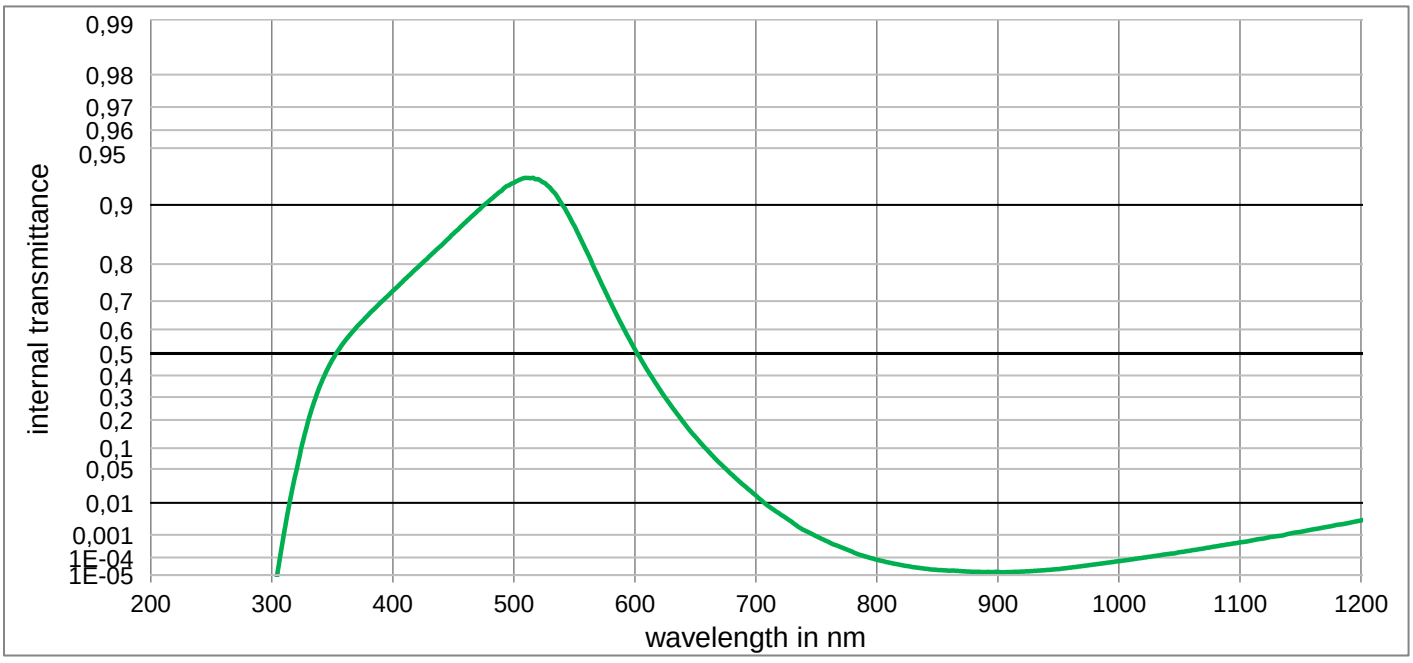
Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,69 g/cm³
Knoop hardness		
HK[0.1/20]	=	467

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

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	2
AR class	=	2
Resistance against humidity		
Sensitive glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

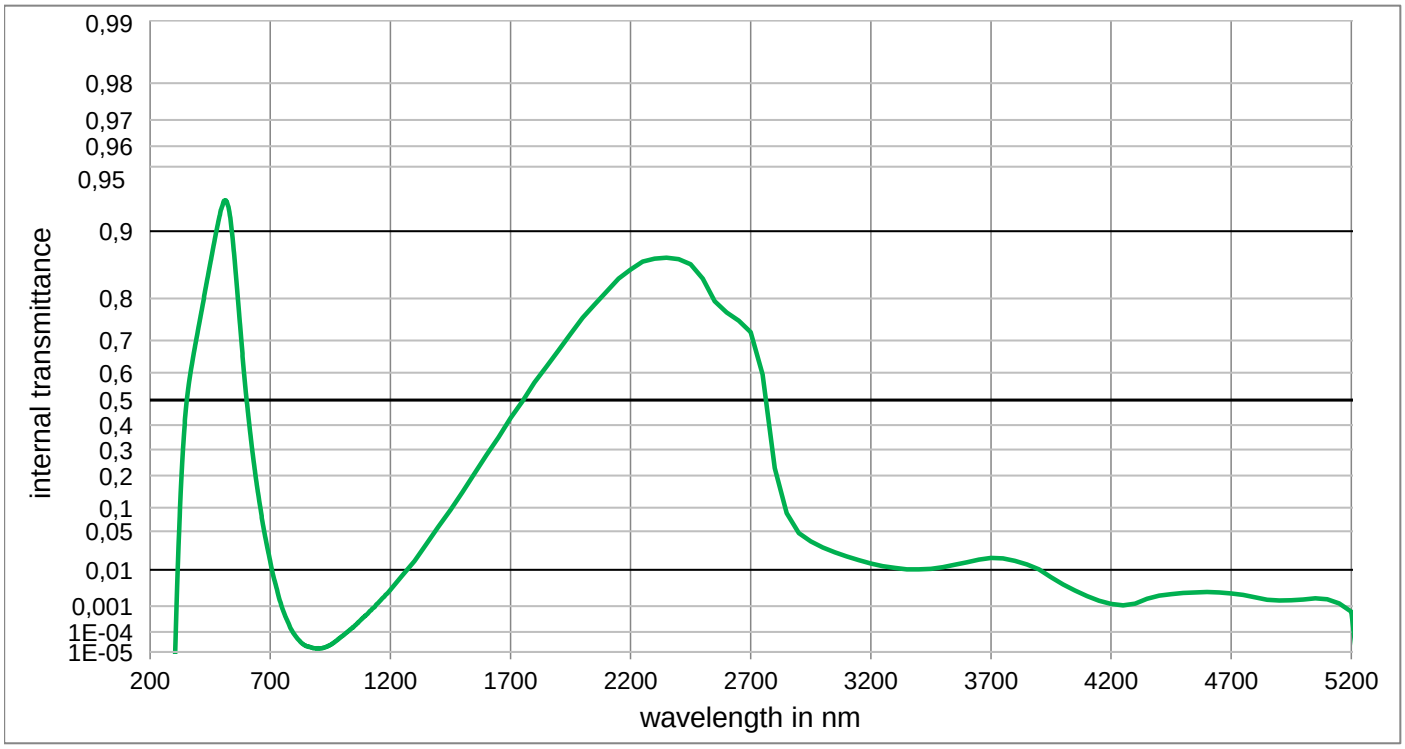
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,254	0,222	0,203
	y	0,332	0,334	0,337
	Y	68,1	55,2	46,4
	λ_d	492 nm	492 nm	492 nm
	P_e	0,214	0,325	0,393
Illuminant A	x	0,359	0,305	0,270
	y	0,439	0,456	0,466
	Y	61,1	46,6	37,6
	λ_d	501 nm	501 nm	501 nm
	P_e	0,201	0,323	0,403

Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG42



Internal transmittance ti 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	< 1,000E-05	500	9,234E-01	800	7,768E-05	1100	4,963E-04	2200	8,507E-01	3700	1,775E-02
210	< 1,000E-05	510	9,279E-01	810	5,462E-05	1110	6,033E-04	2250	8,624E-01	3750	1,729E-02
220	< 1,000E-05	520	9,267E-01	820	3,995E-05	1120	7,275E-04	2300	8,665E-01	3800	1,543E-02
230	< 1,000E-05	530	9,188E-01	830	3,059E-05	1130	8,722E-04	2350	8,678E-01	3850	1,301E-02
240	< 1,000E-05	540	9,003E-01	840	2,447E-05	1140	1,095E-03	2400	8,660E-01	3900	1,018E-02
250	< 1,000E-05	550	8,716E-01	850	2,086E-05	1150	1,277E-03	2450	8,588E-01	3950	6,779E-03
260	< 1,000E-05	560	8,276E-01	860	1,861E-05	1160	1,563E-03	2500	8,362E-01	4000	4,415E-03
270	< 1,000E-05	570	7,687E-01	870	1,773E-05	1170	1,864E-03	2550	7,946E-01	4050	3,031E-03
280	< 1,000E-05	580	6,953E-01	880	1,585E-05	1180	2,255E-03	2600	7,705E-01	4100	2,085E-03
290	< 1,000E-05	590	6,101E-01	890	1,546E-05	1190	2,633E-03	2650	7,512E-01	4150	1,498E-03
300	< 1,000E-05	600	5,178E-01	900	1,593E-05	1200	3,171E-03	2700	7,228E-01	4200	1,191E-03
310	1,094E-03	610	4,287E-01	910	1,546E-05	1250	7,380E-03	2750	5,938E-01	4250	1,063E-03
320	4,416E-02	620	3,398E-01	920	1,658E-05	1300	1,533E-02	2800	2,270E-01	4300	1,199E-03
330	1,931E-01	630	2,598E-01	930	1,816E-05	1350	3,166E-02	2850	8,630E-02	4350	1,720E-03
340	3,537E-01	640	1,909E-01	940	2,045E-05	1400	5,808E-02	2900	4,698E-02	4400	2,140E-03
350	4,717E-01	650	1,366E-01	950	2,350E-05	1450	9,389E-02	2950	3,497E-02	4450	2,362E-03
360	5,508E-01	660	9,400E-02	960	2,852E-05	1500	1,440E-01	3000	2,755E-02	4500	2,572E-03
370	6,085E-01	670	6,215E-02	970	3,496E-05	1550	2,069E-01	3050	2,263E-02	4550	2,675E-03
380	6,549E-01	680	4,026E-02	980	4,313E-05	1600	2,781E-01	3100	1,895E-02	4600	2,729E-03
390	6,954E-01	690	2,523E-02	990	5,297E-05	1650	3,496E-01	3150	1,605E-02	4650	2,641E-03
400	7,309E-01	700	1,516E-02	1000	6,464E-05	1700	4,287E-01	3200	1,362E-02	4700	2,506E-03
410	7,626E-01	710	8,398E-03	1010	7,923E-05	1750	4,958E-01	3250	1,195E-02	4750	2,256E-03
420	7,909E-01	720	4,946E-03	1020	9,752E-05	1800	5,652E-01	3300	1,104E-02	4800	1,914E-03
430	8,164E-01	730	2,764E-03	1030	1,198E-04	1850	6,214E-01	3350	1,027E-02	4850	1,621E-03
440	8,385E-01	740	1,476E-03	1040	1,471E-04	1900	6,717E-01	3400	1,018E-02	4900	1,518E-03
450	8,590E-01	750	8,860E-04	1050	1,815E-04	1950	7,173E-01	3450	1,055E-02	4950	1,548E-03
460	8,769E-01	760	5,196E-04	1060	2,215E-04	2000	7,583E-01	3500	1,139E-02	5000	1,632E-03
470	8,923E-01	770	3,134E-04	1070	2,726E-04	2050	7,873E-01	3550	1,284E-02	5050	1,777E-03
480	9,053E-01	780	1,872E-04	1080	3,342E-04	2100	8,136E-01	3600	1,445E-02	5100	1,675E-03
490	9,158E-01	790	1,157E-04	1090	4,095E-04	2150	8,362E-01	3650	1,637E-02	5150	1,231E-03

Data Sheet

BG55

Optical properties			
Reflection factor			
P_d	=	0,914	
Spectral values guaranteed			
τ_i (405 nm)	≥	0,76	
τ_i (514 nm)	≥	0,93	
τ_i (633 nm)	≥	0,18	
τ_i (694 nm)	≤	0,016	
τ_i (1060 nm)	≤	0,0005	
Refractive indices			
n_F (486 nm)	=	1,546	
n_e (546 nm)	=	1,542	
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	µm²
C_2		1,4952E-02	µm²
C_3		100,000	µm²
Internal quality			
Bubble class		2	

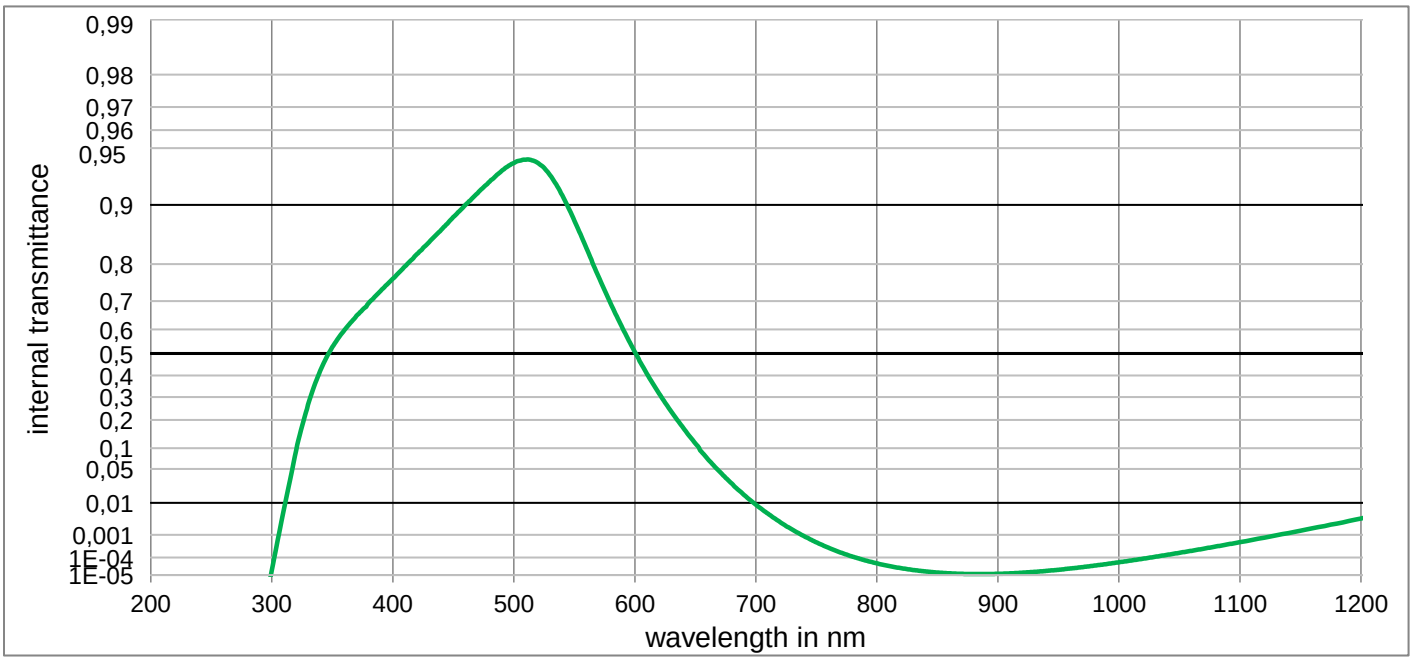
Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,65 g/cm³
Knoop hardness		
HK[0.1/20]	=	504

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

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	2
AR class	=	2
Resistance against humidity		
Sensitive glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

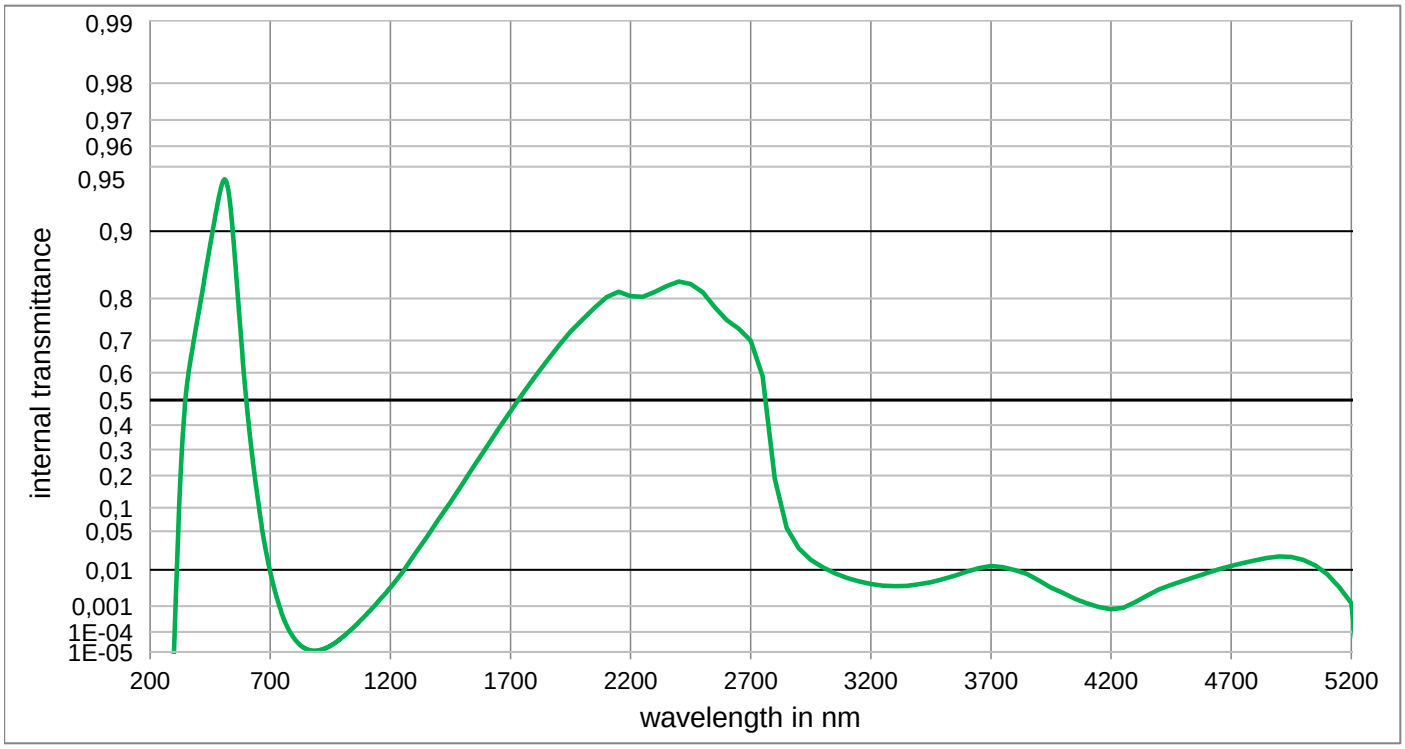
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,252	0,220	0,201
	y	0,329	0,328	0,328
	Y	68,9	56,6	48,2
	λ_d	492 nm	491 nm	491 nm
	P_e	0,223	0,339	0,409
Illuminant A	x	0,356	0,302	0,267
	y	0,438	0,452	0,460
	Y	61,7	47,6	39,0
	λ_d	501 nm	500 nm	500 nm
	P_e	0,208	0,331	0,413

Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG55



Internal transmittance ti 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	< 1,000E-05	500	9,399E-01	800	4,934E-05	1100	5,093E-04	2200	8,044E-01	3700	1,209E-02
210	< 1,000E-05	510	9,424E-01	810	3,526E-05	1110	6,294E-04	2250	8,032E-01	3750	1,149E-02
220	< 1,000E-05	520	9,400E-01	820	2,638E-05	1120	7,757E-04	2300	8,123E-01	3800	9,901E-03
230	< 1,000E-05	530	9,303E-01	830	2,067E-05	1130	9,532E-04	2350	8,232E-01	3850	8,076E-03
240	< 1,000E-05	540	9,110E-01	840	1,694E-05	1140	1,167E-03	2400	8,313E-01	3900	5,598E-03
250	< 1,000E-05	550	8,792E-01	850	1,452E-05	1150	1,424E-03	2450	8,272E-01	3950	3,651E-03
260	< 1,000E-05	560	8,329E-01	860	1,297E-05	1160	1,739E-03	2500	8,119E-01	4000	2,558E-03
270	< 1,000E-05	570	7,701E-01	870	1,207E-05	1170	2,078E-03	2550	7,821E-01	4050	1,710E-03
280	< 1,000E-05	580	6,928E-01	880	1,167E-05	1180	2,505E-03	2600	7,532E-01	4100	1,227E-03
290	< 1,000E-05	590	6,029E-01	890	1,169E-05	1190	3,047E-03	2650	7,316E-01	4150	9,269E-04
300	1,878E-05	600	5,057E-01	900	1,211E-05	1200	3,660E-03	2700	6,993E-01	4200	7,882E-04
310	6,724E-03	610	4,085E-01	910	1,292E-05	1250	8,670E-03	2750	5,881E-01	4250	8,827E-04
320	9,213E-02	620	3,166E-01	920	1,416E-05	1300	2,062E-02	2800	1,888E-01	4300	1,344E-03
330	2,650E-01	630	2,354E-01	930	1,590E-05	1350	4,003E-02	2850	5,554E-02	4350	2,158E-03
340	4,212E-01	640	1,677E-01	940	1,824E-05	1400	7,197E-02	2900	2,645E-02	4400	3,245E-03
350	5,277E-01	650	1,149E-01	950	2,132E-05	1450	1,148E-01	2950	1,629E-02	4450	4,293E-03
360	5,980E-01	660	7,208E-02	960	2,533E-05	1500	1,710E-01	3000	1,137E-02	4500	5,522E-03
370	6,500E-01	670	4,508E-02	970	3,049E-05	1550	2,371E-01	3050	8,398E-03	4550	6,840E-03
380	6,932E-01	680	2,711E-02	980	3,711E-05	1600	3,093E-01	3100	6,519E-03	4600	8,465E-03
390	7,313E-01	690	1,583E-02	990	4,557E-05	1650	3,844E-01	3150	5,315E-03	4650	1,031E-02
400	7,648E-01	700	9,032E-03	1000	5,634E-05	1700	4,561E-01	3200	4,538E-03	4700	1,220E-02
410	7,945E-01	710	5,056E-03	1010	7,000E-05	1750	5,236E-01	3250	4,113E-03	4750	1,406E-02
420	8,214E-01	720	2,809E-03	1020	8,728E-05	1800	5,841E-01	3300	3,971E-03	4800	1,587E-02
430	8,447E-01	730	1,576E-03	1030	1,090E-04	1850	6,379E-01	3350	4,064E-03	4850	1,775E-02
440	8,657E-01	740	8,774E-04	1040	1,363E-04	1900	6,841E-01	3400	4,457E-03	4900	1,892E-02
450	8,842E-01	750	5,015E-04	1050	1,705E-04	1950	7,241E-01	3450	5,018E-03	4950	1,854E-02
460	8,999E-01	760	2,924E-04	1060	2,130E-04	2000	7,545E-01	3500	6,034E-03	5000	1,629E-02
470	9,131E-01	770	1,764E-04	1070	2,657E-04	2050	7,807E-01	3550	7,359E-03	5050	1,249E-02
480	9,246E-01	780	1,106E-04	1080	3,308E-04	2100	8,029E-01	3600	9,128E-03	5100	7,925E-03
490	9,338E-01	790	7,226E-05	1090	4,110E-04	2150	8,131E-01	3650	1,095E-02	5150	3,751E-03

Data Sheet

BG59

Optical properties			
Reflection factor			
	P_d	=	0,911
Spectral values guaranteed			
τ_i (405 nm)		≥	0,37
τ_i (430 nm)		≥	0,42
τ_i (514 nm)		≥	0,72
τ_i (565 nm)		≥	0,42
τ_i (633 nm)		≤	0,02
τ_i (1500 nm)		≤	0,02
Refractive indices			
n_F (486 nm)		=	1,56
n_e (546 nm)		=	1,553
n_d (587,6 nm)		=	1,55
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1			1,3353
B_2			0,0436
B_3			122,4367
C_2			1,3411E-01 µm²
C_3			13784,523 µm²
Internal quality			
Bubble class			0

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,82 g/cm³
Knoop hardness			
	HK[0.1/20]	=	431

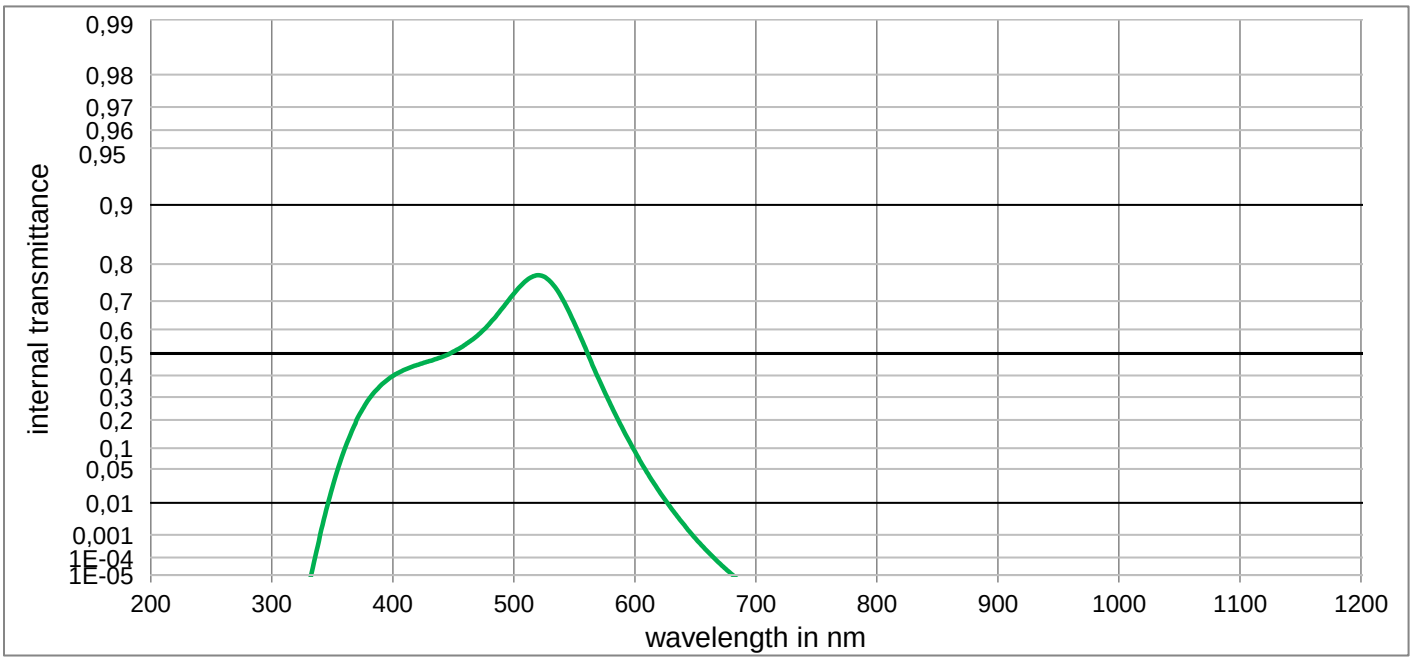
Thermal properties			
Transformation temperature			
	Tg	=	411 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	9,7
	$\alpha_{(20°C/300°C)}$	=	11,6

Chemical properties			
Chemical resistance			
	FR class		
	SR class	=	5.2
	AR class	=	3
Resistance against humidity			
Sensitive glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,200	0,172	0,157
	y	0,356	0,395	0,440
	Y	42,8	26,7	17,9
	λ_d	494 nm	497 nm	500 nm
	P_e	0,393	0,474	0,510
Illuminant A	x	0,261	0,208	0,183
	y	0,484	0,523	0,559
	Y	34,3	20,1	13,1
	λ_d	502 nm	503 nm	505 nm
	P_e	0,421	0,539	0,597

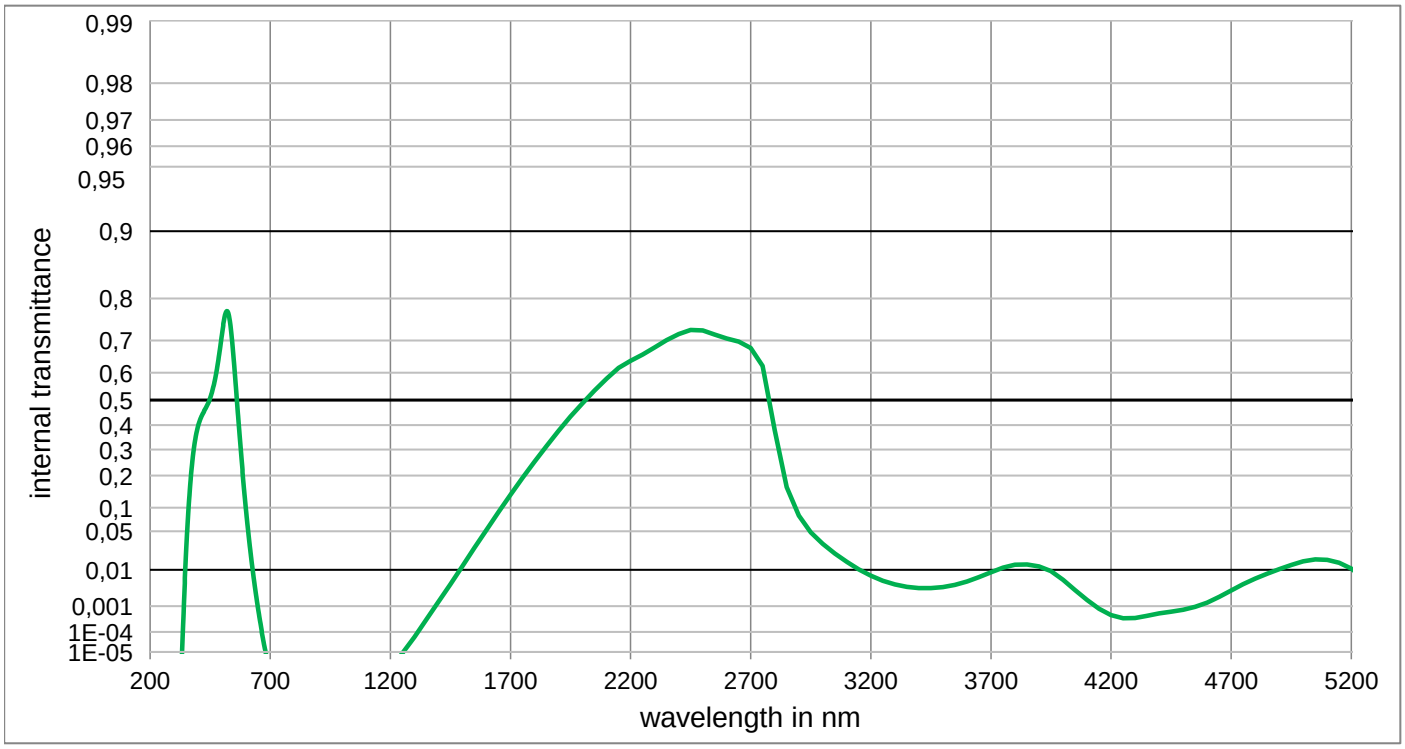
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
lambda_50%(d=0.11mm) @ 636 nm
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG59



Internal transmittance ti 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	< 1,000E-05	500	7,226E-01	800	< 1,000E-05	1100	< 1,000E-05	2200	6,389E-01	3700	8,820E-03
210	< 1,000E-05	510	7,591E-01	810	< 1,000E-05	1110	< 1,000E-05	2250	6,587E-01	3750	1,117E-02
220	< 1,000E-05	520	7,735E-01	820	< 1,000E-05	1120	< 1,000E-05	2300	6,798E-01	3800	1,287E-02
230	< 1,000E-05	530	7,579E-01	830	< 1,000E-05	1130	< 1,000E-05	2350	7,007E-01	3850	1,311E-02
240	< 1,000E-05	540	7,078E-01	840	< 1,000E-05	1140	< 1,000E-05	2400	7,176E-01	3900	1,192E-02
250	< 1,000E-05	550	6,239E-01	850	< 1,000E-05	1150	< 1,000E-05	2450	7,281E-01	3950	9,336E-03
260	< 1,000E-05	560	5,117E-01	860	< 1,000E-05	1160	< 1,000E-05	2500	7,270E-01	4000	5,822E-03
270	< 1,000E-05	570	3,863E-01	870	< 1,000E-05	1170	< 1,000E-05	2550	7,160E-01	4050	3,096E-03
280	< 1,000E-05	580	2,657E-01	880	< 1,000E-05	1180	< 1,000E-05	2600	7,055E-01	4100	1,568E-03
290	< 1,000E-05	590	1,642E-01	890	< 1,000E-05	1190	< 1,000E-05	2650	6,965E-01	4150	8,159E-04
300	< 1,000E-05	600	9,059E-02	900	< 1,000E-05	1200	< 1,000E-05	2700	6,787E-01	4200	4,886E-04
310	< 1,000E-05	610	4,407E-02	910	< 1,000E-05	1250	< 1,000E-05	2750	6,223E-01	4250	3,681E-04
320	< 1,000E-05	620	1,888E-02	920	< 1,000E-05	1300	5,930E-05	2800	3,784E-01	4300	3,728E-04
330	< 1,000E-05	630	7,188E-03	930	< 1,000E-05	1350	3,273E-04	2850	1,604E-01	4350	4,568E-04
340	1,027E-03	640	2,439E-03	940	< 1,000E-05	1400	1,361E-03	2900	8,072E-02	4400	5,594E-04
350	2,251E-02	650	7,312E-04	950	< 1,000E-05	1450	4,512E-03	2950	4,828E-02	4450	6,493E-04
360	9,632E-02	660	1,998E-04	960	< 1,000E-05	1500	1,204E-02	3000	3,175E-02	4500	7,558E-04
370	1,987E-01	670	4,929E-05	970	< 1,000E-05	1550	2,697E-02	3050	2,156E-02	4550	9,438E-04
380	2,886E-01	680	1,139E-05	980	< 1,000E-05	1600	5,205E-02	3100	1,474E-02	4600	1,304E-03
390	3,537E-01	690	< 1,000E-05	990	< 1,000E-05	1650	8,870E-02	3150	1,021E-02	4650	1,959E-03
400	3,982E-01	700	< 1,000E-05	1000	< 1,000E-05	1700	1,363E-01	3200	7,304E-03	4700	3,029E-03
410	4,273E-01	710	< 1,000E-05	1010	< 1,000E-05	1750	1,914E-01	3250	5,506E-03	4750	4,508E-03
420	4,480E-01	720	< 1,000E-05	1020	< 1,000E-05	1800	2,513E-01	3300	4,428E-03	4800	6,243E-03
430	4,655E-01	730	< 1,000E-05	1030	< 1,000E-05	1850	3,140E-01	3350	3,805E-03	4850	8,173E-03
440	4,836E-01	740	< 1,000E-05	1040	< 1,000E-05	1900	3,758E-01	3400	3,515E-03	4900	1,037E-02
450	5,076E-01	750	< 1,000E-05	1050	< 1,000E-05	1950	4,342E-01	3450	3,501E-03	4950	1,279E-02
460	5,386E-01	760	< 1,000E-05	1060	< 1,000E-05	2000	4,878E-01	3500	3,751E-03	5000	1,509E-02
470	5,759E-01	770	< 1,000E-05	1070	< 1,000E-05	2050	5,362E-01	3550	4,305E-03	5050	1,650E-02
480	6,225E-01	780	< 1,000E-05	1080	< 1,000E-05	2100	5,797E-01	3600	5,247E-03	5100	1,628E-02
490	6,740E-01	790	< 1,000E-05	1090	< 1,000E-05	2150	6,165E-01	3650	6,721E-03	5150	1,419E-02

Data Sheet

BG60

Optical properties			
Reflection factor			
	P_d	=	0,914
Spectral values guaranteed			
τ_i (405 nm)		≥	0,8
τ_i (514 nm)		≥	0,91
τ_i (633 nm)		≥	0,1
τ_i (694 nm)		≤	0,008
τ_i (1060 nm)		≤	0,0015
Refractive indices			
n_F (486 nm)		=	1,544
n_e (546 nm)		=	1,54
n_d (587,6 nm)		=	1,538
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 µm²
C_2			1,0918E-01 µm²
C_3			450,591 µm²
Internal quality			
Bubble class			2

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,83 g/cm³
Knoop hardness			
	HK[0.1/20]	=	362

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

Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	52.3
	AR class	=	3.3
Resistance against humidity			

Colormetric 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=0.3mm) = 633 nm
ISO 23364:2021

Disclaimer
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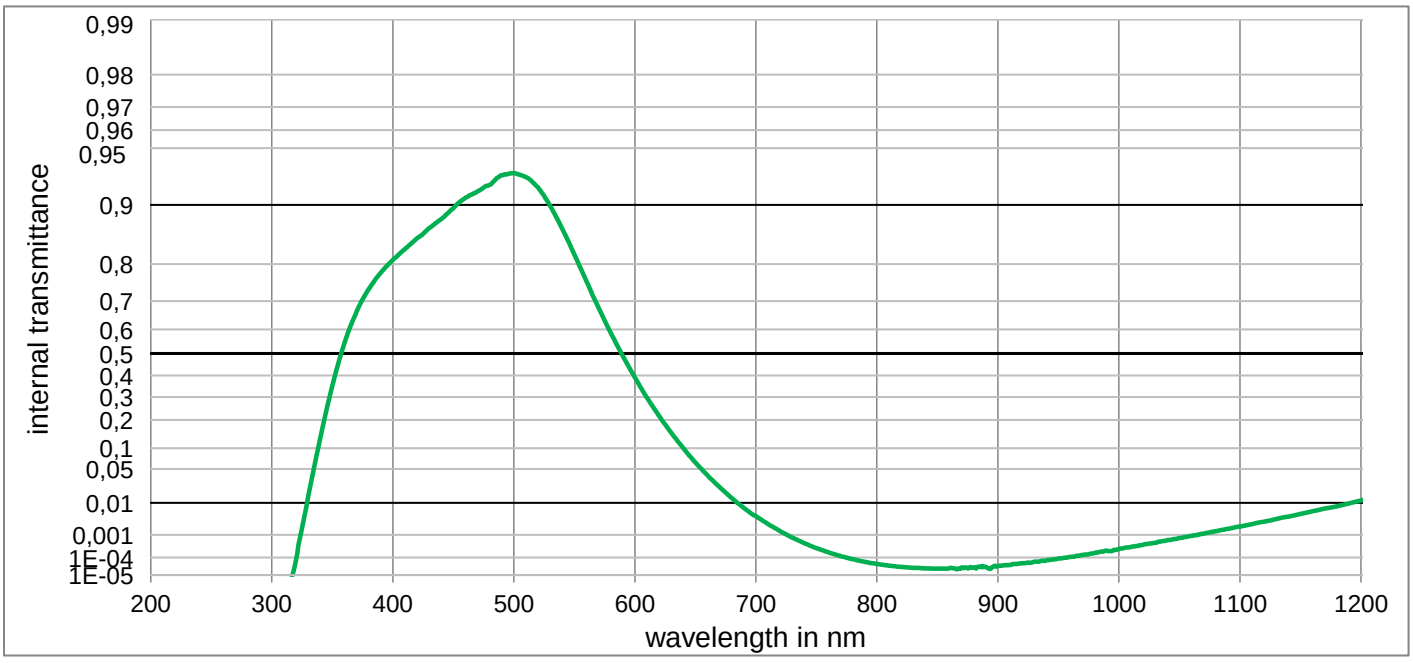
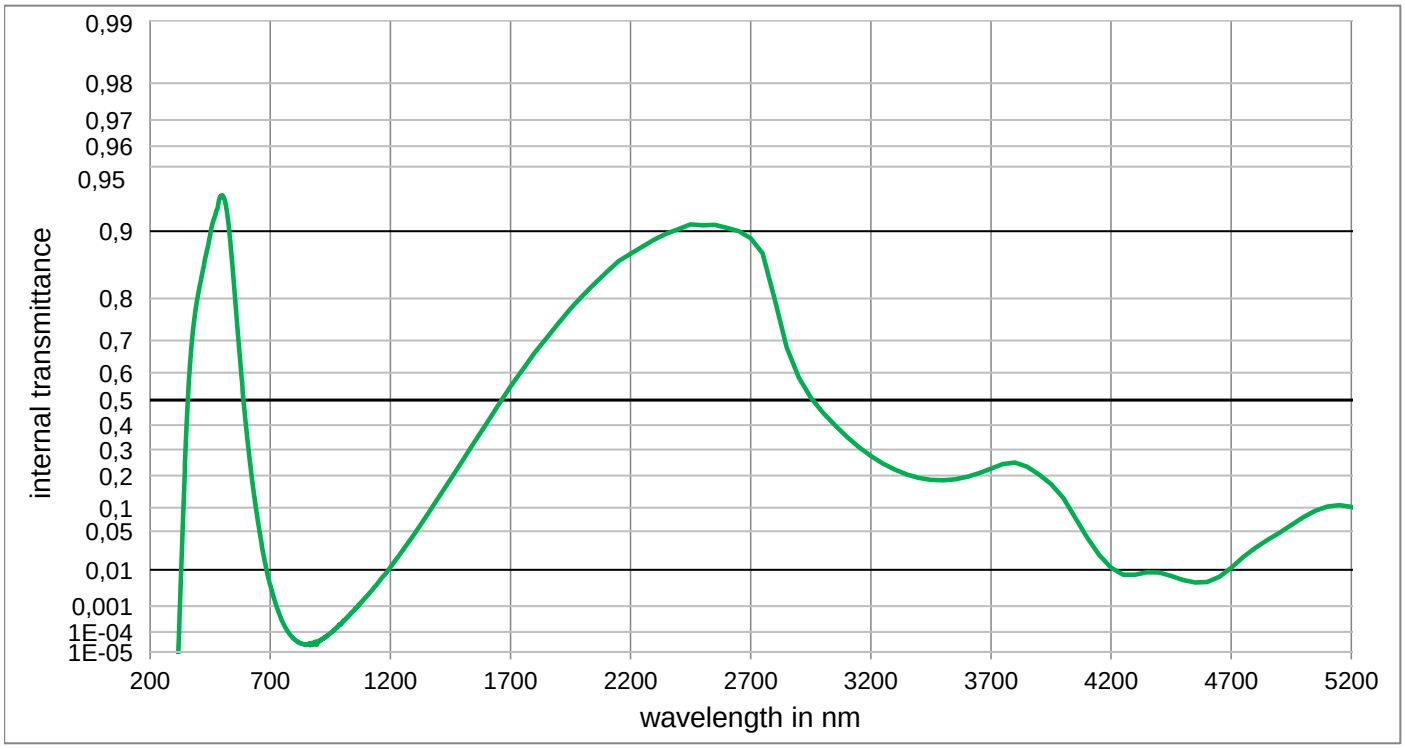


Data Sheet

BG60



Internal transmittance ti 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	< 1,000E-05	500	9,319E-01	800	4,553E-05	1100	1,992E-03	2200	8,733E-01	3700	2,259E-01
210	< 1,000E-05	510	9,286E-01	810	3,683E-05	1110	2,416E-03	2250	8,825E-01	3750	2,432E-01
220	< 1,000E-05	520	9,187E-01	820	3,115E-05	1120	2,902E-03	2300	8,910E-01	3800	2,484E-01
230	< 1,000E-05	530	8,991E-01	830	2,752E-05	1130	3,528E-03	2350	8,974E-01	3850	2,331E-01
240	< 1,000E-05	540	8,673E-01	840	2,593E-05	1140	4,192E-03	2400	9,023E-01	3900	2,041E-01
250	< 1,000E-05	550	8,208E-01	850	2,497E-05	1150	4,976E-03	2450	9,069E-01	3950	1,707E-01
260	< 1,000E-05	560	7,573E-01	860	2,632E-05	1160	5,967E-03	2500	9,061E-01	4000	1,275E-01
270	< 1,000E-05	570	6,790E-01	870	2,877E-05	1170	7,049E-03	2550	9,064E-01	4050	7,682E-02
280	< 1,000E-05	580	5,874E-01	880	2,856E-05	1180	8,166E-03	2600	9,035E-01	4100	4,036E-02
290	< 1,000E-05	590	4,892E-01	890	3,182E-05	1190	9,653E-03	2650	9,000E-01	4150	2,037E-02
300	< 1,000E-05	600	3,905E-01	900	3,559E-05	1200	1,142E-02	2700	8,923E-01	4200	1,121E-02
310	< 1,000E-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

Data Sheet

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)		=	1,544
n_e (546 nm)		=	1,54
n_d (587,6 nm)		=	1,538
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 µm²
C_2			1,0918E-01 µm²
C_3			450,591 µm²
Internal quality			
Bubble class			2

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,83 g/cm³
Knoop hardness			
	HK[0.1/20]	=	362

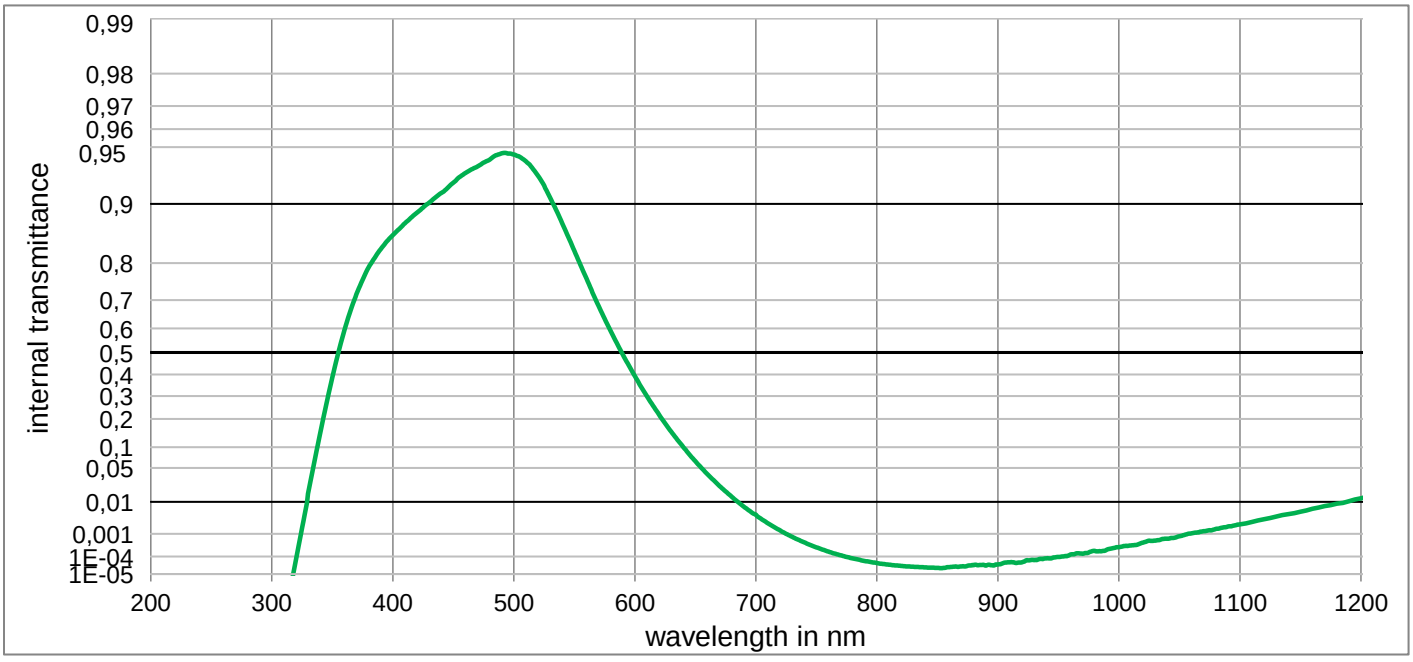
Thermal properties			
Transformation temperature			
	Tg	=	411 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	12,0
	$\alpha_{(20°C/300°C)}$	=	13,9

Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	52.2
	AR class	=	3.2
Resistance against humidity			

Colormetric 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

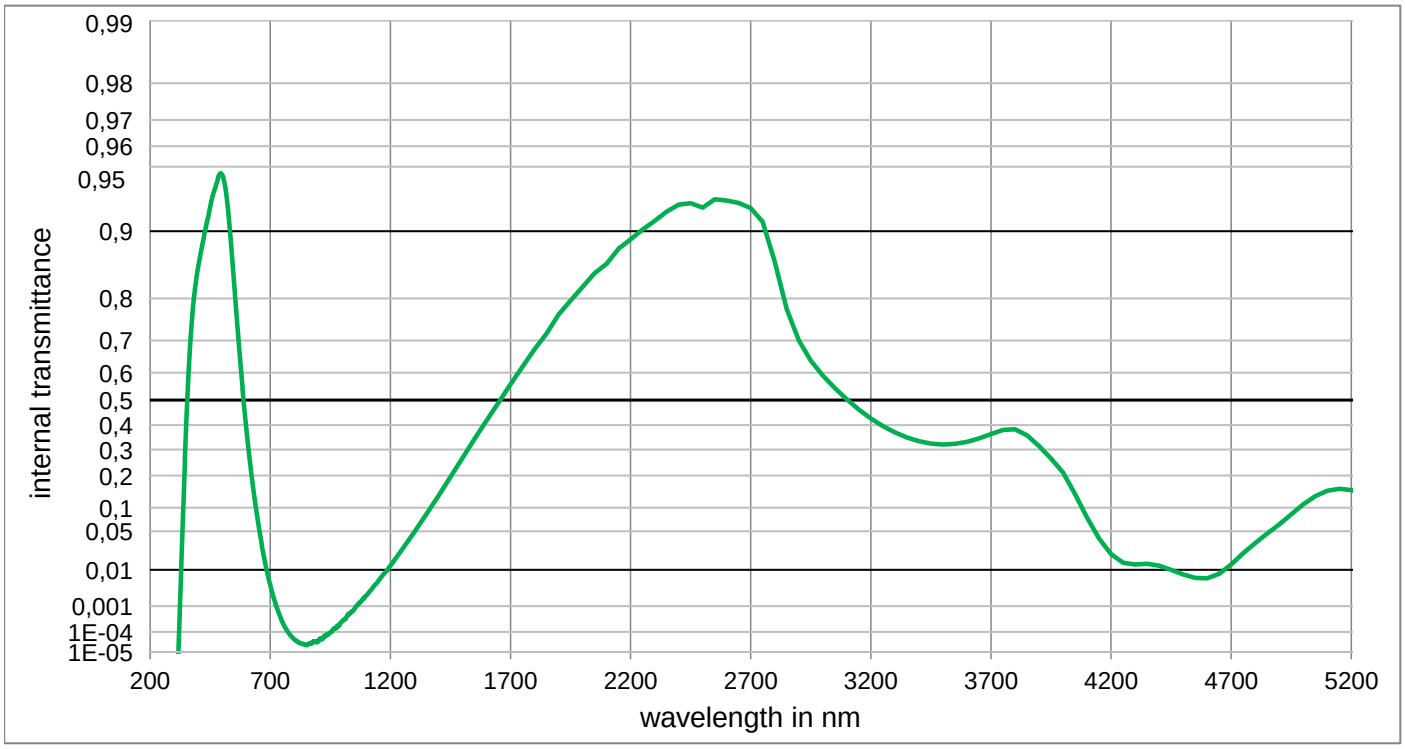
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
lambda_50%(d=0.3mm) = 633 nm
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG60HT



Internal transmittance ti 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	< 1,000E-05	500	9,452E-01	800	4,502E-05	1100	2,177E-03	2200	8,909E-01	3700	3,635E-01
210	< 1,000E-05	510	9,404E-01	810	3,656E-05	1110	2,626E-03	2250	9,019E-01	3750	3,805E-01
220	< 1,000E-05	520	9,288E-01	820	3,119E-05	1120	3,188E-03	2300	9,103E-01	3800	3,826E-01
230	< 1,000E-05	530	9,073E-01	830	2,793E-05	1130	3,874E-03	2350	9,188E-01	3850	3,583E-01
240	< 1,000E-05	540	8,739E-01	840	2,564E-05	1140	4,603E-03	2400	9,246E-01	3900	3,143E-01
250	< 1,000E-05	550	8,260E-01	850	2,372E-05	1150	5,383E-03	2450	9,257E-01	3950	2,645E-01
260	< 1,000E-05	560	7,618E-01	860	2,639E-05	1160	6,519E-03	2500	9,222E-01	4000	2,114E-01
270	< 1,000E-05	570	6,817E-01	870	2,872E-05	1170	7,711E-03	2550	9,288E-01	4050	1,384E-01
280	< 1,000E-05	580	5,900E-01	880	3,410E-05	1180	8,976E-03	2600	9,279E-01	4100	7,617E-02
290	< 1,000E-05	590	4,908E-01	890	3,233E-05	1190	1,032E-02	2650	9,261E-01	4150	3,905E-02
300	< 1,000E-05	600	3,920E-01	900	3,719E-05	1200	1,224E-02	2700	9,218E-01	4200	2,110E-02
310	< 1,000E-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

Data Sheet

BG61

Optical properties			
Reflection factor			
P_d	=	0,915	
Spectral values guaranteed			
τ_i (405 nm)	≥	0,84	
τ_i (514 nm)	≥	0,93	
τ_i (633 nm)	≥	0,18	
τ_i (694 nm)	≤	0,03	
τ_i (1060 nm)	≤	0,008	
Refractive indices			
n_F (486 nm)	=	1,541	
n_e (546 nm)	=	1,537	
n_d (587,6 nm)	=	1,535	
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	µm²
C_2		1,1649E-01	µm²
C_3		12,101	µm²
Internal quality			
Bubble class		2	

Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,81 g/cm³
Knoop hardness		
HK[0.1/20]	=	363

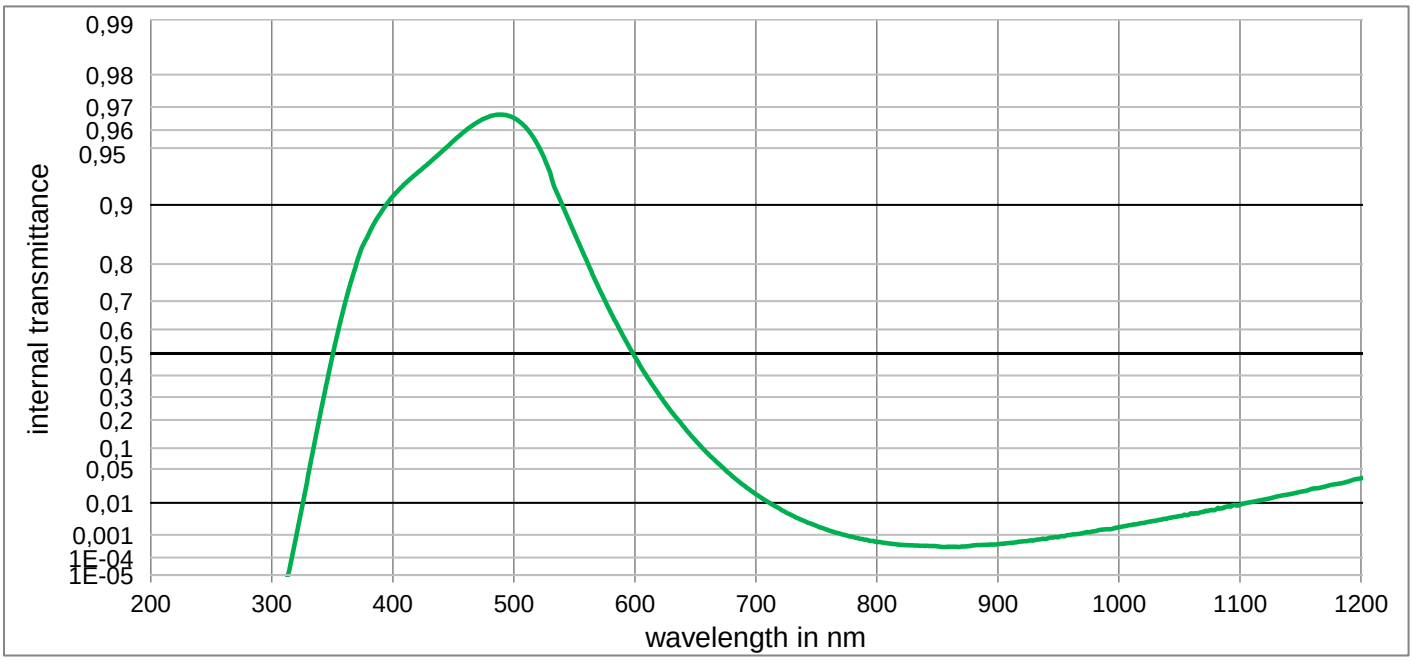
Thermal properties		
Transformation temperature		
Tg	=	402 °C
Thermal expansion in		10^{-6}/K
$\alpha_{(-30°C/+70°C)}$	=	11,9
$\alpha_{(20°C/300°C)}$	=	13,9

Chemical properties		
Chemical resistance		
FR class	=	1
SR class	=	52.3
AR class	=	3.3
Resistance against humidity		

Colormetric 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

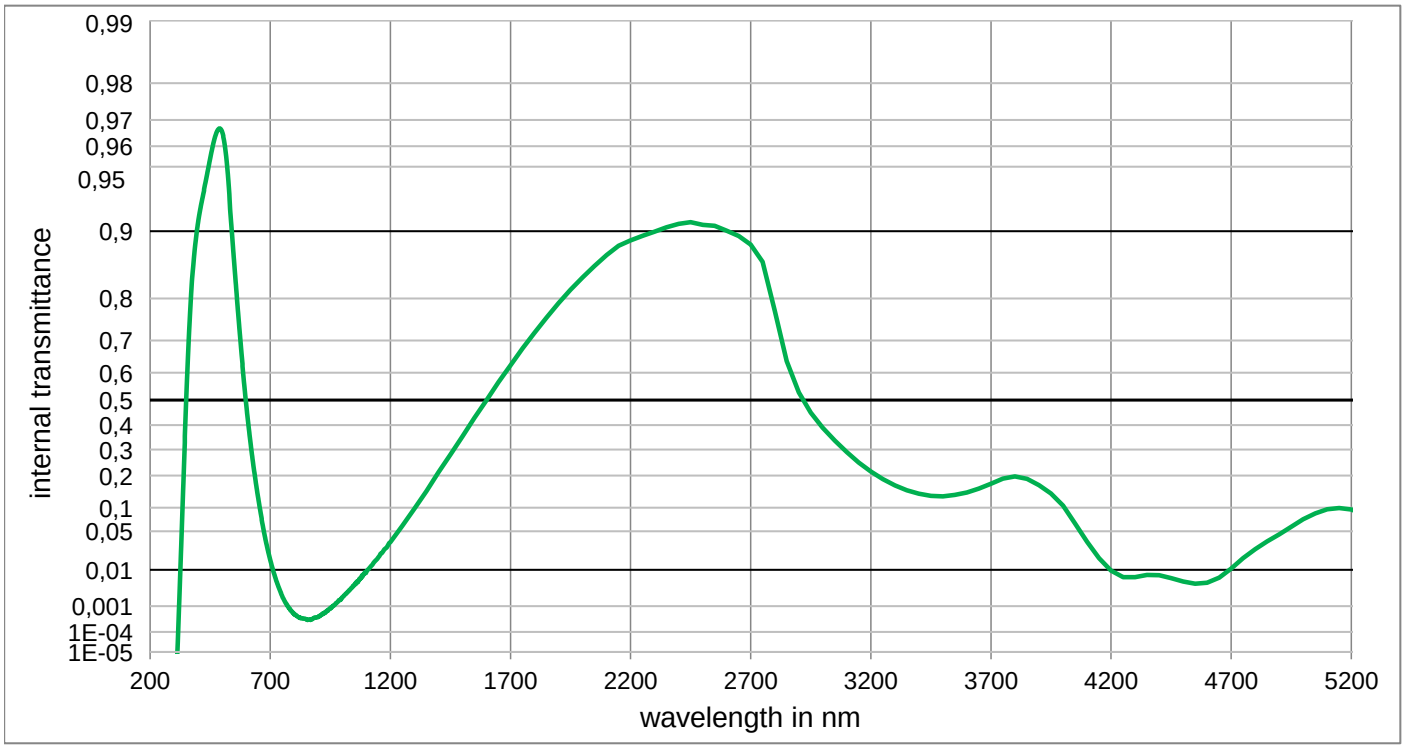
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
lambda_50%(d=0.3mm) = 648 nm
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG61



Internal transmittance ti 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	< 1,000E-05	500	9,656E-01	800	5,193E-04	1100	9,044E-03	2200	8,897E-01	3700	1,718E-01
210	< 1,000E-05	510	9,612E-01	810	4,547E-04	1110	1,045E-02	2250	8,951E-01	3750	1,889E-01
220	< 1,000E-05	520	9,516E-01	820	3,958E-04	1120	1,210E-02	2300	8,995E-01	3800	1,973E-01
230	< 1,000E-05	530	9,326E-01	830	3,721E-04	1130	1,412E-02	2350	9,042E-01	3850	1,886E-01
240	< 1,000E-05	540	9,001E-01	840	3,530E-04	1140	1,599E-02	2400	9,076E-01	3900	1,668E-01
250	< 1,000E-05	550	8,602E-01	850	3,372E-04	1150	1,819E-02	2450	9,091E-01	3950	1,399E-01
260	< 1,000E-05	560	8,082E-01	860	3,277E-04	1160	2,144E-02	2500	9,064E-01	4000	1,051E-01
270	< 1,000E-05	570	7,417E-01	870	3,291E-04	1170	2,359E-02	2550	9,055E-01	4050	6,433E-02
280	< 1,000E-05	580	6,631E-01	880	3,728E-04	1180	2,664E-02	2600	9,005E-01	4100	3,430E-02
290	< 1,000E-05	590	5,767E-01	890	3,944E-04	1190	3,013E-02	2650	8,947E-01	4150	1,749E-02
300	< 1,000E-05	600	4,848E-01	900	4,116E-04	1200	3,407E-02	2700	8,849E-01	4200	9,654E-03
310	< 1,000E-05	610	3,949E-01	910	4,741E-04	1250	5,972E-02	2750	8,623E-01	4250	6,791E-03
320	8,279E-04	620	3,106E-01	920	5,553E-04	1300	9,768E-02	2800	7,744E-01	4300	6,709E-03
330	3,776E-02	630	2,359E-01	930	6,122E-04	1350	1,471E-01	2850	6,386E-01	4350	7,569E-03
340	2,218E-01	640	1,744E-01	940	6,917E-04	1400	2,110E-01	2900	5,289E-01	4400	7,518E-03
350	4,867E-01	650	1,247E-01	950	8,146E-04	1450	2,800E-01	2950	4,504E-01	4450	6,408E-03
360	6,867E-01	660	8,605E-02	960	9,997E-04	1500	3,528E-01	3000	3,893E-01	4500	5,234E-03
370	8,013E-01	670	5,862E-02	970	1,164E-03	1550	4,286E-01	3050	3,366E-01	4550	4,591E-03
380	8,579E-01	680	3,831E-02	980	1,375E-03	1600	4,994E-01	3100	2,896E-01	4600	4,923E-03
390	8,900E-01	690	2,506E-02	990	1,621E-03	1650	5,662E-01	3150	2,488E-01	4650	6,605E-03
400	9,099E-01	700	1,619E-02	1000	1,899E-03	1700	6,247E-01	3200	2,145E-01	4700	1,066E-02
410	9,225E-01	710	1,049E-02	1010	2,246E-03	1750	6,771E-01	3250	1,871E-01	4750	1,748E-02
420	9,320E-01	720	6,864E-03	1020	2,621E-03	1800	7,210E-01	3300	1,658E-01	4800	2,590E-02
430	9,401E-01	730	4,501E-03	1030	3,084E-03	1850	7,586E-01	3350	1,500E-01	4850	3,480E-02
440	9,475E-01	740	3,032E-03	1040	3,652E-03	1900	7,902E-01	3400	1,394E-01	4900	4,502E-02
450	9,542E-01	750	2,113E-03	1050	4,329E-03	1950	8,168E-01	3450	1,330E-01	4950	5,802E-02
460	9,597E-01	760	1,465E-03	1060	5,237E-03	2000	8,384E-01	3500	1,313E-01	5000	7,262E-02
470	9,638E-01	770	1,094E-03	1070	5,656E-03	2050	8,562E-01	3550	1,359E-01	5050	8,615E-02
480	9,663E-01	780	8,376E-04	1080	6,708E-03	2100	8,717E-01	3600	1,432E-01	5100	9,571E-02
490	9,670E-01	790	6,491E-04	1090	8,091E-03	2150	8,834E-01	3650	1,554E-01	5150	9,889E-02

Data Sheet

BG62

Optical properties			
Reflection factor			
	P_d	=	0,915
Spectral values guaranteed			
τ_i (405 nm)		≥	0,73
τ_i (514 nm)		≥	0,89
τ_i (633 nm)		≥	0,08
τ_i (694 nm)		≤	0,005
τ_i (1060 nm)		≤	0,0005
Refractive indices			
n_F (486 nm)		=	1,546
n_e (546 nm)		=	1,542
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 µm²
C_2			3,0034E-02 µm²
C_3			12,219 µm²
Internal quality			
Bubble class			2

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,85 g/cm³
Knoop hardness			
	HK[0.1/20]	=	368

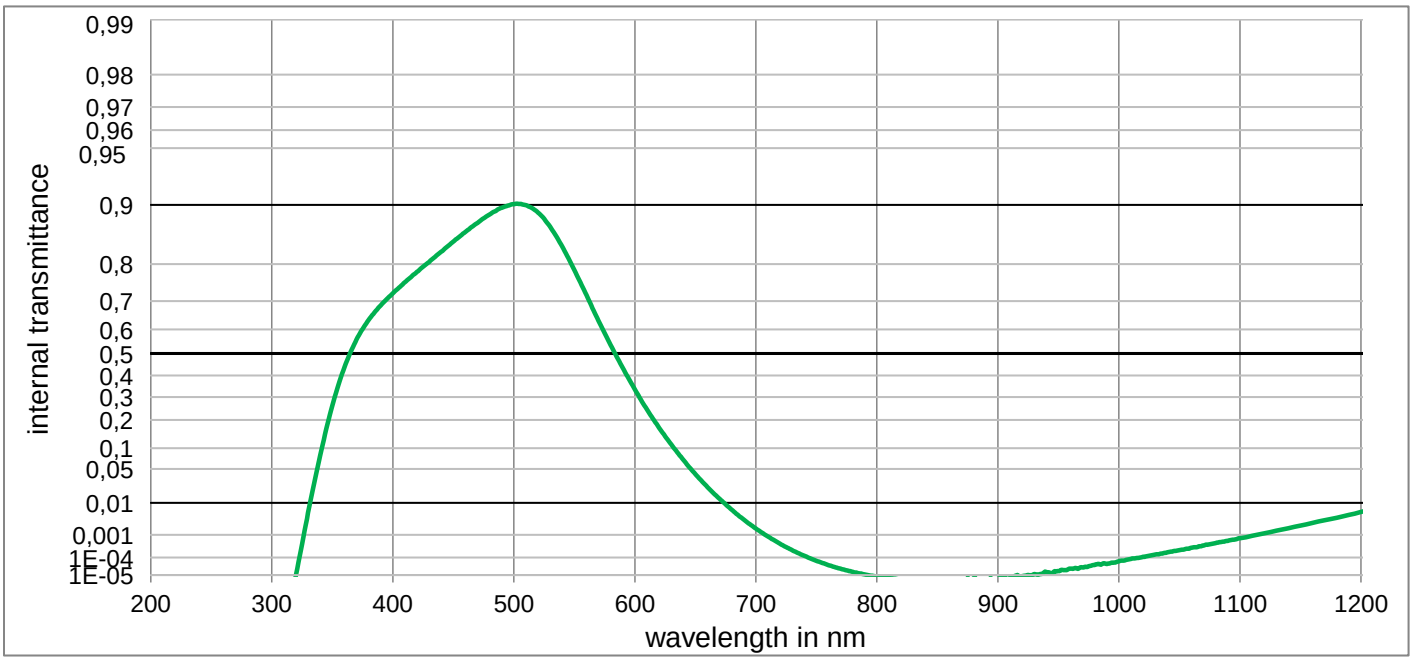
Thermal properties			
Transformation temperature			
	Tg	=	410 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	11,9
	$\alpha_{(20°C/300°C)}$	=	13,6

Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	52.3
	AR class	=	3.3
Resistance against humidity			

Colormetric 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

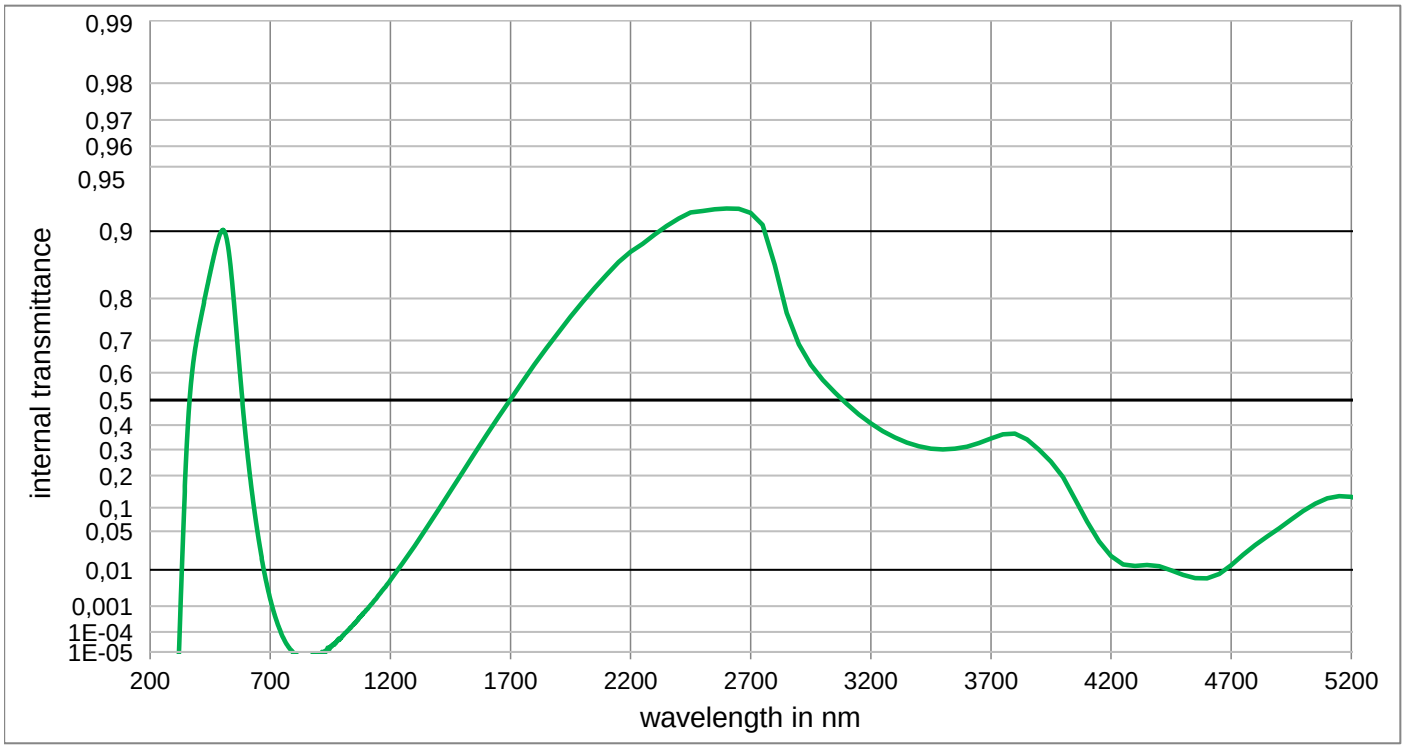
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
lambda_50%(d=0.21mm) = 644 nm
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG62



Internal transmittance ti 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	< 1,000E-05	500	9,010E-01	800	< 1,000E-05	1100	7,390E-04	2200	8,757E-01	3700	3,448E-01
210	< 1,000E-05	510	8,996E-01	810	< 1,000E-05	1110	9,134E-04	2250	8,858E-01	3750	3,621E-01
220	< 1,000E-05	520	8,902E-01	820	< 1,000E-05	1120	1,135E-03	2300	8,963E-01	3800	3,647E-01
230	< 1,000E-05	530	8,704E-01	830	< 1,000E-05	1130	1,415E-03	2350	9,053E-01	3850	3,416E-01
240	< 1,000E-05	540	8,363E-01	840	< 1,000E-05	1140	1,732E-03	2400	9,126E-01	3900	2,998E-01
250	< 1,000E-05	550	7,859E-01	850	< 1,000E-05	1150	2,149E-03	2450	9,180E-01	3950	2,524E-01
260	< 1,000E-05	560	7,179E-01	860	< 1,000E-05	1160	2,620E-03	2500	9,193E-01	4000	1,940E-01
270	< 1,000E-05	570	6,330E-01	870	< 1,000E-05	1170	3,235E-03	2550	9,208E-01	4050	1,235E-01
280	< 1,000E-05	580	5,365E-01	880	< 1,000E-05	1180	3,803E-03	2600	9,215E-01	4100	6,781E-02
290	< 1,000E-05	590	4,347E-01	890	< 1,000E-05	1190	4,695E-03	2650	9,213E-01	4150	3,506E-02
300	< 1,000E-05	600	3,347E-01	900	< 1,000E-05	1200	5,724E-03	2700	9,177E-01	4200	1,926E-02
310	< 1,000E-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

Data Sheet

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)	=	1,546	
n_e (546 nm)	=	1,542	
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 µm²	
C_2		3,0034E-02 µm²	
C_3		12,219 µm²	
Internal quality			
Bubble class		2	

Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,85 g/cm³
Knoop hardness		
HK[0.1/20]	=	368

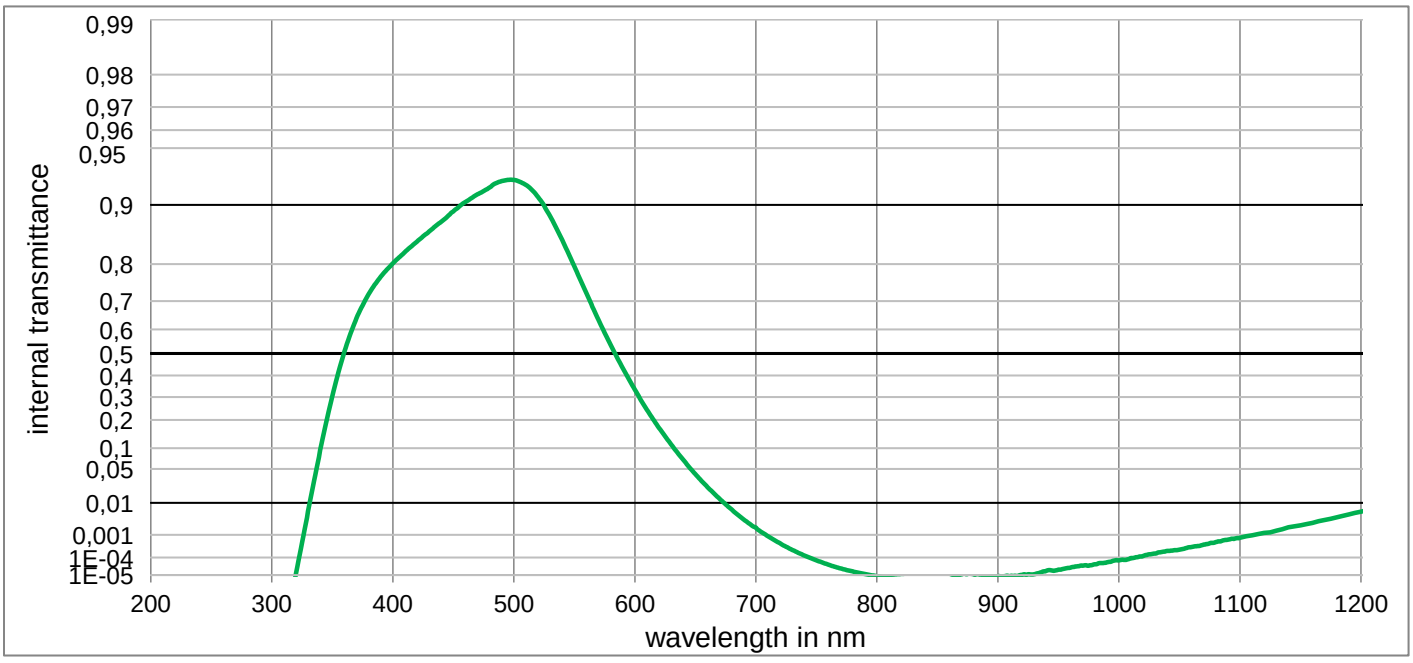
Thermal properties		
Transformation temperature		
Tg	=	410 °C
Thermal expansion in		10^{-6}/K
$\alpha_{(-30°C/+70°C)}$	=	11,8
$\alpha_{(20°C/300°C)}$	=	13,7

Chemical properties		
Chemical resistance		
FR class	=	1
SR class	=	52.3
AR class	=	3.3
Resistance against humidity		

Colormetric 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

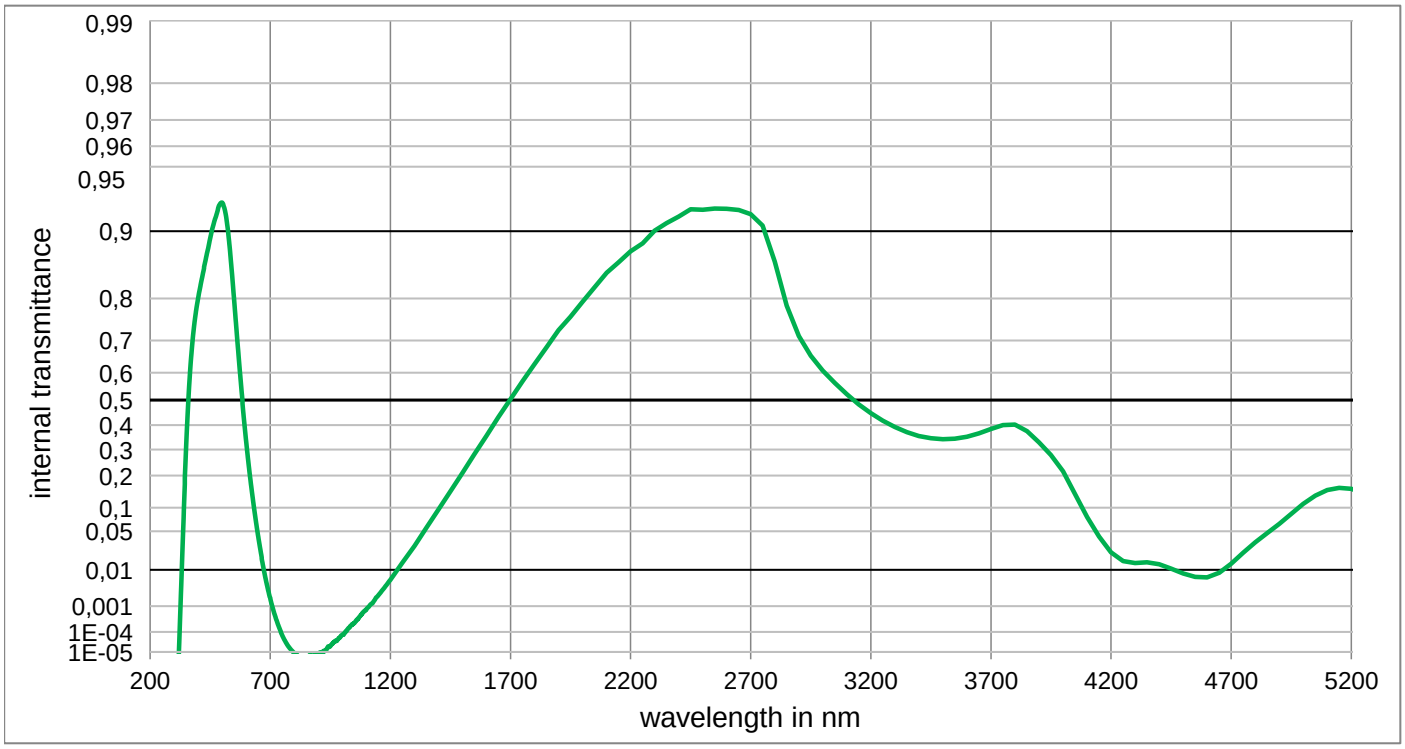
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
lambda_50%(d=0.21mm) = 644 nm
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG62HT



Internal transmittance ti 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	< 1,000E-05	500	9,261E-01	800	< 1,000E-05	1100	7,708E-04	2200	8,764E-01	3700	3,841E-01
210	< 1,000E-05	510	9,214E-01	810	< 1,000E-05	1110	9,495E-04	2250	8,864E-01	3750	4,004E-01
220	< 1,000E-05	520	9,089E-01	820	< 1,000E-05	1120	1,194E-03	2300	9,006E-01	3800	4,015E-01
230	< 1,000E-05	530	8,856E-01	830	< 1,000E-05	1130	1,417E-03	2350	9,081E-01	3850	3,755E-01
240	< 1,000E-05	540	8,483E-01	840	< 1,000E-05	1140	1,889E-03	2400	9,143E-01	3900	3,297E-01
250	< 1,000E-05	550	7,945E-01	850	< 1,000E-05	1150	2,190E-03	2450	9,208E-01	3950	2,780E-01
260	< 1,000E-05	560	7,232E-01	860	< 1,000E-05	1160	2,656E-03	2500	9,204E-01	4000	2,153E-01
270	< 1,000E-05	570	6,361E-01	870	< 1,000E-05	1170	3,280E-03	2550	9,214E-01	4050	1,386E-01
280	< 1,000E-05	580	5,373E-01	880	< 1,000E-05	1180	3,977E-03	2600	9,213E-01	4100	7,754E-02
290	< 1,000E-05	590	4,338E-01	890	< 1,000E-05	1190	4,816E-03	2650	9,202E-01	4150	4,183E-02
300	< 1,000E-05	600	3,335E-01	900	< 1,000E-05	1200	5,792E-03	2700	9,166E-01	4200	2,268E-02
310	< 1,000E-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

Data Sheet

BG63

Optical properties			
Reflection factor			
	P_d	=	0,916
Spectral values guaranteed			
τ_i (405 nm)		≥	0,95
τ_i (514 nm)		≥	0,96
τ_i (633 nm)		≥	0,5
τ_i (694 nm)		≤	0,25
τ_i (1060 nm)		≤	0,16
Refractive indices			
n_F (486 nm)		=	1,538
n_e (546 nm)		=	1,534
n_d (587,6 nm)		=	1,532
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 µm²
C_2			5,7634E-02 µm²
C_3			46,721 µm²
Internal quality			
Bubble class			2

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,79 g/cm³
Knoop hardness			
	HK[0.1/20]	=	362

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

Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	52.3
	AR class	=	3.3
Resistance against humidity			

Colormetric 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=1.5mm) = 614 nm
ISO 23364:2021

Disclaimer
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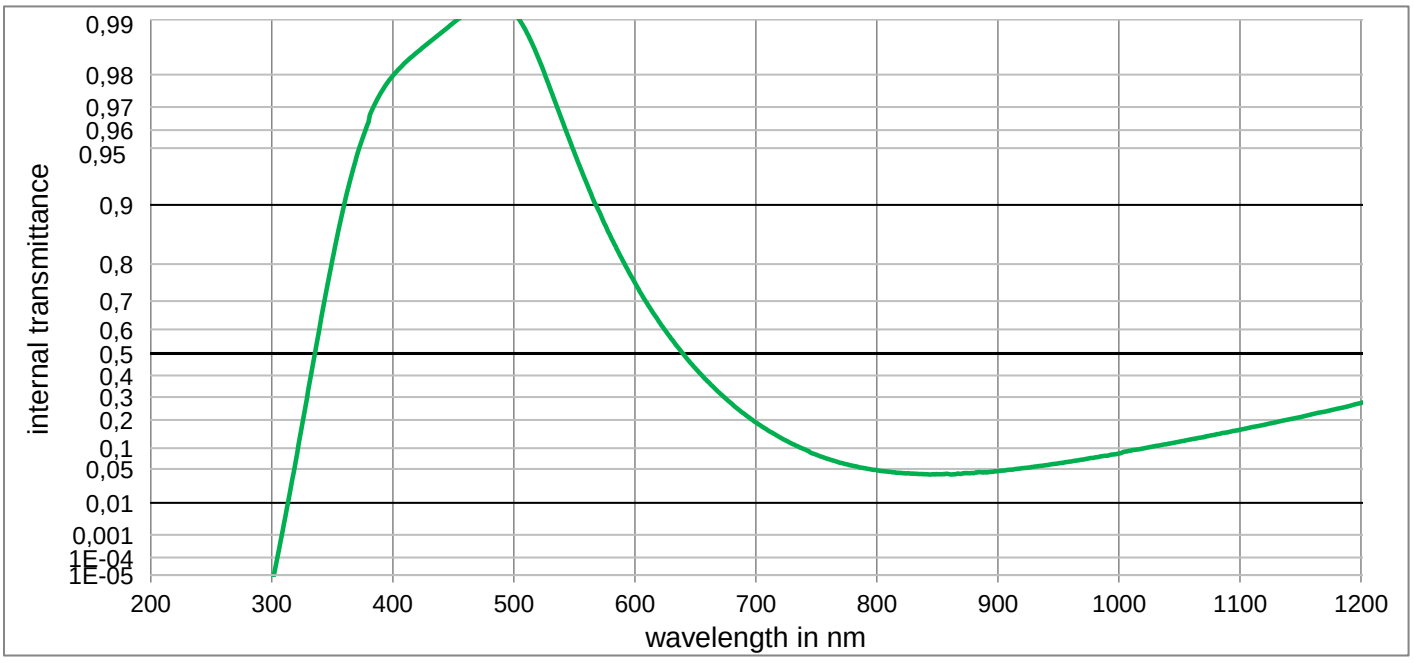
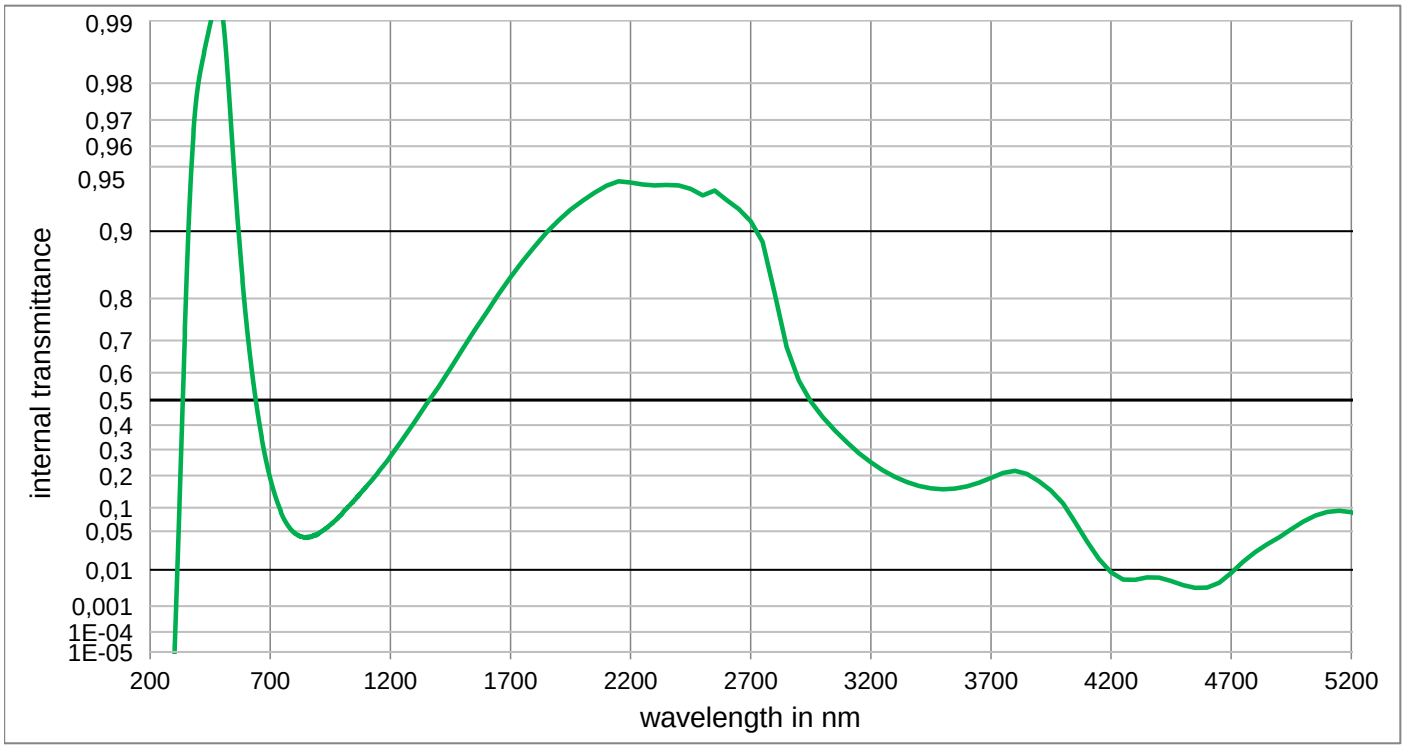


Data Sheet

BG63



Internal transmittance ti 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	< 1,000E-05	500	9,909E-01	800	4,771E-02	1100	1,621E-01	2200	9,406E-01	3700	1,921E-01
210	< 1,000E-05	510	9,885E-01	810	4,471E-02	1110	1,714E-01	2250	9,393E-01	3750	2,095E-01
220	< 1,000E-05	520	9,839E-01	820	4,271E-02	1120	1,806E-01	2300	9,388E-01	3800	2,171E-01
230	< 1,000E-05	530	9,763E-01	830	4,174E-02	1130	1,912E-01	2350	9,391E-01	3850	2,055E-01
240	< 1,000E-05	540	9,644E-01	840	4,061E-02	1140	2,015E-01	2400	9,387E-01	3900	1,796E-01
250	< 1,000E-05	550	9,471E-01	850	4,057E-02	1150	2,122E-01	2450	9,364E-01	3950	1,492E-01
260	< 1,000E-05	560	9,232E-01	860	4,065E-02	1160	2,240E-01	2500	9,317E-01	4000	1,114E-01
270	< 1,000E-05	570	8,935E-01	870	4,149E-02	1170	2,349E-01	2550	9,352E-01	4050	6,722E-02
280	< 1,000E-05	580	8,543E-01	880	4,238E-02	1180	2,467E-01	2600	9,284E-01	4100	3,475E-02
290	< 1,000E-05	590	8,076E-01	890	4,391E-02	1190	2,591E-01	2650	9,210E-01	4150	1,686E-02
300	< 1,000E-05	600	7,536E-01	900	4,619E-02	1200	2,726E-01	2700	9,101E-01	4200	8,809E-03
310	2,433E-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

Data Sheet

BG64

Optical properties			
Reflection factor			
	P_d	=	0,916
Spectral values guaranteed			
τ_i (405 nm)		≥	0,99
τ_i (514 nm)		≥	0,99
τ_i (633 nm)		≥	0,72
τ_i (694 nm)		≤	0,55
τ_i (1060 nm)		≤	0,45
Refractive indices			
n_F (486 nm)		=	1,535
n_e (546 nm)		=	1,532
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 µm²		
C_2	5,5599E-02 µm²		
C_3	69,869 µm²		
Internal quality			
Bubble class	2		

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,78 g/cm³
Knoop hardness			
	HK[0.1/20]	=	371

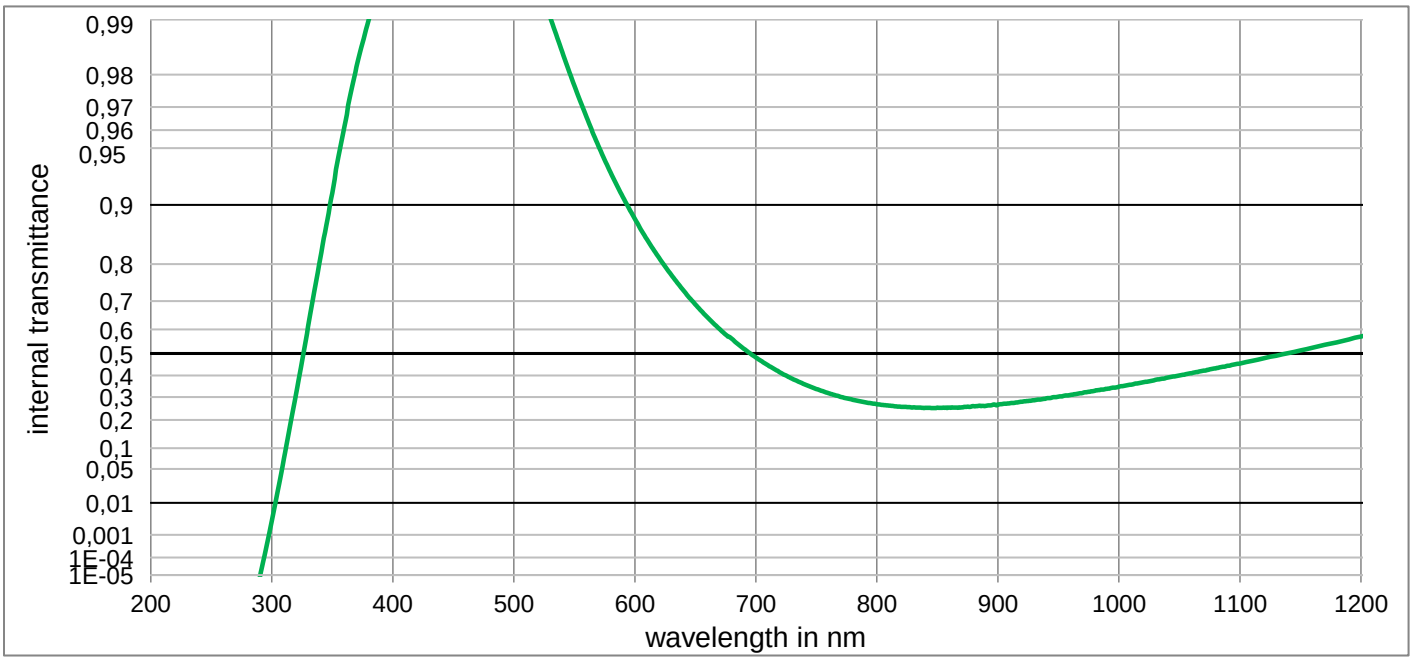
Thermal properties			
Transformation temperature			
	Tg	=	417 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	12,0
	$\alpha_{(20°C/300°C)}$	=	13,8

Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	52.3
	AR class	=	3.3
Resistance against humidity			

Colormetric 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

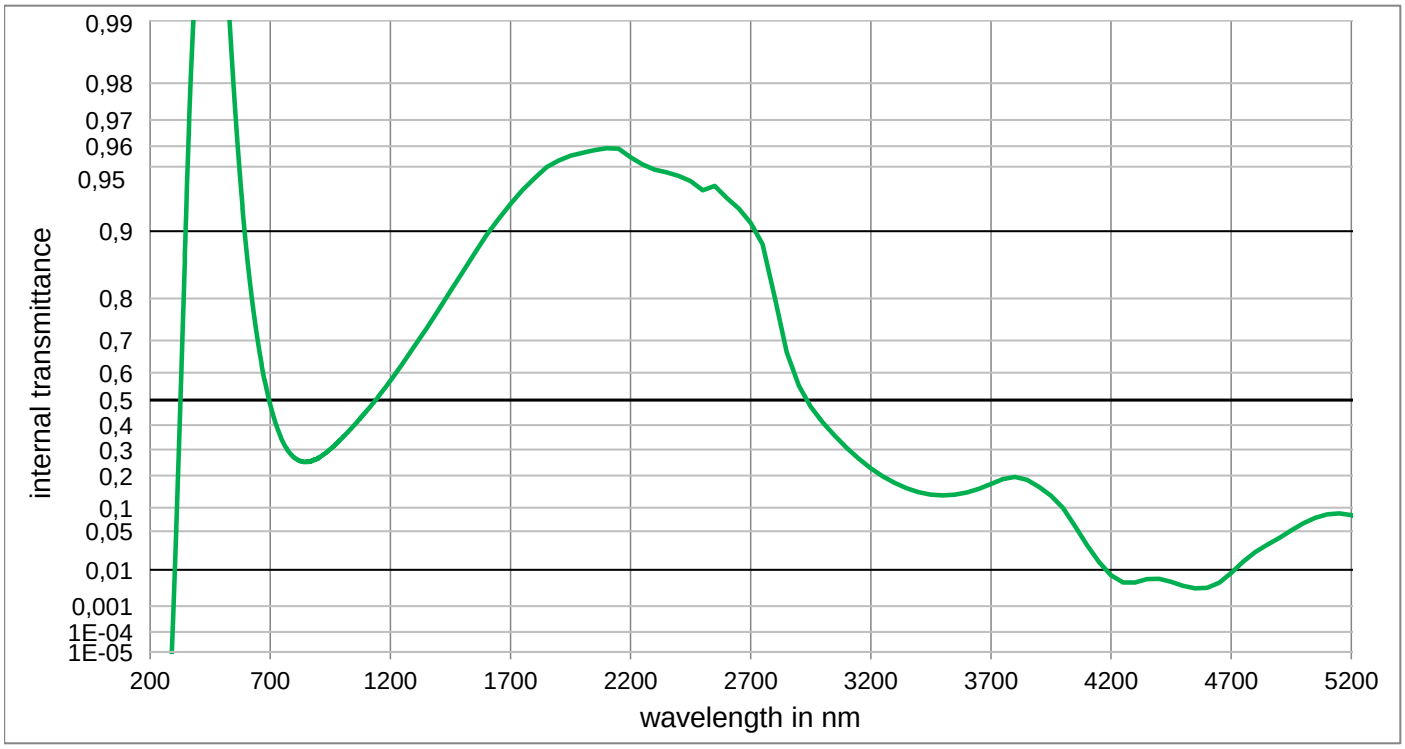
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
lambda_50%(d=3mm) = 619 nm
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG64



Internal transmittance ti 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	< 1,000E-05	500	9,971E-01	800	2,682E-01	1100	4,553E-01	2200	9,549E-01	3700	1,706E-01
210	< 1,000E-05	510	9,959E-01	810	2,611E-01	1110	4,666E-01	2250	9,512E-01	3750	1,874E-01
220	< 1,000E-05	520	9,938E-01	820	2,558E-01	1120	4,786E-01	2300	9,484E-01	3800	1,951E-01
230	< 1,000E-05	530	9,903E-01	830	2,539E-01	1130	4,896E-01	2350	9,469E-01	3850	1,849E-01
240	< 1,000E-05	540	9,850E-01	840	2,511E-01	1140	5,017E-01	2400	9,447E-01	3900	1,614E-01
250	< 1,000E-05	550	9,770E-01	850	2,523E-01	1150	5,137E-01	2450	9,416E-01	3950	1,338E-01
260	< 1,000E-05	560	9,660E-01	860	2,522E-01	1160	5,248E-01	2500	9,354E-01	4000	9,910E-02
270	< 1,000E-05	570	9,513E-01	870	2,539E-01	1170	5,370E-01	2550	9,383E-01	4050	5,906E-02
280	< 1,000E-05	580	9,324E-01	880	2,592E-01	1180	5,479E-01	2600	9,299E-01	4100	3,025E-02
290	< 1,000E-05	590	9,093E-01	890	2,601E-01	1190	5,602E-01	2650	9,214E-01	4150	1,459E-02
300	2,982E-03	600	8,816E-01	900	2,661E-01	1200	5,719E-01	2700	9,084E-01	4200	7,556E-03
310	7,223E-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

Data Sheet

BG66

Optical properties			
Reflection factor			
	P_d	=	0,914
Spectral values guaranteed			
τ_i (430 nm)		≥	0,815
τ_i (514 nm)		≥	0,89
τ_i (565 nm)		≥	0,615
τ_i (694 nm)		≤	0,0015
τ_i (1060 nm)		≤	0,0002
Refractive indices			
n_F (486 nm)		=	1,544
n_e (546 nm)		=	1,541
n_d (587,6 nm)		=	1,539
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 µm²
C_2			2,0582E-02 µm²
C_3			100,000 µm²
Internal quality			
Bubble class			0

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,85 g/cm³
Knoop hardness			
	HK[0.1/20]	=	373

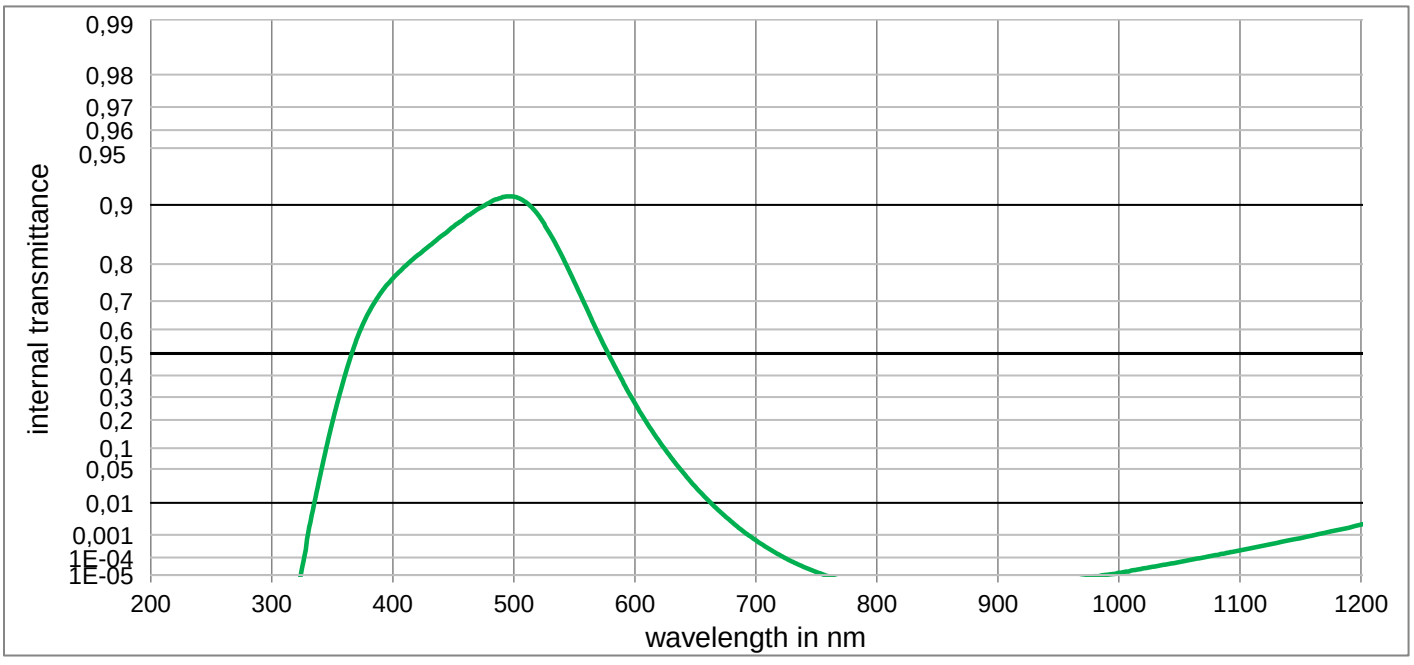
Thermal properties			
Transformation temperature			
	Tg	=	416 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	11,8
	$\alpha_{(20°C/300°C)}$	=	13,7

Chemical properties			
Chemical resistance			
	FR class		
	SR class	=	52.3
	AR class	=	3.3
Resistance against humidity			

Colormetric 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

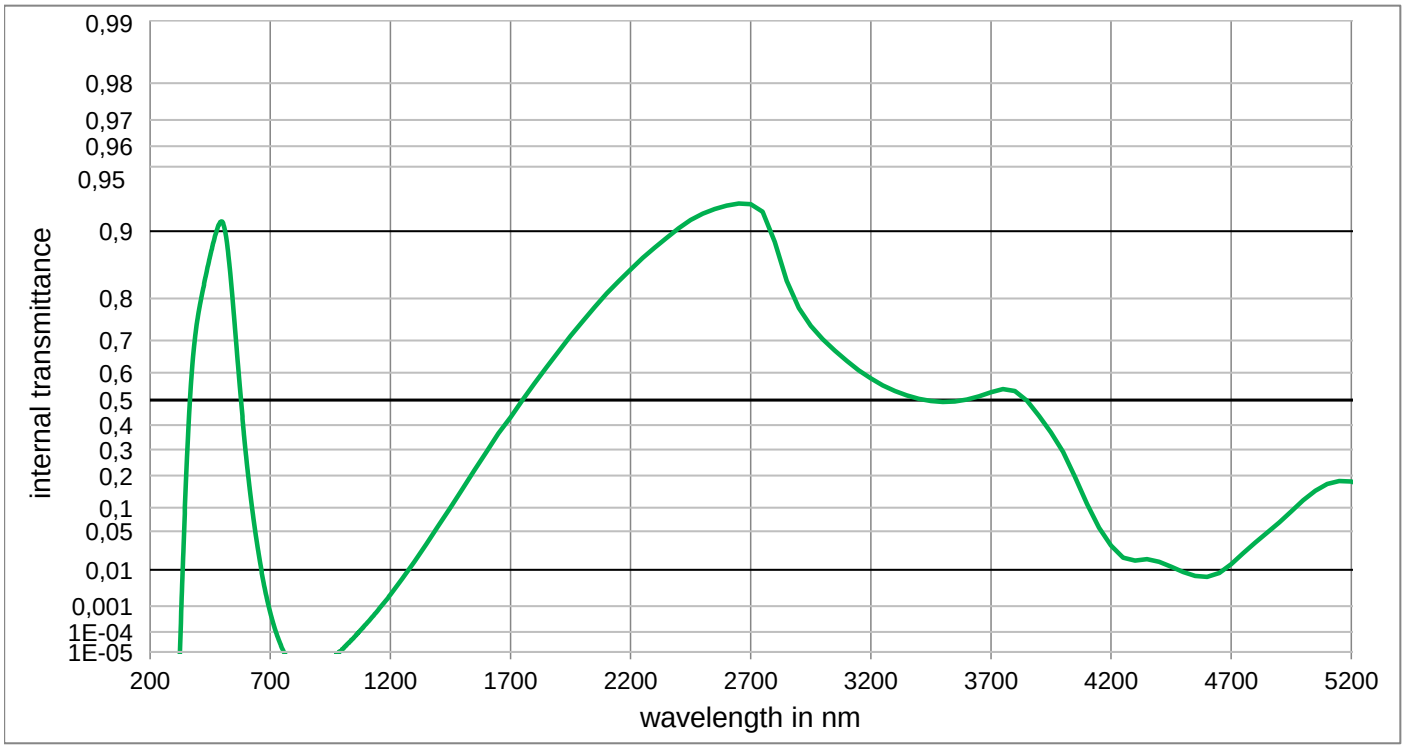
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
lambda_50%(d=0.21mm) @ 635 nm
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG66



Internal transmittance ti 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	< 1,000E-05	500	9,094E-01	800	< 1,000E-05	1100	2,196E-04	2200	8,507E-01	3700	5,296E-01
210	< 1,000E-05	510	9,031E-01	810	< 1,000E-05	1110	2,858E-04	2250	8,676E-01	3750	5,413E-01
220	< 1,000E-05	520	8,874E-01	820	< 1,000E-05	1120	3,654E-04	2300	8,810E-01	3800	5,348E-01
230	< 1,000E-05	530	8,590E-01	830	< 1,000E-05	1130	4,675E-04	2350	8,927E-01	3850	4,976E-01
240	< 1,000E-05	540	8,165E-01	840	< 1,000E-05	1140	5,998E-04	2400	9,031E-01	3900	4,373E-01
250	< 1,000E-05	550	7,560E-01	850	< 1,000E-05	1150	7,406E-04	2450	9,113E-01	3950	3,702E-01
260	< 1,000E-05	560	6,770E-01	860	< 1,000E-05	1160	9,407E-04	2500	9,170E-01	4000	2,907E-01
270	< 1,000E-05	570	5,822E-01	870	< 1,000E-05	1170	1,191E-03	2550	9,209E-01	4050	1,956E-01
280	< 1,000E-05	580	4,782E-01	880	< 1,000E-05	1180	1,473E-03	2600	9,239E-01	4100	1,091E-01
290	< 1,000E-05	590	3,726E-01	890	< 1,000E-05	1190	1,816E-03	2650	9,256E-01	4150	5,625E-02
300	< 1,000E-05	600	2,720E-01	900	< 1,000E-05	1200	2,301E-03	2700	9,250E-01	4200	2,989E-02
310	< 1,000E-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	3,932E-01	660	1,207E-02	960	< 1,000E-05	1500	1,543E-01	3000	7,035E-01	4500	8,858E-03
370	5,584E-01	670	5,939E-03	970	< 1,000E-05	1550	2,192E-01	3050	6,707E-01	4550	7,190E-03
380	6,617E-01	680	2,832E-03	980	< 1,000E-05	1600	2,908E-01	3100	6,389E-01	4600	6,838E-03
390	7,246E-01	690	1,320E-03	990	1,054E-05	1650	3,659E-01	3150	6,083E-01	4650	8,472E-03
400	7,656E-01	700	6,092E-04	1000	1,418E-05	1700	4,320E-01	3200	5,802E-01	4700	1,325E-02
410	7,944E-01	710	2,779E-04	1010	1,905E-05	1750	4,998E-01	3250	5,554E-01	4750	2,175E-02
420	8,179E-01	720	1,290E-04	1020	2,566E-05	1800	5,622E-01	3300	5,344E-01	4800	3,342E-02
430	8,373E-01	730	6,140E-05	1030	3,340E-05	1850	6,185E-01	3350	5,175E-01	4850	4,796E-02
440	8,553E-01	740	3,033E-05	1040	4,450E-05	1900	6,680E-01	3400	5,044E-01	4900	6,617E-02
450	8,702E-01	750	1,534E-05	1050	5,799E-05	1950	7,125E-01	3450	4,961E-01	4950	9,066E-02
460	8,835E-01	760	< 1,000E-05	1060	7,729E-05	2000	7,496E-01	3500	4,929E-01	5000	1,200E-01
470	8,947E-01	770	< 1,000E-05	1070	1,000E-04	2050	7,815E-01	3550	4,948E-01	5050	1,486E-01
480	9,029E-01	780	< 1,000E-05	1080	1,319E-04	2100	8,096E-01	3600	5,022E-01	5100	1,706E-01
490	9,085E-01	790	< 1,000E-05	1090	1,712E-04	2150	8,319E-01	3650	5,144E-01	5150	1,811E-01

Data Sheet

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)		=	1,548
n_e (546 nm)		=	1,544
n_d (587,6 nm)		=	1,542
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 µm²		
C_2	1,7804E-02 µm²		
C_3	131,310 µm²		
Internal quality			
Bubble class	2		

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,87 g/cm³
Knoop hardness			
	HK[0.1/20]	=	385

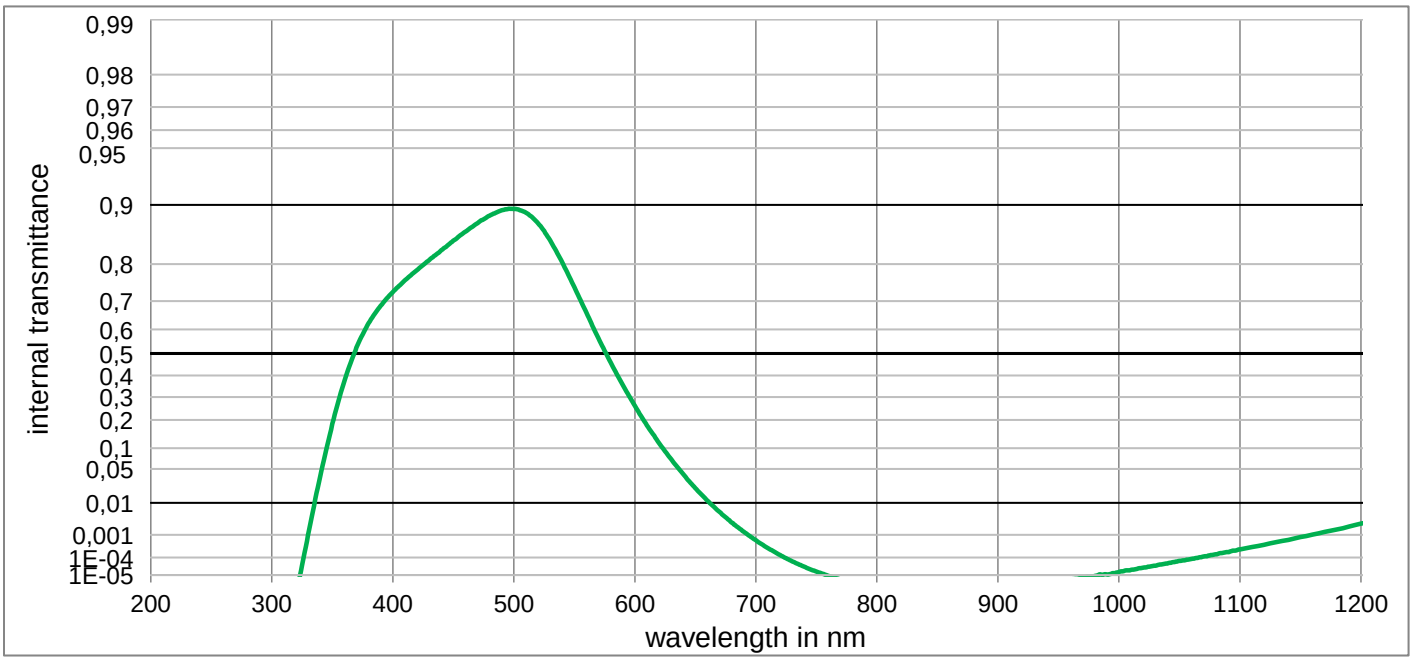
Thermal properties			
Transformation temperature			
	Tg	=	425 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	11,5
	$\alpha_{(20°C/300°C)}$	=	13,3

Chemical properties			
Chemical resistance			
	FR class		
	SR class	=	52,3
	AR class		
Resistance against humidity			

Colormetric 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

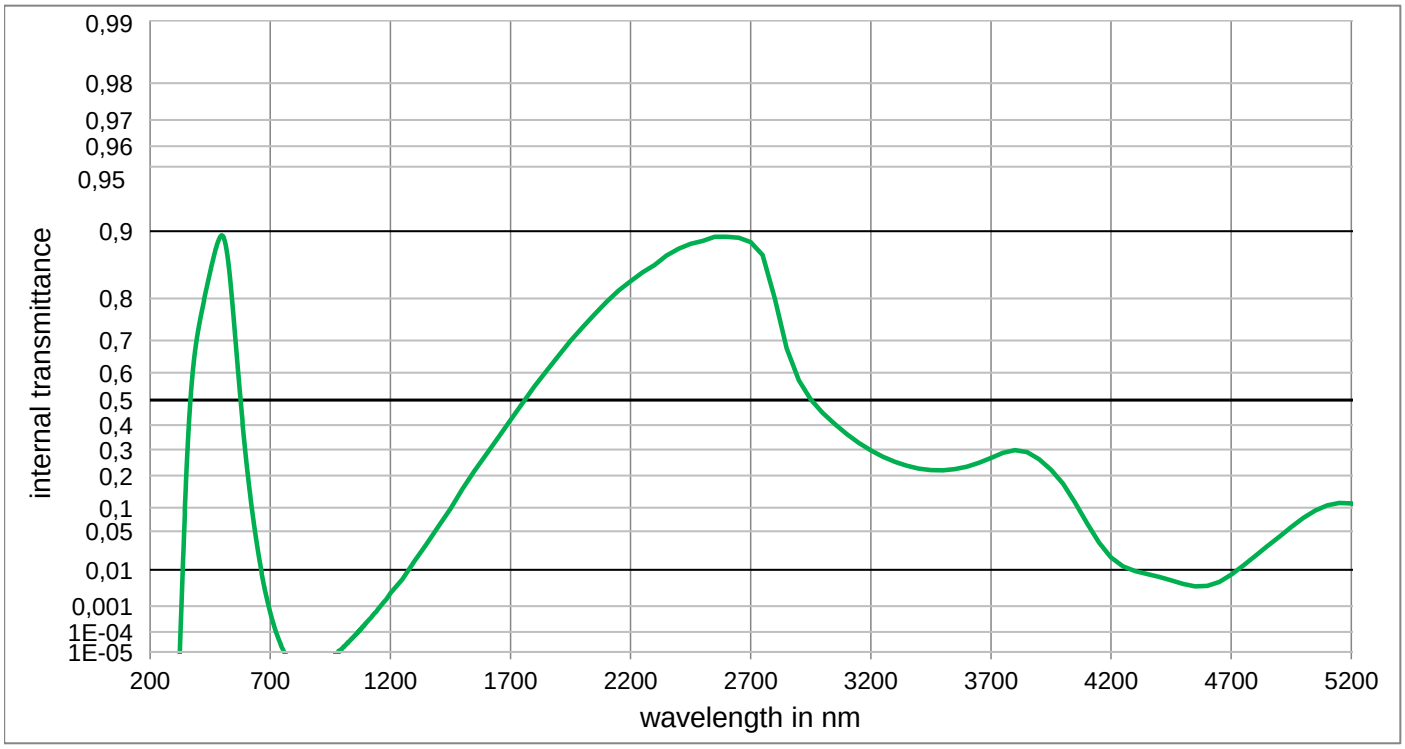
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
lambda_50%(d=0.21mm) = 634 nm
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG66HS



Internal transmittance ti 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	< 1,000E-05	500	8,950E-01	800	< 1,000E-05	1100	2,451E-04	2200	8,318E-01	3700	2,668E-01
210	< 1,000E-05	510	8,901E-01	810	< 1,000E-05	1110	3,149E-04	2250	8,467E-01	3750	2,868E-01
220	< 1,000E-05	520	8,752E-01	820	< 1,000E-05	1120	3,900E-04	2300	8,577E-01	3800	2,981E-01
230	< 1,000E-05	530	8,479E-01	830	< 1,000E-05	1130	5,114E-04	2350	8,709E-01	3850	2,898E-01
240	< 1,000E-05	540	8,039E-01	840	< 1,000E-05	1140	6,304E-04	2400	8,798E-01	3900	2,617E-01
250	< 1,000E-05	550	7,414E-01	850	< 1,000E-05	1150	8,148E-04	2450	8,858E-01	3950	2,215E-01
260	< 1,000E-05	560	6,603E-01	860	< 1,000E-05	1160	1,017E-03	2500	8,891E-01	4000	1,714E-01
270	< 1,000E-05	570	5,644E-01	870	< 1,000E-05	1170	1,283E-03	2550	8,938E-01	4050	1,138E-01
280	< 1,000E-05	580	4,600E-01	880	< 1,000E-05	1180	1,561E-03	2600	8,939E-01	4100	6,435E-02
290	< 1,000E-05	590	3,557E-01	890	< 1,000E-05	1190	1,978E-03	2650	8,927E-01	4150	3,347E-02
300	< 1,000E-05	600	2,598E-01	900	< 1,000E-05	1200	2,514E-03	2700	8,877E-01	4200	1,817E-02
310	< 1,000E-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

Data Sheet

BG67

Optical properties			
Reflection factor			
	P_d	=	0,913
Spectral values guaranteed			
τ_i (450 nm)		≥	0,7
τ_i (500 nm)		≥	0,8
τ_i (550 nm)		≥	0,65
τ_i (600 nm)		≤	0,19
Refractive indices			
n_F (486 nm)		=	1,547
n_e (546 nm)		=	1,543
n_d (587,6 nm)		=	1,541
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 µm²
C_2			1,9422E-02 µm²
C_3			100,000 µm²
Internal quality			
Bubble class			2

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,85 g/cm³
Knoop hardness			
	HK[0.1/20]	=	364

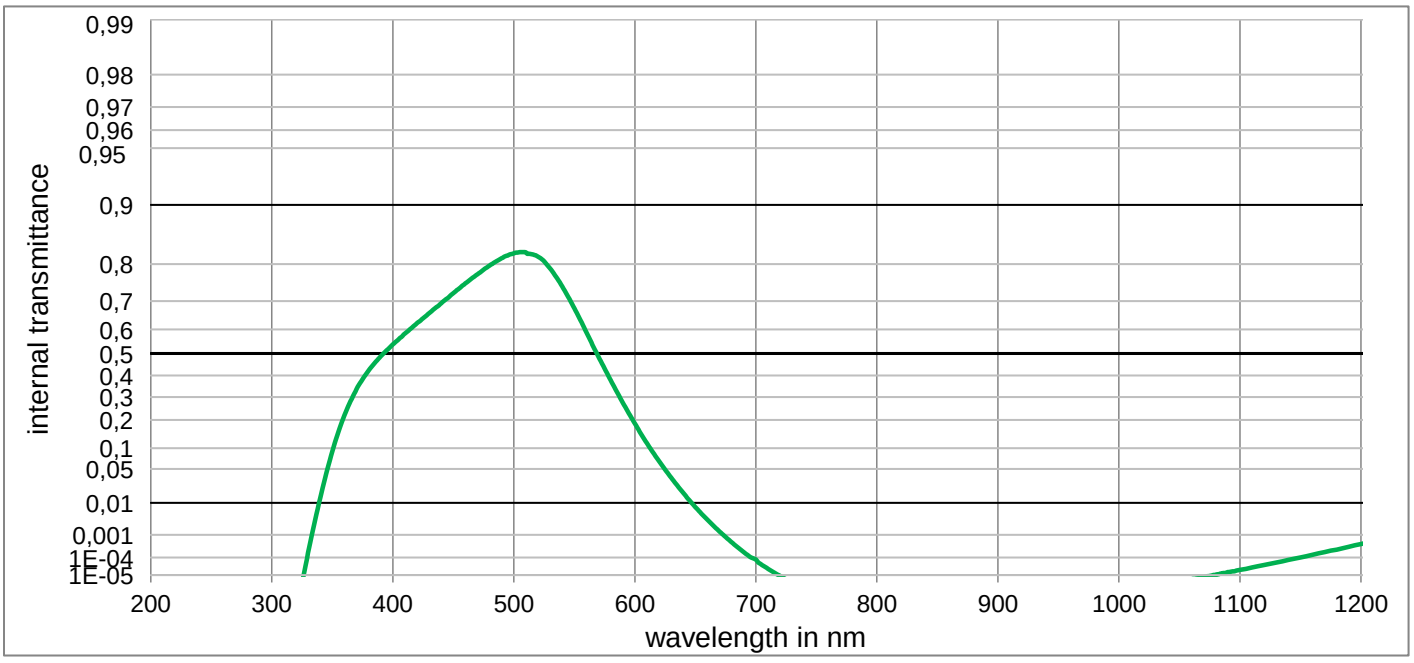
Thermal properties			
Transformation temperature			
	Tg	=	390 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	11,8
	$\alpha_{(20°C/300°C)}$	=	13,7

Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	52.3
	AR class	=	3.3
Resistance against humidity			
Robust glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric 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

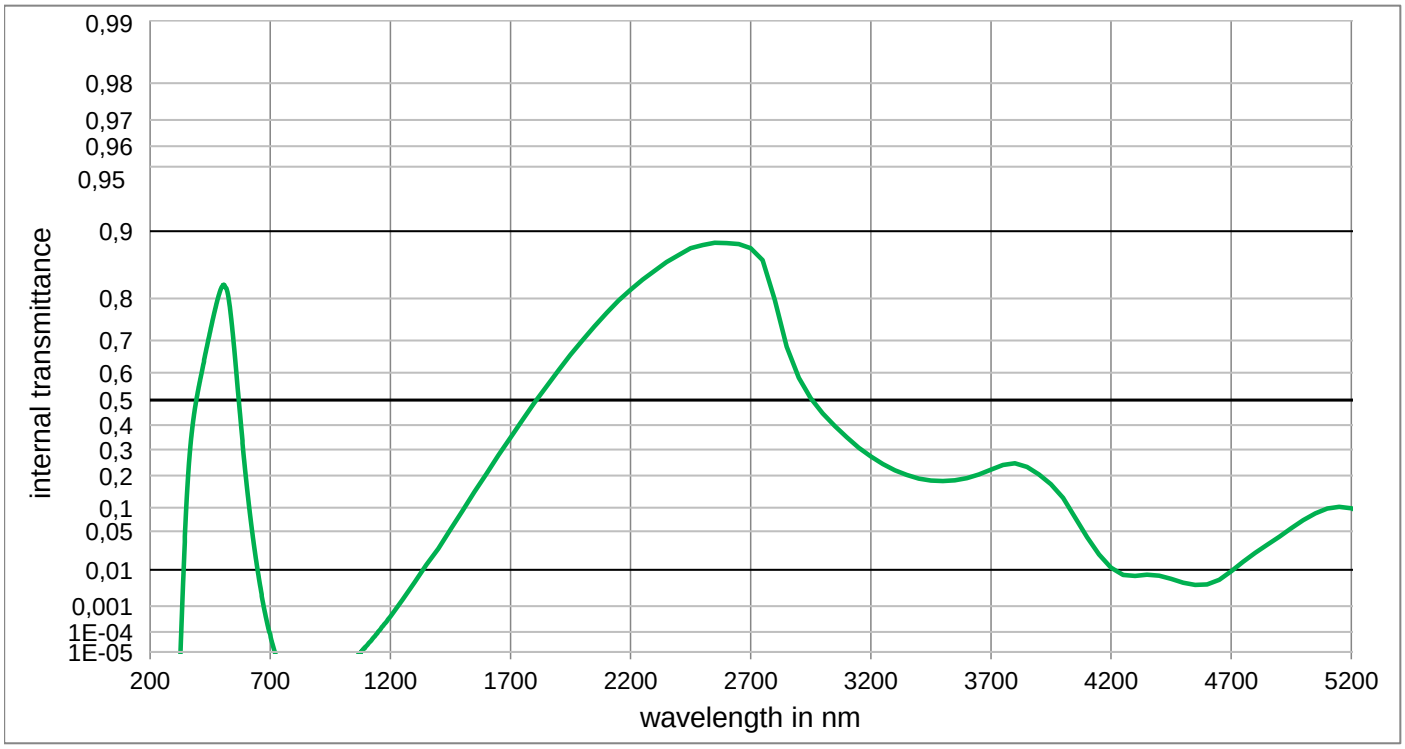
Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
lambda_50%(d=0.145mm) @ 641 nm
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

BG67



Internal transmittance ti 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	< 1,000E-05	500	8,231E-01	800	< 1,000E-05	1100	2,071E-05	2200	8,164E-01	3700	2,218E-01
210	< 1,000E-05	510	8,251E-01	810	< 1,000E-05	1110	2,923E-05	2250	8,345E-01	3750	2,392E-01
220	< 1,000E-05	520	8,162E-01	820	< 1,000E-05	1120	3,952E-05	2300	8,488E-01	3800	2,455E-01
230	< 1,000E-05	530	7,899E-01	830	< 1,000E-05	1130	5,505E-05	2350	8,619E-01	3850	2,318E-01
240	< 1,000E-05	540	7,437E-01	840	< 1,000E-05	1140	7,511E-05	2400	8,717E-01	3900	2,036E-01
250	< 1,000E-05	550	6,764E-01	850	< 1,000E-05	1150	1,020E-04	2450	8,803E-01	3950	1,699E-01
260	< 1,000E-05	560	5,876E-01	860	< 1,000E-05	1160	1,362E-04	2500	8,844E-01	4000	1,268E-01
270	< 1,000E-05	570	4,859E-01	870	< 1,000E-05	1170	1,856E-04	2550	8,871E-01	4050	7,709E-02
280	< 1,000E-05	580	3,787E-01	880	< 1,000E-05	1180	2,399E-04	2600	8,867E-01	4100	4,066E-02
290	< 1,000E-05	590	2,747E-01	890	< 1,000E-05	1190	3,271E-04	2650	8,855E-01	4150	2,051E-02
300	< 1,000E-05	600	1,851E-01	900	< 1,000E-05	1200	4,258E-04	2700	8,805E-01	4200	1,109E-02
310	< 1,000E-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

Data Sheet

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)		=	1,547
n_e (546 nm)		=	1,543
n_d (587,6 nm)		=	1,541
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 µm²		
C_2	1,9422E-02 µm²		
C_3	100,000 µm²		
Internal quality			
Bubble class	2		

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,85 g/cm³
Knoop hardness			
	HK[0.1/20]	=	364

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

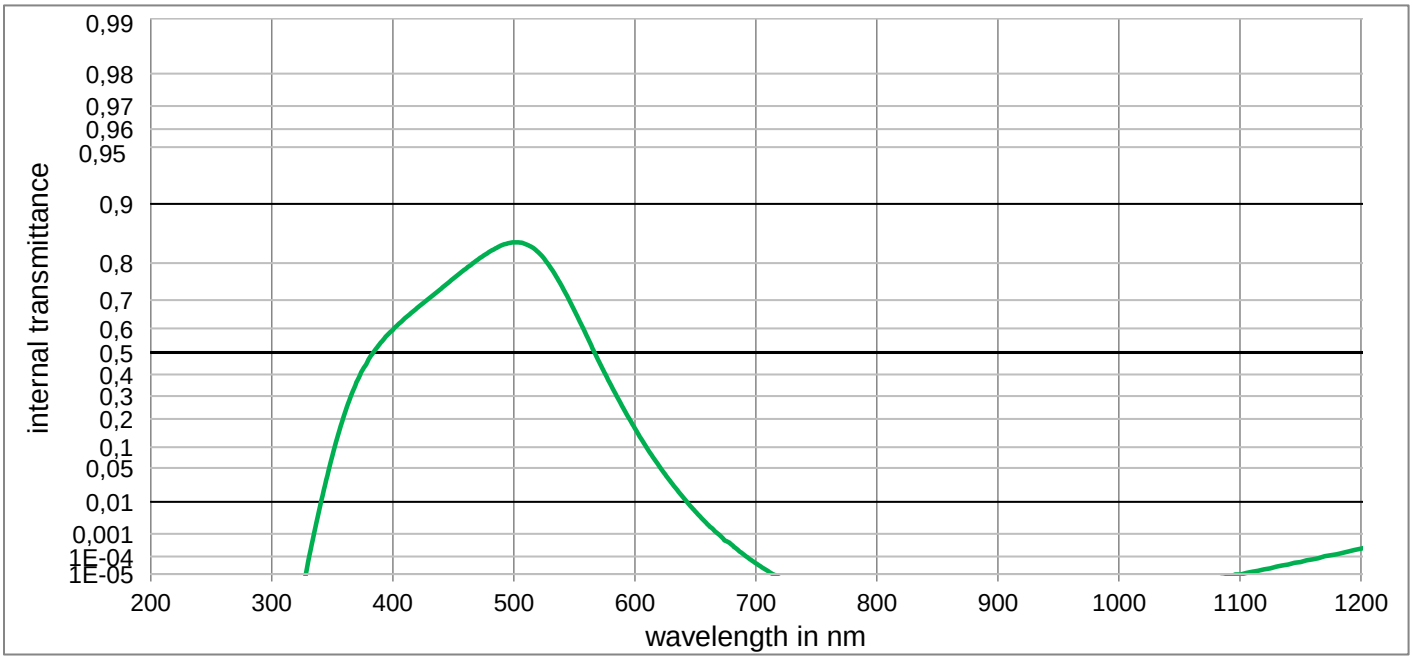
Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	52.3
	AR class	=	3.3
Resistance against humidity			

Colormetric 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 / Shortpass filter
NIR cutoff filter
lambda_50%(d=0.11mm) @ 634 nm
ISO 23364:2021

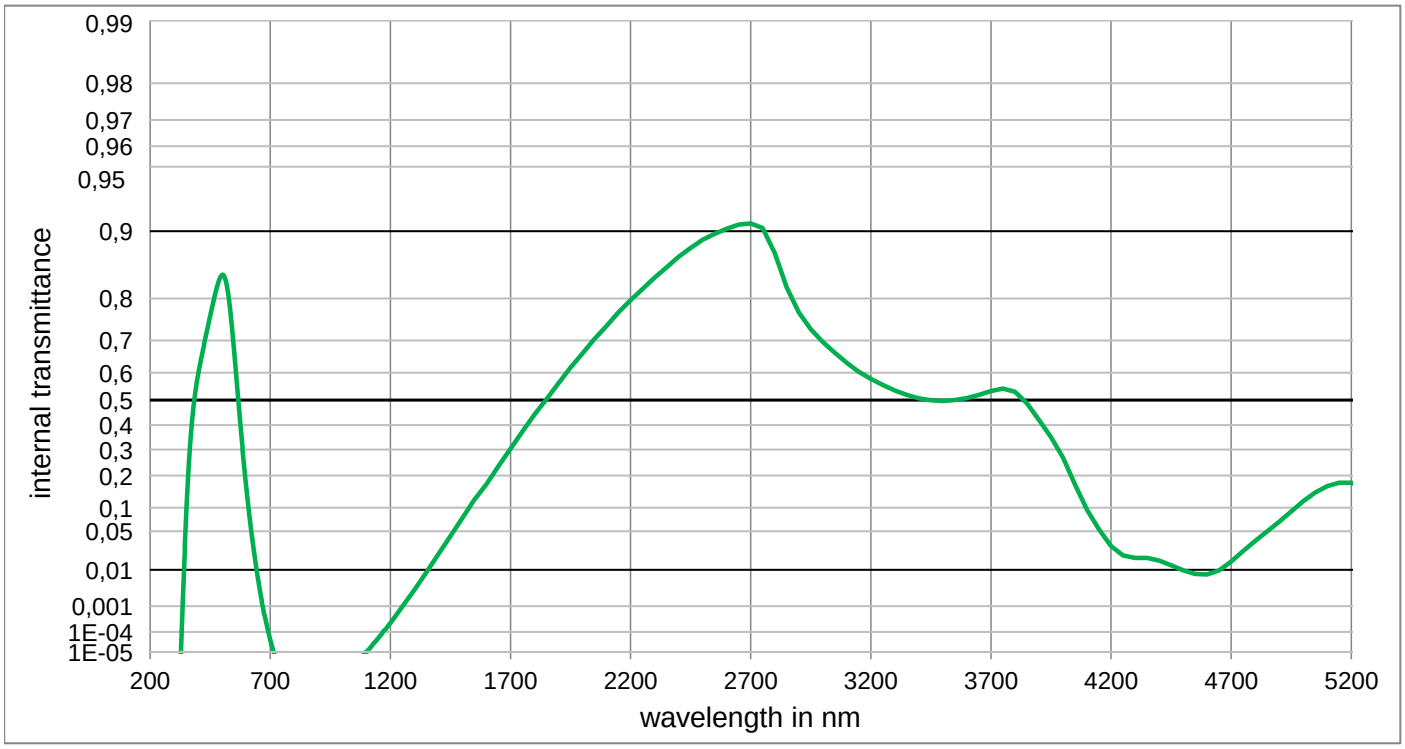
Disclaimer

All data without tolerances are to be understood to be reference values.



Data Sheet

BG67HT



Internal transmittance ti 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	< 1,000E-05	500	8,425E-01	800	< 1,000E-05	1100	< 1,000E-05	2200	7,964E-01	3700	5,342E-01
210	< 1,000E-05	510	8,389E-01	810	< 1,000E-05	1110	1,392E-05	2250	8,185E-01	3750	5,437E-01
220	< 1,000E-05	520	8,236E-01	820	< 1,000E-05	1120	1,999E-05	2300	8,379E-01	3800	5,316E-01
230	< 1,000E-05	530	7,914E-01	830	< 1,000E-05	1130	2,837E-05	2350	8,541E-01	3850	4,866E-01
240	< 1,000E-05	540	7,393E-01	840	< 1,000E-05	1140	3,755E-05	2400	8,694E-01	3900	4,207E-01
250	< 1,000E-05	550	6,655E-01	850	< 1,000E-05	1150	5,176E-05	2450	8,808E-01	3950	3,509E-01
260	< 1,000E-05	560	5,721E-01	860	< 1,000E-05	1160	7,067E-05	2500	8,905E-01	4000	2,676E-01
270	< 1,000E-05	570	4,641E-01	870	< 1,000E-05	1170	1,026E-04	2550	8,973E-01	4050	1,689E-01
280	< 1,000E-05	580	3,534E-01	880	< 1,000E-05	1180	1,293E-04	2600	9,027E-01	4100	9,411E-02
290	< 1,000E-05	590	2,493E-01	890	< 1,000E-05	1190	1,808E-04	2650	9,067E-01	4150	5,303E-02
300	< 1,000E-05	600	1,627E-01	900	< 1,000E-05	1200	2,372E-04	2700	9,079E-01	4200	2,924E-02
310	< 1,000E-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

Data Sheet

S8022

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_e	(546 nm)	= 1,56
n_d	(587,6 nm)	= 1,555 ± 0,005

Sellmeier coefficients

valid from 440 nm to 1550 nm

B_1	1,0783
B_2	0,3094
B_3	36,9992
C_1	5,301E-09 µm²
C_2	3,8950E-02 µm²
C_3	5395,591 µm²

Internal quality

Bubble class 1

Mechanical properties

Reference thickness

d = 2 mm

Density

ρ = 2,77 g/cm³

Knoop hardness

HK[0.1/20]

Thermal properties

Transformation temperature

Tg = 453 °C

Thermal expansion in 10^{-6}/K

$\alpha_{(-30°C/+70°C)}$	= 7,8
$\alpha_{(20°C/300°C)}$	= 8,9
$\alpha_{(20°C/200°C)}$	

Chemical properties

Chemical resistance

FR class = 0

SR class = 4

AR class = 3

Resistance against humidity

Delicate glass

see pocket catalogue "Optical Filter Glass 2024", chapter 5.5

Colormetric 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

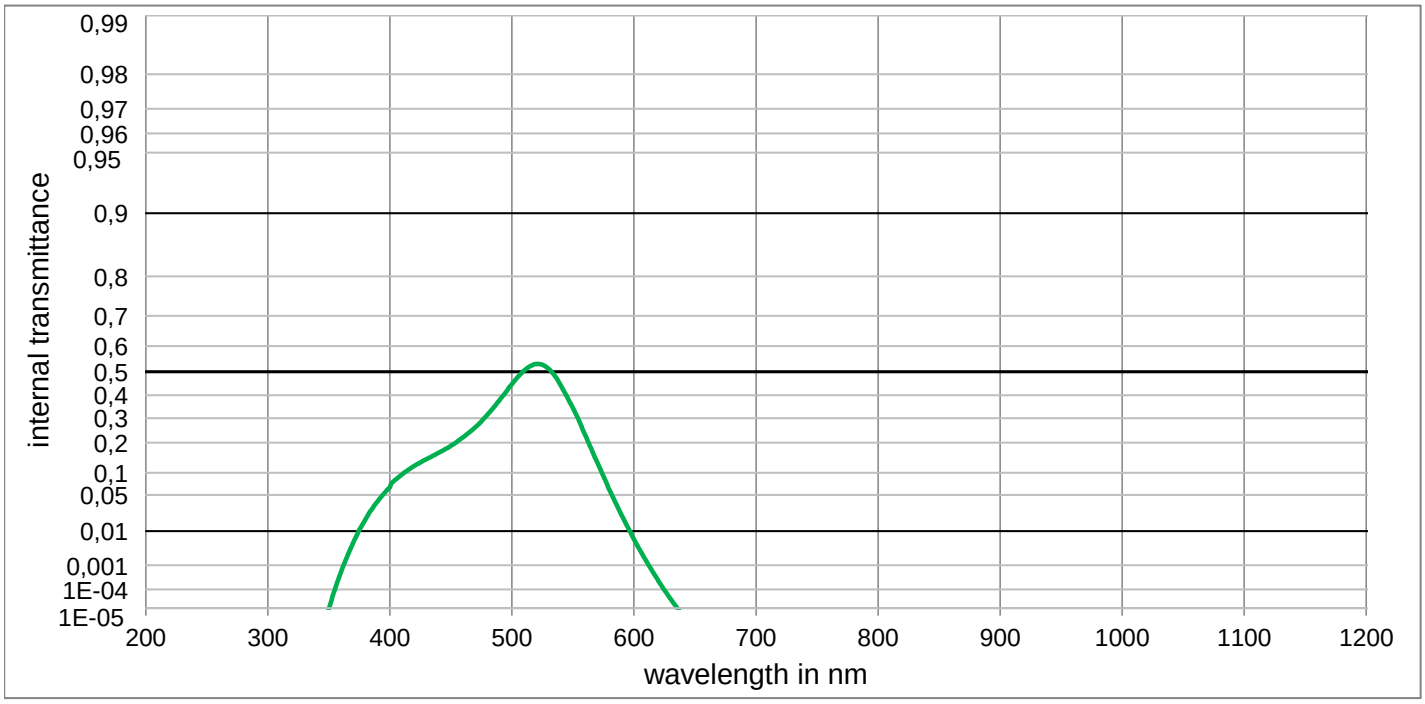
NIR cutoff filter

NVIS-Green A - 2 mm bandpass filter according to MIL-STD-3009

ISO 23364:2021

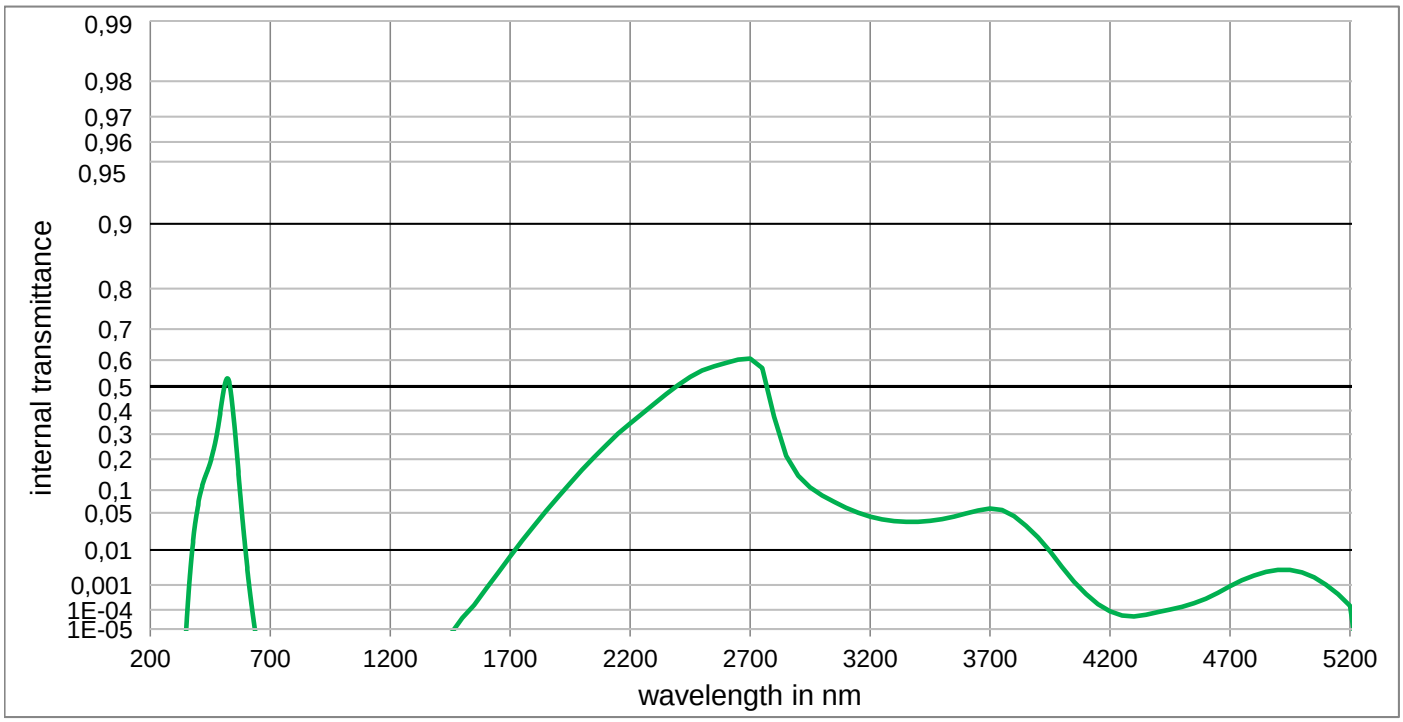
Disclaimer

All data without tolerances are to be understood to be reference values.



Data Sheet

S8022



Internal transmittance ti at reference thickness

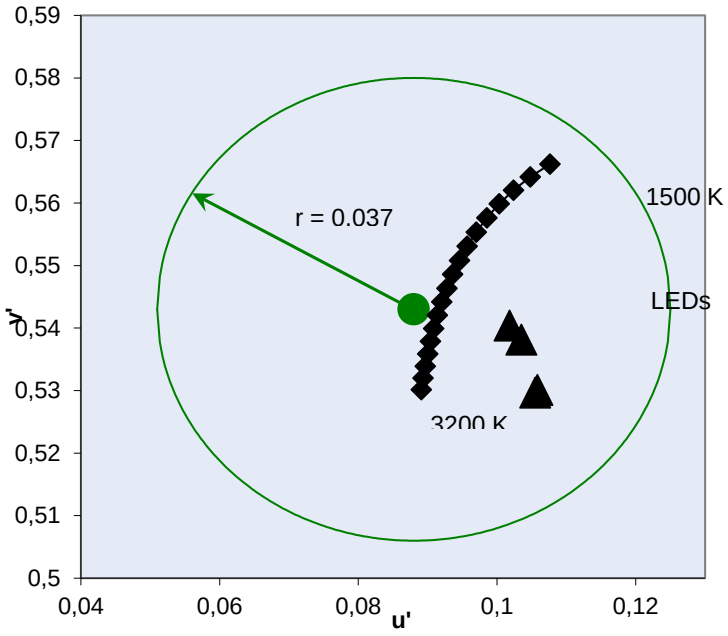
The internal transmittance values, tabulated and graphically represented, are reference values only

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	3,430E-01	850	< 1,000E-05	1150	< 1,000E-05	2450	5,380E-01	3950	9,286E-03
260	< 1,0E-05	560	2,302E-01	860	< 1,000E-05	1160	< 1,000E-05	2500	5,617E-01	4000	3,658E-03
270	< 1,0E-05	570	1,295E-01	870	< 1,000E-05	1170	< 1,000E-05	2550	5,775E-01	4050	1,282E-03
280	< 1,0E-05	580	5,934E-02	880	< 1,000E-05	1180	< 1,000E-05	2600	5,903E-01	4100	4,598E-04
290	< 1,0E-05	590	2,168E-02	890	< 1,000E-05	1190	< 1,000E-05	2650	6,017E-01	4150	1,798E-04
300	< 1,0E-05	600	6,305E-03	900	< 1,000E-05	1200	< 1,000E-05	2700	6,055E-01	4200	8,400E-05
310	< 1,0E-05	610	1,407E-03	910	< 1,000E-05	1250	< 1,000E-05	2750	5,709E-01	4250	5,361E-05
320	< 1,000E-05	620	2,455E-04	920	< 1,000E-05	1300	< 1,000E-05	2800	3,741E-01	4300	4,785E-05
330	< 1,000E-05	630	3,322E-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	3,995E-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

Data Sheet

S8022

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 coodinates (as defined by MIL-STD-3009)

u' = 0.088

v' = 0.543

with radius of tolerance r = 0.037

Data Sheet

S8023

Optical properties

Reflection factor

P_d = 0,913

Values guaranteed

The color of the glass is within a circle of the CIE Y u' 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	15 ±1.5
1500 K	10 ±1.5

Refractive indices

n_e	(546 nm) =	1,54
n_d	(587,6 nm) =	1,541 ± 0,005

Sellmeier coefficients

valid from 440 nm to 1550 nm

B_1	0,0304
B_2	1,3342
B_3	381,6503
C_1	1,246E-01 µm²
C_3	32646,623 µm²

Internal quality

Bubble class 1

Mechanical properties

Reference thickness

d = 3 mm

Density

ρ = 2,75 g/cm³

Knoop hardness

HK[0.1/20]

Thermal properties

Transformation temperature

Tg = 444 °C

Thermal expansion in 10^{-6}/K

$\alpha_{(-30°C/+70°C)}$

$\alpha_{(20°C/300°C)}$

$\alpha_{(20°C/200°C)}$ = 9,7

Chemical properties

Chemical resistance

FR class = 0

SR class = 4

AR class = 3

Resistance against humidity

Delicate glass

see pocket catalogue "Optical Filter Glass 2024", chapter 5.5

Colormetric 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
	P_e	0,388	0,496	0,544
Illuminant A	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

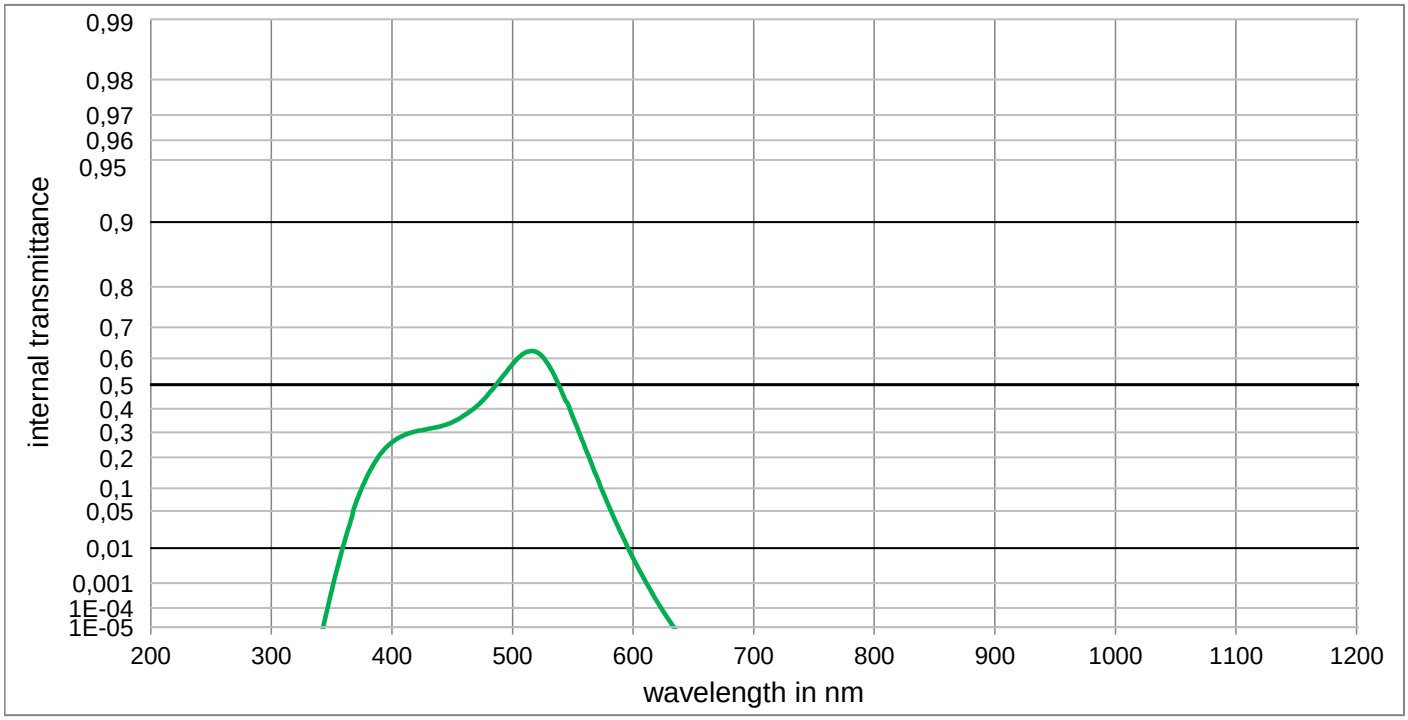
NIR cutoff filter

NVIS-Green A - 3 mm bandpass filter according to MIL-STD-3009

ISO 23364:2021

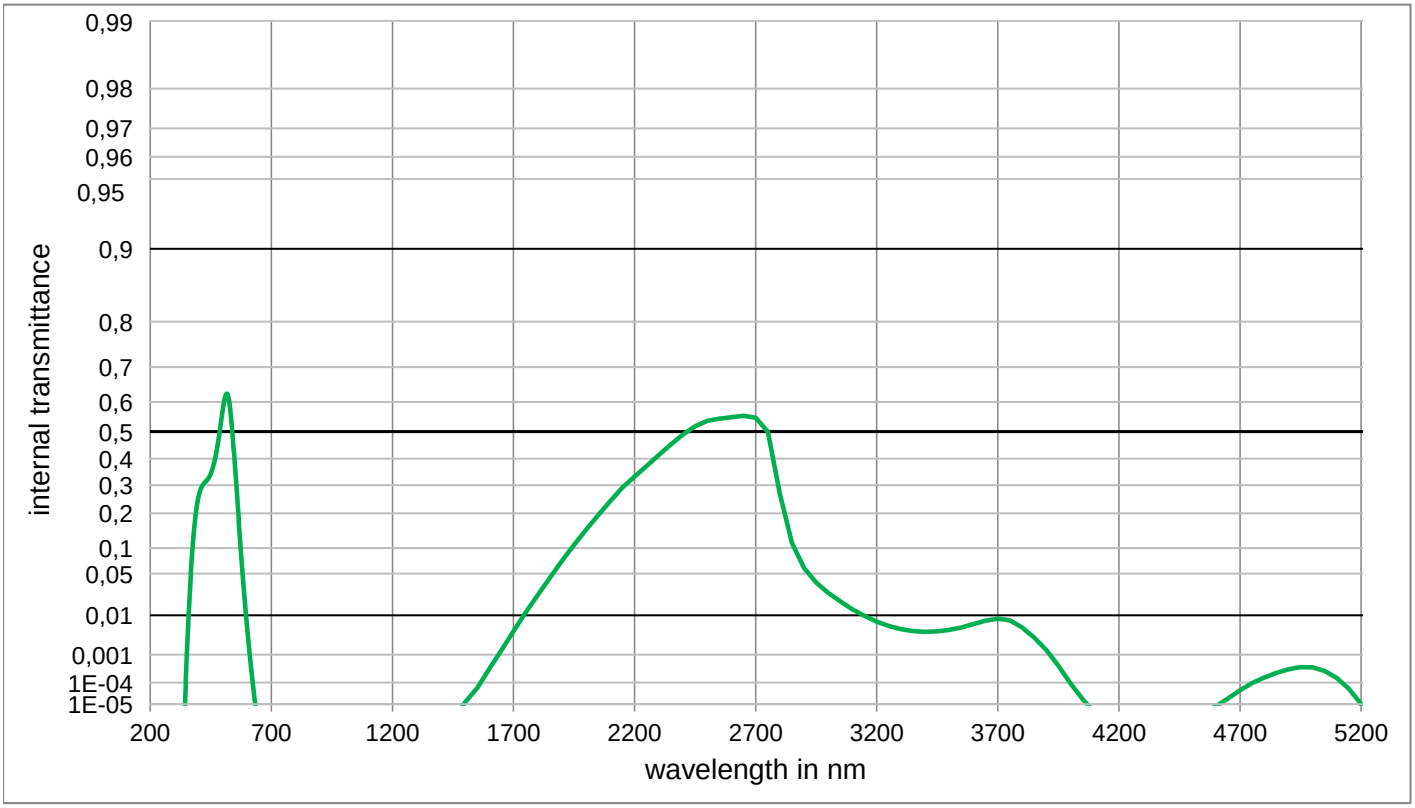
Disclaimer

All data without tolerances are to be understood to be reference values.



Data Sheet

S8023



Internal transmittance ti at reference thickness

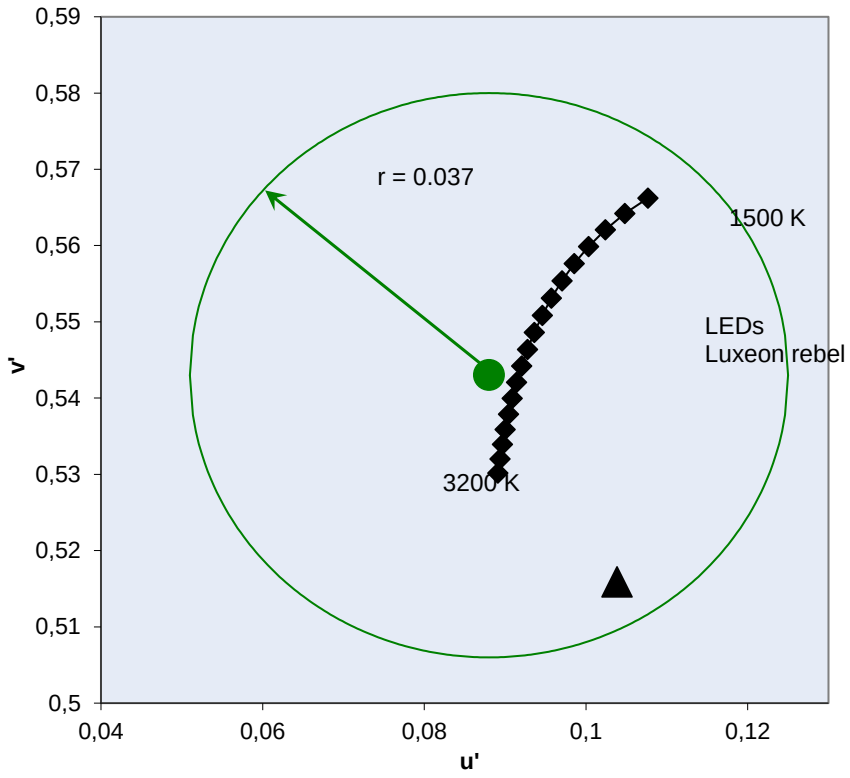
The internal transmittance values, tabulated and graphically represented, are reference values only

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	3,646E-01	850	< 1,000E-05	1150	< 1,000E-05	2450	5,187E-01	3950	4,345E-04
260	< 1,0E-05	560	2,394E-01	860	< 1,000E-05	1160	< 1,000E-05	2500	5,374E-01	4000	9,178E-05
270	< 1,0E-05	570	1,317E-01	870	< 1,000E-05	1170	< 1,000E-05	2550	5,451E-01	4050	1,790E-05
280	< 1,0E-05	580	5,863E-02	880	< 1,000E-05	1180	< 1,000E-05	2600	5,502E-01	4100	< 1,000E-05
290	< 1,0E-05	590	2,067E-02	890	< 1,000E-05	1190	< 1,000E-05	2650	5,547E-01	4150	< 1,000E-05
300	< 1,0E-05	600	5,710E-03	900	< 1,000E-05	1200	< 1,000E-05	2700	5,481E-01	4200	< 1,000E-05
310	< 1,0E-05	610	1,196E-03	910	< 1,000E-05	1250	< 1,000E-05	2750	4,994E-01	4250	< 1,000E-05
320	< 1,000E-05	620	1,920E-04	920	< 1,000E-05	1300	< 1,000E-05	2800	2,689E-01	4300	< 1,000E-05
330	< 1,000E-05	630	2,354E-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	1,239E-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

Data Sheet

S8023

Chromaticity dependence on Incandescent Color Temperature



Chromaticity and NVIS Radiance at reference thickness 3 mm							NVIS Green A
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	**NVIS Green A Chromaticity coodinates**
1700	0,098	0,555	0,237	0,598	12,2	5,1E-11	**(as defined by MIL-STD-3009)**
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	**u' = 0.088**
2000	0,094	0,545	0,219	0,566	14,6	4,7E-11	**v' = 0.543**
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	**with radius of tolerance r = 0.037**
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						

Data Sheet

S8612

Optical properties			
Reflection factor			
P_d	=	0,913	
Spectral values guaranteed			
τ_i (500 nm)	≥	0,96	
τ_i (600 nm)	≥	0,48	
τ_i (700 nm)	<	0,02	
λ ($\tau_{i, max}$) [nm]	=	500 ± 5	
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	µm²
C_2		1,0187E-02	µm²
C_3		134,146	µm²
Internal quality			
Bubble class		1	

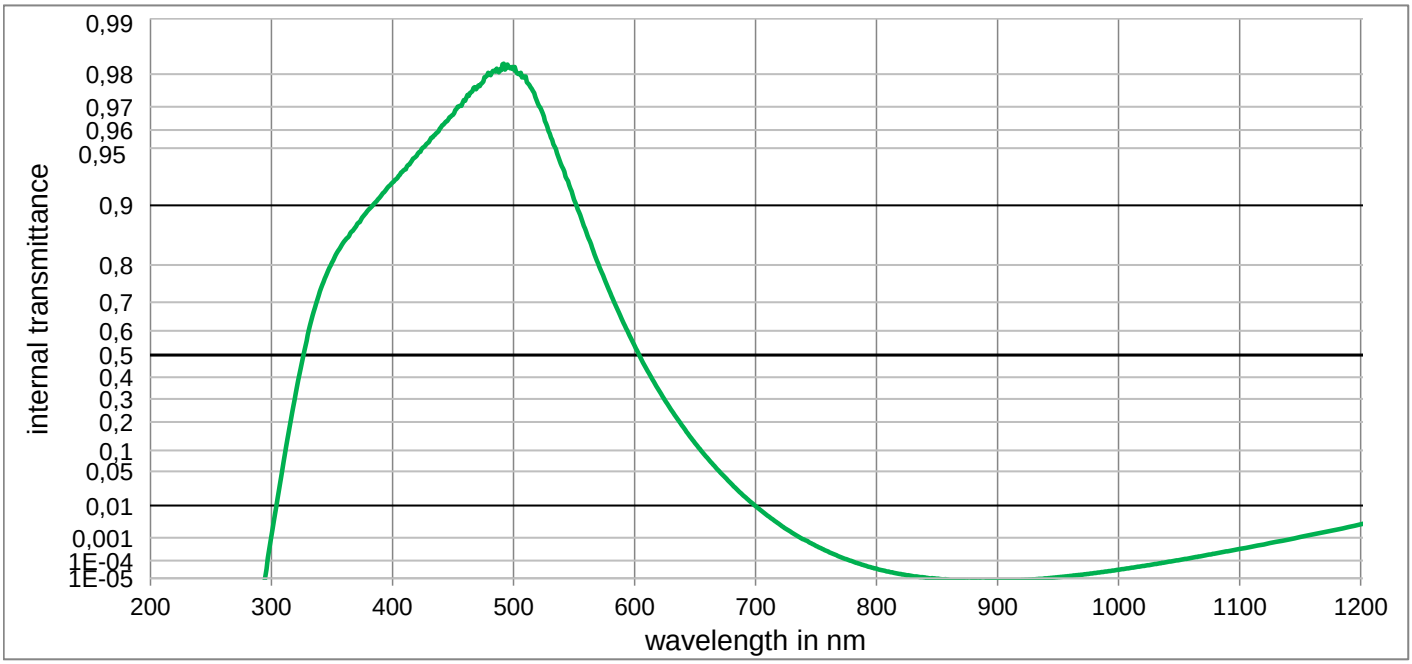
Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,66 g/cm³
Knoop hardness		
HK[0.1/20]	=	470

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

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	3
AR class	=	3
Resistance against humidity		
Delicate glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

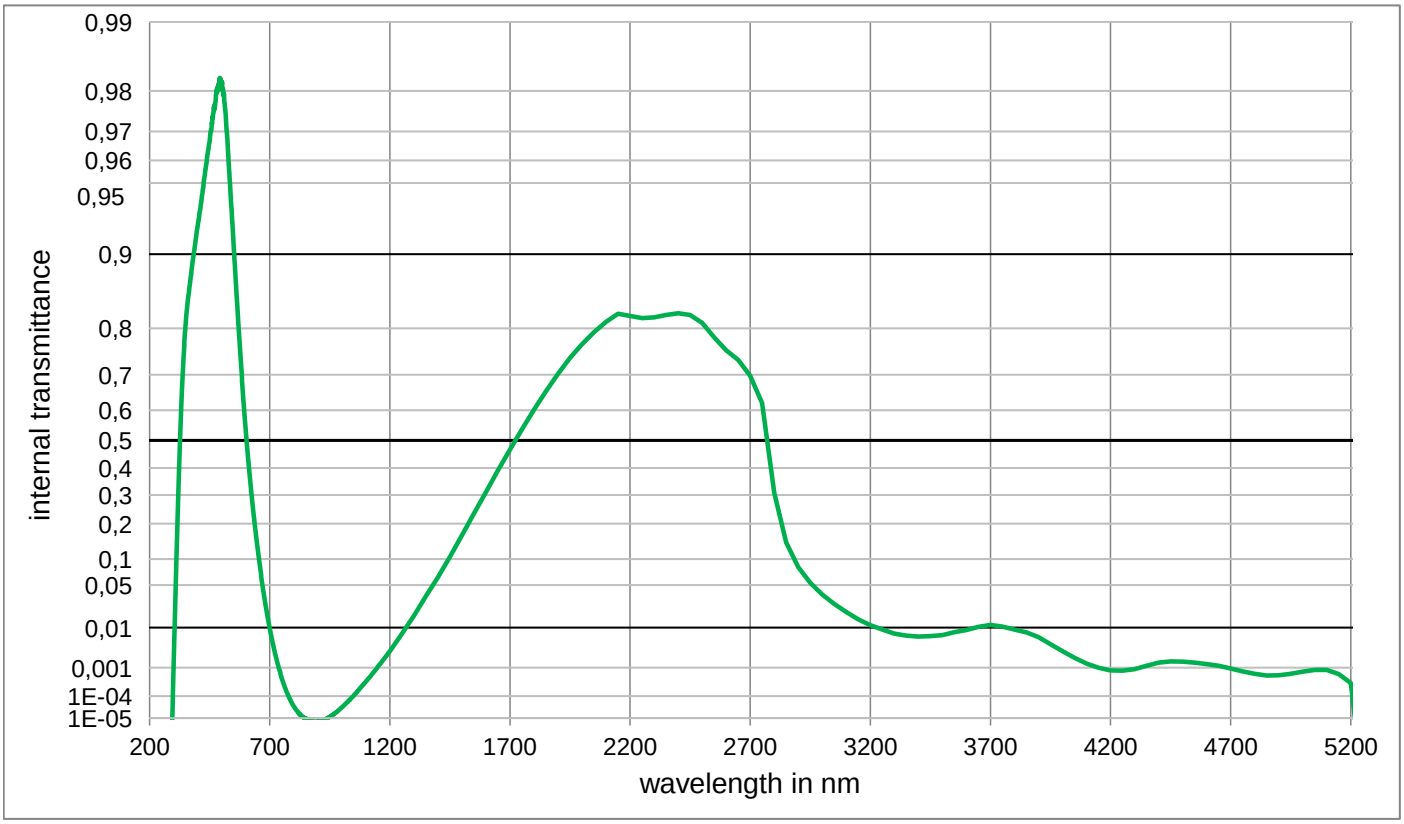
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,251	0,218	0,198
	y	0,321	0,311	0,302
	Y	72,1	61,5	54,4
	λ_d	490 nm	489 nm	489 nm
	P_e	0,232	0,358	0,438
Illuminant A	x	0,356	0,301	0,265
	y	0,433	0,440	0,440
	Y	64,6	51,8	43,9
	λ_d	500 nm	499 nm	498 nm
	P_e	0,208	0,335	0,421

Notes
Ionically colored glass
Bandpass filter / Shortpass filter
NIR cutoff filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

S8612



Internal transmittance ti 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

Data Sheet

VG9

Optical properties			
Reflection factor			
	P_d	=	0,911
Spectral values guaranteed			
τ_i (450 nm)		≤	0,21
τ_i (514 nm)		≥	0,67
τ_i (633 nm)		≤	0,15
τ_i (725 nm)		≤	0,07
τ_i (1060 nm)		≤	0,18
Refractive indices			
n_F (486 nm)		=	1,558
n_e (546 nm)		=	1,552
n_d (587,6 nm)		=	1,549
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1			0,3483
B_2			1,0034
B_3			34,8247
C_1			1,326E-02 µm²
C_2			1,2265E-02 µm²
C_3			5797,735 µm²
Internal quality			
Bubble class			1

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,87 g/cm³
Knoop hardness			
	HK[0.1/20]	=	449

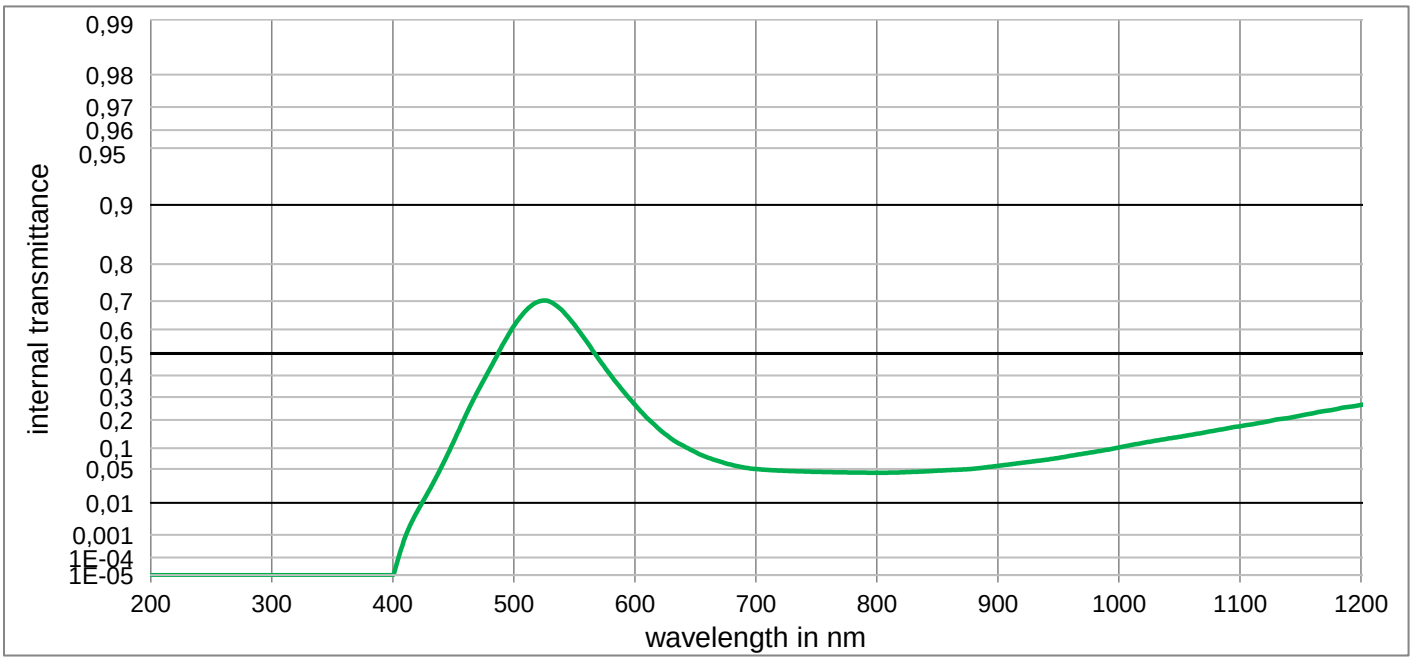
Thermal properties			
Transformation temperature			
	Tg	=	451 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	9,2
	$\alpha_{(20°C/300°C)}$	=	10,6

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	1
	AR class	=	1
Resistance against humidity			
Robust glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric 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

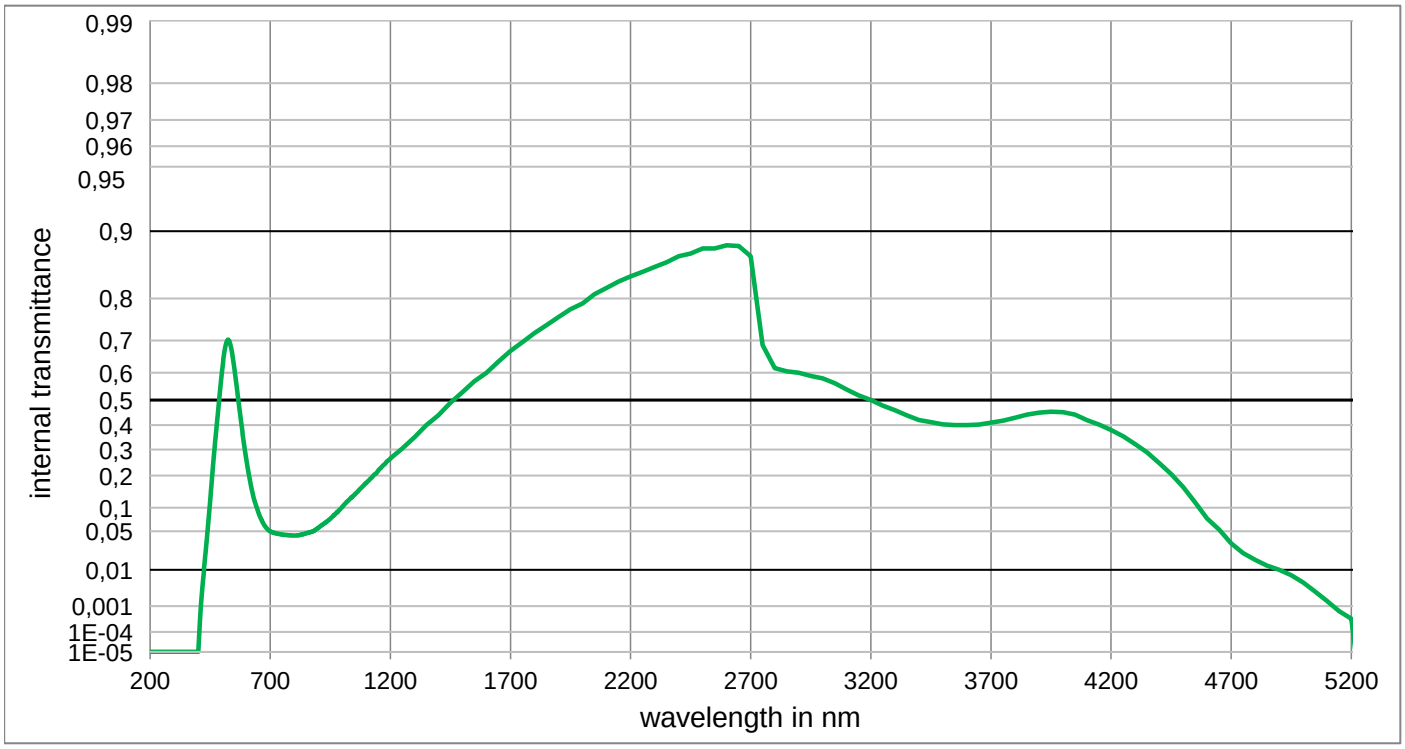
Notes
Ionically colored glass
Bandpass filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

VG9



Internal transmittance ti 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	< 1,000E-05	500	6,130E-01	800	4,315E-02	1100	1,745E-01	2200	8,400E-01	3700	4,100E-01
210	< 1,000E-05	510	6,690E-01	810	4,327E-02	1110	1,824E-01	2250	8,472E-01	3750	4,175E-01
220	< 1,000E-05	520	6,980E-01	820	4,381E-02	1120	1,907E-01	2300	8,548E-01	3800	4,300E-01
230	< 1,000E-05	530	6,980E-01	830	4,462E-02	1130	2,013E-01	2350	8,614E-01	3850	4,420E-01
240	< 1,000E-05	540	6,690E-01	840	4,547E-02	1140	2,079E-01	2400	8,700E-01	3900	4,500E-01
250	< 1,000E-05	550	6,180E-01	850	4,674E-02	1150	2,184E-01	2450	8,736E-01	3950	4,542E-01
260	< 1,000E-05	560	5,520E-01	860	4,781E-02	1160	2,273E-01	2500	8,800E-01	4000	4,524E-01
270	< 1,000E-05	570	4,770E-01	870	4,890E-02	1170	2,372E-01	2550	8,800E-01	4050	4,429E-01
280	< 1,000E-05	580	4,010E-01	880	5,036E-02	1180	2,460E-01	2600	8,840E-01	4100	4,200E-01
290	< 1,000E-05	590	3,300E-01	890	5,300E-02	1190	2,562E-01	2650	8,830E-01	4150	4,015E-01
300	< 1,000E-05	600	2,650E-01	900	5,608E-02	1200	2,644E-01	2700	8,700E-01	4200	3,800E-01
310	< 1,000E-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

Data Sheet

VG20

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)		=	1,547
n_e (546 nm)		=	1,543
n_d (587,6 nm)		=	1,541
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 µm²		
C_2	1,9422E-02 µm²		
C_3	100,000 µm²		
Internal quality			
Bubble class	2		

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,85 g/cm³
Knoop hardness			
	HK[0.1/20]	=	364

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

Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	52.3
	AR class	=	3.3
Resistance against humidity			
Robust glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric 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=0.3mm) @ 604 nm
ISO 23364:2021

Disclaimer
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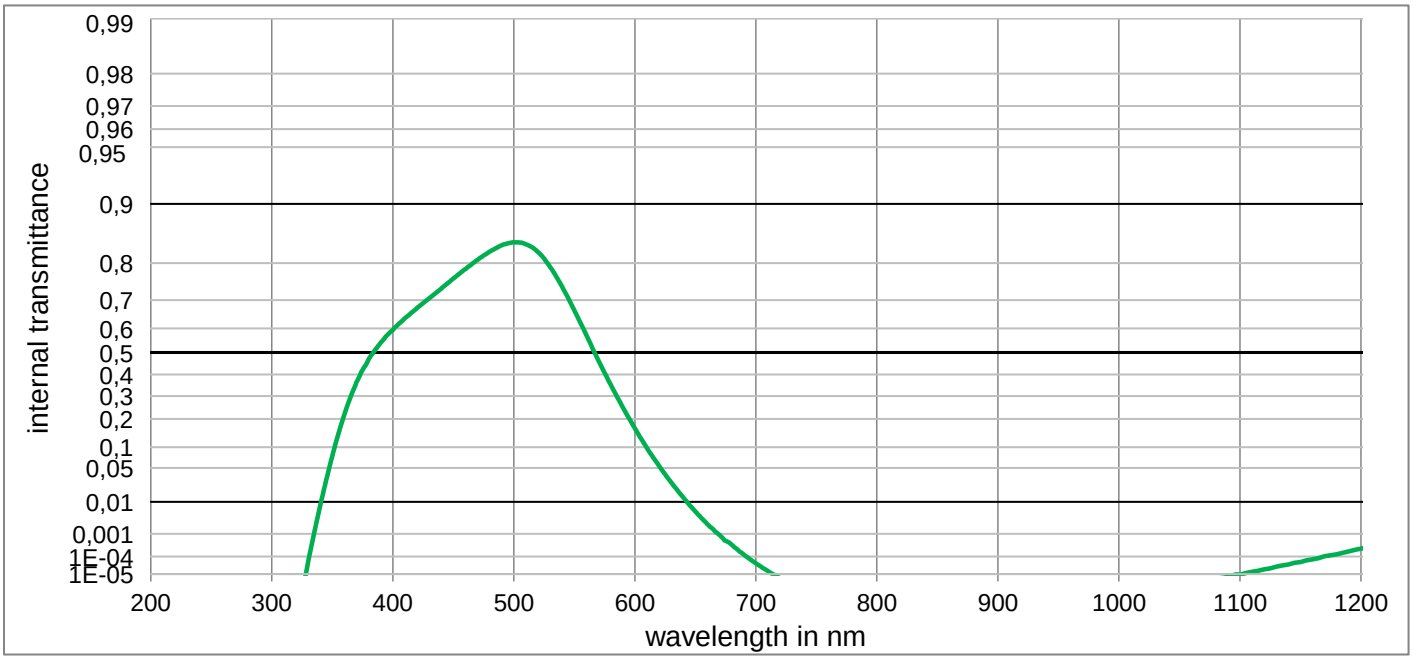
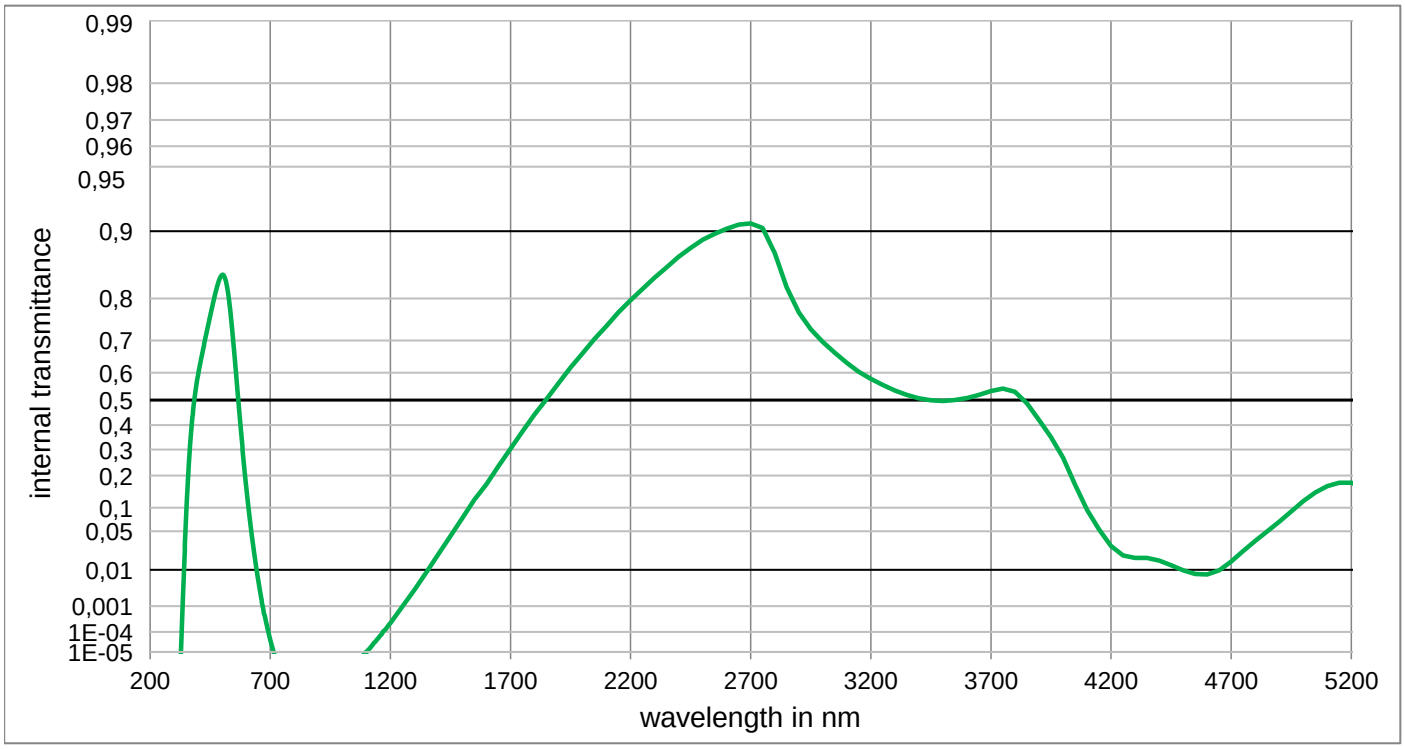


Data Sheet

VG20



Internal transmittance ti 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	< 1,000E-05	500	8,425E-01	800	< 1,000E-05	1100	< 1,000E-05	2200	7,964E-01	3700	5,342E-01
210	< 1,000E-05	510	8,389E-01	810	< 1,000E-05	1110	1,392E-05	2250	8,185E-01	3750	5,437E-01
220	< 1,000E-05	520	8,236E-01	820	< 1,000E-05	1120	1,999E-05	2300	8,379E-01	3800	5,316E-01
230	< 1,000E-05	530	7,914E-01	830	< 1,000E-05	1130	2,837E-05	2350	8,541E-01	3850	4,866E-01
240	< 1,000E-05	540	7,393E-01	840	< 1,000E-05	1140	3,755E-05	2400	8,694E-01	3900	4,207E-01
250	< 1,000E-05	550	6,655E-01	850	< 1,000E-05	1150	5,176E-05	2450	8,808E-01	3950	3,509E-01
260	< 1,000E-05	560	5,721E-01	860	< 1,000E-05	1160	7,067E-05	2500	8,905E-01	4000	2,676E-01
270	< 1,000E-05	570	4,641E-01	870	< 1,000E-05	1170	1,026E-04	2550	8,973E-01	4050	1,689E-01
280	< 1,000E-05	580	3,534E-01	880	< 1,000E-05	1180	1,293E-04	2600	9,027E-01	4100	9,411E-02
290	< 1,000E-05	590	2,493E-01	890	< 1,000E-05	1190	1,808E-04	2650	9,067E-01	4150	5,303E-02
300	< 1,000E-05	600	1,627E-01	900	< 1,000E-05	1200	2,372E-04	2700	9,079E-01	4200	2,924E-02
310	< 1,000E-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

Data Sheet

UG1

Optical properties			
Reflection factor			
	P_d	=	0,913
Spectral values guaranteed			
τ_i (365 nm)		≥	0,8
τ_i (405 nm)		≤	0,1
τ_i (694 nm)		≤	0,06
τ_i (750 nm)		≤	0,53
Refractive indices			
n_F (486 nm)		=	1,548
n_e (546 nm)		=	1,543
n_d (587,6 nm)		=	1,541
Sellmeier coefficients			
valid from 400 nm to 1550 nm			
B_1	0,9475		
B_2	0,3895		
B_3	1,1076		
C_1	9,783E-03 µm²		
C_2	1,1182E-02 µm²		
C_3	147,627 µm²		
Internal quality			
Bubble class	1		

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,77 g/cm³
Knoop hardness			
	HK[0.1/20]	=	482

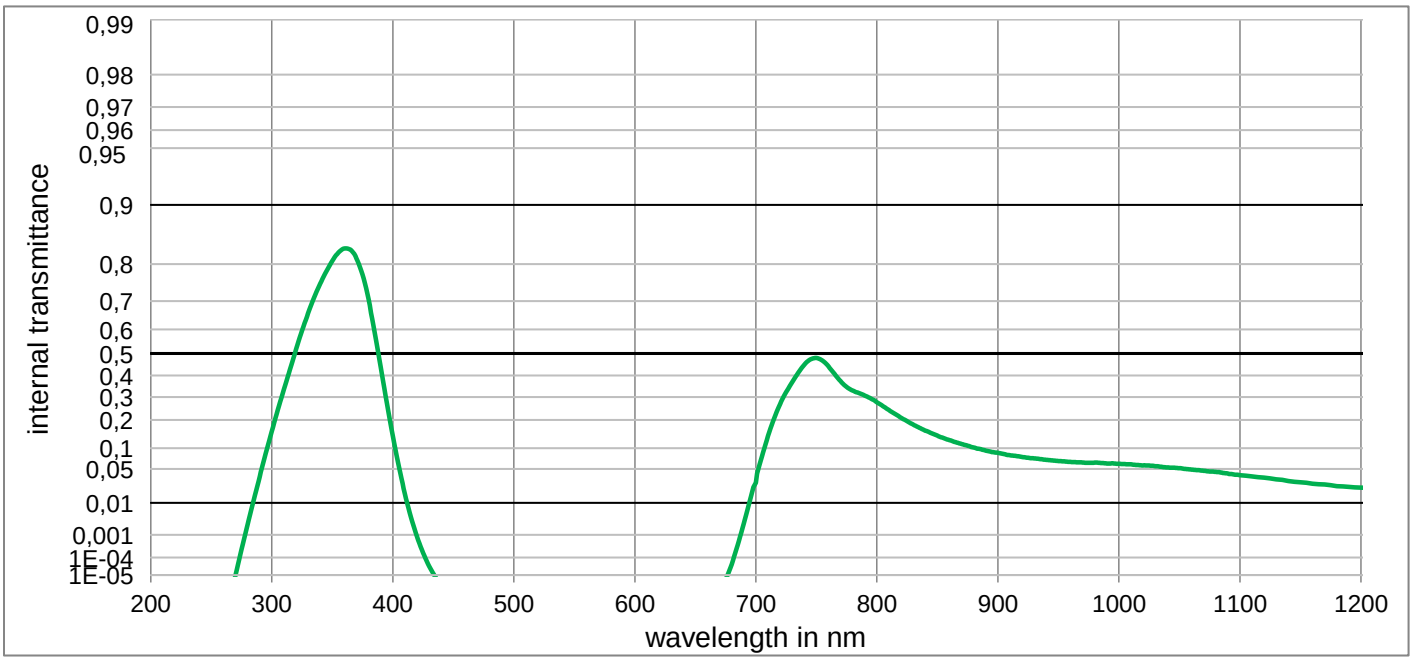
Thermal properties			
Transformation temperature			
	Tg	=	575 °C
Thermal expansion in			10^{-6}/K
$\alpha_{(-30°C/+70°C)}$		=	7,9
$\alpha_{(20°C/300°C)}$		=	8,9

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	1
	AR class	=	1
Resistance against humidity			
Sensitive glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

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			

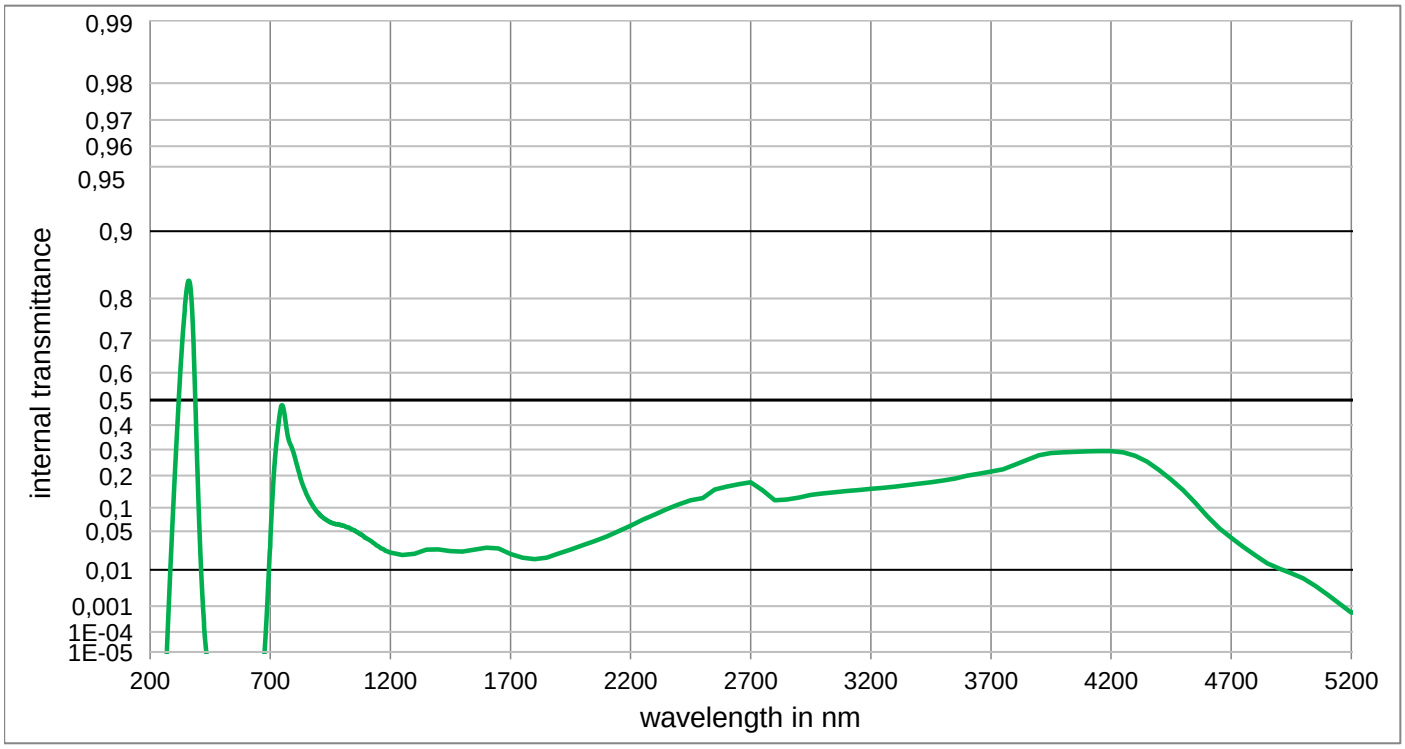
Notes
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Bandpass filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

UG1



Internal transmittance ti 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	< 1,000E-05	500	< 1,000E-05	800	2,769E-01	1100	3,919E-02	2200	5,979E-02	3700	2,146E-01
210	< 1,000E-05	510	< 1,000E-05	810	2,416E-01	1110	3,721E-02	2250	7,156E-02	3750	2,230E-01
220	< 1,000E-05	520	< 1,000E-05	820	2,091E-01	1120	3,533E-02	2300	8,324E-02	3800	2,400E-01
230	< 1,000E-05	530	< 1,000E-05	830	1,812E-01	1130	3,286E-02	2350	9,590E-02	3850	2,592E-01
240	< 1,000E-05	540	< 1,000E-05	840	1,584E-01	1140	3,046E-02	2400	1,083E-01	3900	2,774E-01
250	< 1,000E-05	550	< 1,000E-05	850	1,402E-01	1150	2,892E-02	2450	1,199E-01	3950	2,859E-01
260	< 1,000E-05	560	< 1,000E-05	860	1,250E-01	1160	2,682E-02	2500	1,262E-01	4000	2,887E-01
270	< 1,000E-05	570	< 1,000E-05	870	1,123E-01	1170	2,601E-02	2550	1,524E-01	4050	2,906E-01
280	2,377E-03	580	< 1,000E-05	880	1,019E-01	1180	2,411E-02	2600	1,615E-01	4100	2,925E-01
290	3,691E-02	590	< 1,000E-05	890	9,311E-02	1190	2,337E-02	2650	1,700E-01	4150	2,934E-01
300	1,551E-01	600	< 1,000E-05	900	8,686E-02	1200	2,243E-02	2700	1,762E-01	4200	2,934E-01
310	3,350E-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

Data Sheet

UG2A

Optical properties			
Reflection factor			
	P_d	=	0,918
Spectral values guaranteed			
τ_i (303 nm)		≤	0,07
τ_i (365 nm)		≥	0,81
τ_i (405 nm)		≤	0,1
τ_i (694 nm)		≤	0,04
τ_i (750 nm)		≤	0,52
Refractive indices			
n_F (486 nm)		=	1,529
n_e (546 nm)		=	1,525
n_d (587,6 nm)		=	1,523
Sellmeier coefficients			
valid from 295 nm to 1600 nm			
B_1	0,8819		
B_2	0,4027		
B_3	1,2925		
C_1	4,435E-03 µm²		
C_2	2,0863E-02 µm²		
C_3	169,418 µm²		
Internal quality			
Bubble class	2		

Mechanical properties			
Reference thickness			
	d	=	3,00 mm
Density			
	ρ	=	2,60 g/cm³
Knoop hardness			
HK[0.1/20]			

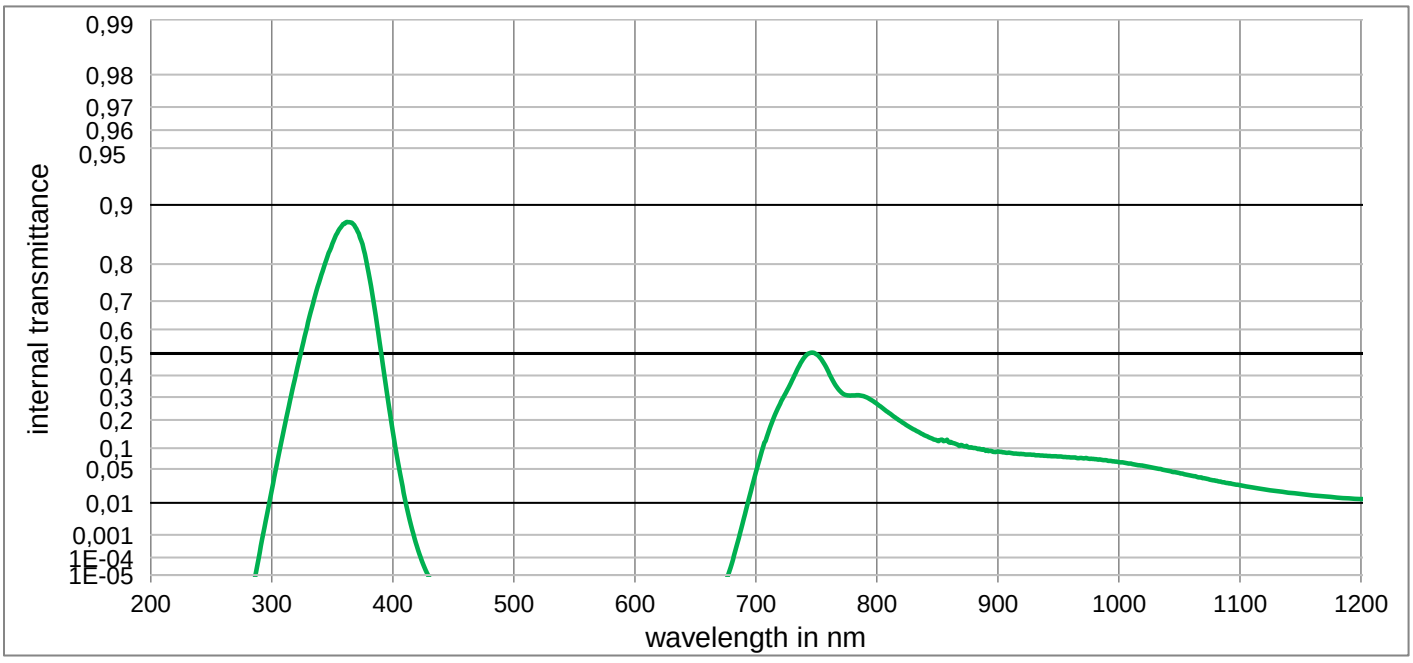
Thermal properties			
Transformation temperature			
	Tg	=	484 °C
Thermal expansion in			10^{-6}/K
$\alpha_{(-30°C/+70°C)}$		=	8,7
$\alpha_{(20°C/300°C)}$		=	9,9

Chemical properties			
Chemical resistance			
	FR class		
	SR class	=	1.0
	AR class	=	1.3
Resistance against humidity			
Sensitive glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

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			

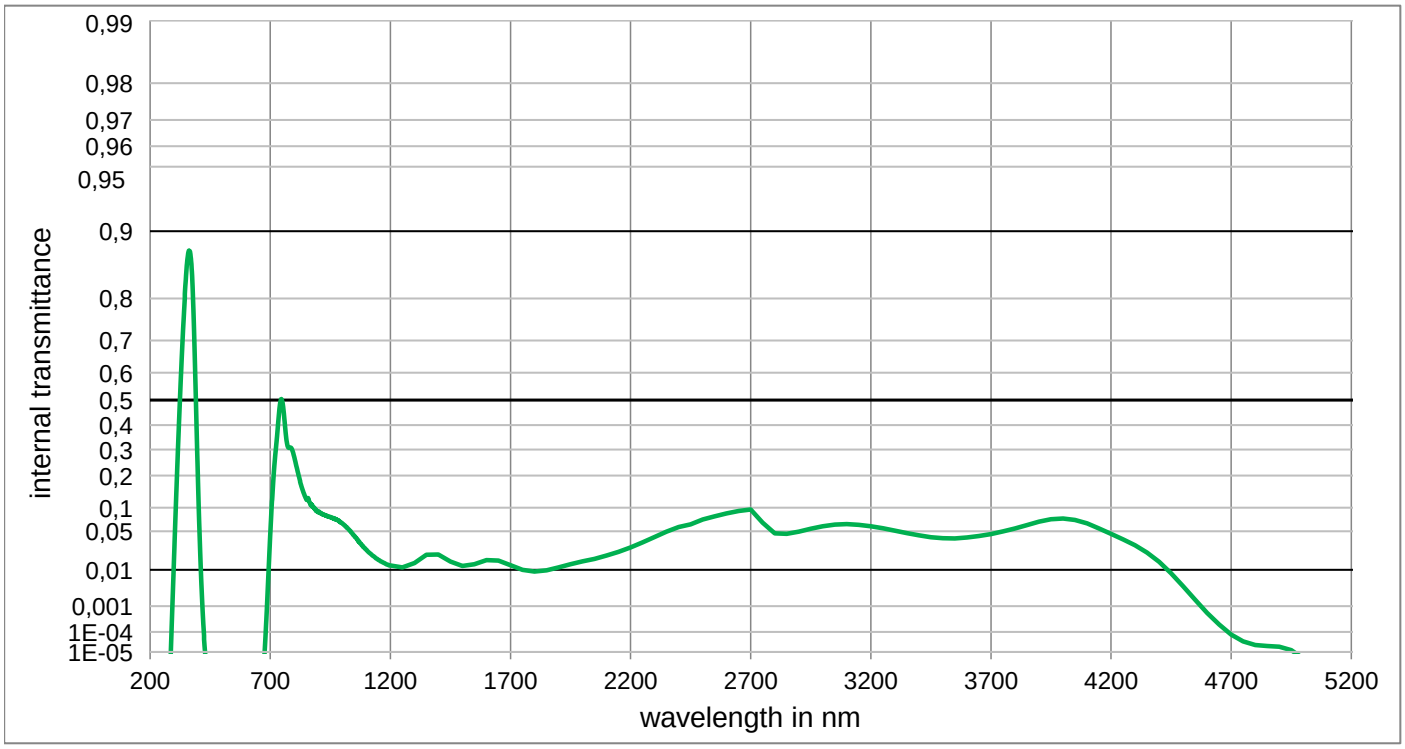
Notes
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Bandpass filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

UG2A



Internal transmittance ti 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	< 1,000E-05	500	< 1,000E-05	800	2,694E-01	1100	2,523E-02	2200	2,753E-02	3700	4,550E-02
210	< 1,000E-05	510	< 1,000E-05	810	2,291E-01	1110	2,269E-02	2250	3,365E-02	3750	4,960E-02
220	< 1,000E-05	520	< 1,000E-05	820	1,934E-01	1120	2,075E-02	2300	4,119E-02	3800	5,487E-02
230	< 1,000E-05	530	< 1,000E-05	830	1,638E-01	1130	1,906E-02	2350	4,948E-02	3850	6,125E-02
240	< 1,000E-05	540	< 1,000E-05	840	1,408E-01	1140	1,742E-02	2400	5,747E-02	3900	6,769E-02
250	< 1,000E-05	550	< 1,000E-05	850	1,232E-01	1150	1,630E-02	2450	6,255E-02	3950	7,273E-02
260	< 1,000E-05	560	< 1,000E-05	860	1,173E-01	1160	1,523E-02	2500	7,233E-02	4000	7,429E-02
270	< 1,000E-05	570	< 1,000E-05	870	1,091E-01	1170	1,438E-02	2550	7,920E-02	4050	7,123E-02
280	< 1,000E-05	580	< 1,000E-05	880	1,008E-01	1180	1,343E-02	2600	8,580E-02	4100	6,414E-02
290	1,820E-04	590	< 1,000E-05	890	9,226E-02	1190	1,285E-02	2650	9,190E-02	4150	5,492E-02
300	1,967E-02	600	< 1,000E-05	900	8,992E-02	1200	1,239E-02	2700	9,526E-02	4200	4,586E-02
310	1,622E-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

Data Sheet

UG5

Optical properties			
Reflection factor			
	P_d	=	0,914
Spectral values guaranteed			
τ_i (254 nm)		≥	0,8
τ_i (308 nm)		≥	0,94
τ_i (405 nm)		≤	0,5
τ_i (546 nm)		≤	0,05
τ_i (633 nm)		≤	0,05
τ_i (725 nm)		≤	0,85
Refractive indices			
n_F (486 nm)		=	1,548
n_e (546 nm)		=	1,545
n_d (587,6 nm)		=	1,543
Sellmeier coefficients			
valid from 250 nm to 1550 nm			
B_1	0,8861		
B_2	0,4613		
B_3	29,7610		
C_1	9,024E-03 µm²		
C_2	8,3379E-03 µm²		
C_3	3197,045 µm²		
Internal quality			
Bubble class	2		

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,84 g/cm³
Knoop hardness			
	HK[0.1/20]	=	407

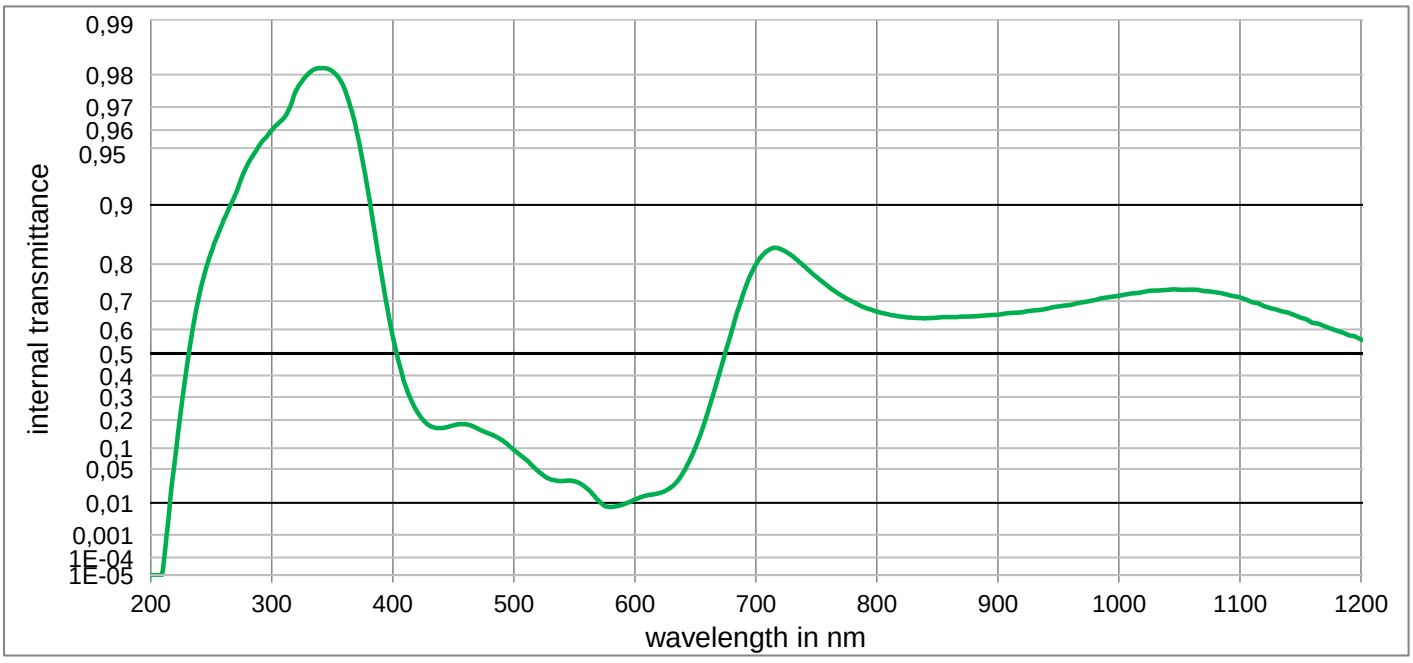
Thermal properties			
Transformation temperature			
	Tg	=	462 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	8,1
	$\alpha_{(20°C/300°C)}$	=	9,3

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	3
	AR class	=	2
Resistance against humidity			
Sensitive glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

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			

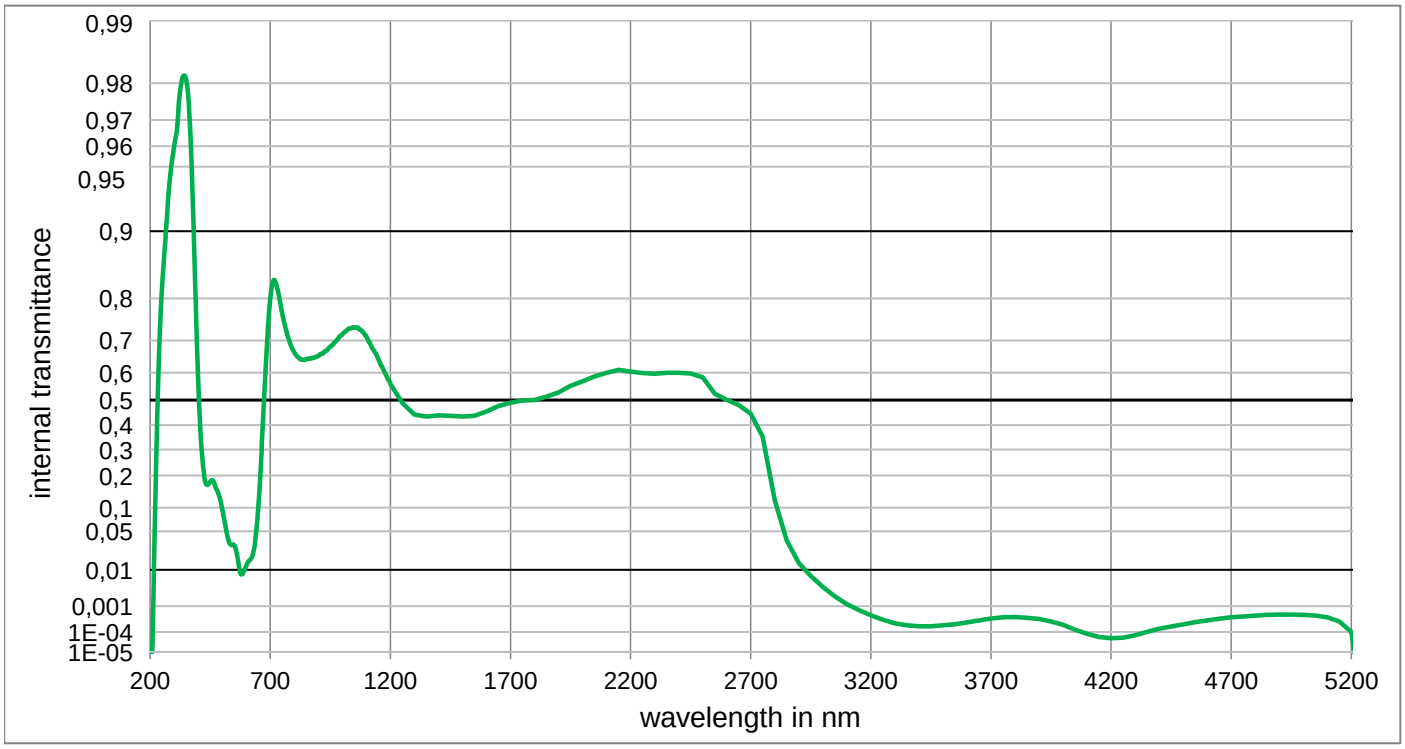
Notes
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Bandpass filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

UG5



Internal transmittance ti 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	< 1,000E-05	500	9,500E-02	800	6,650E-01	1100	7,118E-01	2200	6,039E-01	3700	3,581E-04
210	2,234E-05	510	7,000E-02	810	6,550E-01	1110	6,962E-01	2250	5,992E-01	3750	4,036E-04
220	6,900E-02	520	4,600E-02	820	6,476E-01	1120	6,834E-01	2300	5,961E-01	3800	4,130E-04
230	4,500E-01	530	3,300E-02	830	6,436E-01	1130	6,725E-01	2350	6,000E-01	3850	3,873E-04
240	7,180E-01	540	3,041E-02	840	6,420E-01	1140	6,615E-01	2400	6,000E-01	3900	3,451E-04
250	8,260E-01	550	3,015E-02	850	6,443E-01	1150	6,444E-01	2450	5,969E-01	3950	2,780E-04
260	8,790E-01	560	2,200E-02	860	6,463E-01	1160	6,248E-01	2500	5,835E-01	4000	2,000E-04
270	9,120E-01	570	1,136E-02	870	6,476E-01	1170	6,122E-01	2550	5,246E-01	4050	1,271E-04
280	9,390E-01	580	7,810E-03	880	6,487E-01	1180	5,947E-01	2600	5,010E-01	4100	8,166E-05
290	9,520E-01	590	9,020E-03	890	6,518E-01	1190	5,762E-01	2650	4,806E-01	4150	5,902E-05
300	9,600E-01	600	1,203E-02	900	6,543E-01	1200	5,600E-01	2700	4,461E-01	4200	5,093E-05
310	9,656E-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

Data Sheet

UG11

Optical properties			
Reflection factor			
	P_d	=	0,908
Spectral values guaranteed			
τ_i (254 nm)		≥	0,06
τ_i (334 nm)		≥	0,9
τ_i (405 nm)		≤	0,001
τ_i (694 nm)		≤	0,26
τ_i (725 nm)		≤	0,32
Refractive indices			
n_F (486 nm)		=	1,569
n_e (546 nm)		=	1,565
n_d (587,6 nm)		=	1,563
Sellmeier coefficients			
valid from 270 nm to 600 nm			
B_1	1,3960		
B_2	0,0097		
B_3	0,5658		
C_1	9,230E-03 µm²		
C_2	4,4000E-02 µm²		
C_3	96,000 µm²		
Internal quality			
Bubble class	2		

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,92 g/cm³
Knoop hardness			
	HK[0.1/20]	=	440

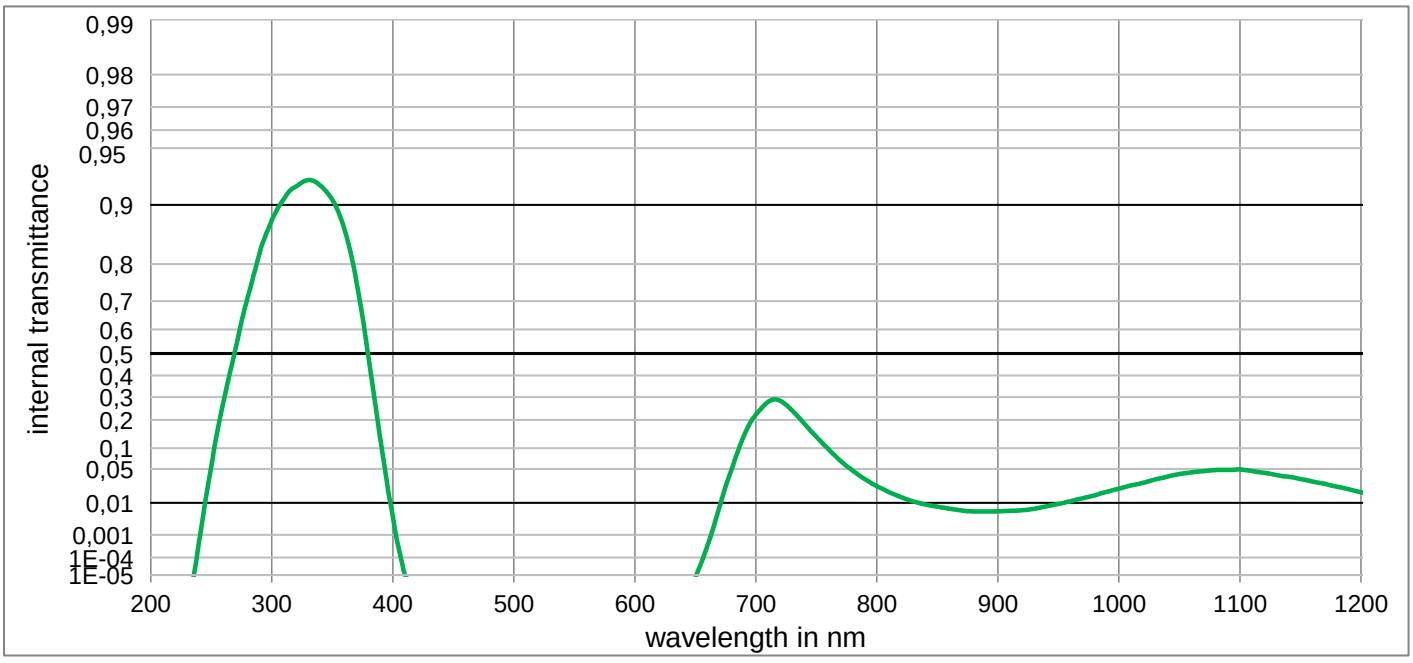
Thermal properties			
Transformation temperature			
	Tg	=	545 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	7,8
	$\alpha_{(20°C/300°C)}$	=	9,0

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	3
	AR class	=	2.2
Resistance against humidity			
Sensitive glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

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
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Bandpass filter
ISO 23364:2021

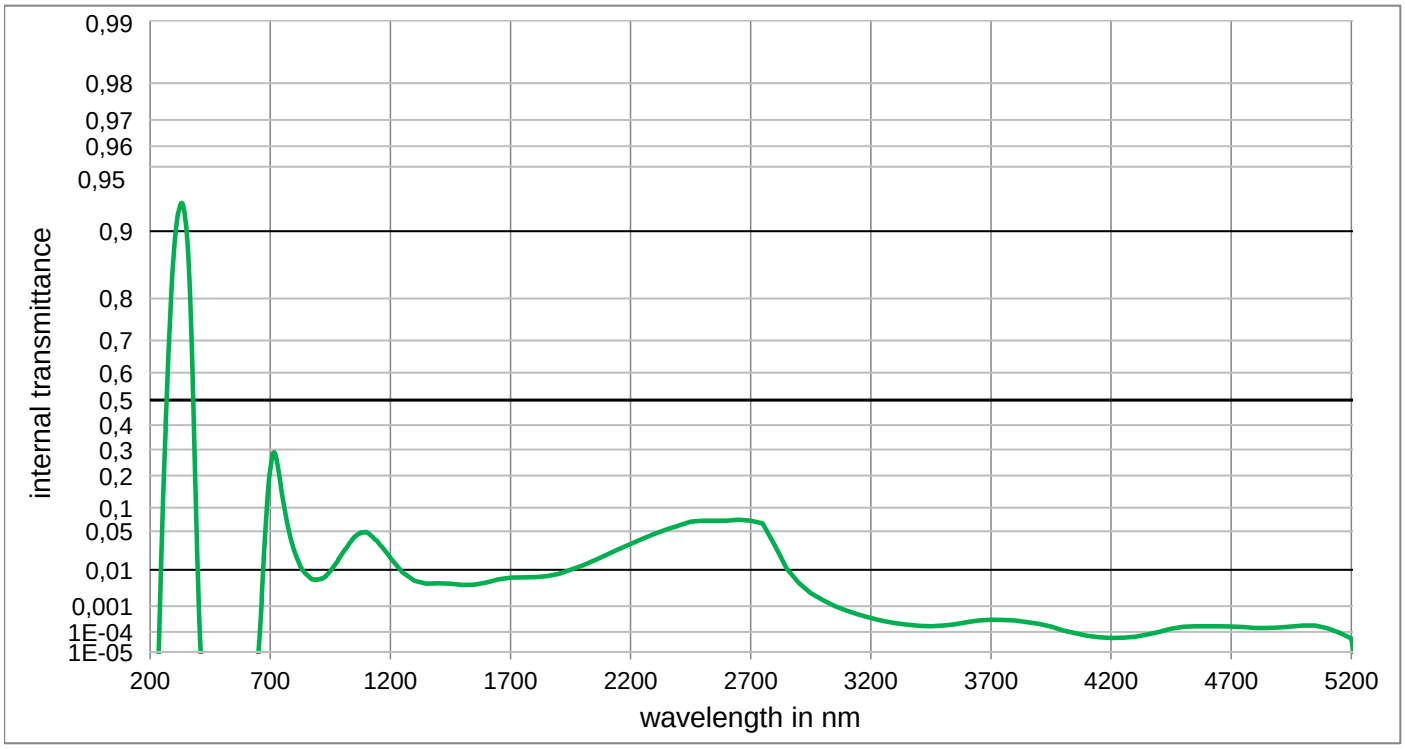
Disclaimer
All data without tolerances are to be understood to be reference values.



Status 03.12.2020

Data Sheet

UG11



Internal transmittance ti 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	< 1,000E-05	500	< 1,000E-05	800	2,400E-02	1100	4,897E-02	2200	3,160E-02	3700	3,206E-04
210	< 1,000E-05	510	< 1,000E-05	810	1,800E-02	1110	4,608E-02	2250	3,845E-02	3750	3,177E-04
220	< 1,000E-05	520	< 1,000E-05	820	1,382E-02	1120	4,300E-02	2300	4,600E-02	3800	3,000E-04
230	< 1,000E-05	530	< 1,000E-05	830	1,088E-02	1130	3,948E-02	2350	5,309E-02	3850	2,594E-04
240	6,067E-04	540	< 1,000E-05	840	9,121E-03	1140	3,666E-02	2400	6,000E-02	3900	2,213E-04
250	5,610E-02	550	< 1,000E-05	850	7,965E-03	1150	3,325E-02	2450	6,776E-02	3950	1,710E-04
260	2,760E-01	560	< 1,000E-05	860	7,014E-03	1160	2,970E-02	2500	7,000E-02	4000	1,180E-04
270	5,210E-01	570	< 1,000E-05	870	6,255E-03	1170	2,691E-02	2550	7,000E-02	4050	8,954E-05
280	7,120E-01	580	< 1,000E-05	880	5,892E-03	1180	2,354E-02	2600	7,000E-02	4100	6,653E-05
290	8,250E-01	590	< 1,000E-05	890	5,834E-03	1190	2,064E-02	2650	7,161E-02	4150	5,741E-05
300	8,800E-01	600	< 1,000E-05	900	5,948E-03	1200	1,775E-02	2700	7,000E-02	4200	5,236E-05
310	9,070E-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

Data Sheet

BG36

Optical properties			
Reflection factor			
	P_d	=	0,877
Spectral values guaranteed			
τ_i (405 nm)		≥	0,9
τ_i (450 nm)		≤	0,42
τ_i (650 nm)		≥	0,9
τ_i (800 nm)		≤	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			
	ρ	=	3,59 g/cm³
Knoop hardness			
	HK[0.1/20]	=	701

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

Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	52.2
	AR class	=	1.2
Resistance against humidity			
Resistant glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric 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
ISO 23364:2021

Disclaimer
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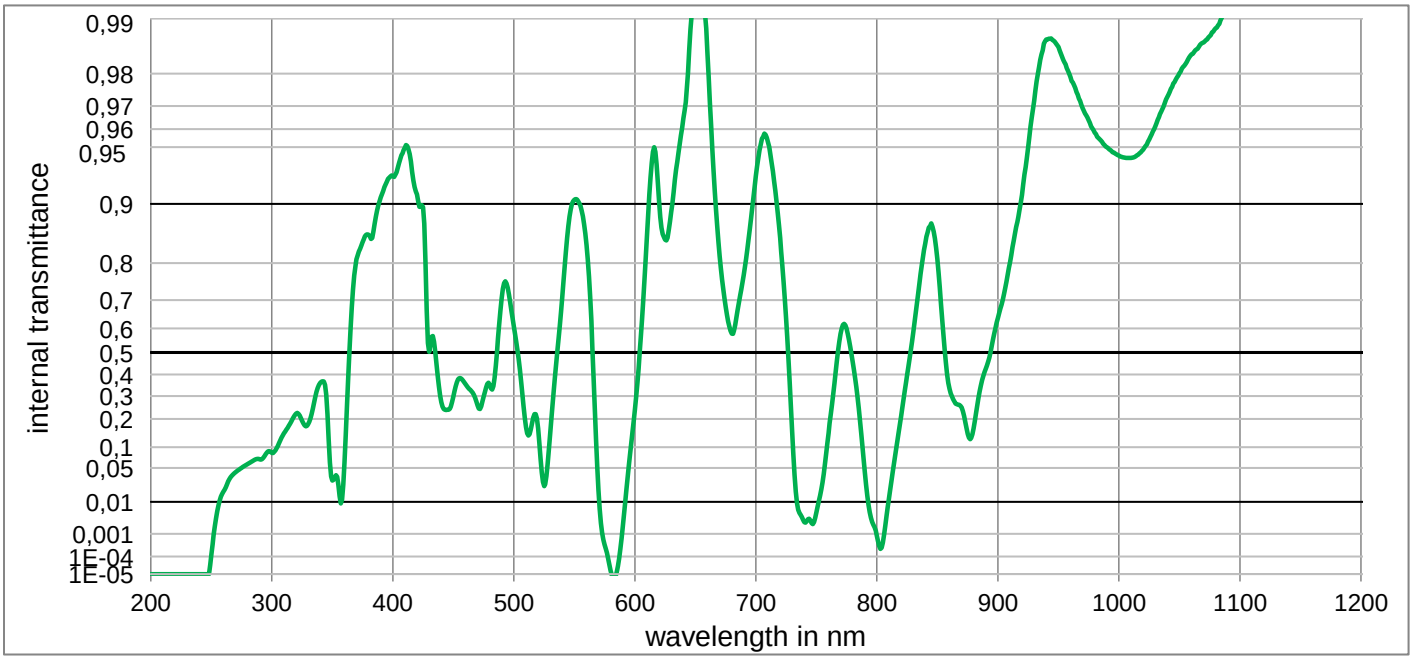
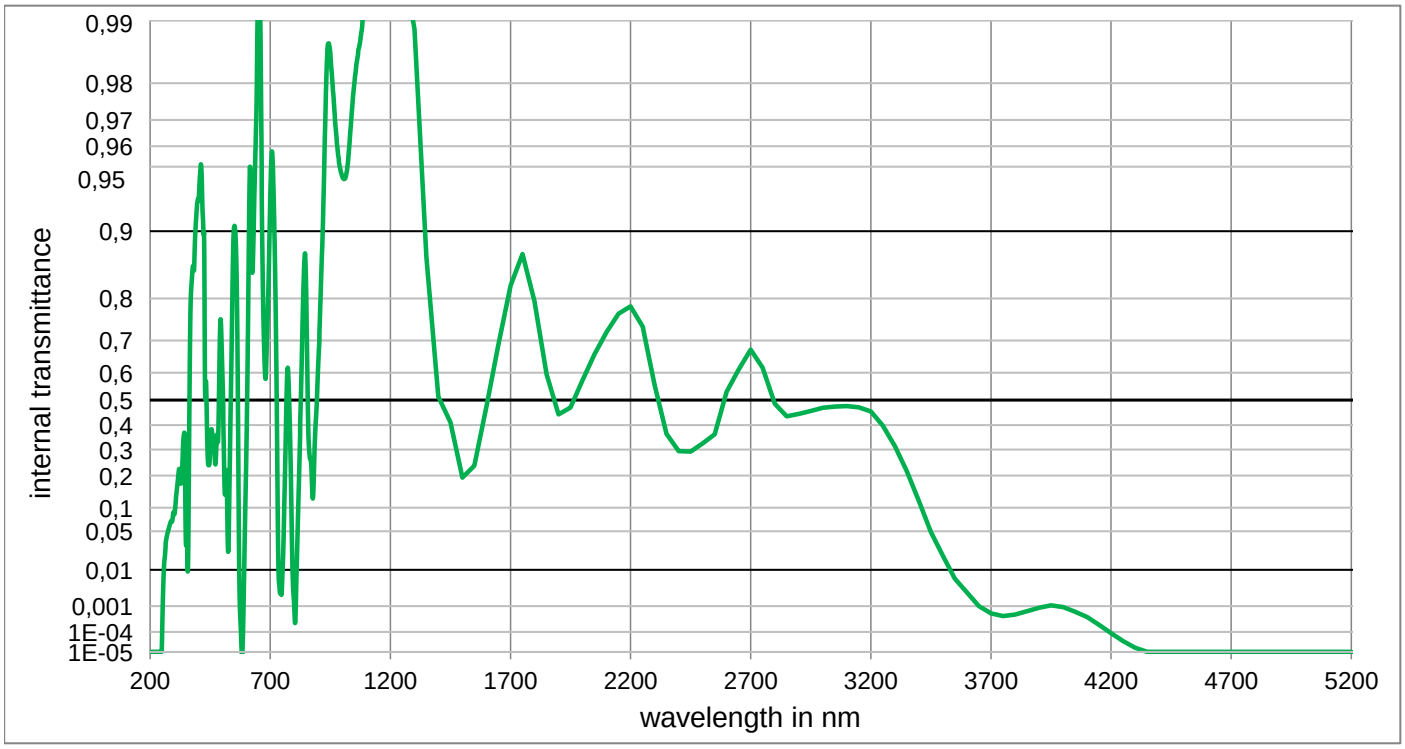


Data Sheet

BG36



Internal transmittance ti 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	< 1,000E-05	500	6,084E-01	800	8,615E-04	1100	9,947E-01	2200	7,840E-01	3700	5,636E-04
210	< 1,000E-05	510	1,685E-01	810	1,212E-02	1110	9,956E-01	2250	7,370E-01	3750	4,498E-04
220	< 1,000E-05	520	1,625E-01	820	2,111E-01	1120	9,965E-01	2300	5,570E-01	3800	5,035E-04
230	< 1,000E-05	530	1,386E-01	830	5,842E-01	1130	9,973E-01	2350	3,641E-01	3850	6,764E-04
240	< 1,000E-05	540	7,084E-01	840	8,398E-01	1140	9,979E-01	2400	2,940E-01	3900	8,872E-04
250	1,297E-04	550	9,047E-01	850	8,090E-01	1150	9,981E-01	2450	2,914E-01	3950	1,054E-03
260	1,734E-02	560	8,367E-01	860	3,330E-01	1160	9,979E-01	2500	3,250E-01	4000	9,311E-04
270	4,220E-02	570	1,873E-02	870	2,481E-01	1170	9,974E-01	2550	3,616E-01	4050	6,485E-04
280	5,797E-02	580	1,610E-05	880	1,625E-01	1180	9,966E-01	2600	5,320E-01	4100	4,112E-04
290	6,801E-02	590	1,816E-03	890	4,256E-01	1190	9,956E-01	2650	6,110E-01	4150	2,000E-04
300	8,428E-02	600	2,413E-01	900	6,394E-01	1200	9,946E-01	2700	6,740E-01	4200	8,913E-05
310	1,446E-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

Data Sheet

S7005

Optical properties	
Reflection factor	
P_d =	0,908
Spectral values guaranteed	
τ_i (360 nm) =	0,414 ± 0,12
Refractive indices	
n_d (587,6 nm) =	1,562
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	-

Mechanical properties	
Reference thickness	
d =	2,00 mm
Density	
ρ =	2,88 g/cm³
Knoop hardness	
HK[0.1/20] =	529

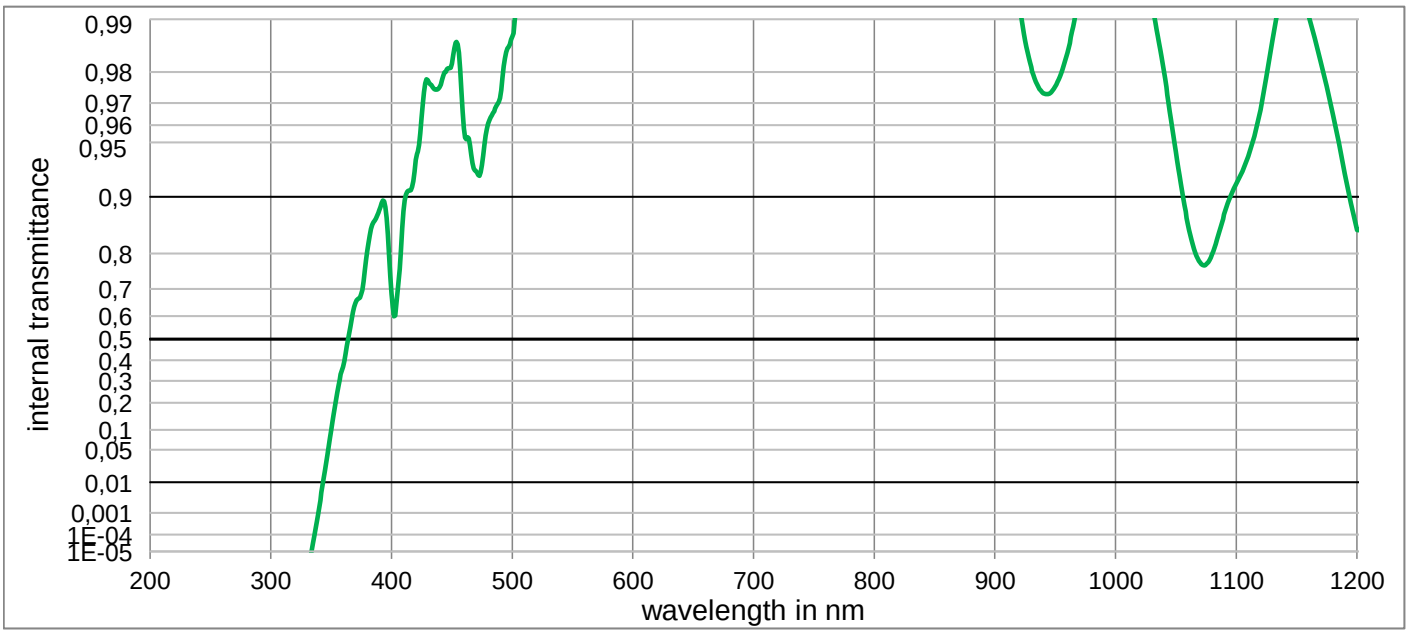
Thermal properties	
Transformation temperature	
Tg =	452 °C
Thermal expansion in	**10^{-6}/K**
$\alpha_{(20°C/300°C)}$ =	11,5

Chemical properties	
Chemical resistance	
FR class =	1
SR class =	1.2
AR class =	1.0
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,314	0,316	0,317
	y	0,331	0,333	0,335
	Y	90,6	90,4	90,2
	λ_d	572,1	572,1	572,2
	P_e	0,010	0,020	0,030
Illuminant A	x	0,449	0,450	0,451
	y	0,408	0,409	0,410
	Y	90,7	90,6	90,4
	λ_d	581,8	581,8	581,9
	P_e	0,014	0,028	0,042

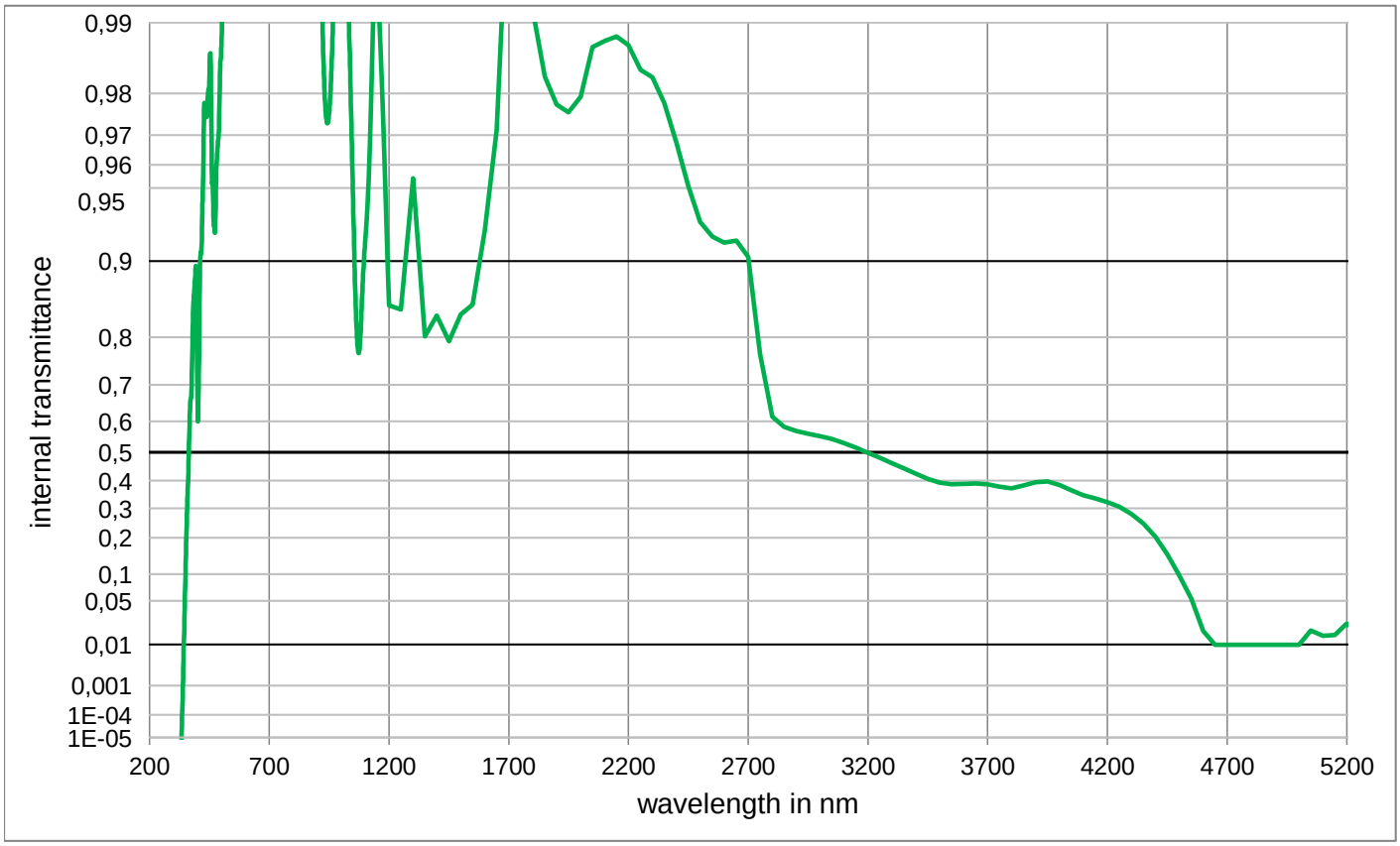
Notes
Ionically colored glass
Samarium doped
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

S7005



Internal transmittance ti 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	9,874E-01	800	9,984E-01	1100	9,151E-01	2200	9,875E-01	3700	3,872E-01
210	< 1,0E-05	510	9,967E-01	810	9,987E-01	1110	9,401E-01	2250	9,841E-01	3750	3,775E-01
220	< 1,0E-05	520	9,980E-01	820	9,989E-01	1120	9,671E-01	2300	9,829E-01	3800	3,725E-01
230	< 1,0E-05	530	9,963E-01	830	9,989E-01	1130	9,868E-01	2350	9,781E-01	3850	3,825E-01
240	< 1,0E-05	540	9,981E-01	840	9,981E-01	1140	9,942E-01	2400	9,677E-01	3900	3,944E-01
250	< 1,0E-05	550	9,975E-01	850	9,983E-01	1150	9,941E-01	2450	9,510E-01	3950	3,970E-01
260	< 1,0E-05	560	9,963E-01	860	9,985E-01	1160	9,905E-01	2500	9,310E-01	4000	3,839E-01
270	< 1,0E-05	570	9,980E-01	870	9,989E-01	1170	9,826E-01	2550	9,205E-01	4050	3,641E-01
280	< 1,0E-05	580	9,999E-01	880	9,993E-01	1180	9,653E-01	2600	9,157E-01	4100	3,467E-01
290	< 1,0E-05	590	9,968E-01	890	9,985E-01	1190	9,252E-01	2650	9,175E-01	4150	3,344E-01
300	< 1,0E-05	600	9,969E-01	900	9,977E-01	1200	8,493E-01	2700	9,039E-01	4200	3,220E-01
310	< 1,0E-05	610	9,970E-01	910	9,981E-01	1250	8,438E-01	2750	7,688E-01	4250	3,065E-01
320	< 1,000E-05	620	9,971E-01	920	9,920E-01	1300	9,545E-01	2800	6,136E-01	4300	2,805E-01
330	< 1,000E-05	630	9,973E-01	930	9,813E-01	1350	8,013E-01	2850	5,831E-01	4350	2,469E-01
340	1,598E-03	640	9,973E-01	940	9,737E-01	1400	8,351E-01	2900	5,707E-01	4400	2,034E-01
350	9,824E-02	650	9,975E-01	950	9,758E-01	1450	7,926E-01	2950	5,612E-01	4450	1,508E-01
360	3,675E-01	660	9,979E-01	960	9,844E-01	1500	8,367E-01	3000	5,532E-01	4500	9,816E-02
370	6,496E-01	670	9,975E-01	970	9,930E-01	1550	8,509E-01	3050	5,439E-01	4550	5,334E-02
380	8,064E-01	680	9,978E-01	980	9,984E-01	1600	9,254E-01	3100	5,313E-01	4600	1,783E-02
390	8,817E-01	690	9,982E-01	990	9,973E-01	1650	9,715E-01	3150	5,159E-01	4650	9,925E-03
400	6,832E-01	700	9,983E-01	1000	9,974E-01	1700	9,979E-01	3200	4,984E-01	4700	9,925E-03
410	8,806E-01	710	9,982E-01	1010	9,994E-01	1750	9,968E-01	3250	4,804E-01	4750	9,925E-03
420	9,374E-01	720	9,985E-01	1020	9,969E-01	1800	9,912E-01	3300	4,624E-01	4800	9,925E-03
430	9,777E-01	730	9,986E-01	1030	9,921E-01	1850	9,831E-01	3350	4,439E-01	4850	9,925E-03
440	9,756E-01	740	9,982E-01	1040	9,801E-01	1900	9,778E-01	3400	4,247E-01	4900	9,925E-03
450	9,821E-01	750	9,987E-01	1050	9,434E-01	1950	9,760E-01	3450	4,063E-01	4950	9,925E-03
460	9,584E-01	760	9,978E-01	1060	8,591E-01	2000	9,794E-01	3500	3,930E-01	5000	9,925E-03
470	9,279E-01	770	9,989E-01	1070	7,772E-01	2050	9,873E-01	3550	3,874E-01	5050	1,806E-02
480	9,607E-01	780	9,988E-01	1080	7,978E-01	2100	9,880E-01	3600	3,887E-01	5100	1,447E-02
490	9,718E-01	790	9,983E-01	1090	8,752E-01	2150	9,885E-01	3650	3,896E-01	5150	1,512E-02

Data Sheet

S7010N

Optical properties			
Reflection factor			
P_d	=	0,909	
Spectral values guaranteed			
τ_i (364 nm)	=	0,414	± 0,060
τ_i (500 nm)	≥	0,85	
Refractive indices			
n_d (587,6 nm)	=	1,56	
Sellmeier coefficients			
on request			
Internal quality			
Bubble class		-	

Mechanical properties		
Reference thickness		
d	=	2,00 mm
Density		
ρ	=	2,88 g/cm³
Knoop hardness		
HK[0.1/20]	=	536

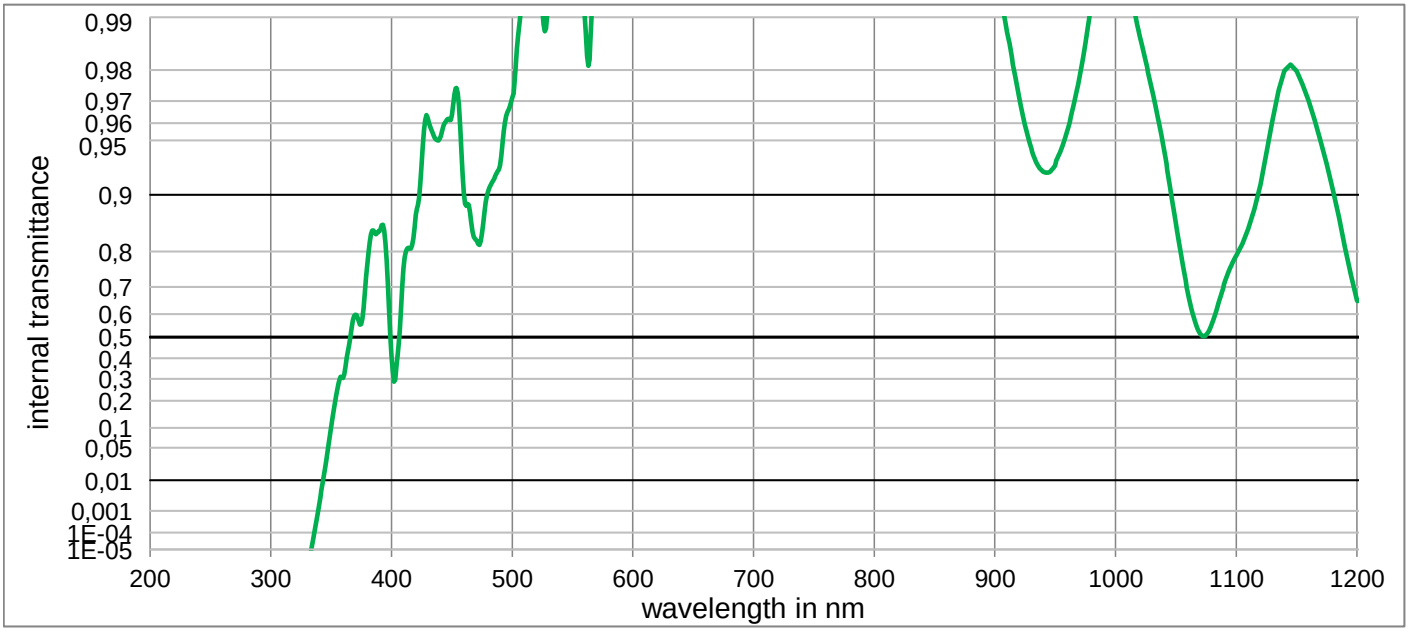
Thermal properties		
Transformation temperature		
Tg	=	452 °C
Thermal expansion in		**10^{-6}/K**
$\alpha_{(20°C/300°C)}$	=	11,5

Chemical properties		
Chemical resistance		
FR class	=	1
SR class	=	1.2
AR class	=	1.0
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,316	0,319	0,322
	y	0,334	0,338	0,343
	Y	90,3	89,9	89,4
	λ_d	572,3	572,4	572,5
	P_e	0,023	0,044	0,065
Illuminant A	x	0,450	0,452	0,455
	y	0,410	0,412	0,414
	Y	90,5	90,3	90,0
	λ_d	581,8	581,9	581,9
	P_e	0,033	0,063	0,092

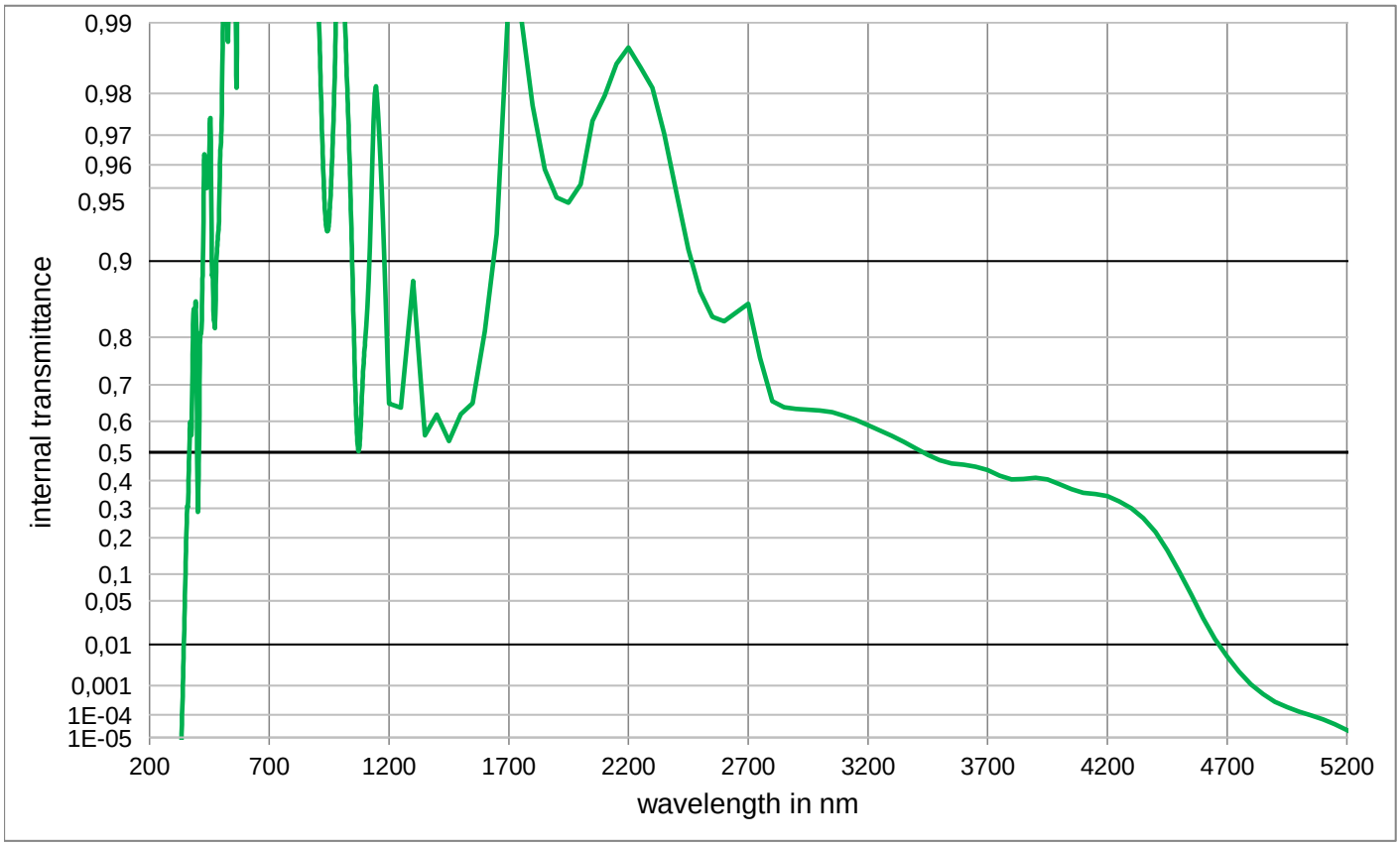
Notes
Ionically colored glass
Samarium doped
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

S7010N



Internal transmittance ti 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	9,713E-01	800	9,992E-01	1100	7,904E-01	2200	9,873E-01	3700	4,375E-01
210	< 1,0E-05	510	9,947E-01	810	9,995E-01	1110	8,478E-01	2250	9,845E-01	3750	4,176E-01
220	< 1,0E-05	520	9,973E-01	820	9,991E-01	1120	9,123E-01	2300	9,811E-01	3800	4,038E-01
230	< 1,0E-05	530	9,927E-01	830	9,993E-01	1130	9,613E-01	2350	9,704E-01	3850	4,062E-01
240	< 1,0E-05	540	9,965E-01	840	9,989E-01	1140	9,799E-01	2400	9,475E-01	3900	4,102E-01
250	< 1,0E-05	550	9,949E-01	850	9,986E-01	1150	9,797E-01	2450	9,106E-01	3950	4,048E-01
260	< 1,0E-05	560	9,903E-01	860	9,977E-01	1160	9,701E-01	2500	8,676E-01	4000	3,874E-01
270	< 1,0E-05	570	9,952E-01	870	9,993E-01	1170	9,496E-01	2550	8,334E-01	4050	3,685E-01
280	< 1,0E-05	580	9,995E-01	880	9,989E-01	1180	9,061E-01	2600	8,267E-01	4100	3,564E-01
290	< 1,0E-05	590	9,999E-01	890	9,976E-01	1190	8,117E-01	2650	8,399E-01	4150	3,516E-01
300	< 1,0E-05	600	9,970E-01	900	9,949E-01	1200	6,513E-01	2700	8,516E-01	4200	3,436E-01
310	< 1,0E-05	610	9,974E-01	910	9,879E-01	1250	6,393E-01	2750	7,606E-01	4250	3,254E-01
320	< 1,000E-05	620	9,975E-01	920	9,718E-01	1300	8,795E-01	2800	6,575E-01	4300	2,994E-01
330	< 1,000E-05	630	9,977E-01	930	9,450E-01	1350	5,560E-01	2850	6,406E-01	4350	2,655E-01
340	1,751E-03	640	9,979E-01	940	9,254E-01	1400	6,197E-01	2900	6,365E-01	4400	2,188E-01
350	1,027E-01	650	9,981E-01	950	9,309E-01	1450	5,378E-01	2950	6,345E-01	4450	1,625E-01
360	3,035E-01	660	9,982E-01	960	9,561E-01	1500	6,209E-01	3000	6,321E-01	4500	1,064E-01
370	5,979E-01	670	9,979E-01	970	9,777E-01	1550	6,524E-01	3050	6,265E-01	4550	5,990E-02
380	7,672E-01	680	9,984E-01	980	9,918E-01	1600	8,107E-01	3100	6,167E-01	4600	2,838E-02
390	8,431E-01	690	9,988E-01	990	9,972E-01	1650	9,225E-01	3150	6,036E-01	4650	1,261E-02
400	4,080E-01	700	9,989E-01	1000	9,973E-01	1700	9,925E-01	3200	5,884E-01	4700	5,539E-03
410	7,567E-01	710	9,988E-01	1010	9,941E-01	1750	9,908E-01	3250	5,718E-01	4750	2,426E-03
420	8,714E-01	720	9,989E-01	1020	9,872E-01	1800	9,775E-01	3300	5,542E-01	4800	1,089E-03
430	9,625E-01	730	9,990E-01	1030	9,746E-01	1850	9,583E-01	3350	5,352E-01	4850	5,416E-04
440	9,508E-01	740	9,987E-01	1040	9,440E-01	1900	9,454E-01	3400	5,126E-01	4900	3,059E-04
450	9,640E-01	750	9,992E-01	1050	8,572E-01	1950	9,425E-01	3450	4,911E-01	4950	1,974E-04
460	9,014E-01	760	9,983E-01	1060	6,792E-01	2000	9,518E-01	3500	4,720E-01	5000	1,355E-04
470	8,266E-01	770	9,990E-01	1070	5,165E-01	2050	9,739E-01	3550	4,617E-01	5050	9,711E-05
480	9,043E-01	780	9,990E-01	1080	5,608E-01	2100	9,796E-01	3600	4,564E-01	5100	6,627E-05
490	9,311E-01	790	9,990E-01	1090	7,086E-01	2150	9,850E-01	3650	4,492E-01	5150	4,091E-05

Data Sheet

S8008G

Optical properties			
Reflection factor			
	P_d	=	0,912
Spectral values guaranteed			
Refractive indices			
n_h (404,7 nm)		=	1,566
n_e (546 nm)		=	1,551
n_d (587,6 nm)		=	1,548
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1	0,8874		
B_2	0,4659		
B_3	21,3145		
C_1	1,137E-02	µm²	
C_2	1,1165E-02	µm²	
C_3	3495,165	µm²	
Internal quality			
Bubble class	0		

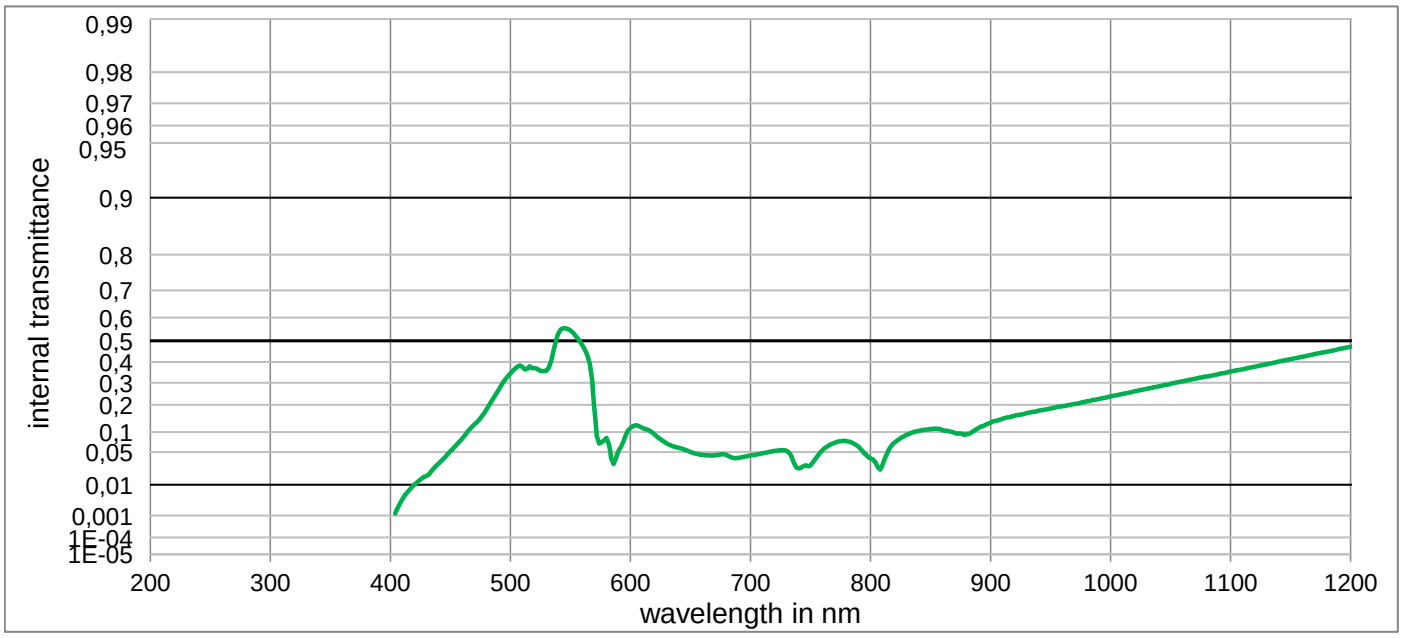
Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,78 g/cm³
Knoop hardness			
HK[0.1/20]		=	569

Thermal properties			
Transformation temperature			
	Tg	=	480 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	7,6
	$\alpha_{(20°C/300°C)}$	=	9,0

Chemical properties			
Chemical resistance			
	FR class		
	SR class	=	1
	AR class	=	1
Resistance against humidity			
Resistant glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

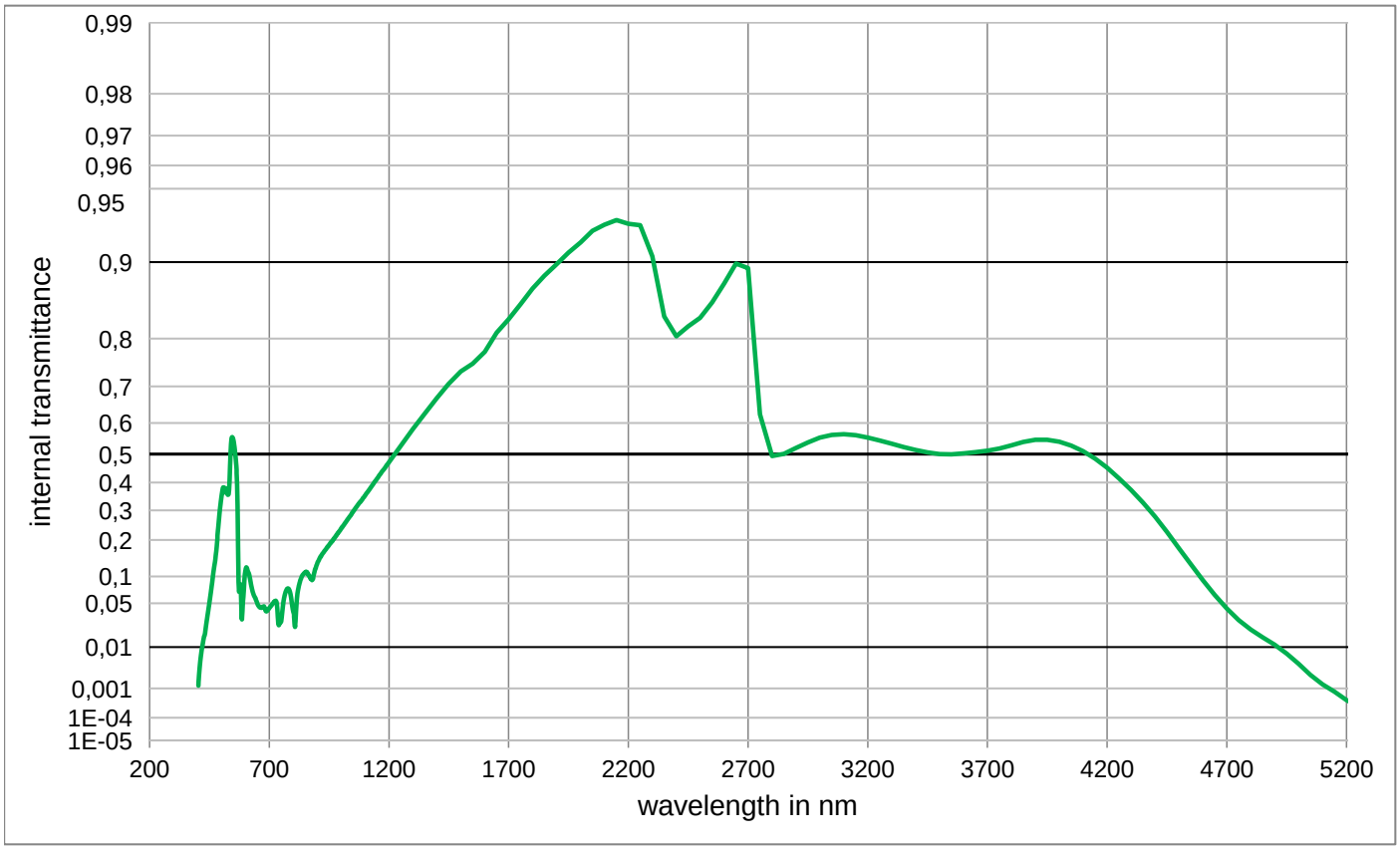
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Ionically colored glass
Contrast enhancement filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

S8008G



Internal transmittance ti 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	3,449E-01	800	3,835E-02	1100	3,535E-01	2200	9,303E-01	3700	5,118E-01
210	< 1,0E-05	510	3,761E-01	810	2,828E-02	1110	3,650E-01	2250	9,292E-01	3750	5,188E-01
220	< 1,0E-05	520	3,701E-01	820	7,119E-02	1120	3,779E-01	2300	9,054E-01	3800	5,291E-01
230	< 1,0E-05	530	3,578E-01	830	9,166E-02	1130	3,891E-01	2350	8,359E-01	3850	5,408E-01
240	< 1,0E-05	540	5,335E-01	840	1,038E-01	1140	4,021E-01	2400	8,040E-01	3900	5,474E-01
250	< 1,0E-05	550	5,462E-01	850	1,097E-01	1150	4,136E-01	2450	8,206E-01	3950	5,475E-01
260	< 1,0E-05	560	4,795E-01	860	1,057E-01	1160	4,259E-01	2500	8,337E-01	4000	5,411E-01
270	< 1,0E-05	570	1,834E-01	870	9,770E-02	1170	4,384E-01	2550	8,554E-01	4050	5,286E-01
280	< 1,0E-05	580	8,299E-02	880	9,302E-02	1180	4,488E-01	2600	8,778E-01	4100	5,098E-01
290	< 1,0E-05	590	5,203E-02	890	1,124E-01	1190	4,617E-01	2650	8,986E-01	4150	4,845E-01
300	< 1,0E-05	600	1,122E-01	900	1,301E-01	1200	4,725E-01	2700	8,943E-01	4200	4,530E-01
310	< 1,0E-05	610	1,127E-01	910	1,449E-01	1250	5,288E-01	2750	6,253E-01	4250	4,152E-01
320	< 1,000E-05	620	9,318E-02	920	1,560E-01	1300	5,811E-01	2800	4,937E-01	4300	3,734E-01
330	< 1,000E-05	630	6,941E-02	930	1,658E-01	1350	6,280E-01	2850	5,009E-01	4350	3,278E-01
340	< 1,000E-05	640	5,888E-02	940	1,757E-01	1400	6,701E-01	2900	5,203E-01	4400	2,778E-01
350	< 1,000E-05	650	5,005E-02	950	1,848E-01	1450	7,065E-01	2950	5,390E-01	4450	2,258E-01
360	< 1,000E-05	660	4,456E-02	960	1,948E-01	1500	7,348E-01	3000	5,543E-01	4500	1,749E-01
370	< 1,000E-05	670	4,374E-02	970	2,037E-01	1550	7,519E-01	3050	5,634E-01	4550	1,294E-01
380	< 1,000E-05	680	4,445E-02	980	2,149E-01	1600	7,756E-01	3100	5,656E-01	4600	9,202E-02
390	< 1,000E-05	690	3,929E-02	990	2,249E-01	1650	8,104E-01	3150	5,620E-01	4650	6,337E-02
400	< 1,000E-05	700	4,328E-02	1000	2,371E-01	1700	8,315E-01	3200	5,546E-01	4700	4,275E-02
410	3,762E-03	710	4,748E-02	1010	2,480E-01	1750	8,530E-01	3250	5,450E-01	4750	2,920E-02
420	9,953E-03	720	5,215E-02	1020	2,598E-01	1800	8,725E-01	3300	5,346E-01	4800	2,065E-02
430	1,650E-02	730	5,249E-02	1030	2,716E-01	1850	8,867E-01	3350	5,240E-01	4850	1,526E-02
440	3,046E-02	740	2,429E-02	1040	2,827E-01	1900	8,979E-01	3400	5,139E-01	4900	1,114E-02
450	5,121E-02	750	2,797E-02	1050	2,950E-01	1950	9,084E-01	3450	5,054E-01	4950	7,390E-03
460	8,230E-02	760	5,401E-02	1060	3,073E-01	2000	9,168E-01	3500	5,000E-01	5000	4,413E-03
470	1,248E-01	770	7,056E-02	1070	3,189E-01	2050	9,254E-01	3550	4,990E-01	5050	2,345E-03
480	1,794E-01	780	7,483E-02	1080	3,307E-01	2100	9,295E-01	3600	5,022E-01	5100	1,315E-03
490	2,659E-01	790	6,097E-02	1090	3,420E-01	2150	9,326E-01	3650	5,062E-01	5150	7,920E-04

Data Sheet

S8802

Optical properties			
Reflection factor			
P_d	=	0,915	
Spectral values guaranteed			
τ_i (445 nm)	=	0,15	± 0,025
τ_i (555 nm)	=	0,305	± 0,035
τ_i (630 nm)	=	0,275	± 0,035
Refractive indices			
n_d (587,6 nm)	=	1,533	
Sellmeier coefficients			
on request			
Internal quality			
Bubble class		0	

Mechanical properties		
Reference thickness		
d	=	3,50 mm
Density		
ρ	=	2,70 g/cm³
Knoop hardness		
HK[0.1/20]		

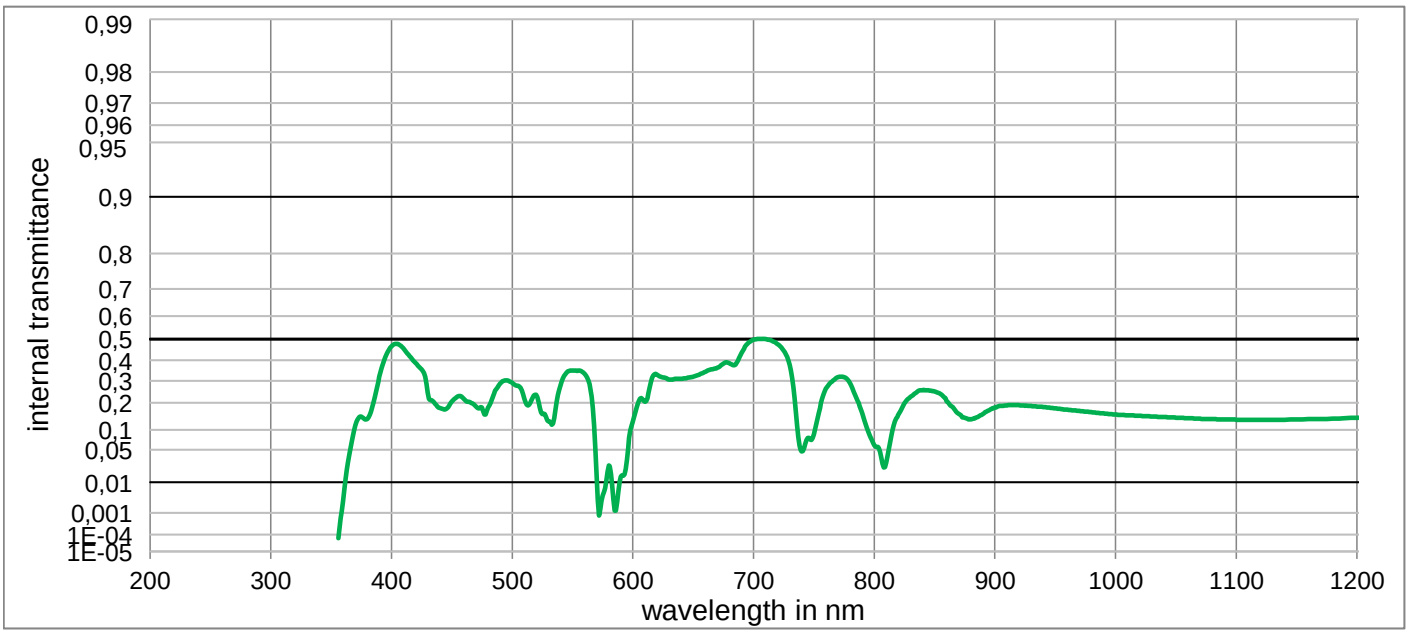
Thermal properties		
Transformation temperature		
Tg	=	510 °C
Thermal expansion in		**10^{-6}/K**
$\alpha_{(20°C/300°C)}$	=	10,8

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	1.0
AR class	=	1.0
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

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			

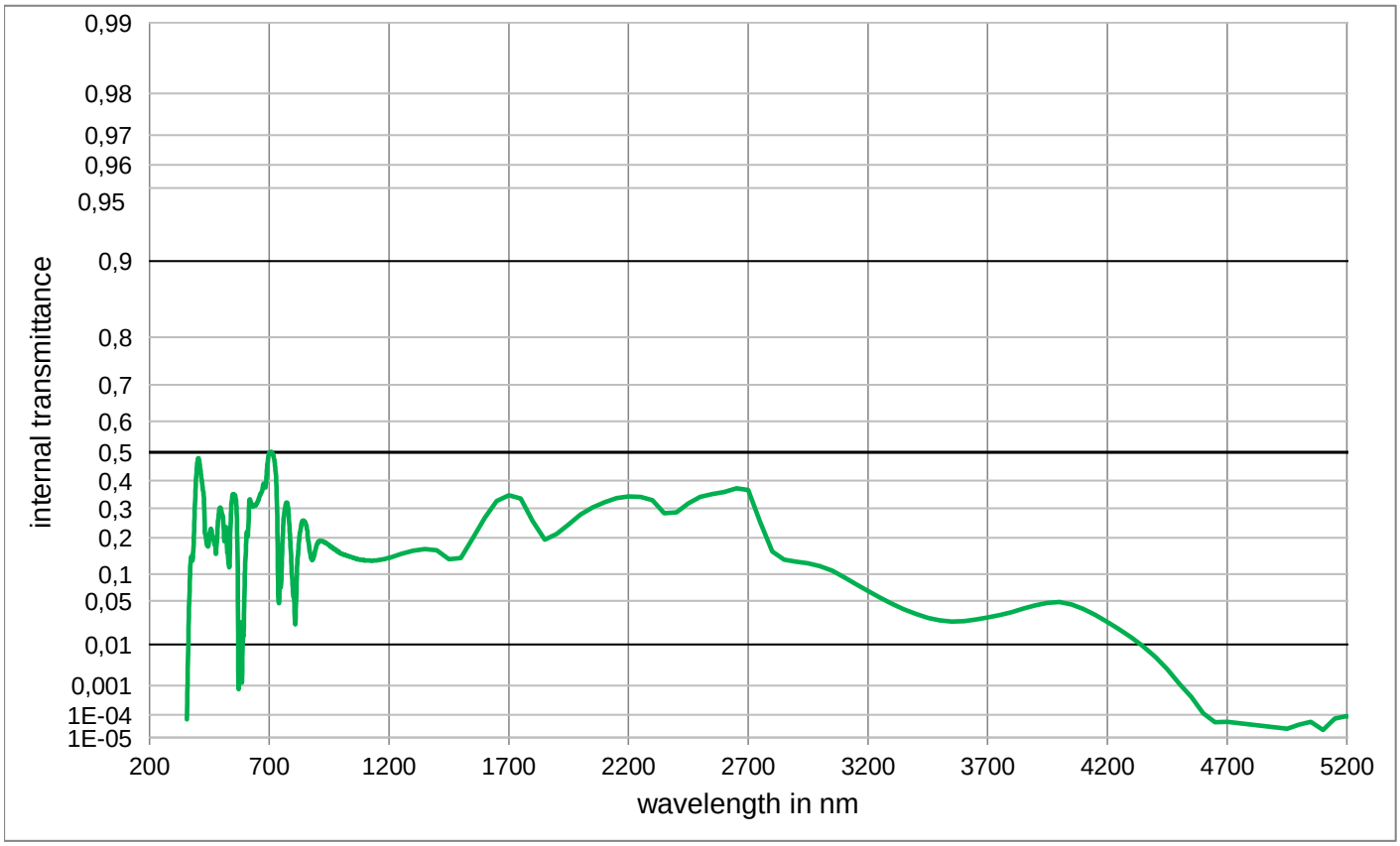
Notes
Ionically colored glass
Contrast enhancement filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

S8802



Internal transmittance ti 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	2,896E-01	800	5,938E-02	1100	1,335E-01	2200	3,427E-01	3700	2,912E-02
210	< 1,0E-05	510	2,193E-01	810	2,875E-02	1110	1,334E-01	2250	3,415E-01	3750	3,168E-02
220	< 1,0E-05	520	2,346E-01	820	1,510E-01	1120	1,331E-01	2300	3,298E-01	3800	3,501E-02
230	< 1,0E-05	530	1,277E-01	830	2,257E-01	1130	1,331E-01	2350	2,833E-01	3850	3,929E-02
240	< 1,0E-05	540	2,777E-01	840	2,563E-01	1140	1,334E-01	2400	2,858E-01	3900	4,375E-02
250	< 1,0E-05	550	3,506E-01	850	2,499E-01	1150	1,341E-01	2450	3,180E-01	3950	4,716E-02
260	< 1,0E-05	560	3,339E-01	860	2,056E-01	1160	1,353E-01	2500	3,404E-01	4000	4,799E-02
270	< 1,0E-05	570	1,558E-02	870	1,562E-01	1170	1,361E-01	2550	3,510E-01	4050	4,507E-02
280	< 1,0E-05	580	2,479E-02	880	1,342E-01	1180	1,373E-01	2600	3,584E-01	4100	3,911E-02
290	< 1,0E-05	590	1,384E-02	890	1,547E-01	1190	1,387E-01	2650	3,715E-01	4150	3,192E-02
300	< 1,0E-05	600	1,262E-01	900	1,799E-01	1200	1,407E-01	2700	3,654E-01	4200	2,508E-02
310	< 1,0E-05	610	2,039E-01	910	1,893E-01	1250	1,512E-01	2750	2,525E-01	4250	1,899E-02
320	< 1,000E-05	620	3,306E-01	920	1,902E-01	1300	1,606E-01	2800	1,581E-01	4300	1,370E-02
330	< 1,000E-05	630	3,067E-01	930	1,869E-01	1350	1,656E-01	2850	1,361E-01	4350	9,150E-03
340	< 1,000E-05	640	3,100E-01	940	1,825E-01	1400	1,623E-01	2900	1,305E-01	4400	5,447E-03
350	< 1,000E-05	650	3,202E-01	950	1,769E-01	1450	1,367E-01	2950	1,264E-01	4450	2,797E-03
360	2,721E-03	660	3,436E-01	960	1,712E-01	1500	1,402E-01	3000	1,191E-01	4500	1,146E-03
370	1,147E-01	670	3,631E-01	970	1,663E-01	1550	1,984E-01	3050	1,076E-01	4550	4,483E-04
380	1,358E-01	680	3,854E-01	980	1,615E-01	1600	2,675E-01	3100	9,357E-02	4600	1,161E-04
390	3,197E-01	690	4,354E-01	990	1,568E-01	1650	3,258E-01	3150	7,907E-02	4650	4,912E-05
400	4,675E-01	700	4,973E-01	1000	1,526E-01	1700	3,471E-01	3200	6,593E-02	4700	5,289E-05
410	4,563E-01	710	5,003E-01	1010	1,501E-01	1750	3,352E-01	3250	5,475E-02	4750	-
420	3,863E-01	720	4,765E-01	1020	1,477E-01	1800	2,551E-01	3300	4,581E-02	4800	-
430	2,438E-01	730	3,768E-01	1030	1,454E-01	1850	1,944E-01	3350	3,869E-02	4850	-
440	1,778E-01	740	4,625E-02	1040	1,433E-01	1900	2,119E-01	3400	3,324E-02	4900	-
450	2,059E-01	750	8,774E-02	1050	1,411E-01	1950	2,430E-01	3450	2,897E-02	4950	2,537E-05
460	2,162E-01	760	2,625E-01	1060	1,392E-01	2000	2,785E-01	3500	2,641E-02	5000	3,913E-05
470	1,852E-01	770	3,179E-01	1070	1,368E-01	2050	3,028E-01	3550	2,529E-02	5050	5,170E-05
480	1,795E-01	780	2,880E-01	1080	1,355E-01	2100	3,221E-01	3600	2,587E-02	5100	2,262E-05
490	2,862E-01	790	1,602E-01	1090	1,347E-01	2150	3,373E-01	3650	2,724E-02	5150	7,095E-05

Data Sheet

S8806A

Optical properties			
Reflection factor			
P_d	=	0,878	
Spectral values guaranteed			
τ_i (455 nm)	>	0,71	
τ_i (580 nm)	=	0,002	± 0,002
τ_i (618 nm)	=	0,9	± 0,030
τ_i (550 nm)	>	0,76	
Refractive indices			
n_h (404,7 nm)	=	1,7067	
n_e (546 nm)	=	1,6878	
n_d (587,6 nm)	=	1,6847	
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1		1,1147	
B_2		0,6697	
B_3		1,3665	
C_1		1,721E-02	µm²
C_2		1,7511E-13	µm²
C_3		100,000	µm²
Internal quality			
Bubble class		-	

Mechanical properties		
Reference thickness		
d	=	2,50 mm
Density		
ρ	=	3,49 g/cm³
Knoop hardness		
HK[0.1/20]		

Thermal properties		
Transformation temperature		
Tg	=	653 °C
Thermal expansion in		10^{-6}/K
$\alpha_{(-30°C/+70°C)}$	=	6,1
$\alpha_{(20°C/300°C)}$	=	7,3

Chemical properties		
Chemical resistance		
FR class	=	4
SR class	=	52.0
AR class	=	1.3
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

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
Contrast enhancement filter
ISO 23364:2021

Disclaimer
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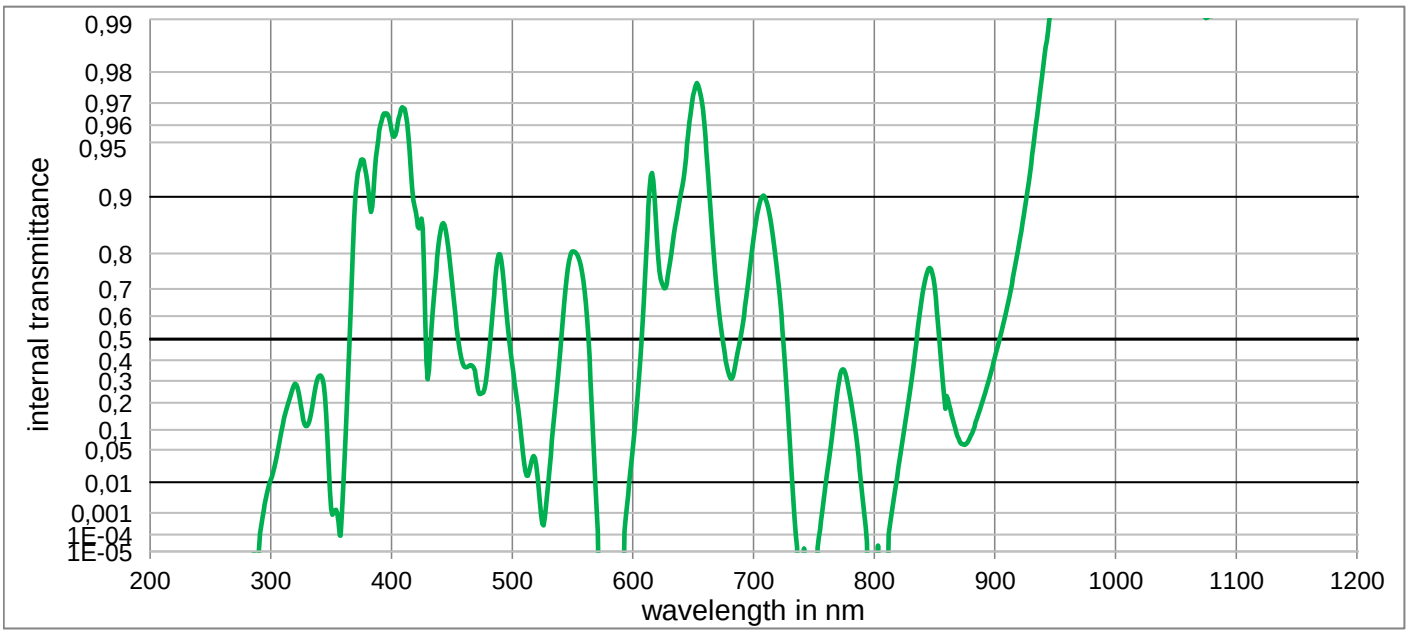
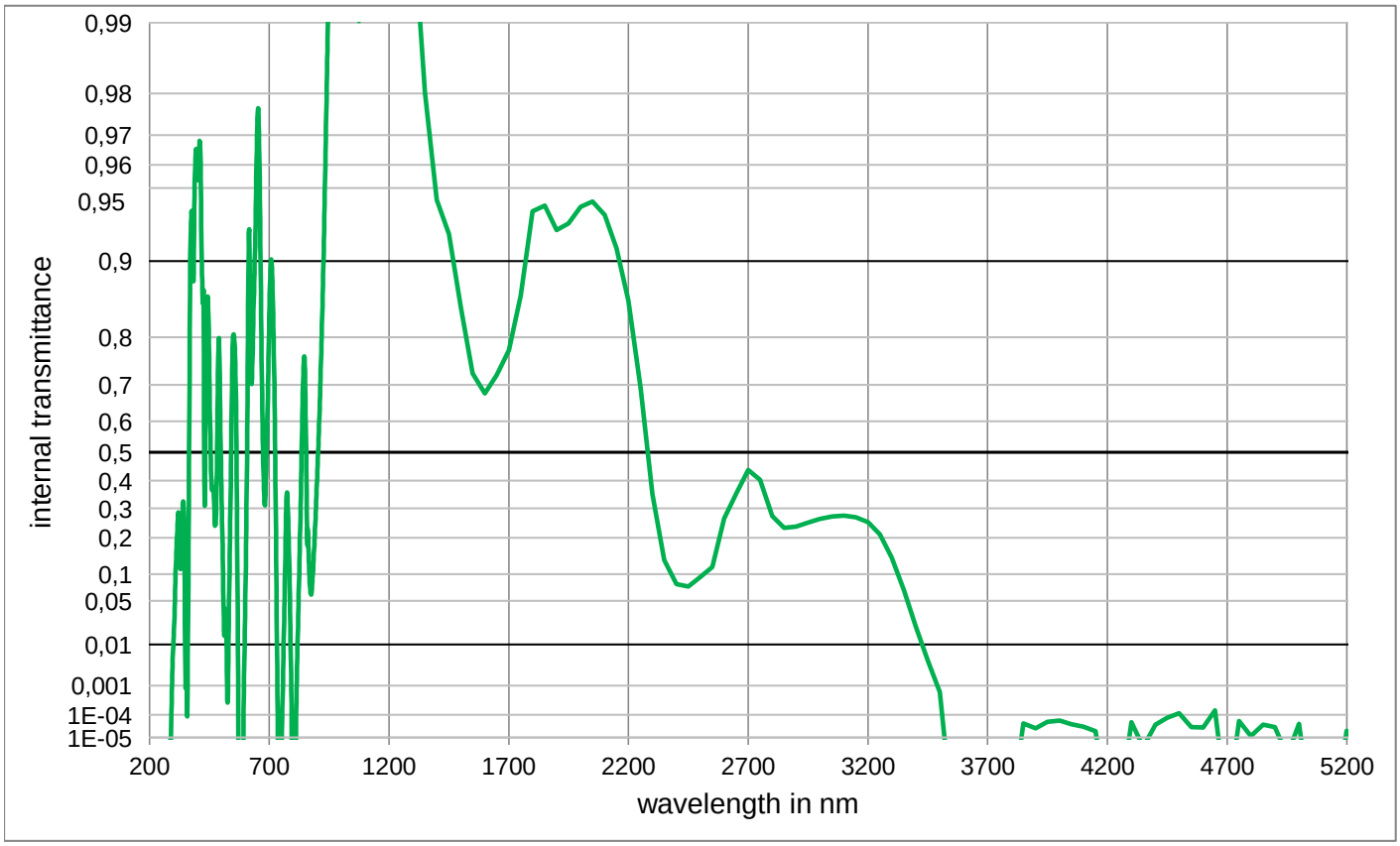


Data Sheet

S8806A



Internal transmittance ti 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	3,756E-01	800	< 1,000E-05	1100	9,956E-01	2200	8,562E-01	3700	
210	< 1,0E-05	510	2,712E-02	810	< 1,000E-05	1110	9,973E-01	2250	6,926E-01	3750	
220	< 1,0E-05	520	2,623E-02	820	2,121E-02	1120	9,982E-01	2300	3,511E-01	3800	
230	< 1,0E-05	530	1,110E-02	830	2,662E-01	1130	9,988E-01	2350	1,347E-01	3850	4,460E-05
240	< 1,0E-05	540	4,537E-01	840	6,804E-01	1140	9,994E-01	2400	7,911E-02	3900	2,669E-05
250	< 1,0E-05	550	8,047E-01	850	7,069E-01	1150	9,997E-01	2450	7,437E-02	3950	5,235E-05
260	< 1,0E-05	560	6,925E-01	860	2,300E-01	1160	9,997E-01	2500	9,294E-02	4000	5,942E-05
270	< 1,0E-05	570	1,587E-03	870	7,556E-02	1170	9,992E-01	2550	1,174E-01	4050	4,125E-05
280	< 1,0E-05	580	< 1,000E-05	880	8,345E-02	1180	9,987E-01	2600	2,638E-01	4100	3,178E-05
290	< 1,0E-05	590	< 1,000E-05	890	2,096E-01	1190	9,971E-01	2650	3,548E-01	4150	2,013E-05
300	1,1E-02	600	5,053E-02	900	4,115E-01	1200	9,943E-01	2700	4,376E-01	4200	
310	1,2E-01	610	7,355E-01	910	6,332E-01	1250	9,918E-01	2750	4,029E-01	4250	
320	2,860E-01	620	8,329E-01	920	8,198E-01	1300	9,964E-01	2800	2,729E-01	4300	4,980E-05
330	1,121E-01	630	7,600E-01	930	9,342E-01	1350	9,802E-01	2850	2,329E-01	4350	< 1,000E-05
340	3,242E-01	640	9,060E-01	940	9,813E-01	1400	9,441E-01	2900	2,364E-01	4400	3,969E-05
350	1,408E-03	650	9,729E-01	950	9,930E-01	1450	9,226E-01	2950	2,500E-01	4450	7,509E-05
360	5,762E-03	660	9,540E-01	960	9,957E-01	1500	8,475E-01	3000	2,630E-01	4500	1,168E-04
370	9,007E-01	670	6,750E-01	970	9,957E-01	1550	7,267E-01	3050	2,713E-01	4550	3,056E-05
380	9,175E-01	680	3,253E-01	980	9,960E-01	1600	6,782E-01	3100	2,735E-01	4600	2,932E-05
390	9,571E-01	690	5,335E-01	990	9,954E-01	1650	7,230E-01	3150	2,685E-01	4650	1,461E-04
400	9,573E-01	700	8,328E-01	1000	9,952E-01	1700	7,761E-01	3200	2,512E-01	4700	
410	9,681E-01	710	8,975E-01	1010	9,953E-01	1750	8,624E-01	3250	2,105E-01	4750	5,584E-05
420	8,796E-01	720	7,394E-01	1020	9,956E-01	1800	9,376E-01	3300	1,410E-01	4800	1,183E-05
430	3,086E-01	730	7,187E-02	1030	9,963E-01	1850	9,409E-01	3350	6,710E-02	4850	3,964E-05
440	8,369E-01	740	< 1,000E-05	1040	9,961E-01	1900	9,254E-01	3400	2,100E-02	4900	3,060E-05
450	7,247E-01	750	< 1,000E-05	1050	9,950E-01	1950	9,299E-01	3450	4,390E-03	4950	< 1,000E-05
460	3,727E-01	760	9,719E-03	1060	9,928E-01	2000	9,400E-01	3500	6,351E-04	5000	4,206E-05
470	3,203E-01	770	2,723E-01	1070	9,904E-01	2050	9,430E-01	3550		5050	
480	3,882E-01	780	2,269E-01	1080	9,904E-01	2100	9,352E-01	3600		5100	
490	7,984E-01	790	5,137E-03	1090	9,931E-01	2150	9,113E-01	3650		5150	

Data Sheet

S8808

Optical properties			
Reflection factor			
P_d	=	0,906	
Spectral values guaranteed			
τ_i (445 nm)	=	0,256	± 0,030
τ_i (555 nm)	=	0,32	± 0,015
τ_i (620 nm)	=	0,285	± 0,030
τ_i (580 nm)	≤	0,02	
Refractive indices			
n_h (404,7 nm)	=	1,5895	
n_e (546 nm)	=	1,5726	
n_d (587,6 nm)	=	1,5698	
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1		0,0144	
B_2		1,4016	
B_3		0,9378	
C_1		6,842E-03	µm²
C_2		1,2018E-02	µm²
C_3		128,775	µm²
Internal quality			
Bubble class		0	

Mechanical properties		
Reference thickness		
d	=	3,50 mm
Density		
ρ	=	2,91 g/cm³
Knoop hardness		
HK[0.1/20]	=	474

Thermal properties		
Transformation temperature		
Tg	=	476 °C
Thermal expansion in		10^{-6}/K
$\alpha_{(20°C/300°C)}$	=	13,3

Chemical properties		
Chemical resistance		
FR class	=	2
SR class	=	5.4
AR class	=	1.0
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

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
Contrast enhancement filter
ISO 23364:2021

Disclaimer
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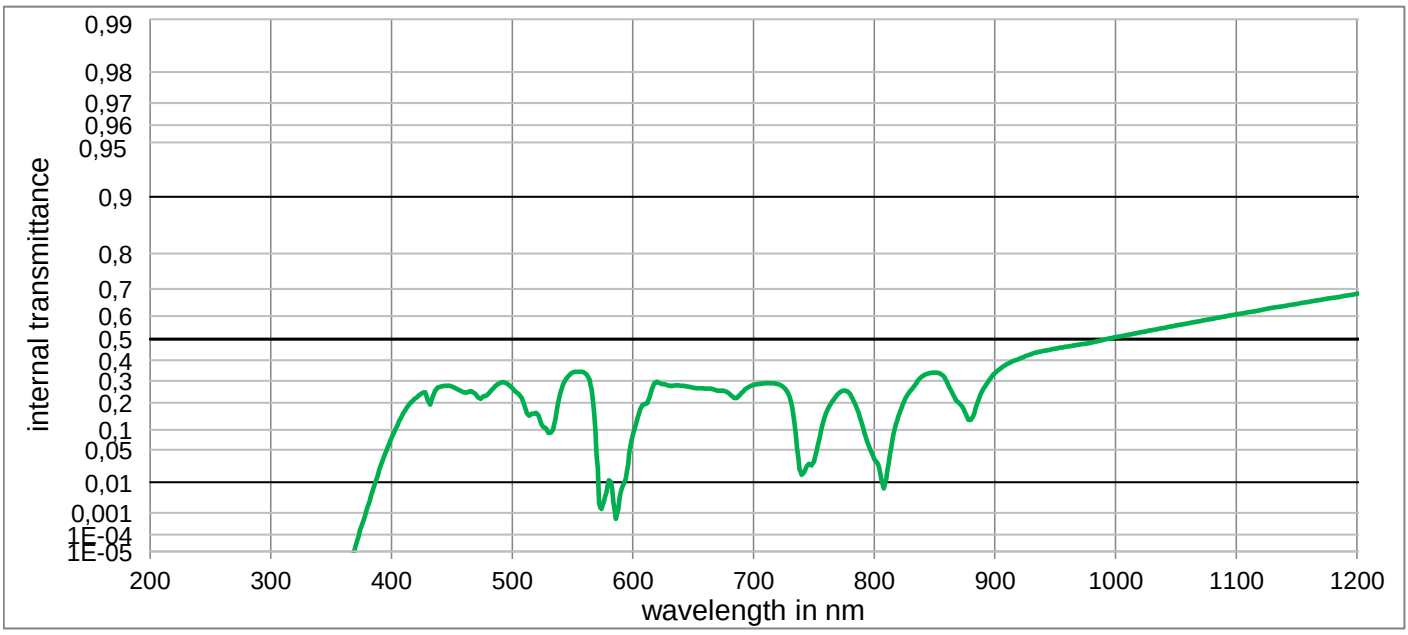
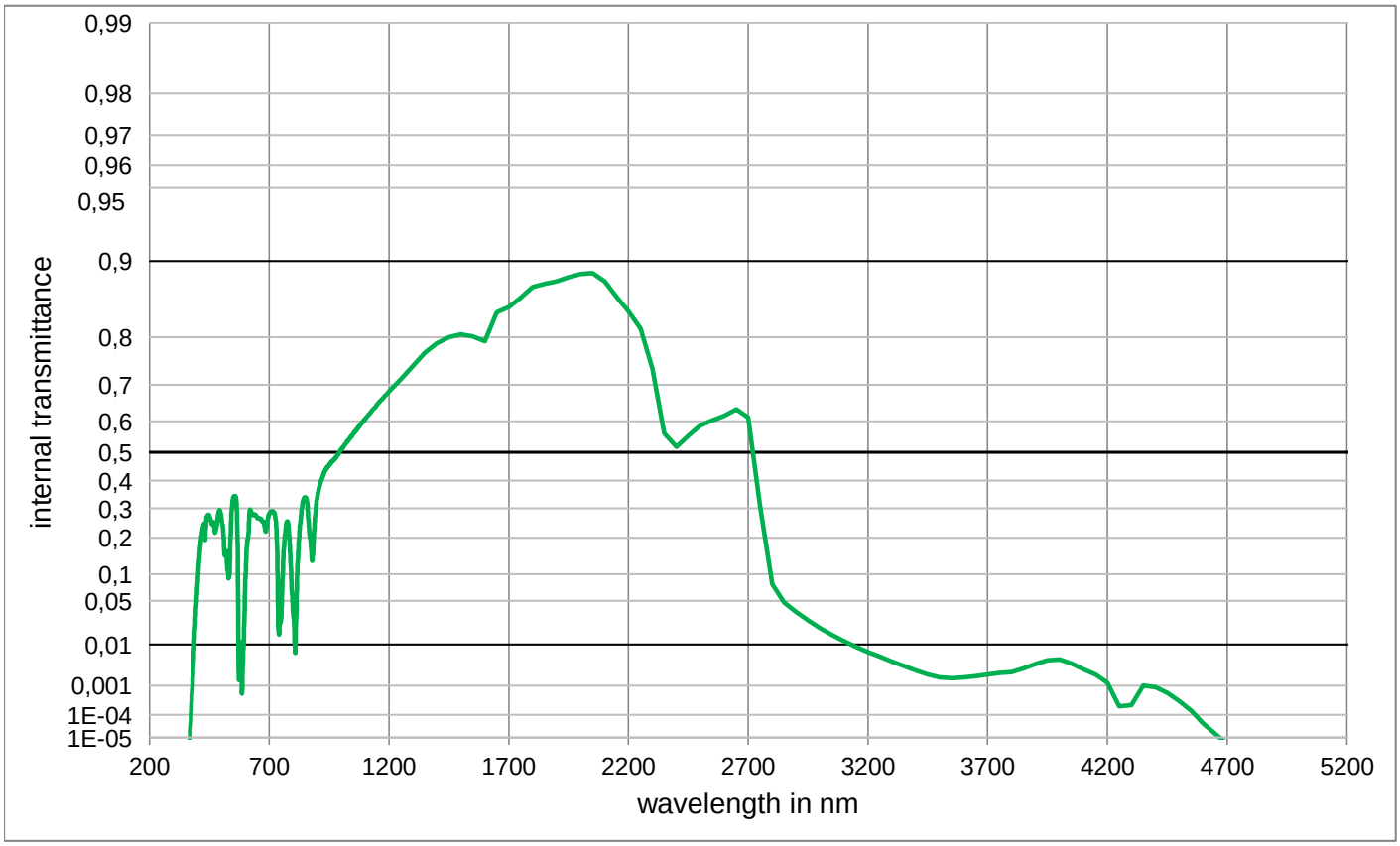


Data Sheet

S8808



Internal transmittance ti 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	2,658E-01	800	3,340E-02	1100	6,066E-01	2200	8,417E-01	3700	2,024E-03
210	< 1,0E-05	510	1,906E-01	810	1,205E-02	1110	6,152E-01	2250	8,148E-01	3750	2,243E-03
220	< 1,0E-05	520	1,596E-01	820	1,434E-01	1120	6,238E-01	2300	7,380E-01	3800	2,380E-03
230	< 1,0E-05	530	9,089E-02	830	2,533E-01	1130	6,326E-01	2350	5,627E-01	3850	2,934E-03
240	< 1,0E-05	540	2,436E-01	840	3,224E-01	1140	6,399E-01	2400	5,192E-01	3900	3,803E-03
250	< 1,0E-05	550	3,396E-01	850	3,397E-01	1150	6,475E-01	2450	5,543E-01	3950	4,622E-03
260	< 1,0E-05	560	3,388E-01	860	2,978E-01	1160	6,552E-01	2500	5,867E-01	4000	4,753E-03
270	< 1,0E-05	570	3,964E-02	870	2,009E-01	1170	6,624E-01	2550	6,025E-01	4050	3,844E-03
280	< 1,0E-05	580	1,122E-02	880	1,332E-01	1180	6,697E-01	2600	6,161E-01	4100	2,771E-03
290	< 1,0E-05	590	5,390E-03	890	2,573E-01	1190	6,766E-01	2650	6,349E-01	4150	2,056E-03
300	< 1,0E-05	600	8,358E-02	900	3,362E-01	1200	6,835E-01	2700	6,120E-01	4200	1,208E-03
310	< 1,0E-05	610	1,944E-01	910	3,809E-01	1250	7,141E-01	2750	3,092E-01	4250	2,104E-04
320	< 1,000E-05	620	2,958E-01	920	4,066E-01	1300	7,438E-01	2800	7,872E-02	4300	2,283E-04
330	< 1,000E-05	630	2,764E-01	930	4,304E-01	1350	7,714E-01	2850	4,772E-02	4350	1,002E-03
340	< 1,000E-05	640	2,770E-01	940	4,446E-01	1400	7,889E-01	2900	3,552E-02	4400	8,931E-04
350	< 1,000E-05	650	2,671E-01	950	4,556E-01	1450	8,002E-01	2950	2,660E-02	4450	6,020E-04
360	< 1,000E-05	660	2,641E-01	960	4,655E-01	1500	8,052E-01	3000	1,993E-02	4500	3,256E-04
370	1,993E-05	670	2,546E-01	970	4,745E-01	1550	8,012E-01	3050	1,517E-02	4550	1,419E-04
380	1,618E-03	680	2,402E-01	980	4,839E-01	1600	7,926E-01	3100	1,163E-02	4600	4,506E-05
390	1,990E-02	690	2,435E-01	990	4,972E-01	1650	8,400E-01	3150	8,979E-03	4650	1,515E-05
400	7,673E-02	700	2,805E-01	1000	5,088E-01	1700	8,474E-01	3200	6,989E-03	4700	< 1,000E-05
410	1,583E-01	710	2,892E-01	1010	5,192E-01	1750	8,599E-01	3250	5,516E-03	4750	< 1,000E-05
420	2,205E-01	720	2,842E-01	1020	5,300E-01	1800	8,727E-01	3300	4,325E-03	4800	< 1,000E-05
430	2,123E-01	730	2,264E-01	1030	5,402E-01	1850	8,763E-01	3350	3,401E-03	4850	< 1,000E-05
440	2,705E-01	740	1,541E-02	1040	5,502E-01	1900	8,791E-01	3400	2,616E-03	4900	< 1,000E-05
450	2,731E-01	750	3,008E-02	1050	5,604E-01	1950	8,835E-01	3450	2,041E-03	4950	< 1,000E-05
460	2,466E-01	760	1,564E-01	1060	5,696E-01	2000	8,871E-01	3500	1,717E-03	5000	< 1,000E-05
470	2,368E-01	770	2,397E-01	1070	5,794E-01	2050	8,882E-01	3550	1,632E-03	5050	< 1,000E-05
480	2,381E-01	780	2,379E-01	1080	5,887E-01	2100	8,792E-01	3600	1,720E-03	5100	< 1,000E-05
490	2,901E-01	790	1,188E-01	1090	5,980E-01	2150	8,611E-01	3650	1,863E-03	5150	< 1,000E-05

Data Sheet

S8809

Optical properties			
Reflection factor			
P_d	=	0,905	
Spectral values guaranteed			
τ_i (440 nm)	=	0,196	± 0,033
τ_i (550 nm)	=	0,234	± 0,032
τ_i (620 nm)	=	0,229	± 0,027
Refractive indices			
n_h (404,7 nm)	=	1,5933	
n_e (546 nm)	=	1,5765	
n_d (587,6 nm)	=	1,5737	
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1		1,2022	
B_2		0,2267	
B_3		3,0814	
C_1		1,377E-02	µm²
C_2		4,8304E-04	µm²
C_3		394,060	µm²
Internal quality			
Bubble class		-	

Mechanical properties		
Reference thickness		
d	=	2,20 mm
Density		
ρ	=	2,91 g/cm³
Knoop hardness		
HK[0.1/20]		

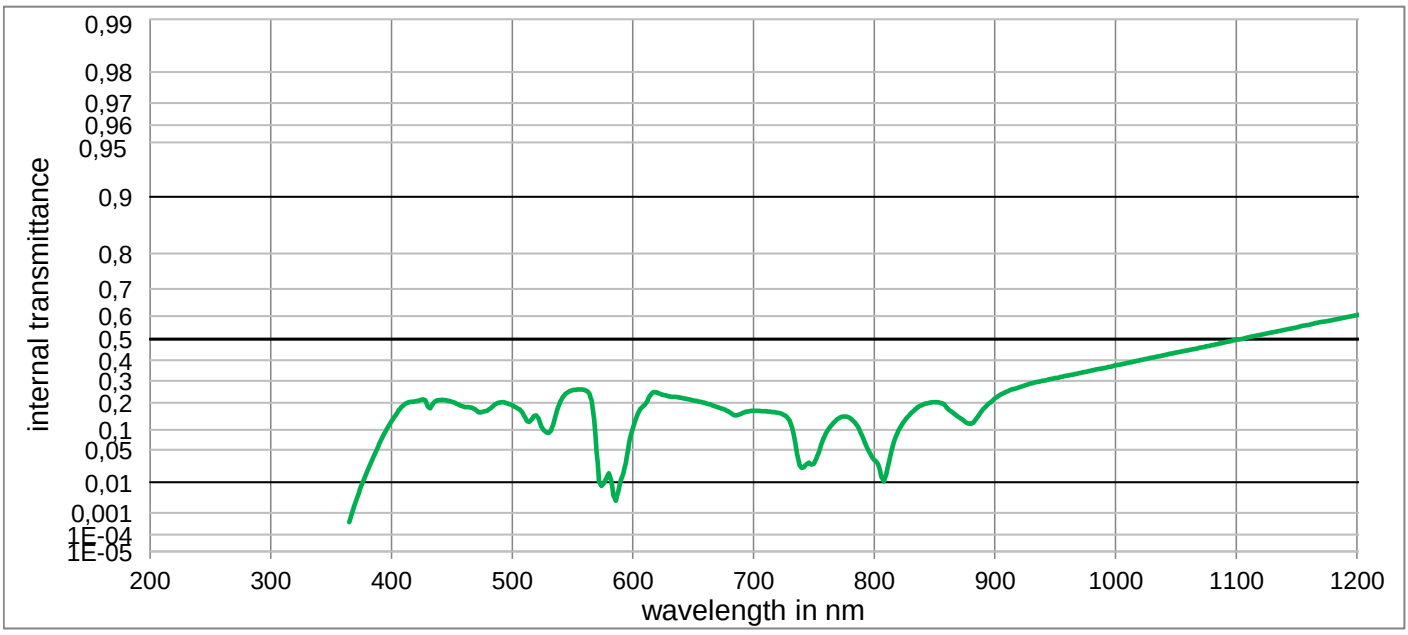
Thermal properties		
Transformation temperature		
Tg	=	459 °C
Thermal expansion in		10^{-6}/K
$\alpha_{(20°C/300°C)}$	=	11,9

Chemical properties	
Chemical resistance	
FR class	
SR class	
AR class	
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,293	0,366	0,320
	y	0,309	0,406	0,288
	Y	35,9	18,8	12,9
	λ_d	477,2	572,0	
	P_e	0,091	0,365	0,093
Illuminant A	x	0,438	0,480	0,479
	y	0,393	0,436	0,368
	Y	35,1	19,3	13,4
	λ_d		581,7	
	P_e	0,028	0,424	0,083

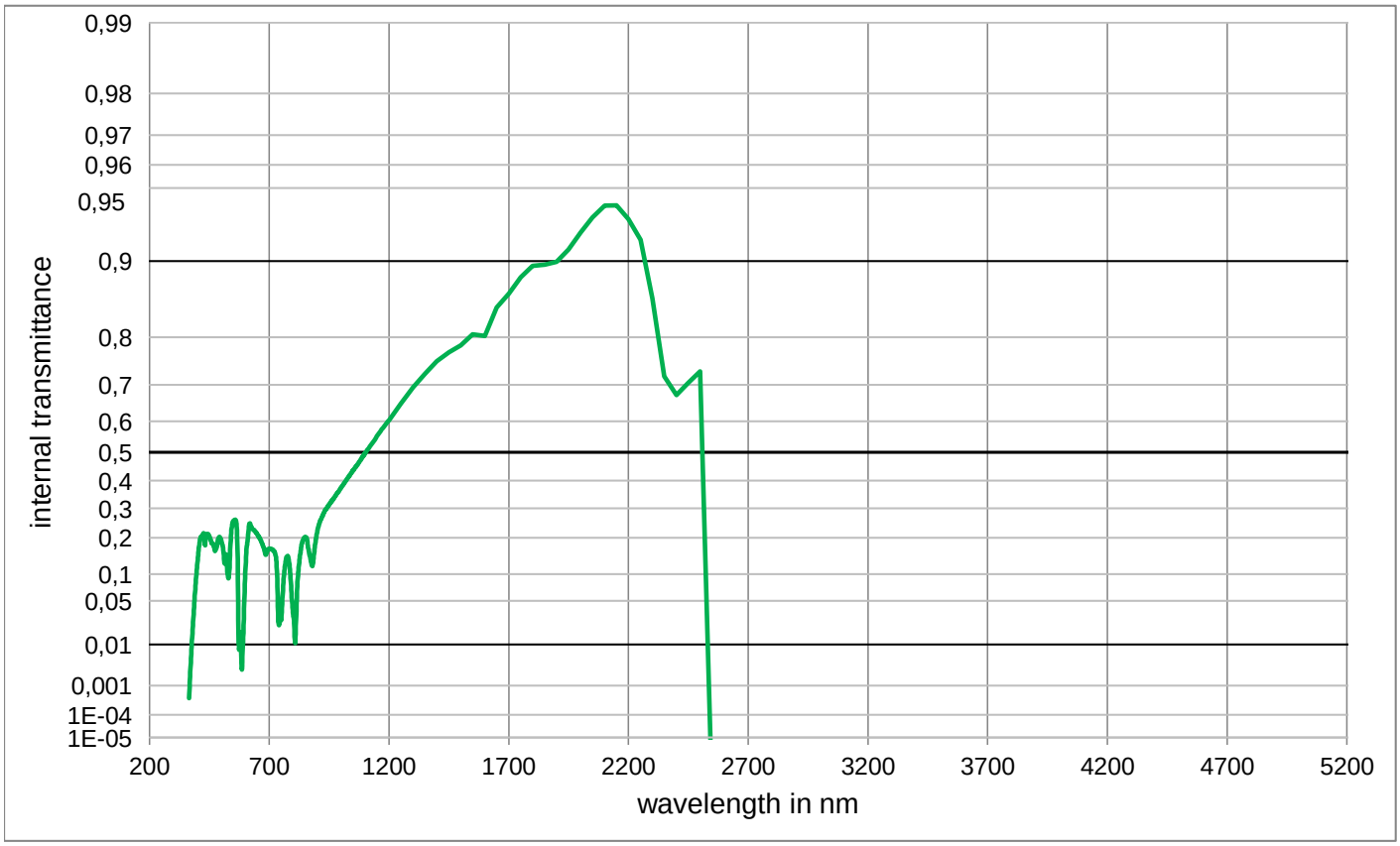
Notes
Ionically colored glass
Contrast enhancement filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

S8809



Internal transmittance ti 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	1,892E-01	800	3,197E-02	1100	4,965E-01	2200	9,327E-01	3700	
210	< 1,0E-05	510	1,470E-01	810	1,562E-02	1110	5,084E-01	2250	9,180E-01	3750	
220	< 1,0E-05	520	1,503E-01	820	9,677E-02	1120	5,200E-01	2300	8,590E-01	3800	
230	< 1,0E-05	530	9,059E-02	830	1,552E-01	1130	5,308E-01	2350	7,200E-01	3850	
240	< 1,0E-05	540	2,057E-01	840	1,911E-01	1140	5,419E-01	2400	6,736E-01	3900	
250	< 1,0E-05	550	2,561E-01	850	2,030E-01	1150	5,532E-01	2450	7,050E-01	3950	
260	< 1,0E-05	560	2,571E-01	860	1,797E-01	1160	5,639E-01	2500	7,315E-01	4000	
270	< 1,0E-05	570	4,613E-02	870	1,442E-01	1170	5,750E-01	2550		4050	
280	< 1,0E-05	580	1,691E-02	880	1,193E-01	1180	5,840E-01	2600		4100	
290	< 1,0E-05	590	1,121E-02	890	1,714E-01	1190	5,946E-01	2650		4150	
300	< 1,0E-05	600	1,025E-01	900	2,190E-01	1200	6,036E-01	2700		4200	
310	< 1,0E-05	610	1,928E-01	910	2,503E-01	1250	6,515E-01	2750		4250	
320	< 1,000E-05	620	2,458E-01	920	2,690E-01	1300	6,941E-01	2800		4300	
330	< 1,000E-05	630	2,280E-01	930	2,877E-01	1350	7,265E-01	2850		4350	
340	< 1,000E-05	640	2,216E-01	940	3,005E-01	1400	7,539E-01	2900		4400	
350	< 1,000E-05	650	2,103E-01	950	3,134E-01	1450	7,724E-01	2950		4450	
360	< 1,000E-05	660	1,988E-01	960	3,256E-01	1500	7,855E-01	3000		4500	
370	2,355E-03	670	1,818E-01	970	3,377E-01	1550	8,051E-01	3050		4550	
380	1,874E-02	680	1,619E-01	980	3,497E-01	1600	8,025E-01	3100		4600	
390	6,302E-02	690	1,566E-01	990	3,610E-01	1650	8,468E-01	3150		4650	
400	1,283E-01	700	1,669E-01	1000	3,748E-01	1700	8,651E-01	3200		4700	
410	1,895E-01	710	1,651E-01	1010	3,870E-01	1750	8,836E-01	3250		4750	
420	2,062E-01	720	1,594E-01	1020	3,999E-01	1800	8,956E-01	3300		4800	
430	1,849E-01	730	1,295E-01	1030	4,119E-01	1850	8,965E-01	3350		4850	
440	2,120E-01	740	2,216E-02	1040	4,244E-01	1900	8,993E-01	3400		4900	
450	2,043E-01	750	2,719E-02	1050	4,365E-01	1950	9,102E-01	3450		4950	
460	1,831E-01	760	8,913E-02	1060	4,478E-01	2000	9,235E-01	3500		5000	
470	1,702E-01	770	1,371E-01	1070	4,601E-01	2050	9,337E-01	3550		5050	
480	1,699E-01	780	1,396E-01	1080	4,717E-01	2100	9,408E-01	3600		5100	
490	2,016E-01	790	8,357E-02	1090	4,848E-01	2150	9,410E-01	3650		5150	

Data Sheet

S8851

Optical properties			
Reflection factor			
P_d	=	0,880	
Spectral values guaranteed			
τ_i (805 nm)	=	0,414	± 0,028
τ_i (976 nm)	=	0,578	± 0,034
τ_i (1222 nm)	=	0,323	± 0,023
τ_i (1945 nm)	=	0,29	± 0,023
τ_i (710 nm)	≥	0,966	
Refractive indices			
n_d (587,6 nm)	=	1,678	
Sellmeier coefficients			
on request			
Internal quality			
Bubble class		2	

Mechanical properties		
Reference thickness		
d	=	2,00 mm
Density		
ρ	=	3,58 g/cm³
Knoop hardness		
HK[0.1/20]		

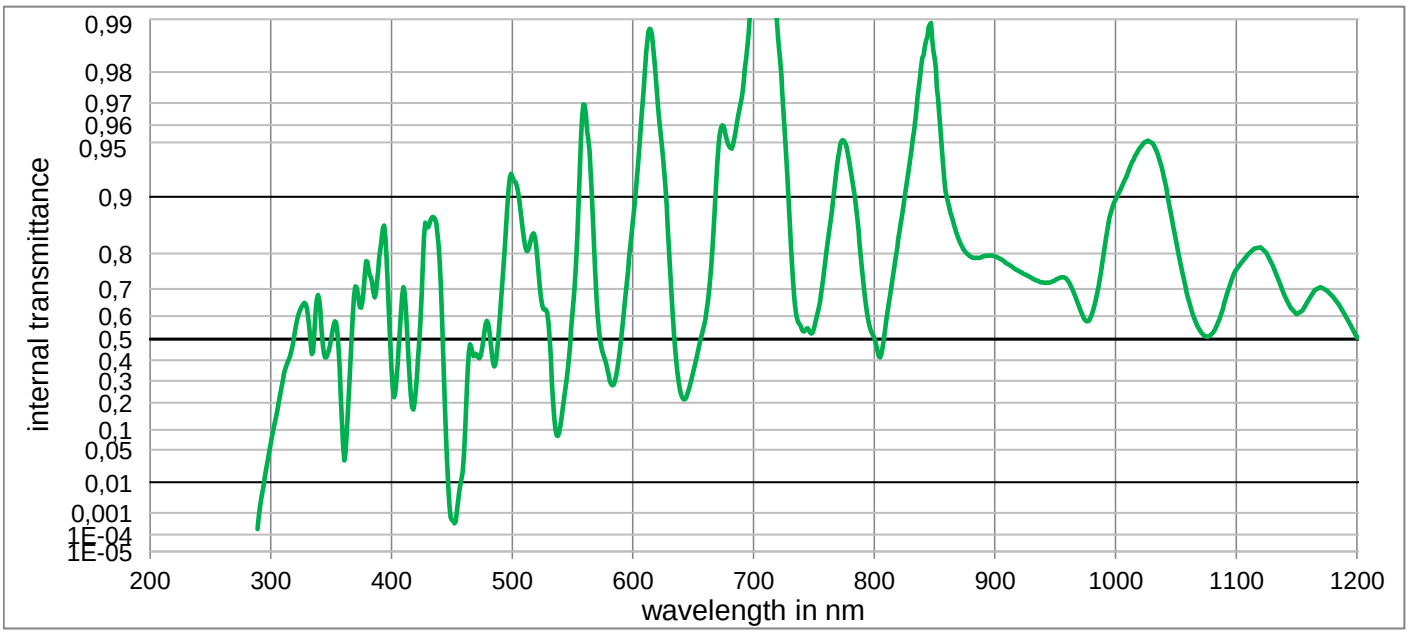
Thermal properties		
Transformation temperature		
Tg	=	659 °C
Thermal expansion in		**10^{-6}/K**
$\alpha_{(20°C/300°C)}$	=	7,2

Chemical properties		
Chemical resistance		
FR class	=	-
SR class	=	-
AR class	=	-
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

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

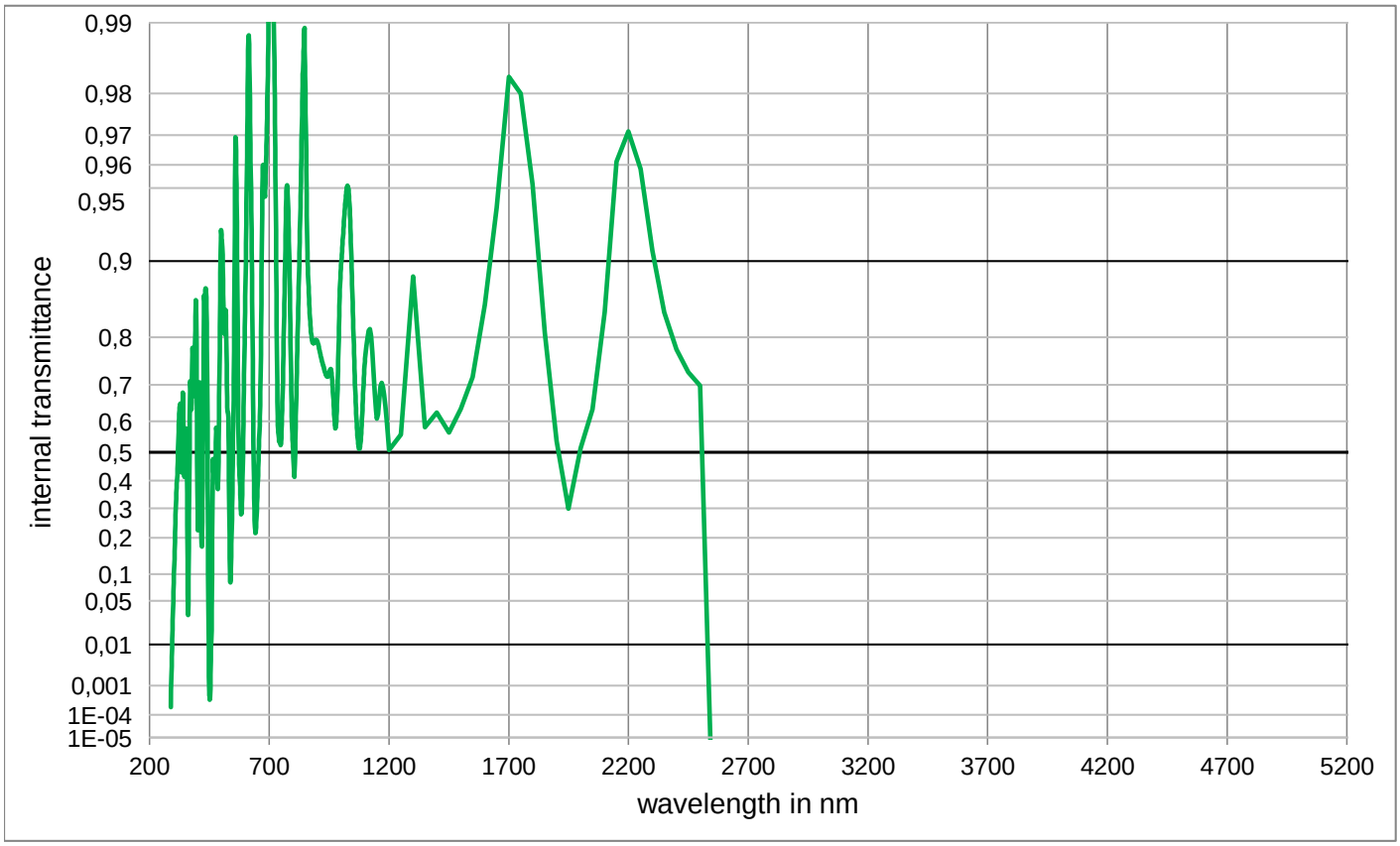
Notes
Ionically colored glass
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

S8851



Internal transmittance ti 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	9,223E-01	800	5,049E-01	1100	7,593E-01	2200	9,710E-01	3700	
210	< 1,0E-05	510	8,278E-01	810	5,805E-01	1110	7,978E-01	2250	9,585E-01	3750	
220	< 1,0E-05	520	8,179E-01	820	8,305E-01	1120	8,142E-01	2300	9,092E-01	3800	
230	< 1,0E-05	530	5,710E-01	830	9,396E-01	1130	7,717E-01	2350	8,398E-01	3850	
240	< 1,0E-05	540	1,134E-01	840	9,835E-01	1140	6,787E-01	2400	7,774E-01	3900	
250	< 1,0E-05	550	6,050E-01	850	9,833E-01	1150	6,080E-01	2450	7,296E-01	3950	
260	< 1,0E-05	560	9,692E-01	860	9,003E-01	1160	6,624E-01	2500	6,979E-01	4000	
270	< 1,0E-05	570	6,676E-01	870	8,321E-01	1170	7,053E-01	2550		4050	
280	< 1,0E-05	580	3,229E-01	880	7,920E-01	1180	6,737E-01	2600		4100	
290	7,4E-04	590	4,870E-01	890	7,927E-01	1190	6,053E-01	2650		4150	
300	6,4E-02	600	8,614E-01	900	7,931E-01	1200	5,074E-01	2700		4200	
310	3,1E-01	610	9,807E-01	910	7,746E-01	1250	5,581E-01	2750		4250	
320	5,353E-01	620	9,737E-01	920	7,541E-01	1300	8,846E-01	2800		4300	
330	6,291E-01	630	8,132E-01	930	7,354E-01	1350	5,817E-01	2850		4350	
340	6,630E-01	640	2,353E-01	940	7,207E-01	1400	6,255E-01	2900		4400	
350	5,002E-01	650	3,410E-01	950	7,278E-01	1450	5,655E-01	2950		4450	
360	6,054E-02	660	5,866E-01	960	7,282E-01	1500	6,359E-01	3000		4500	
370	7,091E-01	670	9,356E-01	970	6,340E-01	1550	7,190E-01	3050		4550	
380	7,802E-01	680	9,473E-01	980	6,015E-01	1600	8,507E-01	3100		4600	
390	7,899E-01	690	9,717E-01	990	7,979E-01	1650	9,396E-01	3150		4650	
400	3,551E-01	700	9,941E-01	1000	8,961E-01	1700	9,830E-01	3200		4700	
410	7,061E-01	710	9,983E-01	1010	9,259E-01	1750	9,800E-01	3250		4750	
420	2,536E-01	720	9,879E-01	1020	9,464E-01	1800	9,516E-01	3300		4800	
430	8,538E-01	730	8,645E-01	1030	9,499E-01	1850	8,076E-01	3350		4850	
440	7,831E-01	740	5,461E-01	1040	9,218E-01	1900	5,381E-01	3400		4900	
450	5,000E-04	750	5,475E-01	1050	8,292E-01	1950	2,986E-01	3450		4950	
460	3,825E-02	760	7,924E-01	1060	6,715E-01	2000	5,150E-01	3500		5000	
470	4,309E-01	770	9,394E-01	1070	5,371E-01	2050	6,356E-01	3550		5050	
480	5,707E-01	780	9,316E-01	1080	5,246E-01	2100	8,405E-01	3600		5100	
490	6,053E-01	790	7,605E-01	1090	6,477E-01	2150	9,613E-01	3650		5150	

Data Sheet

N-WG205

Optical properties	
Reflection factor	
P_d =	0,929
Spectral values guaranteed (d = 2 mm)	
$\lambda_{i\,0,5}$ =	205 nm ± 10 nm
λ_p ($\tau_{i,L}$ = 0,97) =	270 nm
Refractive indices	
n_d (587,6 nm) =	1,48
n_s (852 nm) =	1,47
n_t (1014 nm) =	1,47
Sellmeier coefficients	
valid from 440 nm to 1550 nm	
B_1 =	0,0144
B_2 =	1,1393
B_3 =	1,0869
C_1 =	6,822E-03 µm²
C_2 =	8,6122E-03 µm²
C_3 =	109,981 µm²
Internal quality	
Bubble class	-

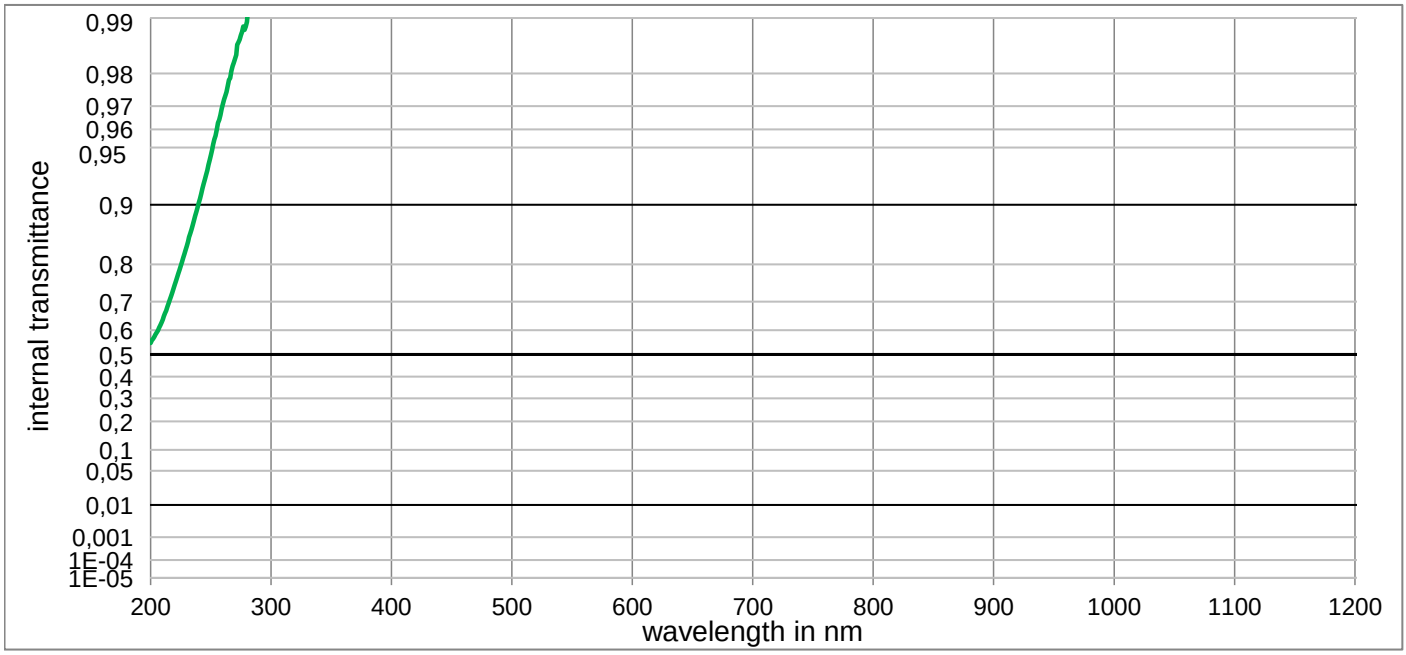
Mechanical properties	
Reference thickness	
d =	2,00 mm
Density	
ρ =	2,22 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	

Thermal properties	
Transformation temperature	
Tg =	440 °C
Thermal expansion in	10^{-6}/K
$\alpha_{(20°C/300°C)}$ =	4,1

Chemical properties	
Chemical resistance	
FR class =	-
SR class =	-
AR class =	-
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

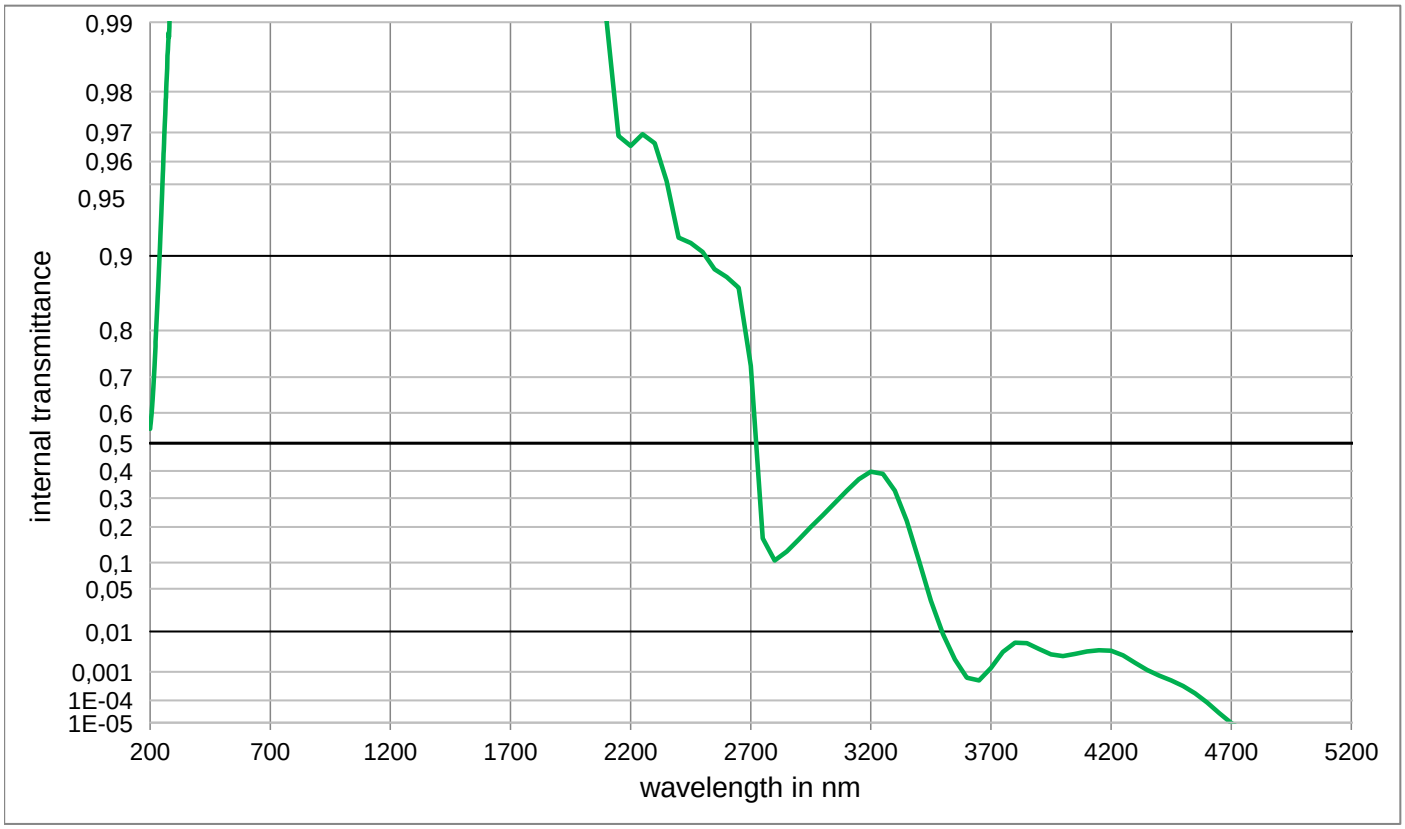
Colormetric properties	1 mm	2 mm	3 mm
Illuminant D65	x		
	y		
	Y		
	λ_d		
	P_e		
Illuminant A	x		
	y		
	Y		
	λ_d		
	P_e		

Notes
Ionically colored glass
Longpass filter
contains strong striae
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

N-WG205



Internal transmittance ti 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	5,5E-01	500	1,000E+00	800	1,000E+00	1100	1,000E+00	2200	9,657E-01	3700	1,300E-03
210	6,4E-01	510	1,000E+00	810	1,000E+00	1110	1,000E+00	2250	9,694E-01	3750	3,496E-03
220	7,5E-01	520	1,000E+00	820	1,000E+00	1120	1,000E+00	2300	9,667E-01	3800	5,778E-03
230	8,4E-01	530	1,000E+00	830	1,000E+00	1130	1,000E+00	2350	9,516E-01	3850	5,658E-03
240	9,0E-01	540	1,000E+00	840	1,000E+00	1140	1,000E+00	2400	9,160E-01	3900	4,117E-03
250	9,5E-01	550	1,000E+00	850	1,000E+00	1150	1,000E+00	2450	9,116E-01	3950	3,029E-03
260	9,7E-01	560	1,000E+00	860	1,000E+00	1160	1,000E+00	2500	9,037E-01	4000	2,738E-03
270	9,8E-01	570	1,000E+00	870	1,000E+00	1170	1,000E+00	2550	8,864E-01	4050	3,110E-03
280	9,9E-01	580	1,000E+00	880	1,000E+00	1180	1,000E+00	2600	8,777E-01	4100	3,612E-03
290	9,9E-01	590	1,000E+00	890	1,000E+00	1190	1,000E+00	2650	8,648E-01	4150	3,861E-03
300	9,9E-01	600	1,000E+00	900	1,000E+00	1200	1,000E+00	2700	7,273E-01	4200	3,738E-03
310	9,9E-01	610	1,000E+00	910	1,000E+00	1250	1,000E+00	2750	1,646E-01	4250	2,866E-03
320	9,953E-01	620	1,000E+00	920	1,000E+00	1300	1,000E+00	2800	1,052E-01	4300	1,823E-03
330	9,968E-01	630	1,000E+00	930	1,000E+00	1350	1,000E+00	2850	1,276E-01	4350	1,145E-03
340	9,981E-01	640	1,000E+00	940	1,000E+00	1400	9,929E-01	2900	1,611E-01	4400	7,717E-04
350	9,987E-01	650	1,000E+00	950	1,000E+00	1450	9,988E-01	2950	1,992E-01	4450	5,340E-04
360	9,996E-01	660	1,000E+00	960	1,000E+00	1500	1,000E+00	3000	2,390E-01	4500	3,471E-04
370	9,994E-01	670	1,000E+00	970	1,000E+00	1550	1,000E+00	3050	2,823E-01	4550	1,909E-04
380	9,995E-01	680	1,000E+00	980	1,000E+00	1600	1,000E+00	3100	3,270E-01	4600	8,269E-05
390	9,993E-01	690	1,000E+00	990	1,000E+00	1650	1,000E+00	3150	3,692E-01	4650	2,901E-05
400	9,994E-01	700	1,000E+00	1000	1,000E+00	1700	1,000E+00	3200	3,970E-01	4700	< 1,000E-05
410	9,997E-01	710	1,000E+00	1010	1,000E+00	1750	1,000E+00	3250	3,890E-01	4750	< 1,000E-05
420	9,999E-01	720	1,000E+00	1020	1,000E+00	1800	1,000E+00	3300	3,273E-01	4800	< 1,000E-05
430	1,000E+00	730	1,000E+00	1030	1,000E+00	1850	1,000E+00	3350	2,200E-01	4850	< 1,000E-05
440	1,000E+00	740	1,000E+00	1040	1,000E+00	1900	9,999E-01	3400	1,048E-01	4900	< 1,000E-05
450	1,000E+00	750	1,000E+00	1050	1,000E+00	1950	9,981E-01	3450	3,420E-02	4950	< 1,000E-05
460	1,000E+00	760	1,000E+00	1060	1,000E+00	2000	9,933E-01	3500	8,818E-03	5000	< 1,000E-05
470	1,000E+00	770	1,000E+00	1070	1,000E+00	2050	9,933E-01	3550	2,255E-03	5050	< 1,000E-05
480	1,000E+00	780	1,000E+00	1080	1,000E+00	2100	9,902E-01	3600	6,575E-04	5100	< 1,000E-05
490	1,000E+00	790	1,000E+00	1090	1,000E+00	2150	9,690E-01	3650	5,338E-04	5150	< 1,000E-05

Data Sheet

N-WG280

Optical properties	
Reflection factor	
P_d	= 0,919
Spectral values guaranteed (d = 2 mm)	
$\lambda_{i\,0,5}$	= 280 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 230 nm
λ_p ($\tau_{i,L}$ = 0,99)	= 380 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 440 nm to 1550 nm	
B_1 =	0,0123
B_2 =	0,5089
B_3 =	1,8825
C_1 =	1,388E-02 µm²
C_2 =	1,8223E-05 µm²
C_3 =	202,101 µm²
Internal quality	
Bubble class	1

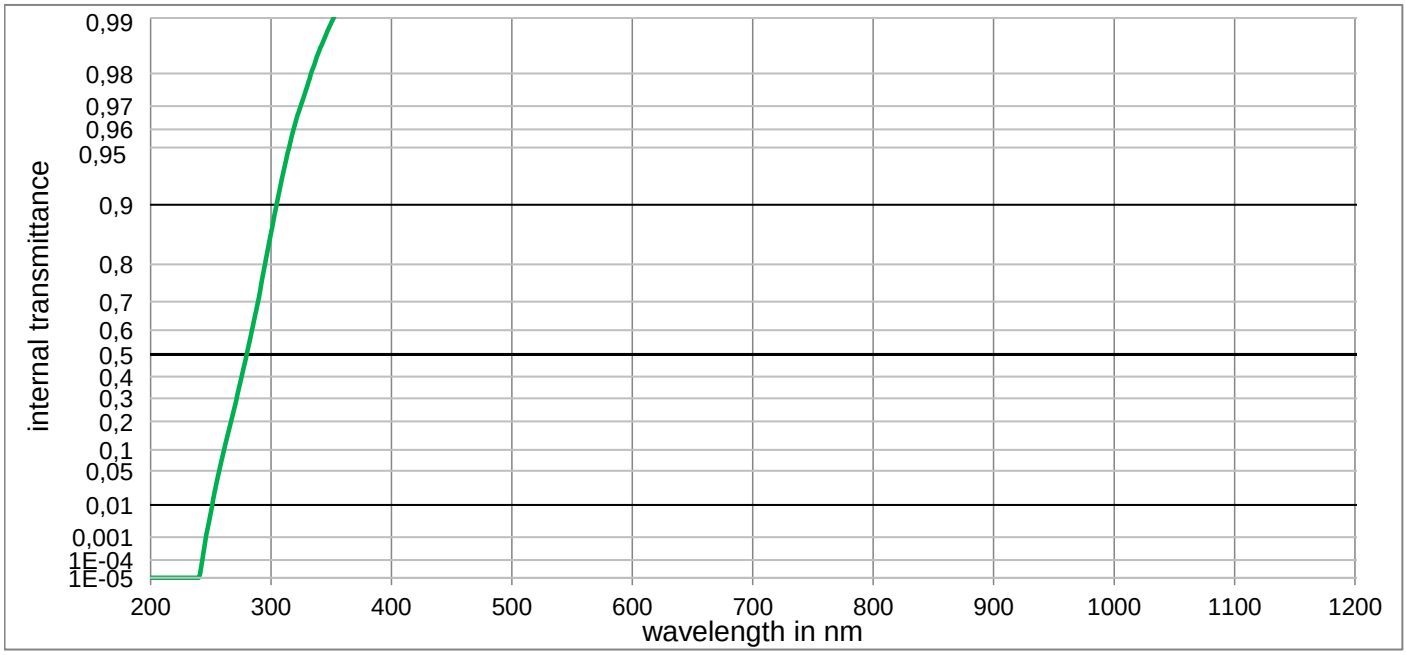
Mechanical properties	
Reference thickness	
d	= 2,00 mm
Density	
ρ	= 2,51 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 610

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 2
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

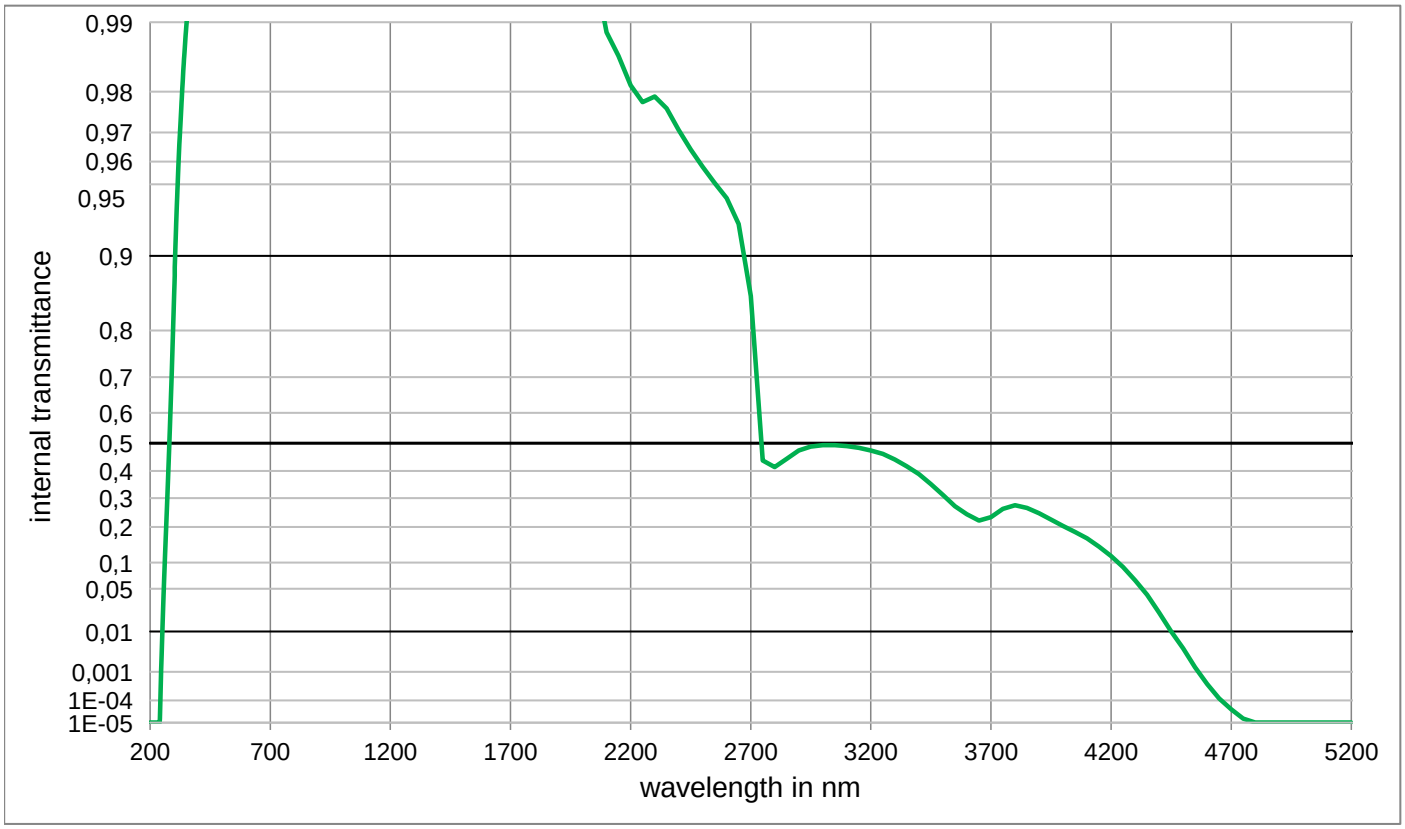
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Base glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

N-WG280



Internal transmittance ti 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

Data Sheet

N-WG295

Optical properties	
Reflection factor	
P_d	= 0,919
Spectral values guaranteed (d = 2 mm)	
$\lambda_{i\,0,5}$	= 295 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 250 nm
λ_p ($\tau_{i,L}$ = 0,99)	= 400 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 440 nm to 1550 nm	
B_1 =	######
B_2 =	0,5097
B_3 =	1,4617
C_2 =	1,9688E-02 µm²
C_3 =	100,000 µm²
Internal quality	
Bubble class	1

Mechanical properties	
Reference thickness	
d	= 2,00 mm
Density	
ρ	= 2,51 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 610

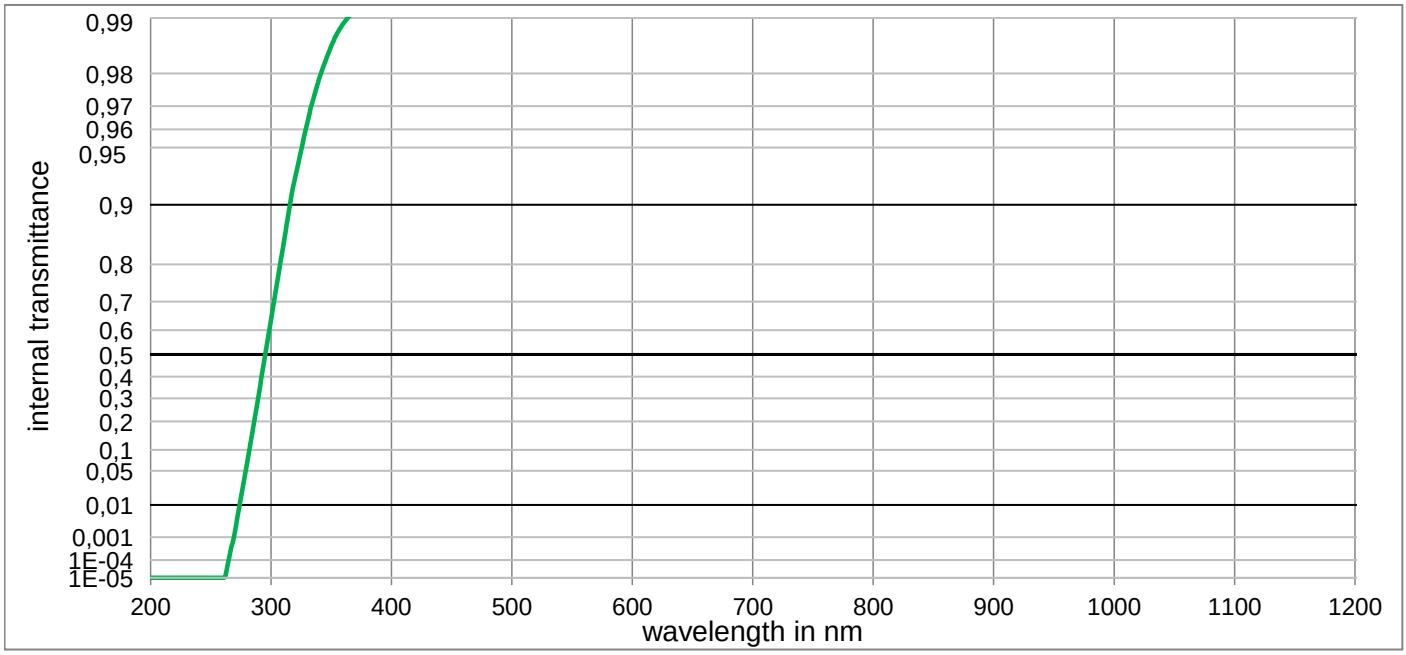
Thermal properties	
Transformation temperature	
Tg	= 565 °C
Thermal expansion in	**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 7,2
$\alpha_{(20°C/300°C)}$	= 8,4
Temperature coefficient	
Tk	= 0,06 nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 2
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

Colormetric properties

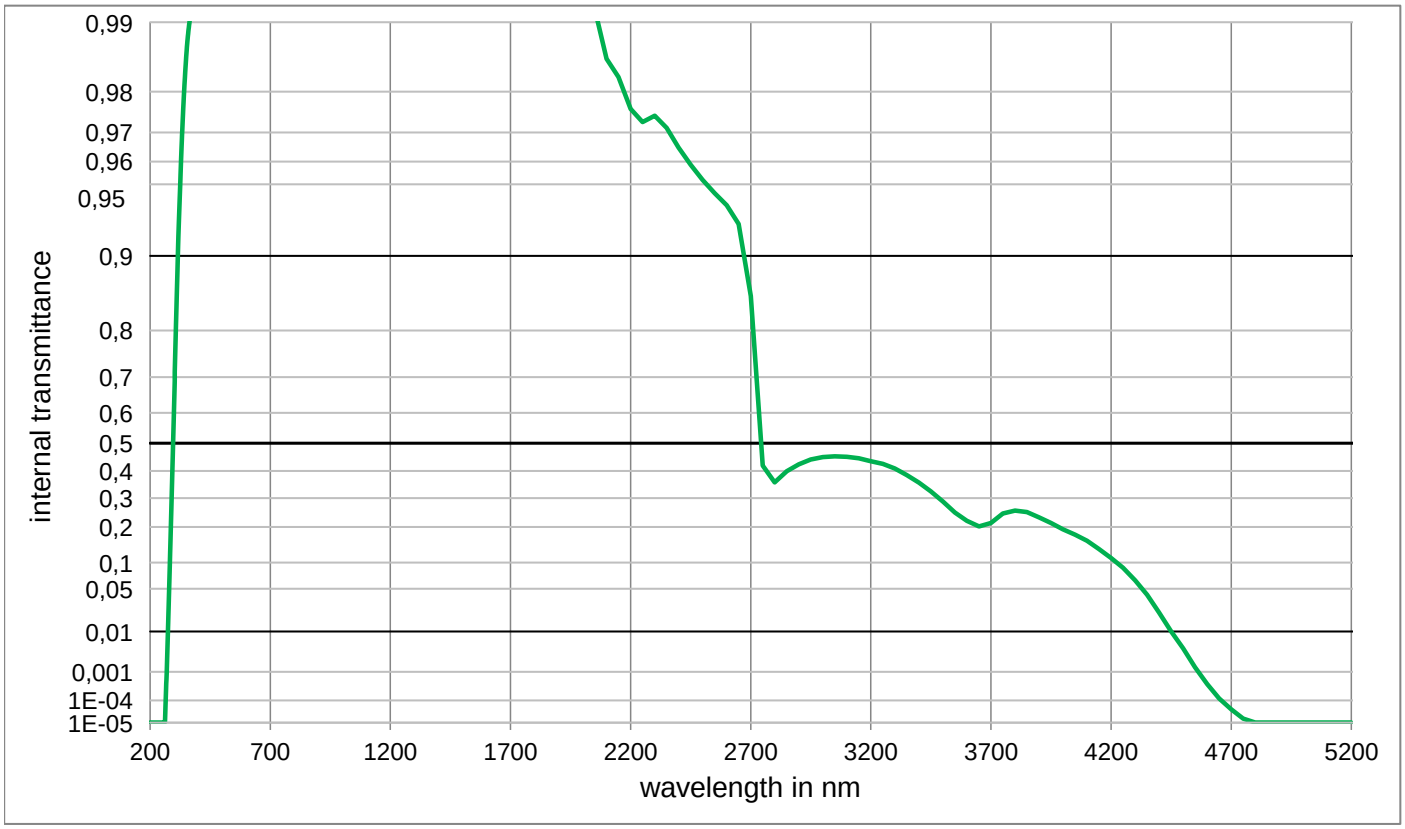
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Base glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

N-WG295



Internal transmittance ti 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

Data Sheet

N-WG305

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 2 mm)	
$\lambda_{i\,0,5}$	= 305 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 260 nm
λ_p ($\tau_{i,L}$ = 0,99)	= 420 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 440 nm to 1550 nm	
B_1 =	1,2190
B_2 =	0,0699
B_3 =	106,2629
C_1 =	5,560E-03 µm²
C_2 =	5,5370E-02 µm²
C_3 =	10043,976 µm²
Internal quality	
Bubble class	1

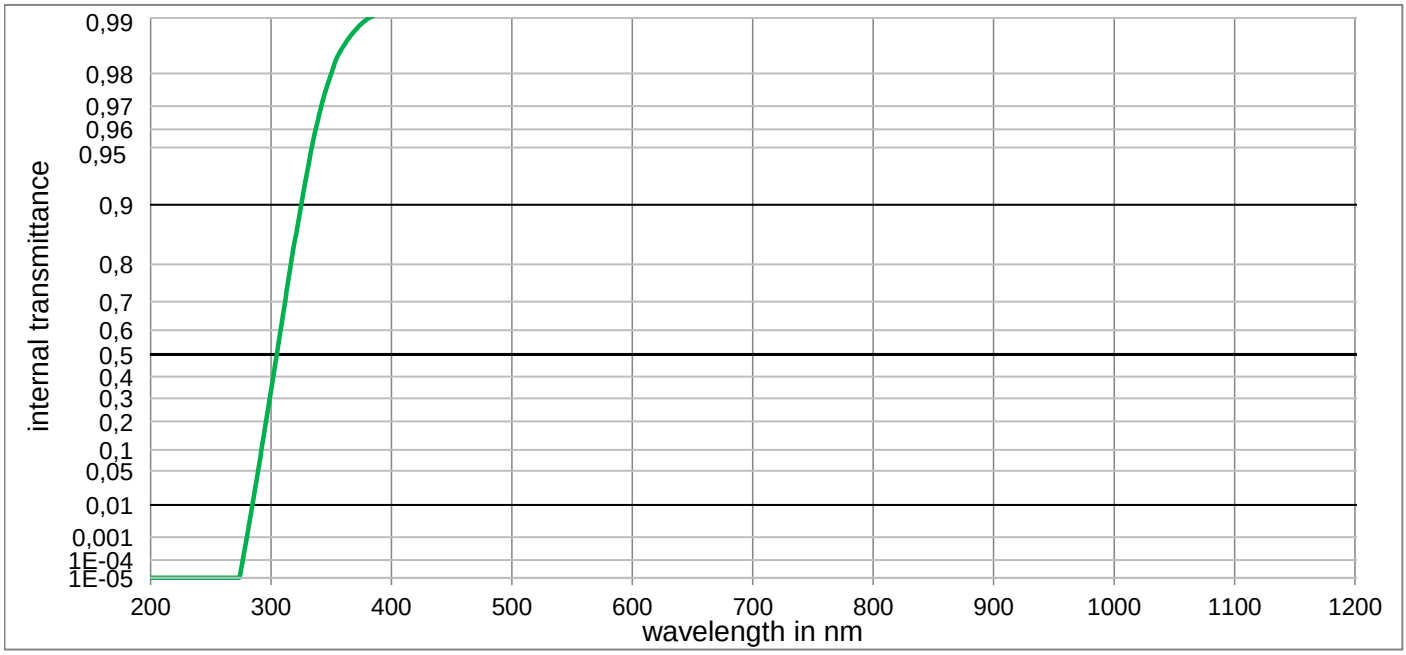
Mechanical properties	
Reference thickness	
d	= 2,00 mm
Density	
ρ	= 2,51 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 610

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 2
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

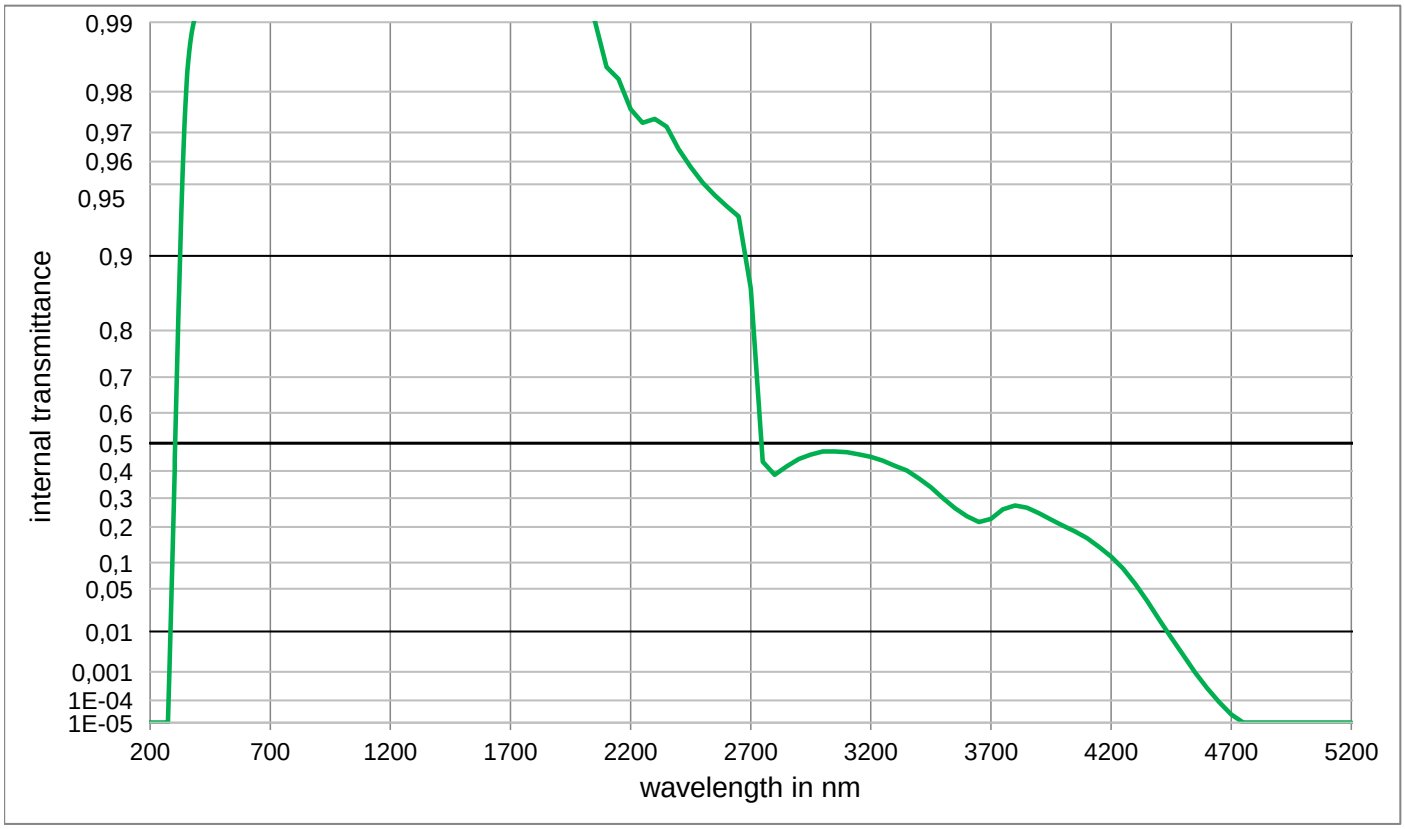
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Base glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

N-WG305



Internal transmittance ti 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

Data Sheet

N-WG320

Optical properties	
Reflection factor	
P_d =	0,913
Spectral values guaranteed (d = 2 mm)	
$\lambda_{i\,0,5}$ =	320 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05) =	280 nm
λ_p ($\tau_{i,L}$ = 0,99) =	470 nm
Refractive indices	
n_d (587,6 nm) =	1,54
n_s (852 nm) =	1,54
n_t (1014 nm) =	1,53
Sellmeier coefficients	
valid from 440 nm to 1550 nm	
B_1 =	0,8861
B_2 =	0,4613
B_3 =	29,7610
C_1 =	9,024E-03 µm²
C_2 =	8,3379E-03 µm²
C_3 =	3197,045 µm²
Internal quality	
Bubble class	1

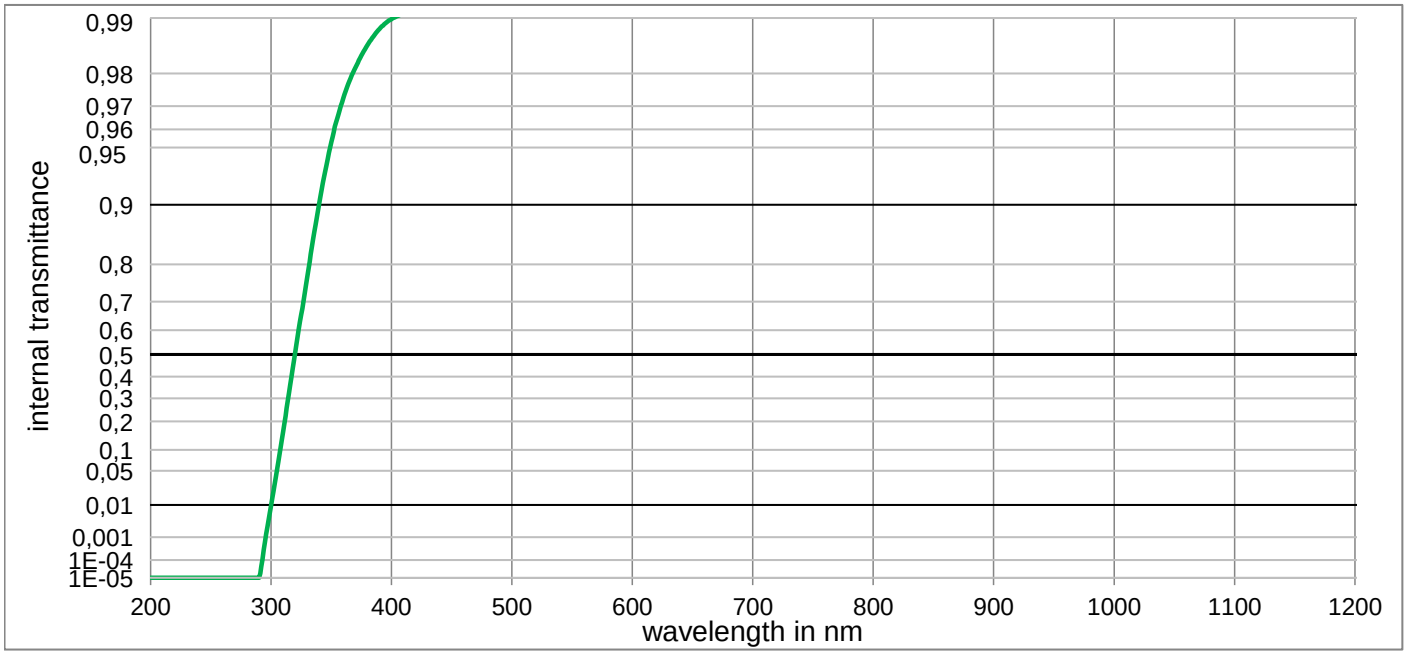
Mechanical properties	
Reference thickness	
d =	2,00 mm
Density	
ρ =	2,51 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$ =	610

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

Chemical properties	
Chemical resistance	
FR class =	0
SR class =	1
AR class =	2
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

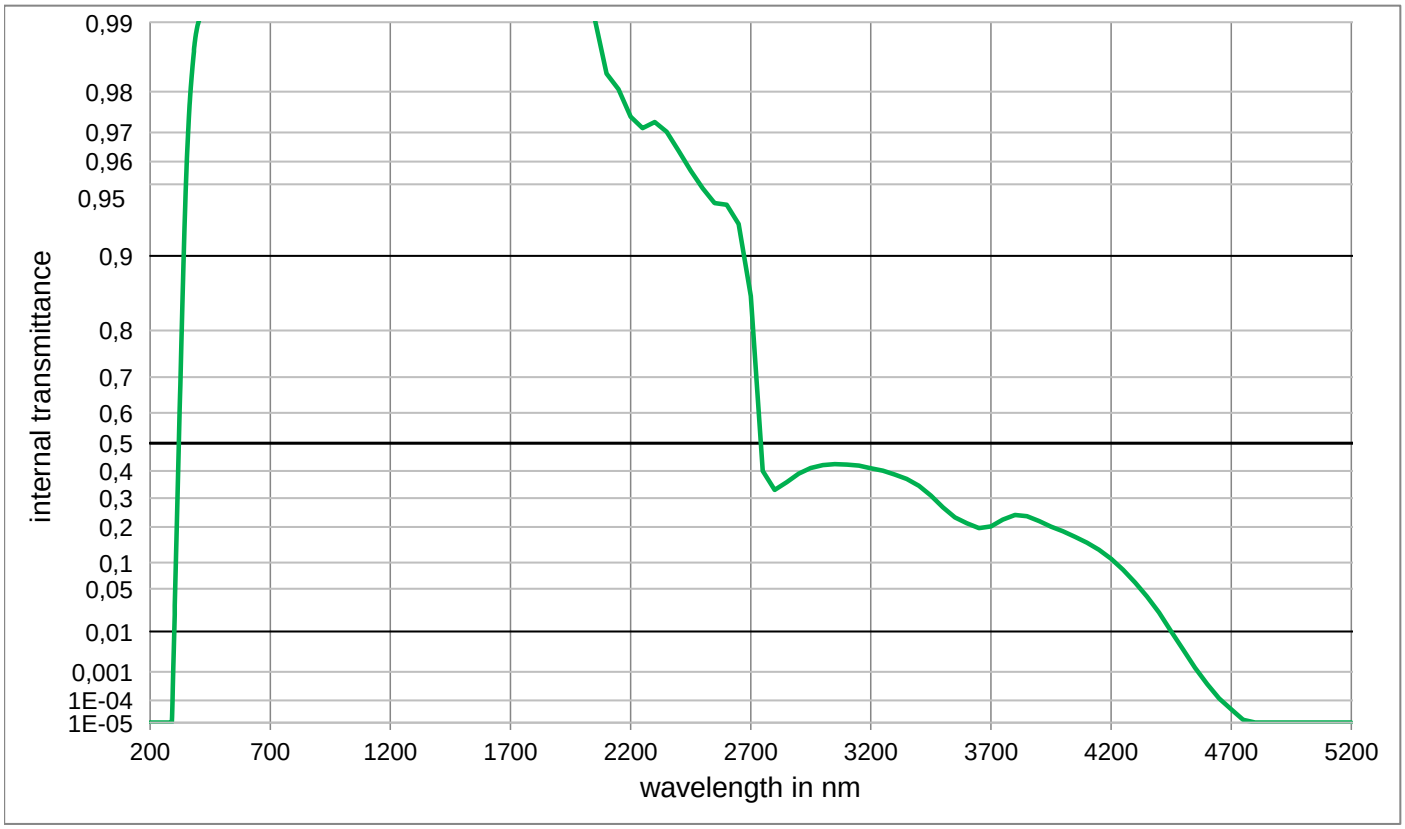
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Base glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

N-WG320



Internal transmittance ti 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

Data Sheet

N-WG360

Optical properties	
Reflection factor	
P_d	= 0,917
Spectral values guaranteed (d = 2 mm)	
$\lambda_{i\,0,5}$	= 360 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 335 nm
λ_p ($\tau_{i,L}$ = 0,99)	= 535 nm
Refractive indices	
n_d (587,6 nm)	= 1,53
n_s (852 nm)	= 1,52
n_t (1014 nm)	= 1,52
Sellmeier coefficients	
valid from 365 nm to 2325 nm	
B_1 =	1,2534
B_2 =	0,0409
B_3 =	0,8749
C_1 =	8,285E-03 µm²
C_2 =	3,9133E-02 µm²
C_3 =	106,087 µm²
Internal quality	
Bubble class	-

Mechanical properties	
Reference thickness	
d	= 2,00 mm
Density	
ρ	= 2,69 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 474

Thermal properties	
Transformation temperature	
Tg	= 522 °C
Thermal expansion in	**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 7,8
$\alpha_{(20°C/300°C)}$	= 8,9

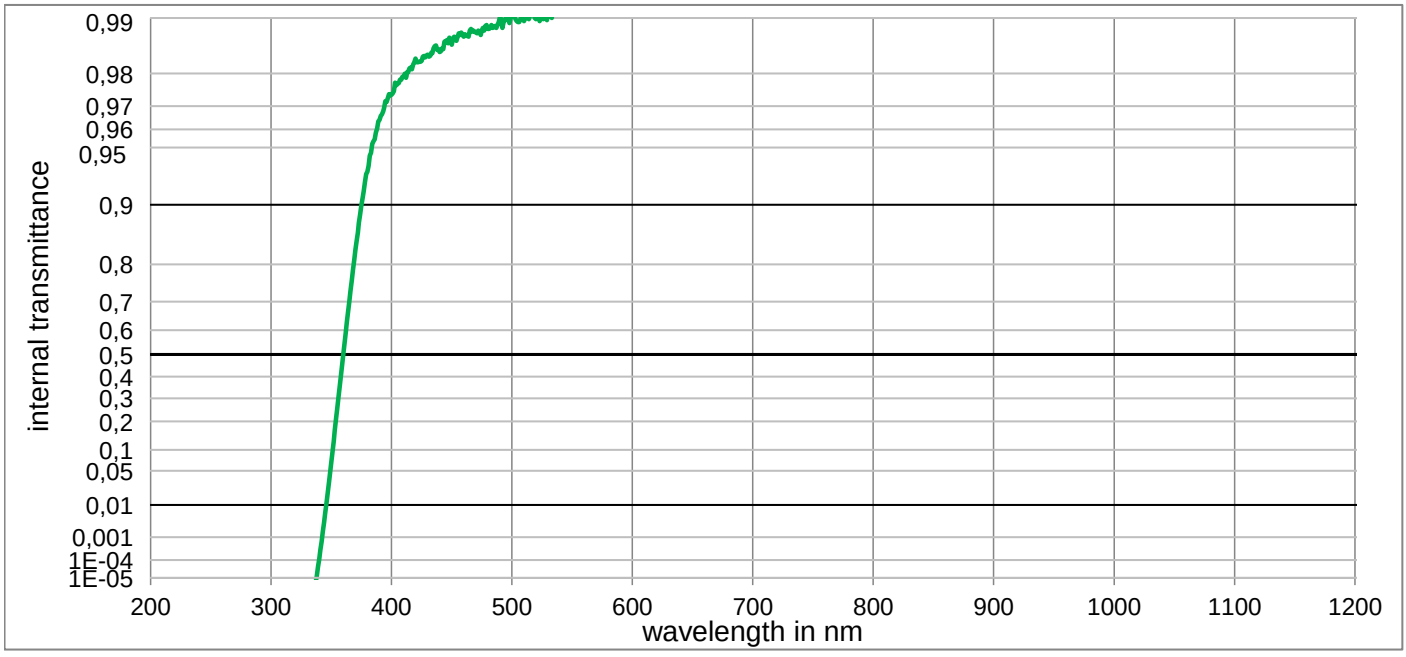
Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1.0
AR class	= 2.0
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

Colormetric properties

		1 mm	2 mm	3 mm
Illuminant D65	x	0,313	0,313	0,313
	y	0,329	0,330	0,330
	Y	91,4	91,0	90,7
	λ_d	575 nm	575 nm	575 nm
	P_e	0,001	0,003	0,004
Illuminant A	x	0,448	0,448	0,448
	y	0,408	0,408	0,408
	Y	91,4	91,0	90,7
	λ_d	585 nm	585 nm	585 nm
	P_e	0,002	0,004	0,006

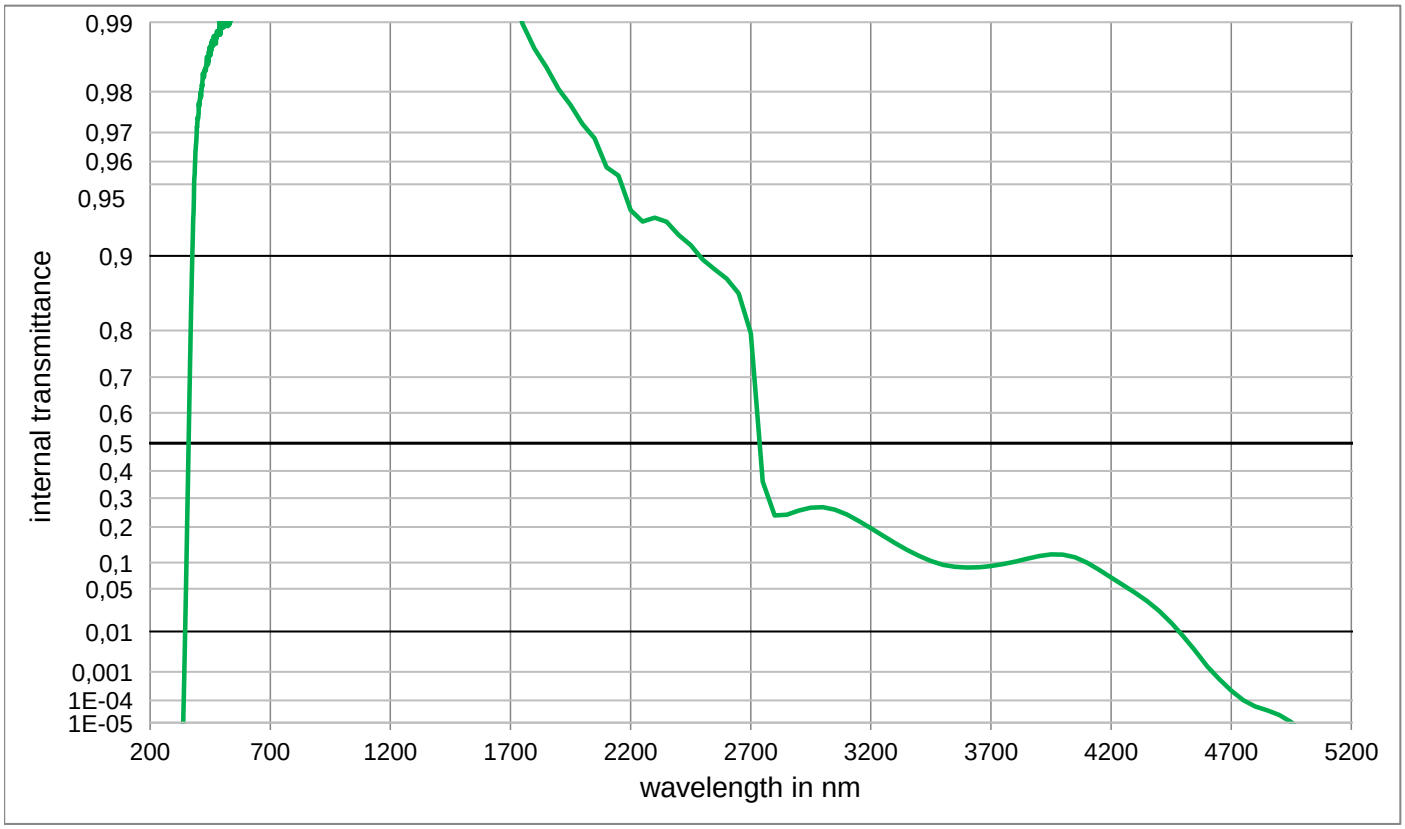
Notes
Ionically colored glass
Longpass filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

N-WG360



Internal transmittance ti 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	9,905E-01	800	9,965E-01	1100	9,974E-01	2200	9,357E-01	3700	9,206E-02
210	< 1,0E-05	510	9,896E-01	810	9,946E-01	1110	9,970E-01	2250	9,281E-01	3750	9,647E-02
220	< 1,0E-05	520	9,899E-01	820	9,954E-01	1120	9,965E-01	2300	9,308E-01	3800	1,023E-01
230	< 1,0E-05	530	9,907E-01	830	9,921E-01	1130	9,974E-01	2350	9,279E-01	3850	1,092E-01
240	< 1,0E-05	540	9,909E-01	840	9,979E-01	1140	9,967E-01	2400	9,181E-01	3900	1,158E-01
250	< 1,0E-05	550	9,913E-01	850	9,985E-01	1150	9,975E-01	2450	9,097E-01	3950	1,200E-01
260	< 1,0E-05	560	9,913E-01	860	9,952E-01	1160	9,970E-01	2500	8,964E-01	4000	1,195E-01
270	< 1,0E-05	570	9,916E-01	870	9,962E-01	1170	9,974E-01	2550	8,866E-01	4050	1,127E-01
280	< 1,0E-05	580	9,924E-01	880	9,942E-01	1180	9,979E-01	2600	8,759E-01	4100	9,989E-02
290	< 1,0E-05	590	9,920E-01	890	9,952E-01	1190	9,975E-01	2650	8,577E-01	4150	8,423E-02
300	< 1,0E-05	600	9,930E-01	900	9,961E-01	1200	9,974E-01	2700	7,951E-01	4200	6,895E-02
310	< 1,0E-05	610	9,918E-01	910	9,971E-01	1250	9,975E-01	2750	3,602E-01	4250	5,560E-02
320	< 1,000E-05	620	9,925E-01	920	9,965E-01	1300	9,975E-01	2800	2,381E-01	4300	4,425E-02
330	< 1,000E-05	630	9,930E-01	930	9,967E-01	1350	9,969E-01	2850	2,411E-01	4350	3,377E-02
340	1,057E-04	640	9,933E-01	940	9,959E-01	1400	9,942E-01	2900	2,553E-01	4400	2,368E-02
350	6,888E-02	650	9,930E-01	950	9,961E-01	1450	9,954E-01	2950	2,659E-01	4450	1,477E-02
360	5,004E-01	660	9,937E-01	960	9,965E-01	1500	9,971E-01	3000	2,677E-01	4500	8,017E-03
370	8,309E-01	670	9,940E-01	970	9,959E-01	1550	9,971E-01	3050	2,591E-01	4550	3,770E-03
380	9,328E-01	680	9,941E-01	980	9,955E-01	1600	9,950E-01	3100	2,422E-01	4600	1,463E-03
390	9,644E-01	690	9,948E-01	990	9,953E-01	1650	9,952E-01	3150	2,198E-01	4650	5,978E-04
400	9,739E-01	700	9,944E-01	1000	9,969E-01	1700	9,937E-01	3200	1,960E-01	4700	2,356E-04
410	9,792E-01	710	9,953E-01	1010	9,967E-01	1750	9,899E-01	3250	1,727E-01	4750	1,034E-04
420	9,834E-01	720	9,957E-01	1020	9,969E-01	1800	9,870E-01	3300	1,514E-01	4800	5,671E-05
430	9,842E-01	730	9,952E-01	1030	9,966E-01	1850	9,843E-01	3350	1,324E-01	4850	3,765E-05
440	9,847E-01	740	9,959E-01	1040	9,975E-01	1900	9,805E-01	3400	1,163E-01	4900	2,374E-05
450	9,860E-01	750	9,944E-01	1050	9,970E-01	1950	9,772E-01	3450	1,035E-01	4950	1,069E-05
460	9,873E-01	760	9,958E-01	1060	9,971E-01	2000	9,724E-01	3500	9,490E-02	5000	< 1,000E-05
470	9,880E-01	770	9,958E-01	1070	9,965E-01	2050	9,682E-01	3550	9,043E-02	5050	< 1,000E-05
480	9,885E-01	780	9,952E-01	1080	9,969E-01	2100	9,577E-01	3600	8,906E-02	5100	< 1,000E-05
490	9,901E-01	790	9,946E-01	1090	9,971E-01	2150	9,541E-01	3650	8,965E-02	5150	< 1,000E-05

Data Sheet

GG395

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 395 nm ± 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

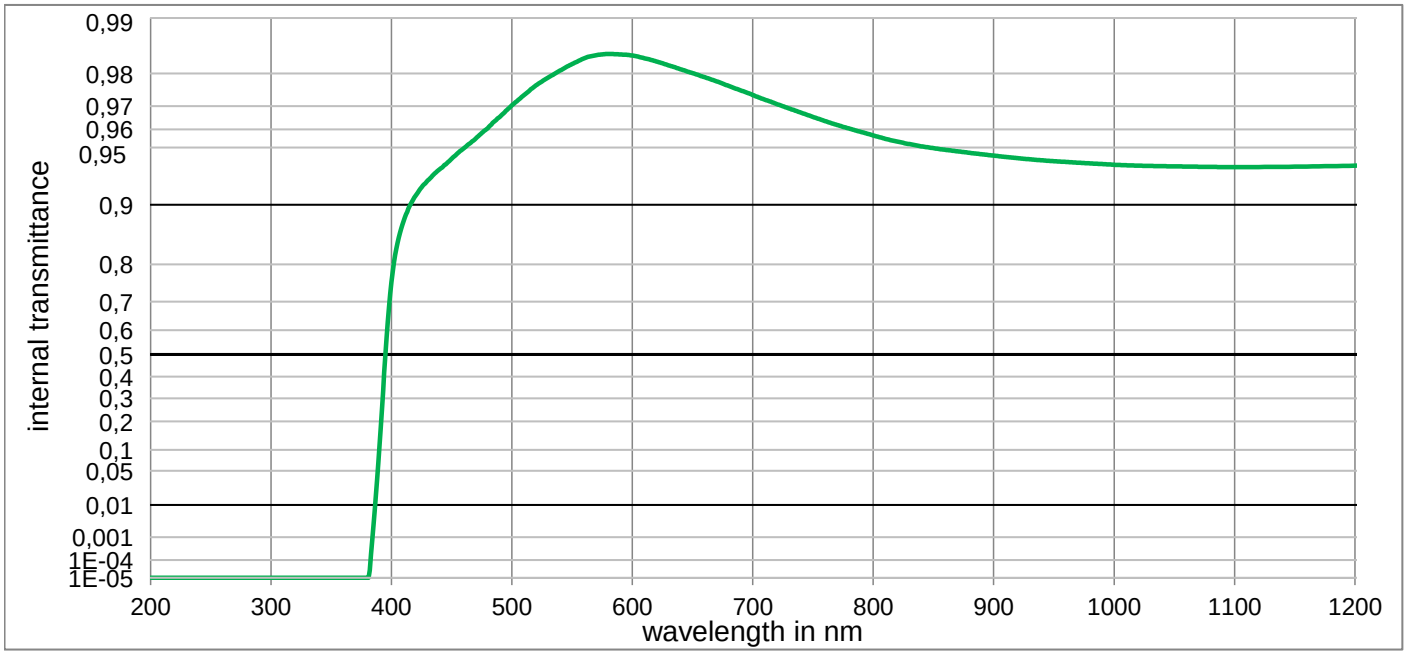
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,55 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 409

Thermal properties		
Transformation temperature		
Tg	= 538 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 7,8	
$\alpha_{(20°C/300°C)}$	= 9,0	
Temperature coefficient		
Tk	= 0,07	nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

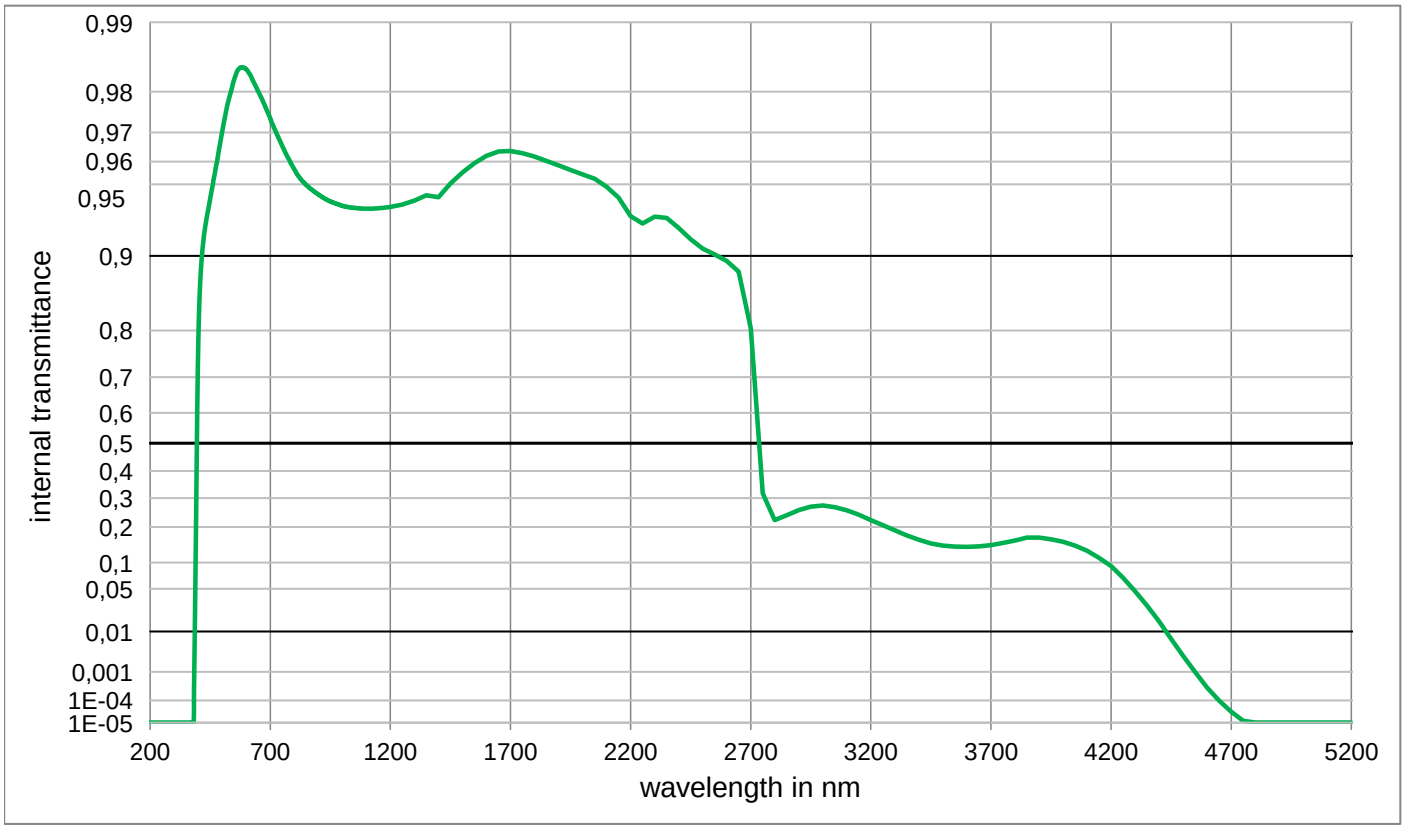
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,314	0,315	0,316
	y	0,331	0,332	0,334
	Y	91,1	90,5	89,8
	λ_d	570 nm	570 nm	571 nm
	P_e	0,008	0,016	0,023
Illuminant A	x	0,448	0,449	0,450
	y	0,408	0,409	0,410
	Y	91,1	90,6	90,0
	λ_d	581 nm	581 nm	581 nm
	P_e	0,010	0,020	0,030

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

GG395



Internal transmittance ti 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

Data Sheet

GG400

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 400 nm ± 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

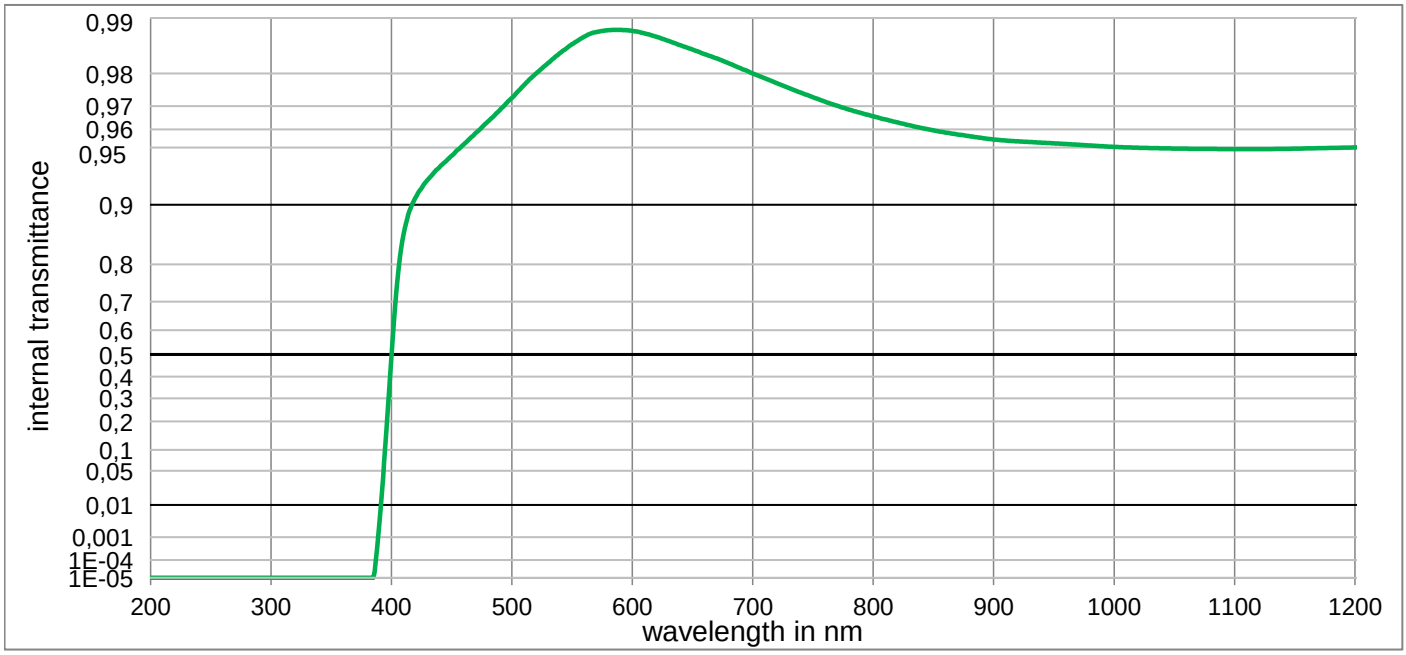
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,55 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 463

Thermal properties		
Transformation temperature		
Tg	= 537 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 7,9	
$\alpha_{(20°C/300°C)}$	= 9,1	
Temperature coefficient		
Tk	= 0,07	nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

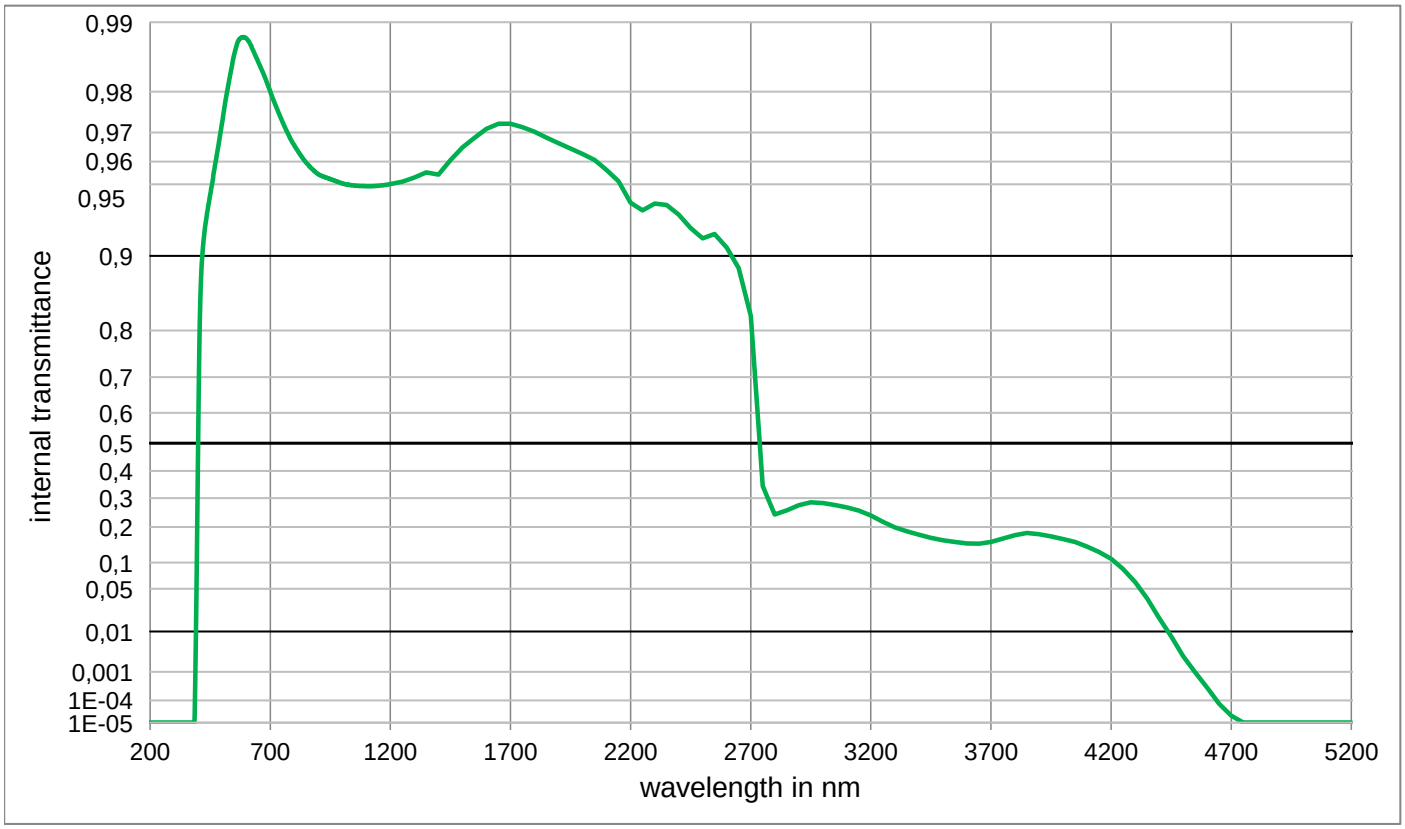
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,314	0,315	0,316
	y	0,331	0,333	0,335
	Y	91,2	90,7	90,2
	λ_d	570 nm	571 nm	571 nm
	P_e	0,009	0,017	0,025
Illuminant A	x	0,448	0,449	0,450
	y	0,408	0,409	0,410
	Y	91,2	90,8	90,4
	λ_d	581 nm	581 nm	581 nm
	P_e	0,011	0,022	0,032

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

GG400



Internal transmittance ti 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

Data Sheet

GG420

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 420 nm ± 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

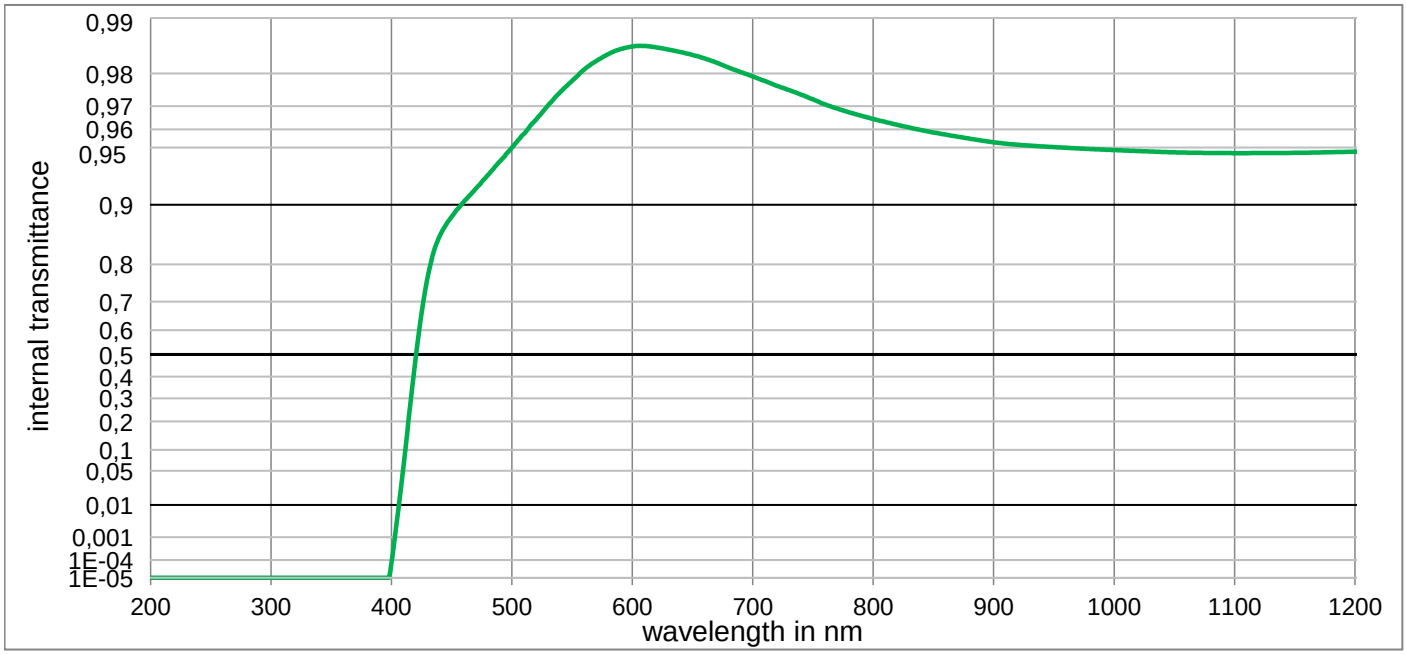
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,55 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 503

Thermal properties		
Transformation temperature		
Tg	= 535 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 7,8	
$\alpha_{(20°C/300°C)}$	= 9,0	
Temperature coefficient		
Tk	= 0,07	nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

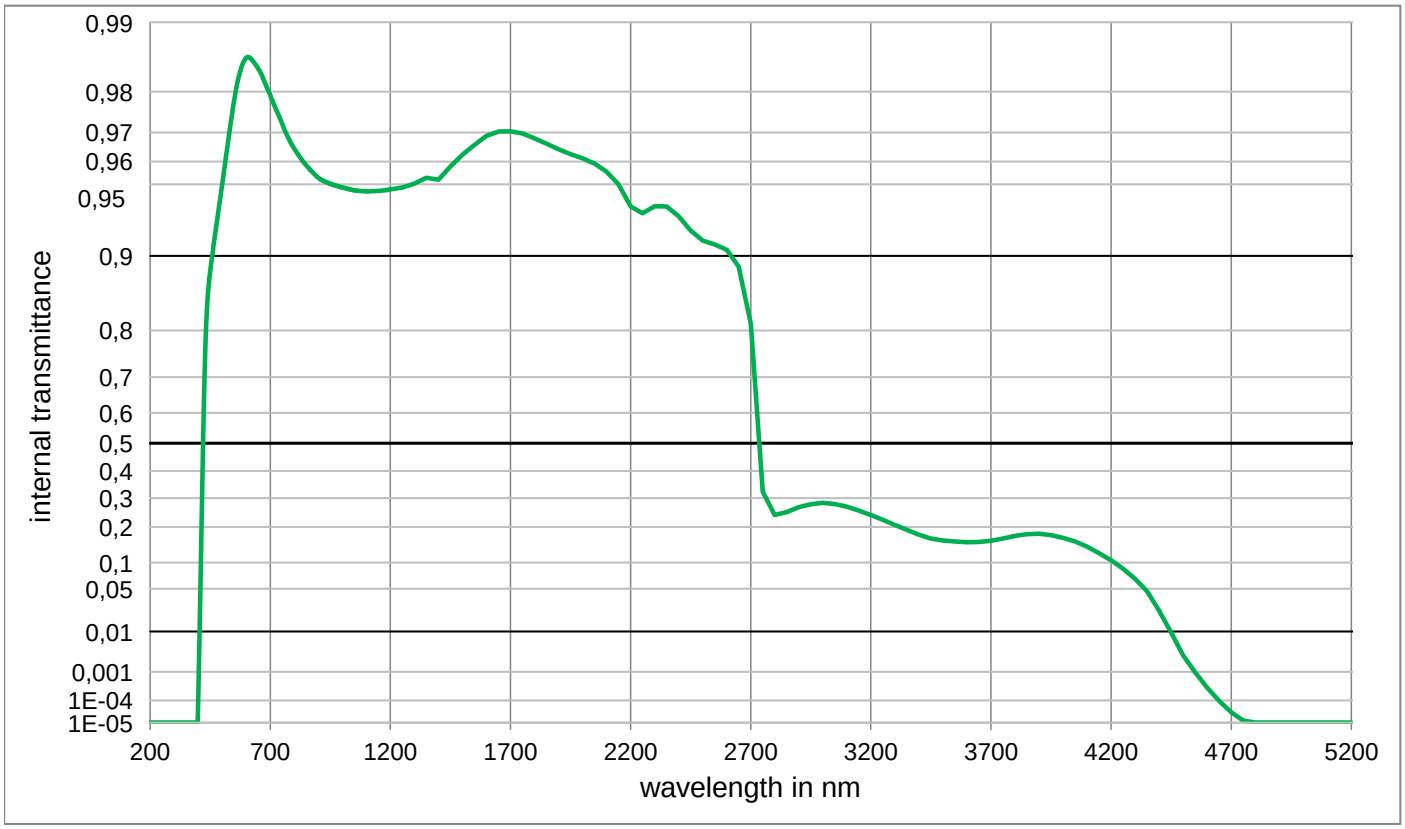
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,317	0,320	0,324
	y	0,337	0,342	0,348
	Y	90,9	90,1	89,2
	λ_d	569 nm	570 nm	570 nm
	P_e	0,033	0,059	0,082
Illuminant A	x	0,450	0,453	0,455
	y	0,410	0,412	0,414
	Y	91,0	90,4	89,7
	λ_d	581 nm	581 nm	581 nm
	P_e	0,038	0,068	0,096

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

GG420



Internal transmittance ti 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

Data Sheet

GG435

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 435 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 370 nm
λ_p ($\tau_{i,L}$ = 0,92)	= 520 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

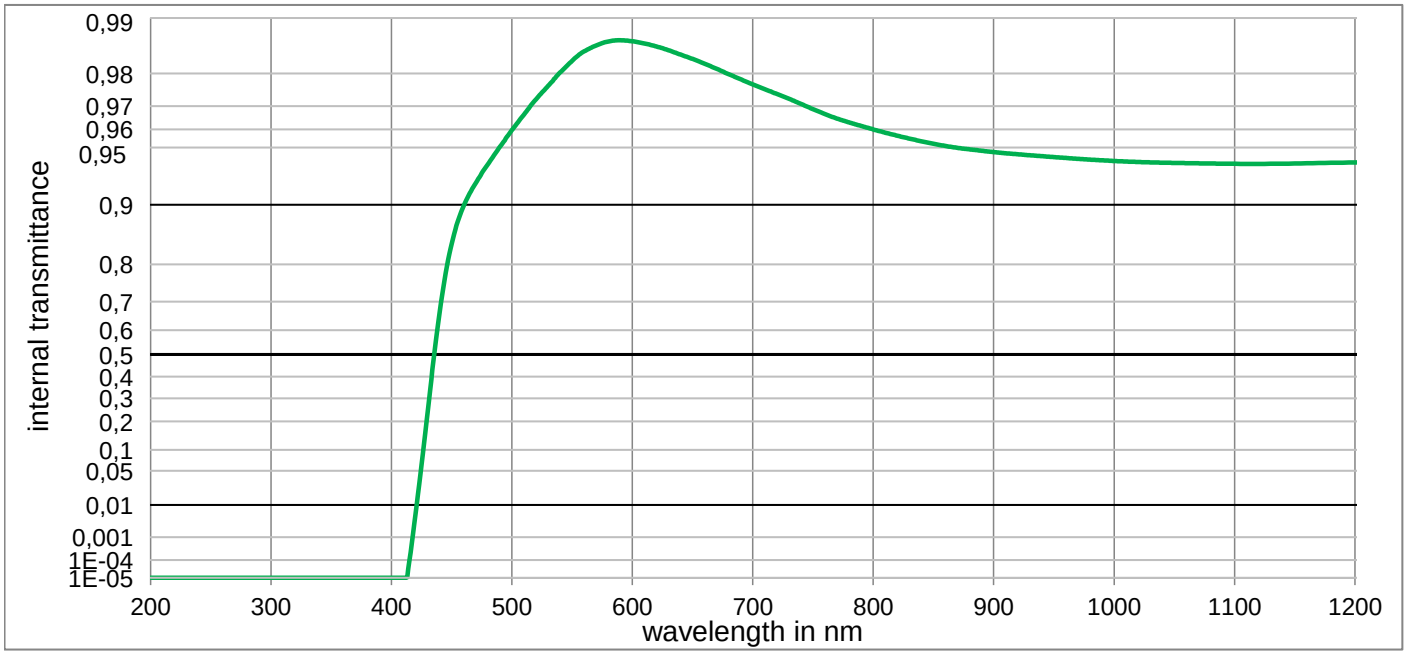
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,55 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 449

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

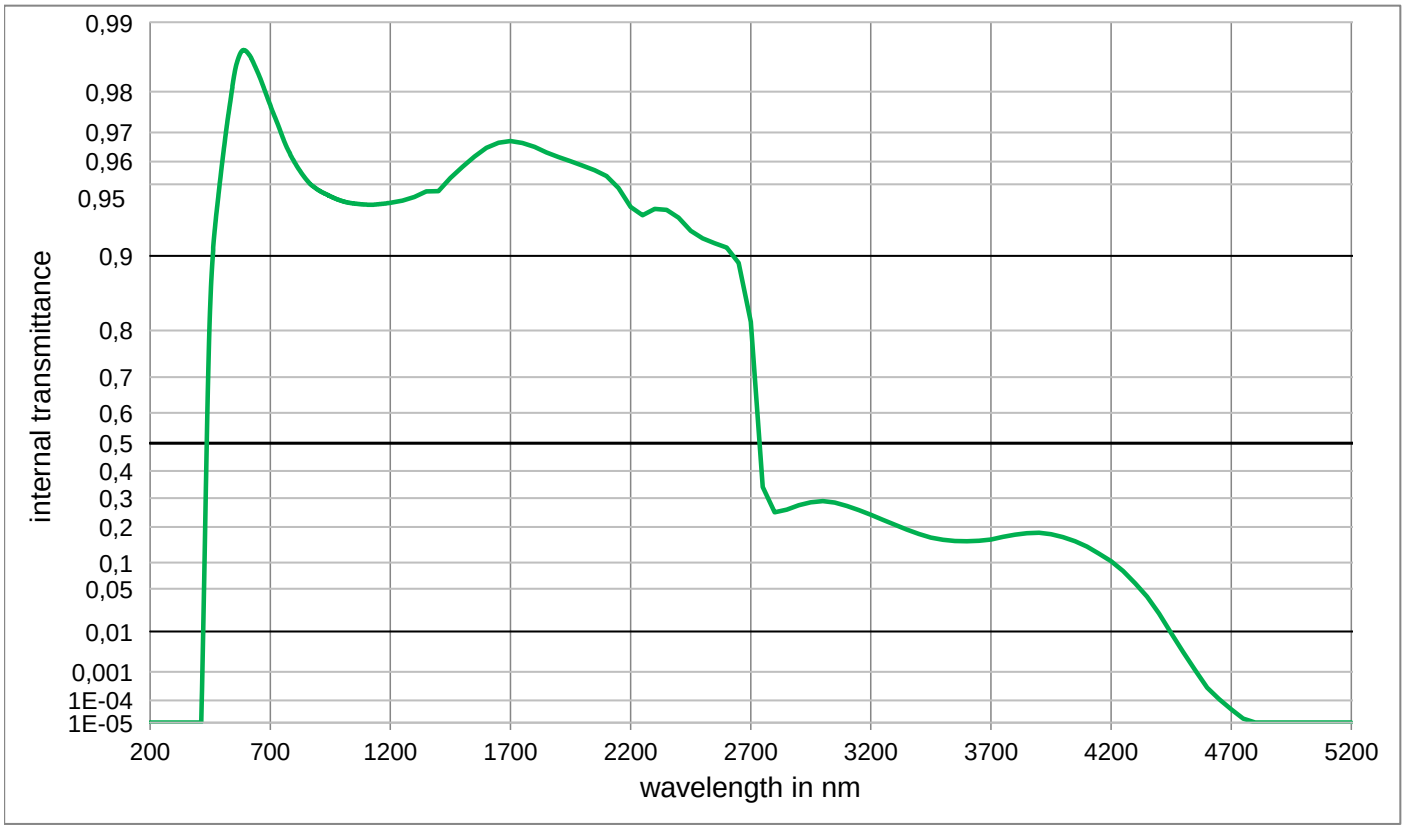
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,323	0,328	0,333
	y	0,350	0,361	0,369
	Y	90,9	90,2	89,5
	λ_d	568 nm	568 nm	568 nm
	P_e	0,086	0,132	0,166
Illuminant A	x	0,453	0,457	0,459
	y	0,415	0,419	0,422
	Y	91,1	90,5	90,0
	λ_d	580 nm	580 nm	580 nm
	P_e	0,092	0,143	0,182

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

GG435



Internal transmittance ti 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

Data Sheet

GG455

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 455 nm ± 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

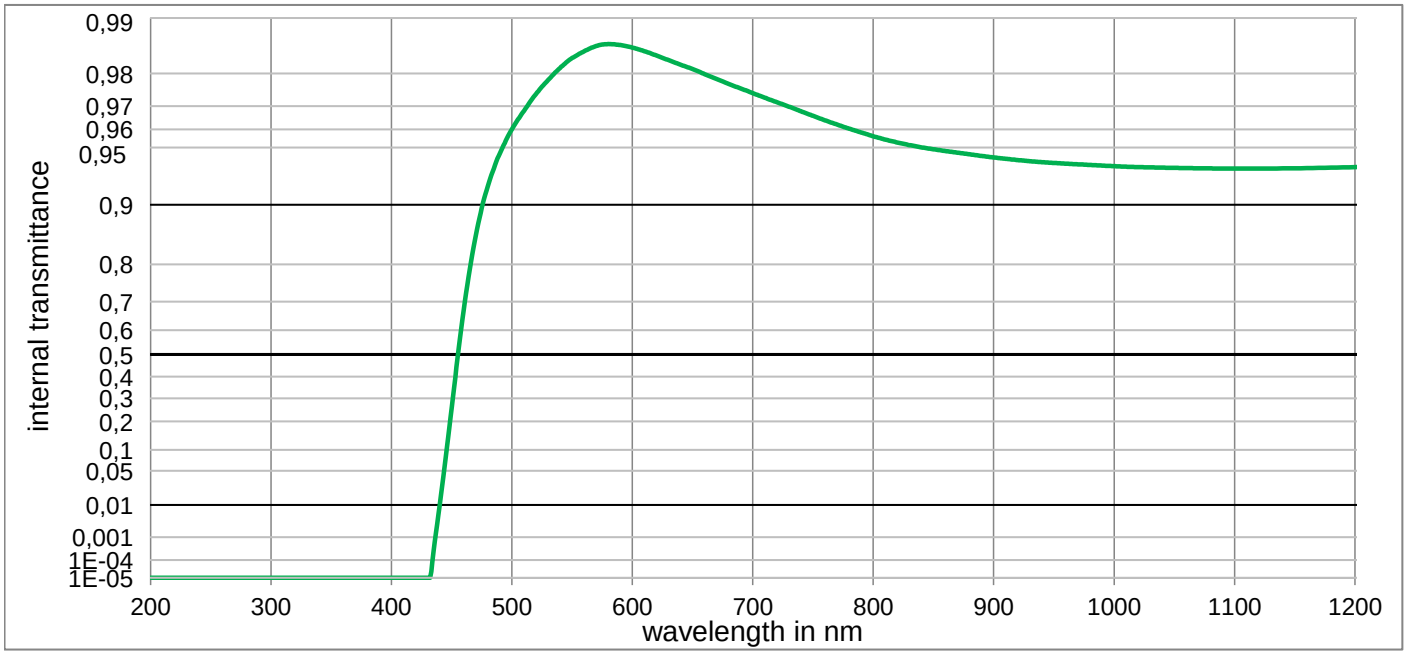
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,56 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 445

Thermal properties		
Transformation temperature		
Tg	= 529 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 8,2	
$\alpha_{(20°C/300°C)}$	= 9,5	
Temperature coefficient		
Tk	= 0,09	nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

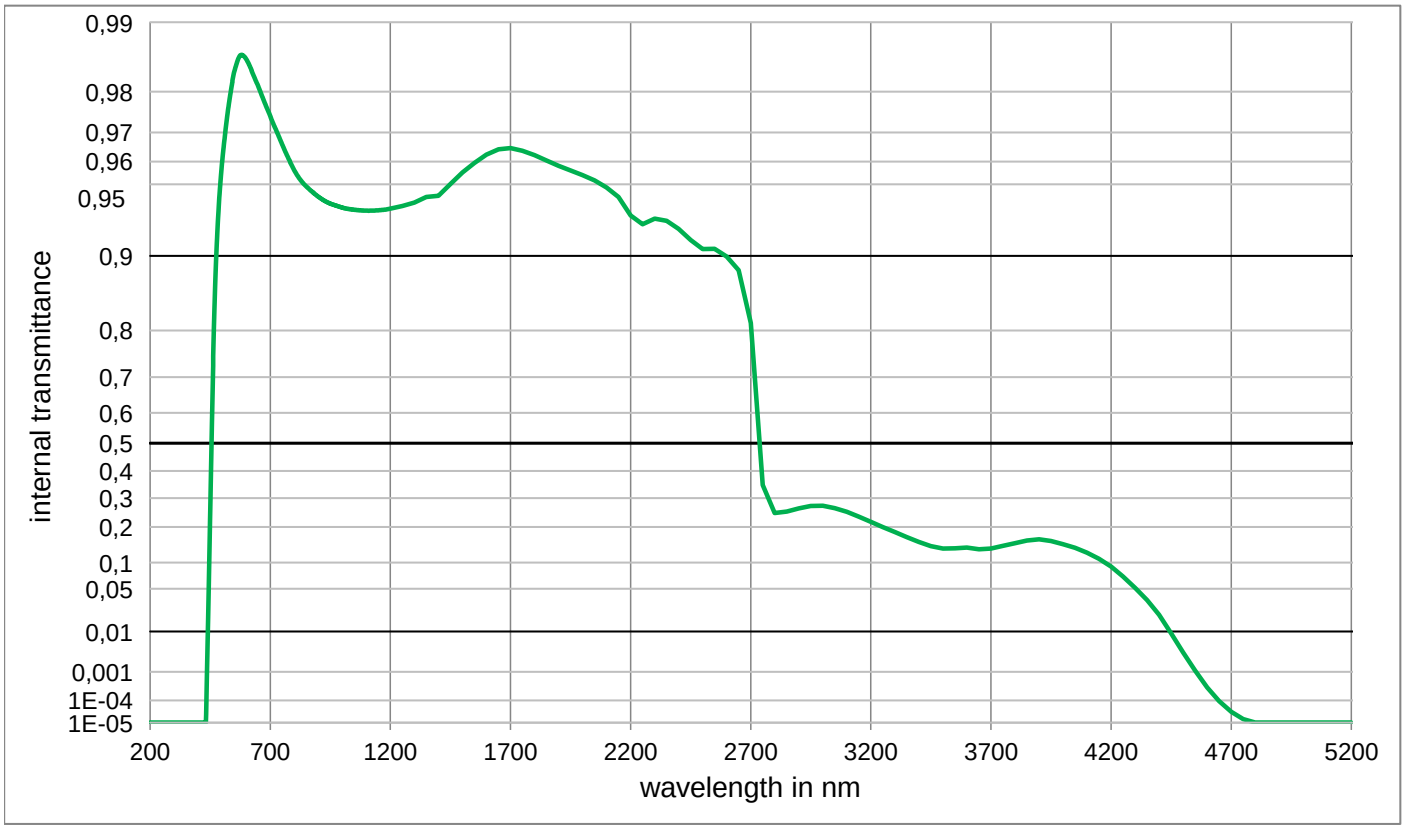
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,344	0,354	0,361
	y	0,394	0,414	0,426
	Y	90,5	89,7	88,9
	λ_d	568 nm	568 nm	568 nm
	P_e	0,270	0,355	0,408
Illuminant A	x	0,465	0,470	0,473
	y	0,431	0,437	0,441
	Y	91,0	90,4	89,8
	λ_d	579 nm	580 nm	580 nm
	P_e	0,282	0,364	0,415

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

GG455



Internal transmittance ti 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

Data Sheet

GG475

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 475 nm ± 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

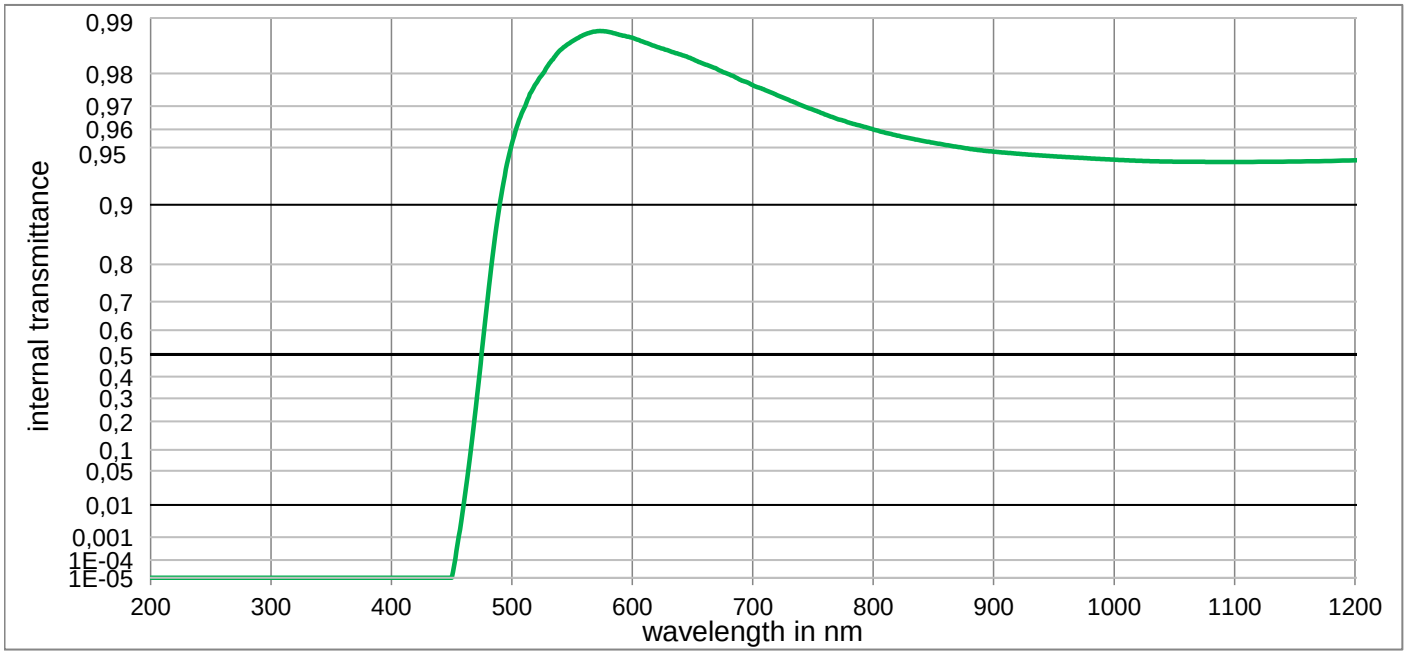
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,56 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 451

Thermal properties		
Transformation temperature		
Tg	= 531 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 8,2	
$\alpha_{(20°C/300°C)}$	= 9,4	
Temperature coefficient		
Tk	= 0,09	nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

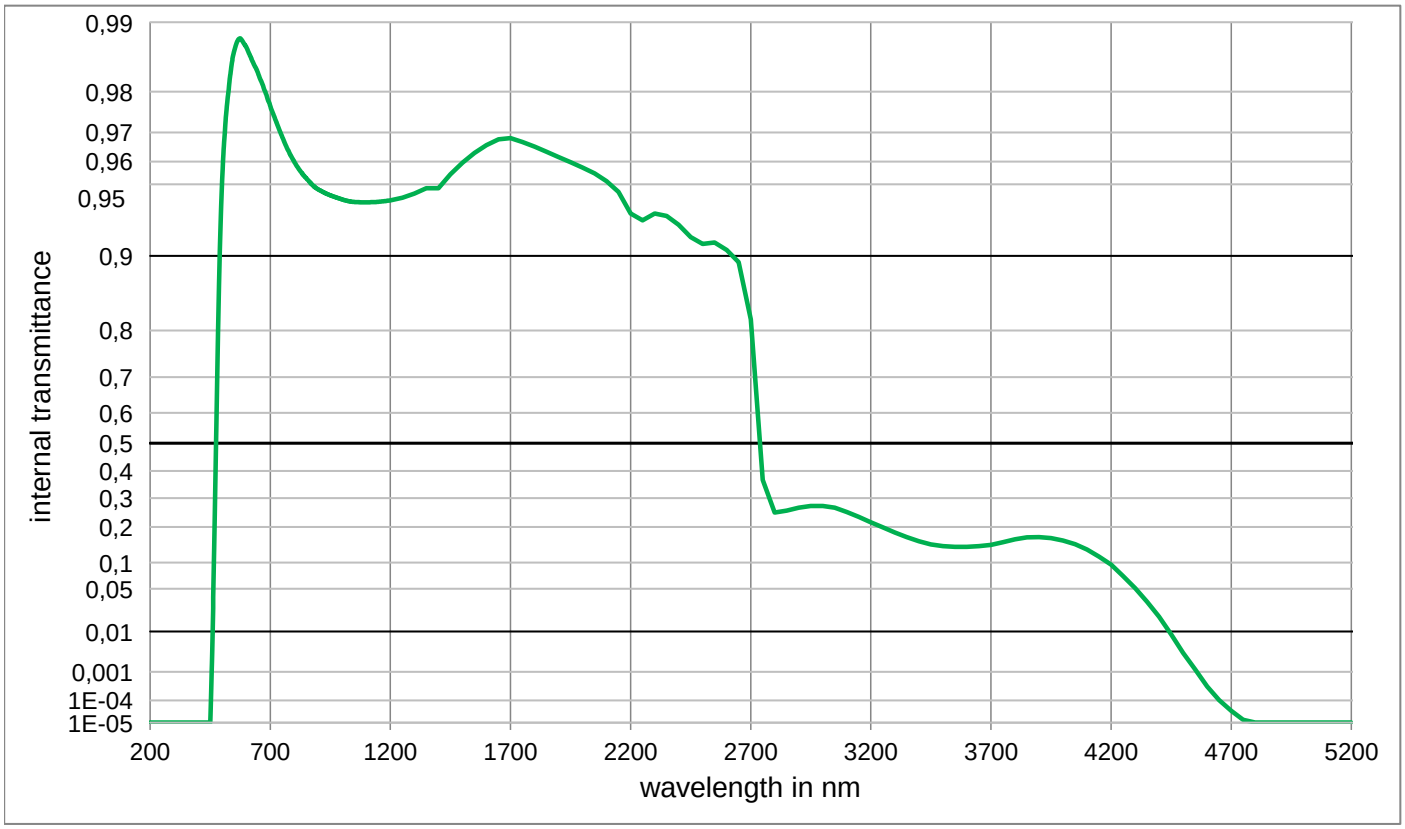
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,381	0,394	0,401
	y	0,463	0,485	0,494
	Y	89,5	88,5	87,7
	λ_d	568 nm	569 nm	569 nm
	P_e	0,567	0,664	0,709
Illuminant A	x	0,483	0,489	0,492
	y	0,453	0,460	0,463
	Y	90,7	90,0	89,4
	λ_d	580 nm	580 nm	580 nm
	P_e	0,560	0,648	0,689

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

GG475



Internal transmittance ti 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

Data Sheet

GG495

Optical properties		
Reflection factor		
P_d	=	0,917
Spectral values guaranteed (d = 3 mm)		
$\lambda_{i\,0,5}$	=	495 nm ± 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 µm²
C_2	=	1,5104E-01 µm²
C_3	=	106,389 µm²
Internal quality		
Bubble class		3

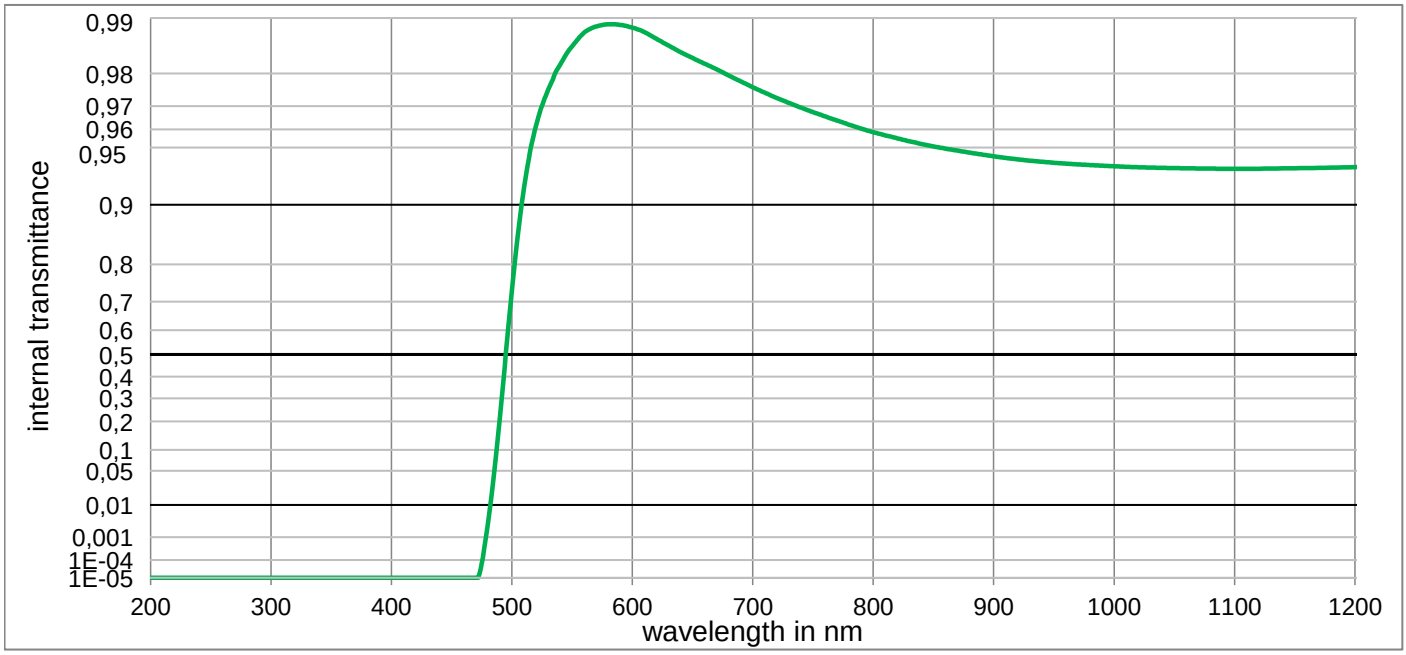
Mechanical properties		
Reference thickness		
d	=	3,00 mm
Density		
ρ	=	2,56 g/cm³
Knoop hardness		
$HK_{[0.1/20]}$	=	501

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

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	1
AR class	=	1
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

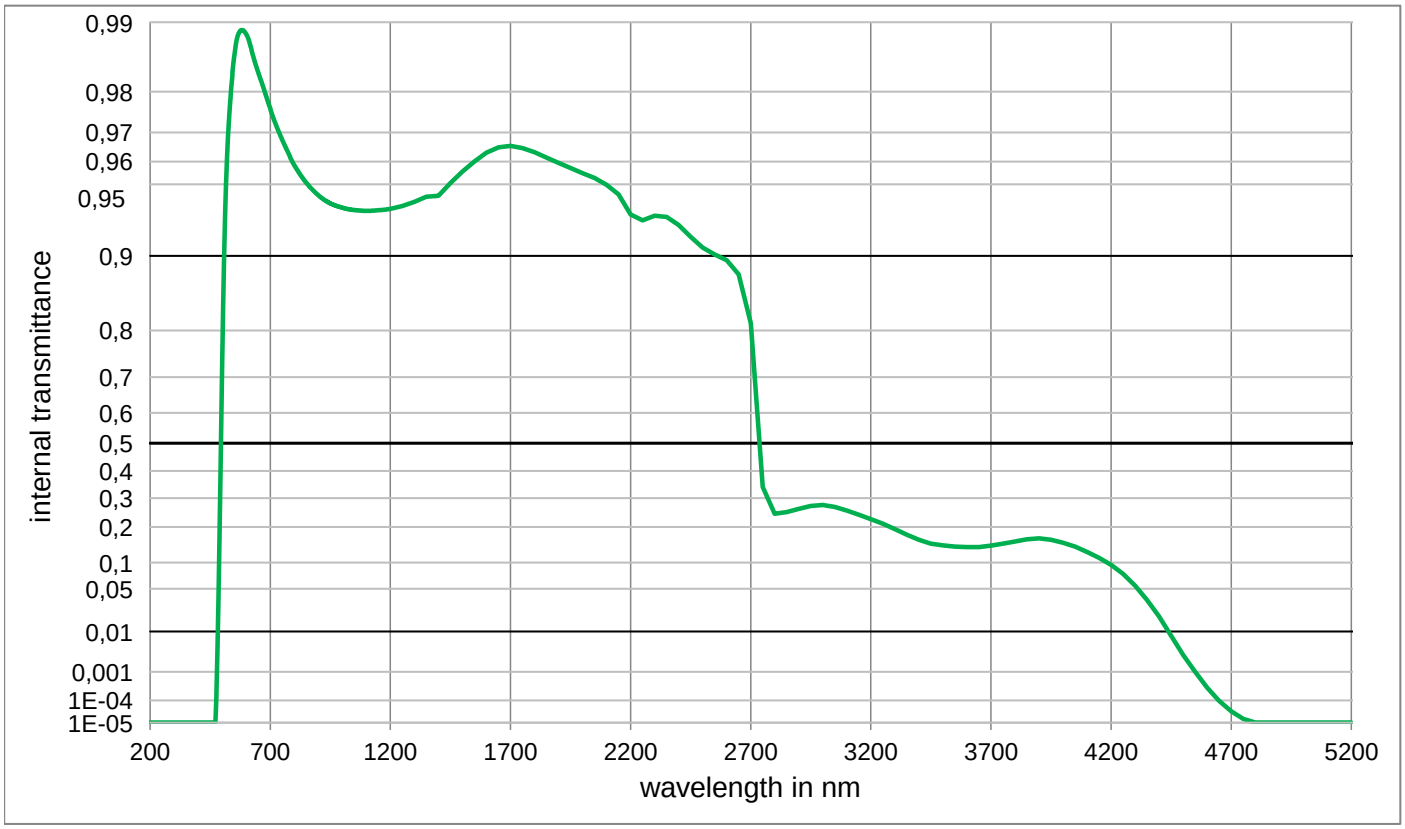
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x	0,422	0,433	0,438
	y	0,514	0,525	0,527
	Y	86,7	85,1	84,0
	λ_d	570 nm	571 nm	571 nm
	P_e	0,824	0,887	0,904
Illuminant A	x	0,502	0,507	0,509
	y	0,469	0,472	0,472
	Y	89,5	88,5	87,7
	λ_d	580 nm	581 nm	581 nm
	P_e	0,807	0,862	0,880

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

GG495



Internal transmittance ti 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

Data Sheet

OG515

Optical properties	
Reflection factor	
P_d	= 0,921
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 515 nm ± 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

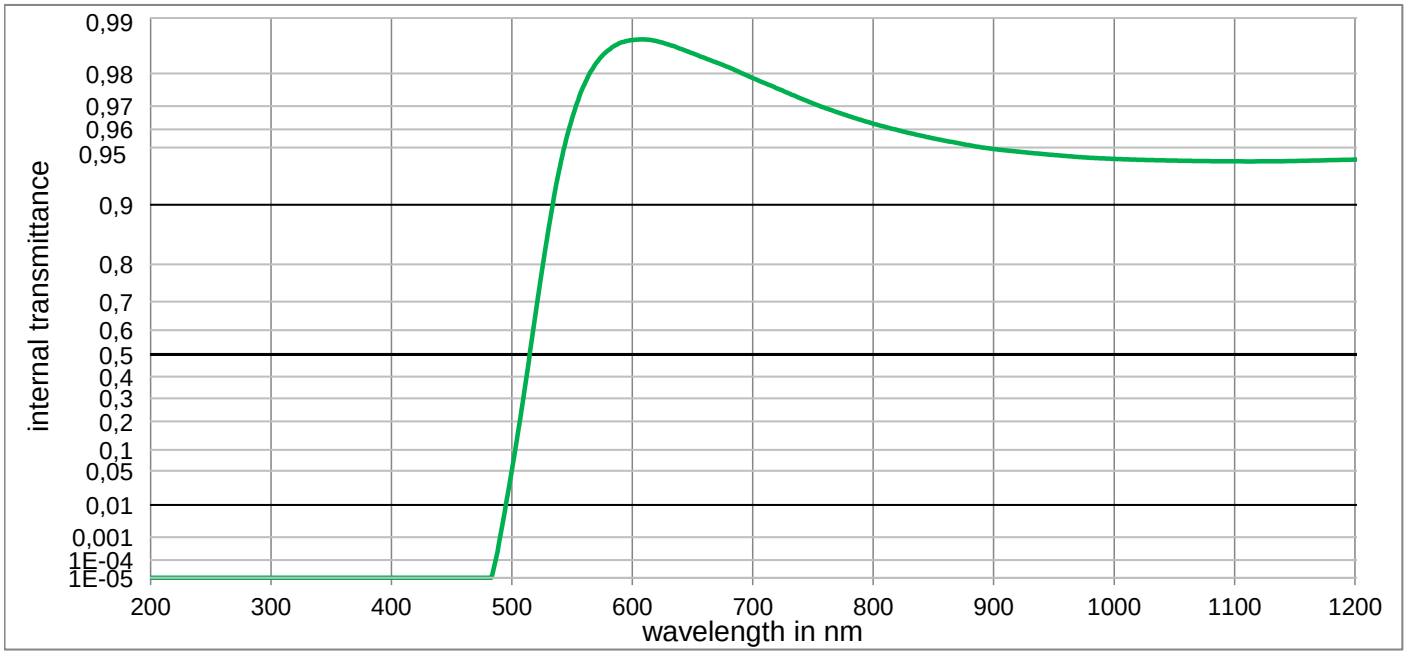
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,56 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 455

Thermal properties		
Transformation temperature		
Tg	= 509 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 7,9	
$\alpha_{(20°C/300°C)}$	= 9,0	
Temperature coefficient		
Tk	= 0,11	nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

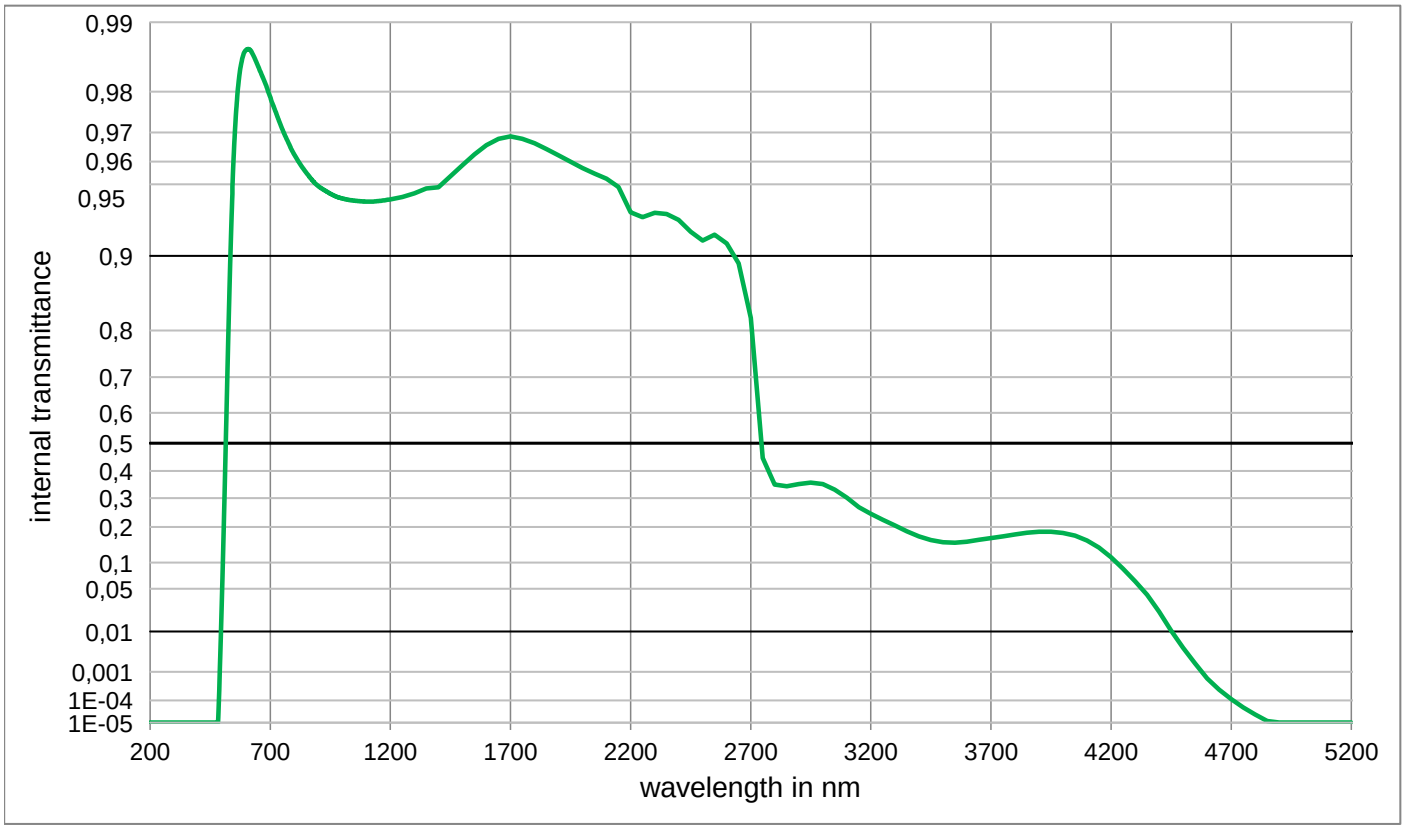
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,448	0,465	0,473
	y	0,516	0,519	0,515
	Y	81,5	77,9	75,4
	λ_d	573 nm	574 nm	575 nm
	P_e	0,902	0,958	0,969
Illuminant A	x	0,516	0,525	0,530
	y	0,468	0,466	0,463
	Y	86,5	84,1	82,3
	λ_d	582 nm	583 nm	583 nm
	P_e	0,896	0,945	0,957

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

OG515



Internal transmittance ti 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

Data Sheet

OG530

Optical properties	
Reflection factor	
P_d	= 0,921
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 530 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 460 nm
λ_p ($\tau_{i,L}$ = 0,93)	= 600 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

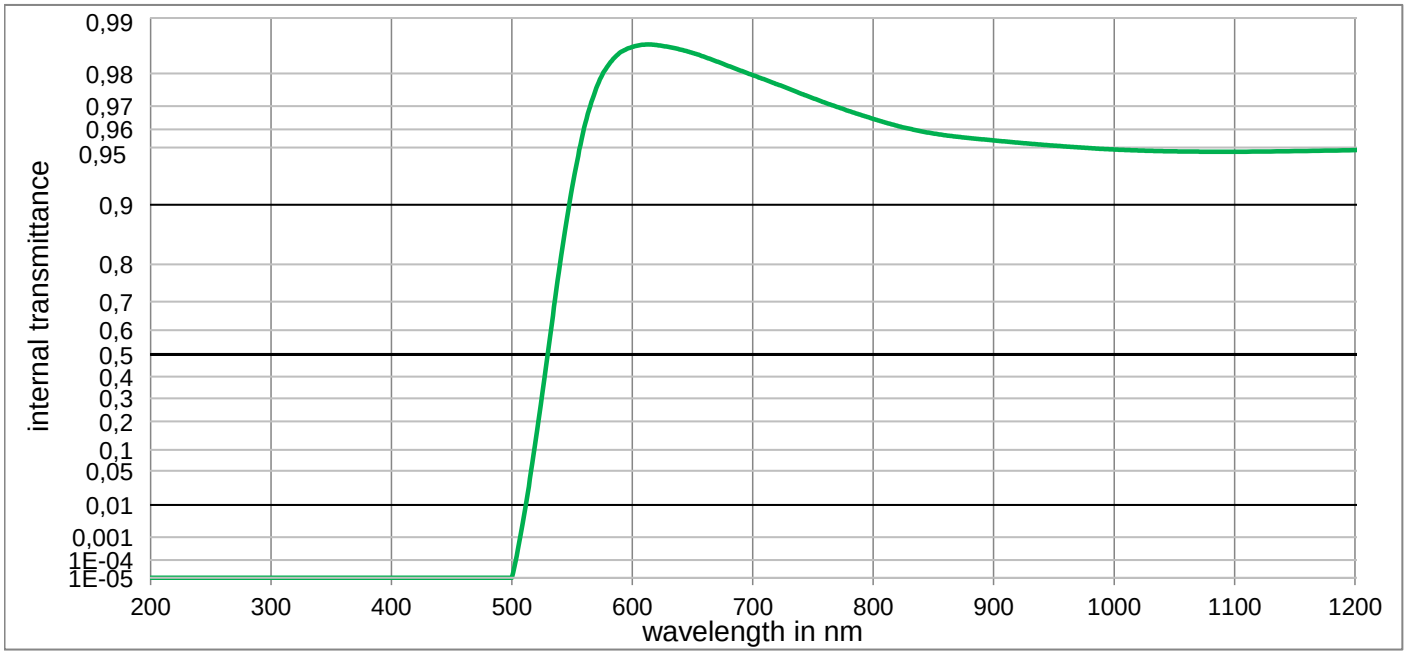
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,56 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 450

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

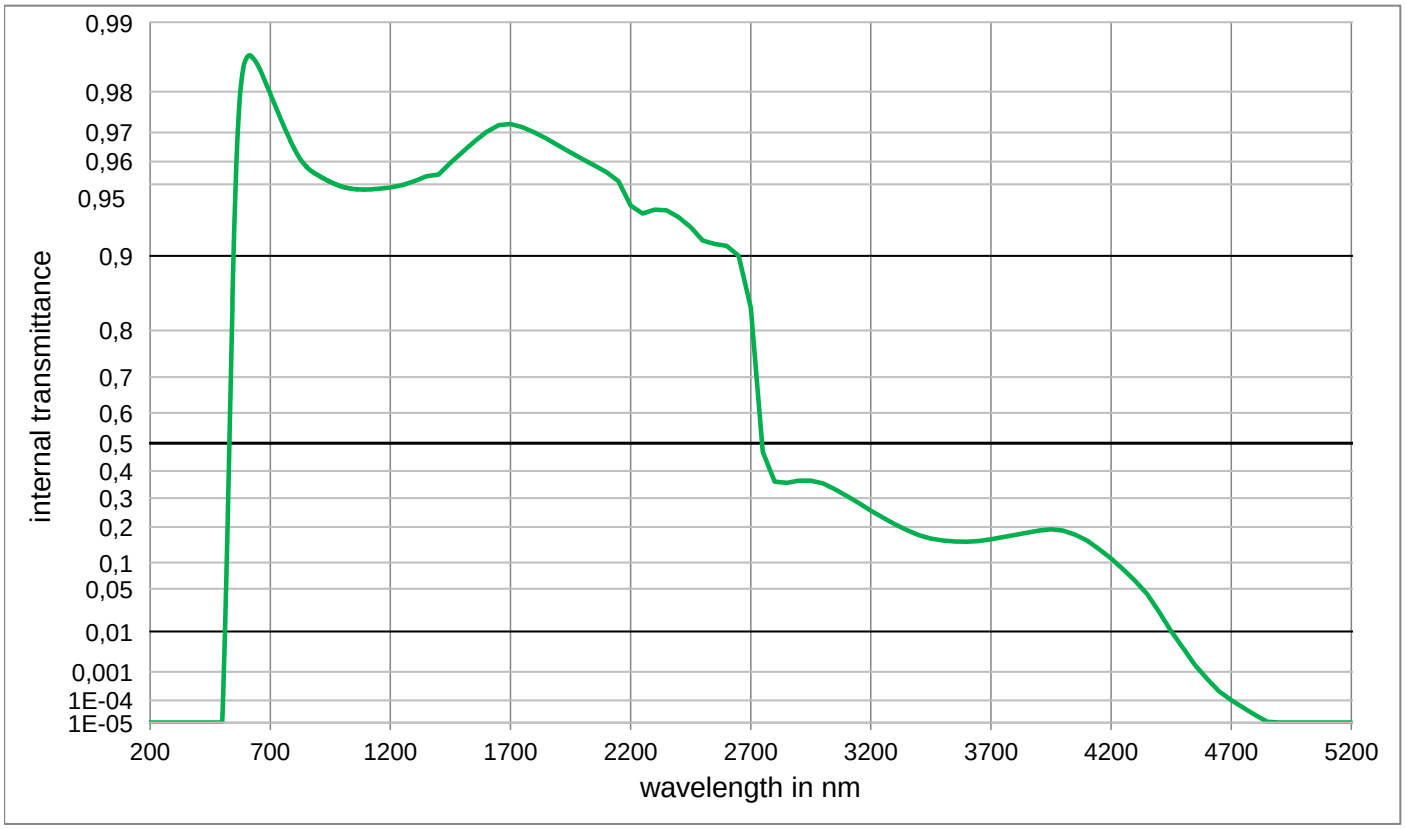
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,476	0,496	0,505
	y	0,501	0,498	0,490
	Y	73,6	68,7	65,6
	λ_d	576 nm	578 nm	579 nm
	P_e	0,938	0,985	0,990
Illuminant A	x	0,534	0,545	0,550
	y	0,457	0,452	0,447
	Y	81,4	77,8	75,4
	λ_d	584 nm	585 nm	586 nm
	P_e	0,943	0,979	0,984

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

OG530



Internal transmittance ti 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

Data Sheet

OG550

Optical properties		
Reflection factor		
P_d	=	0,920
Spectral values guaranteed (d = 3 mm)		
$\lambda_{i\,0,5}$	=	550 nm ± 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)	=	1,51
n_s (852 nm)	=	1,5
n_t (1014 nm)	=	1,50
Sellmeier coefficients		
valid from 580 nm to 2330 nm		
B_1	=	1,2525
B_2	=	0,0009
B_3	=	0,8269
C_1	=	9,542E-03 µm²
C_2	=	1,8891E-01 µm²
C_3	=	101,937 µm²
Internal quality		
Bubble class		3

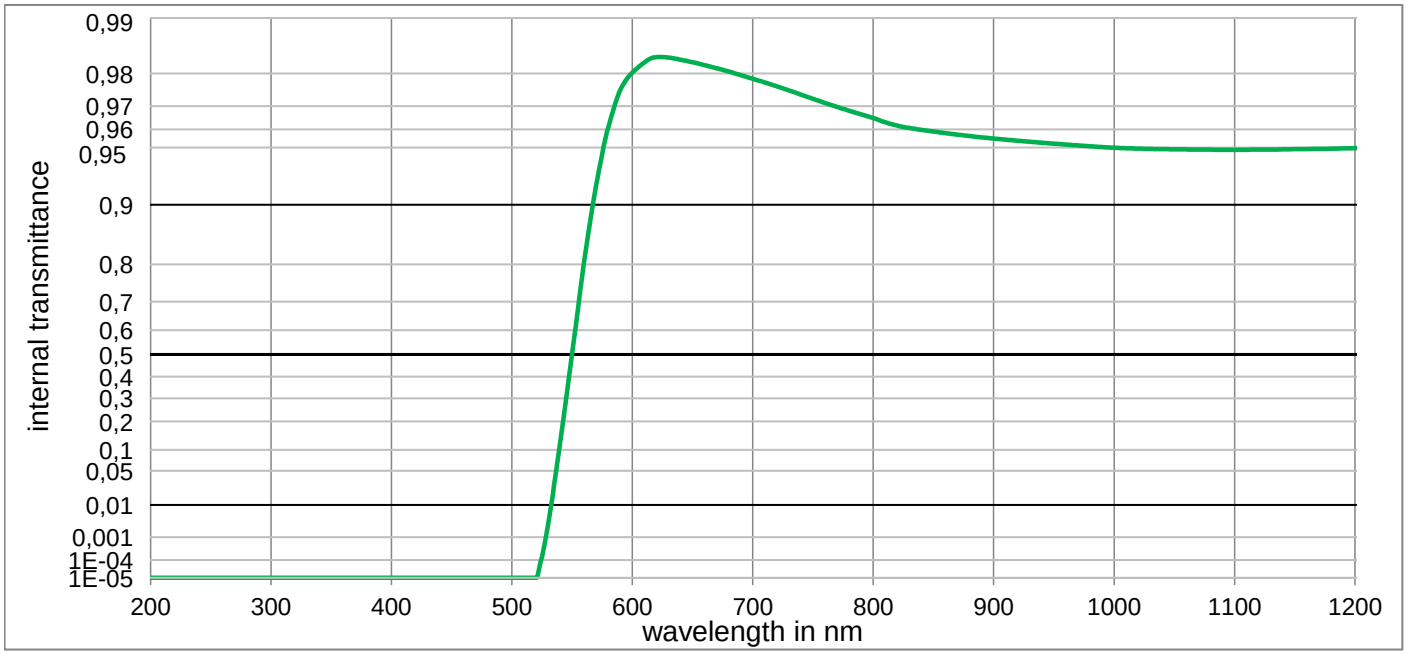
Mechanical properties		
Reference thickness		
d	=	3,00 mm
Density		
ρ	=	2,56 g/cm³
Knoop hardness		
$HK_{[0.1/20]}$	=	462

Thermal properties		
Transformation temperature		
Tg	=	507 °C
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	=	7,9
$\alpha_{(20°C/300°C)}$	=	9,0
Temperature coefficient		
Tk	=	0,12 nm/K

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	1
AR class	=	1
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

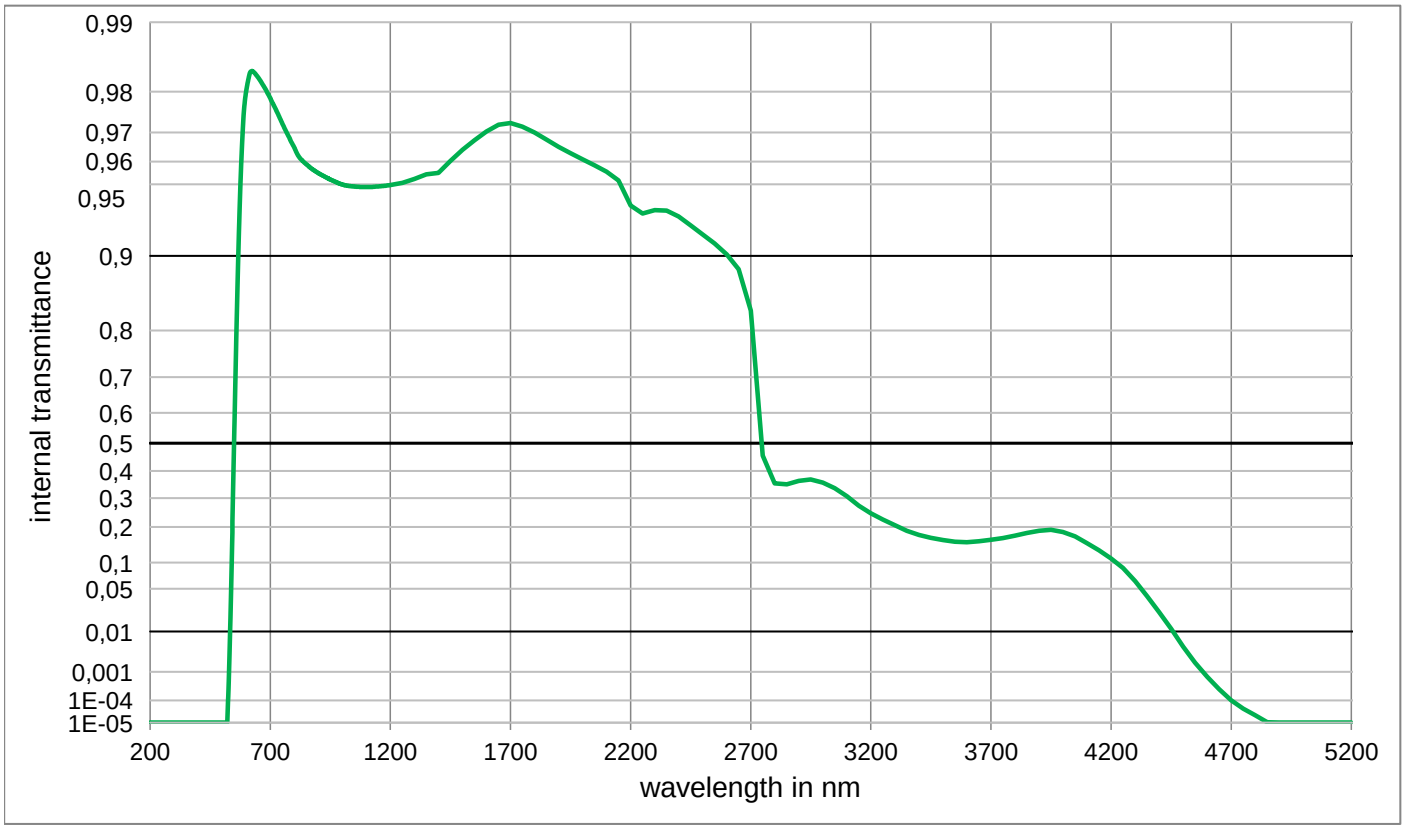
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x	0,521	0,547	0,557
	y	0,459	0,451	0,441
	Y	58,3	52,3	48,9
	λ_d	583 nm	586 nm	587 nm
	P_e	0,948	0,996	0,998
Illuminant A	x	0,565	0,580	0,587
	y	0,429	0,419	0,412
	Y	69,8	64,8	61,7
	λ_d	589 nm	591 nm	592 nm
	P_e	0,963	0,995	0,997

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

OG550



Internal transmittance ti 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

Data Sheet

OG570

Optical properties	
Reflection factor	
P_d	= 0,921
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 570 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 500 nm
λ_p ($\tau_{i,L}$ = 0,93)	= 640 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

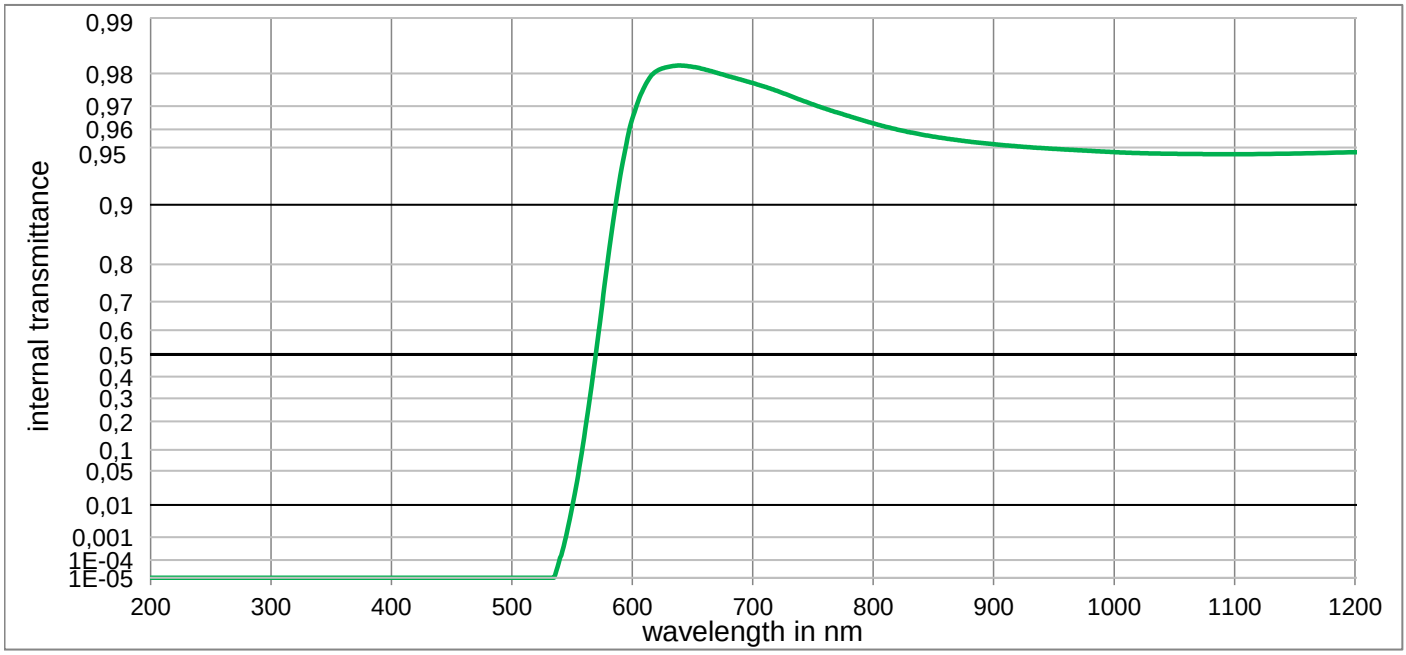
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,74 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 455

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

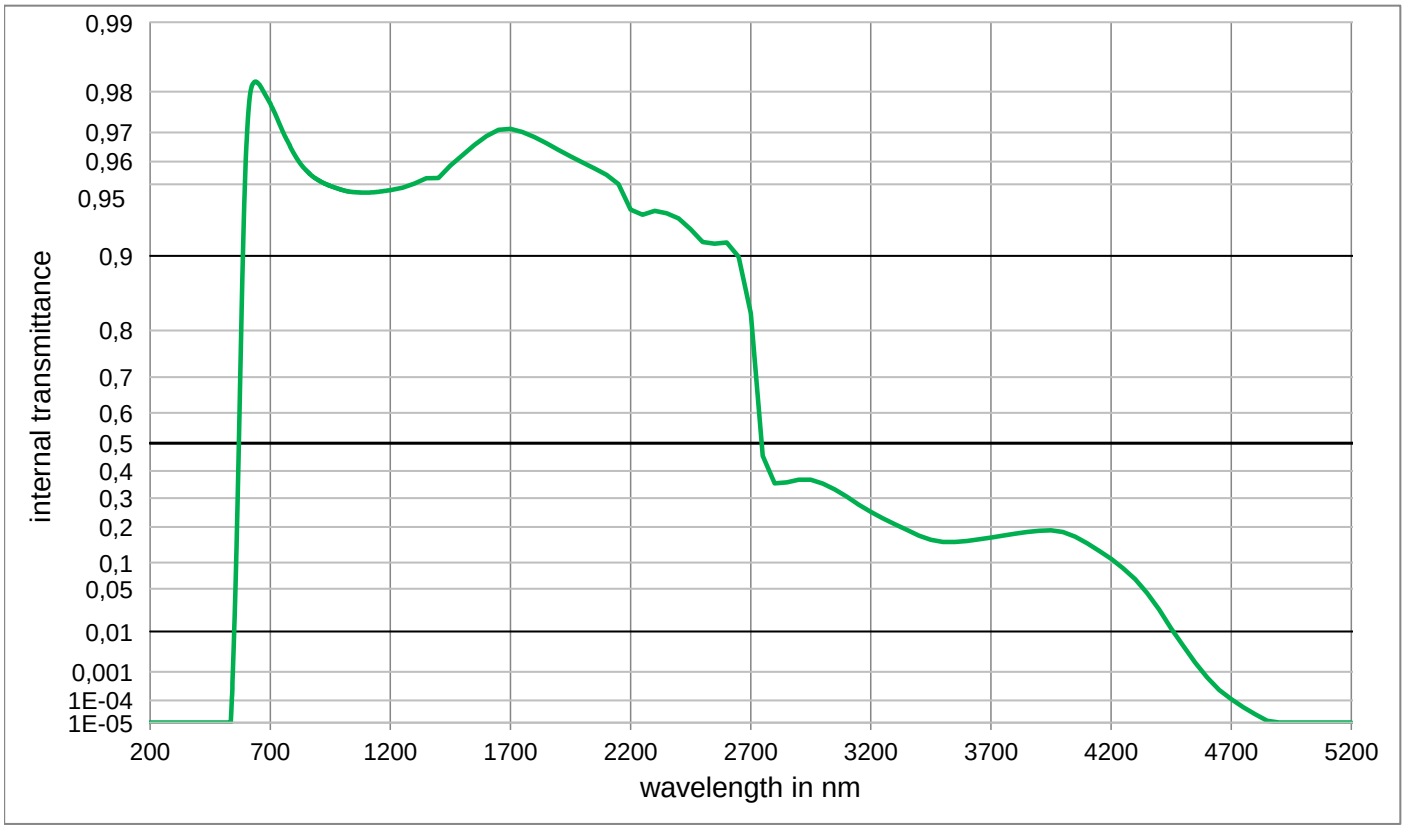
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,566	0,600	0,611
	y	0,412	0,399	0,389
	Y	42,7	36,1	32,9
	λ_d	591 nm	595 nm	597 nm
	P_e	0,941	0,998	1,000
Illuminant A	x	0,600	0,619	0,627
	y	0,394	0,380	0,372
	Y	55,7	49,4	46,0
	λ_d	596 nm	598 nm	600 nm
	P_e	0,964	0,999	1,000

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

OG570



Internal transmittance ti 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

Data Sheet

OG590

Optical properties	
Reflection factor	
P_d	= 0,921
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 590 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 510 nm
λ_p ($\tau_{i,L}$ = 0,93)	= 660 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/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 448

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

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
ISO 23364:2021
Disclaimer
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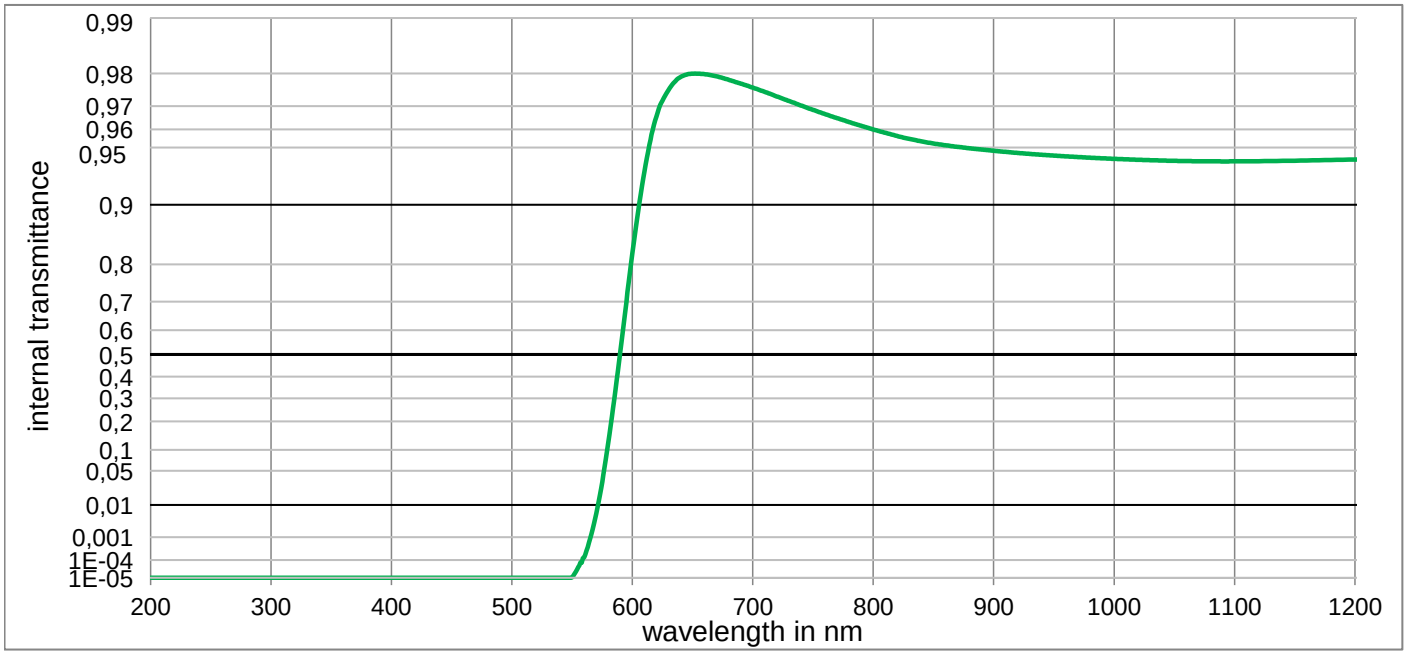
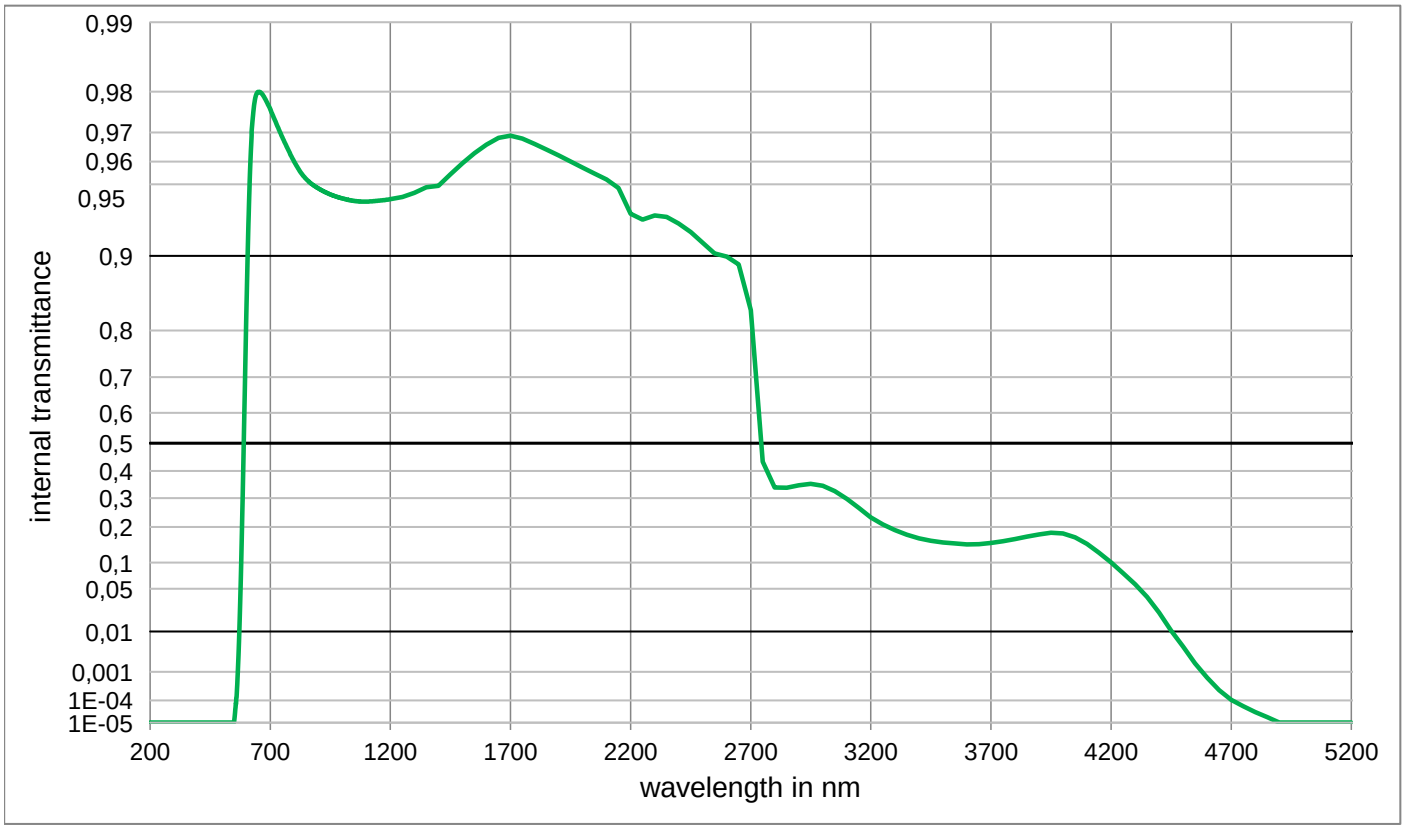


Data Sheet

OG590



Internal transmittance ti 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

Data Sheet

RG610

Optical properties			
Reflection factor			
P_d	=	0,920	
Spectral values guaranteed (d = 3 mm)			
$\lambda_{i\,0,5}$	=	610 nm ± 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)	=	1,51	
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	µm²
C_2	=	2,8886E-01	µm²
C_3	=	98,991	µm²
Internal quality			
Bubble class		3	

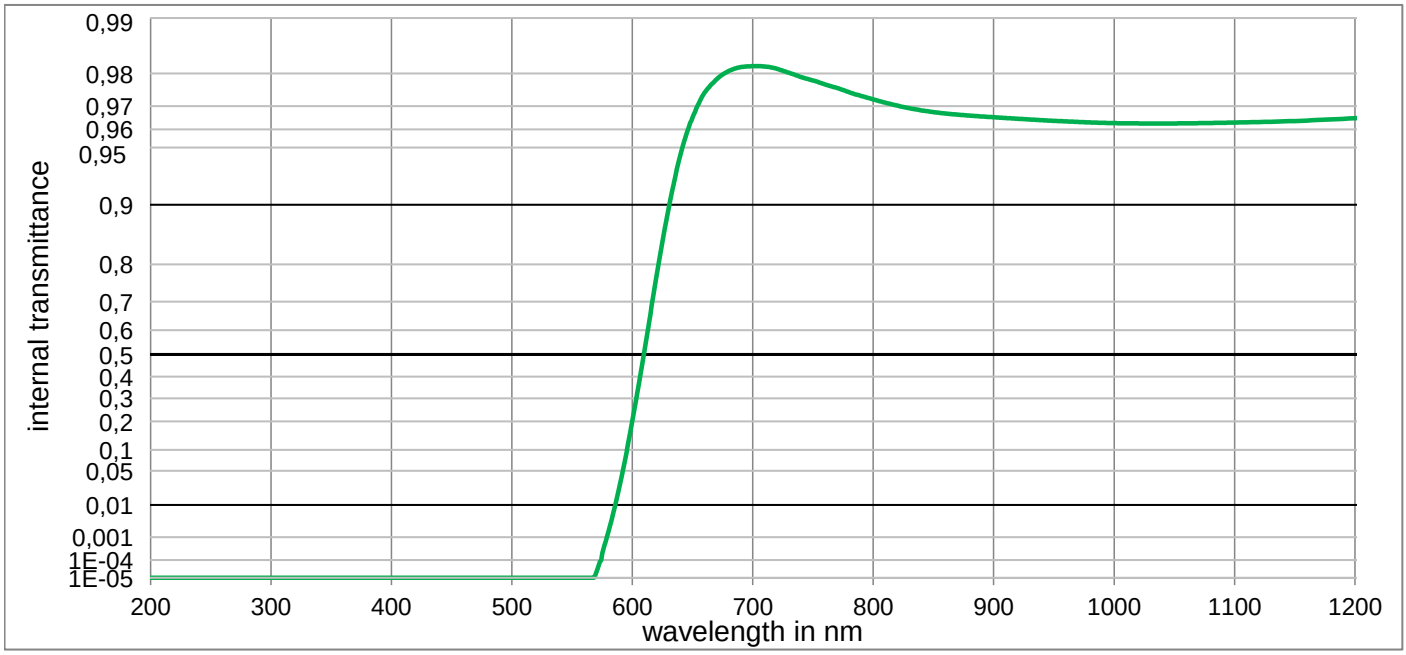
Mechanical properties			
Reference thickness			
d	=	3,00 mm	
Density			
ρ	=	2,65 g/cm³	
Knoop hardness			
$HK_{[0.1/20]}$	=	448	

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

Chemical properties			
Chemical resistance			
FR class			
SR class	=	1	
AR class	=	1	
Resistance against humidity			
Resistant glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

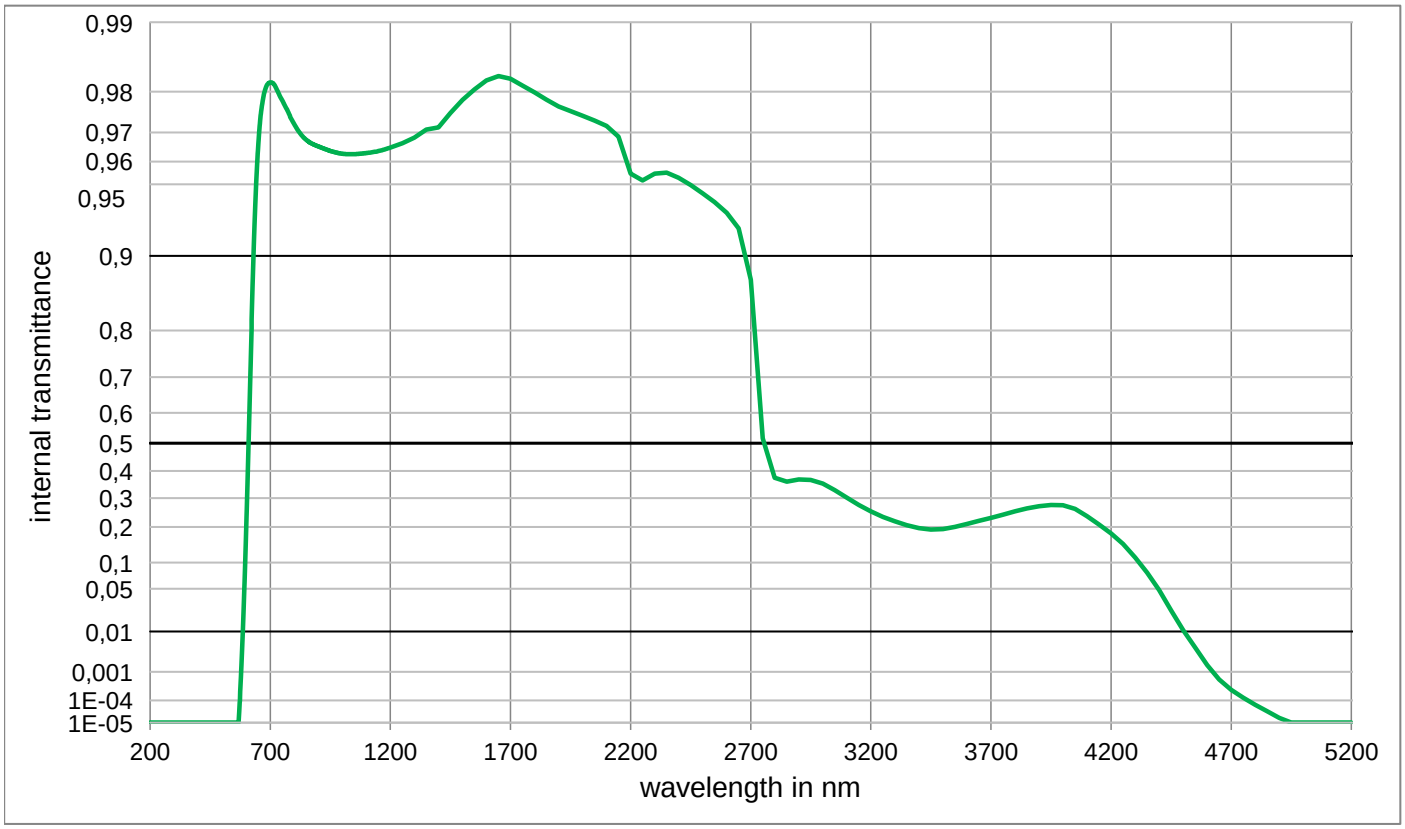
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,629	0,684	0,693
	y	0,330	0,315	0,307
	Y	17,4	11,9	9,9
	λ_d	611 nm	617 nm	621 nm
	P_e	0,886	0,996	1,000
Illuminant A	x	0,663	0,690	0,697
	y	0,328	0,310	0,303
	Y	26,5	19,7	16,8
	λ_d	614 nm	619 nm	623 nm
	P_e	0,939	0,998	0,999

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

RG610



Internal transmittance ti 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

Data Sheet

RG630

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 630 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 540 nm
λ_p ($\tau_{i,L}$ = 0,94)	= 710 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

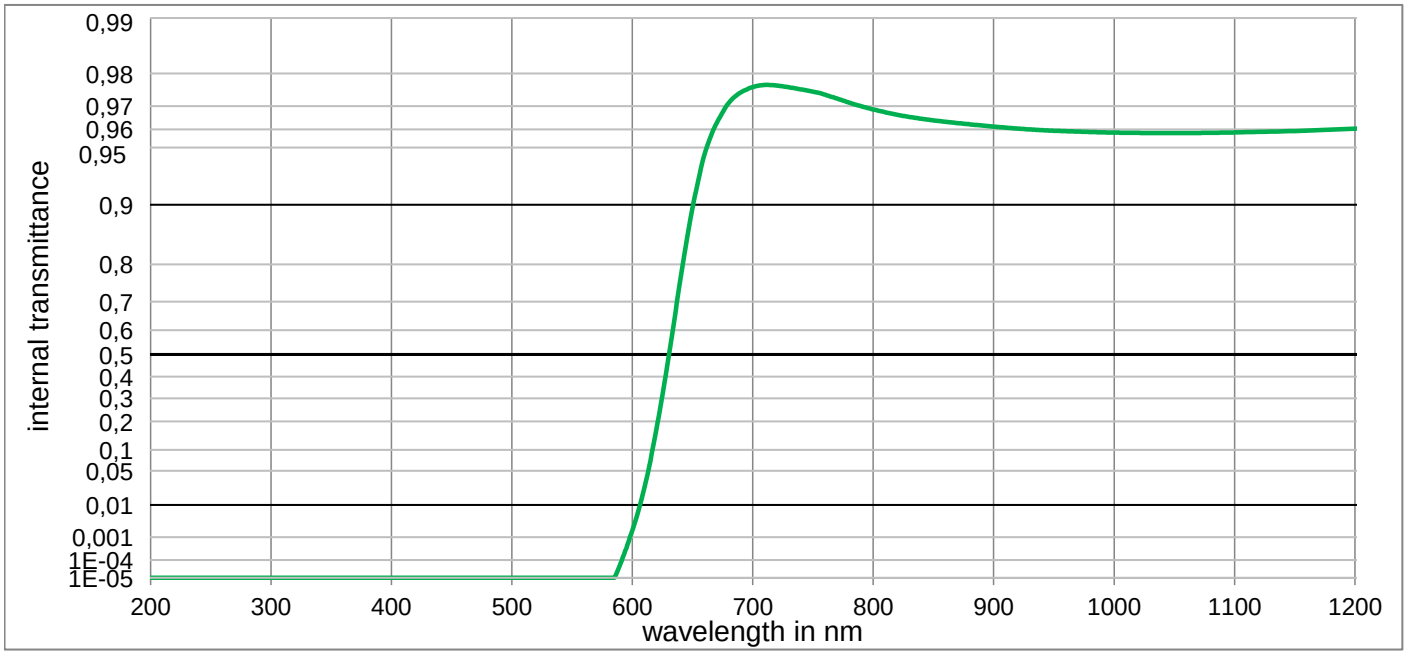
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,65 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 456

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

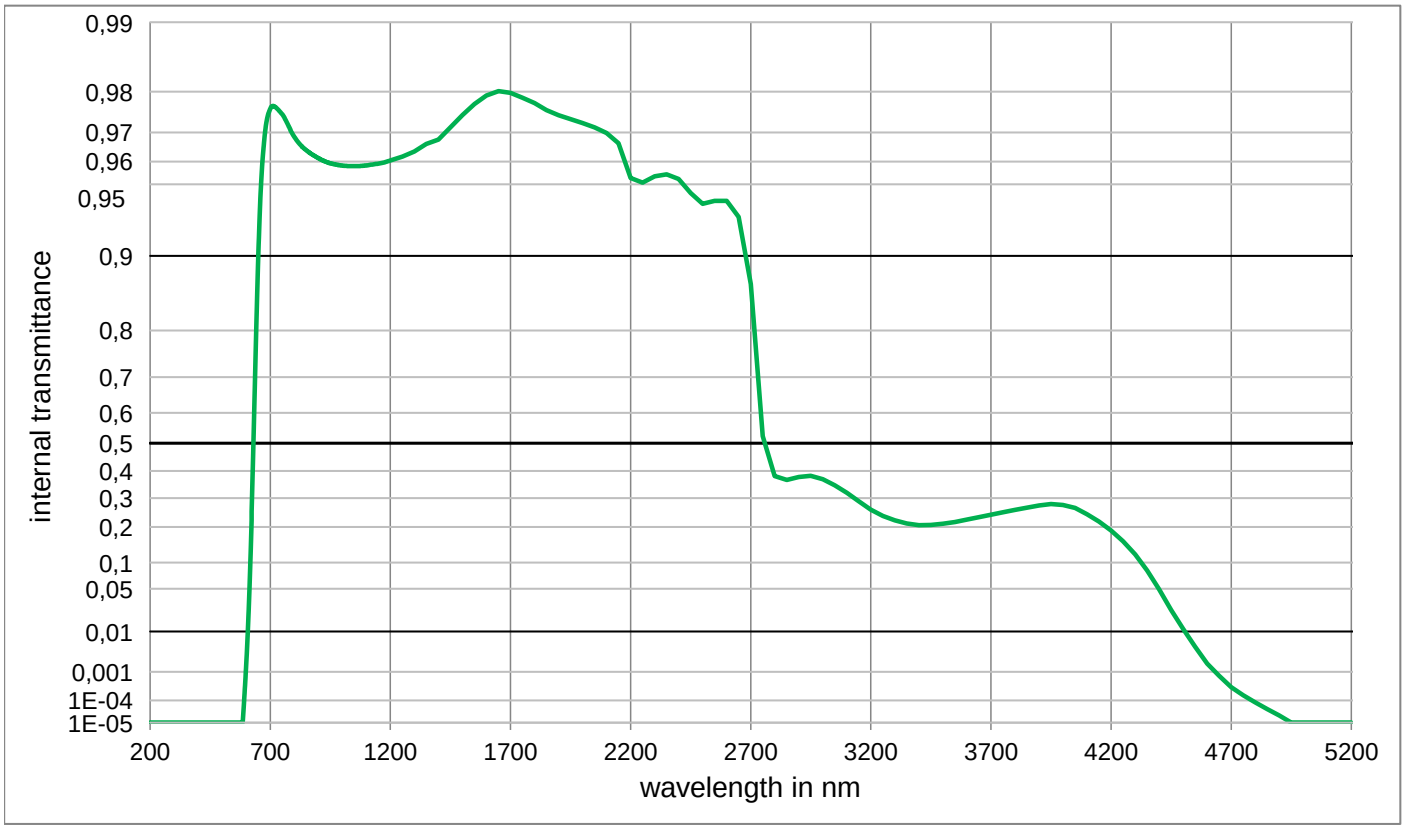
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,624	0,708	0,716
	y	0,305	0,289	0,284
	Y	9,3	5,1	4,0
	λ_d	625 nm	633 nm	637 nm
	P_e	0,802	0,992	1,000
Illuminant A	x	0,678	0,712	0,718
	y	0,307	0,287	0,282
	Y	14,8	9,4	7,6
	λ_d	627 nm	634 nm	639 nm
	P_e	0,899	0,996	0,999

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

RG630



Internal transmittance ti 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

Data Sheet

RG645

Optical properties		
Reflection factor		
P_d	=	0,918
Spectral values guaranteed (d = 3 mm)		
$\lambda_{i\,0,5}$	=	645 nm ± 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

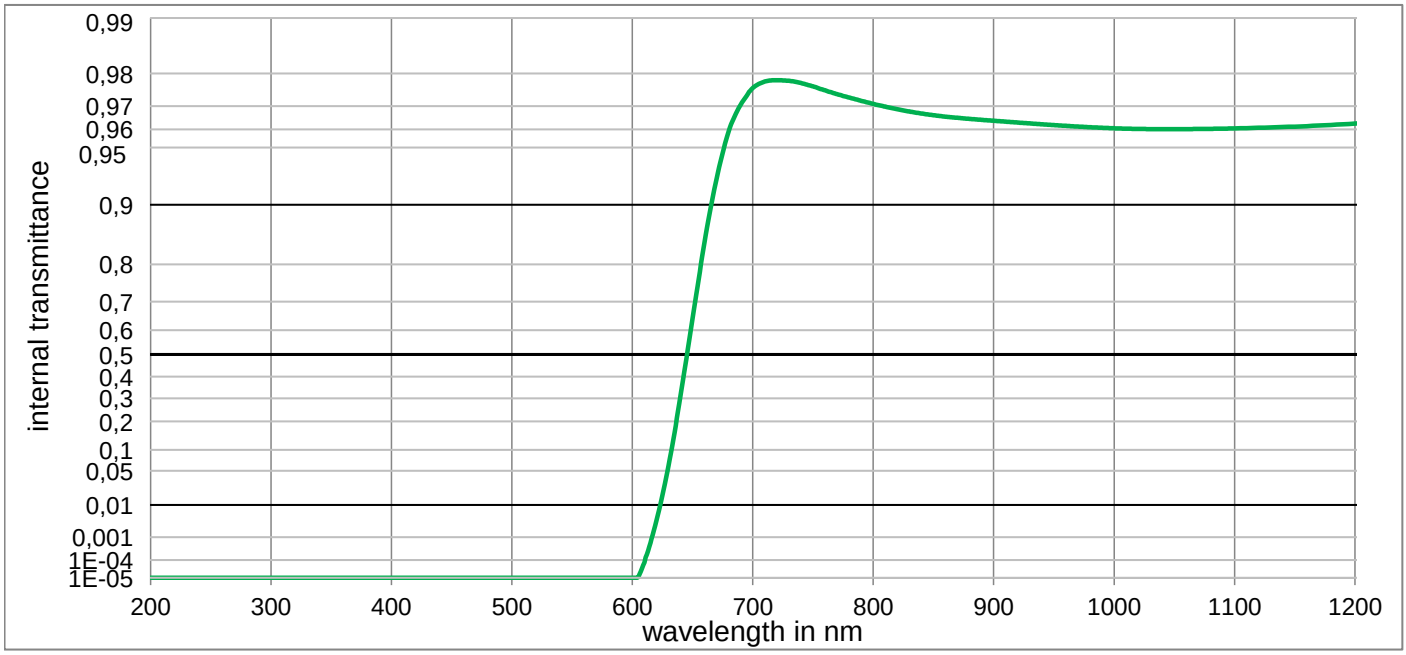
Mechanical properties		
Reference thickness		
d	=	3,00 mm
Density		
ρ	=	2,65 g/cm³
Knoop hardness		
$HK_{[0.1/20]}$	=	456

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

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	1
AR class	=	1
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

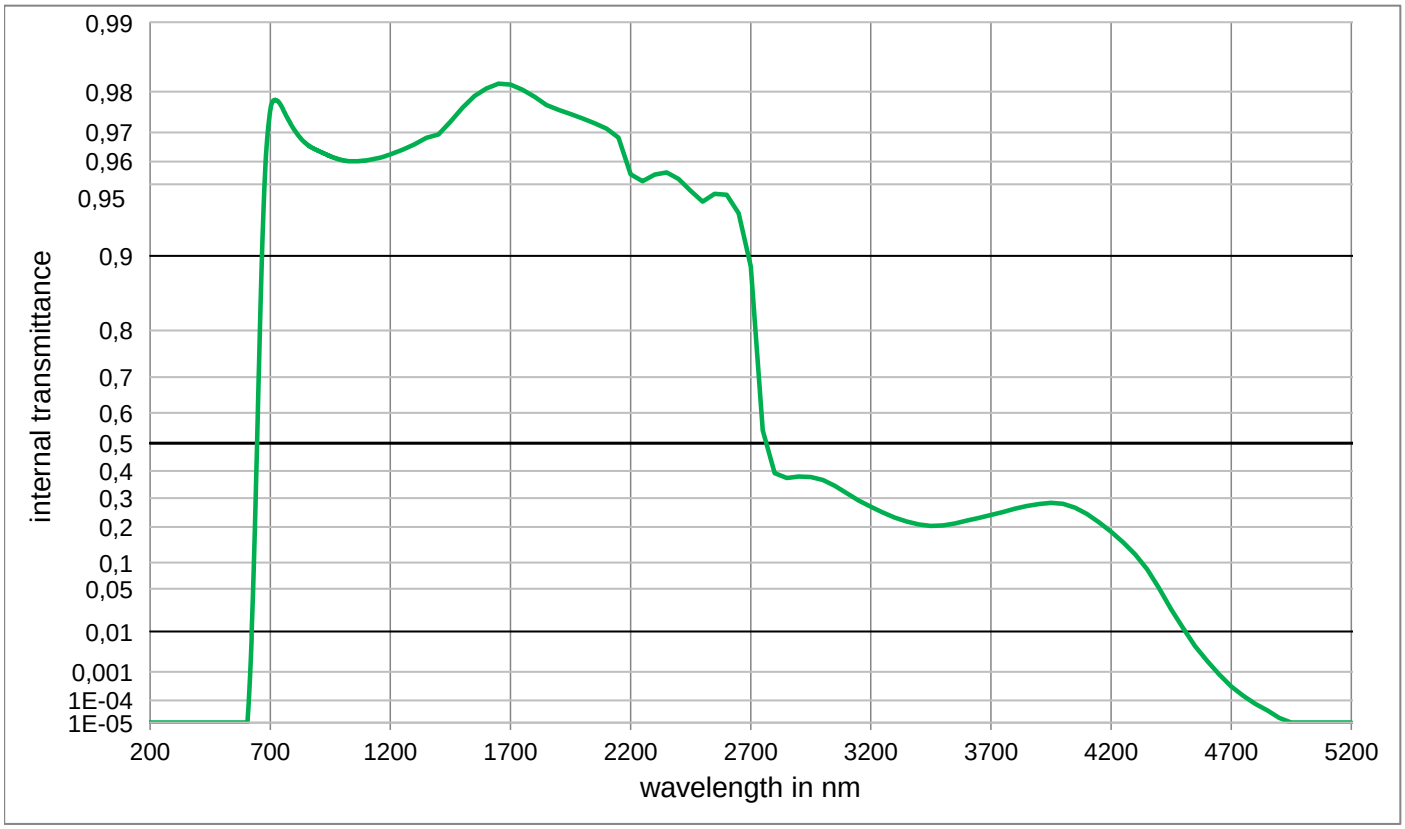
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x	0,584	0,717	0,726
	y	0,298	0,278	0,274
	Y	5,4	2,4	1,8
	λ_d	638 nm	645 nm	650 nm
	P_e	0,670	0,984	0,999
Illuminant A	x	0,672	0,722	0,726
	y	0,303	0,277	0,274
	Y	8,6	4,7	3,6
	λ_d	640 nm	647 nm	651 nm
	P_e	0,828	0,993	0,999

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

RG645



Internal transmittance ti 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

Data Sheet

RG665

Optical properties	
Reflection factor	
P_d	= 0,918
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 665 nm ± 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 µm²
C_2 =	1,8116E-02 µm²
C_3 =	117,823 µm²
Internal quality	
Bubble class	3

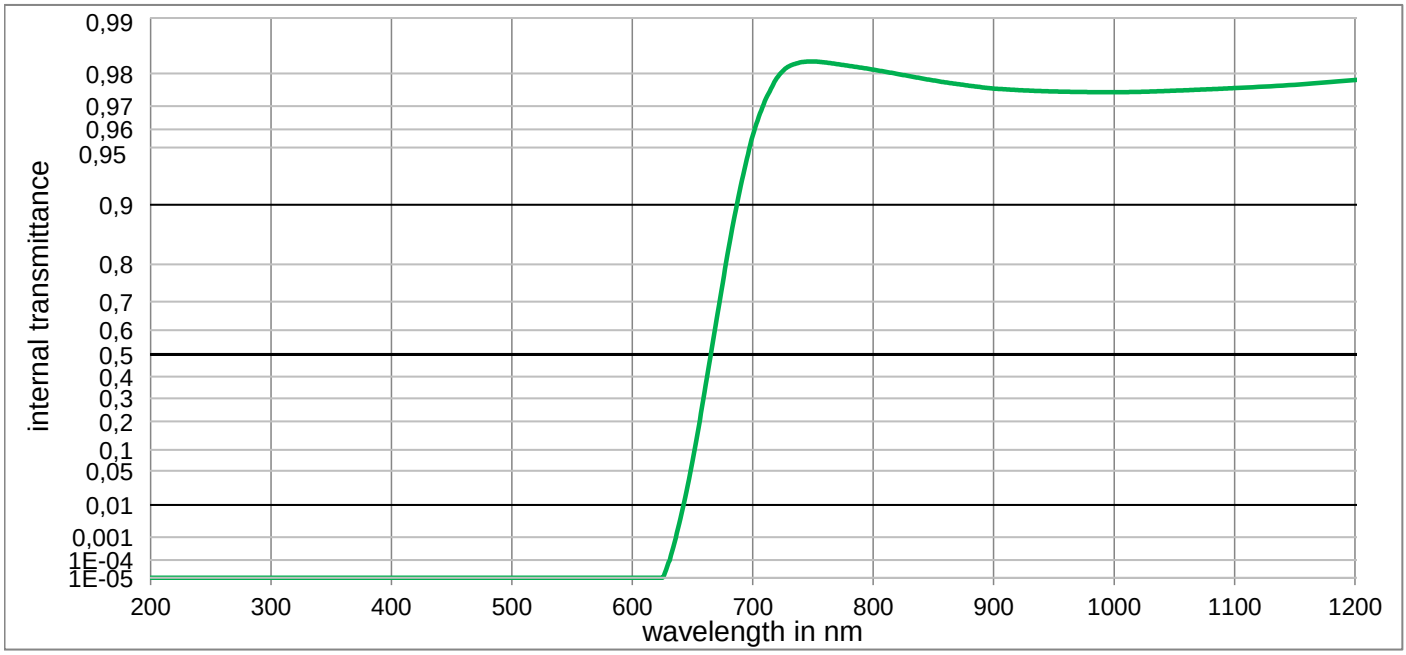
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,77 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 453

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

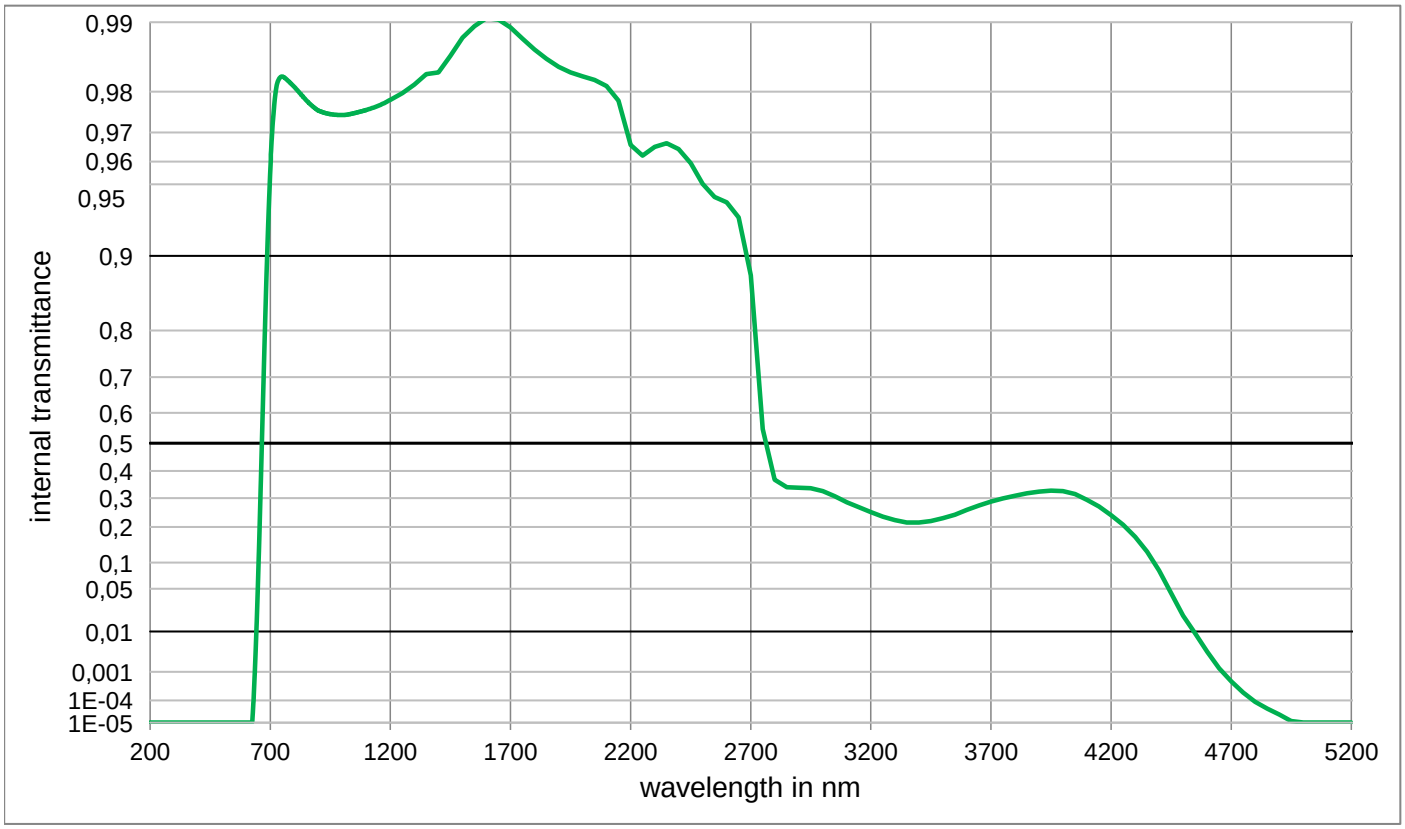
Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,487	0,711	0,731
	y	0,305	0,272	0,268
	Y	3,2	0,8	0,5
	λ_d	654 nm	662 nm	668 nm
	P_e	0,420	0,954	0,998
Illuminant A	x	0,631	0,726	0,732
	y	0,318	0,272	0,268
	Y	4,5	1,6	1,2
	λ_d	656 nm	664 nm	671 nm
	P_e	0,654	0,982	0,999

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

RG665



Internal transmittance ti 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

Data Sheet

RG695

Optical properties	
Reflection factor	
P_d	= 0,915
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 695 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 610 nm
λ_p ($\tau_{i,L}$ = 0,96)	= 780 nm
Refractive indices	
n_d (587,6 nm)	= 1,53
n_s (852 nm)	= 1,53
n_t (1014 nm)	= 1,52
Sellmeier coefficients	
valid from 440 nm to 1550 nm	
B_1 =	0,6009
B_2 =	0,7114
B_3 =	25,2603
C_1 =	1,682E-02 µm²
C_2 =	4,0132E-03 µm²
C_3 =	4853,501 µm²
Internal quality	
Bubble class	3

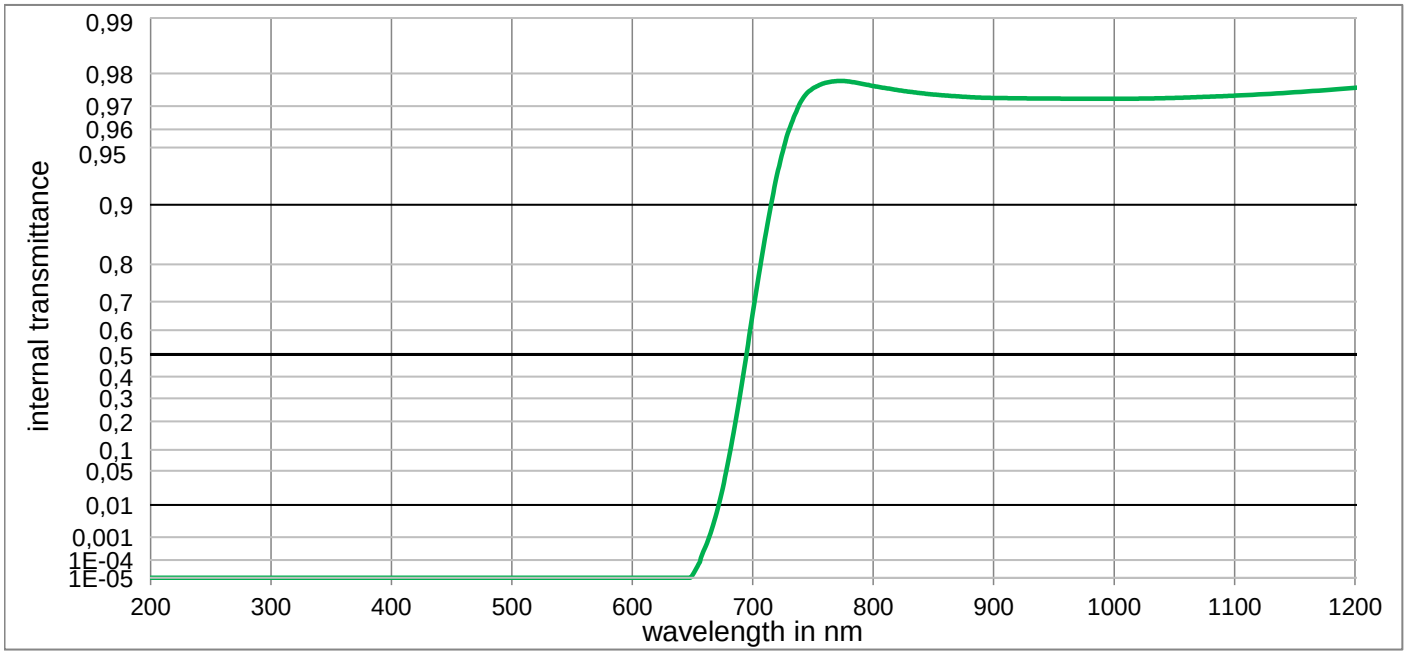
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,76 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 459

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

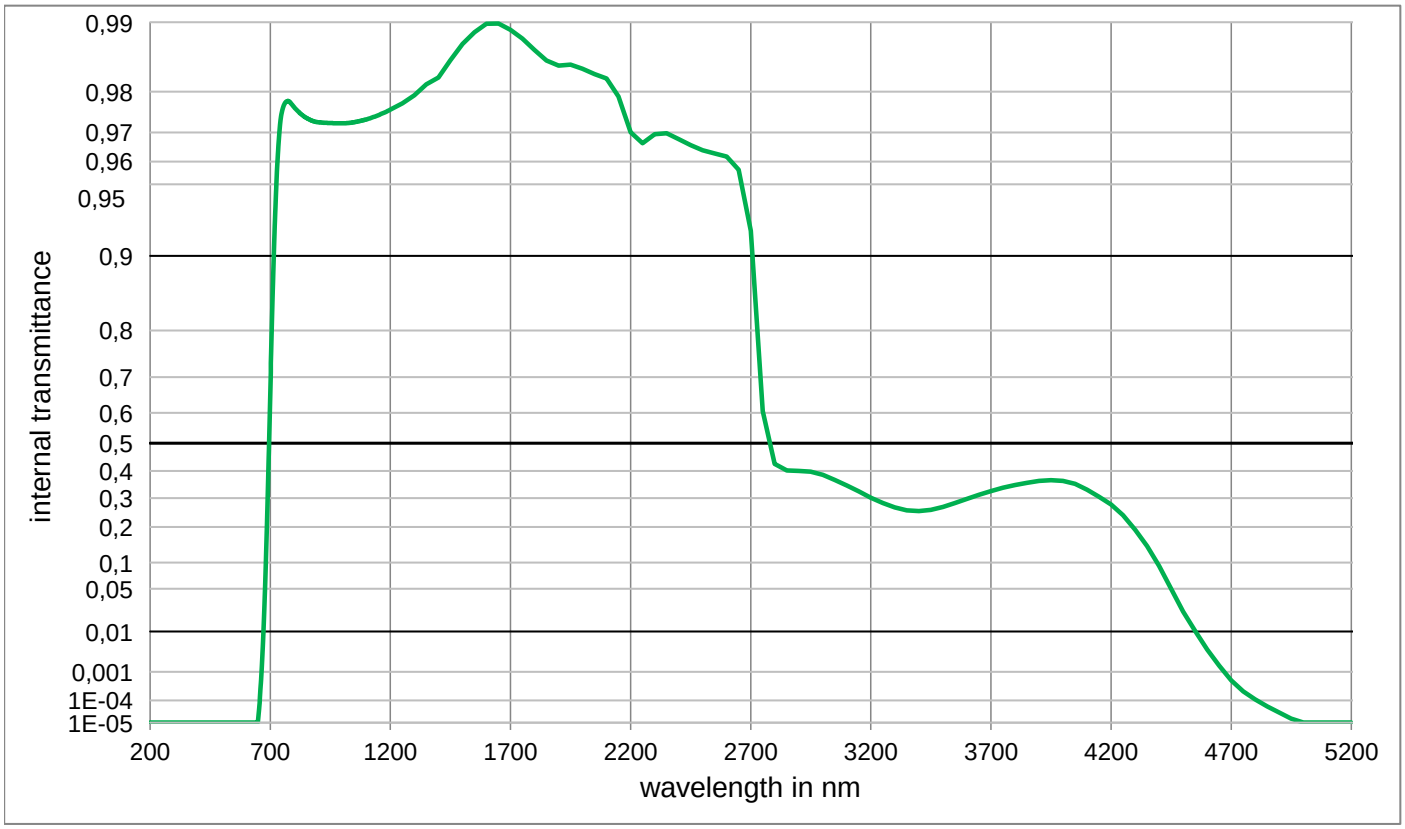
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

RG695



Internal transmittance ti 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

Data Sheet

RG715

Optical properties	
Reflection factor	
P_d	= 0,914
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 715 nm ± 9 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 620 nm
λ_p ($\tau_{i,L}$ = 0,96)	= 810 nm
Refractive indices	
n_d (587,6 nm)	= 1,54
n_s (852 nm)	= 1,53
n_t (1014 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 µm²
C_2 =	1,1301E-02 µm²
C_3 =	855,262 µm²
Internal quality	
Bubble class	3

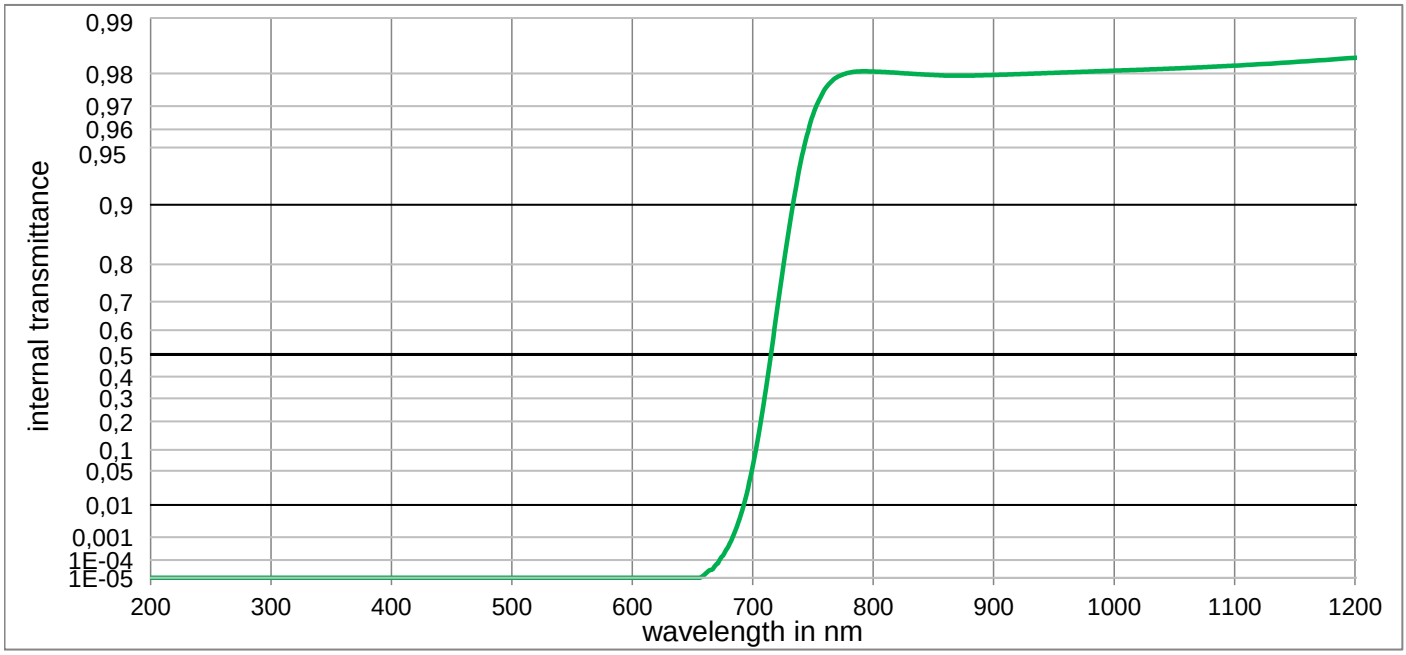
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,76 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 545

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

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

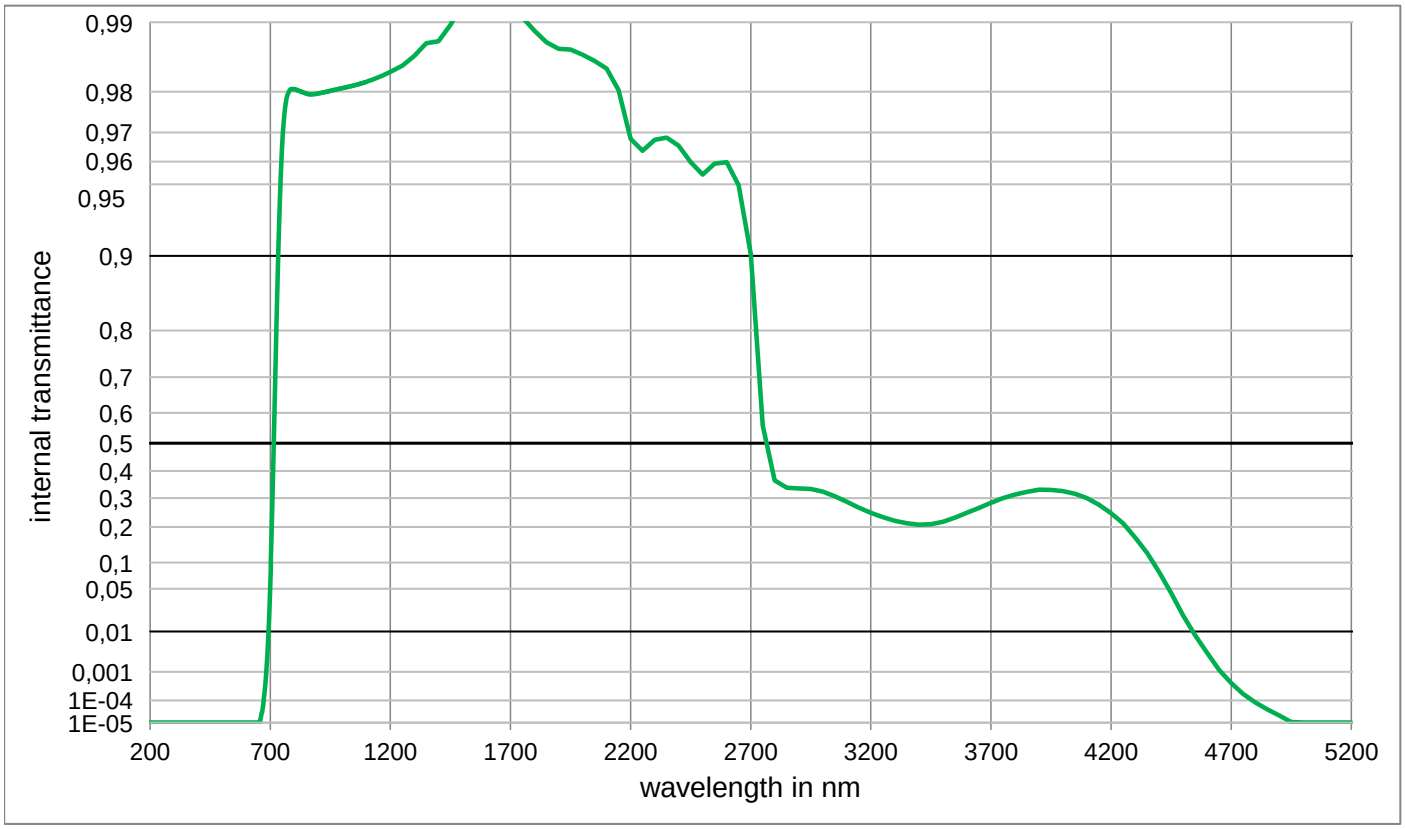
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

RG715



Internal transmittance ti 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

Data Sheet

RG9

Optical properties			
Reflection factor			
	P_d	=	0,920
Spectral values guaranteed			
τ_i (720 nm)		≤	0,45
τ_i (800 nm)		≥	0,92
τ_i (1060 nm)		≤	0,4
Refractive indices			
n_F (486 nm)		=	1,521
n_e (546 nm)		=	1,517
n_d (587,6 nm)		=	1,515
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1	0,6332		
B_2	0,6287		
B_3	64,3526		
C_1	9,656E-03 µm²		
C_2	9,6564E-03 µm²		
C_3	7257,357 µm²		
Internal quality			
Bubble class	3		

Mechanical properties			
Reference thickness			
	d	=	3,00 mm
Density			
	ρ	=	2,58 g/cm³
Knoop hardness			
	HK[0.1/20]	=	459

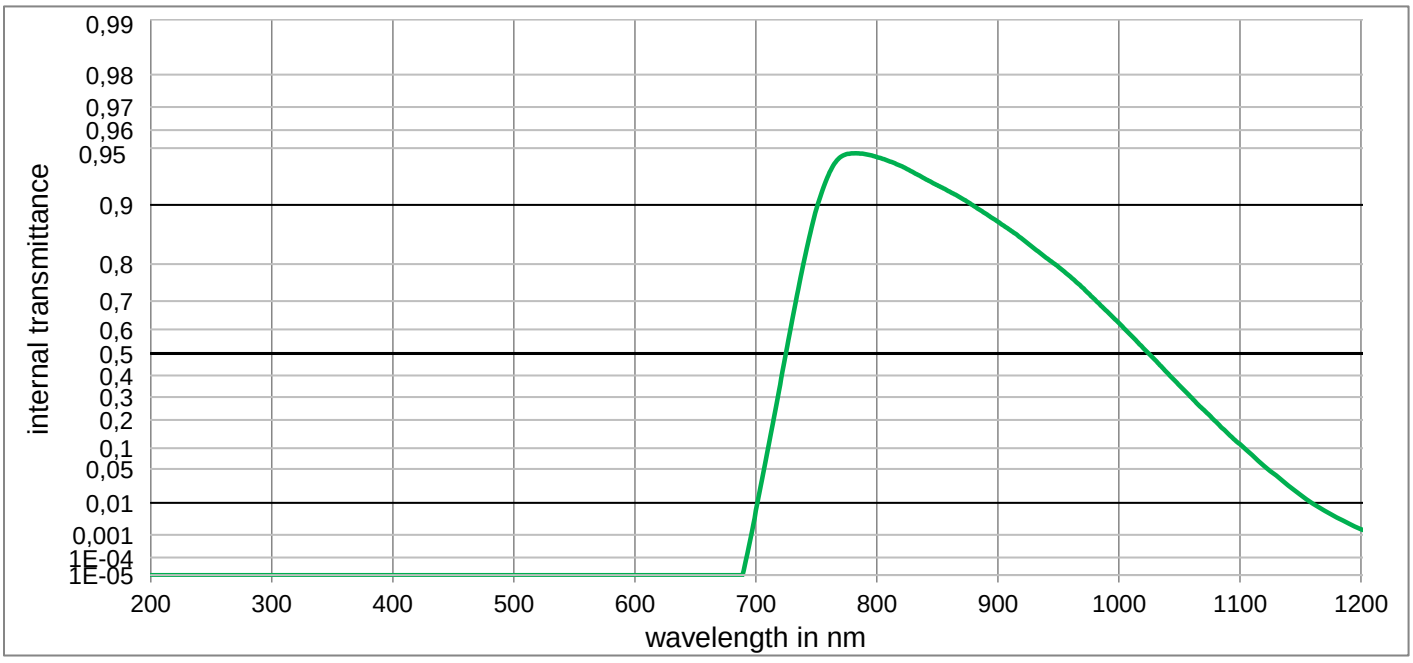
Thermal properties			
Transformation temperature			
	Tg	=	519 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	7,9
	$\alpha_{(20°C/300°C)}$	=	9,0
Temperature coefficient			
	Tk	=	0,06 nm/K

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	1
	AR class	=	1
Resistance against humidity			
Robust glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

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			

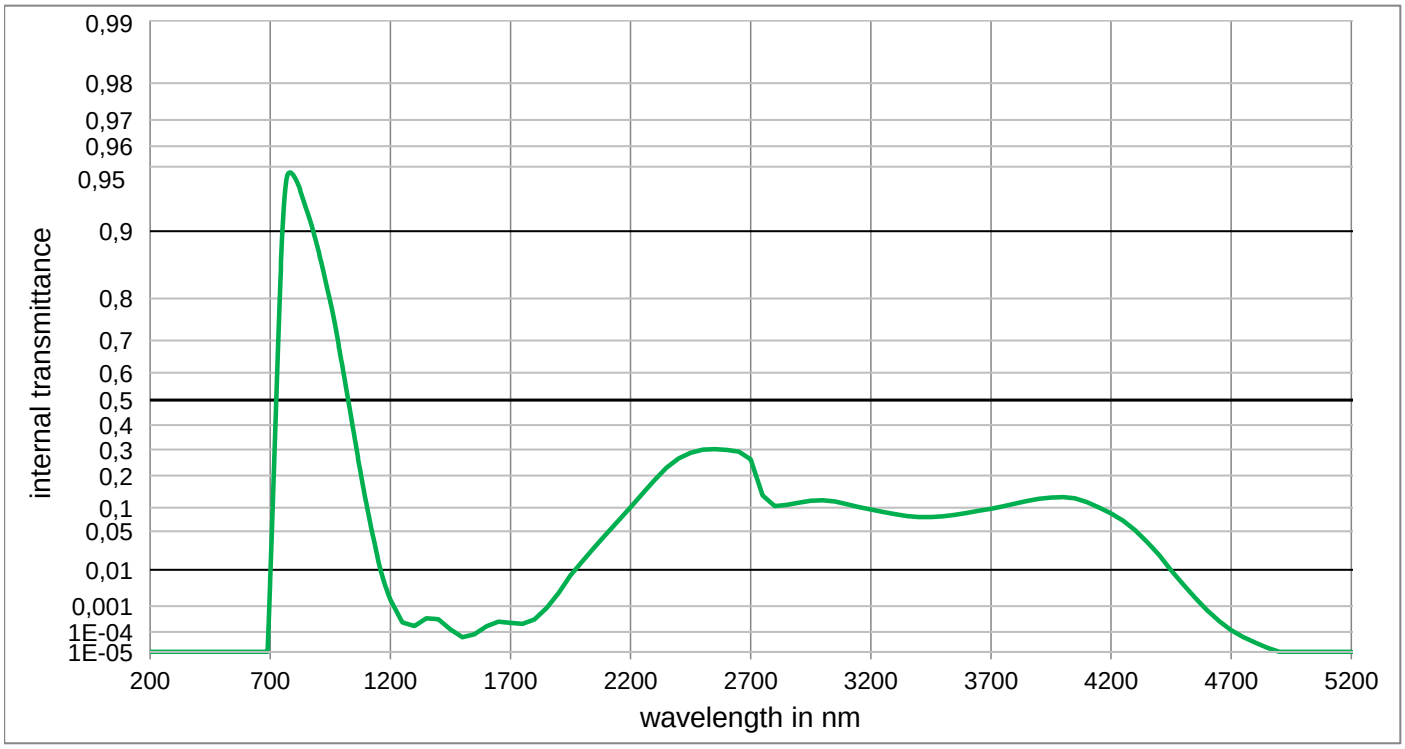
Notes
Bandpass filter / Longpass filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

RG9



Internal transmittance ti 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	< 1,000E-05	500	< 1,000E-05	800	9,442E-01	1100	1,124E-01	2200	1,008E-01	3700	9,734E-02
210	< 1,000E-05	510	< 1,000E-05	810	9,414E-01	1110	8,093E-02	2250	1,400E-01	3750	1,032E-01
220	< 1,000E-05	520	< 1,000E-05	820	9,377E-01	1120	5,559E-02	2300	1,844E-01	3800	1,105E-01
230	< 1,000E-05	530	< 1,000E-05	830	9,327E-01	1130	3,853E-02	2350	2,288E-01	3850	1,182E-01
240	< 1,000E-05	540	< 1,000E-05	840	9,271E-01	1140	2,454E-02	2400	2,643E-01	3900	1,239E-01
250	< 1,000E-05	550	< 1,000E-05	850	9,212E-01	1150	1,553E-02	2450	2,870E-01	3950	1,281E-01
260	< 1,000E-05	560	< 1,000E-05	860	9,148E-01	1160	9,600E-03	2500	2,997E-01	4000	1,292E-01
270	< 1,000E-05	570	< 1,000E-05	870	9,076E-01	1170	6,124E-03	2550	3,020E-01	4050	1,255E-01
280	< 1,000E-05	580	< 1,000E-05	880	8,989E-01	1180	3,890E-03	2600	2,991E-01	4100	1,144E-01
290	< 1,000E-05	590	< 1,000E-05	890	8,889E-01	1190	2,500E-03	2650	2,922E-01	4150	1,006E-01
300	< 1,000E-05	600	< 1,000E-05	900	8,776E-01	1200	1,611E-03	2700	2,612E-01	4200	8,570E-02
310	< 1,000E-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

Data Sheet

RG780

Optical properties	
Reflection factor	
P_d	= 0,908
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 780 nm ± 9 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 610 nm
λ_p ($\tau_{i,L}$ = 0,97)	= 900 nm
Refractive indices	
n_d (587,6 nm)	= 1,56
n_s (852 nm)	= 1,55
n_t (1014 nm)	= 1,55
Sellmeier coefficients	
valid from 440 nm to 1550 nm	
B_1	= 0,4066
B_2	= 0,9852
B_3	= 0,3548
C_1	= 1,139E-02 µm²
C_2	= 1,2050E-02 µm²
C_3	= 55,081 µm²
Internal quality	
Bubble class	3

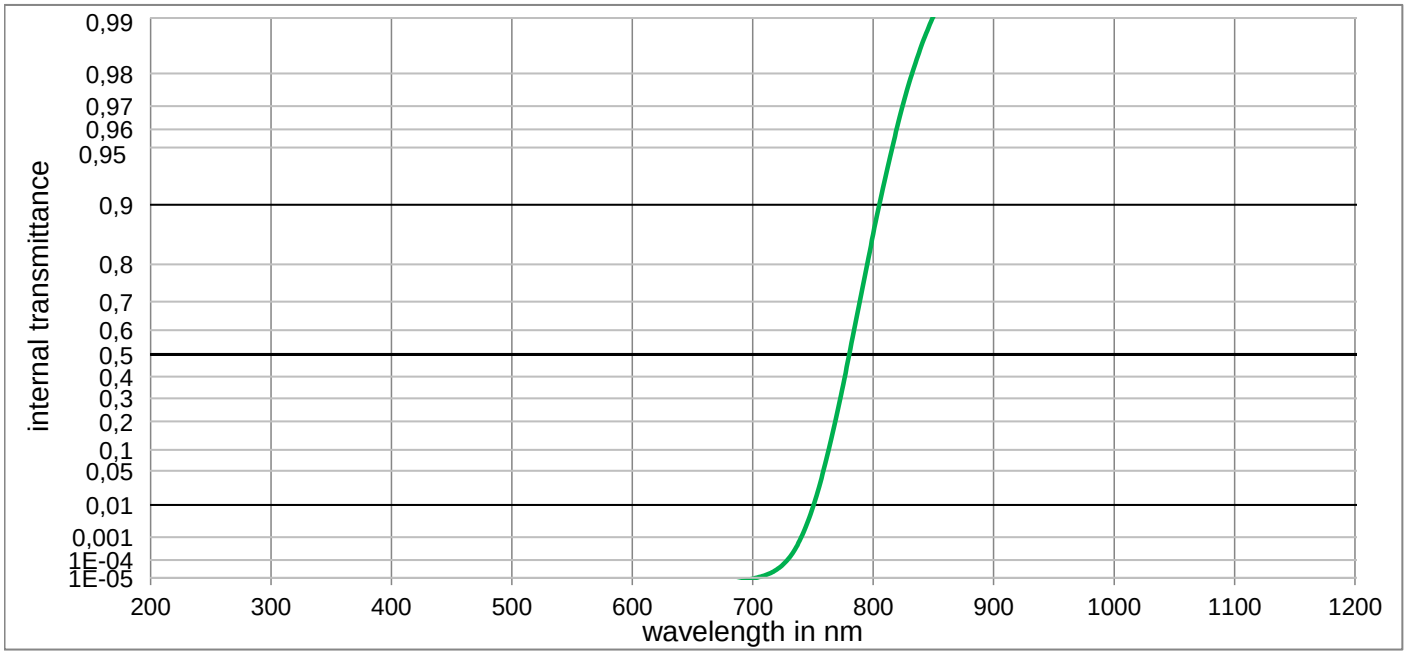
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,94 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	

Thermal properties		
Transformation temperature		
Tg	= 552 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 9,5	
$\alpha_{(20°C/300°C)}$	= 10,5	
Temperature coefficient		
Tk	= 0,22	nm/K

Chemical properties	
Chemical resistance	
FR class	= 5
SR class	= 53.4
AR class	= 1.3
Resistance against humidity	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

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			

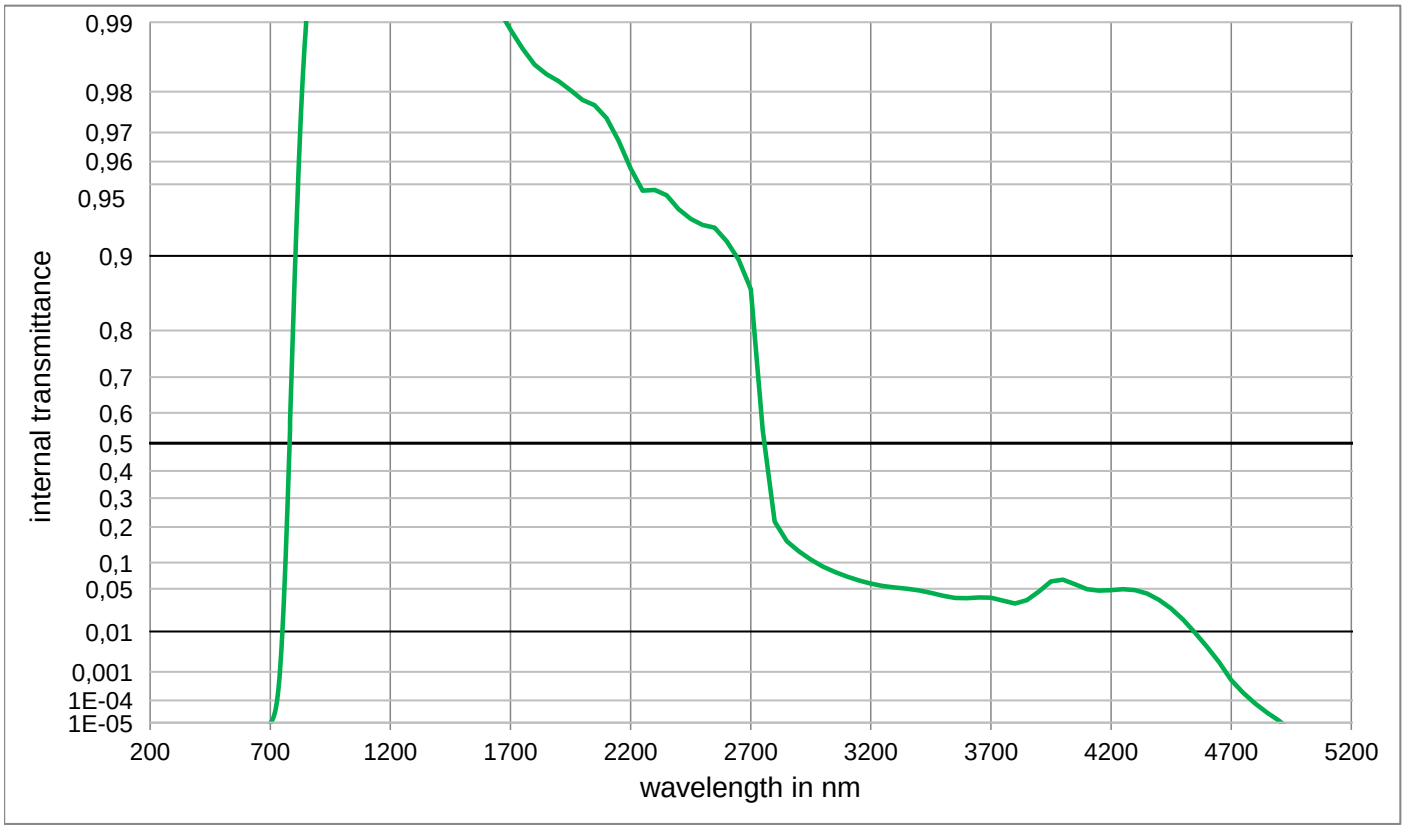
Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Status 18.11.2020

Data Sheet

RG780



Internal transmittance ti 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

Data Sheet

RG830

Optical properties	
Reflection factor	
P_d	= 0,909
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 830 nm ± 9 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 670 nm
λ_p ($\tau_{i,L}$ = 0,97)	= 950 nm
Refractive indices	
n_d (587,6 nm)	= 1,56
n_s (852 nm)	= 1,55
n_t (1014 nm)	= 1,55
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

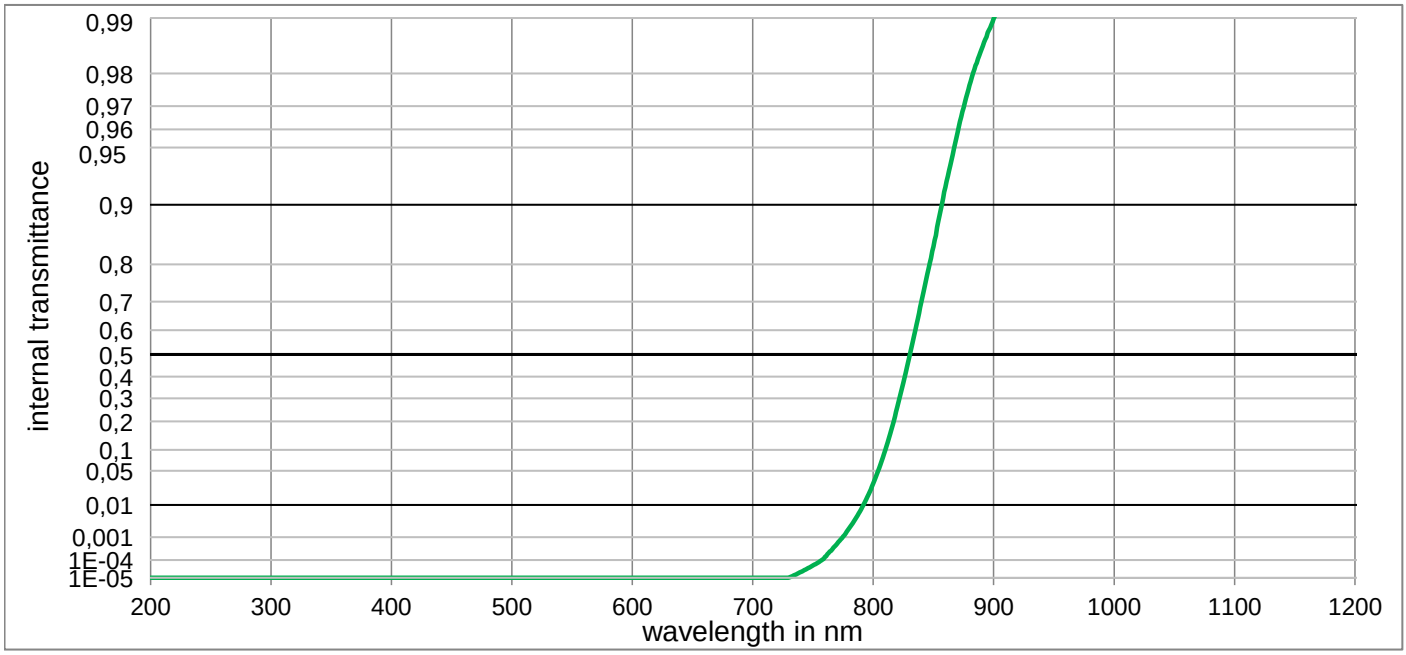
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,94 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 436

Thermal properties		
Transformation temperature		
Tg	= 554 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 9,5	
$\alpha_{(20°C/300°C)}$	= 10,5	
Temperature coefficient		
Tk	= 0,23	nm/K

Chemical properties	
Chemical resistance	
FR class	= 5
SR class	= 53.4
AR class	= 1.3
Resistance against humidity	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

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			

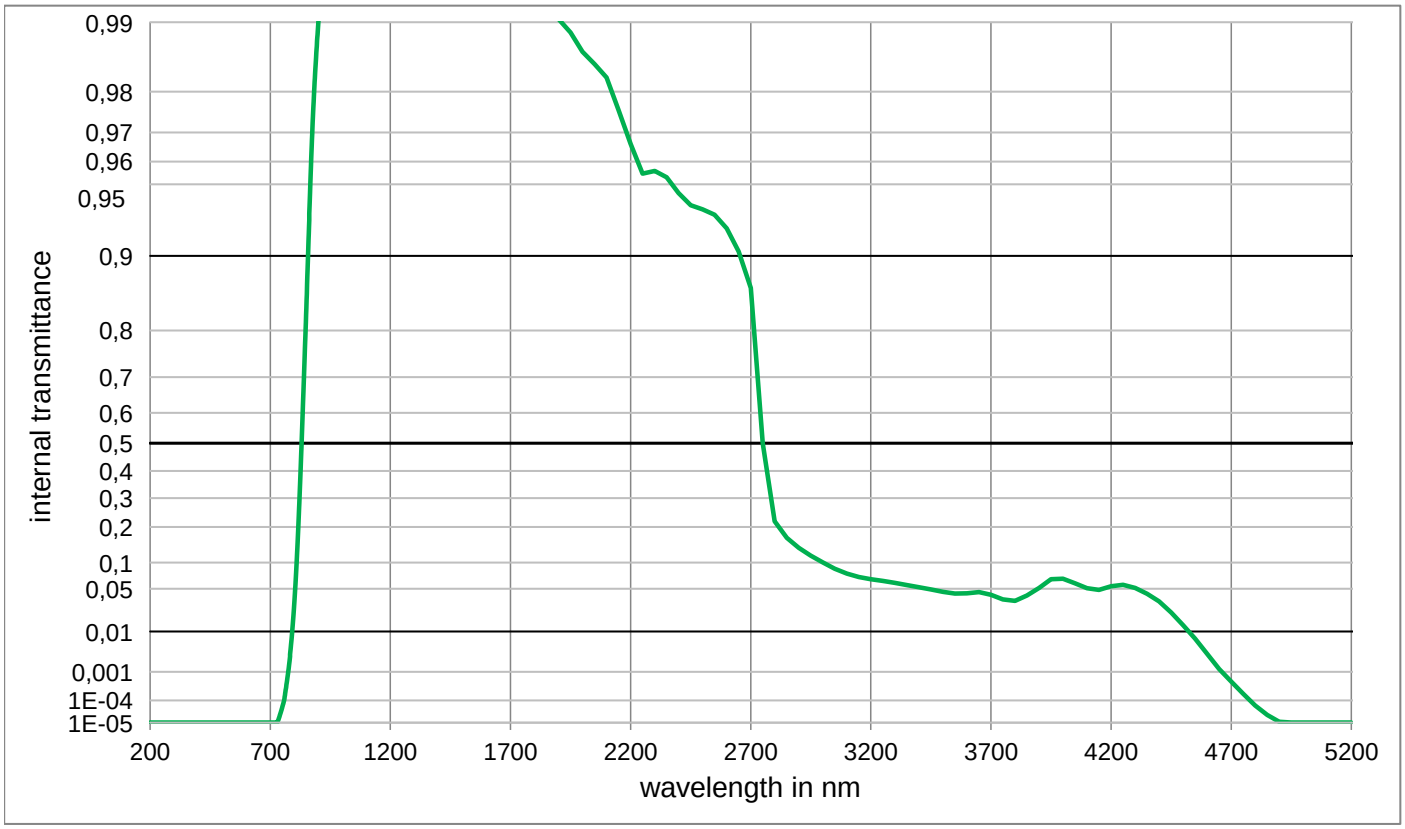
Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Status 18.11.2020

Data Sheet

RG830



Internal transmittance ti 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

Data Sheet

RG850

Optical properties	
Reflection factor	
P_d	= 0,909
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 850 nm ± 9 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 700 nm
λ_p ($\tau_{i,L}$ = 0,90)	= 950 nm
λ_p ($\tau_{i,L}$ = 0,97)	= 1200 nm
Refractive indices	
n_d (587,6 nm)	= 1,56
n_s (852 nm)	= 1,55
n_t (1014 nm)	= 1,55
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	3

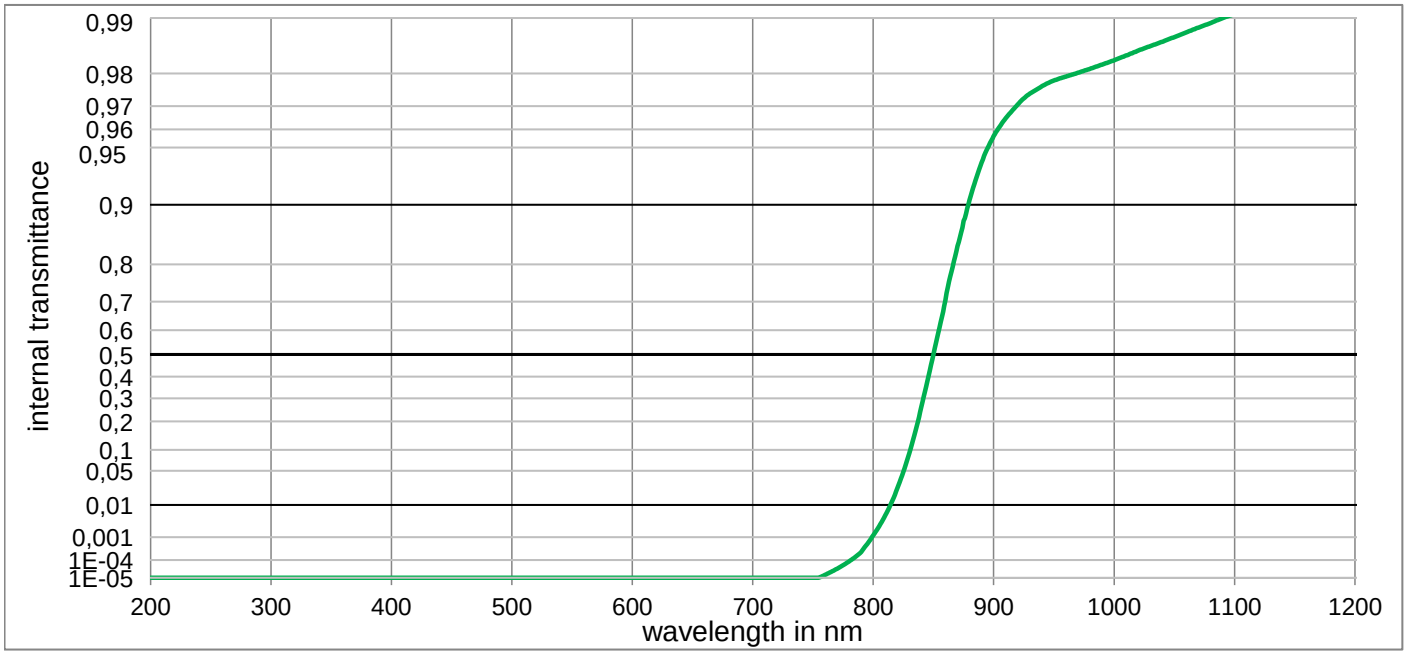
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,93 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 441

Thermal properties		
Transformation temperature		
Tg	= 554 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 9,4	
$\alpha_{(20°C/300°C)}$	= 10,4	
Temperature coefficient		
Tk	= 0,24	nm/K

Chemical properties	
Chemical resistance	
FR class	= 5
SR class	= 53.4
AR class	= 1.3
Resistance against humidity	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

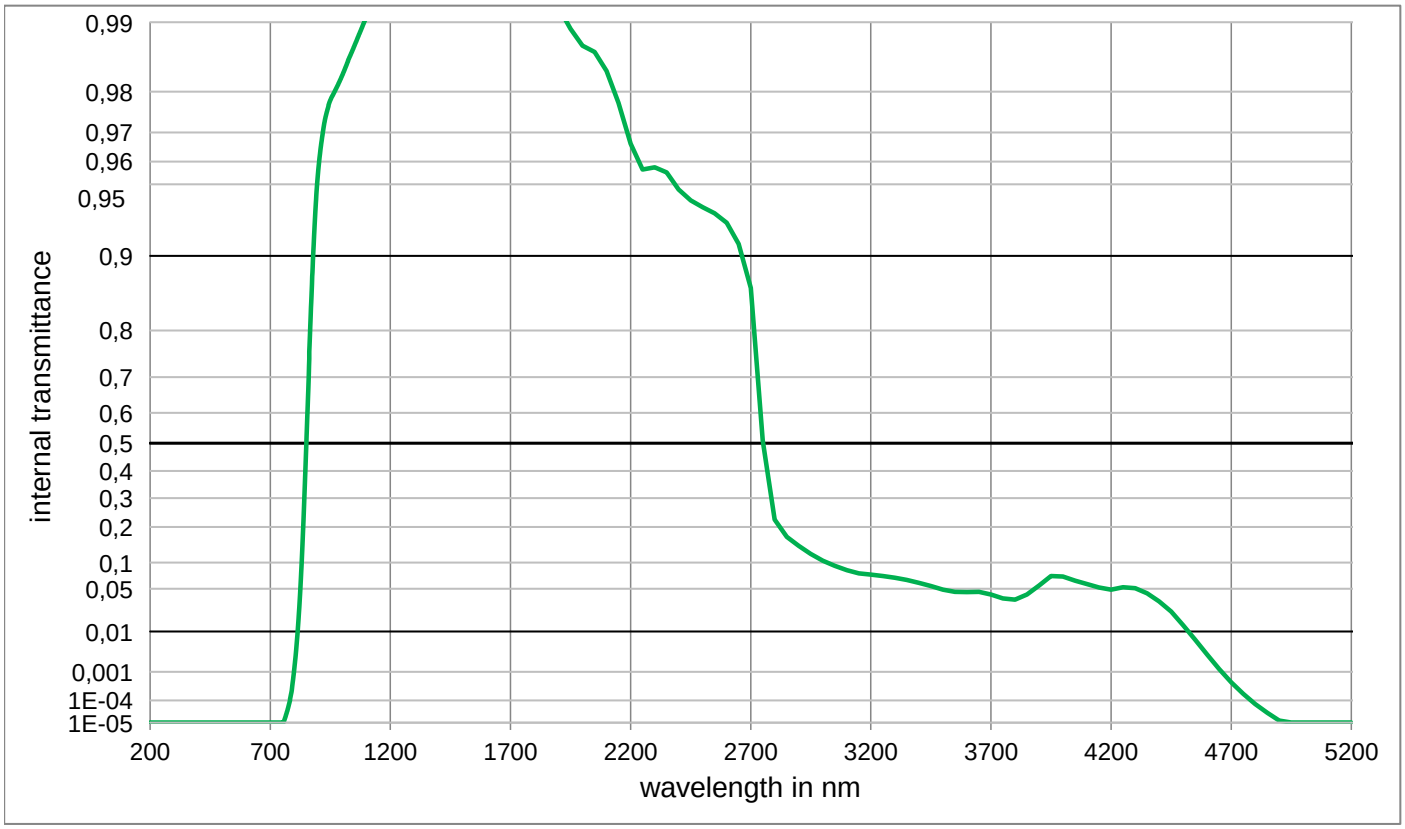
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Stricking glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

RG850



Internal transmittance ti 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

Data Sheet

RG905

Optical properties			
Reflection factor			
	P_d	=	0,921
Spectral values guaranteed			
τ_i (405 nm)		≤	0,002
τ_i (490 nm)		≤	0,08
τ_i (645 nm)		≤	0,002
τ_i (905 nm)		≥	0,97
Refractive indices			
n_F (486 nm)		=	1,516
n_e (546 nm)		=	1,512
n_d (587,6 nm)		=	1,51
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1	0,6150		
B_2	0,6285		
B_3	13,7990		
C_1	1,035E-02 µm²		
C_2	1,0302E-02 µm²		
C_3	1939,581 µm²		
Internal quality			
Bubble class	-		

Mechanical properties			
Reference thickness			
	d	=	4,00 mm
Density			
	ρ	=	2,54 g/cm³
Knoop hardness			
	HK[0.1/20]	=	438

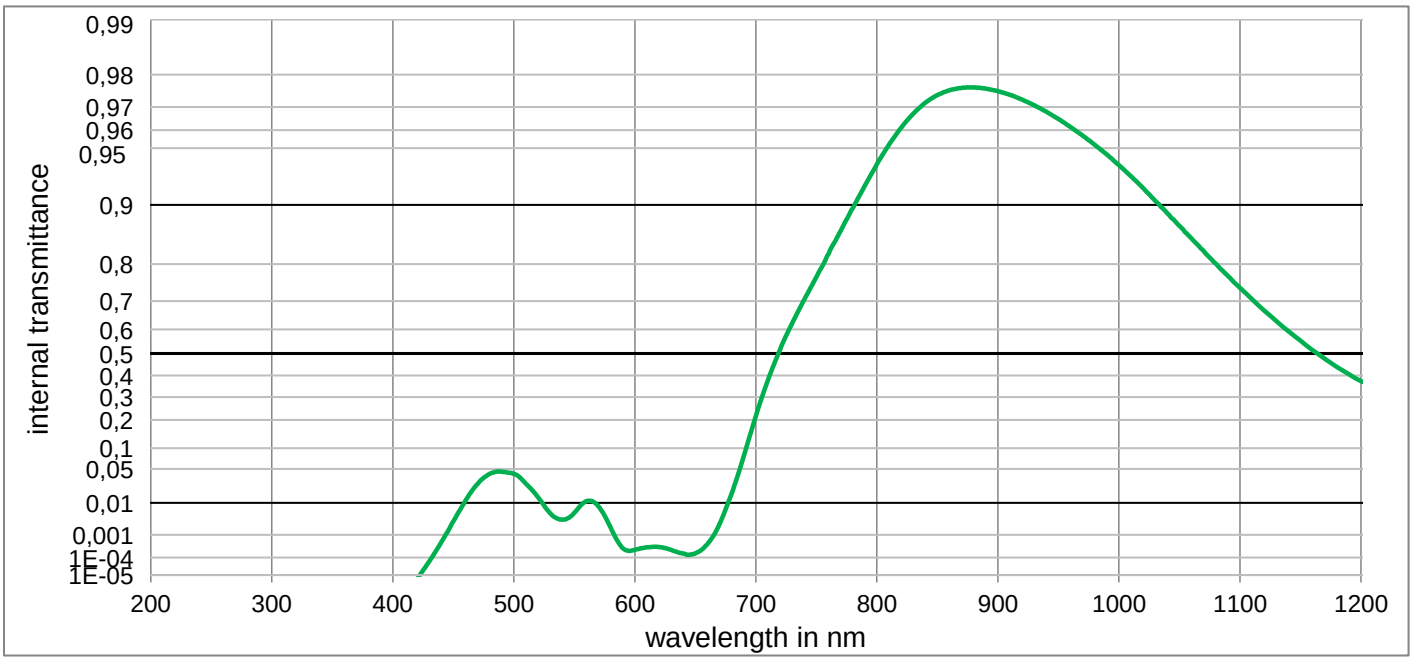
Thermal properties			
Transformation temperature			
	Tg	=	481 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	8,7
	$\alpha_{(20°C/300°C)}$	=	10,0

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	1.0
	AR class	=	1.0
Resistance against humidity			

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
Bandpass filter / Longpass filter
ISO 23364:2021

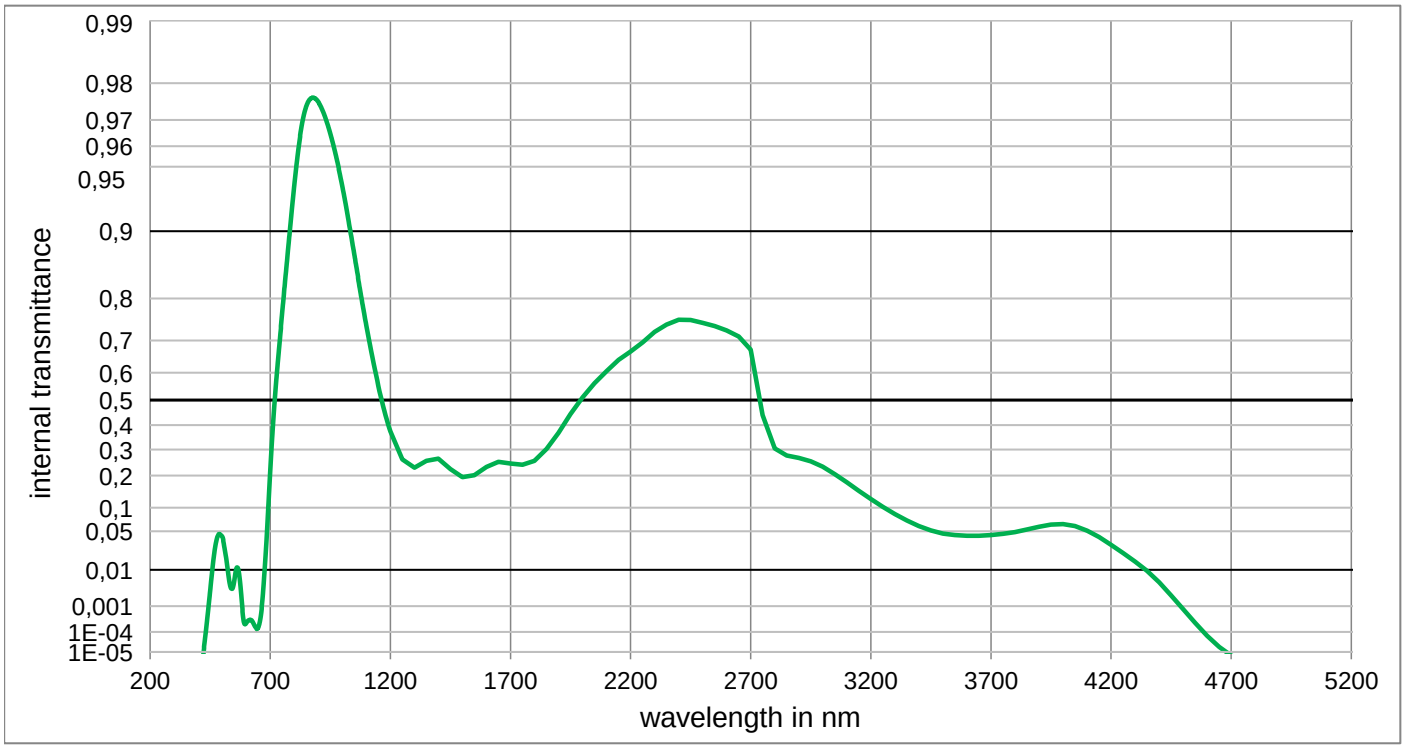
Disclaimer
All data without tolerances are to be understood to be reference values.



Status 25.04.2023

Data Sheet

RG905



Internal transmittance ti 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	< 1,000E-05	500	4,144E-02	800	9,390E-01	1100	7,396E-01	2200	6,679E-01	3700	4,391E-02
210	< 1,000E-05	510	2,703E-02	810	9,520E-01	1110	7,055E-01	2250	6,951E-01	3750	4,577E-02
220	< 1,000E-05	520	1,361E-02	820	9,611E-01	1120	6,691E-01	2300	7,234E-01	3800	4,874E-02
230	< 1,000E-05	530	5,249E-03	830	9,674E-01	1130	6,316E-01	2350	7,420E-01	3850	5,293E-02
240	< 1,000E-05	540	3,344E-03	840	9,715E-01	1140	5,930E-01	2400	7,535E-01	3900	5,778E-02
250	< 1,000E-05	550	5,402E-03	850	9,741E-01	1150	5,546E-01	2450	7,528E-01	3950	6,183E-02
260	< 1,000E-05	560	1,107E-02	860	9,757E-01	1160	5,149E-01	2500	7,462E-01	4000	6,292E-02
270	< 1,000E-05	570	8,130E-03	870	9,764E-01	1170	4,769E-01	2550	7,382E-01	4050	5,930E-02
280	< 1,000E-05	580	1,843E-03	880	9,765E-01	1180	4,398E-01	2600	7,270E-01	4100	5,118E-02
290	< 1,000E-05	590	2,794E-04	890	9,762E-01	1190	4,054E-01	2650	7,110E-01	4150	4,086E-02
300	< 1,000E-05	600	2,365E-04	900	9,754E-01	1200	3,741E-01	2700	6,734E-01	4200	3,081E-02
310	< 1,000E-05	610	3,064E-04	910	9,742E-01	1250	2,610E-01	2750	4,409E-01	4250	2,192E-02
320	< 1,000E-05	620	3,155E-04	920	9,727E-01	1300	2,294E-01	2800	3,043E-01	4300	1,498E-02
330	< 1,000E-05	630	2,321E-04	930	9,706E-01	1350	2,554E-01	2850	2,767E-01	4350	9,436E-03
340	< 1,000E-05	640	1,576E-04	940	9,682E-01	1400	2,637E-01	2900	2,666E-01	4400	5,022E-03
350	< 1,000E-05	650	1,604E-04	950	9,651E-01	1450	2,237E-01	2950	2,536E-01	4450	2,197E-03
360	< 1,000E-05	660	4,276E-04	960	9,615E-01	1500	1,946E-01	3000	2,324E-01	4500	7,882E-04
370	< 1,000E-05	670	2,431E-03	970	9,572E-01	1550	2,015E-01	3050	2,053E-01	4550	2,409E-04
380	< 1,000E-05	680	1,696E-02	980	9,520E-01	1600	2,316E-01	3100	1,763E-01	4600	6,732E-05
390	< 1,000E-05	690	7,804E-02	990	9,458E-01	1650	2,511E-01	3150	1,484E-01	4650	1,888E-05
400	< 1,000E-05	700	2,159E-01	1000	9,384E-01	1700	2,453E-01	3200	1,232E-01	4700	< 1,000E-05
410	< 1,000E-05	710	3,800E-01	1010	9,293E-01	1750	2,398E-01	3250	1,019E-01	4750	< 1,000E-05
420	< 1,000E-05	720	5,179E-01	1020	9,183E-01	1800	2,556E-01	3300	8,420E-02	4800	< 1,000E-05
430	6,155E-05	730	6,230E-01	1030	9,046E-01	1850	3,022E-01	3350	7,017E-02	4850	< 1,000E-05
440	5,118E-04	740	7,044E-01	1040	8,896E-01	1900	3,686E-01	3400	5,923E-02	4900	< 1,000E-05
450	2,924E-03	750	7,693E-01	1050	8,716E-01	1950	4,445E-01	3450	5,152E-02	4950	< 1,000E-05
460	1,124E-02	760	8,221E-01	1060	8,510E-01	2000	5,108E-01	3500	4,635E-02	5000	< 1,000E-05
470	2,674E-02	770	8,634E-01	1070	8,273E-01	2050	5,626E-01	3550	4,383E-02	5050	< 1,000E-05
480	4,130E-02	780	8,957E-01	1080	8,012E-01	2100	6,059E-01	3600	4,281E-02	5100	< 1,000E-05
490	4,486E-02	790	9,207E-01	1090	7,714E-01	2150	6,425E-01	3650	4,292E-02	5150	< 1,000E-05

Data Sheet

RG1000

Optical properties	
Reflection factor	
P_d	= 0,913
Spectral values guaranteed (d = 3 mm)	
$\lambda_{i\,0,5}$	= 1000 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 730 nm
λ_p ($\tau_{i,L}$ = 0,90)	= 1300 nm
Refractive indices	
n_d (587,6 nm)	= 1,54
n_s (852 nm)	= 1,53
n_t (1014 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 µm²
C_2 =	1,1835E-02 µm²
C_3 =	142,345 µm²
Internal quality	
Bubble class	3

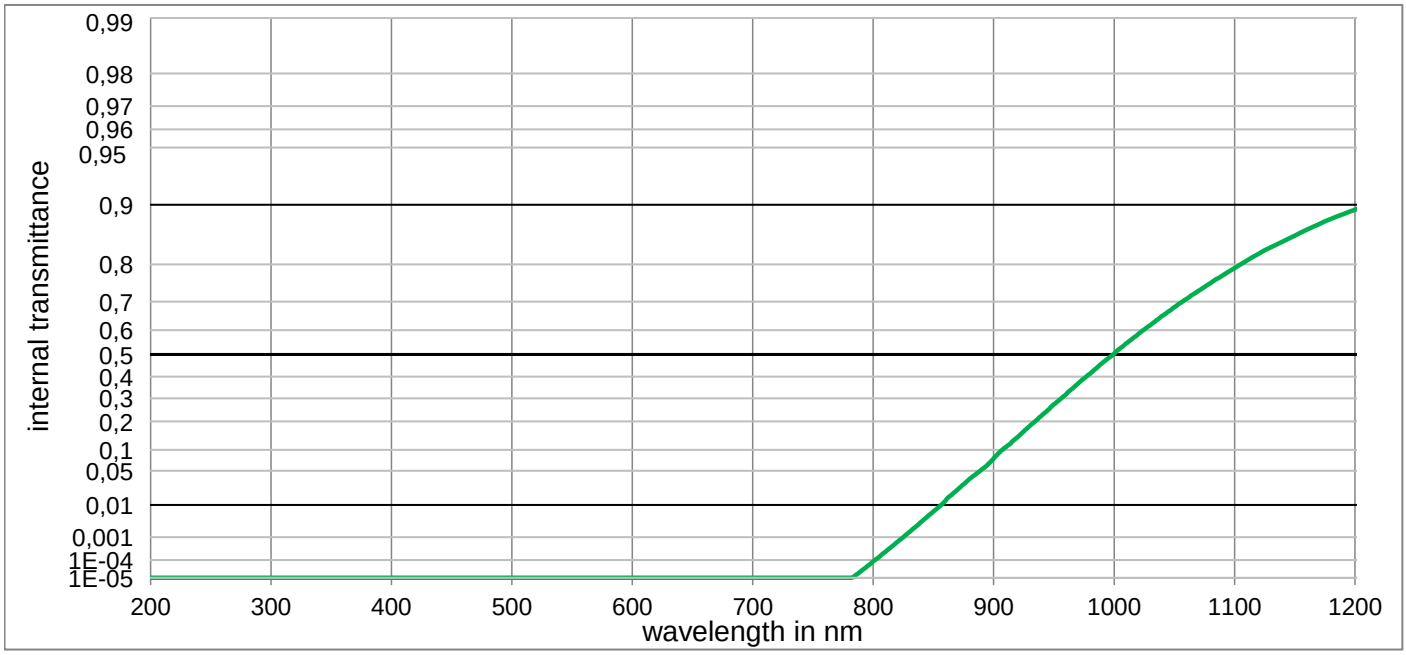
Mechanical properties	
Reference thickness	
d	= 3,00 mm
Density	
ρ	= 2,73 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 460

Thermal properties		
Transformation temperature		
Tg	= 476 °C	
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	= 9,0	
$\alpha_{(20°C/300°C)}$	= 10,2	
Temperature coefficient		
Tk	= 0,41	nm/K

Chemical properties	
Chemical resistance	
FR class	= 0
SR class	= 1
AR class	= 1
Resistance against humidity	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

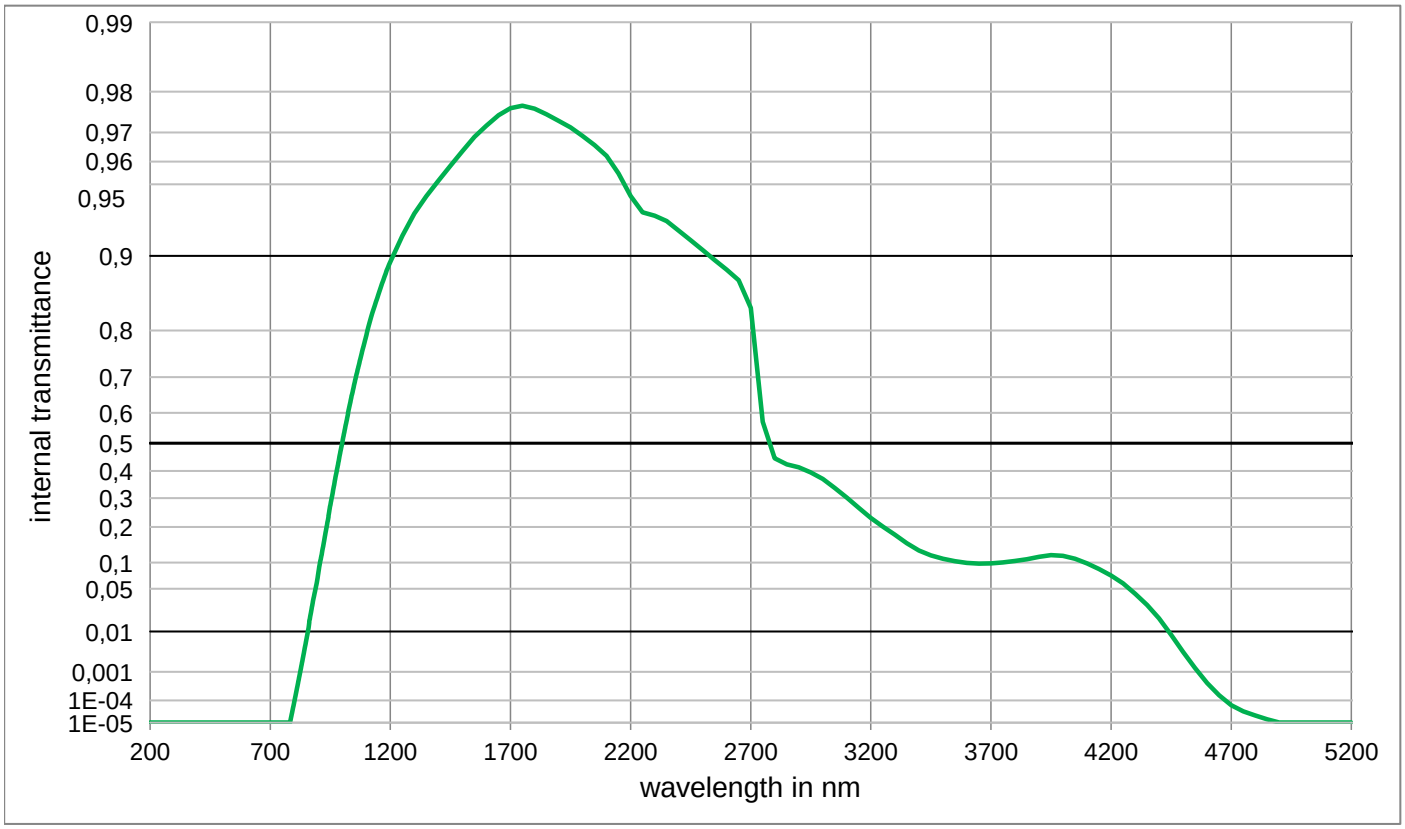
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Ionically colored glass
Longpass filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

RG1000



Internal transmittance ti 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

Data Sheet

S7000

Optical properties	
Reflection factor	
P_d	= 0,908
Spectral values guaranteed (d = 2 mm)	
$\lambda_{i\,0,5}$	= 340 nm ± 6 nm
λ_s ($\tau_{i,U}$ = 1E-05)	= 260 nm
λ_p ($\tau_{i,L}$ = 0,99)	= 420 nm
Refractive indices	
n_d (587,6 nm)	= 1,56
Sellmeier coefficients	
on request	
Internal quality	
Bubble class	-

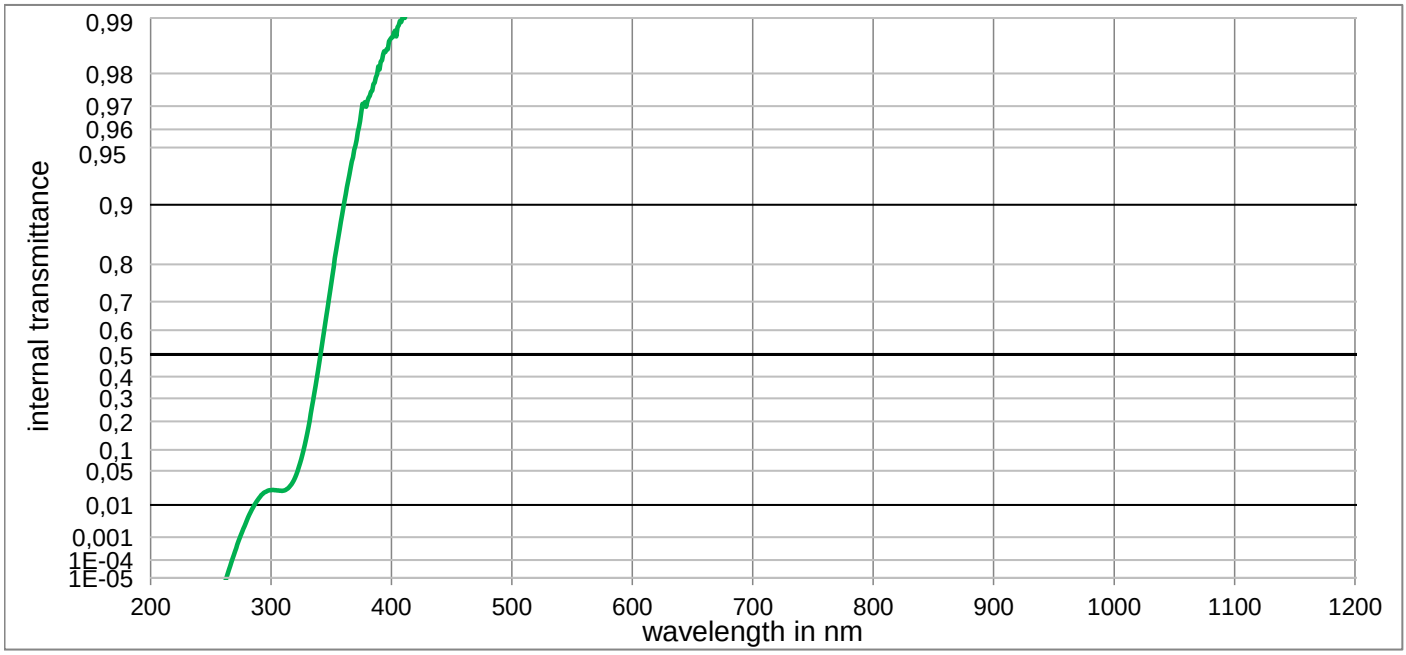
Mechanical properties	
Reference thickness	
d	= 2,00 mm
Density	
ρ	= 2,83 g/cm³
Knoop hardness	
$HK_{[0.1/20]}$	= 525

Thermal properties	
Transformation temperature	
Tg	= 452 °C
Thermal expansion in	**10^{-6}/K**
$\alpha_{(20°C/300°C)}$	= 11,1

Chemical properties	
Chemical resistance	
FR class	= 1
SR class	= 1.2
AR class	= 1.0
Resistance against humidity	
Resistant glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

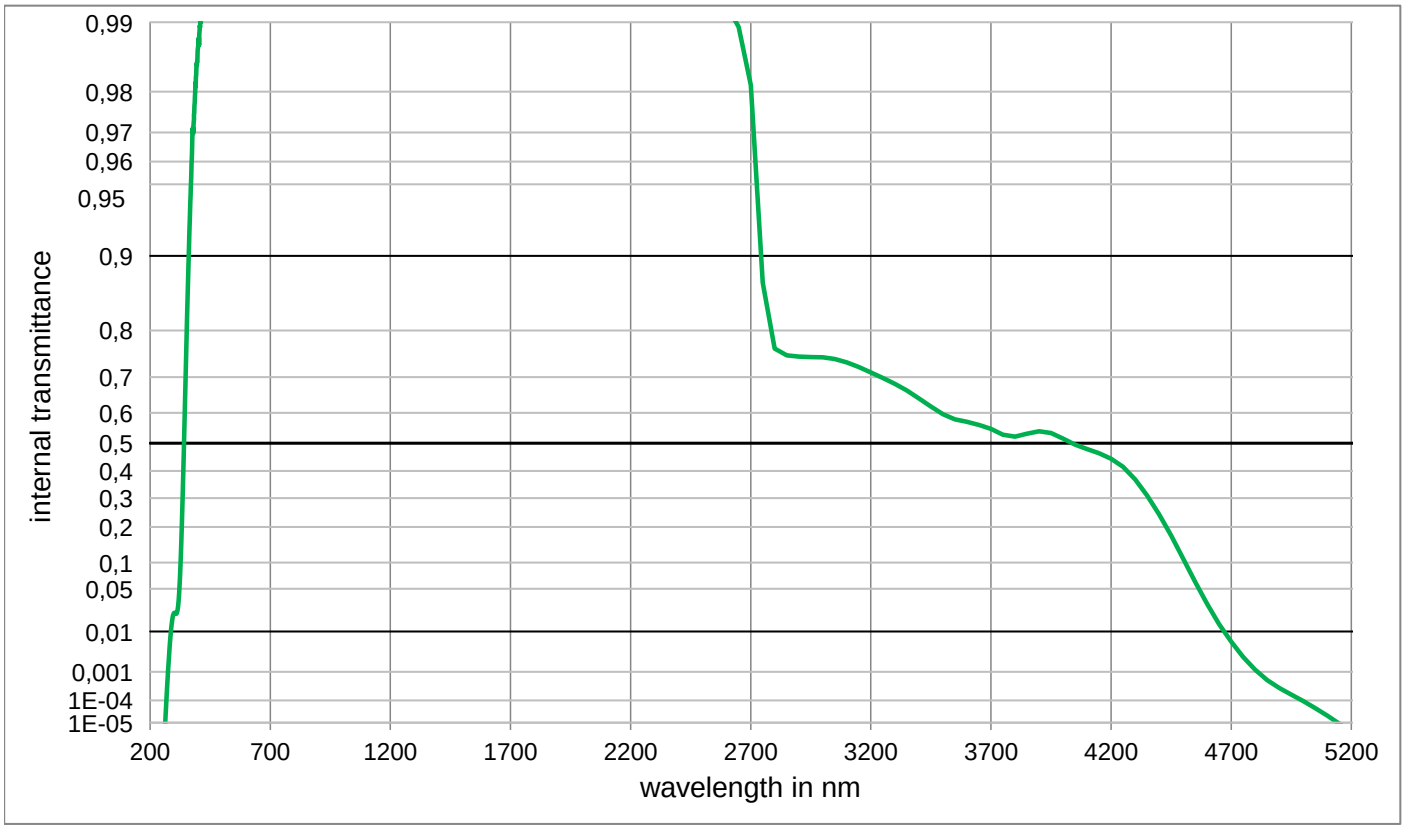
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x	0,313	0,313	0,313
	y	0,329	0,329	0,330
	Y	90,8	90,7	90,7
	λ_d	574 nm	574 nm	575 nm
	P_e	0,001	0,002	0,004
Illuminant A	x	0,448	0,448	0,448
	y	0,408	0,408	0,408
	Y	90,8	90,7	90,7
	λ_d	584 nm	584 nm	584 nm
	P_e	0,002	0,003	0,005

Notes
Ionically colored glass
Cerium doped
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

S7000



Internal transmittance ti 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	9,965E-01	800	9,939E-01	1100	9,973E-01	2200	9,949E-01	3700	5,490E-01
210	< 1,0E-05	510	9,972E-01	810	9,958E-01	1110	9,972E-01	2250	9,915E-01	3750	5,293E-01
220	< 1,0E-05	520	9,979E-01	820	9,942E-01	1120	9,975E-01	2300	9,923E-01	3800	5,223E-01
230	< 1,0E-05	530	9,982E-01	830	9,951E-01	1130	9,976E-01	2350	9,915E-01	3850	5,329E-01
240	< 1,0E-05	540	9,989E-01	840	9,956E-01	1140	9,974E-01	2400	9,995E-01	3900	5,403E-01
250	< 1,0E-05	550	9,994E-01	850	9,939E-01	1150	9,975E-01	2450	9,976E-01	3950	5,346E-01
260	< 1,0E-05	560	9,919E-01	860	9,940E-01	1160	9,975E-01	2500	9,945E-01	4000	5,156E-01
270	2,5E-04	570	9,997E-01	870	9,964E-01	1170	9,976E-01	2550	9,931E-01	4050	4,951E-01
280	3,8E-03	580	9,995E-01	880	9,970E-01	1180	9,975E-01	2600	9,915E-01	4100	4,796E-01
290	1,5E-02	590	9,998E-01	890	9,965E-01	1190	9,978E-01	2650	9,895E-01	4150	4,652E-01
300	2,2E-02	600	9,916E-01	900	9,965E-01	1200	9,976E-01	2700	9,813E-01	4200	4,449E-01
310	2,1E-02	610	9,917E-01	910	9,967E-01	1250	9,977E-01	2750	8,713E-01	4250	4,150E-01
320	3,831E-02	620	9,915E-01	920	9,973E-01	1300	9,977E-01	2800	7,654E-01	4300	3,683E-01
330	1,542E-01	630	9,920E-01	930	9,970E-01	1350	9,988E-01	2850	7,508E-01	4350	3,098E-01
340	4,615E-01	640	9,923E-01	940	9,970E-01	1400	9,980E-01	2900	7,483E-01	4400	2,423E-01
350	7,547E-01	650	9,927E-01	950	9,973E-01	1450	9,978E-01	2950	7,474E-01	4450	1,724E-01
360	8,962E-01	660	9,930E-01	960	9,970E-01	1500	9,983E-01	3000	7,466E-01	4500	1,097E-01
370	9,511E-01	670	9,926E-01	970	9,969E-01	1550	9,983E-01	3050	7,431E-01	4550	6,139E-02
380	9,717E-01	680	9,933E-01	980	9,965E-01	1600	9,984E-01	3100	7,354E-01	4600	3,030E-02
390	9,810E-01	690	9,933E-01	990	9,968E-01	1650	9,983E-01	3150	7,247E-01	4650	1,385E-02
400	9,872E-01	700	9,933E-01	1000	9,968E-01	1700	9,978E-01	3200	7,118E-01	4700	6,063E-03
410	9,906E-01	710	9,923E-01	1010	9,970E-01	1750	9,977E-01	3250	6,980E-01	4750	2,611E-03
420	9,929E-01	720	9,933E-01	1020	9,971E-01	1800	9,975E-01	3300	6,829E-01	4800	1,160E-03
430	9,933E-01	730	9,942E-01	1030	9,973E-01	1850	9,969E-01	3350	6,653E-01	4850	5,507E-04
440	9,946E-01	740	9,930E-01	1040	9,974E-01	1900	9,969E-01	3400	6,429E-01	4900	2,942E-04
450	9,947E-01	750	9,944E-01	1050	9,972E-01	1950	9,969E-01	3450	6,193E-01	4950	1,688E-04
460	9,951E-01	760	9,922E-01	1060	9,972E-01	2000	9,981E-01	3500	5,955E-01	5000	9,375E-05
470	9,968E-01	770	9,949E-01	1070	9,971E-01	2050	9,977E-01	3550	5,800E-01	5050	4,751E-05
480	9,978E-01	780	9,933E-01	1080	9,971E-01	2100	9,955E-01	3600	5,717E-01	5100	2,188E-05
490	9,968E-01	790	9,928E-01	1090	9,973E-01	2150	9,949E-01	3650	5,619E-01	5150	< 1,000E-05

Data Sheet

KG1

Optical properties			
Reflection factor			
	P_d	=	0,920
Spectral values guaranteed			
τ_i (365 nm)		≥	0,89
τ_i (500 nm)		≥	0,92
τ_i (600 nm)		≥	0,88
τ_i (700 nm)		≤	0,68
τ_i (800 nm)		≤	0,33
τ_i (900 nm)		≤	0,1
τ_i (1060 nm)		≤	0,02
τ_i (2200 nm)		≤	0,06
Refractive indices			
n_F (486 nm)		=	1,516
n_e (546 nm)		=	1,513
n_d (587,6 nm)		=	1,511
Sellmeier coefficients			
valid from 400 nm to 1550 nm			
B_1	0,3376		
B_2	0,9188		
B_3	1,8816		
C_1	3,461E-03 µm²		
C_2	9,9076E-03 µm²		
C_3	181,405 µm²		
Internal quality			
Bubble class	3		

Mechanical properties			
Reference thickness			
	d	=	2,00 mm
Density			
	ρ	=	2,52 g/cm³
Knoop hardness			
	HK[0.1/20]	=	456

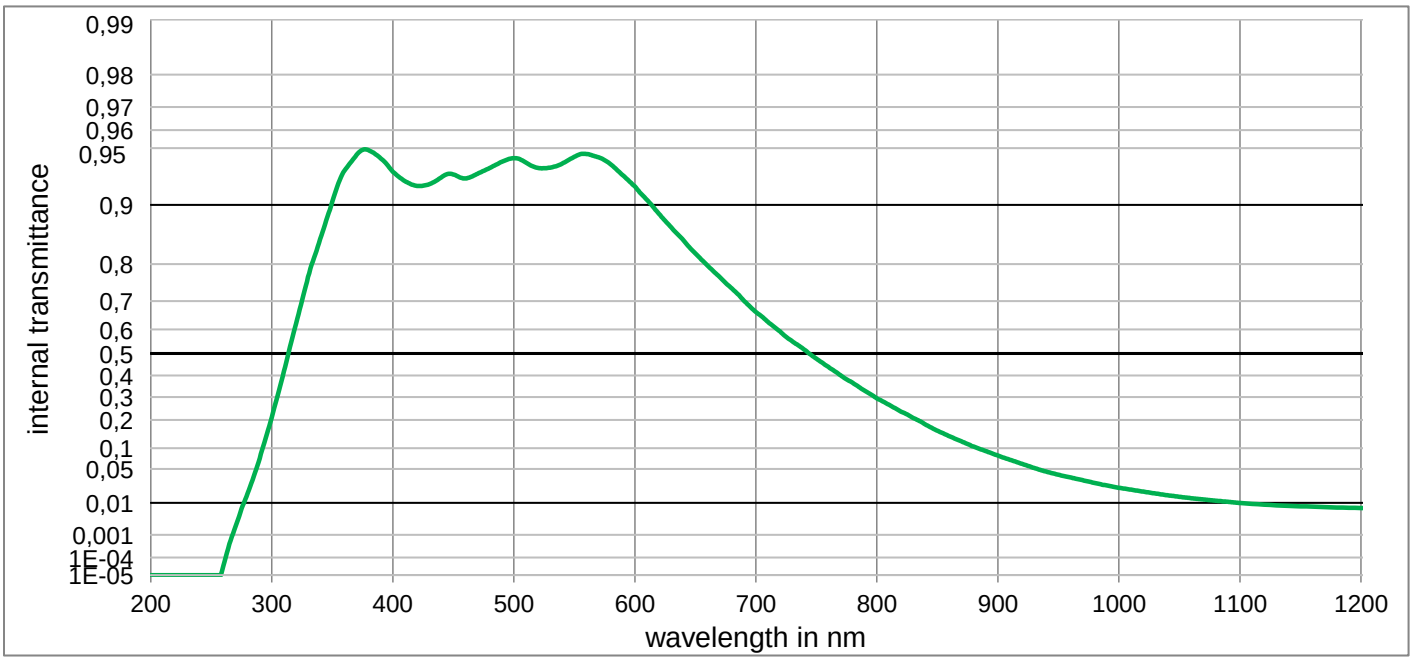
Thermal properties			
Transformation temperature			
	Tg	=	599 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	5,3
	$\alpha_{(20°C/300°C)}$	=	6,1

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	2
	AR class	=	3
Resistance against humidity			
Delicate glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric properties				
		1 mm	2 mm	3 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
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

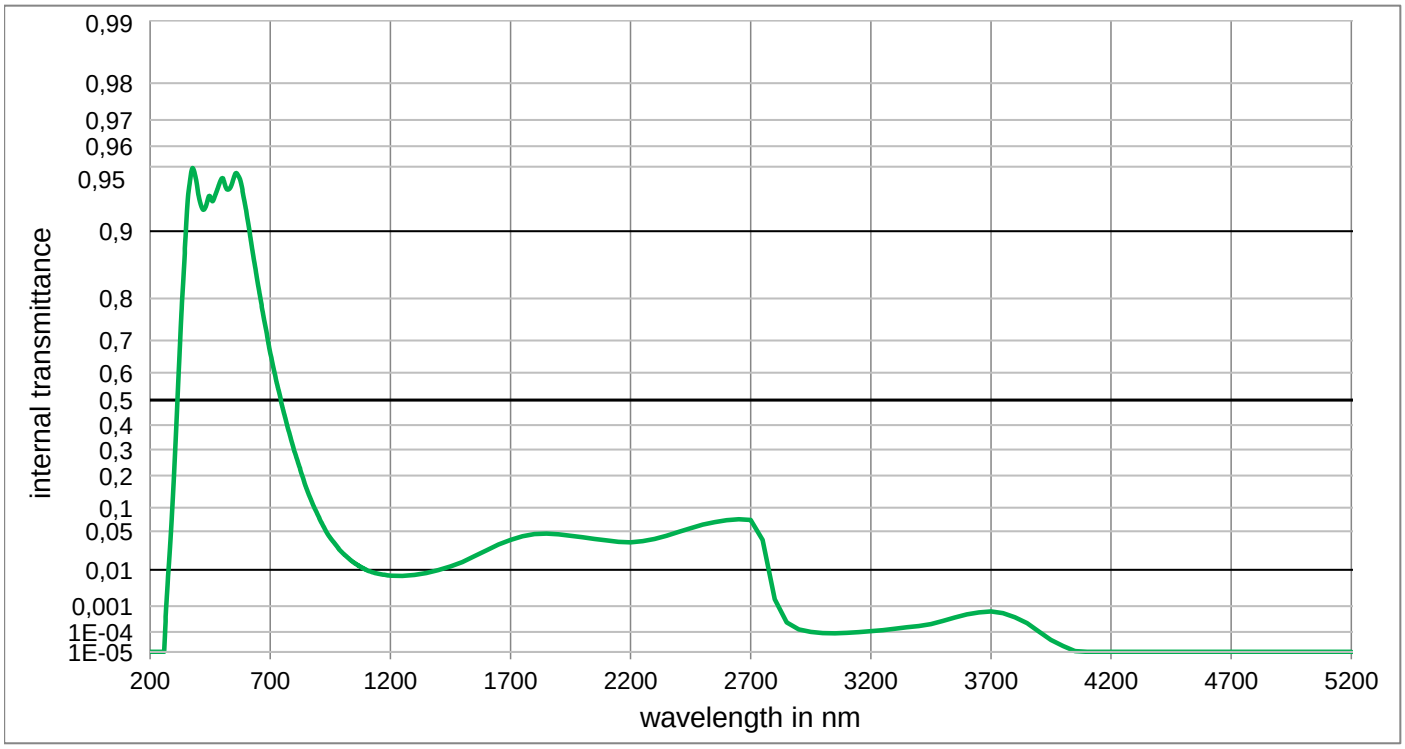
Notes
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Shortpass filter
Heat protection filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

KG1



Internal transmittance ti 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	< 1,000E-05	500	9,434E-01	800	2,936E-01	1100	9,948E-03	2200	3,377E-02	3700	6,632E-04
210	< 1,000E-05	510	9,402E-01	810	2,650E-01	1110	9,410E-03	2250	3,523E-02	3750	5,698E-04
220	< 1,000E-05	520	9,362E-01	820	2,349E-01	1120	8,986E-03	2300	3,829E-02	3800	3,991E-04
230	< 1,000E-05	530	9,364E-01	830	2,082E-01	1130	8,642E-03	2350	4,292E-02	3850	2,350E-04
240	< 1,000E-05	540	9,395E-01	840	1,824E-01	1140	8,360E-03	2400	4,886E-02	3900	1,033E-04
250	< 1,000E-05	550	9,444E-01	850	1,581E-01	1150	8,157E-03	2450	5,536E-02	3950	4,236E-05
260	3,483E-05	560	9,463E-01	860	1,377E-01	1160	7,950E-03	2500	6,181E-02	4000	2,104E-05
270	2,000E-03	570	9,440E-01	870	1,206E-01	1170	7,750E-03	2550	6,692E-02	4050	1,117E-05
280	1,701E-02	580	9,389E-01	880	1,047E-01	1180	7,580E-03	2600	7,069E-02	4100	< 1,000E-05
290	7,300E-02	590	9,302E-01	890	9,150E-02	1190	7,453E-03	2650	7,279E-02	4150	< 1,000E-05
300	2,100E-01	600	9,199E-01	900	7,971E-02	1200	7,350E-03	2700	7,150E-02	4200	< 1,000E-05
310	4,189E-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

Data Sheet

KG2

Optical properties			
Reflection factor			
	P_d	=	0,920
Spectral values guaranteed			
τ_i (365 nm)		≥	0,93
τ_i (500 nm)		≥	0,94
τ_i (600 nm)		≥	0,92
τ_i (700 nm)		≤	0,83
τ_i (800 nm)		≤	0,55
τ_i (900 nm)		≤	0,28
τ_i (1060 nm)		≤	0,12
τ_i (2200 nm)		≤	0,2
Refractive indices			
n_d (587,6 nm)		=	1,51
Sellmeier coefficients			
on request			
Internal quality			
Bubble class			3

Mechanical properties			
Reference thickness			
	d	=	2,00 mm
Density			
	ρ	=	2,52 g/cm³
Knoop hardness			
	HK[0.1/20]	=	444

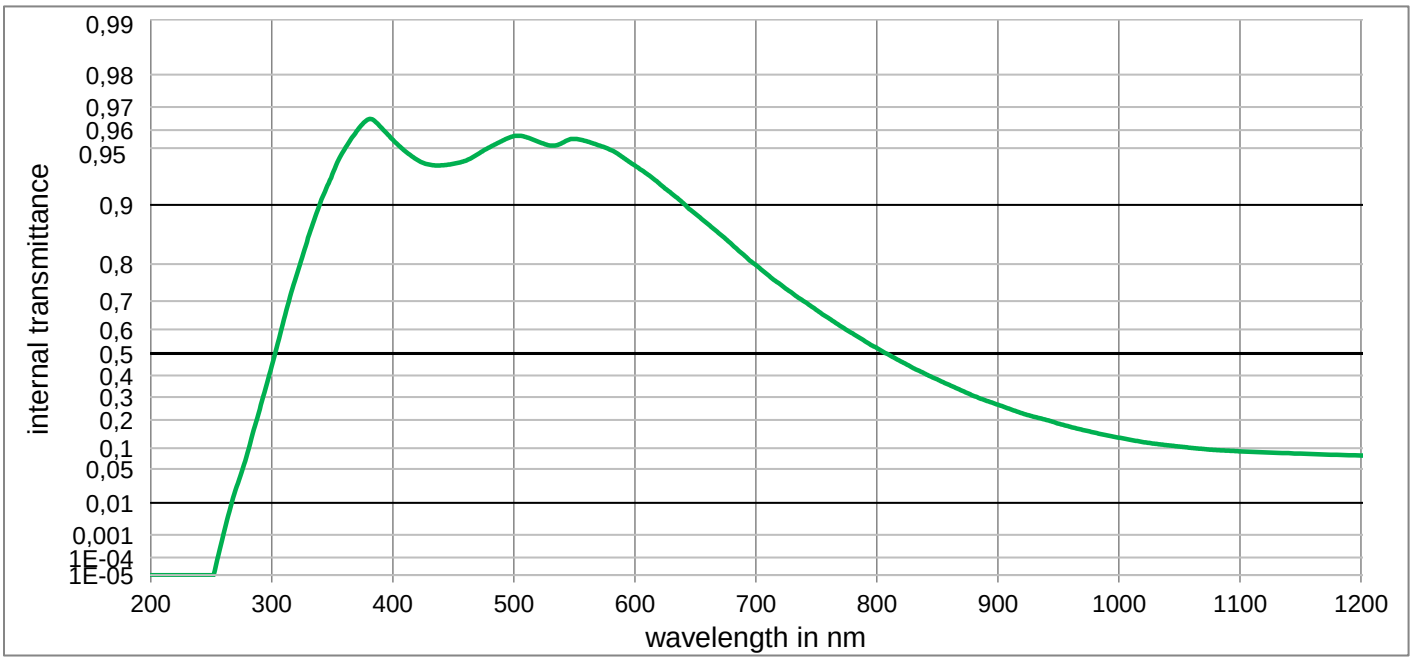
Thermal properties			
Transformation temperature			
	Tg	=	605 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	5,4
	$\alpha_{(20°C/300°C)}$	=	6,3

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	2
	AR class	=	3
Resistance against humidity			
Delicate glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric properties				
		1 mm	2 mm	3 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
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

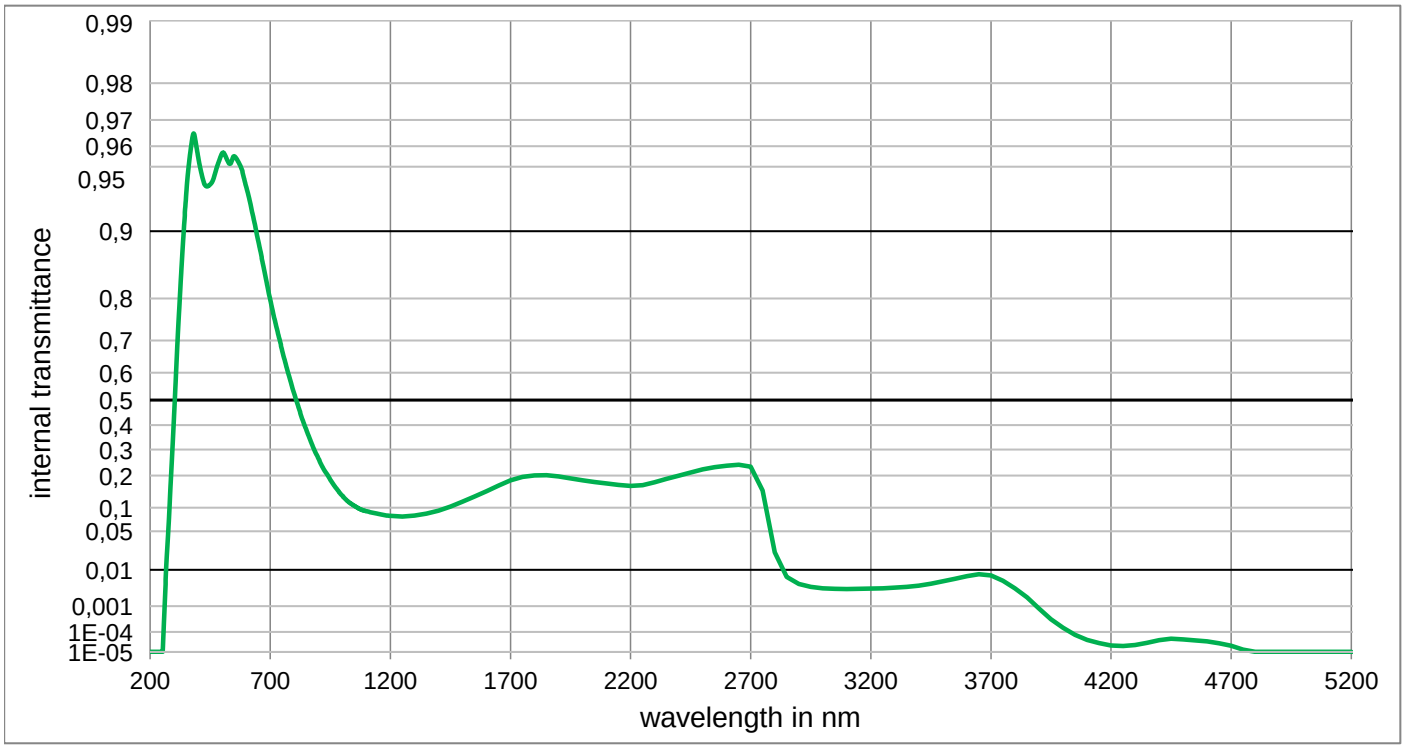
Notes
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Shortpass filter
Heat protection filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

KG2



Internal transmittance ti 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	< 1,000E-05	500	9,569E-01	800	5,237E-01	1100	9,099E-02	2200	1,647E-01	3700	7,376E-03
210	< 1,000E-05	510	9,564E-01	810	4,940E-01	1110	8,975E-02	2250	1,671E-01	3750	5,454E-03
220	< 1,000E-05	520	9,538E-01	820	4,640E-01	1120	8,844E-02	2300	1,764E-01	3800	3,463E-03
230	< 1,000E-05	530	9,516E-01	830	4,342E-01	1130	8,715E-02	2350	1,885E-01	3850	1,917E-03
240	< 1,000E-05	540	9,531E-01	840	4,080E-01	1140	8,600E-02	2400	1,997E-01	3900	8,350E-04
250	< 1,000E-05	550	9,554E-01	850	3,822E-01	1150	8,470E-02	2450	2,114E-01	3950	3,360E-04
260	1,000E-03	560	9,541E-01	860	3,557E-01	1160	8,350E-02	2500	2,227E-01	4000	1,525E-04
270	2,000E-02	570	9,518E-01	870	3,300E-01	1170	8,252E-02	2550	2,311E-01	4050	7,328E-05
280	8,800E-02	580	9,489E-01	880	3,054E-01	1180	8,150E-02	2600	2,370E-01	4100	4,198E-05
290	2,450E-01	590	9,440E-01	890	2,840E-01	1190	8,070E-02	2650	2,404E-01	4150	2,924E-05
300	4,440E-01	600	9,380E-01	900	2,652E-01	1200	8,005E-02	2700	2,327E-01	4200	2,239E-05
310	6,372E-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

Data Sheet

KG3

Optical properties			
Reflection factor			
P_d	=	0,920	
Spectral values guaranteed			
τ_i (365 nm)	≥	0,86	
τ_i (500 nm)	≥	0,88	
τ_i (600 nm)	≥	0,83	
τ_i (700 nm)	≤	0,55	
τ_i (800 nm)	≤	0,14	
τ_i (900 nm)	≤	0,03	
τ_i (1060 nm)	≤	0,001	
τ_i (2200 nm)	≤	0,01	
Refractive indices			
n_F (486 nm)	=	1,522	
n_e (546 nm)	=	1,518	
n_d (587,6 nm)	=	1,516	
Sellmeier coefficients			
valid from 400 nm to 1600 nm			
B_1		1,1717	
B_2		0,0980	
B_3		0,0713	
C_1		6,324E-03 µm²	
C_2		3,1092E-02 µm²	
C_3		10,066 µm²	
Internal quality			
Bubble class		3	

Mechanical properties		
Reference thickness		
d	=	2,00 mm
Density		
ρ	=	2,52 g/cm³
Knoop hardness		
HK[0.1/20]	=	442

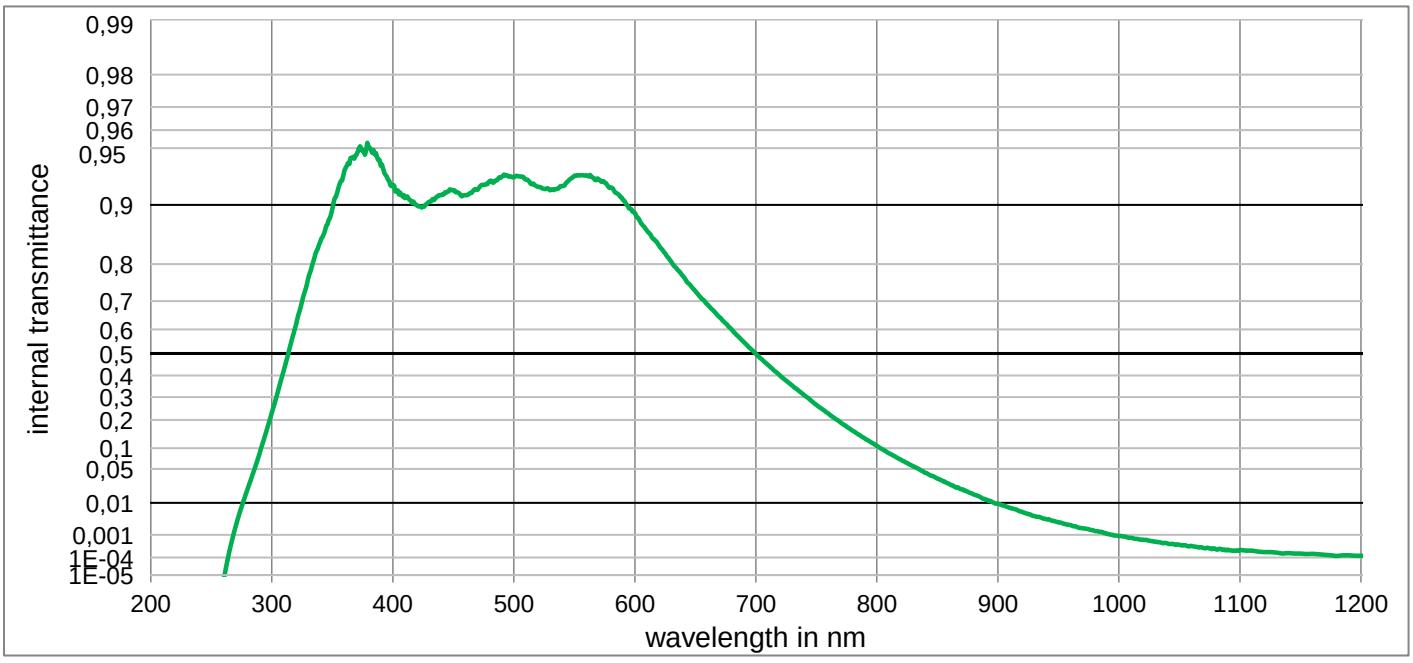
Thermal properties		
Transformation temperature		
Tg	=	581 °C
Thermal expansion in		**10^{-6}/K**
$\alpha_{(-30°C/+70°C)}$	=	5,3
$\alpha_{(20°C/300°C)}$	=	6,1

Chemical properties		
Chemical resistance		
FR class	=	0
SR class	=	2
AR class	=	4
Resistance against humidity		
Delicate glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

Colormetric properties				
		1 mm	2 mm	3 mm
Illuminant D65	x	0,309	0,306	0,303
	y	0,330	0,332	0,333
	Y	87,1	82,4	78,1
	λ_d	496 nm	496 nm	496 nm
	P_e	0,012	0,023	0,033
Illuminant A	x	0,442	0,437	0,432
	y	0,410	0,413	0,416
	Y	86,4	81,3	76,6
	λ_d	504 nm	505 nm	505 nm
	P_e	0,012	0,024	0,035

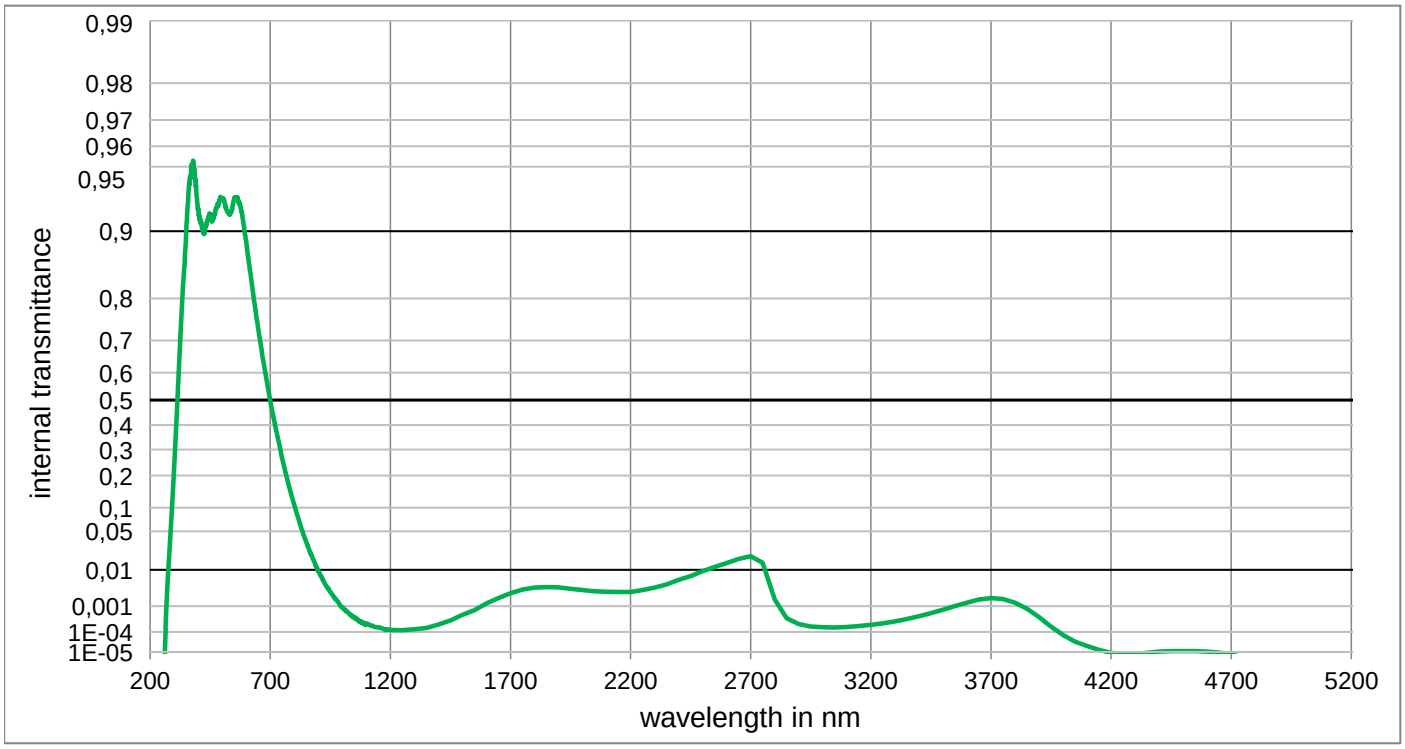
Notes
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Shortpass filter
Heat protection filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

KG3



Internal transmittance ti 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	< 1,000E-05	500	9,282E-01	800	1,066E-01	1100	2,334E-04	2200	2,727E-03	3700	1,822E-03
210	< 1,000E-05	510	9,265E-01	810	8,548E-02	1110	2,163E-04	2250	3,103E-03	3750	1,693E-03
220	< 1,000E-05	520	9,194E-01	820	6,913E-02	1120	1,828E-04	2300	3,642E-03	3800	1,292E-03
230	< 1,000E-05	530	9,162E-01	830	5,533E-02	1130	1,729E-04	2350	4,394E-03	3850	8,111E-04
240	< 1,000E-05	540	9,202E-01	840	4,313E-02	1140	1,649E-04	2400	5,839E-03	3900	4,055E-04
250	< 1,000E-05	550	9,298E-01	850	3,387E-02	1150	1,586E-04	2450	7,150E-03	3950	1,710E-04
260	< 1,000E-05	560	9,303E-01	860	2,668E-02	1160	1,510E-04	2500	9,398E-03	4000	7,230E-05
270	1,919E-03	570	9,267E-01	870	2,066E-02	1170	1,379E-04	2550	1,160E-02	4050	3,512E-05
280	2,114E-02	580	9,189E-01	880	1,585E-02	1180	1,201E-04	2600	1,403E-02	4100	2,115E-05
290	8,698E-02	590	9,059E-01	890	1,195E-02	1190	1,309E-04	2650	1,687E-02	4150	1,291E-05
300	2,288E-01	600	8,899E-01	900	9,471E-03	1200	1,227E-04	2700	1,917E-02	4200	< 1,000E-05
310	4,257E-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

Data Sheet

KG5

Optical properties			
Reflection factor			
	P_d	=	0,920
Spectral values guaranteed			
τ_i (365 nm)		≥	0,8
τ_i (500 nm)		≥	0,86
τ_i (600 nm)		≥	0,8
τ_i (700 nm)		≤	0,43
τ_i (800 nm)		≤	0,09
τ_i (900 nm)		≤	0,008
τ_i (1060 nm)		≤	0,0001
τ_i (2200 nm)		≤	0,001
Refractive indices			
n_F (486 nm)		=	1,518
n_e (546 nm)		=	1,515
n_d (587,6 nm)		=	1,513
Sellmeier coefficients			
valid from 400 nm to 1550 nm			
B_1	1,0371		
B_2	0,2237		
B_3	33,7882		
C_1	9,265E-03 µm²		
C_2	5,0235E-03 µm²		
C_3	3577,611 µm²		
Internal quality			
Bubble class	3		

Mechanical properties			
Reference thickness			
	d	=	2,00 mm
Density			
	ρ	=	2,53 g/cm³
Knoop hardness			
	HK[0.1/20]	=	435

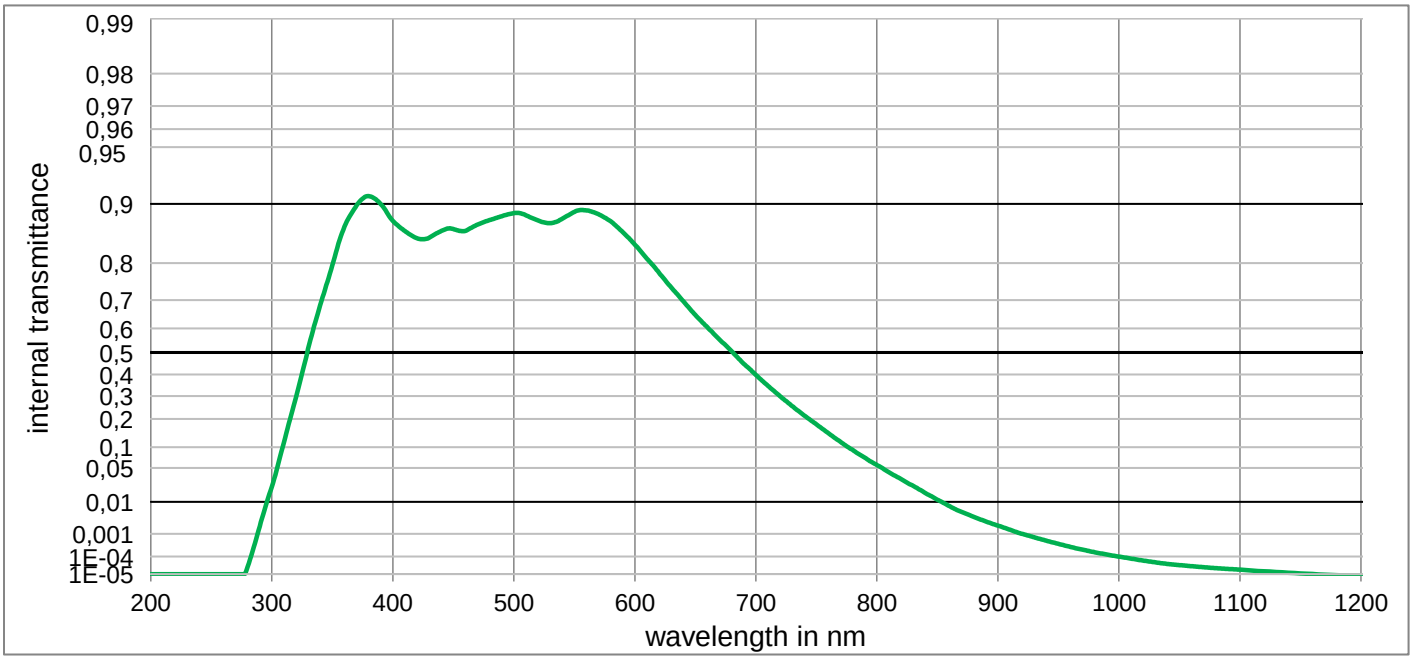
Thermal properties			
Transformation temperature			
	Tg	=	565 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	5,4
	$\alpha_{(20°C/300°C)}$	=	6,2

Chemical properties			
Chemical resistance			
	FR class	=	0
	SR class	=	3
	AR class	=	4
Resistance against humidity			
Delicate glass			
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5			

Colormetric properties				
		1 mm	2 mm	3 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
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

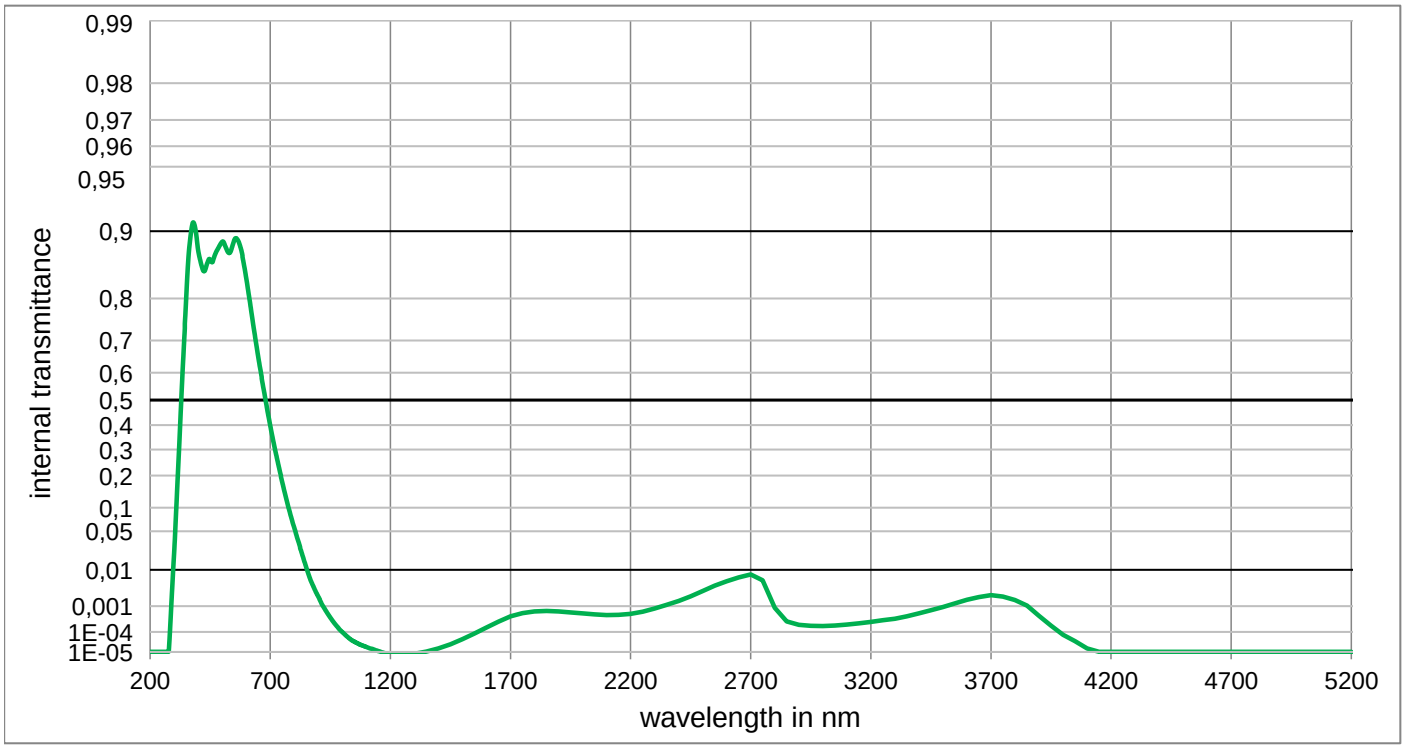
Notes
UV
Transmission changes are possible under the action of intense ultraviolet radiation.
Ionically colored glass
Shortpass filter
Heat protection filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

KG5



Internal transmittance ti 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	< 1,000E-05	500	8,883E-01	800	5,600E-02	1100	1,875E-05	2200	5,413E-04	3700	2,208E-03
210	< 1,000E-05	510	8,854E-01	810	4,211E-02	1110	1,667E-05	2250	6,482E-04	3750	2,015E-03
220	< 1,000E-05	520	8,781E-01	820	3,171E-02	1120	1,500E-05	2300	8,290E-04	3800	1,577E-03
230	< 1,000E-05	530	8,743E-01	830	2,311E-02	1130	1,370E-05	2350	1,095E-03	3850	1,039E-03
240	< 1,000E-05	540	8,806E-01	840	1,632E-02	1140	1,239E-05	2400	1,479E-03	3900	4,560E-04
250	< 1,000E-05	550	8,900E-01	850	1,135E-02	1150	1,109E-05	2450	2,058E-03	3950	1,861E-04
260	< 1,000E-05	560	8,919E-01	860	7,720E-03	1160	1,007E-05	2500	2,914E-03	4000	7,390E-05
270	< 1,000E-05	570	8,870E-01	870	5,300E-03	1170	< 1,000E-05	2550	4,090E-03	4050	3,650E-05
280	2,793E-05	580	8,770E-01	880	3,839E-03	1180	< 1,000E-05	2600	5,337E-03	4100	1,570E-05
290	1,880E-03	590	8,600E-01	890	2,716E-03	1190	< 1,000E-05	2650	6,620E-03	4150	< 1,000E-05
300	2,200E-02	600	8,380E-01	900	1,990E-03	1200	< 1,000E-05	2700	7,858E-03	4200	< 1,000E-05
310	1,138E-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

Data Sheet

NG1

Optical properties			
Reflection factor			
	P_d	=	0,918
Spectral values guaranteed			
τ_i (546 nm)		<	0,0001
Refractive indices			
n_F (486 nm)		=	1,527
n_e (546 nm)		=	1,526
n_d (587,6 nm)		=	1,522
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 µm²
C_2			1,1185E-02 µm²
C_3			100,000 µm²
Internal quality			
Bubble class			2

Mechanical properties			
Reference thickness			
	d	=	1,00 mm
Density			
	ρ	=	2,48 g/cm³
Knoop hardness			
	HK[0.1/20]	=	418

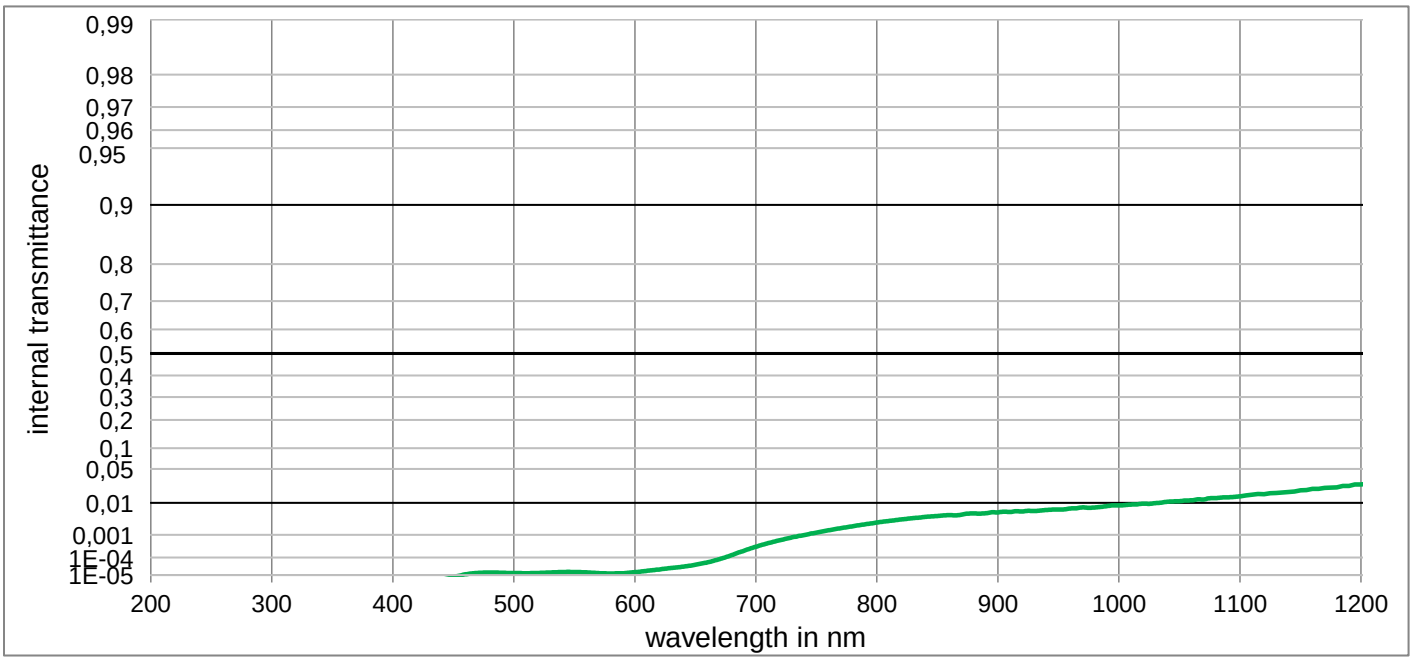
Thermal properties			
Transformation temperature			
	Tg	=	461 °C
Thermal expansion in			10^{-6}/K
	$\alpha_{(-30°C/+70°C)}$	=	6,5
	$\alpha_{(20°C/300°C)}$	=	7,0

Chemical properties			
Chemical resistance			
	FR class	=	1
	SR class	=	2.2
	AR class	=	1
Resistance against humidity			

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			

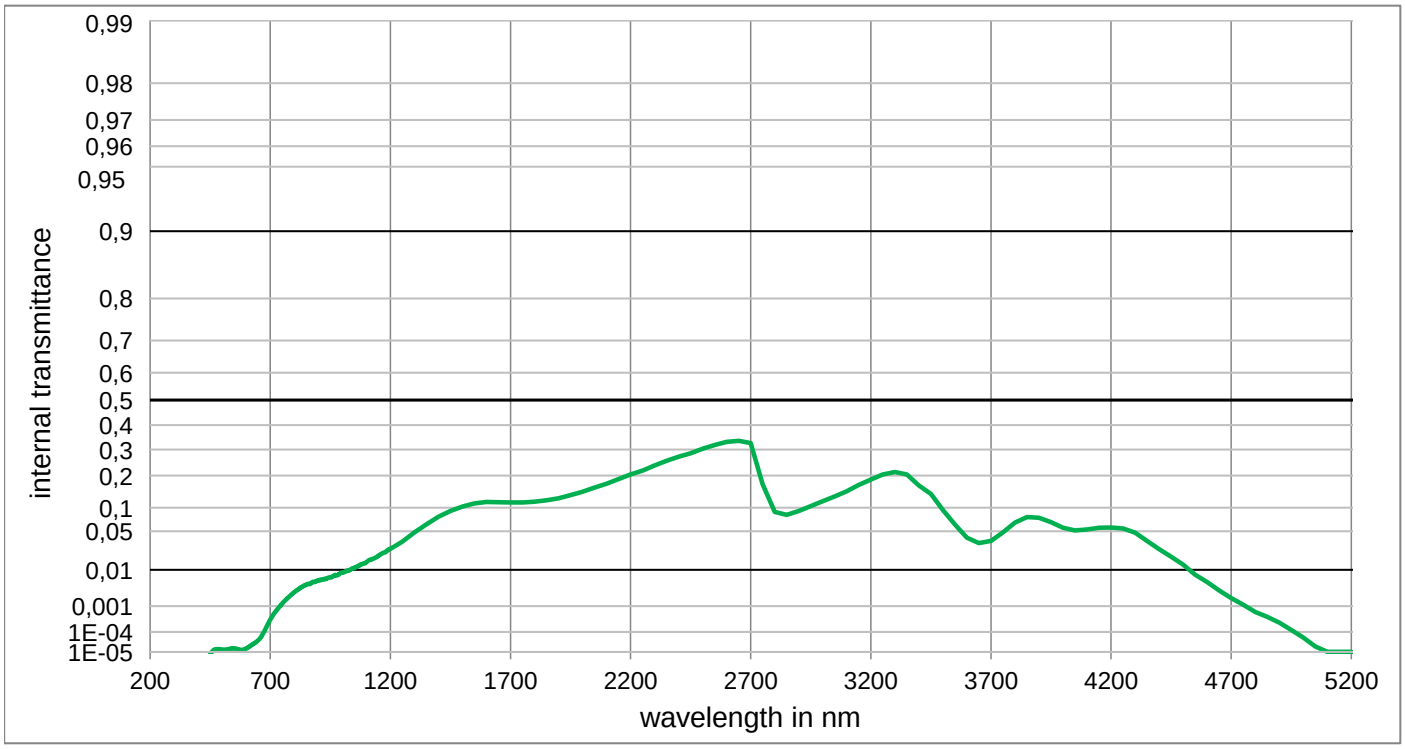
Notes
Ionically colored glass
Neutral density filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

NG1



Internal transmittance ti 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	< 1,000E-05	500	1,340E-05	800	2,710E-03	1100	1,444E-02	2200	2,037E-01	3700	3,550E-02
210	< 1,000E-05	510	1,317E-05	810	3,039E-03	1110	1,580E-02	2250	2,186E-01	3750	4,830E-02
220	< 1,000E-05	520	1,365E-05	820	3,391E-03	1120	1,615E-02	2300	2,378E-01	3800	6,600E-02
230	< 1,000E-05	530	1,459E-05	830	3,730E-03	1130	1,720E-02	2350	2,555E-01	3850	7,740E-02
240	< 1,000E-05	540	1,559E-05	840	4,067E-03	1140	1,811E-02	2400	2,719E-01	3900	7,590E-02
250	< 1,000E-05	550	1,559E-05	850	4,328E-03	1150	1,976E-02	2450	2,853E-01	3950	6,660E-02
260	< 1,000E-05	560	1,482E-05	860	4,614E-03	1160	2,103E-02	2500	3,031E-01	4000	5,590E-02
270	< 1,000E-05	570	1,338E-05	870	4,761E-03	1170	2,212E-02	2550	3,186E-01	4050	5,129E-02
280	< 1,000E-05	580	1,272E-05	880	5,150E-03	1180	2,265E-02	2600	3,308E-01	4100	5,300E-02
290	< 1,000E-05	590	1,315E-05	890	5,234E-03	1190	2,446E-02	2650	3,354E-01	4150	5,610E-02
300	< 1,000E-05	600	1,533E-05	900	5,543E-03	1200	2,600E-02	2700	3,265E-01	4200	5,670E-02
310	< 1,000E-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

Data Sheet

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_h (404,7 nm)	=	1,523	
n_e (546 nm)	=	1,509	
n_d (587,6 nm)	=	1,507	
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1		0,8995	
B_2		0,3364	
B_3		32,4433	
C_1		9,703E-03	µm²
C_2		1,2385E-02	µm²
C_3		4153,754	µm²
Internal quality			
Bubble class		2	

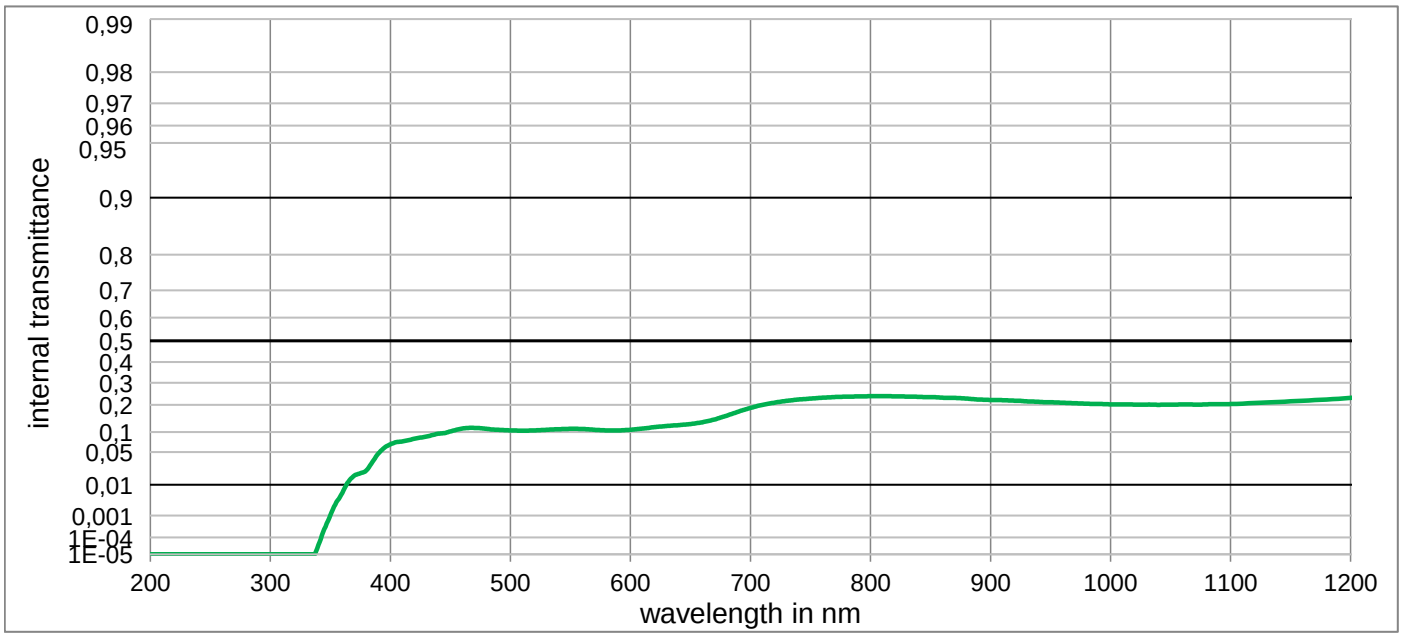
Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,44 g/cm³
Knoop hardness		
HK[0.1/20]	=	443

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

Chemical properties		
Chemical resistance		
FR class	=	1
SR class	=	2.2
AR class	=	1
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

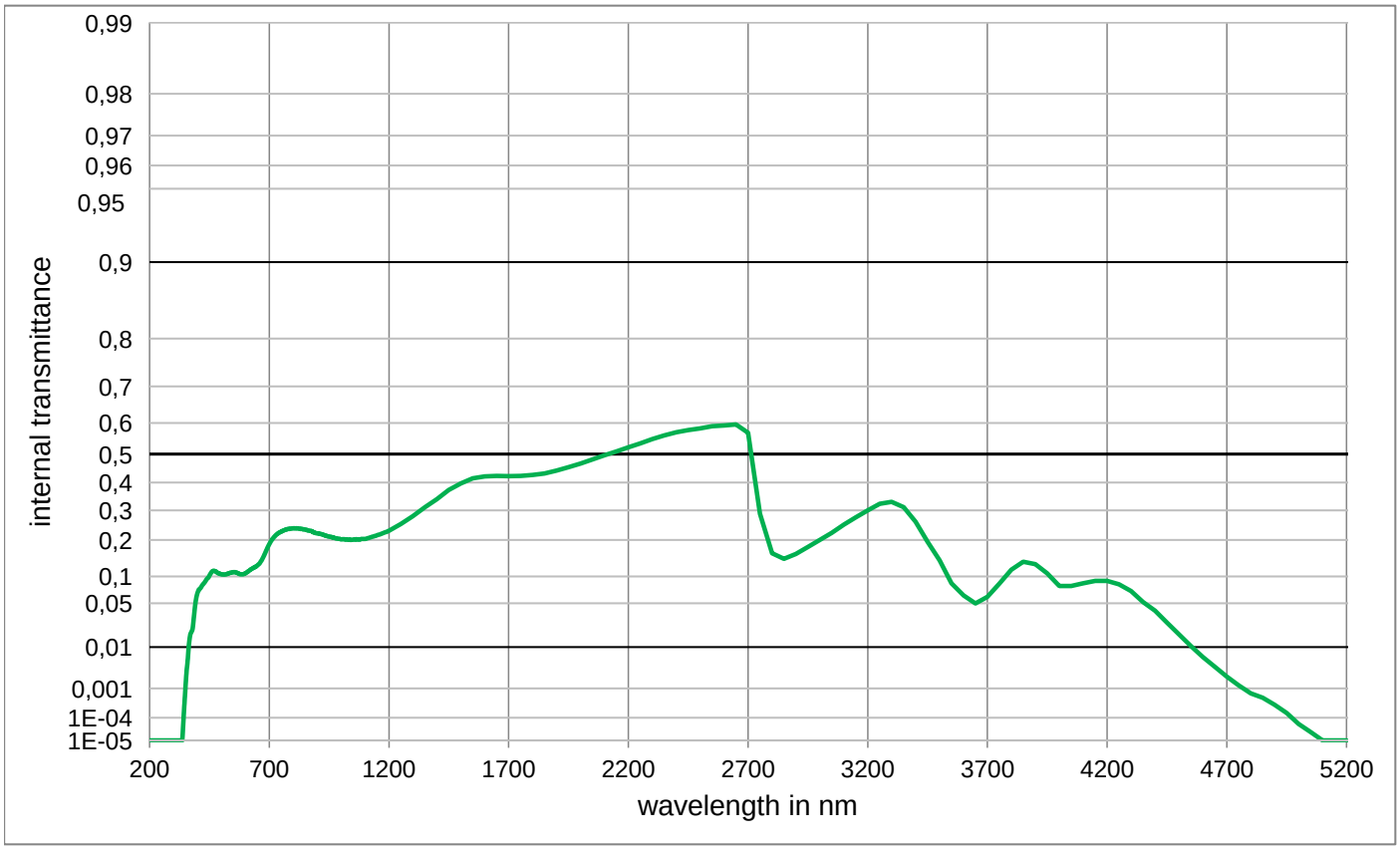
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Ionically colored glass
Neutral density filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

NG3



Internal transmittance ti 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

Data Sheet

NG4

Optical properties			
Reflection factor			
P_d	=	0,922	
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_h (404,7 nm)	=	1,517	
n_e (546 nm)	=	1,505	
n_d (587,6 nm)	=	1,503	
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1		0,6033	
B_2		0,6255	
B_3		54,9099	
C_1		4,261E-03	µm²
C_2		1,4068E-02	µm²
C_3		5448,332	µm²
Internal quality			
Bubble class		2	

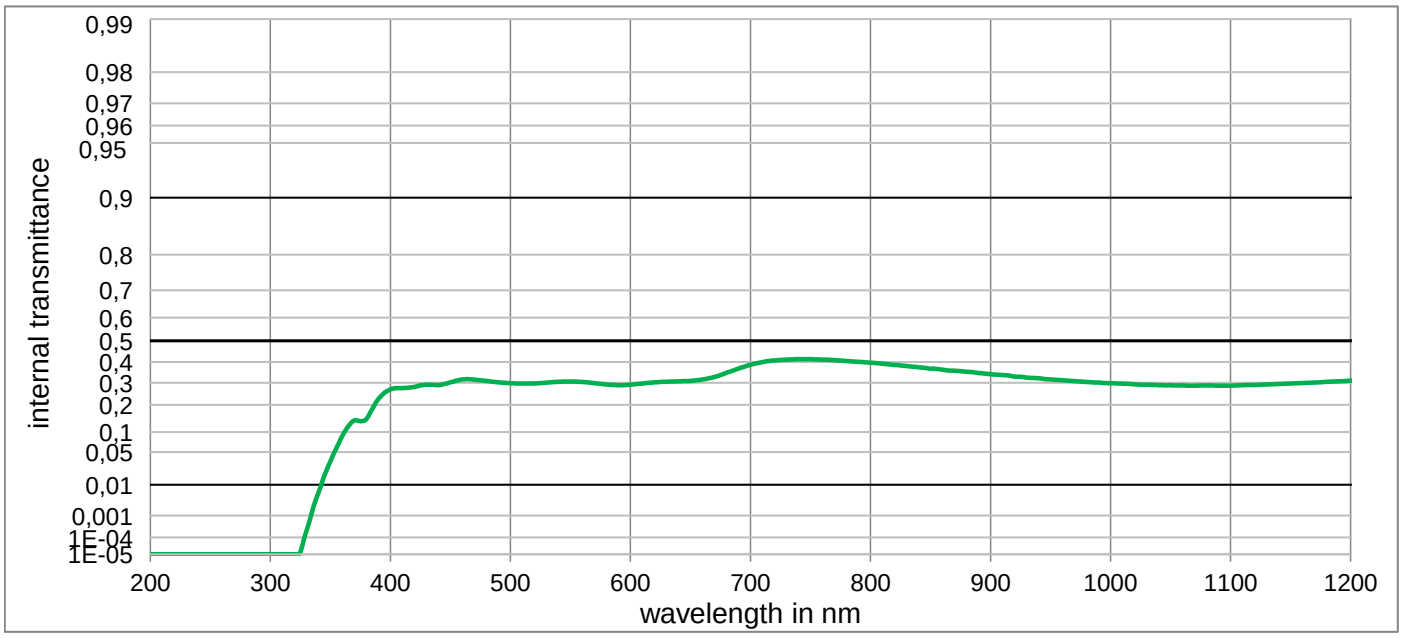
Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,42 g/cm³
Knoop hardness		
HK[0.1/20]	=	423

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

Chemical properties		
Chemical resistance		
FR class	=	1
SR class	=	2.2
AR class	=	1
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

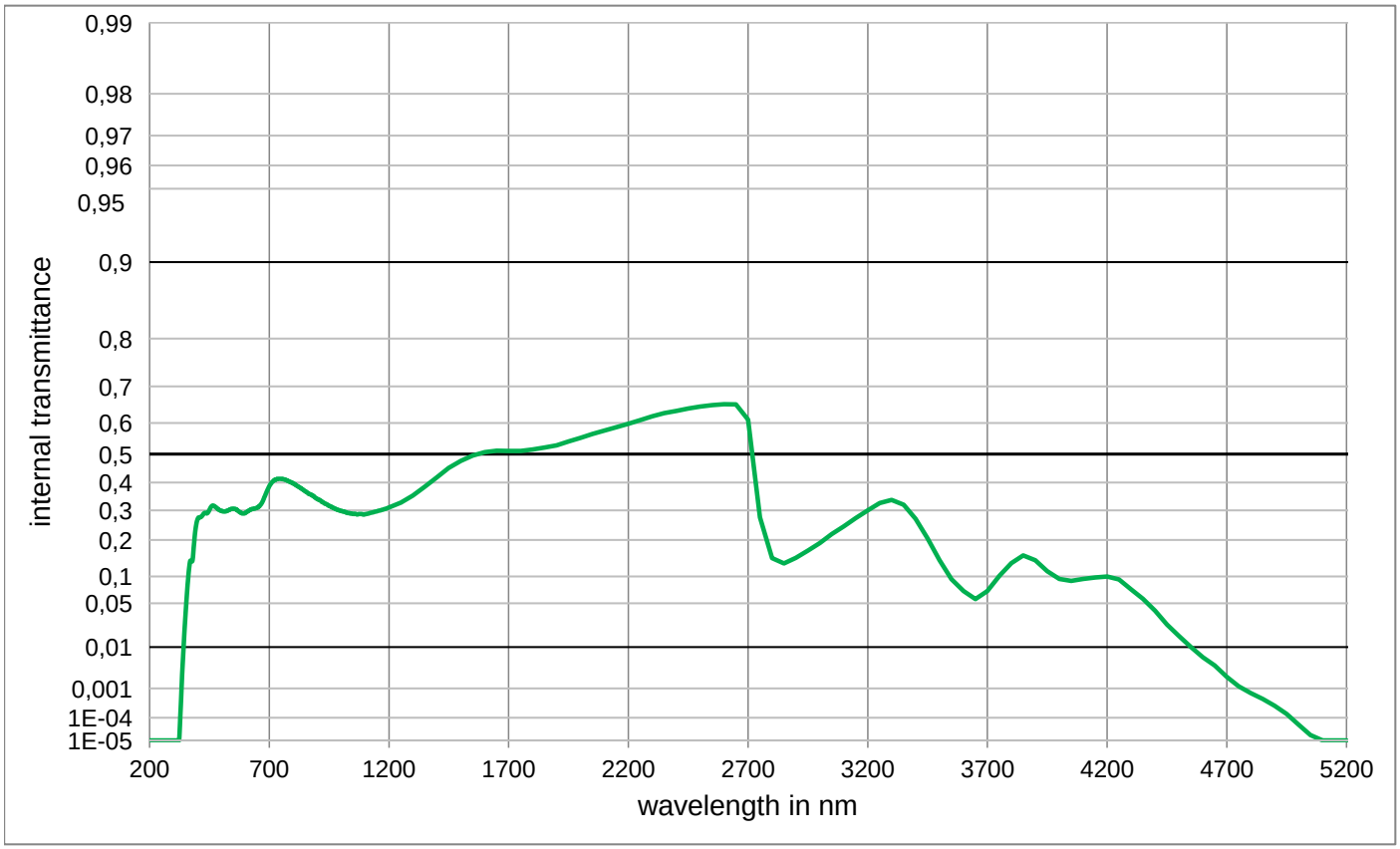
Colormetric properties			
		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Ionically colored glass
Neutral density filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

NG4



Internal transmittance ti 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

Data Sheet

NG5

Optical properties			
Reflection factor			
P_d	=	0,923	
Spectral values guaranteed			
τ_i (405 nm)	=	0,56	± 0,03
τ_i (546 nm)	=	0,57	± 0,03
τ_i (694 nm)	=	0,62	± 0,03
Refractive indices			
n_h (404,7 nm)	=	1,514	
n_e (546 nm)	=	1,502	
n_d (587,6 nm)	=	1,5	
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1		0,7916	
B_2		0,4296	
B_3		36,0098	
C_1		7,310E-03	µm²
C_2		1,2655E-02	µm²
C_3		3759,685	µm²
Internal quality			
Bubble class		2	

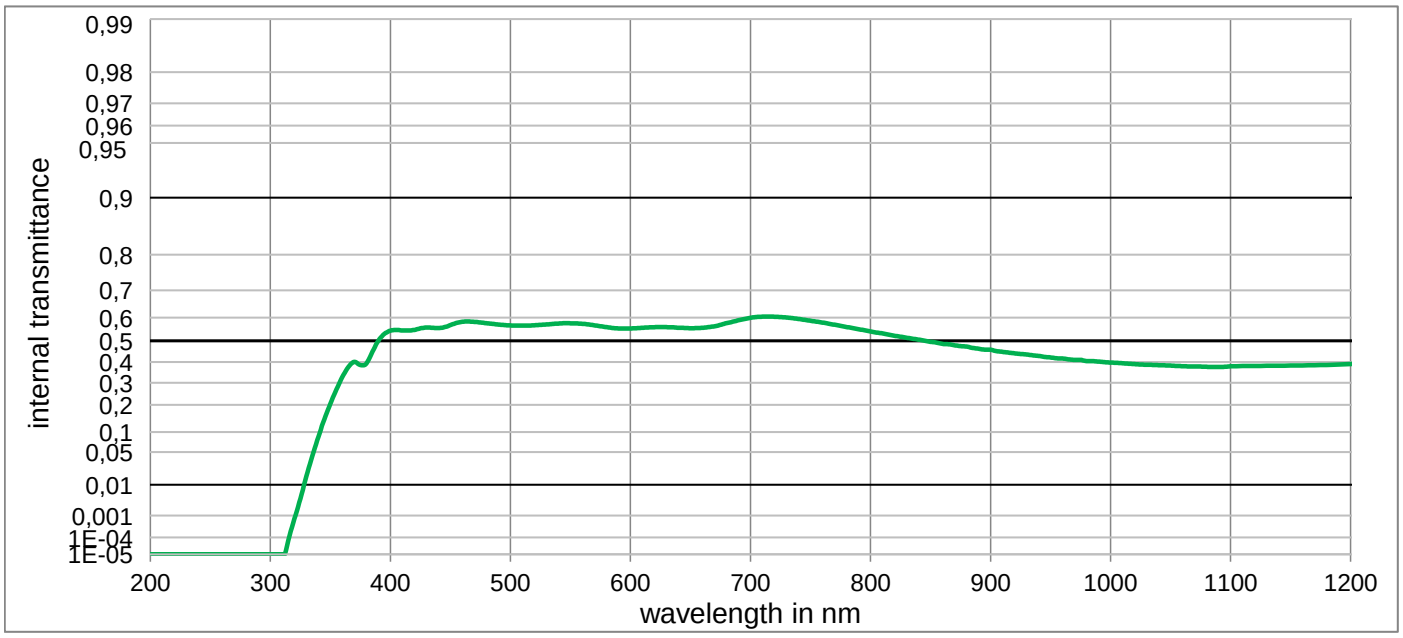
Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,42 g/cm³
Knoop hardness		
HK[0.1/20]	=	435

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

Chemical properties		
Chemical resistance		
FR class	=	1
SR class	=	3.2
AR class	=	2
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

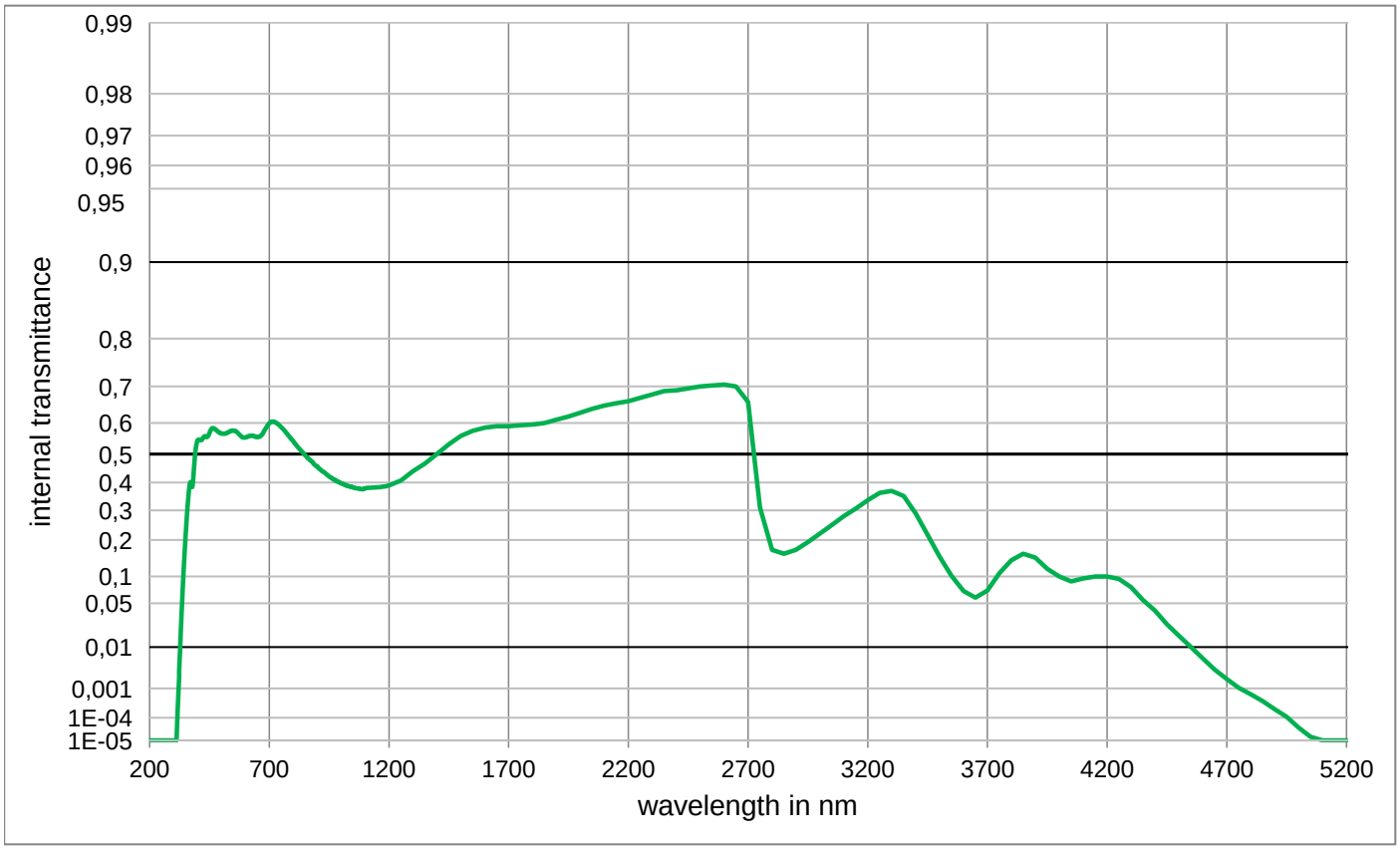
Colormetric properties		1 mm	2 mm	3 mm
Illuminant D65	x			
	y			
	Y			
	λ_d			
	P_e			
Illuminant A	x			
	y			
	Y			
	λ_d			
	P_e			

Notes
Ionically colored glass
Neutral density filter
ISO 23364:2021
Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

NG5



Internal transmittance ti 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

Data Sheet

NG9

Optical properties			
Reflection factor			
P_d	=	0,921	
Spectral values guaranteed			
τ_i (405 nm)	=	0,025	± 0,01
τ_i (546 nm)	=	0,04	± 0,02
τ_i (694 nm)	=	0,08	± 0,02
Refractive indices			
n_h (404,7 nm)	=	1,525	
n_e (546 nm)	=	1,511	
n_d (587,6 nm)	=	1,509	
Sellmeier coefficients			
valid from 440 nm to 1550 nm			
B_1		0,7032	
B_2		0,5370	
B_3		30,3108	
C_1		1,067E-02	µm²
C_2		1,0492E-02	µm²
C_3		3524,129	µm²
Internal quality			
Bubble class		2	

Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,44 g/cm³
Knoop hardness		
HK[0.1/20]	=	420

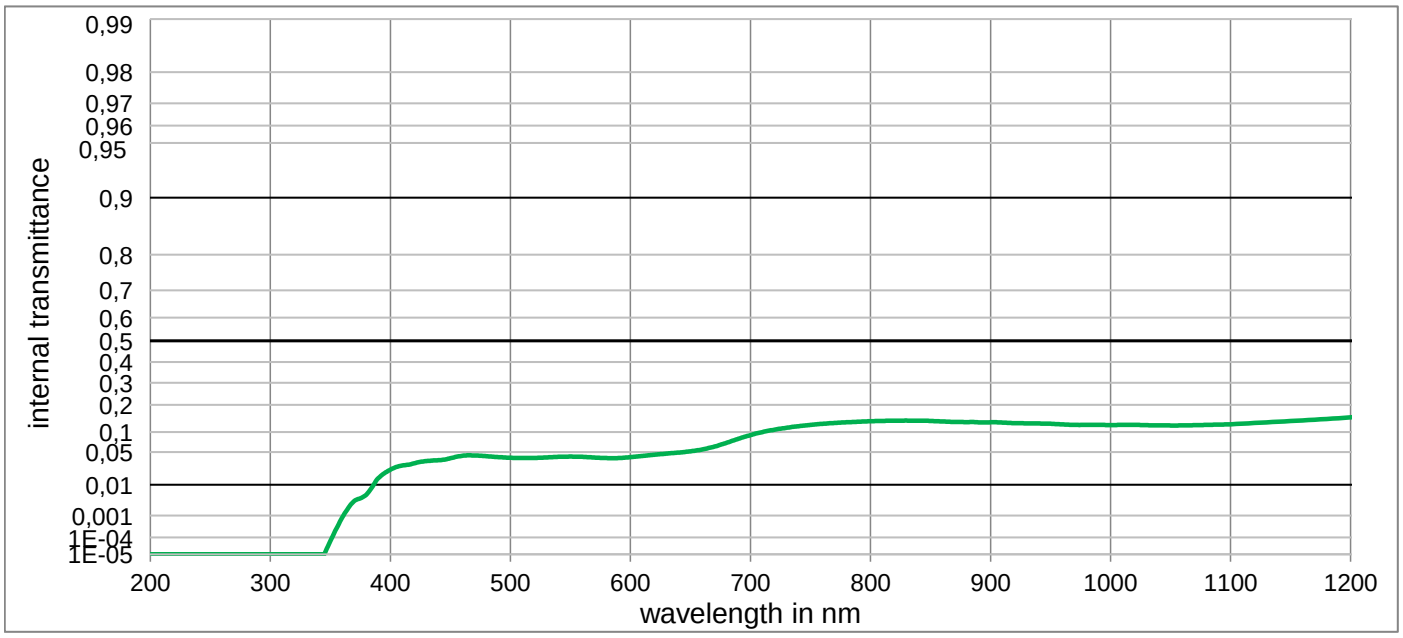
Thermal properties		
Transformation temperature		
Tg	=	469 °C
Thermal expansion in		10^{-6}/K
$\alpha_{(-30°C/+70°C)}$	=	6,5
$\alpha_{(20°C/300°C)}$	=	7,0

Chemical properties		
Chemical resistance		
FR class	=	1
SR class	=	3.2
AR class	=	2
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5		

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			

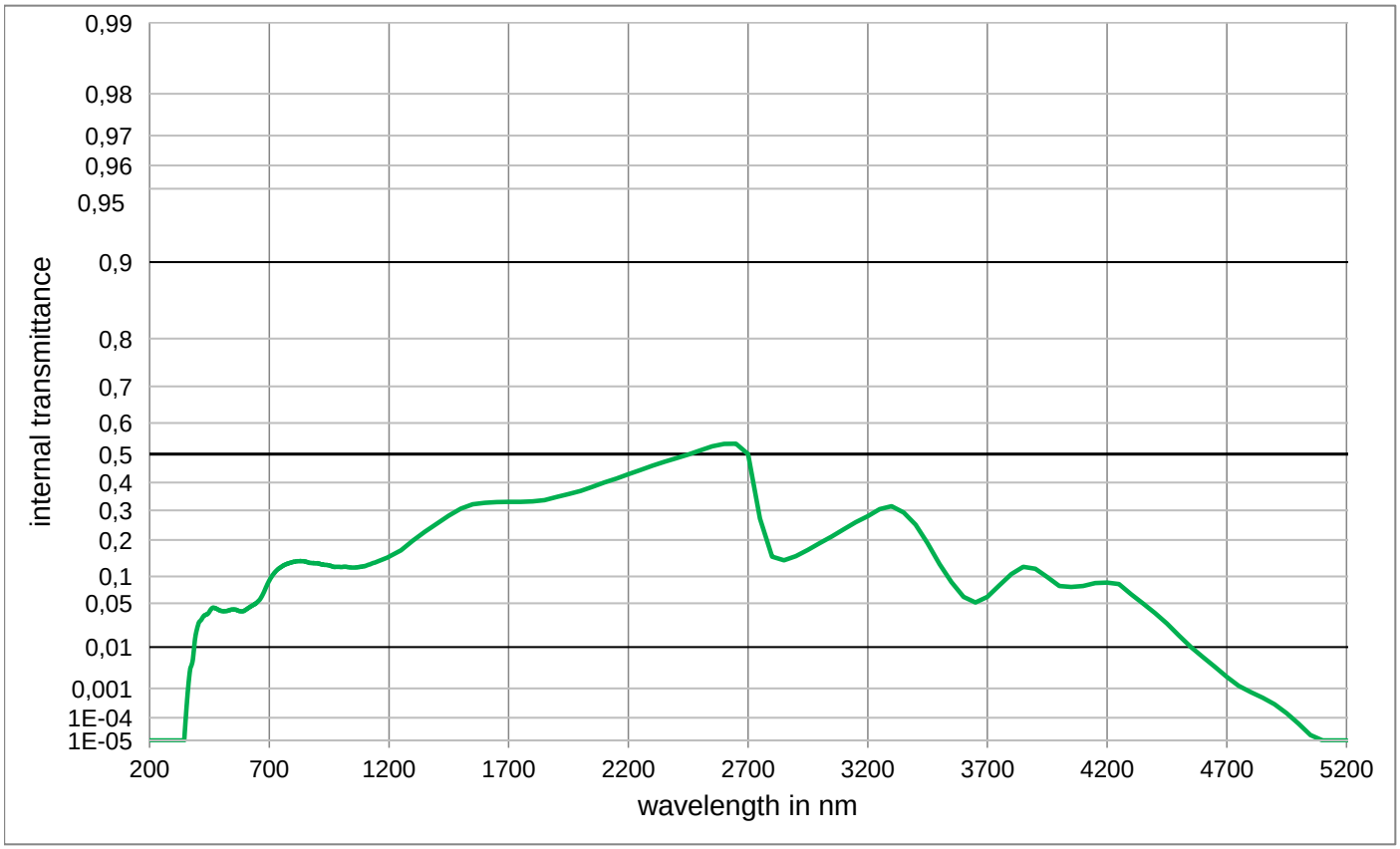
Notes
Ionically colored glass
Neutral density filter
ISO 23364:2021

Disclaimer
All data without tolerances are to be understood to be reference values.



Data Sheet

NG9



Internal transmittance ti 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

Data Sheet

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)	=	1,504	
n_e (546 nm)	=	1,5	
n_d (587,6 nm)	=	1,499	
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	µm²
C_2		4,3272E-02	µm²
C_3		116,448	µm²
Internal quality			
Bubble class		2	

Mechanical properties		
Reference thickness		
d	=	1,00 mm
Density		
ρ	=	2,41 g/cm³
Knoop hardness		
HK[0.1/20]	=	460

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

Chemical properties		
Chemical resistance		
FR class	=	1
SR class	=	3.4
AR class	=	2
Resistance against humidity		
Resistant glass		
see pocket catalogue "Optical Filter Glass 2020", chapter 5.5		

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
Neutral density filter
DIN 58131

Disclaimer
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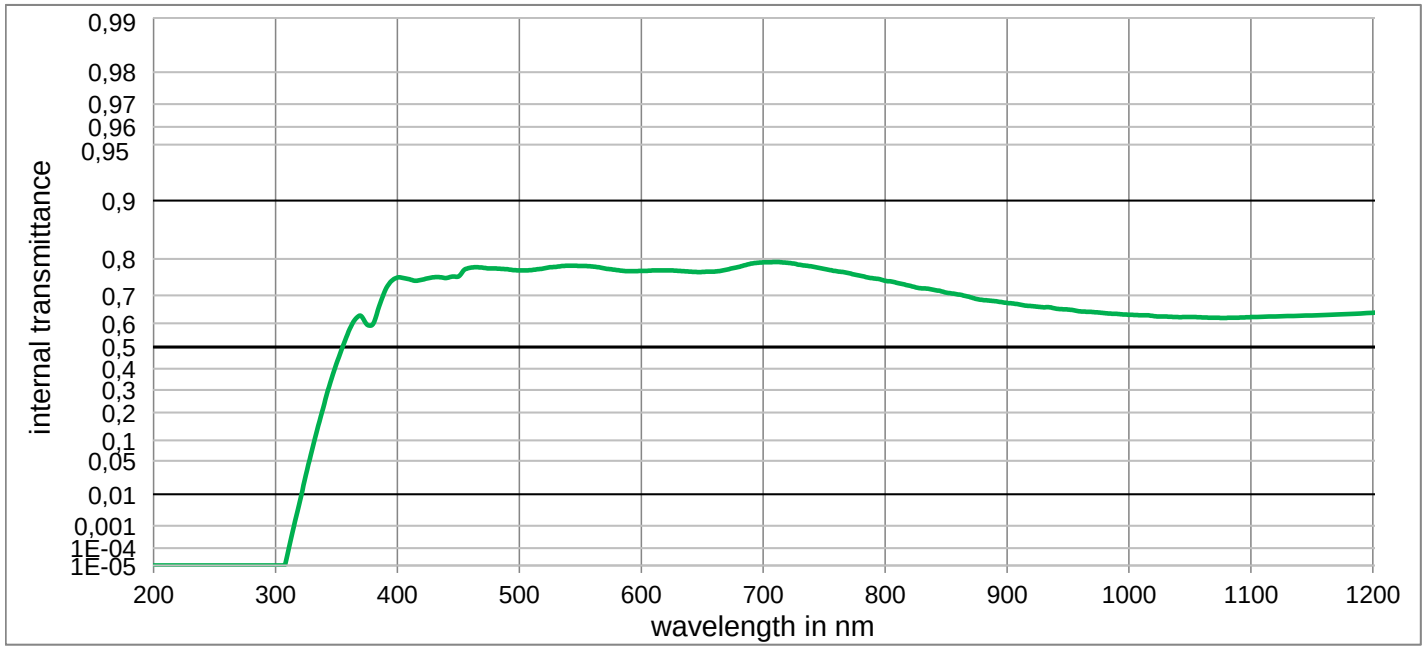
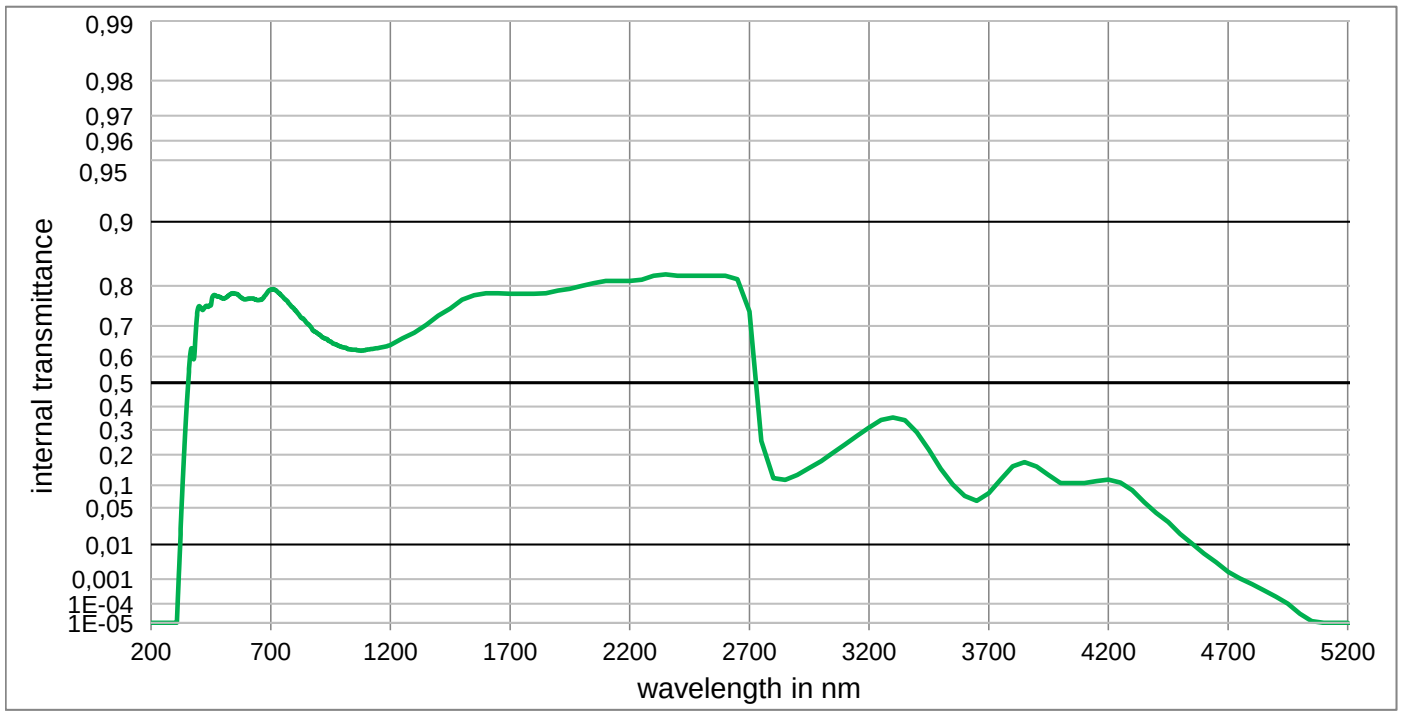


Data Sheet

NG11



Internal transmittance ti 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

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