



ALL COLLECTION DATA SHEETS OPTICAL FILTERS

CONTENT

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Bandpass S8023
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Longpass GG455
Longpass GG475
Longpass GG495
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BG3

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	1

Spectral values guaranteed	
τ_i (365 nm)	≥ 0.94
τ_i (633 nm)	$\leq 5 \cdot 10^{-5}$

Refractive index n		
λ [nm]	Element	n
302.1	Hg	1.55
435.8	Hg	1.52
587.6	He	1.51
1014	Hg	1.50

Density	
ρ [g/cm ³]	2.56

Bubble content	
Bubble class	1

Chemical resistance	
FR class	0
SR class	1.0
AR class	1.0

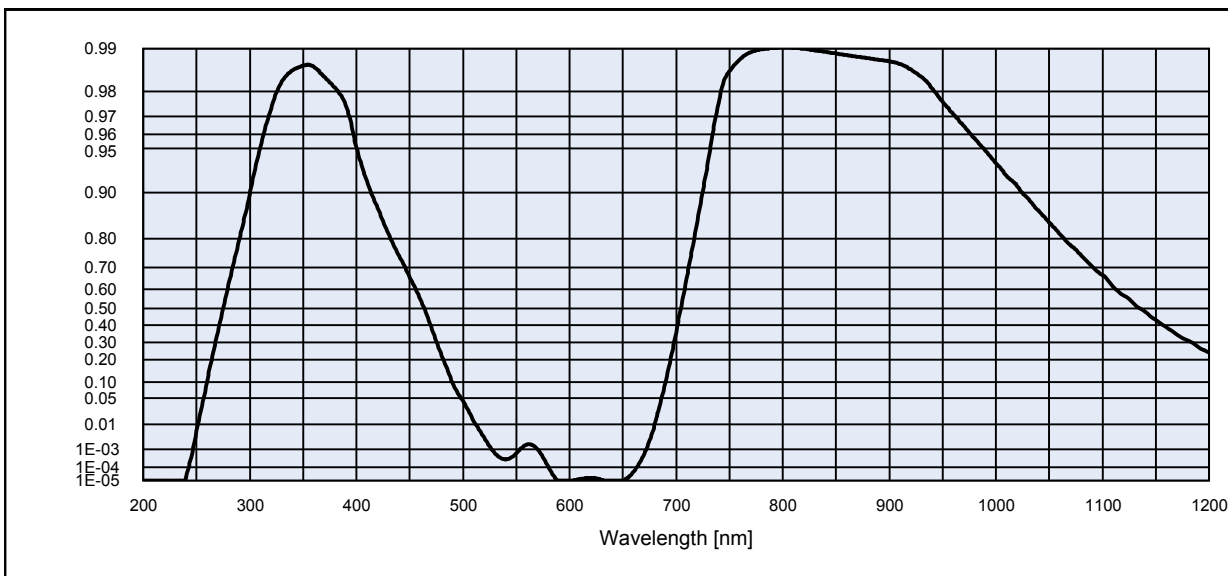
Transformation temperature	
T_g [°C]	478

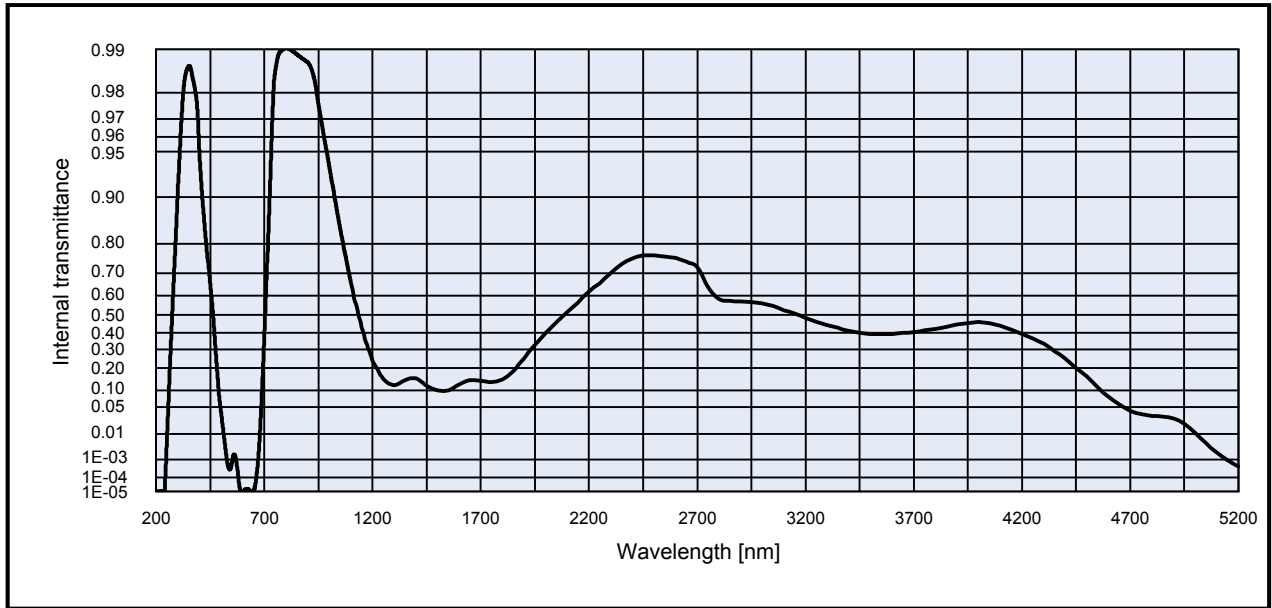
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	8.8
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	10.2
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Band pass filter
V
Transmission changes are possible under the action of intense ultraviolet radiation
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

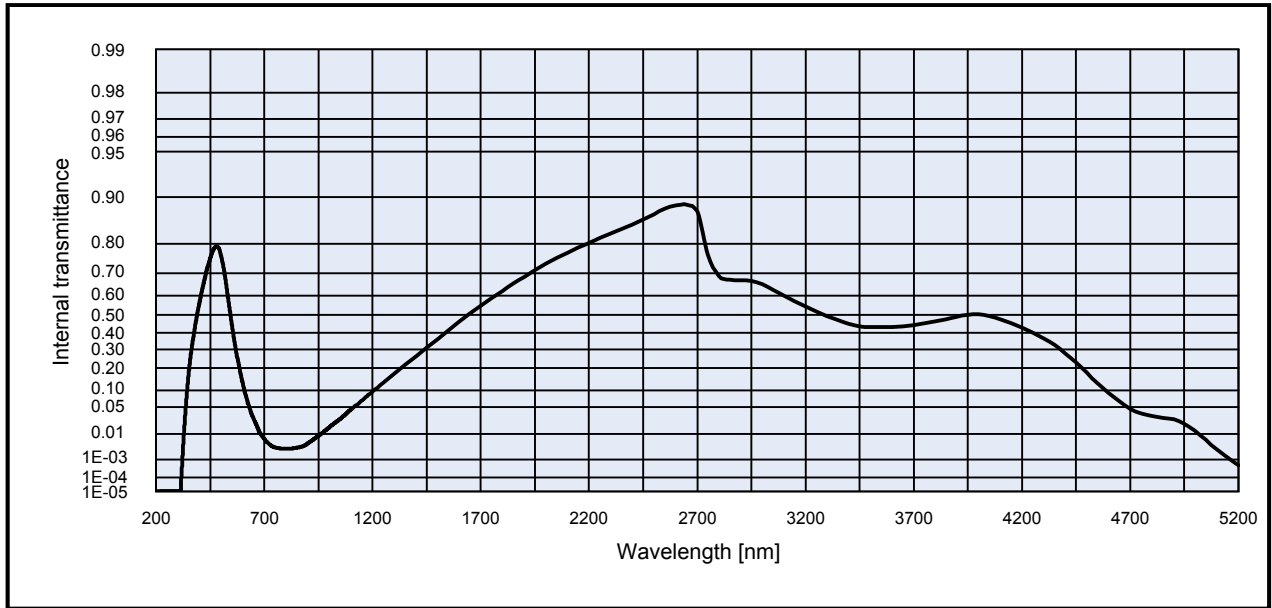
Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]
x	0.160	0.166	0.170	x	0.157	0.163	0.167	x	0.154	0.160	0.163
y	0.042	0.024	0.020	y	0.038	0.022	0.018	y	0.029	0.018	0.014
Y	1	0	0	Y	1	0	0	Y	2	1	0
λ_d [nm]	458	447	440	λ_d [nm]	457	447	442	λ_d [nm]	455	448	444
P_e	0.96	0.98	0.98	P_e	0.97	0.98	0.99	P_e	0.98	0.99	1.00





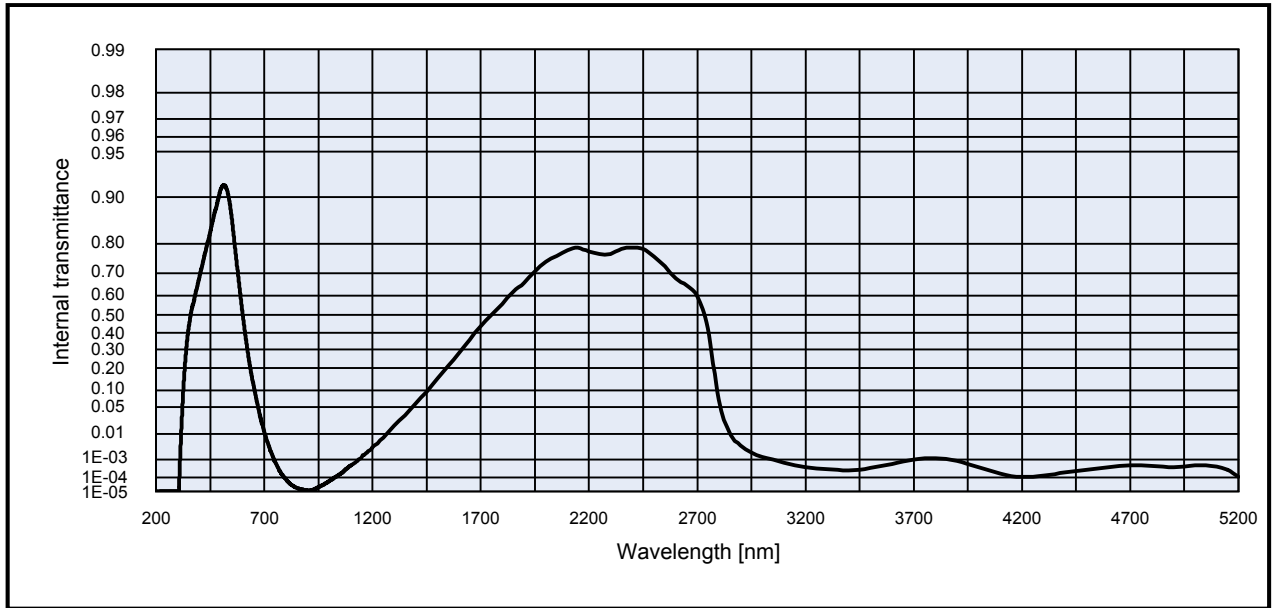
Internal transmittance τ_i at reference thickness d [mm] = 1
The internal transmittance values, tabulated and graphically represented, are reference values only

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	4.3E-02	800	9.9E-01	1100	6.7E-01	2200	6.2E-01	3700	4.0E-01
210	< 1.0E-05	510	1.3E-02	810	9.9E-01	1110	6.2E-01	2250	6.6E-01	3750	4.1E-01
220	< 1.0E-05	520	3.2E-03	820	9.9E-01	1120	5.7E-01	2300	7.0E-01	3800	4.2E-01
230	< 1.0E-05	530	6.4E-04	830	9.9E-01	1130	5.2E-01	2350	7.3E-01	3850	4.3E-01
240	1.9E-05	540	3.0E-04	840	9.9E-01	1140	4.8E-01	2400	7.5E-01	3900	4.5E-01
250	6.1E-03	550	6.2E-04	850	9.9E-01	1150	4.3E-01	2450	7.6E-01	3950	4.6E-01
260	1.0E-01	560	1.7E-03	860	9.9E-01	1160	3.9E-01	2500	7.7E-01	4000	4.6E-01
270	3.6E-01	570	1.0E-03	870	9.9E-01	1170	3.4E-01	2550	7.6E-01	4050	4.6E-01
280	6.3E-01	580	1.1E-04	880	9.9E-01	1180	3.1E-01	2600	7.6E-01	4100	4.4E-01
290	8.0E-01	590	< 1.0E-05	890	9.9E-01	1190	2.7E-01	2650	7.4E-01	4150	4.2E-01
300	9.0E-01	600	< 1.0E-05	900	9.9E-01	1200	2.4E-01	2700	7.2E-01	4200	3.9E-01
310	9.5E-01	610	1.3E-05	910	9.9E-01	1250	1.5E-01	2750	6.4E-01	4250	3.7E-01
320	9.7E-01	620	1.6E-05	920	9.9E-01	1300	1.2E-01	2800	5.9E-01	4300	3.4E-01
330	9.8E-01	630	1.2E-05	930	9.8E-01	1350	1.4E-01	2850	5.8E-01	4350	2.9E-01
340	9.9E-01	640	< 1.0E-05	940	9.8E-01	1400	1.5E-01	2900	5.7E-01	4400	2.5E-01
350	9.9E-01	650	< 1.0E-05	950	9.8E-01	1450	1.2E-01	2950	5.7E-01	4450	2.0E-01
360	9.9E-01	660	4.7E-05	960	9.7E-01	1500	1.0E-01	3000	5.6E-01	4500	1.6E-01
370	9.8E-01	670	5.9E-04	970	9.7E-01	1550	1.0E-01	3050	5.5E-01	4550	1.1E-01
380	9.8E-01	680	1.0E-02	980	9.6E-01	1600	1.2E-01	3100	5.3E-01	4600	7.8E-02
390	9.8E-01	690	1.0E-01	990	9.5E-01	1650	1.4E-01	3150	5.1E-01	4650	5.6E-02
400	9.5E-01	700	3.6E-01	1000	9.4E-01	1700	1.4E-01	3200	4.8E-01	4700	4.2E-02
410	9.2E-01	710	6.6E-01	1010	9.2E-01	1750	1.3E-01	3250	4.6E-01	4750	3.5E-02
420	8.7E-01	720	8.5E-01	1020	9.1E-01	1800	1.4E-01	3300	4.4E-01	4800	3.2E-02
430	8.2E-01	730	9.4E-01	1030	8.9E-01	1850	1.8E-01	3350	4.3E-01	4850	3.1E-02
440	7.5E-01	740	9.8E-01	1040	8.7E-01	1900	2.5E-01	3400	4.1E-01	4900	2.7E-02
450	6.6E-01	750	9.9E-01	1050	8.4E-01	1950	3.3E-01	3450	4.0E-01	4950	2.0E-02
460	5.5E-01	760	9.9E-01	1060	8.1E-01	2000	4.0E-01	3500	3.9E-01	5000	1.1E-02
470	3.9E-01	770	9.9E-01	1070	7.8E-01	2050	4.6E-01	3550	3.9E-01	5050	5.1E-03
480	2.2E-01	780	9.9E-01	1080	7.5E-01	2100	5.2E-01	3600	3.9E-01	5100	2.0E-03
490	9.7E-02	790	9.9E-01	1090	7.1E-01	2150	5.7E-01	3650	4.0E-01	5150	9.1E-04



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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	7.7E-01	800	3.0E-03	1100	4.4E-02	2200	8.0E-01	3700	4.4E-01
210	< 1.0E-05	510	7.3E-01	810	3.0E-03	1110	4.8E-02	2250	8.2E-01	3750	4.5E-01
220	< 1.0E-05	520	6.8E-01	820	3.0E-03	1120	5.2E-02	2300	8.3E-01	3800	4.6E-01
230	< 1.0E-05	530	6.1E-01	830	3.0E-03	1130	5.6E-02	2350	8.4E-01	3850	4.8E-01
240	< 1.0E-05	540	5.4E-01	840	3.1E-03	1140	6.2E-02	2400	8.5E-01	3900	4.9E-01
250	< 1.0E-05	550	4.5E-01	850	3.2E-03	1150	6.7E-02	2450	8.6E-01	3950	5.0E-01
260	< 1.0E-05	560	3.7E-01	860	3.4E-03	1160	7.3E-02	2500	8.7E-01	4000	5.0E-01
270	< 1.0E-05	570	3.0E-01	870	3.5E-03	1170	7.8E-02	2550	8.8E-01	4050	4.9E-01
280	< 1.0E-05	580	2.3E-01	880	3.7E-03	1180	8.4E-02	2600	8.9E-01	4100	4.8E-01
280	< 1.0E-05	580	2.3E-01	880	3.7E-03	1180	8.4E-02	2600	8.9E-01	4100	4.8E-01
290	< 1.0E-05	590	1.7E-01	890	4.1E-03	1190	9.0E-02	2650	8.9E-01	4150	4.6E-01
300	< 1.0E-05	600	1.3E-01	900	4.6E-03	1200	9.6E-02	2700	8.7E-01	4200	4.3E-01
310	< 1.0E-05	610	9.6E-02	910	5.3E-03	1250	1.3E-01	2750	7.7E-01	4250	4.0E-01
320	4.7E-04	620	7.0E-02	920	6.0E-03	1300	1.7E-01	2800	6.9E-01	4300	3.7E-01
330	1.3E-02	630	5.1E-02	930	6.8E-03	1350	2.2E-01	2850	6.8E-01	4350	3.3E-01
340	6.6E-02	640	3.7E-02	940	7.7E-03	1400	2.6E-01	2900	6.7E-01	4400	2.8E-01
350	1.6E-01	650	2.7E-02	950	8.7E-03	1450	3.1E-01	2950	6.7E-01	4450	2.3E-01
360	2.6E-01	660	2.1E-02	960	9.8E-03	1500	3.6E-01	3000	6.5E-01	4500	1.8E-01
370	3.5E-01	670	1.5E-02	970	1.1E-02	1550	4.1E-01	3050	6.3E-01	4550	1.3E-01
380	4.4E-01	680	1.1E-02	980	1.2E-02	1600	4.6E-01	3100	6.0E-01	4600	9.1E-02
390	5.0E-01	690	8.6E-03	990	1.4E-02	1650	5.1E-01	3150	5.7E-01	4650	6.4E-02
400	5.6E-01	700	6.9E-03	1000	1.6E-02	1700	5.5E-01	3200	5.5E-01	4700	4.6E-02
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460	7.8E-01	760	3.2E-03	1060	2.9E-02	2000	7.4E-01	3500	4.3E-01	5000	1.3E-02
470	7.9E-01	770	3.1E-03	1070	3.3E-02	2050	7.6E-01	3550	4.3E-01	5050	6.3E-03
480	7.9E-01	780	3.0E-03	1080	3.6E-02	2100	7.7E-01	3600	4.3E-01	5100	2.8E-03
490	7.9E-01	790	3.0E-03	1090	4.1E-02	2150	7.9E-01	3650	4.4E-01	5150	1.2E-03



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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	9.1E-01	800	7.6E-05	1100	5.0E-04	2200	7.8E-01	3700	1.0E-03
210	< 1.0E-05	510	9.2E-01	810	5.2E-05	1110	6.0E-04	2250	7.7E-01	3750	1.1E-03
220	< 1.0E-05	520	9.2E-01	820	3.8E-05	1120	7.1E-04	2300	7.7E-01	3800	1.2E-03
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240	< 1.0E-05	540	8.9E-01	840	2.3E-05	1140	1.1E-03	2400	7.9E-01	3900	8.6E-04
250	< 1.0E-05	550	8.6E-01	850	1.9E-05	1150	1.3E-03	2450	7.9E-01	3950	5.8E-04
260	< 1.0E-05	560	8.2E-01	860	1.7E-05	1160	1.6E-03	2500	7.6E-01	4000	4.0E-04
270	< 1.0E-05	570	7.6E-01	870	1.5E-05	1170	1.9E-03	2550	7.3E-01	4050	2.7E-04
280	< 1.0E-05	580	6.9E-01	880	1.3E-05	1180	2.3E-03	2600	6.8E-01	4100	1.8E-04
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300	< 1.0E-05	600	5.1E-01	900	1.2E-05	1200	3.3E-03	2700	6.0E-01	4200	1.1E-04
310	5.6E-04	610	4.1E-01	910	1.2E-05	1250	7.5E-03	2750	4.3E-01	4250	1.1E-04
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430	7.8E-01	730	2.3E-03	1030	1.1E-04	1850	6.2E-01	3350	2.9E-04	4850	4.3E-04
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490	9.0E-01	790	1.1E-04	1090	4.1E-04	2150	7.9E-01	3650	8.2E-04	5150	2.9E-04

BG25

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	1

Spectral values guaranteed	
τ_i (334 nm)	≤ 0.80
τ_i (405 nm)	≥ 0.93
τ_i (488 nm)	≤ 0.39
τ_i (725 nm)	≤ 0.36

Refractive index n		
λ [nm]	Element	n
404.7	Hg	1.53
587.6	He	1.51

Density	
ρ [g/cm ³]	2.56

Bubble content	
Bubble class	1

Chemical resistance	
FR class	0
SR class	1.0
AR class	1.0

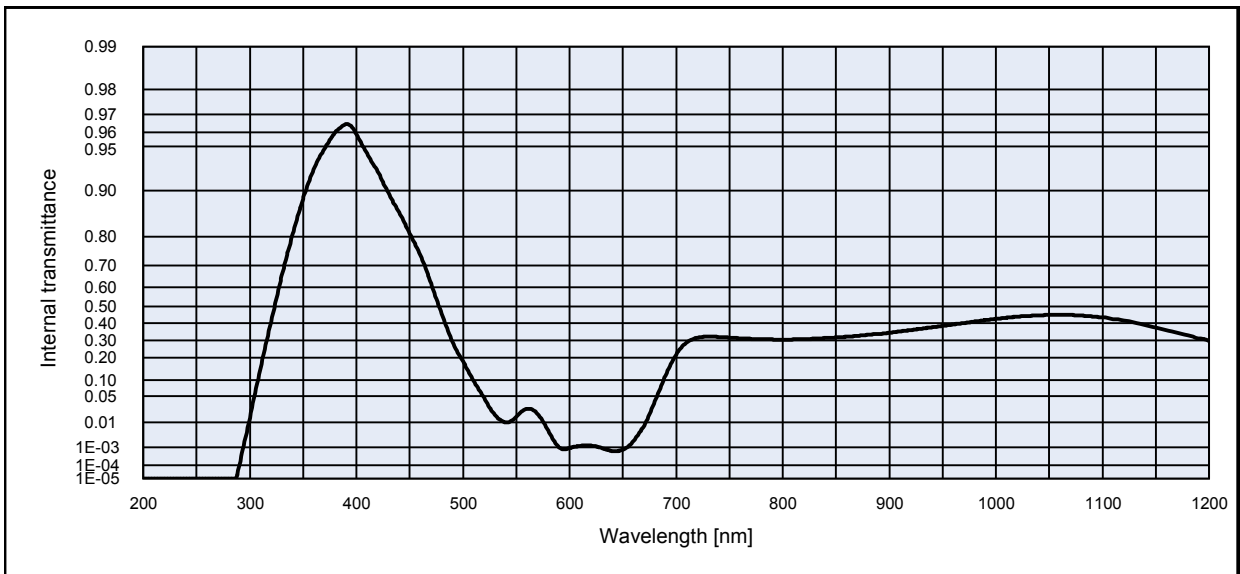
Transformation temperature	
T_g [°C]	487

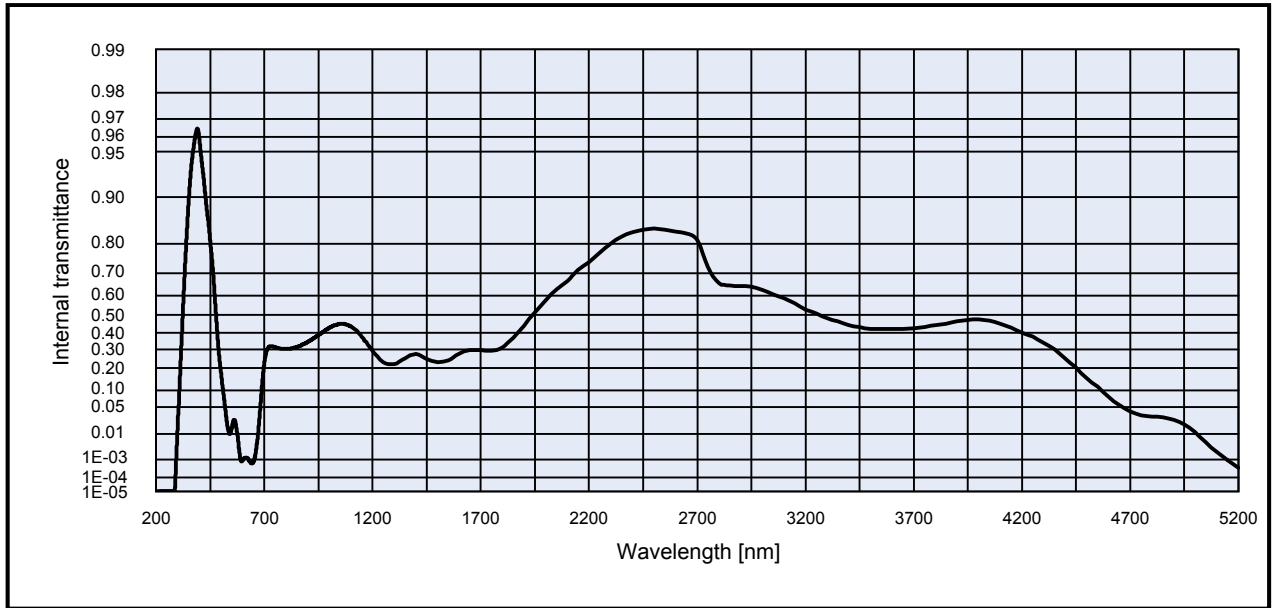
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	8.7
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	10.1
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Band pass filter
V
Transmission changes are possible under the action of intense ultraviolet radiation
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

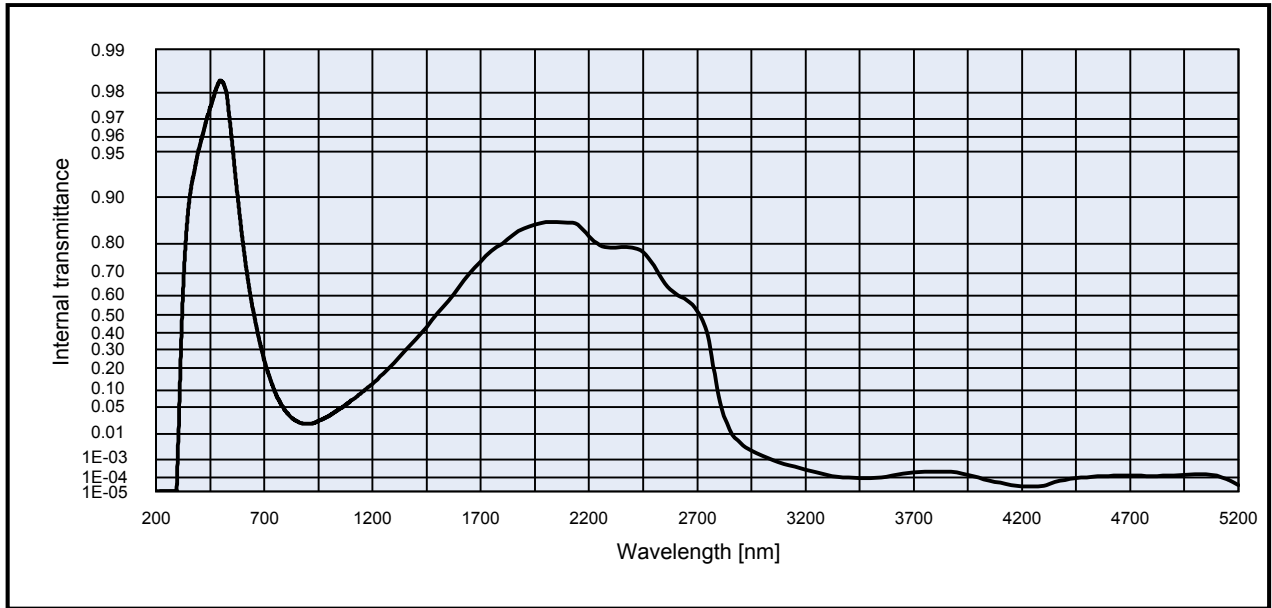
Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]
x	0.155	0.151	0.155	x	0.153	0.152	0.155	x	0.150	0.153	0.157
y	0.093	0.035	0.024	y	0.083	0.033	0.023	y	0.055	0.027	0.021
Y	3	1	0	Y	3	1	0	Y	5	2	1
λ_d [nm]	470	459	454	λ_d [nm]	469	458	453	λ_d [nm]	463	455	451
P_e	0.90	0.98	0.99	P_e	0.91	0.98	0.99	P_e	0.93	0.98	0.99





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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	1.8E-01	800	3.0E-01	1100	4.3E-01	2200	7.4E-01	3700	4.3E-01
210	< 1.0E-05	510	9.7E-02	810	3.0E-01	1110	4.3E-01	2250	7.7E-01	3750	4.3E-01
220	< 1.0E-05	520	4.5E-02	820	3.1E-01	1120	4.2E-01	2300	8.0E-01	3800	4.4E-01
230	< 1.0E-05	530	1.7E-02	830	3.1E-01	1130	4.1E-01	2350	8.2E-01	3850	4.5E-01
240	< 1.0E-05	540	1.0E-02	840	3.1E-01	1140	3.9E-01	2400	8.3E-01	3900	4.6E-01
250	< 1.0E-05	550	1.5E-02	850	3.2E-01	1150	3.8E-01	2450	8.4E-01	3950	4.7E-01
260	< 1.0E-05	560	2.5E-02	860	3.2E-01	1160	3.6E-01	2500	8.4E-01	4000	4.8E-01
270	< 1.0E-05	570	1.8E-02	870	3.3E-01	1170	3.5E-01	2550	8.4E-01	4050	4.7E-01
280	< 1.0E-05	580	5.2E-03	880	3.3E-01	1180	3.3E-01	2600	8.3E-01	4100	4.5E-01
290	8.5E-05	590	1.0E-03	890	3.4E-01	1190	3.1E-01	2650	8.3E-01	4150	4.3E-01
300	1.4E-02	600	9.1E-04	900	3.4E-01	1200	2.9E-01	2700	8.1E-01	4200	4.0E-01
310	1.4E-01	610	1.2E-03	910	3.5E-01	1250	2.3E-01	2750	7.3E-01	4250	3.8E-01
320	4.1E-01	620	1.2E-03	920	3.6E-01	1300	2.2E-01	2800	6.6E-01	4300	3.4E-01
330	6.6E-01	630	9.3E-04	930	3.7E-01	1350	2.5E-01	2850	6.5E-01	4350	3.0E-01
340	8.1E-01	640	6.4E-04	940	3.8E-01	1400	2.8E-01	2900	6.5E-01	4400	2.5E-01
350	8.9E-01	650	7.6E-04	950	3.9E-01	1450	2.5E-01	2950	6.4E-01	4450	2.0E-01
360	9.3E-01	660	2.0E-03	960	3.9E-01	1500	2.3E-01	3000	6.3E-01	4500	1.5E-01
370	9.5E-01	670	8.0E-03	970	4.0E-01	1550	2.4E-01	3050	6.1E-01	4550	1.1E-01
380	9.6E-01	680	3.8E-02	980	4.1E-01	1600	2.8E-01	3100	5.9E-01	4600	7.8E-02
390	9.7E-01	690	1.2E-01	990	4.2E-01	1650	3.0E-01	3150	5.6E-01	4650	5.5E-02
400	9.6E-01	700	2.2E-01	1000	4.3E-01	1700	3.0E-01	3200	5.3E-01	4700	4.0E-02
410	9.4E-01	710	2.9E-01	1010	4.3E-01	1750	2.9E-01	3250	5.1E-01	4750	3.3E-02
420	9.3E-01	720	3.1E-01	1020	4.4E-01	1800	3.1E-01	3300	4.8E-01	4800	3.0E-02
430	9.0E-01	730	3.2E-01	1030	4.4E-01	1850	3.7E-01	3350	4.6E-01	4850	2.9E-02
440	8.6E-01	740	3.2E-01	1040	4.5E-01	1900	4.4E-01	3400	4.4E-01	4900	2.6E-02
450	8.1E-01	750	3.2E-01	1050	4.5E-01	1950	5.1E-01	3450	4.3E-01	4950	2.0E-02
460	7.4E-01	760	3.1E-01	1060	4.5E-01	2000	5.8E-01	3500	4.2E-01	5000	1.1E-02
470	6.2E-01	770	3.1E-01	1070	4.5E-01	2050	6.3E-01	3550	4.2E-01	5050	5.2E-03
480	4.6E-01	780	3.1E-01	1080	4.5E-01	2100	6.7E-01	3600	4.2E-01	5100	2.2E-03
490	2.9E-01	790	3.0E-01	1090	4.4E-01	2150	7.1E-01	3650	4.2E-01	5150	9.4E-04



Internal transmittance τ_i at reference thickness d [mm] = 1
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	9.8E-01	800	4.0E-02	1100	6.6E-02	2200	8.2E-01	3700	2.0E-04
210	< 1.0E-05	510	9.8E-01	810	3.5E-02	1110	7.1E-02	2250	8.0E-01	3750	2.3E-04
220	< 1.0E-05	520	9.8E-01	820	3.1E-02	1120	7.5E-02	2300	7.9E-01	3800	2.3E-04
230	< 1.0E-05	530	9.8E-01	830	2.8E-02	1130	8.1E-02	2350	7.9E-01	3850	2.2E-04
240	< 1.0E-05	540	9.7E-01	840	2.5E-02	1140	8.6E-02	2400	7.9E-01	3900	2.0E-04
250	< 1.0E-05	550	9.6E-01	850	2.3E-02	1150	9.3E-02	2450	7.8E-01	3950	1.4E-04
260	< 1.0E-05	560	9.4E-01	860	2.2E-02	1160	9.9E-02	2500	7.3E-01	4000	1.0E-04
270	< 1.0E-05	570	9.2E-01	870	2.1E-02	1170	1.0E-01	2550	6.6E-01	4050	6.5E-05
280	< 1.0E-05	580	8.9E-01	880	2.0E-02	1180	1.1E-01	2600	6.1E-01	4100	4.4E-05
290	< 1.0E-05	590	8.5E-01	890	2.0E-02	1190	1.2E-01	2650	5.8E-01	4150	3.1E-05
300	6.5E-04	600	8.1E-01	900	2.0E-02	1200	1.3E-01	2700	5.2E-01	4200	2.5E-05
310	1.1E-01	610	7.6E-01	910	2.0E-02	1250	1.7E-01	2750	3.9E-01	4250	2.4E-05
320	4.9E-01	620	7.0E-01	920	2.0E-02	1300	2.3E-01	2800	8.0E-02	4300	2.8E-05
330	7.2E-01	630	6.4E-01	930	2.1E-02	1350	2.9E-01	2850	1.4E-02	4350	5.0E-05
340	8.3E-01	640	5.8E-01	940	2.2E-02	1400	3.6E-01	2900	5.0E-03	4400	6.8E-05
350	8.8E-01	650	5.2E-01	950	2.4E-02	1450	4.3E-01	2950	2.5E-03	4450	9.0E-05
360	9.1E-01	660	4.6E-01	960	2.5E-02	1500	5.1E-01	3000	1.5E-03	4500	1.0E-04
370	9.2E-01	670	4.0E-01	970	2.7E-02	1550	5.8E-01	3050	9.3E-04	4550	1.2E-04
380	9.4E-01	680	3.4E-01	980	2.8E-02	1600	6.4E-01	3100	6.0E-04	4600	1.2E-04
390	9.5E-01	690	2.9E-01	990	3.0E-02	1650	7.0E-01	3150	4.2E-04	4650	1.3E-04
400	9.5E-01	700	2.4E-01	1000	3.2E-02	1700	7.4E-01	3200	3.0E-04	4700	1.3E-04
410	9.6E-01	710	2.0E-01	1010	3.4E-02	1750	7.8E-01	3250	2.1E-04	4750	1.3E-04
420	9.6E-01	720	1.7E-01	1020	3.7E-02	1800	8.0E-01	3300	1.4E-04	4800	1.3E-04
430	9.7E-01	730	1.4E-01	1030	4.0E-02	1850	8.2E-01	3350	1.1E-04	4850	1.3E-04
440	9.7E-01	740	1.2E-01	1040	4.3E-02	1900	8.4E-01	3400	1.0E-04	4900	1.3E-04
450	9.7E-01	750	9.5E-02	1050	4.6E-02	1950	8.5E-01	3450	9.1E-05	4950	1.4E-04
460	9.8E-01	760	7.8E-02	1060	4.9E-02	2000	8.5E-01	3500	9.5E-05	5000	1.6E-04
470	9.8E-01	770	6.6E-02	1070	5.3E-02	2050	8.5E-01	3550	1.1E-04	5050	1.5E-04
480	9.8E-01	780	5.5E-02	1080	5.7E-02	2100	8.5E-01	3600	1.4E-04	5100	1.3E-04
490	9.8E-01	790	4.7E-02	1090	6.1E-02	2150	8.5E-01	3650	1.7E-04	5150	7.5E-05

BG39

Reflection factor	
P_d	0.91

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (350 nm)	\geq	0.60
τ_i (405 nm)	\geq	0.85
τ_i (514 nm)	\geq	0.93
τ_i (633 nm)	\leq	0.30
τ_i (694 nm)	\leq	0.03
τ_i (1060 nm)	\leq	0.001

Refractive index n		
λ [nm]	Element	n
404.7	Hg	1.55
587.6	He	1.54

Density	
ρ [g/cm ³]	2.74

Bubble content	
Bubble class	2

Chemical resistance	
FR class	0
SR class	5.1
AR class	3.0

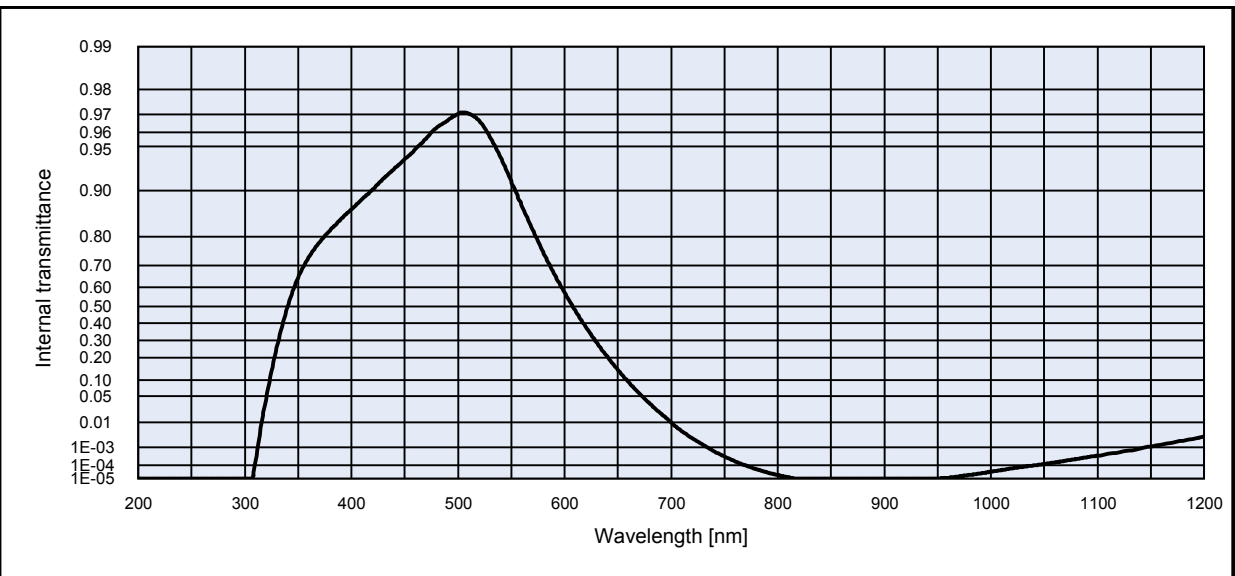
Transformation temperature	
T _g [°C]	322

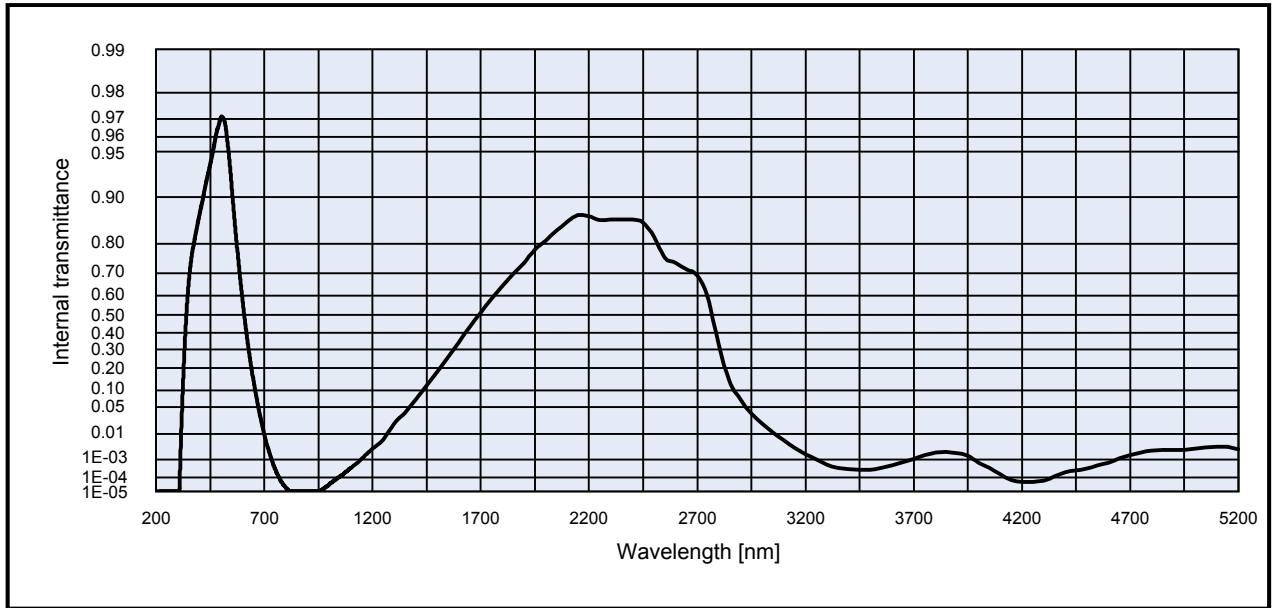
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	11.6
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	13.1

Temperature coefficient	
T _k [nm/°C]	

Notes
Ionically colored glass
Band pass filter / short pass filter
[!!]
Long-term changes in the polished surface are possible
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)			
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]	1
x	0.365	0.314	0.279	x	0.344	0.296	0.264	x	0.257	0.226	0.207	
y	0.434	0.445	0.450	y	0.419	0.425	0.427	y	0.326	0.322	0.318	
Y	66	53	45	Y	67	55	47	Y	73	62	55	
λ_d [nm]	500	500	499	λ_d [nm]	498	498	497	λ_d [nm]	491	490	490	
P _e	0.19	0.31	0.39	P _e	0.19	0.31	0.39	P _e	0.21	0.32	0.39	





Internal transmittance τ_i at reference thickness d [mm] = 1
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	9.7E-01	800	1.9E-05	1100	3.7E-04	2200	8.7E-01	3700	1.1E-03
210	< 1.0E-05	510	9.7E-01	810	1.3E-05	1110	4.6E-04	2250	8.6E-01	3750	1.6E-03
220	< 1.0E-05	520	9.7E-01	820	< 1.0E-05	1120	5.5E-04	2300	8.6E-01	3800	2.1E-03
230	< 1.0E-05	530	9.6E-01	830	< 1.0E-05	1130	7.0E-04	2350	8.6E-01	3850	2.2E-03
240	< 1.0E-05	540	9.4E-01	840	< 1.0E-05	1140	8.8E-04	2400	8.6E-01	3900	1.9E-03
250	< 1.0E-05	550	9.1E-01	850	< 1.0E-05	1150	1.1E-03	2450	8.5E-01	3950	1.5E-03
260	< 1.0E-05	560	8.7E-01	860	< 1.0E-05	1160	1.3E-03	2500	8.2E-01	4000	7.0E-04
270	< 1.0E-05	570	8.2E-01	870	< 1.0E-05	1170	1.7E-03	2550	7.6E-01	4050	3.8E-04
280	< 1.0E-05	580	7.5E-01	880	< 1.0E-05	1180	2.0E-03	2600	7.4E-01	4100	1.7E-04
290	< 1.0E-05	590	6.7E-01	890	< 1.0E-05	1190	2.4E-03	2650	7.1E-01	4150	7.0E-05
300	< 1.0E-05	600	5.8E-01	900	< 1.0E-05	1200	3.1E-03	2700	6.9E-01	4200	5.2E-05
310	1.5E-04	610	4.8E-01	910	< 1.0E-05	1250	6.6E-03	2750	5.9E-01	4250	5.0E-05
320	4.2E-02	620	3.8E-01	920	< 1.0E-05	1300	2.0E-02	2800	3.3E-01	4300	6.0E-05
330	2.6E-01	630	2.9E-01	930	< 1.0E-05	1350	3.8E-02	2850	1.4E-01	4350	1.2E-04
340	4.9E-01	640	2.1E-01	940	< 1.0E-05	1400	7.0E-02	2900	7.0E-02	4400	2.0E-04
350	6.5E-01	650	1.4E-01	950	1.0E-05	1450	1.2E-01	2950	3.6E-02	4450	2.8E-04
360	7.3E-01	660	9.2E-02	960	1.2E-05	1500	1.8E-01	3000	2.0E-02	4500	3.4E-04
370	7.8E-01	670	5.7E-02	970	1.5E-05	1550	2.6E-01	3050	1.1E-02	4550	5.0E-04
380	8.2E-01	680	3.4E-02	980	1.9E-05	1600	3.4E-01	3100	6.0E-03	4600	7.0E-04
390	8.5E-01	690	1.9E-02	990	2.6E-05	1650	4.3E-01	3150	3.1E-03	4650	1.1E-03
400	8.7E-01	700	1.0E-02	1000	3.4E-05	1700	5.1E-01	3200	1.7E-03	4700	1.6E-03
410	8.9E-01	710	5.0E-03	1010	4.5E-05	1750	5.9E-01	3250	9.6E-04	4750	2.0E-03
420	9.0E-01	720	2.6E-03	1020	5.9E-05	1800	6.5E-01	3300	5.6E-04	4800	2.5E-03
430	9.2E-01	730	1.3E-03	1030	7.5E-05	1850	7.0E-01	3350	3.9E-04	4850	2.6E-03
440	9.3E-01	740	6.5E-04	1040	9.2E-05	1900	7.4E-01	3400	3.1E-04	4900	2.6E-03
450	9.4E-01	750	3.3E-04	1050	1.2E-04	1950	7.8E-01	3450	2.9E-04	4950	2.6E-03
460	9.5E-01	760	1.7E-04	1060	1.5E-04	2000	8.1E-01	3500	3.0E-04	5000	3.0E-03
470	9.6E-01	770	9.3E-05	1070	1.8E-04	2050	8.4E-01	3550	3.6E-04	5050	3.3E-03
480	9.6E-01	780	5.1E-05	1080	2.3E-04	2100	8.6E-01	3600	5.1E-04	5100	3.6E-03
490	9.7E-01	790	3.0E-05	1090	3.0E-04	2150	8.7E-01	3650	7.4E-04	5150	3.5E-03

BG40

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (350 nm)	\geq	0.80
τ_i (405 nm)	\geq	0.93
τ_i (514 nm)	\geq	0.97
τ_i (633 nm)	\leq	0.57
τ_i (694 nm)	\leq	0.16
τ_i (1060 nm)	\leq	0.02

Refractive index n		
λ [nm]	Element	n
404.7	Hg	1.54
587.6	He	1.53

Density	
ρ [g/cm ³]	2.74

Bubble content	
Bubble class	2

Chemical resistance	
FR class	0
SR class	5.1
AR class	3.0

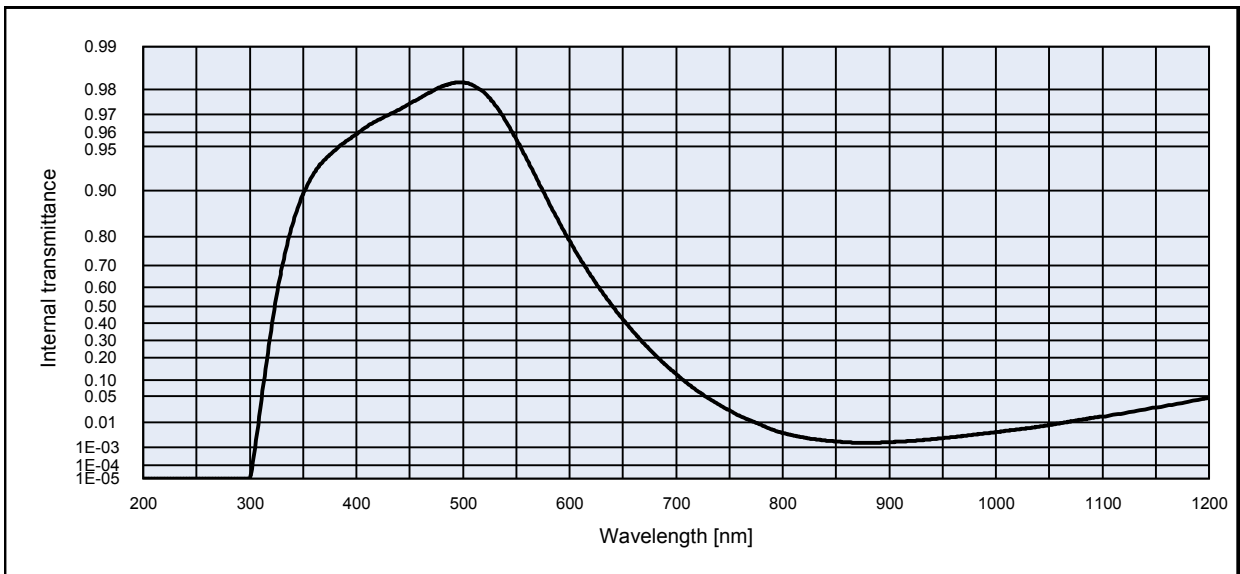
Transformation temperature	
T_g [°C]	313

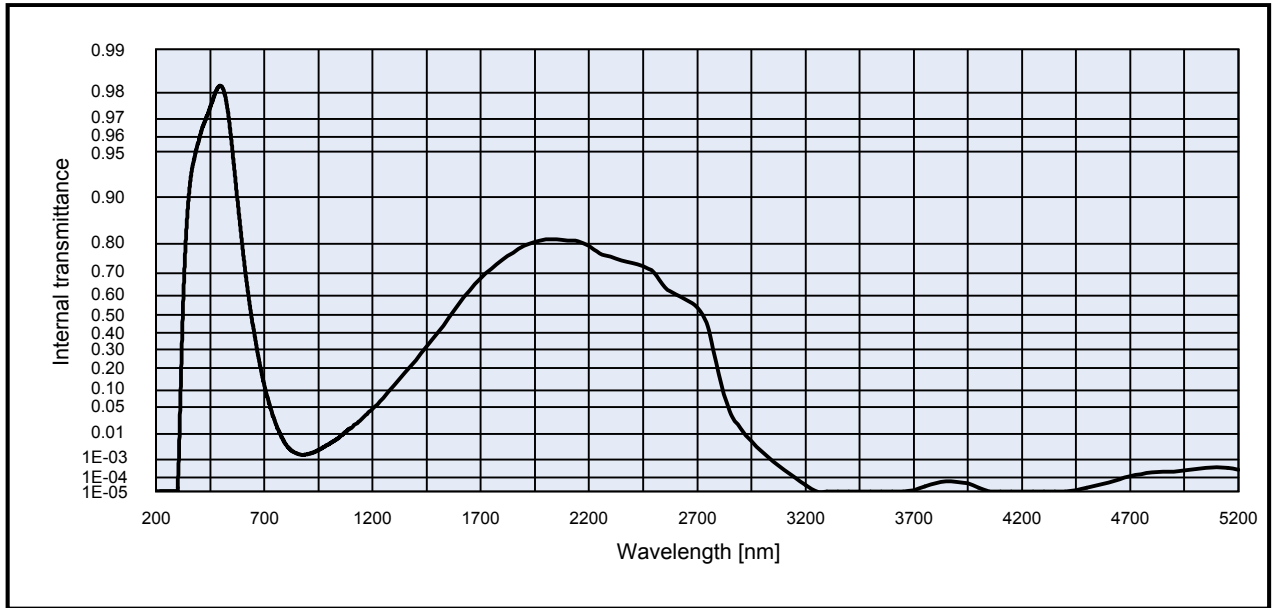
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	11.9
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	13.7

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Band pass filter / short pass filter
[!]
Long-term changes in the polished surface are possible under some circumstances
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)			
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]	1
x	0.406	0.374	0.348	x	0.383	0.352	0.327	x	0.283	0.262	0.246	
y	0.421	0.430	0.436	y	0.409	0.415	0.419	y	0.327	0.324	0.321	
Y	78	68	61	Y	79	70	63	Y	82	75	69	
λ_d [nm]	501	500	500	λ_d [nm]	499	498	498	λ_d [nm]	491	490	490	
P_e	0.09	0.17	0.23	P_e	0.10	0.17	0.23	P_e	0.11	0.19	0.25	





Internal transmittance τ_i at reference thickness d [mm] = 1
The internal transmittance values, tabulated and graphically represented, are reference values only

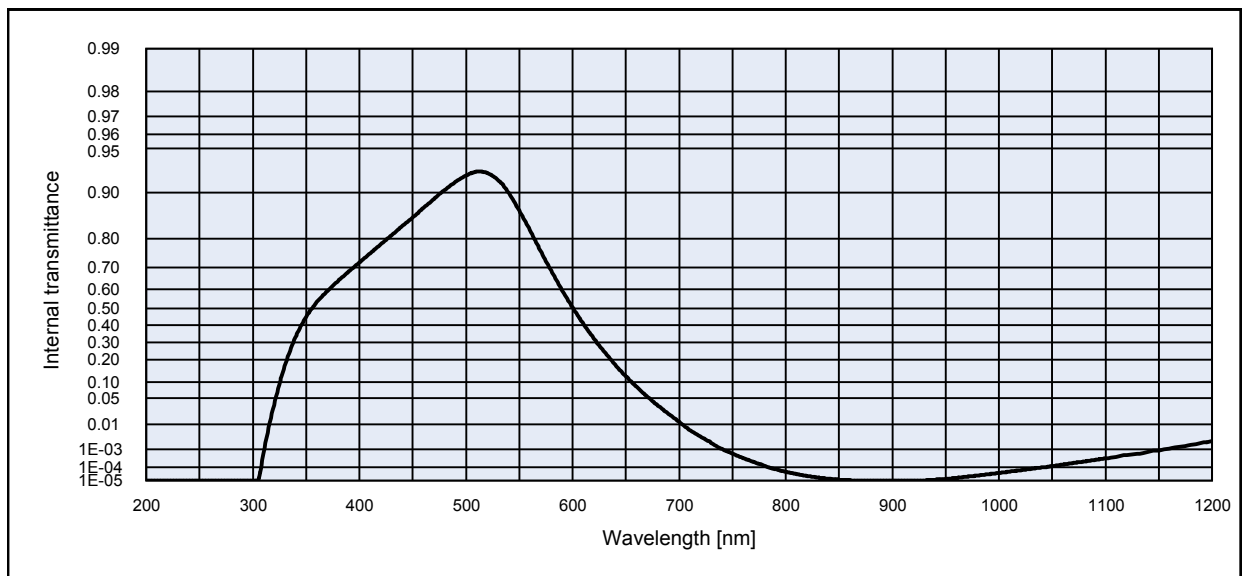
λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i
200	< 1.0E-05	500	9.8E-01	800	4.3E-03	1100	1.5E-02	2200	7.9E-01	3700	1.2E-05
210	< 1.0E-05	510	9.8E-01	810	3.4E-03	1110	1.7E-02	2250	7.7E-01	3750	2.5E-05
220	< 1.0E-05	520	9.8E-01	820	2.8E-03	1120	1.9E-02	2300	7.6E-01	3800	4.2E-05
230	< 1.0E-05	530	9.7E-01	830	2.3E-03	1130	2.1E-02	2350	7.5E-01	3850	5.4E-05
240	< 1.0E-05	540	9.7E-01	840	2.1E-03	1140	2.4E-02	2400	7.4E-01	3900	5.3E-05
250	< 1.0E-05	550	9.6E-01	850	1.9E-03	1150	2.7E-02	2450	7.3E-01	3950	4.3E-05
260	< 1.0E-05	560	9.4E-01	860	1.7E-03	1160	3.1E-02	2500	7.0E-01	4000	2.0E-05
270	< 1.0E-05	570	9.2E-01	870	1.6E-03	1170	3.3E-02	2550	6.4E-01	4050	< 1.0E-05
280	< 1.0E-05	580	8.8E-01	880	1.6E-03	1180	3.7E-02	2600	6.1E-01	4100	< 1.0E-05
290	< 1.0E-05	590	8.4E-01	890	1.7E-03	1190	4.1E-02	2650	5.8E-01	4150	< 1.0E-05
300	< 1.0E-05	600	7.9E-01	900	1.8E-03	1200	4.6E-02	2700	5.4E-01	4200	< 1.0E-05
310	2.6E-02	610	7.3E-01	910	1.8E-03	1250	7.5E-02	2750	4.4E-01	4250	< 1.0E-05
320	3.6E-01	620	6.6E-01	920	2.0E-03	1300	1.2E-01	2800	1.7E-01	4300	< 1.0E-05
330	6.9E-01	630	5.8E-01	930	2.1E-03	1350	1.8E-01	2850	4.2E-02	4350	< 1.0E-05
340	8.3E-01	640	5.0E-01	940	2.4E-03	1400	2.4E-01	2900	1.5E-02	4400	< 1.0E-05
350	8.9E-01	650	4.2E-01	950	2.6E-03	1450	3.2E-01	2950	5.8E-03	4450	1.3E-05
360	9.2E-01	660	3.5E-01	960	2.9E-03	1500	4.0E-01	3000	2.2E-03	4500	2.0E-05
370	9.4E-01	670	2.8E-01	970	3.2E-03	1550	4.8E-01	3050	8.1E-04	4550	3.0E-05
380	9.5E-01	680	2.2E-01	980	3.6E-03	1600	5.6E-01	3100	2.8E-04	4600	4.6E-05
390	9.5E-01	690	1.7E-01	990	4.1E-03	1650	6.3E-01	3150	9.8E-05	4650	7.4E-05
400	9.6E-01	700	1.2E-01	1000	4.5E-03	1700	6.8E-01	3200	3.0E-05	4700	1.2E-04
410	9.6E-01	710	8.9E-02	1010	5.1E-03	1750	7.2E-01	3250	1.0E-05	4750	1.6E-04
420	9.7E-01	720	6.4E-02	1020	5.7E-03	1800	7.5E-01	3300	< 1.0E-05	4800	2.0E-04
430	9.7E-01	730	4.6E-02	1030	6.4E-03	1850	7.7E-01	3350	< 1.0E-05	4850	2.3E-04
440	9.7E-01	740	3.2E-02	1040	7.1E-03	1900	7.9E-01	3400	< 1.0E-05	4900	2.3E-04
450	9.7E-01	750	2.3E-02	1050	8.2E-03	1950	8.0E-01	3450	< 1.0E-05	4950	2.6E-04
460	9.8E-01	760	1.6E-02	1060	9.4E-03	2000	8.1E-01	3500	< 1.0E-05	5000	3.1E-04
470	9.8E-01	770	1.1E-02	1070	1.1E-02	2050	8.1E-01	3550	< 1.0E-05	5050	3.8E-04
480	9.8E-01	780	8.3E-03	1080	1.2E-02	2100	8.1E-01	3600	< 1.0E-05	5100	4.0E-04
490	9.8E-01	790	5.7E-03	1090	1.4E-02	2150	8.1E-01	3650	< 1.0E-05	5150	3.8E-04

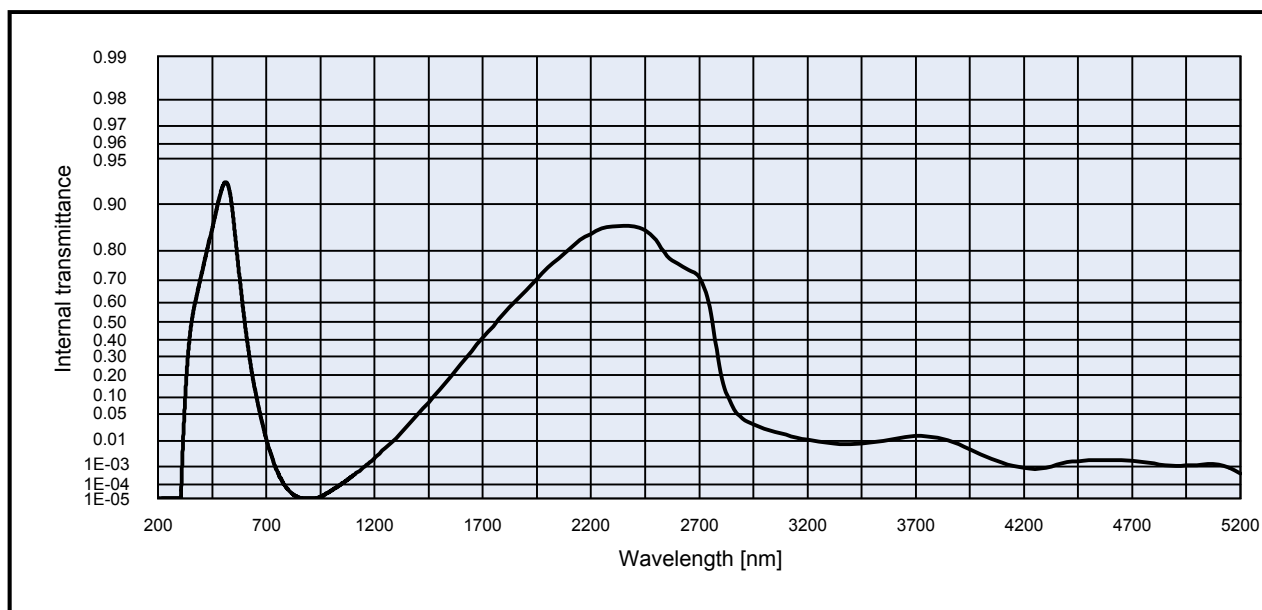
Data Sheet



BG42			Density		Notes Ionically colored glass Band pass filter / short pass filter All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".
ρ [g/cm ³]				2.69	
Reflection factor			Bubble content		
P_d	0.91		Bubble class	2	
Reference thickness			Chemical resistance		
d [mm]	1		FR class	0	
Spectral values guaranteed			SR class	2.0	
τ_i (350 nm)	\geq	0.40	AR class	2.0	
τ_i (405 nm)	\geq	0.65	Transformation temperature		
τ_i (514 nm)	\geq	0.88	T_g [°C]	475	
τ_i (633 nm)	\leq	0.27	Thermal expansion		
τ_i (694 nm)	\leq	0.03	$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	7.3	
τ_i (1060 nm)	\leq	0.002	$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	8.7	
Refractive index n			$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]		
λ [nm]	Element	n	Temperature coefficient		
405	Hg	1.55	T_k [nm/°C]		
588	He	1.54			

Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]
x	0.359	0.305	0.270	x	0.338	0.288	0.256	x	0.254	0.222	0.203
y	0.439	0.456	0.466	y	0.424	0.437	0.445	y	0.332	0.334	0.337
Y	61	47	38	Y	63	48	39	Y	68	55	46
λ_d [nm]	501	501	501	λ_d [nm]	499	499	499	λ_d [nm]	492	492	492
P _e	0.20	0.32	0.40	P _e	0.21	0.33	0.41	P _e	0.21	0.33	0.39





Internal transmittance τ_i at reference thickness d [mm] = 1
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	9.2E-01	800	4.7E-05	1100	3.3E-04	2200	8.4E-01	3700	1.4E-02
210	< 1.0E-05	510	9.3E-01	810	3.3E-05	1110	4.1E-04	2250	8.6E-01	3750	1.4E-02
220	< 1.0E-05	520	9.3E-01	820	2.3E-05	1120	5.0E-04	2300	8.6E-01	3800	1.2E-02
230	< 1.0E-05	530	9.2E-01	830	1.8E-05	1130	6.0E-04	2350	8.6E-01	3850	1.0E-02
240	< 1.0E-05	540	9.0E-01	840	1.4E-05	1140	7.7E-04	2400	8.6E-01	3900	8.0E-03
250	< 1.0E-05	550	8.7E-01	850	1.2E-05	1150	9.0E-04	2450	8.5E-01	3950	5.2E-03
260	< 1.0E-05	560	8.2E-01	860	1.1E-05	1160	1.1E-03	2500	8.3E-01	4000	3.3E-03
270	< 1.0E-05	570	7.6E-01	870	< 1.0E-05	1170	1.3E-03	2550	7.9E-01	4050	2.2E-03
280	< 1.0E-05	580	6.9E-01	880	< 1.0E-05	1180	1.6E-03	2600	7.6E-01	4100	1.5E-03
290	< 1.0E-05	590	6.0E-01	890	< 1.0E-05	1190	1.9E-03	2650	7.4E-01	4150	1.1E-03
300	< 1.0E-05	600	5.1E-01	900	< 1.0E-05	1200	2.3E-03	2700	7.1E-01	4200	8.4E-04
310	5.7E-04	610	4.1E-01	910	< 1.0E-05	1250	5.7E-03	2750	5.8E-01	4250	7.4E-04
320	3.5E-02	620	3.2E-01	920	< 1.0E-05	1300	1.2E-02	2800	2.1E-01	4300	8.4E-04
330	1.7E-01	630	2.4E-01	930	1.0E-05	1350	2.6E-02	2850	7.6E-02	4350	1.2E-03
340	3.3E-01	640	1.8E-01	940	1.2E-05	1400	5.0E-02	2900	4.0E-02	4400	1.5E-03
350	4.5E-01	650	1.2E-01	950	1.3E-05	1450	8.3E-02	2950	2.9E-02	4450	1.7E-03
360	5.3E-01	660	8.3E-02	960	1.6E-05	1500	1.3E-01	3000	2.3E-02	4500	1.9E-03
370	5.9E-01	670	5.4E-02	970	2.0E-05	1550	1.9E-01	3050	1.9E-02	4550	2.0E-03
380	6.4E-01	680	3.4E-02	980	2.5E-05	1600	2.6E-01	3100	1.5E-02	4600	2.0E-03
390	6.8E-01	690	2.1E-02	990	3.2E-05	1650	3.3E-01	3150	1.3E-02	4650	1.9E-03
400	7.2E-01	700	1.2E-02	1000	3.9E-05	1700	4.1E-01	3200	1.1E-02	4700	1.8E-03
410	7.5E-01	710	6.5E-03	1010	4.8E-05	1750	4.8E-01	3250	9.5E-03	4750	1.6E-03
420	7.8E-01	720	3.7E-03	1020	6.0E-05	1800	5.5E-01	3300	8.7E-03	4800	1.4E-03
430	8.1E-01	730	2.0E-03	1030	7.4E-05	1850	6.1E-01	3350	8.1E-03	4850	1.2E-03
440	8.3E-01	740	1.0E-03	1040	9.2E-05	1900	6.6E-01	3400	8.0E-03	4900	1.1E-03
450	8.5E-01	750	6.1E-04	1050	1.2E-04	1950	7.0E-01	3450	8.3E-03	4950	1.1E-03
460	8.7E-01	760	3.5E-04	1060	1.4E-04	2000	7.5E-01	3500	9.0E-03	5000	1.2E-03
470	8.9E-01	770	2.1E-04	1070	1.8E-04	2050	7.8E-01	3550	1.0E-02	5050	1.3E-03
480	9.0E-01	780	1.2E-04	1080	2.2E-04	2100	8.0E-01	3600	1.2E-02	5100	1.2E-03
490	9.2E-01	790	7.2E-05	1090	2.7E-04	2150	8.3E-01	3650	1.3E-02	5150	8.6E-04

BG55

Reflection factor	
P_d	0.913

Reference thickness	
d [mm]	1

Spectral values guaranteed	
τ_i (405 nm) \geq	0,76
τ_i (514 nm) \geq	0,93
τ_i (633 nm) \geq	0,18
τ_i (694 nm) \leq	0,016
τ_i (1060 nm) \leq	0.0005

Refractive index n		
λ [nm]	Element	n
588.6	He	1.54

Density	
ρ [g/cm ³]	2.64

Bubble content	
Bubble class	2

Chemical resistance	
FR class	0
SR class	2.0
AR class	2.0

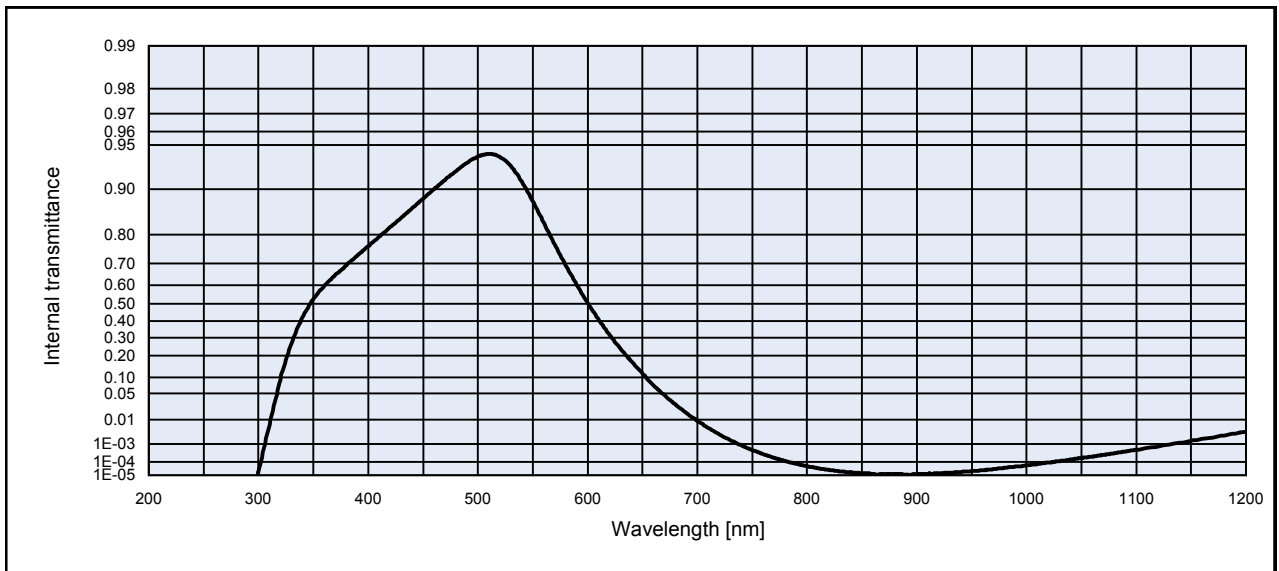
Transformation temperature	
T _g [°C]	453

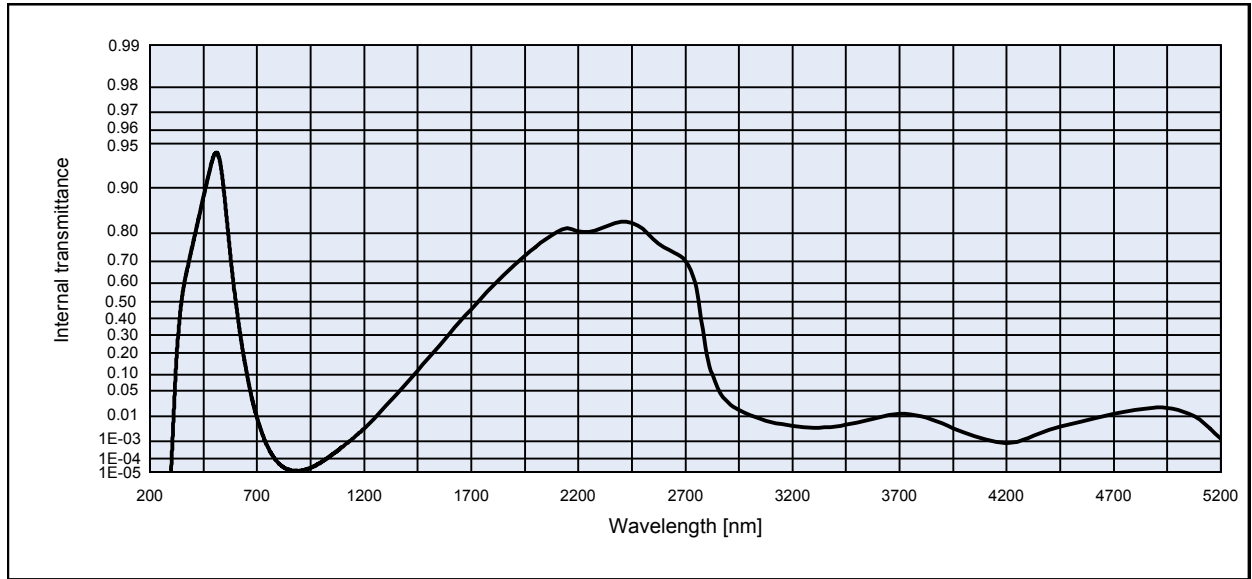
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	7.2
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9.1
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	-

Temperature coefficient	
T _k [nm/°C]	

Notes
Ionically colored glass
Band pass filter / short pass filter
Color compensating filter / IR cut filter
[!]
protective coatings recommended
Long-term changes in the polished surface are possible
CR (ISO/WD 13384) = 1
Knoop hardness HK (0.1/20) = 504
cp = 0,83 J/gK
All data without tolerances are to be understood to be reference values.
Guaranteed values are only those values listed in the section
-Spectral values guaranteed-

Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)			
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]	1
x	0.356	0.302	0.267	x	0.336	0.285	0.252	x	0.252	0.220	0.201	
y	0.438	0.452	0.460	y	0.423	0.432	0.437	y	0.329	0.328	0.328	
Y	62	48	39	Y	63	49	41	Y	69	57	48	
λ_d [nm]	501	500	500	λ_d [nm]	499	498	498	λ_d [nm]	492	491	491	
P _e	0.21	0.33	0.41	P _e	0.21	0.34	0.42	P _e	0.22	0.34	0.41	





Internal transmittance τ_i at reference thickness $d = 1$ mm
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	9.4E-01	800	4.9E-05	1100	5.1E-04	2200	8.0E-01	3700	1.2E-02
210	< 1.0E-05	510	9.4E-01	810	3.5E-05	1110	6.3E-04	2250	8.0E-01	3750	1.1E-02
220	< 1.0E-05	520	9.4E-01	820	2.7E-05	1120	7.6E-04	2300	8.1E-01	3800	9.9E-03
230	< 1.0E-05	530	9.3E-01	830	2.1E-05	1130	9.4E-04	2350	8.2E-01	3850	8.1E-03
240	< 1.0E-05	540	9.1E-01	840	1.7E-05	1140	1.2E-03	2400	8.3E-01	3900	5.6E-03
250	< 1.0E-05	550	8.8E-01	850	1.5E-05	1150	1.4E-03	2450	8.3E-01	3950	3.7E-03
260	< 1.0E-05	560	8.3E-01	860	1.2E-05	1160	1.7E-03	2500	8.1E-01	4000	2.6E-03
270	< 1.0E-05	570	7.7E-01	870	1.2E-05	1170	2.1E-03	2550	7.8E-01	4050	1.7E-03
280	< 1.0E-05	580	6.9E-01	880	1.2E-05	1180	2.5E-03	2600	7.5E-01	4100	1.2E-03
290	< 1.0E-05	590	6.0E-01	890	1.2E-05	1190	3.0E-03	2650	7.3E-01	4150	9.3E-04
300	1.9E-05	600	5.1E-01	900	1.2E-05	1200	3.7E-03	2700	7.0E-01	4200	7.9E-04
310	6.7E-03	610	4.1E-01	910	1.3E-05	1250	8.7E-03	2750	5.9E-01	4250	8.8E-04
320	9.2E-02	620	3.2E-01	920	1.4E-05	1300	2.1E-02	2800	1.9E-01	4300	1.3E-03
330	2.6E-01	630	2.4E-01	930	1.5E-05	1350	4.0E-02	2850	5.6E-02	4350	2.2E-03
340	4.2E-01	640	1.7E-01	940	1.8E-05	1400	7.2E-02	2900	2.6E-02	4400	3.2E-03
350	5.3E-01	650	1.1E-01	950	2.2E-05	1450	1.1E-01	2950	1.6E-02	4450	4.3E-03
360	6.0E-01	660	7.2E-02	960	2.5E-05	1500	1.7E-01	3000	1.1E-02	4500	5.5E-03
370	6.5E-01	670	4.5E-02	970	3.0E-05	1550	2.4E-01	3050	8.4E-03	4550	6.8E-03
380	6.9E-01	680	2.7E-02	980	3.8E-05	1600	3.1E-01	3100	6.5E-03	4600	8.5E-03
390	7.3E-01	690	1.6E-02	990	4.6E-05	1650	3.8E-01	3150	5.3E-03	4650	1.0E-02
400	7.6E-01	700	9.0E-03	1000	5.6E-05	1700	4.6E-01	3200	4.5E-03	4700	1.2E-02
410	7.9E-01	710	5.1E-03	1010	7.0E-05	1750	5.2E-01	3250	4.1E-03	4750	1.4E-02
420	8.2E-01	720	2.8E-03	1020	8.8E-05	1800	5.8E-01	3300	4.0E-03	4800	1.6E-02
430	8.4E-01	730	1.6E-03	1030	1.1E-04	1850	6.4E-01	3350	4.1E-03	4850	1.8E-02
440	8.7E-01	740	8.8E-04	1040	1.4E-04	1900	6.8E-01	3400	4.5E-03	4900	1.9E-02
450	8.8E-01	750	5.0E-04	1050	1.7E-04	1950	7.2E-01	3450	5.0E-03	4950	1.9E-02
460	9.0E-01	760	2.9E-04	1060	2.1E-04	2000	7.5E-01	3500	6.0E-03	5000	1.6E-02
470	9.1E-01	770	1.8E-04	1070	2.7E-04	2050	7.8E-01	3550	7.4E-03	5050	1.2E-02
480	9.2E-01	780	1.1E-04	1080	3.3E-04	2100	8.0E-01	3600	9.1E-03	5100	7.9E-03
490	9.3E-01	790	7.2E-05	1090	4.1E-04	2150	8.1E-01	3650	1.1E-02	5150	3.8E-03

S-8022

Reflection factor	
P _d	0,91

Reference thickness	
d [mm]	2

Values guaranteed	
The color of the 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 1500 K to 3200 K	
Black body radiator	Photopic Transmittance [%]
2100 K	13.5 ± 1.5
1500 K	9.0 ± 1.5

Refractive index n		
λ [nm]	Element	n
587,6	He	1,555
		± 0,005

Density	
ρ [g/cm ³]	2,77

Bubble content	
Bubble class	1

Chemical resistance	
FR class	0
SR class	4.0
AR class	3.0

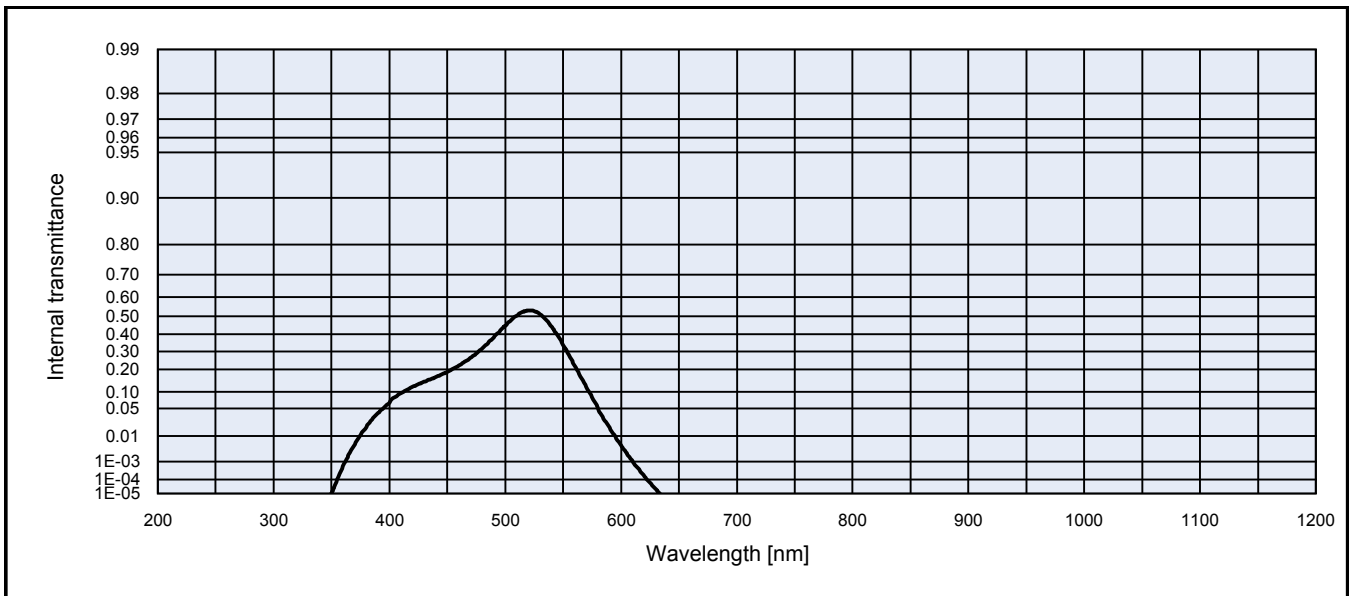
Transformation temperature	
T _g [°C]	453

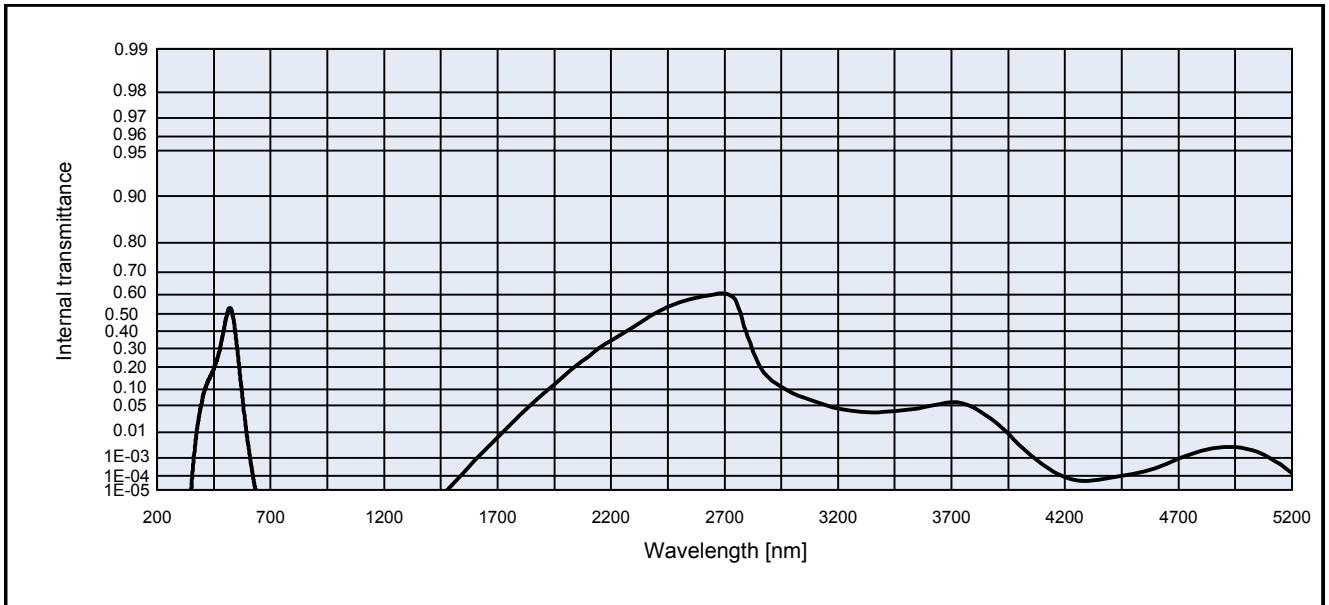
Thermal expansion	
α _{30/+70°C} [10 ⁻⁶ /K]	7,8
α _{20/300°C} [10 ⁻⁶ /K]	8,9
α _{20/200°C} [10 ⁻⁶ /K]	

Temperature coefficient	
T _k [nm/°C]	

Notes	
Ionically colored glass	
Band pass filter / short pass filter	
NVIS-Green A - 2 mm Band Pass Filter according to MIL-STD-3009	
passed thermal shock test as per MIL-STD-202F method 107F, Condition A	
[!]	
protective coatings recommended	
Long-term changes in the polished surface are possible	
All data without tolerances are to be understood to be reference values.	
Guaranteed values are only those values listed in the section	
-Spectral values guaranteed-	

Colorimetric evaluation											
Illuminant A (Planck T = 2856 K)				Illuminant Planck T = 3200 K				Illuminant D65 (T _c = 6504 K)			
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3
x	0,253	0,203	0,178	x	0,241	0,196	0,173	x	0,196	0,169	0,154
y	0,498	0,549	0,593	y	0,478	0,530	0,577	y	0,374	0,432	0,492
Y	30	16	9	Y	31	16	10	Y	37	21	12
λ _d [nm]	503	505	508	λ _d [nm]	502	504	507	λ _d [nm]	496	500	505
P _e	0,44	0,55	0,61	P _e	0,44	0,54	0,60	P _e	0,40	0,47	0,51

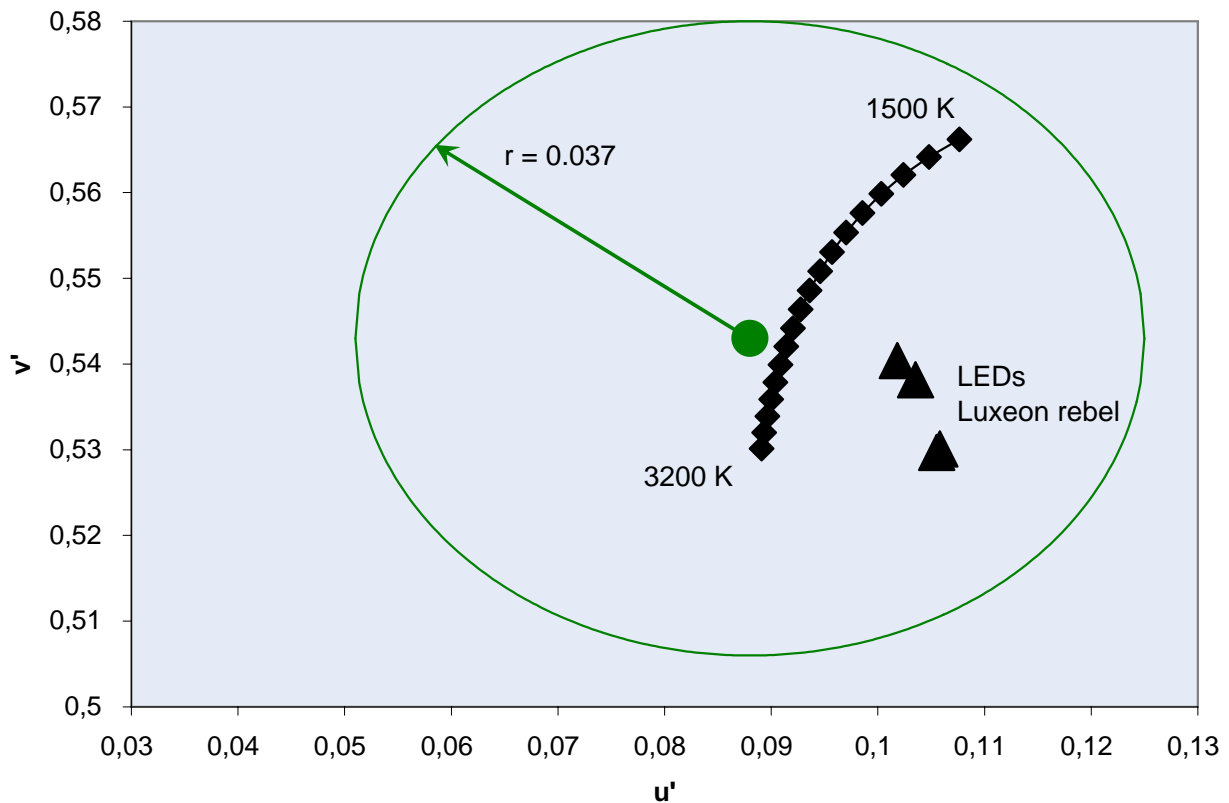




Internal transmittance τ_i at reference thickness $d = 2$ mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	4,5E-01	800	< 1,0E-05	1100	< 1,0E-05	2200	3,5E-01	3700	5,8E-02
210	< 1,0E-05	510	5,0E-01	810	< 1,0E-05	1110	< 1,0E-05	2250	3,9E-01	3750	5,5E-02
220	< 1,0E-05	520	5,3E-01	820	< 1,0E-05	1120	< 1,0E-05	2300	4,3E-01	3800	4,4E-02
230	< 1,0E-05	530	5,1E-01	830	< 1,0E-05	1130	< 1,0E-05	2350	4,7E-01	3850	3,1E-02
240	< 1,0E-05	540	4,4E-01	840	< 1,0E-05	1140	< 1,0E-05	2400	5,1E-01	3900	1,9E-02
250	< 1,0E-05	550	3,4E-01	850	< 1,0E-05	1150	< 1,0E-05	2450	5,4E-01	3950	9,3E-03
260	< 1,0E-05	560	2,2E-01	860	< 1,0E-05	1160	< 1,0E-05	2500	5,6E-01	4000	3,7E-03
270	< 1,0E-05	570	1,2E-01	870	< 1,0E-05	1170	< 1,0E-05	2550	5,8E-01	4050	1,3E-03
280	< 1,0E-05	580	5,3E-02	880	< 1,0E-05	1180	< 1,0E-05	2600	5,9E-01	4100	4,6E-04
290	< 1,0E-05	590	1,7E-02	890	< 1,0E-05	1190	< 1,0E-05	2650	6,0E-01	4150	1,8E-04
300	< 1,0E-05	600	4,7E-03	900	< 1,0E-05	1200	< 1,0E-05	2700	6,1E-01	4200	8,4E-05
310	< 1,0E-05	610	9,9E-04	910	< 1,0E-05	1250	< 1,0E-05	2750	5,7E-01	4250	5,4E-05
320	< 1,0E-05	620	1,6E-04	920	< 1,0E-05	1300	< 1,0E-05	2800	3,7E-01	4300	4,8E-05
330	< 1,0E-05	630	2,1E-05	930	< 1,0E-05	1350	< 1,0E-05	2850	2,1E-01	4350	5,8E-05
340	< 1,0E-05	640	< 1,0E-05	940	< 1,0E-05	1400	< 1,0E-05	2900	1,4E-01	4400	7,8E-05
350	< 1,0E-05	650	< 1,0E-05	950	< 1,0E-05	1450	< 1,0E-05	2950	1,1E-01	4450	1,0E-04
360	5,7E-04	660	< 1,0E-05	960	< 1,0E-05	1500	2,4E-05	3000	8,6E-02	4500	1,4E-04
370	5,2E-03	670	< 1,0E-05	970	< 1,0E-05	1550	1,6E-04	3050	7,1E-02	4550	2,0E-04
380	1,8E-02	680	< 1,0E-05	980	< 1,0E-05	1600	7,4E-04	3100	5,9E-02	4600	3,0E-04
390	4,0E-02	690	< 1,0E-05	990	< 1,0E-05	1650	2,5E-03	3150	5,0E-02	4650	5,2E-04
400	6,5E-02	700	< 1,0E-05	1000	< 1,0E-05	1700	6,9E-03	3200	4,4E-02	4700	9,0E-04
410	9,6E-02	710	< 1,0E-05	1010	< 1,0E-05	1750	1,6E-02	3250	3,9E-02	4750	1,4E-03
420	1,2E-01	720	< 1,0E-05	1020	< 1,0E-05	1800	3,1E-02	3300	3,7E-02	4800	2,0E-03
430	1,4E-01	730	< 1,0E-05	1030	< 1,0E-05	1850	5,3E-02	3350	3,6E-02	4850	2,6E-03
440	1,6E-01	740	< 1,0E-05	1040	< 1,0E-05	1900	8,3E-02	3400	3,6E-02	4900	3,0E-03
450	1,9E-01	750	< 1,0E-05	1050	< 1,0E-05	1950	1,2E-01	3450	3,7E-02	4950	3,0E-03
460	2,2E-01	760	< 1,0E-05	1060	< 1,0E-05	2000	1,6E-01	3500	4,0E-02	5000	2,5E-03
470	2,6E-01	770	< 1,0E-05	1070	< 1,0E-05	2050	2,1E-01	3550	4,4E-02	5050	1,8E-03
480	3,2E-01	780	< 1,0E-05	1080	< 1,0E-05	2100	2,5E-01	3600	4,9E-02	5100	1,0E-03
490	3,8E-01	790	< 1,0E-05	1090	< 1,0E-05	2150	3,0E-01	3650	5,4E-02	5150	4,6E-04

Chromaticity dependence on Incandescent Color Temperature



Chromaticity and NVIS Radiance at thickness $d = 2 \text{ mm}$

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

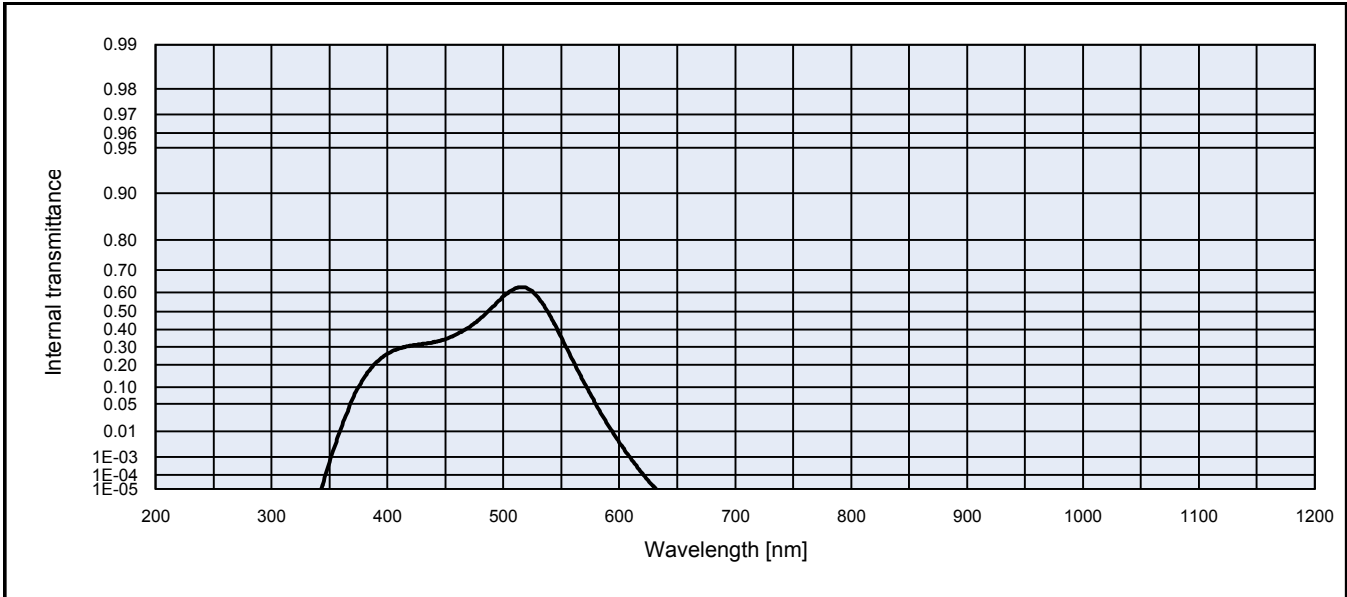
NVIS Green A
Chromaticity coordinates
(as defined by MIL-STD-3009)
 $u' = 0.088$
 $v' = 0.543$
with radius of tolerance $r = 0.037$

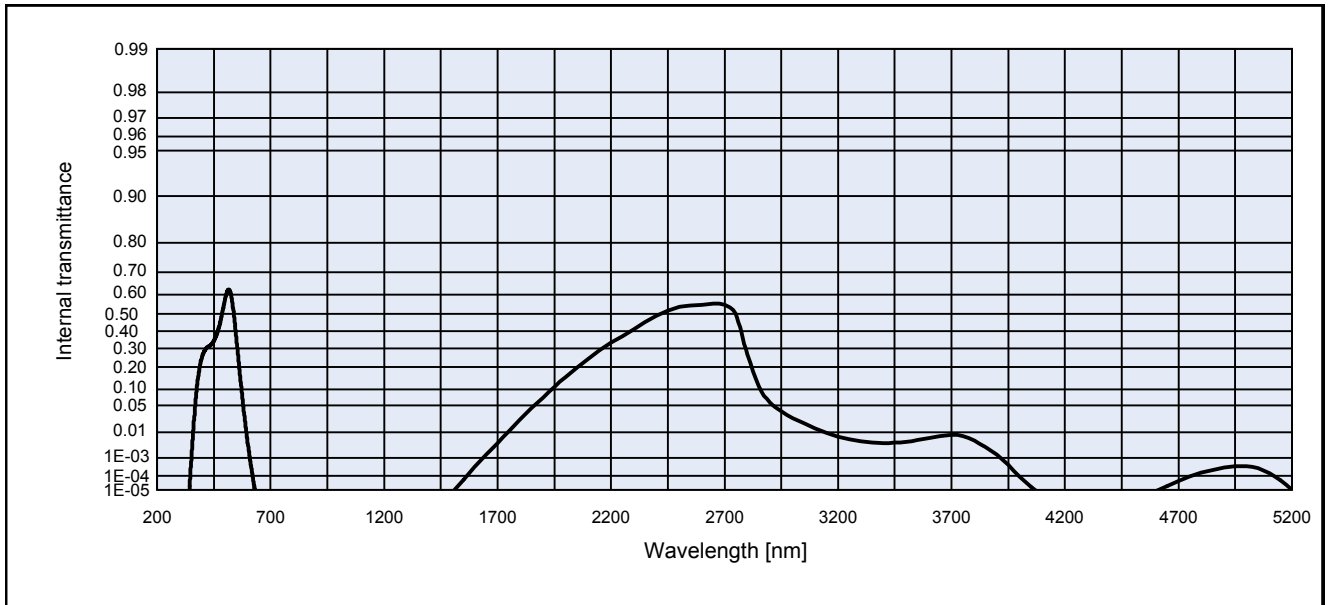
other sources of illumination A service for calculating chromaticity or NVIS radiance can be provided

S-8023			Density		ρ [g/cm ³]		2,75		
Reflection factor			Bubble content		Bubble class		1		
P _d			0,913		Chemical resistance		FR class		
Reference thickness			d [mm]		3		SR class		
Values guaranteed			The color of the 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		AR class		
for any black body radiator 1500 K to 3200 K			Transformation temperature		T _g [°C]		(444)		
Black body radiator		Photopic Transmittance [%]		Thermal expansion		α _{30/+70°C} [10 ⁻⁶ /K]			
2100 K		15.0 ± 1.5		α _{20/300°C} [10 ⁻⁶ /K]					
1500 K		10.0 ± 1.5		α _{20/200°C} [10 ⁻⁶ /K]		9,7			
Refractive index n			Temperature coefficient		T _k [nm/°C]				
λ [nm]		Element		n		587,6		He	
								± 0,005	

Notes
Ionically colored glass
Band pass filter / short pass filter
NVIS-Green A - 2 mm Band Pass Filter according to MIL-STD-3009
passed thermal shock test as per MIL-STD-202F method 107F, Condition A
[!]
protective coatings recommended
Long-term changes in the polished surface are possible
All data without tolerances are to be understood to be reference values.
Guaranteed values are only those values listed in the section -Spectral values guaranteed-.

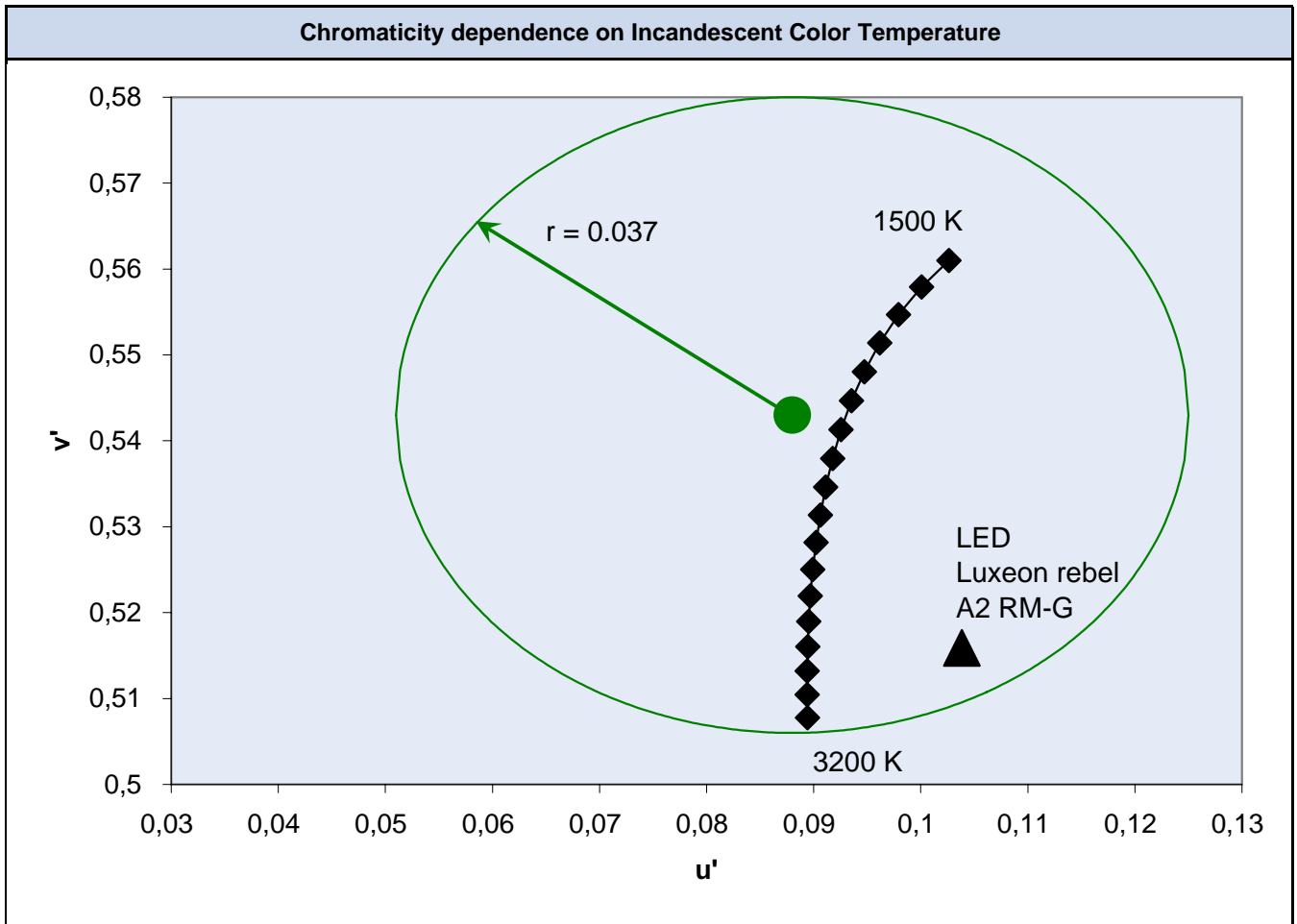
Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)			
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]	1
x	0,277	0,218	0,189	x	0,262	0,209	0,182	x	0,206	0,176	0,160	
y	0,459	0,474	0,486	y	0,437	0,449	0,460	y	0,328	0,334	0,346	
Y	41	27	19	Y	43	28	21	Y	51	35	26	
λ _d [nm]	500	500	500	λ _d [nm]	498	498	499	λ _d [nm]	491	492	493	
P _e	0,39	0,52	0,59	P _e	0,39	0,52	0,59	P _e	0,39	0,50	0,54	





Internal transmittance τ_i at reference thickness $d = 3$ mm
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	5,8E-01	800	< 1,0E-05	1100	< 1,0E-05	2200	3,3E-01	3700	8,5E-03
210	< 1,0E-05	510	6,2E-01	810	< 1,0E-05	1110	< 1,0E-05	2250	3,7E-01	3750	7,8E-03
220	< 1,0E-05	520	6,2E-01	820	< 1,0E-05	1120	< 1,0E-05	2300	4,1E-01	3800	5,4E-03
230	< 1,0E-05	530	5,8E-01	830	< 1,0E-05	1130	< 1,0E-05	2350	4,5E-01	3850	3,0E-03
240	< 1,0E-05	540	4,8E-01	840	< 1,0E-05	1140	< 1,0E-05	2400	4,9E-01	3900	1,4E-03
250	< 1,0E-05	550	3,5E-01	850	< 1,0E-05	1150	< 1,0E-05	2450	5,2E-01	3950	4,3E-04
260	< 1,0E-05	560	2,2E-01	860	< 1,0E-05	1160	< 1,0E-05	2500	5,4E-01	4000	9,2E-05
270	< 1,0E-05	570	1,2E-01	870	< 1,0E-05	1170	< 1,0E-05	2550	5,5E-01	4050	1,8E-05
280	< 1,0E-05	580	4,9E-02	880	< 1,0E-05	1180	< 1,0E-05	2600	5,5E-01	4100	< 1,0E-05
290	< 1,0E-05	590	1,6E-02	890	< 1,0E-05	1190	< 1,0E-05	2650	5,5E-01	4150	< 1,0E-05
300	< 1,0E-05	600	4,1E-03	900	< 1,0E-05	1200	< 1,0E-05	2700	5,5E-01	4200	< 1,0E-05
310	< 1,0E-05	610	8,1E-04	910	< 1,0E-05	1250	< 1,0E-05	2750	5,0E-01	4250	< 1,0E-05
320	< 1,0E-05	620	1,2E-04	920	< 1,0E-05	1300	< 1,0E-05	2800	2,7E-01	4300	< 1,0E-05
330	< 1,0E-05	630	1,4E-05	930	< 1,0E-05	1350	< 1,0E-05	2850	1,1E-01	4350	< 1,0E-05
340	< 1,0E-05	640	< 1,0E-05	940	< 1,0E-05	1400	< 1,0E-05	2900	5,9E-02	4400	< 1,0E-05
350	5,3E-04	650	< 1,0E-05	950	< 1,0E-05	1450	< 1,0E-05	2950	3,7E-02	4450	< 1,0E-05
360	1,2E-02	660	< 1,0E-05	960	< 1,0E-05	1500	< 1,0E-05	3000	2,6E-02	4500	< 1,0E-05
370	6,4E-02	670	< 1,0E-05	970	< 1,0E-05	1550	5,8E-05	3050	1,8E-02	4550	< 1,0E-05
380	1,4E-01	680	< 1,0E-05	980	< 1,0E-05	1600	3,3E-04	3100	1,3E-02	4600	< 1,0E-05
390	2,1E-01	690	< 1,0E-05	990	< 1,0E-05	1650	1,4E-03	3150	9,6E-03	4650	1,9E-05
400	2,6E-01	700	< 1,0E-05	1000	< 1,0E-05	1700	4,4E-03	3200	7,3E-03	4700	4,7E-05
410	2,9E-01	710	< 1,0E-05	1010	< 1,0E-05	1750	1,1E-02	3250	5,8E-03	4750	9,5E-05
420	3,0E-01	720	< 1,0E-05	1020	< 1,0E-05	1800	2,4E-02	3300	4,9E-03	4800	1,6E-04
430	3,1E-01	730	< 1,0E-05	1030	< 1,0E-05	1850	4,4E-02	3350	4,5E-03	4850	2,4E-04
440	3,2E-01	740	< 1,0E-05	1040	< 1,0E-05	1900	7,2E-02	3400	4,3E-03	4900	3,3E-04
450	3,4E-01	750	< 1,0E-05	1050	< 1,0E-05	1950	1,1E-01	3450	4,4E-03	4950	3,9E-04
460	3,7E-01	760	< 1,0E-05	1060	< 1,0E-05	2000	1,5E-01	3500	4,7E-03	5000	3,8E-04
470	4,1E-01	770	< 1,0E-05	1070	< 1,0E-05	2050	1,9E-01	3550	5,4E-03	5050	2,8E-04
480	4,6E-01	780	< 1,0E-05	1080	< 1,0E-05	2100	2,4E-01	3600	6,4E-03	5100	1,5E-04
490	5,2E-01	790	< 1,0E-05	1090	< 1,0E-05	2150	2,9E-01	3650	7,7E-03	5150	5,3E-05



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

NVIS Green A

Chromaticity coordinates
(as defined by MIL-STD-3009)

$u' = 0.088$
 $v' = 0.543$

with radius of tolerance $r = 0.037$

S-8612

Reflection factor	
P_d	0,913

Reference thickness	
d [mm]	1

Spectral values guaranteed	
λ ($\tau_i = \tau_{i,max}$) [nm] =	500 ± 5
$\tau_{i, max}$ ≥	0,96
τ_i (600 nm) ≥	0,48
τ_i (700 nm) <	0,02

Refractive index n		
λ [nm]	Element	n
587,6	He	1,54

Density	
ρ [g/cm ³]	2,68

Bubble content	
Bubble class	1

Chemical resistance	
FR class	0
SR class	3.0
AR class	3.0

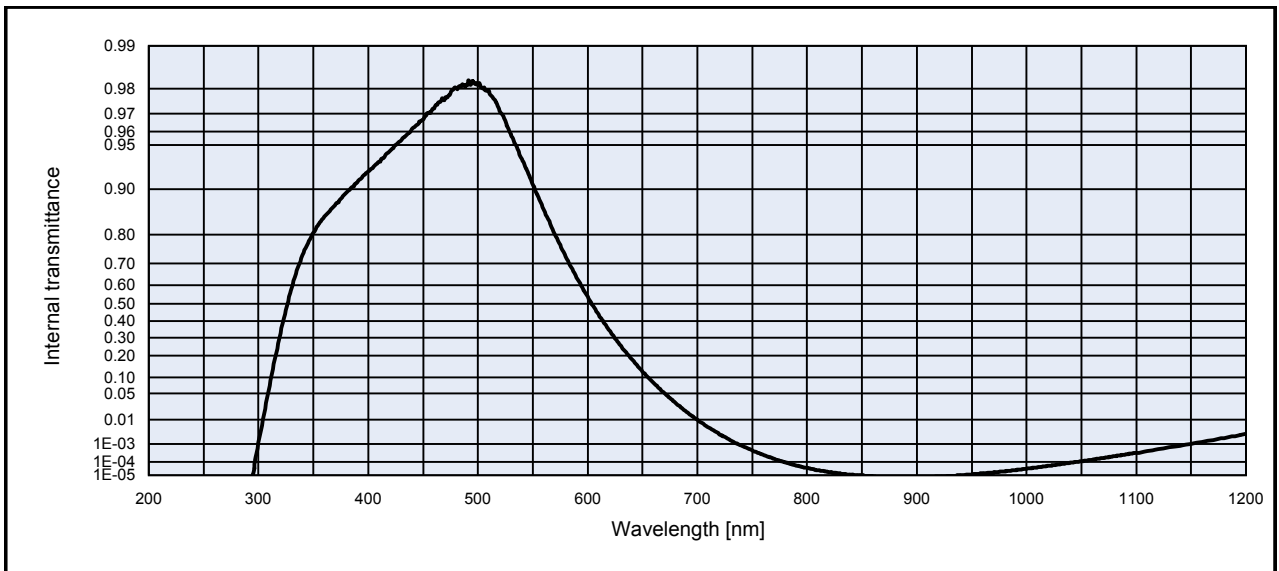
Transformation temperature	
T _g [°C]	404

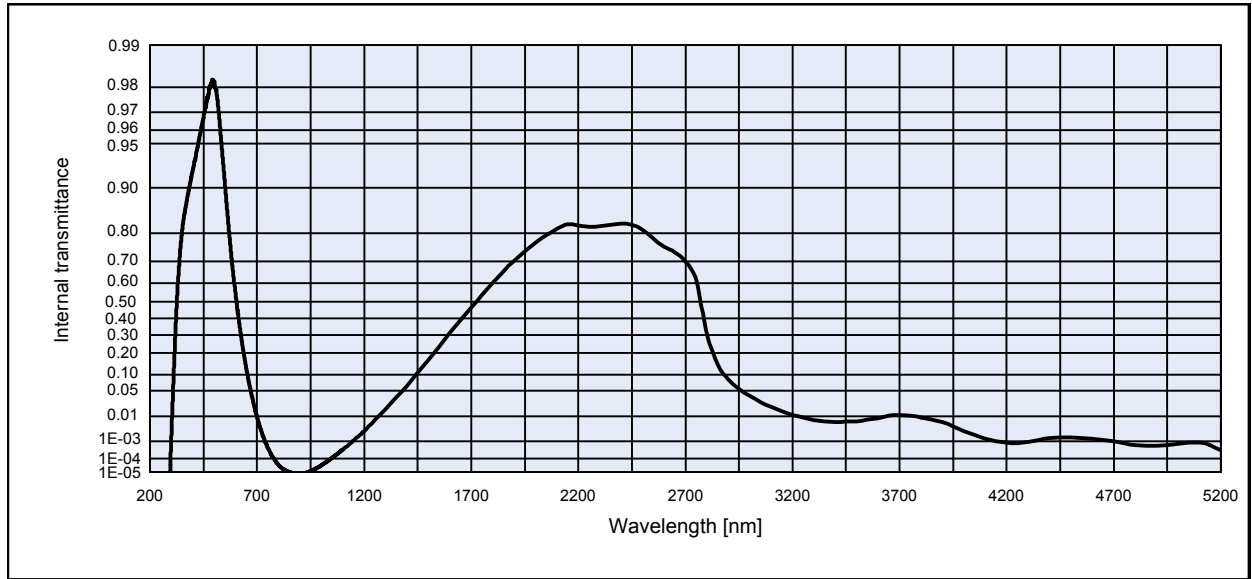
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9,5
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T _k [nm/°C]	

Notes	
Ionically colored glass	
Band pass filter / short pass filter	
Color compensating filter / IR cut filter	
[!!]	
protective coatings recommended	
Long-term changes in the polished surface are possible	
All data without tolerances are to be understood to be reference values.	
Guaranteed values are only those values listed in the section	
-Spectral values guaranteed-	

Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]
x	0,356	0,301	0,265	x	0,335	0,284	0,250	x	0,251	0,218	0,198
y	0,433	0,440	0,440	y	0,417	0,419	0,415	y	0,321	0,311	0,302
Y	65	52	44	Y	66	54	46	Y	72	62	54
λ_d [nm]	500	499	498	λ_d [nm]	498	497	496	λ_d [nm]	490	489	489
P _e	0,21	0,34	0,42	P _e	0,21	0,34	0,43	P _e	0,23	0,36	0,44



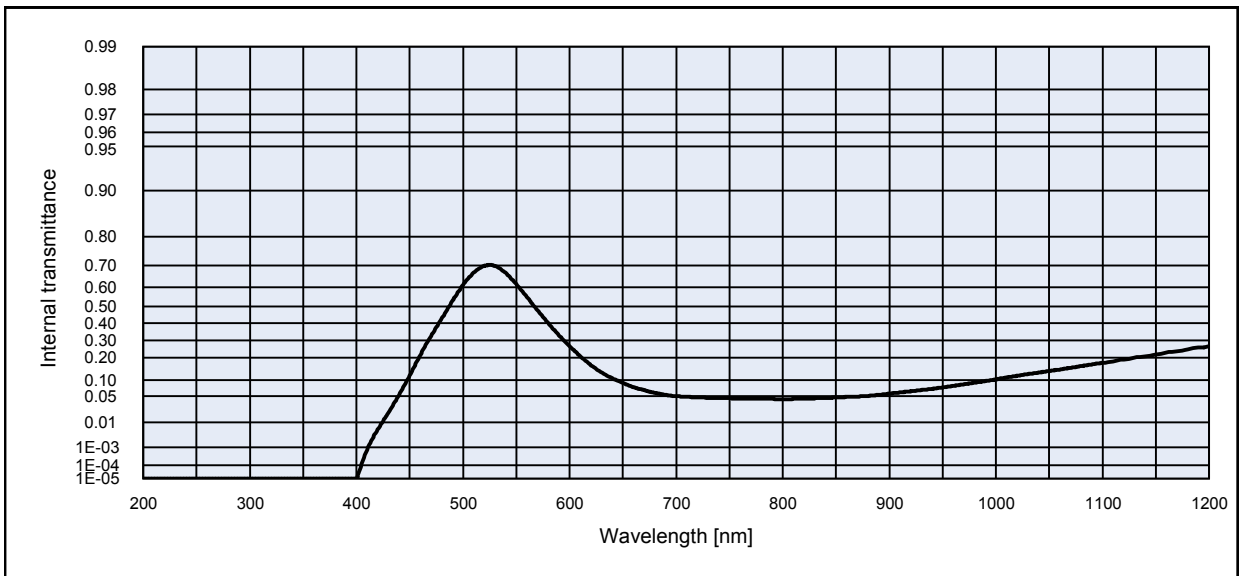


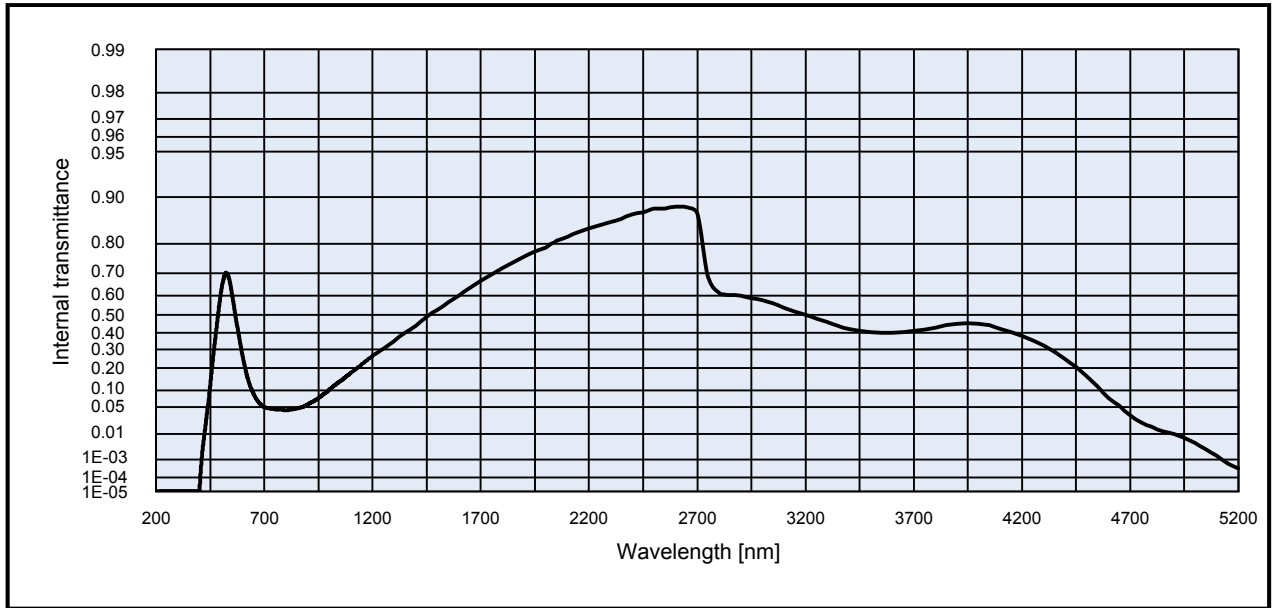
Internal transmittance τ_i at reference thickness $d = 1$ mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	9,8E-01	800	3,7E-05	1100	3,5E-04	2200	8,2E-01	3700	1,1E-02
210	< 1,0E-05	510	9,8E-01	810	2,5E-05	1110	4,4E-04	2250	8,2E-01	3750	1,0E-02
220	< 1,0E-05	520	9,7E-01	820	1,8E-05	1120	5,5E-04	2300	8,2E-01	3800	9,1E-03
230	< 1,0E-05	530	9,6E-01	830	1,4E-05	1130	6,9E-04	2350	8,2E-01	3850	7,9E-03
240	< 1,0E-05	540	9,4E-01	840	1,1E-05	1140	8,5E-04	2400	8,3E-01	3900	6,3E-03
250	< 1,0E-05	550	9,1E-01	850	< 1,0E-05	1150	1,1E-03	2450	8,2E-01	3950	4,3E-03
260	< 1,0E-05	560	8,6E-01	860	< 1,0E-05	1160	1,3E-03	2500	8,1E-01	4000	2,9E-03
270	< 1,0E-05	570	8,0E-01	870	< 1,0E-05	1170	1,6E-03	2550	7,8E-01	4050	1,9E-03
280	< 1,0E-05	580	7,3E-01	880	< 1,0E-05	1180	1,9E-03	2600	7,6E-01	4100	1,3E-03
290	< 1,0E-05	590	6,4E-01	890	< 1,0E-05	1190	2,4E-03	2650	7,4E-01	4150	9,9E-04
300	1,2E-03	600	5,4E-01	900	< 1,0E-05	1200	2,9E-03	2700	7,0E-01	4200	8,2E-04
310	7,0E-02	610	4,4E-01	910	< 1,0E-05	1250	7,4E-03	2750	6,2E-01	4250	8,1E-04
320	3,3E-01	620	3,4E-01	920	< 1,0E-05	1300	1,7E-02	2800	3,1E-01	4300	8,9E-04
330	5,8E-01	630	2,5E-01	930	< 1,0E-05	1350	3,5E-02	2850	1,4E-01	4350	1,1E-03
340	7,3E-01	640	1,8E-01	940	< 1,0E-05	1400	6,3E-02	2900	8,2E-02	4400	1,4E-03
350	8,1E-01	650	1,2E-01	950	1,2E-05	1450	1,1E-01	2950	5,3E-02	4450	1,5E-03
360	8,5E-01	660	8,0E-02	960	1,4E-05	1500	1,6E-01	3000	3,7E-02	4500	1,5E-03
370	8,7E-01	670	5,0E-02	970	1,7E-05	1550	2,3E-01	3050	2,7E-02	4550	1,4E-03
380	8,9E-01	680	3,0E-02	980	2,1E-05	1600	3,1E-01	3100	1,9E-02	4600	1,3E-03
390	9,1E-01	690	1,7E-02	990	2,6E-05	1650	3,9E-01	3150	1,4E-02	4650	1,1E-03
400	9,2E-01	700	9,7E-03	1000	3,3E-05	1700	4,7E-01	3200	1,1E-02	4700	9,5E-04
410	9,4E-01	710	5,3E-03	1010	4,1E-05	1750	5,4E-01	3250	9,2E-03	4750	7,7E-04
420	9,5E-01	720	2,9E-03	1020	5,2E-05	1800	6,0E-01	3300	7,5E-03	4800	6,4E-04
430	9,5E-01	730	1,6E-03	1030	6,6E-05	1850	6,6E-01	3350	6,8E-03	4850	5,7E-04
440	9,6E-01	740	8,7E-04	1040	8,5E-05	1900	7,0E-01	3400	6,4E-03	4900	5,7E-04
450	9,7E-01	750	4,7E-04	1050	1,1E-04	1950	7,4E-01	3450	6,6E-03	4950	6,4E-04
460	9,7E-01	760	2,7E-04	1060	1,4E-04	2000	7,7E-01	3500	6,9E-03	5000	7,5E-04
470	9,8E-01	770	1,5E-04	1070	1,7E-04	2050	7,9E-01	3550	8,0E-03	5050	8,5E-04
480	9,8E-01	780	9,1E-05	1080	2,2E-04	2100	8,1E-01	3600	8,9E-03	5100	8,5E-04
490	9,8E-01	790	5,6E-05	1090	2,8E-04	2150	8,2E-01	3650	1,0E-02	5150	6,3E-04

VG9			Density		Notes			
			ρ [g/cm ³]	2.87		Ionically colored glass		
Reflection factor			Bubble content			Band pass filter		
P_d	0.91		Bubble class					
Reference thickness			Chemical resistance					
d [mm]	1		FR class			0		
			SR class			1.0		
			AR class			1.0		
Spectral values guaranteed			Transformation temperature					
τ_i (450 nm)	\leq	0.21	T _g [°C]			462		
τ_i (514 nm)	\geq	0.67	Thermal expansion					
τ_i (633 nm)	\leq	0.15	$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]			9.2		
τ_i (725 nm)	\leq	0.07	$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]			10.6		
τ_i (1060 nm)	\leq	0.18	$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]					
			Temperature coefficient					
Refractive index n			T _k [nm/°C]					
λ [nm]	Element	n						
480	Cd	1.56						
587.6	He	1.55						
						All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".		

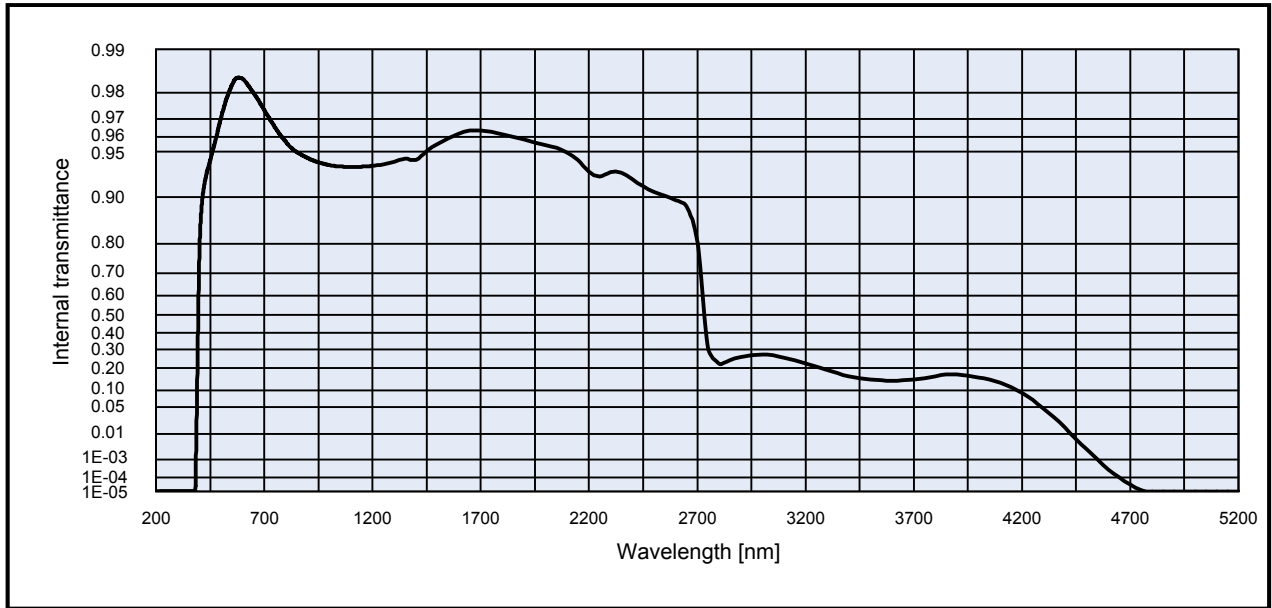
Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3
x	0.370	0.306	0.265	x	0.354	0.295	0.256	x	0.284	0.246	0.220
y	0.522	0.596	0.645	y	0.521	0.596	0.645	y	0.493	0.582	0.637
Y	40	21	12	Y	41	22	13	Y	45	25	15
λ_d [nm]	535	529	527	λ_d [nm]	538	531	528	λ_d [nm]	541	535	532
P _e	0.31	0.47	0.58	P _e	0.33	0.49	0.59	P _e	0.39	0.56	0.66





Internal transmittance τ_i at reference thickness d [mm] = 1
The internal transmittance values, tabulated and graphically represented, are reference values only

λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i
200	< 1.0E-05	500	6.1E-01	800	4.3E-02	1100	1.7E-01	2200	8.4E-01	3700	4.1E-01
210	< 1.0E-05	510	6.7E-01	810	4.3E-02	1110	1.8E-01	2250	8.5E-01	3750	4.2E-01
220	< 1.0E-05	520	7.0E-01	820	4.4E-02	1120	1.9E-01	2300	8.5E-01	3800	4.3E-01
230	< 1.0E-05	530	7.0E-01	830	4.5E-02	1130	2.0E-01	2350	8.6E-01	3850	4.4E-01
240	< 1.0E-05	540	6.7E-01	840	4.5E-02	1140	2.1E-01	2400	8.7E-01	3900	4.5E-01
250	< 1.0E-05	550	6.2E-01	850	4.7E-02	1150	2.2E-01	2450	8.7E-01	3950	4.5E-01
260	< 1.0E-05	560	5.5E-01	860	4.8E-02	1160	2.3E-01	2500	8.8E-01	4000	4.5E-01
270	< 1.0E-05	570	4.8E-01	870	4.9E-02	1170	2.4E-01	2550	8.8E-01	4050	4.4E-01
280	< 1.0E-05	580	4.0E-01	880	5.0E-02	1180	2.5E-01	2600	8.8E-01	4100	4.2E-01
290	< 1.0E-05	590	3.3E-01	890	5.3E-02	1190	2.6E-01	2650	8.8E-01	4150	4.0E-01
300	< 1.0E-05	600	2.7E-01	900	5.6E-02	1200	2.6E-01	2700	8.7E-01	4200	3.8E-01
310	< 1.0E-05	610	2.1E-01	910	5.9E-02	1250	3.0E-01	2750	6.9E-01	4250	3.5E-01
320	< 1.0E-05	620	1.6E-01	920	6.3E-02	1300	3.5E-01	2800	6.2E-01	4300	3.2E-01
330	< 1.0E-05	630	1.3E-01	930	6.6E-02	1350	4.0E-01	2850	6.1E-01	4350	2.9E-01
340	< 1.0E-05	640	1.1E-01	940	7.0E-02	1400	4.4E-01	2900	6.0E-01	4400	2.5E-01
350	< 1.0E-05	650	8.9E-02	950	7.4E-02	1450	4.9E-01	2950	5.9E-01	4450	2.1E-01
360	< 1.0E-05	660	7.5E-02	960	7.9E-02	1500	5.3E-01	3000	5.8E-01	4500	1.6E-01
370	< 1.0E-05	670	6.6E-02	970	8.4E-02	1550	5.7E-01	3050	5.6E-01	4550	1.1E-01
380	< 1.0E-05	680	5.8E-02	980	9.0E-02	1600	6.0E-01	3100	5.4E-01	4600	7.5E-02
390	< 1.0E-05	690	5.3E-02	990	9.5E-02	1650	6.4E-01	3150	5.2E-01	4650	5.2E-02
400	< 1.0E-05	700	5.0E-02	1000	1.0E-01	1700	6.7E-01	3200	5.0E-01	4700	3.3E-02
410	7.6E-04	710	4.8E-02	1010	1.1E-01	1750	7.0E-01	3250	4.8E-01	4750	2.2E-02
420	5.7E-03	720	4.7E-02	1020	1.2E-01	1800	7.2E-01	3300	4.6E-01	4800	1.6E-02
430	2.0E-02	730	4.6E-02	1030	1.2E-01	1850	7.4E-01	3350	4.4E-01	4850	1.2E-02
440	5.3E-02	740	4.5E-02	1040	1.3E-01	1900	7.6E-01	3400	4.2E-01	4900	1.0E-02
450	1.2E-01	750	4.5E-02	1050	1.4E-01	1950	7.8E-01	3450	4.1E-01	4950	7.5E-03
460	2.2E-01	760	4.4E-02	1060	1.4E-01	2000	7.9E-01	3500	4.0E-01	5000	5.0E-03
470	3.3E-01	770	4.4E-02	1070	1.5E-01	2050	8.1E-01	3550	4.0E-01	5050	2.8E-03
480	4.3E-01	780	4.4E-02	1080	1.6E-01	2100	8.2E-01	3600	4.0E-01	5100	1.5E-03
490	5.3E-01	790	4.3E-02	1090	1.7E-01	2150	8.3E-01	3650	4.0E-01	5150	6.6E-04



Internal transmittance τ_i at reference thickness d [mm] = 3
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	9.7E-01	800	9.6E-01	1100	9.4E-01	2200	9.3E-01	3700	1.4E-01
210	< 1.0E-05	510	9.7E-01	810	9.6E-01	1110	9.4E-01	2250	9.3E-01	3750	1.5E-01
220	< 1.0E-05	520	9.8E-01	820	9.5E-01	1120	9.4E-01	2300	9.3E-01	3800	1.6E-01
230	< 1.0E-05	530	9.8E-01	830	9.5E-01	1130	9.4E-01	2350	9.3E-01	3850	1.7E-01
240	< 1.0E-05	540	9.8E-01	840	9.5E-01	1140	9.4E-01	2400	9.2E-01	3900	1.7E-01
250	< 1.0E-05	550	9.8E-01	850	9.5E-01	1150	9.4E-01	2450	9.1E-01	3950	1.6E-01
260	< 1.0E-05	560	9.8E-01	860	9.5E-01	1160	9.4E-01	2500	9.1E-01	4000	1.5E-01
270	< 1.0E-05	570	9.8E-01	870	9.5E-01	1170	9.4E-01	2550	9.0E-01	4050	1.4E-01
280	< 1.0E-05	580	9.8E-01	880	9.5E-01	1180	9.4E-01	2600	9.0E-01	4100	1.3E-01
290	< 1.0E-05	590	9.8E-01	890	9.5E-01	1190	9.4E-01	2650	8.8E-01	4150	1.1E-01
300	< 1.0E-05	600	9.8E-01	900	9.4E-01	1200	9.4E-01	2700	8.0E-01	4200	9.2E-02
310	< 1.0E-05	610	9.8E-01	910	9.4E-01	1250	9.4E-01	2750	3.2E-01	4250	6.8E-02
320	< 1.0E-05	620	9.8E-01	920	9.4E-01	1300	9.4E-01	2800	2.2E-01	4300	4.6E-02
330	< 1.0E-05	630	9.8E-01	930	9.4E-01	1350	9.4E-01	2850	2.4E-01	4350	2.9E-02
340	< 1.0E-05	640	9.8E-01	940	9.4E-01	1400	9.4E-01	2900	2.6E-01	4400	1.6E-02
350	< 1.0E-05	650	9.8E-01	950	9.4E-01	1450	9.5E-01	2950	2.7E-01	4450	6.9E-03
360	< 1.0E-05	660	9.8E-01	960	9.4E-01	1500	9.6E-01	3000	2.7E-01	4500	2.8E-03
370	< 1.0E-05	670	9.8E-01	970	9.4E-01	1550	9.6E-01	3050	2.7E-01	4550	9.9E-04
380	< 1.0E-05	680	9.8E-01	980	9.4E-01	1600	9.6E-01	3100	2.6E-01	4600	3.0E-04
390	1.1E-01	690	9.8E-01	990	9.4E-01	1650	9.6E-01	3150	2.4E-01	4650	9.9E-05
400	7.6E-01	700	9.7E-01	1000	9.4E-01	1700	9.6E-01	3200	2.2E-01	4700	3.3E-05
410	8.8E-01	710	9.7E-01	1010	9.4E-01	1750	9.6E-01	3250	2.1E-01	4750	1.2E-05
420	9.1E-01	720	9.7E-01	1020	9.4E-01	1800	9.6E-01	3300	1.9E-01	4800	< 1.0E-05
430	9.3E-01	730	9.7E-01	1030	9.4E-01	1850	9.6E-01	3350	1.7E-01	4850	< 1.0E-05
440	9.3E-01	740	9.7E-01	1040	9.4E-01	1900	9.6E-01	3400	1.6E-01	4900	< 1.0E-05
450	9.4E-01	750	9.7E-01	1050	9.4E-01	1950	9.6E-01	3450	1.5E-01	4950	< 1.0E-05
460	9.5E-01	760	9.6E-01	1060	9.4E-01	2000	9.5E-01	3500	1.4E-01	5000	< 1.0E-05
470	9.6E-01	770	9.6E-01	1070	9.4E-01	2050	9.5E-01	3550	1.4E-01	5050	< 1.0E-05
480	9.6E-01	780	9.6E-01	1080	9.4E-01	2100	9.5E-01	3600	1.4E-01	5100	< 1.0E-05
490	9.7E-01	790	9.6E-01	1090	9.4E-01	2150	9.4E-01	3650	1.4E-01	5150	< 1.0E-05

GG400

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	3

Spectral values guaranteed	
λ_c ($\tau_i = 0.50$) [nm]	= 400 ± 6
λ_s ($\tau_{is} = 1 \cdot 10^{-5}$) [nm]	= 340
λ_p ($\tau_{ip} = 0.93$) [nm]	= 480

Refractive index n		
λ [nm]	Element	n
546	Hg	1.53
587.6	He	1.52
852.1	Cs	1.52
1014	Hg	1.51

Density	
ρ [g/cm ³]	2.55

Bubble content	
Bubble class	3

Chemical resistance	
FR class	0
SR class	1.0
AR class	1.0

Transformation temperature	
T_g [°C]	537

Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	7.9
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9.1
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	0.07

Notes

Colloidally colored glass

Long pass filter

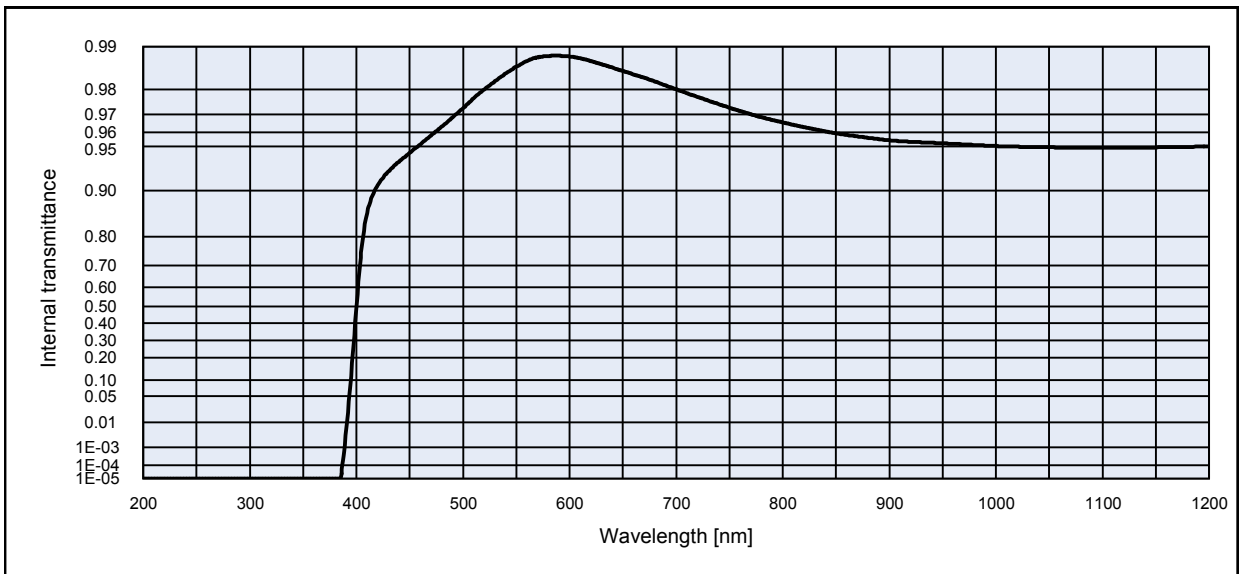
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

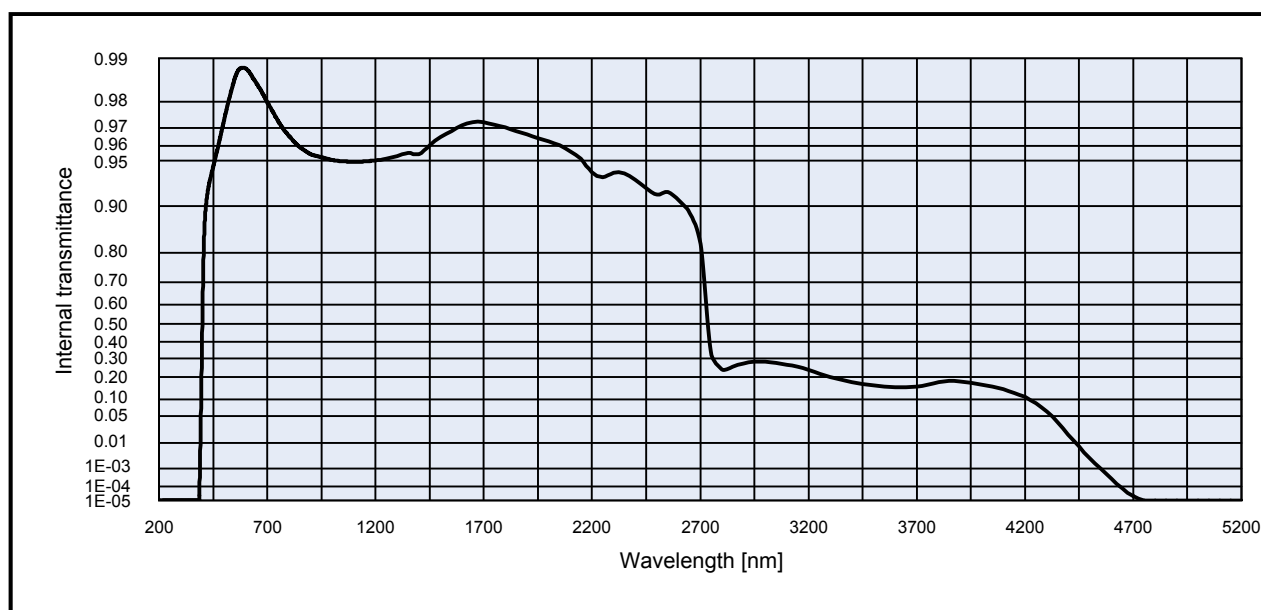
Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
	1	2	3
d [mm]			
x	0.448	0.449	0.450
y	0.408	0.409	0.410
Y	91	91	90
λ_d [nm]	581	581	581
P_e	0.01	0.02	0.03

Illuminant	Planck T = 3200 K		
	1	2	3
d [mm]			
x	0.424	0.425	0.426
y	0.400	0.401	0.402
Y	91	91	90
λ_d [nm]	579	579	579
P_e	0.01	0.02	0.03

Illuminant	D65 ($T_c = 6504$ K)		
	1	2	3
d [mm]			
x	0.314	0.315	0.316
y	0.331	0.333	0.335
Y	91	91	90
λ_d [nm]	570	571	571
P_e	0.01	0.02	0.03

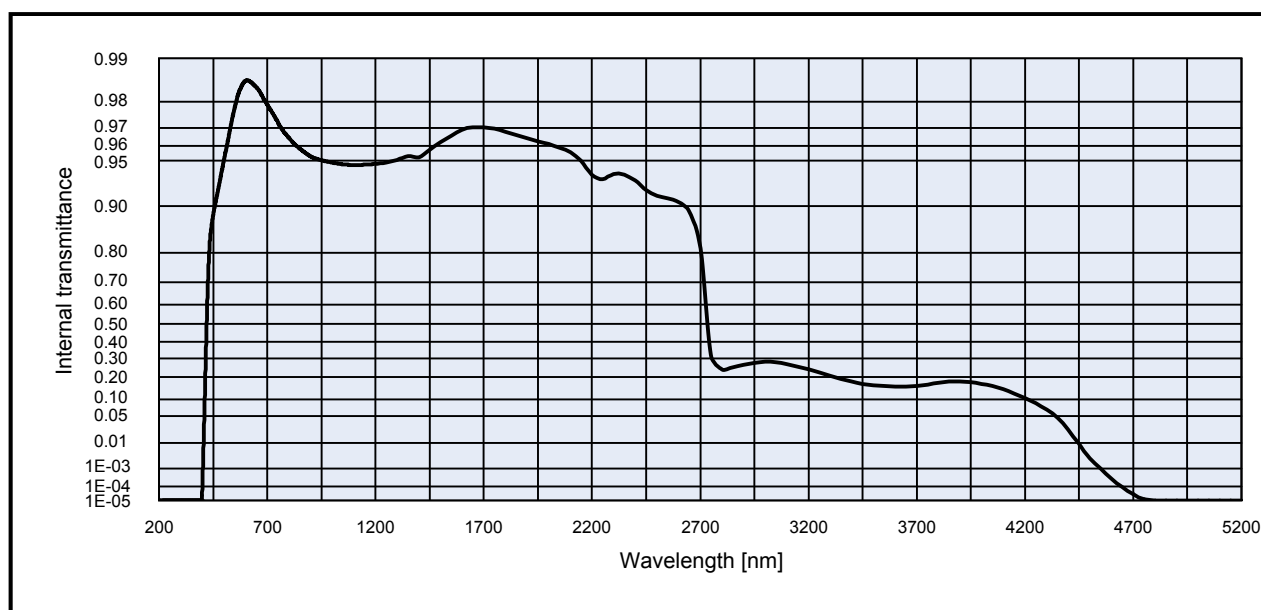




Internal transmittance τ_i at reference thickness d [mm] = 3

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	9.7E-01	800	9.7E-01	1100	9.5E-01	2200	9.4E-01	3700	1.5E-01
210	< 1.0E-05	510	9.8E-01	810	9.6E-01	1110	9.5E-01	2250	9.4E-01	3750	1.6E-01
220	< 1.0E-05	520	9.8E-01	820	9.6E-01	1120	9.5E-01	2300	9.4E-01	3800	1.7E-01
230	< 1.0E-05	530	9.8E-01	830	9.6E-01	1130	9.5E-01	2350	9.4E-01	3850	1.8E-01
240	< 1.0E-05	540	9.8E-01	840	9.6E-01	1140	9.5E-01	2400	9.3E-01	3900	1.8E-01
250	< 1.0E-05	550	9.9E-01	850	9.6E-01	1150	9.5E-01	2450	9.2E-01	3950	1.7E-01
260	< 1.0E-05	560	9.9E-01	860	9.6E-01	1160	9.5E-01	2500	9.2E-01	4000	1.6E-01
270	< 1.0E-05	570	9.9E-01	870	9.6E-01	1170	9.5E-01	2550	9.2E-01	4050	1.5E-01
280	< 1.0E-05	580	9.9E-01	880	9.6E-01	1180	9.5E-01	2600	9.1E-01	4100	1.4E-01
290	< 1.0E-05	590	9.9E-01	890	9.6E-01	1190	9.5E-01	2650	8.9E-01	4150	1.3E-01
300	< 1.0E-05	600	9.9E-01	900	9.5E-01	1200	9.5E-01	2700	8.2E-01	4200	1.1E-01
310	< 1.0E-05	610	9.9E-01	910	9.5E-01	1250	9.5E-01	2750	3.4E-01	4250	8.6E-02
320	< 1.0E-05	620	9.9E-01	920	9.5E-01	1300	9.5E-01	2800	2.4E-01	4300	6.1E-02
330	< 1.0E-05	630	9.9E-01	930	9.5E-01	1350	9.6E-01	2850	2.6E-01	4350	3.7E-02
340	< 1.0E-05	640	9.9E-01	940	9.5E-01	1400	9.5E-01	2900	2.7E-01	4400	1.8E-02
350	< 1.0E-05	650	9.9E-01	950	9.5E-01	1450	9.6E-01	2950	2.8E-01	4450	7.9E-03
360	< 1.0E-05	660	9.8E-01	960	9.5E-01	1500	9.7E-01	3000	2.8E-01	4500	2.8E-03
370	< 1.0E-05	670	9.8E-01	970	9.5E-01	1550	9.7E-01	3050	2.8E-01	4550	9.8E-04
380	< 1.0E-05	680	9.8E-01	980	9.5E-01	1600	9.7E-01	3100	2.7E-01	4600	3.0E-04
390	3.4E-03	690	9.8E-01	990	9.5E-01	1650	9.7E-01	3150	2.6E-01	4650	7.3E-05
400	4.9E-01	700	9.8E-01	1000	9.5E-01	1700	9.7E-01	3200	2.4E-01	4700	2.2E-05
410	8.6E-01	710	9.8E-01	1010	9.5E-01	1750	9.7E-01	3250	2.2E-01	4750	< 1.0E-05
420	9.1E-01	720	9.8E-01	1020	9.5E-01	1800	9.7E-01	3300	2.0E-01	4800	< 1.0E-05
430	9.3E-01	730	9.8E-01	1030	9.5E-01	1850	9.7E-01	3350	1.9E-01	4850	< 1.0E-05
440	9.4E-01	740	9.7E-01	1040	9.5E-01	1900	9.7E-01	3400	1.8E-01	4900	< 1.0E-05
450	9.4E-01	750	9.7E-01	1050	9.5E-01	1950	9.6E-01	3450	1.7E-01	4950	< 1.0E-05
460	9.5E-01	760	9.7E-01	1060	9.5E-01	2000	9.6E-01	3500	1.6E-01	5000	< 1.0E-05
470	9.6E-01	770	9.7E-01	1070	9.5E-01	2050	9.6E-01	3550	1.5E-01	5050	< 1.0E-05
480	9.6E-01	780	9.7E-01	1080	9.5E-01	2100	9.6E-01	3600	1.5E-01	5100	< 1.0E-05
490	9.7E-01	790	9.7E-01	1090	9.5E-01	2150	9.5E-01	3650	1.5E-01	5150	< 1.0E-05



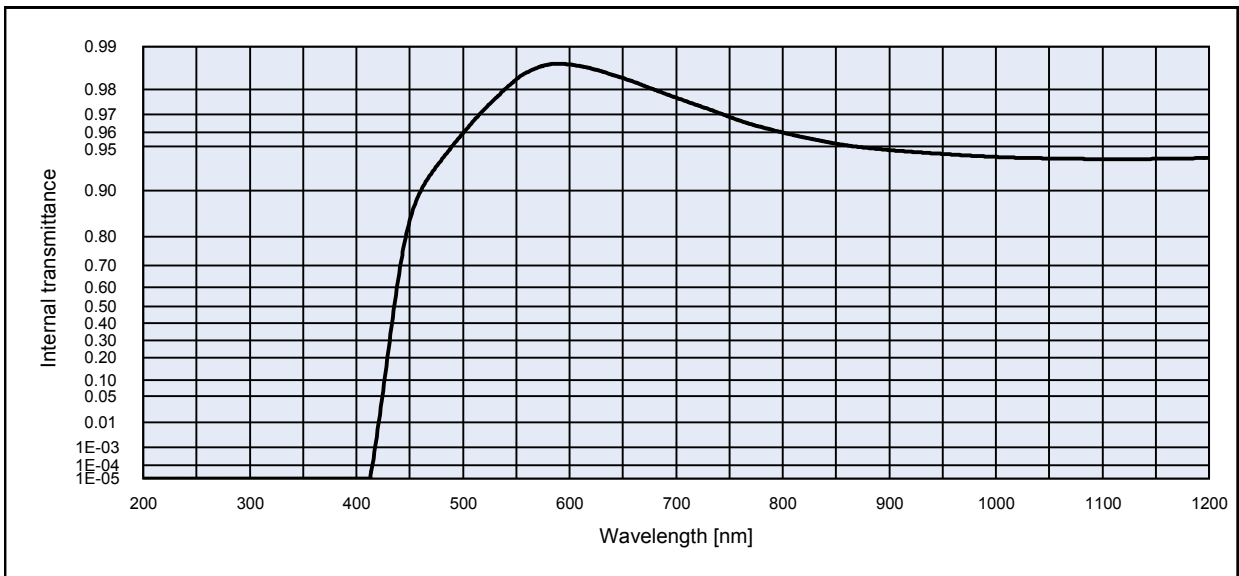
Internal transmittance τ_i at reference thickness d [mm] = 3

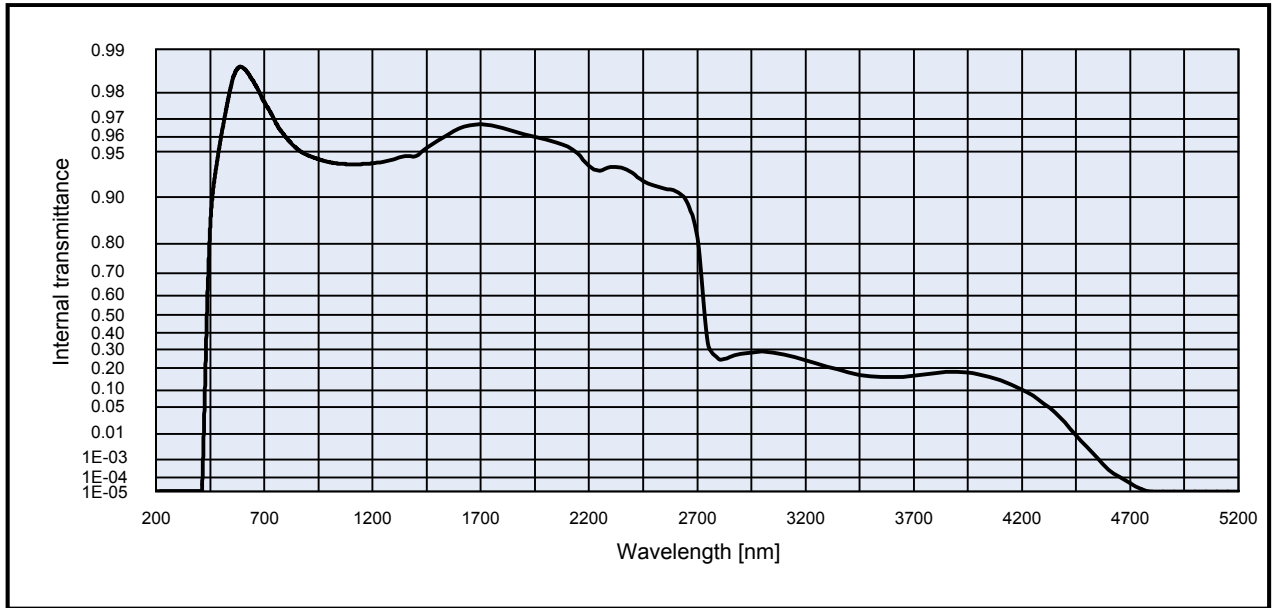
The internal transmittance values, tabulated and graphically represented, are reference values only

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	9.5E-01	800	9.6E-01	1100	9.5E-01	2200	9.4E-01	3700	1.6E-01
210	< 1.0E-05	510	9.6E-01	810	9.6E-01	1110	9.5E-01	2250	9.3E-01	3750	1.6E-01
220	< 1.0E-05	520	9.6E-01	820	9.6E-01	1120	9.5E-01	2300	9.4E-01	3800	1.7E-01
230	< 1.0E-05	530	9.7E-01	830	9.6E-01	1130	9.5E-01	2350	9.4E-01	3850	1.8E-01
240	< 1.0E-05	540	9.7E-01	840	9.6E-01	1140	9.5E-01	2400	9.3E-01	3900	1.8E-01
250	< 1.0E-05	550	9.8E-01	850	9.6E-01	1150	9.5E-01	2450	9.2E-01	3950	1.7E-01
260	< 1.0E-05	560	9.8E-01	860	9.6E-01	1160	9.5E-01	2500	9.1E-01	4000	1.7E-01
270	< 1.0E-05	570	9.8E-01	870	9.6E-01	1170	9.5E-01	2550	9.1E-01	4050	1.6E-01
280	< 1.0E-05	580	9.8E-01	880	9.6E-01	1180	9.5E-01	2600	9.1E-01	4100	1.4E-01
290	< 1.0E-05	590	9.9E-01	890	9.5E-01	1190	9.5E-01	2650	8.9E-01	4150	1.2E-01
300	< 1.0E-05	600	9.9E-01	900	9.5E-01	1200	9.5E-01	2700	8.1E-01	4200	1.1E-01
310	< 1.0E-05	610	9.9E-01	910	9.5E-01	1250	9.5E-01	2750	3.2E-01	4250	8.6E-02
320	< 1.0E-05	620	9.9E-01	920	9.5E-01	1300	9.5E-01	2800	2.4E-01	4300	6.6E-02
330	< 1.0E-05	630	9.9E-01	930	9.5E-01	1350	9.5E-01	2850	2.5E-01	4350	4.6E-02
340	< 1.0E-05	640	9.8E-01	940	9.5E-01	1400	9.5E-01	2900	2.7E-01	4400	2.4E-02
350	< 1.0E-05	650	9.8E-01	950	9.5E-01	1450	9.6E-01	2950	2.8E-01	4450	9.5E-03
360	< 1.0E-05	660	9.8E-01	960	9.5E-01	1500	9.6E-01	3000	2.8E-01	4500	2.9E-03
370	< 1.0E-05	670	9.8E-01	970	9.5E-01	1550	9.7E-01	3050	2.8E-01	4550	9.8E-04
380	< 1.0E-05	680	9.8E-01	980	9.5E-01	1600	9.7E-01	3100	2.7E-01	4600	3.0E-04
390	< 1.0E-05	690	9.8E-01	990	9.5E-01	1650	9.7E-01	3150	2.6E-01	4650	9.5E-05
400	7.0E-05	700	9.8E-01	1000	9.5E-01	1700	9.7E-01	3200	2.4E-01	4700	3.1E-05
410	6.1E-05	710	9.8E-01	1010	9.5E-01	1750	9.7E-01	3250	2.2E-01	4750	1.3E-05
420	4.8E-05	720	9.8E-01	1020	9.5E-01	1800	9.7E-01	3300	2.1E-01	4800	< 1.0E-05
430	7.7E-05	730	9.8E-01	1030	9.5E-01	1850	9.7E-01	3350	1.9E-01	4850	< 1.0E-05
440	8.6E-05	740	9.7E-01	1040	9.5E-01	1900	9.6E-01	3400	1.8E-01	4900	< 1.0E-05
450	8.8E-05	750	9.7E-01	1050	9.5E-01	1950	9.6E-01	3450	1.6E-01	4950	< 1.0E-05
460	9.0E-05	760	9.7E-01	1060	9.5E-01	2000	9.6E-01	3500	1.6E-01	5000	< 1.0E-05
470	9.2E-05	770	9.7E-01	1070	9.5E-01	2050	9.6E-01	3550	1.6E-01	5050	< 1.0E-05
480	9.3E-05	780	9.7E-01	1080	9.5E-01	2100	9.6E-01	3600	1.5E-01	5100	< 1.0E-05
490	9.4E-05	790	9.7E-01	1090	9.5E-01	2150	9.5E-01	3650	1.5E-01	5150	< 1.0E-05

GG435			Density ρ [g/cm ³] 2.55			Notes Colloidally colored glass Long pass filter All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".															
Reflection factor P_d 0.92			Bubble content Bubble class 3																		
Reference thickness d [mm] 3			Chemical resistance FR class 0 SR class 1.0 AR class 1.0																		
Spectral values guaranteed λ_c ($\tau_i = 0.50$) [nm] = 435 ± 6 λ_s ($\tau_{is} = 1 \cdot 10^{-5}$) [nm] = 370 λ_p ($\tau_{ip} = 0.92$) [nm] = 520			Transformation temperature T_g [°C] 537																		
			Thermal expansion $\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K] 7.8 $\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K] 9.1 $\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]																		
Refractive index n <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>λ [nm]</th> <th>Element</th> <th>n</th> </tr> </thead> <tbody> <tr> <td>546</td> <td>Hg</td> <td>1.52</td> </tr> <tr> <td>587.6</td> <td>He</td> <td>1.52</td> </tr> <tr> <td>852.1</td> <td>Cs</td> <td>1.52</td> </tr> <tr> <td>1014</td> <td>Hg</td> <td>1.51</td> </tr> </tbody> </table>			λ [nm]	Element	n		546	Hg	1.52	587.6	He	1.52	852.1	Cs	1.52	1014	Hg	1.51	Temperature coefficient T_k [nm/°C] 0.08		
λ [nm]	Element	n																			
546	Hg	1.52																			
587.6	He	1.52																			
852.1	Cs	1.52																			
1014	Hg	1.51																			

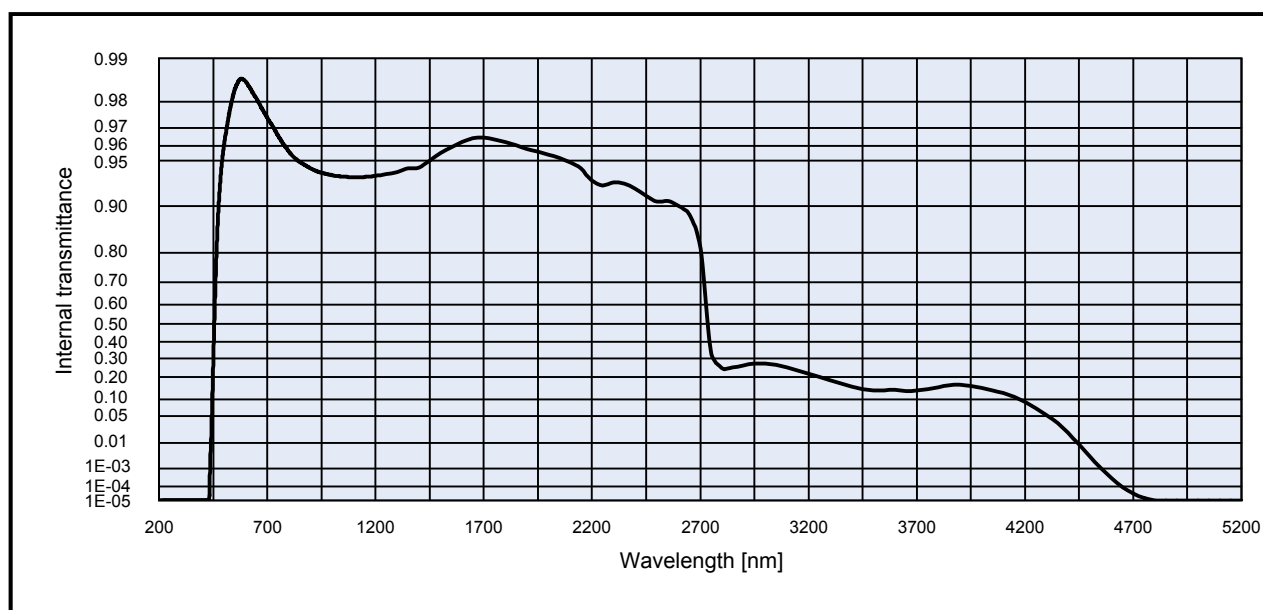
Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)			
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]	1
x	0.453	0.457	0.459	x	0.430	0.434	0.437	x	0.323	0.328	0.333	
y	0.415	0.419	0.422	y	0.409	0.414	0.418	y	0.350	0.361	0.369	
Y	91	91	90	Y	91	90	90	Y	91	90	90	
λ_d [nm]	580	580	580	λ_d [nm]	578	578	578	λ_d [nm]	568	568	568	
P _e	0.09	0.14	0.18	P _e	0.10	0.15	0.19	P _e	0.09	0.13	0.17	





Internal transmittance τ_i at reference thickness d [mm] = 3
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	9.6E-01	800	9.6E-01	1100	9.4E-01	2200	9.4E-01	3700	1.6E-01
210	< 1.0E-05	510	9.7E-01	810	9.6E-01	1110	9.4E-01	2250	9.3E-01	3750	1.7E-01
220	< 1.0E-05	520	9.7E-01	820	9.6E-01	1120	9.4E-01	2300	9.4E-01	3800	1.8E-01
230	< 1.0E-05	530	9.8E-01	830	9.6E-01	1130	9.4E-01	2350	9.4E-01	3850	1.8E-01
240	< 1.0E-05	540	9.8E-01	840	9.5E-01	1140	9.4E-01	2400	9.3E-01	3900	1.8E-01
250	< 1.0E-05	550	9.8E-01	850	9.5E-01	1150	9.4E-01	2450	9.2E-01	3950	1.8E-01
260	< 1.0E-05	560	9.8E-01	860	9.5E-01	1160	9.4E-01	2500	9.2E-01	4000	1.7E-01
270	< 1.0E-05	570	9.9E-01	870	9.5E-01	1170	9.4E-01	2550	9.1E-01	4050	1.6E-01
280	< 1.0E-05	580	9.9E-01	880	9.5E-01	1180	9.4E-01	2600	9.1E-01	4100	1.4E-01
290	< 1.0E-05	590	9.9E-01	890	9.5E-01	1190	9.4E-01	2650	8.9E-01	4150	1.2E-01
300	< 1.0E-05	600	9.9E-01	900	9.5E-01	1200	9.4E-01	2700	8.2E-01	4200	1.0E-01
310	< 1.0E-05	610	9.9E-01	910	9.5E-01	1250	9.4E-01	2750	3.4E-01	4250	8.2E-02
320	< 1.0E-05	620	9.9E-01	920	9.5E-01	1300	9.4E-01	2800	2.5E-01	4300	5.9E-02
330	< 1.0E-05	630	9.9E-01	930	9.5E-01	1350	9.5E-01	2850	2.6E-01	4350	3.9E-02
340	< 1.0E-05	640	9.8E-01	940	9.4E-01	1400	9.5E-01	2900	2.7E-01	4400	2.1E-02
350	< 1.0E-05	650	9.8E-01	950	9.4E-01	1450	9.5E-01	2950	2.8E-01	4450	9.2E-03
360	< 1.0E-05	660	9.8E-01	960	9.4E-01	1500	9.6E-01	3000	2.9E-01	4500	3.5E-03
370	< 1.0E-05	670	9.8E-01	970	9.4E-01	1550	9.6E-01	3050	2.8E-01	4550	1.1E-03
380	< 1.0E-05	680	9.8E-01	980	9.4E-01	1600	9.7E-01	3100	2.7E-01	4600	3.0E-04
390	< 1.0E-05	690	9.8E-01	990	9.4E-01	1650	9.7E-01	3150	2.6E-01	4650	1.1E-04
400	< 1.0E-05	700	9.8E-01	1000	9.4E-01	1700	9.7E-01	3200	2.4E-01	4700	4.2E-05
410	< 1.0E-05	710	9.8E-01	1010	9.4E-01	1750	9.7E-01	3250	2.2E-01	4750	1.6E-05
420	5.7E-03	720	9.7E-01	1020	9.4E-01	1800	9.7E-01	3300	2.1E-01	4800	< 1.0E-05
430	2.4E-01	730	9.7E-01	1030	9.4E-01	1850	9.6E-01	3350	1.9E-01	4850	< 1.0E-05
440	6.6E-01	740	9.7E-01	1040	9.4E-01	1900	9.6E-01	3400	1.8E-01	4900	< 1.0E-05
450	8.4E-01	750	9.7E-01	1050	9.4E-01	1950	9.6E-01	3450	1.7E-01	4950	< 1.0E-05
460	9.0E-01	760	9.7E-01	1060	9.4E-01	2000	9.6E-01	3500	1.6E-01	5000	< 1.0E-05
470	9.2E-01	770	9.7E-01	1070	9.4E-01	2050	9.6E-01	3550	1.6E-01	5050	< 1.0E-05
480	9.4E-01	780	9.6E-01	1080	9.4E-01	2100	9.5E-01	3600	1.6E-01	5100	< 1.0E-05
490	9.5E-01	790	9.6E-01	1090	9.4E-01	2150	9.5E-01	3650	1.6E-01	5150	< 1.0E-05



Internal transmittance τ_i at reference thickness d [mm] = 3

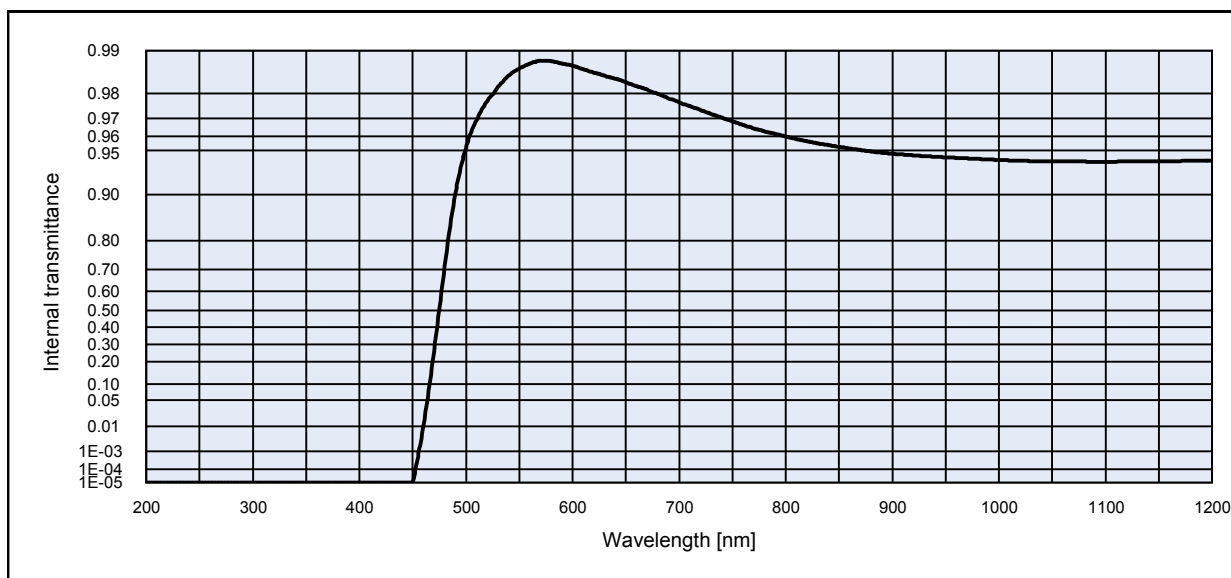
The internal transmittance values, tabulated and graphically represented, are reference values only

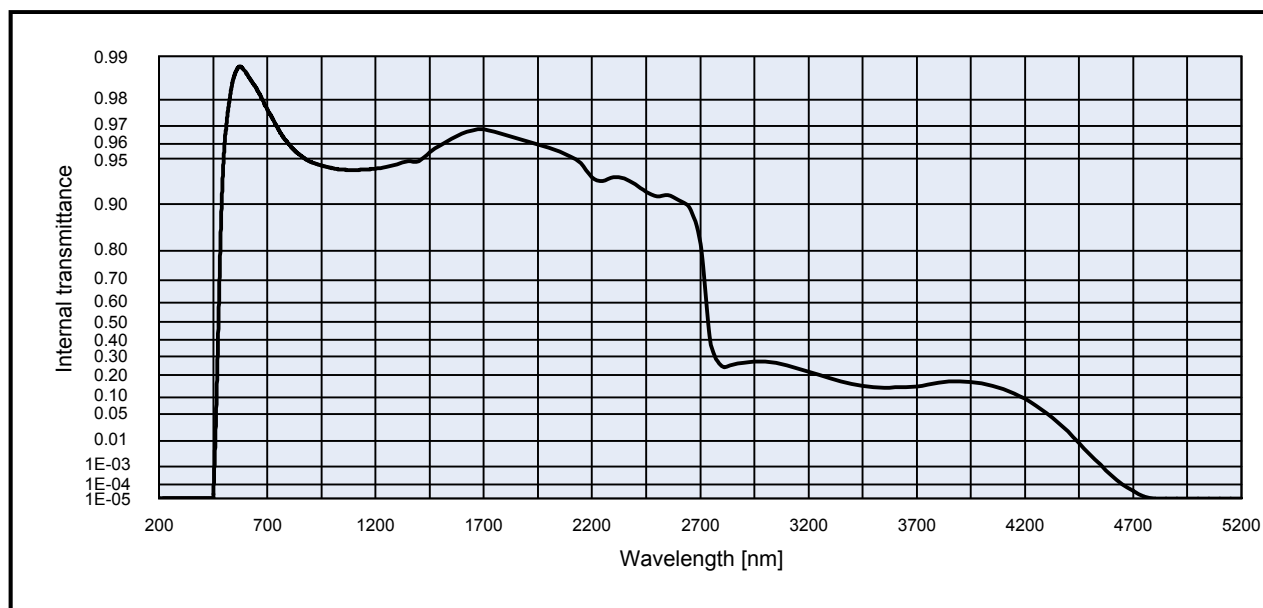
λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i
200	< 1.0E-05	500	9.6E-01	800	9.6E-01	1100	9.4E-01	2200	9.3E-01	3700	1.4E-01
210	< 1.0E-05	510	9.7E-01	810	9.5E-01	1110	9.4E-01	2250	9.3E-01	3750	1.4E-01
220	< 1.0E-05	520	9.7E-01	820	9.5E-01	1120	9.4E-01	2300	9.3E-01	3800	1.5E-01
230	< 1.0E-05	530	9.8E-01	830	9.5E-01	1130	9.4E-01	2350	9.3E-01	3850	1.6E-01
240	< 1.0E-05	540	9.8E-01	840	9.5E-01	1140	9.4E-01	2400	9.2E-01	3900	1.6E-01
250	< 1.0E-05	550	9.8E-01	850	9.5E-01	1150	9.4E-01	2450	9.1E-01	3950	1.6E-01
260	< 1.0E-05	560	9.8E-01	860	9.5E-01	1160	9.4E-01	2500	9.1E-01	4000	1.5E-01
270	< 1.0E-05	570	9.9E-01	870	9.5E-01	1170	9.4E-01	2550	9.1E-01	4050	1.4E-01
280	< 1.0E-05	580	9.9E-01	880	9.5E-01	1180	9.4E-01	2600	9.0E-01	4100	1.2E-01
290	< 1.0E-05	590	9.9E-01	890	9.4E-01	1190	9.4E-01	2650	8.9E-01	4150	1.1E-01
300	< 1.0E-05	600	9.9E-01	900	9.4E-01	1200	9.4E-01	2700	8.1E-01	4200	9.1E-02
310	< 1.0E-05	610	9.8E-01	910	9.4E-01	1250	9.4E-01	2750	3.5E-01	4250	7.1E-02
320	< 1.0E-05	620	9.8E-01	920	9.4E-01	1300	9.4E-01	2800	2.5E-01	4300	5.1E-02
330	< 1.0E-05	630	9.8E-01	930	9.4E-01	1350	9.4E-01	2850	2.5E-01	4350	3.5E-02
340	< 1.0E-05	640	9.8E-01	940	9.4E-01	1400	9.4E-01	2900	2.6E-01	4400	2.0E-02
350	< 1.0E-05	650	9.8E-01	950	9.4E-01	1450	9.5E-01	2950	2.7E-01	4450	9.1E-03
360	< 1.0E-05	660	9.8E-01	960	9.4E-01	1500	9.6E-01	3000	2.7E-01	4500	3.4E-03
370	< 1.0E-05	670	9.8E-01	970	9.4E-01	1550	9.6E-01	3050	2.6E-01	4550	1.1E-03
380	< 1.0E-05	680	9.8E-01	980	9.4E-01	1600	9.6E-01	3100	2.5E-01	4600	3.1E-04
390	< 1.0E-05	690	9.8E-01	990	9.4E-01	1650	9.6E-01	3150	2.3E-01	4650	9.5E-05
400	< 1.0E-05	700	9.7E-01	1000	9.4E-01	1700	9.7E-01	3200	2.2E-01	4700	3.2E-05
410	< 1.0E-05	710	9.7E-01	1010	9.4E-01	1750	9.6E-01	3250	2.0E-01	4750	1.5E-05
420	< 1.0E-05	720	9.7E-01	1020	9.4E-01	1800	9.6E-01	3300	1.8E-01	4800	< 1.0E-05
430	< 1.0E-05	730	9.7E-01	1030	9.4E-01	1850	9.6E-01	3350	1.7E-01	4850	< 1.0E-05
440	9.6E-03	740	9.7E-01	1040	9.4E-01	1900	9.6E-01	3400	1.5E-01	4900	< 1.0E-05
450	2.6E-01	750	9.7E-01	1050	9.4E-01	1950	9.6E-01	3450	1.4E-01	4950	< 1.0E-05
460	6.7E-01	760	9.6E-01	1060	9.4E-01	2000	9.5E-01	3500	1.4E-01	5000	< 1.0E-05
470	8.6E-01	770	9.6E-01	1070	9.4E-01	2050	9.5E-01	3550	1.4E-01	5050	< 1.0E-05
480	9.2E-01	780	9.6E-01	1080	9.4E-01	2100	9.5E-01	3600	1.4E-01	5100	< 1.0E-05
490	9.5E-01	790	9.6E-01	1090	9.4E-01	2150	9.4E-01	3650	1.3E-01	5150	< 1.0E-05

GG475

Density		Notes	
ρ [g/cm ³]	2.56	Colloidally colored glass	
Bubble content		Long pass filter	
Reflection factor			
P_d	0.92		
Reference thickness			
d [mm]	3		
Chemical resistance			
FR class	0		
SR class	1.0		
AR class	1.0		
Transformation temperature			
T _g [°C]	531		
Thermal expansion			
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	8.2		
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9.4		
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]			
Temperature coefficient			
T _k [nm/°C]	0.09		
Refractive index n		All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".	
λ [nm]	Element	n	
546	Hg	1.53	
587.6	He	1.52	
852.1	Cs	1.52	
1014	Hg	1.51	

Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)			
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3	
x	0.483	0.489	0.492	x	0.465	0.473	0.476	x	0.381	0.394	0.401	
y	0.453	0.460	0.463	y	0.458	0.466	0.470	y	0.463	0.485	0.494	
Y	91	90	89	Y	91	90	89	Y	89	88	88	
λ_d [nm]	580	580	580	λ_d [nm]	578	578	578	λ_d [nm]	568	569	569	
P _e	0.56	0.65	0.69	P _e	0.57	0.66	0.70	P _e	0.57	0.66	0.71	

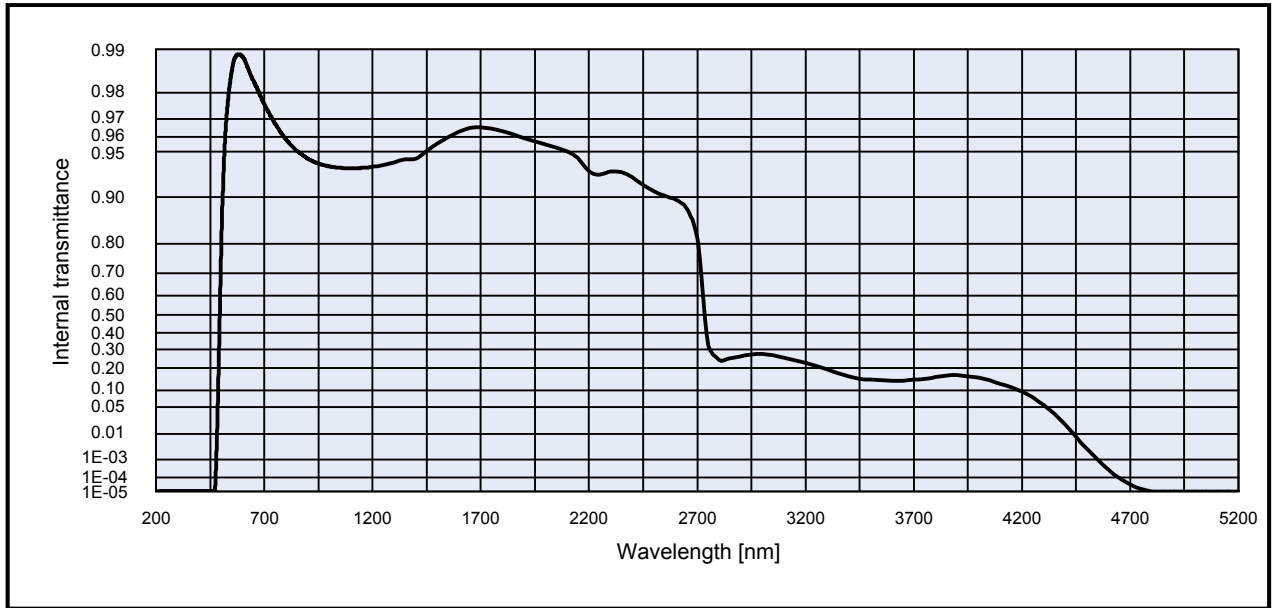




Internal transmittance τ_i at reference thickness d [mm] = 3

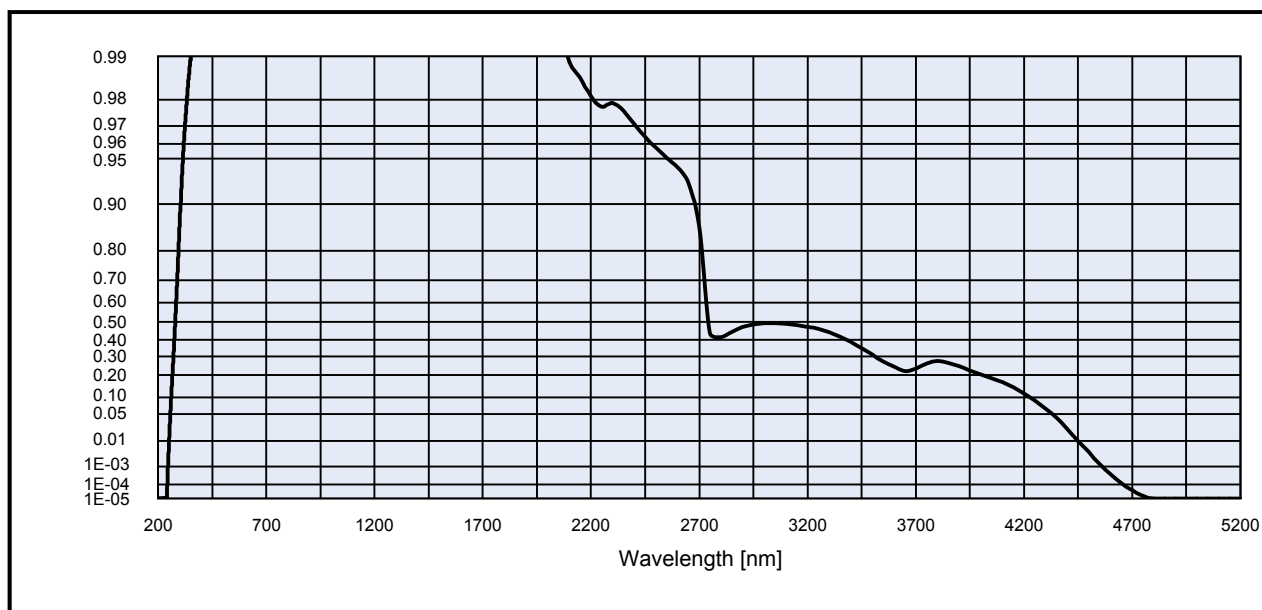
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λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i
200	< 1.0E-05	500	9.5E-01	800	9.6E-01	1100	9.4E-01	2200	9.3E-01	3700	1.5E-01
210	< 1.0E-05	510	9.7E-01	810	9.6E-01	1110	9.4E-01	2250	9.3E-01	3750	1.5E-01
220	< 1.0E-05	520	9.8E-01	820	9.6E-01	1120	9.4E-01	2300	9.3E-01	3800	1.6E-01
230	< 1.0E-05	530	9.8E-01	830	9.6E-01	1130	9.4E-01	2350	9.3E-01	3850	1.7E-01
240	< 1.0E-05	540	9.9E-01	840	9.5E-01	1140	9.4E-01	2400	9.3E-01	3900	1.7E-01
250	< 1.0E-05	550	9.9E-01	850	9.5E-01	1150	9.4E-01	2450	9.2E-01	3950	1.7E-01
260	< 1.0E-05	560	9.9E-01	860	9.5E-01	1160	9.4E-01	2500	9.1E-01	4000	1.6E-01
270	< 1.0E-05	570	9.9E-01	870	9.5E-01	1170	9.4E-01	2550	9.1E-01	4050	1.5E-01
280	< 1.0E-05	580	9.9E-01	880	9.5E-01	1180	9.4E-01	2600	9.1E-01	4100	1.3E-01
290	< 1.0E-05	590	9.9E-01	890	9.5E-01	1190	9.4E-01	2650	8.9E-01	4150	1.1E-01
300	< 1.0E-05	600	9.9E-01	900	9.5E-01	1200	9.4E-01	2700	8.2E-01	4200	9.5E-02
310	< 1.0E-05	610	9.9E-01	910	9.5E-01	1250	9.4E-01	2750	3.7E-01	4250	7.1E-02
320	< 1.0E-05	620	9.9E-01	920	9.5E-01	1300	9.5E-01	2800	2.5E-01	4300	5.1E-02
330	< 1.0E-05	630	9.8E-01	930	9.5E-01	1350	9.5E-01	2850	2.6E-01	4350	3.3E-02
340	< 1.0E-05	640	9.8E-01	940	9.4E-01	1400	9.5E-01	2900	2.7E-01	4400	1.9E-02
350	< 1.0E-05	650	9.8E-01	950	9.4E-01	1450	9.5E-01	2950	2.7E-01	4450	8.8E-03
360	< 1.0E-05	660	9.8E-01	960	9.4E-01	1500	9.6E-01	3000	2.7E-01	4500	3.3E-03
370	< 1.0E-05	670	9.8E-01	970	9.4E-01	1550	9.6E-01	3050	2.7E-01	4550	1.2E-03
380	< 1.0E-05	680	9.8E-01	980	9.4E-01	1600	9.7E-01	3100	2.5E-01	4600	3.4E-04
390	< 1.0E-05	690	9.8E-01	990	9.4E-01	1650	9.7E-01	3150	2.3E-01	4650	1.0E-04
400	< 1.0E-05	700	9.8E-01	1000	9.4E-01	1700	9.7E-01	3200	2.2E-01	4700	3.7E-05
410	< 1.0E-05	710	9.8E-01	1010	9.4E-01	1750	9.7E-01	3250	2.0E-01	4750	1.4E-05
420	< 1.0E-05	720	9.7E-01	1020	9.4E-01	1800	9.7E-01	3300	1.8E-01	4800	< 1.0E-05
430	< 1.0E-05	730	9.7E-01	1030	9.4E-01	1850	9.6E-01	3350	1.7E-01	4850	< 1.0E-05
440	< 1.0E-05	740	9.7E-01	1040	9.4E-01	1900	9.6E-01	3400	1.6E-01	4900	< 1.0E-05
450	< 1.0E-05	750	9.7E-01	1050	9.4E-01	1950	9.6E-01	3450	1.5E-01	4950	< 1.0E-05
460	1.0E-02	760	9.7E-01	1060	9.4E-01	2000	9.6E-01	3500	1.4E-01	5000	< 1.0E-05
470	2.6E-01	770	9.6E-01	1070	9.4E-01	2050	9.6E-01	3550	1.4E-01	5050	< 1.0E-05
480	7.1E-01	780	9.6E-01	1080	9.4E-01	2100	9.5E-01	3600	1.4E-01	5100	< 1.0E-05
490	9.0E-01	790	9.6E-01	1090	9.4E-01	2150	9.5E-01	3650	1.4E-01	5150	< 1.0E-05



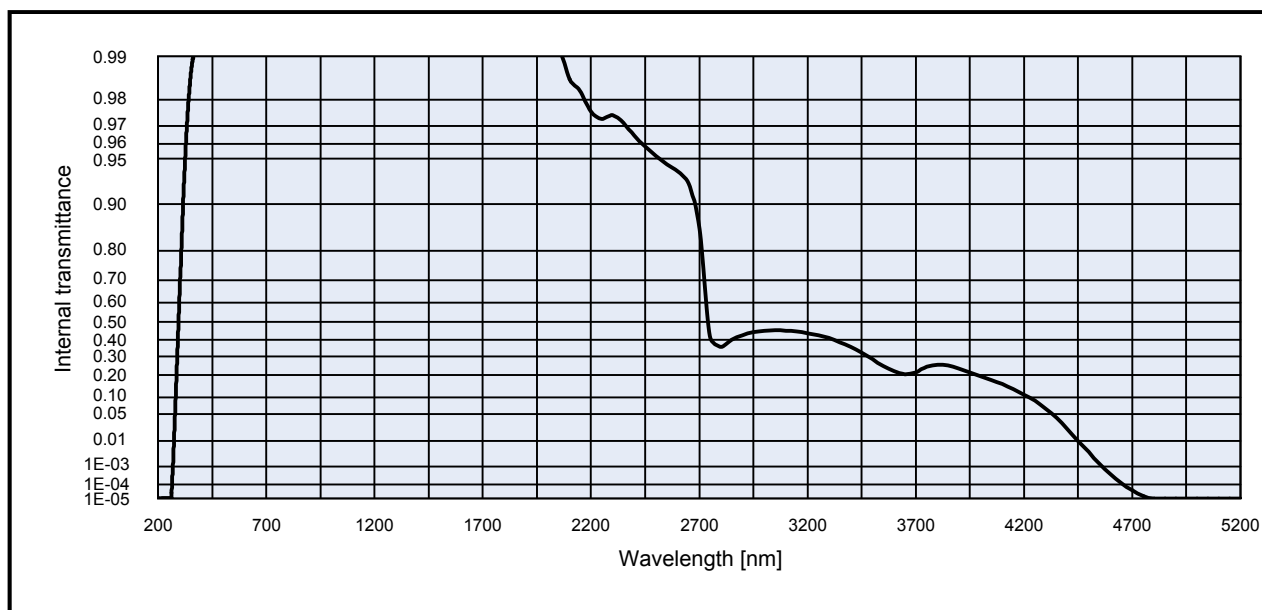
Internal transmittance τ_i at reference thickness d [mm] = 3
The internal transmittance values, tabulated and graphically represented, are reference values only

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	7.3E-01	800	9.6E-01	1100	9.4E-01	2200	9.3E-01	3700	1.4E-01
210	< 1.0E-05	510	9.2E-01	810	9.6E-01	1110	9.4E-01	2250	9.3E-01	3750	1.5E-01
220	< 1.0E-05	520	9.6E-01	820	9.6E-01	1120	9.4E-01	2300	9.3E-01	3800	1.6E-01
230	< 1.0E-05	530	9.8E-01	830	9.5E-01	1130	9.4E-01	2350	9.3E-01	3850	1.6E-01
240	< 1.0E-05	540	9.8E-01	840	9.5E-01	1140	9.4E-01	2400	9.3E-01	3900	1.6E-01
250	< 1.0E-05	550	9.9E-01	850	9.5E-01	1150	9.4E-01	2450	9.2E-01	3950	1.6E-01
260	< 1.0E-05	560	9.9E-01	860	9.5E-01	1160	9.4E-01	2500	9.1E-01	4000	1.5E-01
270	< 1.0E-05	570	9.9E-01	870	9.5E-01	1170	9.4E-01	2550	9.0E-01	4050	1.4E-01
280	< 1.0E-05	580	9.9E-01	880	9.5E-01	1180	9.4E-01	2600	9.0E-01	4100	1.3E-01
290	< 1.0E-05	590	9.9E-01	890	9.5E-01	1190	9.4E-01	2650	8.8E-01	4150	1.1E-01
300	< 1.0E-05	600	9.9E-01	900	9.4E-01	1200	9.4E-01	2700	8.1E-01	4200	9.5E-02
310	< 1.0E-05	610	9.9E-01	910	9.4E-01	1250	9.4E-01	2750	3.4E-01	4250	7.6E-02
320	< 1.0E-05	620	9.9E-01	920	9.4E-01	1300	9.4E-01	2800	2.4E-01	4300	5.5E-02
330	< 1.0E-05	630	9.9E-01	930	9.4E-01	1350	9.4E-01	2850	2.5E-01	4350	3.5E-02
340	< 1.0E-05	640	9.8E-01	940	9.4E-01	1400	9.4E-01	2900	2.6E-01	4400	1.9E-02
350	< 1.0E-05	650	9.8E-01	950	9.4E-01	1450	9.5E-01	2950	2.7E-01	4450	8.2E-03
360	< 1.0E-05	660	9.8E-01	960	9.4E-01	1500	9.6E-01	3000	2.8E-01	4500	2.9E-03
370	< 1.0E-05	670	9.8E-01	970	9.4E-01	1550	9.6E-01	3050	2.7E-01	4550	1.0E-03
380	< 1.0E-05	680	9.8E-01	980	9.4E-01	1600	9.6E-01	3100	2.6E-01	4600	3.0E-04
390	< 1.0E-05	690	9.8E-01	990	9.4E-01	1650	9.7E-01	3150	2.4E-01	4650	9.6E-05
400	< 1.0E-05	700	9.8E-01	1000	9.4E-01	1700	9.7E-01	3200	2.3E-01	4700	3.4E-05
410	< 1.0E-05	710	9.7E-01	1010	9.4E-01	1750	9.6E-01	3250	2.1E-01	4750	1.5E-05
420	< 1.0E-05	720	9.7E-01	1020	9.4E-01	1800	9.6E-01	3300	1.9E-01	4800	< 1.0E-05
430	< 1.0E-05	730	9.7E-01	1030	9.4E-01	1850	9.6E-01	3350	1.8E-01	4850	< 1.0E-05
440	< 1.0E-05	740	9.7E-01	1040	9.4E-01	1900	9.6E-01	3400	1.6E-01	4900	< 1.0E-05
450	< 1.0E-05	750	9.7E-01	1050	9.4E-01	1950	9.6E-01	3450	1.5E-01	4950	< 1.0E-05
460	< 1.0E-05	760	9.7E-01	1060	9.4E-01	2000	9.6E-01	3500	1.4E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.6E-01	1070	9.4E-01	2050	9.5E-01	3550	1.4E-01	5050	< 1.0E-05
480	2.8E-03	780	9.6E-01	1080	9.4E-01	2100	9.5E-01	3600	1.4E-01	5100	< 1.0E-05
490	2.2E-01	790	9.6E-01	1090	9.4E-01	2150	9.4E-01	3650	1.4E-01	5150	< 1.0E-05



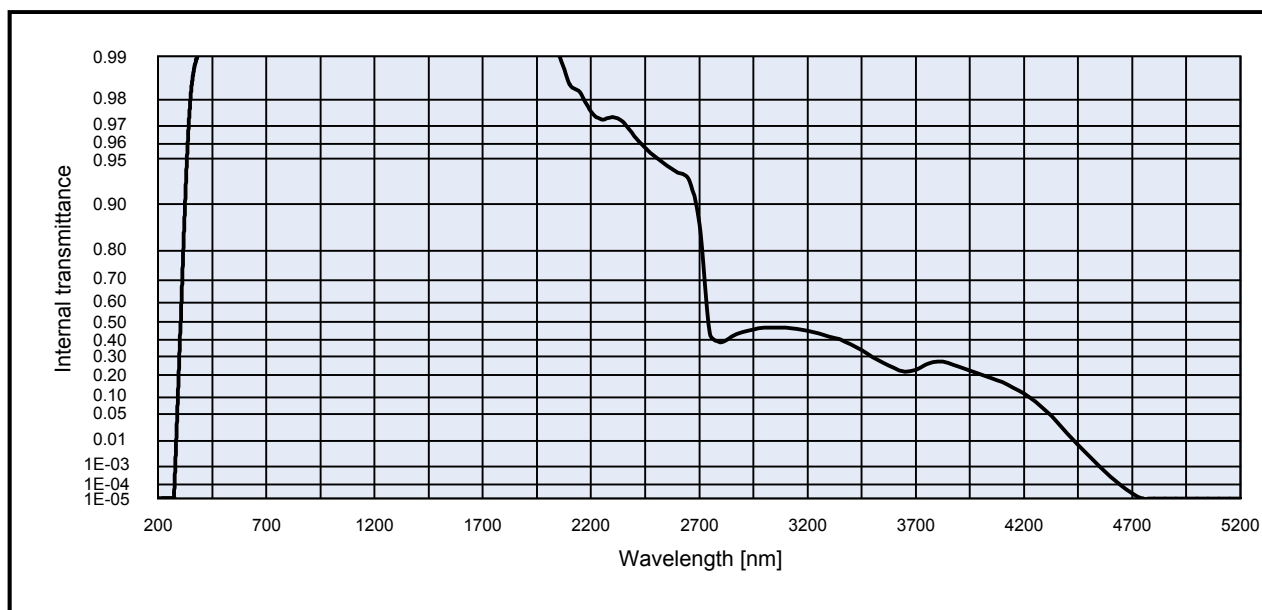
Internal transmittance τ_i at reference thickness d [mm] = 2
The internal transmittance values, tabulated and graphically represented, are reference values only

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	1.0E+00	800	1.0E+00	1100	1.0E+00	2200	9.8E-01	3700	2.3E-01
210	< 1.0E-05	510	1.0E+00	810	1.0E+00	1110	1.0E+00	2250	9.8E-01	3750	2.6E-01
220	< 1.0E-05	520	1.0E+00	820	1.0E+00	1120	1.0E+00	2300	9.8E-01	3800	2.7E-01
230	< 1.0E-05	530	1.0E+00	830	1.0E+00	1130	1.0E+00	2350	9.8E-01	3850	2.7E-01
240	< 1.0E-05	540	1.0E+00	840	1.0E+00	1140	1.0E+00	2400	9.7E-01	3900	2.5E-01
250	6.6E-03	550	1.0E+00	850	1.0E+00	1150	1.0E+00	2450	9.6E-01	3950	2.2E-01
260	8.6E-02	560	1.0E+00	860	1.0E+00	1160	1.0E+00	2500	9.6E-01	4000	2.0E-01
270	2.7E-01	570	1.0E+00	870	1.0E+00	1170	1.0E+00	2550	9.5E-01	4050	1.8E-01
280	5.1E-01	580	1.0E+00	880	1.0E+00	1180	1.0E+00	2600	9.4E-01	4100	1.6E-01
290	7.2E-01	590	1.0E+00	890	1.0E+00	1190	1.0E+00	2650	9.3E-01	4150	1.4E-01
300	8.6E-01	600	1.0E+00	900	1.0E+00	1200	1.0E+00	2700	8.5E-01	4200	1.2E-01
310	9.3E-01	610	1.0E+00	910	1.0E+00	1250	1.0E+00	2750	4.4E-01	4250	9.0E-02
320	9.6E-01	620	1.0E+00	920	1.0E+00	1300	1.0E+00	2800	4.1E-01	4300	6.4E-02
330	9.8E-01	630	1.0E+00	930	1.0E+00	1350	1.0E+00	2850	4.4E-01	4350	4.1E-02
340	9.8E-01	640	1.0E+00	940	1.0E+00	1400	1.0E+00	2900	4.7E-01	4400	2.2E-02
350	9.9E-01	650	1.0E+00	950	1.0E+00	1450	1.0E+00	2950	4.9E-01	4450	1.0E-02
360	9.9E-01	660	1.0E+00	960	1.0E+00	1500	1.0E+00	3000	4.9E-01	4500	4.3E-03
370	9.9E-01	670	1.0E+00	970	1.0E+00	1550	1.0E+00	3050	4.9E-01	4550	1.4E-03
380	9.9E-01	680	1.0E+00	980	1.0E+00	1600	1.0E+00	3100	4.9E-01	4600	4.1E-04
390	9.9E-01	690	1.0E+00	990	1.0E+00	1650	1.0E+00	3150	4.8E-01	4650	1.2E-04
400	9.9E-01	700	1.0E+00	1000	1.0E+00	1700	1.0E+00	3200	4.7E-01	4700	4.2E-05
410	1.0E+00	710	1.0E+00	1010	1.0E+00	1750	1.0E+00	3250	4.6E-01	4750	1.6E-05
420	1.0E+00	720	1.0E+00	1020	1.0E+00	1800	1.0E+00	3300	4.4E-01	4800	< 1.0E-05
430	1.0E+00	730	1.0E+00	1030	1.0E+00	1850	1.0E+00	3350	4.2E-01	4850	< 1.0E-05
440	1.0E+00	740	1.0E+00	1040	1.0E+00	1900	1.0E+00	3400	3.9E-01	4900	< 1.0E-05
450	1.0E+00	750	1.0E+00	1050	1.0E+00	1950	1.0E+00	3450	3.5E-01	4950	< 1.0E-05
460	1.0E+00	760	1.0E+00	1060	1.0E+00	2000	1.0E+00	3500	3.1E-01	5000	< 1.0E-05
470	1.0E+00	770	1.0E+00	1070	1.0E+00	2050	9.9E-01	3550	2.7E-01	5050	< 1.0E-05
480	1.0E+00	780	1.0E+00	1080	1.0E+00	2100	9.9E-01	3600	2.4E-01	5100	< 1.0E-05
490	1.0E+00	790	1.0E+00	1090	1.0E+00	2150	9.9E-01	3650	2.2E-01	5150	< 1.0E-05



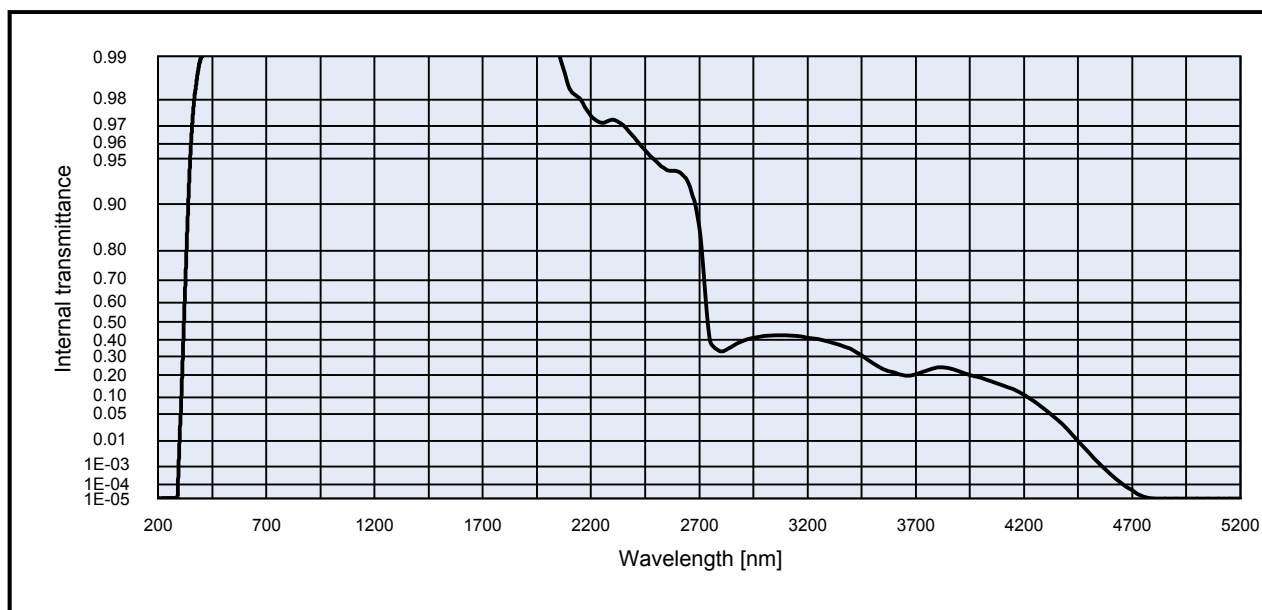
Internal transmittance τ_i at reference thickness d [mm] = 2
The internal transmittance values, tabulated and graphically represented, are reference values only

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	1.0E+00	800	1.0E+00	1100	1.0E+00	2200	9.8E-01	3700	2.1E-01
210	< 1.0E-05	510	1.0E+00	810	1.0E+00	1110	1.0E+00	2250	9.7E-01	3750	2.5E-01
220	< 1.0E-05	520	1.0E+00	820	1.0E+00	1120	1.0E+00	2300	9.7E-01	3800	2.6E-01
230	< 1.0E-05	530	1.0E+00	830	1.0E+00	1130	1.0E+00	2350	9.7E-01	3850	2.5E-01
240	< 1.0E-05	540	1.0E+00	840	1.0E+00	1140	1.0E+00	2400	9.7E-01	3900	2.3E-01
250	< 1.0E-05	550	1.0E+00	850	1.0E+00	1150	1.0E+00	2450	9.6E-01	3950	2.1E-01
260	< 1.0E-05	560	1.0E+00	860	1.0E+00	1160	1.0E+00	2500	9.5E-01	4000	1.9E-01
270	1.6E-03	570	1.0E+00	870	1.0E+00	1170	1.0E+00	2550	9.5E-01	4050	1.8E-01
280	6.4E-02	580	1.0E+00	880	1.0E+00	1180	1.0E+00	2600	9.4E-01	4100	1.6E-01
290	3.3E-01	590	1.0E+00	890	1.0E+00	1190	1.0E+00	2650	9.3E-01	4150	1.3E-01
300	6.4E-01	600	1.0E+00	900	1.0E+00	1200	1.0E+00	2700	8.5E-01	4200	1.1E-01
310	8.4E-01	610	1.0E+00	910	1.0E+00	1250	1.0E+00	2750	4.2E-01	4250	8.8E-02
320	9.3E-01	620	1.0E+00	920	1.0E+00	1300	1.0E+00	2800	3.6E-01	4300	6.4E-02
330	9.6E-01	630	1.0E+00	930	1.0E+00	1350	1.0E+00	2850	4.0E-01	4350	4.1E-02
340	9.8E-01	640	1.0E+00	940	1.0E+00	1400	1.0E+00	2900	4.2E-01	4400	2.2E-02
350	9.9E-01	650	1.0E+00	950	1.0E+00	1450	1.0E+00	2950	4.4E-01	4450	1.0E-02
360	9.9E-01	660	1.0E+00	960	1.0E+00	1500	1.0E+00	3000	4.5E-01	4500	4.3E-03
370	9.9E-01	670	1.0E+00	970	1.0E+00	1550	1.0E+00	3050	4.5E-01	4550	1.4E-03
380	9.9E-01	680	1.0E+00	980	1.0E+00	1600	1.0E+00	3100	4.5E-01	4600	4.1E-04
390	9.9E-01	690	1.0E+00	990	1.0E+00	1650	1.0E+00	3150	4.5E-01	4650	1.2E-04
400	9.9E-01	700	1.0E+00	1000	1.0E+00	1700	1.0E+00	3200	4.4E-01	4700	4.2E-05
410	9.9E-01	710	1.0E+00	1010	1.0E+00	1750	1.0E+00	3250	4.3E-01	4750	1.6E-05
420	9.9E-01	720	1.0E+00	1020	1.0E+00	1800	1.0E+00	3300	4.1E-01	4800	< 1.0E-05
430	9.9E-01	730	1.0E+00	1030	1.0E+00	1850	1.0E+00	3350	3.9E-01	4850	< 1.0E-05
440	9.9E-01	740	1.0E+00	1040	1.0E+00	1900	1.0E+00	3400	3.6E-01	4900	< 1.0E-05
450	1.0E+00	750	1.0E+00	1050	1.0E+00	1950	9.9E-01	3450	3.2E-01	4950	< 1.0E-05
460	1.0E+00	760	1.0E+00	1060	1.0E+00	2000	9.9E-01	3500	2.9E-01	5000	< 1.0E-05
470	1.0E+00	770	1.0E+00	1070	1.0E+00	2050	9.9E-01	3550	2.5E-01	5050	< 1.0E-05
480	1.0E+00	780	1.0E+00	1080	1.0E+00	2100	9.9E-01	3600	2.2E-01	5100	< 1.0E-05
490	1.0E+00	790	1.0E+00	1090	1.0E+00	2150	9.8E-01	3650	2.0E-01	5150	< 1.0E-05



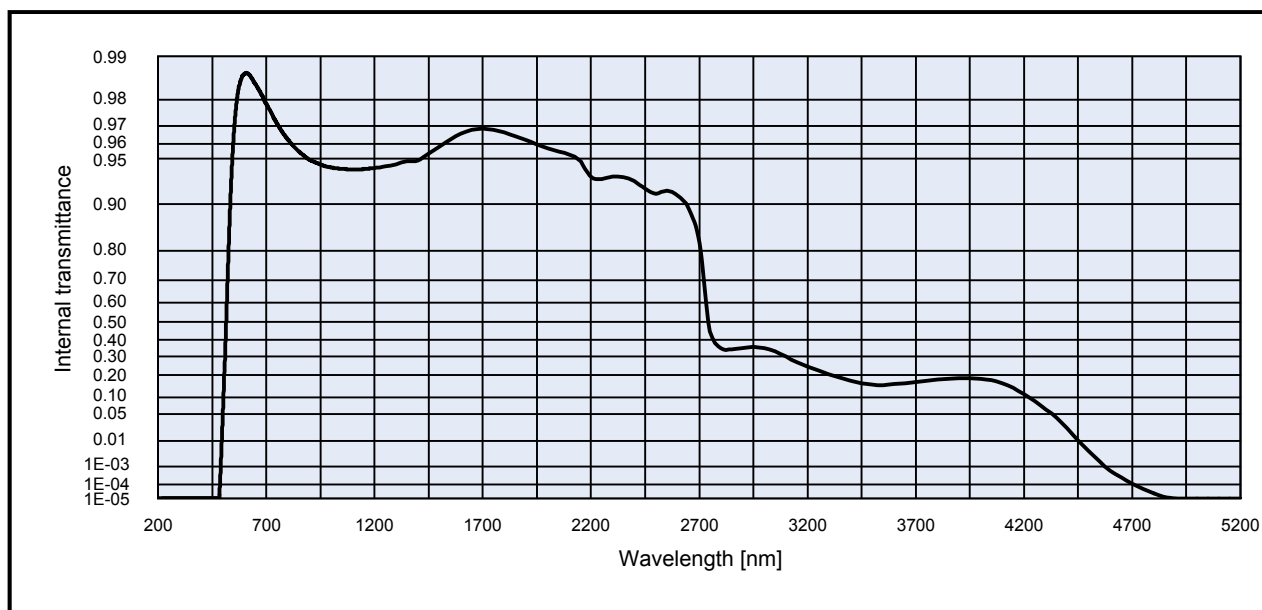
Internal transmittance τ_i at reference thickness d [mm] = 2
The internal transmittance values, tabulated and graphically represented, are reference values only

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	9.9E-01	800	1.0E+00	1100	1.0E+00	2200	9.8E-01	3700	2.3E-01
210	< 1.0E-05	510	1.0E+00	810	1.0E+00	1110	1.0E+00	2250	9.7E-01	3750	2.6E-01
220	< 1.0E-05	520	1.0E+00	820	1.0E+00	1120	1.0E+00	2300	9.7E-01	3800	2.7E-01
230	< 1.0E-05	530	1.0E+00	830	1.0E+00	1130	1.0E+00	2350	9.7E-01	3850	2.7E-01
240	< 1.0E-05	540	1.0E+00	840	1.0E+00	1140	1.0E+00	2400	9.6E-01	3900	2.5E-01
250	< 1.0E-05	550	1.0E+00	850	1.0E+00	1150	1.0E+00	2450	9.6E-01	3950	2.2E-01
260	< 1.0E-05	560	1.0E+00	860	1.0E+00	1160	1.0E+00	2500	9.5E-01	4000	2.0E-01
270	< 1.0E-05	570	1.0E+00	870	1.0E+00	1170	1.0E+00	2550	9.4E-01	4050	1.9E-01
280	1.0E-03	580	1.0E+00	880	1.0E+00	1180	1.0E+00	2600	9.4E-01	4100	1.7E-01
290	6.2E-02	590	1.0E+00	890	1.0E+00	1190	1.0E+00	2650	9.3E-01	4150	1.4E-01
300	3.4E-01	600	1.0E+00	900	1.0E+00	1200	1.0E+00	2700	8.6E-01	4200	1.1E-01
310	6.6E-01	610	1.0E+00	910	1.0E+00	1250	1.0E+00	2750	4.3E-01	4250	8.7E-02
320	8.5E-01	620	1.0E+00	920	1.0E+00	1300	1.0E+00	2800	3.9E-01	4300	5.8E-02
330	9.3E-01	630	1.0E+00	930	1.0E+00	1350	1.0E+00	2850	4.2E-01	4350	3.4E-02
340	9.7E-01	640	1.0E+00	940	1.0E+00	1400	1.0E+00	2900	4.4E-01	4400	1.7E-02
350	9.8E-01	650	1.0E+00	950	1.0E+00	1450	1.0E+00	2950	4.6E-01	4450	7.4E-03
360	9.9E-01	660	1.0E+00	960	1.0E+00	1500	1.0E+00	3000	4.7E-01	4500	2.9E-03
370	9.9E-01	670	1.0E+00	970	1.0E+00	1550	1.0E+00	3050	4.7E-01	4550	9.6E-04
380	9.9E-01	680	1.0E+00	980	1.0E+00	1600	1.0E+00	3100	4.7E-01	4600	2.9E-04
390	9.9E-01	690	1.0E+00	990	1.0E+00	1650	1.0E+00	3150	4.6E-01	4650	8.5E-05
400	9.9E-01	700	1.0E+00	1000	1.0E+00	1700	1.0E+00	3200	4.5E-01	4700	2.5E-05
410	9.9E-01	710	1.0E+00	1010	1.0E+00	1750	1.0E+00	3250	4.4E-01	4750	< 1.0E-05
420	9.9E-01	720	1.0E+00	1020	1.0E+00	1800	1.0E+00	3300	4.2E-01	4800	< 1.0E-05
430	9.9E-01	730	1.0E+00	1030	1.0E+00	1850	1.0E+00	3350	4.0E-01	4850	< 1.0E-05
440	9.9E-01	740	1.0E+00	1040	1.0E+00	1900	9.9E-01	3400	3.7E-01	4900	< 1.0E-05
450	9.9E-01	750	1.0E+00	1050	1.0E+00	1950	9.9E-01	3450	3.4E-01	4950	< 1.0E-05
460	9.9E-01	760	1.0E+00	1060	1.0E+00	2000	9.9E-01	3500	3.0E-01	5000	< 1.0E-05
470	9.9E-01	770	1.0E+00	1070	1.0E+00	2050	9.9E-01	3550	2.6E-01	5050	< 1.0E-05
480	9.9E-01	780	1.0E+00	1080	1.0E+00	2100	9.8E-01	3600	2.4E-01	5100	< 1.0E-05
490	9.9E-01	790	1.0E+00	1090	1.0E+00	2150	9.8E-01	3650	2.2E-01	5150	< 1.0E-05



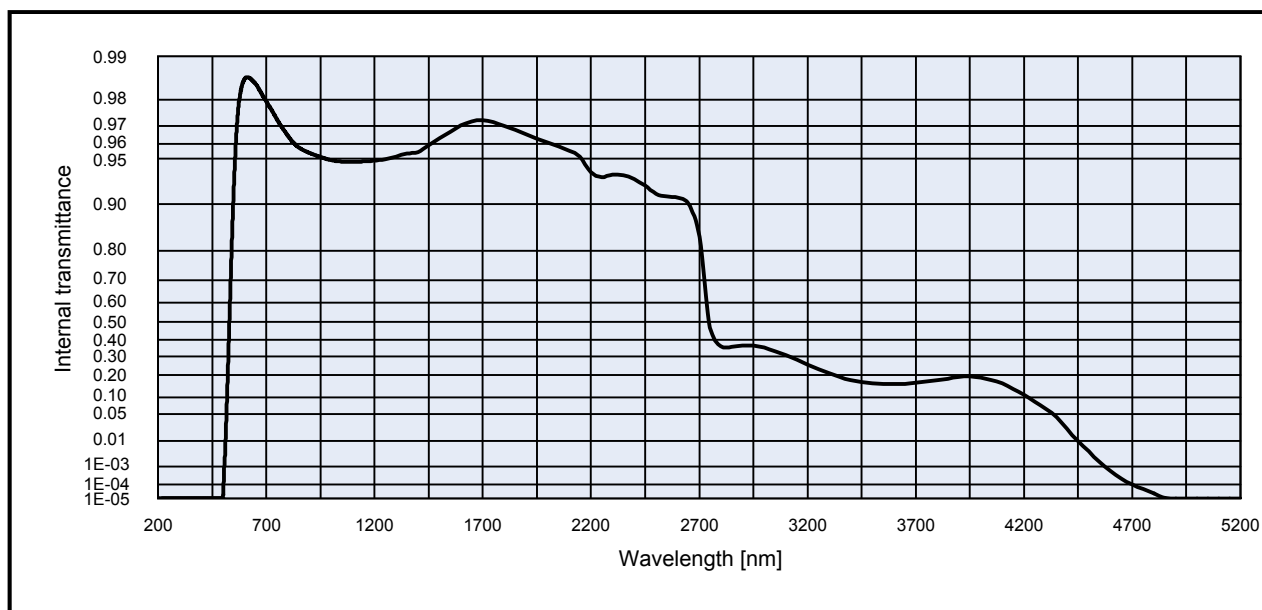
Internal transmittance τ_i at reference thickness d [mm] = 2
The internal transmittance values, tabulated and graphically represented, are reference values only

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	9.9E-01	800	1.0E+00	1100	1.0E+00	2200	9.7E-01	3700	2.0E-01
210	< 1.0E-05	510	9.9E-01	810	1.0E+00	1110	1.0E+00	2250	9.7E-01	3750	2.2E-01
220	< 1.0E-05	520	9.9E-01	820	1.0E+00	1120	1.0E+00	2300	9.7E-01	3800	2.4E-01
230	< 1.0E-05	530	9.9E-01	830	1.0E+00	1130	1.0E+00	2350	9.7E-01	3850	2.4E-01
240	< 1.0E-05	540	1.0E+00	840	1.0E+00	1140	1.0E+00	2400	9.6E-01	3900	2.2E-01
250	< 1.0E-05	550	1.0E+00	850	1.0E+00	1150	1.0E+00	2450	9.6E-01	3950	2.0E-01
260	< 1.0E-05	560	1.0E+00	860	1.0E+00	1160	1.0E+00	2500	9.5E-01	4000	1.9E-01
270	< 1.0E-05	570	1.0E+00	870	1.0E+00	1170	1.0E+00	2550	9.4E-01	4050	1.7E-01
280	< 1.0E-05	580	1.0E+00	880	1.0E+00	1180	1.0E+00	2600	9.4E-01	4100	1.5E-01
290	< 1.0E-05	590	1.0E+00	890	1.0E+00	1190	1.0E+00	2650	9.3E-01	4150	1.3E-01
300	9.6E-03	600	1.0E+00	900	1.0E+00	1200	1.0E+00	2700	8.5E-01	4200	1.1E-01
310	1.6E-01	610	1.0E+00	910	1.0E+00	1250	1.0E+00	2750	4.0E-01	4250	8.4E-02
320	5.1E-01	620	1.0E+00	920	1.0E+00	1300	1.0E+00	2800	3.3E-01	4300	6.0E-02
330	7.7E-01	630	1.0E+00	930	1.0E+00	1350	1.0E+00	2850	3.6E-01	4350	3.9E-02
340	9.0E-01	640	1.0E+00	940	1.0E+00	1400	1.0E+00	2900	3.9E-01	4400	2.2E-02
350	9.5E-01	650	1.0E+00	950	1.0E+00	1450	1.0E+00	2950	4.1E-01	4450	1.0E-02
360	9.7E-01	660	1.0E+00	960	1.0E+00	1500	1.0E+00	3000	4.2E-01	4500	4.0E-03
370	9.8E-01	670	1.0E+00	970	1.0E+00	1550	1.0E+00	3050	4.2E-01	4550	1.3E-03
380	9.9E-01	680	1.0E+00	980	1.0E+00	1600	1.0E+00	3100	4.2E-01	4600	4.1E-04
390	9.9E-01	690	1.0E+00	990	1.0E+00	1650	1.0E+00	3150	4.2E-01	4650	1.2E-04
400	9.9E-01	700	1.0E+00	1000	1.0E+00	1700	1.0E+00	3200	4.1E-01	4700	4.2E-05
410	9.9E-01	710	1.0E+00	1010	1.0E+00	1750	1.0E+00	3250	4.0E-01	4750	1.4E-05
420	9.9E-01	720	1.0E+00	1020	1.0E+00	1800	1.0E+00	3300	3.9E-01	4800	< 1.0E-05
430	9.9E-01	730	1.0E+00	1030	1.0E+00	1850	1.0E+00	3350	3.7E-01	4850	< 1.0E-05
440	9.9E-01	740	1.0E+00	1040	1.0E+00	1900	1.0E+00	3400	3.5E-01	4900	< 1.0E-05
450	9.9E-01	750	1.0E+00	1050	1.0E+00	1950	9.9E-01	3450	3.1E-01	4950	< 1.0E-05
460	9.9E-01	760	1.0E+00	1060	1.0E+00	2000	9.9E-01	3500	2.7E-01	5000	< 1.0E-05
470	9.9E-01	770	1.0E+00	1070	1.0E+00	2050	9.9E-01	3550	2.3E-01	5050	< 1.0E-05
480	9.9E-01	780	1.0E+00	1080	1.0E+00	2100	9.8E-01	3600	2.1E-01	5100	< 1.0E-05
490	9.9E-01	790	1.0E+00	1090	1.0E+00	2150	9.8E-01	3650	2.0E-01	5150	< 1.0E-05



Internal transmittance τ_i at reference thickness d [mm] = 3
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	5.1E-02	800	9.6E-01	1100	9.4E-01	2200	9.3E-01	3700	1.7E-01
210	< 1.0E-05	510	3.2E-01	810	9.6E-01	1110	9.4E-01	2250	9.3E-01	3750	1.7E-01
220	< 1.0E-05	520	6.7E-01	820	9.6E-01	1120	9.4E-01	2300	9.3E-01	3800	1.8E-01
230	< 1.0E-05	530	8.6E-01	830	9.6E-01	1130	9.4E-01	2350	9.3E-01	3850	1.8E-01
240	< 1.0E-05	540	9.4E-01	840	9.6E-01	1140	9.4E-01	2400	9.3E-01	3900	1.8E-01
250	< 1.0E-05	550	9.7E-01	850	9.6E-01	1150	9.4E-01	2450	9.2E-01	3950	1.8E-01
260	< 1.0E-05	560	9.8E-01	860	9.5E-01	1160	9.4E-01	2500	9.1E-01	4000	1.8E-01
270	< 1.0E-05	570	9.8E-01	870	9.5E-01	1170	9.4E-01	2550	9.2E-01	4050	1.7E-01
280	< 1.0E-05	580	9.9E-01	880	9.5E-01	1180	9.4E-01	2600	9.1E-01	4100	1.6E-01
290	< 1.0E-05	590	9.9E-01	890	9.5E-01	1190	9.4E-01	2650	8.9E-01	4150	1.4E-01
300	< 1.0E-05	600	9.9E-01	900	9.5E-01	1200	9.4E-01	2700	8.2E-01	4200	1.1E-01
310	< 1.0E-05	610	9.9E-01	910	9.5E-01	1250	9.4E-01	2750	4.5E-01	4250	8.6E-02
320	< 1.0E-05	620	9.9E-01	920	9.5E-01	1300	9.5E-01	2800	3.5E-01	4300	6.2E-02
330	< 1.0E-05	630	9.9E-01	930	9.5E-01	1350	9.5E-01	2850	3.4E-01	4350	4.1E-02
340	< 1.0E-05	640	9.9E-01	940	9.5E-01	1400	9.5E-01	2900	3.5E-01	4400	2.3E-02
350	< 1.0E-05	650	9.8E-01	950	9.5E-01	1450	9.5E-01	2950	3.6E-01	4450	1.0E-02
360	< 1.0E-05	660	9.8E-01	960	9.4E-01	1500	9.6E-01	3000	3.5E-01	4500	4.4E-03
370	< 1.0E-05	670	9.8E-01	970	9.4E-01	1550	9.6E-01	3050	3.3E-01	4550	1.7E-03
380	< 1.0E-05	680	9.8E-01	980	9.4E-01	1600	9.7E-01	3100	3.0E-01	4600	6.2E-04
390	< 1.0E-05	690	9.8E-01	990	9.4E-01	1650	9.7E-01	3150	2.7E-01	4650	2.6E-04
400	< 1.0E-05	700	9.8E-01	1000	9.4E-01	1700	9.7E-01	3200	2.4E-01	4700	1.1E-04
410	< 1.0E-05	710	9.8E-01	1010	9.4E-01	1750	9.7E-01	3250	2.2E-01	4750	5.1E-05
420	< 1.0E-05	720	9.8E-01	1020	9.4E-01	1800	9.7E-01	3300	2.0E-01	4800	2.4E-05
430	< 1.0E-05	730	9.7E-01	1030	9.4E-01	1850	9.6E-01	3350	1.9E-01	4850	1.2E-05
440	< 1.0E-05	740	9.7E-01	1040	9.4E-01	1900	9.6E-01	3400	1.7E-01	4900	< 1.0E-05
450	< 1.0E-05	750	9.7E-01	1050	9.4E-01	1950	9.6E-01	3450	1.6E-01	4950	< 1.0E-05
460	< 1.0E-05	760	9.7E-01	1060	9.4E-01	2000	9.6E-01	3500	1.5E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.7E-01	1070	9.4E-01	2050	9.5E-01	3550	1.5E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.7E-01	1080	9.4E-01	2100	9.5E-01	3600	1.5E-01	5100	< 1.0E-05
490	9.7E-04	790	9.6E-01	1090	9.4E-01	2150	9.5E-01	3650	1.6E-01	5150	< 1.0E-05



Internal transmittance τ_i at reference thickness d [mm] = 3
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	< 1.0E-05	800	9.6E-01	1100	9.5E-01	2200	9.4E-01	3700	1.6E-01
210	< 1.0E-05	510	5.2E-03	810	9.6E-01	1110	9.5E-01	2250	9.3E-01	3750	1.7E-01
220	< 1.0E-05	520	1.4E-01	820	9.6E-01	1120	9.5E-01	2300	9.4E-01	3800	1.8E-01
230	< 1.0E-05	530	5.1E-01	830	9.6E-01	1130	9.5E-01	2350	9.4E-01	3850	1.8E-01
240	< 1.0E-05	540	8.0E-01	840	9.6E-01	1140	9.5E-01	2400	9.3E-01	3900	1.9E-01
250	< 1.0E-05	550	9.2E-01	850	9.6E-01	1150	9.5E-01	2450	9.2E-01	3950	1.9E-01
260	< 1.0E-05	560	9.6E-01	860	9.6E-01	1160	9.5E-01	2500	9.1E-01	4000	1.9E-01
270	< 1.0E-05	570	9.8E-01	870	9.6E-01	1170	9.5E-01	2550	9.1E-01	4050	1.8E-01
280	< 1.0E-05	580	9.8E-01	880	9.6E-01	1180	9.5E-01	2600	9.1E-01	4100	1.6E-01
290	< 1.0E-05	590	9.8E-01	890	9.5E-01	1190	9.5E-01	2650	9.0E-01	4150	1.3E-01
300	< 1.0E-05	600	9.9E-01	900	9.5E-01	1200	9.5E-01	2700	8.4E-01	4200	1.1E-01
310	< 1.0E-05	610	9.9E-01	910	9.5E-01	1250	9.5E-01	2750	4.7E-01	4250	8.5E-02
320	< 1.0E-05	620	9.9E-01	920	9.5E-01	1300	9.5E-01	2800	3.6E-01	4300	6.3E-02
330	< 1.0E-05	630	9.9E-01	930	9.5E-01	1350	9.5E-01	2850	3.6E-01	4350	4.3E-02
340	< 1.0E-05	640	9.9E-01	940	9.5E-01	1400	9.5E-01	2900	3.6E-01	4400	2.3E-02
350	< 1.0E-05	650	9.8E-01	950	9.5E-01	1450	9.6E-01	2950	3.6E-01	4450	1.0E-02
360	< 1.0E-05	660	9.8E-01	960	9.5E-01	1500	9.6E-01	3000	3.5E-01	4500	4.3E-03
370	< 1.0E-05	670	9.8E-01	970	9.5E-01	1550	9.7E-01	3050	3.3E-01	4550	1.6E-03
380	< 1.0E-05	680	9.8E-01	980	9.5E-01	1600	9.7E-01	3100	3.1E-01	4600	5.9E-04
390	< 1.0E-05	690	9.8E-01	990	9.5E-01	1650	9.7E-01	3150	2.8E-01	4650	2.3E-04
400	< 1.0E-05	700	9.8E-01	1000	9.5E-01	1700	9.7E-01	3200	2.6E-01	4700	1.0E-04
410	< 1.0E-05	710	9.8E-01	1010	9.5E-01	1750	9.7E-01	3250	2.3E-01	4750	4.9E-05
420	< 1.0E-05	720	9.8E-01	1020	9.5E-01	1800	9.7E-01	3300	2.1E-01	4800	2.4E-05
430	< 1.0E-05	730	9.8E-01	1030	9.5E-01	1850	9.7E-01	3350	1.9E-01	4850	1.1E-05
440	< 1.0E-05	740	9.7E-01	1040	9.5E-01	1900	9.7E-01	3400	1.7E-01	4900	< 1.0E-05
450	< 1.0E-05	750	9.7E-01	1050	9.5E-01	1950	9.6E-01	3450	1.6E-01	4950	< 1.0E-05
460	< 1.0E-05	760	9.7E-01	1060	9.5E-01	2000	9.6E-01	3500	1.6E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.7E-01	1070	9.5E-01	2050	9.6E-01	3550	1.6E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.7E-01	1080	9.5E-01	2100	9.6E-01	3600	1.5E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.7E-01	1090	9.5E-01	2150	9.5E-01	3650	1.6E-01	5150	< 1.0E-05

OG550

OG550	
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Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	3

Spectral values guaranteed	
λ_c ($\tau_i = 0.50$) [nm]	= 550 ± 6
λ_s ($\tau_{is} = 1 \cdot 10^{-5}$) [nm]	= 480
λ_p ($\tau_{ip} = 0.93$) [nm]	= 620

Refractive index n		
λ [nm]	Element	n
546	Hg	1.51
587.6	He	1.51
852.1	Cs	1.51
1014	Hg	1.50

Density	
ρ [g/cm ³]	2.56

Bubble content	
Bubble class	3

Chemical resistance	
FR class	0
SR class	1.0
AR class	1.0

Transformation temperature	
T_g [°C]	507

Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	7.9
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9.0
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	0.12

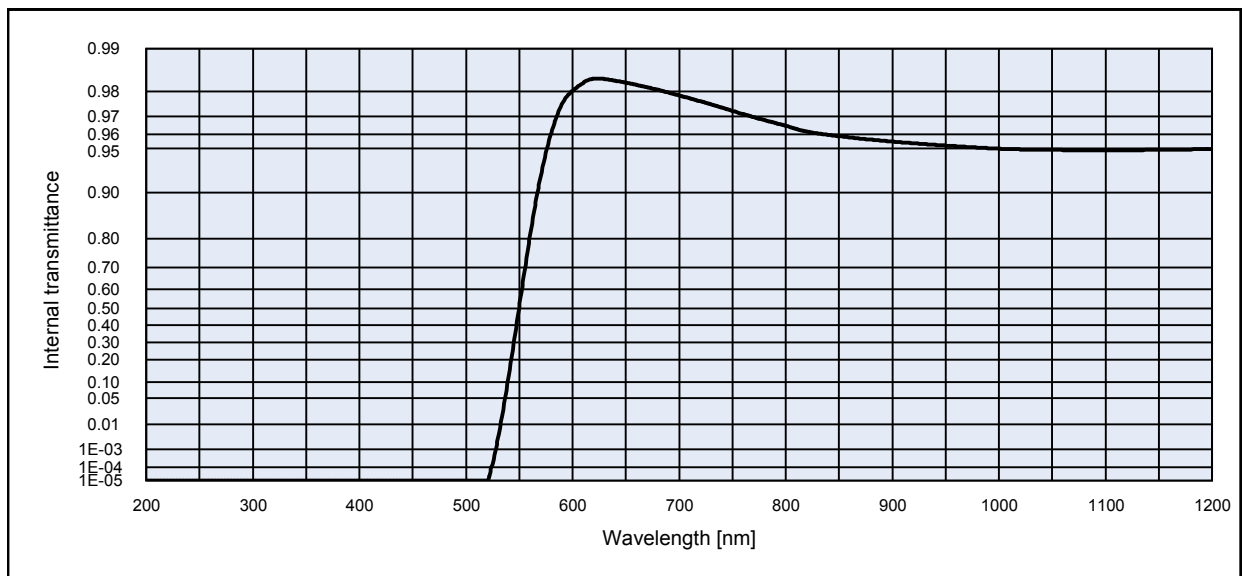
Notes

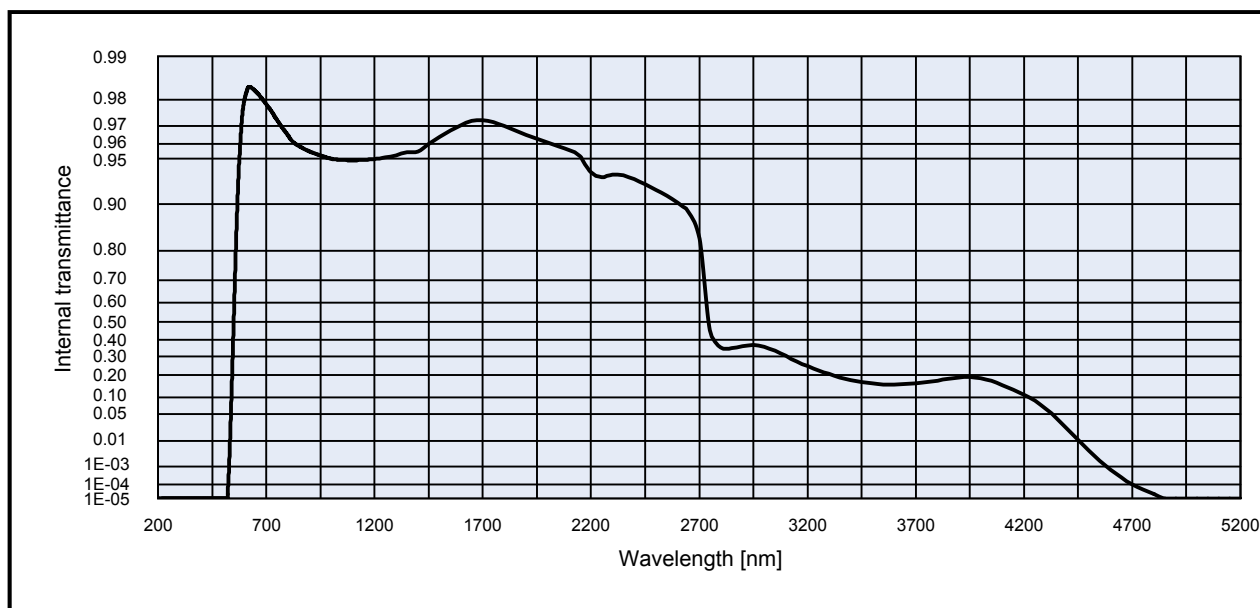
Colloidally colored glass

Long pass filter

All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]
x	0.565	0.580	0.587	x	0.558	0.574	0.581	x	0.521	0.547	0.557
y	0.429	0.419	0.412	y	0.435	0.425	0.418	y	0.459	0.451	0.441
Y	70	65	62	Y	68	63	59	Y	58	52	49
λ_d [nm]	589	591	592	λ_d [nm]	588	590	591	λ_d [nm]	583	586	587
P_e	0.96	1.00	1.00	P_e	0.96	1.00	1.00	P_e	0.95	1.00	1.00



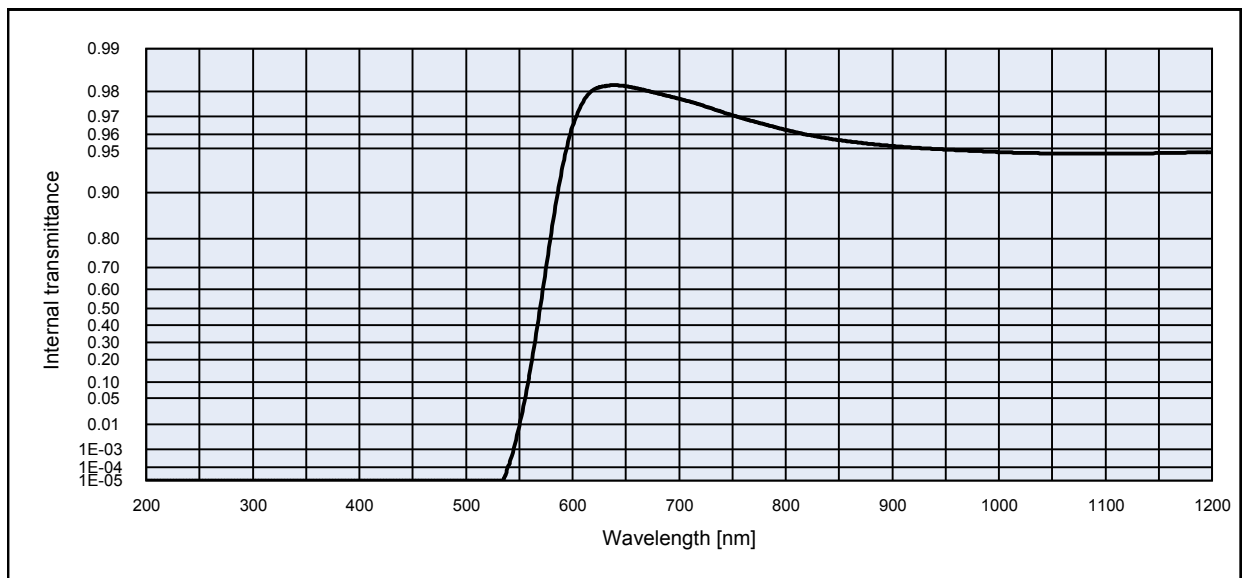


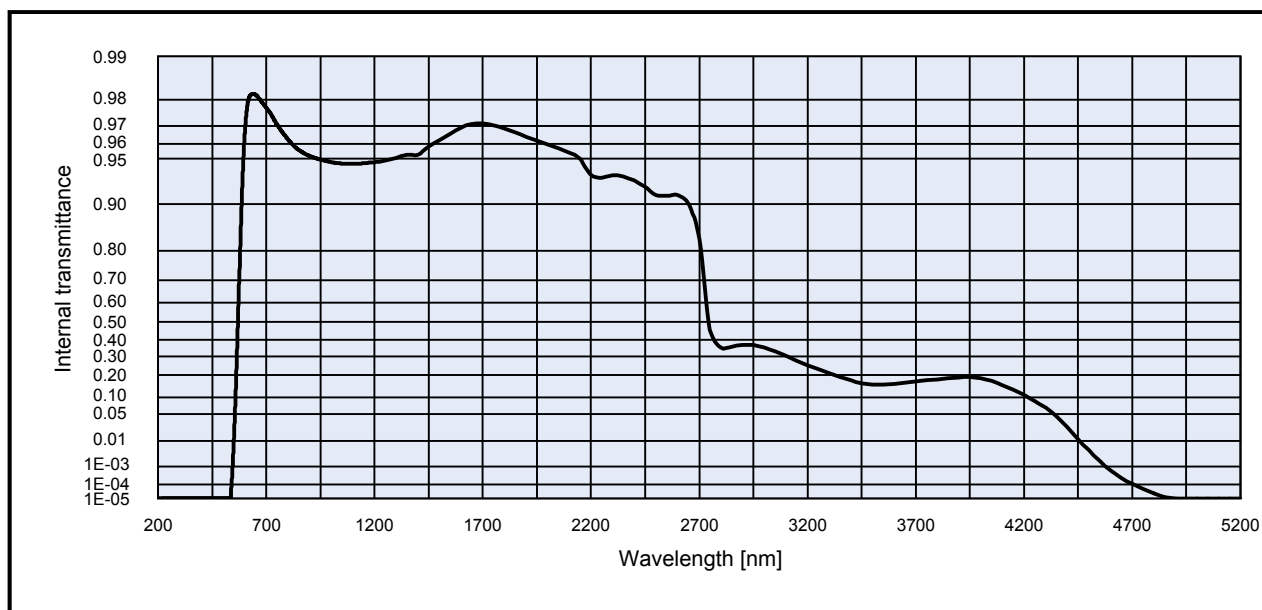
Internal transmittance τ_i at reference thickness d [mm] = 3
The internal transmittance values, tabulated and graphically represented, are reference values only

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	< 1.0E-05	800	9.7E-01	1100	9.5E-01	2200	9.4E-01	3700	1.6E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.6E-01	1110	9.5E-01	2250	9.3E-01	3750	1.7E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.6E-01	1120	9.5E-01	2300	9.4E-01	3800	1.7E-01
230	< 1.0E-05	530	2.8E-03	830	9.6E-01	1130	9.5E-01	2350	9.4E-01	3850	1.8E-01
240	< 1.0E-05	540	1.2E-01	840	9.6E-01	1140	9.5E-01	2400	9.3E-01	3900	1.9E-01
250	< 1.0E-05	550	5.1E-01	850	9.6E-01	1150	9.5E-01	2450	9.3E-01	3950	1.9E-01
260	< 1.0E-05	560	8.1E-01	860	9.6E-01	1160	9.5E-01	2500	9.2E-01	4000	1.8E-01
270	< 1.0E-05	570	9.2E-01	870	9.6E-01	1170	9.5E-01	2550	9.1E-01	4050	1.7E-01
280	< 1.0E-05	580	9.6E-01	880	9.6E-01	1180	9.5E-01	2600	9.0E-01	4100	1.5E-01
290	< 1.0E-05	590	9.8E-01	890	9.6E-01	1190	9.5E-01	2650	8.9E-01	4150	1.3E-01
300	< 1.0E-05	600	9.8E-01	900	9.6E-01	1200	9.5E-01	2700	8.3E-01	4200	1.1E-01
310	< 1.0E-05	610	9.8E-01	910	9.5E-01	1250	9.5E-01	2750	4.6E-01	4250	8.8E-02
320	< 1.0E-05	620	9.8E-01	920	9.5E-01	1300	9.5E-01	2800	3.5E-01	4300	6.2E-02
330	< 1.0E-05	630	9.8E-01	930	9.5E-01	1350	9.5E-01	2850	3.5E-01	4350	3.9E-02
340	< 1.0E-05	640	9.8E-01	940	9.5E-01	1400	9.6E-01	2900	3.6E-01	4400	2.3E-02
350	< 1.0E-05	650	9.8E-01	950	9.5E-01	1450	9.6E-01	2950	3.7E-01	4450	1.1E-02
360	< 1.0E-05	660	9.8E-01	960	9.5E-01	1500	9.6E-01	3000	3.6E-01	4500	4.7E-03
370	< 1.0E-05	670	9.8E-01	970	9.5E-01	1550	9.7E-01	3050	3.4E-01	4550	1.8E-03
380	< 1.0E-05	680	9.8E-01	980	9.5E-01	1600	9.7E-01	3100	3.1E-01	4600	7.0E-04
390	< 1.0E-05	690	9.8E-01	990	9.5E-01	1650	9.7E-01	3150	2.7E-01	4650	2.7E-04
400	< 1.0E-05	700	9.8E-01	1000	9.5E-01	1700	9.7E-01	3200	2.5E-01	4700	1.0E-04
410	< 1.0E-05	710	9.8E-01	1010	9.5E-01	1750	9.7E-01	3250	2.2E-01	4750	4.5E-05
420	< 1.0E-05	720	9.8E-01	1020	9.5E-01	1800	9.7E-01	3300	2.1E-01	4800	2.3E-05
430	< 1.0E-05	730	9.8E-01	1030	9.5E-01	1850	9.7E-01	3350	1.9E-01	4850	1.1E-05
440	< 1.0E-05	740	9.7E-01	1040	9.5E-01	1900	9.7E-01	3400	1.7E-01	4900	< 1.0E-05
450	< 1.0E-05	750	9.7E-01	1050	9.5E-01	1950	9.6E-01	3450	1.7E-01	4950	< 1.0E-05
460	< 1.0E-05	760	9.7E-01	1060	9.5E-01	2000	9.6E-01	3500	1.6E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.7E-01	1070	9.5E-01	2050	9.6E-01	3550	1.5E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.7E-01	1080	9.5E-01	2100	9.6E-01	3600	1.5E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.7E-01	1090	9.5E-01	2150	9.5E-01	3650	1.6E-01	5150	< 1.0E-05

OG570			Density		Notes		
			ρ [g/cm ³]		2.56		
Reflection factor			Bubble content		Colloidally colored glass		
P_d			Bubble class		Long pass filter		
0.92			3				
Reference thickness			Chemical resistance				
d [mm]			FR class				
3			SR class				
			AR class				
			1.0				
			1.0				
Spectral values guaranteed			Transformation temperature				
λ_c ($\tau_i = 0.50$) [nm] = 570 ± 6			T _g [°C]		510		
λ_s ($\tau_{is} = 1 \cdot 10^{-5}$) [nm] = 500			Thermal expansion				
λ_p ($\tau_{ip} = 0.93$) [nm] = 640			$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]		7.9		
			$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]		9.0		
			$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]				
			Temperature coefficient				
			T _k [nm/°C]		0.12		
Refractive index n					<p>All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".</p>		
λ [nm]	Element	n					
587.6	He	1.51					
852.1	Cs	1.51					
1014	Hg	1.50					

Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]
x	0.600	0.619	0.627	x	0.595	0.616	0.624	x	0.566	0.600	0.611
y	0.394	0.380	0.372	y	0.398	0.384	0.375	y	0.412	0.399	0.389
Y	56	49	46	Y	53	47	44	Y	43	36	33
λ_d [nm]	596	598	600	λ_d [nm]	595	598	599	λ_d [nm]	591	595	597
P _e	0.96	1.00	1.00	P _e	0.96	1.00	1.00	P _e	0.94	1.00	1.00





Internal transmittance τ_i at reference thickness d [mm] = 3
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	< 1.0E-05	800	9.6E-01	1100	9.5E-01	2200	9.4E-01	3700	1.7E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.6E-01	1110	9.5E-01	2250	9.3E-01	3750	1.7E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.6E-01	1120	9.5E-01	2300	9.4E-01	3800	1.8E-01
230	< 1.0E-05	530	< 1.0E-05	830	9.6E-01	1130	9.5E-01	2350	9.3E-01	3850	1.8E-01
240	< 1.0E-05	540	1.3E-04	840	9.6E-01	1140	9.5E-01	2400	9.3E-01	3900	1.9E-01
250	< 1.0E-05	550	8.8E-03	850	9.6E-01	1150	9.5E-01	2450	9.2E-01	3950	1.9E-01
260	< 1.0E-05	560	1.4E-01	860	9.6E-01	1160	9.5E-01	2500	9.1E-01	4000	1.8E-01
270	< 1.0E-05	570	5.2E-01	870	9.5E-01	1170	9.5E-01	2550	9.1E-01	4050	1.7E-01
280	< 1.0E-05	580	8.2E-01	880	9.5E-01	1180	9.5E-01	2600	9.1E-01	4100	1.5E-01
290	< 1.0E-05	590	9.3E-01	890	9.5E-01	1190	9.5E-01	2650	9.0E-01	4150	1.3E-01
300	< 1.0E-05	600	9.6E-01	900	9.5E-01	1200	9.5E-01	2700	8.3E-01	4200	1.1E-01
310	< 1.0E-05	610	9.8E-01	910	9.5E-01	1250	9.5E-01	2750	4.6E-01	4250	8.8E-02
320	< 1.0E-05	620	9.8E-01	920	9.5E-01	1300	9.5E-01	2800	3.5E-01	4300	6.6E-02
330	< 1.0E-05	630	9.8E-01	930	9.5E-01	1350	9.5E-01	2850	3.6E-01	4350	4.4E-02
340	< 1.0E-05	640	9.8E-01	940	9.5E-01	1400	9.5E-01	2900	3.7E-01	4400	2.5E-02
350	< 1.0E-05	650	9.8E-01	950	9.5E-01	1450	9.6E-01	2950	3.7E-01	4450	1.1E-02
360	< 1.0E-05	660	9.8E-01	960	9.5E-01	1500	9.6E-01	3000	3.5E-01	4500	4.9E-03
370	< 1.0E-05	670	9.8E-01	970	9.5E-01	1550	9.7E-01	3050	3.3E-01	4550	1.9E-03
380	< 1.0E-05	680	9.8E-01	980	9.5E-01	1600	9.7E-01	3100	3.1E-01	4600	6.6E-04
390	< 1.0E-05	690	9.8E-01	990	9.5E-01	1650	9.7E-01	3150	2.8E-01	4650	2.5E-04
400	< 1.0E-05	700	9.8E-01	1000	9.5E-01	1700	9.7E-01	3200	2.5E-01	4700	1.1E-04
410	< 1.0E-05	710	9.8E-01	1010	9.5E-01	1750	9.7E-01	3250	2.3E-01	4750	5.3E-05
420	< 1.0E-05	720	9.8E-01	1020	9.5E-01	1800	9.7E-01	3300	2.1E-01	4800	2.5E-05
430	< 1.0E-05	730	9.7E-01	1030	9.5E-01	1850	9.7E-01	3350	1.9E-01	4850	1.2E-05
440	< 1.0E-05	740	9.7E-01	1040	9.5E-01	1900	9.6E-01	3400	1.7E-01	4900	< 1.0E-05
450	< 1.0E-05	750	9.7E-01	1050	9.5E-01	1950	9.6E-01	3450	1.6E-01	4950	< 1.0E-05
460	< 1.0E-05	760	9.7E-01	1060	9.5E-01	2000	9.6E-01	3500	1.5E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.7E-01	1070	9.5E-01	2050	9.6E-01	3550	1.5E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.7E-01	1080	9.5E-01	2100	9.5E-01	3600	1.6E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.6E-01	1090	9.5E-01	2150	9.5E-01	3650	1.6E-01	5150	< 1.0E-05

OG590

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	3

Spectral values guaranteed	
λ_c ($\tau_i = 0.50$) [nm]	= 590 ± 6
λ_s ($\tau_{is} = 1 \cdot 10^{-5}$) [nm]	= 510
λ_p ($\tau_{ip} = 0.93$) [nm]	= 660

Refractive index n		
λ [nm]	Element	n
587.6	He	1.51
852.1	Cs	1.51
1014	Hg	1.50

Density	
ρ [g/cm ³]	2.56

Bubble content	
Bubble class	3

Chemical resistance	
FR class	0
SR class	1.0
AR class	1.0

Transformation temperature	
T_g [°C]	506

Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	7.9
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9.0
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	0.13

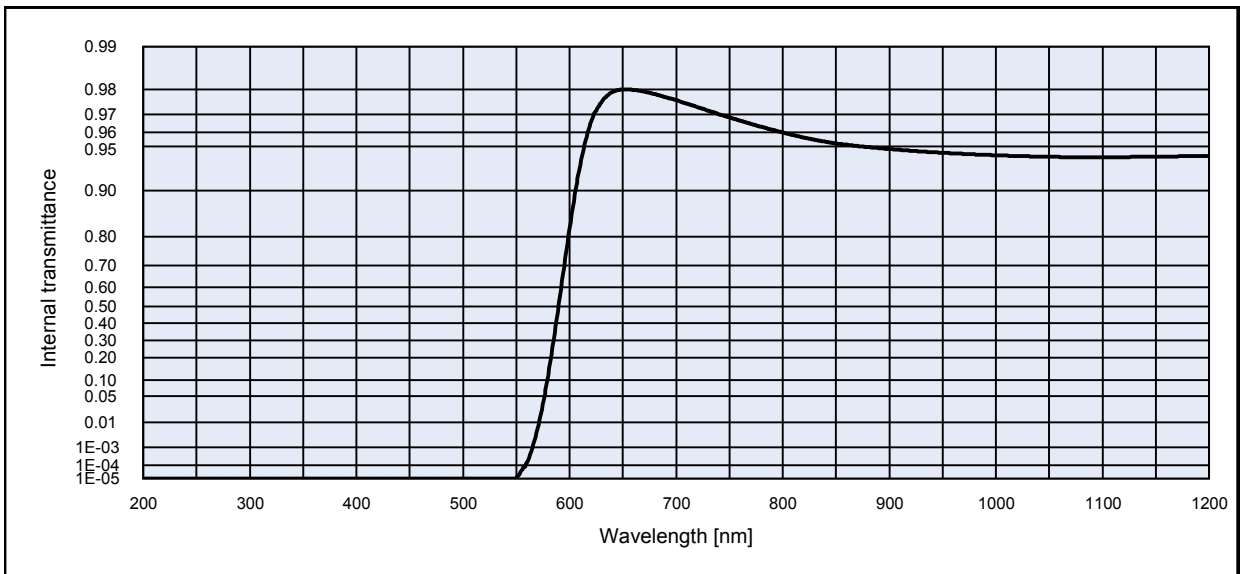
Notes

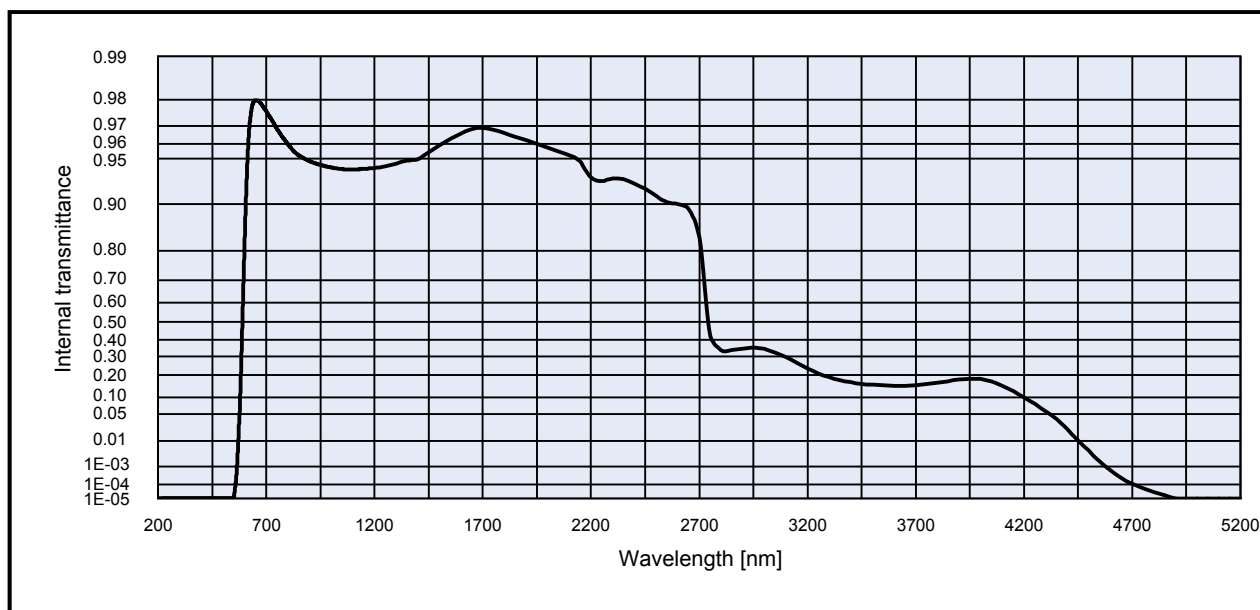
Colloidally colored glass

Long pass filter

All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation											
Illuminant A (Planck T = 2856 K)				Illuminant Planck T = 3200 K				Illuminant D65 (T _c = 6504 K)			
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3
x	0.639	0.662	0.669	x	0.635	0.660	0.667	x	0.610	0.652	0.661
y	0.354	0.338	0.331	y	0.356	0.340	0.332	y	0.361	0.347	0.338
Y	39	33	30	Y	37	31	28	Y	27	22	19
λ_d [nm]	605	609	611	λ_d [nm]	604	608	611	λ_d [nm]	602	606	609
P_e	0.96	1.00	1.00	P_e	0.95	1.00	1.00	P_e	0.92	1.00	1.00





Internal transmittance τ_i at reference thickness d [mm] = 3
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	< 1.0E-05	800	9.6E-01	1100	9.4E-01	2200	9.3E-01	3700	1.5E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.6E-01	1110	9.4E-01	2250	9.3E-01	3750	1.6E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.6E-01	1120	9.4E-01	2300	9.3E-01	3800	1.6E-01
230	< 1.0E-05	530	< 1.0E-05	830	9.6E-01	1130	9.4E-01	2350	9.3E-01	3850	1.7E-01
240	< 1.0E-05	540	< 1.0E-05	840	9.5E-01	1140	9.4E-01	2400	9.3E-01	3900	1.8E-01
250	< 1.0E-05	550	1.1E-05	850	9.5E-01	1150	9.4E-01	2450	9.2E-01	3950	1.8E-01
260	< 1.0E-05	560	1.3E-04	860	9.5E-01	1160	9.4E-01	2500	9.1E-01	4000	1.8E-01
270	< 1.0E-05	570	5.9E-03	870	9.5E-01	1170	9.4E-01	2550	9.0E-01	4050	1.7E-01
280	< 1.0E-05	580	1.2E-01	880	9.5E-01	1180	9.4E-01	2600	9.0E-01	4100	1.5E-01
290	< 1.0E-05	590	5.2E-01	890	9.5E-01	1190	9.4E-01	2650	8.9E-01	4150	1.2E-01
300	< 1.0E-05	600	8.2E-01	900	9.5E-01	1200	9.4E-01	2700	8.3E-01	4200	1.0E-01
310	< 1.0E-05	610	9.3E-01	910	9.5E-01	1250	9.4E-01	2750	4.3E-01	4250	7.8E-02
320	< 1.0E-05	620	9.7E-01	920	9.5E-01	1300	9.5E-01	2800	3.4E-01	4300	5.7E-02
330	< 1.0E-05	630	9.8E-01	930	9.5E-01	1350	9.5E-01	2850	3.4E-01	4350	3.9E-02
340	< 1.0E-05	640	9.8E-01	940	9.5E-01	1400	9.5E-01	2900	3.5E-01	4400	2.2E-02
350	< 1.0E-05	650	9.8E-01	950	9.4E-01	1450	9.5E-01	2950	3.5E-01	4450	1.0E-02
360	< 1.0E-05	660	9.8E-01	960	9.4E-01	1500	9.6E-01	3000	3.5E-01	4500	4.7E-03
370	< 1.0E-05	670	9.8E-01	970	9.4E-01	1550	9.6E-01	3050	3.3E-01	4550	1.7E-03
380	< 1.0E-05	680	9.8E-01	980	9.4E-01	1600	9.7E-01	3100	3.0E-01	4600	6.6E-04
390	< 1.0E-05	690	9.8E-01	990	9.4E-01	1650	9.7E-01	3150	2.6E-01	4650	2.5E-04
400	< 1.0E-05	700	9.8E-01	1000	9.4E-01	1700	9.7E-01	3200	2.3E-01	4700	1.1E-04
410	< 1.0E-05	710	9.7E-01	1010	9.4E-01	1750	9.7E-01	3250	2.1E-01	4750	5.7E-05
420	< 1.0E-05	720	9.7E-01	1020	9.4E-01	1800	9.7E-01	3300	1.9E-01	4800	3.2E-05
430	< 1.0E-05	730	9.7E-01	1030	9.4E-01	1850	9.6E-01	3350	1.8E-01	4850	1.8E-05
440	< 1.0E-05	740	9.7E-01	1040	9.4E-01	1900	9.6E-01	3400	1.6E-01	4900	< 1.0E-05
450	< 1.0E-05	750	9.7E-01	1050	9.4E-01	1950	9.6E-01	3450	1.6E-01	4950	< 1.0E-05
460	< 1.0E-05	760	9.7E-01	1060	9.4E-01	2000	9.6E-01	3500	1.5E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.7E-01	1070	9.4E-01	2050	9.5E-01	3550	1.5E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.6E-01	1080	9.4E-01	2100	9.5E-01	3600	1.5E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.6E-01	1090	9.4E-01	2150	9.5E-01	3650	1.5E-01	5150	< 1.0E-05

RG9

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	3

Spectral values guaranteed	
τ_i (720 nm)	≤ 0.45
τ_i (800 nm)	≥ 0.92
τ_i (1060 nm)	≤ 0.40

Refractive index n		
λ [nm]	Element	n
587.6	He	1.52
852.1	Cs	1.51
1014	Hg	1.50

Density	
ρ [g/cm ³]	2.58

Bubble content	
Bubble class	3

Chemical resistance	
FR class	0
SR class	1.0
AR class	1.0

Transformation temperature	
T_g [°C]	519

Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	7.9
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9.0
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	0.06

Notes

Ionically / Colloidally colored glass

Band pass filter / long pass filter

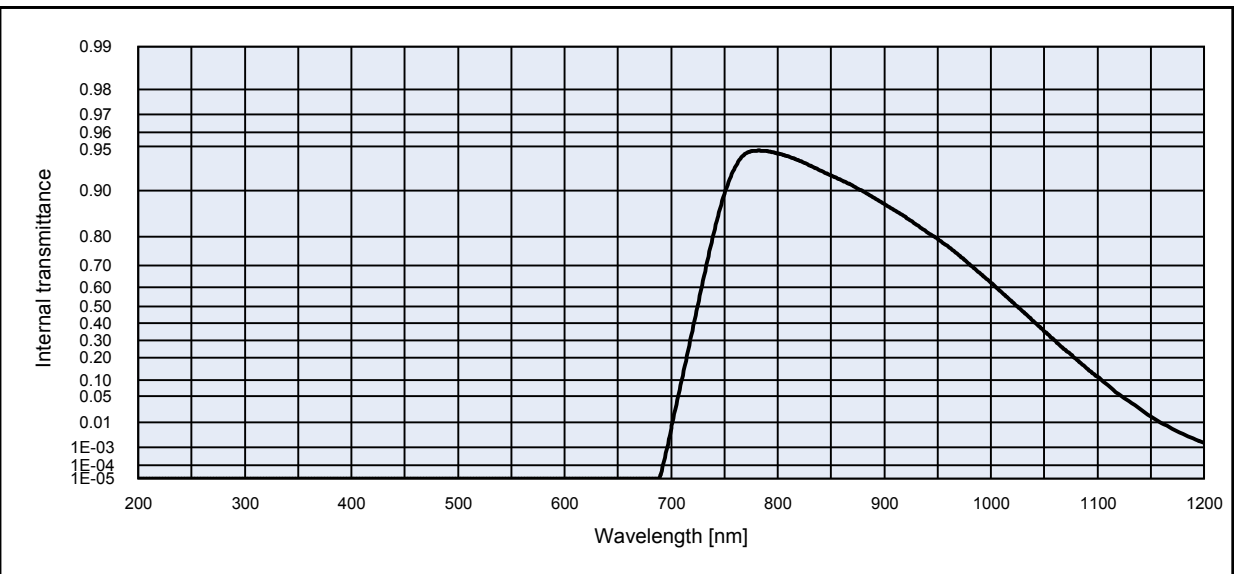
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

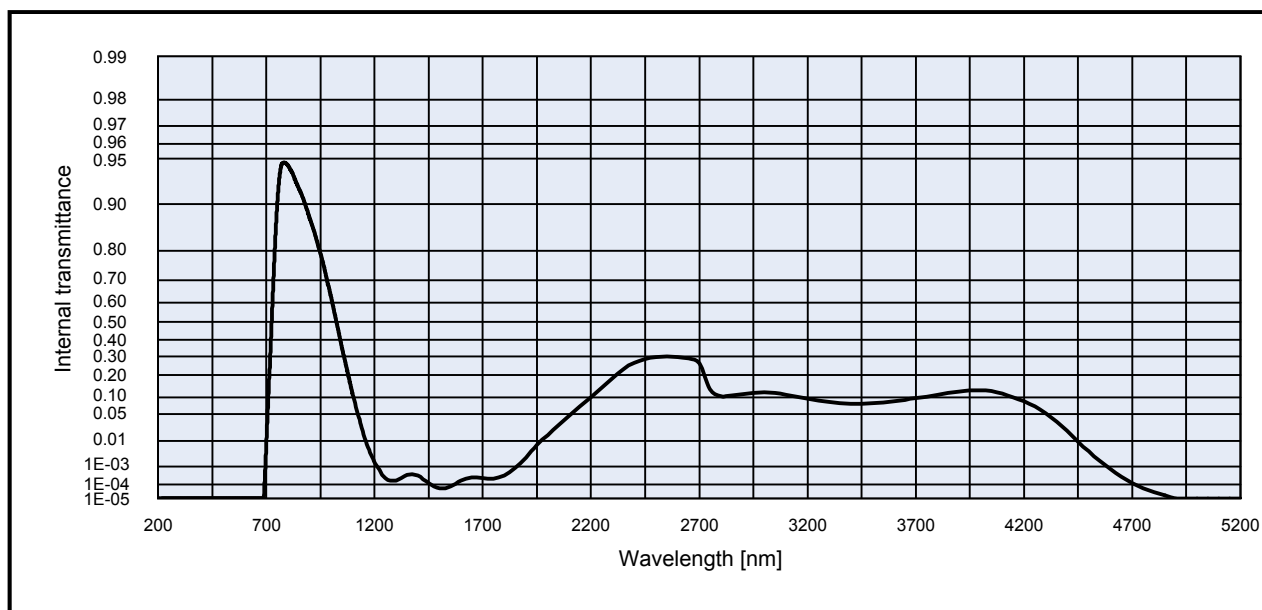
Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
	1	2	3
d [mm]			
x			
y			
Y			
λ_d [nm]			
P_e			

Illuminant	Planck T = 3200 K		
	1	2	3
d [mm]			
x			
y			
Y			
λ_d [nm]			
P_e			

Illuminant	D65 ($T_c = 6504$ K)		
	1	2	3
d [mm]			
x			
y			
Y			
λ_d [nm]			
P_e			



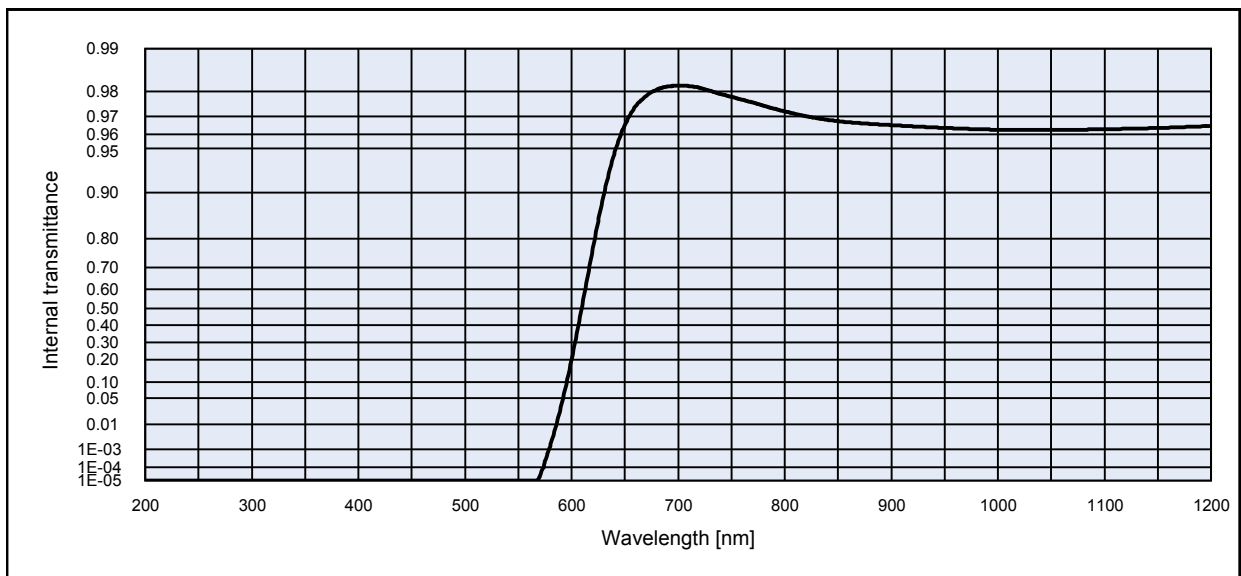


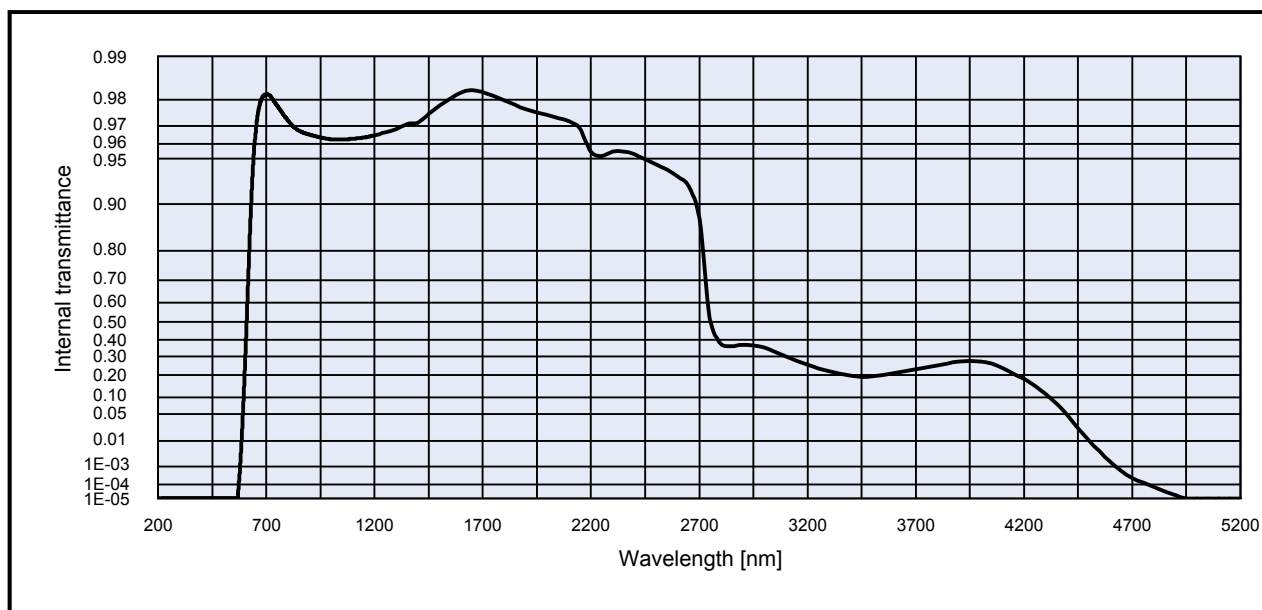
Internal transmittance τ_i at reference thickness d [mm] = 3
The internal transmittance values, tabulated and graphically represented, are reference values only

λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i
200	< 1.0E-05	500	< 1.0E-05	800	9.4E-01	1100	1.1E-01	2200	1.0E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.4E-01	1110	8.1E-02	2250	1.4E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.4E-01	1120	5.6E-02	2300	1.8E-01
230	< 1.0E-05	530	< 1.0E-05	830	9.3E-01	1130	3.9E-02	2350	2.3E-01
240	< 1.0E-05	540	< 1.0E-05	840	9.3E-01	1140	2.5E-02	2400	2.6E-01
250	< 1.0E-05	550	< 1.0E-05	850	9.2E-01	1150	1.6E-02	2450	2.9E-01
260	< 1.0E-05	560	< 1.0E-05	860	9.1E-01	1160	9.6E-03	2500	3.0E-01
270	< 1.0E-05	570	< 1.0E-05	870	9.1E-01	1170	6.1E-03	2550	3.0E-01
280	< 1.0E-05	580	< 1.0E-05	880	9.0E-01	1180	3.9E-03	2600	3.0E-01
290	< 1.0E-05	590	< 1.0E-05	890	8.9E-01	1190	2.5E-03	2650	2.9E-01
300	< 1.0E-05	600	< 1.0E-05	900	8.8E-01	1200	1.6E-03	2700	2.6E-01
310	< 1.0E-05	610	< 1.0E-05	910	8.7E-01	1250	2.5E-04	2750	1.3E-01
320	< 1.0E-05	620	< 1.0E-05	920	8.5E-01	1300	1.8E-04	2800	1.0E-01
330	< 1.0E-05	630	< 1.0E-05	930	8.3E-01	1350	3.7E-04	2850	1.1E-01
340	< 1.0E-05	640	< 1.0E-05	940	8.1E-01	1400	3.4E-04	2900	1.1E-01
350	< 1.0E-05	650	< 1.0E-05	950	7.9E-01	1450	1.3E-04	2950	1.2E-01
360	< 1.0E-05	660	< 1.0E-05	960	7.7E-01	1500	5.7E-05	3000	1.2E-01
370	< 1.0E-05	670	< 1.0E-05	970	7.4E-01	1550	7.8E-05	3050	1.2E-01
380	< 1.0E-05	680	< 1.0E-05	980	7.1E-01	1600	1.7E-04	3100	1.1E-01
390	< 1.0E-05	690	1.9E-05	990	6.7E-01	1650	2.7E-04	3150	1.0E-01
400	< 1.0E-05	700	6.4E-03	1000	6.2E-01	1700	2.4E-04	3200	9.5E-02
410	< 1.0E-05	710	9.9E-02	1010	5.8E-01	1750	2.2E-04	3250	8.9E-02
420	< 1.0E-05	720	3.6E-01	1020	5.2E-01	1800	3.3E-04	3300	8.4E-02
430	< 1.0E-05	730	6.3E-01	1030	4.7E-01	1850	8.6E-04	3350	8.0E-02
440	< 1.0E-05	740	8.1E-01	1040	4.1E-01	1900	2.5E-03	3400	7.7E-02
450	< 1.0E-05	750	9.0E-01	1050	3.5E-01	1950	7.4E-03	3450	7.8E-02
460	< 1.0E-05	760	9.3E-01	1060	3.0E-01	2000	1.5E-02	3500	7.9E-02
470	< 1.0E-05	770	9.4E-01	1070	2.4E-01	2050	2.8E-02	3550	8.2E-02
480	< 1.0E-05	780	9.5E-01	1080	1.9E-01	2100	4.6E-02	3600	8.7E-02
490	< 1.0E-05	790	9.5E-01	1090	1.5E-01	2150	7.0E-02	3650	9.2E-02
								3700	9.7E-02
								3750	1.0E-01
								3800	1.1E-01
								3850	1.2E-01
								3900	1.2E-01
								3950	1.3E-01
								4000	1.3E-01
								4050	1.3E-01
								4100	1.1E-01
								4150	1.0E-01
								4200	8.6E-02
								4250	7.0E-02
								4300	5.2E-02
								4350	3.4E-02
								4400	2.0E-02
								4450	9.8E-03
								4500	4.4E-03
								4550	1.8E-03
								4600	7.2E-04
								4650	2.8E-04
								4700	1.2E-04
								4750	5.8E-05
								4800	3.2E-05
								4850	1.7E-05
								4900	< 1.0E-05
								4950	< 1.0E-05
								5000	< 1.0E-05
								5050	< 1.0E-05
								5100	< 1.0E-05
								5150	< 1.0E-05

RG610			Density		Notes		
			ρ [g/cm ³]		2.65		
Reflection factor			Bubble content		Colloidally colored glass		
P_d			Bubble class		Long pass filter		
0.92			3				
Reference thickness			Chemical resistance				
d [mm]			FR class				
3			SR class				
			AR class				
			1.0				
			1.0				
Spectral values guaranteed			Transformation temperature				
λ_c ($\tau_i = 0.50$) [nm]			T _g [°C]		520		
= 610 ± 6							
λ_s ($\tau_{is} = 1 \cdot 10^{-5}$) [nm]			Thermal expansion				
= 530			$\alpha_{-30/+70^\circ\text{C}}$ [$10^{-6}/\text{K}$]		8.0		
λ_p ($\tau_{ip} = 0.94$) [nm]			$\alpha_{20/300^\circ\text{C}}$ [$10^{-6}/\text{K}$]		9.2		
= 690			$\alpha_{20/200^\circ\text{C}}$ [$10^{-6}/\text{K}$]				
Refractive index n			Temperature coefficient		All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".		
λ [nm]			T _k [nm/°C]				
Element			0.14				
n							
587.6	He	1.52					
852.1	Cs	1.52					
1014	Hg	1.51					

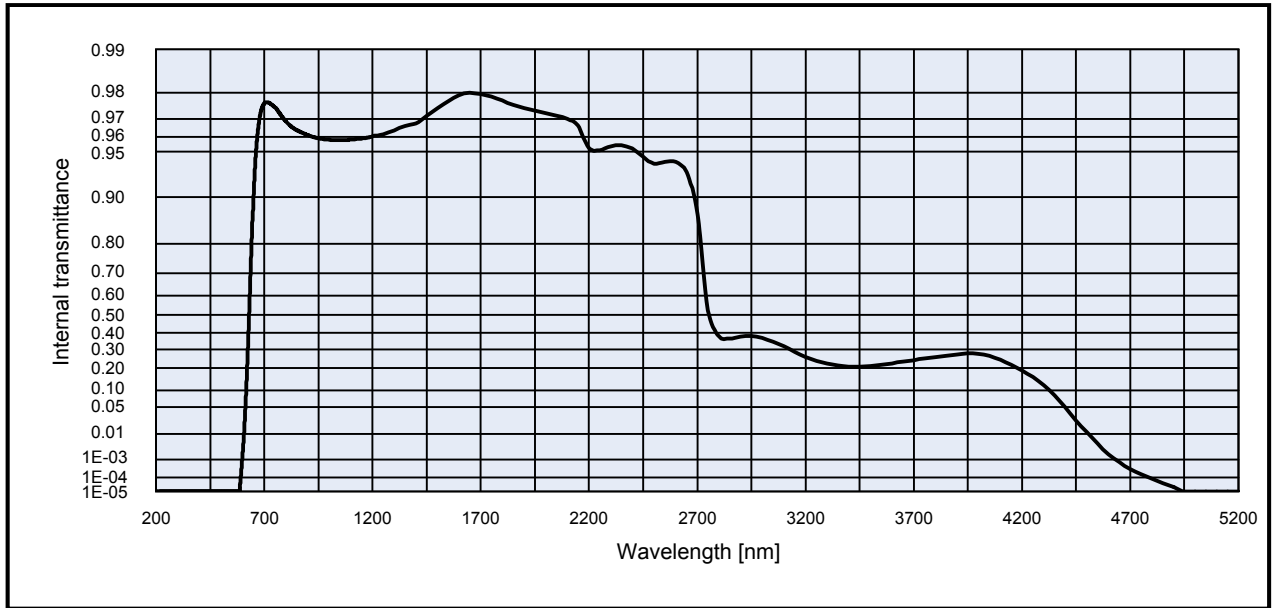
Colorimetric evaluation												
illuminant	A (Planck T = 2856 K)			illuminant	Planck T = 3200 K			illuminant	D65 (T _c = 6504 K)			
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3	
x	0.663	0.690	0.697	x	0.659	0.689	0.696	x	0.629	0.684	0.693	
y	0.328	0.310	0.303	y	0.329	0.311	0.304	y	0.330	0.315	0.307	
Y	27	20	17	Y	25	18	15	Y	17	12	10	
λ_d [nm]	614	619	623	λ_d [nm]	613	619	623	λ_d [nm]	611	617	621	
P _e	0.94	1.00	1.00	P _e	0.93	1.00	1.00	P _e	0.89	1.00	1.00	





Internal transmittance τ_i at reference thickness d [mm] = 3
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	< 1.0E-05	800	9.7E-01	1100	9.6E-01	2200	9.5E-01	3700	2.3E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.7E-01	1110	9.6E-01	2250	9.5E-01	3750	2.4E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.7E-01	1120	9.6E-01	2300	9.6E-01	3800	2.5E-01
230	< 1.0E-05	530	< 1.0E-05	830	9.7E-01	1130	9.6E-01	2350	9.6E-01	3850	2.6E-01
240	< 1.0E-05	540	< 1.0E-05	840	9.7E-01	1140	9.6E-01	2400	9.5E-01	3900	2.7E-01
250	< 1.0E-05	550	< 1.0E-05	850	9.7E-01	1150	9.6E-01	2450	9.5E-01	3950	2.8E-01
260	< 1.0E-05	560	< 1.0E-05	860	9.7E-01	1160	9.6E-01	2500	9.5E-01	4000	2.7E-01
270	< 1.0E-05	570	2.1E-05	870	9.7E-01	1170	9.6E-01	2550	9.4E-01	4050	2.6E-01
280	< 1.0E-05	580	1.5E-03	880	9.7E-01	1180	9.6E-01	2600	9.3E-01	4100	2.4E-01
290	< 1.0E-05	590	3.1E-02	890	9.7E-01	1190	9.6E-01	2650	9.2E-01	4150	2.1E-01
300	< 1.0E-05	600	2.0E-01	900	9.7E-01	1200	9.7E-01	2700	8.7E-01	4200	1.8E-01
310	< 1.0E-05	610	5.2E-01	910	9.7E-01	1250	9.7E-01	2750	5.2E-01	4250	1.5E-01
320	< 1.0E-05	620	7.7E-01	920	9.6E-01	1300	9.7E-01	2800	3.7E-01	4300	1.1E-01
330	< 1.0E-05	630	8.9E-01	930	9.6E-01	1350	9.7E-01	2850	3.6E-01	4350	7.8E-02
340	< 1.0E-05	640	9.5E-01	940	9.6E-01	1400	9.7E-01	2900	3.7E-01	4400	4.8E-02
350	< 1.0E-05	650	9.7E-01	950	9.6E-01	1450	9.8E-01	2950	3.7E-01	4450	2.4E-02
360	< 1.0E-05	660	9.7E-01	960	9.6E-01	1500	9.8E-01	3000	3.5E-01	4500	1.1E-02
370	< 1.0E-05	670	9.8E-01	970	9.6E-01	1550	9.8E-01	3050	3.3E-01	4550	4.5E-03
380	< 1.0E-05	680	9.8E-01	980	9.6E-01	1600	9.8E-01	3100	3.0E-01	4600	1.6E-03
390	< 1.0E-05	690	9.8E-01	990	9.6E-01	1650	9.8E-01	3150	2.8E-01	4650	5.7E-04
400	< 1.0E-05	700	9.8E-01	1000	9.6E-01	1700	9.8E-01	3200	2.5E-01	4700	2.5E-04
410	< 1.0E-05	710	9.8E-01	1010	9.6E-01	1750	9.8E-01	3250	2.3E-01	4750	1.3E-04
420	< 1.0E-05	720	9.8E-01	1020	9.6E-01	1800	9.8E-01	3300	2.2E-01	4800	6.7E-05
430	< 1.0E-05	730	9.8E-01	1030	9.6E-01	1850	9.8E-01	3350	2.1E-01	4850	3.4E-05
440	< 1.0E-05	740	9.8E-01	1040	9.6E-01	1900	9.8E-01	3400	2.0E-01	4900	1.7E-05
450	< 1.0E-05	750	9.8E-01	1050	9.6E-01	1950	9.8E-01	3450	1.9E-01	4950	< 1.0E-05
460	< 1.0E-05	760	9.8E-01	1060	9.6E-01	2000	9.7E-01	3500	1.9E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.8E-01	1070	9.6E-01	2050	9.7E-01	3550	2.0E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.7E-01	1080	9.6E-01	2100	9.7E-01	3600	2.1E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.7E-01	1090	9.6E-01	2150	9.7E-01	3650	2.2E-01	5150	< 1.0E-05



Internal transmittance τ_i at reference thickness d [mm] = 3
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	< 1.0E-05	800	9.7E-01	1100	9.6E-01	2200	9.5E-01	3700	2.4E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.7E-01	1110	9.6E-01	2250	9.5E-01	3750	2.5E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.7E-01	1120	9.6E-01	2300	9.5E-01	3800	2.6E-01
230	< 1.0E-05	530	< 1.0E-05	830	9.7E-01	1130	9.6E-01	2350	9.5E-01	3850	2.7E-01
240	< 1.0E-05	540	< 1.0E-05	840	9.6E-01	1140	9.6E-01	2400	9.5E-01	3900	2.7E-01
250	< 1.0E-05	550	< 1.0E-05	850	9.6E-01	1150	9.6E-01	2450	9.5E-01	3950	2.8E-01
260	< 1.0E-05	560	< 1.0E-05	860	9.6E-01	1160	9.6E-01	2500	9.4E-01	4000	2.8E-01
270	< 1.0E-05	570	< 1.0E-05	870	9.6E-01	1170	9.6E-01	2550	9.4E-01	4050	2.6E-01
280	< 1.0E-05	580	< 1.0E-05	880	9.6E-01	1180	9.6E-01	2600	9.4E-01	4100	2.4E-01
290	< 1.0E-05	590	6.2E-05	890	9.6E-01	1190	9.6E-01	2650	9.3E-01	4150	2.2E-01
300	< 1.0E-05	600	1.7E-03	900	9.6E-01	1200	9.6E-01	2700	8.7E-01	4200	1.9E-01
310	< 1.0E-05	610	2.5E-02	910	9.6E-01	1250	9.6E-01	2750	5.2E-01	4250	1.6E-01
320	< 1.0E-05	620	1.7E-01	920	9.6E-01	1300	9.6E-01	2800	3.8E-01	4300	1.2E-01
330	< 1.0E-05	630	4.9E-01	930	9.6E-01	1350	9.7E-01	2850	3.7E-01	4350	8.3E-02
340	< 1.0E-05	640	7.7E-01	940	9.6E-01	1400	9.7E-01	2900	3.8E-01	4400	4.9E-02
350	< 1.0E-05	650	9.0E-01	950	9.6E-01	1450	9.7E-01	2950	3.8E-01	4450	2.4E-02
360	< 1.0E-05	660	9.5E-01	960	9.6E-01	1500	9.7E-01	3000	3.7E-01	4500	1.1E-02
370	< 1.0E-05	670	9.6E-01	970	9.6E-01	1550	9.8E-01	3050	3.5E-01	4550	4.7E-03
380	< 1.0E-05	680	9.7E-01	980	9.6E-01	1600	9.8E-01	3100	3.2E-01	4600	1.7E-03
390	< 1.0E-05	690	9.7E-01	990	9.6E-01	1650	9.8E-01	3150	2.9E-01	4650	7.5E-04
400	< 1.0E-05	700	9.8E-01	1000	9.6E-01	1700	9.8E-01	3200	2.6E-01	4700	3.2E-04
410	< 1.0E-05	710	9.8E-01	1010	9.6E-01	1750	9.8E-01	3250	2.4E-01	4750	1.6E-04
420	< 1.0E-05	720	9.8E-01	1020	9.6E-01	1800	9.8E-01	3300	2.2E-01	4800	8.4E-05
430	< 1.0E-05	730	9.8E-01	1030	9.6E-01	1850	9.8E-01	3350	2.1E-01	4850	4.4E-05
440	< 1.0E-05	740	9.8E-01	1040	9.6E-01	1900	9.7E-01	3400	2.1E-01	4900	2.2E-05
450	< 1.0E-05	750	9.7E-01	1050	9.6E-01	1950	9.7E-01	3450	2.1E-01	4950	< 1.0E-05
460	< 1.0E-05	760	9.7E-01	1060	9.6E-01	2000	9.7E-01	3500	2.1E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.7E-01	1070	9.6E-01	2050	9.7E-01	3550	2.2E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.7E-01	1080	9.6E-01	2100	9.7E-01	3600	2.2E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.7E-01	1090	9.6E-01	2150	9.7E-01	3650	2.3E-01	5150	< 1.0E-05

RG645

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	3

Spectral values guaranteed	
λ_c ($\tau_i = 0.50$) [nm]	= 645 ± 6
λ_s ($\tau_{is} = 1 \cdot 10^{-5}$) [nm]	= 560
λ_p ($\tau_{ip} = 0.94$) [nm]	= 720

Refractive index n		
λ [nm]	Element	n
587.6	He	1.52
852.1	Cs	1.52
1014	Hg	1.51

Density	
ρ [g/cm ³]	2.65

Bubble content	
Bubble class	3

Chemical resistance	
FR class	0
SR class	1.0
AR class	1.0

Transformation temperature	
T _g [°C]	519

Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	8.0
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9.2
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T _k [nm/°C]	0.16

Notes

Colloidally colored glass

Long pass filter

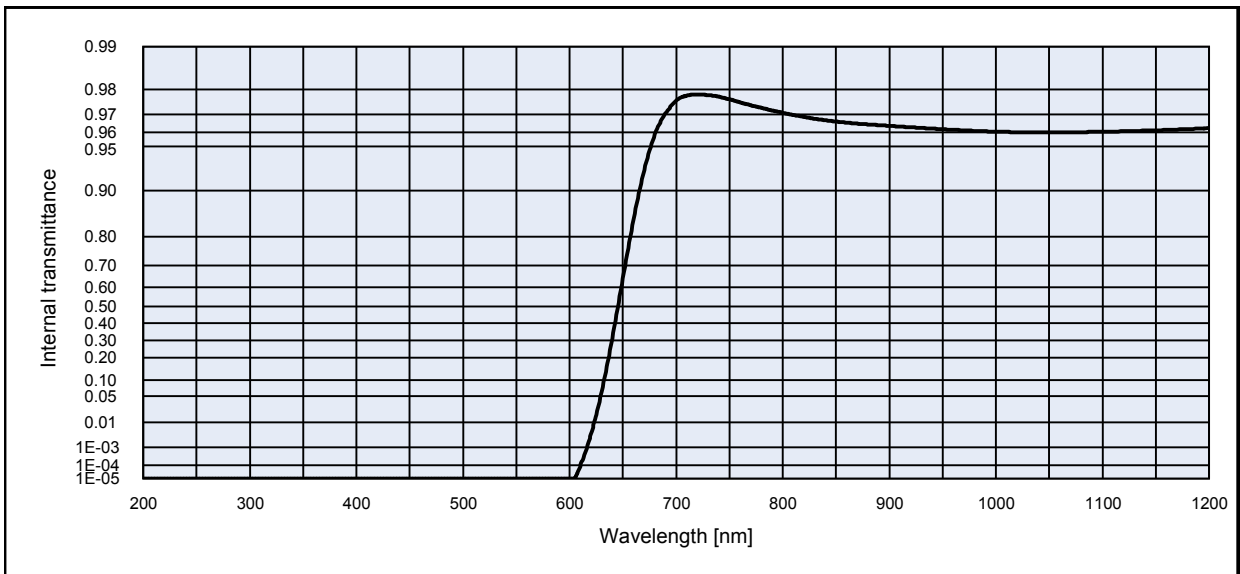
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

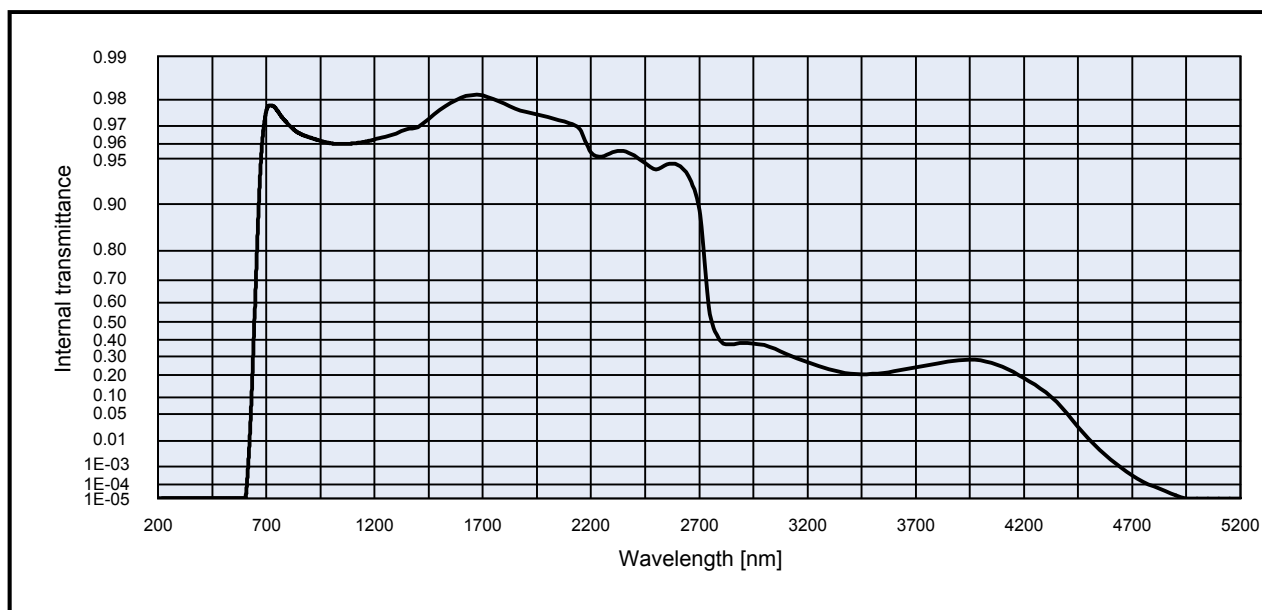
Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
	1	2	3
d [mm]			
x	0.672	0.722	0.726
y	0.303	0.277	0.274
Y	9	5	4
λ_d [nm]	640	647	651
P _e	0.83	0.99	1.00

Illuminant	Planck T = 3200 K		
	1	2	3
d [mm]			
x	0.662	0.722	0.726
y	0.304	0.277	0.274
Y	8	4	3
λ_d [nm]	640	646	651
P _e	0.81	0.99	1.00

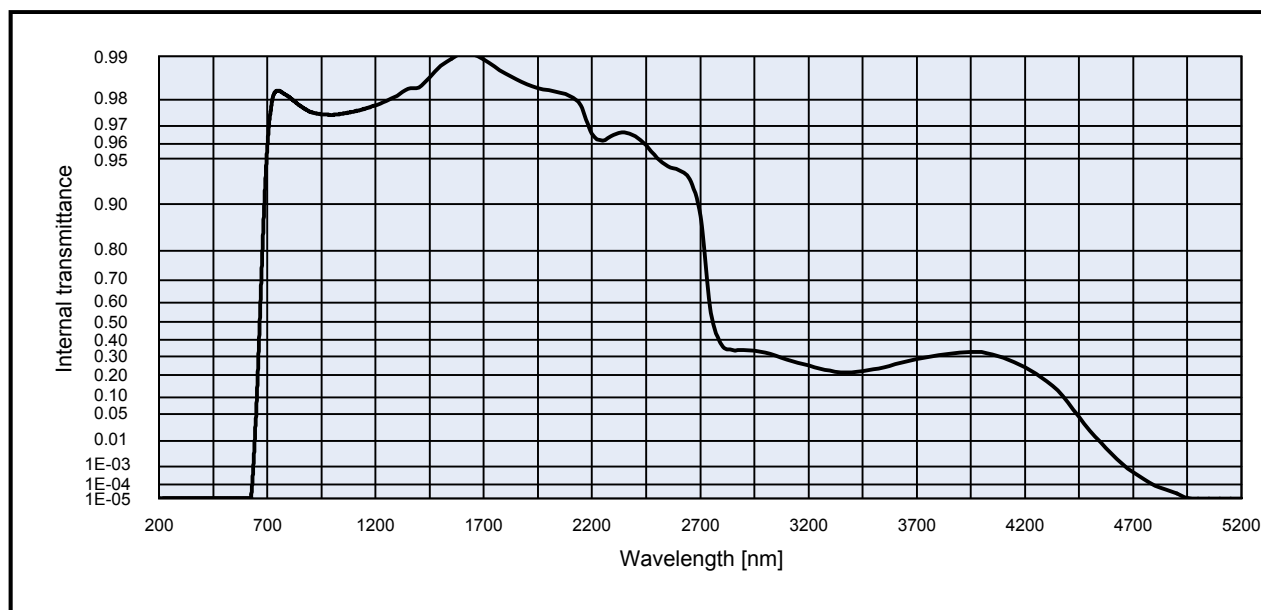
Illuminant	D65 (T _c = 6504 K)		
	1	2	3
d [mm]			
x	0.584	0.717	0.726
y	0.298	0.278	0.274
Y	5	2	2
λ_d [nm]	638	645	650
P _e	0.67	0.98	1.00





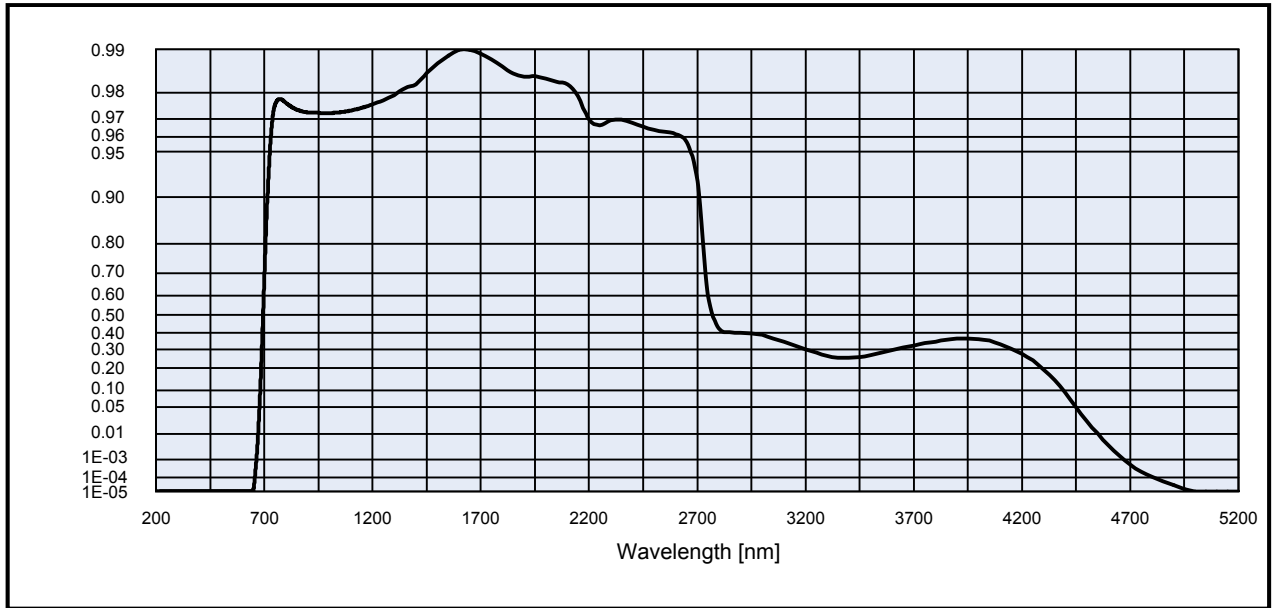
Internal transmittance τ_i at reference thickness d [mm] = 3
The internal transmittance values, tabulated and graphically represented, are reference values only

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	< 1.0E-05	800	9.7E-01	1100	9.6E-01	2200	9.5E-01	3700	2.4E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.7E-01	1110	9.6E-01	2250	9.5E-01	3750	2.5E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.7E-01	1120	9.6E-01	2300	9.5E-01	3800	2.6E-01
230	< 1.0E-05	530	< 1.0E-05	830	9.7E-01	1130	9.6E-01	2350	9.6E-01	3850	2.7E-01
240	< 1.0E-05	540	< 1.0E-05	840	9.7E-01	1140	9.6E-01	2400	9.5E-01	3900	2.8E-01
250	< 1.0E-05	550	< 1.0E-05	850	9.7E-01	1150	9.6E-01	2450	9.5E-01	3950	2.8E-01
260	< 1.0E-05	560	< 1.0E-05	860	9.7E-01	1160	9.6E-01	2500	9.4E-01	4000	2.8E-01
270	< 1.0E-05	570	< 1.0E-05	870	9.7E-01	1170	9.6E-01	2550	9.5E-01	4050	2.7E-01
280	< 1.0E-05	580	< 1.0E-05	880	9.6E-01	1180	9.6E-01	2600	9.4E-01	4100	2.4E-01
290	< 1.0E-05	590	< 1.0E-05	890	9.6E-01	1190	9.6E-01	2650	9.3E-01	4150	2.2E-01
300	< 1.0E-05	600	< 1.0E-05	900	9.6E-01	1200	9.6E-01	2700	8.9E-01	4200	1.8E-01
310	< 1.0E-05	610	7.6E-05	910	9.6E-01	1250	9.6E-01	2750	5.4E-01	4250	1.5E-01
320	< 1.0E-05	620	3.6E-03	920	9.6E-01	1300	9.7E-01	2800	3.9E-01	4300	1.2E-01
330	< 1.0E-05	630	6.1E-02	930	9.6E-01	1350	9.7E-01	2850	3.7E-01	4350	8.5E-02
340	< 1.0E-05	640	3.1E-01	940	9.6E-01	1400	9.7E-01	2900	3.8E-01	4400	5.1E-02
350	< 1.0E-05	650	6.5E-01	950	9.6E-01	1450	9.7E-01	2950	3.8E-01	4450	2.5E-02
360	< 1.0E-05	660	8.4E-01	960	9.6E-01	1500	9.8E-01	3000	3.7E-01	4500	1.2E-02
370	< 1.0E-05	670	9.3E-01	970	9.6E-01	1550	9.8E-01	3050	3.5E-01	4550	4.8E-03
380	< 1.0E-05	680	9.6E-01	980	9.6E-01	1600	9.8E-01	3100	3.2E-01	4600	2.0E-03
390	< 1.0E-05	690	9.7E-01	990	9.6E-01	1650	9.8E-01	3150	2.9E-01	4650	8.3E-04
400	< 1.0E-05	700	9.8E-01	1000	9.6E-01	1700	9.8E-01	3200	2.7E-01	4700	3.3E-04
410	< 1.0E-05	710	9.8E-01	1010	9.6E-01	1750	9.8E-01	3250	2.5E-01	4750	1.5E-04
420	< 1.0E-05	720	9.8E-01	1020	9.6E-01	1800	9.8E-01	3300	2.3E-01	4800	7.3E-05
430	< 1.0E-05	730	9.8E-01	1030	9.6E-01	1850	9.8E-01	3350	2.2E-01	4850	3.8E-05
440	< 1.0E-05	740	9.8E-01	1040	9.6E-01	1900	9.8E-01	3400	2.1E-01	4900	1.7E-05
450	< 1.0E-05	750	9.8E-01	1050	9.6E-01	1950	9.8E-01	3450	2.0E-01	4950	< 1.0E-05
460	< 1.0E-05	760	9.8E-01	1060	9.6E-01	2000	9.7E-01	3500	2.0E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.7E-01	1070	9.6E-01	2050	9.7E-01	3550	2.1E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.7E-01	1080	9.6E-01	2100	9.7E-01	3600	2.2E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.7E-01	1090	9.6E-01	2150	9.7E-01	3650	2.3E-01	5150	< 1.0E-05



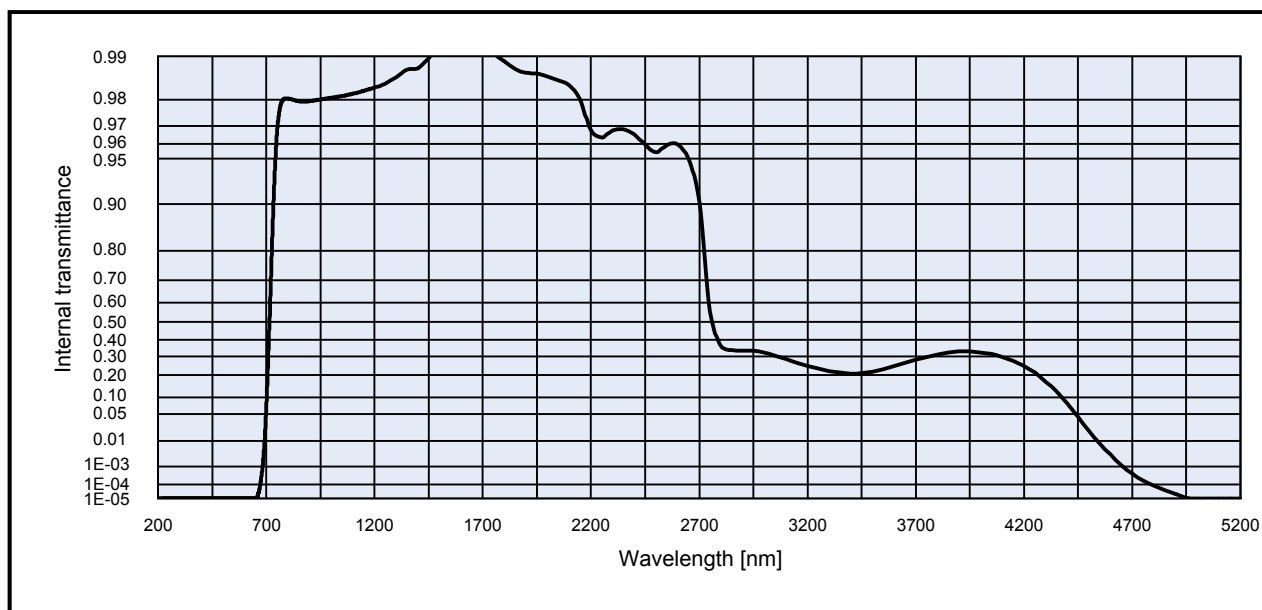
Internal transmittance τ_i at reference thickness d [mm] = 3
The internal transmittance values, tabulated and graphically represented, are reference values only

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	< 1.0E-05	800	9.8E-01	1100	9.8E-01	2200	9.7E-01	3700	2.9E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.8E-01	1110	9.8E-01	2250	9.6E-01	3750	3.0E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.8E-01	1120	9.8E-01	2300	9.7E-01	3800	3.1E-01
230	< 1.0E-05	530	< 1.0E-05	830	9.8E-01	1130	9.8E-01	2350	9.7E-01	3850	3.2E-01
240	< 1.0E-05	540	< 1.0E-05	840	9.8E-01	1140	9.8E-01	2400	9.6E-01	3900	3.2E-01
250	< 1.0E-05	550	< 1.0E-05	850	9.8E-01	1150	9.8E-01	2450	9.6E-01	3950	3.3E-01
260	< 1.0E-05	560	< 1.0E-05	860	9.8E-01	1160	9.8E-01	2500	9.5E-01	4000	3.3E-01
270	< 1.0E-05	570	< 1.0E-05	870	9.8E-01	1170	9.8E-01	2550	9.4E-01	4050	3.1E-01
280	< 1.0E-05	580	< 1.0E-05	880	9.8E-01	1180	9.8E-01	2600	9.4E-01	4100	2.9E-01
290	< 1.0E-05	590	< 1.0E-05	890	9.8E-01	1190	9.8E-01	2650	9.3E-01	4150	2.7E-01
300	< 1.0E-05	600	< 1.0E-05	900	9.8E-01	1200	9.8E-01	2700	8.8E-01	4200	2.4E-01
310	< 1.0E-05	610	< 1.0E-05	910	9.8E-01	1250	9.8E-01	2750	5.5E-01	4250	2.1E-01
320	< 1.0E-05	620	< 1.0E-05	920	9.8E-01	1300	9.8E-01	2800	3.7E-01	4300	1.7E-01
330	< 1.0E-05	630	7.4E-05	930	9.8E-01	1350	9.8E-01	2850	3.4E-01	4350	1.3E-01
340	< 1.0E-05	640	4.3E-03	940	9.8E-01	1400	9.8E-01	2900	3.4E-01	4400	8.3E-02
350	< 1.0E-05	650	7.2E-02	950	9.7E-01	1450	9.9E-01	2950	3.4E-01	4450	4.4E-02
360	< 1.0E-05	660	3.3E-01	960	9.7E-01	1500	9.9E-01	3000	3.3E-01	4500	2.0E-02
370	< 1.0E-05	670	6.4E-01	970	9.7E-01	1550	9.9E-01	3050	3.1E-01	4550	9.2E-03
380	< 1.0E-05	680	8.3E-01	980	9.7E-01	1600	9.9E-01	3100	2.8E-01	4600	3.5E-03
390	< 1.0E-05	690	9.2E-01	990	9.7E-01	1650	9.9E-01	3150	2.7E-01	4650	1.3E-03
400	< 1.0E-05	700	9.6E-01	1000	9.7E-01	1700	9.9E-01	3200	2.5E-01	4700	5.0E-04
410	< 1.0E-05	710	9.7E-01	1010	9.7E-01	1750	9.9E-01	3250	2.3E-01	4750	2.0E-04
420	< 1.0E-05	720	9.8E-01	1020	9.7E-01	1800	9.9E-01	3300	2.2E-01	4800	8.7E-05
430	< 1.0E-05	730	9.8E-01	1030	9.7E-01	1850	9.9E-01	3350	2.1E-01	4850	4.5E-05
440	< 1.0E-05	740	9.8E-01	1040	9.8E-01	1900	9.8E-01	3400	2.1E-01	4900	2.5E-05
450	< 1.0E-05	750	9.8E-01	1050	9.8E-01	1950	9.8E-01	3450	2.2E-01	4950	1.2E-05
460	< 1.0E-05	760	9.8E-01	1060	9.8E-01	2000	9.8E-01	3500	2.3E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.8E-01	1070	9.8E-01	2050	9.8E-01	3550	2.4E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.8E-01	1080	9.8E-01	2100	9.8E-01	3600	2.6E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.8E-01	1090	9.8E-01	2150	9.8E-01	3650	2.7E-01	5150	< 1.0E-05



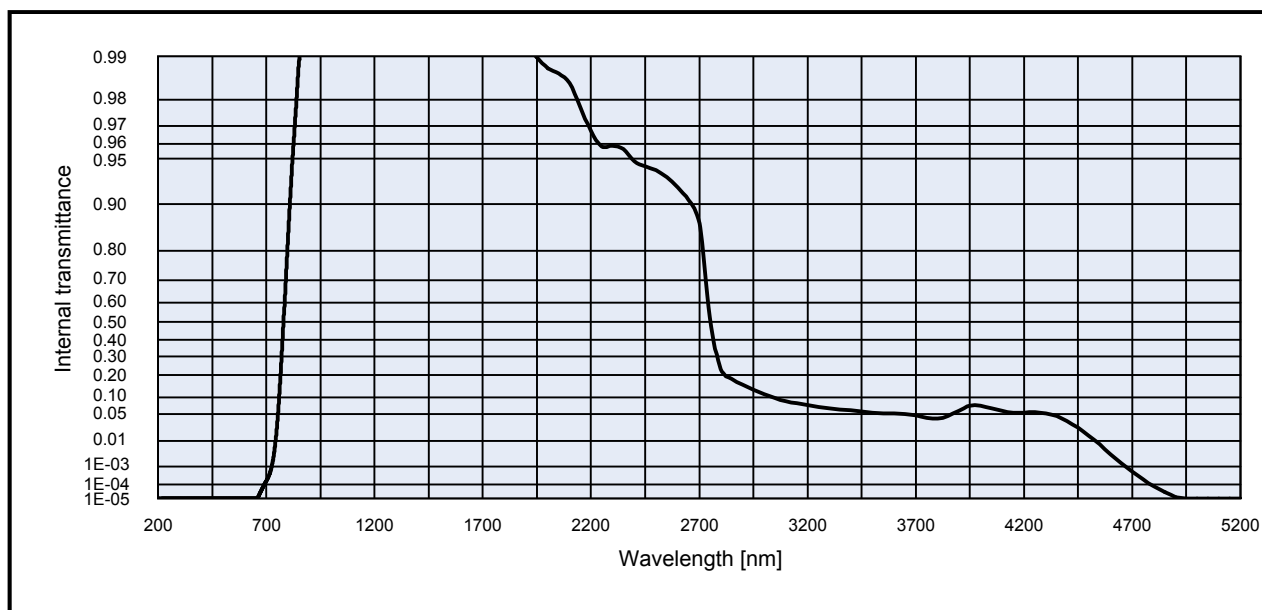
Internal transmittance τ_i at reference thickness d [mm] = 3
The internal transmittance values, tabulated and graphically represented, are reference values only

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	< 1.0E-05	800	9.8E-01	1100	9.7E-01	2200	9.7E-01	3700	3.3E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.8E-01	1110	9.7E-01	2250	9.7E-01	3750	3.4E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.8E-01	1120	9.7E-01	2300	9.7E-01	3800	3.5E-01
230	< 1.0E-05	530	< 1.0E-05	830	9.7E-01	1130	9.7E-01	2350	9.7E-01	3850	3.6E-01
240	< 1.0E-05	540	< 1.0E-05	840	9.7E-01	1140	9.7E-01	2400	9.7E-01	3900	3.6E-01
250	< 1.0E-05	550	< 1.0E-05	850	9.7E-01	1150	9.7E-01	2450	9.7E-01	3950	3.7E-01
260	< 1.0E-05	560	< 1.0E-05	860	9.7E-01	1160	9.7E-01	2500	9.6E-01	4000	3.6E-01
270	< 1.0E-05	570	< 1.0E-05	870	9.7E-01	1170	9.8E-01	2550	9.6E-01	4050	3.5E-01
280	< 1.0E-05	580	< 1.0E-05	880	9.7E-01	1180	9.8E-01	2600	9.6E-01	4100	3.3E-01
290	< 1.0E-05	590	< 1.0E-05	890	9.7E-01	1190	9.8E-01	2650	9.6E-01	4150	3.1E-01
300	< 1.0E-05	600	< 1.0E-05	900	9.7E-01	1200	9.8E-01	2700	9.2E-01	4200	2.8E-01
310	< 1.0E-05	610	< 1.0E-05	910	9.7E-01	1250	9.8E-01	2750	6.1E-01	4250	2.4E-01
320	< 1.0E-05	620	< 1.0E-05	920	9.7E-01	1300	9.8E-01	2800	4.3E-01	4300	1.9E-01
330	< 1.0E-05	630	< 1.0E-05	930	9.7E-01	1350	9.8E-01	2850	4.0E-01	4350	1.4E-01
340	< 1.0E-05	640	< 1.0E-05	940	9.7E-01	1400	9.8E-01	2900	4.0E-01	4400	9.3E-02
350	< 1.0E-05	650	1.5E-05	950	9.7E-01	1450	9.9E-01	2950	4.0E-01	4450	5.0E-02
360	< 1.0E-05	660	3.4E-04	960	9.7E-01	1500	9.9E-01	3000	3.9E-01	4500	2.3E-02
370	< 1.0E-05	670	6.3E-03	970	9.7E-01	1550	9.9E-01	3050	3.7E-01	4550	1.0E-02
380	< 1.0E-05	680	7.5E-02	980	9.7E-01	1600	9.9E-01	3100	3.5E-01	4600	4.0E-03
390	< 1.0E-05	690	3.4E-01	990	9.7E-01	1650	9.9E-01	3150	3.2E-01	4650	1.5E-03
400	< 1.0E-05	700	6.6E-01	1000	9.7E-01	1700	9.9E-01	3200	3.0E-01	4700	5.3E-04
410	< 1.0E-05	710	8.5E-01	1010	9.7E-01	1750	9.9E-01	3250	2.8E-01	4750	2.2E-04
420	< 1.0E-05	720	9.3E-01	1020	9.7E-01	1800	9.9E-01	3300	2.7E-01	4800	1.1E-04
430	< 1.0E-05	730	9.6E-01	1030	9.7E-01	1850	9.9E-01	3350	2.6E-01	4850	5.6E-05
440	< 1.0E-05	740	9.7E-01	1040	9.7E-01	1900	9.8E-01	3400	2.5E-01	4900	3.1E-05
450	< 1.0E-05	750	9.8E-01	1050	9.7E-01	1950	9.8E-01	3450	2.6E-01	4950	1.6E-05
460	< 1.0E-05	760	9.8E-01	1060	9.7E-01	2000	9.8E-01	3500	2.7E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.8E-01	1070	9.7E-01	2050	9.8E-01	3550	2.8E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.8E-01	1080	9.7E-01	2100	9.8E-01	3600	3.0E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.8E-01	1090	9.7E-01	2150	9.8E-01	3650	3.1E-01	5150	< 1.0E-05



Internal transmittance τ_i at reference thickness d [mm] = 3
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	< 1.0E-05	800	9.8E-01	1100	9.8E-01	2200	9.7E-01	3700	2.8E-01
210	< 1.0E-05	510	< 1.0E-05	810	9.8E-01	1110	9.8E-01	2250	9.6E-01	3750	3.0E-01
220	< 1.0E-05	520	< 1.0E-05	820	9.8E-01	1120	9.8E-01	2300	9.7E-01	3800	3.1E-01
230	< 1.0E-05	530	< 1.0E-05	830	9.8E-01	1130	9.8E-01	2350	9.7E-01	3850	3.2E-01
240	< 1.0E-05	540	< 1.0E-05	840	9.8E-01	1140	9.8E-01	2400	9.7E-01	3900	3.3E-01
250	< 1.0E-05	550	< 1.0E-05	850	9.8E-01	1150	9.8E-01	2450	9.6E-01	3950	3.3E-01
260	< 1.0E-05	560	< 1.0E-05	860	9.8E-01	1160	9.8E-01	2500	9.5E-01	4000	3.3E-01
270	< 1.0E-05	570	< 1.0E-05	870	9.8E-01	1170	9.8E-01	2550	9.6E-01	4050	3.2E-01
280	< 1.0E-05	580	< 1.0E-05	880	9.8E-01	1180	9.8E-01	2600	9.6E-01	4100	3.0E-01
290	< 1.0E-05	590	< 1.0E-05	890	9.8E-01	1190	9.8E-01	2650	9.5E-01	4150	2.8E-01
300	< 1.0E-05	600	< 1.0E-05	900	9.8E-01	1200	9.8E-01	2700	9.0E-01	4200	2.5E-01
310	< 1.0E-05	610	< 1.0E-05	910	9.8E-01	1250	9.8E-01	2750	5.6E-01	4250	2.1E-01
320	< 1.0E-05	620	< 1.0E-05	920	9.8E-01	1300	9.9E-01	2800	3.7E-01	4300	1.7E-01
330	< 1.0E-05	630	< 1.0E-05	930	9.8E-01	1350	9.9E-01	2850	3.4E-01	4350	1.2E-01
340	< 1.0E-05	640	< 1.0E-05	940	9.8E-01	1400	9.9E-01	2900	3.4E-01	4400	8.0E-02
350	< 1.0E-05	650	< 1.0E-05	950	9.8E-01	1450	9.9E-01	2950	3.3E-01	4450	4.4E-02
360	< 1.0E-05	660	1.6E-05	960	9.8E-01	1500	9.9E-01	3000	3.2E-01	4500	2.0E-02
370	< 1.0E-05	670	6.3E-05	970	9.8E-01	1550	9.9E-01	3050	3.1E-01	4550	8.4E-03
380	< 1.0E-05	680	4.5E-04	980	9.8E-01	1600	9.9E-01	3100	2.9E-01	4600	3.3E-03
390	< 1.0E-05	690	5.4E-03	990	9.8E-01	1650	9.9E-01	3150	2.7E-01	4650	1.1E-03
400	< 1.0E-05	700	5.9E-02	1000	9.8E-01	1700	9.9E-01	3200	2.5E-01	4700	4.4E-04
410	< 1.0E-05	710	3.1E-01	1010	9.8E-01	1750	9.9E-01	3250	2.3E-01	4750	1.8E-04
420	< 1.0E-05	720	6.7E-01	1020	9.8E-01	1800	9.9E-01	3300	2.2E-01	4800	8.3E-05
430	< 1.0E-05	730	8.7E-01	1030	9.8E-01	1850	9.9E-01	3350	2.1E-01	4850	4.2E-05
440	< 1.0E-05	740	9.4E-01	1040	9.8E-01	1900	9.9E-01	3400	2.1E-01	4900	2.2E-05
450	< 1.0E-05	750	9.7E-01	1050	9.8E-01	1950	9.9E-01	3450	2.1E-01	4950	1.1E-05
460	< 1.0E-05	760	9.8E-01	1060	9.8E-01	2000	9.9E-01	3500	2.2E-01	5000	< 1.0E-05
470	< 1.0E-05	770	9.8E-01	1070	9.8E-01	2050	9.9E-01	3550	2.3E-01	5050	< 1.0E-05
480	< 1.0E-05	780	9.8E-01	1080	9.8E-01	2100	9.8E-01	3600	2.5E-01	5100	< 1.0E-05
490	< 1.0E-05	790	9.8E-01	1090	9.8E-01	2150	9.8E-01	3650	2.6E-01	5150	< 1.0E-05



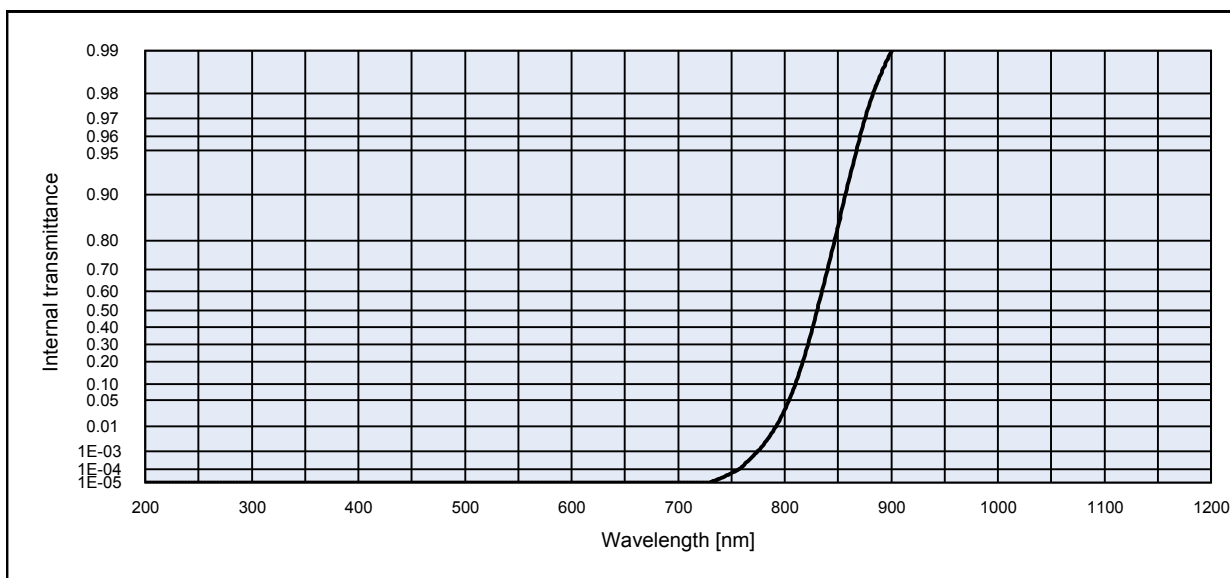
Internal transmittance τ_i at reference thickness d [mm] = 3
The internal transmittance values, tabulated and graphically represented, are reference values only

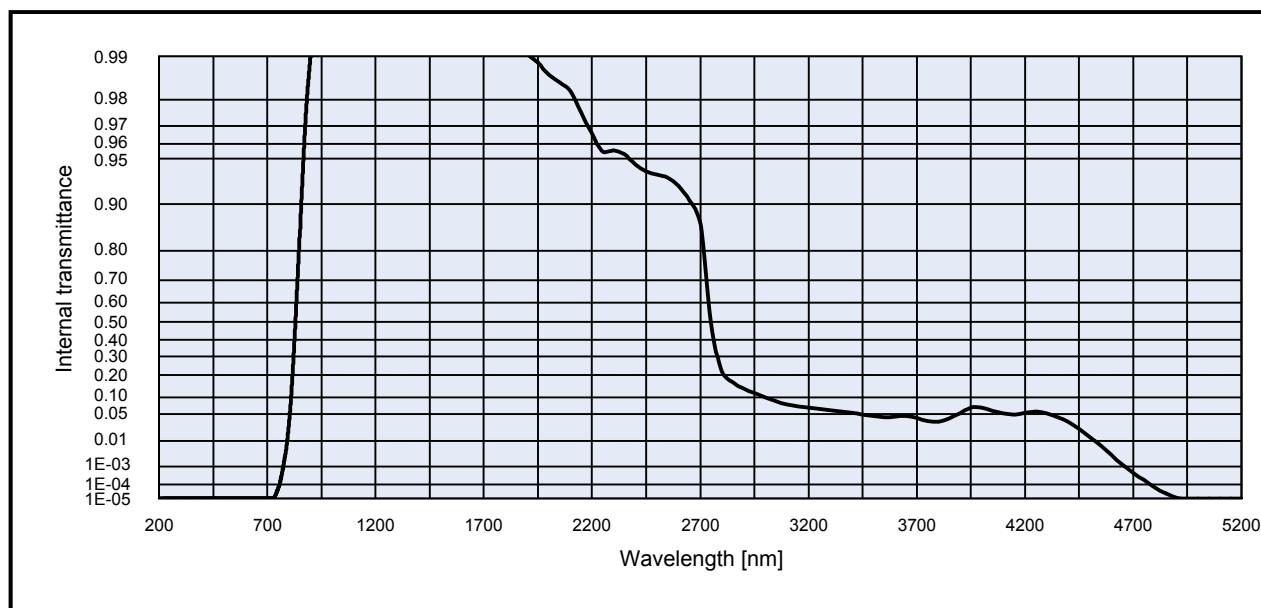
λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i
200	< 1.0E-05	500	< 1.0E-05	800	8.3E-01	1100	1.0E+00	2200	9.7E-01	3700	4.6E-02
210	< 1.0E-05	510	< 1.0E-05	810	9.0E-01	1110	1.0E+00	2250	9.6E-01	3750	4.1E-02
220	< 1.0E-05	520	< 1.0E-05	820	9.5E-01	1120	1.0E+00	2300	9.6E-01	3800	4.0E-02
230	< 1.0E-05	530	< 1.0E-05	830	9.7E-01	1130	1.0E+00	2350	9.6E-01	3850	4.6E-02
240	< 1.0E-05	540	< 1.0E-05	840	9.8E-01	1140	1.0E+00	2400	9.5E-01	3900	5.7E-02
250	< 1.0E-05	550	< 1.0E-05	850	9.9E-01	1150	1.0E+00	2450	9.4E-01	3950	7.3E-02
260	< 1.0E-05	560	< 1.0E-05	860	9.9E-01	1160	1.0E+00	2500	9.4E-01	4000	7.3E-02
270	< 1.0E-05	570	< 1.0E-05	870	1.0E+00	1170	1.0E+00	2550	9.3E-01	4050	6.6E-02
280	< 1.0E-05	580	< 1.0E-05	880	1.0E+00	1180	1.0E+00	2600	9.2E-01	4100	5.7E-02
290	< 1.0E-05	590	< 1.0E-05	890	1.0E+00	1190	1.0E+00	2650	9.1E-01	4150	5.2E-02
300	< 1.0E-05	600	< 1.0E-05	900	1.0E+00	1200	1.0E+00	2700	8.7E-01	4200	5.4E-02
310	< 1.0E-05	610	< 1.0E-05	910	1.0E+00	1250	1.0E+00	2750	5.3E-01	4250	5.4E-02
320	< 1.0E-05	620	< 1.0E-05	920	1.0E+00	1300	1.0E+00	2800	2.3E-01	4300	5.2E-02
330	< 1.0E-05	630	< 1.0E-05	930	1.0E+00	1350	1.0E+00	2850	1.8E-01	4350	4.5E-02
340	< 1.0E-05	640	< 1.0E-05	940	1.0E+00	1400	1.0E+00	2900	1.5E-01	4400	3.5E-02
350	< 1.0E-05	650	< 1.0E-05	950	1.0E+00	1450	1.0E+00	2950	1.3E-01	4450	2.4E-02
360	< 1.0E-05	660	1.2E-05	960	1.0E+00	1500	1.0E+00	3000	1.1E-01	4500	1.5E-02
370	< 1.0E-05	670	2.3E-05	970	1.0E+00	1550	1.0E+00	3050	9.8E-02	4550	8.0E-03
380	< 1.0E-05	680	4.6E-05	980	1.0E+00	1600	1.0E+00	3100	8.8E-02	4600	3.4E-03
390	< 1.0E-05	690	9.0E-05	990	1.0E+00	1650	1.0E+00	3150	8.0E-02	4650	1.4E-03
400	< 1.0E-05	700	1.6E-04	1000	1.0E+00	1700	1.0E+00	3200	7.4E-02	4700	5.5E-04
410	< 1.0E-05	710	2.9E-04	1010	1.0E+00	1750	1.0E+00	3250	6.9E-02	4750	2.0E-04
420	< 1.0E-05	720	6.0E-04	1020	1.0E+00	1800	9.9E-01	3300	6.5E-02	4800	7.4E-05
430	< 1.0E-05	730	1.7E-03	1030	1.0E+00	1850	9.9E-01	3350	6.2E-02	4850	3.0E-05
440	< 1.0E-05	740	6.4E-03	1040	1.0E+00	1900	9.9E-01	3400	5.9E-02	4900	1.2E-05
450	< 1.0E-05	750	2.7E-02	1050	1.0E+00	1950	9.9E-01	3450	5.6E-02	4950	< 1.0E-05
460	< 1.0E-05	760	1.0E-01	1060	1.0E+00	2000	9.9E-01	3500	5.4E-02	5000	< 1.0E-05
470	< 1.0E-05	770	2.7E-01	1070	1.0E+00	2050	9.9E-01	3550	5.2E-02	5050	< 1.0E-05
480	< 1.0E-05	780	5.0E-01	1080	1.0E+00	2100	9.8E-01	3600	5.2E-02	5100	< 1.0E-05
490	< 1.0E-05	790	7.0E-01	1090	1.0E+00	2150	9.8E-01	3650	5.1E-02	5150	< 1.0E-05

RG830

Density		Notes	
ρ [g/cm ³]	2.94	Colloidally colored glass	
Reflection factor		Long pass filter	
P_d	0.91		
Reference thickness			
d [mm]	3		
Spectral values guaranteed			
λ_c ($\tau_i = 0.50$) [nm]	= 830 ± 9		
λ_s ($\tau_{is} = 1 \cdot 10^{-5}$) [nm]	= 670		
λ_p ($\tau_{ip} = 0.97$) [nm]	= 950		
Bubble content			
Bubble class	3		
Chemical resistance			
FR class	5		
SR class	53.4		
AR class	1.3		
Transformation temperature			
T_g [°C]	554		
Thermal expansion			
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	9.5		
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	10.5		
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]			
Refractive index n		All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".	
λ [nm]	Element	n	
587.6	He	1.56	
852.1	Cs	1.55	
1014	Hg	1.55	
Temperature coefficient			
T_k [nm/°C]	0.23		

Colorimetric evaluation											
Illuminant A (Planck T = 2856 K)				Illuminant Planck T = 3200 K				Illuminant D65 (T _c = 6504 K)			
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3
x				x				x			
y				y				y			
Y				Y				Y			
λ_d [nm]				λ_d [nm]				λ_d [nm]			
P_e				P_e				P_e			





Internal transmittance τ_i at reference thickness d [mm] = 3
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	< 1.0E-05	800	3.0E-02	1100	1.0E+00	2200	9.7E-01	3700	4.1E-02
210	< 1.0E-05	510	< 1.0E-05	810	9.9E-02	1110	1.0E+00	2250	9.6E-01	3750	3.6E-02
220	< 1.0E-05	520	< 1.0E-05	820	2.6E-01	1120	1.0E+00	2300	9.6E-01	3800	3.4E-02
230	< 1.0E-05	530	< 1.0E-05	830	4.9E-01	1130	1.0E+00	2350	9.5E-01	3850	4.1E-02
240	< 1.0E-05	540	< 1.0E-05	840	7.0E-01	1140	1.0E+00	2400	9.5E-01	3900	5.1E-02
250	< 1.0E-05	550	< 1.0E-05	850	8.4E-01	1150	1.0E+00	2450	9.4E-01	3950	6.6E-02
260	< 1.0E-05	560	< 1.0E-05	860	9.2E-01	1160	1.0E+00	2500	9.4E-01	4000	6.7E-02
270	< 1.0E-05	570	< 1.0E-05	870	9.6E-01	1170	1.0E+00	2550	9.3E-01	4050	5.9E-02
280	< 1.0E-05	580	< 1.0E-05	880	9.8E-01	1180	1.0E+00	2600	9.2E-01	4100	5.1E-02
290	< 1.0E-05	590	< 1.0E-05	890	9.9E-01	1190	1.0E+00	2650	9.0E-01	4150	4.8E-02
300	< 1.0E-05	600	< 1.0E-05	900	9.9E-01	1200	1.0E+00	2700	8.6E-01	4200	5.4E-02
310	< 1.0E-05	610	< 1.0E-05	910	9.9E-01	1250	1.0E+00	2750	5.0E-01	4250	5.6E-02
320	< 1.0E-05	620	< 1.0E-05	920	9.9E-01	1300	1.0E+00	2800	2.2E-01	4300	5.1E-02
330	< 1.0E-05	630	< 1.0E-05	930	1.0E+00	1350	1.0E+00	2850	1.7E-01	4350	4.3E-02
340	< 1.0E-05	640	< 1.0E-05	940	1.0E+00	1400	1.0E+00	2900	1.4E-01	4400	3.3E-02
350	< 1.0E-05	650	< 1.0E-05	950	1.0E+00	1450	1.0E+00	2950	1.2E-01	4450	2.2E-02
360	< 1.0E-05	660	< 1.0E-05	960	1.0E+00	1500	1.0E+00	3000	1.0E-01	4500	1.3E-02
370	< 1.0E-05	670	< 1.0E-05	970	1.0E+00	1550	1.0E+00	3050	8.6E-02	4550	7.1E-03
380	< 1.0E-05	680	< 1.0E-05	980	1.0E+00	1600	1.0E+00	3100	7.7E-02	4600	3.1E-03
390	< 1.0E-05	690	< 1.0E-05	990	1.0E+00	1650	1.0E+00	3150	7.0E-02	4650	1.2E-03
400	< 1.0E-05	700	< 1.0E-05	1000	1.0E+00	1700	1.0E+00	3200	6.6E-02	4700	4.9E-04
410	< 1.0E-05	710	< 1.0E-05	1010	1.0E+00	1750	9.9E-01	3250	6.3E-02	4750	1.8E-04
420	< 1.0E-05	720	< 1.0E-05	1020	1.0E+00	1800	9.9E-01	3300	5.9E-02	4800	6.2E-05
430	< 1.0E-05	730	1.0E-05	1030	1.0E+00	1850	9.9E-01	3350	5.6E-02	4850	2.4E-05
440	< 1.0E-05	740	2.3E-05	1040	1.0E+00	1900	9.9E-01	3400	5.2E-02	4900	1.1E-05
450	< 1.0E-05	750	5.2E-05	1050	1.0E+00	1950	9.9E-01	3450	4.9E-02	4950	< 1.0E-05
460	< 1.0E-05	760	1.4E-04	1060	1.0E+00	2000	9.9E-01	3500	4.6E-02	5000	< 1.0E-05
470	< 1.0E-05	770	5.6E-04	1070	1.0E+00	2050	9.8E-01	3550	4.3E-02	5050	< 1.0E-05
480	< 1.0E-05	780	2.0E-03	1080	1.0E+00	2100	9.8E-01	3600	4.4E-02	5100	< 1.0E-05
490	< 1.0E-05	790	7.8E-03	1090	1.0E+00	2150	9.8E-01	3650	4.5E-02	5150	< 1.0E-05

RG850

Reflection factor	
P_d	0.91

Reference thickness	
d [mm]	3

Spectral values guaranteed	
λ_c ($\tau_i = 0.50$) [nm]	= 850 ± 9
λ_s ($\tau_{is} = 1 \cdot 10^{-5}$) [nm]	= 700
λ_{p1} ($\tau_{ip1} = 0.90$) [nm]	= 950
λ_{p2} ($\tau_{ip2} = 0.97$) [nm]	= 1200

Refractive index n		
λ [nm]	Element	n
587.6	He	1.56
852.1	Cs	1.55
1014	Hg	1.55

Density	
ρ [g/cm ³]	2.93

Bubble content	
Bubble class	3

Chemical resistance	
FR class	5
SR class	53.4
AR class	1.3

Transformation temperature	
T _g [°C]	554

Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	9.5
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	10.5
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T _k [nm/°C]	0.24

Notes

Colloidally colored glass

Long pass filter

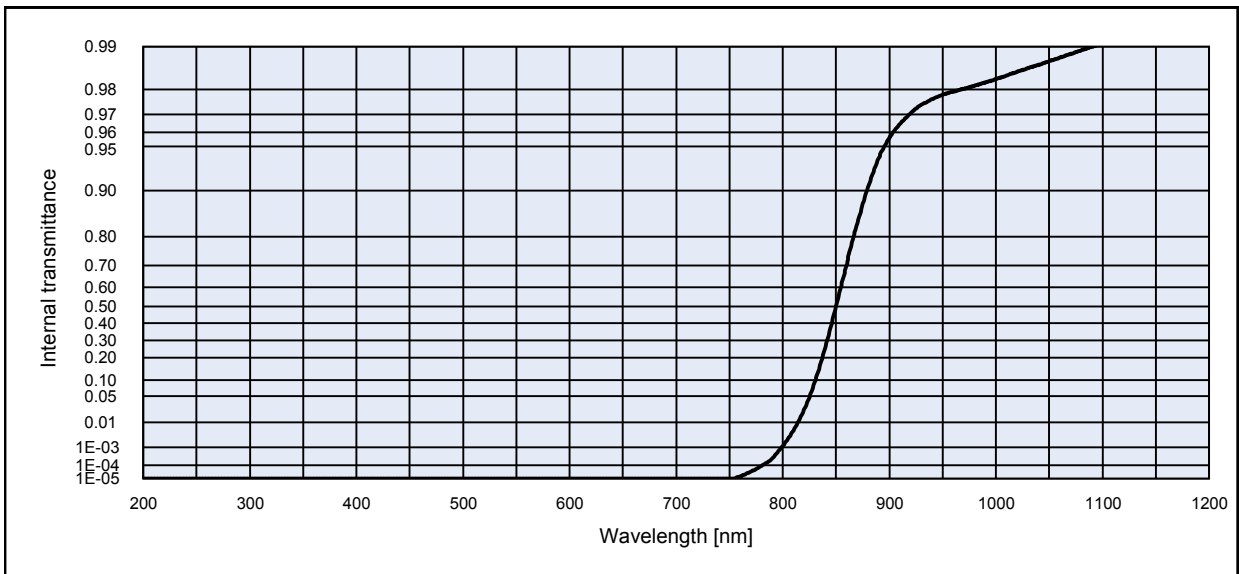
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

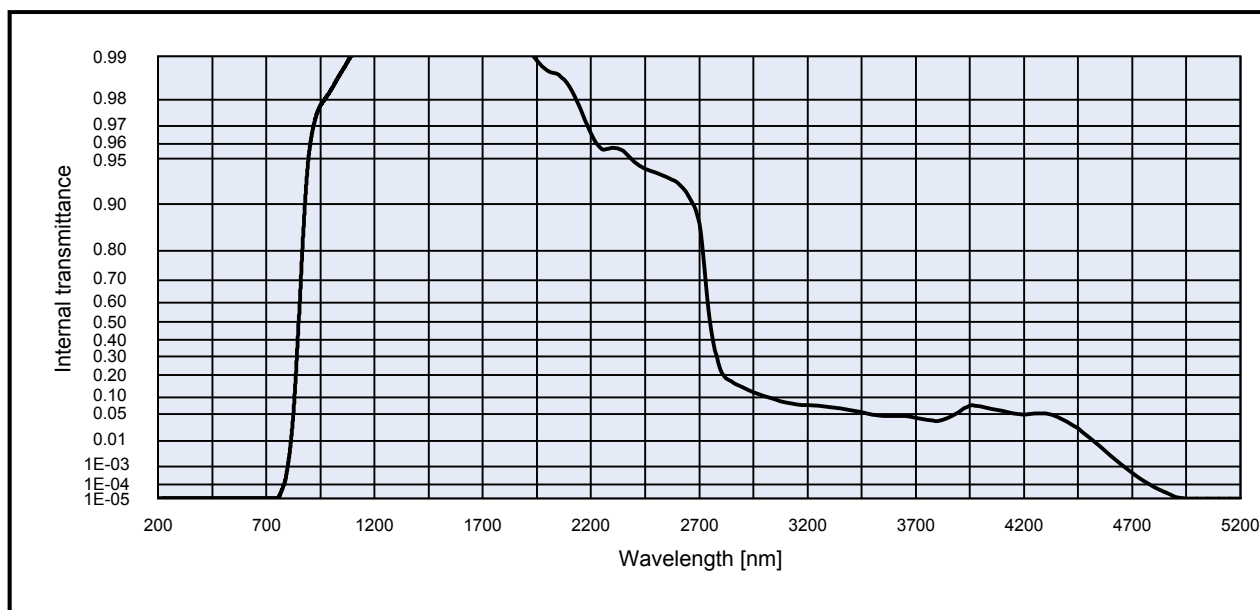
Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
	1	2	3
d [mm]			
x			
y			
Y			
λ_d [nm]			
P _e			

Illuminant	Planck T = 3200 K		
	1	2	3
d [mm]			
x			
y			
Y			
λ_d [nm]			
P _e			

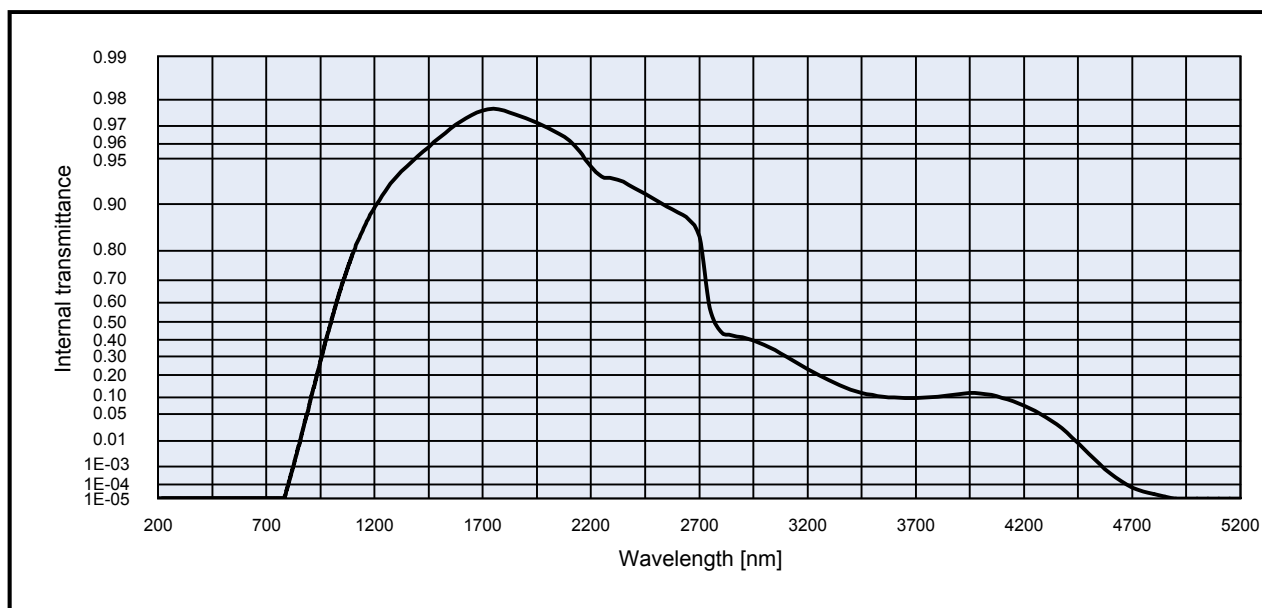
Illuminant	D65 (T _c = 6504 K)		
	1	2	3
d [mm]			
x			
y			
Y			
λ_d [nm]			
P _e			





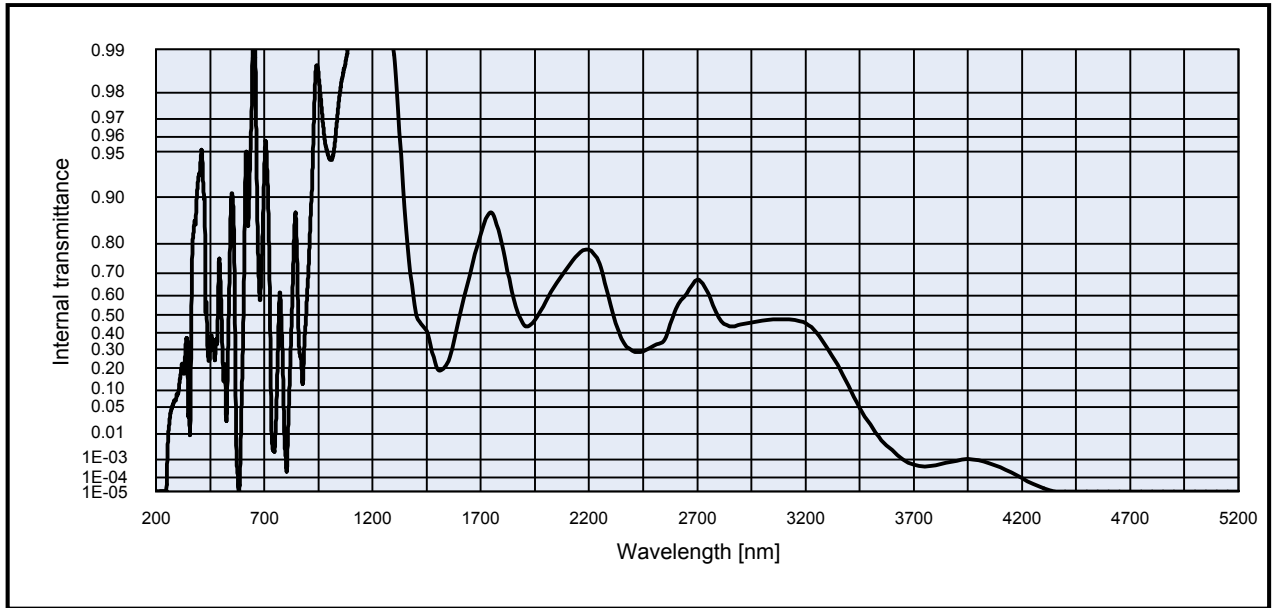
Internal transmittance τ_i at reference thickness d [mm] = 3
The internal transmittance values, tabulated and graphically represented, are reference values only

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	< 1.0E-05	800	1.2E-03	1100	9.9E-01	2200	9.7E-01	3700	4.2E-02
210	< 1.0E-05	510	< 1.0E-05	810	5.3E-03	1110	9.9E-01	2250	9.6E-01	3750	3.7E-02
220	< 1.0E-05	520	< 1.0E-05	820	2.4E-02	1120	9.9E-01	2300	9.6E-01	3800	3.5E-02
230	< 1.0E-05	530	< 1.0E-05	830	9.1E-02	1130	9.9E-01	2350	9.6E-01	3850	4.2E-02
240	< 1.0E-05	540	< 1.0E-05	840	2.6E-01	1140	9.9E-01	2400	9.5E-01	3900	5.5E-02
250	< 1.0E-05	550	< 1.0E-05	850	5.0E-01	1150	9.9E-01	2450	9.4E-01	3950	7.2E-02
260	< 1.0E-05	560	< 1.0E-05	860	7.0E-01	1160	9.9E-01	2500	9.4E-01	4000	7.1E-02
270	< 1.0E-05	570	< 1.0E-05	870	8.4E-01	1170	9.9E-01	2550	9.3E-01	4050	6.3E-02
280	< 1.0E-05	580	< 1.0E-05	880	9.1E-01	1180	9.9E-01	2600	9.3E-01	4100	5.7E-02
290	< 1.0E-05	590	< 1.0E-05	890	9.4E-01	1190	9.9E-01	2650	9.1E-01	4150	5.2E-02
300	< 1.0E-05	600	< 1.0E-05	900	9.6E-01	1200	9.9E-01	2700	8.6E-01	4200	4.9E-02
310	< 1.0E-05	610	< 1.0E-05	910	9.7E-01	1250	1.0E+00	2750	5.1E-01	4250	5.2E-02
320	< 1.0E-05	620	< 1.0E-05	920	9.7E-01	1300	1.0E+00	2800	2.2E-01	4300	5.1E-02
330	< 1.0E-05	630	< 1.0E-05	930	9.7E-01	1350	1.0E+00	2850	1.7E-01	4350	4.4E-02
340	< 1.0E-05	640	< 1.0E-05	940	9.8E-01	1400	1.0E+00	2900	1.4E-01	4400	3.3E-02
350	< 1.0E-05	650	< 1.0E-05	950	9.8E-01	1450	1.0E+00	2950	1.2E-01	4450	2.3E-02
360	< 1.0E-05	660	< 1.0E-05	960	9.8E-01	1500	1.0E+00	3000	1.0E-01	4500	1.3E-02
370	< 1.0E-05	670	< 1.0E-05	970	9.8E-01	1550	1.0E+00	3050	9.3E-02	4550	6.8E-03
380	< 1.0E-05	680	< 1.0E-05	980	9.8E-01	1600	1.0E+00	3100	8.3E-02	4600	3.0E-03
390	< 1.0E-05	690	< 1.0E-05	990	9.8E-01	1650	1.0E+00	3150	7.7E-02	4650	1.2E-03
400	< 1.0E-05	700	< 1.0E-05	1000	9.8E-01	1700	1.0E+00	3200	7.4E-02	4700	4.7E-04
410	< 1.0E-05	710	< 1.0E-05	1010	9.8E-01	1750	9.9E-01	3250	7.2E-02	4750	1.8E-04
420	< 1.0E-05	720	< 1.0E-05	1020	9.8E-01	1800	9.9E-01	3300	6.8E-02	4800	7.2E-05
430	< 1.0E-05	730	< 1.0E-05	1030	9.9E-01	1850	9.9E-01	3350	6.4E-02	4850	3.0E-05
440	< 1.0E-05	740	< 1.0E-05	1040	9.9E-01	1900	9.9E-01	3400	5.9E-02	4900	1.3E-05
450	< 1.0E-05	750	< 1.0E-05	1050	9.9E-01	1950	9.9E-01	3450	5.4E-02	4950	< 1.0E-05
460	< 1.0E-05	760	1.5E-05	1060	9.9E-01	2000	9.9E-01	3500	4.9E-02	5000	< 1.0E-05
470	< 1.0E-05	770	3.4E-05	1070	9.9E-01	2050	9.9E-01	3550	4.5E-02	5050	< 1.0E-05
480	< 1.0E-05	780	8.5E-05	1080	9.9E-01	2100	9.8E-01	3600	4.5E-02	5100	< 1.0E-05
490	< 1.0E-05	790	2.4E-04	1090	9.9E-01	2150	9.8E-01	3650	4.5E-02	5150	< 1.0E-05



Internal transmittance τ_i at reference thickness d [mm] = 3
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	< 1.0E-05	800	8.4E-05	1100	7.9E-01	2200	9.4E-01	3700	9.8E-02
210	< 1.0E-05	510	< 1.0E-05	810	2.5E-04	1110	8.1E-01	2250	9.3E-01	3750	1.0E-01
220	< 1.0E-05	520	< 1.0E-05	820	6.5E-04	1120	8.2E-01	2300	9.3E-01	3800	1.0E-01
230	< 1.0E-05	530	< 1.0E-05	830	1.6E-03	1130	8.4E-01	2350	9.3E-01	3850	1.1E-01
240	< 1.0E-05	540	< 1.0E-05	840	3.4E-03	1140	8.5E-01	2400	9.2E-01	3900	1.1E-01
250	< 1.0E-05	550	< 1.0E-05	850	6.8E-03	1150	8.6E-01	2450	9.1E-01	3950	1.2E-01
260	< 1.0E-05	560	< 1.0E-05	860	1.3E-02	1160	8.7E-01	2500	9.1E-01	4000	1.2E-01
270	< 1.0E-05	570	< 1.0E-05	870	2.2E-02	1170	8.7E-01	2550	9.0E-01	4050	1.1E-01
280	< 1.0E-05	580	< 1.0E-05	880	3.6E-02	1180	8.8E-01	2600	8.9E-01	4100	9.8E-02
290	< 1.0E-05	590	< 1.0E-05	890	5.2E-02	1190	8.9E-01	2650	8.7E-01	4150	8.6E-02
300	< 1.0E-05	600	< 1.0E-05	900	7.7E-02	1200	8.9E-01	2700	8.4E-01	4200	7.2E-02
310	< 1.0E-05	610	< 1.0E-05	910	1.1E-01	1250	9.2E-01	2750	5.7E-01	4250	5.9E-02
320	< 1.0E-05	620	< 1.0E-05	920	1.4E-01	1300	9.3E-01	2800	4.5E-01	4300	4.3E-02
330	< 1.0E-05	630	< 1.0E-05	930	1.8E-01	1350	9.4E-01	2850	4.2E-01	4350	2.9E-02
340	< 1.0E-05	640	< 1.0E-05	940	2.2E-01	1400	9.5E-01	2900	4.1E-01	4400	1.8E-02
350	< 1.0E-05	650	< 1.0E-05	950	2.7E-01	1450	9.6E-01	2950	3.9E-01	4450	8.5E-03
360	< 1.0E-05	660	< 1.0E-05	960	3.2E-01	1500	9.6E-01	3000	3.7E-01	4500	3.5E-03
370	< 1.0E-05	670	< 1.0E-05	970	3.7E-01	1550	9.7E-01	3050	3.4E-01	4550	1.3E-03
380	< 1.0E-05	680	< 1.0E-05	980	4.1E-01	1600	9.7E-01	3100	3.0E-01	4600	4.4E-04
390	< 1.0E-05	690	< 1.0E-05	990	4.6E-01	1650	9.7E-01	3150	2.6E-01	4650	1.6E-04
400	< 1.0E-05	700	< 1.0E-05	1000	5.0E-01	1700	9.8E-01	3200	2.3E-01	4700	6.4E-05
410	< 1.0E-05	710	< 1.0E-05	1010	5.5E-01	1750	9.8E-01	3250	2.0E-01	4750	3.4E-05
420	< 1.0E-05	720	< 1.0E-05	1020	5.8E-01	1800	9.8E-01	3300	1.8E-01	4800	2.2E-05
430	< 1.0E-05	730	< 1.0E-05	1030	6.2E-01	1850	9.7E-01	3350	1.5E-01	4850	1.4E-05
440	< 1.0E-05	740	< 1.0E-05	1040	6.5E-01	1900	9.7E-01	3400	1.3E-01	4900	< 1.0E-05
450	< 1.0E-05	750	< 1.0E-05	1050	6.8E-01	1950	9.7E-01	3450	1.2E-01	4950	< 1.0E-05
460	< 1.0E-05	760	< 1.0E-05	1060	7.1E-01	2000	9.7E-01	3500	1.1E-01	5000	< 1.0E-05
470	< 1.0E-05	770	< 1.0E-05	1070	7.3E-01	2050	9.7E-01	3550	1.0E-01	5050	< 1.0E-05
480	< 1.0E-05	780	< 1.0E-05	1080	7.5E-01	2100	9.6E-01	3600	9.9E-02	5100	< 1.0E-05
490	< 1.0E-05	790	2.6E-05	1090	7.7E-01	2150	9.6E-01	3650	9.8E-02	5150	< 1.0E-05

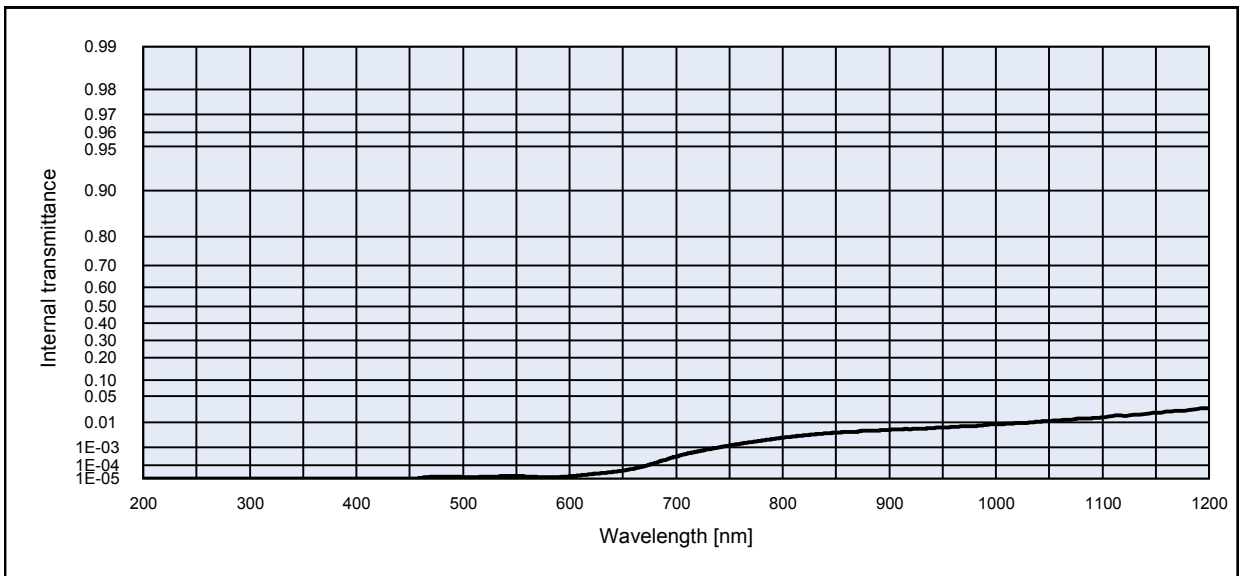


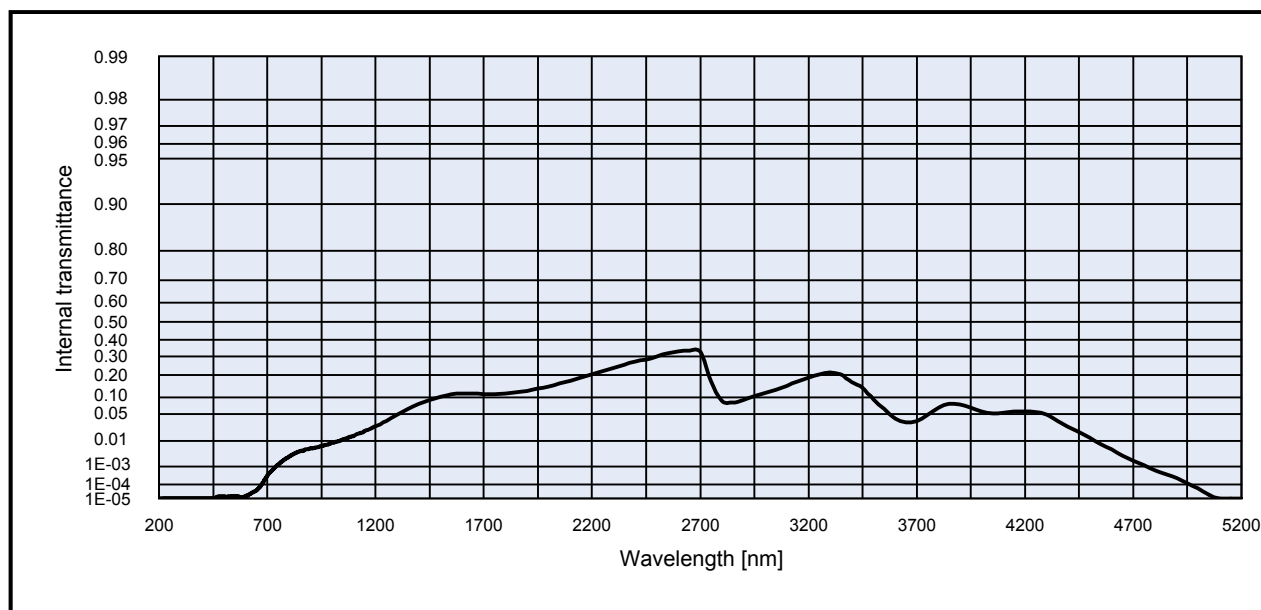
Internal transmittance τ_i at reference thickness d [mm] = 1
The internal transmittance values, tabulated and graphically represented, are reference values only

λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i
200	< 1.0E-05	500	6.1E-01	800	8.6E-04	1100	9.9E-01	2200	7.8E-01	3700	5.6E-04
210	< 1.0E-05	510	1.7E-01	810	1.2E-02	1110	1.0E+00	2250	7.4E-01	3750	4.5E-04
220	< 1.0E-05	520	1.6E-01	820	2.1E-01	1120	1.0E+00	2300	5.6E-01	3800	5.0E-04
230	< 1.0E-05	530	1.4E-01	830	5.8E-01	1130	1.0E+00	2350	3.6E-01	3850	6.8E-04
240	< 1.0E-05	540	7.1E-01	840	8.4E-01	1140	1.0E+00	2400	2.9E-01	3900	8.9E-04
250	1.3E-04	550	9.0E-01	850	8.1E-01	1150	1.0E+00	2450	2.9E-01	3950	1.1E-03
260	1.7E-02	560	8.4E-01	860	3.3E-01	1160	1.0E+00	2500	3.2E-01	4000	9.3E-04
270	4.2E-02	570	1.9E-02	870	2.5E-01	1170	1.0E+00	2550	3.6E-01	4050	6.5E-04
280	5.8E-02	580	1.6E-05	880	1.6E-01	1180	1.0E+00	2600	5.3E-01	4100	4.1E-04
290	6.8E-02	590	1.8E-03	890	4.3E-01	1190	1.0E+00	2650	6.1E-01	4150	2.0E-04
300	8.4E-02	600	2.4E-01	900	6.4E-01	1200	9.9E-01	2700	6.7E-01	4200	8.9E-05
310	1.4E-01	610	8.5E-01	910	8.0E-01	1250	1.0E+00	2750	6.2E-01	4250	3.7E-05
320	2.2E-01	620	9.0E-01	920	9.1E-01	1300	9.9E-01	2800	4.9E-01	4300	1.7E-05
330	1.8E-01	630	8.9E-01	930	9.7E-01	1350	8.7E-01	2850	4.4E-01	4350	< 1.0E-05
340	3.6E-01	640	9.6E-01	940	9.9E-01	1400	5.1E-01	2900	4.5E-01	4400	< 1.0E-05
350	3.0E-02	650	1.0E+00	950	9.9E-01	1450	4.1E-01	2950	4.6E-01	4450	< 1.0E-05
360	6.1E-02	660	9.8E-01	960	9.8E-01	1500	1.9E-01	3000	4.7E-01	4500	< 1.0E-05
370	8.1E-01	670	8.2E-01	970	9.7E-01	1550	2.4E-01	3050	4.7E-01	4550	< 1.0E-05
380	8.6E-01	680	5.8E-01	980	9.6E-01	1600	4.8E-01	3100	4.8E-01	4600	< 1.0E-05
390	9.1E-01	690	7.7E-01	990	9.5E-01	1650	6.9E-01	3150	4.7E-01	4650	< 1.0E-05
400	9.3E-01	700	9.3E-01	1000	9.4E-01	1700	8.2E-01	3200	4.5E-01	4700	< 1.0E-05
410	9.5E-01	710	9.5E-01	1010	9.4E-01	1750	8.7E-01	3250	4.0E-01	4750	< 1.0E-05
420	9.1E-01	720	8.5E-01	1020	9.5E-01	1800	8.0E-01	3300	3.1E-01	4800	< 1.0E-05
430	5.0E-01	730	1.5E-01	1030	9.6E-01	1850	5.9E-01	3350	2.2E-01	4850	< 1.0E-05
440	2.7E-01	740	2.6E-03	1040	9.7E-01	1900	4.4E-01	3400	1.2E-01	4900	< 1.0E-05
450	3.0E-01	750	5.3E-03	1050	9.8E-01	1950	4.7E-01	3450	4.9E-02	4950	< 1.0E-05
460	3.6E-01	760	1.5E-01	1060	9.8E-01	2000	5.7E-01	3500	2.0E-02	5000	< 1.0E-05
470	2.6E-01	770	5.8E-01	1070	9.9E-01	2050	6.6E-01	3550	6.3E-03	5050	< 1.0E-05
480	3.5E-01	780	4.6E-01	1080	9.9E-01	2100	7.2E-01	3600	2.7E-03	5100	< 1.0E-05
490	7.1E-01	790	4.2E-02	1090	9.9E-01	2150	7.7E-01	3650	1.0E-03	5150	< 1.0E-05

NG1		Density		Notes	
		ρ [g/cm ³]	2.47	Ionically colored glass	
Reflection factor		Bubble content		Neutral density filter	
P_d	0.92	Bubble class	2		
Reference thickness		Chemical resistance			
d [mm]	1	FR class	1		
		SR class	2.2		
		AR class	1.0		
Spectral values guaranteed		Transformation temperature			
τ_i (546 nm)	< 1 · 10 ⁻⁴	T _g [°C]	471		
		Thermal expansion			
		$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	6.6		
		$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	7.2		
		$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]			
Refractive index n		Temperature coefficient		<p>All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".</p>	
λ [nm]	Element	n	T _k [nm/°C]		
587.6	He	1.52			

Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3
x				x				x			
y				y				y			
Y				Y				Y			
λ_d [nm]				λ_d [nm]				λ_d [nm]			
P _e				P _e				P _e			





Internal transmittance τ_i at reference thickness d [mm] = 1
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	1.3E-05	800	2.7E-03	1100	1.4E-02	2200	2.0E-01	3700	3.6E-02
210	< 1.0E-05	510	1.3E-05	810	3.0E-03	1110	1.6E-02	2250	2.2E-01	3750	4.8E-02
220	< 1.0E-05	520	1.4E-05	820	3.4E-03	1120	1.6E-02	2300	2.4E-01	3800	6.6E-02
230	< 1.0E-05	530	1.5E-05	830	3.7E-03	1130	1.7E-02	2350	2.6E-01	3850	7.7E-02
240	< 1.0E-05	540	1.6E-05	840	4.1E-03	1140	1.8E-02	2400	2.7E-01	3900	7.6E-02
250	< 1.0E-05	550	1.6E-05	850	4.3E-03	1150	2.0E-02	2450	2.9E-01	3950	6.7E-02
260	< 1.0E-05	560	1.5E-05	860	4.6E-03	1160	2.1E-02	2500	3.0E-01	4000	5.6E-02
270	< 1.0E-05	570	1.3E-05	870	4.8E-03	1170	2.2E-02	2550	3.2E-01	4050	5.1E-02
280	< 1.0E-05	580	1.3E-05	880	5.2E-03	1180	2.3E-02	2600	3.3E-01	4100	5.3E-02
290	< 1.0E-05	590	1.3E-05	890	5.2E-03	1190	2.4E-02	2650	3.4E-01	4150	5.6E-02
300	< 1.0E-05	600	1.5E-05	900	5.5E-03	1200	2.6E-02	2700	3.3E-01	4200	5.7E-02
310	< 1.0E-05	610	1.8E-05	910	5.7E-03	1250	3.5E-02	2750	1.7E-01	4250	5.5E-02
320	< 1.0E-05	620	2.2E-05	920	5.9E-03	1300	4.8E-02	2800	8.9E-02	4300	4.8E-02
330	< 1.0E-05	630	2.7E-05	930	6.0E-03	1350	6.2E-02	2850	8.2E-02	4350	3.5E-02
340	< 1.0E-05	640	3.3E-05	940	6.5E-03	1400	7.8E-02	2900	9.2E-02	4400	2.6E-02
350	< 1.0E-05	650	4.1E-05	950	6.7E-03	1450	9.2E-02	2950	1.0E-01	4450	1.9E-02
360	< 1.0E-05	660	5.6E-05	960	7.1E-03	1500	1.0E-01	3000	1.2E-01	4500	1.3E-02
370	< 1.0E-05	670	8.3E-05	970	7.6E-03	1550	1.1E-01	3050	1.3E-01	4550	7.8E-03
380	< 1.0E-05	680	1.3E-04	980	7.6E-03	1600	1.2E-01	3100	1.5E-01	4600	5.1E-03
390	< 1.0E-05	690	2.1E-04	990	8.2E-03	1650	1.1E-01	3150	1.7E-01	4650	3.0E-03
400	< 1.0E-05	700	3.2E-04	1000	8.6E-03	1700	1.1E-01	3200	1.9E-01	4700	1.8E-03
410	< 1.0E-05	710	4.6E-04	1010	9.1E-03	1750	1.1E-01	3250	2.0E-01	4750	1.1E-03
420	< 1.0E-05	720	6.2E-04	1020	9.6E-03	1800	1.2E-01	3300	2.1E-01	4800	6.3E-04
430	< 1.0E-05	730	8.0E-04	1030	9.8E-03	1850	1.2E-01	3350	2.0E-01	4850	4.2E-04
440	< 1.0E-05	740	9.9E-04	1040	1.1E-02	1900	1.3E-01	3400	1.7E-01	4900	2.5E-04
450	< 1.0E-05	750	1.2E-03	1050	1.1E-02	1950	1.3E-01	3450	1.4E-01	4950	1.2E-04
460	1.1E-05	760	1.5E-03	1060	1.2E-02	2000	1.5E-01	3500	9.4E-02	5000	5.5E-05
470	1.4E-05	770	1.7E-03	1070	1.2E-02	2050	1.6E-01	3550	6.3E-02	5050	2.0E-05
480	1.4E-05	780	2.0E-03	1080	1.3E-02	2100	1.7E-01	3600	4.0E-02	5100	< 1.0E-05
490	1.4E-05	790	2.4E-03	1090	1.4E-02	2150	1.9E-01	3650	3.3E-02	5150	< 1.0E-05

NG3

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (405 nm)	=	0.06 ± 0.02
τ_i (546 nm)	=	0.10 ± 0.02
τ_i (694 nm)	=	0.17 ± 0.03

Refractive index n		
λ [nm]	Element	n
587.6	He	1.51

Density	
ρ [g/cm ³]	2.44

Bubble content	
Bubble class	2

Chemical resistance	
FR class	1
SR class	2.2
AR class	1.0

Transformation temperature	
T_g [°C]	462

Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	6.5
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	7.3
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes

Ionically colored glass

Neutral density filter

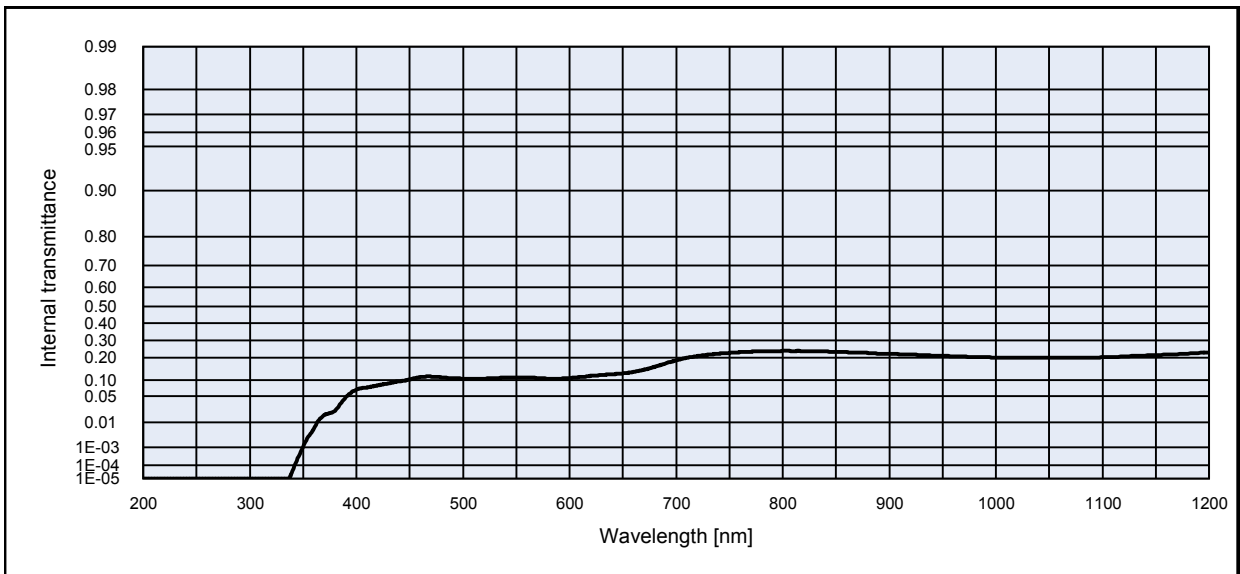
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

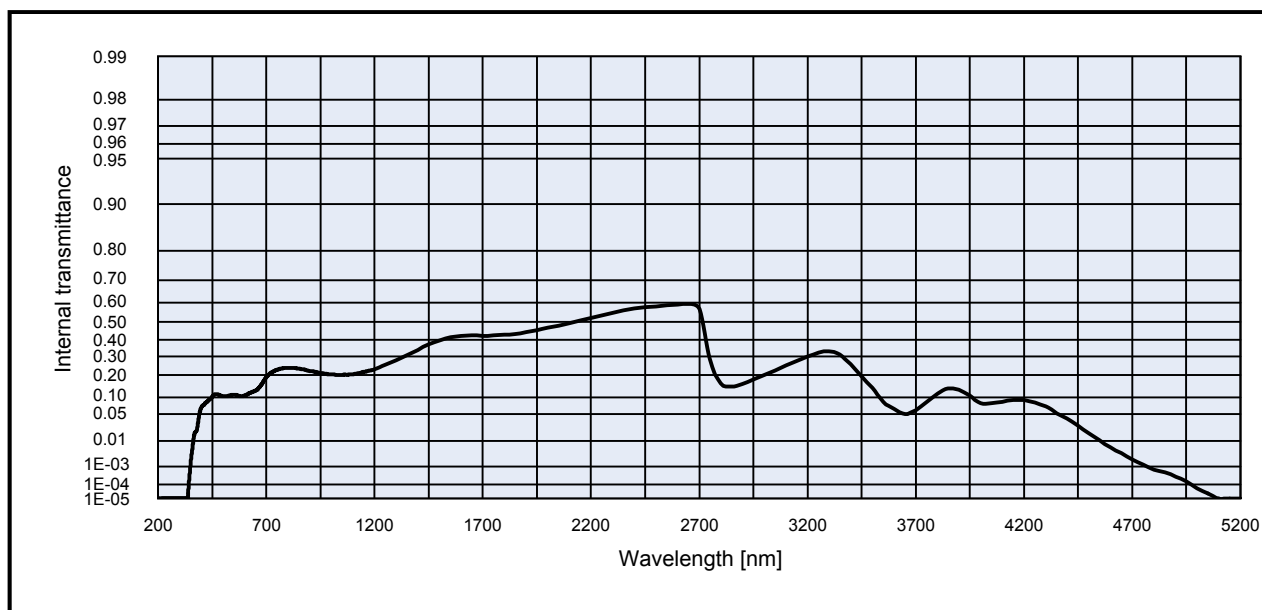
Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)			
	d [mm]	1	2	3
x				
y				
Y				
λ_d [nm]				
P_e				

Illuminant	Planck T = 3200 K			
	d [mm]	1	2	3
x				
y				
Y				
λ_d [nm]				
P_e				

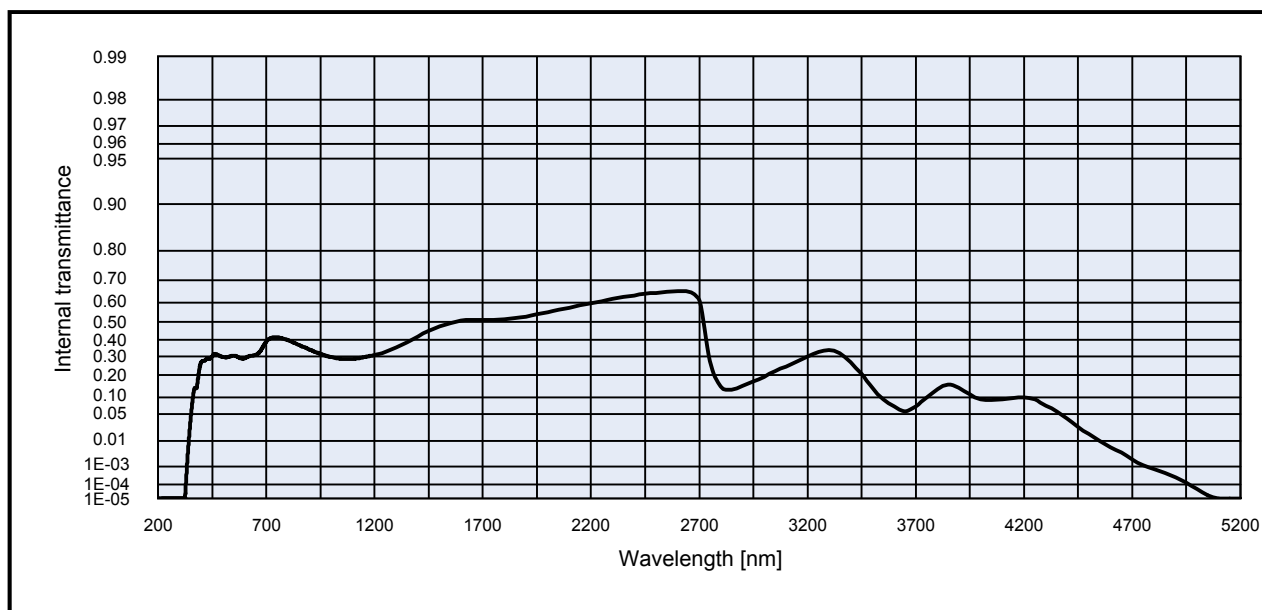
Illuminant	D65 (T _c = 6504 K)			
	d [mm]	1	2	3
x				
y				
Y				
λ_d [nm]				
P_e				





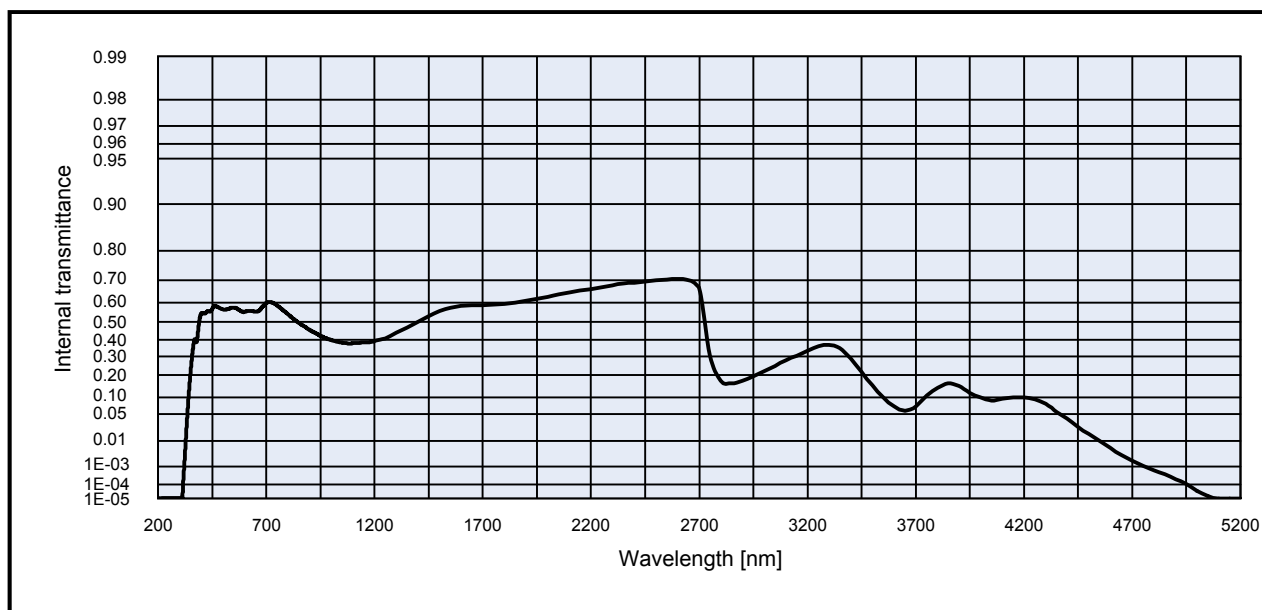
Internal transmittance τ_i at reference thickness d [mm] = 1
The internal transmittance values, tabulated and graphically represented, are reference values only

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	1.0E-01	800	2.4E-01	1100	2.0E-01	2200	5.2E-01	3700	6.0E-02
210	< 1.0E-05	510	1.0E-01	810	2.4E-01	1110	2.1E-01	2250	5.4E-01	3750	8.5E-02
220	< 1.0E-05	520	1.0E-01	820	2.4E-01	1120	2.1E-01	2300	5.5E-01	3800	1.2E-01
230	< 1.0E-05	530	1.1E-01	830	2.4E-01	1130	2.1E-01	2350	5.6E-01	3850	1.4E-01
240	< 1.0E-05	540	1.1E-01	840	2.4E-01	1140	2.1E-01	2400	5.7E-01	3900	1.3E-01
250	< 1.0E-05	550	1.1E-01	850	2.3E-01	1150	2.1E-01	2450	5.8E-01	3950	1.1E-01
260	< 1.0E-05	560	1.1E-01	860	2.3E-01	1160	2.2E-01	2500	5.8E-01	4000	8.0E-02
270	< 1.0E-05	570	1.1E-01	870	2.3E-01	1170	2.2E-01	2550	5.9E-01	4050	8.0E-02
280	< 1.0E-05	580	1.1E-01	880	2.3E-01	1180	2.2E-01	2600	5.9E-01	4100	8.5E-02
290	< 1.0E-05	590	1.0E-01	890	2.2E-01	1190	2.3E-01	2650	6.0E-01	4150	9.0E-02
300	< 1.0E-05	600	1.1E-01	900	2.2E-01	1200	2.3E-01	2700	5.7E-01	4200	9.0E-02
310	< 1.0E-05	610	1.1E-01	910	2.2E-01	1250	2.5E-01	2750	2.9E-01	4250	8.3E-02
320	< 1.0E-05	620	1.2E-01	920	2.2E-01	1300	2.8E-01	2800	1.6E-01	4300	7.0E-02
330	< 1.0E-05	630	1.2E-01	930	2.2E-01	1350	3.1E-01	2850	1.4E-01	4350	5.2E-02
340	3.9E-05	640	1.2E-01	940	2.1E-01	1400	3.4E-01	2900	1.6E-01	4400	4.0E-02
350	1.0E-03	650	1.3E-01	950	2.1E-01	1450	3.7E-01	2950	1.8E-01	4450	2.7E-02
360	5.9E-03	660	1.3E-01	960	2.1E-01	1500	4.0E-01	3000	2.0E-01	4500	1.7E-02
370	1.7E-02	670	1.4E-01	970	2.1E-01	1550	4.1E-01	3050	2.2E-01	4550	1.0E-02
380	2.2E-02	680	1.6E-01	980	2.0E-01	1600	4.2E-01	3100	2.5E-01	4600	6.2E-03
390	4.7E-02	690	1.7E-01	990	2.0E-01	1650	4.2E-01	3150	2.8E-01	4650	3.7E-03
400	6.7E-02	700	1.9E-01	1000	2.0E-01	1700	4.2E-01	3200	3.0E-01	4700	2.1E-03
410	7.4E-02	710	2.0E-01	1010	2.0E-01	1750	4.2E-01	3250	3.2E-01	4750	1.2E-03
420	8.1E-02	720	2.1E-01	1020	2.0E-01	1800	4.3E-01	3300	3.3E-01	4800	7.1E-04
430	8.7E-02	730	2.2E-01	1030	2.0E-01	1850	4.3E-01	3350	3.1E-01	4850	5.2E-04
440	9.5E-02	740	2.2E-01	1040	2.0E-01	1900	4.4E-01	3400	2.6E-01	4900	3.0E-04
450	1.0E-01	750	2.3E-01	1050	2.0E-01	1950	4.5E-01	3450	1.9E-01	4950	1.5E-04
460	1.1E-01	760	2.3E-01	1060	2.0E-01	2000	4.7E-01	3500	1.4E-01	5000	5.6E-05
470	1.1E-01	770	2.3E-01	1070	2.0E-01	2050	4.8E-01	3550	8.5E-02	5050	2.5E-05
480	1.1E-01	780	2.4E-01	1080	2.0E-01	2100	5.0E-01	3600	6.2E-02	5100	< 1.0E-05
490	1.1E-01	790	2.4E-01	1090	2.0E-01	2150	5.1E-01	3650	5.0E-02	5150	< 1.0E-05



Internal transmittance τ_i at reference thickness d [mm] = 1
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	3.0E-01	800	4.0E-01	1100	2.9E-01	2200	6.0E-01	3700	7.0E-02
210	< 1.0E-05	510	3.0E-01	810	3.9E-01	1110	2.9E-01	2250	6.1E-01	3750	1.0E-01
220	< 1.0E-05	520	3.0E-01	820	3.9E-01	1120	2.9E-01	2300	6.2E-01	3800	1.3E-01
230	< 1.0E-05	530	3.0E-01	830	3.8E-01	1130	2.9E-01	2350	6.3E-01	3850	1.5E-01
240	< 1.0E-05	540	3.0E-01	840	3.7E-01	1140	2.9E-01	2400	6.4E-01	3900	1.4E-01
250	< 1.0E-05	550	3.1E-01	850	3.7E-01	1150	3.0E-01	2450	6.4E-01	3950	1.1E-01
260	< 1.0E-05	560	3.0E-01	860	3.6E-01	1160	3.0E-01	2500	6.5E-01	4000	9.4E-02
270	< 1.0E-05	570	3.0E-01	870	3.6E-01	1170	3.0E-01	2550	6.5E-01	4050	9.0E-02
280	< 1.0E-05	580	2.9E-01	880	3.5E-01	1180	3.0E-01	2600	6.5E-01	4100	9.4E-02
290	< 1.0E-05	590	2.9E-01	890	3.5E-01	1190	3.1E-01	2650	6.5E-01	4150	9.8E-02
300	< 1.0E-05	600	2.9E-01	900	3.4E-01	1200	3.1E-01	2700	6.1E-01	4200	1.0E-01
310	< 1.0E-05	610	3.0E-01	910	3.4E-01	1250	3.3E-01	2750	2.8E-01	4250	9.3E-02
320	< 1.0E-05	620	3.0E-01	920	3.3E-01	1300	3.5E-01	2800	1.5E-01	4300	7.3E-02
330	2.0E-04	630	3.0E-01	930	3.3E-01	1350	3.9E-01	2850	1.3E-01	4350	5.7E-02
340	6.0E-03	640	3.1E-01	940	3.2E-01	1400	4.2E-01	2900	1.5E-01	4400	4.0E-02
350	3.4E-02	650	3.1E-01	950	3.2E-01	1450	4.5E-01	2950	1.7E-01	4450	2.5E-02
360	8.9E-02	660	3.2E-01	960	3.1E-01	1500	4.8E-01	3000	1.9E-01	4500	1.6E-02
370	1.4E-01	670	3.3E-01	970	3.1E-01	1550	4.9E-01	3050	2.2E-01	4550	1.0E-02
380	1.4E-01	680	3.5E-01	980	3.0E-01	1600	5.1E-01	3100	2.4E-01	4600	6.2E-03
390	2.3E-01	690	3.7E-01	990	3.0E-01	1650	5.1E-01	3150	2.7E-01	4650	4.0E-03
400	2.7E-01	700	3.9E-01	1000	3.0E-01	1700	5.1E-01	3200	3.0E-01	4700	2.1E-03
410	2.8E-01	710	4.0E-01	1010	3.0E-01	1750	5.1E-01	3250	3.3E-01	4750	1.2E-03
420	2.8E-01	720	4.1E-01	1020	2.9E-01	1800	5.2E-01	3300	3.4E-01	4800	7.3E-04
430	2.9E-01	730	4.1E-01	1030	2.9E-01	1850	5.2E-01	3350	3.2E-01	4850	4.7E-04
440	2.9E-01	740	4.1E-01	1040	2.9E-01	1900	5.3E-01	3400	2.7E-01	4900	2.8E-04
450	3.0E-01	750	4.1E-01	1050	2.9E-01	1950	5.4E-01	3450	2.1E-01	4950	1.4E-04
460	3.2E-01	760	4.1E-01	1060	2.9E-01	2000	5.5E-01	3500	1.4E-01	5000	5.2E-05
470	3.1E-01	770	4.1E-01	1070	2.9E-01	2050	5.7E-01	3550	9.4E-02	5050	1.8E-05
480	3.1E-01	780	4.0E-01	1080	2.9E-01	2100	5.8E-01	3600	7.0E-02	5100	< 1.0E-05
490	3.0E-01	790	4.0E-01	1090	2.9E-01	2150	5.9E-01	3650	5.6E-02	5150	< 1.0E-05



Internal transmittance τ_i at reference thickness d [mm] = 1
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	5.7E-01	800	5.4E-01	1100	3.8E-01	2200	6.6E-01	3700	7.1E-02
210	< 1.0E-05	510	5.7E-01	810	5.3E-01	1110	3.8E-01	2250	6.7E-01	3750	1.1E-01
220	< 1.0E-05	520	5.7E-01	820	5.2E-01	1120	3.8E-01	2300	6.8E-01	3800	1.4E-01
230	< 1.0E-05	530	5.7E-01	830	5.1E-01	1130	3.8E-01	2350	6.9E-01	3850	1.6E-01
240	< 1.0E-05	540	5.8E-01	840	5.1E-01	1140	3.8E-01	2400	6.9E-01	3900	1.5E-01
250	< 1.0E-05	550	5.8E-01	850	5.0E-01	1150	3.8E-01	2450	6.9E-01	3950	1.2E-01
260	< 1.0E-05	560	5.7E-01	860	4.9E-01	1160	3.8E-01	2500	7.0E-01	4000	1.0E-01
270	< 1.0E-05	570	5.7E-01	870	4.8E-01	1170	3.8E-01	2550	7.0E-01	4050	8.9E-02
280	< 1.0E-05	580	5.6E-01	880	4.7E-01	1180	3.9E-01	2600	7.0E-01	4100	9.5E-02
290	< 1.0E-05	590	5.5E-01	890	4.6E-01	1190	3.9E-01	2650	7.0E-01	4150	1.0E-01
300	< 1.0E-05	600	5.5E-01	900	4.6E-01	1200	3.9E-01	2700	6.6E-01	4200	1.0E-01
310	< 1.0E-05	610	5.6E-01	910	4.5E-01	1250	4.1E-01	2750	3.1E-01	4250	9.4E-02
320	7.4E-04	620	5.6E-01	920	4.4E-01	1300	4.4E-01	2800	1.7E-01	4300	7.8E-02
330	1.6E-02	630	5.6E-01	930	4.4E-01	1350	4.7E-01	2850	1.6E-01	4350	5.5E-02
340	8.6E-02	640	5.6E-01	940	4.3E-01	1400	5.0E-01	2900	1.7E-01	4400	4.0E-02
350	2.1E-01	650	5.6E-01	950	4.2E-01	1450	5.3E-01	2950	1.9E-01	4450	2.5E-02
360	3.3E-01	660	5.6E-01	960	4.2E-01	1500	5.6E-01	3000	2.2E-01	4500	1.6E-02
370	4.0E-01	670	5.6E-01	970	4.1E-01	1550	5.8E-01	3050	2.5E-01	4550	1.0E-02
380	3.9E-01	680	5.8E-01	980	4.1E-01	1600	5.9E-01	3100	2.8E-01	4600	5.8E-03
390	5.0E-01	690	5.9E-01	990	4.0E-01	1650	5.9E-01	3150	3.1E-01	4650	3.2E-03
400	5.5E-01	700	6.0E-01	1000	4.0E-01	1700	5.9E-01	3200	3.4E-01	4700	1.8E-03
410	5.5E-01	710	6.0E-01	1010	3.9E-01	1750	5.9E-01	3250	3.6E-01	4750	1.0E-03
420	5.5E-01	720	6.0E-01	1020	3.9E-01	1800	6.0E-01	3300	3.7E-01	4800	6.6E-04
430	5.6E-01	730	6.0E-01	1030	3.9E-01	1850	6.0E-01	3350	3.5E-01	4850	4.0E-04
440	5.6E-01	740	5.9E-01	1040	3.8E-01	1900	6.1E-01	3400	2.9E-01	4900	2.1E-04
450	5.7E-01	750	5.9E-01	1050	3.8E-01	1950	6.2E-01	3450	2.2E-01	4950	1.1E-04
460	5.8E-01	760	5.8E-01	1060	3.8E-01	2000	6.3E-01	3500	1.5E-01	5000	3.9E-05
470	5.8E-01	770	5.7E-01	1070	3.8E-01	2050	6.4E-01	3550	1.0E-01	5050	1.5E-05
480	5.8E-01	780	5.6E-01	1080	3.8E-01	2100	6.5E-01	3600	7.0E-02	5100	< 1.0E-05
490	5.7E-01	790	5.5E-01	1090	3.8E-01	2150	6.6E-01	3650	5.9E-02	5150	< 1.0E-05

NG9

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	1

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 index n		
λ [nm]	Element	n
587.6	He	1.51

Density	
ρ [g/cm ³]	2.45

Bubble content	
Bubble class	2

Chemical resistance	
FR class	1
SR class	3.2
AR class	2.0

Transformation temperature	
T_g [°C]	470

Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	6.4
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	7.2
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes

Ionically colored glass

Neutral density filter

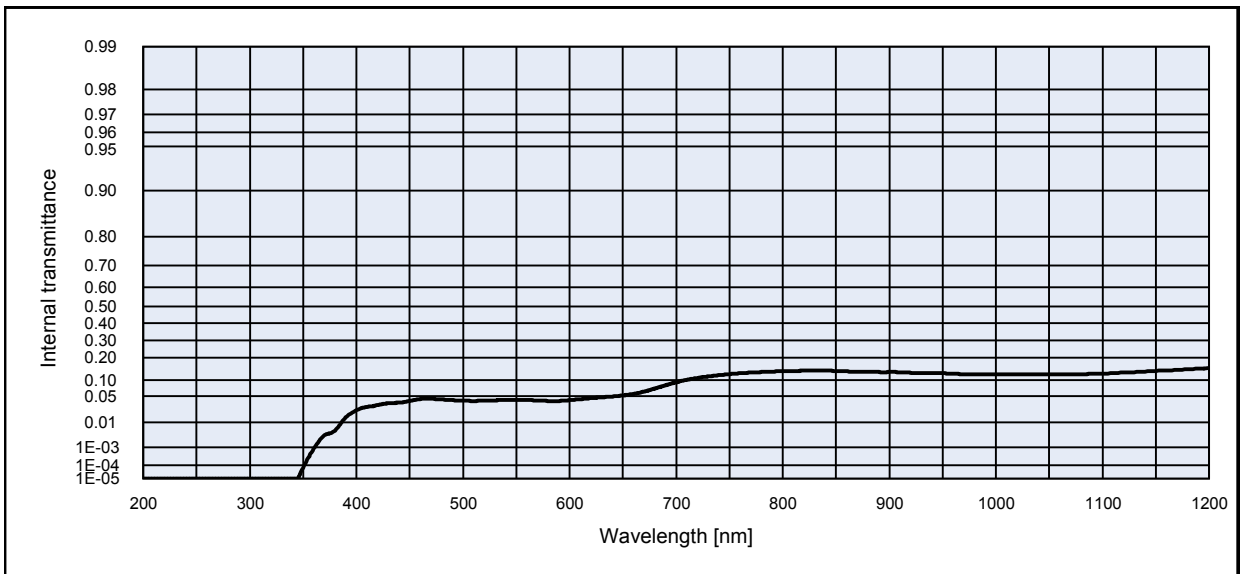
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

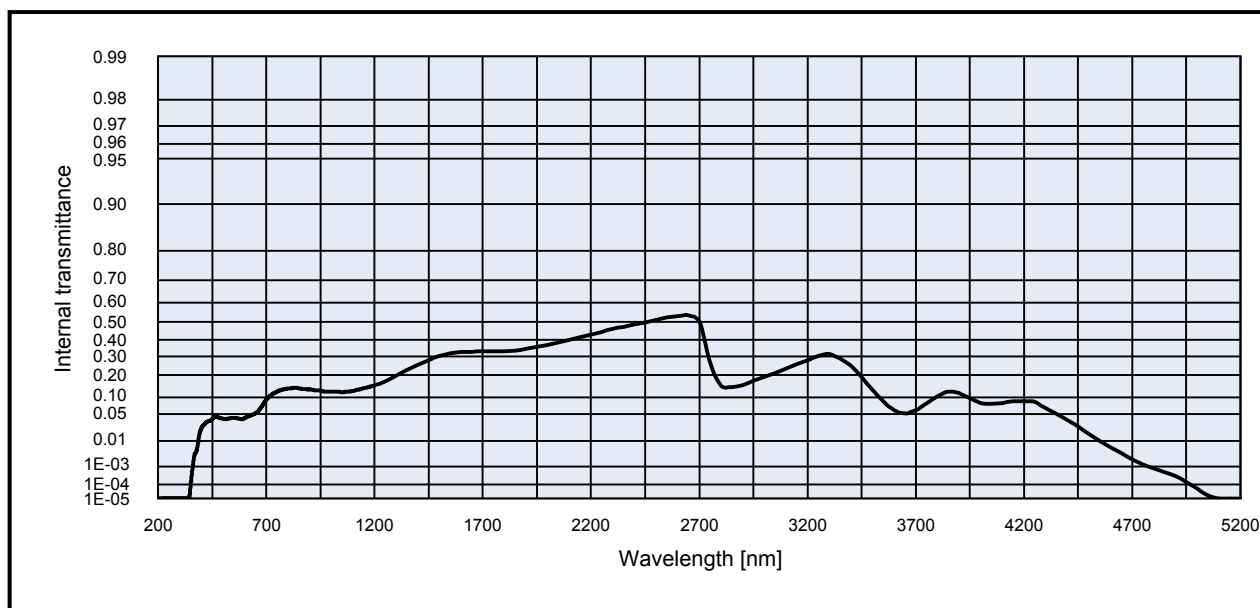
Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)			
	d [mm]	1	2	3
x				
y				
Y				
λ_d [nm]				
P_e				

Illuminant	Planck T = 3200 K			
	d [mm]	1	2	3
x				
y				
Y				
λ_d [nm]				
P_e				

Illuminant	D65 (T _c = 6504 K)			
	d [mm]	1	2	3
x				
y				
Y				
λ_d [nm]				
P_e				





Internal transmittance τ_i at reference thickness d [mm] = 1
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	4.0E-02	800	1.4E-01	1100	1.3E-01	2200	4.3E-01	3700	6.0E-02
210	< 1.0E-05	510	3.9E-02	810	1.4E-01	1110	1.3E-01	2250	4.4E-01	3750	8.1E-02
220	< 1.0E-05	520	3.9E-02	820	1.4E-01	1120	1.3E-01	2300	4.6E-01	3800	1.1E-01
230	< 1.0E-05	530	4.0E-02	830	1.4E-01	1130	1.3E-01	2350	4.7E-01	3850	1.2E-01
240	< 1.0E-05	540	4.1E-02	840	1.4E-01	1140	1.3E-01	2400	4.9E-01	3900	1.2E-01
250	< 1.0E-05	550	4.2E-02	850	1.4E-01	1150	1.4E-01	2450	5.0E-01	3950	9.9E-02
260	< 1.0E-05	560	4.1E-02	860	1.3E-01	1160	1.4E-01	2500	5.1E-01	4000	8.0E-02
270	< 1.0E-05	570	4.0E-02	870	1.3E-01	1170	1.4E-01	2550	5.3E-01	4050	7.8E-02
280	< 1.0E-05	580	3.9E-02	880	1.3E-01	1180	1.4E-01	2600	5.3E-01	4100	8.0E-02
290	< 1.0E-05	590	3.9E-02	890	1.3E-01	1190	1.5E-01	2650	5.3E-01	4150	8.6E-02
300	< 1.0E-05	600	4.1E-02	900	1.3E-01	1200	1.5E-01	2700	5.0E-01	4200	8.6E-02
310	< 1.0E-05	610	4.3E-02	910	1.3E-01	1250	1.7E-01	2750	2.7E-01	4250	8.4E-02
320	< 1.0E-05	620	4.5E-02	920	1.3E-01	1300	2.0E-01	2800	1.5E-01	4300	6.5E-02
330	< 1.0E-05	630	4.7E-02	930	1.3E-01	1350	2.3E-01	2850	1.4E-01	4350	5.0E-02
340	< 1.0E-05	640	4.9E-02	940	1.3E-01	1400	2.5E-01	2900	1.5E-01	4400	3.7E-02
350	6.4E-05	650	5.2E-02	950	1.3E-01	1450	2.8E-01	2950	1.7E-01	4450	2.6E-02
360	8.5E-04	660	5.5E-02	960	1.2E-01	1500	3.1E-01	3000	1.9E-01	4500	1.6E-02
370	3.4E-03	670	6.2E-02	970	1.2E-01	1550	3.2E-01	3050	2.1E-01	4550	1.0E-02
380	5.3E-03	680	7.0E-02	980	1.2E-01	1600	3.3E-01	3100	2.3E-01	4600	6.2E-03
390	1.5E-02	690	8.1E-02	990	1.2E-01	1650	3.3E-01	3150	2.6E-01	4650	3.8E-03
400	2.3E-02	700	9.1E-02	1000	1.2E-01	1700	3.3E-01	3200	2.8E-01	4700	2.1E-03
410	2.8E-02	710	1.0E-01	1010	1.2E-01	1750	3.3E-01	3250	3.0E-01	4750	1.2E-03
420	3.1E-02	720	1.1E-01	1020	1.2E-01	1800	3.3E-01	3300	3.1E-01	4800	7.7E-04
430	3.4E-02	730	1.1E-01	1030	1.2E-01	1850	3.4E-01	3350	2.9E-01	4850	5.2E-04
440	3.6E-02	740	1.2E-01	1040	1.2E-01	1900	3.5E-01	3400	2.5E-01	4900	3.1E-04
450	3.9E-02	750	1.2E-01	1050	1.2E-01	1950	3.6E-01	3450	1.9E-01	4950	1.5E-04
460	4.3E-02	760	1.3E-01	1060	1.2E-01	2000	3.7E-01	3500	1.3E-01	5000	5.8E-05
470	4.4E-02	770	1.3E-01	1070	1.2E-01	2050	3.8E-01	3550	8.8E-02	5050	1.8E-05
480	4.2E-02	780	1.3E-01	1080	1.2E-01	2100	4.0E-01	3600	6.0E-02	5100	< 1.0E-05
490	4.1E-02	790	1.3E-01	1090	1.2E-01	2150	4.1E-01	3650	5.1E-02	5150	< 1.0E-05

NG11

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	1

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 index n		
λ [nm]	Element	n
404.7	Hg	1.51
587.6	He	1.50
1014	Hg	1.49

Density	
ρ [g/cm ³]	2.42

Bubble content	
Bubble class	2

Chemical resistance	
FR class	1
SR class	3.4
AR class	2.0

Transformation temperature	
T_g [°C]	481

Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	6.9
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	7.5
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

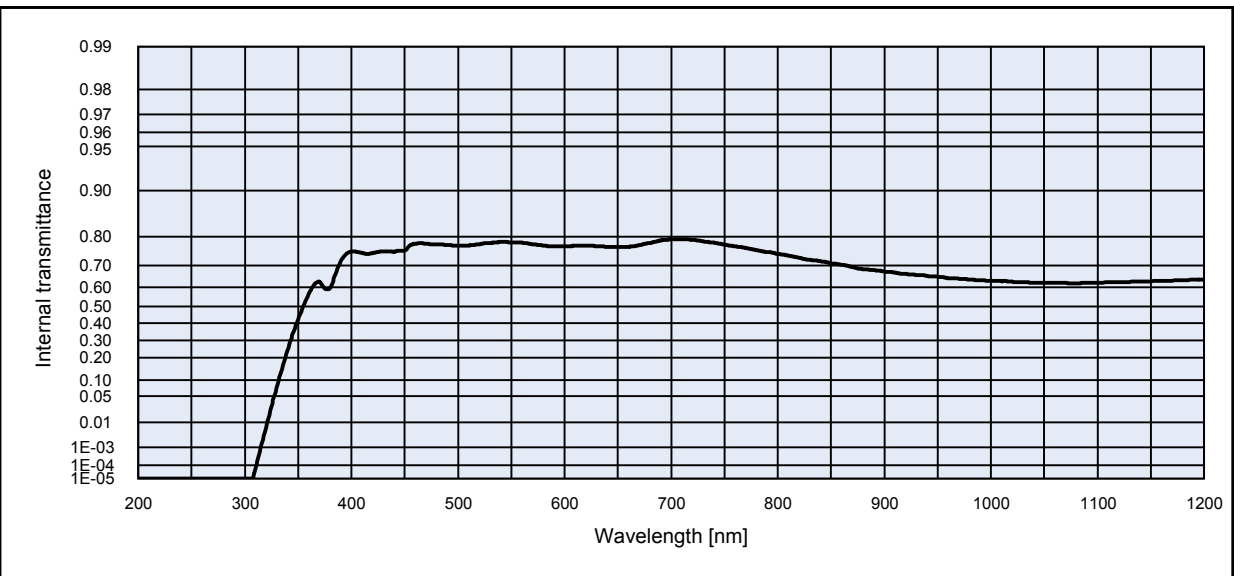
Notes

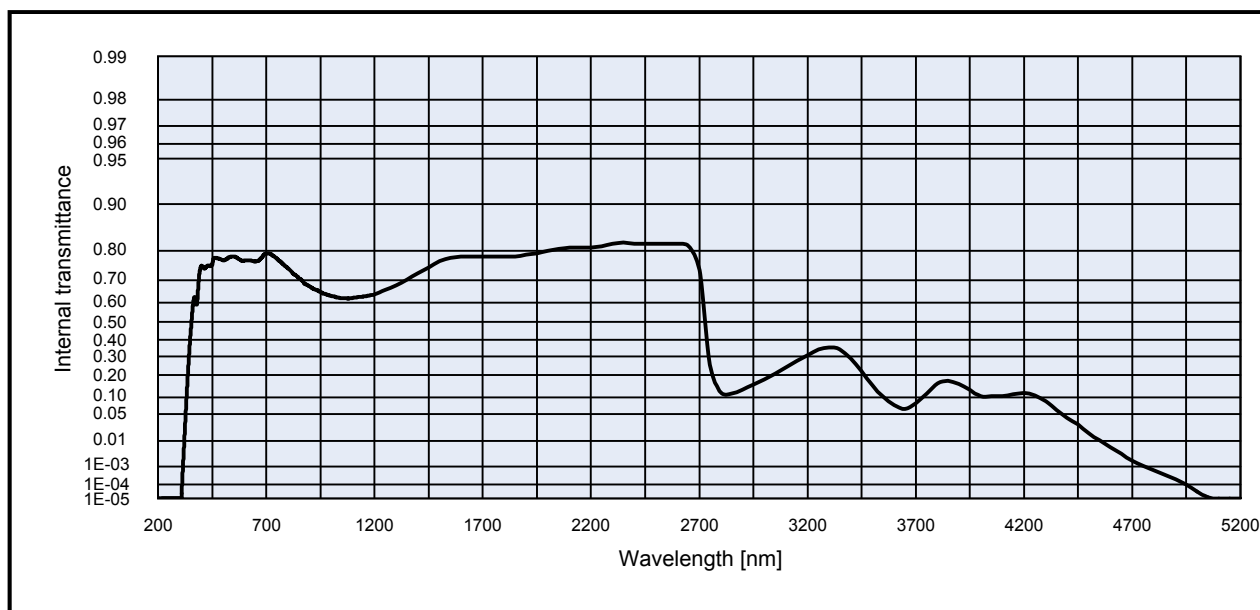
Ionically colored glass

Neutral density filter

All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation											
Illuminant A (Planck T = 2856 K)			Illuminant Planck T = 3200 K			Illuminant D65 (T _c = 6504 K)					
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3
x				x				x			
y				y				y			
Y				Y				Y			
λ_d [nm]				λ_d [nm]				λ_d [nm]			
P_e				P_e				P_e			





Internal transmittance τ_i at reference thickness d [mm] = 1
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	7.7E-01	800	7.4E-01	1100	6.2E-01	2200	8.1E-01	3700	8.0E-02
210	< 1.0E-05	510	7.7E-01	810	7.4E-01	1110	6.3E-01	2250	8.1E-01	3750	1.2E-01
220	< 1.0E-05	520	7.8E-01	820	7.3E-01	1120	6.3E-01	2300	8.2E-01	3800	1.6E-01
230	< 1.0E-05	530	7.8E-01	830	7.2E-01	1130	6.3E-01	2350	8.2E-01	3850	1.7E-01
240	< 1.0E-05	540	7.8E-01	840	7.2E-01	1140	6.3E-01	2400	8.2E-01	3900	1.6E-01
250	< 1.0E-05	550	7.8E-01	850	7.1E-01	1150	6.3E-01	2450	8.2E-01	3950	1.3E-01
260	< 1.0E-05	560	7.8E-01	860	7.0E-01	1160	6.3E-01	2500	8.2E-01	4000	1.1E-01
270	< 1.0E-05	570	7.8E-01	870	6.9E-01	1170	6.3E-01	2550	8.2E-01	4050	1.1E-01
280	< 1.0E-05	580	7.7E-01	880	6.9E-01	1180	6.4E-01	2600	8.2E-01	4100	1.1E-01
290	< 1.0E-05	590	7.7E-01	890	6.8E-01	1190	6.4E-01	2650	8.1E-01	4150	1.1E-01
300	< 1.0E-05	600	7.7E-01	900	6.8E-01	1200	6.4E-01	2700	7.4E-01	4200	1.2E-01
310	5.1E-05	610	7.7E-01	910	6.7E-01	1250	6.6E-01	2750	2.5E-01	4250	1.1E-01
320	6.6E-03	620	7.7E-01	920	6.6E-01	1300	6.8E-01	2800	1.2E-01	4300	8.7E-02
330	7.4E-02	630	7.7E-01	930	6.6E-01	1350	7.0E-01	2850	1.2E-01	4350	6.0E-02
340	2.4E-01	640	7.7E-01	940	6.6E-01	1400	7.3E-01	2900	1.3E-01	4400	4.2E-02
350	4.2E-01	650	7.7E-01	950	6.5E-01	1450	7.5E-01	2950	1.5E-01	4450	2.9E-02
360	5.7E-01	660	7.7E-01	960	6.5E-01	1500	7.7E-01	3000	1.8E-01	4500	1.7E-02
370	6.3E-01	670	7.7E-01	970	6.4E-01	1550	7.8E-01	3050	2.1E-01	4550	1.0E-02
380	6.0E-01	680	7.8E-01	980	6.4E-01	1600	7.8E-01	3100	2.4E-01	4600	6.0E-03
390	7.2E-01	690	7.9E-01	990	6.4E-01	1650	7.8E-01	3150	2.8E-01	4650	3.5E-03
400	7.5E-01	700	7.9E-01	1000	6.3E-01	1700	7.8E-01	3200	3.1E-01	4700	1.8E-03
410	7.5E-01	710	7.9E-01	1010	6.3E-01	1750	7.8E-01	3250	3.4E-01	4750	1.1E-03
420	7.5E-01	720	7.9E-01	1020	6.3E-01	1800	7.8E-01	3300	3.5E-01	4800	6.6E-04
430	7.5E-01	730	7.9E-01	1030	6.3E-01	1850	7.8E-01	3350	3.4E-01	4850	3.8E-04
440	7.5E-01	740	7.8E-01	1040	6.2E-01	1900	7.9E-01	3400	2.9E-01	4900	2.1E-04
450	7.6E-01	750	7.8E-01	1050	6.2E-01	1950	7.9E-01	3450	2.2E-01	4950	1.0E-04
460	7.8E-01	760	7.7E-01	1060	6.2E-01	2000	8.0E-01	3500	1.5E-01	5000	3.2E-05
470	7.8E-01	770	7.7E-01	1070	6.2E-01	2050	8.1E-01	3550	1.0E-01	5050	1.3E-05
480	7.8E-01	780	7.6E-01	1080	6.2E-01	2100	8.1E-01	3600	7.4E-02	5100	< 1.0E-05
490	7.8E-01	790	7.5E-01	1090	6.2E-01	2150	8.1E-01	3650	6.3E-02	5150	< 1.0E-05

KG1

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	2

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)	≤ 0.10
τ_i (1060 nm)	≤ 0.02
τ_i (2200 nm)	≤ 0.06

Refractive index n		
λ [nm]	Element	n
365	Hg	1.53
587.6	He	1.52

Density	
ρ [g/cm ³]	2.53

Bubble content	
Bubble class	3

Chemical resistance	
FR class	0
SR class	2.0
AR class	3.0

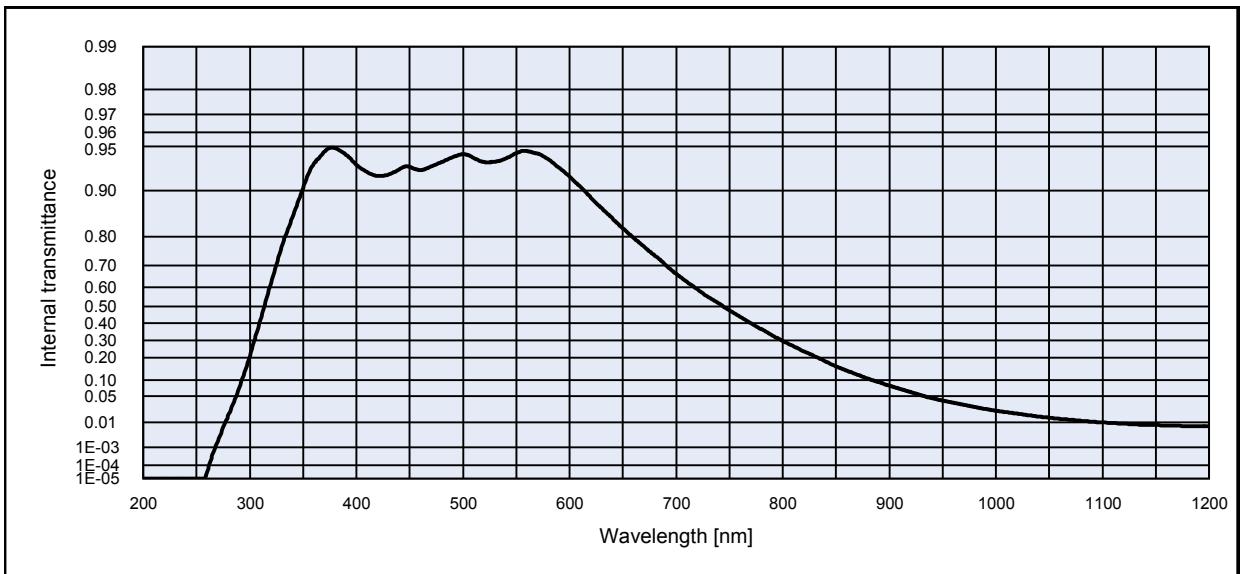
Transformation temperature	
T_g [°C]	599

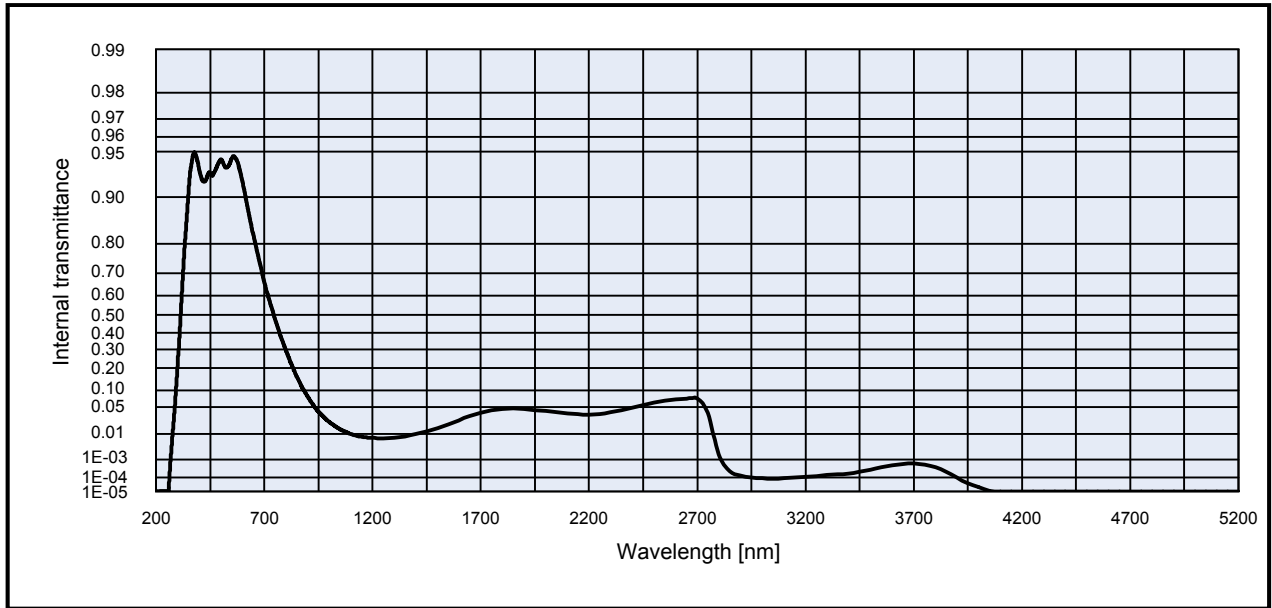
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	5.3
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	6.1
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Short pass filter
Heat protection filter
[!]
Long-term changes in the polished surface are possible under some circumstances
V
Transmission changes are possible under the action of intense ultraviolet radiation
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)			
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3	
x	0.444	0.441	0.438	x	0.420	0.417	0.415	x	0.311	0.309	0.307	
y	0.409	0.411	0.413	y	0.401	0.402	0.404	y	0.330	0.331	0.332	
Y	88	85	82	Y	88	85	82	Y	89	86	83	
λ_d [nm]	505	505	505	λ_d [nm]	503	504	504	λ_d [nm]	497	497	498	
P_e	0.01	0.01	0.02	P_e	0.01	0.01	0.02	P_e	0.01	0.01	0.02	





Internal transmittance τ_i at reference thickness d [mm] = 2
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	9.4E-01	800	2.9E-01	1100	9.9E-03	2200	3.4E-02	3700	6.6E-04
210	< 1.0E-05	510	9.4E-01	810	2.7E-01	1110	9.4E-03	2250	3.5E-02	3750	5.7E-04
220	< 1.0E-05	520	9.4E-01	820	2.3E-01	1120	9.0E-03	2300	3.8E-02	3800	4.0E-04
230	< 1.0E-05	530	9.4E-01	830	2.1E-01	1130	8.6E-03	2350	4.3E-02	3850	2.4E-04
240	< 1.0E-05	540	9.4E-01	840	1.8E-01	1140	8.4E-03	2400	4.9E-02	3900	1.0E-04
250	< 1.0E-05	550	9.4E-01	850	1.6E-01	1150	8.2E-03	2450	5.5E-02	3950	4.2E-05
260	3.5E-05	560	9.5E-01	860	1.4E-01	1160	8.0E-03	2500	6.2E-02	4000	2.1E-05
270	2.0E-03	570	9.4E-01	870	1.2E-01	1170	7.8E-03	2550	6.7E-02	4050	1.1E-05
280	1.7E-02	580	9.4E-01	880	1.0E-01	1180	7.6E-03	2600	7.1E-02	4100	< 1.0E-05
290	7.3E-02	590	9.3E-01	890	9.2E-02	1190	7.5E-03	2650	7.3E-02	4150	< 1.0E-05
300	2.1E-01	600	9.2E-01	900	8.0E-02	1200	7.4E-03	2700	7.2E-02	4200	< 1.0E-05
310	4.2E-01	610	9.1E-01	910	6.9E-02	1250	7.2E-03	2750	3.7E-02	4250	< 1.0E-05
320	6.2E-01	620	8.9E-01	920	6.0E-02	1300	7.6E-03	2800	1.7E-03	4300	< 1.0E-05
330	7.7E-01	630	8.7E-01	930	5.2E-02	1350	8.5E-03	2850	2.5E-04	4350	< 1.0E-05
340	8.5E-01	640	8.5E-01	940	4.5E-02	1400	9.8E-03	2900	1.3E-04	4400	< 1.0E-05
350	9.0E-01	650	8.2E-01	950	4.0E-02	1450	1.2E-02	2950	9.9E-05	4450	< 1.0E-05
360	9.3E-01	660	8.0E-01	960	3.5E-02	1500	1.5E-02	3000	8.9E-05	4500	< 1.0E-05
370	9.5E-01	670	7.7E-01	970	3.2E-02	1550	1.9E-02	3050	8.6E-05	4550	< 1.0E-05
380	9.5E-01	680	7.4E-01	980	2.8E-02	1600	2.5E-02	3100	9.0E-05	4600	< 1.0E-05
390	9.4E-01	690	7.0E-01	990	2.5E-02	1650	3.1E-02	3150	9.8E-05	4650	< 1.0E-05
400	9.3E-01	700	6.6E-01	1000	2.2E-02	1700	3.7E-02	3200	1.1E-04	4700	< 1.0E-05
410	9.3E-01	710	6.3E-01	1010	2.0E-02	1750	4.2E-02	3250	1.2E-04	4750	< 1.0E-05
420	9.2E-01	720	5.9E-01	1020	1.8E-02	1800	4.6E-02	3300	1.4E-04	4800	< 1.0E-05
430	9.2E-01	730	5.5E-01	1030	1.7E-02	1850	4.6E-02	3350	1.6E-04	4850	< 1.0E-05
440	9.3E-01	740	5.2E-01	1040	1.5E-02	1900	4.5E-02	3400	1.8E-04	4900	< 1.0E-05
450	9.3E-01	750	4.8E-01	1050	1.4E-02	1950	4.3E-02	3450	2.2E-04	4950	< 1.0E-05
460	9.3E-01	760	4.4E-01	1060	1.3E-02	2000	4.1E-02	3500	2.9E-04	5000	< 1.0E-05
470	9.3E-01	770	4.0E-01	1070	1.2E-02	2050	3.8E-02	3550	3.9E-04	5050	< 1.0E-05
480	9.4E-01	780	3.7E-01	1080	1.1E-02	2100	3.6E-02	3600	5.1E-04	5100	< 1.0E-05
490	9.4E-01	790	3.3E-01	1090	1.1E-02	2150	3.4E-02	3650	6.1E-04	5150	< 1.0E-05

KG2

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	2

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)	≤ 0.20

Refractive index n		
λ [nm]	Element	n
365	Hg	1.53
587.6	He	1.51

Density	
ρ [g/cm ³]	2.52

Bubble content	
Bubble class	3

Chemical resistance	
FR class	0
SR class	2.0
AR class	3.0

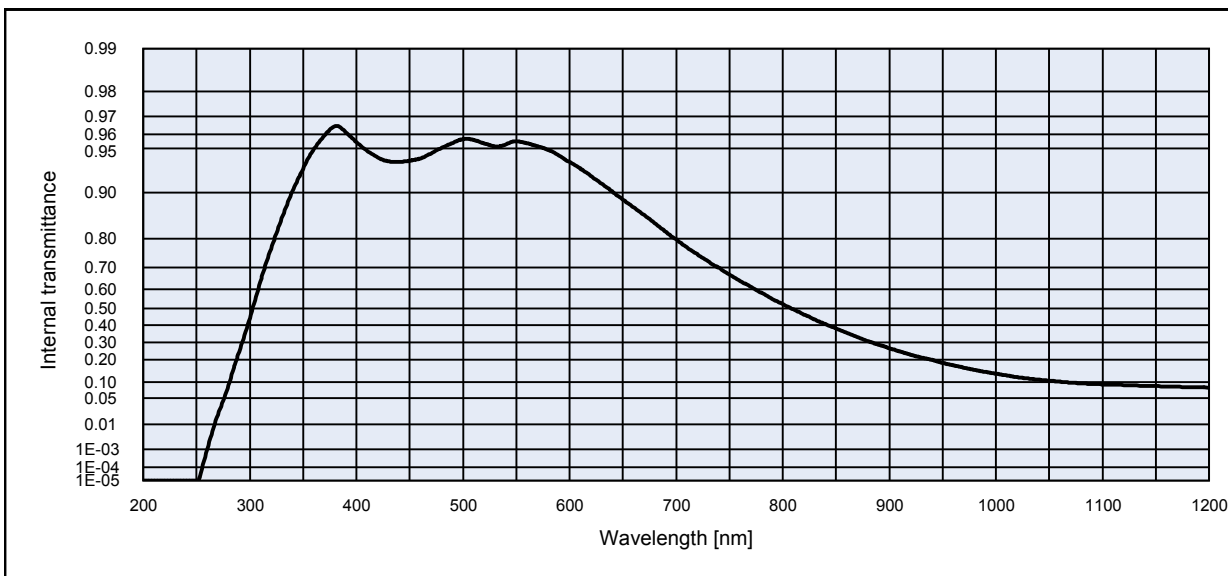
Transformation temperature	
T_g [°C]	605

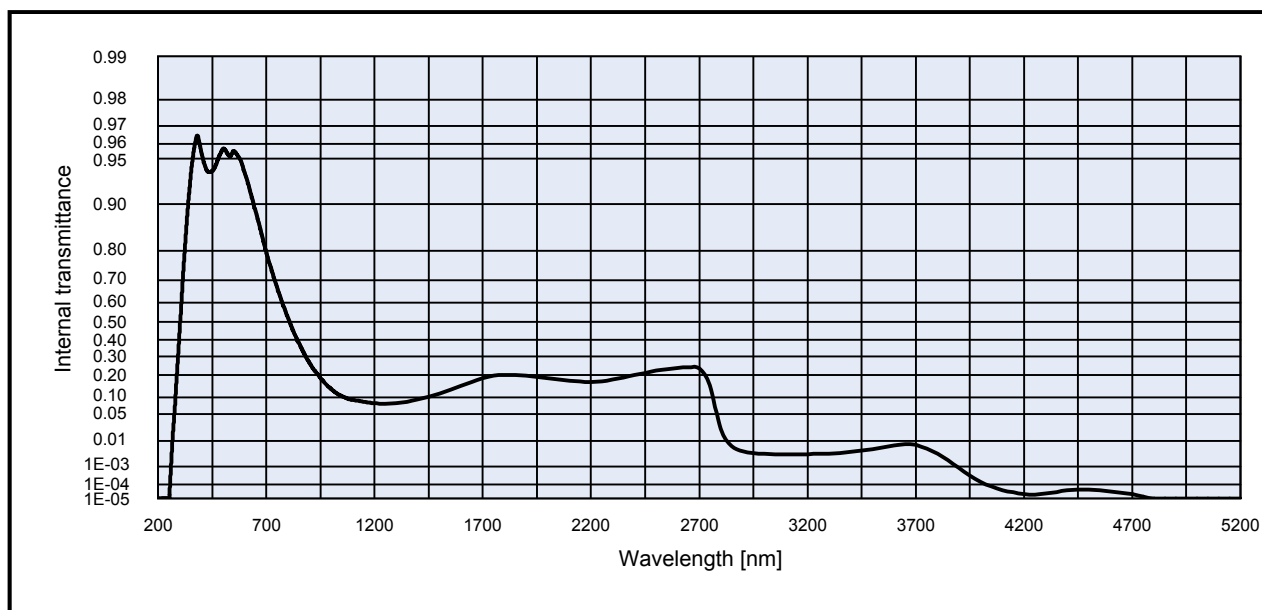
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	5.4
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	6.3
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Short pass filter
Heat protection filter
[!]
Long-term changes in the polished surface are possible under some circumstances
V
Transmission changes are possible under the action of intense ultraviolet radiation
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)			
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]	1
x	0.446	0.444	0.442	x	0.422	0.420	0.419	x	0.312	0.311	0.310	
y	0.409	0.410	0.411	y	0.400	0.401	0.402	y	0.330	0.331	0.331	
Y	89	87	84	Y	89	87	84	Y	90	87	85	
λ_d [nm]	506	507	507	λ_d [nm]	505	505	506	λ_d [nm]	501	501	501	
P_e	0.00	0.01	0.01	P_e	0.00	0.01	0.01	P_e	0.00	0.01	0.01	





Internal transmittance τ_i at reference thickness d [mm] = 2
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	9.6E-01	800	5.2E-01	1100	9.1E-02	2200	1.6E-01	3700	7.4E-03
210	< 1.0E-05	510	9.6E-01	810	4.9E-01	1110	9.0E-02	2250	1.7E-01	3750	5.5E-03
220	< 1.0E-05	520	9.5E-01	820	4.6E-01	1120	8.8E-02	2300	1.8E-01	3800	3.5E-03
230	< 1.0E-05	530	9.5E-01	830	4.3E-01	1130	8.7E-02	2350	1.9E-01	3850	1.9E-03
240	< 1.0E-05	540	9.5E-01	840	4.1E-01	1140	8.6E-02	2400	2.0E-01	3900	8.4E-04
250	< 1.0E-05	550	9.6E-01	850	3.8E-01	1150	8.5E-02	2450	2.1E-01	3950	3.4E-04
260	1.0E-03	560	9.5E-01	860	3.6E-01	1160	8.4E-02	2500	2.2E-01	4000	1.5E-04
270	2.0E-02	570	9.5E-01	870	3.3E-01	1170	8.3E-02	2550	2.3E-01	4050	7.3E-05
280	8.8E-02	580	9.5E-01	880	3.1E-01	1180	8.2E-02	2600	2.4E-01	4100	4.2E-05
290	2.5E-01	590	9.4E-01	890	2.8E-01	1190	8.1E-02	2650	2.4E-01	4150	2.9E-05
300	4.4E-01	600	9.4E-01	900	2.7E-01	1200	8.0E-02	2700	2.3E-01	4200	2.2E-05
310	6.4E-01	610	9.3E-01	910	2.5E-01	1250	7.9E-02	2750	1.5E-01	4250	2.1E-05
320	7.7E-01	620	9.2E-01	920	2.3E-01	1300	8.1E-02	2800	2.3E-02	4300	2.3E-05
330	8.5E-01	630	9.1E-01	930	2.1E-01	1350	8.5E-02	2850	6.8E-03	4350	3.0E-05
340	9.0E-01	640	9.0E-01	940	2.0E-01	1400	9.3E-02	2900	4.5E-03	4400	4.2E-05
350	9.3E-01	650	8.9E-01	950	1.9E-01	1450	1.0E-01	2950	3.8E-03	4450	4.8E-05
360	9.5E-01	660	8.8E-01	960	1.7E-01	1500	1.2E-01	3000	3.5E-03	4500	4.5E-05
370	9.6E-01	670	8.6E-01	970	1.6E-01	1550	1.3E-01	3050	3.4E-03	4550	4.0E-05
380	9.7E-01	680	8.4E-01	980	1.5E-01	1600	1.5E-01	3100	3.3E-03	4600	3.6E-05
390	9.6E-01	690	8.2E-01	990	1.4E-01	1650	1.7E-01	3150	3.4E-03	4650	2.9E-05
400	9.5E-01	700	8.0E-01	1000	1.3E-01	1700	1.8E-01	3200	3.4E-03	4700	2.1E-05
410	9.5E-01	710	7.7E-01	1010	1.3E-01	1750	2.0E-01	3250	3.5E-03	4750	1.3E-05
420	9.4E-01	720	7.5E-01	1020	1.2E-01	1800	2.0E-01	3300	3.6E-03	4800	< 1.0E-05
430	9.4E-01	730	7.3E-01	1030	1.1E-01	1850	2.0E-01	3350	3.8E-03	4850	< 1.0E-05
440	9.4E-01	740	7.0E-01	1040	1.1E-01	1900	2.0E-01	3400	4.1E-03	4900	< 1.0E-05
450	9.4E-01	750	6.7E-01	1050	1.0E-01	1950	1.9E-01	3450	4.6E-03	4950	< 1.0E-05
460	9.4E-01	760	6.4E-01	1060	1.0E-01	2000	1.8E-01	3500	5.3E-03	5000	< 1.0E-05
470	9.5E-01	770	6.1E-01	1070	9.7E-02	2050	1.8E-01	3550	6.1E-03	5050	< 1.0E-05
480	9.5E-01	780	5.8E-01	1080	9.5E-02	2100	1.7E-01	3600	7.1E-03	5100	< 1.0E-05
490	9.5E-01	790	5.5E-01	1090	9.3E-02	2150	1.7E-01	3650	7.9E-03	5150	< 1.0E-05

KG3

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	2

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 index n		
λ [nm]	Element	n
365	Hg	1.53
587.6	He	1.51

Density	
ρ [g/cm ³]	2.52

Bubble content	
Bubble class	3

Chemical resistance	
FR class	0
SR class	2.0
AR class	4.0

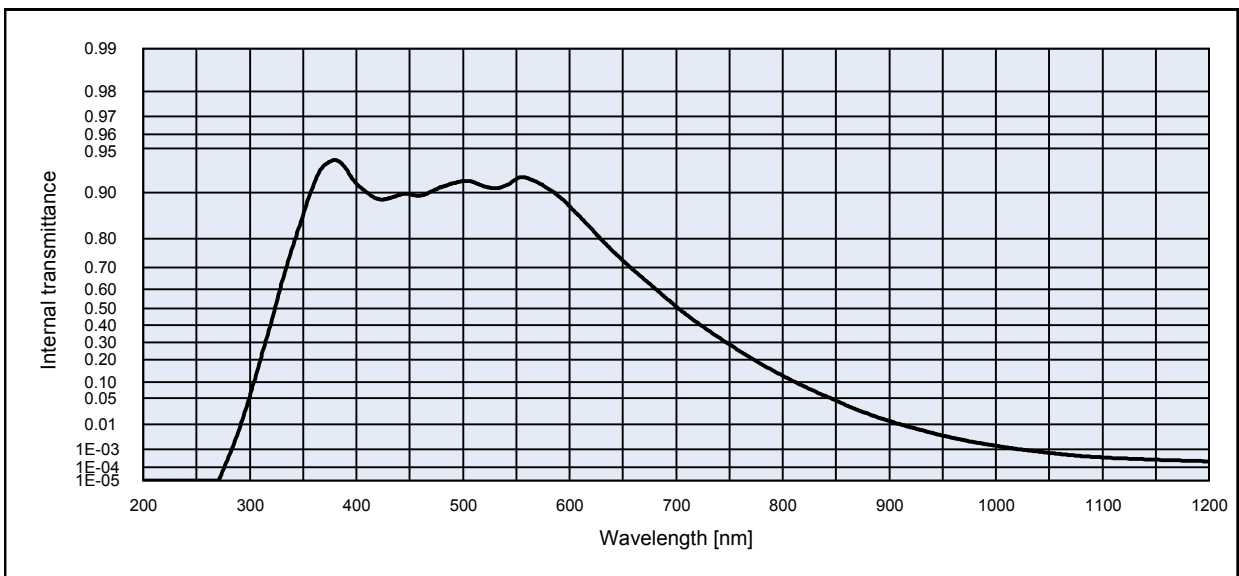
Transformation temperature	
T_g [°C]	581

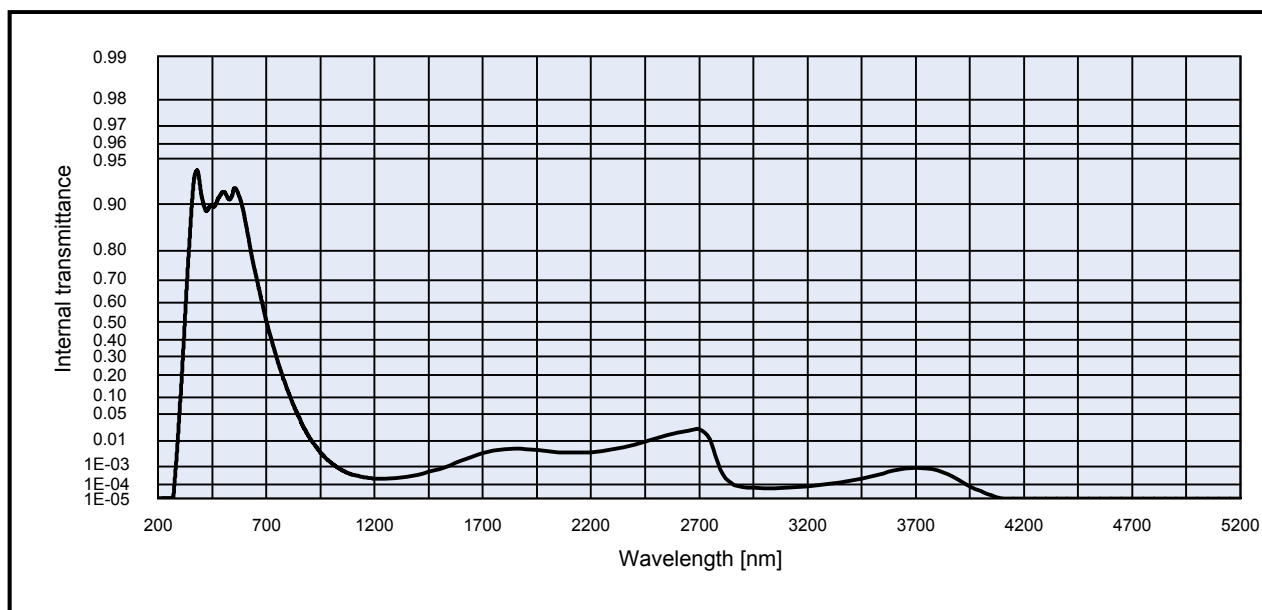
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	5.3
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	6.1
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Short pass filter
Heat protection filter
[!]
Long-term changes in the polished surface are possible under some circumstances
V
Transmission changes are possible under the action of intense ultraviolet radiation
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)			
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]	1
x	0.442	0.437	0.432	x	0.418	0.413	0.409	x	0.309	0.306	0.303	
y	0.410	0.413	0.416	y	0.401	0.404	0.406	y	0.330	0.332	0.333	
Y	86	81	77	Y	87	82	77	Y	87	82	78	
λ_d [nm]	504	505	505	λ_d [nm]	503	503	503	λ_d [nm]	496	496	496	
P_e	0.01	0.02	0.04	P_e	0.01	0.02	0.04	P_e	0.01	0.02	0.03	





Internal transmittance τ_i at reference thickness d [mm] = 2
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	9.2E-01	800	1.3E-01	1100	3.8E-04	2200	4.0E-03	3700	8.7E-04
210	< 1.0E-05	510	9.2E-01	810	1.0E-01	1110	3.5E-04	2250	4.4E-03	3750	7.9E-04
220	< 1.0E-05	520	9.1E-01	820	8.4E-02	1120	3.3E-04	2300	5.1E-03	3800	6.3E-04
230	< 1.0E-05	530	9.1E-01	830	6.9E-02	1130	3.1E-04	2350	6.2E-03	3850	4.2E-04
240	< 1.0E-05	540	9.1E-01	840	5.5E-02	1140	2.9E-04	2400	7.7E-03	3900	1.9E-04
250	< 1.0E-05	550	9.2E-01	850	4.4E-02	1150	2.8E-04	2450	9.5E-03	3950	7.8E-05
260	< 1.0E-05	560	9.2E-01	860	3.4E-02	1160	2.7E-04	2500	1.2E-02	4000	3.6E-05
270	< 1.0E-05	570	9.1E-01	870	2.7E-02	1170	2.5E-04	2550	1.5E-02	4050	1.8E-05
280	4.0E-04	580	9.1E-01	880	2.1E-02	1180	2.4E-04	2600	1.8E-02	4100	< 1.0E-05
290	6.9E-03	590	8.9E-01	890	1.6E-02	1190	2.3E-04	2650	2.0E-02	4150	< 1.0E-05
300	5.5E-02	600	8.8E-01	900	1.3E-02	1200	2.3E-04	2700	2.1E-02	4200	< 1.0E-05
310	2.0E-01	610	8.6E-01	910	1.0E-02	1250	2.2E-04	2750	1.1E-02	4250	< 1.0E-05
320	4.1E-01	620	8.3E-01	920	8.1E-03	1300	2.4E-04	2800	6.5E-04	4300	< 1.0E-05
330	6.3E-01	630	8.0E-01	930	6.5E-03	1350	2.9E-04	2850	1.2E-04	4350	< 1.0E-05
340	7.7E-01	640	7.6E-01	940	5.1E-03	1400	3.8E-04	2900	6.9E-05	4400	< 1.0E-05
350	8.6E-01	650	7.3E-01	950	4.0E-03	1450	5.4E-04	2950	6.0E-05	4450	< 1.0E-05
360	9.1E-01	660	6.9E-01	960	3.2E-03	1500	7.6E-04	3000	5.8E-05	4500	< 1.0E-05
370	9.3E-01	670	6.5E-01	970	2.6E-03	1550	1.2E-03	3050	5.8E-05	4550	< 1.0E-05
380	9.4E-01	680	6.1E-01	980	2.1E-03	1600	1.8E-03	3100	6.1E-05	4600	< 1.0E-05
390	9.3E-01	690	5.6E-01	990	1.8E-03	1650	2.7E-03	3150	6.7E-05	4650	< 1.0E-05
400	9.1E-01	700	5.1E-01	1000	1.5E-03	1700	3.8E-03	3200	7.6E-05	4700	< 1.0E-05
410	9.0E-01	710	4.6E-01	1010	1.2E-03	1750	4.7E-03	3250	8.9E-05	4750	< 1.0E-05
420	8.9E-01	720	4.2E-01	1020	1.0E-03	1800	5.2E-03	3300	1.1E-04	4800	< 1.0E-05
430	8.9E-01	730	3.7E-01	1030	8.9E-04	1850	5.4E-03	3350	1.4E-04	4850	< 1.0E-05
440	9.0E-01	740	3.3E-01	1040	7.6E-04	1900	5.2E-03	3400	1.7E-04	4900	< 1.0E-05
450	9.0E-01	750	2.9E-01	1050	6.7E-04	1950	4.9E-03	3450	2.2E-04	4950	< 1.0E-05
460	9.0E-01	760	2.5E-01	1060	5.8E-04	2000	4.4E-03	3500	3.1E-04	5000	< 1.0E-05
470	9.0E-01	770	2.1E-01	1070	5.1E-04	2050	4.1E-03	3550	4.5E-04	5050	< 1.0E-05
480	9.1E-01	780	1.8E-01	1080	4.5E-04	2100	3.9E-03	3600	6.2E-04	5100	< 1.0E-05
490	9.1E-01	790	1.5E-01	1090	4.1E-04	2150	3.9E-03	3650	7.9E-04	5150	< 1.0E-05

KG5

Reflection factor	
P_d	0.92

Reference thickness	
d [mm]	2

Spectral values guaranteed		
τ_i (365 nm)	\geq	0.80
τ_i (500 nm)	\geq	0.86
τ_i (600 nm)	\geq	0.80
τ_i (700 nm)	\leq	0.43
τ_i (800 nm)	\leq	0.09
τ_i (900 nm)	\leq	0.008
τ_i (1060 nm)	\leq	$1 \cdot 10^{-4}$
τ_i (2200 nm)	\leq	0.001

Refractive index n		
λ [nm]	Element	n
365	Hg	1.53
587.6	He	1.51

Density	
ρ [g/cm ³]	2.53

Bubble content	
Bubble class	3

Chemical resistance	
FR class	0
SR class	3.0
AR class	4.0

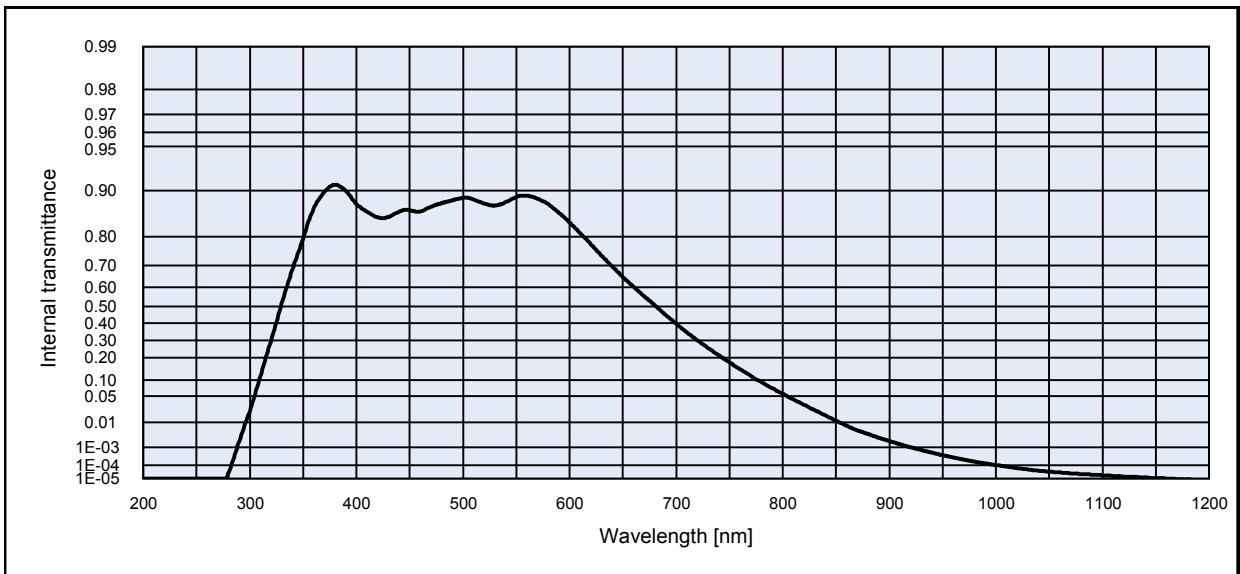
Transformation temperature	
T_g [°C]	565

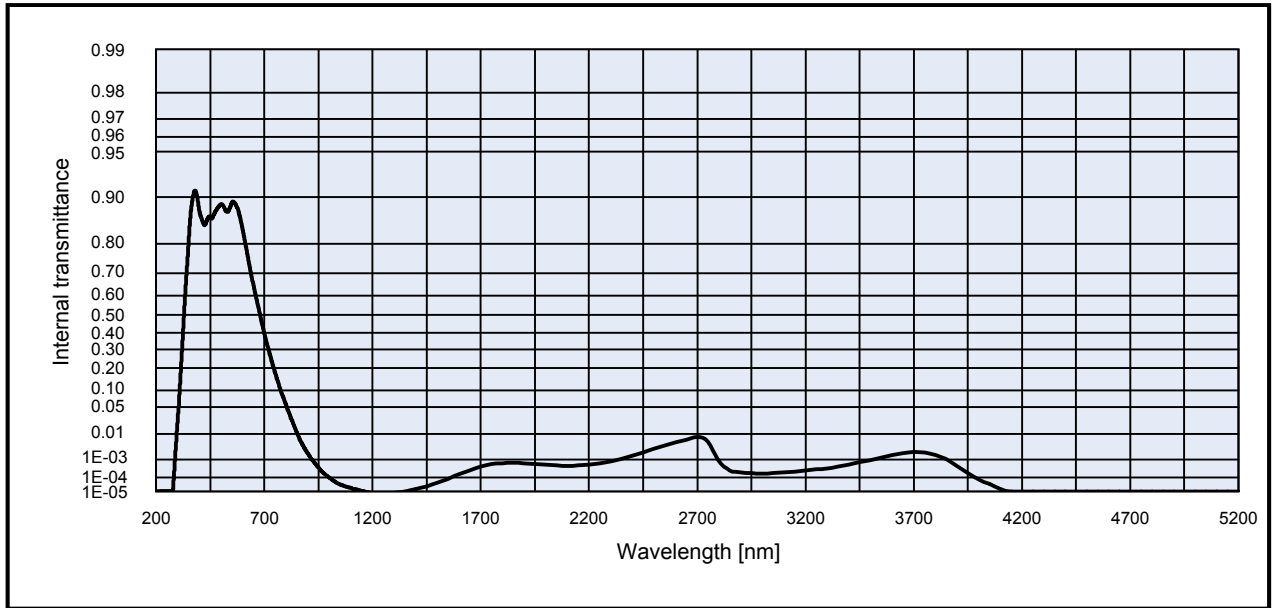
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [$10^{-6}/\text{K}$]	5.4
$\alpha_{20/300^\circ\text{C}}$ [$10^{-6}/\text{K}$]	6.2
$\alpha_{20/200^\circ\text{C}}$ [$10^{-6}/\text{K}$]	

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Short pass filter
Heat protection filter
[!]
Long-term changes in the polished surface are possible under some circumstances
V
Transmission changes are possible under the action of intense ultraviolet radiation
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation												
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 ($T_c = 6504$ K)			
	d [mm]	1	2		3	d [mm]	1		2	3	d [mm]	1
x	0.440	0.434	0.427	x	0.416	0.410	0.404	x	0.308	0.304	0.300	
y	0.411	0.415	0.418	y	0.402	0.406	0.409	y	0.331	0.332	0.334	
Y	85	78	72	Y	85	78	72	Y	85	79	74	
λ_d [nm]	504	505	505	λ_d [nm]	503	503	503	λ_d [nm]	496	496	496	
P_e	0.02	0.03	0.05	P_e	0.02	0.03	0.05	P_e	0.02	0.03	0.04	





Internal transmittance τ_i at reference thickness d [mm] = 2
The internal transmittance values, tabulated and graphically represented, are reference values only

λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i	λ [nm]	τ_i
200	< 1.0E-05	500	8.9E-01	800	5.6E-02	1100	1.9E-05	2200	5.4E-04	3700	2.2E-03
210	< 1.0E-05	510	8.9E-01	810	4.2E-02	1110	1.7E-05	2250	6.5E-04	3750	2.0E-03
220	< 1.0E-05	520	8.8E-01	820	3.2E-02	1120	1.5E-05	2300	8.3E-04	3800	1.6E-03
230	< 1.0E-05	530	8.7E-01	830	2.3E-02	1130	1.4E-05	2350	1.1E-03	3850	1.0E-03
240	< 1.0E-05	540	8.8E-01	840	1.6E-02	1140	1.2E-05	2400	1.5E-03	3900	4.6E-04
250	< 1.0E-05	550	8.9E-01	850	1.1E-02	1150	1.1E-05	2450	2.1E-03	3950	1.9E-04
260	< 1.0E-05	560	8.9E-01	860	7.7E-03	1160	1.0E-05	2500	2.9E-03	4000	7.4E-05
270	< 1.0E-05	570	8.9E-01	870	5.3E-03	1170	< 1.0E-05	2550	4.1E-03	4050	3.7E-05
280	2.8E-05	580	8.8E-01	880	3.8E-03	1180	< 1.0E-05	2600	5.3E-03	4100	1.6E-05
290	1.9E-03	590	8.6E-01	890	2.7E-03	1190	< 1.0E-05	2650	6.6E-03	4150	< 1.0E-05
300	2.2E-02	600	8.4E-01	900	2.0E-03	1200	< 1.0E-05	2700	7.9E-03	4200	< 1.0E-05
310	1.1E-01	610	8.1E-01	910	1.4E-03	1250	< 1.0E-05	2750	5.6E-03	4250	< 1.0E-05
320	3.0E-01	620	7.8E-01	920	1.0E-03	1300	< 1.0E-05	2800	8.9E-04	4300	< 1.0E-05
330	5.2E-01	630	7.4E-01	930	7.3E-04	1350	1.0E-05	2850	2.8E-04	4350	< 1.0E-05
340	6.8E-01	640	7.0E-01	940	5.3E-04	1400	1.5E-05	2900	2.0E-04	4400	< 1.0E-05
350	8.0E-01	650	6.5E-01	950	3.9E-04	1450	2.6E-05	2950	1.9E-04	4450	< 1.0E-05
360	8.7E-01	660	6.0E-01	960	2.9E-04	1500	4.5E-05	3000	1.8E-04	4500	< 1.0E-05
370	9.0E-01	670	5.6E-01	970	2.2E-04	1550	8.5E-05	3050	1.9E-04	4550	< 1.0E-05
380	9.1E-01	680	5.1E-01	980	1.6E-04	1600	1.5E-04	3100	2.1E-04	4600	< 1.0E-05
390	9.0E-01	690	4.5E-01	990	1.3E-04	1650	2.7E-04	3150	2.3E-04	4650	< 1.0E-05
400	8.8E-01	700	4.0E-01	1000	9.9E-05	1700	4.4E-04	3200	2.7E-04	4700	< 1.0E-05
410	8.6E-01	710	3.5E-01	1010	7.8E-05	1750	5.8E-04	3250	3.1E-04	4750	< 1.0E-05
420	8.5E-01	720	3.0E-01	1020	6.2E-05	1800	6.6E-04	3300	3.6E-04	4800	< 1.0E-05
430	8.5E-01	730	2.6E-01	1030	4.9E-05	1850	6.9E-04	3350	4.3E-04	4850	< 1.0E-05
440	8.6E-01	740	2.1E-01	1040	4.1E-05	1900	6.5E-04	3400	5.6E-04	4900	< 1.0E-05
450	8.7E-01	750	1.8E-01	1050	3.5E-05	1950	6.0E-04	3450	7.3E-04	4950	< 1.0E-05
460	8.6E-01	760	1.5E-01	1060	3.0E-05	2000	5.6E-04	3500	9.3E-04	5000	< 1.0E-05
470	8.7E-01	770	1.2E-01	1070	2.6E-05	2050	5.1E-04	3550	1.2E-03	5050	< 1.0E-05
480	8.8E-01	780	9.2E-02	1080	2.3E-05	2100	4.9E-04	3600	1.6E-03	5100	< 1.0E-05
490	8.8E-01	790	7.2E-02	1090	2.1E-05	2150	4.9E-04	3650	2.0E-03	5150	< 1.0E-05

UG1

Reflection factor	
P_d	0.91

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (365 nm)	\geq	0.80
τ_i (405 nm)	\leq	0.10
τ_i (694 nm)	\leq	0.06
τ_i (750 nm)	\leq	0.53

Refractive index n		
λ [nm]	Element	n
365	Hg	1.57
587.6	He	1.54

Density	
ρ [g/cm ³]	2.77

Bubble content	
Bubble class	1

Chemical resistance	
FR class	0
SR class	1.0
AR class	1.0

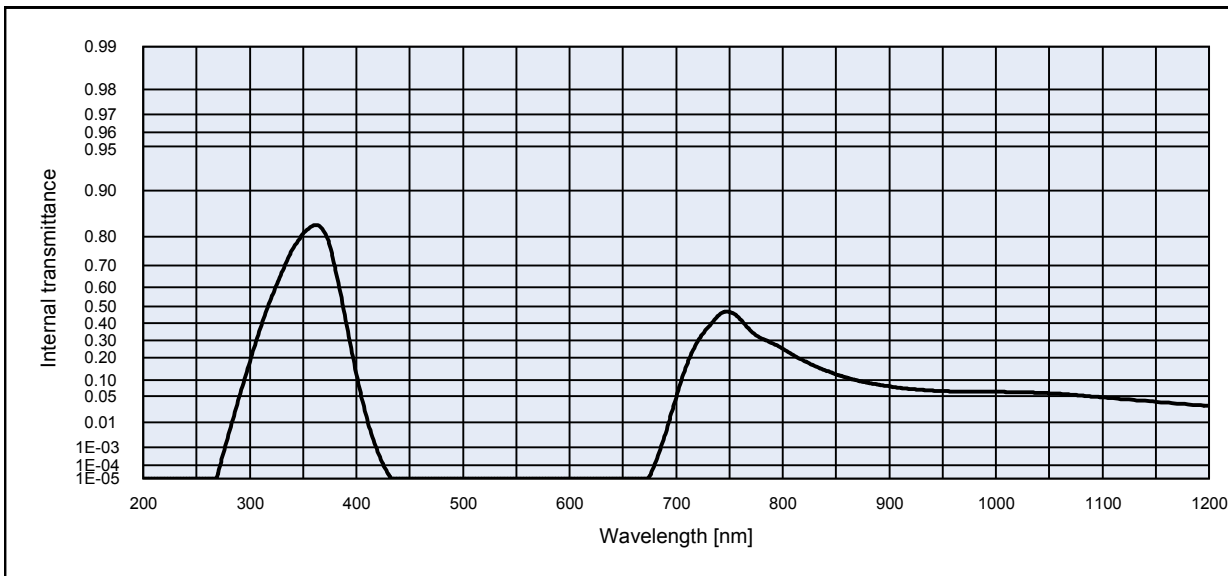
Transformation temperature	
T_g [°C]	603

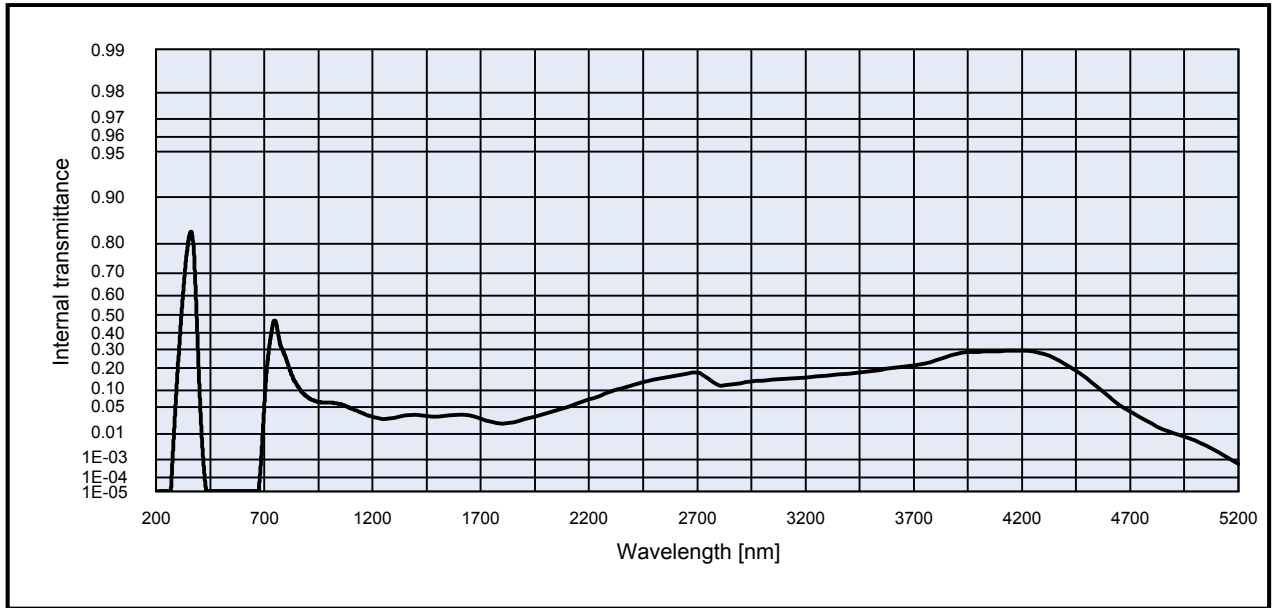
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	7.9
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	8.9
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Band pass filter
V
Transmission changes are possible under the action of intense ultraviolet radiation
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3
x				x				x			
y				y				y			
Y				Y				Y			
λ_d [nm]				λ_d [nm]				λ_d [nm]			
P_e				P_e				P_e			





Internal transmittance τ_i at reference thickness d [mm] = 1
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	< 1.0E-05	800	2.5E-01	1100	4.7E-02	2200	7.0E-02	3700	2.1E-01
210	< 1.0E-05	510	< 1.0E-05	810	2.2E-01	1110	4.5E-02	2250	8.1E-02	3750	2.2E-01
220	< 1.0E-05	520	< 1.0E-05	820	1.9E-01	1120	4.3E-02	2300	9.5E-02	3800	2.4E-01
230	< 1.0E-05	530	< 1.0E-05	830	1.6E-01	1130	4.1E-02	2350	1.1E-01	3850	2.6E-01
240	< 1.0E-05	540	< 1.0E-05	840	1.4E-01	1140	3.9E-02	2400	1.2E-01	3900	2.8E-01
250	< 1.0E-05	550	< 1.0E-05	850	1.2E-01	1150	3.7E-02	2450	1.3E-01	3950	2.9E-01
260	< 1.0E-05	560	< 1.0E-05	860	1.1E-01	1160	3.6E-02	2500	1.4E-01	4000	2.9E-01
270	2.5E-05	570	< 1.0E-05	870	9.8E-02	1170	3.4E-02	2550	1.5E-01	4050	2.9E-01
280	3.7E-03	580	< 1.0E-05	880	8.9E-02	1180	3.2E-02	2600	1.6E-01	4100	2.9E-01
290	4.8E-02	590	< 1.0E-05	890	8.3E-02	1190	3.1E-02	2650	1.7E-01	4150	2.9E-01
300	1.8E-01	600	< 1.0E-05	900	7.8E-02	1200	3.0E-02	2700	1.8E-01	4200	2.9E-01
310	3.7E-01	610	< 1.0E-05	910	7.3E-02	1250	2.6E-02	2750	1.5E-01	4250	2.9E-01
320	5.4E-01	620	< 1.0E-05	920	6.9E-02	1300	2.9E-02	2800	1.2E-01	4300	2.8E-01
330	6.7E-01	630	< 1.0E-05	930	6.7E-02	1350	3.2E-02	2850	1.2E-01	4350	2.5E-01
340	7.6E-01	640	< 1.0E-05	940	6.5E-02	1400	3.3E-02	2900	1.3E-01	4400	2.2E-01
350	8.1E-01	650	< 1.0E-05	950	6.3E-02	1450	3.1E-02	2950	1.4E-01	4450	1.9E-01
360	8.3E-01	660	< 1.0E-05	960	6.2E-02	1500	3.0E-02	3000	1.4E-01	4500	1.5E-01
370	8.1E-01	670	< 1.0E-05	970	6.1E-02	1550	3.2E-02	3050	1.4E-01	4550	1.1E-01
380	6.9E-01	680	1.2E-04	980	6.1E-02	1600	3.4E-02	3100	1.5E-01	4600	8.0E-02
390	4.2E-01	690	4.0E-03	990	6.1E-02	1650	3.2E-02	3150	1.5E-01	4650	5.5E-02
400	1.2E-01	700	4.7E-02	1000	6.1E-02	1700	2.8E-02	3200	1.5E-01	4700	4.0E-02
410	1.3E-02	710	1.6E-01	1010	6.1E-02	1750	2.3E-02	3250	1.6E-01	4750	2.8E-02
420	6.1E-04	720	2.9E-01	1020	6.0E-02	1800	2.0E-02	3300	1.6E-01	4800	2.0E-02
430	2.3E-05	730	3.8E-01	1030	6.0E-02	1850	2.2E-02	3350	1.7E-01	4850	1.4E-02
440	< 1.0E-05	740	4.5E-01	1040	5.9E-02	1900	2.6E-02	3400	1.7E-01	4900	1.1E-02
450	< 1.0E-05	750	4.7E-01	1050	5.7E-02	1950	3.0E-02	3450	1.8E-01	4950	8.4E-03
460	< 1.0E-05	760	4.3E-01	1060	5.6E-02	2000	3.6E-02	3500	1.8E-01	5000	6.3E-03
470	< 1.0E-05	770	3.6E-01	1070	5.4E-02	2050	4.3E-02	3550	1.9E-01	5050	4.1E-03
480	< 1.0E-05	780	3.1E-01	1080	5.1E-02	2100	5.0E-02	3600	2.0E-01	5100	2.3E-03
490	< 1.0E-05	790	2.8E-01	1090	4.9E-02	2150	5.9E-02	3650	2.1E-01	5150	1.2E-03

UG5

Reflection factor	
P_d	0.91

Reference thickness	
d [mm]	1

Spectral values guaranteed		
t_i (254 nm)	\geq	0.80
t_i (308 nm)	\geq	0.94
t_i (405 nm)	\leq	0.50
t_i (546 nm)	\leq	0.05
t_i (633 nm)	\leq	0.05
t_i (725 nm)	\leq	0.85

Refractive index n		
λ [nm]	Element	n
253.7	Hg	1.60
365	Hg	1.56
587.6	He	1.54
1014	Hg	1.53

Density	
ρ [g/cm ³]	2.85

Bubble content	
Bubble class	2

Chemical resistance	
FR class	0
SR class	3.0
AR class	2.0

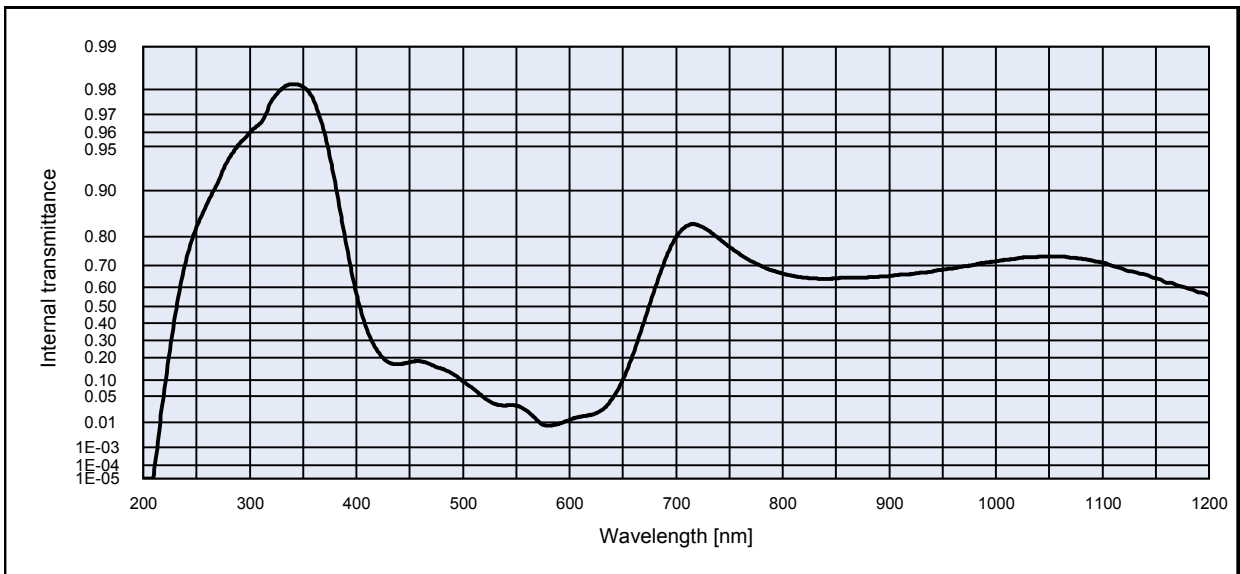
Transformation temperature	
T_g [°C]	462

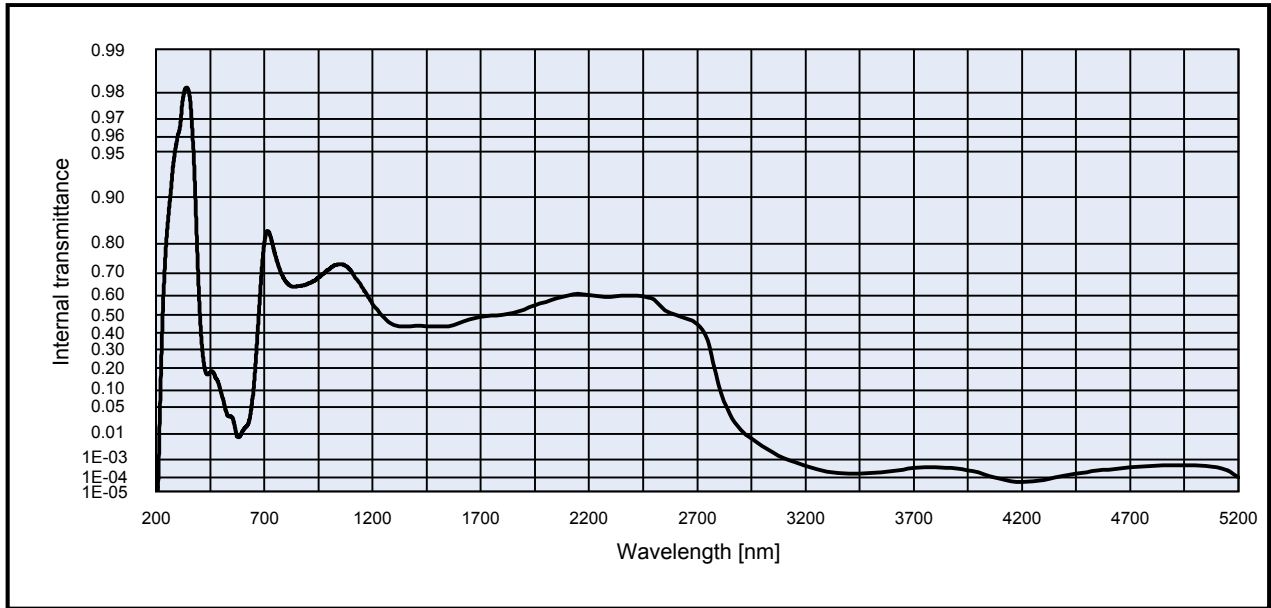
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	8.1
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9.4
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Band pass filter
[!!]
Long-term changes in the polished surface are possible
V
Transmission changes are possible under the action of intense ultraviolet radiation
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation											
Illuminant A (Planck T = 2856 K)			Illuminant Planck T = 3200 K			Illuminant D65 (T _c = 6504 K)					
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3
x				x				x			
y				y				y			
Y				Y				Y			
λ_d [nm]				λ_d [nm]				λ_d [nm]			
P_e				P_e				P_e			





Internal transmittance τ_i at reference thickness d [mm] = 1
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	9.5E-02	800	6.6E-01	1100	7.1E-01	2200	6.0E-01	3700	3.6E-04
210	2.2E-05	510	7.0E-02	810	6.6E-01	1110	7.0E-01	2250	6.0E-01	3750	4.0E-04
220	6.9E-02	520	4.6E-02	820	6.5E-01	1120	6.8E-01	2300	6.0E-01	3800	4.1E-04
230	4.5E-01	530	3.3E-02	830	6.4E-01	1130	6.7E-01	2350	6.0E-01	3850	3.9E-04
240	7.2E-01	540	3.0E-02	840	6.4E-01	1140	6.6E-01	2400	6.0E-01	3900	3.5E-04
250	8.3E-01	550	3.0E-02	850	6.4E-01	1150	6.4E-01	2450	6.0E-01	3950	2.8E-04
260	8.8E-01	560	2.2E-02	860	6.5E-01	1160	6.2E-01	2500	5.8E-01	4000	2.0E-04
270	9.1E-01	570	1.1E-02	870	6.5E-01	1170	6.1E-01	2550	5.2E-01	4050	1.3E-04
280	9.4E-01	580	7.8E-03	880	6.5E-01	1180	5.9E-01	2600	5.0E-01	4100	8.2E-05
290	9.5E-01	590	9.0E-03	890	6.5E-01	1190	5.8E-01	2650	4.8E-01	4150	5.9E-05
300	9.6E-01	600	1.2E-02	900	6.5E-01	1200	5.6E-01	2700	4.5E-01	4200	5.1E-05
310	9.7E-01	610	1.5E-02	910	6.6E-01	1250	4.9E-01	2750	3.5E-01	4250	5.4E-05
320	9.8E-01	620	1.7E-02	920	6.6E-01	1300	4.4E-01	2800	1.2E-01	4300	7.0E-05
330	9.8E-01	630	2.3E-02	930	6.7E-01	1350	4.4E-01	2850	3.6E-02	4350	1.0E-04
340	9.8E-01	640	4.4E-02	940	6.7E-01	1400	4.4E-01	2900	1.4E-02	4400	1.4E-04
350	9.8E-01	650	1.0E-01	950	6.8E-01	1450	4.4E-01	2950	7.2E-03	4450	1.7E-04
360	9.8E-01	660	2.3E-01	960	6.9E-01	1500	4.3E-01	3000	3.8E-03	4500	2.1E-04
370	9.6E-01	670	4.1E-01	970	7.0E-01	1550	4.4E-01	3050	2.0E-03	4550	2.6E-04
380	9.1E-01	680	6.0E-01	980	7.0E-01	1600	4.6E-01	3100	1.2E-03	4600	3.0E-04
390	7.9E-01	690	7.3E-01	990	7.1E-01	1650	4.8E-01	3150	7.4E-04	4650	3.5E-04
400	5.7E-01	700	8.0E-01	1000	7.2E-01	1700	4.9E-01	3200	4.8E-04	4700	4.0E-04
410	3.6E-01	710	8.3E-01	1010	7.2E-01	1750	5.0E-01	3250	3.2E-04	4750	4.3E-04
420	2.4E-01	720	8.3E-01	1020	7.3E-01	1800	5.0E-01	3300	2.3E-04	4800	4.7E-04
430	1.8E-01	730	8.2E-01	1030	7.3E-01	1850	5.1E-01	3350	1.9E-04	4850	4.9E-04
440	1.7E-01	740	8.0E-01	1040	7.3E-01	1900	5.3E-01	3400	1.8E-04	4900	5.0E-04
450	1.8E-01	750	7.7E-01	1050	7.3E-01	1950	5.5E-01	3450	1.8E-04	4950	5.0E-04
460	1.8E-01	760	7.4E-01	1060	7.3E-01	2000	5.7E-01	3500	1.9E-04	5000	5.0E-04
470	1.7E-01	770	7.2E-01	1070	7.3E-01	2050	5.9E-01	3550	2.1E-04	5050	4.6E-04
480	1.5E-01	780	7.0E-01	1080	7.3E-01	2100	6.0E-01	3600	2.5E-04	5100	4.0E-04
490	1.3E-01	790	6.8E-01	1090	7.2E-01	2150	6.1E-01	3650	3.0E-04	5150	2.7E-04

UG11

Reflection factor	
P_d	0.91

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (254 nm)	\geq	0.06
τ_i (334 nm)	\geq	0.90
τ_i (405 nm)	\leq	0.001
τ_i (694 nm)	\leq	0.26
τ_i (725 nm)	\leq	0.32

Refractive index n		
λ [nm]	Element	n
365	Hg	1.59
587.6	He	1.56

Density	
ρ [g/cm ³]	2.92

Bubble content	
Bubble class	2

Chemical resistance	
FR class	0
SR class	3.0
AR class	2.2

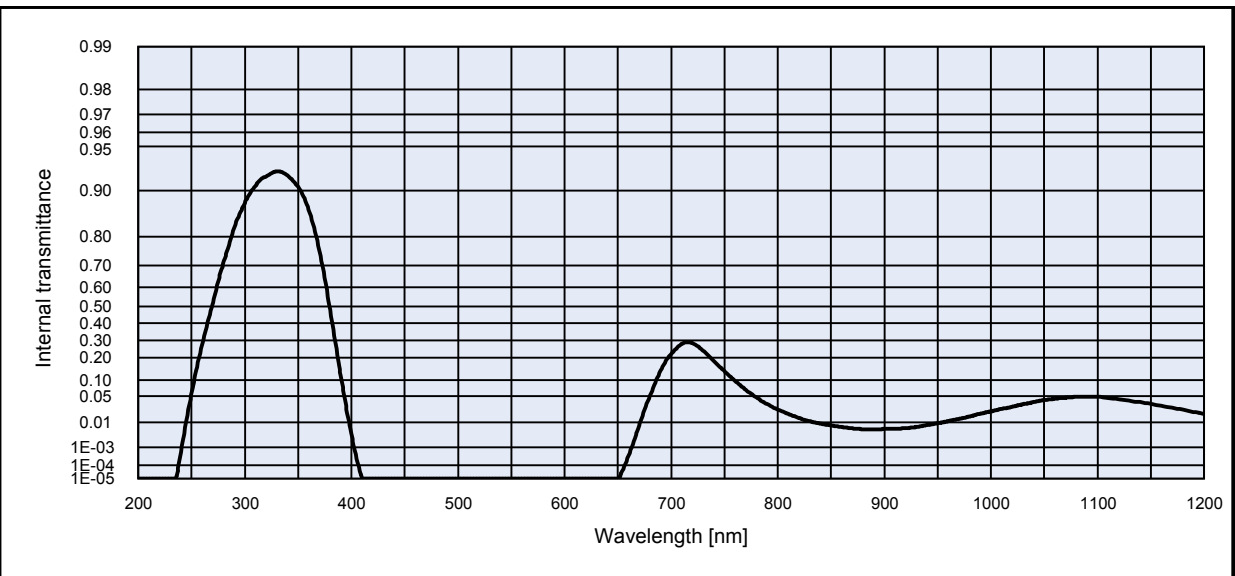
Transformation temperature	
T_g [°C]	545

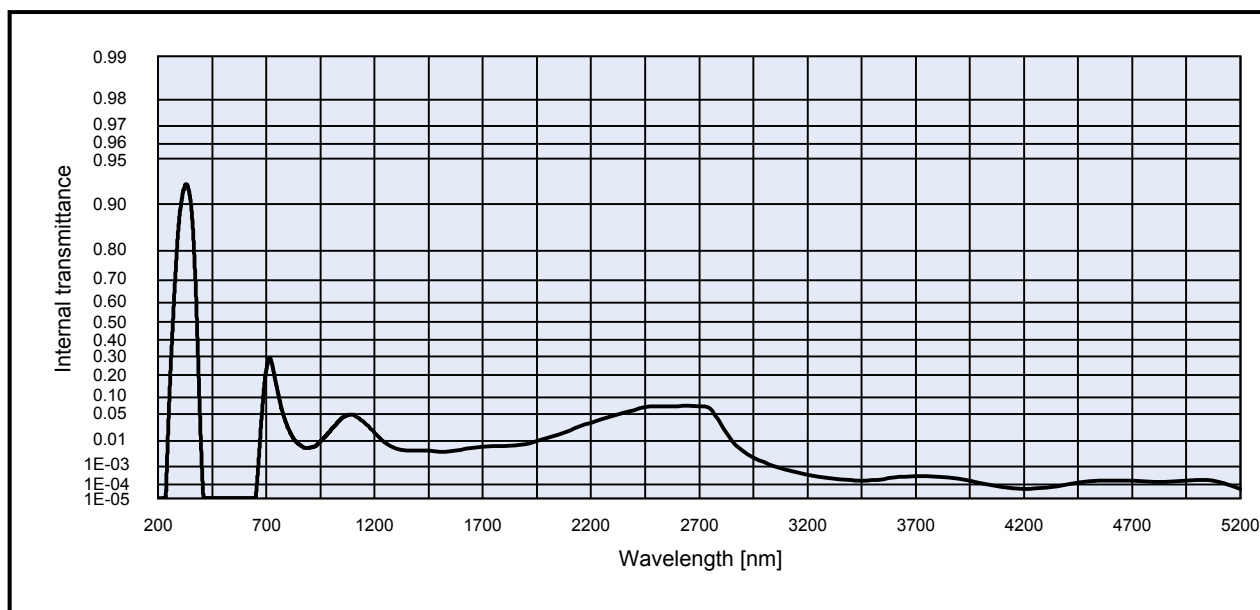
Thermal expansion	
$\alpha_{-30/+70^\circ\text{C}}$ [10 ⁻⁶ /K]	7.8
$\alpha_{20/300^\circ\text{C}}$ [10 ⁻⁶ /K]	9.0
$\alpha_{20/200^\circ\text{C}}$ [10 ⁻⁶ /K]	

Temperature coefficient	
T_k [nm/°C]	

Notes
Ionically colored glass
Band pass filter
[!]
Long-term changes in the polished surface are possible
V
Transmission changes are possible under the action of intense ultraviolet radiation
All data without tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation											
Illuminant	A (Planck T = 2856 K)			Illuminant	Planck T = 3200 K			Illuminant	D65 (T _c = 6504 K)		
d [mm]	1	2	3	d [mm]	1	2	3	d [mm]	1	2	3
x				x				x			
y				y				y			
Y				Y				Y			
λ_d [nm]				λ_d [nm]				λ_d [nm]			
P_e				P_e				P_e			





Internal transmittance τ_i at reference thickness d [mm] = 1
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	< 1.0E-05	800	2.4E-02	1100	4.9E-02	2200	3.2E-02	3700	3.2E-04
210	< 1.0E-05	510	< 1.0E-05	810	1.8E-02	1110	4.6E-02	2250	3.8E-02	3750	3.2E-04
220	< 1.0E-05	520	< 1.0E-05	820	1.4E-02	1120	4.3E-02	2300	4.6E-02	3800	3.0E-04
230	< 1.0E-05	530	< 1.0E-05	830	1.1E-02	1130	3.9E-02	2350	5.3E-02	3850	2.6E-04
240	6.1E-04	540	< 1.0E-05	840	9.1E-03	1140	3.7E-02	2400	6.0E-02	3900	2.2E-04
250	5.6E-02	550	< 1.0E-05	850	8.0E-03	1150	3.3E-02	2450	6.8E-02	3950	1.7E-04
260	2.8E-01	560	< 1.0E-05	860	7.0E-03	1160	3.0E-02	2500	7.0E-02	4000	1.2E-04
270	5.2E-01	570	< 1.0E-05	870	6.3E-03	1170	2.7E-02	2550	7.0E-02	4050	9.0E-05
280	7.1E-01	580	< 1.0E-05	880	5.9E-03	1180	2.4E-02	2600	7.0E-02	4100	6.7E-05
290	8.3E-01	590	< 1.0E-05	890	5.8E-03	1190	2.1E-02	2650	7.2E-02	4150	5.7E-05
300	8.8E-01	600	< 1.0E-05	900	5.9E-03	1200	1.8E-02	2700	7.0E-02	4200	5.2E-05
310	9.1E-01	610	< 1.0E-05	910	6.1E-03	1250	8.8E-03	2750	6.4E-02	4250	5.4E-05
320	9.2E-01	620	< 1.0E-05	920	6.4E-03	1300	5.5E-03	2800	3.0E-02	4300	6.1E-05
330	9.3E-01	630	< 1.0E-05	930	7.0E-03	1350	4.6E-03	2850	1.1E-02	4350	7.6E-05
340	9.2E-01	640	< 1.0E-05	940	8.1E-03	1400	4.8E-03	2900	4.8E-03	4400	1.0E-04
350	9.1E-01	650	< 1.0E-05	950	9.4E-03	1450	4.7E-03	2950	2.5E-03	4450	1.4E-04
360	8.7E-01	660	3.6E-04	960	1.1E-02	1500	4.3E-03	3000	1.6E-03	4500	1.7E-04
370	7.6E-01	670	8.1E-03	970	1.3E-02	1550	4.3E-03	3050	1.0E-03	4550	1.7E-04
380	4.8E-01	680	5.0E-02	980	1.5E-02	1600	5.0E-03	3100	7.0E-04	4600	1.8E-04
390	1.2E-01	690	1.4E-01	990	1.8E-02	1650	6.0E-03	3150	5.0E-04	4650	1.7E-04
400	4.0E-03	700	2.2E-01	1000	2.1E-02	1700	6.6E-03	3200	3.7E-04	4700	1.7E-04
410	1.0E-05	710	2.8E-01	1010	2.5E-02	1750	6.7E-03	3250	2.9E-04	4750	1.6E-04
420	< 1.0E-05	720	2.8E-01	1020	2.8E-02	1800	6.8E-03	3300	2.4E-04	4800	1.5E-04
430	< 1.0E-05	730	2.4E-01	1030	3.3E-02	1850	7.2E-03	3350	2.1E-04	4850	1.5E-04
440	< 1.0E-05	740	1.9E-01	1040	3.7E-02	1900	8.0E-03	3400	1.8E-04	4900	1.6E-04
450	< 1.0E-05	750	1.4E-01	1050	4.1E-02	1950	1.0E-02	3450	1.8E-04	4950	1.7E-04
460	< 1.0E-05	760	9.7E-02	1060	4.4E-02	2000	1.2E-02	3500	1.9E-04	5000	1.9E-04
470	< 1.0E-05	770	6.7E-02	1070	4.6E-02	2050	1.6E-02	3550	2.1E-04	5050	1.9E-04
480	< 1.0E-05	780	4.7E-02	1080	4.8E-02	2100	2.0E-02	3600	2.6E-04	5100	1.4E-04
490	< 1.0E-05	790	3.3E-02	1090	4.8E-02	2150	2.6E-02	3650	3.0E-04	5150	9.4E-05