Полосовые фильтры BG, VG, S

Технические характеристики

По вопросам продаж и поддержки обращайтесь:

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Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
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Брянск (4832)59-03-52
Владивосток (423)249-28-31
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Екатеринбург (343)384-55-89
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Калининград (4012)72-03-81
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Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
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Уфа (347)229-48-12
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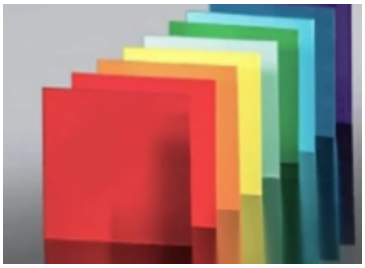
Data Sheet



BG3

Reflection factor	
P_d	0.921

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (365nm)	≥	0.94
τ_i (633nm)	≤	0.00005

Refractive Index n
n (302.1 nm) = 1.548
n_g (435.8 nm) = 1.520
$n_{F'}$ (480.0 nm) = 1.516
n_F (486.1 nm) = 1.516
Sellmeier coefficients on request

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	
Tg [°C]	478

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

Temperature coefficient	
T_K [nm/°C]	

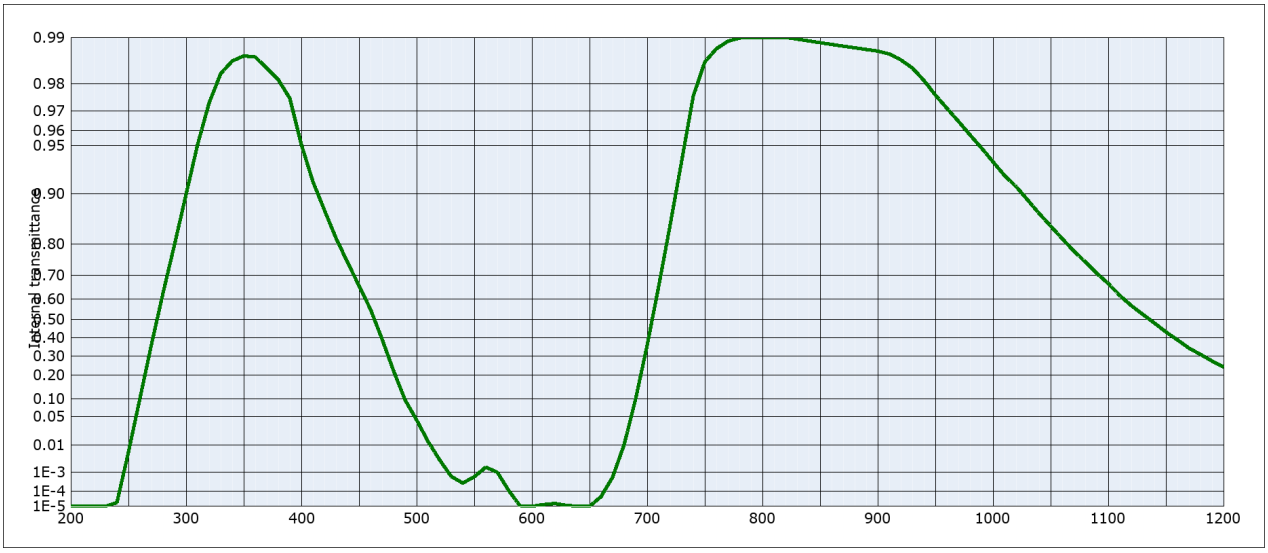
Notes
Ionically colored glass
Bandpass filter
Transmission changes are possible
under the action of intense
ultraviolet radiation.
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.160	0.166	0.170
y	0.042	0.024	0.020
Y	1	0	0
λ_d [nm]	458	447	440
P_e	0.96	0.98	0.98

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.157	0.163	0.167
y	0.038	0.022	0.018
Y	1	0	0
λ_d [nm]	457	447	442
P_e	0.97	0.98	0.99

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.154	0.160	0.163
y	0.029	0.018	0.014
Y	2	1	0
λ_d [nm]	455	448	444
P_e	0.98	0.99	1.00



BG3

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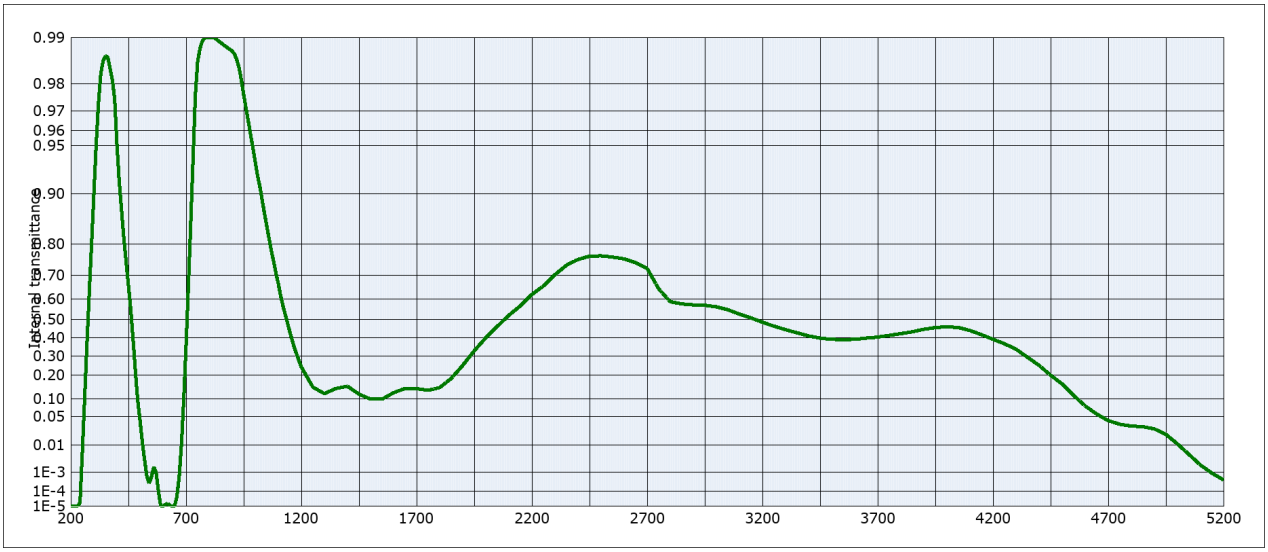

Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	$4.3 \cdot 10^{-2}$	800	0.990	1100	0.667	2200	0.620	3700	0.404
210	$< 10^{-5}$	510	$1.3 \cdot 10^{-2}$	810	0.990	1110	0.615	2250	0.657	3750	0.413
220	$< 10^{-5}$	520	$3.2 \cdot 10^{-3}$	820	0.990	1120	0.568	2300	0.701	3800	0.423
230	$< 10^{-5}$	530	$6.4 \cdot 10^{-4}$	830	0.990	1130	0.525	2350	0.735	3850	0.433
240	$1.9 \cdot 10^{-5}$	540	$3.0 \cdot 10^{-4}$	840	0.989	1140	0.480	2400	0.754	3900	0.446
250	$6.1 \cdot 10^{-3}$	550	$6.2 \cdot 10^{-4}$	850	0.989	1150	0.432	2450	0.764	3950	0.456
260	0.103	560	$1.7 \cdot 10^{-3}$	860	0.989	1160	0.388	2500	0.765	4000	0.460
270	0.364	570	$1.0 \cdot 10^{-3}$	870	0.989	1170	0.343	2550	0.761	4050	0.456
280	0.626	580	$1.1 \cdot 10^{-4}$	880	0.988	1180	0.308	2600	0.756	4100	0.440
290	0.798	590	$< 10^{-5}$	890	0.988	1190	0.273	2650	0.743	4150	0.417
300	0.899	600	$< 10^{-5}$	900	0.988	1200	0.241	2700	0.724	4200	0.392
310	0.951	610	$1.3 \cdot 10^{-5}$	910	0.987	1250	0.146	2750	0.644	4250	0.367
320	0.973	620	$1.6 \cdot 10^{-5}$	920	0.986	1300	0.120	2800	0.587	4300	0.337
330	0.983	630	$1.2 \cdot 10^{-5}$	930	0.984	1350	0.141	2850	0.576	4350	0.293
340	0.986	640	$< 10^{-5}$	940	0.981	1400	0.150	2900	0.572	4400	0.250
350	0.987	650	$< 10^{-5}$	950	0.976	1450	0.118	2950	0.570	4450	0.200
360	0.987	660	$4.7 \cdot 10^{-5}$	960	0.971	1500	0.100	3000	0.562	4500	0.160
370	0.984	670	$5.9 \cdot 10^{-4}$	970	0.965	1550	0.100	3050	0.548	4550	0.113
380	0.981	680	$1.0 \cdot 10^{-2}$	980	0.957	1600	0.124	3100	0.526	4600	$7.8 \cdot 10^{-2}$
390	0.975	690	0.100	990	0.948	1650	0.141	3150	0.507	4650	$5.6 \cdot 10^{-2}$
400	0.951	700	0.359	1000	0.937	1700	0.140	3200	0.484	4700	$4.2 \cdot 10^{-2}$
410	0.916	710	0.655	1010	0.923	1750	0.133	3250	0.463	4750	$3.5 \cdot 10^{-2}$
420	0.874	720	0.846	1020	0.910	1800	0.144	3300	0.444	4800	$3.2 \cdot 10^{-2}$
430	0.815	730	0.938	1030	0.891	1850	0.185	3350	0.427	4850	$3.1 \cdot 10^{-2}$
440	0.745	740	0.976	1040	0.868	1900	0.250	3400	0.410	4900	$2.7 \cdot 10^{-2}$
450	0.658	750	0.986	1050	0.843	1950	0.328	3450	0.398	4950	$2.0 \cdot 10^{-2}$
460	0.550	760	0.988	1060	0.813	2000	0.400	3500	0.392	5000	$1.1 \cdot 10^{-2}$
470	0.393	770	0.989	1070	0.780	2050	0.462	3550	0.390	5050	$5.1 \cdot 10^{-3}$
480	0.222	780	0.990	1080	0.746	2100	0.520	3600	0.392	5100	$2.0 \cdot 10^{-3}$
490	$9.7 \cdot 10^{-2}$	790	0.990	1090	0.706	2150	0.567	3650	0.398	5150	$9.1 \cdot 10^{-4}$

Data Sheet

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BG7

Reflection factor	
P_d	0.918

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (365nm)	≥	0.25
τ_i (488nm)	≥	0.78
τ_i (633nm)	≤	0.08

Refractive Index n
n_h (404.7 nm) = 1.540
n_d (587.6 nm) = 1.520

Density	
ρ [g/cm^3]	2.61

Bubble content	
Bubble class	1

Chemical Resistance	
FR class	0
SR class	1.0
AR class	1.0

Transformation temperature	
Tg [°C]	468

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	8.5
$\alpha_{20/300°C}$ [10^{-6}/K]	9.9
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

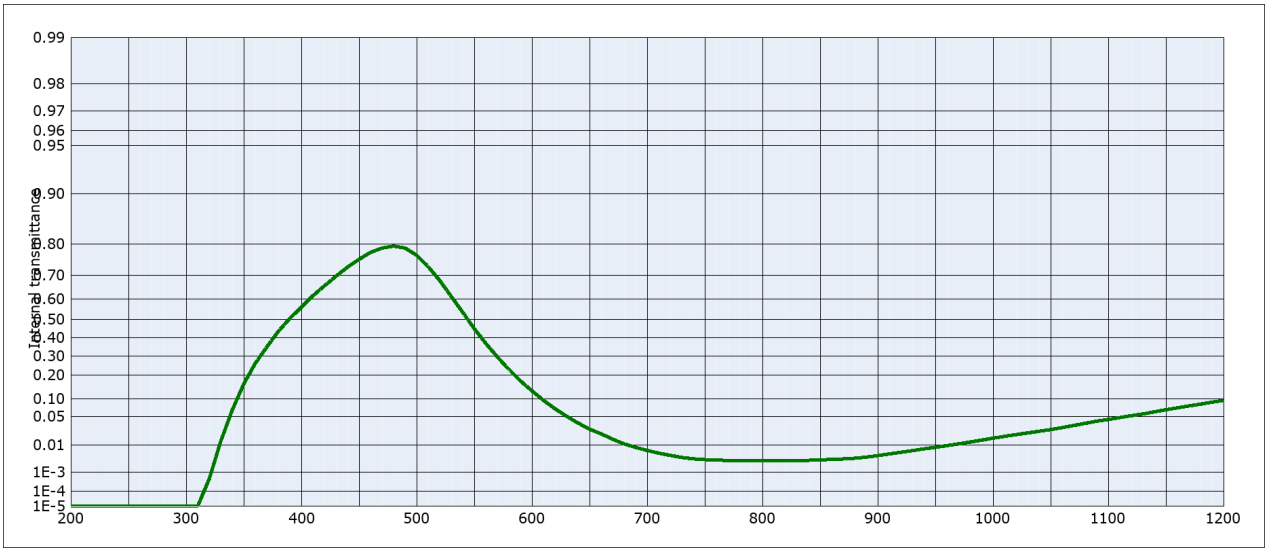
Notes
Ionically colored glass
Bandpass filter
All data wihout tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation

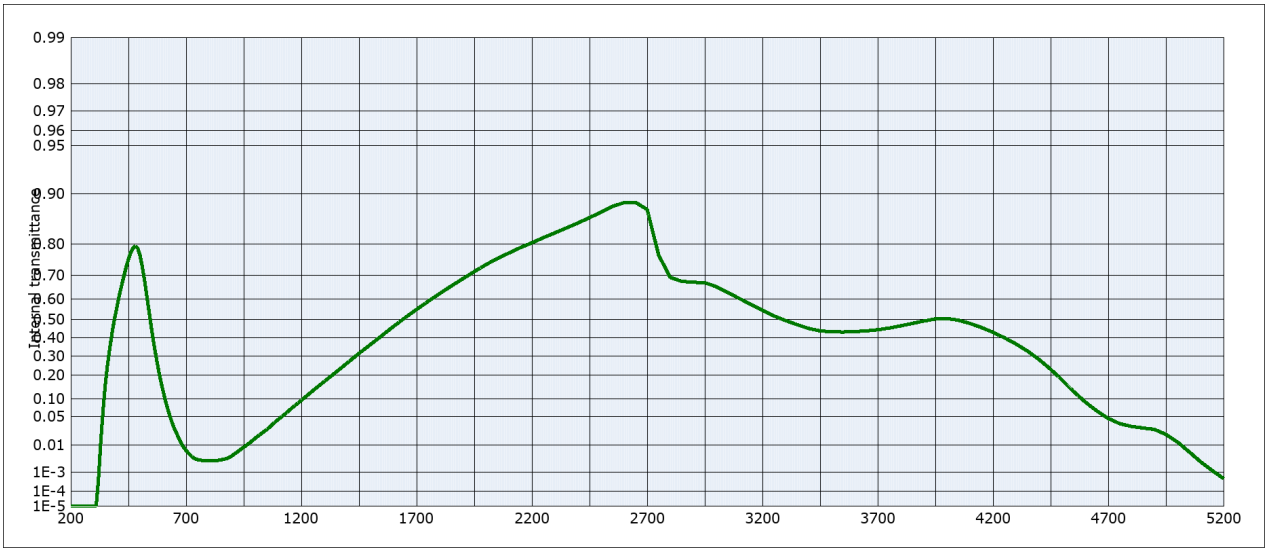
Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.262	0.179	0.145
y	0.406	0.360	0.317
Y	30	14	8
λ_d [nm]	495	492	490
P_e	0.44	0.65	0.76

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.246	0.172	0.143
y	0.382	0.333	0.292
Y	31	16	9
λ_d [nm]	493	490	488
P_e	0.45	0.66	0.76

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.191	0.152	0.138
y	0.272	0.229	0.200
Y	38	21	13
λ_d [nm]	486	484	482
P_e	0.49	0.68	0.76



BG7



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	$< 10^{-5}$	500	0.767	800	$3.0 \cdot 10^{-3}$	1100	$4.4 \cdot 10^{-2}$	2200	0.803	3700	0.444
210	$< 10^{-5}$	510	0.730	810	$3.0 \cdot 10^{-3}$	1110	$4.8 \cdot 10^{-2}$	2250	0.816	3750	0.453
220	$< 10^{-5}$	520	0.679	820	$3.0 \cdot 10^{-3}$	1120	$5.2 \cdot 10^{-2}$	2300	0.827	3800	0.465
230	$< 10^{-5}$	530	0.611	830	$3.0 \cdot 10^{-3}$	1130	$5.6 \cdot 10^{-2}$	2350	0.839	3850	0.478
240	$< 10^{-5}$	540	0.535	840	$3.1 \cdot 10^{-3}$	1140	$6.2 \cdot 10^{-2}$	2400	0.849	3900	0.490
250	$< 10^{-5}$	550	0.450	850	$3.2 \cdot 10^{-3}$	1150	$6.7 \cdot 10^{-2}$	2450	0.860	3950	0.501
260	$< 10^{-5}$	560	0.369	860	$3.4 \cdot 10^{-3}$	1160	$7.3 \cdot 10^{-2}$	2500	0.870	4000	0.503
270	$< 10^{-5}$	570	0.295	870	$3.5 \cdot 10^{-3}$	1170	$7.8 \cdot 10^{-2}$	2550	0.881	4050	0.495
280	$< 10^{-5}$	580	0.229	880	$3.7 \cdot 10^{-3}$	1180	$8.4 \cdot 10^{-2}$	2600	0.887	4100	0.478
290	$< 10^{-5}$	590	0.174	890	$4.1 \cdot 10^{-3}$	1190	$9.0 \cdot 10^{-2}$	2650	0.887	4150	0.456
300	$< 10^{-5}$	600	0.131	900	$4.6 \cdot 10^{-3}$	1200	$9.6 \cdot 10^{-2}$	2700	0.875	4200	0.430
310	$< 10^{-5}$	610	$9.6 \cdot 10^{-2}$	910	$5.3 \cdot 10^{-3}$	1250	0.132	2750	0.767	4250	0.400
320	$4.7 \cdot 10^{-4}$	620	$7.0 \cdot 10^{-2}$	920	$6.0 \cdot 10^{-3}$	1300	0.171	2800	0.691	4300	0.366
330	$1.3 \cdot 10^{-2}$	630	$5.1 \cdot 10^{-2}$	930	$6.8 \cdot 10^{-3}$	1350	0.215	2850	0.675	4350	0.326
340	$6.6 \cdot 10^{-2}$	640	$3.7 \cdot 10^{-2}$	940	$7.7 \cdot 10^{-3}$	1400	0.263	2900	0.672	4400	0.281
350	0.160	650	$2.7 \cdot 10^{-2}$	950	$8.7 \cdot 10^{-3}$	1450	0.314	2950	0.670	4450	0.230
360	0.260	660	$2.1 \cdot 10^{-2}$	960	$9.8 \cdot 10^{-3}$	1500	0.363	3000	0.654	4500	0.177
370	0.349	670	$1.5 \cdot 10^{-2}$	970	$1.1 \cdot 10^{-2}$	1550	0.413	3050	0.628	4550	0.128
380	0.435	680	$1.1 \cdot 10^{-2}$	980	$1.2 \cdot 10^{-2}$	1600	0.462	3100	0.602	4600	$9.0 \cdot 10^{-2}$
390	0.504	690	$8.6 \cdot 10^{-3}$	990	$1.4 \cdot 10^{-2}$	1650	0.508	3150	0.574	4650	$6.4 \cdot 10^{-2}$
400	0.561	700	$6.9 \cdot 10^{-3}$	1000	$1.6 \cdot 10^{-2}$	1700	0.550	3200	0.546	4700	$4.6 \cdot 10^{-2}$
410	0.614	710	$5.6 \cdot 10^{-3}$	1010	$1.8 \cdot 10^{-2}$	1750	0.589	3250	0.517	4750	$3.6 \cdot 10^{-2}$
420	0.657	720	$4.7 \cdot 10^{-3}$	1020	$2.0 \cdot 10^{-2}$	1800	0.624	3300	0.493	4800	$3.1 \cdot 10^{-2}$
430	0.695	730	$4.0 \cdot 10^{-3}$	1030	$2.2 \cdot 10^{-2}$	1850	0.656	3350	0.472	4850	$2.9 \cdot 10^{-2}$
440	0.728	740	$3.6 \cdot 10^{-3}$	1040	$2.4 \cdot 10^{-2}$	1900	0.685	3400	0.451	4900	$2.7 \cdot 10^{-2}$
450	0.754	750	$3.3 \cdot 10^{-3}$	1050	$2.6 \cdot 10^{-2}$	1950	0.712	3450	0.438	4950	$2.0 \cdot 10^{-2}$
460	0.776	760	$3.2 \cdot 10^{-3}$	1060	$2.9 \cdot 10^{-2}$	2000	0.737	3500	0.433	5000	$1.3 \cdot 10^{-2}$
470	0.788	770	$3.1 \cdot 10^{-3}$	1070	$3.3 \cdot 10^{-2}$	2050	0.757	3550	0.432	5050	$6.3 \cdot 10^{-3}$
480	0.794	780	$3.0 \cdot 10^{-3}$	1080	$3.6 \cdot 10^{-2}$	2100	0.774	3600	0.434	5100	$2.8 \cdot 10^{-3}$
490	0.788	790	$3.0 \cdot 10^{-3}$	1090	$4.1 \cdot 10^{-2}$	2150	0.789	3650	0.438	5150	$1.2 \cdot 10^{-3}$

Data Sheet

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BG18

Reflection factor	
P_d	0.914

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (350nm)	≥	0.3
τ_i (405nm)	≥	0.65
τ_i (514nm)	≥	0.88
τ_i (633nm)	≤	0.25
τ_i (694nm)	≤	0.03
τ_i (1060nm)	≤	0.0005

Refractive Index n
n_h (404.7 nm) = 1.550
n_d (587.6 nm) = 1.540

Density	
ρ [g/cm^3]	2.68

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	0
SR class	2.0
AR class	2.0

Transformation temperature	
Tg [°C]	457

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	7.4
$\alpha_{20/300°C}$ [10^{-6}/K]	8.9
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

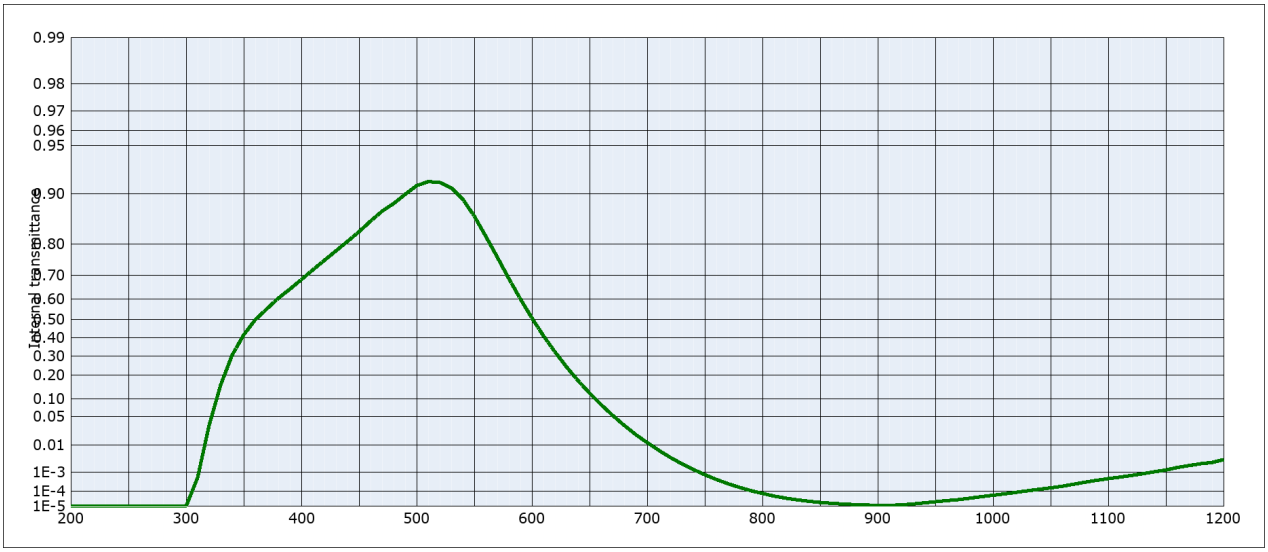
Notes
Ionically colored glass
Bandpass filter / shortpass filter
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.361	0.309	0.275
y	0.441	0.459	0.472
Y	61	46	37
λ_d [nm]	502	501	501
P_e	0.20	0.31	0.39

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.340	0.292	0.260
y	0.426	0.441	0.451
Y	62	48	38
λ_d [nm]	500	500	500
P_e	0.20	0.32	0.39

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.255	0.225	0.206
y	0.335	0.340	0.346
Y	68	54	45
λ_d [nm]	493	493	493
P_e	0.21	0.31	0.38



BG18

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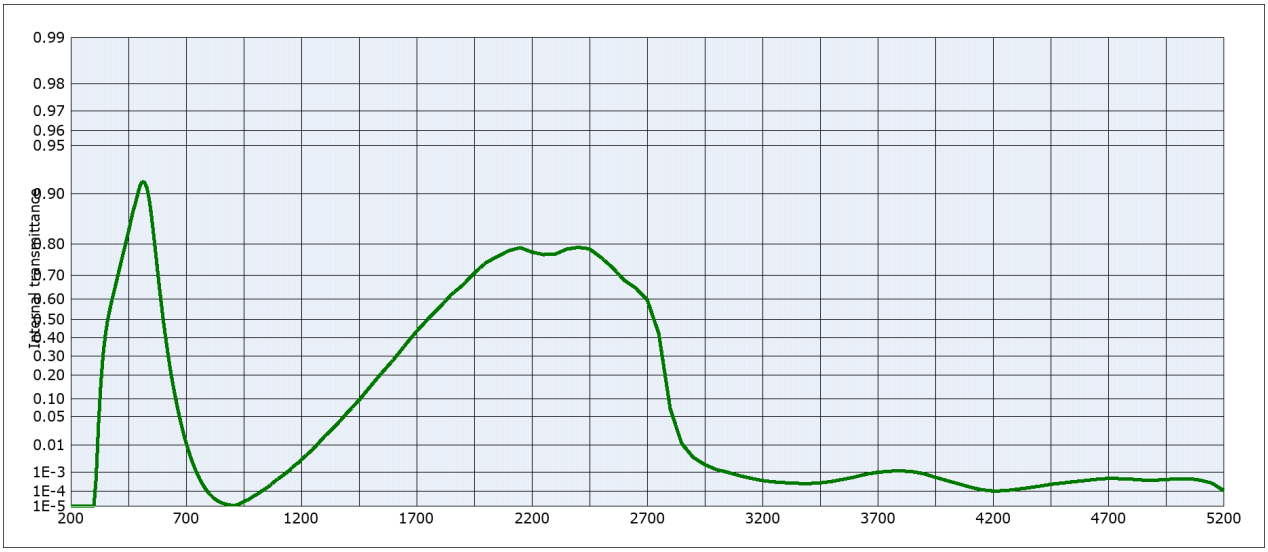


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.911	800	$7.6 \cdot 10^{-5}$	1100	$5.0 \cdot 10^{-4}$	2200	0.777	3700	$1.0 \cdot 10^{-3}$
210	$< 10^{-5}$	510	0.916	810	$5.2 \cdot 10^{-5}$	1110	$6.0 \cdot 10^{-4}$	2250	0.769	3750	$1.1 \cdot 10^{-3}$
220	$< 10^{-5}$	520	0.915	820	$3.8 \cdot 10^{-5}$	1120	$7.1 \cdot 10^{-4}$	2300	0.770	3800	$1.2 \cdot 10^{-3}$
230	$< 10^{-5}$	530	0.908	830	$2.9 \cdot 10^{-5}$	1130	$8.6 \cdot 10^{-4}$	2350	0.785	3850	$1.1 \cdot 10^{-3}$
240	$< 10^{-5}$	540	0.892	840	$2.3 \cdot 10^{-5}$	1140	$1.1 \cdot 10^{-3}$	2400	0.790	3900	$8.6 \cdot 10^{-4}$
250	$< 10^{-5}$	550	0.863	850	$1.9 \cdot 10^{-5}$	1150	$1.3 \cdot 10^{-3}$	2450	0.786	3950	$5.8 \cdot 10^{-4}$
260	$< 10^{-5}$	560	0.819	860	$1.7 \cdot 10^{-5}$	1160	$1.6 \cdot 10^{-3}$	2500	0.760	4000	$4.0 \cdot 10^{-4}$
270	$< 10^{-5}$	570	0.761	870	$1.5 \cdot 10^{-5}$	1170	$1.9 \cdot 10^{-3}$	2550	0.726	4050	$2.7 \cdot 10^{-4}$
280	$< 10^{-5}$	580	0.686	880	$1.3 \cdot 10^{-5}$	1180	$2.3 \cdot 10^{-3}$	2600	0.680	4100	$1.8 \cdot 10^{-4}$
290	$< 10^{-5}$	590	0.600	890	$1.2 \cdot 10^{-5}$	1190	$2.6 \cdot 10^{-3}$	2650	0.648	4150	$1.3 \cdot 10^{-4}$
300	$< 10^{-5}$	600	0.506	900	$1.2 \cdot 10^{-5}$	1200	$3.3 \cdot 10^{-3}$	2700	0.596	4200	$1.1 \cdot 10^{-4}$
310	$5.6 \cdot 10^{-4}$	610	0.411	910	$1.2 \cdot 10^{-5}$	1250	$7.5 \cdot 10^{-3}$	2750	0.426	4250	$1.1 \cdot 10^{-4}$
320	$3.3 \cdot 10^{-2}$	620	0.322	920	$1.3 \cdot 10^{-5}$	1300	$1.8 \cdot 10^{-2}$	2800	$7.0 \cdot 10^{-2}$	4300	$1.3 \cdot 10^{-4}$
330	0.156	630	0.242	930	$1.5 \cdot 10^{-5}$	1350	$3.3 \cdot 10^{-2}$	2850	$1.1 \cdot 10^{-2}$	4350	$1.6 \cdot 10^{-4}$
340	0.305	640	0.175	940	$1.8 \cdot 10^{-5}$	1400	$6.0 \cdot 10^{-2}$	2900	$4.0 \cdot 10^{-3}$	4400	$2.0 \cdot 10^{-4}$
350	0.416	650	0.122	950	$2.1 \cdot 10^{-5}$	1450	$9.6 \cdot 10^{-2}$	2950	$2.1 \cdot 10^{-3}$	4450	$2.6 \cdot 10^{-4}$
360	0.497	660	$8.2 \cdot 10^{-2}$	960	$2.6 \cdot 10^{-5}$	1500	0.150	3000	$1.3 \cdot 10^{-3}$	4500	$3.0 \cdot 10^{-4}$
370	0.552	670	$5.3 \cdot 10^{-2}$	970	$3.0 \cdot 10^{-5}$	1550	0.214	3050	$1.0 \cdot 10^{-3}$	4550	$3.5 \cdot 10^{-4}$
380	0.603	680	$3.3 \cdot 10^{-2}$	980	$3.7 \cdot 10^{-5}$	1600	0.280	3100	$7.0 \cdot 10^{-4}$	4600	$4.0 \cdot 10^{-4}$
390	0.643	690	$2.0 \cdot 10^{-2}$	990	$4.8 \cdot 10^{-5}$	1650	0.359	3150	$5.2 \cdot 10^{-4}$	4650	$4.7 \cdot 10^{-4}$
400	0.682	700	$1.2 \cdot 10^{-2}$	1000	$5.8 \cdot 10^{-5}$	1700	0.436	3200	$4.0 \cdot 10^{-4}$	4700	$5.1 \cdot 10^{-4}$
410	0.719	710	$7.0 \cdot 10^{-3}$	1010	$7.1 \cdot 10^{-5}$	1750	0.502	3250	$3.4 \cdot 10^{-4}$	4750	$5.0 \cdot 10^{-4}$
420	0.751	720	$4.0 \cdot 10^{-3}$	1020	$8.8 \cdot 10^{-5}$	1800	0.560	3300	$3.1 \cdot 10^{-4}$	4800	$4.7 \cdot 10^{-4}$
430	0.780	730	$2.3 \cdot 10^{-3}$	1030	$1.1 \cdot 10^{-4}$	1850	0.619	3350	$2.9 \cdot 10^{-4}$	4850	$4.3 \cdot 10^{-4}$
440	0.806	740	$1.3 \cdot 10^{-3}$	1040	$1.3 \cdot 10^{-4}$	1900	0.660	3400	$2.8 \cdot 10^{-4}$	4900	$4.2 \cdot 10^{-4}$
450	0.830	750	$7.7 \cdot 10^{-4}$	1050	$1.6 \cdot 10^{-4}$	1950	0.707	3450	$3.0 \cdot 10^{-4}$	4950	$4.5 \cdot 10^{-4}$
460	0.853	760	$4.6 \cdot 10^{-4}$	1060	$2.0 \cdot 10^{-4}$	2000	0.743	3500	$3.6 \cdot 10^{-4}$	5000	$5.0 \cdot 10^{-4}$
470	0.872	770	$2.8 \cdot 10^{-4}$	1070	$2.6 \cdot 10^{-4}$	2050	0.763	3550	$4.6 \cdot 10^{-4}$	5050	$5.0 \cdot 10^{-4}$
480	0.885	780	$1.7 \cdot 10^{-4}$	1080	$3.3 \cdot 10^{-4}$	2100	0.781	3600	$6.0 \cdot 10^{-4}$	5100	$4.2 \cdot 10^{-4}$
490	0.899	790	$1.1 \cdot 10^{-4}$	1090	$4.1 \cdot 10^{-4}$	2150	0.789	3650	$8.2 \cdot 10^{-4}$	5150	$2.9 \cdot 10^{-4}$

Data Sheet

SCHOTT

BG25

Reflection factor	
P_d	0.921

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (334nm)	≤	0.8
τ_i (405nm)	≥	0.93
τ_i (488nm)	≤	0.39
τ_i (725nm)	≤	0.36

Refractive Index n
n_h (404.7 nm) = 1.530
n_d (587.6 nm) = 1.510
Sellmeier coefficients on request

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	
Tg [°C]	487

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

Temperature coefficient	
T_K [nm/°C]	

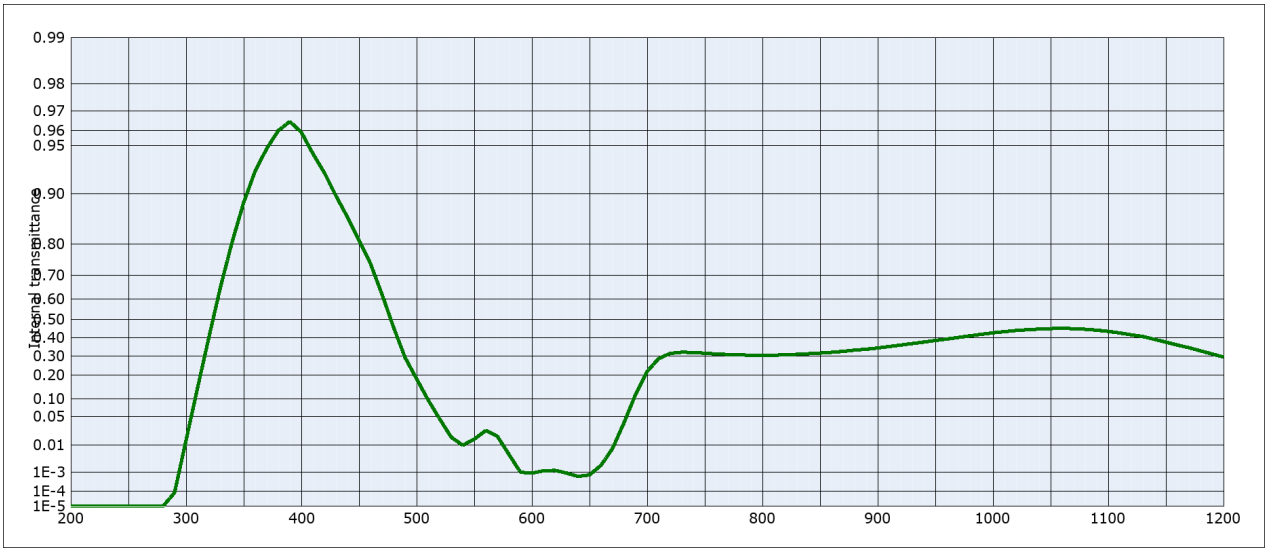
Notes
Ionically colored glass
Bandpass filter
Transmission changes are possible
under the action of intense
ultraviolet radiation.
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.155	0.151	0.155
y	0.093	0.035	0.024
Y	3	1	0
λ_d [nm]	470	459	454
P_e	0.90	0.98	0.99

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.153	0.152	0.155
y	0.083	0.033	0.023
Y	3	1	0
λ_d [nm]	469	458	453
P_e	0.91	0.98	0.99

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.150	0.153	0.157
y	0.055	0.027	0.021
Y	5	2	1
λ_d [nm]	463	455	451
P_e	0.93	0.98	0.99



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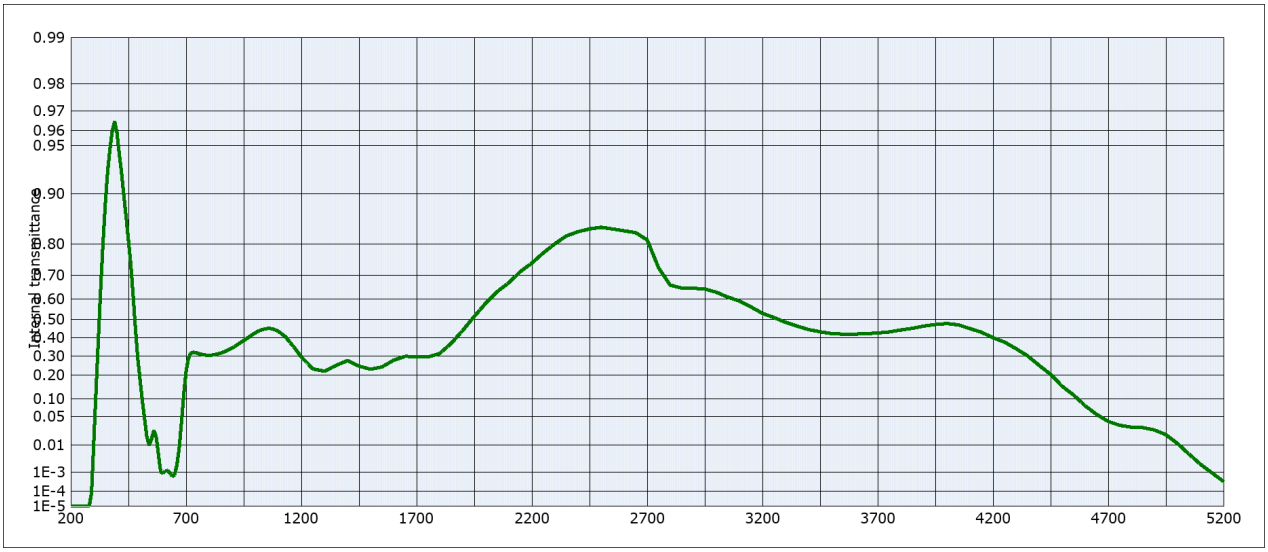


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.183	800	0.304	1100	0.435	2200	0.742	3700	0.426
210	$< 10^{-5}$	510	$9.7 \cdot 10^{-2}$	810	0.304	1110	0.426	2250	0.774	3750	0.432
220	$< 10^{-5}$	520	$4.5 \cdot 10^{-2}$	820	0.306	1120	0.416	2300	0.800	3800	0.442
230	$< 10^{-5}$	530	$1.7 \cdot 10^{-2}$	830	0.309	1130	0.407	2350	0.820	3850	0.452
240	$< 10^{-5}$	540	$1.0 \cdot 10^{-2}$	840	0.312	1140	0.392	2400	0.830	3900	0.464
250	$< 10^{-5}$	550	$1.5 \cdot 10^{-2}$	850	0.316	1150	0.376	2450	0.836	3950	0.472
260	$< 10^{-5}$	560	$2.5 \cdot 10^{-2}$	860	0.320	1160	0.360	2500	0.840	4000	0.477
270	$< 10^{-5}$	570	$1.8 \cdot 10^{-2}$	870	0.325	1170	0.345	2550	0.836	4050	0.470
280	$< 10^{-5}$	580	$5.2 \cdot 10^{-3}$	880	0.332	1180	0.328	2600	0.832	4100	0.450
290	$8.5 \cdot 10^{-5}$	590	$1.0 \cdot 10^{-3}$	890	0.337	1190	0.311	2650	0.828	4150	0.431
300	$1.4 \cdot 10^{-2}$	600	$9.1 \cdot 10^{-4}$	900	0.344	1200	0.294	2700	0.810	4200	0.400
310	0.144	610	$1.2 \cdot 10^{-3}$	910	0.352	1250	0.232	2750	0.725	4250	0.376
320	0.408	620	$1.2 \cdot 10^{-3}$	920	0.360	1300	0.220	2800	0.660	4300	0.340
330	0.655	630	$9.3 \cdot 10^{-4}$	930	0.368	1350	0.250	2850	0.648	4350	0.301
340	0.805	640	$6.4 \cdot 10^{-4}$	940	0.376	1400	0.275	2900	0.647	4400	0.250
350	0.887	650	$7.6 \cdot 10^{-4}$	950	0.385	1450	0.246	2950	0.644	4450	0.205
360	0.928	660	$2.0 \cdot 10^{-3}$	960	0.393	1500	0.230	3000	0.630	4500	0.150
370	0.948	670	$8.0 \cdot 10^{-3}$	970	0.402	1550	0.242	3050	0.608	4550	0.115
380	0.960	680	$3.8 \cdot 10^{-2}$	980	0.411	1600	0.277	3100	0.590	4600	$7.8 \cdot 10^{-2}$
390	0.965	690	0.118	990	0.419	1650	0.298	3150	0.562	4650	$5.5 \cdot 10^{-2}$
400	0.959	700	0.219	1000	0.427	1700	0.296	3200	0.530	4700	$4.0 \cdot 10^{-2}$
410	0.944	710	0.286	1010	0.434	1750	0.295	3250	0.509	4750	$3.3 \cdot 10^{-2}$
420	0.926	720	0.314	1020	0.440	1800	0.313	3300	0.484	4800	$3.0 \cdot 10^{-2}$
430	0.897	730	0.320	1030	0.444	1850	0.369	3350	0.464	4850	$2.9 \cdot 10^{-2}$
440	0.861	740	0.319	1040	0.448	1900	0.440	3400	0.445	4900	$2.6 \cdot 10^{-2}$
450	0.809	750	0.315	1050	0.450	1950	0.515	3450	0.433	4950	$2.0 \cdot 10^{-2}$
460	0.740	760	0.311	1060	0.451	2000	0.580	3500	0.423	5000	$1.1 \cdot 10^{-2}$
470	0.620	770	0.308	1070	0.450	2050	0.633	3550	0.420	5050	$5.2 \cdot 10^{-3}$
480	0.457	780	0.306	1080	0.447	2100	0.670	3600	0.420	5100	$2.2 \cdot 10^{-3}$
490	0.291	790	0.304	1090	0.442	2150	0.712	3650	0.423	5150	$9.4 \cdot 10^{-4}$

Data Sheet

SCHOTT

BG38

Reflection factor	
P_d	0.916

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (350nm)	≥	0.8
τ_i (405nm)	≥	0.93
τ_i (514nm)	≥	0.95
τ_i (633nm)	≤	0.67
τ_i (694nm)	≤	0.32
τ_i (1060nm)	≤	0.06

Refractive Index n
n_h (404.7 nm) = 1.540
n_d (587.6 nm) = 1.530

Density	
ρ [g/cm^3]	2.66

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	0
SR class	2.0
AR class	2.0

Transformation temperature	
Tg [°C]	482

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	7.5
$\alpha_{20/300°C}$ [10^{-6}/K]	8.9
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

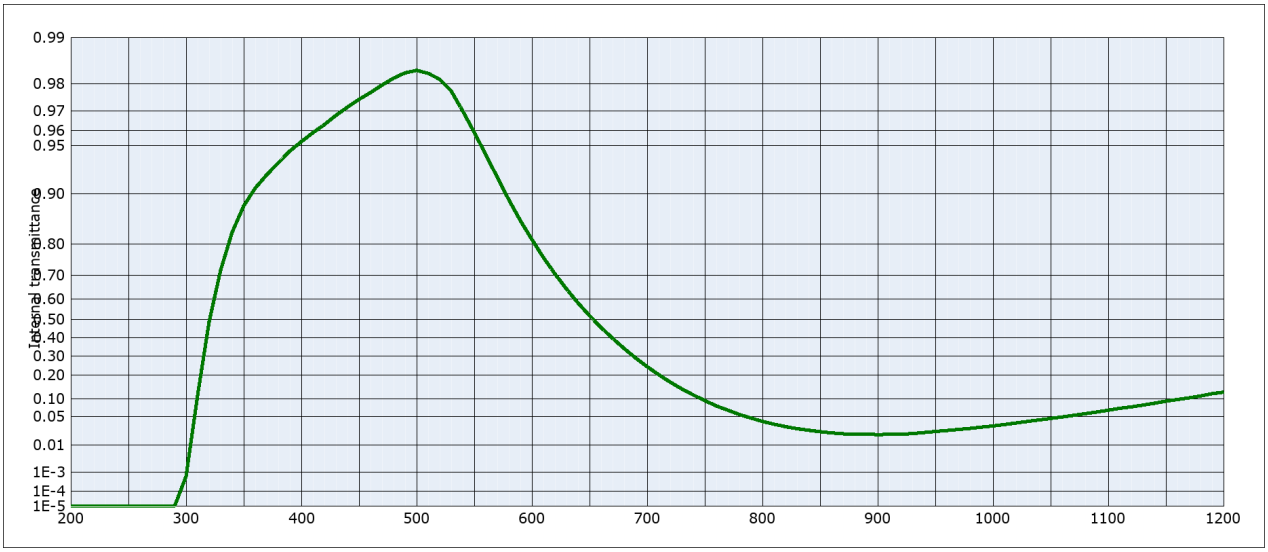
Notes
Ionically colored glass
Bandpass filter / shortpass filter
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.413	0.384	0.360
y	0.419	0.427	0.433
Y	80	71	64
λ_d [nm]	501	500	500
P_e	0.08	0.14	0.20

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.390	0.362	0.339
y	0.407	0.413	0.417
Y	80	72	65
λ_d [nm]	499	498	498
P_e	0.08	0.15	0.21

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.288	0.268	0.253
y	0.328	0.326	0.323
Y	83	76	71
λ_d [nm]	491	491	490
P_e	0.09	0.16	0.22



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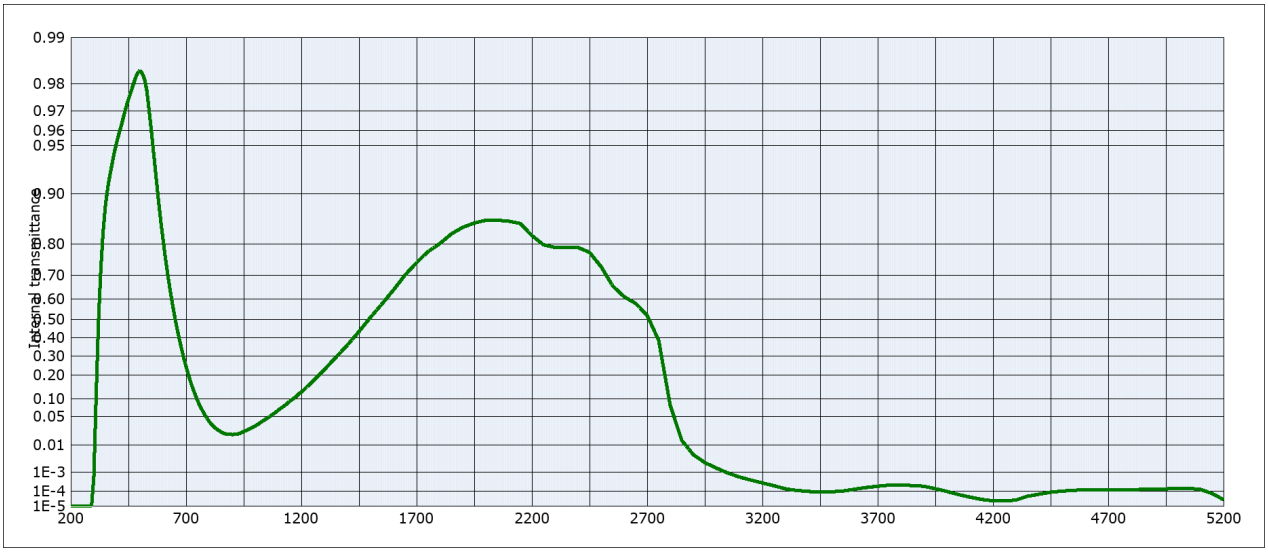


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.984	800	$4.0 \cdot 10^{-2}$	1100	$6.6 \cdot 10^{-2}$	2200	0.821	3700	$2.0 \cdot 10^{-4}$
210	$< 10^{-5}$	510	0.983	810	$3.5 \cdot 10^{-2}$	1110	$7.1 \cdot 10^{-2}$	2250	0.797	3750	$2.3 \cdot 10^{-4}$
220	$< 10^{-5}$	520	0.981	820	$3.1 \cdot 10^{-2}$	1120	$7.5 \cdot 10^{-2}$	2300	0.790	3800	$2.3 \cdot 10^{-4}$
230	$< 10^{-5}$	530	0.978	830	$2.8 \cdot 10^{-2}$	1130	$8.1 \cdot 10^{-2}$	2350	0.791	3850	$2.2 \cdot 10^{-4}$
240	$< 10^{-5}$	540	0.970	840	$2.5 \cdot 10^{-2}$	1140	$8.6 \cdot 10^{-2}$	2400	0.790	3900	$2.0 \cdot 10^{-4}$
250	$< 10^{-5}$	550	0.959	850	$2.3 \cdot 10^{-2}$	1150	$9.3 \cdot 10^{-2}$	2450	0.776	3950	$1.4 \cdot 10^{-4}$
260	$< 10^{-5}$	560	0.943	860	$2.2 \cdot 10^{-2}$	1160	$9.9 \cdot 10^{-2}$	2500	0.730	4000	$1.0 \cdot 10^{-4}$
270	$< 10^{-5}$	570	0.921	870	$2.1 \cdot 10^{-2}$	1170	0.104	2550	0.657	4050	$6.5 \cdot 10^{-5}$
280	$< 10^{-5}$	580	0.891	880	$2.0 \cdot 10^{-2}$	1180	0.111	2600	0.610	4100	$4.4 \cdot 10^{-5}$
290	$< 10^{-5}$	590	0.854	890	$2.0 \cdot 10^{-2}$	1190	0.120	2650	0.579	4150	$3.1 \cdot 10^{-5}$
300	$6.5 \cdot 10^{-4}$	600	0.811	900	$2.0 \cdot 10^{-2}$	1200	0.126	2700	0.520	4200	$2.5 \cdot 10^{-5}$
310	0.114	610	0.760	910	$2.0 \cdot 10^{-2}$	1250	0.172	2750	0.385	4250	$2.4 \cdot 10^{-5}$
320	0.487	620	0.704	920	$2.0 \cdot 10^{-2}$	1300	0.228	2800	$8.0 \cdot 10^{-2}$	4300	$2.8 \cdot 10^{-5}$
330	0.718	630	0.644	930	$2.1 \cdot 10^{-2}$	1350	0.293	2850	$1.4 \cdot 10^{-2}$	4350	$5.0 \cdot 10^{-5}$
340	0.829	640	0.581	940	$2.2 \cdot 10^{-2}$	1400	0.360	2900	$5.0 \cdot 10^{-3}$	4400	$6.8 \cdot 10^{-5}$
350	0.881	650	0.518	950	$2.4 \cdot 10^{-2}$	1450	0.434	2950	$2.5 \cdot 10^{-3}$	4450	$9.0 \cdot 10^{-5}$
360	0.908	660	0.456	960	$2.5 \cdot 10^{-2}$	1500	0.510	3000	$1.5 \cdot 10^{-3}$	4500	$1.0 \cdot 10^{-4}$
370	0.924	670	0.397	970	$2.6 \cdot 10^{-2}$	1550	0.577	3050	$9.3 \cdot 10^{-4}$	4550	$1.2 \cdot 10^{-4}$
380	0.936	680	0.341	980	$2.8 \cdot 10^{-2}$	1600	0.640	3100	$6.0 \cdot 10^{-4}$	4600	$1.2 \cdot 10^{-4}$
390	0.946	690	0.289	990	$3.0 \cdot 10^{-2}$	1650	0.700	3150	$4.2 \cdot 10^{-4}$	4650	$1.3 \cdot 10^{-4}$
400	0.953	700	0.243	1000	$3.2 \cdot 10^{-2}$	1700	0.744	3200	$3.0 \cdot 10^{-4}$	4700	$1.3 \cdot 10^{-4}$
410	0.959	710	0.203	1010	$3.4 \cdot 10^{-2}$	1750	0.778	3250	$2.1 \cdot 10^{-4}$	4750	$1.3 \cdot 10^{-4}$
420	0.963	720	0.168	1020	$3.7 \cdot 10^{-2}$	1800	0.800	3300	$1.4 \cdot 10^{-4}$	4800	$1.3 \cdot 10^{-4}$
430	0.968	730	0.139	1030	$4.0 \cdot 10^{-2}$	1850	0.825	3350	$1.1 \cdot 10^{-4}$	4850	$1.3 \cdot 10^{-4}$
440	0.972	740	0.115	1040	$4.3 \cdot 10^{-2}$	1900	0.840	3400	$1.0 \cdot 10^{-4}$	4900	$1.3 \cdot 10^{-4}$
450	0.975	750	$9.5 \cdot 10^{-2}$	1050	$4.6 \cdot 10^{-2}$	1950	0.849	3450	$9.1 \cdot 10^{-5}$	4950	$1.4 \cdot 10^{-4}$
460	0.977	760	$7.8 \cdot 10^{-2}$	1060	$4.9 \cdot 10^{-2}$	2000	0.855	3500	$9.5 \cdot 10^{-5}$	5000	$1.6 \cdot 10^{-4}$
470	0.980	770	$6.6 \cdot 10^{-2}$	1070	$5.3 \cdot 10^{-2}$	2050	0.855	3550	$1.1 \cdot 10^{-4}$	5050	$1.5 \cdot 10^{-4}$
480	0.982	780	$5.5 \cdot 10^{-2}$	1080	$5.7 \cdot 10^{-2}$	2100	0.853	3600	$1.4 \cdot 10^{-4}$	5100	$1.3 \cdot 10^{-4}$
490	0.983	790	$4.7 \cdot 10^{-2}$	1090	$6.1 \cdot 10^{-2}$	2150	0.848	3650	$1.7 \cdot 10^{-4}$	5150	$7.5 \cdot 10^{-5}$

Data Sheet

SCHOTT

BG39

Reflection factor	
P_d	0.914

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (350nm)	≥	0.6
τ_i (405nm)	≥	0.85
τ_i (514nm)	≥	0.93
τ_i (633nm)	≤	0.3
τ_i (694nm)	≤	0.03
τ_i (1060nm)	≤	0.001

Refractive Index n
n_h (404.7 nm) = 1.550
n_d (587.6 nm) = 1.540

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	
Tg [°C]	322

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

Temperature coefficient	
T_K [nm/°C]	

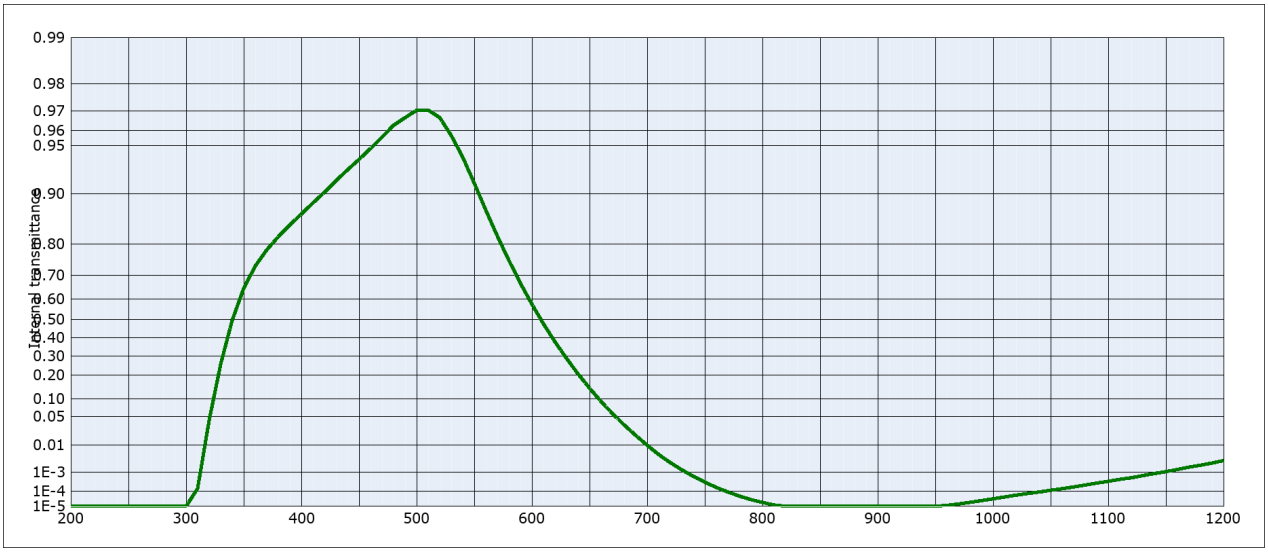
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Long-term changes of the polished
surface are possible.
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.365	0.314	0.279
y	0.434	0.445	0.450
Y	66	53	45
λ_d [nm]	500	500	499
P_e	0.19	0.31	0.39

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.344	0.296	0.264
y	0.419	0.425	0.427
Y	67	55	47
λ_d [nm]	498	498	497
P_e	0.19	0.31	0.39

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.257	0.226	0.207
y	0.326	0.322	0.318
Y	73	62	55
λ_d [nm]	491	490	490
P_e	0.21	0.32	0.39



BG39

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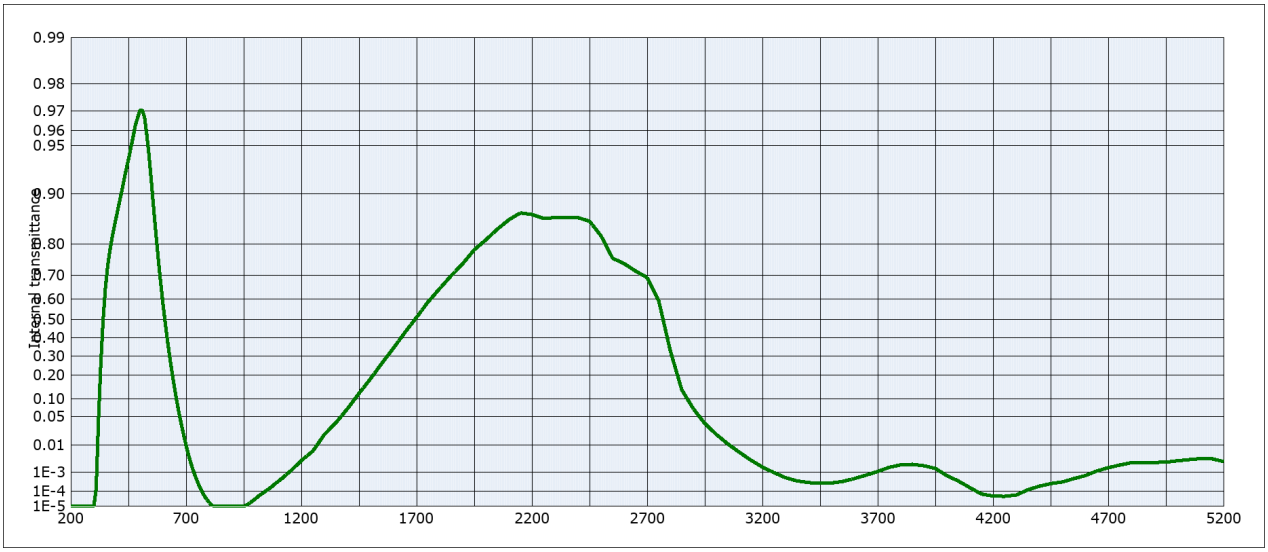

Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.970	800	$1.9 \cdot 10^{-5}$	1100	$3.7 \cdot 10^{-4}$	2200	0.866	3700	$1.1 \cdot 10^{-3}$
210	$< 10^{-5}$	510	0.970	810	$1.3 \cdot 10^{-5}$	1110	$4.6 \cdot 10^{-4}$	2250	0.859	3750	$1.6 \cdot 10^{-3}$
220	$< 10^{-5}$	520	0.967	820	$< 10^{-5}$	1120	$5.5 \cdot 10^{-4}$	2300	0.860	3800	$2.1 \cdot 10^{-3}$
230	$< 10^{-5}$	530	0.957	830	$< 10^{-5}$	1130	$7.0 \cdot 10^{-4}$	2350	0.860	3850	$2.2 \cdot 10^{-3}$
240	$< 10^{-5}$	540	0.941	840	$< 10^{-5}$	1140	$8.8 \cdot 10^{-4}$	2400	0.860	3900	$1.9 \cdot 10^{-3}$
250	$< 10^{-5}$	550	0.914	850	$< 10^{-5}$	1150	$1.1 \cdot 10^{-3}$	2450	0.853	3950	$1.5 \cdot 10^{-3}$
260	$< 10^{-5}$	560	0.874	860	$< 10^{-5}$	1160	$1.3 \cdot 10^{-3}$	2500	0.820	4000	$7.0 \cdot 10^{-4}$
270	$< 10^{-5}$	570	0.820	870	$< 10^{-5}$	1170	$1.7 \cdot 10^{-3}$	2550	0.758	4050	$3.8 \cdot 10^{-4}$
280	$< 10^{-5}$	580	0.751	880	$< 10^{-5}$	1180	$2.0 \cdot 10^{-3}$	2600	0.740	4100	$1.7 \cdot 10^{-4}$
290	$< 10^{-5}$	590	0.668	890	$< 10^{-5}$	1190	$2.4 \cdot 10^{-3}$	2650	0.714	4150	$7.0 \cdot 10^{-5}$
300	$< 10^{-5}$	600	0.575	900	$< 10^{-5}$	1200	$3.1 \cdot 10^{-3}$	2700	0.690	4200	$5.2 \cdot 10^{-5}$
310	$1.5 \cdot 10^{-4}$	610	0.476	910	$< 10^{-5}$	1250	$6.6 \cdot 10^{-3}$	2750	0.592	4250	$5.0 \cdot 10^{-5}$
320	$4.2 \cdot 10^{-2}$	620	0.378	920	$< 10^{-5}$	1300	$2.0 \cdot 10^{-2}$	2800	0.330	4300	$6.0 \cdot 10^{-5}$
330	0.256	630	0.287	930	$< 10^{-5}$	1350	$3.8 \cdot 10^{-2}$	2850	0.136	4350	$1.2 \cdot 10^{-4}$
340	0.494	640	0.207	940	$< 10^{-5}$	1400	$7.0 \cdot 10^{-2}$	2900	$7.0 \cdot 10^{-2}$	4400	$2.0 \cdot 10^{-4}$
350	0.647	650	0.142	950	$1.0 \cdot 10^{-5}$	1450	0.121	2950	$3.6 \cdot 10^{-2}$	4450	$2.8 \cdot 10^{-4}$
360	0.732	660	$9.2 \cdot 10^{-2}$	960	$1.2 \cdot 10^{-5}$	1500	0.184	3000	$2.0 \cdot 10^{-2}$	4500	$3.4 \cdot 10^{-4}$
370	0.783	670	$5.7 \cdot 10^{-2}$	970	$1.5 \cdot 10^{-5}$	1550	0.262	3050	$1.1 \cdot 10^{-2}$	4550	$5.0 \cdot 10^{-4}$
380	0.818	680	$3.4 \cdot 10^{-2}$	980	$1.9 \cdot 10^{-5}$	1600	0.344	3100	$6.0 \cdot 10^{-3}$	4600	$7.0 \cdot 10^{-4}$
390	0.845	690	$1.9 \cdot 10^{-2}$	990	$2.6 \cdot 10^{-5}$	1650	0.431	3150	$3.1 \cdot 10^{-3}$	4650	$1.1 \cdot 10^{-3}$
400	0.867	700	$1.0 \cdot 10^{-2}$	1000	$3.4 \cdot 10^{-5}$	1700	0.510	3200	$1.7 \cdot 10^{-3}$	4700	$1.6 \cdot 10^{-3}$
410	0.886	710	$5.0 \cdot 10^{-3}$	1010	$4.5 \cdot 10^{-5}$	1750	0.586	3250	$9.6 \cdot 10^{-4}$	4750	$2.0 \cdot 10^{-3}$
420	0.902	720	$2.6 \cdot 10^{-3}$	1020	$5.9 \cdot 10^{-5}$	1800	0.646	3300	$5.6 \cdot 10^{-4}$	4800	$2.5 \cdot 10^{-3}$
430	0.917	730	$1.3 \cdot 10^{-3}$	1030	$7.5 \cdot 10^{-5}$	1850	0.697	3350	$3.9 \cdot 10^{-4}$	4850	$2.6 \cdot 10^{-3}$
440	0.929	740	$6.5 \cdot 10^{-4}$	1040	$9.2 \cdot 10^{-5}$	1900	0.740	3400	$3.1 \cdot 10^{-4}$	4900	$2.6 \cdot 10^{-3}$
450	0.939	750	$3.3 \cdot 10^{-4}$	1050	$1.2 \cdot 10^{-4}$	1950	0.783	3450	$2.9 \cdot 10^{-4}$	4950	$2.6 \cdot 10^{-3}$
460	0.948	760	$1.7 \cdot 10^{-4}$	1060	$1.5 \cdot 10^{-4}$	2000	0.810	3500	$3.0 \cdot 10^{-4}$	5000	$3.0 \cdot 10^{-3}$
470	0.956	770	$9.3 \cdot 10^{-5}$	1070	$1.8 \cdot 10^{-4}$	2050	0.836	3550	$3.6 \cdot 10^{-4}$	5050	$3.3 \cdot 10^{-3}$
480	0.963	780	$5.1 \cdot 10^{-5}$	1080	$2.3 \cdot 10^{-4}$	2100	0.856	3600	$5.1 \cdot 10^{-4}$	5100	$3.6 \cdot 10^{-3}$
490	0.967	790	$3.0 \cdot 10^{-5}$	1090	$3.0 \cdot 10^{-4}$	2150	0.869	3650	$7.4 \cdot 10^{-4}$	5150	$3.5 \cdot 10^{-3}$

Data Sheet

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BG40

Reflection factor	
P_d	0.916

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (350nm)	≥	0.8
τ_i (405nm)	≥	0.93
τ_i (514nm)	≥	0.97
τ_i (633nm)	≤	0.57
τ_i (694nm)	≤	0.16
τ_i (1060nm)	≤	0.02

Refractive Index n
n_g (435.8 nm) = 1.540
$n_{F'}$ (480.0 nm) = 1.536
n_F (486.1 nm) = 1.536
n_e (546.1 nm) = 1.532
Sellmeier coefficients on request

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	
Tg [°C]	313

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

Temperature coefficient	
T_K [nm/°C]	

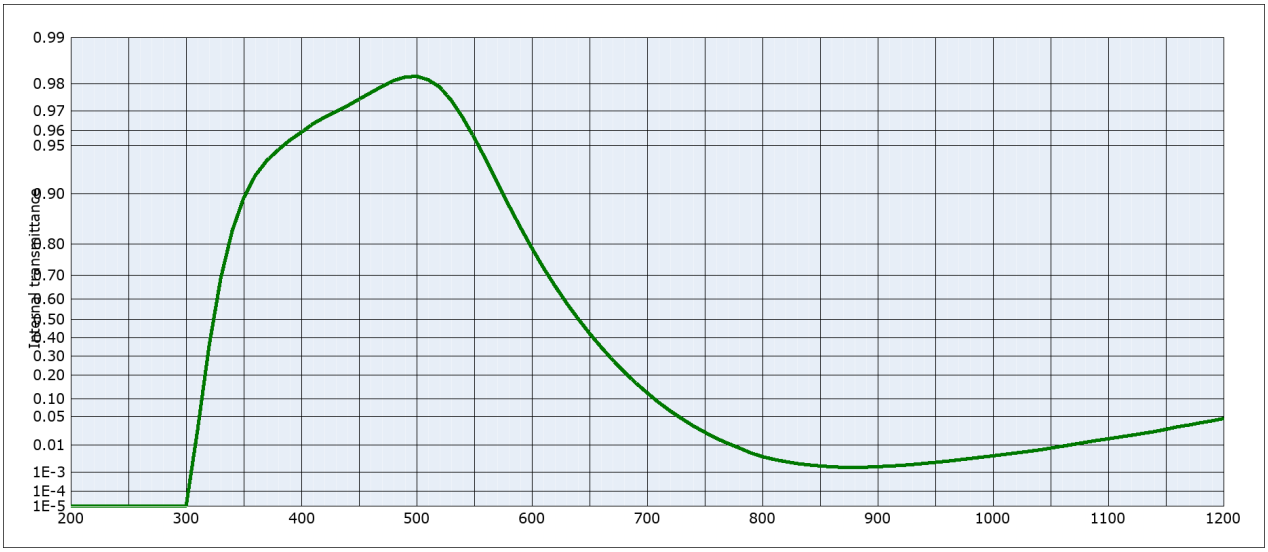
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Long-term changes of the polished
surface are possible under some
circumstances.
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.406	0.374	0.348
y	0.421	0.430	0.436
Y	78	68	61
λ_d [nm]	501	500	500
P_e	0.09	0.17	0.23

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.383	0.352	0.327
y	0.409	0.415	0.419
Y	79	70	63
λ_d [nm]	499	498	498
P_e	0.10	0.17	0.23

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.283	0.262	0.246
y	0.327	0.324	0.321
Y	82	75	69
λ_d [nm]	491	490	490
P_e	0.11	0.19	0.25



BG40

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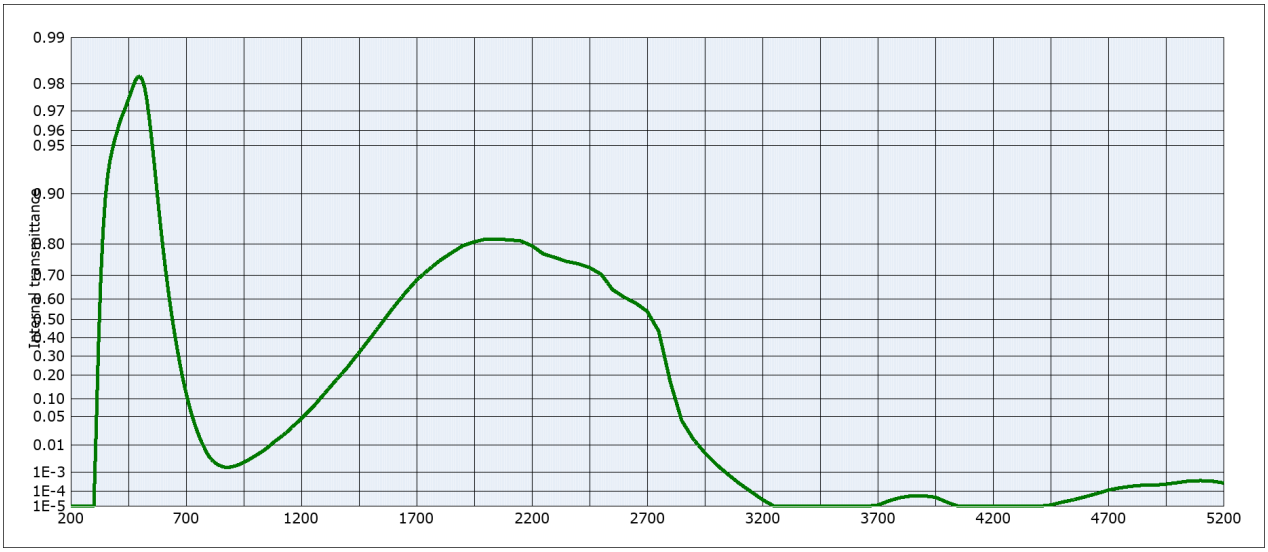

Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.982	800	$4.3 \cdot 10^{-3}$	1100	$1.5 \cdot 10^{-2}$	2200	0.795	3700	$1.2 \cdot 10^{-5}$
210	$< 10^{-5}$	510	0.981	810	$3.4 \cdot 10^{-3}$	1110	$1.7 \cdot 10^{-2}$	2250	0.771	3750	$2.5 \cdot 10^{-5}$
220	$< 10^{-5}$	520	0.979	820	$2.8 \cdot 10^{-3}$	1120	$1.9 \cdot 10^{-2}$	2300	0.760	3800	$4.2 \cdot 10^{-5}$
230	$< 10^{-5}$	530	0.974	830	$2.3 \cdot 10^{-3}$	1130	$2.1 \cdot 10^{-2}$	2350	0.747	3850	$5.4 \cdot 10^{-5}$
240	$< 10^{-5}$	540	0.967	840	$2.1 \cdot 10^{-3}$	1140	$2.4 \cdot 10^{-2}$	2400	0.740	3900	$5.3 \cdot 10^{-5}$
250	$< 10^{-5}$	550	0.956	850	$1.9 \cdot 10^{-3}$	1150	$2.7 \cdot 10^{-2}$	2450	0.727	3950	$4.3 \cdot 10^{-5}$
260	$< 10^{-5}$	560	0.939	860	$1.7 \cdot 10^{-3}$	1160	$3.1 \cdot 10^{-2}$	2500	0.703	4000	$2.0 \cdot 10^{-5}$
270	$< 10^{-5}$	570	0.915	870	$1.6 \cdot 10^{-3}$	1170	$3.3 \cdot 10^{-2}$	2550	0.641	4050	$< 10^{-5}$
280	$< 10^{-5}$	580	0.882	880	$1.6 \cdot 10^{-3}$	1180	$3.7 \cdot 10^{-2}$	2600	0.608	4100	$< 10^{-5}$
290	$< 10^{-5}$	590	0.840	890	$1.7 \cdot 10^{-3}$	1190	$4.1 \cdot 10^{-2}$	2650	0.581	4150	$< 10^{-5}$
300	$< 10^{-5}$	600	0.788	900	$1.8 \cdot 10^{-3}$	1200	$4.6 \cdot 10^{-2}$	2700	0.540	4200	$< 10^{-5}$
310	$2.6 \cdot 10^{-2}$	610	0.726	910	$1.8 \cdot 10^{-3}$	1250	$7.4 \cdot 10^{-2}$	2750	0.436	4250	$< 10^{-5}$
320	0.356	620	0.657	920	$2.0 \cdot 10^{-3}$	1300	0.120	2800	0.170	4300	$< 10^{-5}$
330	0.686	630	0.581	930	$2.1 \cdot 10^{-3}$	1350	0.176	2850	$4.2 \cdot 10^{-2}$	4350	$< 10^{-5}$
340	0.832	640	0.503	940	$2.4 \cdot 10^{-3}$	1400	0.240	2900	$1.5 \cdot 10^{-2}$	4400	$< 10^{-5}$
350	0.894	650	0.424	950	$2.6 \cdot 10^{-3}$	1450	0.319	2950	$5.8 \cdot 10^{-3}$	4450	$1.3 \cdot 10^{-5}$
360	0.923	660	0.349	960	$2.9 \cdot 10^{-3}$	1500	0.400	3000	$2.2 \cdot 10^{-3}$	4500	$2.0 \cdot 10^{-5}$
370	0.938	670	0.279	970	$3.2 \cdot 10^{-3}$	1550	0.483	3050	$8.1 \cdot 10^{-4}$	4550	$3.0 \cdot 10^{-5}$
380	0.947	680	0.217	980	$3.6 \cdot 10^{-3}$	1600	0.560	3100	$2.8 \cdot 10^{-4}$	4600	$4.6 \cdot 10^{-5}$
390	0.954	690	0.165	990	$4.1 \cdot 10^{-3}$	1650	0.626	3150	$9.8 \cdot 10^{-5}$	4650	$7.4 \cdot 10^{-5}$
400	0.959	700	0.123	1000	$4.5 \cdot 10^{-3}$	1700	0.680	3200	$3.0 \cdot 10^{-5}$	4700	$1.2 \cdot 10^{-4}$
410	0.964	710	$8.9 \cdot 10^{-2}$	1010	$5.1 \cdot 10^{-3}$	1750	0.718	3250	$1.0 \cdot 10^{-5}$	4750	$1.6 \cdot 10^{-4}$
420	0.967	720	$6.4 \cdot 10^{-2}$	1020	$5.7 \cdot 10^{-3}$	1800	0.750	3300	$< 10^{-5}$	4800	$2.0 \cdot 10^{-4}$
430	0.970	730	$4.6 \cdot 10^{-2}$	1030	$6.4 \cdot 10^{-3}$	1850	0.774	3350	$< 10^{-5}$	4850	$2.3 \cdot 10^{-4}$
440	0.972	740	$3.2 \cdot 10^{-2}$	1040	$7.1 \cdot 10^{-3}$	1900	0.795	3400	$< 10^{-5}$	4900	$2.3 \cdot 10^{-4}$
450	0.975	750	$2.3 \cdot 10^{-2}$	1050	$8.2 \cdot 10^{-3}$	1950	0.805	3450	$< 10^{-5}$	4950	$2.6 \cdot 10^{-4}$
460	0.977	760	$1.6 \cdot 10^{-2}$	1060	$9.4 \cdot 10^{-3}$	2000	0.812	3500	$< 10^{-5}$	5000	$3.1 \cdot 10^{-4}$
470	0.979	770	$1.1 \cdot 10^{-2}$	1070	$1.1 \cdot 10^{-2}$	2050	0.812	3550	$< 10^{-5}$	5050	$3.8 \cdot 10^{-4}$
480	0.981	780	$8.3 \cdot 10^{-3}$	1080	$1.2 \cdot 10^{-2}$	2100	0.810	3600	$< 10^{-5}$	5100	$4.0 \cdot 10^{-4}$
490	0.982	790	$5.7 \cdot 10^{-3}$	1090	$1.4 \cdot 10^{-2}$	2150	0.808	3650	$< 10^{-5}$	5150	$3.8 \cdot 10^{-4}$

Data Sheet

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BG42

Reflection factor	
P_d	0.914

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (350nm)	≥	0.4
τ_i (405nm)	≥	0.65
τ_i (514nm)	≥	0.88
τ_i (633nm)	≤	0.27
τ_i (694nm)	≤	0.03
τ_i (1060nm)	≤	0.002

Refractive Index n
n_h (404.7 nm) = 1.550
n_d (587.6 nm) = 1.540

Density	
ρ [g/cm^3]	2.69

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	0
SR class	2.0
AR class	2.0

Transformation temperature	
Tg [°C]	475

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	7.3
$\alpha_{20/300°C}$ [10^{-6}/K]	8.7
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

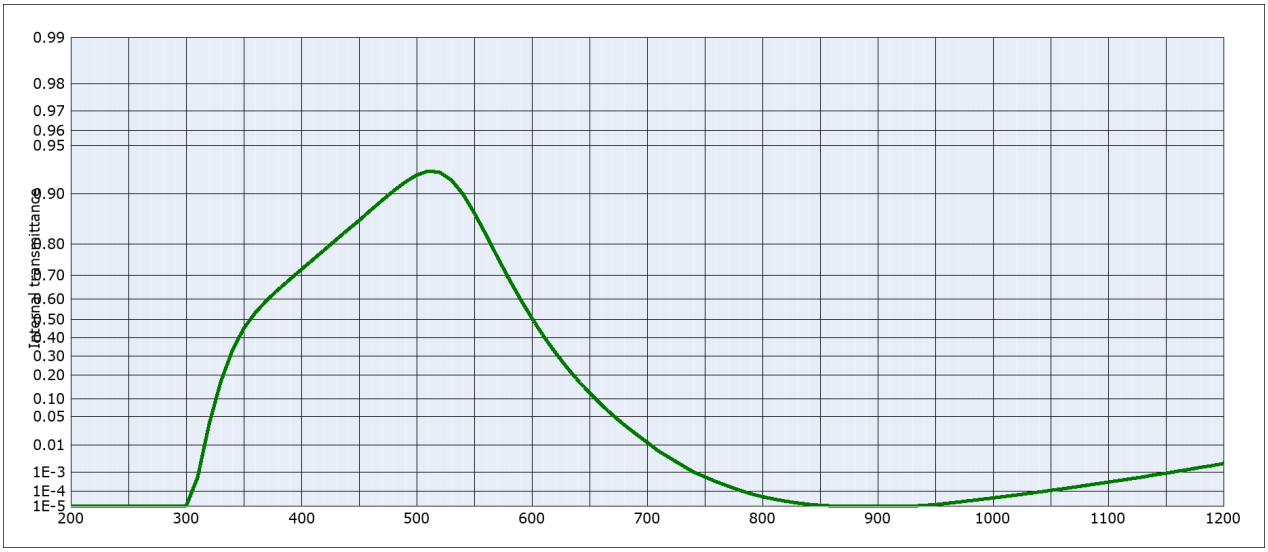
Notes
Ionically colored glass
Bandpass filter / shortpass filter
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.359	0.305	0.270
y	0.439	0.456	0.466
Y	61	47	38
λ_d [nm]	501	501	501
P_e	0.20	0.32	0.40

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.338	0.288	0.256
y	0.424	0.437	0.445
Y	63	48	39
λ_d [nm]	499	499	499
P_e	0.21	0.33	0.41

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.254	0.222	0.203
y	0.332	0.334	0.337
Y	68	55	46
λ_d [nm]	492	492	492
P_e	0.21	0.33	0.39



BG42

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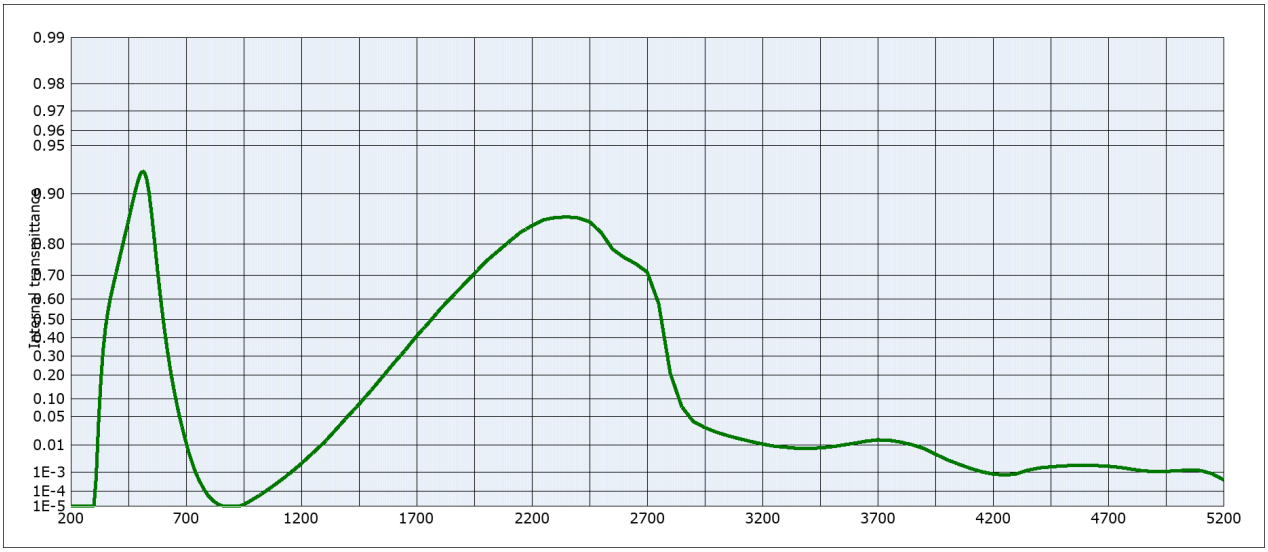


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.923	800	$4.7 \cdot 10^{-5}$	1100	$3.3 \cdot 10^{-4}$	2200	0.844	3700	$1.4 \cdot 10^{-2}$
210	$< 10^{-5}$	510	0.928	810	$3.3 \cdot 10^{-5}$	1110	$4.1 \cdot 10^{-4}$	2250	0.856	3750	$1.4 \cdot 10^{-2}$
220	$< 10^{-5}$	520	0.926	820	$2.3 \cdot 10^{-5}$	1120	$5.0 \cdot 10^{-4}$	2300	0.860	3800	$1.2 \cdot 10^{-2}$
230	$< 10^{-5}$	530	0.918	830	$1.8 \cdot 10^{-5}$	1130	$6.0 \cdot 10^{-4}$	2350	0.861	3850	$1.0 \cdot 10^{-2}$
240	$< 10^{-5}$	540	0.900	840	$1.4 \cdot 10^{-5}$	1140	$7.7 \cdot 10^{-4}$	2400	0.860	3900	$8.0 \cdot 10^{-3}$
250	$< 10^{-5}$	550	0.869	850	$1.2 \cdot 10^{-5}$	1150	$9.0 \cdot 10^{-4}$	2450	0.852	3950	$5.2 \cdot 10^{-3}$
260	$< 10^{-5}$	560	0.824	860	$1.1 \cdot 10^{-5}$	1160	$1.1 \cdot 10^{-3}$	2500	0.828	4000	$3.3 \cdot 10^{-3}$
270	$< 10^{-5}$	570	0.762	870	$< 10^{-5}$	1170	$1.3 \cdot 10^{-3}$	2550	0.785	4050	$2.2 \cdot 10^{-3}$
280	$< 10^{-5}$	580	0.686	880	$< 10^{-5}$	1180	$1.6 \cdot 10^{-3}$	2600	0.760	4100	$1.5 \cdot 10^{-3}$
290	$< 10^{-5}$	590	0.599	890	$< 10^{-5}$	1190	$1.9 \cdot 10^{-3}$	2650	0.740	4150	$1.1 \cdot 10^{-3}$
300	$< 10^{-5}$	600	0.505	900	$< 10^{-5}$	1200	$2.3 \cdot 10^{-3}$	2700	0.711	4200	$8.4 \cdot 10^{-4}$
310	$5.7 \cdot 10^{-4}$	610	0.410	910	$< 10^{-5}$	1250	$5.7 \cdot 10^{-3}$	2750	0.578	4250	$7.4 \cdot 10^{-4}$
320	$3.5 \cdot 10^{-2}$	620	0.321	920	$< 10^{-5}$	1300	$1.2 \cdot 10^{-2}$	2800	0.210	4300	$8.4 \cdot 10^{-4}$
330	0.168	630	0.242	930	$1.0 \cdot 10^{-5}$	1350	$2.6 \cdot 10^{-2}$	2850	$7.6 \cdot 10^{-2}$	4350	$1.2 \cdot 10^{-3}$
340	0.328	640	0.175	940	$1.2 \cdot 10^{-5}$	1400	$5.0 \cdot 10^{-2}$	2900	$4.0 \cdot 10^{-2}$	4400	$1.5 \cdot 10^{-3}$
350	0.451	650	0.123	950	$1.3 \cdot 10^{-5}$	1450	$8.3 \cdot 10^{-2}$	2950	$2.9 \cdot 10^{-2}$	4450	$1.7 \cdot 10^{-3}$
360	0.533	660	$8.3 \cdot 10^{-2}$	960	$1.6 \cdot 10^{-5}$	1500	0.130	3000	$2.3 \cdot 10^{-2}$	4500	$1.9 \cdot 10^{-3}$
370	0.593	670	$5.4 \cdot 10^{-2}$	970	$2.0 \cdot 10^{-5}$	1550	0.190	3050	$1.9 \cdot 10^{-2}$	4550	$2.0 \cdot 10^{-3}$
380	0.642	680	$3.4 \cdot 10^{-2}$	980	$2.5 \cdot 10^{-5}$	1600	0.260	3100	$1.5 \cdot 10^{-2}$	4600	$2.0 \cdot 10^{-3}$
390	0.683	690	$2.1 \cdot 10^{-2}$	990	$3.2 \cdot 10^{-5}$	1650	0.331	3150	$1.3 \cdot 10^{-2}$	4650	$1.9 \cdot 10^{-3}$
400	0.720	700	$1.2 \cdot 10^{-2}$	1000	$3.9 \cdot 10^{-5}$	1700	0.410	3200	$1.1 \cdot 10^{-2}$	4700	$1.8 \cdot 10^{-3}$
410	0.753	710	$6.5 \cdot 10^{-3}$	1010	$4.8 \cdot 10^{-5}$	1750	0.478	3250	$9.5 \cdot 10^{-3}$	4750	$1.6 \cdot 10^{-3}$
420	0.783	720	$3.7 \cdot 10^{-3}$	1020	$6.0 \cdot 10^{-5}$	1800	0.549	3300	$8.7 \cdot 10^{-3}$	4800	$1.4 \cdot 10^{-3}$
430	0.810	730	$2.0 \cdot 10^{-3}$	1030	$7.4 \cdot 10^{-5}$	1850	0.606	3350	$8.1 \cdot 10^{-3}$	4850	$1.2 \cdot 10^{-3}$
440	0.834	740	$1.0 \cdot 10^{-3}$	1040	$9.2 \cdot 10^{-5}$	1900	0.658	3400	$8.0 \cdot 10^{-3}$	4900	$1.1 \cdot 10^{-3}$
450	0.854	750	$6.1 \cdot 10^{-4}$	1050	$1.2 \cdot 10^{-4}$	1950	0.705	3450	$8.3 \cdot 10^{-3}$	4950	$1.1 \cdot 10^{-3}$
460	0.874	760	$3.5 \cdot 10^{-4}$	1060	$1.4 \cdot 10^{-4}$	2000	0.747	3500	$9.0 \cdot 10^{-3}$	5000	$1.2 \cdot 10^{-3}$
470	0.890	770	$2.0 \cdot 10^{-4}$	1070	$1.8 \cdot 10^{-4}$	2050	0.778	3550	$1.0 \cdot 10^{-2}$	5050	$1.3 \cdot 10^{-3}$
480	0.904	780	$1.2 \cdot 10^{-4}$	1080	$2.2 \cdot 10^{-4}$	2100	0.805	3600	$1.2 \cdot 10^{-2}$	5100	$1.2 \cdot 10^{-3}$
490	0.915	790	$7.2 \cdot 10^{-5}$	1090	$2.7 \cdot 10^{-4}$	2150	0.828	3650	$1.3 \cdot 10^{-2}$	5150	$8.6 \cdot 10^{-4}$

Data Sheet

SCHOTT

S8612

Reflection factor	
P_d	0.913

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (500nm)	≥	0.96
τ_i (600nm)	≥	0.48
τ_i (700nm)	<	0.02
λ (τ_i .max) [nm]	=	500 ± 5

Refractive Index n
n_e (546.1 nm) = 1.542
n_d (587.6 nm) = 1.540
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.66

Bubble content	
Bubble class	1

Chemical Resistance	
FR class	0
SR class	3.0
AR class	3.0

Transformation temperature	
Tg [°C]	391

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

Temperature coefficient	
T_K [nm/°C]	

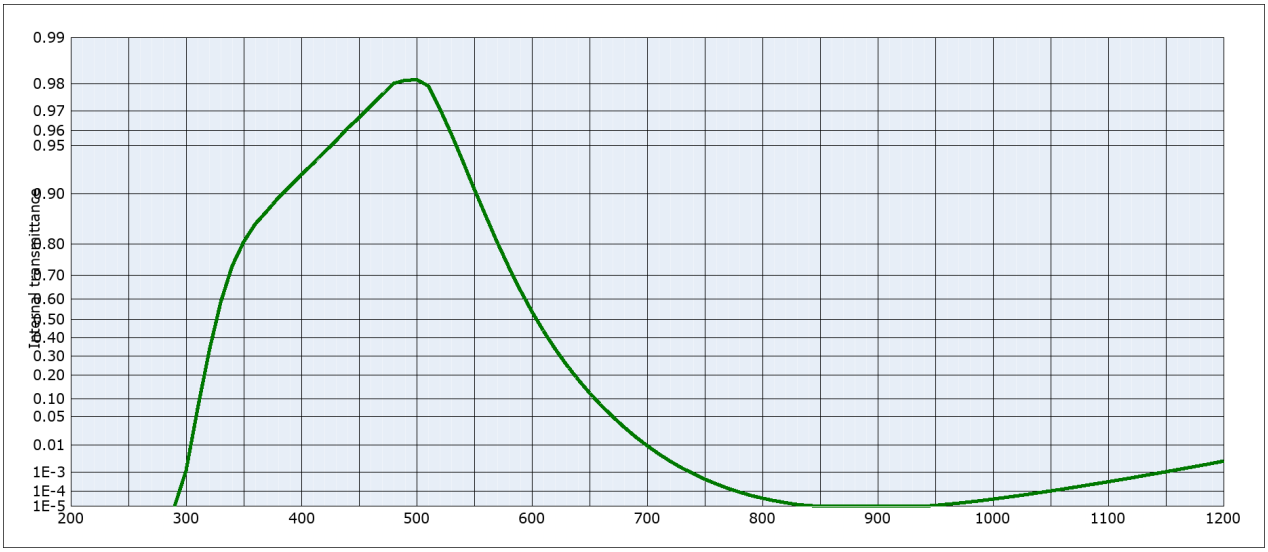
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
Long-term changes of the polished
surface are possible.
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.356	0.301	0.265
y	0.433	0.440	0.440
Y	65	52	44
λ_d [nm]	500	499	498
P_e	0.21	0.34	0.42

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.335	0.284	0.250
y	0.417	0.419	0.415
Y	66	54	46
λ_d [nm]	498	497	496
P_e	0.21	0.34	0.43

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.251	0.218	0.198
y	0.321	0.311	0.302
Y	72	62	54
λ_d [nm]	490	489	489
P_e	0.23	0.36	0.44



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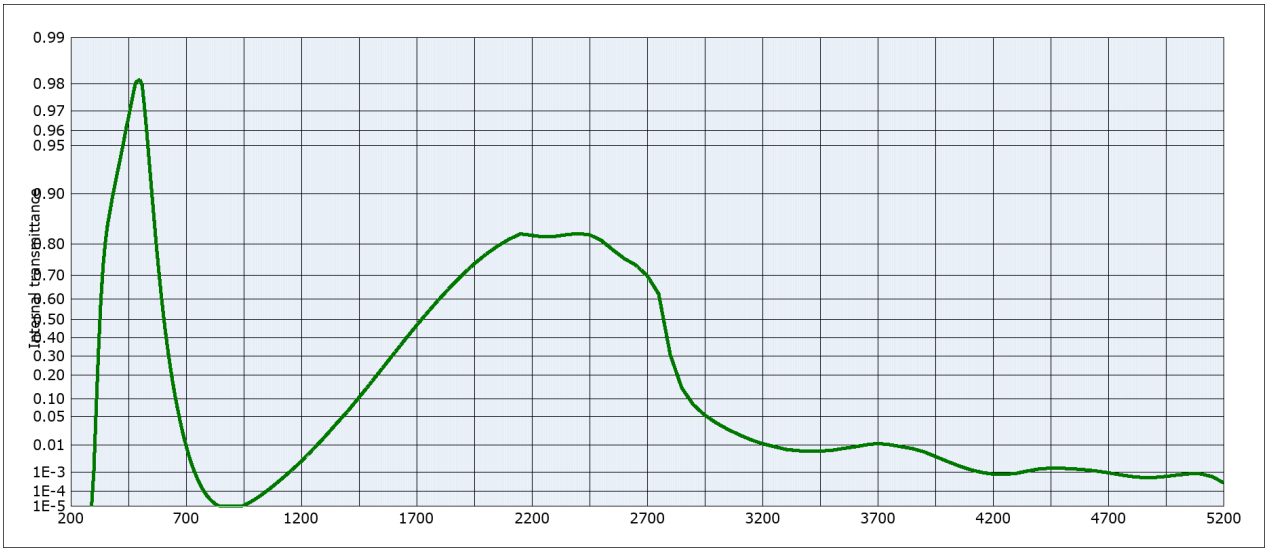


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.981	800	$3.7 \cdot 10^{-5}$	1100	$3.5 \cdot 10^{-4}$	2200	0.821	3700	$1.1 \cdot 10^{-2}$
210	$< 10^{-5}$	510	0.979	810	$2.5 \cdot 10^{-5}$	1110	$4.4 \cdot 10^{-4}$	2250	0.818	3750	$1.0 \cdot 10^{-2}$
220	$< 10^{-5}$	520	0.971	820	$1.8 \cdot 10^{-5}$	1120	$5.5 \cdot 10^{-4}$	2300	0.819	3800	$9.1 \cdot 10^{-3}$
230	$< 10^{-5}$	530	0.958	830	$1.4 \cdot 10^{-5}$	1130	$6.9 \cdot 10^{-4}$	2350	0.823	3850	$7.9 \cdot 10^{-3}$
240	$< 10^{-5}$	540	0.938	840	$1.1 \cdot 10^{-5}$	1140	$8.5 \cdot 10^{-4}$	2400	0.826	3900	$6.3 \cdot 10^{-3}$
250	$< 10^{-5}$	550	0.906	850	$< 10^{-5}$	1150	$1.1 \cdot 10^{-3}$	2450	0.823	3950	$4.3 \cdot 10^{-3}$
260	$< 10^{-5}$	560	0.863	860	$< 10^{-5}$	1160	$1.3 \cdot 10^{-3}$	2500	0.809	4000	$2.9 \cdot 10^{-3}$
270	$< 10^{-5}$	570	0.803	870	$< 10^{-5}$	1170	$1.6 \cdot 10^{-3}$	2550	0.783	4050	$1.9 \cdot 10^{-3}$
280	$< 10^{-5}$	580	0.728	880	$< 10^{-5}$	1180	$1.9 \cdot 10^{-3}$	2600	0.757	4100	$1.3 \cdot 10^{-3}$
290	$< 10^{-5}$	590	0.638	890	$< 10^{-5}$	1190	$2.4 \cdot 10^{-3}$	2650	0.735	4150	$9.9 \cdot 10^{-4}$
300	$1.2 \cdot 10^{-3}$	600	0.539	900	$< 10^{-5}$	1200	$2.9 \cdot 10^{-3}$	2700	0.697	4200	$8.2 \cdot 10^{-4}$
310	$7.0 \cdot 10^{-2}$	610	0.438	910	$< 10^{-5}$	1250	$7.4 \cdot 10^{-3}$	2750	0.622	4250	$8.1 \cdot 10^{-4}$
320	0.326	620	0.340	920	$< 10^{-5}$	1300	$1.7 \cdot 10^{-2}$	2800	0.307	4300	$8.9 \cdot 10^{-4}$
330	0.584	630	0.253	930	$< 10^{-5}$	1350	$3.5 \cdot 10^{-2}$	2850	0.143	4350	$1.1 \cdot 10^{-3}$
340	0.732	640	0.181	940	$< 10^{-5}$	1400	$6.3 \cdot 10^{-2}$	2900	$8.2 \cdot 10^{-2}$	4400	$1.4 \cdot 10^{-3}$
350	0.805	650	0.123	950	$1.2 \cdot 10^{-5}$	1450	0.106	2950	$5.3 \cdot 10^{-2}$	4450	$1.5 \cdot 10^{-3}$
360	0.847	660	$8.0 \cdot 10^{-2}$	960	$1.4 \cdot 10^{-5}$	1500	0.163	3000	$3.7 \cdot 10^{-2}$	4500	$1.5 \cdot 10^{-3}$
370	0.872	670	$5.0 \cdot 10^{-2}$	970	$1.7 \cdot 10^{-5}$	1550	0.233	3050	$2.7 \cdot 10^{-2}$	4550	$1.4 \cdot 10^{-3}$
380	0.894	680	$3.0 \cdot 10^{-2}$	980	$2.1 \cdot 10^{-5}$	1600	0.311	3100	$1.9 \cdot 10^{-2}$	4600	$1.3 \cdot 10^{-3}$
390	0.910	690	$1.7 \cdot 10^{-2}$	990	$2.6 \cdot 10^{-5}$	1650	0.391	3150	$1.4 \cdot 10^{-2}$	4650	$1.1 \cdot 10^{-3}$
400	0.924	700	$9.7 \cdot 10^{-3}$	1000	$3.3 \cdot 10^{-5}$	1700	0.467	3200	$1.1 \cdot 10^{-2}$	4700	$9.5 \cdot 10^{-4}$
410	0.935	710	$5.3 \cdot 10^{-3}$	1010	$4.1 \cdot 10^{-5}$	1750	0.538	3250	$9.2 \cdot 10^{-3}$	4750	$7.7 \cdot 10^{-4}$
420	0.945	720	$2.9 \cdot 10^{-3}$	1020	$5.2 \cdot 10^{-5}$	1800	0.601	3300	$7.5 \cdot 10^{-3}$	4800	$6.4 \cdot 10^{-4}$
430	0.954	730	$1.6 \cdot 10^{-3}$	1030	$6.6 \cdot 10^{-5}$	1850	0.656	3350	$6.8 \cdot 10^{-3}$	4850	$5.7 \cdot 10^{-4}$
440	0.961	740	$8.7 \cdot 10^{-4}$	1040	$8.5 \cdot 10^{-5}$	1900	0.702	3400	$6.4 \cdot 10^{-3}$	4900	$5.7 \cdot 10^{-4}$
450	0.967	750	$4.7 \cdot 10^{-4}$	1050	$1.1 \cdot 10^{-4}$	1950	0.740	3450	$6.6 \cdot 10^{-3}$	4950	$6.4 \cdot 10^{-4}$
460	0.972	760	$2.7 \cdot 10^{-4}$	1060	$1.4 \cdot 10^{-4}$	2000	0.770	3500	$6.9 \cdot 10^{-3}$	5000	$7.5 \cdot 10^{-4}$
470	0.976	770	$1.5 \cdot 10^{-4}$	1070	$1.7 \cdot 10^{-4}$	2050	0.793	3550	$8.0 \cdot 10^{-3}$	5050	$8.5 \cdot 10^{-4}$
480	0.980	780	$9.1 \cdot 10^{-5}$	1080	$2.2 \cdot 10^{-4}$	2100	0.811	3600	$8.9 \cdot 10^{-3}$	5100	$8.5 \cdot 10^{-4}$
490	0.981	790	$5.6 \cdot 10^{-5}$	1090	$2.8 \cdot 10^{-4}$	2150	0.825	3650	$1.0 \cdot 10^{-2}$	5150	$6.3 \cdot 10^{-4}$

Data Sheet

SCHOTT

BG50

Reflection factor	
P_d	0.916

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (500nm)	≥	0.96
τ_i (600nm)	≥	0.68
τ_i (700nm)	≤	0.13

Refractive Index n
n_h (404.7 nm) = 1.550
$n_{F'}$ (480.0 nm) = 1.540
n_e (546.1 nm) = 1.540
n_d (587.6 nm) = 1.530

Density	
ρ [g/cm^3]	2.61

Bubble content	
Bubble class	1

Chemical Resistance	
FR class	0
SR class	2.0
AR class	2.0

Transformation temperature	
Tg [°C]	452

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	7.3
$\alpha_{20/300°C}$ [10^{-6}/K]	9.0
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

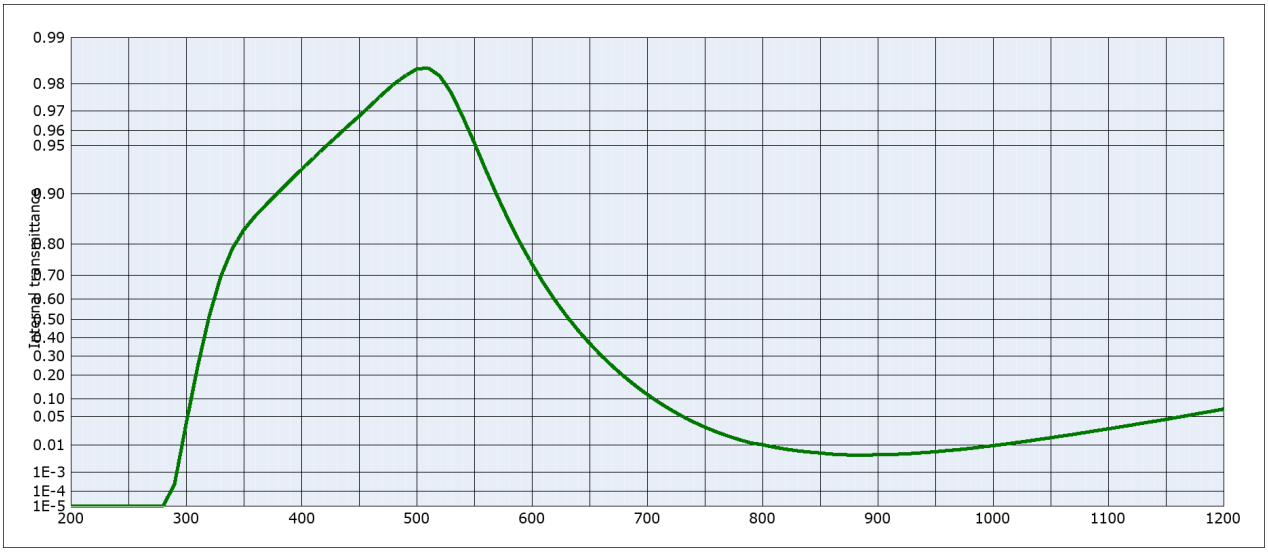
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
Long-term changes of the polished surface are possible under some circumstances.
All data wihout tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation

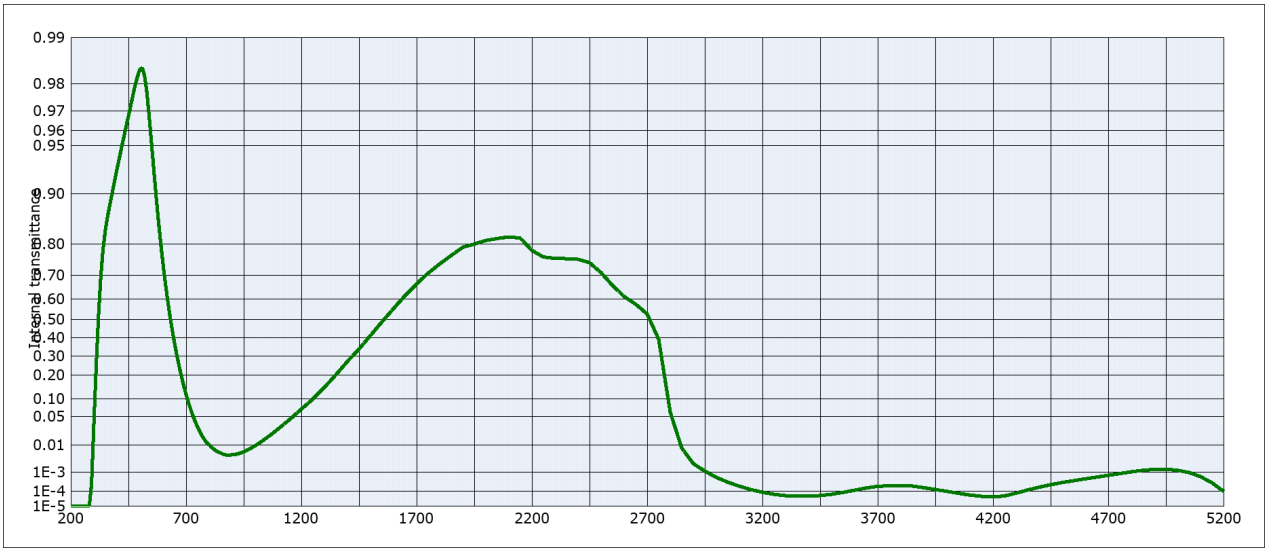
Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.398	0.360	0.331
y	0.424	0.435	0.441
Y	75	65	57
λ_d [nm]	501	500	500
P_e	0.11	0.20	0.27

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.375	0.339	0.311
y	0.411	0.419	0.423
Y	76	66	59
λ_d [nm]	499	498	498
P_e	0.12	0.20	0.27

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.278	0.254	0.236
y	0.328	0.325	0.323
Y	80	72	66
λ_d [nm]	491	491	491
P_e	0.13	0.22	0.29



BG50



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	$< 10^{-5}$	500	0.984	800	$1.0 \cdot 10^{-2}$	1100	$2.7 \cdot 10^{-2}$	2200	0.781	3700	$2.0 \cdot 10^{-4}$
210	$< 10^{-5}$	510	0.984	810	$8.8 \cdot 10^{-3}$	1110	$3.0 \cdot 10^{-2}$	2250	0.762	3750	$2.1 \cdot 10^{-4}$
220	$< 10^{-5}$	520	0.982	820	$7.6 \cdot 10^{-3}$	1120	$3.3 \cdot 10^{-2}$	2300	0.757	3800	$2.1 \cdot 10^{-4}$
230	$< 10^{-5}$	530	0.977	830	$6.8 \cdot 10^{-3}$	1130	$3.7 \cdot 10^{-2}$	2350	0.756	3850	$2.1 \cdot 10^{-4}$
240	$< 10^{-5}$	540	0.967	840	$6.1 \cdot 10^{-3}$	1140	$4.0 \cdot 10^{-2}$	2400	0.754	3900	$1.7 \cdot 10^{-4}$
250	$< 10^{-5}$	550	0.952	850	$5.7 \cdot 10^{-3}$	1150	$4.4 \cdot 10^{-2}$	2450	0.743	3950	$1.3 \cdot 10^{-4}$
260	$< 10^{-5}$	560	0.929	860	$5.2 \cdot 10^{-3}$	1160	$4.8 \cdot 10^{-2}$	2500	0.708	4000	$1.0 \cdot 10^{-4}$
270	$< 10^{-5}$	570	0.897	870	$4.9 \cdot 10^{-3}$	1170	$5.3 \cdot 10^{-2}$	2550	0.658	4050	$7.7 \cdot 10^{-5}$
280	$< 10^{-5}$	580	0.854	880	$4.8 \cdot 10^{-3}$	1180	$5.8 \cdot 10^{-2}$	2600	0.611	4100	$6.0 \cdot 10^{-5}$
290	$2.6 \cdot 10^{-4}$	590	0.801	890	$4.9 \cdot 10^{-3}$	1190	$6.3 \cdot 10^{-2}$	2650	0.575	4150	$5.0 \cdot 10^{-5}$
300	$3.5 \cdot 10^{-2}$	600	0.739	900	$4.9 \cdot 10^{-3}$	1200	$6.9 \cdot 10^{-2}$	2700	0.527	4200	$4.5 \cdot 10^{-5}$
310	0.243	610	0.669	910	$5.0 \cdot 10^{-3}$	1250	0.100	2750	0.391	4250	$5.3 \cdot 10^{-5}$
320	0.514	620	0.594	920	$5.2 \cdot 10^{-3}$	1300	0.145	2800	$6.1 \cdot 10^{-2}$	4300	$7.9 \cdot 10^{-5}$
330	0.693	630	0.517	930	$5.5 \cdot 10^{-3}$	1350	0.203	2850	$8.2 \cdot 10^{-3}$	4350	$1.2 \cdot 10^{-4}$
340	0.786	640	0.441	940	$5.9 \cdot 10^{-3}$	1400	0.271	2900	$2.3 \cdot 10^{-3}$	4400	$1.8 \cdot 10^{-4}$
350	0.834	650	0.369	950	$6.2 \cdot 10^{-3}$	1450	0.338	2950	$1.1 \cdot 10^{-3}$	4450	$2.4 \cdot 10^{-4}$
360	0.863	660	0.304	960	$6.8 \cdot 10^{-3}$	1500	0.413	3000	$5.8 \cdot 10^{-4}$	4500	$3.2 \cdot 10^{-4}$
370	0.884	670	0.245	970	$7.3 \cdot 10^{-3}$	1550	0.487	3050	$3.3 \cdot 10^{-4}$	4550	$4.0 \cdot 10^{-4}$
380	0.902	680	0.194	980	$8.0 \cdot 10^{-3}$	1600	0.554	3100	$2.0 \cdot 10^{-4}$	4600	$4.9 \cdot 10^{-4}$
390	0.917	690	0.152	990	$8.9 \cdot 10^{-3}$	1650	0.615	3150	$1.3 \cdot 10^{-4}$	4650	$5.9 \cdot 10^{-4}$
400	0.929	700	0.117	1000	$9.8 \cdot 10^{-3}$	1700	0.665	3200	$8.9 \cdot 10^{-5}$	4700	$7.2 \cdot 10^{-4}$
410	0.940	710	$8.9 \cdot 10^{-2}$	1010	$1.1 \cdot 10^{-2}$	1750	0.707	3250	$6.7 \cdot 10^{-5}$	4750	$8.7 \cdot 10^{-4}$
420	0.949	720	$6.8 \cdot 10^{-2}$	1020	$1.2 \cdot 10^{-2}$	1800	0.739	3300	$5.5 \cdot 10^{-5}$	4800	$1.0 \cdot 10^{-3}$
430	0.956	730	$5.2 \cdot 10^{-2}$	1030	$1.3 \cdot 10^{-2}$	1850	0.766	3350	$5.0 \cdot 10^{-5}$	4850	$1.2 \cdot 10^{-3}$
440	0.962	740	$3.9 \cdot 10^{-2}$	1040	$1.5 \cdot 10^{-2}$	1900	0.790	3400	$5.0 \cdot 10^{-5}$	4900	$1.3 \cdot 10^{-3}$
450	0.968	750	$3.0 \cdot 10^{-2}$	1050	$1.6 \cdot 10^{-2}$	1950	0.799	3450	$5.6 \cdot 10^{-5}$	4950	$1.4 \cdot 10^{-3}$
460	0.972	760	$2.3 \cdot 10^{-2}$	1060	$1.8 \cdot 10^{-2}$	2000	0.809	3500	$6.7 \cdot 10^{-5}$	5000	$1.2 \cdot 10^{-3}$
470	0.977	770	$1.8 \cdot 10^{-2}$	1070	$2.0 \cdot 10^{-2}$	2050	0.814	3550	$8.8 \cdot 10^{-5}$	5050	$9.8 \cdot 10^{-4}$
480	0.980	780	$1.4 \cdot 10^{-2}$	1080	$2.2 \cdot 10^{-2}$	2100	0.818	3600	$1.2 \cdot 10^{-4}$	5100	$6.3 \cdot 10^{-4}$
490	0.982	790	$1.2 \cdot 10^{-2}$	1090	$2.5 \cdot 10^{-2}$	2150	0.814	3650	$1.6 \cdot 10^{-4}$	5150	$3.1 \cdot 10^{-4}$

Data Sheet

SCHOTT

BG55

Reflection factor	
P_d	0.914

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (405nm)	≥	0.76
τ_i (514nm)	≥	0.93
τ_i (633nm)	≥	0.18
τ_i (694nm)	≤	0.016
τ_i (1060nm)	≤	0.0005

Refractive Index n
n_i (365.0 nm) = 1.560
n_h (404.7 nm) = 1.554
n_g (435.8 nm) = 1.550
$n_{F'}$ (480.0 nm) = 1.546
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.65

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	0
SR class	2.0
AR class	2.0

Transformation temperature	
Tg [°C]	453

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

Temperature coefficient	
T_K [nm/°C]	

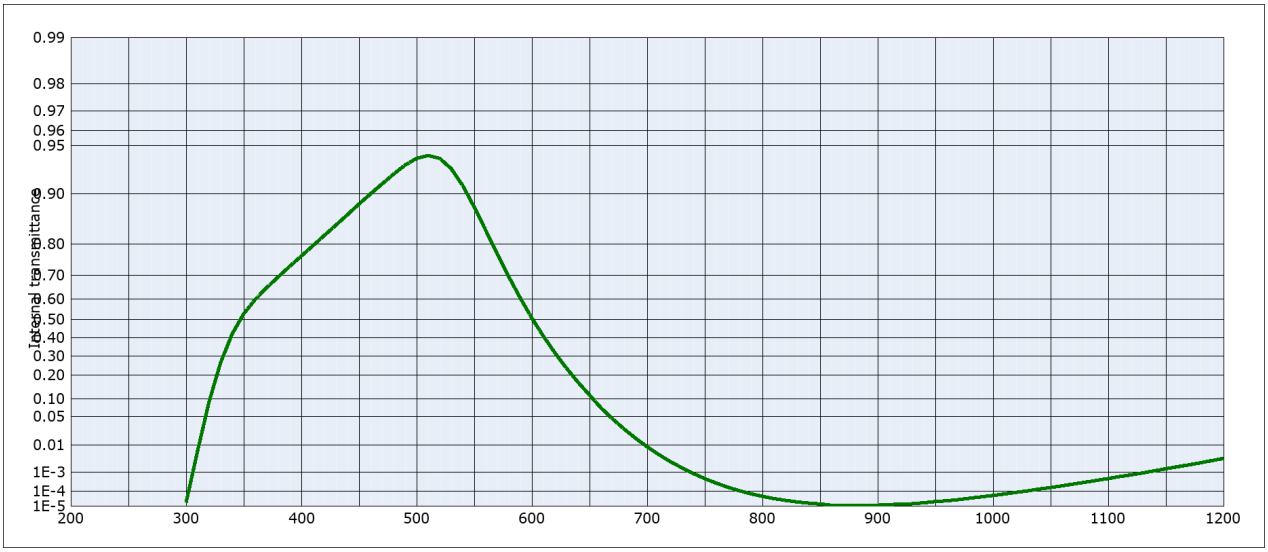
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
Long-term changes of the polished
surface are possible under some
circumstances.
CR (ISO/WD 13384) = 1
Knoop hardness HK (0.1/20) = 504
cp = 0,83 J/gK
All data wihout tolerances are to be
understood 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	0.356	0.302	0.267
y	0.438	0.452	0.460
Y	62	48	39
λ_d [nm]	501	500	500
P_e	0.21	0.33	0.41

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.336	0.285	0.252
y	0.423	0.432	0.437
Y	63	49	41
λ_d [nm]	499	498	498
P_e	0.21	0.34	0.42

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.252	0.220	0.201
y	0.329	0.328	0.328
Y	69	57	48
λ_d [nm]	492	491	491
P_e	0.22	0.34	0.41



BG55

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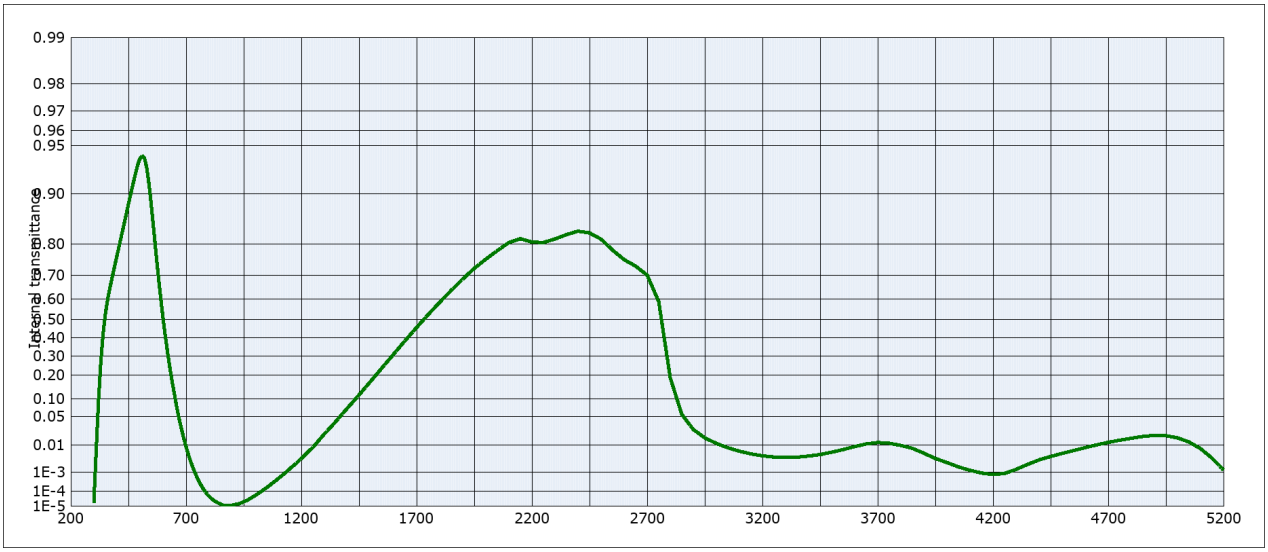


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.940	800	$4.9 \cdot 10^{-5}$	1100	$5.1 \cdot 10^{-4}$	2200	0.804	3700	$1.2 \cdot 10^{-2}$
210	$< 10^{-5}$	510	0.942	810	$3.5 \cdot 10^{-5}$	1110	$6.3 \cdot 10^{-4}$	2250	0.803	3750	$1.1 \cdot 10^{-2}$
220	$< 10^{-5}$	520	0.940	820	$2.7 \cdot 10^{-5}$	1120	$7.6 \cdot 10^{-4}$	2300	0.812	3800	$9.9 \cdot 10^{-3}$
230	$< 10^{-5}$	530	0.930	830	$2.1 \cdot 10^{-5}$	1130	$9.4 \cdot 10^{-4}$	2350	0.823	3850	$8.1 \cdot 10^{-3}$
240	$< 10^{-5}$	540	0.911	840	$1.7 \cdot 10^{-5}$	1140	$1.2 \cdot 10^{-3}$	2400	0.831	3900	$5.6 \cdot 10^{-3}$
250	$< 10^{-5}$	550	0.879	850	$1.5 \cdot 10^{-5}$	1150	$1.4 \cdot 10^{-3}$	2450	0.827	3950	$3.7 \cdot 10^{-3}$
260	$< 10^{-5}$	560	0.833	860	$1.2 \cdot 10^{-5}$	1160	$1.7 \cdot 10^{-3}$	2500	0.812	4000	$2.6 \cdot 10^{-3}$
270	$< 10^{-5}$	570	0.770	870	$1.2 \cdot 10^{-5}$	1170	$2.1 \cdot 10^{-3}$	2550	0.782	4050	$1.7 \cdot 10^{-3}$
280	$< 10^{-5}$	580	0.693	880	$1.2 \cdot 10^{-5}$	1180	$2.5 \cdot 10^{-3}$	2600	0.753	4100	$1.2 \cdot 10^{-3}$
290	$< 10^{-5}$	590	0.603	890	$1.2 \cdot 10^{-5}$	1190	$3.0 \cdot 10^{-3}$	2650	0.732	4150	$9.3 \cdot 10^{-4}$
300	$1.9 \cdot 10^{-5}$	600	0.506	900	$1.2 \cdot 10^{-5}$	1200	$3.7 \cdot 10^{-3}$	2700	0.699	4200	$7.9 \cdot 10^{-4}$
310	$6.7 \cdot 10^{-3}$	610	0.408	910	$1.3 \cdot 10^{-5}$	1250	$8.7 \cdot 10^{-3}$	2750	0.588	4250	$8.8 \cdot 10^{-4}$
320	$9.2 \cdot 10^{-2}$	620	0.317	920	$1.4 \cdot 10^{-5}$	1300	$2.1 \cdot 10^{-2}$	2800	0.189	4300	$1.3 \cdot 10^{-3}$
330	0.265	630	0.235	930	$1.5 \cdot 10^{-5}$	1350	$4.0 \cdot 10^{-2}$	2850	$5.6 \cdot 10^{-2}$	4350	$2.2 \cdot 10^{-3}$
340	0.421	640	0.168	940	$1.8 \cdot 10^{-5}$	1400	$7.2 \cdot 10^{-2}$	2900	$2.6 \cdot 10^{-2}$	4400	$3.2 \cdot 10^{-3}$
350	0.528	650	0.115	950	$2.2 \cdot 10^{-5}$	1450	0.115	2950	$1.6 \cdot 10^{-2}$	4450	$4.3 \cdot 10^{-3}$
360	0.598	660	$7.2 \cdot 10^{-2}$	960	$2.5 \cdot 10^{-5}$	1500	0.171	3000	$1.1 \cdot 10^{-2}$	4500	$5.5 \cdot 10^{-3}$
370	0.650	670	$4.5 \cdot 10^{-2}$	970	$3.0 \cdot 10^{-5}$	1550	0.237	3050	$8.4 \cdot 10^{-3}$	4550	$6.8 \cdot 10^{-3}$
380	0.693	680	$2.7 \cdot 10^{-2}$	980	$3.8 \cdot 10^{-5}$	1600	0.309	3100	$6.5 \cdot 10^{-3}$	4600	$8.5 \cdot 10^{-3}$
390	0.731	690	$1.6 \cdot 10^{-2}$	990	$4.6 \cdot 10^{-5}$	1650	0.384	3150	$5.3 \cdot 10^{-3}$	4650	$1.0 \cdot 10^{-2}$
400	0.765	700	$9.0 \cdot 10^{-3}$	1000	$5.6 \cdot 10^{-5}$	1700	0.456	3200	$4.5 \cdot 10^{-3}$	4700	$1.2 \cdot 10^{-2}$
410	0.794	710	$5.1 \cdot 10^{-3}$	1010	$7.0 \cdot 10^{-5}$	1750	0.524	3250	$4.1 \cdot 10^{-3}$	4750	$1.4 \cdot 10^{-2}$
420	0.821	720	$2.8 \cdot 10^{-3}$	1020	$8.8 \cdot 10^{-5}$	1800	0.584	3300	$4.0 \cdot 10^{-3}$	4800	$1.6 \cdot 10^{-2}$
430	0.845	730	$1.6 \cdot 10^{-3}$	1030	$1.1 \cdot 10^{-4}$	1850	0.638	3350	$4.1 \cdot 10^{-3}$	4850	$1.8 \cdot 10^{-2}$
440	0.866	740	$8.8 \cdot 10^{-4}$	1040	$1.4 \cdot 10^{-4}$	1900	0.684	3400	$4.5 \cdot 10^{-3}$	4900	$1.9 \cdot 10^{-2}$
450	0.884	750	$5.0 \cdot 10^{-4}$	1050	$1.7 \cdot 10^{-4}$	1950	0.724	3450	$5.0 \cdot 10^{-3}$	4950	$1.9 \cdot 10^{-2}$
460	0.900	760	$2.9 \cdot 10^{-4}$	1060	$2.1 \cdot 10^{-4}$	2000	0.754	3500	$6.0 \cdot 10^{-3}$	5000	$1.6 \cdot 10^{-2}$
470	0.913	770	$1.8 \cdot 10^{-4}$	1070	$2.7 \cdot 10^{-4}$	2050	0.781	3550	$7.4 \cdot 10^{-3}$	5050	$1.2 \cdot 10^{-2}$
480	0.925	780	$1.1 \cdot 10^{-4}$	1080	$3.3 \cdot 10^{-4}$	2100	0.803	3600	$9.1 \cdot 10^{-3}$	5100	$7.9 \cdot 10^{-3}$
490	0.934	790	$7.2 \cdot 10^{-5}$	1090	$4.1 \cdot 10^{-4}$	2150	0.813	3650	$1.1 \cdot 10^{-2}$	5150	$3.8 \cdot 10^{-3}$

Data Sheet

SCHOTT

BG60

Reflection factor	
P_d	0.914

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (405nm)	≥	0.8
τ_i (514nm)	≥	0.91
τ_i (633nm)	≥	0.1
τ_i (694nm)	≤	0.008
τ_i (1060nm)	≤	0.0015

Refractive Index n
n_i (365.0 nm) = 1.559
n_h (404.7 nm) = 1.552
n_g (435.8 nm) = 1.548
$n_{F'}$ (480.0 nm) = 1.544
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.83

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	1.0
SR class	52.3
AR class	3.3

Transformation temperature	
Tg [°C]	411

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	12.0
$\alpha_{20/300°C}$ [10^{-6}/K]	13.9
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

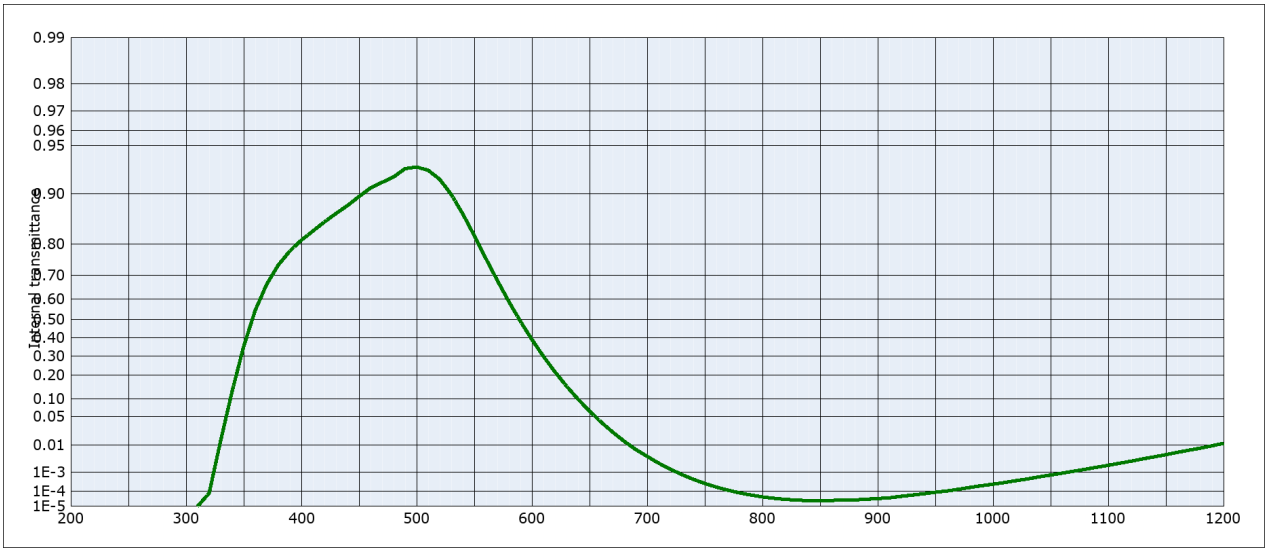
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=0.3mm) = 633 nm
Long-term changes of the polished
surface are possible under some
circumstances.
no visible surface damage after 500 h
of humidity test 85 °C / 85 % rh
Knoop hardness HK (0.1/20) = 362
All data wihout 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	0.334	0.271	0.232
y	0.436	0.441	0.437
Y	56	40	32
λ_d [nm]	499	498	497
P_e	0.26	0.41	0.50

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.314	0.256	0.221
y	0.418	0.417	0.411
Y	57	42	33
λ_d [nm]	497	496	495
P_e	0.27	0.41	0.50

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.236	0.201	0.181
y	0.318	0.306	0.297
Y	64	50	41
λ_d [nm]	490	489	489
P_e	0.29	0.43	0.51



BG60

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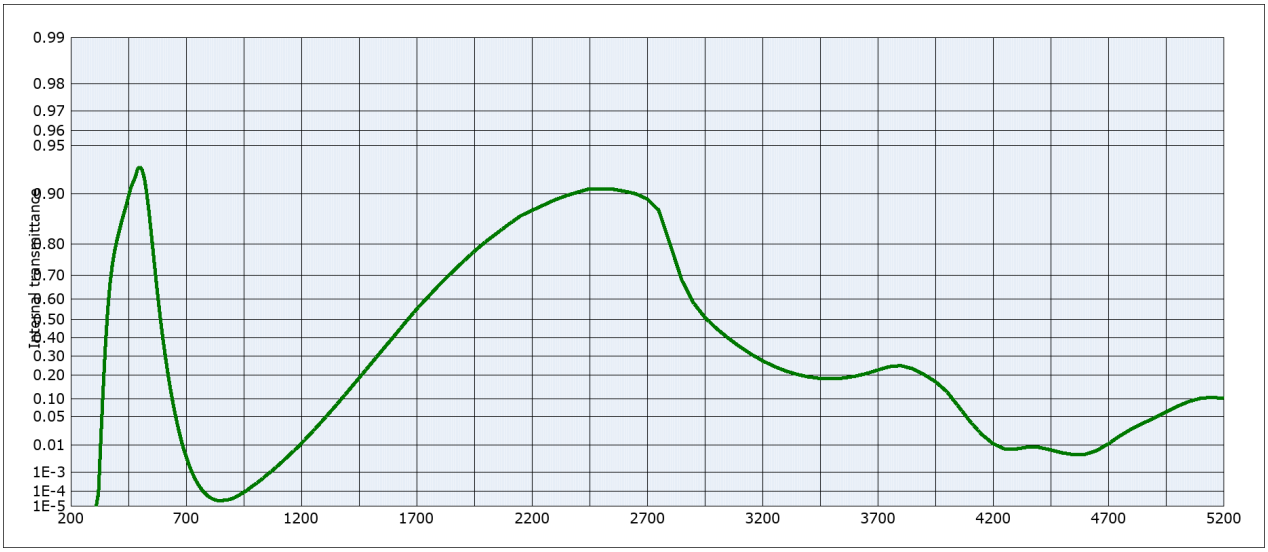


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.932	800	$4.6 \cdot 10^{-5}$	1100	$2.0 \cdot 10^{-3}$	2200	0.873	3700	0.226
210	$< 10^{-5}$	510	0.929	810	$3.7 \cdot 10^{-5}$	1110	$2.4 \cdot 10^{-3}$	2250	0.882	3750	0.243
220	$< 10^{-5}$	520	0.919	820	$3.1 \cdot 10^{-5}$	1120	$2.9 \cdot 10^{-3}$	2300	0.891	3800	0.248
230	$< 10^{-5}$	530	0.899	830	$2.8 \cdot 10^{-5}$	1130	$3.5 \cdot 10^{-3}$	2350	0.897	3850	0.233
240	$< 10^{-5}$	540	0.867	840	$2.6 \cdot 10^{-5}$	1140	$4.2 \cdot 10^{-3}$	2400	0.902	3900	0.204
250	$< 10^{-5}$	550	0.821	850	$2.5 \cdot 10^{-5}$	1150	$5.0 \cdot 10^{-3}$	2450	0.907	3950	0.171
260	$< 10^{-5}$	560	0.757	860	$2.6 \cdot 10^{-5}$	1160	$6.0 \cdot 10^{-3}$	2500	0.906	4000	0.128
270	$< 10^{-5}$	570	0.679	870	$2.9 \cdot 10^{-5}$	1170	$7.0 \cdot 10^{-3}$	2550	0.906	4050	$7.7 \cdot 10^{-2}$
280	$< 10^{-5}$	580	0.587	880	$2.9 \cdot 10^{-5}$	1180	$8.2 \cdot 10^{-3}$	2600	0.904	4100	$4.0 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.489	890	$3.2 \cdot 10^{-5}$	1190	$9.7 \cdot 10^{-3}$	2650	0.900	4150	$2.0 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.390	900	$3.6 \cdot 10^{-5}$	1200	$1.1 \cdot 10^{-2}$	2700	0.892	4200	$1.1 \cdot 10^{-2}$
310	$< 10^{-5}$	610	0.298	910	$4.0 \cdot 10^{-5}$	1250	$2.4 \cdot 10^{-2}$	2750	0.874	4250	$7.7 \cdot 10^{-3}$
320	$7.8 \cdot 10^{-5}$	620	0.217	920	$4.9 \cdot 10^{-5}$	1300	$4.6 \cdot 10^{-2}$	2800	0.798	4300	$7.7 \cdot 10^{-3}$
330	$1.4 \cdot 10^{-2}$	630	0.151	930	$6.0 \cdot 10^{-5}$	1350	$8.0 \cdot 10^{-2}$	2850	0.680	4350	$8.8 \cdot 10^{-3}$
340	0.130	640	0.100	940	$7.2 \cdot 10^{-5}$	1400	0.127	2900	0.583	4400	$8.6 \cdot 10^{-3}$
350	0.352	650	$6.4 \cdot 10^{-2}$	950	$9.0 \cdot 10^{-5}$	1450	0.187	2950	0.510	4450	$7.2 \cdot 10^{-3}$
360	0.545	660	$3.9 \cdot 10^{-2}$	960	$1.1 \cdot 10^{-4}$	1500	0.256	3000	0.451	4500	$5.8 \cdot 10^{-3}$
370	0.664	670	$2.3 \cdot 10^{-2}$	970	$1.3 \cdot 10^{-4}$	1550	0.330	3050	0.400	4550	$5.0 \cdot 10^{-3}$
380	0.736	680	$1.3 \cdot 10^{-2}$	980	$1.7 \cdot 10^{-4}$	1600	0.406	3100	0.352	4600	$5.1 \cdot 10^{-3}$
390	0.779	690	$7.4 \cdot 10^{-3}$	990	$2.1 \cdot 10^{-4}$	1650	0.481	3150	0.310	4650	$6.8 \cdot 10^{-3}$
400	0.809	700	$4.3 \cdot 10^{-3}$	1000	$2.6 \cdot 10^{-4}$	1700	0.551	3200	0.274	4700	$1.1 \cdot 10^{-2}$
410	0.831	710	$2.4 \cdot 10^{-3}$	1010	$3.2 \cdot 10^{-4}$	1750	0.609	3250	0.245	4750	$1.8 \cdot 10^{-2}$
420	0.851	720	$1.4 \cdot 10^{-3}$	1020	$4.0 \cdot 10^{-4}$	1800	0.663	3300	0.222	4800	$2.7 \cdot 10^{-2}$
430	0.868	730	$7.9 \cdot 10^{-4}$	1030	$4.8 \cdot 10^{-4}$	1850	0.707	3350	0.204	4850	$3.6 \cdot 10^{-2}$
440	0.882	740	$4.6 \cdot 10^{-4}$	1040	$6.1 \cdot 10^{-4}$	1900	0.746	3400	0.192	4900	$4.7 \cdot 10^{-2}$
450	0.896	750	$2.8 \cdot 10^{-4}$	1050	$7.5 \cdot 10^{-4}$	1950	0.779	3450	0.185	4950	$6.1 \cdot 10^{-2}$
460	0.908	760	$1.8 \cdot 10^{-4}$	1060	$9.2 \cdot 10^{-4}$	2000	0.806	3500	0.183	5000	$7.7 \cdot 10^{-2}$
470	0.915	770	$1.2 \cdot 10^{-4}$	1070	$1.1 \cdot 10^{-3}$	2050	0.827	3550	0.187	5050	$9.2 \cdot 10^{-2}$
480	0.921	780	$8.2 \cdot 10^{-5}$	1080	$1.4 \cdot 10^{-3}$	2100	0.847	3600	0.195	5100	0.103
490	0.930	790	$6.0 \cdot 10^{-5}$	1090	$1.7 \cdot 10^{-3}$	2150	0.863	3650	0.208	5150	0.107

Data Sheet

SCHOTT

BG60HT

Reflection factor	
P_d	0.914

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (405nm)	≥	0.85
τ_i (514nm)	≥	0.93
τ_i (633nm)	≥	0.1
τ_i (694nm)	≤	0.008
τ_i (1060nm)	≤	0.0015

Refractive Index n
n_i (365.0 nm) = 1.559
n_h (404.7 nm) = 1.552
n_g (435.8 nm) = 1.548
$n_{F'}$ (480.0 nm) = 1.544
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.83

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	1.0
SR class	52.2
AR class	3.2

Transformation temperature	
Tg [°C]	411

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	12.0
$\alpha_{20/300°C}$ [10^{-6}/K]	13.9
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

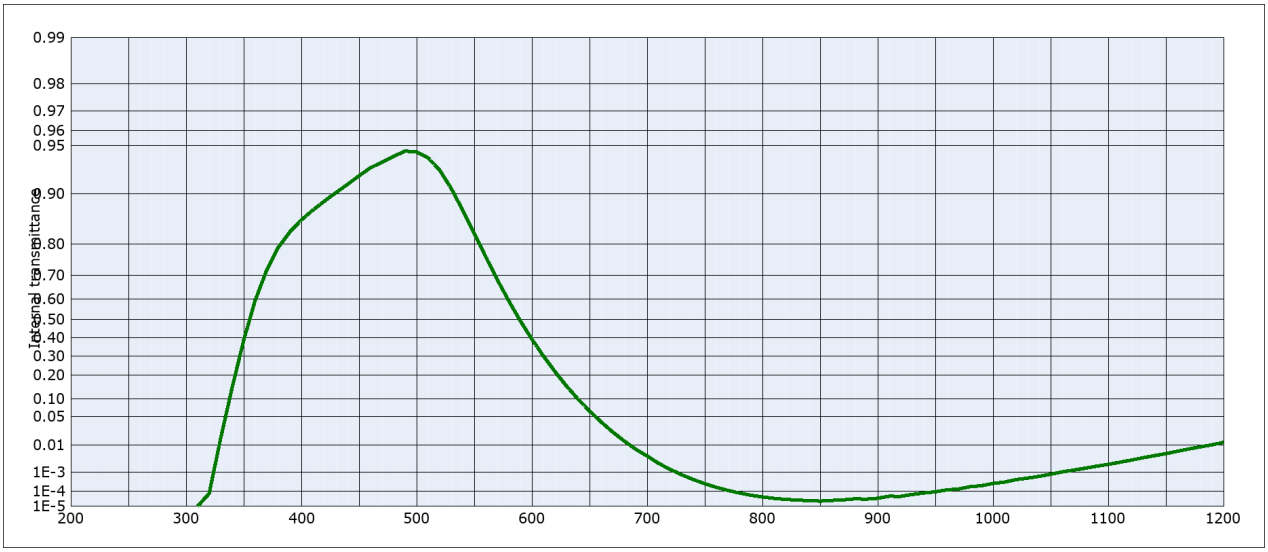
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=0.3mm) = 633 nm
Long-term changes of the polished
surface are possible under some
circumstances.
no visible surface damage after 500 h
of humidity test 85 °C / 85 % rh
Knoop hardness HK (0.1/20) = 362
All data wihout 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	0.330	0.266	0.227
y	0.435	0.436	0.429
Y	56	41	32
λ_d [nm]	499	498	496
P_e	0.27	0.42	0.51

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.310	0.251	0.216
y	0.416	0.412	0.403
Y	57	43	34
λ_d [nm]	497	496	495
P_e	0.28	0.43	0.52

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.233	0.198	0.178
y	0.315	0.300	0.287
Y	64	51	42
λ_d [nm]	489	488	488
P_e	0.30	0.44	0.52



BG60HT

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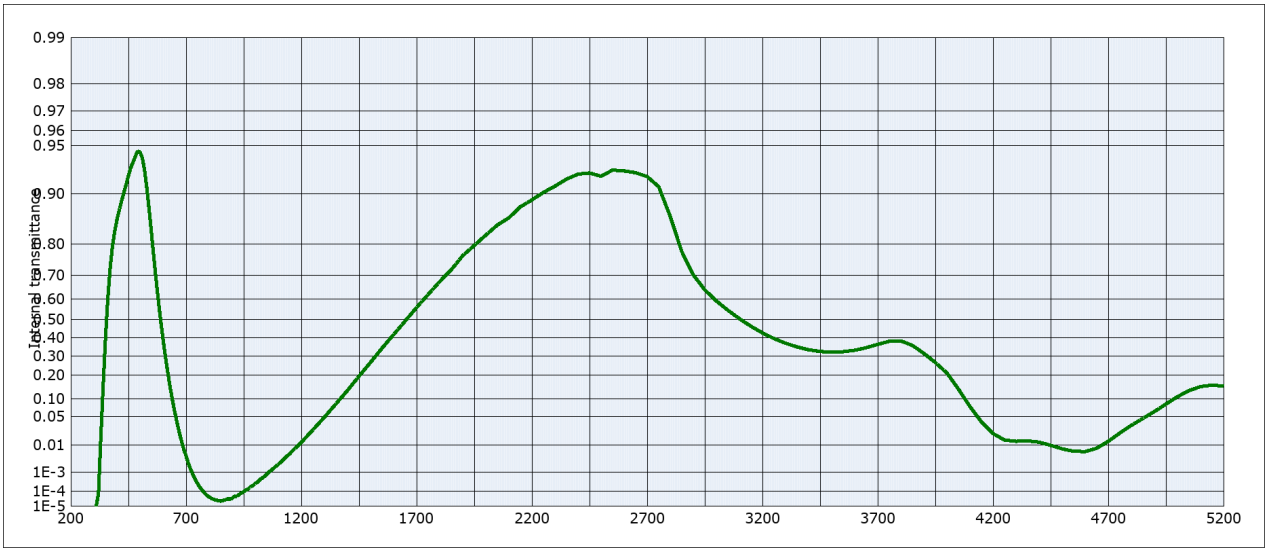


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.945	800	$4.5 \cdot 10^{-5}$	1100	$2.2 \cdot 10^{-3}$	2200	0.891	3700	0.363
210	$< 10^{-5}$	510	0.940	810	$3.7 \cdot 10^{-5}$	1110	$2.6 \cdot 10^{-3}$	2250	0.902	3750	0.380
220	$< 10^{-5}$	520	0.929	820	$3.1 \cdot 10^{-5}$	1120	$3.2 \cdot 10^{-3}$	2300	0.910	3800	0.383
230	$< 10^{-5}$	530	0.907	830	$2.8 \cdot 10^{-5}$	1130	$3.9 \cdot 10^{-3}$	2350	0.919	3850	0.358
240	$< 10^{-5}$	540	0.874	840	$2.6 \cdot 10^{-5}$	1140	$4.6 \cdot 10^{-3}$	2400	0.925	3900	0.314
250	$< 10^{-5}$	550	0.826	850	$2.4 \cdot 10^{-5}$	1150	$5.4 \cdot 10^{-3}$	2450	0.926	3950	0.265
260	$< 10^{-5}$	560	0.762	860	$2.6 \cdot 10^{-5}$	1160	$6.5 \cdot 10^{-3}$	2500	0.922	4000	0.211
270	$< 10^{-5}$	570	0.682	870	$2.9 \cdot 10^{-5}$	1170	$7.7 \cdot 10^{-3}$	2550	0.929	4050	0.138
280	$< 10^{-5}$	580	0.590	880	$3.4 \cdot 10^{-5}$	1180	$9.0 \cdot 10^{-3}$	2600	0.928	4100	$7.6 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.491	890	$3.2 \cdot 10^{-5}$	1190	$1.0 \cdot 10^{-2}$	2650	0.926	4150	$3.9 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.392	900	$3.7 \cdot 10^{-5}$	1200	$1.2 \cdot 10^{-2}$	2700	0.922	4200	$2.1 \cdot 10^{-2}$
310	$< 10^{-5}$	610	0.299	910	$5.0 \cdot 10^{-5}$	1250	$2.6 \cdot 10^{-2}$	2750	0.910	4250	$1.4 \cdot 10^{-2}$
320	$7.4 \cdot 10^{-5}$	620	0.218	920	$5.0 \cdot 10^{-5}$	1300	$4.9 \cdot 10^{-2}$	2800	0.862	4300	$1.3 \cdot 10^{-2}$
330	$1.6 \cdot 10^{-2}$	630	0.151	930	$6.5 \cdot 10^{-5}$	1350	$8.4 \cdot 10^{-2}$	2850	0.778	4350	$1.3 \cdot 10^{-2}$
340	0.145	640	0.100	940	$8.1 \cdot 10^{-5}$	1400	0.132	2900	0.700	4400	$1.2 \cdot 10^{-2}$
350	0.387	650	$6.4 \cdot 10^{-2}$	950	$9.5 \cdot 10^{-5}$	1450	0.195	2950	0.640	4450	$1.0 \cdot 10^{-2}$
360	0.594	660	$3.9 \cdot 10^{-2}$	960	$1.2 \cdot 10^{-4}$	1500	0.266	3000	0.591	4500	$7.8 \cdot 10^{-3}$
370	0.718	670	$2.3 \cdot 10^{-2}$	970	$1.4 \cdot 10^{-4}$	1550	0.343	3050	0.545	4550	$6.5 \cdot 10^{-3}$
380	0.790	680	$1.3 \cdot 10^{-2}$	980	$1.9 \cdot 10^{-4}$	1600	0.418	3100	0.503	4600	$6.3 \cdot 10^{-3}$
390	0.830	690	$7.6 \cdot 10^{-3}$	990	$2.1 \cdot 10^{-4}$	1650	0.490	3150	0.463	4650	$8.1 \cdot 10^{-3}$
400	0.855	700	$4.5 \cdot 10^{-3}$	1000	$2.8 \cdot 10^{-4}$	1700	0.559	3200	0.427	4700	$1.3 \cdot 10^{-2}$
410	0.874	710	$2.4 \cdot 10^{-3}$	1010	$3.4 \cdot 10^{-4}$	1750	0.620	3250	0.396	4750	$2.2 \cdot 10^{-2}$
420	0.889	720	$1.3 \cdot 10^{-3}$	1020	$4.5 \cdot 10^{-4}$	1800	0.674	3300	0.370	4800	$3.3 \cdot 10^{-2}$
430	0.902	730	$7.7 \cdot 10^{-4}$	1030	$5.3 \cdot 10^{-4}$	1850	0.719	3350	0.350	4850	$4.6 \cdot 10^{-2}$
440	0.912	740	$4.5 \cdot 10^{-4}$	1040	$6.5 \cdot 10^{-4}$	1900	0.766	3400	0.334	4900	$6.2 \cdot 10^{-2}$
450	0.923	750	$2.7 \cdot 10^{-4}$	1050	$8.1 \cdot 10^{-4}$	1950	0.795	3450	0.324	4950	$8.4 \cdot 10^{-2}$
460	0.931	760	$1.7 \cdot 10^{-4}$	1060	$1.0 \cdot 10^{-3}$	2000	0.822	3500	0.320	5000	0.109
470	0.936	770	$1.2 \cdot 10^{-4}$	1070	$1.2 \cdot 10^{-3}$	2050	0.845	3550	0.323	5050	0.132
480	0.942	780	$8.0 \cdot 10^{-5}$	1080	$1.5 \cdot 10^{-3}$	2100	0.860	3600	0.331	5100	0.149
490	0.946	790	$5.9 \cdot 10^{-5}$	1090	$1.8 \cdot 10^{-3}$	2150	0.880	3650	0.345	5150	0.155

Data Sheet

SCHOTT

BG61

Reflection factor	
P_d	0.915

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (405nm)	≥	0.84
τ_i (514nm)	≥	0.93
τ_i (633nm)	≥	0.18
τ_i (694nm)	≤	0.03
τ_i (1060nm)	≤	0.008

Refractive Index n
n_i (365.0 nm) = 1.556
n_h (404.7 nm) = 1.549
n_g (435.8 nm) = 1.545
$n_{F'}$ (480.0 nm) = 1.541
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.81

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	1.0
SR class	52.3
AR class	3.3

Transformation temperature	
Tg [°C]	402

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	11.9
$\alpha_{20/300°C}$ [10^{-6}/K]	13.9
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

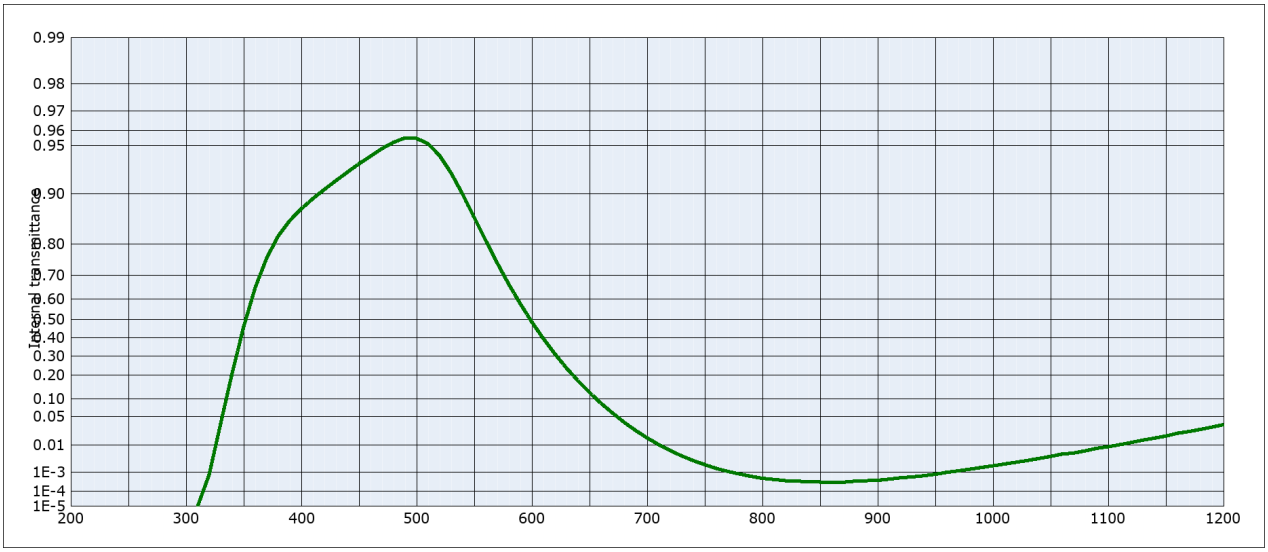
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=0.3mm) = 648 nm
Long-term changes of the polished
surface are possible under some
circumstances.
no visible surface damage after 500 h
of humidity test 85 °C / 85 % rh
Knoop hardness HK (0.1/20) = 363
All data wihout 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	0.349	0.289	0.250
y	0.432	0.438	0.435
Y	60	46	37
λ_d [nm]	499	498	497
P_e	0.22	0.37	0.46

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.328	0.272	0.236
y	0.415	0.416	0.410
Y	62	48	39
λ_d [nm]	497	496	495
P_e	0.23	0.37	0.47

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.245	0.210	0.189
y	0.319	0.307	0.296
Y	68	55	47
λ_d [nm]	490	489	488
P_e	0.25	0.39	0.48



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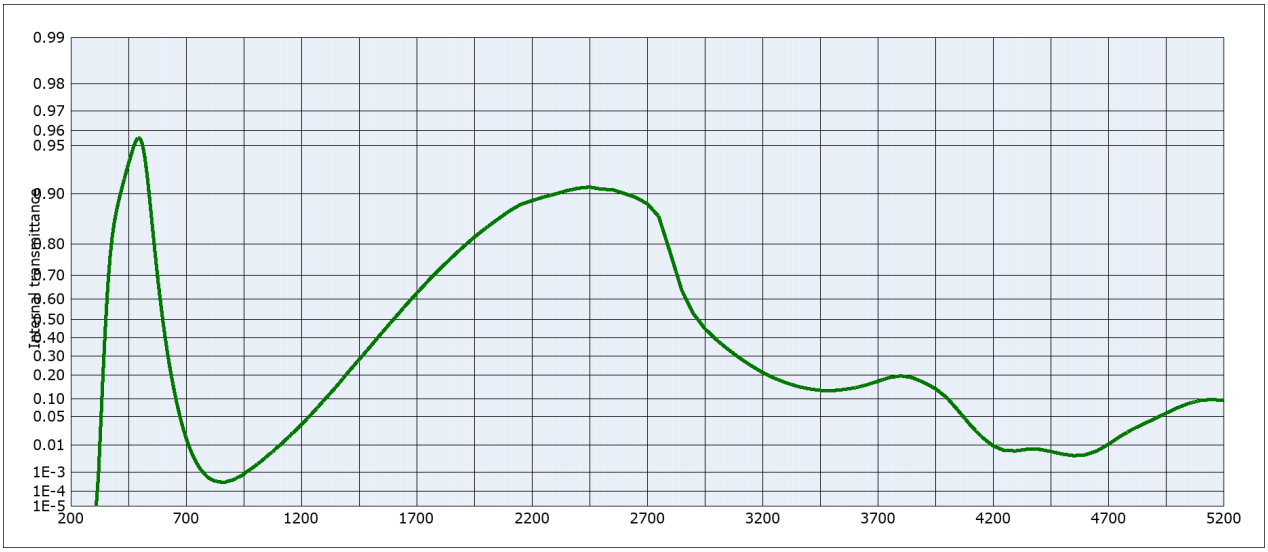

Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.955	800	$5.2 \cdot 10^{-4}$	1100	$9.0 \cdot 10^{-3}$	2200	0.890	3700	0.172
210	$< 10^{-5}$	510	0.952	810	$4.5 \cdot 10^{-4}$	1110	$1.0 \cdot 10^{-2}$	2250	0.895	3750	0.189
220	$< 10^{-5}$	520	0.942	820	$4.0 \cdot 10^{-4}$	1120	$1.2 \cdot 10^{-2}$	2300	0.899	3800	0.197
230	$< 10^{-5}$	530	0.926	830	$3.7 \cdot 10^{-4}$	1130	$1.4 \cdot 10^{-2}$	2350	0.904	3850	0.189
240	$< 10^{-5}$	540	0.899	840	$3.5 \cdot 10^{-4}$	1140	$1.6 \cdot 10^{-2}$	2400	0.908	3900	0.167
250	$< 10^{-5}$	550	0.860	850	$3.4 \cdot 10^{-4}$	1150	$1.8 \cdot 10^{-2}$	2450	0.909	3950	0.140
260	$< 10^{-5}$	560	0.808	860	$3.3 \cdot 10^{-4}$	1160	$2.1 \cdot 10^{-2}$	2500	0.906	4000	0.105
270	$< 10^{-5}$	570	0.742	870	$3.3 \cdot 10^{-4}$	1170	$2.4 \cdot 10^{-2}$	2550	0.906	4050	$6.4 \cdot 10^{-2}$
280	$< 10^{-5}$	580	0.663	880	$3.7 \cdot 10^{-4}$	1180	$2.7 \cdot 10^{-2}$	2600	0.900	4100	$3.4 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.577	890	$3.9 \cdot 10^{-4}$	1190	$3.0 \cdot 10^{-2}$	2650	0.895	4150	$1.7 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.485	900	$4.1 \cdot 10^{-4}$	1200	$3.4 \cdot 10^{-2}$	2700	0.885	4200	$9.7 \cdot 10^{-3}$
310	$< 10^{-5}$	610	0.395	910	$4.7 \cdot 10^{-4}$	1250	$6.0 \cdot 10^{-2}$	2750	0.862	4250	$6.8 \cdot 10^{-3}$
320	$7.7 \cdot 10^{-4}$	620	0.311	920	$5.6 \cdot 10^{-4}$	1300	$9.8 \cdot 10^{-2}$	2800	0.774	4300	$6.7 \cdot 10^{-3}$
330	$3.6 \cdot 10^{-2}$	630	0.236	930	$6.1 \cdot 10^{-4}$	1350	0.147	2850	0.639	4350	$7.6 \cdot 10^{-3}$
340	0.211	640	0.174	940	$6.9 \cdot 10^{-4}$	1400	0.211	2900	0.529	4400	$7.5 \cdot 10^{-3}$
350	0.461	650	0.125	950	$8.1 \cdot 10^{-4}$	1450	0.280	2950	0.450	4450	$6.4 \cdot 10^{-3}$
360	0.650	660	$8.6 \cdot 10^{-2}$	960	$1.0 \cdot 10^{-3}$	1500	0.353	3000	0.389	4500	$5.2 \cdot 10^{-3}$
370	0.759	670	$5.9 \cdot 10^{-2}$	970	$1.2 \cdot 10^{-3}$	1550	0.429	3050	0.337	4550	$4.6 \cdot 10^{-3}$
380	0.820	680	$3.8 \cdot 10^{-2}$	980	$1.4 \cdot 10^{-3}$	1600	0.499	3100	0.290	4600	$4.9 \cdot 10^{-3}$
390	0.854	690	$2.5 \cdot 10^{-2}$	990	$1.6 \cdot 10^{-3}$	1650	0.566	3150	0.249	4650	$6.6 \cdot 10^{-3}$
400	0.876	700	$1.6 \cdot 10^{-2}$	1000	$1.9 \cdot 10^{-3}$	1700	0.625	3200	0.214	4700	$1.1 \cdot 10^{-2}$
410	0.893	710	$1.0 \cdot 10^{-2}$	1010	$2.2 \cdot 10^{-3}$	1750	0.677	3250	0.187	4750	$1.7 \cdot 10^{-2}$
420	0.906	720	$6.9 \cdot 10^{-3}$	1020	$2.6 \cdot 10^{-3}$	1800	0.721	3300	0.166	4800	$2.6 \cdot 10^{-2}$
430	0.917	730	$4.5 \cdot 10^{-3}$	1030	$3.1 \cdot 10^{-3}$	1850	0.759	3350	0.150	4850	$3.5 \cdot 10^{-2}$
440	0.927	740	$3.0 \cdot 10^{-3}$	1040	$3.7 \cdot 10^{-3}$	1900	0.790	3400	0.139	4900	$4.5 \cdot 10^{-2}$
450	0.935	750	$2.1 \cdot 10^{-3}$	1050	$4.3 \cdot 10^{-3}$	1950	0.817	3450	0.133	4950	$5.8 \cdot 10^{-2}$
460	0.942	760	$1.5 \cdot 10^{-3}$	1060	$5.2 \cdot 10^{-3}$	2000	0.838	3500	0.131	5000	$7.3 \cdot 10^{-2}$
470	0.948	770	$1.1 \cdot 10^{-3}$	1070	$5.7 \cdot 10^{-3}$	2050	0.856	3550	0.136	5050	$8.6 \cdot 10^{-2}$
480	0.952	780	$8.4 \cdot 10^{-4}$	1080	$6.7 \cdot 10^{-3}$	2100	0.872	3600	0.143	5100	$9.6 \cdot 10^{-2}$
490	0.956	790	$6.5 \cdot 10^{-4}$	1090	$8.1 \cdot 10^{-3}$	2150	0.883	3650	0.155	5150	$9.9 \cdot 10^{-2}$

Data Sheet

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BG62

Reflection factor	
P_d	0.915

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (405nm)	≥	0.73
τ_i (514nm)	≥	0.89
τ_i (633nm)	≥	0.08
τ_i (694nm)	≤	0.005
τ_i (1060nm)	≤	0.0005

Refractive Index n
n_i (365.0 nm) = 1.561
n_h (404.7 nm) = 1.554
n_g (435.8 nm) = 1.550
$n_{F'}$ (480.0 nm) = 1.546
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.85

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	1.0
SR class	52.3
AR class	3.3

Transformation temperature	
Tg [°C]	410

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	11.9
$\alpha_{20/300°C}$ [10^{-6}/K]	13.6
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

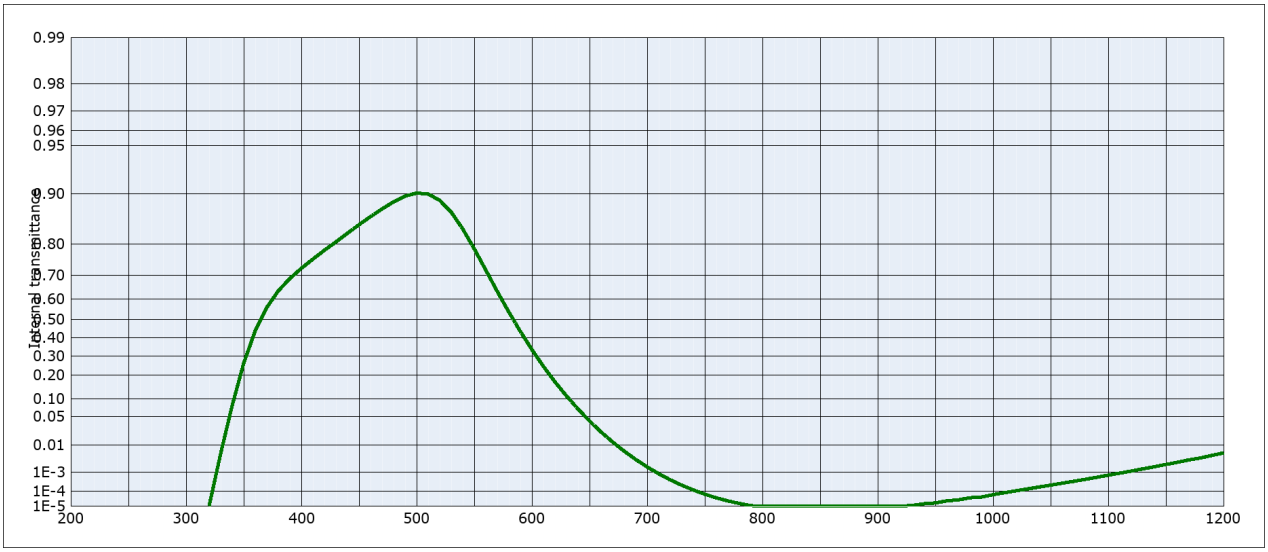
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=0.21mm) = 644 nm
Long-term changes of the polished
surface are possible under some
circumstances.
no visible surface damage after 500 h
of humidity test 85 °C / 85 % rh
Knoop hardness HK (0.1/20) = 368
All data wihout 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	0.321	0.257	0.220
y	0.441	0.447	0.445
Y	52	36	27
λ_d [nm]	499	498	498
P_e	0.29	0.44	0.52

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.302	0.243	0.210
y	0.422	0.423	0.419
Y	53	38	29
λ_d [nm]	498	497	496
P_e	0.30	0.44	0.53

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.229	0.194	0.175
y	0.320	0.311	0.305
Y	60	45	36
λ_d [nm]	490	490	489
P_e	0.31	0.45	0.52



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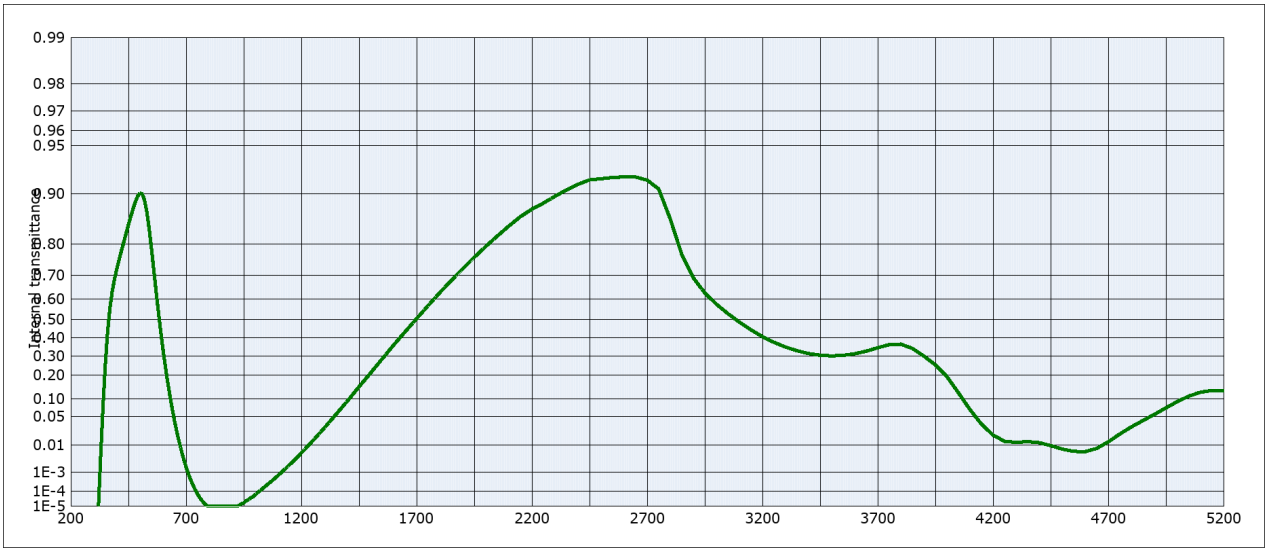

Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.901	800	$< 10^{-5}$	1100	$7.4 \cdot 10^{-4}$	2200	0.876	3700	0.345
210	$< 10^{-5}$	510	0.900	810	$< 10^{-5}$	1110	$9.1 \cdot 10^{-4}$	2250	0.886	3750	0.362
220	$< 10^{-5}$	520	0.890	820	$< 10^{-5}$	1120	$1.1 \cdot 10^{-3}$	2300	0.896	3800	0.365
230	$< 10^{-5}$	530	0.870	830	$< 10^{-5}$	1130	$1.4 \cdot 10^{-3}$	2350	0.905	3850	0.342
240	$< 10^{-5}$	540	0.836	840	$< 10^{-5}$	1140	$1.7 \cdot 10^{-3}$	2400	0.913	3900	0.300
250	$< 10^{-5}$	550	0.786	850	$< 10^{-5}$	1150	$2.1 \cdot 10^{-3}$	2450	0.918	3950	0.252
260	$< 10^{-5}$	560	0.718	860	$< 10^{-5}$	1160	$2.6 \cdot 10^{-3}$	2500	0.919	4000	0.194
270	$< 10^{-5}$	570	0.633	870	$< 10^{-5}$	1170	$3.2 \cdot 10^{-3}$	2550	0.921	4050	0.123
280	$< 10^{-5}$	580	0.536	880	$< 10^{-5}$	1180	$3.8 \cdot 10^{-3}$	2600	0.921	4100	$6.8 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.435	890	$< 10^{-5}$	1190	$4.7 \cdot 10^{-3}$	2650	0.921	4150	$3.5 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.335	900	$< 10^{-5}$	1200	$5.7 \cdot 10^{-3}$	2700	0.918	4200	$1.9 \cdot 10^{-2}$
310	$< 10^{-5}$	610	0.245	910	$< 10^{-5}$	1250	$1.4 \cdot 10^{-2}$	2750	0.907	4250	$1.3 \cdot 10^{-2}$
320	$1.1 \cdot 10^{-5}$	620	0.169	920	$< 10^{-5}$	1300	$2.9 \cdot 10^{-2}$	2800	0.858	4300	$1.2 \cdot 10^{-2}$
330	$5.4 \cdot 10^{-3}$	630	0.112	930	$1.2 \cdot 10^{-5}$	1350	$5.5 \cdot 10^{-2}$	2850	0.770	4350	$1.3 \cdot 10^{-2}$
340	$8.0 \cdot 10^{-2}$	640	$6.9 \cdot 10^{-2}$	940	$1.5 \cdot 10^{-5}$	1400	$9.4 \cdot 10^{-2}$	2900	0.689	4400	$1.2 \cdot 10^{-2}$
350	0.261	650	$4.1 \cdot 10^{-2}$	950	$1.8 \cdot 10^{-5}$	1450	0.147	2950	0.627	4450	$9.8 \cdot 10^{-3}$
360	0.438	660	$2.3 \cdot 10^{-2}$	960	$2.5 \cdot 10^{-5}$	1500	0.211	3000	0.575	4500	$7.6 \cdot 10^{-3}$
370	0.559	670	$1.3 \cdot 10^{-2}$	970	$2.9 \cdot 10^{-5}$	1550	0.283	3050	0.529	4550	$6.4 \cdot 10^{-3}$
380	0.636	680	$6.6 \cdot 10^{-3}$	980	$4.0 \cdot 10^{-5}$	1600	0.359	3100	0.485	4600	$6.3 \cdot 10^{-3}$
390	0.686	690	$3.4 \cdot 10^{-3}$	990	$4.5 \cdot 10^{-5}$	1650	0.433	3150	0.443	4650	$8.0 \cdot 10^{-3}$
400	0.724	700	$1.7 \cdot 10^{-3}$	1000	$6.3 \cdot 10^{-5}$	1700	0.503	3200	0.406	4700	$1.3 \cdot 10^{-2}$
410	0.755	710	$8.6 \cdot 10^{-4}$	1010	$8.5 \cdot 10^{-5}$	1750	0.569	3250	0.375	4750	$2.0 \cdot 10^{-2}$
420	0.782	720	$4.4 \cdot 10^{-4}$	1020	$1.1 \cdot 10^{-4}$	1800	0.627	3300	0.349	4800	$3.0 \cdot 10^{-2}$
430	0.805	730	$2.3 \cdot 10^{-4}$	1030	$1.4 \cdot 10^{-4}$	1850	0.678	3350	0.328	4850	$4.2 \cdot 10^{-2}$
440	0.826	740	$1.2 \cdot 10^{-4}$	1040	$1.8 \cdot 10^{-4}$	1900	0.722	3400	0.313	4900	$5.5 \cdot 10^{-2}$
450	0.846	750	$6.8 \cdot 10^{-5}$	1050	$2.3 \cdot 10^{-4}$	1950	0.760	3450	0.304	4950	$7.2 \cdot 10^{-2}$
460	0.862	760	$3.9 \cdot 10^{-5}$	1060	$2.9 \cdot 10^{-4}$	2000	0.793	3500	0.300	5000	$9.2 \cdot 10^{-2}$
470	0.876	770	$2.4 \cdot 10^{-5}$	1070	$3.7 \cdot 10^{-4}$	2050	0.820	3550	0.303	5050	0.111
480	0.888	780	$1.6 \cdot 10^{-5}$	1080	$4.6 \cdot 10^{-4}$	2100	0.843	3600	0.312	5100	0.125
490	0.897	790	$1.1 \cdot 10^{-5}$	1090	$5.8 \cdot 10^{-4}$	2150	0.862	3650	0.326	5150	0.132

Data Sheet

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BG62HT

Reflection factor	
P_d	0.914

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (405nm)	≥	0.8
τ_i (514nm)	≥	0.9
τ_i (633nm)	≥	0.08
τ_i (694nm)	≤	0.004
τ_i (1060nm)	≤	0.0005

Refractive Index n
n_i (365.0 nm) = 1.561
n_h (404.7 nm) = 1.554
n_g (435.8 nm) = 1.550
$n_{F'}$ (480.0 nm) = 1.546
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.85

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	1.0
SR class	52.3
AR class	3.3

Transformation temperature	
Tg [°C]	410

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	11.8
$\alpha_{20/300°C}$ [10^{-6}/K]	13.7
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

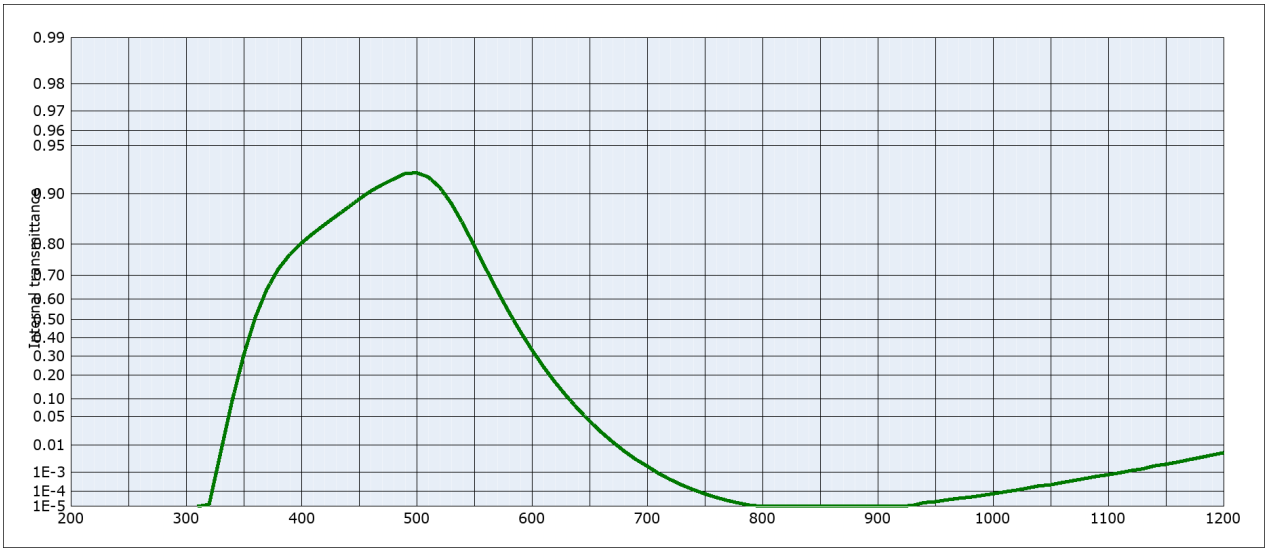
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=0.21mm) = 644 nm
Long-term changes of the polished
surface are possible under some
circumstances.
no visible surface damage after 500 h
of humidity test 85 °C / 85 % rh
Knoop hardness HK (0.1/20) = 368
All data wihout 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	0.317	0.252	0.215
y	0.438	0.438	0.430
Y	52	37	28
λ_d [nm]	499	497	496
P_e	0.30	0.45	0.54

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.298	0.238	0.205
y	0.418	0.413	0.403
Y	54	39	30
λ_d [nm]	497	496	495
P_e	0.31	0.46	0.55

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.226	0.191	0.172
y	0.314	0.299	0.288
Y	61	47	38
λ_d [nm]	489	489	488
P_e	0.33	0.47	0.55



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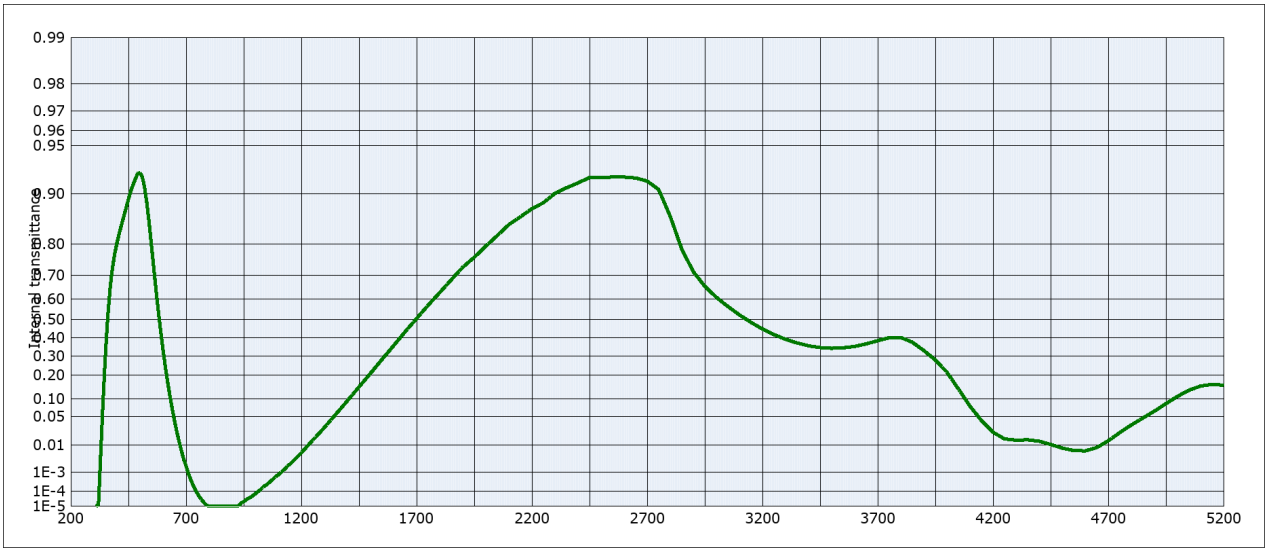


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.926	800	$< 10^{-5}$	1100	$7.7 \cdot 10^{-4}$	2200	0.876	3700	0.384
210	$< 10^{-5}$	510	0.921	810	$< 10^{-5}$	1110	$9.5 \cdot 10^{-4}$	2250	0.886	3750	0.400
220	$< 10^{-5}$	520	0.909	820	$< 10^{-5}$	1120	$1.2 \cdot 10^{-3}$	2300	0.901	3800	0.402
230	$< 10^{-5}$	530	0.886	830	$< 10^{-5}$	1130	$1.4 \cdot 10^{-3}$	2350	0.908	3850	0.375
240	$< 10^{-5}$	540	0.848	840	$< 10^{-5}$	1140	$1.9 \cdot 10^{-3}$	2400	0.914	3900	0.330
250	$< 10^{-5}$	550	0.794	850	$< 10^{-5}$	1150	$2.2 \cdot 10^{-3}$	2450	0.921	3950	0.278
260	$< 10^{-5}$	560	0.723	860	$< 10^{-5}$	1160	$2.7 \cdot 10^{-3}$	2500	0.920	4000	0.215
270	$< 10^{-5}$	570	0.636	870	$< 10^{-5}$	1170	$3.3 \cdot 10^{-3}$	2550	0.921	4050	0.139
280	$< 10^{-5}$	580	0.537	880	$< 10^{-5}$	1180	$4.0 \cdot 10^{-3}$	2600	0.921	4100	$7.8 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.434	890	$< 10^{-5}$	1190	$4.8 \cdot 10^{-3}$	2650	0.920	4150	$4.2 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.334	900	$< 10^{-5}$	1200	$5.8 \cdot 10^{-3}$	2700	0.917	4200	$2.3 \cdot 10^{-2}$
310	$< 10^{-5}$	610	0.243	910	$< 10^{-5}$	1250	$1.4 \cdot 10^{-2}$	2750	0.906	4250	$1.5 \cdot 10^{-2}$
320	$1.3 \cdot 10^{-5}$	620	0.168	920	$1.0 \cdot 10^{-5}$	1300	$2.9 \cdot 10^{-2}$	2800	0.863	4300	$1.4 \cdot 10^{-2}$
330	$5.9 \cdot 10^{-3}$	630	0.111	930	$1.1 \cdot 10^{-5}$	1350	$5.6 \cdot 10^{-2}$	2850	0.785	4350	$1.4 \cdot 10^{-2}$
340	$9.5 \cdot 10^{-2}$	640	$6.9 \cdot 10^{-2}$	940	$1.9 \cdot 10^{-5}$	1400	$9.5 \cdot 10^{-2}$	2900	0.712	4400	$1.3 \cdot 10^{-2}$
350	0.304	650	$4.1 \cdot 10^{-2}$	950	$2.2 \cdot 10^{-5}$	1450	0.147	2950	0.655	4450	$1.1 \cdot 10^{-2}$
360	0.509	660	$2.3 \cdot 10^{-2}$	960	$2.9 \cdot 10^{-5}$	1500	0.210	3000	0.607	4500	$8.2 \cdot 10^{-3}$
370	0.642	670	$1.3 \cdot 10^{-2}$	970	$3.7 \cdot 10^{-5}$	1550	0.281	3050	0.564	4550	$6.8 \cdot 10^{-3}$
380	0.721	680	$6.6 \cdot 10^{-3}$	980	$4.4 \cdot 10^{-5}$	1600	0.356	3100	0.522	4600	$6.7 \cdot 10^{-3}$
390	0.769	690	$3.4 \cdot 10^{-3}$	990	$5.6 \cdot 10^{-5}$	1650	0.433	3150	0.483	4650	$8.5 \cdot 10^{-3}$
400	0.802	700	$1.8 \cdot 10^{-3}$	1000	$7.2 \cdot 10^{-5}$	1700	0.504	3200	0.448	4700	$1.4 \cdot 10^{-2}$
410	0.826	710	$8.8 \cdot 10^{-4}$	1010	$9.4 \cdot 10^{-5}$	1750	0.570	3250	0.417	4750	$2.2 \cdot 10^{-2}$
420	0.846	720	$4.5 \cdot 10^{-4}$	1020	$1.2 \cdot 10^{-4}$	1800	0.628	3300	0.392	4800	$3.4 \cdot 10^{-2}$
430	0.863	730	$2.4 \cdot 10^{-4}$	1030	$1.6 \cdot 10^{-4}$	1850	0.681	3350	0.371	4850	$4.7 \cdot 10^{-2}$
440	0.878	740	$1.3 \cdot 10^{-4}$	1040	$2.1 \cdot 10^{-4}$	1900	0.728	3400	0.356	4900	$6.3 \cdot 10^{-2}$
450	0.892	750	$7.1 \cdot 10^{-5}$	1050	$2.4 \cdot 10^{-4}$	1950	0.761	3450	0.346	4950	$8.5 \cdot 10^{-2}$
460	0.904	760	$4.2 \cdot 10^{-5}$	1060	$3.2 \cdot 10^{-4}$	2000	0.794	3500	0.342	5000	0.110
470	0.912	770	$2.6 \cdot 10^{-5}$	1070	$4.0 \cdot 10^{-4}$	2050	0.821	3550	0.345	5050	0.133
480	0.919	780	$1.7 \cdot 10^{-5}$	1080	$5.1 \cdot 10^{-4}$	2100	0.846	3600	0.352	5100	0.151
490	0.925	790	$1.2 \cdot 10^{-5}$	1090	$6.5 \cdot 10^{-4}$	2150	0.862	3650	0.366	5150	0.158

Data Sheet

SCHOTT

BG63

Reflection factor	
P_d	0.916

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (405nm)	≥	0.95
τ_i (514nm)	≥	0.96
τ_i (633nm)	≥	0.5
τ_i (694nm)	≤	0.25
τ_i (1060nm)	≤	0.16

Refractive Index n
n_i (365.0 nm) = 1.552
n_h (404.7 nm) = 1.546
n_g (435.8 nm) = 1.542
$n_{F'}$ (480.0 nm) = 1.538
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.79

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	1.0
SR class	52.3
AR class	3.3

Transformation temperature	
Tg [°C]	416

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	11.9
$\alpha_{20/300°C}$ [10^{-6}/K]	13.9
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

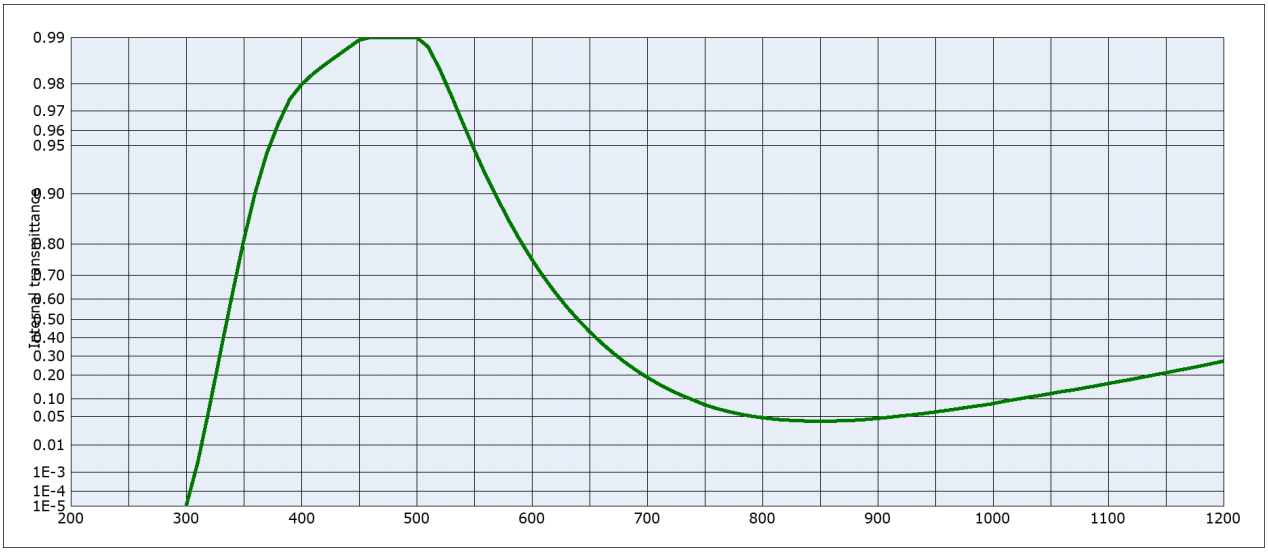
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=1.5mm) = 614 nm
Long-term changes of the polished
surface are possible under some
circumstances.
Knoop hardness HK (0.1/20) = 362
All data wihout tolerances are to be
understood 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	0.403	0.366	0.336
y	0.420	0.428	0.432
Y	76	66	59
λ_d [nm]	500	499	499
P_e	0.10	0.19	0.26

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.380	0.344	0.316
y	0.408	0.412	0.414
Y	77	68	60
λ_d [nm]	498	497	497
P_e	0.11	0.19	0.27

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.280	0.255	0.237
y	0.325	0.319	0.313
Y	81	73	67
λ_d [nm]	490	489	489
P_e	0.12	0.22	0.29



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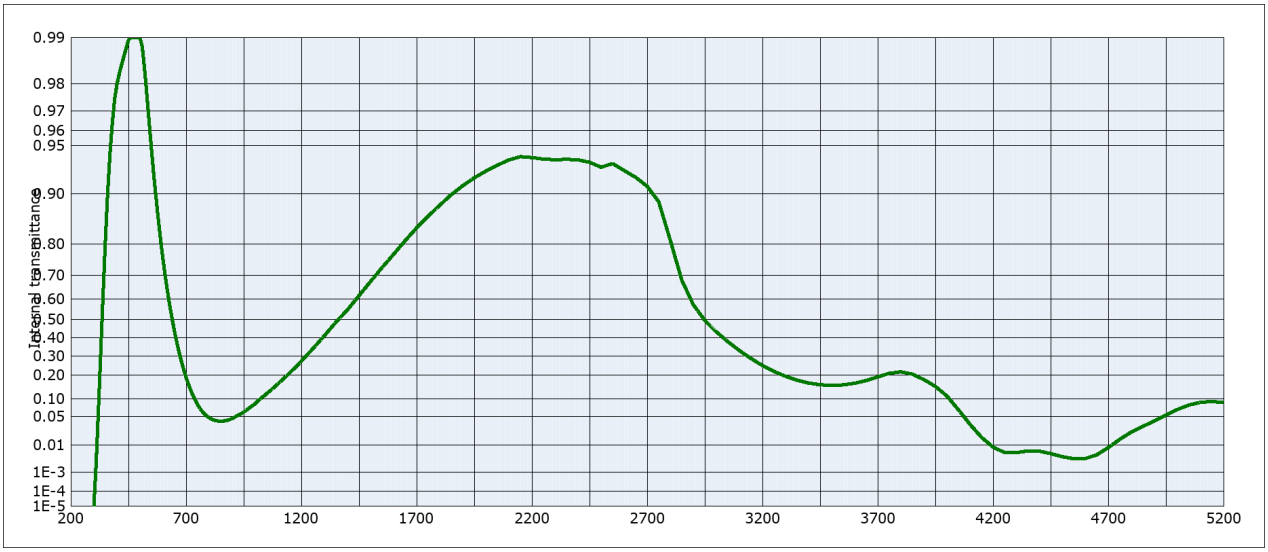

Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.991	800	$4.8 \cdot 10^{-2}$	1100	0.162	2200	0.941	3700	0.192
210	$< 10^{-5}$	510	0.988	810	$4.5 \cdot 10^{-2}$	1110	0.171	2250	0.939	3750	0.209
220	$< 10^{-5}$	520	0.984	820	$4.3 \cdot 10^{-2}$	1120	0.181	2300	0.939	3800	0.217
230	$< 10^{-5}$	530	0.976	830	$4.2 \cdot 10^{-2}$	1130	0.191	2350	0.939	3850	0.206
240	$< 10^{-5}$	540	0.964	840	$4.1 \cdot 10^{-2}$	1140	0.202	2400	0.939	3900	0.180
250	$< 10^{-5}$	550	0.947	850	$4.1 \cdot 10^{-2}$	1150	0.212	2450	0.936	3950	0.149
260	$< 10^{-5}$	560	0.923	860	$4.1 \cdot 10^{-2}$	1160	0.224	2500	0.932	4000	0.111
270	$< 10^{-5}$	570	0.893	870	$4.1 \cdot 10^{-2}$	1170	0.235	2550	0.935	4050	$6.7 \cdot 10^{-2}$
280	$< 10^{-5}$	580	0.854	880	$4.2 \cdot 10^{-2}$	1180	0.247	2600	0.928	4100	$3.5 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.808	890	$4.4 \cdot 10^{-2}$	1190	0.259	2650	0.921	4150	$1.7 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.754	900	$4.6 \cdot 10^{-2}$	1200	0.273	2700	0.910	4200	$8.8 \cdot 10^{-3}$
310	$2.4 \cdot 10^{-3}$	610	0.694	910	$4.9 \cdot 10^{-2}$	1250	0.340	2750	0.888	4250	$5.9 \cdot 10^{-3}$
320	$7.0 \cdot 10^{-2}$	620	0.630	920	$5.2 \cdot 10^{-2}$	1300	0.412	2800	0.809	4300	$5.8 \cdot 10^{-3}$
330	0.327	630	0.563	930	$5.4 \cdot 10^{-2}$	1350	0.484	2850	0.681	4350	$6.6 \cdot 10^{-3}$
340	0.619	640	0.498	940	$5.8 \cdot 10^{-2}$	1400	0.548	2900	0.573	4400	$6.6 \cdot 10^{-3}$
350	0.809	650	0.434	950	$6.1 \cdot 10^{-2}$	1450	0.614	2950	0.494	4450	$5.4 \cdot 10^{-3}$
360	0.902	660	0.373	960	$6.5 \cdot 10^{-2}$	1500	0.675	3000	0.433	4500	$4.3 \cdot 10^{-3}$
370	0.944	670	0.318	970	$7.0 \cdot 10^{-2}$	1550	0.727	3050	0.379	4550	$3.6 \cdot 10^{-3}$
380	0.964	680	0.270	980	$7.5 \cdot 10^{-2}$	1600	0.770	3100	0.330	4600	$3.6 \cdot 10^{-3}$
390	0.975	690	0.227	990	$8.0 \cdot 10^{-2}$	1650	0.808	3150	0.286	4650	$4.9 \cdot 10^{-3}$
400	0.980	700	0.190	1000	$8.5 \cdot 10^{-2}$	1700	0.839	3200	0.249	4700	$8.5 \cdot 10^{-3}$
410	0.983	710	0.159	1010	$9.3 \cdot 10^{-2}$	1750	0.863	3250	0.219	4750	$1.5 \cdot 10^{-2}$
420	0.985	720	0.134	1020	$9.9 \cdot 10^{-2}$	1800	0.882	3300	0.195	4800	$2.3 \cdot 10^{-2}$
430	0.987	730	0.113	1030	0.106	1850	0.899	3350	0.177	4850	$3.1 \cdot 10^{-2}$
440	0.988	740	$9.7 \cdot 10^{-2}$	1040	0.112	1900	0.911	3400	0.164	4900	$4.1 \cdot 10^{-2}$
450	0.990	750	$8.2 \cdot 10^{-2}$	1050	0.120	1950	0.920	3450	0.156	4950	$5.4 \cdot 10^{-2}$
460	0.991	760	$7.1 \cdot 10^{-2}$	1060	0.128	2000	0.928	3500	0.153	5000	$6.8 \cdot 10^{-2}$
470	0.992	770	$6.3 \cdot 10^{-2}$	1070	0.135	2050	0.934	3550	0.156	5050	$8.1 \cdot 10^{-2}$
480	0.992	780	$5.6 \cdot 10^{-2}$	1080	0.144	2100	0.939	3600	0.163	5100	$8.9 \cdot 10^{-2}$
490	0.992	790	$5.1 \cdot 10^{-2}$	1090	0.152	2150	0.941	3650	0.175	5150	$9.2 \cdot 10^{-2}$

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Density	
ρ [g/cm³]	2.78

Reflection factor	
P_d	0.916

Bubble content	
Bubble class	2

Reference thickness	
d [mm]	1

Chemical Resistance	
FR class	1.0
SR class	52.3
AR class	3.3

Spectral values guaranteed		
τ_i (405nm)	≥	0.99
τ_i (514nm)	≥	0.99
τ_i (633nm)	≥	0.72
τ_i (694nm)	≤	0.55
τ_i (1060nm)	≤	0.45

Transformation temperature	
Tg [°C]	417

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	12.0
$\alpha_{20/300°C}$ [10^{-6}/K]	13.8
$\alpha_{20/200°C}$ [10^{-6}/K]	

Refractive Index n
n_i (365.0 nm) = 1.549
n_h (404.7 nm) = 1.543
n_g (435.8 nm) = 1.539
$n_{F'}$ (480.0 nm) = 1.536
Sellmeier coefficients on request

Temperature coefficient	
T_K [nm/°C]	

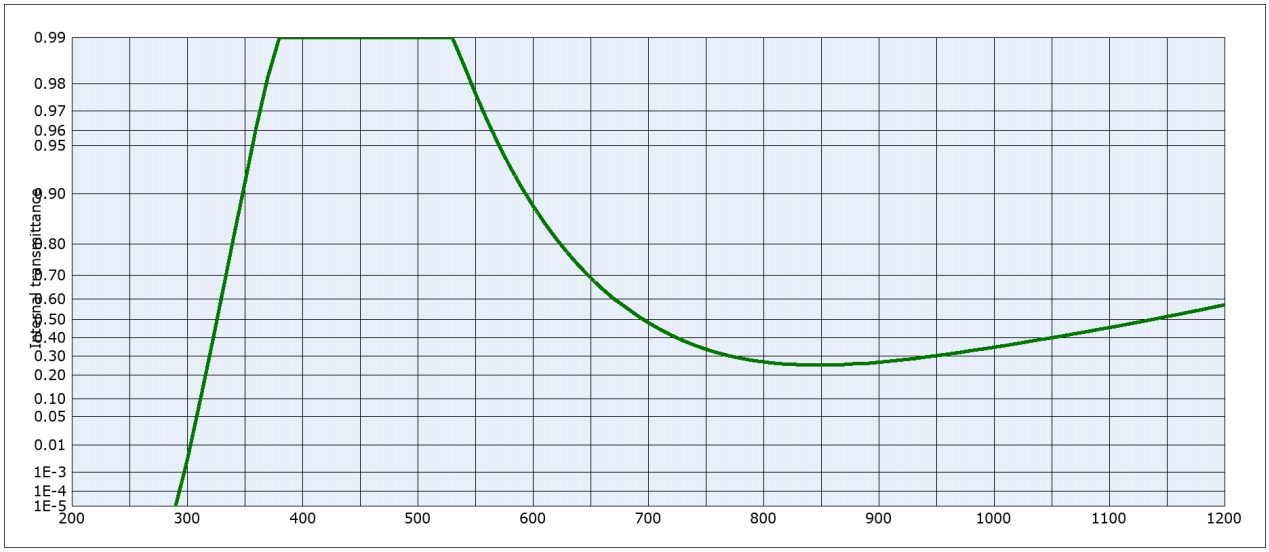
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=3mm) = 619 nm
Long-term changes of the polished
surface are possible under some
circumstances.
Knoop hardness HK (0.1/20) = 371
All data wihout tolerances are to be
understood 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	0.427	0.408	0.391
y	0.414	0.419	0.423
Y	84	78	73
λ_d [nm]	500	500	500
P_e	0.05	0.09	0.13

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.403	0.385	0.368
y	0.403	0.407	0.410
Y	85	79	74
λ_d [nm]	498	498	498
P_e	0.05	0.09	0.13

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.297	0.284	0.272
y	0.327	0.325	0.323
Y	87	82	79
λ_d [nm]	490	490	490
P_e	0.06	0.11	0.15



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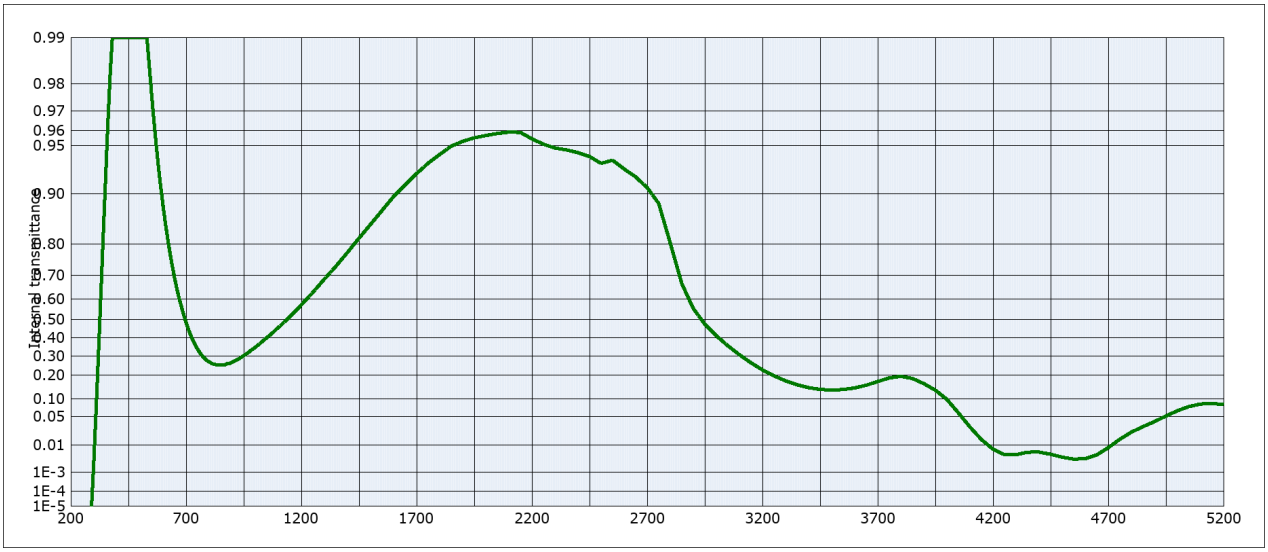

Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.997	800	0.268	1100	0.455	2200	0.955	3700	0.171
210	$< 10^{-5}$	510	0.996	810	0.261	1110	0.467	2250	0.951	3750	0.187
220	$< 10^{-5}$	520	0.994	820	0.256	1120	0.479	2300	0.948	3800	0.195
230	$< 10^{-5}$	530	0.990	830	0.254	1130	0.490	2350	0.947	3850	0.185
240	$< 10^{-5}$	540	0.985	840	0.251	1140	0.502	2400	0.945	3900	0.161
250	$< 10^{-5}$	550	0.977	850	0.252	1150	0.514	2450	0.942	3950	0.134
260	$< 10^{-5}$	560	0.966	860	0.252	1160	0.525	2500	0.935	4000	$9.9 \cdot 10^{-2}$
270	$< 10^{-5}$	570	0.951	870	0.254	1170	0.537	2550	0.938	4050	$5.9 \cdot 10^{-2}$
280	$< 10^{-5}$	580	0.932	880	0.259	1180	0.548	2600	0.930	4100	$3.0 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.909	890	0.260	1190	0.560	2650	0.921	4150	$1.5 \cdot 10^{-2}$
300	$3.0 \cdot 10^{-3}$	600	0.882	900	0.266	1200	0.572	2700	0.908	4200	$7.6 \cdot 10^{-3}$
310	$7.2 \cdot 10^{-2}$	610	0.850	910	0.272	1250	0.629	2750	0.885	4250	$5.0 \cdot 10^{-3}$
320	0.314	620	0.814	920	0.279	1300	0.684	2800	0.802	4300	$5.0 \cdot 10^{-3}$
330	0.610	630	0.775	930	0.285	1350	0.731	2850	0.666	4350	$6.1 \cdot 10^{-3}$
340	0.812	640	0.733	940	0.294	1400	0.775	2900	0.554	4400	$6.1 \cdot 10^{-3}$
350	0.913	650	0.689	950	0.301	1450	0.814	2950	0.473	4450	$5.1 \cdot 10^{-3}$
360	0.962	660	0.645	960	0.310	1500	0.846	3000	0.411	4500	$4.1 \cdot 10^{-3}$
370	0.982	670	0.601	970	0.319	1550	0.873	3050	0.356	4550	$3.5 \cdot 10^{-3}$
380	0.990	680	0.562	980	0.329	1600	0.896	3100	0.307	4600	$3.6 \cdot 10^{-3}$
390	0.993	690	0.521	990	0.338	1650	0.912	3150	0.263	4650	$4.9 \cdot 10^{-3}$
400	0.995	700	0.482	1000	0.348	1700	0.925	3200	0.227	4700	$8.5 \cdot 10^{-3}$
410	0.996	710	0.447	1010	0.357	1750	0.936	3250	0.197	4750	$1.5 \cdot 10^{-2}$
420	0.996	720	0.414	1020	0.368	1800	0.943	3300	0.174	4800	$2.3 \cdot 10^{-2}$
430	0.997	730	0.385	1030	0.379	1850	0.950	3350	0.156	4850	$3.1 \cdot 10^{-2}$
440	0.997	740	0.359	1040	0.390	1900	0.953	3400	0.144	4900	$4.0 \cdot 10^{-2}$
450	0.997	750	0.337	1050	0.400	1950	0.956	3450	0.137	4950	$5.1 \cdot 10^{-2}$
460	0.998	760	0.317	1060	0.411	2000	0.957	3500	0.134	5000	$6.5 \cdot 10^{-2}$
470	0.998	770	0.301	1070	0.422	2050	0.958	3550	0.136	5050	$7.6 \cdot 10^{-2}$
480	0.998	780	0.288	1080	0.433	2100	0.959	3600	0.143	5100	$8.4 \cdot 10^{-2}$
490	0.998	790	0.276	1090	0.445	2150	0.959	3650	0.154	5150	$8.6 \cdot 10^{-2}$

Data Sheet

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Reflection factor	
P_d	0.913

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (405nm)	≥	0.71
τ_i (514nm)	≥	0.85
τ_i (633nm)	≥	0.04
τ_i (694nm)	≤	0.0025
τ_i (1060nm)	≤	0.0004

Refractive Index n
n_e (546.1 nm) = 1.544
n_d (587.6 nm) = 1.542
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.87

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	0
SR class	52.3
AR class	0

Transformation temperature	
Tg [°C]	425

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	11.5
$\alpha_{20/300°C}$ [10^{-6}/K]	13.3
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

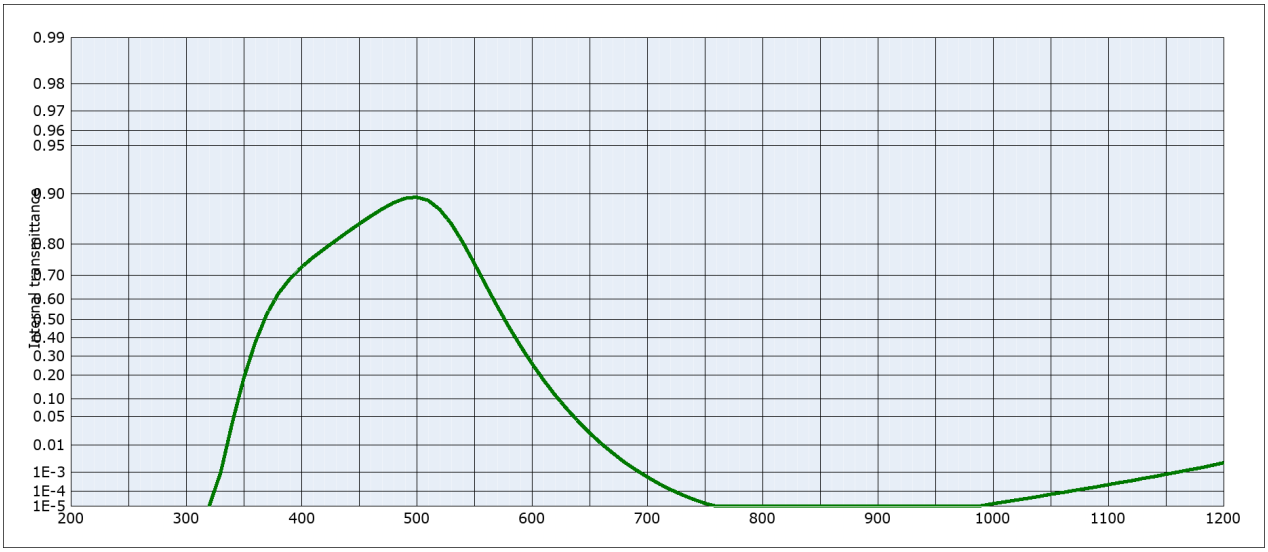
Notes
Ionically colored glass
Bandpass filter / shortpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=0.21mm) = 634 nm
Long-term changes of the polished
surface are possible under some
circumstances.
no visible surface damage after 500 h
of humidity test 85 °C / 85 % rh
Knoop hardness HK (0.1/20) = 385
All data wihout 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	0.300	0.234	0.198
y	0.440	0.438	0.430
Y	47	32	23
λ_d [nm]	499	497	496
P_e	0.34	0.49	0.58

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.283	0.222	0.190
y	0.419	0.413	0.403
Y	49	33	25
λ_d [nm]	497	496	495
P_e	0.35	0.50	0.59

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.217	0.182	0.164
y	0.313	0.298	0.288
Y	56	41	32
λ_d [nm]	489	489	488
P_e	0.36	0.50	0.58



BG66HS

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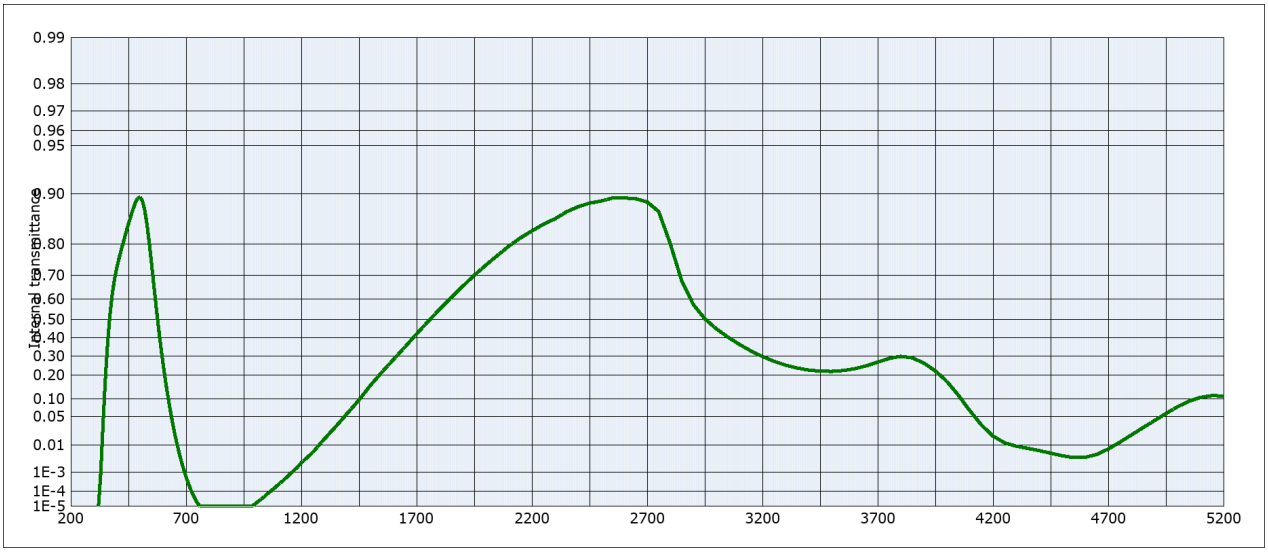


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.895	800	$< 10^{-5}$	1100	$2.5 \cdot 10^{-4}$	2200	0.832	3700	0.267
210	$< 10^{-5}$	510	0.890	810	$< 10^{-5}$	1110	$3.1 \cdot 10^{-4}$	2250	0.847	3750	0.287
220	$< 10^{-5}$	520	0.875	820	$< 10^{-5}$	1120	$3.9 \cdot 10^{-4}$	2300	0.858	3800	0.298
230	$< 10^{-5}$	530	0.848	830	$< 10^{-5}$	1130	$5.1 \cdot 10^{-4}$	2350	0.871	3850	0.290
240	$< 10^{-5}$	540	0.804	840	$< 10^{-5}$	1140	$6.3 \cdot 10^{-4}$	2400	0.880	3900	0.262
250	$< 10^{-5}$	550	0.741	850	$< 10^{-5}$	1150	$8.1 \cdot 10^{-4}$	2450	0.886	3950	0.222
260	$< 10^{-5}$	560	0.660	860	$< 10^{-5}$	1160	$1.0 \cdot 10^{-3}$	2500	0.889	4000	0.171
270	$< 10^{-5}$	570	0.564	870	$< 10^{-5}$	1170	$1.3 \cdot 10^{-3}$	2550	0.894	4050	0.114
280	$< 10^{-5}$	580	0.460	880	$< 10^{-5}$	1180	$1.6 \cdot 10^{-3}$	2600	0.894	4100	$6.4 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.356	890	$< 10^{-5}$	1190	$2.0 \cdot 10^{-3}$	2650	0.893	4150	$3.3 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.260	900	$< 10^{-5}$	1200	$2.5 \cdot 10^{-3}$	2700	0.888	4200	$1.8 \cdot 10^{-2}$
310	$< 10^{-5}$	610	0.179	910	$< 10^{-5}$	1250	$6.0 \cdot 10^{-3}$	2750	0.871	4250	$1.2 \cdot 10^{-2}$
320	$< 10^{-5}$	620	0.115	920	$< 10^{-5}$	1300	$1.5 \cdot 10^{-2}$	2800	0.800	4300	$9.4 \cdot 10^{-3}$
330	$9.7 \cdot 10^{-4}$	630	$7.1 \cdot 10^{-2}$	930	$< 10^{-5}$	1350	$3.1 \cdot 10^{-2}$	2850	0.677	4350	$8.1 \cdot 10^{-3}$
340	$3.7 \cdot 10^{-2}$	640	$4.1 \cdot 10^{-2}$	940	$< 10^{-5}$	1400	$5.8 \cdot 10^{-2}$	2900	0.574	4400	$6.8 \cdot 10^{-3}$
350	0.185	650	$2.2 \cdot 10^{-2}$	950	$< 10^{-5}$	1450	$9.7 \cdot 10^{-2}$	2950	0.502	4450	$5.6 \cdot 10^{-3}$
360	0.375	660	$1.1 \cdot 10^{-2}$	960	$< 10^{-5}$	1500	0.154	3000	0.449	4500	$4.6 \cdot 10^{-3}$
370	0.526	670	$5.7 \cdot 10^{-3}$	970	$< 10^{-5}$	1550	0.216	3050	0.404	4550	$4.0 \cdot 10^{-3}$
380	0.623	680	$2.7 \cdot 10^{-3}$	980	$< 10^{-5}$	1600	0.282	3100	0.364	4600	$4.0 \cdot 10^{-3}$
390	0.685	690	$1.3 \cdot 10^{-3}$	990	$1.1 \cdot 10^{-5}$	1650	0.350	3150	0.328	4650	$5.1 \cdot 10^{-3}$
400	0.728	700	$6.1 \cdot 10^{-4}$	1000	$1.6 \cdot 10^{-5}$	1700	0.421	3200	0.297	4700	$7.7 \cdot 10^{-3}$
410	0.760	710	$2.8 \cdot 10^{-4}$	1010	$2.1 \cdot 10^{-5}$	1750	0.488	3250	0.271	4750	$1.2 \cdot 10^{-2}$
420	0.786	720	$1.3 \cdot 10^{-4}$	1020	$2.8 \cdot 10^{-5}$	1800	0.551	3300	0.251	4800	$1.9 \cdot 10^{-2}$
430	0.809	730	$6.3 \cdot 10^{-5}$	1030	$3.7 \cdot 10^{-5}$	1850	0.606	3350	0.236	4850	$2.9 \cdot 10^{-2}$
440	0.829	740	$3.2 \cdot 10^{-5}$	1040	$4.9 \cdot 10^{-5}$	1900	0.655	3400	0.226	4900	$4.1 \cdot 10^{-2}$
450	0.847	750	$1.7 \cdot 10^{-5}$	1050	$6.7 \cdot 10^{-5}$	1950	0.699	3450	0.220	4950	$5.7 \cdot 10^{-2}$
460	0.863	760	$< 10^{-5}$	1060	$8.5 \cdot 10^{-5}$	2000	0.735	3500	0.219	5000	$7.5 \cdot 10^{-2}$
470	0.876	770	$< 10^{-5}$	1070	$1.1 \cdot 10^{-4}$	2050	0.766	3550	0.223	5050	$9.3 \cdot 10^{-2}$
480	0.886	780	$< 10^{-5}$	1080	$1.5 \cdot 10^{-4}$	2100	0.793	3600	0.233	5100	0.106
490	0.893	790	$< 10^{-5}$	1090	$1.9 \cdot 10^{-4}$	2150	0.815	3650	0.247	5150	0.112

Data Sheet

SCHOTT

BG67

Reflection factor	
P_d	0.913

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (450nm)	≥	0.7
τ_i (500nm)	≥	0.8
τ_i (550nm)	≥	0.65
τ_i (600nm)	≤	0.19

Refractive Index n
n_h (404.7 nm) = 1.556
n_g (435.8 nm) = 1.552
$n_{F'}$ (480.0 nm) = 1.547
n_F (486.1 nm) = 1.547
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.85

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	1.0
SR class	52.3
AR class	3.3

Transformation temperature	
Tg [°C]	390

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	11.8
$\alpha_{20/300°C}$ [10^{-6}/K]	13.7
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

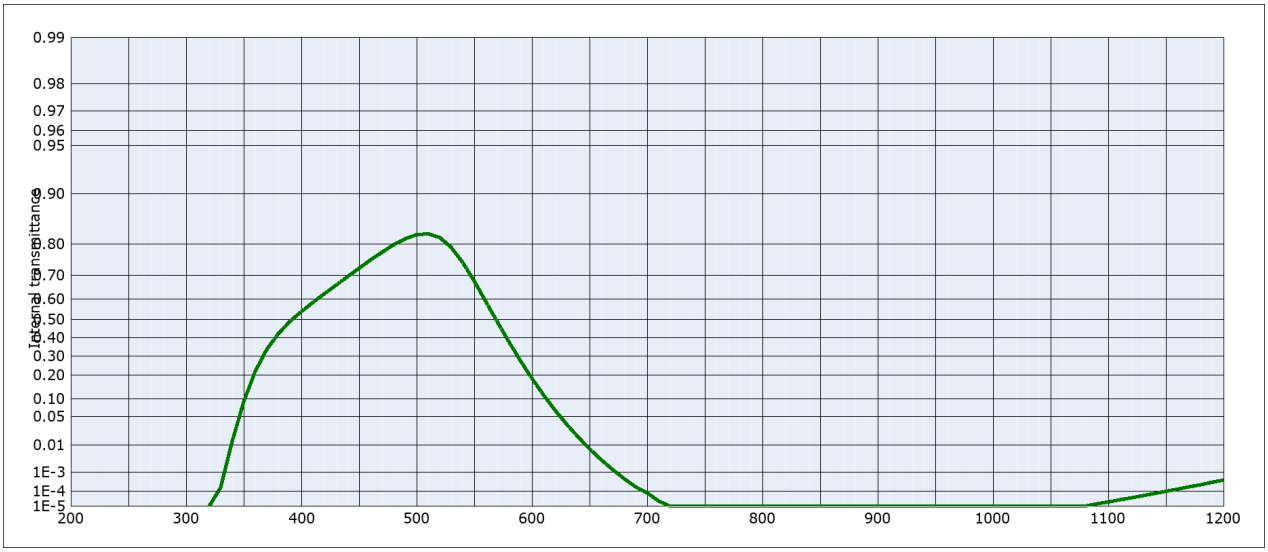
Notes
Ionically colored glass
Bandpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=0.145mm) @ 641 nm
Long-term changes in the polished
surface are possible under some
circumstances.
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.285	0.222	0.189
y	0.450	0.456	0.457
Y	41	25	17
λ_d [nm]	499	498	498
P_e	0.37	0.52	0.59

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.269	0.211	0.182
y	0.429	0.431	0.431
Y	43	27	19
λ_d [nm]	498	497	497
P_e	0.38	0.52	0.60

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.209	0.176	0.159
y	0.321	0.317	0.318
Y	50	33	24
λ_d [nm]	491	490	491
P_e	0.38	0.51	0.57



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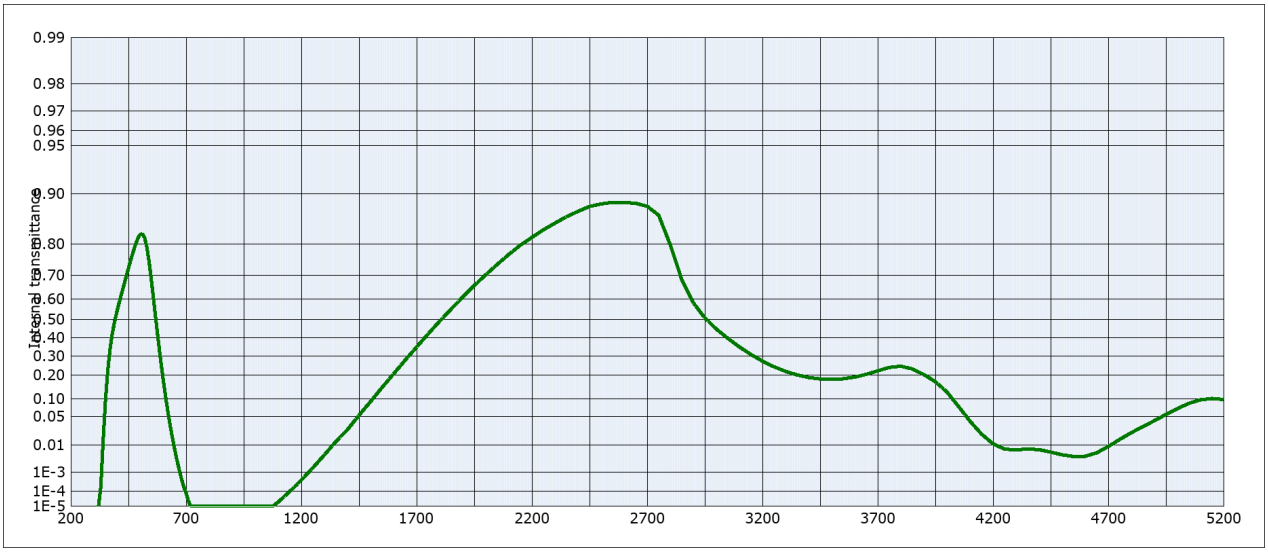


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.823	800	$< 10^{-5}$	1100	$2.1 \cdot 10^{-5}$	2200	0.816	3700	0.222
210	$< 10^{-5}$	510	0.825	810	$< 10^{-5}$	1110	$2.9 \cdot 10^{-5}$	2250	0.834	3750	0.239
220	$< 10^{-5}$	520	0.816	820	$< 10^{-5}$	1120	$4.0 \cdot 10^{-5}$	2300	0.849	3800	0.246
230	$< 10^{-5}$	530	0.790	830	$< 10^{-5}$	1130	$5.5 \cdot 10^{-5}$	2350	0.862	3850	0.232
240	$< 10^{-5}$	540	0.744	840	$< 10^{-5}$	1140	$7.5 \cdot 10^{-5}$	2400	0.872	3900	0.204
250	$< 10^{-5}$	550	0.676	850	$< 10^{-5}$	1150	$1.0 \cdot 10^{-4}$	2450	0.880	3950	0.170
260	$< 10^{-5}$	560	0.588	860	$< 10^{-5}$	1160	$1.4 \cdot 10^{-4}$	2500	0.884	4000	0.127
270	$< 10^{-5}$	570	0.486	870	$< 10^{-5}$	1170	$1.9 \cdot 10^{-4}$	2550	0.887	4050	$7.7 \cdot 10^{-2}$
280	$< 10^{-5}$	580	0.379	880	$< 10^{-5}$	1180	$2.4 \cdot 10^{-4}$	2600	0.887	4100	$4.1 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.275	890	$< 10^{-5}$	1190	$3.3 \cdot 10^{-4}$	2650	0.886	4150	$2.1 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.185	900	$< 10^{-5}$	1200	$4.3 \cdot 10^{-4}$	2700	0.881	4200	$1.1 \cdot 10^{-2}$
310	$< 10^{-5}$	610	0.115	910	$< 10^{-5}$	1250	$1.6 \cdot 10^{-3}$	2750	0.865	4250	$7.6 \cdot 10^{-3}$
320	$< 10^{-5}$	620	$6.6 \cdot 10^{-2}$	920	$< 10^{-5}$	1300	$4.9 \cdot 10^{-3}$	2800	0.797	4300	$7.2 \cdot 10^{-3}$
330	$1.7 \cdot 10^{-4}$	630	$3.5 \cdot 10^{-2}$	930	$< 10^{-5}$	1350	$1.3 \cdot 10^{-2}$	2850	0.682	4350	$7.7 \cdot 10^{-3}$
340	$1.3 \cdot 10^{-2}$	640	$1.7 \cdot 10^{-2}$	940	$< 10^{-5}$	1400	$2.6 \cdot 10^{-2}$	2900	0.582	4400	$7.3 \cdot 10^{-3}$
350	$9.1 \cdot 10^{-2}$	650	$7.8 \cdot 10^{-3}$	950	$< 10^{-5}$	1450	$5.3 \cdot 10^{-2}$	2950	0.507	4450	$6.1 \cdot 10^{-3}$
360	0.220	660	$3.3 \cdot 10^{-3}$	960	$< 10^{-5}$	1500	$9.2 \cdot 10^{-2}$	3000	0.448	4500	$4.9 \cdot 10^{-3}$
370	0.336	670	$1.3 \cdot 10^{-3}$	970	$< 10^{-5}$	1550	0.145	3050	0.396	4550	$4.3 \cdot 10^{-3}$
380	0.423	680	$5.0 \cdot 10^{-4}$	980	$< 10^{-5}$	1600	0.207	3100	0.350	4600	$4.4 \cdot 10^{-3}$
390	0.488	690	$1.8 \cdot 10^{-4}$	990	$< 10^{-5}$	1650	0.277	3150	0.308	4650	$5.8 \cdot 10^{-3}$
400	0.539	700	$8.1 \cdot 10^{-5}$	1000	$< 10^{-5}$	1700	0.349	3200	0.272	4700	$9.2 \cdot 10^{-3}$
410	0.583	710	$2.4 \cdot 10^{-5}$	1010	$< 10^{-5}$	1750	0.421	3250	0.243	4750	$1.5 \cdot 10^{-2}$
420	0.623	720	$< 10^{-5}$	1020	$< 10^{-5}$	1800	0.490	3300	0.219	4800	$2.2 \cdot 10^{-2}$
430	0.659	730	$< 10^{-5}$	1030	$< 10^{-5}$	1850	0.552	3350	0.202	4850	$3.1 \cdot 10^{-2}$
440	0.693	740	$< 10^{-5}$	1040	$< 10^{-5}$	1900	0.608	3400	0.190	4900	$4.1 \cdot 10^{-2}$
450	0.724	750	$< 10^{-5}$	1050	$< 10^{-5}$	1950	0.658	3450	0.183	4950	$5.5 \cdot 10^{-2}$
460	0.752	760	$< 10^{-5}$	1060	$< 10^{-5}$	2000	0.701	3500	0.180	5000	$7.1 \cdot 10^{-2}$
470	0.776	770	$< 10^{-5}$	1070	$< 10^{-5}$	2050	0.738	3550	0.183	5050	$8.6 \cdot 10^{-2}$
480	0.797	780	$< 10^{-5}$	1080	$1.0 \cdot 10^{-5}$	2100	0.770	3600	0.191	5100	$9.8 \cdot 10^{-2}$
490	0.813	790	$< 10^{-5}$	1090	$1.5 \cdot 10^{-5}$	2150	0.796	3650	0.204	5150	0.102

Data Sheet

SCHOTT

BG67HT

Reflection factor	
P_d	0.913

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (450nm)	≥	0.75
τ_i (500nm)	≥	0.83
τ_i (550nm)	≥	0.65
τ_i (600nm)	≤	0.19

Refractive Index n
n_h (404.7 nm) = 1.556
n_g (435.8 nm) = 1.552
$n_{F'}$ (480.0 nm) = 1.547
n_F (486.1 nm) = 1.547
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.85

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	1.0
SR class	52.3
AR class	3.3

Transformation temperature	
Tg [°C]	390

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	11.8
$\alpha_{20/300°C}$ [10^{-6}/K]	13.7
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

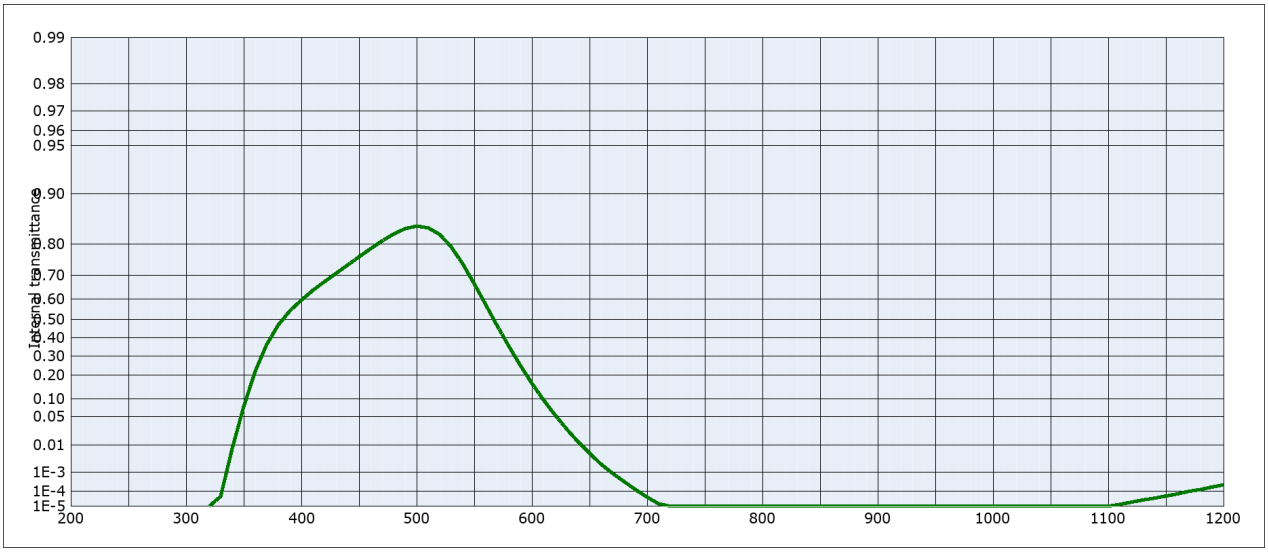
Notes
Ionically colored glass
Bandpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=0.145mm) @ 641 nm
Long-term changes of the polished
surface are possible under some
circumstances.
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.274	0.211	0.179
y	0.445	0.441	0.434
Y	40	25	17
λ_d [nm]	499	497	496
P_e	0.40	0.55	0.63

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.259	0.201	0.173
y	0.422	0.415	0.407
Y	42	26	18
λ_d [nm]	497	496	495
P_e	0.41	0.55	0.63

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.203	0.170	0.154
y	0.312	0.300	0.294
Y	49	33	24
λ_d [nm]	490	489	489
P_e	0.41	0.54	0.61



BG67HT

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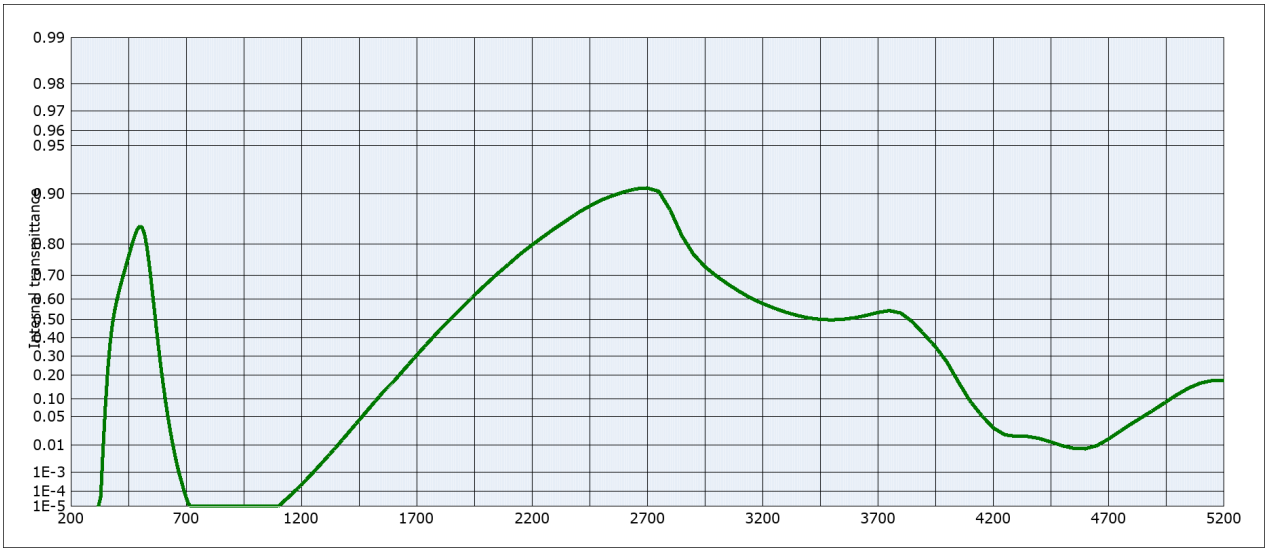


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.843	800	$< 10^{-5}$	1100	$< 10^{-5}$	2200	0.796	3700	0.534
210	$< 10^{-5}$	510	0.839	810	$< 10^{-5}$	1110	$1.4 \cdot 10^{-5}$	2250	0.818	3750	0.544
220	$< 10^{-5}$	520	0.824	820	$< 10^{-5}$	1120	$2.0 \cdot 10^{-5}$	2300	0.838	3800	0.532
230	$< 10^{-5}$	530	0.791	830	$< 10^{-5}$	1130	$2.8 \cdot 10^{-5}$	2350	0.854	3850	0.487
240	$< 10^{-5}$	540	0.739	840	$< 10^{-5}$	1140	$3.8 \cdot 10^{-5}$	2400	0.869	3900	0.421
250	$< 10^{-5}$	550	0.665	850	$< 10^{-5}$	1150	$5.2 \cdot 10^{-5}$	2450	0.881	3950	0.351
260	$< 10^{-5}$	560	0.572	860	$< 10^{-5}$	1160	$7.1 \cdot 10^{-5}$	2500	0.891	4000	0.268
270	$< 10^{-5}$	570	0.464	870	$< 10^{-5}$	1170	$1.0 \cdot 10^{-4}$	2550	0.897	4050	0.169
280	$< 10^{-5}$	580	0.353	880	$< 10^{-5}$	1180	$1.3 \cdot 10^{-4}$	2600	0.903	4100	$9.4 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.249	890	$< 10^{-5}$	1190	$1.8 \cdot 10^{-4}$	2650	0.907	4150	$5.3 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.163	900	$< 10^{-5}$	1200	$2.4 \cdot 10^{-4}$	2700	0.908	4200	$2.9 \cdot 10^{-2}$
310	$< 10^{-5}$	610	$9.8 \cdot 10^{-2}$	910	$< 10^{-5}$	1250	$9.6 \cdot 10^{-4}$	2750	0.903	4250	$2.0 \cdot 10^{-2}$
320	$< 10^{-5}$	620	$5.4 \cdot 10^{-2}$	920	$< 10^{-5}$	1300	$3.2 \cdot 10^{-3}$	2800	0.874	4300	$1.8 \cdot 10^{-2}$
330	$4.9 \cdot 10^{-5}$	630	$2.7 \cdot 10^{-2}$	930	$< 10^{-5}$	1350	$8.7 \cdot 10^{-3}$	2850	0.821	4350	$1.8 \cdot 10^{-2}$
340	$7.9 \cdot 10^{-3}$	640	$1.3 \cdot 10^{-2}$	940	$< 10^{-5}$	1400	$2.1 \cdot 10^{-2}$	2900	0.771	4400	$1.6 \cdot 10^{-2}$
350	$7.6 \cdot 10^{-2}$	650	$5.6 \cdot 10^{-3}$	950	$< 10^{-5}$	1450	$4.2 \cdot 10^{-2}$	2950	0.730	4450	$1.3 \cdot 10^{-2}$
360	0.220	660	$2.2 \cdot 10^{-3}$	960	$< 10^{-5}$	1500	$7.6 \cdot 10^{-2}$	3000	0.696	4500	$9.7 \cdot 10^{-3}$
370	0.363	670	$9.0 \cdot 10^{-4}$	970	$< 10^{-5}$	1550	0.122	3050	0.664	4550	$8.1 \cdot 10^{-3}$
380	0.470	680	$3.6 \cdot 10^{-4}$	980	$< 10^{-5}$	1600	0.170	3100	0.633	4600	$7.8 \cdot 10^{-3}$
390	0.543	690	$1.3 \cdot 10^{-4}$	990	$< 10^{-5}$	1650	0.235	3150	0.603	4650	$9.8 \cdot 10^{-3}$
400	0.594	700	$4.4 \cdot 10^{-5}$	1000	$< 10^{-5}$	1700	0.304	3200	0.578	4700	$1.5 \cdot 10^{-2}$
410	0.638	710	$1.5 \cdot 10^{-5}$	1010	$< 10^{-5}$	1750	0.374	3250	0.556	4750	$2.4 \cdot 10^{-2}$
420	0.674	720	$< 10^{-5}$	1020	$< 10^{-5}$	1800	0.442	3300	0.536	4800	$3.6 \cdot 10^{-2}$
430	0.706	730	$< 10^{-5}$	1030	$< 10^{-5}$	1850	0.504	3350	0.520	4850	$5.0 \cdot 10^{-2}$
440	0.735	740	$< 10^{-5}$	1040	$< 10^{-5}$	1900	0.563	3400	0.506	4900	$6.8 \cdot 10^{-2}$
450	0.762	750	$< 10^{-5}$	1050	$< 10^{-5}$	1950	0.617	3450	0.499	4950	$9.1 \cdot 10^{-2}$
460	0.786	760	$< 10^{-5}$	1060	$< 10^{-5}$	2000	0.663	3500	0.496	5000	0.117
470	0.807	770	$< 10^{-5}$	1070	$< 10^{-5}$	2050	0.704	3550	0.500	5050	0.143
480	0.824	780	$< 10^{-5}$	1080	$< 10^{-5}$	2100	0.739	3600	0.507	5100	0.164
490	0.837	790	$< 10^{-5}$	1090	$< 10^{-5}$	2150	0.771	3650	0.520	5150	0.175

Data Sheet

SCHOTT

VG9

Reflection factor	
P_d	0.911

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (450nm)	≤	0.21
τ_i (514nm)	≥	0.67
τ_i (633nm)	≤	0.15
τ_i (725nm)	≤	0.07
τ_i (1060nm)	≤	0.18

Refractive Index n
$n_{F'}$ (480.0 nm) = 1.560
n_d (587.6 nm) = 1.550

Density	
ρ [g/cm^3]	2.87

Bubble content	
Bubble class	1

Chemical Resistance	
FR class	0
SR class	1.0
AR class	1.0

Transformation temperature	
Tg [°C]	462

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	9.2
$\alpha_{20/300°C}$ [10^{-6}/K]	10.6
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

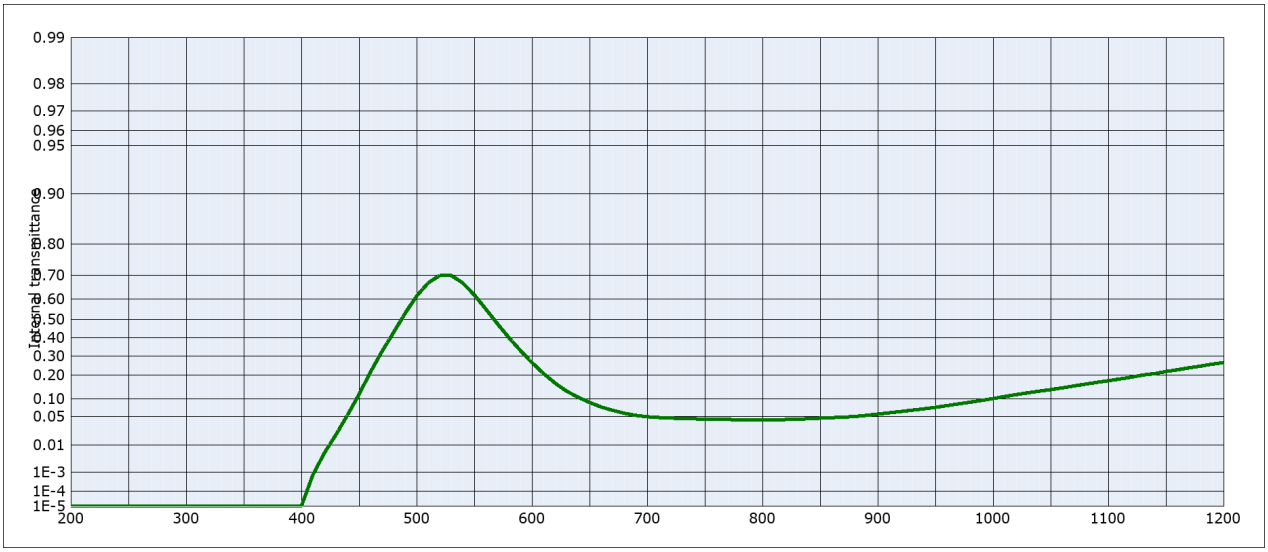
Notes
Ionically colored glass
Bandpass filter
All data wihout tolerances are to be understood to be reference values. Guaranteed values are only those values listed in the section "Spectral values guaranteed".

Colorimetric evaluation

Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.370	0.306	0.265
y	0.522	0.596	0.645
Y	40	21	12
λ_d [nm]	535	529	527
P_e	0.31	0.47	0.58

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.354	0.295	0.256
y	0.521	0.596	0.645
Y	41	22	13
λ_d [nm]	538	531	528
P_e	0.33	0.49	0.59

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.284	0.246	0.220
y	0.493	0.582	0.637
Y	45	25	15
λ_d [nm]	541	535	532
P_e	0.39	0.56	0.66



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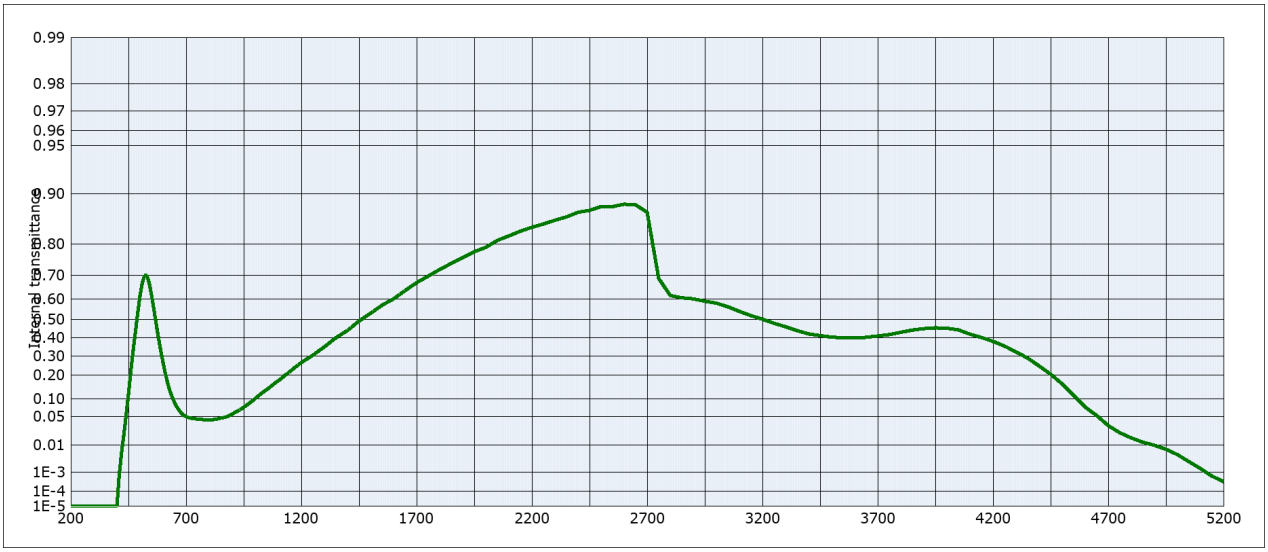


Internal transmittance τ_i at reference thickness d = 1 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.613	800	$4.3 \cdot 10^{-2}$	1100	0.174	2200	0.840	3700	0.410
210	$< 10^{-5}$	510	0.669	810	$4.3 \cdot 10^{-2}$	1110	0.182	2250	0.847	3750	0.418
220	$< 10^{-5}$	520	0.698	820	$4.4 \cdot 10^{-2}$	1120	0.191	2300	0.855	3800	0.430
230	$< 10^{-5}$	530	0.698	830	$4.5 \cdot 10^{-2}$	1130	0.201	2350	0.861	3850	0.442
240	$< 10^{-5}$	540	0.669	840	$4.5 \cdot 10^{-2}$	1140	0.208	2400	0.870	3900	0.450
250	$< 10^{-5}$	550	0.618	850	$4.7 \cdot 10^{-2}$	1150	0.218	2450	0.874	3950	0.454
260	$< 10^{-5}$	560	0.552	860	$4.8 \cdot 10^{-2}$	1160	0.227	2500	0.880	4000	0.452
270	$< 10^{-5}$	570	0.477	870	$4.9 \cdot 10^{-2}$	1170	0.237	2550	0.880	4050	0.443
280	$< 10^{-5}$	580	0.401	880	$5.0 \cdot 10^{-2}$	1180	0.246	2600	0.884	4100	0.420
290	$< 10^{-5}$	590	0.330	890	$5.3 \cdot 10^{-2}$	1190	0.256	2650	0.883	4150	0.402
300	$< 10^{-5}$	600	0.265	900	$5.6 \cdot 10^{-2}$	1200	0.264	2700	0.870	4200	0.380
310	$< 10^{-5}$	610	0.209	910	$5.9 \cdot 10^{-2}$	1250	0.304	2750	0.687	4250	0.354
320	$< 10^{-5}$	620	0.164	920	$6.3 \cdot 10^{-2}$	1300	0.350	2800	0.615	4300	0.322
330	$< 10^{-5}$	630	0.130	930	$6.6 \cdot 10^{-2}$	1350	0.400	2850	0.605	4350	0.288
340	$< 10^{-5}$	640	0.107	940	$7.0 \cdot 10^{-2}$	1400	0.440	2900	0.600	4400	0.247
350	$< 10^{-5}$	650	$8.9 \cdot 10^{-2}$	950	$7.4 \cdot 10^{-2}$	1450	0.490	2950	0.589	4450	0.205
360	$< 10^{-5}$	660	$7.5 \cdot 10^{-2}$	960	$7.9 \cdot 10^{-2}$	1500	0.530	3000	0.580	4500	0.160
370	$< 10^{-5}$	670	$6.6 \cdot 10^{-2}$	970	$8.4 \cdot 10^{-2}$	1550	0.570	3050	0.563	4550	0.114
380	$< 10^{-5}$	680	$5.8 \cdot 10^{-2}$	980	$9.0 \cdot 10^{-2}$	1600	0.600	3100	0.540	4600	$7.4 \cdot 10^{-2}$
390	$< 10^{-5}$	690	$5.3 \cdot 10^{-2}$	990	$9.5 \cdot 10^{-2}$	1650	0.637	3150	0.518	4650	$5.2 \cdot 10^{-2}$
400	$< 10^{-5}$	700	$5.0 \cdot 10^{-2}$	1000	0.102	1700	0.670	3200	0.500	4700	$3.3 \cdot 10^{-2}$
410	$7.6 \cdot 10^{-4}$	710	$4.8 \cdot 10^{-2}$	1010	0.109	1750	0.696	3250	0.479	4750	$2.2 \cdot 10^{-2}$
420	$5.7 \cdot 10^{-3}$	720	$4.7 \cdot 10^{-2}$	1020	0.116	1800	0.720	3300	0.460	4800	$1.6 \cdot 10^{-2}$
430	$2.0 \cdot 10^{-2}$	730	$4.6 \cdot 10^{-2}$	1030	0.123	1850	0.741	3350	0.439	4850	$1.2 \cdot 10^{-2}$
440	$5.3 \cdot 10^{-2}$	740	$4.5 \cdot 10^{-2}$	1040	0.130	1900	0.760	3400	0.421	4900	$1.0 \cdot 10^{-2}$
450	0.117	750	$4.5 \cdot 10^{-2}$	1050	0.136	1950	0.778	3450	0.412	4950	$7.5 \cdot 10^{-3}$
460	0.216	760	$4.4 \cdot 10^{-2}$	1060	0.143	2000	0.790	3500	0.403	5000	$5.0 \cdot 10^{-3}$
470	0.325	770	$4.4 \cdot 10^{-2}$	1070	0.151	2050	0.809	3550	0.400	5050	$2.8 \cdot 10^{-3}$
480	0.429	780	$4.4 \cdot 10^{-2}$	1080	0.159	2100	0.820	3600	0.400	5100	$1.5 \cdot 10^{-3}$
490	0.530	790	$4.3 \cdot 10^{-2}$	1090	0.167	2150	0.831	3650	0.402	5150	$6.6 \cdot 10^{-4}$

Data Sheet

SCHOTT

VG20

Reflection factor	
P_d	0.913

Reference thickness	
d [mm]	1

Spectral values guaranteed		
τ_i (450nm)	≥	0.75
τ_i (500nm)	≥	0.83
τ_i (550nm)	≥	0.65
τ_i (600nm)	≤	0.19

Refractive Index n
n_h (404.7 nm) = 1.556
n_g (435.8 nm) = 1.552
$n_{F'}$ (480.0 nm) = 1.547
n_F (486.1 nm) = 1.547
Sellmeier coefficients on request

Density	
ρ [g/cm^3]	2.85

Bubble content	
Bubble class	2

Chemical Resistance	
FR class	1.0
SR class	52.3
AR class	3.3

Transformation temperature	
Tg [°C]	390

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	11.8
$\alpha_{20/300°C}$ [10^{-6}/K]	13.7
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

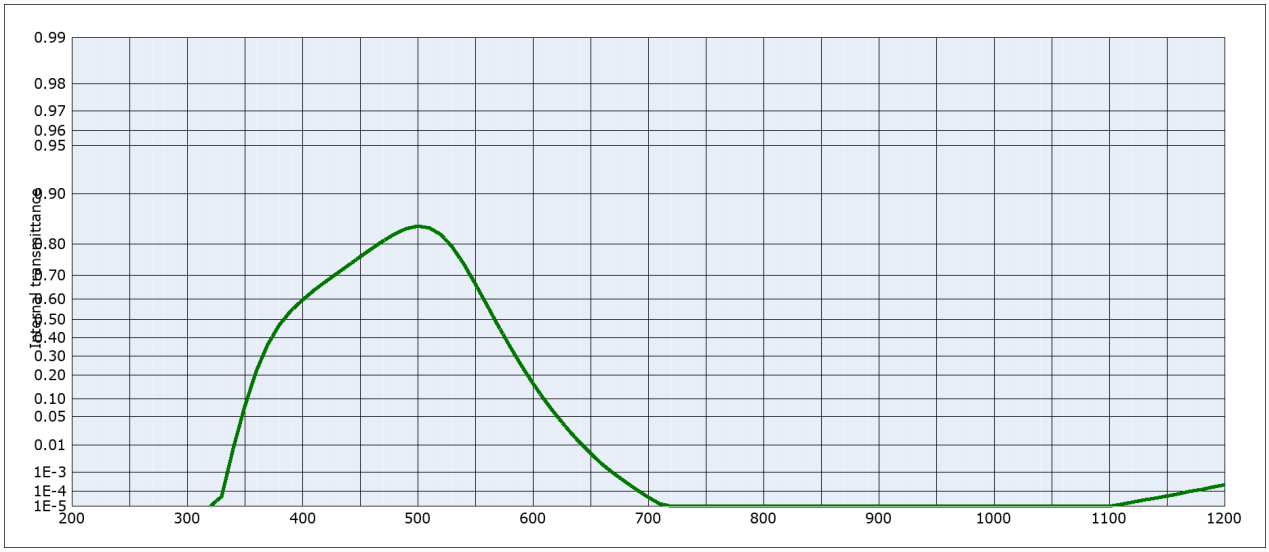
Notes
Ionically colored glass
Bandpass filter
Color compensating filter / IR cut filter
lambda_50%(thickness=0.3mm) @ 604 nm
Long-term changes of the polished
surface are possible under some
circumstances.
All data wihout tolerances are to be
understood to be reference values.
Guaranteed values are only those
values listed in the section
"Spectral values guaranteed".

Colorimetric evaluation

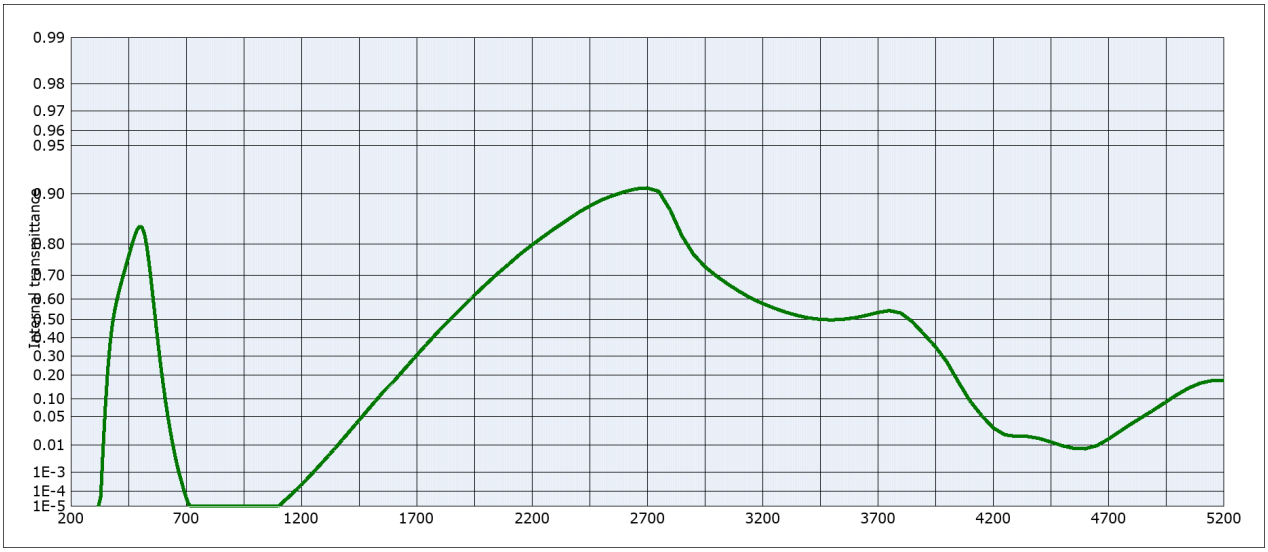
Illuminant	A (Planck T = 2856 K)		
d [mm]	1	2	3
x	0.274	0.211	0.179
y	0.445	0.441	0.434
Y	40	25	17
λ_d [nm]	499	497	496
P_e	0.40	0.55	0.63

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.259	0.201	0.173
y	0.422	0.415	0.407
Y	42	26	18
λ_d [nm]	497	496	495
P_e	0.41	0.55	0.63

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.203	0.170	0.154
y	0.312	0.300	0.294
Y	49	33	24
λ_d [nm]	490	489	489
P_e	0.41	0.54	0.61



VG20



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	$< 10^{-5}$	500	0.843	800	$< 10^{-5}$	1100	$< 10^{-5}$	2200	0.796	3700	0.534
210	$< 10^{-5}$	510	0.839	810	$< 10^{-5}$	1110	$1.4 \cdot 10^{-5}$	2250	0.818	3750	0.544
220	$< 10^{-5}$	520	0.824	820	$< 10^{-5}$	1120	$2.0 \cdot 10^{-5}$	2300	0.838	3800	0.532
230	$< 10^{-5}$	530	0.791	830	$< 10^{-5}$	1130	$2.8 \cdot 10^{-5}$	2350	0.854	3850	0.487
240	$< 10^{-5}$	540	0.739	840	$< 10^{-5}$	1140	$3.8 \cdot 10^{-5}$	2400	0.869	3900	0.421
250	$< 10^{-5}$	550	0.665	850	$< 10^{-5}$	1150	$5.2 \cdot 10^{-5}$	2450	0.881	3950	0.351
260	$< 10^{-5}$	560	0.572	860	$< 10^{-5}$	1160	$7.1 \cdot 10^{-5}$	2500	0.891	4000	0.268
270	$< 10^{-5}$	570	0.464	870	$< 10^{-5}$	1170	$1.0 \cdot 10^{-4}$	2550	0.897	4050	0.169
280	$< 10^{-5}$	580	0.353	880	$< 10^{-5}$	1180	$1.3 \cdot 10^{-4}$	2600	0.903	4100	$9.4 \cdot 10^{-2}$
290	$< 10^{-5}$	590	0.249	890	$< 10^{-5}$	1190	$1.8 \cdot 10^{-4}$	2650	0.907	4150	$5.3 \cdot 10^{-2}$
300	$< 10^{-5}$	600	0.163	900	$< 10^{-5}$	1200	$2.4 \cdot 10^{-4}$	2700	0.908	4200	$2.9 \cdot 10^{-2}$
310	$< 10^{-5}$	610	$9.8 \cdot 10^{-2}$	910	$< 10^{-5}$	1250	$9.6 \cdot 10^{-4}$	2750	0.903	4250	$2.0 \cdot 10^{-2}$
320	$< 10^{-5}$	620	$5.4 \cdot 10^{-2}$	920	$< 10^{-5}$	1300	$3.2 \cdot 10^{-3}$	2800	0.874	4300	$1.8 \cdot 10^{-2}$
330	$4.9 \cdot 10^{-5}$	630	$2.7 \cdot 10^{-2}$	930	$< 10^{-5}$	1350	$8.7 \cdot 10^{-3}$	2850	0.821	4350	$1.8 \cdot 10^{-2}$
340	$7.9 \cdot 10^{-3}$	640	$1.3 \cdot 10^{-2}$	940	$< 10^{-5}$	1400	$2.1 \cdot 10^{-2}$	2900	0.771	4400	$1.6 \cdot 10^{-2}$
350	$7.6 \cdot 10^{-2}$	650	$5.6 \cdot 10^{-3}$	950	$< 10^{-5}$	1450	$4.2 \cdot 10^{-2}$	2950	0.730	4450	$1.3 \cdot 10^{-2}$
360	0.220	660	$2.2 \cdot 10^{-3}$	960	$< 10^{-5}$	1500	$7.6 \cdot 10^{-2}$	3000	0.696	4500	$9.7 \cdot 10^{-3}$
370	0.363	670	$9.0 \cdot 10^{-4}$	970	$< 10^{-5}$	1550	0.122	3050	0.664	4550	$8.1 \cdot 10^{-3}$
380	0.470	680	$3.6 \cdot 10^{-4}$	980	$< 10^{-5}$	1600	0.170	3100	0.633	4600	$7.8 \cdot 10^{-3}$
390	0.543	690	$1.3 \cdot 10^{-4}$	990	$< 10^{-5}$	1650	0.235	3150	0.603	4650	$9.8 \cdot 10^{-3}$
400	0.594	700	$4.4 \cdot 10^{-5}$	1000	$< 10^{-5}$	1700	0.304	3200	0.578	4700	$1.5 \cdot 10^{-2}$
410	0.638	710	$1.5 \cdot 10^{-5}$	1010	$< 10^{-5}$	1750	0.374	3250	0.556	4750	$2.4 \cdot 10^{-2}$
420	0.674	720	$< 10^{-5}$	1020	$< 10^{-5}$	1800	0.442	3300	0.536	4800	$3.6 \cdot 10^{-2}$
430	0.706	730	$< 10^{-5}$	1030	$< 10^{-5}$	1850	0.504	3350	0.520	4850	$5.0 \cdot 10^{-2}$
440	0.735	740	$< 10^{-5}$	1040	$< 10^{-5}$	1900	0.563	3400	0.506	4900	$6.8 \cdot 10^{-2}$
450	0.762	750	$< 10^{-5}$	1050	$< 10^{-5}$	1950	0.617	3450	0.499	4950	$9.1 \cdot 10^{-2}$
460	0.786	760	$< 10^{-5}$	1060	$< 10^{-5}$	2000	0.663	3500	0.496	5000	0.117
470	0.807	770	$< 10^{-5}$	1070	$< 10^{-5}$	2050	0.704	3550	0.500	5050	0.143
480	0.824	780	$< 10^{-5}$	1080	$< 10^{-5}$	2100	0.739	3600	0.507	5100	0.164
490	0.837	790	$< 10^{-5}$	1090	$< 10^{-5}$	2150	0.771	3650	0.520	5150	0.175

Data Sheet

SCHOTT

S8022

Reflection factor	
P_d	0.910

Reference thickness	
d [mm]	2

Spectral values guaranteed

Refractive Index n
n_d (587.6 nm) = 1.555

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	
Tg [°C]	453

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	7.8
$\alpha_{20/300°C}$ [10^{-6}/K]	8.9
$\alpha_{20/200°C}$ [10^{-6}/K]	

Temperature coefficient	
T_K [nm/°C]	

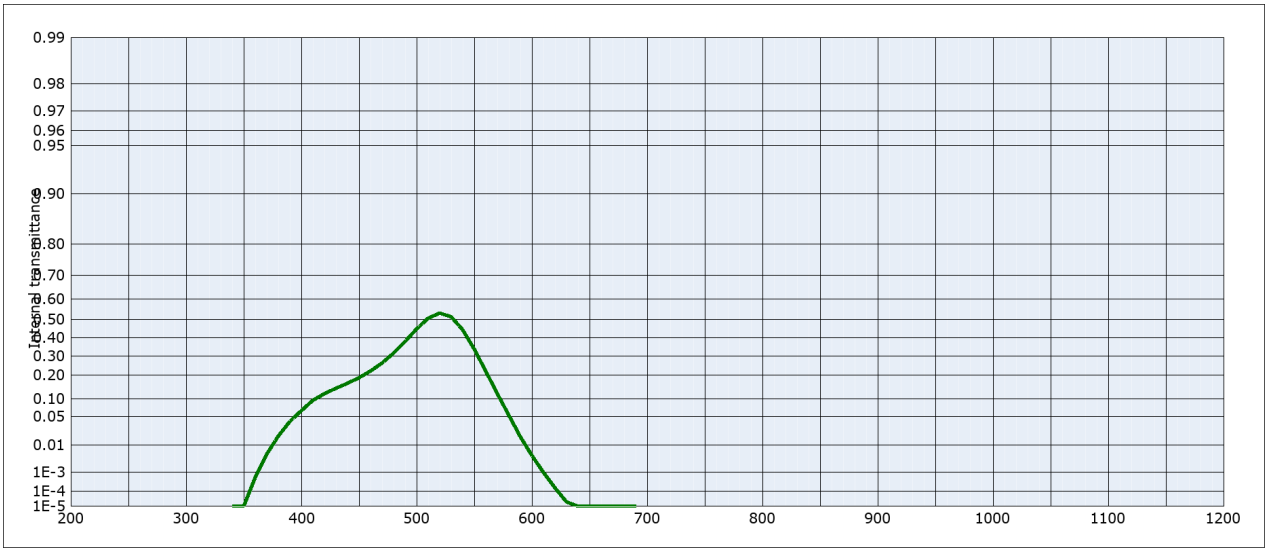
Notes
Ionically colored glass
Bandpass filter
NVIS-Green A - 2 mm bandpass Filter
according to MIL-STD-3009
Long-term changes of the polished
surface are possible.
passed thermal shock test as per
MIL-STD-202F method 107F, Condition A
All data wihout tolerances are to be
understood to be reference values.
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	0.253	0.203	0.178
y	0.498	0.549	0.593
Y	30	16	9
λ_d [nm]	503	505	508
P_e	0.44	0.55	0.61

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.241	0.196	0.173
y	0.478	0.530	0.577
Y	31	16	10
λ_d [nm]	502	504	507
P_e	0.44	0.54	0.60

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.196	0.169	0.154
y	0.374	0.432	0.492
Y	37	21	12
λ_d [nm]	496	500	505
P_e	0.40	0.47	0.51



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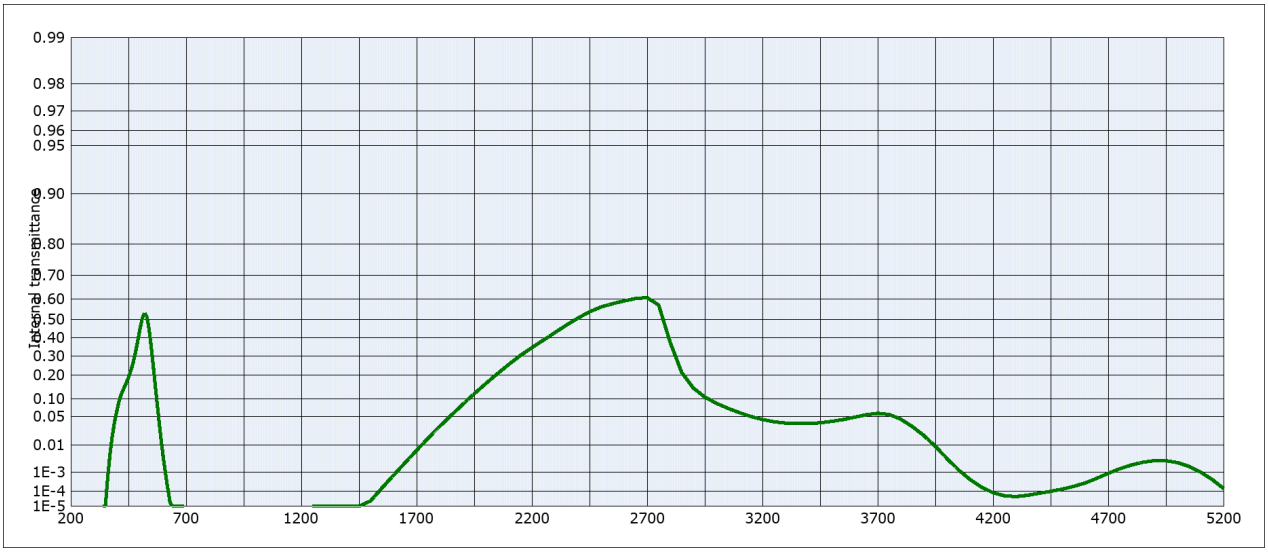


Internal transmittance τ_i at reference thickness d = 2 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.448	800	$< 10^{-5}$	1100	$< 10^{-5}$	2200	0.345	3700	$5.8 \cdot 10^{-2}$
210	$< 10^{-5}$	510	0.505	810	$< 10^{-5}$	1110	$< 10^{-5}$	2250	0.387	3750	$5.5 \cdot 10^{-2}$
220	$< 10^{-5}$	520	0.531	820	$< 10^{-5}$	1120	$< 10^{-5}$	2300	0.429	3800	$4.4 \cdot 10^{-2}$
230	$< 10^{-5}$	530	0.512	830	$< 10^{-5}$	1130	$< 10^{-5}$	2350	0.469	3850	$3.1 \cdot 10^{-2}$
240	$< 10^{-5}$	540	0.443	840	$< 10^{-5}$	1140	$< 10^{-5}$	2400	0.506	3900	$1.9 \cdot 10^{-2}$
250	$< 10^{-5}$	550	0.337	850	$< 10^{-5}$	1150	$< 10^{-5}$	2450	0.538	3950	$9.3 \cdot 10^{-3}$
260	$< 10^{-5}$	560	0.220	860	$< 10^{-5}$	1160	$< 10^{-5}$	2500	0.562	4000	$3.7 \cdot 10^{-3}$
270	$< 10^{-5}$	570	0.120	870	$< 10^{-5}$	1170	$< 10^{-5}$	2550	0.577	4050	$1.3 \cdot 10^{-3}$
280	$< 10^{-5}$	580	$5.3 \cdot 10^{-2}$	880	$< 10^{-5}$	1180	$< 10^{-5}$	2600	0.590	4100	$4.6 \cdot 10^{-4}$
290	$< 10^{-5}$	590	$1.7 \cdot 10^{-2}$	890	$< 10^{-5}$	1190	$< 10^{-5}$	2650	0.602	4150	$1.8 \cdot 10^{-4}$
300	$< 10^{-5}$	600	$4.7 \cdot 10^{-3}$	900	$< 10^{-5}$	1200	$< 10^{-5}$	2700	0.606	4200	$8.4 \cdot 10^{-5}$
310	$< 10^{-5}$	610	$9.9 \cdot 10^{-4}$	910	$< 10^{-5}$	1250	$< 10^{-5}$	2750	0.571	4250	$5.4 \cdot 10^{-5}$
320	$< 10^{-5}$	620	$1.6 \cdot 10^{-4}$	920	$< 10^{-5}$	1300	$< 10^{-5}$	2800	0.374	4300	$4.8 \cdot 10^{-5}$
330	$< 10^{-5}$	630	$2.1 \cdot 10^{-5}$	930	$< 10^{-5}$	1350	$< 10^{-5}$	2850	0.213	4350	$5.8 \cdot 10^{-5}$
340	$< 10^{-5}$	640	$< 10^{-5}$	940	$< 10^{-5}$	1400	$< 10^{-5}$	2900	0.142	4400	$7.8 \cdot 10^{-5}$
350	$< 10^{-5}$	650	$< 10^{-5}$	950	$< 10^{-5}$	1450	$< 10^{-5}$	2950	0.107	4450	$1.0 \cdot 10^{-4}$
360	$5.7 \cdot 10^{-4}$	660	$< 10^{-5}$	960	$< 10^{-5}$	1500	$2.4 \cdot 10^{-5}$	3000	$8.6 \cdot 10^{-2}$	4500	$1.4 \cdot 10^{-4}$
370	$5.2 \cdot 10^{-3}$	670	$< 10^{-5}$	970	$< 10^{-5}$	1550	$1.6 \cdot 10^{-4}$	3050	$7.1 \cdot 10^{-2}$	4550	$2.0 \cdot 10^{-4}$
380	$1.8 \cdot 10^{-2}$	680	$< 10^{-5}$	980	$< 10^{-5}$	1600	$7.4 \cdot 10^{-4}$	3100	$5.9 \cdot 10^{-2}$	4600	$3.0 \cdot 10^{-4}$
390	$4.0 \cdot 10^{-2}$	690	$< 10^{-5}$	990	$< 10^{-5}$	1650	$2.5 \cdot 10^{-3}$	3150	$5.0 \cdot 10^{-2}$	4650	$5.2 \cdot 10^{-4}$
400	$6.5 \cdot 10^{-2}$	700	$< 10^{-5}$	1000	$< 10^{-5}$	1700	$6.9 \cdot 10^{-3}$	3200	$4.4 \cdot 10^{-2}$	4700	$9.0 \cdot 10^{-4}$
410	$9.6 \cdot 10^{-2}$	710	$< 10^{-5}$	1010	$< 10^{-5}$	1750	$1.6 \cdot 10^{-2}$	3250	$3.9 \cdot 10^{-2}$	4750	$1.4 \cdot 10^{-3}$
420	0.120	720	$< 10^{-5}$	1020	$< 10^{-5}$	1800	$3.1 \cdot 10^{-2}$	3300	$3.7 \cdot 10^{-2}$	4800	$2.0 \cdot 10^{-3}$
430	0.141	730	$< 10^{-5}$	1030	$< 10^{-5}$	1850	$5.3 \cdot 10^{-2}$	3350	$3.6 \cdot 10^{-2}$	4850	$2.6 \cdot 10^{-3}$
440	0.163	740	$< 10^{-5}$	1040	$< 10^{-5}$	1900	$8.3 \cdot 10^{-2}$	3400	$3.6 \cdot 10^{-2}$	4900	$3.0 \cdot 10^{-3}$
450	0.188	750	$< 10^{-5}$	1050	$< 10^{-5}$	1950	0.120	3450	$3.7 \cdot 10^{-2}$	4950	$3.0 \cdot 10^{-3}$
460	0.221	760	$< 10^{-5}$	1060	$< 10^{-5}$	2000	0.162	3500	$4.0 \cdot 10^{-2}$	5000	$2.5 \cdot 10^{-3}$
470	0.262	770	$< 10^{-5}$	1070	$< 10^{-5}$	2050	0.207	3550	$4.4 \cdot 10^{-2}$	5050	$1.8 \cdot 10^{-3}$
480	0.316	780	$< 10^{-5}$	1080	$< 10^{-5}$	2100	0.255	3600	$4.9 \cdot 10^{-2}$	5100	$1.0 \cdot 10^{-3}$
490	0.380	790	$< 10^{-5}$	1090	$< 10^{-5}$	2150	0.302	3650	$5.4 \cdot 10^{-2}$	5150	$4.6 \cdot 10^{-4}$

Data Sheet

SCHOTT

S8023

Reflection factor	
P_d	0.913

Reference thickness	
d [mm]	3

Spectral values guaranteed

Refractive Index n
n_d (587.6 nm) = 1.541

Density	
ρ [g/cm^3]	2.75

Bubble content	
Bubble class	1

Chemical Resistance	
FR class	0
SR class	4.0
AR class	3.0

Transformation temperature	
Tg [°C]	444

Thermal expansion	
$\alpha_{-30/+70°C}$ [10^{-6}/K]	
$\alpha_{20/300°C}$ [10^{-6}/K]	
$\alpha_{20/200°C}$ [10^{-6}/K]	9.7

Temperature coefficient	
T_K [nm/°C]	

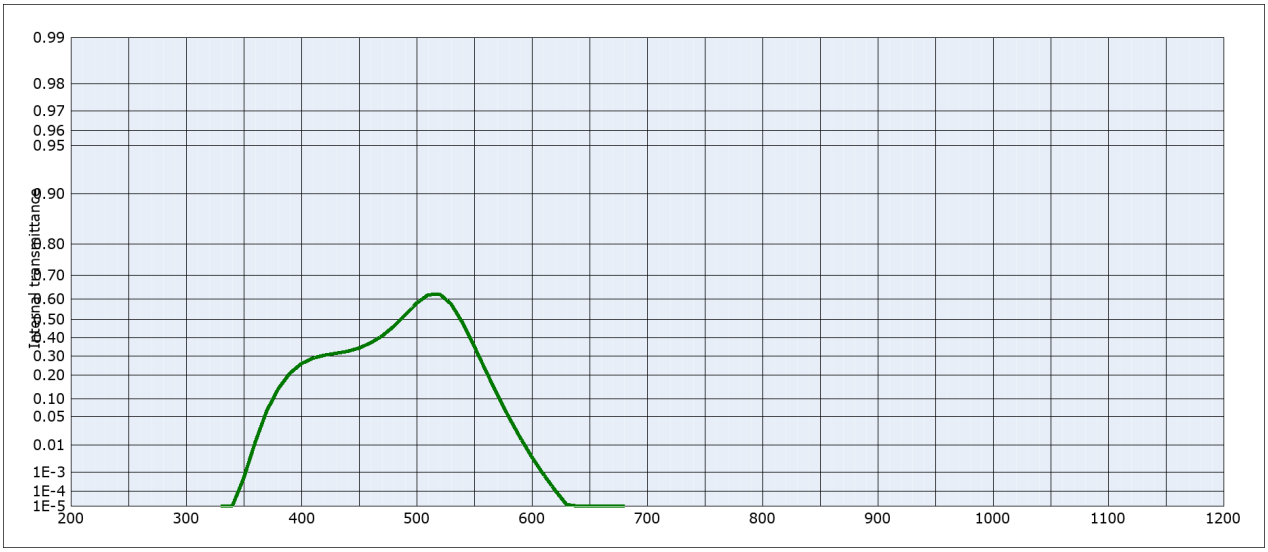
Notes
Ionically colored glass
Bandpass filter
NVIS-Green A - 3 mm bandpass Filter
according to MIL-STD-3009
Long-term changes of the polished
surface are possible.
passed thermal shock test as per
MIL-STD-202F method 107F, Condition A
All data wihout tolerances are to be
understood to be reference values.
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	0.277	0.218	0.189
y	0.459	0.474	0.486
Y	41	27	19
λ_d [nm]	500	500	500
P_e	0.39	0.52	0.59

Illuminant	Planck T = 3200 K		
d [mm]	1	2	3
x	0.262	0.209	0.182
y	0.437	0.449	0.460
Y	43	28	21
λ_d [nm]	498	498	499
P_e	0.39	0.52	0.59

Illuminant	D65 (T_C = 6504 K)		
d [mm]	1	2	3
x	0.206	0.176	0.160
y	0.328	0.334	0.346
Y	51	35	26
λ_d [nm]	491	492	493
P_e	0.39	0.50	0.54



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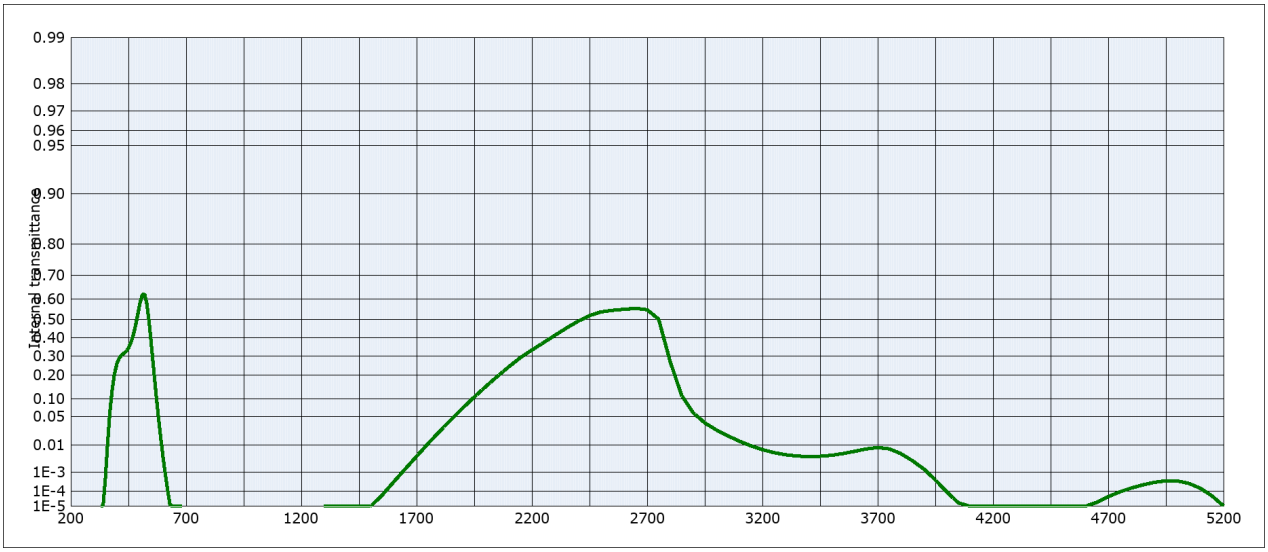

Internal transmittance τ_i at reference thickness d = 3 mm
The internal transmittance values, tabulated and graphically represented, are reference values only

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	$< 10^{-5}$	500	0.580	800	$< 10^{-5}$	1100	$< 10^{-5}$	2200	0.332	3700	$8.5 \cdot 10^{-3}$
210	$< 10^{-5}$	510	0.619	810	$< 10^{-5}$	1110	$< 10^{-5}$	2250	0.373	3750	$7.8 \cdot 10^{-3}$
220	$< 10^{-5}$	520	0.622	820	$< 10^{-5}$	1120	$< 10^{-5}$	2300	0.414	3800	$5.4 \cdot 10^{-3}$
230	$< 10^{-5}$	530	0.575	830	$< 10^{-5}$	1130	$< 10^{-5}$	2350	0.453	3850	$3.0 \cdot 10^{-3}$
240	$< 10^{-5}$	540	0.480	840	$< 10^{-5}$	1140	$< 10^{-5}$	2400	0.489	3900	$1.4 \cdot 10^{-3}$
250	$< 10^{-5}$	550	0.353	850	$< 10^{-5}$	1150	$< 10^{-5}$	2450	0.519	3950	$4.3 \cdot 10^{-4}$
260	$< 10^{-5}$	560	0.222	860	$< 10^{-5}$	1160	$< 10^{-5}$	2500	0.537	4000	$9.2 \cdot 10^{-5}$
270	$< 10^{-5}$	570	0.116	870	$< 10^{-5}$	1170	$< 10^{-5}$	2550	0.545	4050	$1.8 \cdot 10^{-5}$
280	$< 10^{-5}$	580	$4.9 \cdot 10^{-2}$	880	$< 10^{-5}$	1180	$< 10^{-5}$	2600	0.550	4100	$< 10^{-5}$
290	$< 10^{-5}$	590	$1.6 \cdot 10^{-2}$	890	$< 10^{-5}$	1190	$< 10^{-5}$	2650	0.555	4150	$< 10^{-5}$
300	$< 10^{-5}$	600	$4.1 \cdot 10^{-3}$	900	$< 10^{-5}$	1200	$< 10^{-5}$	2700	0.548	4200	$< 10^{-5}$
310	$< 10^{-5}$	610	$8.1 \cdot 10^{-4}$	910	$< 10^{-5}$	1250	$< 10^{-5}$	2750	0.499	4250	$< 10^{-5}$
320	$< 10^{-5}$	620	$1.2 \cdot 10^{-4}$	920	$< 10^{-5}$	1300	$< 10^{-5}$	2800	0.269	4300	$< 10^{-5}$
330	$< 10^{-5}$	630	$1.4 \cdot 10^{-5}$	930	$< 10^{-5}$	1350	$< 10^{-5}$	2850	0.112	4350	$< 10^{-5}$
340	$< 10^{-5}$	640	$< 10^{-5}$	940	$< 10^{-5}$	1400	$< 10^{-5}$	2900	$5.9 \cdot 10^{-2}$	4400	$< 10^{-5}$
350	$5.3 \cdot 10^{-4}$	650	$< 10^{-5}$	950	$< 10^{-5}$	1450	$< 10^{-5}$	2950	$3.7 \cdot 10^{-2}$	4450	$< 10^{-5}$
360	$1.2 \cdot 10^{-2}$	660	$< 10^{-5}$	960	$< 10^{-5}$	1500	$< 10^{-5}$	3000	$2.6 \cdot 10^{-2}$	4500	$< 10^{-5}$
370	$6.4 \cdot 10^{-2}$	670	$< 10^{-5}$	970	$< 10^{-5}$	1550	$5.8 \cdot 10^{-5}$	3050	$1.8 \cdot 10^{-2}$	4550	$< 10^{-5}$
380	0.140	680	$< 10^{-5}$	980	$< 10^{-5}$	1600	$3.3 \cdot 10^{-4}$	3100	$1.3 \cdot 10^{-2}$	4600	$< 10^{-5}$
390	0.210	690	$< 10^{-5}$	990	$< 10^{-5}$	1650	$1.4 \cdot 10^{-3}$	3150	$9.6 \cdot 10^{-3}$	4650	$1.9 \cdot 10^{-5}$
400	0.259	700	$< 10^{-5}$	1000	$< 10^{-5}$	1700	$4.4 \cdot 10^{-3}$	3200	$7.3 \cdot 10^{-3}$	4700	$4.7 \cdot 10^{-5}$
410	0.288	710	$< 10^{-5}$	1010	$< 10^{-5}$	1750	$1.1 \cdot 10^{-2}$	3250	$5.8 \cdot 10^{-3}$	4750	$9.5 \cdot 10^{-5}$
420	0.304	720	$< 10^{-5}$	1020	$< 10^{-5}$	1800	$2.4 \cdot 10^{-2}$	3300	$4.9 \cdot 10^{-3}$	4800	$1.6 \cdot 10^{-4}$
430	0.314	730	$< 10^{-5}$	1030	$< 10^{-5}$	1850	$4.4 \cdot 10^{-2}$	3350	$4.5 \cdot 10^{-3}$	4850	$2.4 \cdot 10^{-4}$
440	0.325	740	$< 10^{-5}$	1040	$< 10^{-5}$	1900	$7.2 \cdot 10^{-2}$	3400	$4.3 \cdot 10^{-3}$	4900	$3.3 \cdot 10^{-4}$
450	0.343	750	$< 10^{-5}$	1050	$< 10^{-5}$	1950	0.107	3450	$4.4 \cdot 10^{-3}$	4950	$3.9 \cdot 10^{-4}$
460	0.372	760	$< 10^{-5}$	1060	$< 10^{-5}$	2000	0.149	3500	$4.7 \cdot 10^{-3}$	5000	$3.8 \cdot 10^{-4}$
470	0.410	770	$< 10^{-5}$	1070	$< 10^{-5}$	2050	0.195	3550	$5.4 \cdot 10^{-3}$	5050	$2.8 \cdot 10^{-4}$
480	0.461	780	$< 10^{-5}$	1080	$< 10^{-5}$	2100	0.243	3600	$6.4 \cdot 10^{-3}$	5100	$1.5 \cdot 10^{-4}$
490	0.521	790	$< 10^{-5}$	1090	$< 10^{-5}$	2150	0.291	3650	$7.7 \cdot 10^{-3}$	5150	$5.3 \cdot 10^{-5}$

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