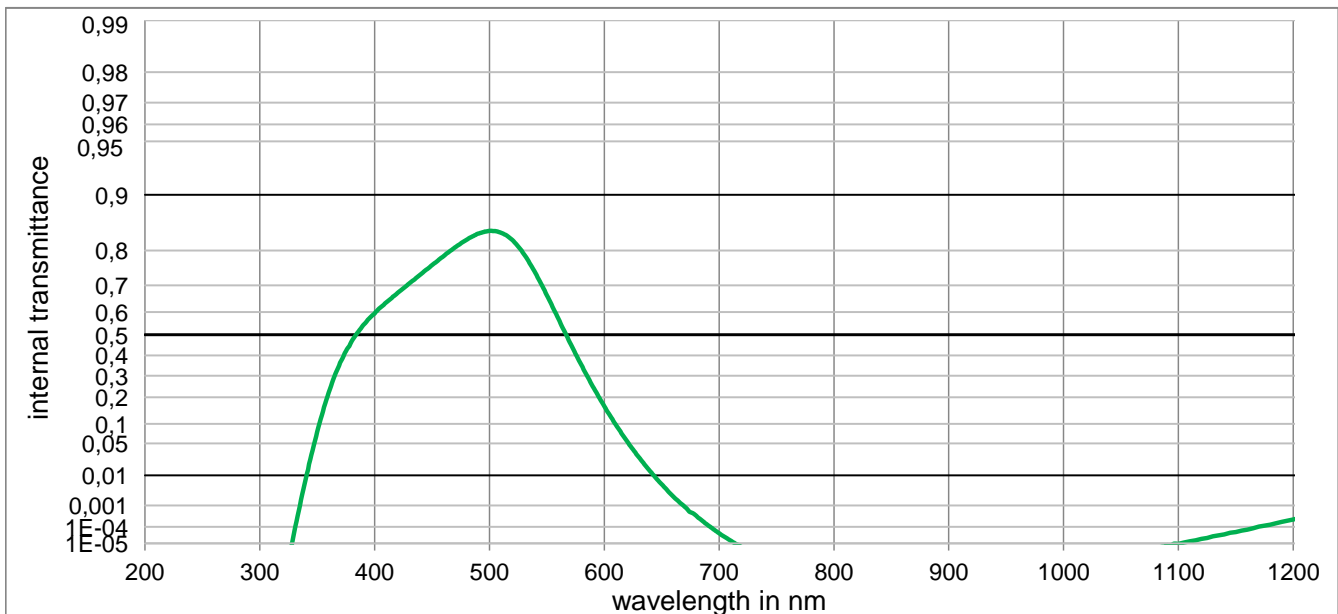
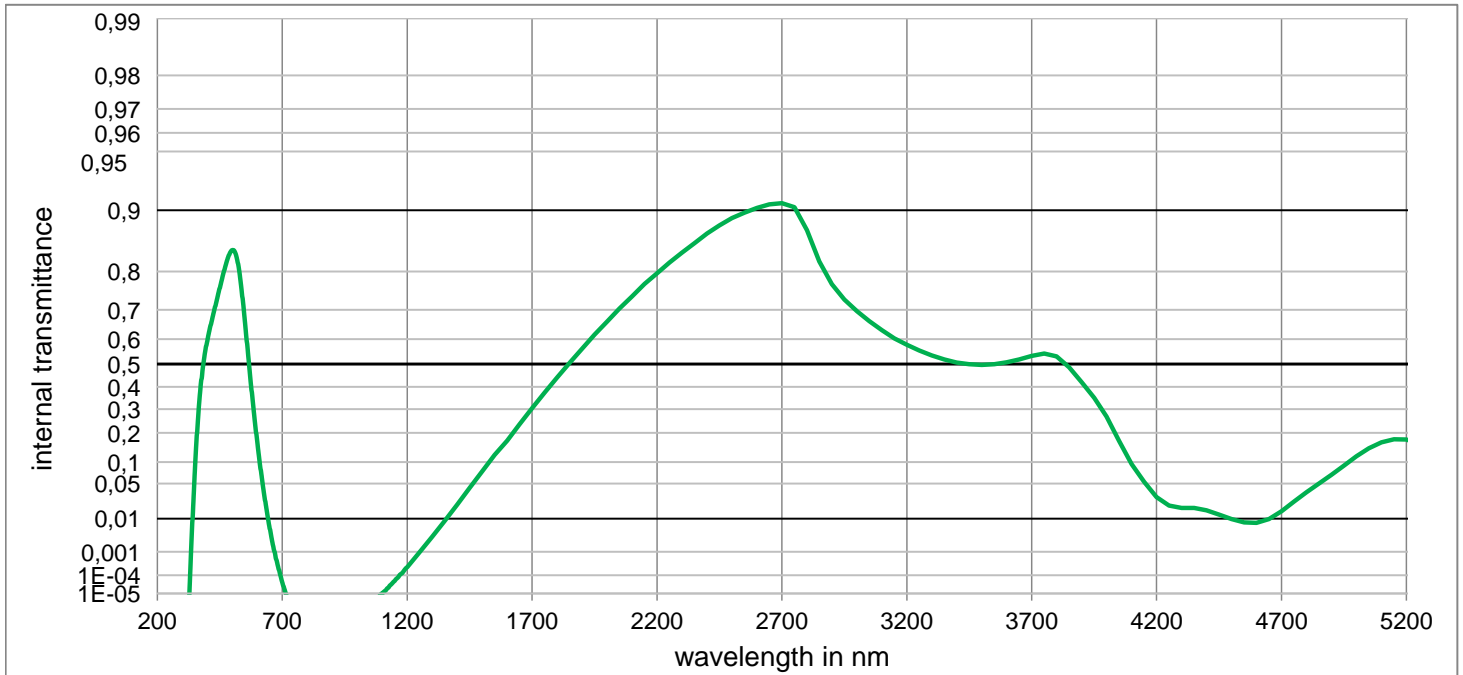


## VG20

Optical properties	Mechanical properties	Colormetric properties	
<b>Reflection factor</b>	<b>Reference thickness</b>		
$P_d = 0,913$	$d = 1,00 \text{ mm}$	1 mm      2 mm      3 mm	
<b>Spectral values guaranteed</b>	<b>Density</b>	Illuminant D65	
$\tau_i (450 \text{ nm}) \geq 0,75$	$\rho = 2,85 \text{ g/cm}^3$		x    0,203    0,170    0,154
$\tau_i (500 \text{ nm}) \geq 0,83$	<b>Knoop hardness</b>		y    0,312    0,300    0,294
$\tau_i (550 \text{ nm}) \geq 0,65$	HK[0.1/20] = 364		Y    49,0     33,2     24,1
$\tau_i (600 \text{ nm}) \leq 0,19$			$\lambda_d$ 490 nm    489 nm    489 nm
		$P_e$ 0,413    0,543    0,607	
	<b>Thermal properties</b>	Illuminant A	
	<b>Transformation temperature</b>		x    0,274    0,211    0,179
	$T_g = 390 \text{ }^\circ\text{C}$		y    0,445    0,441    0,434
	<b>Thermal expansion in <math>10^{-6}/\text{K}</math></b>		Y    39,9     24,9     17,2
	$\alpha_{(-30^\circ\text{C}/+70^\circ\text{C})} = 11,8$		$\lambda_d$ 499 nm    497 nm    496 nm
	$\alpha_{(20^\circ\text{C}/300^\circ\text{C})} = 13,7$	$P_e$ 0,398    0,549    0,625	
<b>Refractive indices</b>		<b>Notes</b>	
$n_F (486 \text{ nm}) = 1,55$			
$n_e (546 \text{ nm}) = 1,54$			
$n_d (587,6 \text{ nm}) = 1,54$			
<b>Sellmeier coefficients</b>			
valid from 400 nm to 1550 nm			
$B_1 = 0,7165$	<b>Chemical properties</b>		
$B_2 = 0,6218$	<b>Chemical resistance</b>		
$B_3 = 0,6042$	FR class = 1		
$C_1 = 1,764\text{E-}09 \mu\text{m}^2$	SR class = 52.3		
$C_2 = 1,9422\text{E-}02 \mu\text{m}^2$	AR class = 3.3		
$C_3 = 100,000 \mu\text{m}^2$	<b>Resistance against humidity</b>		
<b>Internal quality</b>	Robust glass		
Bubble class 2	see pocket catalogue "Optical Filter Glass 2020", chapter 5.5		
		<b>Disclaimer</b>	
		All data without tolerances are to be understood to be reference values.	



## VG20



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

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