

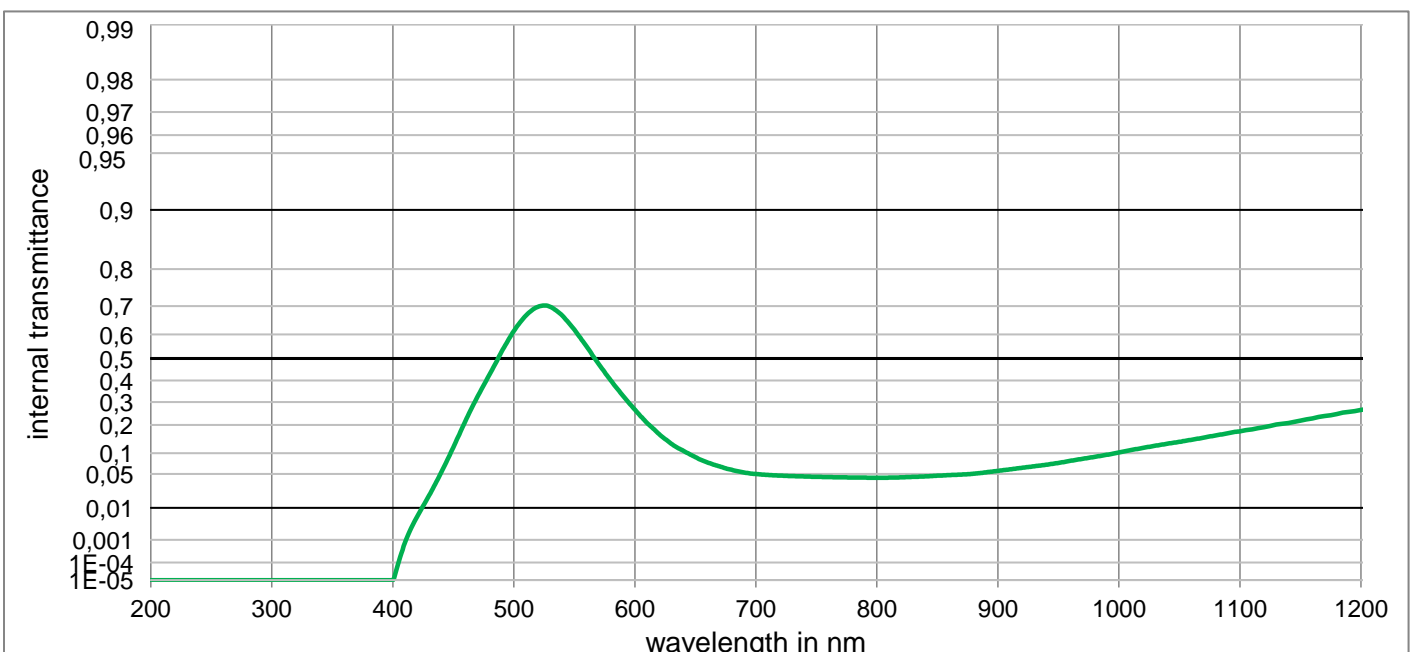
## VG9

Optical properties	
<b>Reflection factor</b>	
$P_d = 0,911$	
<b>Spectral values guaranteed</b>	
$\tau_i$ (450 nm)	$\leq 0,21$
$\tau_i$ (514 nm)	$\geq 0,67$
$\tau_i$ (633 nm)	$\leq 0,15$
$\tau_i$ (725 nm)	$\leq 0,07$
$\tau_i$ (1060 nm)	$\leq 0,18$
<b>Refractive indices</b>	
$n_F$ (486 nm)	$= 1,558$
$n_e$ (546 nm)	$= 1,552$
$n_d$ (587,6 nm)	$= 1,549$
<b>Sellmeier coefficients</b>	
valid from 440 nm to 1550 nm	
$B_1$	0,3483
$B_2$	1,0034
$B_3$	34,8247
$C_1$	1,326E-02 $\mu\text{m}^2$
$C_2$	1,2265E-02 $\mu\text{m}^2$
$C_3$	5797,735 $\mu\text{m}^2$
<b>Internal quality</b>	
Bubble class	1

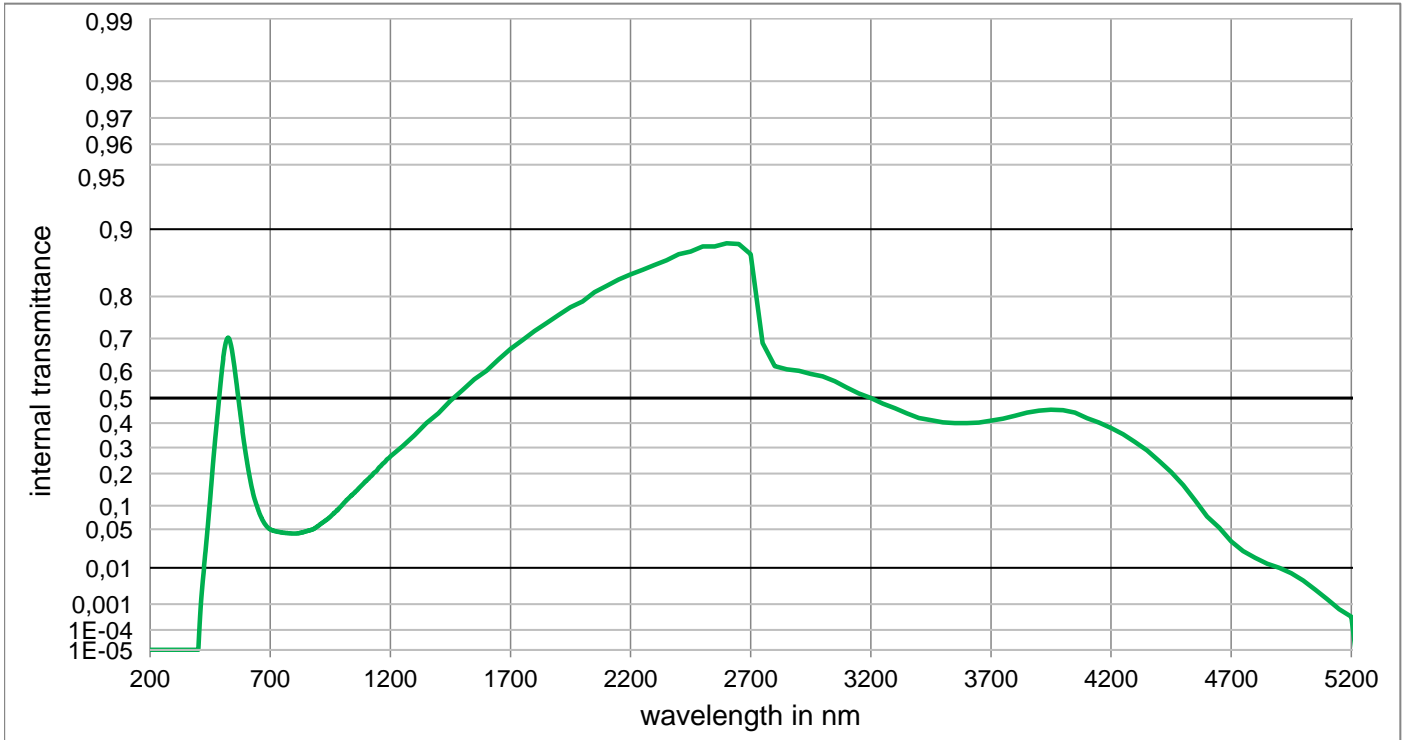
Mechanical properties	
<b>Reference thickness</b>	
$d = 1,00 \text{ mm}$	
<b>Density</b>	
$\rho = 2,87 \text{ g/cm}^3$	
<b>Knoop hardness</b>	
HK[0.1/20] = 449	
<b>Thermal properties</b>	
<b>Transformation temperature</b>	
$T_g = 451 \text{ }^\circ\text{C}$	
<b>Thermal expansion in <math>10^{-6}/\text{K}</math></b>	
$\alpha$ (-30 $^\circ\text{C}/+70^\circ\text{C}$ )	= 9,2
$\alpha$ (20 $^\circ\text{C}/300^\circ\text{C}$ )	= 10,6
<b>Chemical properties</b>	
<b>Chemical resistance</b>	
FR class	= 0
SR class	= 1
AR class	= 1
<b>Resistance against humidity</b>	
Robust glass	
see pocket catalogue "Optical Filter Glass 2024", chapter 5.5	

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

Notes	
Ionically colored glass	
Bandpass filter	
ISO 23364:2021	
<b>Disclaimer</b>	
All data without tolerances are to be understood to be reference values.	



## VG9



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